# CITY OF KIRKLAND
# CITY COUNCIL

**Penny Sweet, Mayor • Jay Arnold, Deputy Mayor • Dave Asher • Kelli Curtis**
**Tom Neir •Toby Nixon • Jon Pascal • Kurt Triplett, City Manager**

*Vision Statement*
*Kirkland is one of the most livable cities in America. We are a vibrant, attractive, green and welcoming place to live, work and play. Civic engagement, innovation and diversity are highly valued. We are respectful, fair and inclusive. We honor our rich heritage while embracing the future. Kirkland strives to be a model, sustainable city that values preserving and enhancing our natural environment for our enjoyment and future generations.*

123 Fifth Avenue • Kirkland, Washington 98033-6189 • 425.587.3000 • TTY Relay Service 711 • www.kirklandwa.gov

## AGENDA
## KIRKLAND CITY COUNCIL MEETING
## City Council Chamber
## Tuesday, July 16, 2019
## 6:00 p.m. – Study Session
## 7:30 p.m. – Regular Meeting

COUNCIL AGENDA materials are available on the City of Kirkland website www.kirklandwa.gov. Information regarding specific agenda topics may also be obtained from the City Clerk's Office on the Friday preceding the Council meeting. You are encouraged to call the City Clerk's Office (425-587-3190) or the City Manager's Office (425-587-3001) if you have any questions concerning City Council meetings, City services, or other municipal matters. The City of Kirkland strives to accommodate people with disabilities. Please contact the City Clerk's Office at 425-587-3190. If you should experience difficulty hearing the proceedings, please bring this to the attention of the Council by raising your hand.

**PLEASE CALL 48 HOURS IN ADVANCE** (425-587-3190) if you require this content in an alternate format or if you need a sign language interpreter in attendance at this meeting.

**EXECUTIVE SESSIONS** may be held by the City Council only for the purposes specified in RCW 42.30.110. These include buying and selling real property, certain personnel issues, and litigation. The Council is permitted by law to have a closed meeting to discuss labor negotiations, including strategy discussions.

**ITEMS FROM THE AUDIENCE** provides an opportunity for members of the public to address the Council on any subject which is not of a quasi-judicial nature or scheduled for a public hearing. (Items which may not be addressed under Items from the Audience are indicated by an asterisk*.) The Council will receive comments on other issues, whether the matter is otherwise on the agenda for the same meeting or not. Speaker's remarks will be limited to three minutes apiece. No more than three speakers may address the Council on any one subject. However, if both proponents and opponents wish to speak, then up to three proponents and up to three opponents of the matter may address the Council.

**PUBLIC HEARINGS** are held to receive public comment on important matters before the Council. You are welcome to offer your comments after being recognized by the Mayor. After all persons have spoken, the hearing is closed to public comment and the Council proceeds with its deliberation and decision making.

1. *CALL TO ORDER*
2. *ROLL CALL*
3. *STUDY SESSION*
   a. I-405/NE 85th Street Inline Station and Interchange Update
4. *EXECUTIVE SESSION*
5. *HONORS AND PROCLAMATIONS*
6. *COMMUNICATIONS*
   a. *Announcements*
   b. *Items from the Audience*
   c. *Petitions*
7. *PUBLIC HEARINGS*
8. *SPECIAL PRESENTATIONS*

*9. CONSENT CALENDAR*

a. *Approval of Minutes*

(1) July 2, 2019

(2) July 10, 2019

b. *Audit of Accounts and Payment of Bills and Payroll*

c. *General Correspondence*

d. *Claims*

e. *Award of Bids*

(1) 6th Street South Rehabilitation Project

f. *Acceptance of Public Improvements and Establishing Lien Period*

g. *Approval of Agreements*

h. *Other Items of Business*

(1) Public Disclosure Semi-Annual Report

(a) Ordinance O-4692, Relating to the Public Records Performance Report

(2) Ordinance O-4693, Amending Kirkland Municipal Code Section 21.06.255 Relating to Land Surface Modification Permit Expiration

(3) Procurement Report

*10. BUSINESS*

a. Cross Kirkland Corridor Historic Depot Site Project

b. Ordinance O-4694, Amending the Biennial Budget for 2019-2020

c. 2019 Comprehensive Solid Waste Management Plan

(1) Resolution R-5379, Approving the 2019 Comprehensive Solid Waste Management Plan for the King County Solid Waste System

(2) Ordinance O-4695 and its Summary, Relating to Refuse and Garbage and Amending Chapter 16 of the Kirkland Municipal Code

***QUASI-JUDICIAL MATTERS** Public comments are not taken on quasi-judicial matters, where the Council acts in the role of judges. The Council is legally required to decide the issue based solely upon information contained in the public record and obtained at special public hearings before the Council. The public record for quasi-judicial matters is developed from testimony at earlier public hearings held before a Hearing Examiner, the Houghton Community Council, or a city board or commission, as well as from written correspondence submitted within certain legal time frames. There are special guidelines for these public hearings and written submittals.

**ORDINANCES** are legislative acts or local laws. They are the most permanent and binding form of Council action, and may be changed or repealed only by a subsequent ordinance. Ordinances normally become effective five days after the ordinance is published in the City's official newspaper.

**RESOLUTIONS** are adopted to express the policy of the Council, or to direct certain types of administrative action. A resolution may be changed by adoption of a subsequent resolution.

d. Ordinance O-4696, Adopting the Kirkland General Sewer Plan

**CITY COUNCIL COMMITTEE** agendas and minutes are posted on the City of Kirkland website, www.kirklandwa.gov.

**ITEMS FROM THE AUDIENCE** Unless it is 10:00 p.m. or later, speakers may continue to address the Council during an additional Items from the Audience period; provided, that the total amount of time allotted for the additional Items from the Audience period shall not exceed 15 minutes. A speaker who addressed the Council during the earlier Items from the Audience period may speak again, and on the same subject, however, speakers who have not yet addressed the Council will be given priority. All other limitations as to time, number of speakers, quasi-judicial matters, and public hearings discussed above shall apply.

*11. REPORTS*

a. *City Council Regional and Committee Reports*

b. *City Manager Reports*

(1) Calendar Update

*12. ITEMS FROM THE AUDIENCE*

*13. ADJOURNMENT*

**CITY OF KIRKLAND**
**Department of Public Works**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3800**
**www.kirklandwa.gov**

**MEMORANDUM**

**To:** Kurt Triplett, City Manager

**From:** June Carlson, Transportation Strategic Advisor
Joel Pfundt, Transportation Division Manager
Kathy Brown, Public Works Director

**Date:** July 3, 2019

**Subject:** I-405/NE 85th STREET INLINE STATION AND INTERCHANGE

**RECOMMENDATION:**

City Council receives a summary and update regarding the I-405/85th Street Inline Station and Interchange.

**BACKGROUND AND DISCUSSION:**

The I-405/NE 85th Street Inline Bus Rapid Transit (BRT) Station and Interchange plans are advancing to preliminary engineering and environmental review. The project team has nearly completed a series of outreach meetings that will culminate in this presentation, summarizing comments received to date and inviting questions and feedback from the City Council.

Through a partnership between the Washington State Department of Transportation and Sound Transit, and in collaboration with the City, a three-level preliminary concept for the interchange was identified. The base level will be a lowered NE 85th Street for vehicles traveling east/west; the middle level will be dedicated to transit, pedestrians, bicyclists, and vehicle access to the express toll lanes; and the top level will be I-405 general purpose and express toll lanes. Construction is to be complete in 2024.

In March 2019, the Sound Transit Board approved advancing the refined BRT project into the conceptual engineering and environmental review phase. A technical review of the engineering plans at 5% recently has been completed. The project team has presented the project in multiple forums: 1) the Kirkland Alliance of Neighborhoods (KAN), 2) the Transportation Commission, 3) the general community at a public open house, and 4) the Regional Transportation Ad Hoc Council Work Group.

Throughout the series of meetings, numerous recurring comments were received:

1. Importance of a connection to downtown Kirkland similar to the dedicated bus lanes included in the ST3 ballot measure
2. Questions on pedestrian safety at roundabouts and through the interchange
3. Request to include additional intersection in traffic study, such as NE 87th Street and 114th Avenue NE

4. Need for park-and-ride space and/or drop-off/pick-up areas
5. Questions about queueing on I-405 off ramps due to smaller footprint
6. Pedestrian disruption of traffic without signalized intersection
7. Importance of bike infrastructure
8. Need for more information on roundabout operations and examples
9. Need for transit priority elements for local bus service on NE 85th Street
10. Questions about an additional eastbound lane analyzed as part of the project between 120th Avenue NE and 122nd Avenue NE
11. Request to fund additional nonmotorized access opportunities to surrounding neighborhoods

Comments received at the June 10 Open House included:

1. General support for the project
2. Importance of connections to downtown Kirkland
3. A preference for roundabouts over signals
4. Support for nonmotorized access elements
5. Need to fund additional nonmotorized access opportunities
6. Concern about construction impacts
7. Need for BRT station amenities
8. Support for new connection to Express Toll Lanes

Discussions at the second Transportation Commission meeting centered on:

1. Pedestrian/bicycle safety. Research regarding roundabout safety indicates increased safety of roundabouts over signalized intersections. There are fewer lanes to be negotiated at once, vehicles are moving slower in the roundabout, gaps in traffic occur and pedestrian-activated rectangular rapid flashing beacons (RRFB) will be installed.

   The project team showed examples of roundabouts with similar motorized and nonmotorized traffic volumes.

2. Pedestrian/bicycle connection. There was strong support expressed for including the nonmotorized connections from each corner of the interchange to the surrounding neighborhoods in the base project.

3. Traffic analysis. During the upcoming environmental review, more detailed traffic analysis will be conducted.

The Transportation Commission thanked the project team for addressing the concerns expressed in their earlier meeting and praised their responsiveness and work. The Transportation Commission agreed to move to more detailed engineering and environmental review.

*NE 85th Street Transitway and Unresolved Issues*
The City has proposed to Sound Transit the "NE 85th Street Transitway" as a cost effective and efficient alternative to the representative project included in the ST3 ballot measure to connect the BRT station with 6th Street South (see Attachment A). Agreement on the connection between downtown Kirkland and the BRT Station has not yet been reached, but staff from both the City and Sound Transit continue to collaborate to resolve details of the connections project.

Also yet to be resolved are the pedestrian/bicycle connections in each quadrant of the interchange, the drop off and pick up area in the NW quadrant, and transit/pedestrian/bicycle connections to downtown, and how the additional eastbound lane analyzed as part of the project between 120th Avenue NE and 122nd Avenue NE would be funded as the traffic analysis demonstrates the interchange works best when the lane is implemented.

The Council's Regional Transportation Ad Hoc Work Group, consisting of Deputy Mayor Jay Arnold, Councilmember Dave Asher and Councilmember Jon Pascal have been strongly engaged in the discussions related to the Inline Station, Interchange and the NE 85th Street Transitway. The Ad Hoc Work Group has had multiple meetings with the Sound Transit and WSDOT teams on these and related issues, as well as discussions with the three Eastside Sound Transit Board members. The Ad Hoc Work Group has emphasized several of the key themes that have come from the public outreach, including the need for a transitway connection from the BRT station to downtown, the need for pedestrian and bicycle access to and from downtown to the station, and the importance of including pedestrian/bicycle access at each of the quadrants of the station.

Additionally, Sound Transit recently conducted a value engineering (VE) exercise that also will be summarized at this study session. The VE Team brainstormed potential ways to save costs and make the project more effective.

A summary of the process and findings will be presented to the Council by the following Sound Transit and WSDOT staff:

- Paul Cornish, Sound Transit BRT Program, Project Director
- Diana Giraldo, WSDOT I-405/NE 85th Street Interchange Project Design Manager
- Barrett Hanson, WSDOT Design Engineering Manager
- Karl Westby, WSDOT Traffic Engineering Manager

**NEXT STEPS:**

At the August 7, 2019 City Council meeting, staff will present a letter to Sound Transit reflecting the Council comments from the July 16 study session and expressing support for moving the project components into the environmental assessment phase and advancing engineering plans in preparation for the design/build contractor procurement.

Attachment A: NE 85th Street Transit Way Concept and Feasibility Study Tech Memo

January 31, 2019

# NE 85th Street Transit Way

## Concept and Feasibility Study TECH MEMO

Prepared for:

**City of Kirkland**

Contact: June Carlson
Kirkland Public Works
425.587.3923

**V+M Structural Design**

Contact: Schaun Valdovinos
2212 Queen Anne Ave N #530
Seattle, WA 98109
206.880.1533

STRUCTURAL DESIGN

**Contract #31800098**
V+M Project #1105
MEM-003

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

## Table of Contents

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# 1 Executive Summary

The City of Kirkland has undertaken a Concept and Feasibility Study of pedestrian and bicycle connections between the future Bus Rapid Transit (BRT) Station at NE 85th Street / I-405 and NE 85th Street / 6th Street in Kirkland, which follows along NE 85th Street.

The purpose of this study is to develop concepts on how to create a useful connection between the future I-405 BRT Station at NE 85th St and downtown Kirkland. Sound Transit is collaborating with the City of Kirkland to construct an improved connection and/or an enhanced transit connection along this corridor. Today there is not a safe, convenient and comfortable way to travel between these two locations; nor locations in between these two nodes, such as the Cross Kirkland Corridor (CKC) and other potential development parcels.

The study evaluates alignment and profile options of an ADA compliant transit way that could accommodate small shuttle vehicles, pedestrians, and cyclists routed along the south slope of NE 85th Street with a connection to the CKC. The pathway then gains elevation utilizing a spiral tower to cross over the CKC and make the connection with Kirkland Way.  Improvements from this point (at Kirkland Way) to the future BRT Station will be carried out by Sound Transit as part of the station project extents.

The study analyzes the feasibility of these concepts and proposes high level structural solutions. A cost estimate is provided in an appendix.


***Figure*** *– Aerial photo of Study Area (north is right)*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

## 2 Project Description

The City of Kirkland desires a pedestrian and bicycle connections between the future Bus Rapid Transit (BRT) Station at NE 85th Street / I-405 and NE 85th Street / 6th Street in Kirkland, which follows along the southern wooded slope of NE 85th Street. This pathway and bridge structure is given the nickname "NE 85th Street Transit Way" and is envisioned as an ADA compliant transit way with consideration to minimize pedestrian travel time.

The BRT location is approximately one mile from downtown Kirkland, with the study area comprising 2200-ft of distance between Kirkland Way and 6th Street. Currently, there is no safe, direct connection from downtown Kirkland to the future I-405 BRT Station at NE 85th Street.


***Figure*** *– Study Area (north is up)*

The pathway continuing to the future BRT Station east of Kirkland Way is expected to remain within ADA grades as it is currently being contemplated as part of the Sound Transit design. A visualization of the BRT Station at I-405 is pictured below.

***Figure*** *– Future I-405 BRT Concept*

## 3 Purpose, Needs and Benefits

### 3.1 Purpose

The purpose of the feasibility study is to understand the constraints of the site and evaluate options to provide direct connections between 6th Street, the CKC and Kirkland Way. Conceptual design explores

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

opportunities to enhance the user experience of the trail and seeks to minimize disturbance to the existing trees where possible.

The NE 85th Street Transit Way will increase access and ridership to the future BRT by providing a direct, convenient, gradual, and safe connection for users, bicyclists and pedestrians to travel to/from the new BRT Station. This will increase access to places of employment and community assets while providing a key connection with the CKC to extend the regional trail and future transportation corridor into downtown Kirkland via an off-street facility.

By designing the NE 85th Street Transit Way as a creative, inspiring and fun pathway and structural solution, it is hoped it will encourage tourism and economic development.

### 3.2 Needs

There is currently no direct pedestrian/cycling connection from downtown Kirkland to the future BRT Station. Current trails are narrow, uneven and steep. Creation of a new major pathway to connect the three vital points of 6th Street, the CKC and Kirkland Way meeting ADA grades and requirements will greatly enhance the livability of the community and access to the Interchange. It will encourage walking and bicycling to promote a healthy lifestyle and can be used for recreational activities such as dog walking, jogging, and family activities.

The seamless integration of the proposed pathway with the CKC will provide residents, students and employees direct access to sites of interest throughout the former rail corridor, which includes the Totem Lake neighborhood, the Google Campus, and the South Kirkland Transit Center. The optimization of pedestrian and bicycle connections to businesses and educational institutions along Cross Kirkland Corridor is consistent with the CKC Master Plan.

The CKC will eventually form part of an impressive regional trail system reaching from Woodinville to Renton, with east-west routes connecting to Redmond, Issaquah, and across the floating bridges to Seattle. This is poised to become a green bicycle highway with a direct route into downtown Kirkland.

### 3.3 Benefits

The proposed NE 85th Street Transit Way will provide the following benefits to the City of Kirkland by creating:

1. New connectivity from downtown Kirkland to the future BRT Station and beyond that will enhance user access to rapid transit, residences and businesses.
2. A new connection to the CKC from downtown Kirkland.
3. Ability for the new transit way to carry small driver/driverless shuttles at slow speeds to provide convenient, unimpeded transport to/from the BRT Station.
4. An enhancement to the regional trail network.
5. A pleasant, enjoyable off-street pathway with a gradual grade below 5% for recreational users, including walkers, joggers, dog walkers, and all-age cyclists.
6. A bridge structure that is designed as a type of observation tower to become an attraction along the CKC that is a place unto itself.

V+M STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# 4 Background and History

Sound Transit has been working with the City of Kirkland to provide enhanced connectivity between downtown Kirkland and the future BRT Station at I-405.

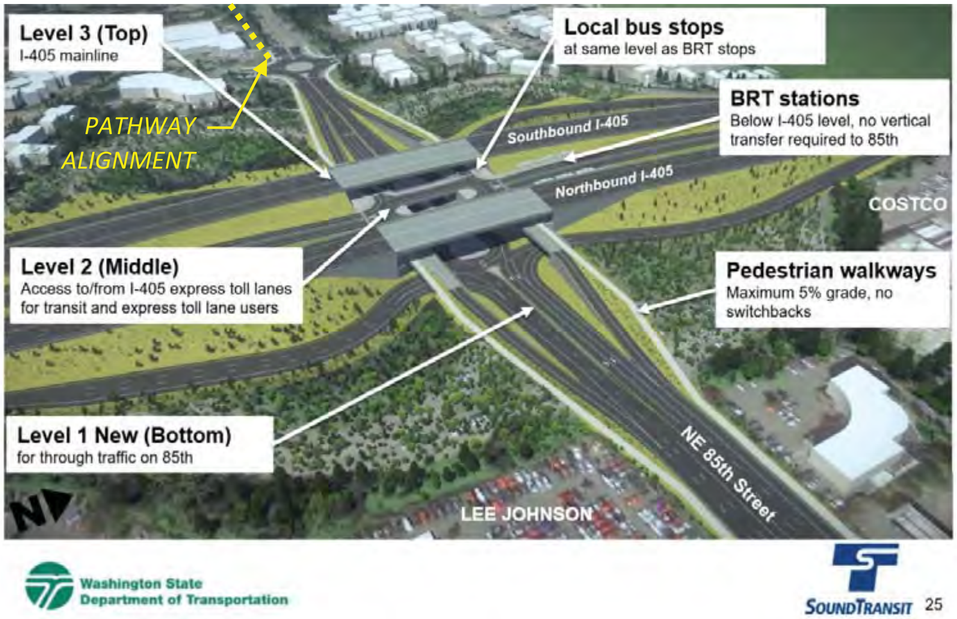



***Figure*** *– Future I-405 BRT Concept looking west towards the study site in yellow*

## 4.1 Related Plans, Studies and Information

The NE 85th Street Transit Way study dovetails with the objectives and outcomes set out in the following documents:

- City of Kirkland Comprehensive Plan, Chapter XV.D. Moss Bay Neighborhood Chapter,
- City of Kirkland Downtown Plan
- City of Kirkland Transportation Master Plan
- City of Kirkland Urban Site Plan
- City of Kirkland Transit Implementation Plan
- City of Kirkland GIS data
- Cross Kirkland Corridor Master Plan, June 2014
- Cross Kirkland Corridor Bus Rapid Transit Report, October 2016
- Sound Transit 3 (ST3) System Plan
- WSDOT I-405 Master Plan
- WSDOT NE 85th St BRT Station and Interchange conceptual design information

## 4.2 Site Photos

Photos of the various existing features along the study area are presented below.

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure*** *– Looking east along existing pathway standing at 6th Street (L) and moving to the east (R)*

***Figure*** *– Looking east along 5th Ave (L) and looking west from corner in road (R)*

***Figure*** *– Looking east at existing staircase (L and R)*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com


***Figure*** *– Looking east at top of staircase (L) and looking north into woods (R)*


***Figure*** *– Looking west back down existing path (L) and looking west from CKC (R)*


***Figure*** *– Looking west from CKC with gas line visible (L) and looking northwest at existing bridge pier (R)*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure*** *– Looking north along the CKC (L) and looking east up existing gravel path (R)*

***Figure*** *– Looking east along existing path (L) and looking east along upper section of path (R)*

***Figure*** *– Looking west along NE 85th St (L) and looking east toward I-405 (R)*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

Drone footage of the project site is presented below.

***Figure*** *– Looking west*

***Figure*** *– Looking west with CKC visible*

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure** – Looking north along CKC*

***Figure** – Looking south along CKC*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

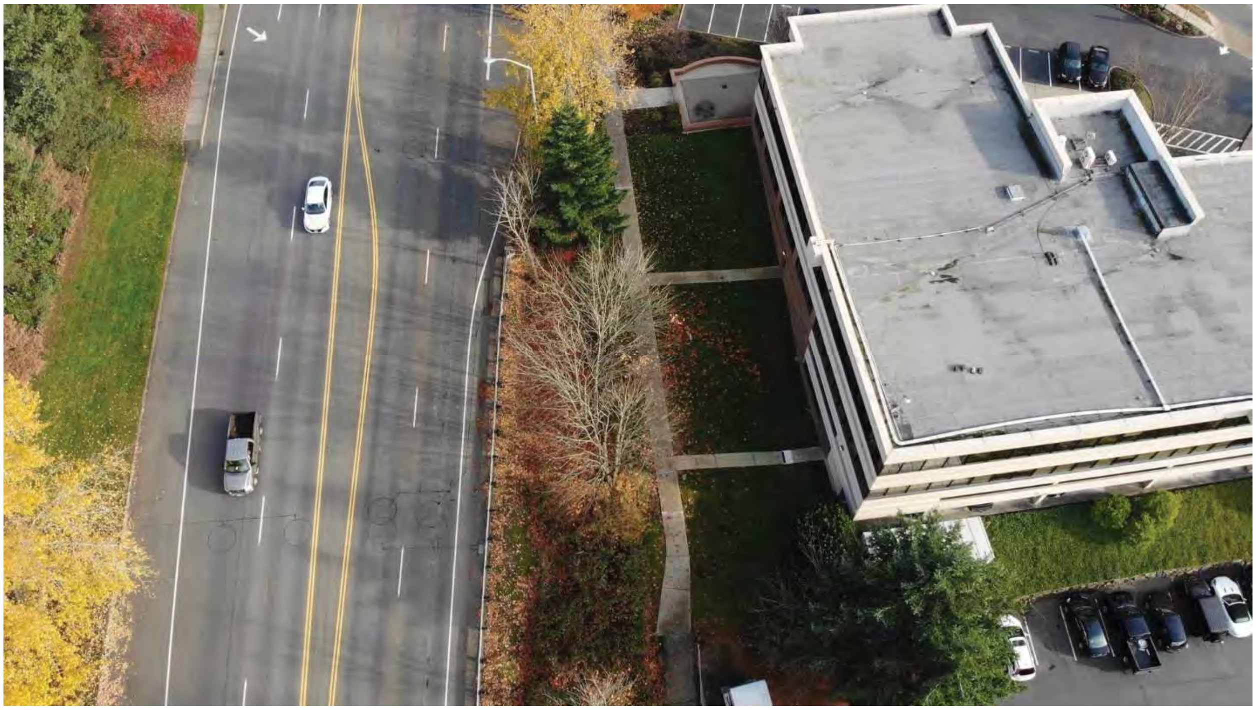


***Figure*** *– Looking east at existing trail near Kirkland way*

***Figure*** *– Looking east toward I-405*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# 5 Design Assumptions

Relevant design assumptions and information used in the development of the concepts for the pathway and bridge structure is provided below.

## 5.1 Transit Way Users

The new pathway and bridge structure will be designed for three user types as follows:

1. Pedestrians
2. Cyclists
3. Small Shuttle Vehicles

## 5.2 Reference Shuttle Vehicle

The City envisions the potential of eventually running small Autonomous Vehicles (AV) similar in size to a golf cart along the pathway and bridge. The AV could either operate in separate designated space or intermingle with ped/bike users. These small vehicles would utilize a slow travel speed to minimize the hazard to other users. The City might also permit them to travel along the CKC in the future.

The goal of the AV shuttles is to provide passengers an option to get from downtown Kirkland and the CKC to the NE 85th BRT Station in a dry, comfortable environment with the goal of increasing ridership of the BRT.

Vehicle types studied to determine the most appropriate reference vehicle include:

1. Concept Covered Bike: One concept for keeping users "dry" is to create an *Enclosed Bicycle-type Vehicle* that could have an power-assist feature. This would allow the bridge to operate as a multiuse path with "luxury" bikes.

   Taking this concept one step further could allow for a bike-share rental system akin to LimeBikes and scooters, but with a more comfortable enclosure. In fact, there are current examples of this type of *vehicle* as nearby as Vancouver, BC with fleets available for rental at UBC.

   With a smooth connection to the CKC from the NE 85th Street Transit Way, an enclosed e-bike-share system could provide a large network for travel throughout Kirkland without needing separate infrastructure for powered vehicles or pods.

   The options presented below feature cargo space for up to a second passenger.


***Figure*** *– Velomobility in Vancouver, BC (L) and Elf (R)*

2. Shuttle Vehicle: Emerging technology is targeted to move groups of people using small shuttle vehicles. These could use drivers in the near-term or could be a fully autonomous fleet. City's are

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

testing autonomous vehicles around the world, with some of the more popular options shown below.


*Figure – AURO (L), Olli (C) and Navya(R)*

The City used the **Olli** as the Reference Vehicle for use in the Feasibility Study. The Olli Shuttle has the potential to be an autonomous vehicle with the following Specs Information (3.6 tons) follow:

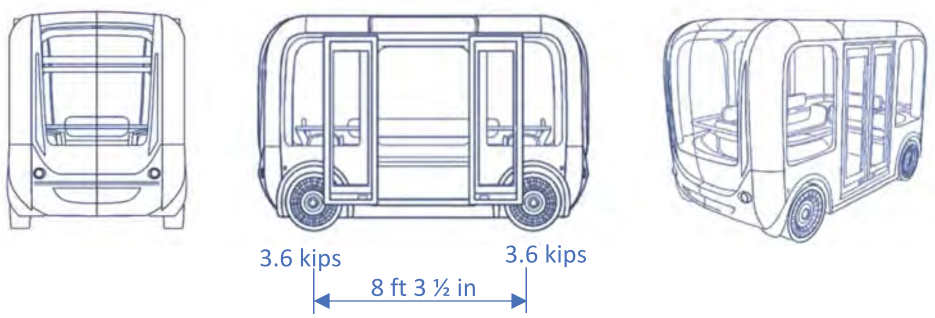



*Figure – Olli vehicle drawings and wheelbase*

- Capacity: 8 passengers
- Range: 40 mi/60 km (nominal), 25 mi/40 km (max load, max A/C)
- Max Speed: 40 km/h (25 mph)
- Average Grade: < 5%
    - Max grade is 16% for brief periods
- Charge Time (230 V): 3 hours
- Curb Weight: 2654 kg (5850 lbs)
- Capacity: 612 kg (1350 lbs)
- Loaded Weight: 3266 kg (7200 lbs) 3.6 tons
- Length: 3920mm (12.86 ft)
- Width: 2050mm (6.73 ft)
- Height: 2500mm (8.20 ft)
- Wheelbase: 2526mm (8.29 ft)

The proposed loading condition is for the bridge to simultaneously support peds/bikes + the Olli vehicle. This loading pattern will be project specific since the only vehicle loading prescribed in *AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridge 2009* is the applicable maintenance vehicle loading as follows:

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

**Table 3.2-1—Design Vehicle**

| Clear Deck Width | Design Vehicle |
|---|---|
| 7 to 10 ft | H5 |
| Over 10 ft | H10 |

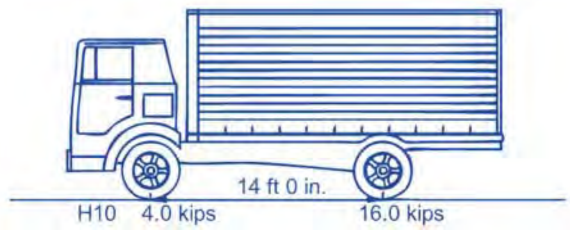



***Figure** – AASHTO maintenance vehicle design requirements*

The H10 (10 tons) Maintenance Vehicle is applied to the bridge deck without the presence of pedestrian/bike loading. Therefore, the Olli loading would need to be added to the preliminary engineering analysis to ensure it does not govern global behavior. The local design of components will still be governed by the H10, since it is 10 tons vs 3.6 tons.

## 5.3 Width

Bridge widths were reviewed as part of the study to develop an appropriate economical solution that provides users with a comfortable experience while sharing the transit way with the shuttles.

- Pedestrians + Bicycles + Shuttles: 18 to 20-ft clear width

SketchUp models were used to evaluate various widths of the bridge deck ranging in 2-ft increments from 14-ft up to 22-ft. Here are the sections to illustrate the available widths and user comfort.

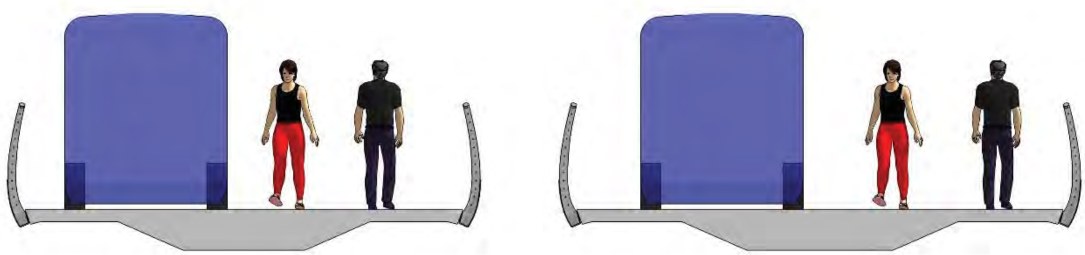


***Figure** – Evaluation of Olli vehicle with presence of pedestrians for 18-ft clear width (L) and 20-ft clear width (R)*

***Figure** – 20-ft clear width with only pedestrians (L) and two (2) Olli vehicles (R)*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

From the model, it is clear that attempting to accommodate two (2) Olli vehicles becomes impractical. It adversely drives up the bridge width to where the cost is significant. It was therefore determined that it is best to design for one (1) Olli on any section of the bridge. Olli vehicles can communicate so can ping one another to determine when it should proceed along the pathway and when it should wait at a designating holding area.

The CKC becomes an ideal holding point for an Olli traveling in the opposite direction. At this holding location, it costs very little to build out a plaza for the vehicles to wait. This also happens to be essentially the halfway point along the transit way.

### 5.4 Grades

There is a significant change in elevation between 6th Street and Kirkland Way that the existing NE 8th Street roadway overcomes with an average grade of approximately 6.5%, which exceeds the ADA limit of 5%. Therefore, the pathway grades must:

- Stay below max grades of 5%
- Satisfy ADA

The connection with the CKC creates an integrated landing that could include plaza space for seating or resting before users ascend the structure to cross over the CKC.

### 5.5 Vertical Clearance

The Sound Transit Vertical Clearance requirement is assumed to be 16'-6" above top of rail, based on the criteria established for a similar situation of Overlake Village Pedestrian Overpass, which crosses over SR-520 and the Link trackway. As can be seen below, the absolute minimum is 14'-7" with 15'-0" desired. Using 16'-6" therefore seems reasonable for this study to accommodate final track elevation and construction tolerances.

8. Vertical Clearances to Overhead Structures

   a. Since the Link system will draw electric traction power from an overhead contact wire system, the following vertical clearances from the top of the high rail along any given section of track to the soffit of any overhead structure, within the horizontal limits of the Clearance Envelope shall be provided as a minimum:

| **Location** | **Minimum Vertical Clearance** |
|---|---|
| At Overhead Bridges | 21 feet 6 inches, preferred minimum<br>15 feet 0 inches, desired minimum<br>14 feet 7 inches, absolute minimum |
| Link Structures over roadways | 16 feet 6 inches, desired minimum |

***Figure*** *– Sound Transit Vertical Clearance Criteria*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# 6 Right-of-Way

Right-of-Way across the project site is all owned by the City of Kirkland. One ROW issue that is identified as an apparent encroachment into public ROW by the public storage property immediately east of the CKC.

# 7 Utilities

The NE 85th Street Transit Way has little impacts on utilities.

## 7.1 Gas Line

The gas line runs along the southern edge of the project site in an east-west orientation. It should be possible to design the bridge foundations and pathway to avoid impacts to this utility.

## 7.2 Sanitary Sewer

A trunk line runs along the eastern edge of the CKC and should be avoided.

There is also a sewer line running connecting to the CKC from the east, running south of the existing pathway. It should be possible to avoid impacting this sewer line.

## 7.3 Storm Sewer

There is storm sewer infrastructure at the west end of the site that may be impacted and require relocation or protection.

# 8 Alignment and Profile

Alignments were considered on the north and south sides of NE 85th Street, with the south slope being preferred. This is due to the higher level of visibility, more developed road system, better sunlight, and existing trails that offer supplemental connections.

To maintain an ADA compliant trail grade of <5% requires significantly more length than is available between 6th Street and Kirkland Way. The west portion of the alignment can ascend at 5% and connect directly to the CKC, which is quite ideal. To achieve a low longitudinal grade and creating visual interest for users, the west alignment:

- Incorporates some curvature in the horizontal alignment.

The east portion of the alignment must cross over the CKC and requires a significant length of switchback at 5% grade to connect into the CKC. The bridge height above ground becomes significant as it continues west to then switchback towards the embankment of NE 85th. This poses challenges from the perspectives of engineering (seismic and bridge dynamics), construction, and cost.

Therefore, concepts were studied to condense the structure into a smaller footprint, which led to the idea of creating a spiraling ramp tower at the west edge of the CKC. The concept evolved from a purely functional solution into a potential attraction for both users of the new NE 85th St Connector and CKC. It becomes a lookout tower that would offer stunning views across Kirkland downtown, Lake Washington and to the mountains beyond.

This becomes an opportunity to capitalize on this perched vista with an elegant, expressive structural solution to match.

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

*Figure – Switzerland Baumwipfelpfad Canopy Walk vista*

## 8.1 Option A

The first concept is to follow parallel to NE 85th Street and have the main span across the CKC connect tangent to the spiral tower. The lower trail would then be benched into the embankment supporting the roadway.

## 8.2 Option B

The second concept introduces a curve into the eastern segment to frame into the south side of the spiral tower.

The spiral tower is rotated to further create an item of interest along the CKC. The increased separation from NE 85th Street could make the pathway more pleasant.

The profile of pathway is shown below where it interfaces with the CKC and crosses over using the spiral tower.

V+M STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

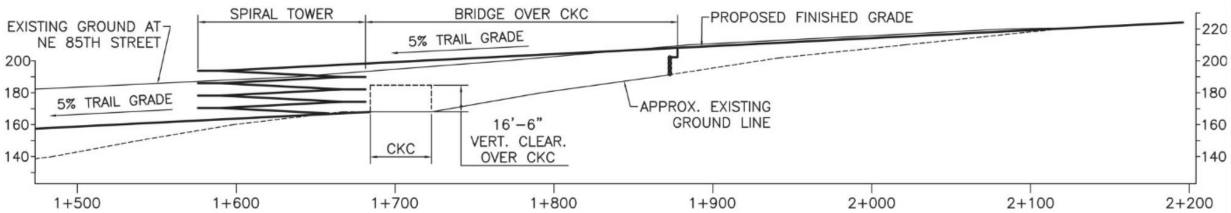



***Figure*** *– Profile of Spiral Ramp*

The full alignments of the two alternatives are shown below.

***Figure*** *– Alignment option with bridge over CKC near NE 85th St*

***Figure*** *– Alignment option with bridge over CKC angled away from NE 85th St*

Retained fill is used to support the trail for the maximum extent possible to minimize costs. It was determined that the west portion of the pathway could be entirely on retained fill while following a grade just below 5% and achieve the needed elevation to provide a direct connection from 6th Street to the CKC. This serendipitous geometry allows the new pathway to be benched into the existing fill slope with a lower retaining wall founded on the slope.

Wire-faced Gabion walls are considered as the conceptual MSE wall facing material, providing a natural looking, robust system that is also less sensitive to the expected differential settlement that will occur from adding weight to the slope.

***Figure*** *– Wire-faced MSE walls artistically used on Montornes Pedestrian Bridge, Spain*

The alignment could be optimized to provide only a wall on the downslope side of the trail while the upslope side matches grade. However, to give the users a more interesting experience, the feasibility

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

concept uses a combination of some cut on the upslope side for portions with a shorter associated downslope wall at these sections. In general, the cost is approximately the same in either case. A railing will be attached to the top of the walls greater than 30" to provide fall protection. The west trail alignment was fit to follow the existing contours as presented below. The variation of cross sections follow after.

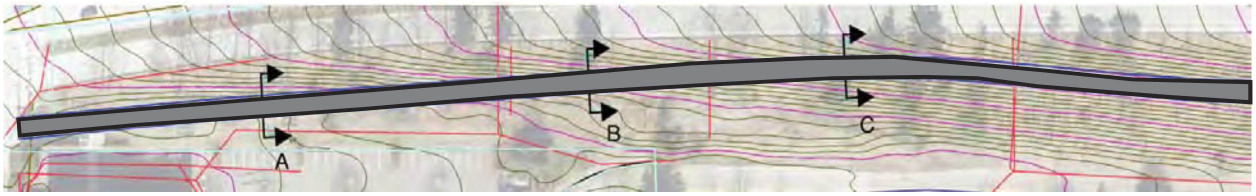



***Figure*** *– Wall sections along the west alignment*

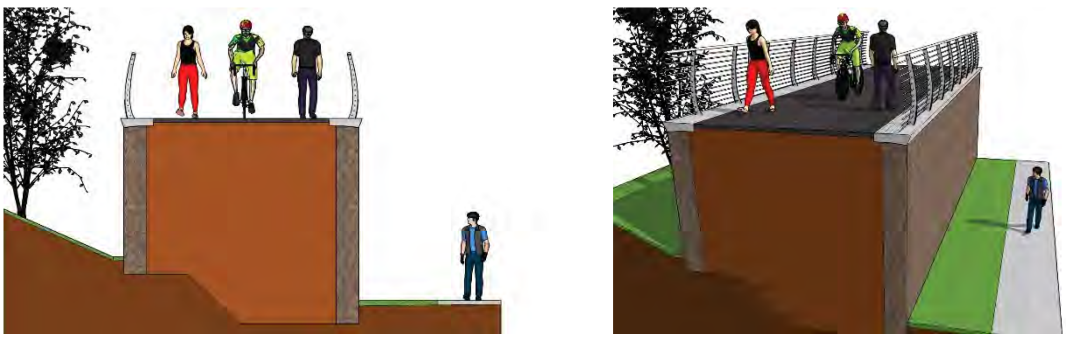


***Figure*** *– Section A with walls on both sides (stretch near west end at 6th Street)*

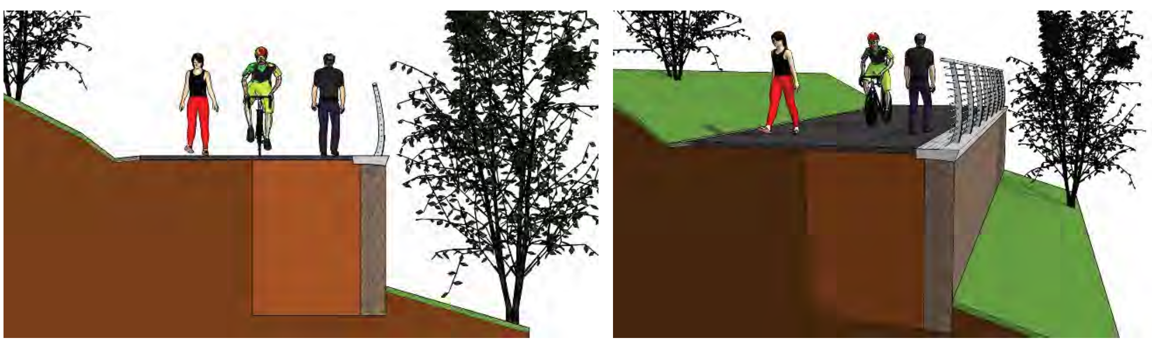


***Figure*** *– Section B with downslope MSE Wall*

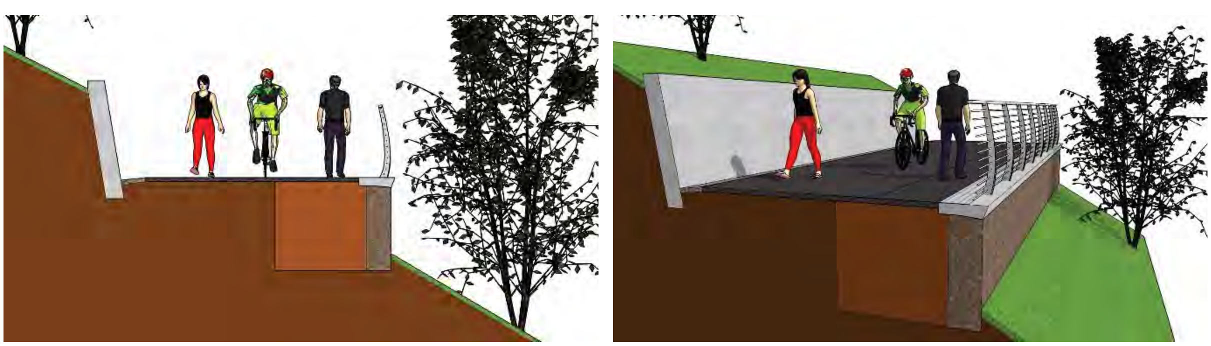


***Figure*** *–Section C with upslope cut and downslope wall*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# 9 Bridge Structural Concepts

Create a signature structure on a reasonable budget.

## 9.1 Spiral Ramp Precedents

The concept is inspired by the Guggenheim Museum in NYC, where the interior gallery space spirals upward around the perimeter of the atrium space:

***Figure*** *– Spiraling form of the Guggenheim NYC*

The concept of a spiraling roadway was utilized for a highway project in Japan (lower left) and also for the pedestrian/bicycle ramp on the Golden Ears Bridge in British Columbia.

***Figure*** *– Spiral ramp examples for a roadway in Japan (L) and pedestrian ramp in British Columbia (R)*

With these precedents in mind, the NE 85$^{th}$ Connector spiral tower concept is developed.

## 9.2 Elevation Requirements

The east segment of path is positioned within a narrow right of way, which necessitates the alignment be more or less straight from Kirkland Way to the CKC.

Elevation drop required to meet the CKC:

- EL @ Kirkland Way sidewalk = 224-ft
- EL @ CKC ~= 167-ft
- ΔEL = 57-ft

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

- @5% grade, $L_{required}$ = 57-ft ÷ 5% = 1140-ft

The length of pathway for the segment from the intersection of Kirkland Way/NE 85th to the west edge of the CKC is roughly:

- East path length = 520-ft.

This gives an elevation drop of 26-ft. Therefore, the trail surface will be 31-ft above the CKC at this point.

This becomes an opportunity to capitalize on this perched vista with a structural solution to match. There is an opportunity to create a lookout "tower" that serves to support a spiraling bridge ramp.

Completing the calculations to determine what the tower might look like, the available width of ROW between NE 85th and the parcel to the south was studied. The available width is just under 100-ft. To leave some buffer between the NE 85th roadway and the parcel, the usable width is set to approximately 75-ft for the out-to-out dimension of a spiral ramp.

With the assumption of 1-ft curbs and a 14-ft clear deck width, the inner diameter of a circular ramp would be:

- $D_{inner}$ = 75' – 2*(15') = 45'
- Length of each revolution of spiral = π·D = 141'
- EL drop per revolution = 141' * 5% = 7' ← *Not sufficient*

This is too small of a circle to achieve a sufficient elevation drop along each revolution. The min vertical clearance above the pathway is 8-ft per AASHTO. Assuming a structure depth of 2-ft, it would therefore be necessary to provide enough length per revolution to achieve a 10-ft elevation drop from top of deck to top of deck.

It is observed that a larger circular ramp is not possible within the available width. Therefore, an oval shaped ramp is contemplated, with two semicircular ends connected with tangent segments as follows:

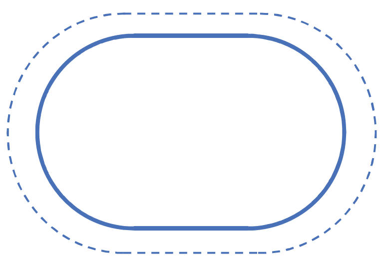


***Figure** – Oval inner edge in bold to illustrate the controlling length*

The inner curb face radius is set to 20-ft. To achieve the 10-ft drop per revolution, the tangent length would need to be:

- $L_{req}$ = 10' ÷ 5% = 200'
- Curved length = π·(2*20') = 125.6'
- Tangent length required = (200' – 125.6') ÷ 2 = 37.2'

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

It is noted that the grade along the inner edge of the curves is 5%, but is just 3.7% at centerline of deck and only 2.95% along the outer curb face. Therefore, if ascending traffic is assigned to the outer edge, it becomes a very reasonable grade through the curves. The tangent sections are 5% grade across the width.

Next, a calculation is made of the number of revolutions to achieve the necessary elevation change.

- Recalling that ΔEL = 31' from the top of deck to CKC elevation at west edge corridor
- ΔEL = 10' per revolution
- Required revolutions = 31'/(10' per rev) = 3.1 revolutions

This allows for smaller "oval" at the base of the tower and gradually increasing the tangent length as it rises into the air.

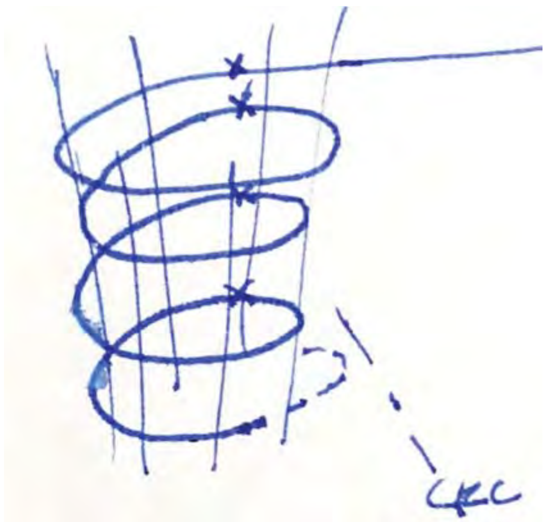



***Figure*** *– Hand sketch of the Spiral Tower concept*

The large bridge span across the CKC could potentially frame into the tower.

## 9.3 Lookout Tower Precedents

Following the feasibility studies of this concept, a collection of alpine lookout towers was assembled as presented on the following pages.

The timber construction of the treetop lookout in Krkonoše National Park, CZ provides a nice visual example of how the spiral tower might look (https://www.stezkakrkonose.cz/en/).

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure*** *– Example Spiral Lookout Tower in the Czech Republic*

A new concept for a spiraling lookout in Denmark is shown below, which is larger in scale than the required concept for NE 85th St Connector.

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure*** *– Spiral lookout planned in Denmark*

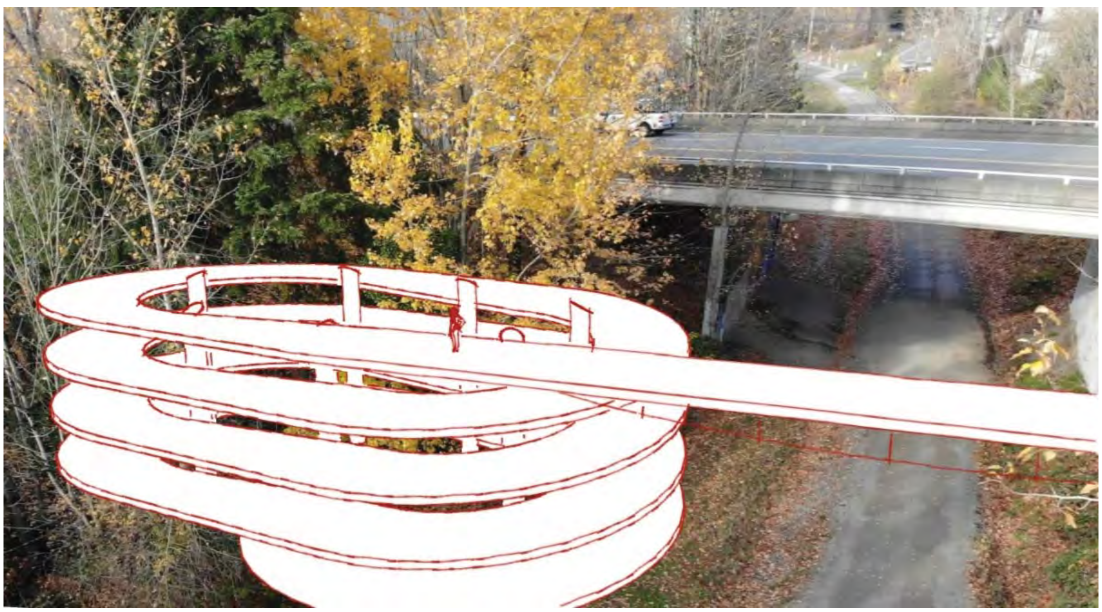


***Figure*** *– Simple illustration of Spiral Tower massing*

## 9.4 Bridge Span Precedents

The bridge structure could be comprised of glulam beams across the CKC and east towards Kirkland Way. There were reference concepts for a snaking alignment that would add interest and could be coordinated with new planted evergreen trees as seen in the following reference examples.

STRUCTURAL
DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure** – Switzerland Baumwipfelpfad Canopy Wal*

***Figure** – Switzerland Baumwipfelpfad Canopy Wal*

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

The structural system could also use steel as seen in the following reference example.

***Figure*** *– Atlanta Botanical Gardens Canopy Walk with 12-ft wide deck*

***Figure*** *– Atlanta Botanical Gardens Canopy Walk*

## 9.5 Railing System Precedents

Some railing examples are presented below.

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

*Figure – Bachledka Canopy Walk*

*Figure – Cape Town Canopy Walk*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

***Figure*** *– Cape Town Canopy Walk*

***Figure*** *– Cape Town Canopy Walk*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# 10 Constructability

## 10.1 Wall Construction

For the NE 85th Street Transit Way, the lower west trail could be benched into the hillside by first staking the alignment in the field followed by felling and clearing trees. A bulldozer could then grade a bench along the existing slope following the dripline of the downslope wall. To prevent excessive settlement, the ground will need to be cleared and grubbed to reach competent material prior to constructing the MSE walls and backfilling.

Wire facing materials can be stockpiles in the CKC. Rock fill can be delivered via the CKC. Railroad Ave provides a direct at-grade access point. Flaggers may be required if the City desires to avoid a full closure of the trail. In general, this type of construction progresses quickly, as long as the slope is found to be stable to allow unshored temporary excavation.

## 10.2 Bridge Construction

For the bridge span across the CKC and associated spiral tower, the CKC could be used to stage assembly of elements on the ground and lifted into position using a high payload crane. During certain periods of construction activity, it may be necessary to have temporary trail closures or establish a temporary detour.

The following provides an example of a new observation tower in Shönbuch Park in Herrenberg, Germany. The tower was assembled of glulam columns with a spiral staircase and lifted onto a base with a large crane.

***Figure*** *– Pre-assembly of tower on the ground and then lifting complete piece into position*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

## 11 Issues and Risks

Projects can face issues and risks that are known and unknown. During the feasibility study, a close look at underground utilities, right of way, topography, and a high-level look at ground conditions. In general, the project does not face significant challenges aside from achieving the required elevation gain while remaining below ADA acceptable grades.

- The ROW is all owned by the City along the study area.
- Utility impacts should be able to be avoided with minor exceptions.
- Ground conditions appear reasonable on the surface (no cliffs, immediate evidence of unstable slope conditions).

One issue identified is the encroachment into public ROW by the public storage property immediately east of the CKC.


Unknown risks could include contaminated soils, challenging geotechnical conditions, or unexpected permit requirements (although no streams are identified based on GIS data).

STRUCTURAL DESIGN
Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

## 12 ROM Cost Estimates

Please see Appendix A for the full discussion of the Rough Order of Magnitude (ROM) Cost Estimates developed for the 18-ft deck width using a consistent baseline alignment as shown below.


**Comparitive Cost Summary**

| Option | Deck Clear Width (ft) | Construction Cost (Subtotal 1*) | Soft Costs (Subtotal 2) | Total Cost |
|---|---|---|---|---|
| Ped/Bike/Shuttle | 18 | $ 22,330,000 | $ 9,640,000 | $ 32,000,000 |

** Accuracy of estimate for a 1%-15% feasibility study is -40% and +100% per WSDOT Estimating Guidelines, Table 4-1: Cost Estimating Matrix.*

## 13 Drawings

Plans of the alignment are presented in Appendix B.

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

# Appendix A – Cost Estimate

STRUCTURAL DESIGN

**DATE:** 1/29/2019
**PROJECT:** NE 85th St Transit Way
**TOPIC:** Feasibility Cost Estimate
**BY:** Schaun Valdovinos

**NE 85th St Transit Way Feasibility ROM Cost Estimates - Summary**

**Disclaimer**

This document has been prepared for the titled project. V+M accepts no responsibility or liability for the consequence of this document being used for a purpose other than the purposes for which it was commissioned. Any person using or relying on the document for such other purpose agrees to indemnify V+M for all loss or damage resulting therefrom.

To the extent that this report is based on information supplied by other parties, V+M accepts no liability for any loss or damage suffered by the client, whether through stemming from any conclusions based on data supplied by parties other than V+M and used by V+M in preparing this document.

**Basis of Estimate**

This is a feasibility Rough Order of Magnitude cost estimates to provide a high level cost for the NE 85th St Transit Way concept for the City of Kirkland planning purposes. This cost estimate is developed based on a bridge structure that spans across the CKC and includes a spiral tower to make the required elevation change at ADA grades less than 5%. The estimate includes costs to complete Preliminary Engineering, Outreach & Construction Management, including City staff costs; Construction; allowances; contingency; and taxes. The estimates are calculated in 2019 dollars and do not include any escalation but do include a basic 15% contingency in the estimates.

The cost estimate is for a roughly 2% design, so retains ambiguity on structural details, and precedes survey or geotechnical information. As such, it is an estimate built up using basic unit costs applied to major elements.

Unit prices are based on WSDOT BDM 2018 values and previous experience with costs for similar completed pedestrian bridge structures and retaining walls. The values used reflect an efficient, constructable design with strong aesthetic merit. Wire faced MSE walls are envisioned to support the west trail section while upslope walls would be aesthetic boulder walls or shotcrete walls with a rock-like fascia.

The estimate excludes excessive lighting, extravagent railings, throw barrier, roof structure, extensive street furniture, or solutions that require extensive formwork.

Stairs and/or elevators are excluded from the scope of work. Costs associated with supplemental artwork are also excluded from the scope of work.

The estimates are based on a preliminary linear alignment with a spiral ramp tower located on the west side of the CKC. The west and east approach trails are assumed to be comprised of retained fill, with full height vertical walls. Existing trails west and east of the CKC could be slightly realigned to maintain alternative access routes, albeit at steeper grades.

- The length of west approach is based on an elevation change of 82-ft @ 5%, or 1640-ft.
- The spiral ramp uses a 5% grade at the inner radius to maintain ADA grade < 5%
- The bridge crosses over the CKC with > 18-ft vertical clearance above the ground below.
- Superstructure materials and structural system are not determined at this time.

Foundations are assumed to be conventional construction and no ground improvments are anticipated.

No contaminated material removal and disposal is included.

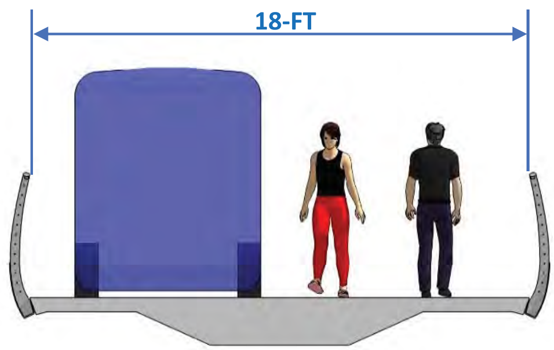
No property acquisition is anticipated and therefore is not included.

No impacts to streams or wetlands is anticipated and basic landscaping costs are included.

No roadway, modification of signals, drainage impacts, or major utility impacts are anticipated as part of this project and therefore are not included.

**Bridge Widths Evaluated**

The City of Kirkland requested a high level estimate of the bridge construction costs for the deck width of 18-ft shown below.




**Comparative Cost Summary**

| Item | Deck Clear Width (ft) | Construction Cost (Subtotal 1*) | Soft Costs (Subtotal 2) | Total Cost |
|---|---|---|---|---|
| Option 14' Total | 14 | $ 18,260,000 | $ 8,730,000 | $ 27,000,000 |
| Option 18' Total | 18 | $ 22,071,619 | $ 10,525,733 | $ 32,600,000 |

** Accuracy of estimate for a 1%-15% feasibility study is -40% and +100% per WSDOT Estimating Guidelines, Table 4-1: Cost Estimating Matrix.*

*** Total includes cost of shuttle fleet*

STRUCTURAL DESIGN

**DATE:** 11/19/2018
**PROJECT:** NE 85th St Transit Way
**TOPIC:** Feasibility Cost Estimate
**BY:** Schaun Valdovinos

**Feasibility Cost Estimate**

Bridge Width | 14 | ft

| Description | Unit | $/Unit | Quantity | Item Cost | |
|---|---|---|---|---|---|
| MSE Walls - Welded Wire | SF | $ 40 | 33086 | $ 1,323,420 | *WSDOT high end value* |
| Asphalt Pathway | SF | $ 2.33 | 28574 | $ 66,673 | *2" asphalt* |
| Bridge | SF | $ 550 | 17900 | $ 9,845,000 | *WSDOT median value* |
| Railing | LF | $ 300 | 4731 | $ 1,419,300 | |
| Pathway Lighting | LS | $ 350,000 | 1 | $ 350,000 | |
| Temporary Erosion Control | Each | $ 125,000 | 1 | $ 125,000 | |
| Restoration/Landscaping | Each | $ 100,000 | 1 | $ 100,000 | |
| Misc Item Allowance | Each | 20.0% | 1 | $ 2,645,879 | *WSDOT allowance* |
| Mobilization (% of above items) | Each | 0.0% | 1 | $ - | *WSDOT unit prices incl. mob.* |
| Contingency | Each | 15.0% | 1 | $ 2,381,291 | |
| | | | **Subtotal 1 =** | **$ 18,256,562** | *-40%/+100%** |

** Per Table 4-1: Cost Estimating Matrix from WSDOT Estimating Guidelines May 2018, the expected variation for a 1-15% design is -40% and +100%*

| Description | Unit | Value | Quantity | Item Cost | |
|---|---|---|---|---|---|
| Tax | Each | 10.1% | 1 | $ 1,843,913 | |
| Preliminary Engineering | Each | 15.0% | 1 | $ 2,738,484 | *T9-1 M3034.03 May 2018* |
| Outreach | Each | 1.0% | 1 | $ 182,566 | |
| Construction Engineering | Each | 12.0% | 1 | $ 2,190,787 | |
| Permits | LS | $ 130,000 | 1 | $ 130,000 | |
| City Staff Cost | Each | 9.0% | 1 | $ 1,643,091 | |
| | | | **Subtotal 2 =** | **$ 8,728,841** | |
| | | | **Total =** | **$ 26,990,000** | |

**Note:**

*For the assumptions associated with this Feasibility Cost Estimate, please refer to the "Summary" worksheet of this workbook.*

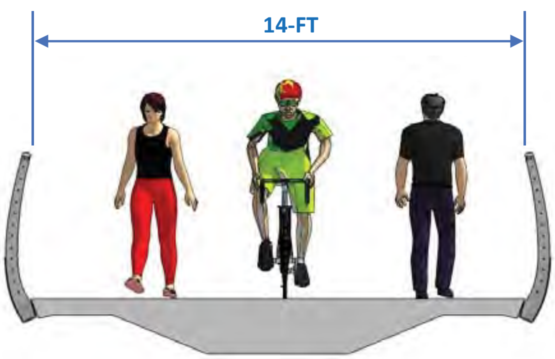



***Figure:*** *14 ft wide deck*

STRUCTURAL DESIGN

**DATE:** 11/19/2018
**PROJECT:** NE 85th St Transit Way
**TOPIC:** Feasibility Cost Estimate
**BY:** Schaun Valdovinos

**Feasibility Cost Estimate - TOTAL**

Bridge Width 18 ft

| Description | Unit | $/Unit | Quantity | Total | |
|---|---|---|---|---|---|
| MSE Walls - Welded Wire | SF | $ 40 | 38048 | $ 1,521,933 | *WSDOT high end value* |
| Asphalt Pathway | SF | $ 4.67 | 36738 | $ 171,444 | *4" asphalt* |
| Bridge | SF | $ 550 | 22375 | $ 12,306,250 | *WSDOT median value* |
| Railing | LF | $ 300 | 4731 | $ 1,419,300 | |
| Pathway Lighting | LS | $ 350,000 | 1.0 | $ 350,000 | |
| Temporary Erosion Control | LS | $ 125,000 | 1.0 | $ 125,000 | |
| Restoration/Landscaping | LS | $ 100,000 | 1.0 | $ 100,000 | |
| Misc Item Allowance | Each | 20.0% | 1.0 | $ 3,198,785 | *WSDOT allowance* |
| Mobilization (% of above items) | Each | 0.0% | 1.0 | $ - | *WSDOT unit prices incl. mob.* |
| Contingency | Each | 15.0% | 1.0 | $ 2,878,907 | |
| | | | **Subtotal 1 =** | **$ 22,071,619** | *-40%/+100%** |

** Per Table 4-1: Cost Estimating Matrix from WSDOT Estimating Guidelines May 2018, the expected variation for a 1-15% design is -40% and +100%*

| Description | Unit | Value | Quantity | Total | |
|---|---|---|---|---|---|
| Tax | Each | 10.1% | 1 | $ 2,229,234 | |
| Preliminary Engineering | Each | 15.0% | 1 | $ 3,310,743 | *T9-1 M3034.03 May 2018* |
| Outreach | Each | 1.0% | 1 | $ 220,716 | |
| Construction Engineering | Each | 12.0% | 1 | $ 2,648,594 | |
| Permits | LS | $ 130,000 | 1 | $ 130,000 | |
| City Staff & Agency Staff Cost | Each | 9.0% | 1 | $ 1,986,446 | |
| | | | **Subtotal 2 =** | **$ 10,525,733** | |
| | | | **Total =** | **$ 32,600,000** | |

**Note:**

*For the assumptions associated with this Feasibility Cost Estimate, please refer to the "Summary" worksheet of this workbook.*

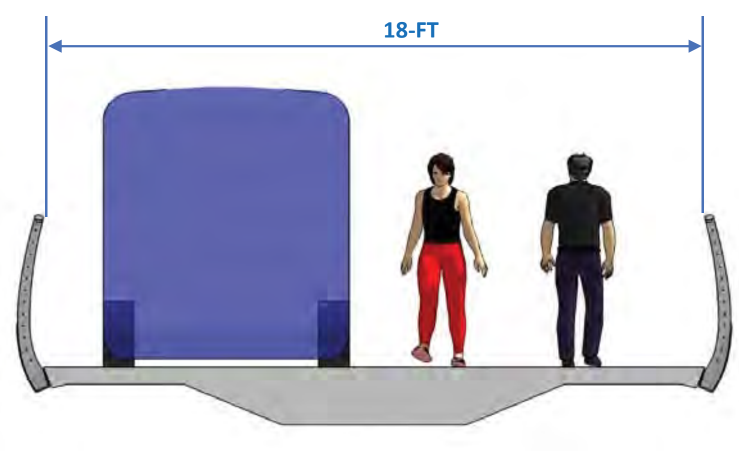



***Figure:*** *18 ft wide deck*

**WSDOT Estimating Guidelines, May 2018**

**Table 4-1 Cost Estimating Matrix**

| Project Development Phase | Percentage of Design Completed | Purpose of Estimate | Methodology | Tools | Estimate Range |
|---|---|---|---|---|---|
| **Planning**<br>Washington Transportation Plan<br>Highway System Plan<br>Design Studies<br>Route Dev. Plans | 0% to 2% | Screening or Feasibility<br>WTP/HSP<br>(20-Year Plan)<br>WTP – Washington Transportation Plan<br>HSP – Highway Systems Plan | Parametric | PLCE and/or MP3 | -50% to +200% |
| | 1% to 15% | Concept Study or Feasibility<br>Implementation Plan (10 Yr. Plan) | Parametric<br>Risk-Based | PLCE and/or MPE<br>Risk assessment models | -40% to 100% |
| **Scoping**<br>Project Summary (PD, DDS) | 10% to 30% | Budget Authorization or Control<br>Capital Improvement & Preservation Plan (CIPP) | Parametric<br>Historical Bid-Based<br>Risk-Based | PLCE and/or MP3<br>UBA, BidTabs Pro<br>Risk assessment models | -30% to +50% |
| **Design**<br>Design Documentation<br>I/S Plans for Approval<br>Design Approval | 30% to 90% | Design Estimates (Project Control of Scope Schedule Budget) | Historical Bid-Based<br>Cost-Based<br>Risk-Based | UBA, BidTabs Pro<br>Risk assessment models | -10% to +25% |
| **PS&E**<br>Plans, Specs, Estimate (R/W Plans approved) | 90% to 100% | Engineer's Estimate (prior to bid) | Historical Bid-Based<br>Cost-Based<br>Risk-Based | EBASE, UBA, BidTabs Pro, Risk assessment models | -5% to +10% |

***Figure -*** *Table 4-1: Cost Estimating Matrix from WSDOT Estimating Guidelines May 2018, the expected variation for a 5-10% design is -30% and +50%*

**WSDOT Estimating Guidelines, May 2018**

## Chapter 7 Cost Estimating Data

The cost of work items is estimated, including the Miscellaneous Items Allowance in design, and then the markups such as mobilization, sales tax, preliminary engineering (PE), and construction engineering (CE) are applied to them.

**Table 7-1 Markups Summary**

| Cost Estimating Elements[1][2] | Planning | Scoping | Design | PS&E |
|---|---|---|---|---|
| **Mobilization** | Per EBASE www.wsdot.wa.gov/design/projectdev/engineeringapplications/adready.htm | | | |
| **Sales Tax** | Site-specific, based on Control Section. Data can be found in TRIPS or EBASE. Specific direction is found in Standard Specification 1-07.2. www.wsdot.wa.gov/mr/rdonlyres/c1b02cbf-ea4c-4a3f-afff-f13cc43cc9de/96366/taxes.pdf | | | |
| **Preliminary Engineering** | See Table 9-1 | | PM's Workplan + Actuals to Date | Actual |
| **Miscellaneous Item Allowance in Design**[3] | 30% to 50% | 20% to 30% | 10% to 20% | 0% (all items should be defined) |
| **Contingency** | Applies to parametric, historical bid-based, and cost-based estimates only. Per EBASE www.wsdot.wa.gov/mr/rdonlyres/c1b02cbf-ea4c-4a3f-afff-f13cc43cc9de/96724/engineeringandcontpercentagetables.pdf | | | |
| **Construction Engineering** | Per EBASE www.wsdot.wa.gov/mr/rdonlyres/c1b02cbf-ea4c-4a3f-afff-f13cc43cc9de/96724/engineeringandcontpercentagetables.pdf | | | |

**Notes:**

[1] Round to appropriate significant digit; for example, $196,526,918.00 is rounded to $197 million.

[2] Report cost estimates in current dollars to program management. The Construction Cost Index (CCI) will be used to inflate the estimate to midpoint of construction by program management. Note: Public declarations of estimated project costs should be presented in the form of a range in Year-Of-Expenditure (YOE) dollars.

[3] Miscellaneous Item Allowance in Design accounts for lack of scope definition and those items too small to be identified at the stage of project design. This allowance is eliminated for final PS&E estimates on design-bid-build projects because the scope and estimate for all items should be identified at that point.

*Figure - Table 7-1: Markups Summary from WSDOT Estimating Guidelines May 2018*

**WSDOT Bridge Design Manual, June 2018**

# Appendix 12.3-A1 Structural Estimating Aids Construction Costs

## UNIT COSTS

***Before using these structure unit costs for any official WSDOT project cost estimate, contact the Bridge and Structures Office at 360-705-7201 to discuss the specific project criteria and constructability related risks, so an appropriate structures construction cost can be provided.***

| | UNIT | LOW | MEDIAN | HIGH ΔΔ |
|---|---|---|---|---|
| Pedestrian Bridge — Reinforced Concrete | SF | $400.00 | $550.00 | $700.00 |
| Reinforced Concrete Rigid Frame (Tunnel) | SF | | * $100.00 | |
| Replace Existing Curbs & Barrier With Safety Shape Traffic Barrier (Including Removal) | LF | $220.00 | $280.00 | $350.00 |
| Reinforced Concrete Retaining Wall (Exposed Area) | SF | $55.00 | $75.00 | $90.00 |
| SE Wall — Welded Wire | SF | $20.00 | $30.00 | $40.00 |
| SE Wall — Precast Conc. Panels or Conc. Block | SF | $30.00 | $40.00 | $50.00 |
| SE Wall — CIP Conc. Fascia Panels (Special Design) | SF | $40.00 | $50.00 | $60.00 |
| Permanent Geosynthic Wall w/ Shotcrete Facing | SF | $20.00 | $35.00 | $50.00 |
| Permanent Geosynthic Wall w/ Concrete Fascia Panel | SF | $30.00 | $45.00 | $60.00 |
| Soil Nail Wall | SF | $80.00 | $100.00 | $130.00 |
| Shotcrete Facing | SF | $20.00 | $30.00 | $40.00 |
| Concrete Fascia Panel | SF | $30.00 | $40.00 | $50.00 |
| Soldier Pile Wall (Exposed Area) | SF | $100.00 | $120.00 | $130.00 |
| Soldier Pile Tieback Wall (Exposed Area) | SF | $140.00 | $160.00 | $200.00 |

*Based on limited cost data. Check with the Bridge Project Support Engineer.

Bridge areas are computed as follows:

Typical Bridges: Width x Length

Width: Total width of Deck, including portion under the barrier.

Length: Distance between back of pavement seats, or for a Bridge having Wingwalls, 3'-0" behind the top of the embankment slope; typically end of Wingwalls to end of Wingwalls, reference Standard Plans H9.

Special Cases:

Widenings - Actual area of new construction.

Tunnel - Outside dimension from top of footing to top of footing over the tunnel roof, i.e., including walls and top width.

ΔΔ For small jobs (less than $100,000), use the high end of the cost range as a starting point.

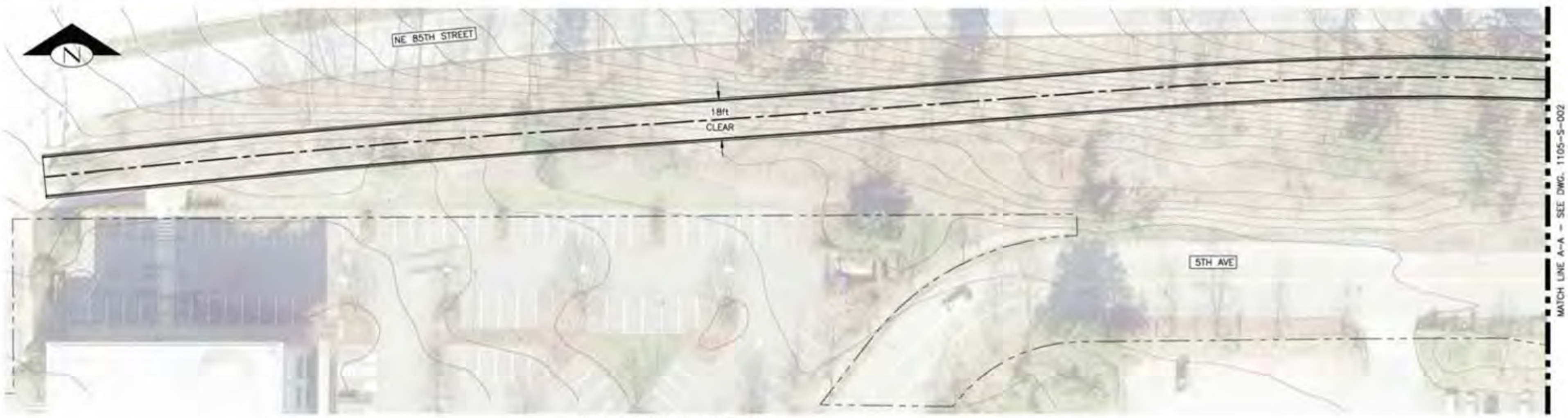
***(Note: Unit structure costs include mobilization but do not include sales tax, engineering, or contingency)***

*Figure - Table 12.3-A1: Estimating Aides from WSDOT BDM June 2018*

STRUCTURAL DESIGN

Address: 2212 Queen Anne Ave N #530
Phone: 206.880.1533
Website: www.vm-structural.com

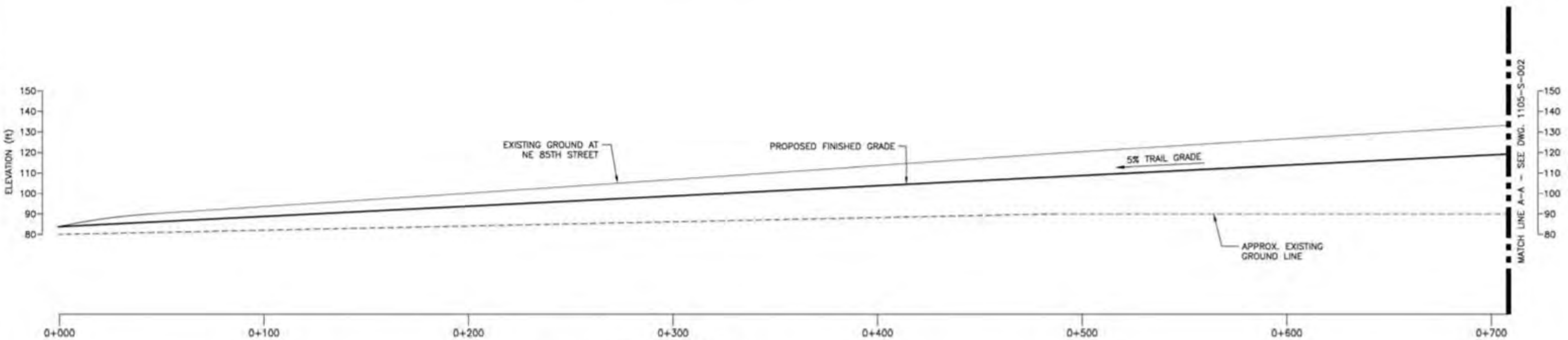
# Appendix B – Drawings




(NOTE: RETAINING WALLS NOT SHOWN)

PLAN – WEST TOWER ALIGNMENT B

SCALE: 3/64" = 1'-0"




(NOTE: RETAINING WALLS NOT SHOWN)

PROFILE – WEST TOWER ALIGNMENT B

SCALE: 3/64" = 1'-0"

**PRELIMINARY NOT FOR CONSTRUCTION**

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS
123 FIFTH AVENUE KIRKLAND, WA 98033
(425) 587-3800 www.kirklandwa.gov

| NO. | DATE | BY | APPR. | REVISION |
|---|---|---|---|---|
| PA | 01/31/2019 | SJV | SLV | FEASIBILITY STUDY |

V&M STRUCTURAL DESIGN

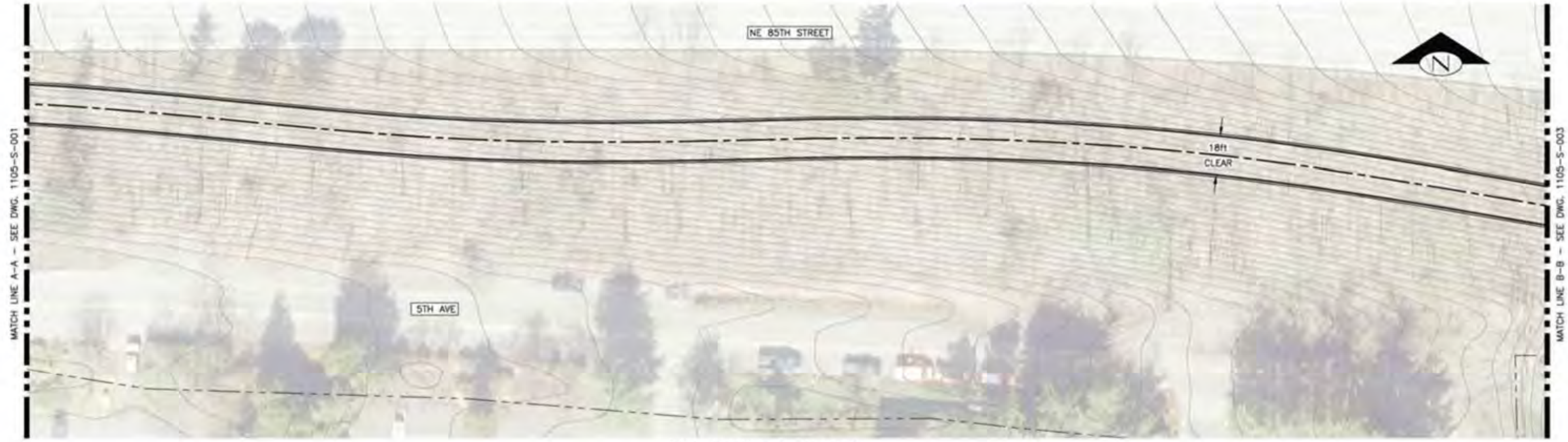
APPROVED BY:

DATE:

S. VALDOVINOS 01/31/2019 DESIGNED BY: DATE
S. VARNEY 01/31/2019 DRAWN BY: DATE
S. VALDOVINOS 01/31/2019 CHECKED BY: DATE

CITY OF KIRKLAND
NE 85TH STREET TRANSIT WAY
GENERAL ARRANGEMENT
SHEET 1

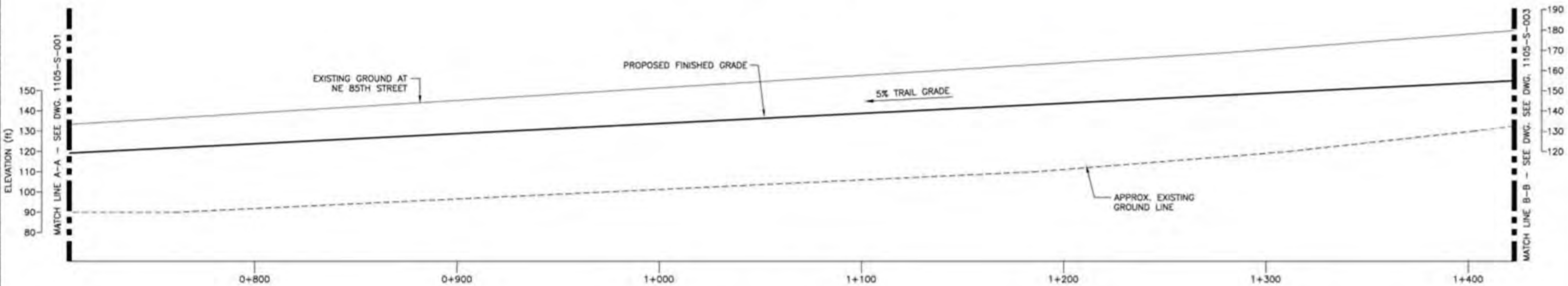
SHEET: 1105-S-001
SCALE: AS SHOWN
FILENAME: 1105-S-001-003.dwg




(NOTE: RETAINING WALLS NOT SHOWN)

PLAN – WEST TOWER ALIGNMENT B

SCALE: 3/64" = 1'-0"




(NOTE: RETAINING WALLS NOT SHOWN)

PROFILE – WEST TOWER ALIGNMENT B

SCALE: 3/64" = 1'-0"

PRELIMINARY NOT FOR CONSTRUCTION

CITY OF KIRKLAND

DEPARTMENT OF PUBLIC WORKS

123 FIFTH AVENUE KIRKLAND, WA 98033

(425) 587-3800 www.kirklandwa.gov

| NO. | DATE | BY | APPR. | REVISION |
|---|---|---|---|---|
| PA | 01/31/2019 | SJV | SLV | FEASIBILITY STUDY |

STRUCTURAL DESIGN

APPROVED BY:

DATE:

| | |
|---|---|
| S. VALDOVINOS — DESIGNED BY | 01/31/2019 — DATE |
| S. VARNEY — DRAWN BY | 01/31/2019 — DATE |
| S. VALDOVINOS — CHECKED BY | 01/31/2019 — DATE |

CITY OF KIRKLAND

NE 85TH STREET TRANSIT WAY

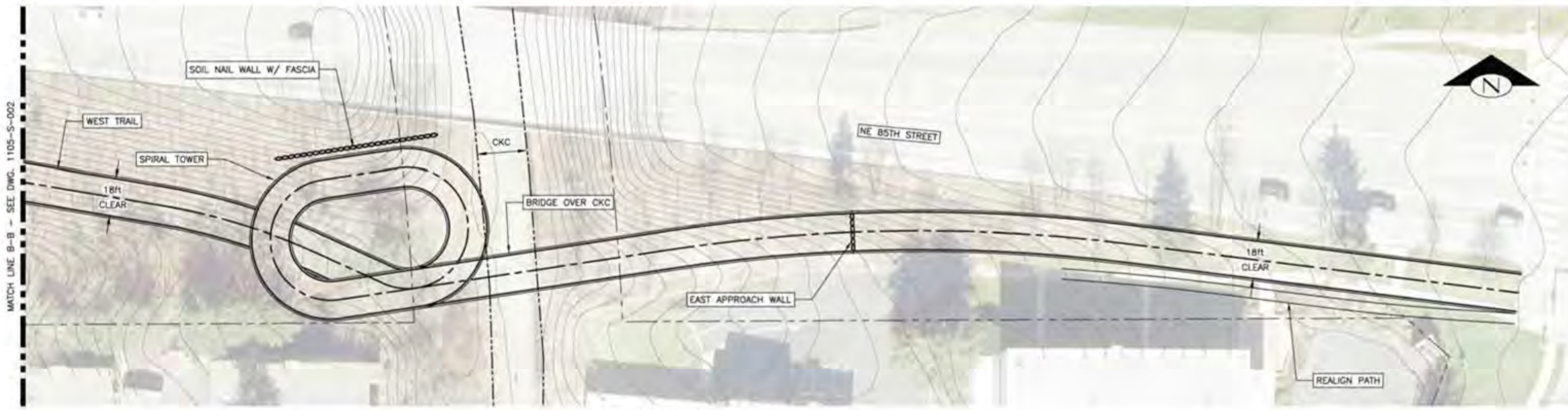
GENERAL ARRANGEMENT

SHEET 2

SHEET: 1105-S-002

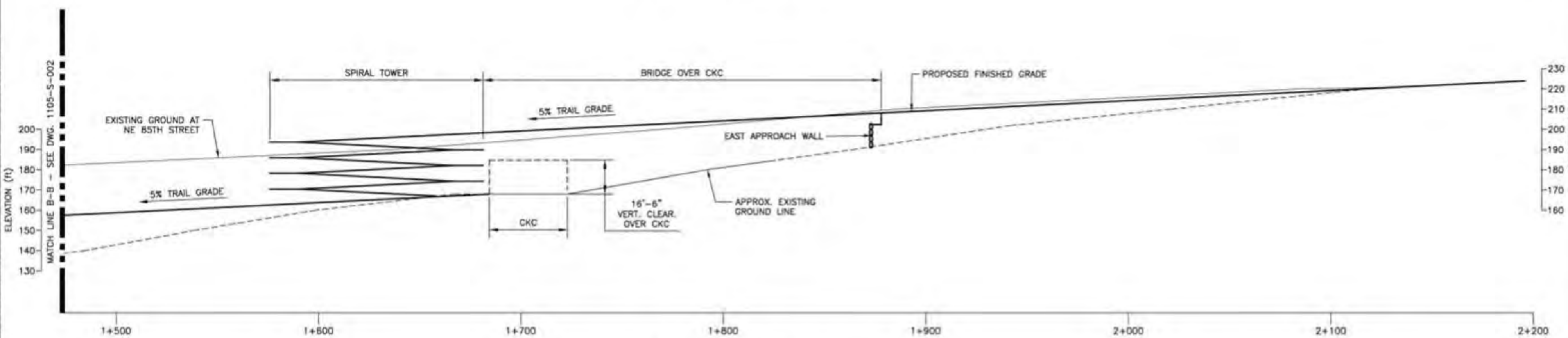
SCALE: AS SHOWN

FILENAME: 1105-S-001-003.dwg




(NOTE: RETAINING WALLS NOT SHOWN)

PLAN – WEST TOWER ALIGNMENT B
SCALE: 3/64" = 1'-0"




(NOTE: RETAINING WALLS NOT SHOWN)

PROFILE – WEST TOWER ALIGNMENT B
SCALE: 3/64" = 1'-0"

PRELIMINARY NOT FOR CONSTRUCTION

CITY OF KIRKLAND
DEPARTMENT OF PUBLIC WORKS
123 FIFTH AVENUE KIRKLAND, WA 98033
(425) 587-3800 www.kirklandwa.gov

| NO. | DATE | BY | APPR. | REVISION |
|---|---|---|---|---|
| PA | 01/31/2019 | SJV | SLV | FEASIBILITY STUDY |

STRUCTURAL DESIGN

APPROVED BY:

DATE:

S. VALDOVINOS — DESIGNED BY — 01/31/2019 DATE
S. VARNEY — DRAWN BY — 01/31/2019 DATE
S. VALDOVINOS — CHECKED BY — 01/31/2019 DATE

CITY OF KIRKLAND
NE 85TH STREET TRANSIT WAY
GENERAL ARRANGEMENT SHEET 3

SHEET: 1105-S-003
SCALE: AS SHOWN
FILENAME: 1105-S-001-003.dwg

KIRKLAND CITY COUNCIL MEETING MINUTES
July 02, 2019

1. CALL TO ORDER

Mayor Sweet called the study session to order at 6 p.m. and called the regular meeting to order at 7:30 p.m.

1. ROLL CALL

ROLL CALL:

| | |
|---|---|
| Members Present: | Deputy Mayor Jay Arnold, Councilmember Dave Asher, Councilmember Kelli Curtis, Councilmember Toby Nixon, Councilmember Jon Pascal, and Mayor Penny Sweet. |
| Members Absent: | None. |
| Staff Present: | None. |

Motion to excuse Councilmember Neir's absence due to travel.
Moved by Councilmember Jon Pascal, seconded by Councilmember Kelli Curtis
Vote: Motion carried 6-0
Yes: Deputy Mayor Jay Arnold, Councilmember Dave Asher, Councilmember Kelli Curtis, Councilmember Toby Nixon, Councilmember Jon Pascal, and Mayor Penny Sweet.

2. STUDY SESSION

a. Special Events Overview and Benchmarking

Joining the Council were Parks and Community Services (PCS) Director Lynn Zwaagstra, PCS Deputy Director of Operations John Lloyd, PCS Special Projects Coordinator Sudie Elkayssi, and City Manager Kurt Triplett.

3. EXECUTIVE SESSION

None.

4. HONORS AND PROCLAMATIONS

a. Parks and Recreation Month Proclamation

Park Board Chair Rosalie Wessels accepted the proclamation from Mayor Sweet and Councilmember Curtis.

5. COMMUNICATIONS

a. Announcements

b. Items from the Audience

Mallory Van Abbema

c. Petitions

6. PUBLIC HEARINGS

a. Resolution R-5378, Authorizing the Placement of a King County Ballot Proposition Before the Voters Concerning Funding the Medic One/Emergency Medical Services Levy from January 1, 2020 through December 31, 2025

Following opening remarks by Fire Chief Joe Sanford, Mayor Sweet opened the public hearing. No testimony was offered and the Mayor closed the hearing.

Motion to Approve Resolution R-5378, entitled "A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AUTHORIZING KING COUNTY TO PLACE BEFORE THE VOTERS A COUNTY-WIDE BALLOT PROPOSITION FOR FUNDING THE MEDIC ONE/EMERGENCY MEDICAL SERVICES (EMS) LEVY FOR THE PERIOD FROM JANUARY 1, 2020 THROUGH DECEMBER 31, 2025 PURSUANT TO RCW 84.52.069."
Moved by Deputy Mayor Jay Arnold, seconded by Councilmember Toby Nixon
Vote: Motion carried 6-0
Yes: Deputy Mayor Jay Arnold, Councilmember Dave Asher, Councilmember Kelli Curtis, Councilmember Toby Nixon, Councilmember Jon Pascal, and Mayor Penny Sweet.

7. SPECIAL PRESENTATIONS

None.

8. CONSENT CALENDAR

a. Approval of Minutes

(1) June 15, 2019

(2) June 18, 2019

(3) June 22, 2019

The minutes of the June 15, 18 and 22, 2019 City Council meetings were approved via approval of the consent calendar.

b. Audit of Accounts and Payment of Bills and Payroll

Payroll: $4,058,568.30
Bills: $12,012,672.08

| | | |
|---|---|---|
| CA190619 | wire #86 | checks #706319 - 706439 |
| CA190626 | | checks #706440 - 706583 |
| CA190627 | | check #706584 |
| CA190628 | | check #706585 |
| LB627A | wire #88 | |
| LB628A | wire #87 | |
| LB628C | wire #90 | |
| LB701A | wire #91 | |
| Purch Card | MAY ACH | |

c. General Correspondence

d. Claims

(1) Claims for Damages

Claims received from Kirk and Carol Mathewson, Thatcher Mathewson, ANV, LLC, Celane, LLC, and Tapps, LLC were acknowledged via approval of the consent calendar.

e. Award of Bids

f. Acceptance of Public Improvements and Establishing Lien Period

(1) Fire Station 25 Renovation Project

Work performed by Western Ventures Construction, Inc. of Mountlake Terrace, Washington, on the Fire Station 25 Renovation Project was accepted, thereby establishing the statutory lien period, and the fiscal note directing remaining funds to the Fire Station 24 Replacement Project was approved, via approval of the consent calendar.

g. Approval of Agreements

h. Other Items of Business

Motion to Approve the consent calendar.
Moved by Councilmember Jon Pascal, seconded by Councilmember Kelli Curtis
Vote: Motion carried 6-0
Yes: Deputy Mayor Jay Arnold, Councilmember Dave Asher, Councilmember Kelli Curtis, Councilmember Toby Nixon, Councilmember Jon Pascal, and Mayor Penny Sweet.

9. BUSINESS

a. Business Partnership and Naming Rights Policy

Parks and Community Services Director Lynn Zwaagstra responded to Council questions and received feedback on the draft policy. City Attorney Kevin Raymond and City Manager Kurt Triplett also responded to questions.

b. Surface Water Design Manual Update and Proposed Feasibility Study

Public Works Surface Water Program Supervisor Jenny Gaus provided an overview of the response to Council questions posed in relation to the adopted 2016 King County Surface Water Design Manual and received Council feedback on a proposed feasibility study of a regional stormwater facility.

10. REPORTS

a. City Council Regional and Committee Reports

Councilmembers shared information regarding the 132nd Square Park Master Plan Update Open House; the Association of Washington Cities Annual Conference; the Torah Walk for Congregation Kol Ami; the upcoming Fourth of July Celebrate Kirkland celebration; an Interfaith 4th of July BBQ at the IMAN Center; an upcoming Sound Cities Association Public Issues Committee meeting; an implicit bias training with Dr. Bryant Marks; a site development tour sponsored by the Master Builders Association of King and Snohomish County; a Gotcha bike and scooter demonstration at City Hall; the Fire Department promotion and recognition ceremony; the City of Kirkland Sustainability Forum; a King County Regional Transit Committee meeting; the recent appointments in the 1st Legislative District; the King County Council Mobility Committee recommended that the North Eastside Mobility Project be forwarded to the King County Council for approval; requested and received support to add an item to a future Council agenda to review the issues around the A Regional Coalition for Housing (ARCH) program; requested and received support to add an item to a future Council agenda to review the issue of implicit bias in relation to the role of the Prosecutor's office; a Lake Washington School District Sustainability Ambassadors project meeting; a Cascade Water Alliance Finance Committee meeting; a Cascade Water Alliance Board meeting; a ribbon-cutting for Banner Bank; a ribbon-cutting for the Quirk Law Group; and a pre-parade reception for the military veterans participating in the 4th of July parade.

b. City Manager Reports

City Manager Kurt Triplett shared information about a meeting of the School Resource Officer (SRO) Joint Task Force; a recommendation from the A Regional Coalition for Housing (ARCH) board to pass actions in connection with HB 1406; and an update about the car-free Park Lane Summer Sundays events.

(1) Calendar Update

None.

11. ITEMS FROM THE AUDIENCE

None.

12. ADJOURNMENT

The Kirkland City Council regular meeting of July 2, 2019 was adjourned at 8:45 p.m.

| | |
|---|---|
| Kathi Anderson, City Clerk | Penny Sweet, Mayor |

# KIRKLAND CITY COUNCIL SPECIAL MEETING

**Kirkland Business Roundtable**
**Kirkland City Hall**
**Council Chamber**
**123 Fifth Avenue**
**Kirkland, WA 98033**

**July 10, 2019**
**8:00 a.m.**

**Minutes**

## 1. CALL TO ORDER

The event commenced at 8:00 a.m.; due to an expected quorum of Councilmembers in attendance, the event was noticed as a special City Council meeting; however, as a quorum was not reached at the time of the meeting, the special meeting of the full City Council was canceled. The Business Roundtable event proceeded with its scheduled agenda.

## 2. ROLL CALL

Present: Deputy Mayor Jay Arnold and Councilmembers Dave Asher and Toby Nixon.

## 3. BUSINESS ROUNDTABLE AGENDA

Topics on the agenda included the Kirkland Urban Update, Port of Seattle Update and the City Sustainability Master Plan.

## 4. ADJOURNMENT

The July 10, 2019 Kirkland Business Roundtable event/Special Meeting of the Kirkland City Council concluded at 8:05 a.m.

______________________________ ______________________________

Kathi Anderson, City Clerk | Penny Sweet, Mayor

**CITY OF KIRKLAND**
**Department of Public Works**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3800**
**www.kirklandwa.gov**

**MEMORANDUM**

**To:** Kurt Triplett, City Manager

**From:** George Minassian, P.E., Sr. Project Engineer
Rod Steitzer, P.E., Capital Projects Manager
Kathy Brown, Public Works Director

**Date:** July 3, 2019

**Subject:** 6TH STREET SOUTH REHABILITATION PROJECT—AWARD CONTRACT

**RECOMMENDATION:**

City Council awards a construction contract for the 6th Street South Rehabilitation Project (Project) to Lakeside Industries of Issaquah, Washington, in the amount of $1,489,979.00.

By taking action on this item under the Consent Calendar, the City Council is awarding a construction contract for the subject Project.

**BACKGROUND DISCUSSION:**

6th Street South is a main north/south arterial roadway located in the Moss Bay and Everest neighborhoods. The rehabilitation and paving of this street, from NE 68th Street to 4th Avenue (see Attachment A, Vicinity Map), is the last phase of a series of projects that have enhanced the pedestrian access, infrastructure, and traffic flow along this corridor.

The scope of the Project includes replacement of damaged cement concrete curb, gutter, and sidewalk; installation of ADA-compliant sidewalk ramps; pavement milling; roadway base and pavement repair; application of a new wearing surface layer of asphalt; and pavement markings.

With an engineer's estimate of $1.38 million for construction, two bids were received on June 19, 2019, with Lakeside Industries being the lowest responsible bidder. The bid results are as follows:

**Table 1: Bid Results**

| Contractor | Total |
|---|---|
| *Engineer's Estimate* | *$1,380,195.25* |
| **Lakeside Industries** | **$1,489,979.00** |
| Watson Asphalt | $1,536,249.00 |

The Project has a base budget of $1,000,000 for the current year plus a reallocation of 2018 and 2019 Street Preservation Program funds that the Council approved in June of 2018 and June of 2019, bringing the total budget to $1,930,000 as shown in Table 2, below:

**Table 2: 6th Street South Rehabilitation Project Funding**

| Funding Source | Amount |
|---|---|
| 2019 Adopted CIP (2019-2024) | $1,000,000 |
| 6th Street South Rehabilitation Contribution from 2018 Street Preservation Program (City Council Approved 6/19/2018) | $280,000 |
| City Council Approved Carry-over from 2019 Program (City Council Approved 6/18/2019) | $650,000 |
| **Total** | $1,930,000 |

During the 2019-2024 CIP, staff programmed the Project with total funding of $2,480,000:

- $280,000 was made available by the City Council in 2018 to advance the Project (see Table 2, above);
- $1,000,000 is programmed in 2019;
- $1,200,000 is programmed in 2020.

At the time of the 2019-2024 CIP, there was a City intersection improvement project under construction at 6th Street South and 9th Avenue South and a major water and sewer main replacement project scheduled to begin in the fall of 2018. In addition, the City had information from several private communications companies that they would be making permitting requests in 2019 for communications cabling system upgrades planned along the same corridor. Based on that information, staff felt it would be likely the Project would run into 2020 for its completion and its funding plan was established accordingly.

At this point, staff is pleased to report that the City's other two projects are mostly complete, and that the communications utilities are working to complete their upgrade efforts in the near future. The current schedule for the Project shows it being substantially complete in October 2019. Given this accelerated design and construction schedule, the Project will be complete before the originally-programmed Project budget is fully available. Therefore, in response to staff's request, at its June 18, 2019 meeting the Council approved a reallocation of $650,000 of 2019 Street Preservation Program Funds for the Project. As planned currently, much or all of the $1,200,0000 budgeted for the Project in 2020 likely will be available for reallocation to other priority roadway projects, such as the Totem Lake Gateway project or the 2020 Street Preservation Program.

The anticipated expenses for the 6th Street S Rehabilitation Project are as follows:

**Table 3 – 6th Street S Rehabilitation Project Expenses**

| Expense | Amount |
|---|---|
| Engineering, Inspection, Admin | $ 361,585 |
| Construction | $ 1,489,979 |
| Contingency | $ 78,436 |
| **TOTAL** | **$1,930,000** |

For a pavement rehabilitation project, the contingency is usually calculated as 10% of the contract value; however, to stay within the current project funding, the contingency presented in Table 3 is 5.3% of the contract amount. If this contingency proves insufficient, there is funding available in the 2020 CIP plan, as described above and staff will propose a revised budget and funding plan during the CIP update later this year.

Based on the bids received and the budget available, staff recommends awarding the construction contract. If the Council awards the contract at its July 16 meeting, then staff will begin the pre-construction public outreach process by notifying adjacent property owners with an informational mailer describing the Project. This information, along with a regularly updated construction schedule, also will be posted on the City's website. Construction notice signs will be installed on higher volume streets leading to project area in advance of the construction, and portable construction notice signs will be placed on adjacent residential streets a few days prior to construction. Door hangers describing the work also will be distributed to all adjacent homes and businesses at least 24 hours prior to construction.

Attachment A: Vicinity Map
Attachment B: Project Budget Report


Vicinity Map

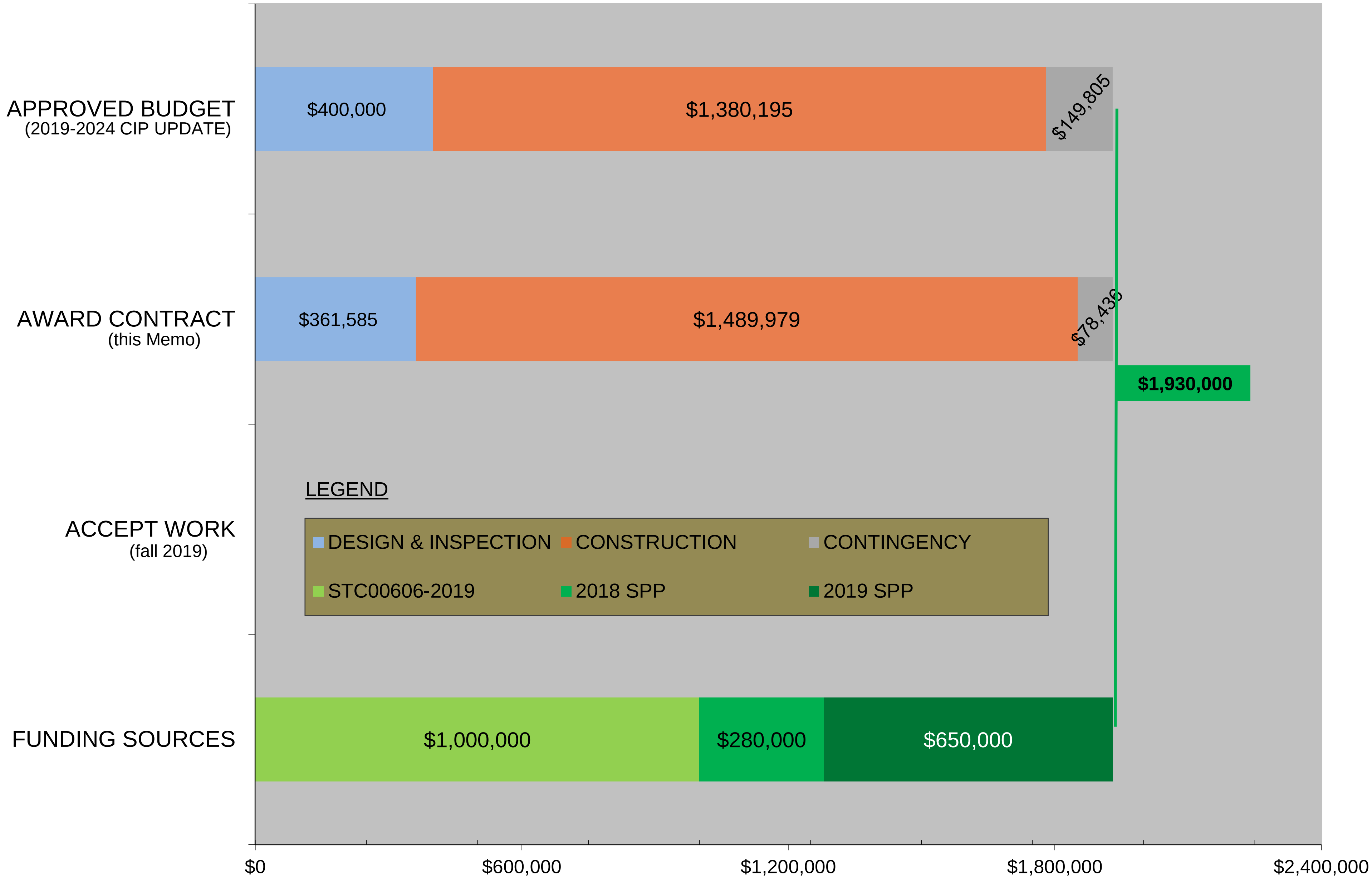
6th Street Rabilitation (STC0060600)

Attachment B

# Project Budget Report

## 6th Street South Rehabilitation Project



**CITY OF KIRKLAND**
**Department of Finance & Administration**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3190**
**www.kirklandwa.gov**

## MEMORANDUM

**To:** Kurt Triplett, City Manager

**From:** Michael Olson, Director of Finance and Administration
Kathi Anderson, City Clerk/Public Records Officer
Ana Campbell, Deputy City Clerk

**Date:** July 3, 2019

**Subject:** PUBLIC DISCLOSURE SEMI-ANNUAL PERFORMANCE REPORT

### RECOMMENDATION

City Council receives the semi-annual status report on the City's public records disclosure program pursuant to KMC 3.15.120 and approves a proposed ordinance (attachment A) adjusting the semi-annual reporting dates. By acting on the consent calendar, the Council is accepting the report and approving the ordinance.

### BACKGROUND

In accordance with KMC 3.15.120, this report presents the performance of the City's Public Disclosure Program during the first half of 2019. KMC 3.15.120 states that the semi-annual public records disclosure report shall include: (1) the number of open records requests at the beginning of reporting period; (2) the number of records requests received during the reporting period; (3) the number of records requests closed in the period; and (4) the number of open requests at the end of the reporting period. This information is represented in Figure A.

**Figure A**

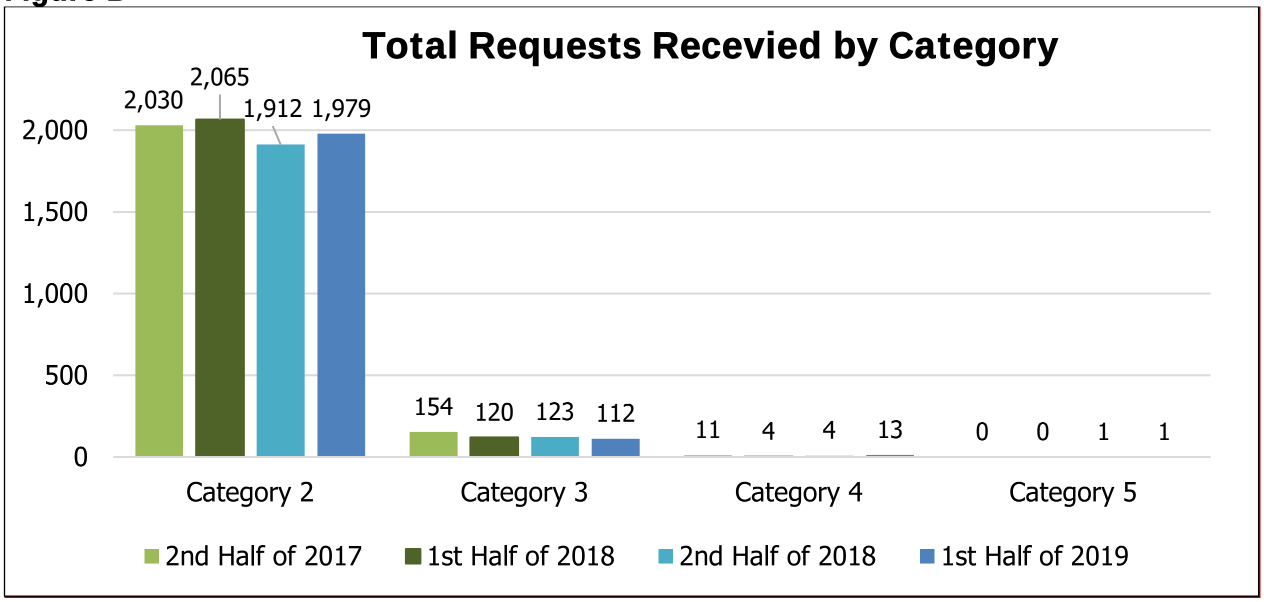
| Mandatory Reporting Information | |
|---|---|
| Requests Open on January 1, 2019 | 119 |
| Requests Received January 1 – June 30, 2019 | 2,105 |
| Requests Closed January 1 – June 30, 2019 | 2,103 |
| Requests Open on June 30, 2019 | 121 |

### DATA-BASED ANALYSIS OF PERFORMANCE

This report presents information on the City's performance by comparing the total requests received and the average time it took to process them. Performance is presented as a comparison between four reporting periods: the second half of 2017, the first and second halves of 2018, and the first half of 2019.

The City experienced a 3% increase in the total number of requests from July 1 – December 31, 2018 compared to January 1 – June 30, 2019. The number of requests rose from 2,040 to 2,105. The comparison of requests by category between the four reporting periods is presented in Figure B.

**Figure B**[1]



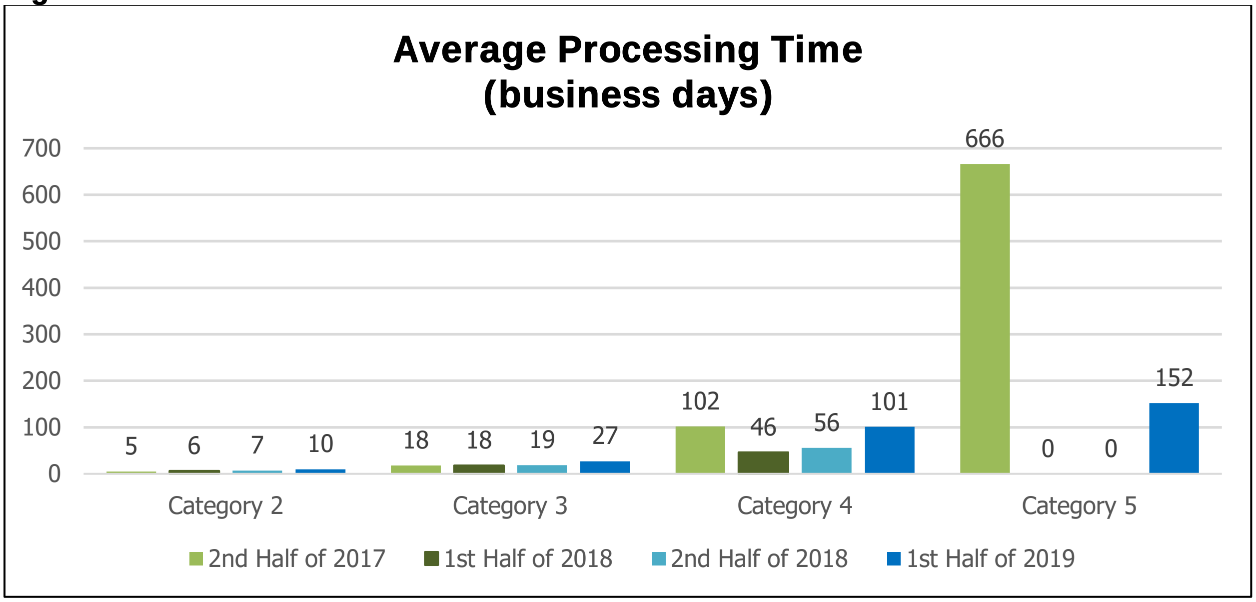

Pursuant to the City's PRA Rule 080, the following goals for standard response time periods are established as follows: [2]

(a) Category 1 records requests - immediately or the next business day
(b) Category 2 records requests - within five business days
(c) Category 3 records requests - usually between 5 and 30 business days
(d) Category 4 records requests - may require several weeks to several months
(e) Category 5 records requests - may require several weeks to several months

[1] There were no Category 1 requests received during any of the reporting periods
[2] Time is dependent on the nature and scope of the request for category 3, 4, and 5 requests

Figure C presents data for the average processing time (in business days) by category. The data only reflects processing time for requests that have been closed during the current reporting period.

**Figure C**




The increased processing time reflected in the second half of 2017 documents the closure of three category 5 requests which took two and a half years to complete (the actual timespan isn't reflected until final disposition). Since we did not close any category 5 requests in 2018, the processing times are represented by zero business days. In May of this year we closed one category 5 request that was received in December 2018, represented by the 152 business days.

## TIMELINE FACTORS

The primary factors contributing to the increase of average processing times in this reporting period for all categories were:

- Changes in Police Records Unit personnel/staffing
- Tripling of category 4 requests received
- Processing an open category 5 request received in March 2019
- Processing the now closed category 5 requests received in December 2018 and closed in May 2019

## LEGISLATIVE IMPACTS

The Joint Legislative Audit and Review Committee's (JLARC) reporting deadline moved from July 1 to August 1 to accommodate the amendments set forth in HB 1667, adopted in the 2019 legislative session. The City's public disclosure management software provider, GovQA, has scheduled a software configuration update for July 12th incorporating those amendments. Following implementation of the update, staff will complete and submit the report and provide a copy to Council.

This year's report is comprised of 16 metrics collected from January 1, 2018 through December 31, 2018. Here are a few highlights of the report:

- Metric 1 – 63% of requests were closed within 5 business days
- Metric 2 – 5-day letters were sent out in an average of 1.86 business days
- Metric 3 – Requests were closed in an average of 7.2 business days

**SEMI-ANNUAL REPORTING DATE ADJUSTMENT**

Following discussion at the June Public Disclosure Steering Team meeting, the team recommended proposing a one month change in the semi-annual reporting timelines. The current requirements are that the report from January 1 through June 30 must be presented to the Council by July 31, and the report from July 1 – December 31 must be presented by January 31 of the following year. The practical impact is that the report must be presented at the second Council meeting of each month, which is third Tuesday. Because there is a two two-week lead time required for Council packets, the result of the current language is that Clerk's office only has a week to analyze the 6 months of data and draft the report. To provide more time for the report to be prepared, if approved, the ordinance pushes the two reporting dates out by one month. The report for the period of July 1 to December 31 moves from January 31 to the end of February, and the report for the period of January 1 to June 30 moves from July 31 to August 31.

**RELATED UPDATES**

Staff are also currently reviewing the internal minimum threshold for waiving costs when producing records in hardcopy format. The current practice is to waive any fee less than $5.00, and charge $0.15/page when printing, and $0.10/page when scanning. Staff is analyzing whether the current $5 threshold should be increased or decreased due to advancements in technology, and staff time associated with processing payments. Staff will continue working with the Steering Team to determine the best outcome.

The Public Disclosure Steering Team will continue to assess the needs of the public records program. The current funding level appears to be adequate; to date, the program has not needed to draw on the $100,000 Public Records Contingency Fund approved by the City Council in 2017.

# ORDINANCE O-4692

AN ORDINANCE OF THE CITY OF KIRKLAND RELATING TO THE PUBLIC RECORDS PERFORMANCE REPORT.

WHEREAS, the City Council receives public disclosure semi-annual performance reports from staff; and

WHEREAS, the reporting period of July 1 to December 31 is presently required to be reported on no later than January 31 each year, and the reporting period of January 1 to June 30 is presently required to be reported on no later than July 31 each year; and

WHEREAS, staff would benefit from additional report preparation time between the close of the reporting period and the meeting packet due date; and

WHEREAS, staff recommends the report for the period of July 1 to December 31 be extended to February, and the report for the period of January 1 to June 30 be extended to August.

NOW, THEREFORE, the City Council of the City of Kirkland do ordain as follows:

Section 1. Kirkland Municipal Code Section 3.15.120 is amended to read as follows:

**3.15.120 Public records performance report.**

No later than ~~July 31st~~ August 31st and ~~January 31st~~ the last day of February of each year, the city clerk will submit to the city council a report on the city's performance in responding to public records requests during the preceding six months. The report shall include, at a minimum:

(1) Open records requests (queue) at beginning of period;

(2) Number of records requests received in the period by category;

(3) Number of records requests closed in the period by category; and

(4) Open records requests (queue) at end of period.

Section 2. This ordinance shall be in force and effect five days from and after its passage by the Kirkland City Council and publication, as required by law.

Passed by majority vote of the Kirkland City Council in open meeting this _____ day of _______________, 2019.

Signed in authentication thereof this _____ day of __________, 2019.

______________________________
Penny Sweet, Mayor

Attest:

______________________________
Kathi Anderson, City Clerk

Approved as to Form:

______________________________
Kevin Raymond, City Attorney

**CITY OF KIRKLAND**
**Planning and Building Department**
**123 5th Avenue, Kirkland, WA 98033**
**425.587.3600- www.kirklandwa.gov**

**MEMORANDUM**

**To:** Kurt Triplett, City Manager

**From:** Angela Ruggeri, Senior Planner
John Burkhalter, Public Works Development Engineering Manager
Adam Weinstein, Planning and Building Director

**Date:** June 26, 2019

**Subject:** An Ordinance Relating to Amendment of Kirkland Municipal Code Section 21.06.255 – Permit Expiration

## RECOMMENDATION

City Council pass the attached ordinance. This ordinance would amend Section 21.06.255(b) of the Kirkland Municipal Code relating to the expiration of Land Surface Modification (LSM) permits.

## BACKGROUND DISCUSSION

Section 21.06.255(b) of the Kirkland Municipal Code states that every LSM permit and every building permit and its associated ancillary permits that are issued for a commercial, educational, institutional, multifamily, public, industrial or similar structure expires in three years from the date of issuance.

LSM permits that are associated with short subdivisions, subdivisions and binding site plans often expire before all the work associated with the permit is finished. When this occurs, the applicant must reapply for the LSM permit (through an administrative process) even though there is no substantive change to the permit requirements. This amendment will remedy that problem by allowing the LSM permit to be active until the expiration of the preliminary subdivision, short subdivision or binding site plan, or until the LSM permit is finaled in the case of a recorded subdivision, short subdivision or binding site plan.

# ORDINANCE O-4693

AN ORDINANCE OF THE CITY OF KIRKLAND RELATING TO THE EXPIRATION OF LAND SURFACE MODIFICATION PERMITS AND AMENDING SECTION 21.06.255 OF THE KIRKLAND MUNICIPAL CODE.

The City Council of the City of Kirkland do ordain as follows:

Section 1. Section 21.06.255 of the Kirkland Municipal Code is amended to read as follows.

**21.06.255 Permit expiration.**

(a) Every building permit and its associated ancillary permits issued for an IRC permitted structure or for a tenant space within an existing building shall expire in two years from the date of issuance. Within two years of the issuance of the permit for an IRC structure, the outside must be complete including roofing, siding, windows, exterior doors and applicable site and right-of-way improvements. The two years to complete the IRC structure may not be extended.

(b) Every LSM permit and every building permit and its associated ancillary permits issued for a commercial, educational, institutional, multifamily, public, industrial or similar structure shall expire in three years from the date of issuance. LSM permits supporting approved subdivisions, short subdivisions or binding site plans shall expire upon the expiration of the preliminary subdivision, preliminary short subdivision or binding site plan; however, an approved or issued LSM permit for a recorded subdivision, short subdivision or binding site plan shall not expire until the LSM permit is finaled.

(c) Sign permits and electrical, mechanical, and plumbing permits not associated with a building permit shall expire one year from the date of issuance.

(d) The building official may grant a thirty-day extension of time for permits when only the final inspection is remaining and all other work has been approved.

(e) It is a violation of this chapter to allow a permit to expire without first obtaining an approved final inspection.

Exception 1: A new building permit approved to current code and issued for an IRC structure to complete the work covered by a previous, expired permit shall expire in:

(1) One year if the framing inspection was not approved on the previous permit; or

(2) Six months if the framing inspection was approved on the previous permit and the exterior of the structure is not completed per subsection (3) of this section; or

(3) Two years if the outside of the structure is complete including roofing, siding, windows, exterior doors and applicable site and right-of-way improvements.

Exception 2: For permits resulting from work without a permit or other code enforcement action(s), the expiration date will be determined by the building official.

Section 2. This ordinance shall be in full force and effect five days from and after its passage by the Kirkland City Council and publication, as required by law.

Passed by majority vote of the Kirkland City Council in open meeting this _____ day of ______, 2019.

Signed in authentication thereof this _____ day of _____, 2019.

____________________________
Penny Sweet, Mayor

Attest:

____________________________
Kathi Anderson, City Clerk

Approved as to Form:

____________________________
Kevin Raymond, City Attorney

**CITY OF KIRKLAND**
**Department of Finance & Administration**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3100**
**www.kirklandwa.gov**

# MEMORANDUM

**To:** Kurt Triplett, City Manager

**From:** Greg Piland, Financial Operations Manager

**Date:** July 2, 2019

**Subject:** REPORT ON PROCUREMENT ACTIVITIES FOR COUNCIL MEETING OF July 16, 2019.

This report is provided to apprise the Council of recent and upcoming procurement activities where the cost is estimated or known to be in excess of $50,000. The "Process" column on the table indicates the process being used to determine the award of the contract.

The City's major procurement activities initiated since the last report dated June 6, 2019 are as follows:

| | Project/Purchase | Process | Estimate/Price | Status |
|---|---|---|---|---|
| 1. | CKC Surface Water Headwall Repair Project | Invitation for Bids | $328,710.16 | Contract awarded to Dungeness Construction Corporation of Langley, WA. |
| 2. | 2019-2020 Multifamily Recycling Outreach Project | Request for Proposals | $80,000.00 | Contract awarded to Cascadia Consulting Group of Seattle, WA. |
| 3. | NE 142nd Street Surface Water Drainage Improvements Project | Request for Qualifications | $255,659.00 | Contract awarded to BHC Consultants LLC of Seattle, WA based on qualifications per RCW 39.80. |
| 4. | 6th Street South Rehabilitation Construction Inspection | Request for Qualifications | $154,273.00 | Contract awarded to KPG Inc. of Seattle, WA based on qualifications per RCW 39.80. |
| 5. | Totem Lake Pedestrian Bridge Design | Request for Qualifications | $198,500.68 | Amended contract awarded to COWI North America, Inc. of Seattle, WA based on qualifications per RCW 39.80. |

Please contact Greg Piland if you have any questions regarding this report.

**CITY OF KIRKLAND**
**City Manager's Office**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3001**
**www.kirklandwa.gov**

**MEMORANDUM**

**To:** Kurt Triplett, City Manager

**From:** Kathy Brown, Public Works Director
Kari Page, Senior Neighborhood Services Coordinator

**Date:** July 3, 2019

**Subject:** KIRKLAND ROTARY-SPONSORED CKC HISTORIC DEPOT SITE PROJECT

**RECOMMENDATION:**

City Council to:

- Receive a briefing on the Cross Kirkland Corridor (CKC) Historic Depot Site Project sponsored by the Kirkland Rotary Club of Kirkland, including reviewing two size options for a proposed picnic pavillion (Project) for the City Council to consider;

- Receive a briefing on the remaining trail connections in the CKC Master Plan and any other potential uses of the CKC Emergent Opportunity Fund;

- Provide direction to staff on whether or not to participate financially in the Project.

    - Option 1: Approve financially contributing to the pavilion. Determine what size the pavillion should be (see below) and which funding source should be used:
        A. CKC Emergent Project Opportunity Fund;
        B. REET 2018 over projections; and/or
        C. City Council Special Projects Reserves.

    - Option 2: Elect not to participate financially.

**BACKGROUND DISCUSSION:**

The CKC has become one of the hallmarks of Kirkland. It is a 5.75-mile trail that runs from the South Kirkland Park-and-Ride north to Totem Lake. At present, it is improved with a ten-foot-wide crushed gravel surface, with a long-range Master Plan to transform the 100-foot-wide corridor into a multimodal transportation facility for high capacity transit, pedestrians, and bikes, with community destination points and attractions along the way.

The Rotary Club of Kirkland has been inspired by the CKC Master Plan and has proposed to reinvigorate the site of the City's original Northern Pacific railroad station, which was located on

Railroad Avenue near Kirkland Avenue. In the CKC Master Plan, this site is within the Everest Edge character zone.

**Past City Council Updates**
The Kirkland Rotary CKC Historic Depot Site Project is the first master-plan-inspired project involving community volunteers, outside agency grant funding, and private donations. The centerpiece of the Rotary's project is a proposed picnic pavilion with picnic tables and illustrated signage describing the railroad's history in Kirkland. Also proposed are photographs of trains and of the two structures that stood successively on the site between 1912 and 1974. The proposal includes a 60-foot section of original rails, a native plants area displaying the original vegetation along the Corridor, a railroad signal from the CKC, and a split-rail fence along the street border.

The City Council reviewed the overall project concept at its January 16, 2018 and its April 16, 2019 meetings under the "Items from the Audience" agenda item. Staff was directed to continue to work with the Rotary and return with more specific information as plans evolved and funds were raised. Staff presented three depot design options at the May 21, 2019 City Council meeting at which time the City Council expressed concerns about 1) City funding for what some felt was solely a community sponsored project; 2) the size of the pavilion not encompassing the entire existing concrete slab; and 3) the use of the CKC Emergent Project Opportunity Fund for these improvements, rather than for future, additional new CKC access projects. This staff report addresses each of these concerns below.

**1. City funding request**
The Rotary has raised a significant amount of money and leveraged volunteer efforts to fund the majority of the project. It has exhausted its resources and is asking for the City to fund the construction of the pavilion.

Since the idea was first discussed with the City Council, the Rotary has been diligent about raising funds, dedicating and anticipating at least 268 hours of time to make physical improvements, and obtaining grants from funding partners. The total value raised by the Rotary for site improvements is $28,914, with $22,600 in secured funding and an estimated volunteer labor value of $6,314.

In addition to the $28,914 given and pledged for site improvements, the Rotary has raised $32,400 for the purchase of the proposed picnic pavilion. The Rotary is asking the City to pay for the construction of the pavilion (between $35,600 and $48,155).

Based upon City Council direction this past May, staff has outlined two size options for the least expensive pavilion included in the May City Council report. One option is 16' x 28' and built on the existing depot's concrete slab and the second is 16' x 36' and spans the perimeter of the slab without disturbing the slab. The Rotary Club of Kirkland would ask for a sign or plaque to recognize its contributions to this project.

**2. Cost for two size options** - Country Lane Gazebo

Description:

- Alpine Wood Pavilion (Kit)
- Cedar wood posts with laminated pressure-treated wood core
- 7′-3″ clearance
- 8″ x 8″ cedar wood posts with laminated pressure-treated wood core
- Stained – Cedar
- Upgrade to Ribbed Metal Roofing – Evergreen Color

Country Lane Gazebo (not to scale).

**Option 1 –16' x 28'** Proposed City contribution $35,600

**Option 2 – 16' x 36'** Proposed City contribution $48,155

**Table 1**

| Item (16'x28') | Estimated Total |
|---|---|
| Design | $1,000 |
| Permit | $2,000 |
| Inspection | $1,500 |
| **PE Subtotal** | $4,500 |
| In-House | $10,000 |
| Construction | $44,500 |
| Tax (10.1%) | $4,500 |
| Contingency | $4,500 |
| **Total** | $68,000 |
| **Rotary** | $32,400 |
| **City** | $35,600 |

**Table 2**

| Item (16'x36') | Estimated Total |
|---|---|
| Design | $1,000 |
| Permit | $2,000 |
| Inspection | $1,500 |
| **PE Subtotal** | $4,500 |
| In-House | $10,000 |
| Construction | $55,000 |
| Tax (10.1%) | $5,555 |
| Contingency | $5,500 |
| **Total** | $80,555 |
| **Rotary** | $32,400 |
| **City** | $48,155 |

**3. Possible sources of funds**
City Council asked staff to provide an overview of other potential uses of the CKC Emergent Project Opportunity Fund and also to identify alternative funding sources.

Potential sources of funds:

A. CKC Emergent Project Opportunity Fund;
B. REET 2018 over projections; and/or
C. City Council Special Projects Reserves.

A. **CKC Emergent Project Opportunity Fund** is described in the Capital Improvement Program as "an opportunity fund for implementation of a wide range of CKC access improvements." In 2019, $193,000 was carried forward from previous years and an additional $100,000 was added in the 2019-2023 Capital Improvement Program resulting in a balance of $293,000. There has been a wide range of uses of these funds over the years. Examples include:
   - Connections:
     - NE 64th Street $14,900
     - NE 68th Street $17,000 ($94,400 total cost with $77,400 paid by the Neighborhood Safety Program)
     - NE 55th Street $6,000 (materials and volunteer supervision only)
   - General access type improvements:
     - Fencing at NE 124th Street/Totem Lake Boulevard
     - Salvage of the Kalakala parts for a future art installation on the CKC
     - Wayfinding maps installed along the corridor
     - Trail maps distributed to the public
     - Bike bells
     - Pedestrian counters
     - Adopt-a-trail signs
     - Golf cart (8 passenger)

   Overall, the Master Plan identifies 40 different connection locations along the 5.75 miles, some of which are on public property, and some of which are on private property. Table 3 outlines the status of all identified connections to CKC.

   **Table 3: Status of CKC Connections**

| Connections | Complete | Remaining on Public Property | Remaining on Private Property | Total |
|---|---|---|---|---|
| Master Plan | 22 | 10 | 8 | 40 |
| Non-Master Plan | 7 | 1 | 5 | 13 |
| Total | 29 | 11 | 13 | 53 |

   The ten *Master Plan connections* remaining to be complete on public property include:
   - High priority/regionally significant:
     - 132nd Avenue NE to Eastside Rail Corridor (crossing 132nd Avenue NE)
     - Totem Lake Connector (crossing NE 124th Street/Totem Lake Boulevard)
     - 6th Street, to CKC, and I-405 (east/west) - considered part of the Sound Transit Bus Rapid Transit station improvements at NE 85th Street
     - South Kirkland Park and Ride (west) - currently scheduled in the Sound Transit improvements with light rail from Bellevue to south Kirkland
   - Pending CKC Stormwater Drainage Headwall Repair project

    - North Crestwoods (west)
- Lower priority
    - NE 116th Street (north) – public/private property
    - NE 116th Street (south) – public/private property
    - South Crestwoods/Cotton Hill Park (east) – public property
    - 110th Pl NE (east) – right-of-way
    - 6th Street grade separation (crossing 6$^{th}$ Street) – right-of-way

Examples of other future projects possibly vying for these funds include:

- Kalakala art project (if located on the CKC)
- ADA parking at CKC at 128th Lane NE, 110th Avenue NE, and Railroad Avenue
- Mountain bike course
- Additional trail maps
- Additional pedestrian/bicycle counters
- Wayfinding
- ADA ramp from Terrace Park to CKC

**B. REET 2018 revenues in excess of projections** could be used for this one-time, relatively small expense without burdening this fund or the other two funding options.

**C. City Council Special Projects Reserves** currently has $210,460 including $60,460 currently with another $150,000 replenishing the account later this month.

If the City Council chooses to move forward with participating financially with the picnic pavilion, staff recommends using some combination of the three accounts. One possible option is to split the cost between the two or three of these accounts.

**Summary**

Following the City Council's discussion, staff is seeking direction on whether or not the City should participate financially in the Kirkland Rotary Club pavilion and what size the City Council prefers. If the City Council decides to contribute to the pavilion, staff will move forward with the Project and return with a bid award and fiscal note later this year.

**CITY OF KIRKLAND**
**Department of Finance & Administration**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3100**
**www.kirklandwa.gov**

## MEMORANDUM

**To:** Kurt Triplett, City Manager

**From:** Michael Olson, Director of Finance and Administration

**Date:** July 10, 2019

**Subject:** 2019-2020 BUDGET ADJUSTMENT: OPERATING CARRYOVERS AND OTHER ADJUSTMENTS

## RECOMMENDATION:

The City Council receives a brief recap of the year-end 2018 financial results and adopts the attached ordinance increasing the 2019-2020 budget appropriations for selected funds.

## BACKGROUND DISCUSSION:

The following budget adjustments are primarily for the operating funds, with the exception of recognizing actual balances in the Impact Fees and Real Estate Excise Tax (REET) funds. An update of the Capital Improvement Program and budget adjustments for the capital funds will be brought to the Council this coming this fall. As discussed at the May Council retreat, there are two key factors impacting final financial updates. The two factors are the transition of financial planning staff, as well as the on-going transition with the financial software MUNIS and the accompanying changes in how the new system provides reporting information. The newly hired financial planning staff are continuing to reconcile the unobligated balances in the General fund in MUNIS with the possibility of bringing back more detailed adjustments as part of the December budget update.

### 2018 Year-End Results

The year-end results for 2018 are discussed in detail in the Financial Management Report (FMR), which is included as **Attachment A**. This section provides a brief overview of the General Fund results versus the budget:

- Actual 2018 **General Fund revenues** ended the year $12.2 million over the budgeted level ($108.3 million versus budget of $96.1 million). The total revenue is $4.4 million more than estimated during the development of the 2019-2020 Budget in the fall of 2018. Retail sales taxes revenue represented $3.1 million of this amount, with the remainder coming from development service, interest earnings and a cross-section of categories. 2018 Development service revenue was extraordinary and was taken into account when the 2019-2020 biennial budget was prepared. Some of these funds have been used for the City Manager recommended additions which are detailed below.

- Actual 2018 **General Fund expenditures** ended the year about $1.0 million under budget, with the savings split between personnel services and professional services.

- Overall the City of Kirkland's **General Fund** performance was favorable, resulting in an increase of $13.2 million from the 2018 budget, a combination of increased revenues and expenditures below budget. Major contributions were increases to Development Services Reserves of $7,645,485 and Revolving Accounts of $512,620.

The following sections discuss the use of the resulting one-time funds, after factoring out obligated program reserves in the General Fund. This report covers also other operating and non-operating funds.

### Carryovers and Budget Adjustments

State law prohibits expenditures from exceeding the budgeted appropriation for any fund and requires the City to adjust appropriations when:

1. Unanticipated revenue exists and will potentially be expended;
2. New funds are established during the budget year which were not included in the original budget; or
3. The City Council authorizes positions, projects, or programs not incorporated into the current year's budget.

This budget adjustment allows for appropriation increases where it is anticipated that total expenditures may be in excess of the adopted 2019-2020 budget. Four types of adjustments are included in the proposed 2019-2020 budget amendment:

1. Operating carryovers;
2. Council directed and other adjustments;
3. Housekeeping adjustments; and,
4. Recognizing resources forward (cash at the end of 2018) across all funds.

Total appropriation adjustments result in a net budget increase of $27.8 million primarily due to adjustments for actual beginning cash balances in the General Fund and other funds, and an aggregate total adjustment of $40.7 million. The difference of almost $12.9 million from the appropriation changes is the result of some adjustments occurring within the funds and use of existing Resources Forward. The Budget Summary Attachment **(Attachment B)** shows both line item and appropriation changes. Line item changes are administrative adjustments within funds and are provided for reference. Appropriation adjustments change the total budget and require adoption by ordinance.

The following is a recap of major items requested in this budget adjustment:

**Carryovers** relate to uncompleted projects, contracts, or purchases that were authorized but not spent in the prior biennial budget. In order to complete these items, both the funding and the expenditure authority need to be "carried over" from the 2017-2018 Budget to the 2019-2020 Budget. Accordingly, the 2019-2020 Adopted Budget needs to be amended. Funding for carryovers primarily comes from recognizing cash that was obligated but not spent in the prior biennium (i.e. Resources Forward) and from external sources such as grants. Total carryover adjustments are $3.7 million across all funds.

1. **Operating Carryover** requests primarily consist of uncompleted projects and other one-time projects or activities. Recommended carryover requests total $2.7 million in the General Fund and $1.0 million in other operating funds. Resources forward funds the operating carryovers. Uses of resources forward net of carry forwards are described later in this memorandum. Carryover items include the following:

- **2018 Invoice Payments** – Carryovers in this category reflect adjustments to the 2019-2020 Budget to acknowledge payment of invoices in the current biennium for services received in the prior biennium. This adjustment is necessary because vendors did not invoice the City in time to allow for payment from the 2018 budget. Adjustments in this category are significantly less than prior years due to the new financial software (Munis). Munis is designed to use the prior year budget when these invoices are paid in the first few months of the following year. Carryovers for invoice payments in the General Fund total $137,360 and $17,637 in all other operating funds, including:

  General Fund
  - BKR Model Support, $14,360
  - Transportation Management Plan Support, $20,000
  - Transportation Consulting Services, $103,000

  All other funds
  - Information Technology Fund:
    - Adobe LiveCycle Support, $17,637

- **Projects not completed in 2017-2018**. These recommended carryovers are for projects previously funded in the 2017-2018 budget but are not yet completed. Recommended carryovers for 2017-2018 projects continuing into or being postponed until the 2019-2020 biennium total $2,182,535 in the General Fund and $318,011 in other funds, including:

  General Fund:

  - Lake and Central Feasibility Study, $150,000
  - Transit Oriented Development Study, $10,000
  - Policy Report Development & Equity Analysis Training, $9,150
  - Capital Funding to Neighborhood Services, $35,585
  - Eastside Rail Corridor Regional Branding, $9,000
  - Cultural Arts Commission Staffing, $17,580
  - Love of Kirkland/Inclusive Community, $40,000
  - Kirkland Heritage Society, $4,000
  - Records Management System, $13,064
  - Fire Station Outreach, $150,000
  - Delayed CIP Transfers (Fire Station 27 funding), $1,300,000
  - Speedometer Permit Review Reporting Tool, $5,000
  - Zoning Code Charts to Tables, $13,143
  - Senior Resource Guide, $20,900
  - Regional Aquatics Facilities Study, $7,500
  - Park and Trail Maps Printing, $2,300
  - Park Security Enhancements, $51,000
  - Plates and Helmets, Life Vests, Audio Recorders, $40,432
  - Totem Lake Room Improvements, $31,881
  - Holmes Point Development Standards Update, $150,000

- Commute Trip Reduction Enhancements, $62,000
- Commute Trip Reduction Incentives, $60,000

All Other Operating Funds:

- Water/Sewer Operating Fund:
    - Utility Rate Update Consulting Services, $3,881
    - Sewer Comprehensive Plan, $5,218
    - Hydraulic Modeling Consulting Services, $43,730

- Surface Water Management Fund:
    - Paint Outreach, $8,127
    - Spill Kit Program, $1,367
    - Utility Rate Update Consulting Services, $1,912
    - 132nd Square Park Geotechnical Investigation, $2,254
    - Beaver Management, $3,125
    - Equipment for Education & Outreach Specialist, $4,627
    - 132nd Square Park Flow Monitoring, $23,820
    - Surface Water Design Manual Study, $39,700
    - Forbes/NRH Stormwater Retrofit Planning, $180,250

- **Other Carryovers –** Recommended carryovers for other items that do not fall into the categories discussed above total $366,829 in the General Fund and $689,833 in other funds:

  General Fund:

  - King County EMS Core Services-Funded Equipment, $11,300
  - Structural Engineer, $106,100
  - Digitization Project, $68,000
  - Grants - Shoreline and Historic Preservation, $42,244
  - Teen Activity Mini Grant Program, $3,000
  - Human Services Grants, $43,185
  - Grant Support for Capital Engineering, $15,000
  - CAO-SDM CIP Environmental Planner, $75,000
  - Transportation Intern, $3,000

  All Other Operating Funds:

  - Street Operating Fund:
      - Development-related Sidewalk Improvement, $50,000

  - Water/Sewer Operating Fund:
      - Telemetry Improvements, $80,000
      - Water Opportunity Funds, $150,000
      - Manhole Replacement and Sewer Opportunity Funds, $180,238

  - Surface Water Management Fund:
      - Waterworks Construction Grant, $20,000
      - Local Source Control Inspections, $40,376

  - Information Technology Fund:

  - o Temporary Design Specialist (0.8 FTE), $12,700 (partially funded by Resource Forward)
  - o Graphics Forms, $6,050
  - o Adobe LiveCycle Contingency, $12,739
  - o ERC Fiber Feasibility Study, $99,000
  - o Computer Hardware, $38,730

2. **Council Directed/Other** Adjustments are changes to the budget based on formal policy decisions by the Council subsequent to the adoption of the 2019-2020 budget in December 2018 or smaller changes approved by the City Manager. Net appropriation changes for these items are $2.7 million. The appropriation changes total $1.8 million for the General Fund and $0.9 million with the other funds. School Zone Cameras totaling $0.58 million is appropriated with revenue from school zone speeding fines. The remaining appropriations are funded with external revenues (development revenues), internal fund transfers, resources forward (reserves) and offsetting expenditures within their own funds. Significant adjustments include:

   <u>Operating Funds</u>

   - General Fund
     - o Complete Count for the 2020 Census, $30,000
     - o Financial Operations Manager, $45,001 (Salary Adjustments Reserve)
     - o Implicit Bias Training, $150,000
     - o School Zone Cameras, Municipal Court (0.75 FTE), $107,577
     - o Temporary Lead Building Inspector, $9,642
     - o EnerGov Update Preparations, $2,225
     - o Infield Maintenance Finn Hill Middle School, $6,500
     - o Transfer Salary Savings to Detox Cell, $80,000
     - o School Zone Cameras, Police (1FTE), $443,917
     - o Purchase of 11 Tax title Properties from King County, $35,500 (Building and Property Reserves)
     - o Support Launch of Eastrail brand, $3,040
     - o Temporary HR Assistant, $62,764
     - o Backfill Neighborhood Outreach Coordinator, $19,738
     - o Temporary/Graduate Intern - Vision Zero Effects, $7,420
     - o Senior Planner Position from 0.8 FTE to 1.0 FTE, $58,453
     - o Emergency Management Intern, $7,026
     - o I-405/NE 85$^{th}$ Street Station Area Plan, $450,000 (see more information below)
     - o Innovation Interns, $68,000 (see more information below)
     - o Parking Enforcement Officer, 188,852 (see more information on the next page)

   The City Manager recommends use of $518,000 of resources forward to make progress on the City Council's work program with funding the I-405/NE 85$^{th}$ Street Station Area Plan at $450,000 and innovation interns for $68,000 described below. In response to community concerns, the City Manager also recommends adding one additional Parking Enforcement Officer to increase parking enforcement near Park & Rides, in Totem Lake, in bike lanes, at water front parks, and other areas as needed. The new position is projected to be funded by revenues generated from parking infractions.

     - o I-405/NE 85$^{th}$ Street Station Area Plan, $450,000

The I-405/NE 85th Street Station Area Plan is comprehensive planning effort for the area surrounding the proposed bus rapid transit station at I405/NE 85th Street. The plan would encompass architectural/design, transportation, economic, and land use considerations.

- Innovation Interns, $68,000
  Innovation internships are designed to help complete Work Program or other high priority items. Interns will perform a variety of tasks which could include: assist with research projects, community outreach efforts and with the design and distribution of outreach materials; perform policy analysis, collect data, write summary reports, and present findings.
- Parking Enforcement Officer, $188,852
  The addition of a Parking Enforcement Officer will provide for greater service in parking enforcement for high traffic areas including Park & Rides, waterfront parks, bike lanes, and will provide enforcement for other areas as needed. This funding request includes the startup expenditures of the vehicle, equipment, salary and benefits for the remainder of 2019 and all of 2020.

- Lodging Tax Fund:
  - Kirkland Visitor Center Exterior Sign, $6,400
  - Special Projects Coordinator 0.15 FTE Increase, $16,271

- Street Operating Fund:
  - School Zone Cameras, $28,665

- Limited General Obligation Bond Fund:
  - Net Impact of CIP Adjustments, ($649,112) (Funding Transfer to Parks Maintenance Center Project)

- Information Technology Fund:
  - Temporary Design Specialist – Munis Support Staffing, $6,456
  - Temporary Design Specialist, $9,250
  - Professional Services for IT Stabilization, $26,900
  - Senior Business Analyst - Temporary Reorganization, $53,851
  - Temporary Design Specialist, $63,914 (Partially funded by Carryover)
  - Sr. Applications Analyst Extension - IT Stabilization, 85,384
  - Senior Business Analyst - IT Stabilization, $141,328

- Facilities Maintenance Fund:
  - Parks Maintenance Center, $309,239

Non-Operating Funds

- Impact Fees Fund:
  - Parks Maintenance Center, $400,000

- Excise Tax Capital Improvement Fund:
  - CIP Adjustments, net impact – REET 2 Reserves, $462,114

3. **Housekeeping Adjustments** include items that adjust the budget detail to reflect corrections to the adopted budget totaling $118,219 (with matching appropriation changes). Recommended operating adjustments include:

- Court Position not included in adopted budget, $134,307
- Budget Ordinance correction in General Fund, ($33,534)
- Federal Funds received in prior years not restricted, $17,446

These adjustments are funded through reconciliation of internal and external revenues against future needs, federal grant receipt and Resources Forward.

4. **Fund Balances** include changes that reflect the results and perfomance of the current fiscal year. It also depicts coming year's financial transactions on available resources as presented in the 2019-2020 budget. A minimum level of fund balance must be maintained in each fund to assure adequate cash flow. In all cases, fund balance is at or above the minimum level. A negative change in fund balance is not necessarily a reflection of concern. Rather, it typically reflects the use of accumulated resources for planned expenditures (e.g. use of bond proceeds for capital projects.)

**2019 Reserves**, and beginning fund balance (cash), were estimated as part of the 2019-2020 budget process during the fall of 2018. Now that 2018 is complete, staff has reconciled the estimated resources forward with actual balances. An adjustment (increase or decrease) to the budgeted beginning balance with a corresponding offset to the expenditure side will be made for all operating, capital and other non-operating funds. This offset is usually to a reserve account, but may be to other line items depending on the nature of the change in the beginning balance. The current proposed budget adjustments discussed above recognize the estimated balances in the General Fund and Other Funds required to fund carryovers.

**General Fund**
Based on the current information, total beginning fund balance adjustment in the General Fund is a net increase of $13.6 million, a result of Actual Revenues and Expenditures performance compared to our 2017-2018 Revised Budget as shown in Table 1. This majority of these funds are set aside for Development Services Reserves and other Reserves since the adoption of the 2019-2020 budget in December 2018. $12.6 million of the resources forward in the General Fund is used to fund the carryover requests and Council & other funding decisions as shown in Table 2.

**Table 1 – General Fund Budget Adjustment**

| | General Fund |
|---|---|
| | |
| 2019-2020 Adopted Budget - Dec. 2018 | 245,651,799 |
| Budget Adjustments | 13,635,975 |
| **2019-2020 Amended Budget** | **259,287,774** |

Cash is being set aside for the following items that have occurred since the adoption of the budget in December 2018 (a total of $8,308,105):

- **Development Services Reserves** – Recognize that development services-related revenues received in excess of the estimate in 2018 is for work that will need to be completed in this biennium by adding $7,645,485 to the development services reserves.
- **Revolving Accounts –** Adjust special reserves in the General Fund to recognize an additional $512,620 in actual cash balances.

- **Council Special Project Reserve** – Fund this reserve to replenish the expenditure related to implicit bias training of $150,000.

**Table 2 – General Fund Fund Balance Change Summary**

| General Fund Resources Forward | Amount |
|---|---|
| **Net Change in General Fund Resources Forward** | **12,643,590** |
| External Revenues | 801,690 |
| Transfers and Other Adjustments | 89,922 |
| Use of Fund Balances | 100,773 |
| **Total Revenues & Other Sources** | **13,635,975** |
| General Fund Carryovers | (2,686,724) |
| Council Directed/Other | (1,775,655) |
| Housekeeping | (118,219) |
| Reserves Reconciliation and Balances | (8,158,105) |
| **Total Uses** | **(12,738,703)** |
| **Remaining Changes to Fund Balances** | **897,272** |

**Other Funds**

With all other funds (operating and capital), there is a net change to resources forward of $13.2 million. Table 3 provides a summary of net change in Resources Forward with its total revenue and other sources, as well as, the total uses. As development service revenues in 2017-2018 were extraordinary, the increase impacted positively both operating and non-operating funds, including REETs, Impact Fees, Water & Sewer and others. REET revenue resulted in an increase in fund balance of $10.8 million. Impact Fees Funds increased $0.8 million. The Water & Sewer Fund balance increased $0.5 million related to connection which was a pass-through to Cascade Water Alliance. This is a timing issue where the expenditure is expected to be paid in the current biennium.

The remaining beginning fund balance adjustment in other funds requiring an appropriation change is a net increase of $14.2 million, as detailed in the following table.

**Table 3 – Non-General Fund Fund Balance Change Summary**

| Other Funds Resources Forward | Amount |
|---|---|
| **Net Change In Resources Forward** | **13,163,336** |
| External Revenues | 119,000 |
| Transfers and Other Adjustments | (284,901) |
| Use of Fund Balances | 1,190,453 |
| **Total Revenue & Other Sources** | **14,187,888** |
| Carryovers/Council Directed/Other | (1,986,141) |
| Reserves Reconciliation and CIP Balances | (12,195,347) |
| **Total Uses** | **(14,181,488)** |
| **Remaining Changes to Fund Balances** | **6,400** |

The remaining changes to Fund Balances and Reserves will be retained as working capital.

## SUMMARY:

Table 4 summarizes the total budget appropriation change of $27.8 million:

**Table 4 – Adjustment Type Summary**

| Adjustment Type | General Fund | Other Funds | Total |
|---|---|---|---|
| Carryovers | 2,686,724 | 1,025,481 | 3,712,205 |
| Council Directed/Other | 1,775,655 | 960,660 | 2,736,315 |
| Housekeeping | 118,219 | - | 118,219 |
| Reserves/Working Capital & Balances | 9,055,377 | 12,195,347 | 21,250,724 |
| **Total** | **13,635,975** | **14,181,488** | **27,817,463** |

Table 5 displays the adjustments and summarizes the 2019-2020 revised budget by fund type. The Budget Summary Attachment (**Attachment B**) details the budget adjustments by type and revenue source, where applicable.

**Table 5 – Fund Appropriation Change Summary**

| Fund Type | 2019-2020 Adopted Budget | Appropriation Adjustments | 2019-2020 Amended Budget |
|---|---|---|---|
| General Government: | | | |
| General Fund | 245,651,799 | 13,635,975 | 259,287,774 |
| Other Operating Funds | 206,029,741 | 1,281,311 | 207,311,052 |
| Internal Funds | 79,781,915 | 771,352 | 80,553,267 |
| Non-Operating Funds | 54,724,784 | 11,819,969 | 66,544,753 |
| Utilities Funds: | | | |
| Water/Sewer | 114,121,260 | 657,310 | 114,778,570 |
| Surface Water | 52,994,170 | 263,432 | 53,257,602 |
| Solid Waste | 39,720,466 | (611,886) | 39,108,580 |
| **Total Budget** | **793,024,135** | **27,817,463** | **820,841,598** |

By approving the attached ordinance updating the budget, the Council will be adjusting the appropriation authority to reflect these new revenues and other changes. The next opportunity to adjust the budget will occur this fall during the update of the Capital Improvement Program and review of the capital projects funds. The final opportunity in 2019 is scheduled in December 2019 as part of the mid-biennial budget adjustment process.

# Financial Management Report as of December 31, 2018

**AT A GLANCE:**

2019-2020 Budget was approved by the Kirkland City Council on Dec.11, 2018 (page 2)

2018 General Fund revenues increased 4.9% over 2017 (page 3)

General Sales Tax revenue grew 8.7% through 2018 (pages 5-7)

The City's transition to a new financial system has resulted in reporting on an accrual, rather than cash basis.

***Inside this issue:***



## Summary of All Operating Funds: *Revenue*

- **General Fund** revenue ended the year **4.9 percent** above 2017 levels, an increase of $5.0 million. This increase was primarily driven by significant increases in building permits of $3.5 million that were nearly double the 2017 amounts and a sales tax revenue increase of $1.9 million (an 8.7% increase). These increases were partially offset by a decrease in utility taxes of $616,239 (down 4.2%) primarily in the telecom sector. It is worth noting that 2017 actuals include $2.4 million in proceeds from the sale of the 505 Market Building which is included in the miscellaneous category. Excluding these one-time property proceeds, the year-over-year revenue growth was 7.4 percent. A more detailed analysis of General Fund revenue can be found on pages 2-3, and of sales tax revenue on pages 5-7.

- **Other General Government Funds** finished the year **2.8 percent** higher than 2017. The **Street Operating Fund** revenues were **3.3 percent** higher than 2017 due to revenues received for street cut permits and parking fees. The **Information Technology Fund** revenues were **6.8 percent** higher due to additions from service packages in the 2018 budget.

- Revenues in **Utility Funds** in total were up **3.4 percent** compared to 2017, and **2.4 percent** above the 2018 budget. Increases in utility rates, the addition of new utility customers, and changes in consumption can impact both revenue and expenditures. In utility funds, which are operated as enterprises, the comparison of actual revenues to expenditures is an important measure of the whether utility rates are sufficient to cover costs. In 2018, each utility ended the year with actual revenue greater than expenses.

- **Water/Sewer Operating Fund** revenue was up **4.0 percent** from 2017. Actual revenue was **102.6 percent of budget**. The growth in collections was primarily due to a 1.7 percent water rate increase and 2.1 percent sewer rate increase for single family residences. Sewer rates increased by approximately 1.4% for multifamily and commercial customers.

- **Surface Water Management Fund** revenues were **3.9 percent** higher than 2017. Fund revenues were **1.9 percent** above the budget, consistent with prior years.

- **Solid Waste Fund** revenues through 2018 were **2.2 percent** higher than 2017, and were **2.4 percent** over the annual budget.

| | Year-to-Date Actual | | | Budget | | | % of Budget | |
|---|---|---|---|---|---|---|---|---|
| **Resources by Fund** | **12/31/2017** | **12/31/2018** | **% Change** | **2017** | **2018** | **% Change** | **2017** | **2018** |
| ***General Gov't Operating:*** | | | | | | | | |
| General Fund | 103,202,706 | 108,284,342 | 4.9% | 98,896,719 | 96,097,288 | -2.8% | 104.4% | 112.7% |
| Other General Gov't Operating Funds | 28,818,237 | 29,612,173 | 2.8% | 28,340,588 | 29,069,084 | 2.6% | 101.7% | 101.9% |
| **Total General Gov't Operating** | **132,020,942** | **137,896,515** | **4.5%** | **127,237,307** | **125,166,372** | **-1.6%** | **103.8%** | **110.2%** |
| ***Utilities:*** | | | | | | | | |
| Water/Sewer Operating Fund | 28,608,187 | 29,751,864 | 4.0% | 28,419,059 | 29,008,658 | 2.1% | 100.7% | 102.6% |
| Surface Water Management Fund | 10,465,832 | 10,876,030 | 3.9% | 10,701,307 | 10,669,088 | -0.3% | 97.8% | 101.9% |
| Solid Waste Fund | 17,612,254 | 18,006,420 | 2.2% | 17,354,535 | 17,590,939 | 1.4% | 101.5% | 102.4% |
| **Total Utilities** | **56,686,273** | **58,634,315** | **3.4%** | **56,474,901** | **57,268,685** | **1.4%** | **100.4%** | **102.4%** |
| **Total All Operating Funds** | **188,707,215** | **196,530,830** | **4.1%** | **183,712,208** | **182,435,057** | **-0.7%** | **102.7%** | **107.7%** |

*Budgeted and actual revenues exclude resources forward and interfund transfers.

**Kirkland City Council Adopts 2019-2020 Budget**

On December 11th, the City Council adopted its $793 million 2019-2020 biennial budget with the theme of "Safe, Sustainable, and Connected."

Features of the new budget include:

*Safe:*

- Enhanced funding for police services and community safety funded by the voter-approved Proposition 1
- A new fire station, training facilities, and emergency management staffing

*Sustainable:*

- Development of the City's first Sustainability Master Plan
- Expanded Green Kirkland Partnership
- Expanded Public Works and Parks Maintenance Centers

*Connected:*

- New Bus Rapid Transit interchange at I-405 and NE 85th Street
- Investments in trails, bikeways, greenways, and the Totem Lake Connector Bridge

While this new budget represents a **5.5 percent** increase over 2017-2018, most additional services are backed by new revenue or are offset by reductions elsewhere. The City also takes conscientious steps to ensure its financial sustainability as it grows including maintaining a **AAA** Credit Rating from Standard and Poor's, keeping its price of government low (3.8%) and below the typical range of 5-6%, and earning the State Auditor's **Stewardship Award**.

# Summary of All Operating Funds: *Expenditures*

- **General Fund** expenditures (excluding interfund transfers) finished 2018 up **6.2 percent**, or **$5.45 million** higher than 2017 and was **99.5 percent** of budget. Growth in personnel services and professional services (including intergovernmental) were the primary drivers of the year-over-year growth in expenditures. It should be noted that 2018 actual expenses include accruals for expenses incurred in 2018 but paid on 2019 (see discussion: Changes to FMR). An analysis of General Fund expenditures by department can be found on pages 4 and 5.

- **Other General Government Operating Funds** expenditures were **11.7 percent**, or **$2.75 million** lower than 2017. The total net change resulted from:
  - ◊ A **$1.98 million** decrease in vehicle purchases in the **Equipment Rental Fund**.
  - ◊ **Lodging Tax Fund** expenditures that were **$89,130** less than 2017.
  - ◊ **Information Technology Fund** expenditures were **3.9 percent**, or **$245,000** lower due to fluctuating pension liabilities.
  - ◊ The **Street Operating Fund** expenditures were higher by **2.0 percent** due to work related to parking facilities and traffic signals.
  - ◊ **Parks Maintenance** expenditures were higher by **$28,197** due to position vacancies in 2017.

- **Water/Sewer Operating Fund** actual expenditures were **5.3 percent** higher than 2017, and at **100.5 percent** of 2018 budget due primarily to the timing of monthly water payments. Although expenditures were slightly over budget, the utility did not exceed its legal budget authority once budgeted reserves are included. Again, the more significant indicator is that utility revenues exceeded utility expenditures.

- **Surface Water Management Fund** expenditures through 2018 were **4.3 percent** higher than 2017 due to the filling of positions that were vacant in 2017. Expenditures through 2018 were at **94.4 percent** of budget.

- **Solid Waste Fund** expenditures were **1.2 percent** higher in 2018 than in 2017. An increase in the waste disposal contract, based on annual consumer price index growth, was the main cause of the overall increase. Expenditures were at **100.7** percent of budget in 2018 due to timing of payments to waste management. The Solid Waste Fund was also within its overall budget after including budgeted reserves.

| | Year-to-Date Actual | | | Budget | | | % of Budget | |
|---|---|---|---|---|---|---|---|---|
| **Expenditures by Fund** | **12/31/2017** | **12/31/2018** | **% Change** | **2017** | **2018** | **% Change** | **2017** | **2018** |
| ***General Gov't Operating:*** | | | | | | | | |
| General Fund | 88,185,876 | 93,634,085 | 6.2% | 91,544,768 | 94,112,054 | 2.8% | 96.3% | 99.5% |
| Other General Gov't Operating Funds | 23,586,318 | 20,831,598 | -11.7% | 25,552,249 | 25,843,420 | 1.1% | 92.3% | 80.6% |
| **Total General Gov't Operating** | **111,772,194** | **114,465,682** | **2.4%** | **117,097,017** | **119,955,474** | **2.4%** | **95.5%** | **95.4%** |
| ***Utilities:*** | | | | | | | | |
| Water/Sewer Operating Fund | 22,819,173 | 24,017,575 | 5.3% | 23,834,895 | 23,905,037 | 0.3% | 95.7% | 100.5% |
| Surface Water Management Fund | 7,525,791 | 7,846,799 | 4.3% | 8,684,484 | 8,311,895 | -4.3% | 86.7% | 94.4% |
| Solid Waste Fund | 17,162,439 | 17,373,592 | 1.2% | 16,968,641 | 17,252,338 | 1.7% | 101.1% | 100.7% |
| **Total Utilities** | **47,507,403** | **49,237,966** | **3.6%** | **49,488,020** | **49,469,270** | **0.0%** | **96.0%** | **99.5%** |
| **Total All Operating Funds** | **159,279,596** | **163,703,649** | **2.8%** | **166,585,037** | **169,424,744** | **1.7%** | **95.6%** | **96.6%** |

*Budgeted and actual expenditures exclude working capital, operating reserves, capital reserves, and interfund transfers.

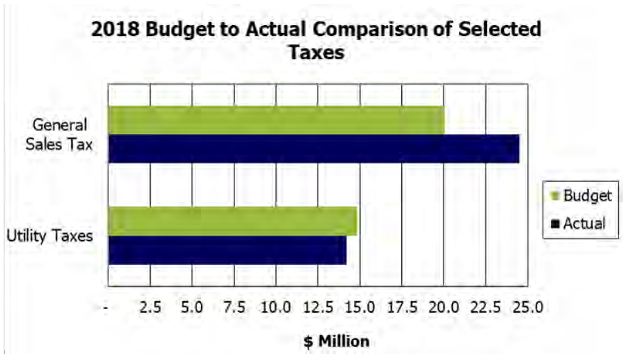
# General Fund Revenue

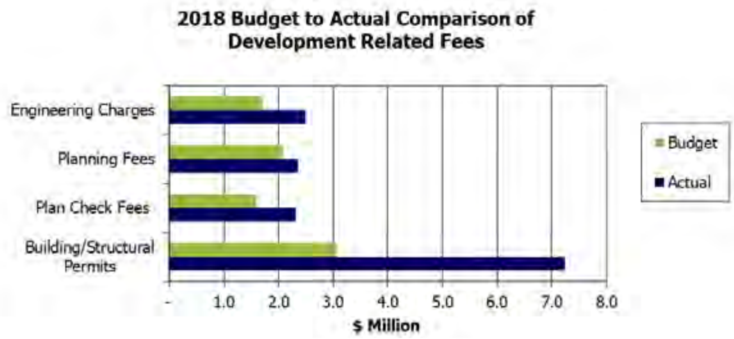
- **General Retail Sales tax** revenue allocated to the General Fund through 2018 was **10.6 percent** higher than 2017, and finished at **22.3 percent** over the budgeted amount. A detailed analysis of total sales tax revenue can be found on page 5 and 6.
- **Property taxes** received through 2018 were **2.7 percent** higher than 2017, and **0.4 percent** higher than budgeted based on the final approved levy for 2018.
- **Utility tax** collections were **4.2 percent** less than 2017, at **95.6 percent** of budget. Warmer winter weather and reduced consumer spending on telephone and cable have led to this year-over-year decline.
- **Revenue generating regulatory license (RGRL)** collections were **14.5 percent** higher than 2017, and **28.0 percent** above budget. This year-over-year increase is due to the escalating growth of new businesses and diligent follow-up on back payments from businesses that were formerly unlicensed.
- **Building, Structural and Equipment Permit** revenues were almost double in collections through 2018, or **94.8 percent** higher than 2017, and nearly double the budgeted amount for the year. Building permits were the driving force behind this substantial increase. Much of the increased revenue will be set aside in the development services reserve to recognize that the work it is funding will occur in subsequent years.
- **Grants and Federal Entitlements** were **175.7 percent** higher than 2017, and **173.5 percent** above budget, due primarily to new and increased grant receipts of $204,400 from the Department of Natural Resources, $120,300 from Indirect Federal Highway Plan Construction, and $128,756 Community Development Block Grants in 2018. A required accounting change for Emergency Medical Transport fees resulted in an increase of $253,000 in this category. Previously all transport fees were reported under the Other Charges for Service category. As of 2018 Medicare/Medicaid reimbursed transports were moved to the Federal Entitlement category.
- **State Shared Revenues** were up **9.0 percent** due to an increase in marijuana excise tax receipts that resulted from a one-time legislative provision which reversed an earlier reduction in shared revenues. The City received a total of $219,738 from marijuana excise taxes in 2018.
- **Plan Check Fees** and **Planning Fees** decreased in 2018 by **17.1 percent** and **13.9 percent** respectively. This year's decrease was primarily due to large fees collected in 2017 for The Village at Totem Lake and Kirkland Urban.
- **Recreation fees** were **9.5 percent** higher due to increased demand for programs including a new After School Program, Recreational Sports, Preschool, and Youth Programs.
- **Miscellaneous revenue** was lower by **37.7** percent compared to 2017 due to $2.4 million in one-time proceeds from the sale of the 505 Market property sale in 2017.

| General Fund Resource Category | Year-to-Date Actual 12/31/2017 | Year-to-Date Actual 12/31/2018 | Year-to-Date Actual % Change | Budget 2017 | Budget 2018 | Budget % Change | % of Budget 2017 | % of Budget 2018 |
|---|---|---|---|---|---|---|---|---|
| ***Taxes:*** | | | | | | | | |
| Retail Sales Tax: General | 22,159,656 | 24,499,162 | 10.6% | 20,872,134 | 20,031,035 | -4.0% | 106.2% | 122.3% |
| Retail Sales Tax Credit: Annexation | 4,228,624 | 4,237,613 | 0.2% | 3,935,000 | 3,935,000 | 0.0% | 107.5% | 107.7% |
| Retail Sales Tax: Criminal Justice | 2,386,321 | 2,622,592 | 9.9% | 2,305,000 | 2,363,000 | 2.5% | 103.5% | 111.0% |
| Property Tax | 18,343,360 | 18,838,823 | 2.7% | 18,384,976 | 18,762,395 | 2.1% | 99.8% | 100.4% |
| Utility Taxes | 14,816,655 | 14,200,416 | -4.2% | 14,661,582 | 14,857,345 | 1.3% | 101.1% | 95.6% |
| Rev Generating Regulatory License | 2,858,364 | 3,273,007 | 14.5% | 2,509,268 | 2,556,313 | 1.9% | 113.9% | 128.0% |
| Other Taxes | 1,617,663 | 1,648,203 | 1.9% | 1,377,458 | 1,378,208 | 0.1% | 117.4% | 119.6% |
| **Total Taxes** | **66,410,642** | **69,319,816** | **4.4%** | **64,045,418** | **63,883,296** | **-0.3%** | **103.7%** | **108.5%** |
| ***Licenses & Permits:*** | | | | | | | | |
| Building, Structural & Equipment Permits | 3,714,990 | 7,236,351 | 94.8% | 3,445,600 | 3,047,988 | -11.5% | 107.8% | 237.4% |
| Business Licenses/Franchise Fees | 4,750,611 | 5,007,955 | 5.4% | 4,691,013 | 4,745,631 | 1.2% | 101.3% | 105.5% |
| Other Licenses & Permits | 642,994 | 940,512 | 46.3% | 539,101 | 760,972 | 41.2% | 119.3% | 123.6% |
| **Total Licenses & Permits** | **9,108,595** | **13,184,818** | **44.8%** | **8,675,714** | **8,554,591** | **-1.4%** | **105.0%** | **154.1%** |
| ***Intergovernmental:*** | | | | | | | | |
| Grants and Federal Entitlements | 335,983 | 926,438 | 175.7% | 155,136 | 533,888 | 244.1% | 216.6% | 173.5% |
| State Shared Revenues & Entitlements | 1,420,011 | 1,547,446 | 9.0% | 1,366,446 | 1,428,072 | 4.5% | 103.9% | 108.4% |
| EMS | 1,052,014 | 1,027,766 | -2.3% | 939,657 | 1,077,212 | 14.6% | 112.0% | 95.4% |
| **Total Intergovernmental** | **2,808,008** | **3,501,650** | **24.7%** | **2,461,239** | **3,039,172** | **23.5%** | **114.1%** | **115.2%** |
| ***Charges for Services:*** | | | | | | | | |
| Internal Charges | 7,339,767 | 7,974,144 | 8.6% | 7,400,677 | 7,752,675 | 4.8% | 99.2% | 102.9% |
| Engineering Services | 2,581,269 | 2,486,372 | -3.7% | 2,085,548 | 1,702,696 | -18.4% | 123.8% | 146.0% |
| Plan Check Fee | 2,794,006 | 2,314,947 | -17.1% | 2,000,000 | 1,600,000 | -20.0% | 139.7% | 144.7% |
| Planning Fees | 2,736,937 | 2,355,809 | -13.9% | 2,724,083 | 2,073,059 | -23.9% | 100.5% | 113.6% |
| Recreation | 1,520,906 | 1,665,604 | 9.5% | 1,390,471 | 1,395,278 | 0.3% | 109.4% | 119.4% |
| Other Charges for Services | 1,648,369 | 1,110,968 | -32.6% | 1,995,440 | 2,021,216 | 1.3% | 82.6% | 55.0% |
| **Total Charges for Services** | **18,621,253** | **17,907,844** | **-3.8%** | **17,596,219** | **16,544,924** | **-6.0%** | **105.8%** | **108.2%** |
| ***Fines & Forfeits*** | 1,553,930 | 1,439,762 | -7.3% | 1,856,030 | 1,861,612 | 0.3% | 83.7% | 77.3% |
| ***Miscellaneous*** | 4,700,277 | 2,930,453 | -37.7% | 4,262,099 | 2,213,693 | -48.1% | 110.3% | 132.4% |
| **Total Revenues** | **103,202,706** | **108,284,342** | **4.9%** | **98,896,719** | **96,097,288** | **-2.8%** | **104.4%** | **112.7%** |
| ***Other Financing Sources:*** | | | | | | | | |
| Interfund Transfers | 240,859 | 257,144 | 6.8% | 379,515 | 316,021 | -16.7% | 63.5% | 81.4% |
| **Total Other Financing Sources** | **240,859** | **257,144** | **6.8%** | **379,515** | **316,021** | **-16.7%** | **63.5%** | **81.4%** |
| **Total Resources** | **103,443,565** | **108,541,486** | **4.9%** | **99,276,234** | **96,413,309** | **-2.9%** | **104.2%** | **112.6%** |

*Budgeted and actual revenues exclude resources forward.

**General Fund Revenue *continued***




# General Fund Expenditures

| General Fund Department Expenditures | Year-to-Date Actual 12/31/2017 | Year-to-Date Actual 12/31/2018 | % Change | Budget 2017 | Budget 2018 | % Change | % of Budget 2017 | % of Budget 2018 |
|---|---|---|---|---|---|---|---|---|
| Non-Departmental | 2,610,193 | 3,566,079 | 36.6% | 2,845,912 | 2,464,395 | -13.4% | 91.7% | 144.7% |
| City Council | 478,883 | 561,428 | 17.2% | 518,224 | 585,542 | 13.0% | 92.4% | 95.9% |
| City Manager's Office | 2,412,097 | 2,800,703 | 16.1% | 2,881,373 | 2,809,317 | -2.5% | 83.7% | 99.7% |
| Municipal Court | 2,421,484 | 2,483,478 | 2.6% | 2,493,411 | 2,547,622 | 2.2% | 97.1% | 97.5% |
| Human Resources | 1,561,450 | 1,525,155 | -2.3% | 1,583,237 | 1,602,223 | 1.2% | 98.6% | 95.2% |
| City Attorney's Office | 1,161,702 | 1,299,909 | 11.9% | 1,224,232 | 1,261,447 | 3.0% | 94.9% | 103.0% |
| Parks & Community Services | 7,956,777 | 8,958,610 | 12.6% | 8,655,553 | 8,684,415 | 0.3% | 91.9% | 103.2% |
| Public Works (Engineering) | 6,561,518 | 7,121,716 | 8.5% | 7,183,615 | 7,929,156 | 10.4% | 91.3% | 89.8% |
| Finance and Administration | 5,074,680 | 5,461,401 | 7.6% | 5,098,737 | 5,452,557 | 6.9% | 99.5% | 100.2% |
| Planning & Building | 9,972,540 | 9,989,021 | 0.2% | 10,756,124 | 10,667,963 | -0.8% | 92.7% | 93.6% |
| Police | 25,534,569 | 26,041,755 | 2.0% | 25,787,126 | 26,420,889 | 2.5% | 99.0% | 98.6% |
| Fire | 22,439,984 | 23,824,830 | 6.2% | 22,517,224 | 23,686,528 | 5.2% | 99.7% | 100.6% |
| **Total Expenditures** | **88,185,876** | **93,634,085** | **6.2%** | **91,544,768** | **94,112,054** | **2.8%** | **96.3%** | **99.5%** |
| ***Other Financing Uses:*** | | | | | | | | |
| Interfund Transfers | 12,844,825 | 5,276,754 | -58.9% | 12,780,572 | 7,830,864 | -38.7% | 100.5% | 67.4% |
| **Total Other Financing Uses** | **12,844,825** | **5,276,754** | **-58.9%** | **12,780,572** | **7,830,864** | **-38.7%** | **100.5%** | **67.4%** |
| **Total Expenditures & Other Uses** | **101,030,701** | **98,910,839** | **-2.1%** | **104,325,340** | **101,942,918** | **-2.3%** | **96.8%** | **97.0%** |

*Budgeted and actual expenditures exclude working capital, operating reserves, and capital reserves.

**Comparing 2018 and 2017 General Fund expenditures:**

*Actual 2018 General Fund expenditures (excluding "other financing uses") were*

In 2018, excluding interfund transfers, General Fund expenditures were **6.2 percent** higher than 2017, and **99.5 percent** of budget. Specific reasons for variances with expenditures are highlighted below:

- **Non-Departmental** expenditures were up **36.6 percent**, or **$955,886** primarily due to a payment of $850,000 for the purchase of the Houghton Court Apartments. Funding for the purchase was provided by using a portion of the proceeds from the sale of 505 Market in 2017 which had been held in the Building and Property Reserve until the 2018 property purchase expenditure was made.
- **City Council** expenditures were **17.2 percent** higher, or **$82,545**, through 2018 than the previous year due to the addition of the Community Safety Survey and slightly higher-than-anticipated dues payments.
- The **City Manager's Office** expenditures through 2018 were up **16.1 percent**, or **$388,606** from 2017. The majority of this was due to a reorganization within the department which led to higher personnel costs from overlapping positions. The overlaps will resolve by the end of 2019.
- **Parks and Community Services** expenditures in 2018 were **12.6 percent**, or **$1,001,832**, above 2017 and **103.2 percent** of budget. This increase was driven by additional salary and benefit costs as well as additional money spent on a fee study in 2018.

*Continued on next page*

- **Public Works (Engineering)** expenditures were **8.5 percent**, or **$560,198** higher than 2017 but only **89.8 percent** of budget. Growth in expenditures driven by the timing of payments related to 2017-2018 service packages for Kirkland Green Trip, Bellevue-Kirkland-Redmond (BKR) Travel Model, as well as Commute Trip Reduction expenses were offset by position vacancies.
- **Police** expenditures through 2018 were up **2.0 percent**, or **$507,186**, compared to 2017. The increase in expenditures reflect the addition of the Animal Services program effective in 2018. The increase is also resulted from filled vacancies, particularly in the Traffic unit.
- Expenditures for the **Fire Department** through 2018 were **6.2 percent**, or **$1,384,847**, higher than last year and **100.6 percent** of budget. This was primarily due to additional personnel costs within emergency preparedness and overtime expenses within the fire prevention division.

## Sales Tax Revenue Analysis & Outlook

General sales tax revenue through 2018 was **8.7 percent** higher than 2017. Contracting led the growth, followed by General Merchandise/Miscellaneous Retail at a 19.5% increase, mainly due to the Marketplace Fairness Act that went into effect in January 2018. Excluding the impact of revenue growth in the Contracting sector, the 2018 year-to-date total would have been **5.5 percent** through 2018.

*Figures in this section vary from those in the General Fund analysis because this analysis is on a cash basis whereas the General Fund*

**Review by business sector:**


- **Contracting** was up **20.6 percent** compared to 2017. Construction collections were strong and made up **49.5 percent** of total sales tax growth for 2018.
- Sales tax from the **retail sectors** was collectively up **4.4 percent** compared to 2017 and in aggregate contributed **26.5 percent** of the year-over-year growth.
  - ◊ **Auto/gas retail** was down **1.8 percent** due to declining vehicle sales which was partially offset by higher retail fuel sales.
  - ◊ **General merchandise/miscellaneous retail** was up **19.5 percent** compared to 2017 primarily due to the Marketplace Fairness Act, which requires retailers to collect sales tax on behalf of third party sellers.
  - ◊ **Retail eating/drinking** was up **2.1 percent** compared to 2017.
  - ◊ **Other retail** was up **6.2 percent** compared to 2017 due primarily to growth in Clothing, Building & Garden and Electronics subcategories.
- Revenues from **Communications** were **7.3 percent** lower than 2017 due to a one-time back tax payment received in 2017.
- Revenues from **Services** grew by **10.3 percent** due to a one-time audit of a single taxpayer.
- **Miscellaneous** was **11.8 percent** above last year, due to growth in the Real Estate subsector.

*"Other Retail " includes a broad range of retailers that include Furniture, Electronics & Appliances, Building Material & Garden Equipment/Supplies, Food & Beverages, Health & Personal Care items, Clothing, and Sport-*

**City of Kirkland Actual Sales Tax Receipts**

| Business Sector Group | YTD 2017 | YTD 2018 | Dollar Change | Percent Change | Percent of Total 2017 | Percent of Total 2018 |
|---|---|---|---|---|---|---|
| Services | 2,842,908 | 3,136,670 | 293,762 | 10.3% | 13.0% | 13.2% |
| Contracting | 4,573,497 | 5,514,739 | 941,242 | 20.6% | 20.9% | 23.2% |
| Communications | 592,699 | 549,191 | (43,508) | -7.3% | 2.7% | 2.3% |
| Retail: | | | | | | |
| Auto/Gas Retail | 5,042,218 | 4,951,935 | (90,283) | -1.8% | 23.1% | 20.8% |
| Gen Merch/Misc Retail | 1,965,613 | 2,348,637 | 383,025 | 19.5% | 9.0% | 9.9% |
| Retail Eating/Drinking | 1,683,847 | 1,719,164 | 35,317 | 2.1% | 7.7% | 7.2% |
| Other Retail | 2,858,068 | 3,034,390 | 176,322 | 6.2% | 13.1% | 12.8% |
| Wholesale | 1,009,745 | 1,063,075 | 53,330 | 5.3% | 4.6% | 4.5% |
| Miscellaneous | 1,283,970 | 1,434,990 | 151,019 | 11.8% | 5.9% | 6.0% |
| **Total** | **21,852,566** | **23,752,792** | **1,900,226** | **8.7%** | **100.0%** | **100.0%** |

*Kirkland's sales tax base is comprised of a variety of businesses, which are grouped and analyzed by business sector (according to "North American Industry Classification System" or NAICS). Nine business sector groupings are used to compare 2018 to 2017 sales tax receipts in the table to the left.*

*When analyzing monthly sales tax receipts, there are two items to note:*

*First, most businesses remit their sales tax collections to the Washington State Department of Revenue on a monthly basis. Small businesses only have to remit their sales tax collections either quarterly or annually, which can create anomalies when comparing the same month between the two years. Second, for those businesses that remit their sales tax collections monthly, there is a two month lag from the time that sales tax is collected to the time it is distributed to the City.*

| Month | Sales Tax Receipts 2017 | Sales Tax Receipts 2018 | Dollar Change | Percent Change |
|---|---|---|---|---|
| Jan | 1,660,299 | 1,808,241 | 147,941 | 8.9% |
| Feb | 2,080,553 | 2,239,701 | 159,149 | 7.6% |
| Mar | 1,727,469 | 1,743,964 | 16,495 | 1.0% |
| April | 1,568,441 | 1,620,132 | 51,691 | 3.3% |
| May | 1,902,424 | 2,041,851 | 139,427 | 7.3% |
| June | 1,658,228 | 1,793,018 | 134,790 | 8.1% |
| July | 1,904,655 | 2,000,423 | 95,767 | 5.0% |
| Aug | 1,945,048 | 2,205,093 | 260,045 | 13.4% |
| Sept | 1,902,371 | 2,083,748 | 181,377 | 9.5% |
| Oct | 1,870,747 | 2,047,951 | 177,204 | 9.5% |
| Nov | 1,896,181 | 2,184,432 | 288,251 | 15.2% |
| Dec | 1,736,151 | 1,984,238 | 248,087 | 14.3% |
| **Total** | **21,852,566** | **23,752,792** | **1,900,226** | **8.7%** |

## Review by business district:

An analysis by geographic business district is performed to show growth and decline within districts and can be further analyzed by sector within each district. Highlights from the City's larger business districts can be found below:

**Totem Lake**, which accounted for **24.9 percent** of total sales tax receipts through 2018, was down **3.7 percent**, or **$226,208**, from 2018. The district experienced a **5.9 percent** decrease in the Auto/Gas Retail and Retail Eating sectors, but this decline was offset by growth in the Other Retail sector.

**NE 85th Street**, which made up **8.0 percent** of the total sales tax receipts through 2018, was down **1.7 percent** compared to 2017. Growth in Auto/Gas Retail was more than offset by decreases in the Services, General Merchandise/ Miscellaneous Retail and Eating/Drinking Retail sectors.

**Downtown**, which accounted for **3.8 percent** of sales tax receipts for 2018, was down **10.7 percent.** The majority of this decline was in the Retail Eating/Drinking and the Services sectors due to the temporary closure of business during the Kirkland Urban development.

When reviewing sales tax receipts by business district, it is important to be aware that **59.0 percent** of the revenues received in 2018 were in the "unassigned or no district" category largely due to contracting and other revenue, which includes revenue from internet, catalog sales and other businesses located outside of the City. This percentage has grown in recent years as internet sales have grown in volume and new businesses have been created that have yet to be classified by district. For the Unassigned revenues, **Contracting** was up **20.6 percent** over 2017 and **Other** was up **17.7 percent**.

It should also be noted that businesses with a physical presence within the City commonly conduct online sales activity alongside their traditional storefront activity within the same business registration, but that available data does not contain sufficient detail to distinguish between origin and destination based sales.

**OFFICE VACANCIES:**

Kirkland's total office vacancy rate remains low, at 4.8 percent. Vacancies are expected to stay low as tech and co-working demand remains strong and options in Seattle and the Eastside remain few. Even amidst concerns that Amazon could scale back their operations in the region following their HQ2 decision, they have continued expansion locally—particularly in Bellevue—and will remain a dominant force in the office real estate market.

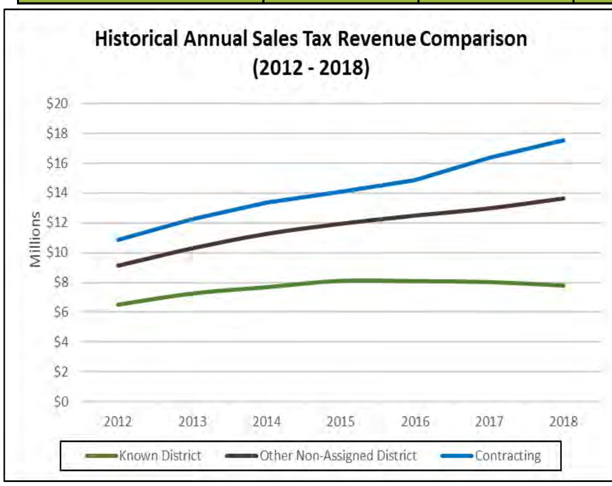
While 2019 growth is not anticipated to surpass the pace set this year, developers are still confident as tenants in the region are seeking 7 million square feet of space, with nearly half of that on the Eastside.

**LODGING TAX REVENUE:**

Lodging tax revenue grew slightly by $3,871 through 2018, or 1.2 percent higher than 2017. Revenues through 2018 were 113.2 percent of the annual budget.

## Review by business district *continued*

| Business District | YTD 2017 | YTD 2018 | Dollar Change | Percent Change | Percent of Total 2017 | Percent of Total 2018 |
|---|---|---|---|---|---|---|
| Totem Lake | 6,148,687 | 5,922,479 | (226,208) | -3.7% | 28.1% | 24.9% |
| NE 85th St | 1,933,690 | 1,900,067 | (33,624) | -1.7% | 8.8% | 8.0% |
| Downtown | 1,003,074 | 895,686 | (107,388) | -10.7% | 4.6% | 3.8% |
| Carillon Pt/Yarrow Bay | 150,109 | 179,411 | 29,302 | 19.5% | 0.7% | 0.8% |
| Houghton & Bridle Trails | 356,150 | 330,593 | (25,557) | -7.2% | 1.6% | 1.4% |
| Bridle Trails | 145,808 | 118,945 | (26,863) | -18.4% | 0.7% | 0.5% |
| Houghton | 210,343 | 211,649 | 1,306 | 0.6% | 1.0% | 0.9% |
| Juanita | 100,405 | 101,718 | 1,313 | 1.3% | 0.5% | 0.4% |
| Kingsgate | 143,722 | 158,115 | 14,393 | 10.0% | 0.7% | 0.7% |
| North Juanita | 128,321 | 141,739 | 13,418 | 10.5% | 0.6% | 0.6% |
| Finn Hill | 95,412 | 93,051 | (2,361) | -2.5% | 0.4% | 0.4% |
| Unassigned or No District: | | | | | | |
| Contracting | 4,558,626 | 5,515,534 | 956,908 | 21.0% | 20.9% | 23.2% |
| Other | 7,234,371 | 8,514,400 | 1,280,029 | 17.7% | 33.1% | 35.8% |
| **Total** | **21,852,566** | **23,752,792** | **1,900,226** | **8.7%** | **100.0%** | **100.0%** |




*In addition to this breakdown by business district (according to geographic area), Kirkland's sales tax base includes many businesses which are "unassigned or no district." This applies for small businesses and companies with no physical presence in Kirkland.*

*Furthermore construction contracting companies perform work throughout the city, and for that reason, their revenue cannot be classified to a specific district.*

## Economic Environment Update

The **Washington State Economic & Revenue Council** monthly update reports total nonfarm payroll employment rose 27,100 for the fourth quarter. On an annual basis, 2019 is expected to grow 2.2 percent and 2020 is expected to grow 1.5 percent.
The Conference Board's **Consumer Confidence Index** went down to 128.1 in December from 136.4 in November. For 2018, the consumer confidence index has averaged 130.5, considerably higher than the 120.5 average seen in 2017. A rating of 100 equals the 1985 consumer confidence level.

**Unemployment Rates** edged higher to 3.9 percent in December from 3.7 in November at national level, and maintained at 4.5 percent in December and November at the state level. Unemployment rates for King County and Kirkland each grew from 3.3 to 3.6 percent and from 3.2 to 3.5 percent, respectively.

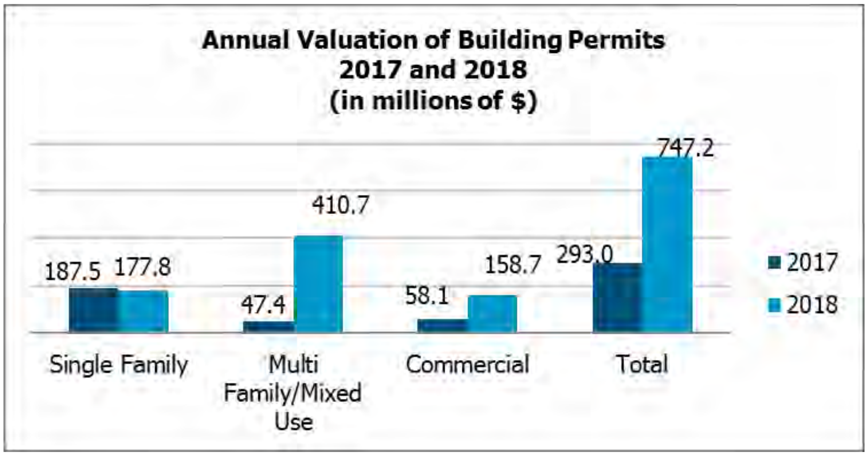
The **Western Washington Purchasing Manager Index** fell to 54.5 in December 2018, a drop of 7.2 from November, but it still indicates a continuation of the expanding economy. At the national level, the December index was 54.1.

**Inflation** in the Seattle area is high relative to the national rate. In December 2018, the

## Economic Environment Update *continued*

Seattle CPI-W was 2.7 percent compared to 4.0 percent the previous year. For December, the national CPI decreased to 1.8 percent, compared to 2.2 percent a year ago.

The **Seattle area home prices** have tapered, and home prices have fallen from their peak in September, but they are still 12.8 percent above levels from a year ago. Seattle home prices are still up 89 percent since December 2011 and exceed the May 2007 peak by 31 percent. New housing permits in Washington were 48,700 in December, increased from 41,400 in September based on the data available from the Washington Economic and Revenue Update.



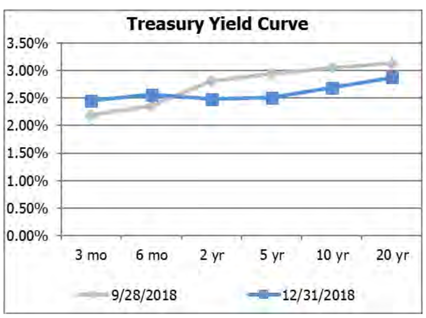

The valuation of local **building permitting activity** has increased by **$454.2 million** for 2018. The significant contributor to this increase is from Multi Family/Mixed Use has increased **$363.2 million**, or **765.6 percent** above 2017 levels. Commercial permit valuations have increased **$100.6 million**, or **173.4 percent** above 2017, but residential permit valuation has decreased by **$9.7 million**, or **5.2 percent** below 2017.

# Investment Report

## *As of December 31, 2018*

### MARKET OVERVIEW

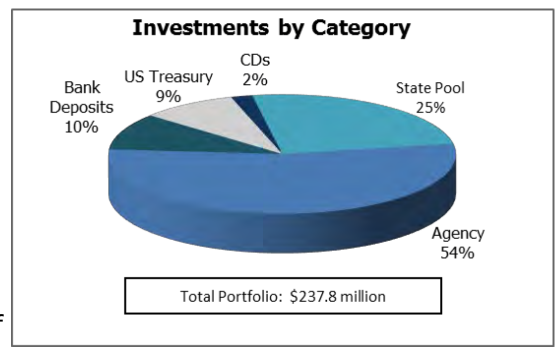
The economic growth continued to improve in the 4th quarter of 2018 despite the decline in the stock market. The Fed Funds rate is now at 2.25 to 2.50 percent from the increase on December 18, 2018 for a total of 3 rate increases in 2018. Given the market volatility at the end of the year, it is possible that there will be no rate hikes in 2019. At the end of year, the yield curve inverted in the 2 to 5 year notes for a short while. The longer maturities dropped about 25 basis points.




### CITY PORTFOLIO

The primary objectives for the City of Kirkland's investment activities are: legality, safety, liquidity and yield. Additionally, the City diversifies its investments according to established maximum allowable exposure limits so that reliance on any one issuer will not place an undue financial burden on the City.

The City's portfolio increased $16.2 million in the 4th quarter of 2018, moving from $221.6 million on September 30, 2018 to $237.8 million on December 31, 2018. The increase in the portfolio is consistent with normal cash flows as the 2nd half of property taxes is received at the end of October and early November. Increases in sales tax, real estate excise tax and development revenues also account for the increased cash in the 4th quarter.




**Diversification**

The City's current investment portfolio is composed of Government Sponsored Enterprises (GSEs) bonds, US Government Obligations, a Bank CD, Bank Deposits and the State Investment Pool. City investment procedures allow for 100% of the portfolio to be invested in U.S. Treasury or Federal Government obligations.

**Liquidity**

The target duration for the City's portfolio is based on the 0-5 year U.S. Treasury. The duration of the City's investment portfolio increased to 1.17 years on December 31, 2018 from 1.13 years on September 28, 2018. The current benchmark duration is 1.36 years.

**Yield**

The City Portfolio yield to maturity increased from 1.79 per-

**2019 ECONOMIC OUTLOOK and INVESTMENT STRATEGY**

According to 37 forecasters surveyed by the Federal Reserve Bank of Philadelphia, the U.S. economy grew at an annual rate of 2.9 percent in 2018 and is expected to grow at 2.7 percent in 2019. CPI inflation averaged 2.6 percent in 2018 and is expected to be at 2.3 percent in 2019. The unemployment rate averaged 3.9 percent in 2018 and 3.7 percent in 2019. The Fed Funds rate remained at 2.25 percent through the end of 2018.

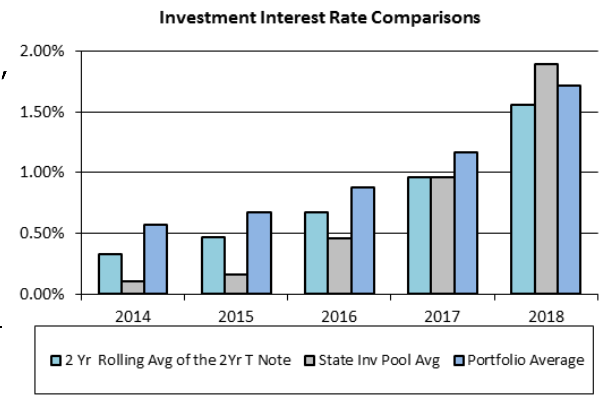
The City's investment advisor, Government Portfolio Advisors (GPA) is recommending continuing to invest in current yields that are at or close to ten-year highs while maintaining our portfolio duration close to our benchmark duration

The State Pool is currently at 2.23%, slowly increasing each month as short term rates rise with the increase in the Fed Funds rate. Rates may continue to rise if the Fed Funds rate increases in 2019. Investment income for 2019 is estimated to be $3.1 million.

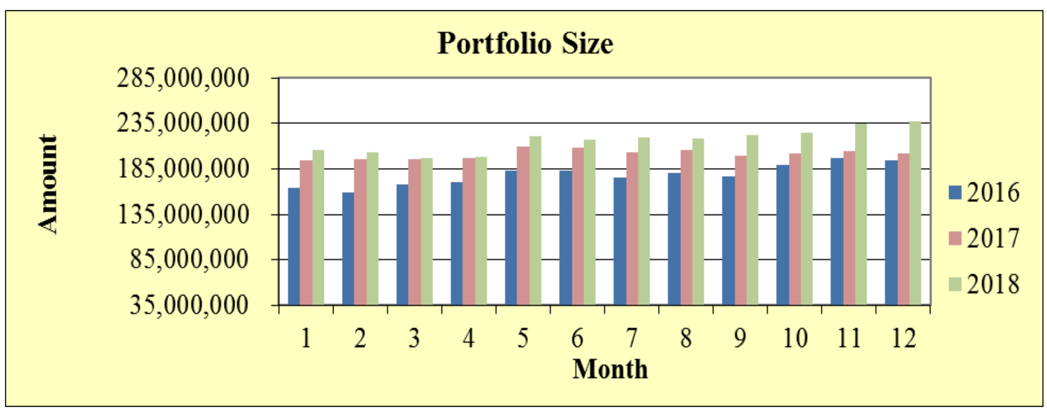
## Investment Report *continued*

cent on September 28, 2018 to 2.04 percent on December 31, 2018. Through December 31, 2018, the City's annual average yield to maturity increased to 1.72 percent. The City's portfolio benchmark is the range between the 90 day Treasury Bill and the 2 year rolling average of the 2 year Treasury Note. This benchmark is used as it is reflective of the maturity guidelines required in the Investment Policy adopted by City Council. The City's portfolio outperformed the 2 year rolling average of the 2 year Treasury note, which was 1.97 percent on December 31, 2018.

| Benchmark Comparison | Sept 28, 2018 | Dec 31, 2018 |
|---|---|---|
| City Yield to Maturity (YTM) | 1.79% | 2.04% |
| City Average YTM | 1.63% | 1.72% |
| City Year to Date Yield | 1.49% | 1.49% |
| 90 Day Treasury Bill | 2.19% | 2.45% |
| 2 yr Rolling Avg 2 yr T Note | 1.76% | 1.97% |




The City's implementation of a more active investment strategy due to contracting with an investment advisor has resulted in increasing portfolio yields. The Local Government Investment Pool reacts quicker to increases and decreases in interest rates. Investing in longer maturities keeps the portfolio rate greater than the State Pool in periods of declining and low interest rates. Overall, this




***Reserves** are an important indicator of the City's fiscal health and effectively represent "savings accounts" that are established to meet unforeseen budgetary needs (general purpose reserves) or are dedicated to a specific purpose. Ending balances in the table below are based on budget. Actual balances in some reserves may vary based on revenue performance (e.g., Excise Tax and Impact Fees).*

strategy has resulted in greater returns to the City's investments.

## Reserve Analysis

- Contributions to reserves in 2015-2016 and planned contributions in 2017-2018 have allowed the City to replenish many of the general purpose reserves to target levels, as indicated in the table on the next page. The City's fiscal policy is to set at least 1 percent of the General Fund adopted budget for reserve replenishment toward 80 percent of the target level (100 percent for the Revenue Stabilization Reserve). Additional fund balance in 2016 enabled the City to create a reserve to protect against future revenue losses from the Annexation Sales Tax Credit expiration in 2021. Adequate fund balance and reserve levels are a necessary component of financial management strategy and a key factor in external agencies' measurement of the City's financial strength (Standard and Poor's AAA and Moody's Aaa).

| USES AND ADDITIONS HIGHLIGHTS RESERVE | AMOUNT | DESCRIPTION |
|---|---|---|
| **2017-18 Council Authorized Uses** | | |
| Prior Uses | $25,322,695 | |
| Council Special Projects Reserve | $6,900 | Kirkland Heritage Society |
| Litigation Reserve | $12,027 | Legal Intern |
| Fire OT & Equipment Reserve | $200,000 | Funding Additional OT due to Vacancies |
| Tour Dock Reserve | $32,925 | Moorage Feasibility Study |
| Development Services Reserves | $12,736 | Development Services Equipment Upgrades |
| Development Services Reserves | $611,427 | Development Services Temporary Staffing |
| Tree Ordinance Reserve | $7,942 | Temporary Increase of Urban Forester |
| Surface Water Construction Reserve | $84,000 | Cedar View Drainage Park Improvements |
| Park Impact Fees | $135,000 | Transfer to Park CIP for TL Expanded Phase 1 |
| Water Sewer Construction Reserve | $645,642 | 120th Ave NE Watermain Improvement |
| Water Sewer Construction Reserve | $50,298 | Watermain Replacement at Cochran Springs |
| Radio Replacement Reserve | $5,000 | Maintenance Center Radio Base Replacement |
| PC Replacement Reserve | $104,200 | Replacement of Devices |
| Cemetery Operating Reserve | $311 | Addition to Undistributed Personnel Costs |
| **2017-18 Council Authorized Additions** | | |
| Prior Additions | $12,643,672 | |
| Tour Dock Reserve | $11,328 | Return of funds from previous moorage study |
| Parks Facilities Sinking Fund | $100 | Project Closure |
| Fire Life Cycle Reserve | $79,800 | Project Closure |
| Police Life Cycle Reserve | $100 | Project Closure |
| Water Sewer Construction Reserve | $4,698,991 | Repayment of Interfund Loan |
| Surface Water Construction Reserve | $116,426 | Project Closure |
| Vehicle Replacement Reserve | $193,181 | Return of excess funds for Police vehicles |
| Facilities Sinking Fund | $85,924 | Energy Efficiency Savings |
| **Net Additions / (Uses)** | **($9,401,581)** | |

*The summary above details all Council authorized uses and additions in the 2017-18 biennium.*

### GENERAL CAPITAL RESERVES

- Real estate prices have appreciated rapidly in recent years and **Real Estate Excise Tax (REET)** collections in 2018 reached $10 million, which was a record amount.
- Impact fees (Parks and Transportation) reflect fees paid for development that creates additional demands on the City's Parks and Transportation systems. **Parks Impact Fee** revenue ended 2018 at **503.2 percent** of budget and **Transportation Impact Fees** at **173.4 percent** of budget.

*General Purpose reserves are funded from general revenue and may be used for any general government function.*

*All Other Reserves with Targets have restrictions for use either from the funding source or by Council-directed policy (such as the Litigation Reserve).*

*The target comparison reflects revised ending balances to the targets established in the budget process for those reserves with targets.*

**General Government & Utility Reserves Targets Summary**

| Reserves | Est. 2017 Beginning Balance | Adopted 2018 Ending Balance* | Revised 2018 Ending Balance | 2017-18 Target | Revised Over (Under) Target |
|---|---|---|---|---|---|
| **GENERAL PURPOSE RESERVES WITH TARGETS** | | | | | |
| General Fund Reserves: | | | | | |
| General Fund Contingency | 50,000 | 50,000 | 50,000 | 50,000 | 0 |
| General Oper. Reserve (Rainy Day) | 4,803,388 | 4,829,865 | 4,829,865 | 4,829,865 | 0 |
| Revenue Stabilization Reserve | 2,848,220 | 3,029,951 | 3,029,951 | 3,029,951 | 0 |
| Building & Property Reserve | 3,600,000 | 600,000 | 697,099 | 600,000 | 97,099 |
| Council Special Projects Reserve | 250,000 | 381,927 | 181,627 | 250,000 | (68,373) |
| Contingency | 4,036,425 | 5,675,121 | 5,675,121 | 6,076,030 | (400,909) |
| General Capital Contingency | 4,993,407 | 5,709,768 | 2,252,953 | 6,317,430 | (4,064,477) |
| **General Purpose Reserves with Targets** | **20,581,440** | **20,276,632** | **16,716,616** | **21,153,276** | **(4,436,660)** |
| **ALL OTHER RESERVES WITH TARGETS** | | | | | |
| General Fund Reserves: | | | | | |
| Litigation Reserve | 93,871 | 150,000 | 21,750 | 150,000 | (128,250) |
| Firefighter's Pension Reserve | 1,225,835 | 976,955 | 1,451,411 | 933,405 | 518,006 |
| Health Benefits Fund: | | | | | |
| Claims Reserve | 2,058,311 | 2,022,685 | 2,022,685 | 2,022,685 | 0 |
| Rate Stabilization Reserve | 1,000,000 | 0 | 0 | 0 | 0 |
| Excise Tax Capital Improvement: | | | | | |
| REET 1 | 5,213,854 | 3,834,466 | 3,739,728 | 1,000,000 | 2,739,728 |
| REET 2 | 6,000,344 | 8,457,722 | 2,802,959 | 1,000,000 | 1,802,959 |
| Water/Sewer Operating Reserve | 2,659,932 | 2,659,932 | 2,659,932 | 2,659,932 | 0 |
| Water/Sewer Capital Contingency | 613,300 | 1,216,400 | 1,216,400 | 1,216,400 | 0 |
| Surface Water Operating Reserve | 893,306 | 983,035 | 983,035 | 983,035 | 0 |
| Surface Water Capital Contingency | 391,380 | 740,492 | 740,492 | 740,492 | 0 |
| **Other Reserves with Targets** | **20,150,133** | **21,041,687** | **15,638,392** | **10,705,949** | **4,932,443** |
| **Reserves without Targets** | **70,430,209** | **68,313,124** | **64,325,938** | **n/a** | **n/a** |
| **Total Reserves** | **90,580,342** | **89,354,811** | **79,964,330** | **n/a** | **n/a** |

## Financial Management Report as of December 31, 2018

*General Fund and Contingency reserves are funded from general purpose revenue and are governed by Council-adopted policies.*

| Reserves | | Est. 2017 Beginning Balance | Adopted 2018 Ending Balance | Additional Authorized Uses/Additions | Revised 2018 Ending Balance |
|---|---|---|---|---|---|
| **GENERAL FUND/CONTINGENCY** | | | | | |
| General Fund Reserves: | | | | | |
| General Fund Contingency | Unexpected General Fund expenditures | 50,000 | 50,000 | 0 | 50,000 |
| General Oper. Reserve (Rainy Day) | Unforeseen revenues/temporary events | 4,803,388 | 4,829,865 | 0 | 4,829,865 |
| Revenue Stabilization Reserve | Temporary revenue shortfalls | 2,848,220 | 3,029,951 | 0 | 3,029,951 |
| Building & Property Reserve | Property-related transactions | 3,600,000 | 600,000 | 97,099 | 697,099 |
| Council Special Projects Reserve | One-time special projects | 250,000 | 381,927 | (200,300) | 181,627 |
| Annexation Sales Tax Reserve | Preparation for credit expiring in 2021 | 0 | 500,000 | 0 | 500,000 |
| Contingency | Unforeseen expenditures | 4,036,425 | 5,675,121 | 0 | 5,675,121 |
| Total General Fund/Contingency | | 15,588,033 | 15,066,864 | (103,201) | 14,963,663 |

*Special Purpose reserves reflect both restricted and dedicated revenue for specific purpose, as well as general revenue set aside for specific purposes.*

| Reserves | | Est. 2017 Beginning Balance | Adopted 2018 Ending Balance | Additional Authorized Uses/Additions | Revised 2018 Ending Balance |
|---|---|---|---|---|---|
| **SPECIAL PURPOSE RESERVES** | | | | | |
| Litigation Reserve | Outside counsel costs contingency | 93,871 | 150,000 | (140,277) | 21,750 |
| Labor Relations Reserve | Labor negotiation costs contingency | 74,342 | 71,757 | 0 | 71,757 |
| Police Equipment Reserve | Equipment funded from seized property | 81,687 | 91,695 | 0 | 91,695 |
| Fire OT & Equipment Reserve | Contingency for overtime and equipment | 190,704 | 200,000 | (200,000) | 0 |
| LEOFF 1 Police Reserve | Police long-term care benefits | 618,079 | 618,079 | 0 | 618,079 |
| Facilities Expansion Reserve | Special facilities expansions reserve | 50,663 | 50,663 | (30,000) | 20,663 |
| Development Services Reserve | Revenue and staffing stabilization | 5,782,995 | 6,607,183 | (1,821,262) | 4,785,921 |
| Development Svcs. Technology Reserve | Permit system replacement | 1,425,872 | 1,501,512 | (67,423) | 1,434,089 |
| Tour Dock | Dock repairs | 281,408 | 327,408 | (47,097) | 280,311 |
| Park Rental Sinking Fund | 20 year facility life cycle costs | 0 | 150,000 | 0 | 150,000 |
| Tree Ordinance | Replacement trees program | 74,585 | 118,610 | (7,942) | 110,668 |
| Revolving/Donation Accounts | Fees/Donations for specific purposes | 444,696 | 683,905 | (15,954) | 667,951 |
| Lodging Tax Fund | Tourism program and facilities | 220,068 | 156,500 | 0 | 156,500 |
| Street Fund Operating Reserve | Unforseen expenditures | 100,000 | 100,000 | 12,058 | 112,058 |
| Cemetery Improvement | Cemetery improvements/debt service | 727,390 | 751,435 | (311) | 751,124 |
| Off-Street Parking | Downtown parking improvements | 217,695 | 380,978 | (62,300) | 318,678 |
| Fire Equipment Life Cycle | 20-year fire equipment costs | 750,804 | 1,364,204 | 87,207 | 1,451,411 |
| Parks Facilities Sinking Fund | 20-year parks facilities costs | 0 | 186,000 | 100 | 186,100 |
| Police Equipment Life Cycle | 20-year police equipment costs | 980,914 | 979,114 | 183,594 | 1,162,708 |
| Technology Equipment Life Cycle | 20-year technology equipment costs | 1,315,713 | 730,013 | 0 | 730,013 |
| Firefighter's Pension | Long-term care/pension benefits | 1,225,835 | 976,955 | 0 | 976,955 |
| Total Special Purpose Reserves | | 14,657,321 | 16,196,011 | (2,109,607) | 14,098,431 |

*General Capital Reserves provide the City the ability to respond to unexpected changes in costs and accumulate funds for future projects. It is funded from both general revenue and restricted revenue.*

| Reserves | | Est. 2017 Beginning Balance | Adopted 2018 Ending Balance | Additional Authorized Uses/Additions | Revised 2018 Ending Balance |
|---|---|---|---|---|---|
| **GENERAL CAPITAL RESERVES** | | | | | |
| Excise Tax Capital Improvement: | | | | | |
| REET 1 | Parks/transportation/facilities projects, parks de | 5,213,854 | 3,834,466 | (94,738) | 3,739,728 |
| REET 2 | Transportation and other capital projects | 6,000,344 | 8,457,722 | (5,654,763) | 2,802,959 |
| Impact Fees | | | | | |
| Transportation | Transportation capacity projects | 1,926,771 | 3,635,208 | 6,822 | 3,642,030 |
| Parks | Parks capacity projects | 1,523,337 | 3,116,107 | (135,000) | 2,981,107 |
| General Capital Contingency | Changes to General capital projects | 4,993,407 | 5,709,768 | (3,456,815) | 2,252,953 |
| Total General Capital Reserves | | 19,657,713 | 24,753,271 | (9,334,494) | 15,418,777 |

*Utility reserves are funded from utility rates and provide the utilities with the ability to respond to unexpected costs and accumulate funds for future replacement projects.*

| Reserves | | Est. 2017 Beginning Balance | Adopted 2018 Ending Balance | Additional Authorized Uses/Additions | Revised 2018 Ending Balance |
|---|---|---|---|---|---|
| **UTILITY RESERVES** | | | | | |
| Water/Sewer Utility: | | | | | |
| Water/Sewer Operating Reserve | Operating contingency | 2,659,932 | 2,659,932 | 0 | 2,659,932 |
| Water/Sewer Debt Service Reserve | Debt service reserve | 501,024 | 62,022 | 0 | 62,022 |
| Water/Sewer Capital Contingency | Changes to Water/Sewer capital projects | 613,300 | 1,216,400 | 0 | 1,216,400 |
| Water/Sewer Construction Reserve | Replacement/re-prioritized/new projects | 10,591,907 | 6,915,455 | 3,935,144 | 10,850,599 |
| Surface Water Utility: | | | | | |
| Surface Water Operating Reserve | Operating contingency | 893,306 | 983,035 | 0 | 983,035 |
| Surface Water Capital Contingency | Changes to Surface Water capital projects | 391,380 | 740,492 | 0 | 740,492 |
| Surface Water Construction Reserve | Replacement/re-prioritized/new projects | 7,828,203 | 2,658,105 | (2,514,485) | 142,693 |
| Total Utility Reserves | | 23,479,052 | 15,235,441 | 1,420,659 | 16,655,173 |

*Internal service funds are funded by charges to operating departments. They provide for the accumulation of funds for replacement of equipment, as well as the ability to respond to unexpected costs.*

| Reserves | | Est. 2017 Beginning Balance | Adopted 2018 Ending Balance | Additional Authorized Uses/Additions | Revised 2018 Ending Balance |
|---|---|---|---|---|---|
| **INTERNAL SERVICE FUND RESERVES** | | | | | |
| Health Benefits: | | | | | |
| Claims Reserve | Health benefits self insurance claims | 2,058,311 | 2,022,685 | 0 | 2,022,685 |
| Rate Stabilization Reserve | Rate stabilization | 1,000,000 | 0 | 0 | 0 |
| Equipment Rental: | | | | | |
| Vehicle Reserve | Vehicle replacements | 8,570,163 | 9,666,346 | 193,181 | 9,859,527 |
| Radio Reserve | Radio replacements | 8,463 | 17,950 | (5,000) | 12,950 |
| Information Technology: | | | | | |
| PC Replacement Reserve | PC equipment replacements | 308,453 | 196,587 | (104,200) | 92,387 |
| Major Systems Replacement Reserve | Major technology systems replacement | 1,300,289 | 0 | 500,000 | 500,000 |
| Facilities Maintenance: | | | | | |
| Operating Reserve | Unforeseen operating costs | 800,000 | 800,000 | 0 | 800,000 |
| Facilities Sinking Fund | 20-year facility life cycle costs | 3,152,544 | 5,399,656 | 141,081 | 5,540,737 |
| Total Internal Service Fund Reserves | | 17,198,223 | 18,103,224 | 725,062 | 18,828,286 |
| **Grand Total** | | 90,580,342 | 89,354,811 | (9,401,581) | 79,964,330 |


The Financial Management Report (FMR) is a high-level status report on the City's financial condition that is produced quarterly.

- It provides a **summary budget to actual and year over year comparisons** for year-to-date revenues and expenditures for all operating funds.
- The **Sales Tax Revenue Analysis** report takes a closer look at one of the City's larger and most economically sensitive revenue sources.
- **Economic Environment** information provides a brief outlook at the key economic indicators for the Eastside and Kirkland such as office vacancies, residential housing prices/sales, development activity, inflation and unemployment.
- The **Investment Summary** report includes a brief market overview, a snapshot of the City's investment portfolio, and the City's year-to-date investment performance.
- The **Reserve Summary** report highlights the uses of and additions to the City's reserves in the current year as well as the projected ending reserve balance relative to each reserve's target amount.

- Tracey Dunlap, Deputy City Manager
- Michael Olson, Director of Finance & Administration
- Elijah Panci, Senior Financial Analyst
- Doug Honma-Crane, Budget Analyst
- Marilou Moore, Financial Consultant

City of Kirkland
123 5th Avenue
Kirkland, WA 98033
Ph. 425-587-3146
www.kirklandwa.gov

***Economic Environment Update References:***

- The Conference Board Consumer Confidence Index Press Release, December 2018
- *ISM-Western Washington, Inc. Report On Business*, Institute for Supply Management-Western Washington
- Washington State Economic & Revenue Forecast Council, *December 2018 Economic & Revenue Update, November 2018 Economic Forecast*
- CB Richard Ellis Real Estate Services, Market View Puget Sound, 4th Quarter 2018
- Colliers International Research and Forecast Report, Puget Sound Region, Fourth Quarter 2018
- S&P/Case-Shiller Seattle Home Price Index
- United States Bureau of Labor Statistics
- Washington State Department of Revenue
- City of Kirkland Planning & Building Department
- City of Kirkland Finance & Administration Department

2019-2020 Budget Adjustments
July 2019

Attachment B

| Dept. | Description | FTE | Total Adjustment | Appropriation Change | Adjustment Type: Carryover | Adjustment Type: Council & Other | Adjustment Type: House-keeping | Adjustment Type: Resources Forward | Appropriation Source: Resources Forward | Appropriation Source: External Revenue | Appropriation Source: Int. Charge or Transfer | Funding Source (If Not Designated, Working Capital) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **010 - GENERAL FUND** | | | | | | | | | | | | |
| CC | Replenish Council Special Projects Reserve | | 150,000 | | | | | 150,000 | | | | |
| CMO | Lake and Central Feasibility Study | | 150,000 | | 150,000 | | | | | | | |
| CMO | Transit Oriented Development Study | | 10,000 | | 10,000 | | | | | | | |
| CMO | Policy Report Development & Equity Analysis Training | | 9,150 | | 9,150 | | | | | | | |
| CMO | Capital Funding to Neighborhood Services | | 35,585 | | 35,585 | | | | | | | |
| CMO | Eastside Rail Corridor Regional Branding | | 9,000 | | 9,000 | | | | | | | |
| CMO | Support launch of EasTrail brand | | 3,040 | | | 3,040 | | | | | | Council Special Projects Reserve |
| CMO | Cultural Arts Commission Staffing | | 17,580 | | 17,580 | | | | | | | |
| CMO | Love of Kirkland/Inclusive Community | | 40,000 | | 40,000 | | | | | | | |
| CMO | Kirkland Heritage Society | | 4,000 | | 4,000 | | | | | | | |
| CMO | Complete Count for the 2020 Census | | 30,000 | | | 30,000 | | | | | | Council Special Projects Reserve |
| FAC | Purchase of Tax Title properties | | 35,500 | | | 35,500 | | | | | | Building and Property Reserve |
| F&A | Records Management System | | 13,064 | | 13,064 | | | | | | | |
| F&A | Financial Operations Manager | | 45,001 | | | 45,001 | | | | | | Undistributed Personnel Costs |
| FD | King County EMS Core Services-Funded Equipment | | 11,300 | 11,300 | 11,300 | | | | | 11,300 | | Use of KC EMS Core Service Funds not completed |
| FD | Emergency Management Interns | | 7,026 | 4,800 | | 7,026 | | | | 4,800 | | EMPG Grant; Expenditure offsets |
| HR | Implicit Bias Training | | 150,000 | | | 150,000 | | | | | | Council Special Projects Reserve |
| HR | Temporary HR Assistant extension | | 62,764 | 62,764 | | 62,764 | | | | | 62,764 | Project 12 balance |
| MC | School Zone Cameras | 0.75 | 107,577 | 107,577 | | 107,577 | | | | 107,577 | | School Zone Speeding Fines |
| MC | Adjustment to corect missed amount in adopted budget | | 134,307 | 134,307 | | | 134,307 | | 134,307 | | | |
| ND | Fire Station Outreach | | 150,000 | | 150,000 | | | | | | | |
| ND | Delayed CIP Transfer(s) Fire Station 27 | | 1,300,000 | | 1,300,000 | | - | | | | | |
| PB | Speedometer Permit Review Reporting Tool | | 5,000 | | 5,000 | | | | | | | |
| PB | Structural Engineer | | 106,100 | | 106,100 | | | | | | | |
| PB | Digitization Project | | 68,000 | | 68,000 | | | | | | | |
| PB | Grants - Shoreline and Historic Preservation | | 42,244 | 42,244 | 42,244 | | | | | 42,244 | | Grants not yet reimbursed |
| PB | Zoning Code Charts to Tables | | 13,143 | | 13,143 | | | | | | | |
| PB | Temporary Lead Building Inspector | | 9,642 | - | | 9,642 | | | | | | Development Reserves Building |
| PB | EnerGov Update Preparations | | 2,225 | - | | 2,225 | | | | | | Development Reserves Technology |
| PB | Change Senior Planner Position from .8 to 1.0 | 0.20 | 58,453 | | | 58,453 | | | | | | |
| PCS | Teen Activity Mini Grant Program | | 3,000 | 3,000 | 3,000 | | | | | 3,000 | | Grants not yet reimbursed |
| PCS | Human Services Grants | | 43,185 | | 43,185 | | | | | | | |
| PCS | Senior Resource Guide | | 20,900 | | 20,900 | | | | | | | |
| PCS | Regional Aquatics Facilities Study | | 7,500 | | 7,500 | | | | | | | |
| PCS | Park and Trail Maps Printing | | 2,300 | | 2,300 | | | | | | | |
| PCS | Park Security Enhancements | | 51,000 | | 51,000 | | | | | | | |
| PCS | Infield Maintenance Finn Hill Middle School | | 6,500 | | | 6,500 | | | | | | Council Special Projects Reserve |
| PD | Plates and Helmets, Life Vests, Audio Recorders | | 40,432 | | 40,432 | | | | | | | |
| PD | Totem Lake Room Improvements | | 31,881 | | 31,881 | | | | | | | |
| PD | Federal Funds Received were not restricted | | 17,446 | | | | 17,446 | | | | | |

2019-2020 Budget Adjustments
July 2019

Attachment B

| Dept. | Description | FTE | Total Adjustment | Appropriation Change | Adjustment Type: Carryover | Adjustment Type: Council & Other | Adjustment Type: House-keeping | Adjustment Type: Resources Forward | Appropriation Source: Resources Forward | Appropriation Source: External Revenue | Appropriation Source: Int. Charge or Transfer | Funding Source (If Not Designated, Working Capital) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD | Transfer Salary Savings to Detox Cell | | 80,000 | | | 80,000 | | | | | | |
| PD | School Zone Cameras | 1.00 | 443,917 | 443,917 | | 443,917 | | | | 443,917 | | School Zone Speeding Fines |
| PD | Parking Enforcement Officer | 1.00 | 188,852 | 188,852 | | 188,852 | | | | 188,852 | | |
| PW | Grant Support for Capital Engineering | | 15,000 | | 15,000 | | | | | | | |
| PW | CAO-SWDM CIP Environmental Planner | | 75,000 | | 75,000 | | | | | | | |
| PW | Holmes Point Development Standards Update | | 150,000 | | 150,000 | | | | | | | |
| PW | BKR Model Support | | 14,360 | | 14,360 | | | | | | | |
| PW | Transportation Management Plan Support | | 20,000 | | 20,000 | | | | | | | |
| PW | Transportation Consulting Services | | 103,000 | | 103,000 | | | | | | | |
| PW | Commute Trip Reduction Enhancements | | 62,000 | | 62,000 | | | | | | | |
| PW | Commute Trip Reduction Incentives | | 60,000 | | 60,000 | | | | | | | |
| PW | Transportation Intern | | 3,000 | | 3,000 | | | | | | | |
| PW | Backfill Neighborhood Outreach Coordinator | | 19,738 | 19,738 | | 19,738 | | | | | 19,738 | CIP charges |
| PW | Temporary Graduate Intern to assist with Vision Zero efforts | | 7,420 | 7,420 | | 7,420 | | | | | 7,420 | CIP charges |
| N/A | CM Recommended Council Work Program Items | | | | | | | | | | | |
| | 85th & 405 Station Area Plan | | 450,000 | | | 450,000 | | | | | | |
| | Innovation Interns | | 68,000 | | | 68,000 | | | | | | |
| N/A | Budget ord correction for missed adj in original adoption | | (33,534) | (33,534) | | | (33,534) | | (33,534) | | | Gen Fund Ordinance was too large, Correction needed |
| N/A | Dev. Svcs. Reserve - Recognize Actual Balance | | 7,645,485 | | | | | 7,645,485 | | | | |
| N/A | Revolving Accts. - Recognize Actual Balance | | 512,620 | | | | | 512,620 | | | | |
| N/A | Resources Forward - Recognize Actual Balance/Reserves | | 12,643,590 | 12,643,590 | | | | 12,643,590 | 12,643,590 | | | |
| **TOTAL - GENERAL FUND** | | **2.95** | **25,532,293** | **13,635,975** | **2,686,724** | **1,775,655** | **118,219** | **20,951,695** | **12,744,363** | **801,690** | **89,922** | |
| | | | | | | | | | | | | |
| **OTHER FUNDS** | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| ***112 - LODGING TAX FUND*** | | | | | | | | | | | | |
| ND | Special Projects Coordinator 0.15 FTE Increase | | 16,271 | 16,271 | | 16,271 | | | | | 16,271 | Lodging Tax Reserves |
| ND | Kirkland Visitor Center Exterior Sign | | 6,400 | 6,400 | | 6,400 | | | | | 6,400 | Lodging Tax Reserves |
| N/A | Resources Forward - Recognize Actual Balance | | 90,906 | 90,906 | | | | 90,906 | 90,906 | | | |
| **Total - Lodging Tax Fund** | | | **113,577** | **113,577** | **-** | **22,671** | **-** | **90,906** | **90,906** | **-** | **22,671** | |
| | | | | | | | | | | | | |
| ***117 - STREET OPERATING FUND*** | | | | | | | | | | | | |
| PW | Development-related Sidewalk Improvement | | 50,000 | | 50,000 | | | | | | | |
| PW | School Zone Cameras | | 28,665 | 28,665 | | 28,665 | | | | | 28,665 | School Zone Speeding Fines |
| N/A | Resources Forward - Recognize Actual Balance | | 260,039 | 260,039 | | | | 260,039 | 260,039 | | | |
| **Total - Street Operating Fund** | | | **338,704** | **288,704** | **50,000** | **28,665** | **-** | **260,039** | **260,039** | **-** | **28,665** | |
| | | | | | | | | | | | | |
| ***122 - CEMETERY OPERATING FUND*** | | | | | | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | (10,284) | (10,284) | | | | (10,284) | (10,284) | | | |

2019-2020 Budget Adjustments
July 2019

Attachment B

| | | | | | Adjustment Type | | | | Appropriation Source | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dept. | Description | FTE | Total Adjustment | Appropriation Change | Carryover | Council & Other | House-keeping | Resources Forward | Resources Forward | External Revenue | Int. Charge or Transfer | Funding Source (If Not Designated, Working Capital) |
| **Total - Cemetery Operating Fund** | | | **(10,284)** | **(10,284)** | **-** | **-** | **-** | **(10,284)** | **(10,284)** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***125 - PARKS MAINTENANCE FUND*** | | | | | | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | 48,794 | 48,794 | | | | 48,794 | 48,794 | | | |
| **Total - Parks Maintenance Fund** | | | **48,794** | **48,794** | **-** | **-** | **-** | **48,794** | **48,794** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***128 - PARKS LEVY FUND*** | | | | | | | | | | | | |
| ND | Resources Forward CIP Adjustments | | 645,692 | 645,692 | | | | 645,692 | 645,692 | | | |
| N/A | Resources Forward - Recognize Actual Balance | | 194,828 | 194,828 | | | | 194,828 | 194,828 | | | |
| **Total - Parks Levy Fund** | | | **840,520** | **840,520** | **-** | **-** | **-** | **840,520** | **840,520** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***156 - IMPACT FEES FUND*** | | | | | | | | | | | | |
| PCS | CIP Adjustment - Funds to Parks Maint Center Project | | 400,000 | 400,000 | | 400,000 | | | 400,000 | | | |
| N/A | Resources Forward Balance - Transportation | | 432,678 | 432,678 | | | | 432,678 | 432,678 | | | |
| N/A | Resources Forward Balance - Parks | | 407,503 | 407,503 | | | | 407,503 | 407,503 | | | |
| **Total - Impact Fees Fund** | | | **1,240,181** | **1,240,181** | **-** | **400,000** | **-** | **840,181** | **1,240,181** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***190 - EXCISE TAX (REET) CAPITAL IMPROVEMENT FUND*** | | | | | | | | | | | | |
| PW | REET 2 net CIP Adj - ITS Phase 2 closed, Phase 1 100th Ave NE | | 462,114 | 462,114 | | 462,114 | | | 462,114 | | | Project closure and Resources Forward |
| N/A | Resources Forward - Recognize Actual Balance, REET 1 | | 9,479,221 | 9,479,221 | | | | 9,479,221 | 9,479,221 | | | |
| N/A | Resources Forward - Recognize Actual Balance, REET 2 | | 1,275,343 | 1,275,343 | | | | 1,275,343 | 1,275,343 | | | |
| **Total - Excise Tax Capital Improvement Fund** | | | **11,216,678** | **11,216,678** | **-** | **462,114** | **-** | **10,754,564** | **11,216,678** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***210 - LIMITED TAX GENERAL OBLIGATION (LTGO) DEBT SERVICE FUND*** | | | | | | | | | | | | |
| PCS | CIP Adjustment - Funds to Parks Maint Center Project | | (649,112) | (649,112) | | (649,112) | | | | | (649,112) | Eliminating planned budget transfer |
| **Total - LTGO Debt Service Fund** | | | **(649,112)** | **(649,112)** | **-** | **(649,112)** | **-** | **-** | **-** | **-** | **(649,112)** | |
| | | | | | | | | | | | | |
| ***220 - UNLIMITED TAX GENERAL OBLIGATION (UTGO) DEBT SERVICE FUND*** | | | | | | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | (2,984) | (2,984) | | | | (2,984) | (2,984) | | | |
| **Total - UTGO Debt Service Fund** | | | **(2,984)** | **(2,984)** | **-** | **-** | **-** | **(2,984)** | **(2,984)** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***411 - WATER/SEWER OPERATING FUND*** | | | | | | | | | | | | |
| PW | Utility Rate Update Consulting Services | | 3,881 | | 3,881 | | | | | | | |
| PW | Hydraulic Modeling Consulting Services | | 43,730 | | 43,730 | | | | | | | |
| PW | Manhole Replacement and Sewer Opportunity Funds | | 180,238 | | 180,238 | | | | | | | |
| PW | Water Opportunity Funds | | 150,000 | | 150,000 | | | | | | | |
| PW | Telemetry Improvements | | 80,000 | | 80,000 | | | | | | | |
| PW | Sewer Comprehensive Plan | | 5,218 | | 5,218 | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | 657,310 | 657,310 | | | | 657,310 | 657,310 | | | |
| **Total - Water/Sewer Operating Fund** | | | **1,120,377** | **657,310** | **463,067** | **-** | **-** | **657,310** | **657,310** | **-** | **-** | |

2019-2020 Budget Adjustments
July 2019

Attachment B

| | | | | | Adjustment Type | | | | Appropriation Source | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dept. | Description | FTE | Total Adjustment | Appropriation Change | Carryover | Council & Other | House-keeping | Resources Forward | Resources Forward | External Revenue | Int. Charge or Transfer | Funding Source (If Not Designated, Working Capital) |
| | | | | | | | | | | | | |
| ***421 - SURFACE WATER MANAGEMENT FUND*** | | | | | | | | | | | | |
| PW | 132nd Square Park Geotechnical Investigation | | 2,254 | | 2,254 | | | | | | | |
| PW | 132nd Square Park Flow Monitoring | | 23,820 | | 23,820 | | | | | | | |
| PW | Forbes/NRH Stormwater Retrofit Planning | | 180,250 | | 180,250 | | | | | | | |
| PW | Surface Water Design Manual Study | | 39,700 | | 39,700 | | | | | | | |
| PW | Local Source Control Inspections | | 40,376 | | 40,376 | | | | | | | |
| PW | Spill Kit Program | | 1,367 | | 1,367 | | | | | | | |
| PW | Paint Outreach | | 8,127 | | 8,127 | | | | | | | |
| PW | Beaver Management | | 3,125 | | 3,125 | | | | | | | |
| PW | Equipment for Education & Outreach Specialist | | 4,627 | | 4,627 | | | | | | | |
| PW | Utility Rate Update Consulting Services | | 1,912 | | 1,912 | | | | | | | |
| PW | Waterworks Construction Grant | | 20,000 | 20,000 | 20,000 | | | | | 20,000 | | |
| N/A | Resources Forward - Recognize Actual Balance | | 243,432 | 243,432 | | | | 243,432 | 243,432 | | | |
| **Total - Surface Water Management Fund** | | | **568,990** | **263,432** | **325,558** | **-** | **-** | **243,432** | **243,432** | **20,000** | **-** | |
| | | | | | | | | | | | | |
| ***431 - SOLID WASTE FUND*** | | | | | | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | (611,886) | (611,886) | | | | (611,886) | (611,886) | | | |
| **Total - Solid Waste Fund** | | | **(611,886)** | **(611,886)** | **-** | **-** | **-** | **(611,886)** | **(611,886)** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***511 - HEALTH BENEFITS FUND*** | | | | | | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | 211,700 | 211,700 | | | | 211,700 | 211,700 | | | |
| **Total - Health Benefits Fund** | | | **211,700** | **211,700** | **-** | **-** | **-** | **211,700** | **211,700** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***521 - EQUIPMENT RENTAL FUND*** | | | | | | | | | | | | |
| N/A | Beginning Resources Forward - Fleet | | (131,218) | (131,218) | | | | (131,218) | (131,218) | | | |
| N/A | Beginning Resources Forward - Radio | | (9,395) | (9,395) | | | | (9,395) | (9,395) | | | |
| **Total - Equipment Rental Fund** | | | **(140,613)** | **(140,613)** | **-** | **-** | **-** | **(140,613)** | **(140,613)** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***522 - INFORMATION TECHNOLOGY FUND*** | | | | | | | | | | | | |
| IT | Graphics Forms Work | | 6,050 | | 6,050 | | | | | | | |
| IT | Adobe Livecycle Support | | 17,637 | | 17,637 | | | | | | | |
| IT | Adobe Lifecycle Contingency | | 12,739 | | 12,739 | | | | | | | |
| IT | Acorio | | 38,730 | | 38,730 | | | | | | | |
| IT | ERC Fiber Feasibility Study | | 99,000 | 99,000 | 99,000 | | | | | 99,000 | | |
| IT | Temporary Design Specialist | | 76,614 | 76,614 | 12,700 | 63,914 | | | 12,700 | | 63,914 | Res. Fwd.; Project 12 balance; Exp. offsets |
| IT | Temporary Design Specialist - Munis Support | | 6,456 | | | 6,456 | | | | | | |
| IT | Temporary Design Specialist | | 9,250 | - | | 9,250 | | | | | | |
| IT | Sr. Applications Analyst Extension - IT Stabilization | | 85,384 | 83,884 | | 85,384 | | | | | 83,884 | IT CIP Project balances; Expenditure offsets |
| IT | Senior Business Analyst - IT Stabilization | | 141,328 | 138,177 | | 141,328 | | | | | 138,177 | IT CIP Project balances; Expenditure offsets |

2019-2020 Budget Adjustments
July 2019

Attachment B

| | | | | | Adjustment Type | | | | Appropriation Source | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dept. | Description | FTE | Total Adjustment | Appropriation Change | Carryover | Council & Other | House-keeping | Resources Forward | Resources Forward | External Revenue | Int. Charge or Transfer | Funding Source (If Not Designated, Working Capital) |
| IT | Professional Services for IT Stabilization | | 26,900 | 26,900 | | 26,900 | | | | | 26,900 | IT CIP Project balances; Expenditure offsets |
| IT | Senior Business Analyst - Temporary Reorganization | | 53,851 | - | | 53,851 | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | (59,070) | (59,070) | | | | (59,070) | (59,070) | | | |
| **Total - Information Technology Fund** | | | **514,869** | **365,505** | **186,856** | **387,083** | **-** | **(59,070)** | **(46,370)** | **99,000** | **312,875** | |
| | | | | | | | | | | | | |
| ***527 - FACILITIES MAINTENANCE FUND*** | | | | | | | | | | | | ***266,505*** |
| PCS | CIP Adjustment - Funds to Parks Maint Center Project | | 309,239 | 309,239 | | 309,239 | | | 309,239 | | | |
| N/A | Resources Forward - Recognize Actual Balance | | 25,521 | 25,521 | | | | 25,521 | 25,521 | | | |
| **Total - Facilities Maintenance Fund** | | | **334,760** | **334,760** | **-** | **309,239** | **-** | **25,521** | **334,760** | **-** | **-** | |
| | | | | | | | | | | | | |
| ***610 - FIREFIGHTER'S PENSION FUND*** | | | | | | | | | | | | |
| N/A | Resources Forward - Recognize Actual Balance | | 15,206 | 15,206 | | | | 15,206 | 15,206 | | | |
| **Total - Firefighter's Pension Fund** | | | **15,206** | **15,206** | **-** | **-** | **-** | **15,206** | **15,206** | **-** | **-** | |
| | | | | | | | | | | | | |
| **TOTAL OTHER FUNDS** | | | **15,149,477** | **14,181,488** | **1,025,481** | **960,660** | **-** | **13,163,336** | **14,347,389** | **119,000** | **(284,901)** | |
| | | | | | | | | | | | | |
| **GRAND TOTAL - ALL FUNDS** | | **2.95** | **40,681,770** | **27,817,463** | **3,712,205** | **2,736,315** | **118,219** | **34,115,031** | **27,091,752** | **920,690** | **(194,979)** | |

ORDINANCE O-4694

AN ORDINANCE OF THE CITY OF KIRKLAND AMENDING THE BIENNIAL BUDGET FOR 2019-2020.

WHEREAS, the City Council finds that the proposed adjustments to the Biennial Budget for 2019-2020 reflect revenues and expenditures that are intended to ensure the provision of vital municipal services at acceptable levels.

NOW, THEREFORE, the City Council of the City of Kirkland do ordain as follows:

Section 1. The July 2019 adjustments to the Biennial Budget of the City of Kirkland for 2019-2020 are adopted.

Section 2. In summary form, modifications to the totals of estimated revenues and appropriations for each separate fund and the aggregate totals for all such funds combined are as follows:

| Funds | Original Adopted Budget | Adjustments | Revised Budget |
|---|---|---|---|
| General | 245,651,799 | 13,635,975 | 259,287,774 |
| Lodging Tax | 931,981 | 113,577 | 1,045,558 |
| Street Operating | 22,765,763 | 288,704 | 23,054,467 |
| Cemetery Operating | 1,163,870 | (10,284) | 1,153,586 |
| Parks Maintenance | 3,671,012 | 48,794 | 3,719,806 |
| Park Levy | 6,877,269 | 840,520 | 7,717,789 |
| Contingency | 6,292,477 | | 6,292,477 |
| Impact Fees | 14,394,618 | 1,240,181 | 15,634,799 |
| Excise Tax Capital Improvement | 20,964,701 | 11,216,678 | 32,181,379 |
| Limited General Obligation Bonds | 10,164,749 | (649,112) | 9,515,637 |
| Unlimited General Obligation Bonds | 1,434,094 | (2,984) | 1,431,110 |
| General Capital Projects | 56,493,690 | | 56,493,690 |
| Transportation Capital Projects | 114,126,156 | | 114,126,156 |
| Water/Sewer Operating | 74,147,610 | 657,310 | 74,804,920 |
| Water/Sewer Debt Service | 923,742 | | 923,742 |
| Utility Capital Projects | 39,049,908 | | 39,049,908 |
| Surface Water Management | 29,631,615 | 263,432 | 29,895,047 |
| Surface Water Capital Projects | 23,362,555 | | 23,362,555 |
| Solid Waste | 39,720,466 | (611,886) | 39,108,580 |
| Health Benefits | 19,905,690 | 211,700 | 20,117,390 |
| Equipment Rental | 27,675,835 | (140,613) | 27,535,222 |
| Information Technology | 16,428,916 | 365,505 | 16,794,421 |
| Facilities Maintenance | 15,771,474 | 334,760 | 16,106,234 |
| Firefighter's Pension | 1,474,145 | 15,206 | 1,489,351 |
| | 793,024,135 | 27,817,463 | 820,841,598 |

Section 3. This ordinance shall be in force and effect five days from and after its passage by the Kirkland City Council and publication, as required by law.

Passed by majority vote of the Kirkland City Council in open meeting this _______ day of _________, 2019.

Signed in authentication thereof this _______ day of _________, 2019.

_____________________________
Penny Sweet, Mayor

Attest:

_____________________________
Kathi Anderson, City Clerk

Approved as to Form:

_____________________________
Kevin Raymond, City Attorney

**CITY OF KIRKLAND**
**Department of Public Works**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3800**
**www.kirklandwa.gov**

# MEMORANDUM

**To:** Kurt Triplett, City Manager

**From:** John MacGillivray, Solid Waste Programs Supervisor
Kathy Brown, Public Works Director

**Date:** July 3, 2019

**Subject:** 2019 COMPREHENSIVE SOLID WASTE MANAGEMENT PLAN

## STAFF RECOMMENDATION:

That the City Council:

- Approves the attached Resolution adopting the *2019 Comprehensive Solid Waste Management Plan*; and
- Approves the attached Ordinance and revisions to Title 16, "Refuse and Garbage," in the *Kirkland Municipal Code*.

Kirkland Solid Waste Program staff and a representative from the King County Solid Waste Division (KCSWD) will present an overview of the Plan and answer questions at the July 16, 2019 City Council meeting.

## INTRODUCTION:

This staff report was written to serve as an aide to reviewing the Comprehensive Solid Waste Management Plan (Plan), and was organized to focus attention on the chapters, policies, goals, and actions that could be the most impactful to Kirkland's waste prevention, waste reduction, and recycling programs; local and regional services; and utility rates offered to residents and businesses over the next several years. The Plan was presented to the Public Works, Parks, and Human Services Committee on June 21, 2019.

The following attachments accompany this memorandum:

A. FAQ on the 2019 Comprehensive Solid Waste Management Plan

B. Policies, Goals, and Actions Matrix

C. Northeast Recycling and Transfer Station Siting Process Timeline

D. Transfer Station Siting Criteria Example

**COMPREHENSIVE PLAN ORGANIZATION:**

The Plan is a lengthy 403-page document organized into eight chapters and six appendices. The six most important chapters are noted below. While all chapters are worthy of review, Chapters 4, 5, and 6 are of the most importance and relevance to Kirkland and the region and are highlighted in boxes below. Those chapters include recommendations to:

- Site and construct a new transfer station in the northeast County service area and close the Houghton Transfer Station;
- Further develop the Cedar Hills Regional Landfill (Cedar Hills) through 2040; and
- Establish waste generation and disposal targets and a recycling diversion goal.

These three chapters will be discussed in greater detail later in this staff report.

*Chapter Summaries*

**Chapter 2: The Existing Solid Waste System.** This chapter provides an overview of the garbage and recycling collection systems and facilities in King County and how those systems are integrated to provide safe, affordable, and reliable solid waste collection to the County's residents and businesses.

**Chapter 3: Forecasting and Data.** The focus of this chapter is on solid waste data and how the recycling and disposal data received from the various sectors (single family, multifamily, commercial, and self-haul) influence—over the short and long term—the overall combined and sector-specific operational, programmatic, and educational planning decisions made the County and cities.

**Chapter 4: Sustainable Materials Management.** This chapter is where the rubber meets the road. The overarching goal is to achieve zero waste of resources that have economic value by 2030 through achieving an interim 70% recycling diversion rate, waste generation and disposal targets, and implementing dozens of actions. All goals, targets, and actions are geared ultimately toward extending the life of the Cedar Hill Regional Landfill through 2040. Attachment B to this memorandum shows the various policies, goals and actions in the Plan and the specific actions Kirkland has taken to achieve them.

**Chapter 5: Solid Waste Transfer and Processing.** This chapter provides details about the transfer and disposal network in King County and discusses the three transfer station options that were considered to replace the Houghton Transfer Station. The chapter makes a recommendation to site and build a new Northeast Recycling and Transfer Station somewhere in the northeast County service area.

**Chapter 6: Landfill Management and Solid Waste Disposal.** The current and future methods of disposing of the County's waste is discussed in this chapter. Of the three options considered, the Plan recommends further development of an additional area on the landfill property to provide landfill capacity through 2040.

**Chapter 7: Solid Waste System Finance.** This chapter discusses how the various revenues received by the County are used to operate the County's transfer and disposal system and how those revenues are distributed among the County's various cost centers. The policies and actions in this chapter provide the framework to ensure that there is accountability and transparency in the County's financial operations.

*Plan Organization*

Each chapter in the 2019 Comprehensive Solid Waste Management Plan is prefaced by a series of policies, goals, and/or actions. There are 27 policies, 70 actions, but just one goal—albeit an important one—concerning zero waste of resources and the need to achieve a 70% recycling diversion rate. The Plan also designates the party or parties primarily and secondarily responsible for implementing the policies, goals, and actions, which can include cities, King County, collection companies, the Washington State Department of Ecology, or a combination thereof. As discussed on page 1-2 of the Plan:

> **Policies** provide broad direction and authorization for services and system priorities. Policies should not change through the life of the Plan.
>
> **Goals** reflect the long-term outcomes and aspirations for the regional system. Goals should not change through the life of the Plan.
>
> **Actions** are targeted, specific, and time-based to implement policies and could include: programs, studies, infrastructure improvements, and regulations. Actions are built on a foundation of daily service delivery by the county, cities, and other stakeholders. This Plan does not attempt to describe every solid waste task in the regional system. It lists only those that are particularly important to initiate or continue. Actions may be updated outside of the formal Plan update process to adapt to changing conditions.

Attachment B to this staff report, "Policies, Goals, and Actions Matrix," provides a list and description of the individual policies, goals, and actions divided by chapter. The party with primary responsibility for implementing a specific policy, goal, or action is listed first or alone. The "Kirkland Activities" column provides a brief description of the actions Kirkland has taken to achieve and comply with each policy, goal, or action, where applicable.

## CONTEXT AND BACKGROUND:

The following section introduces and discusses several pertinent aspects of the complex, cooperative solid waste management system in King County.

*The Solid Waste Interlocal Agreement*

The City of Kirkland, along with 36 other cities in King County, is a signatory to a solid waste interlocal agreement (ILA) with King County through 2040. The ILA was renegotiated in 2010-2012, and Kirkland, along with most other cities, signed their extended ILAs in early 2013.

The primary function of the ILA is to delineate the responsibilities of each party as they pertain to the collection, transport, and disposal of solid waste in King County. All cities with ILAs are required to direct their waste in the King County system and pay a per-ton disposal fee. This provides King County with a reliable source of revenue to own, operate, and maintain the transfer system and the Cedar Hills Regional Landfill (Landfill) on behalf of cities and the County itself. One of the other key requirements of the ILA is the designation of King County as the planning authority with a responsibility to draft a Plan at least every five years on behalf of cities, pursuant to RCW 70.95.080 and RCW 70.95.110. The current version of the Plan was last updated 18 years ago in 2001. Updates to the Plan were nearly completed in 2009 and 2013 but were derailed for two major reasons.

The first derailment was because in order to pay for the transfer system renovation, the County asked cities: 1) if they would prefer the County issue longer term bonds through 2040 with a higher debt service but lower disposal rates; or 2) issue shorter term bonds through 2028 that would result in higher disposal rates but lower overall debt service. Cities, including Kirkland, chose longer term bond option, which necessitated the negotiation of a new ILA whose term was through 2040 so that the County had revenue to back the long term bonds. ILA negotiations were first delayed due to a disagreement over how to deal with joint and several environmental liability concerning current landfill and closed landfills.

Second, after successfully completing the extended ILA negotiation, the City of Bellevue stated that it would not sign the new ILA and would leave the cooperative system upon the expiration of its ILA in 2028, taking with it about 10% of the system-wide tonnage and the associated revenue. This caused the County to take pause and reconsider the need for a new Northeast Recycling and Transfer Station (NERTS) because of the projected decrease in tonnage and revenues, even though the replacement and closure of the Houghton Transfer Station was identified and approved in the 2006 Waste Export and Transfer System Plan. Bellevue eventually reversed course and decided to sign the extended ILA in 2018. This action restored the County's long held plan to site and construct a new NERTS and eventually close the old Houghton Transfer Station.

*Plan Approval Process*

The ILA prescribes the process by which the Plan is adopted. Once the Plan is approved by the Regional Policy Committee and the Metropolitan King County Council (MKCC), it's the cities' turn to act to approve or disapprove the Plan. Approval of the Plan requires approval by cities representing three-quarters of the total population of the cities that act to approve or disapprove the Plan. Cities may also choose to take no action to approve or disapprove of the Plan. The ILA prescribes that, "In calculating the three-quarters of the population, the calculation shall consider only those incorporated jurisdictions taking formal action to approve or disapprove the Comprehensive Plan within 120 days of receipt of the Plan." The 120-day approval period begins once a city takes receipt of the Plan.

**The Plan was received by the City of Kirkland on May 20, 2019. Pursuant to the ILA, if the City Council intends to act to approve or disapprove of the Plan, it must do so within 120 days of receipt which requires action by September 16, 2019. To meet this deadline, action would need to be taken on or before the September 3, 2019 City Council meeting.**

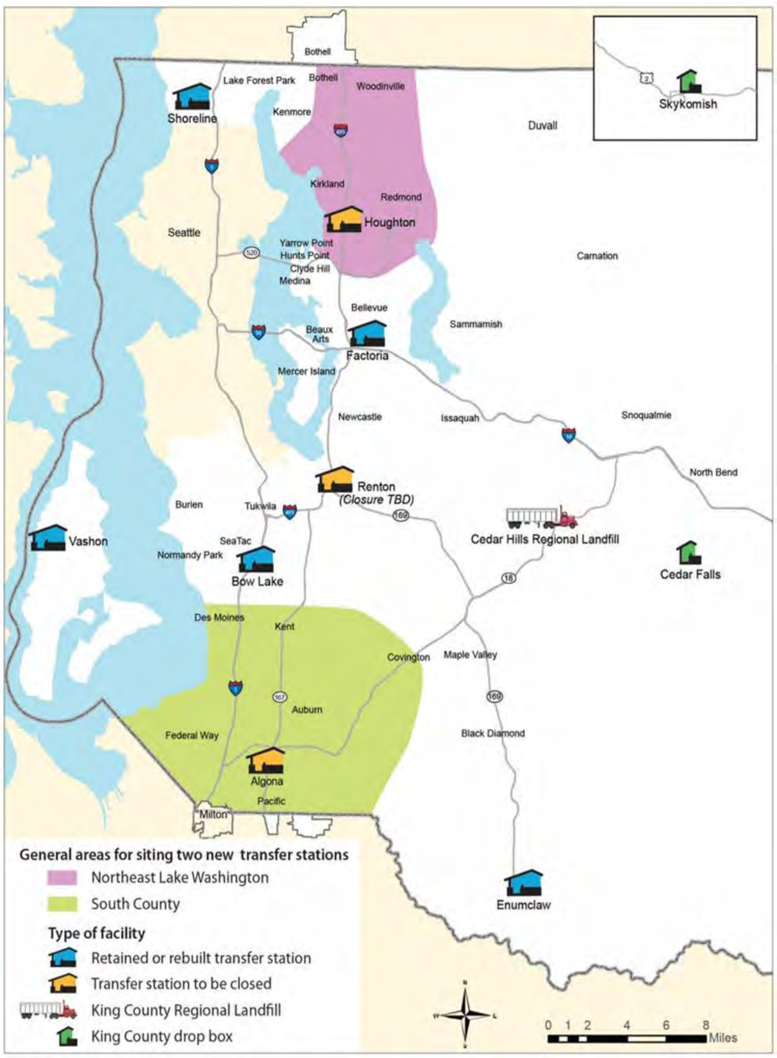
If the Plan is adopted by Kirkland, the City is committing to making a reasonable, good faith effort to implement or abide by each policy, goal, and action in the Plan, where applicable. However, there are no specific legal ramifications or other penalties if Kirkland or any other city is unable or unwilling to adopt or achieve, in full or in part, any or all the policies, goals, and actions.

*The Solid Waste System in King County*

King County owns, operates, and maintains eight urban and two rural transfer station hubs where garbage that is received from garbage collection companies such as Waste Management and from residential self-haulers is consolidated for bulk transport on 53-foot container trailers to Cedar Hills in the unincorporated Maple Valley area.

The Houghton Transfer Station, located adjacent to the closed Houghton landfill, has been in operation since 1967. Per the ILA, cities are required to direct all their garbage to the King County system and must pay a per ton disposal fee ("tipping fee") that is used to pay for administration; bonded debt for capital improvements projects; recycling programs; and the operation and maintenance of the transfer stations, Cedar Hills, and several closed landfills

Map 1: Transfer Station




Source: 2019 Comprehensive Solid Waste Management Plan

through the County. King County is responsible for proposing the disposal fee, which is subject to review by cities and approval by the MKCC. The City of Seattle is not part of the King County system. Seattle owns and operates its own transfer stations and rails its waste to out-of-county landfills.

**CHAPTER DISCUSSIONS:**

The following discussion focuses upon the three major elements of the Plan that are of most importance to Kirkland, including the transfer system, disposal, and sustainable materials management.

### *Chapter 5: Solid Waste Transfer and Processing System*

The Houghton Transfer Station has a long and storied history. King County has been contemplating the closure of the station for over 25 years. The majority of Houghton property was first an open landfill between the 1940's and 1960's. In 1965, King County closed the landfill and opened the station. In its 1992 Plan, King County proposed replacing the station with a new station at a different location. Unfortunately, in 1995, the rate proposal submitted by the KCSWD that included funds for the replacement of Houghton was rejected and the KCSWD was directed to continue to operate Houghton as-is at its current location. The closure and replacement of Houghton was recommended again—but this time approved—in the 2006 Solid Waste Transfer and Waste Management Plan (Transfer Plan), which served as the road map for the renovation of all station in the King County transfer system. In the 2006 Transfer Plan, Houghton failed to meet several key service-level criteria and was slated for replacement as a part of the County's transfer station capital improvement program.

While the Shoreline, Bow Lake, and Factoria stations were rebuilt and the siting process for Algona started, the process to replace Houghton was halted because of Bellevue's aforementioned indication it would not sign the extended ILA. Once Bellevue signed on to the extended ILA, work began anew on the Plan, which now recommends the construction of the new transfer station in the northeast King County service area and the closure of Houghton once the new station comes online. If the Plan is approved by cities, King County will begin a siting process for a new station as required in the following policy and action:

> ***Policy T-3*** *– Engage cities and communities in the siting and development of facilities, and in developing mitigation measures for impacts related to the construction, operation, and maintenance of transfer facilities, as allowed by applicable local, State, and federal laws.*
>
> ***Action 1-T*** *– Continue to implement transfer station modernization as set forth in the Solid Waste Transfer and Waste Management Plan and approved by the Metropolitan King County Council in 2007, including siting and building a new Northeast recycling and transfer station and closing the Houghton station when the new station is complete. Adapt the siting process included in the Solid Waste Transfer and Waste Management Plan to meet community needs in the Northeast service area.*

*Transfer Station Options for the Northeast County*

The Plan considers three transfer station options for the northeast County but recommends siting and construction a new station in the northeast service area. The options considered include:

1. **Keep Existing Houghton Station Open.** The "as-is" option is the most inexpensive option whereby the station would be retained in its current state and with little prospect for new services and operational upgrades or renovation. It would add $2.39 to the disposal fee and offer little in the way of emissions reductions.

2. **New Northeast Transfer Station (*Recommended*).** The most expensive option, estimated to add an additional $13.11/ton to the disposal fee, is a new modern station that would offer reliable service, equity, and recycling services to residents and businesses in the northeast County service area. This option would add about $1.10 per month or $13 per year to the average customer's bill. A new station also would meet all six of the key urban transfer station service level criteria in the Plan—none of which are currently met by the aged Houghton facility. Key criteria include time on site, vehicle capacity, recycling services, handling capacity, waste storage space, and waste compaction. This option also offers the highest reduction in GHG emissions, largely because of the addition of recycling services.

3. **Combination of Facilities.** This hybrid option proposed to keep Houghton open to self-haul customers only and would have built a smaller station in the service area open only to commercial waste haulers. The cost per ton would have increased by about $10 with a GHG emission reduction second to the recommended option.

| Comparative Attribute | Houghton "As Is" | Northeast Recycling and Transfer Station | Combination of Facilities |
|---|---|---|---|
| *Total cost per Ton (2029)*[1] | $2.39 | $13.11 | $9.79 |
| *GHG Reductions from Transfer Station Recycling (2029)*[2] | (2,165 MTCO2e) | (32,098 MTCO2e) | (28,802 MTCO2e) |
| *Level of Service*[3] | Will not meet any of the 6 key level of service criteria. | Will meet all 6 key level of service criteria. | Will not meet all 6 key level of service criteria. |
| *Recycling* | Curbside mix, textiles, and cardboard. | Curbside mix, textiles, cardboard, clean wood, scrap metal, yard waste, appliances, and other recyclables TBD. | Curbside mix, textiles, cardboard, clean wood, scrap metal, and yard waste. |
| *Risks* | • Limited recycling and flexibility for the system in the future, and<br>• Host city opposition. | • Siting a new station may take time and be costly, and<br>• Potential host city opposition. | • Limited recycling and flexibility for the system in the future,<br>• Siting a new station, and<br>• Potential host city opposition. |

Source: 2019 Comprehensive Solid Waste Management Plan

*Important Northeast Transfer Station Siting Considerations*

- **Site Identification.** King County is obligated to cast a wide net and consider all possible parcels in the service area that meet a basic level of siting criteria. Even if a given city indicated a strong interest in hosting a new station and offered up a parcel, King County would still be required to identify and evaluate all available parcels in other cities and unincorporated areas in the service area. However, if a city did express an interest in hosting and a parcel substantially met the established siting criteria, that would not preclude King County from beginning a SEPA/EIS process to determine the viability of that site. For an example of the criteria used to select sites for the South County Recycling and Transfer Station, please see Attachment D, "Transfer Siting Criteria Example."

- **Rebuilt transfer station locations.** Historically, King County has built new stations on the site of their old stations. In Shoreline, Bow Lake, and Factoria, the old station was torn down and a new station constructed in its place or adjacent to the old station on the same parcel. The only exception to date is the new Algona transfer station, which will be built on a nearby parcel.

- **Potential sites in Kirkland.** It is highly likely that the Houghton property will be one of the sites that will be considered as a site for a new station. This is an important nuance to recognize. King County's intent to close the old Houghton station does not necessarily mean that a new station could not be built at its current location on the same parcel. One other potential site that has been identified is the Houghton Park-and-Ride property.

- **Siting Timeline.** The transfer station siting processes can take up to two years to complete. Kirkland has suggested that King County look for opportunities to expedite the siting process.

- **Modern transfer stations.** Modern transfer stations built over the past several years in King County and Seattle are far safer, dependable, and more efficient at managing waste, traffic, odors, and noise. New stations often offer public amenities for residents and transportation infrastructure improvements to host cities. Modern stations, such as the North Transfer Station in Seattle which opened in 2017, have been constructed adjacent to or within neighborhoods with minimal impacts to surrounding residents.

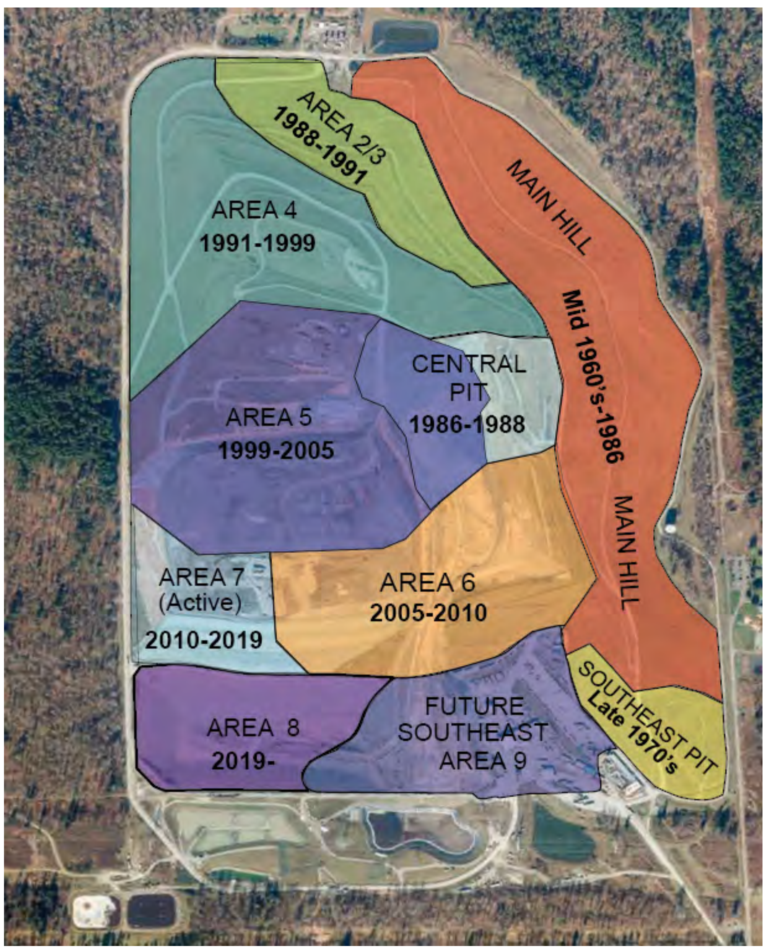
*NERTS Siting Process*

With the approval of the Plan by the MKCC in April 2019, funding to support the siting of a NERTS was released to the KCSWD. The draft timeline for the siting of the station is included as Attachment C to this staff report. If the Plan is approved by cities, King County anticipates hiring a siting consultant to assist with the siting process no later than September 2019. Kirkland leadership recently met with representatives from King County on May 29, 2019 to exchange interests and discuss the timeline. Early on, Kirkland will be entering into a dialogue with its city partners in the northeast County service area and expects a robust public engagement process with members of the community as the siting process progresses.

## *Chapter 6: Landfill Management and Solid Waste Disposal*

The Cedar Hills Regional Landfill began accepting waste in the 1965 and is depicted in Map 2, below. Located on a 920-acre parcel, the facility is closed to public access and accepts waste only from King County transfer vehicles, local garbage haulers, and those with an approved special waste disposal permit. King County maintains administrative offices and operations facilities on the southeastern portion of the property adjacent to a landfill gas-to-energy processing facility operated by a private interest, Bio Energy Washington. The landfill is surrounded by a wooded 1,000-foot buffer intended to separate neighbors from noise, odors, and litter. King County provides ongoing monitoring of ground water, stormwater, air quality, and leachate, and strives to keep bird activity and litter to a minimum. Active landfill areas are covered overnight to prevent the abundance of wildlife that reside around the landfill from gaining access to trash.

Map 2: Cedar Hills




Source: 2019 Comprehensive Solid Waste Management Plan

Cedar Hills is divided into several distinct areas that are permitted to be filled up to an elevation of about 800 feet. Areas 1-7 are closed at this time and no longer are receiving waste, but may receive additional waste in the future as the areas settle over time below 800 feet elevation. Area 8 is the currently active disposal cell and has enough capacity to carry the region through roughly 2028. As recently as a dozen years ago, the landfill was scheduled to close as early as

2016. However, due to an increase in actions taken by cities and their residents and businesses to divert more materials from the landfill to recycling, coupled with the County's creativity in maximizing the available disposal space at the facility, the estimated closure date has been extended until at least 2028 when Area 8 is projected to be filled up. To delay the closure of the landfill until at least 2040, the Plan recommends further development of one final area, Area 9. Assuming Area 9 is constructed and opened, it will supplant the administrative offices, scale house, and equipment maintenance facilities to an off-site location.

The most important disposal policies and action in the Plan include the following:

> ***Policy D-1*** – *Operate and maintain the Cedar Hills Regional Landfill to meet or exceed the highest federal, State, and local standards for protection of public health and the environment.*
>
> ***Policy D-2*** – *Maximize the capacity and lifespan of the Cedar Hills Regional Landfill.*
>
> ***Action 1-d*** – *Further develop the Cedar Hills Regional Landfill to maximize disposal capacity. To account for technological advances, do not specify the next disposal method after ultimate Cedar Hills closure in this Plan. Conduct analysis of post Cedar Hills disposal options prior to the next Plan update to ensure adequate lead time for selecting, planning for, and implementing the next disposal method.*

*Future Disposal Options*

The Plan considered three different future disposal options beyond 2028.

> **Option 1: Further Develop Cedar Hills (*Recommended*).** If Area 9 is developed it will add landfill capacity at least through 2040.
>
> **Option 2: Waste Export.** Waste would be exported via rail to landfills with capacity in Washington and/or Oregon. The City of Seattle is an example of a waste exporter in the region. A key risk with this option is the availability of reliable rail capacity and the loss of control. It also would require existing transfer stations to be modified for rail-ready transport and have higher GHG emissions than Option 1.
>
> **Option 3: Mass Burn Incinerator.** King County's waste would be burned in a mass burn incinerator with a portion of the energy produced converted and distributed into the power grid. The potential sites for an incinerator are limited because of environmental concerns and emissions, and logically would include a site at the landfill.

| Comparative Attribute | Further Develop Cedar Hills | Waste Export To An Out-of-County Landfill | Waste To Energy Facility |
|---|---|---|---|
| *Cost per Ton*[1] | $41 | $55 | $136 |
| *Life Cycle Greenhouse Gas Emissions (EPA's WARM Model)* | (134,000)[2] MTCO2e | (78,000)[2] MTCO2e | 12,000 to 80,000[3] MTCO2e |
| *Annual Greenhouse Gas Emissions (EPA's eGGRT)* | 91,000[4] MTCO2e/year | 91,000[4] MTCO2e/year | 1,200,000 MTCO2e/year |
| *Recycling Rate* | No change | No change | 2% increase |
| *Risks* | SEPA, Permitting | Rail Capacity, Control | Siting, Sizing |

Source: 2019 Comprehensive Solid Waste Management Plan

Of the three future disposal options considered, maximizing the capacity of the landfill was clearly the preferred option and is recommended. Relative to the other two options, further landfill development is less expensive and less detrimental to the environment. A mass burn incinerator could cost upwards of $1.2 billion or more adding about $136/ton to the tipping fee versus $41/ton for further landfill capacity development. Further, the anticipated annual GHG emissions from an incinerator (1,200,000 MTCO2e/year), according to the model EPA's GHG emission model used in the Plan, would be up to 12 times as much the annual emissions from landfilling (91,000 MTCO2e/year).

*Important Disposal Considerations*

**Development versus expansion.** Further development of the landfill will not increase the footprint of the parcel on which the Cedar Hills is located. Cedar Hills is not expanding; rather, the County is maximizing the available capacity of the landfill through the further development of a new cell. The future development of Area 9 will occur within the existing boundaries of the property and will not encroach upon the 1,000-foot buffer.

**Neighbors' resistance to further landfill development.** The KCSWD has been consistent in operating the landfill to the highest standards and in its intent to be a good neighbor. However, some neighbors have been periodically impacted by litter and odors from the landfill as well as from the Cedar Grove Composting facility located next door. Upon its approval of the Plan, the MKCC included several mitigation provisions intended to reinforce and improve upon the County's commitment to mitigate impacts to neighboring residents. These provisions include improving its bird management program to control litter, compliance with the height restrictions of Areas 5, 6, 7, a requirement that no waste be landfilled in the 1,000-foot buffer, a post landfill closure plan, and exploration of County road repair mitigation.

**Landfilling offers the most benefits.** There are no plans to develop any more landfills in King County once Cedar Hills is full. Landfilling will provide the most affordable disposal rates to King County cities through 2040 relative to other disposal options. Other benefits include lower greenhouse gas emissions, the ability to manage our waste locally, and time for the County and cities to plan for the next disposal option after the landfill is full.

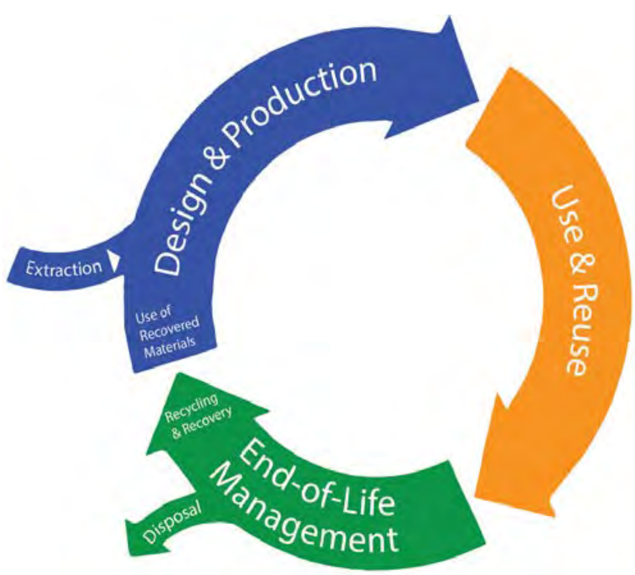
### *Chapter 4: Sustainable Materials Management*

There are 33 actions included in this chapter, 21 of which cities have a primary or secondary responsibility for implementing. A list of the actions and a summary of Kirkland's past, current, and/or future activities related to each activity can be found in Attachment B, "Policies, Goals, and Actions Matrix."

The sustainable materials management chapter of the Plan represents a fundamental shift in how we as a city, the County, and the region should view solid waste management and sustainability. Sustainable materials management is foundational to the Washington State Department of Ecology's solid waste and hazardous waste management plan, Moving Washington Beyond Waste and Toxics (2015). Sustainable materials management is a systemic approach to using and reusing materials more productively over their entire life cycles. Sustainable materials management takes a cradle-to-grave approach that considers opportunities to make products more durable, recyclable, and less resource-use intensive over a complete lifecycle beginning at material extraction to design, production and distribution, through use and reuse, and at the end-of-life through recovery, recycling, and disposal. It is a shift to viewing our waste holistically with an eye toward how each stage in a product's life are intertwined and complementary.

In a sense, it's a departure from recycling diversion to reuse, waste prevention, and waste reduction.

Sustainable Materials Management Life Cycle




Source: Moving Washington Beyond Waste and Toxic – Washington State Department of Ecology

The recycling diversion rate has been a key metric used to gauge the success of Kirkland's recycling programs for many years. Kirkland's single-family recycling diversion rate ranks amongst the highest in King County and the region each year, hovering around 65%. The multifamily diversion rate has improved significantly in the past five years, peaking now at a respectable 30%. While the Plan still considers recycling diversion an important indicator to gauge the success of our individual and collective recycling programs, sustainable materials management embraces the waste hierarchy by focusing our attention first on reuse, waste prevention, and waste reduction before recycling diversion. The goal is for us to not produce as much "stuff" and to elevate waste prevention/reduction over recycling diversion as the key metrics of individual and collective success.

**To prolong the life of the Cedar Hills Landfill through 2040 and achieve the goal of zero waste of resources, cities must work individually and collectively to implement a variety of structural, educational, incentive-based, legislative, and enforcement actions to achieve the 70% recycling diversion goal and the waste generation and waste disposal targets in the Plan. Failure to substantially achieve these goals and targets may shrink the critical decision-making window available to the County and cities to choose a future, long-term and more expensive method of garbage disposal.**

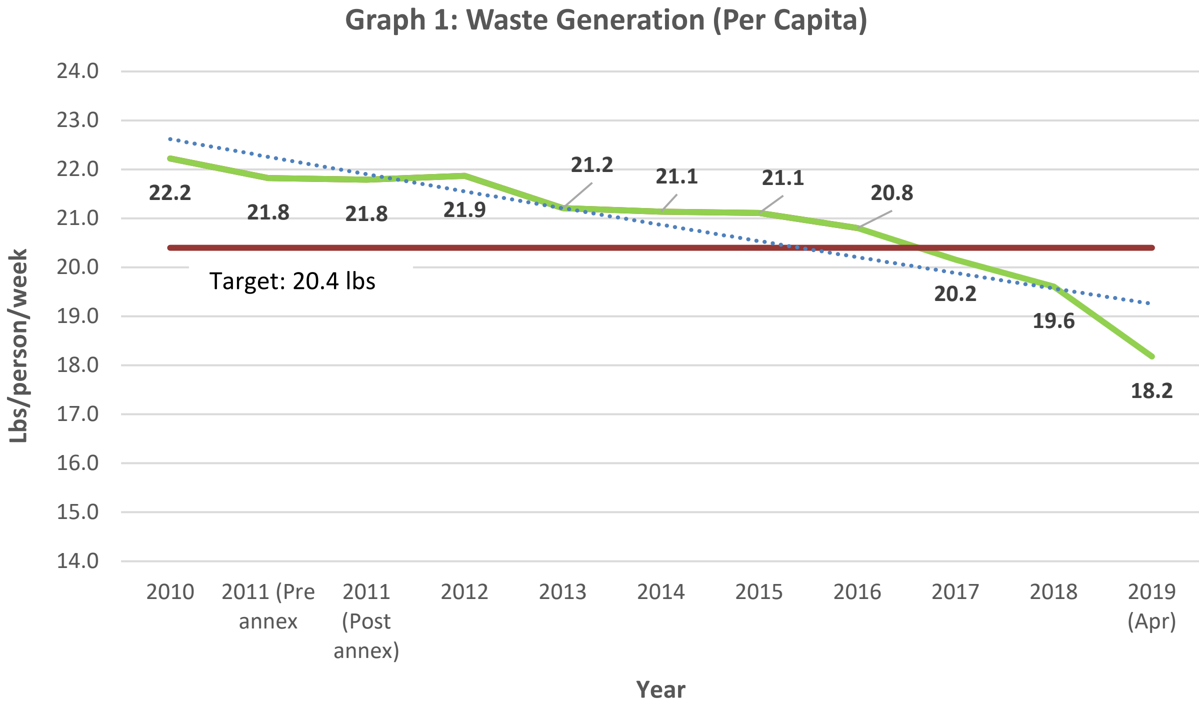
**Waste Prevention Targets**

The Plan includes two new sustainability targets—waste generation and waste disposal—which both are indicators of waste prevention and reduction.

1. **Waste generation** is the total amount of waste ("stuff") we produce per capita and per employee, which includes a combination of garbage, recyclables, and yard and food waste. Per capita refers to all single-family and multifamily residents. Per employee also includes waste disposed by customers at a place of business. A decrease in waste generation means that the total amount of materials disposed and/or recycled has been reduced. The per capita waste disposal target is 20.4 pounds/week and the per employee target is 42.2 pounds/week.

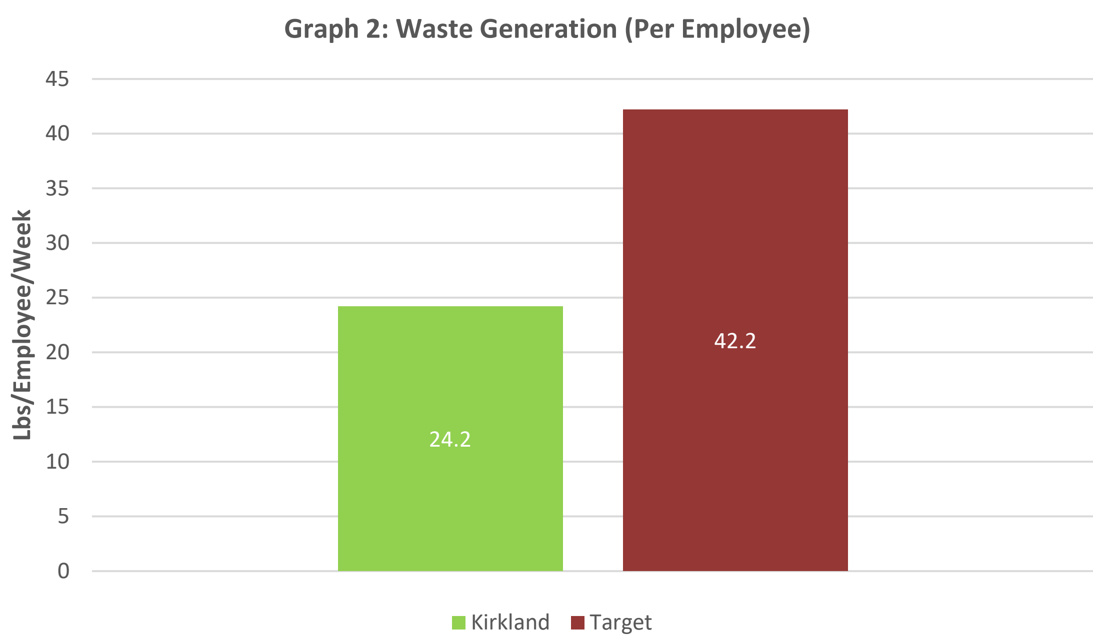
   *Kirkland Per Capita Waste Generation*

   Kirkland's per capita waste generation performance through April 2019 is shown below in Graph 1. Kirkland's residential waste generation has progressively declined over time and is now 2.2 pounds below the Plan's target.




*Kirkland's Per Employee Waste Generation*

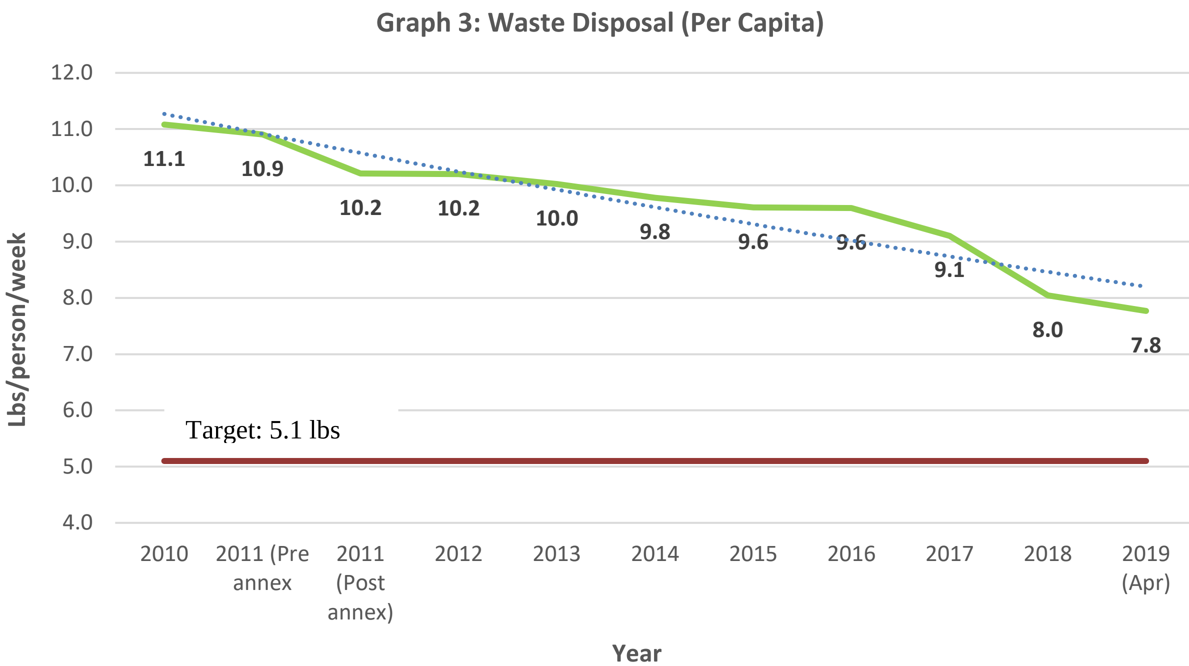
Through May 2019 as shown in Graph 2, Kirkland's commercial sector is producing only 24.2 pounds of garbage, recycling, and organics per employee, 18 pound lower than the per employee target. The most recent estimate of the number of employees working in Kirkland is 48,077.



2. **Waste Disposal** focuses only on the amount of trash produced and landfilled per capita and per employee. It is an indicator of an increase in waste prevention and/or recycling diversion. The Plan's per capita waste disposal target is 5.1 pounds per week. The per employee target is 4.1 pounds per week.

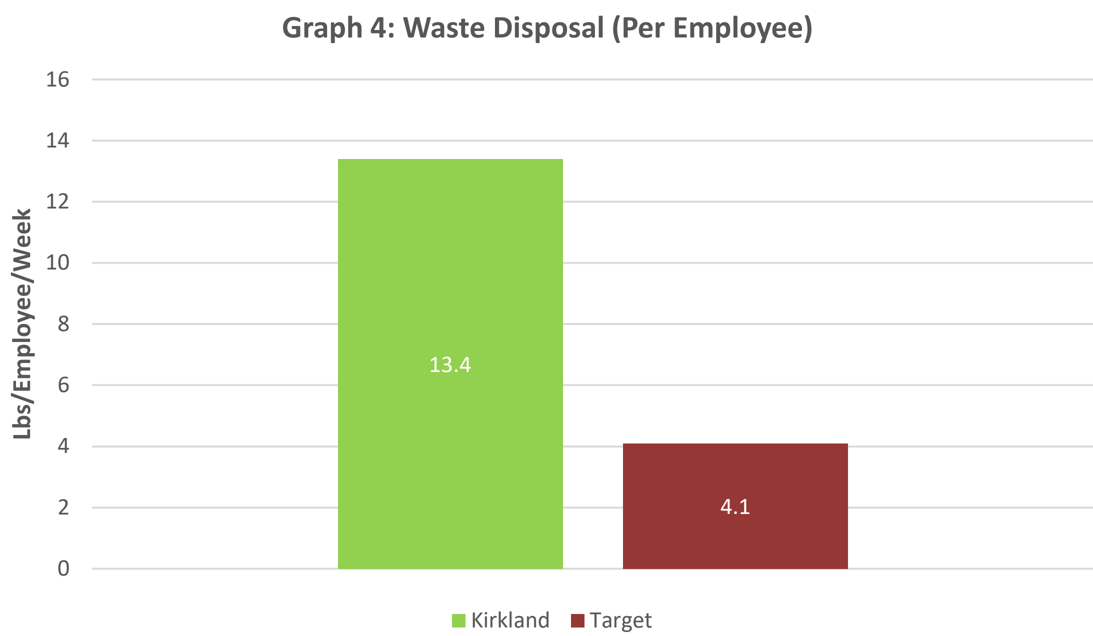
*Kirkland's Per Capita Waste Disposal*

As shown below in Graph 3, Kirkland's per capita waste disposal is trending downward but is still 2.7 pounds per week from reaching the target.




*Kirkland's Per Employee Waste Disposal*

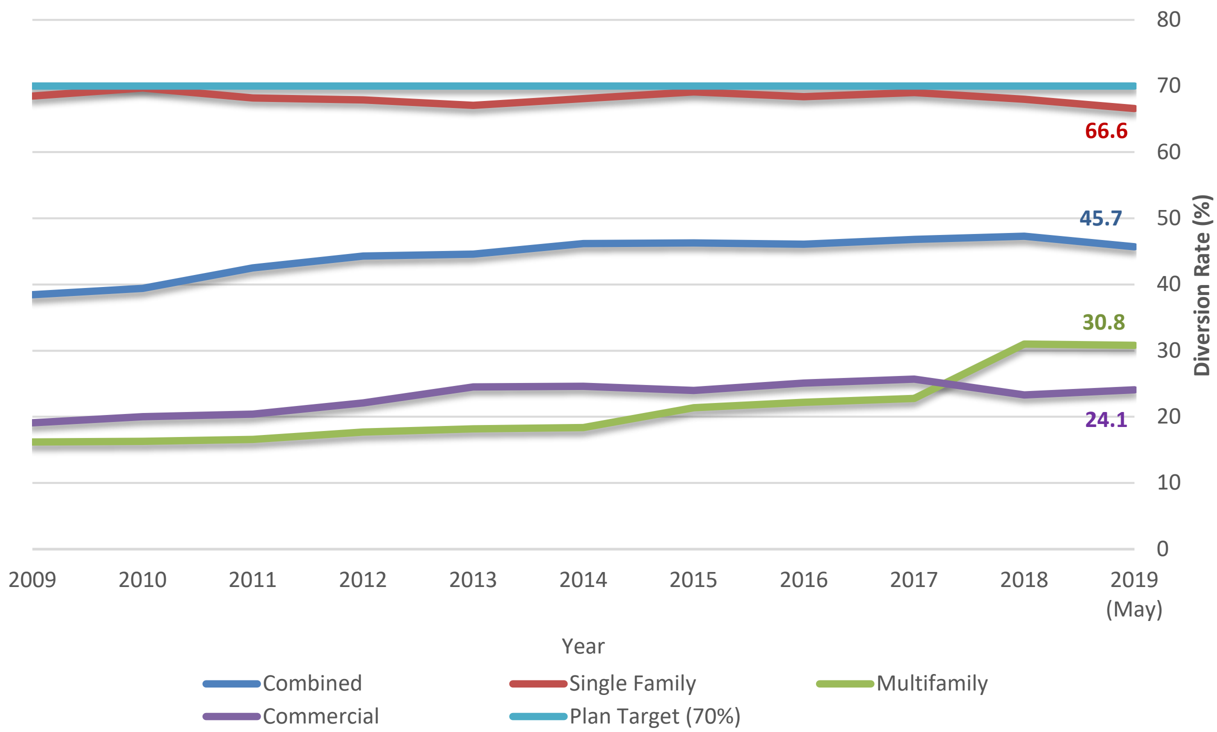
Kirkland's commercial sector now produces 13.4 pounds per employee, per week or 9.3 pounds higher than the target. When compared to the Waste Generation target, Kirkland's commercial sector is disposing of a relatively high amount of garbage. This shows there are opportunities to encourage businesses to implement more waste prevention and reduction measures and divert more disposed materials for recycling in their front and back of house operations by taking advantage of Kirkland's business recycling program and through joining the EnviroStars Green Business Program.




3. **Recycling Diversion** is the percentage of the total waste stream that is diverted from disposal for recycling or composting. The Plan's aspirational Achieve Zero Waste of Resources Goal strives to eliminate the disposal of materials with economic value by 2030 with an interim goal to achieve a combined 70 percent recycling diversion rate that includes waste produced in both the residential and commercial sectors.

   Graph 5, below, shows Kirkland performance relative to the 70% interim goal. The single-family sector is hovering close to the goal at 67%. Recycling diversion in the multifamily sector has improved significantly over the past three years, now at 31%. The commercial sector is lagging at 24%. The multifamily and commercial sectors offer the most opportunity to get closer the 70% recycling diversion rate goal. Kirkland's overall combined recycling diversion rate is 45.7% through May 2019.

Graph 5: Recycling Diversion Rate by Sector (2009-2019)




**KIRKLAND MUNICIPAL CODE UPDATE:**

The following section discusses potential updates to the *Kirkland Municipal Code* (KMC) Title 16. If the City Council approves the Plan, the following KMC code revision will memorialize the commitments made in code.

*Background*

There are three sections of KMC Title 16, "Refuse and Garbage," that are pertinent to the Plan update. Save for a 2016 addition to 16.08.012 in Section G pertaining to Multifamily Residential Recycling, there have not been any substantial updates to the following KMC sections since 2002, with most of the language drafted in the early 1990's. If the City Council acts to approve the Plan, staff proposes the following code revisions, discussed below, to modernize the solid waste code and recognize the commitment made to try to achieve the goals and actions in the Plan.

*Discussion of Proposed Revisions to KMC 16.08*

**16.08.001 Legislative findings and policy.**

The language in this section has been revised to reflect the applicable and appropriate references to RCW Title 70.95. References to the current solid waste interlocal agreement and the City's participation in the Metropolitan Solid Waste Advisory Committee and the Solid Waste Advisory Committee have been added.

**16.08.002 Plan – Adopted.**

Replaced text with new reference to 2019 Comprehensive Solid Waste Management Plan.

**16.08.012 Waste stream reduction plan.**

- **Section (1) Goal** has been amended to add reference to the waste generation and waste disposal goals in the Plan.

- **Subsection 2 (A): Program Elements** updated to clarify that the collection and processing of hazardous waste is managed through the King County Hazardous Waste Management Program, not a separate local Kirkland operated program.

- **Section 2 (D)** is proposed for deletion.

- **Section 2 (E) Recyclable Materials** has been updated to reference the list of accepted in Kirkland solid waste contract instead of listing each commodity separately.

- **Section 2 (F) Penalty for Excessive Waste Generation** is proposed for deletion. Kirkland has not actively enforced this section of the code in the past. The provision may be excessive and duplicative. KMC 16.08.040 requires residents to have enough garbage capacity to accommodate their production of waste and residents are free to subscribe and pay for as much garbage collection capacity and service as is required to meet this provision. Kirkland's linear "pay as you throw" rate structure does not provide a "bulk discount" for customers with larger cart sizes and results in larger producers paying more. Linear rates with embedded recycling service also encourage residents and businesses to reduce their waste.

- **NEW SECTION: Section 2 (X) Commercial Recycling** is proposed to require that all commercial properties have an equal weekly volume of garbage and recycling service. This is proposed as an important step to aid the commercial sector in meeting the Plan's waste disposal goal. For properties that do not have enough recycling capacity, a significant portion of their recyclables are being disposed of in the garbage leading to a higher than ideal disposal rate. This proposed code revision would not result in any cost increases to businesses. Commercial recycling service up to 150% the size of their garbage service at no additional cost to businesses through the City's contract with Waste Management. In Washington State, commercial recycling service is free market, so businesses also may elect to subscribe to service with a recycling service provider of their own choosing where the service may or may not be provided for free.

  Improving waste reduction and recycling diversion in the commercial sector is an ongoing challenge for local solid waste management jurisdictions. Just like multifamily properties, commercial properties need a variety of tools to be successful at recycling. According to Waste Management data, the commercial sector in Kirkland produces 32.7% of the total waste generated in the City. As of May 2019, the commercial sector diverted only about 24% of the total waste for recycling or composting. Kirkland's current failure to meet the Plan's Waste Disposal goal highlights the need to reduce waste and divert more materials from the landfill.

In 2015, Kirkland City Council adopted a revision to the KMC that requires all multifamily properties to offer recycling service to its residents and have at least a 1:1 ratio of recycling capacity to garbage capacity. The multifamily requirement has been a useful tool to encourage recycling and has supported the growth of the multifamily diversion rate to over 30%. Staff now is proposing a similar requirement for commercial properties.

*Kirkland's Commercial Recycling Program*

Kirkland's contract with Waste Management provides commercial properties with up to 150% of their garbage capacity in recycling service at no additional cost. Per State law, commercial customers may forego Waste Management's recycling service and contract directly with any other recycling service provider. A recent audit revealed that over 100 businesses either contract with a separate recycling hauler or do not have any recycling at all. Further, about 40% of Kirkland businesses with recycling service do not meet the proposed 1:1 ratio standard. According to the 2015 King County Waste Characterization Study, about 70.5% of the waste disposed by non-residential customers in King County could be recycled or composted instead. The major components of this 70.5% include food (24.7%), paper (23.1%), and plastic (14.3%). Kirkland commercial properties also have large amounts of recyclables in their trash.

Outreach to these commercial properties informing them of the availability of recycling service at no additional cost can be effective but does not always yield results. It can be challenging to reach the right person at a commercial property, or some may be resistant to participating. Kirkland currently supports businesses in increasing and improving recycling in variety of ways. Existing commercial recycling resources include:

- Free deskside recycling bins
- Free posters and signage
- Outreach in connection with the EnviroStars Green Business Program
- Education and outreach from Waste Management Recycle Corps Interns
- Free technical assistance on site
- Assistance with starting a free food waste composting service

A requirement that businesses have recycling service on site, and that they have enough, will help Kirkland businesses divert more items for recycling and reduce waste.

**NEXT STEPS:**

The Plan is expected to reach the approval threshold by King County cities on or before the September 16, 2019 deadline. Once approved by cities, the final step in the approval process is a 45-day review period by the Washington State Department of Ecology. Once the Plan is approved by cities, staff expects the County to begin the competitive procurement of a siting consultant and begin the siting process for a new NERTS to be located somewhere in the NE County service area by forming a Core Northeast City Working Group and a Siting Advisory Committee, both of which will have City of Kirkland elected and staff representation.

Attachment A: Frequently Asked Questions on the Plan
Attachment B: Policies, Goals, and Action Matrix
Attachment C: Northeast Recycling and Transfer Station Siting Process Timeline
Attachment D: Transfer Station Siting Criteria Example

King County
Department of
Natural Resources and Parks

Solid Waste Division

# Planning for the Future of Regional Waste Management

*Frequently Asked Questions on the 2019 Comprehensive Solid Waste Management Plan*

Responsible waste management is a top priority as we plan for the economic and environmental future of our region.

The *2019 Comprehensive Solid Waste Management Plan* (Comp Plan) adopted by the King County Council on April 24, 2019, was developed in close cooperation with local jurisdictions, private sector waste management experts, and the input of numerous stakeholders and community members. While it addresses many topics, the plan zeroes in on three key priorities:

- Increasing the regional recycling rate from the present 54 percent to 70 percent so these materials can be made into new products.
- Expanding and modernizing services at current garbage and recycling transfer stations, and adding new facilities in underserved areas such as northeast and south King County.
- Identifying how to dispose of garbage after 2028 when the currently built areas at the Cedar Hills Regional Landfill are expected to be full.

This document outlines responses to common issues and questions about the Comp Plan and landfill management.

## Contents

## BIRD and WILDLIFE MANAGEMENT

**What steps are taken to keep animals, especially large birds like eagles, out of the garbage at the Cedar Hills Regional Landfill?**

Operations staff work closely with biologists from the consulting firm Innovative Wildlife Solutions to ensure bird and wildlife protection, and to deter scavenging by the animals. Active areas of the landfill are covered daily to keep animals and birds out of the garbage. Bird control techniques include trapping and culling, and deterrents such as scarecrows and drones. Pyrotechnics are also used from time to time.

Eagles' dietary preferences are spawning trout and salmon, followed by other animals and carrion. They are mainly attracted to the landfill because of warmth and absence of human activity.

Eagles are protected under the Federal Bald and Golden Eagle Protection Act, so while our operations cannot harass or harm the birds, they can and do take steps approved by wildlife biologists to make the landfill a less desirable habitat option.

**Who determines if wildlife control progress is satisfactory?**

The Comp Plan requires the Solid Waste Division to track and report on its bird management practices.

**I suspect animals or birds are carrying landfill garbage onto my property. What do I do?**

Landfill neighbors can call the division at 206-477-4466 to request assistance with removal of refuse deposited by wildlife. Operations will also investigate ways to reduce future incidents.

## BUFFERS/PROPERTY ACQUISITION/FORESTRY

**How much buffer separates the landfill from nearby properties?**

When the Cedar Hills Regional Landfill was originally permitted in the early 1960s, County Commissioners decided it should have a 1,000 foot buffer instead of the 250 foot buffer required by state laws in place at the time.

**Was there ever encroachment on the buffer?**

Aerial photos from 1966 show that garbage was improperly buried within the 1,000-foot-buffer on the eastern border near 22 homes. There is no county record to indicate why that was done.

**Is King County acquiring homes from property owners near the area where the buffer was reduced?**

King County has already worked with four willing sellers to purchase their homes, and our offer remains open to the other property owners in that particular area who would be interested in selling.

**Are there any efforts to improve the buffer zone?**

Yes. Long term efforts to improve the quality of the buffer include working with a landscape architect from King County Roads to add more trees to the western buffer, and maintaining/restoring the size of the east buffer by acquiring properties from willing sellers along the east buffer.

## COMMUNITY ENGAGEMENT

**What does King County do to understand landfill neighbor concerns?**

Staying connected with the public, and especially our facility neighbors, is core to our commitment to customer service excellence. Examples of our community engagement since the beginning of 2018 include a 60-day public comment period on the Comp Plan that coincided with a well-advertised online open house and three in-person open houses including one for landfill neighbors.

Over the past year, there was one public landfill tour; two semi-annual landfill neighbor meetings; participation in a councilmember's open house last October 2019 for landfill neighbors; public notification plus a two-week comment period on a proposal to temporarily extend hours at Cedar Hills during the Viaduct closure; nine e-newsletters to 590 neighbor subscribers and two mailed letters to about 900 neighbors; and multiple correspondence, phone calls, and face-to-face conversations with neighbors. There is another semi-annual landfill neighbor community meeting scheduled on June 20, 2019.

**How do the public or cities give feedback to the division?**

The division has two advisory committees – the Metropolitan Solid Waste Advisory Committee (MSWAC) and the Solid Waste Advisory Committee (SWAC). MSWAC comprises staff and elected officials from the cities that participate in the county's regional solid waste system. MSWAC members are appointed by their respective cities. SWAC members are appointed by the Executive and confirmed by the King County Council. SWAC members represent the diverse interests of residents, waste management companies, the recycling industry, public interest groups, labor, local elected officials, recyclable markets, and manufacturers located in King County. SWAC would be the committee landfill neighbors could serve on.

**Are community members invited to serve on the committees or attend the meetings?**

MSWAC and SWAC monthly meetings are open to the public, and agendas are typically published a week in advance. Minutes are taken at every meeting to summarize presented material, document deliberative discussion of committee business, and to record motions approved by the committee. Meeting minutes from the prior month are presented to committee members for review, and members have the opportunity to request amendments and corrections before minutes are approved by the chair.

Landfill neighbors have served on SWAC in the past and we are currently recruiting for a specific committee vacancy to be filled by a landfill neighbor. Serving on the committee does require a commitment – meetings are held each month, usually in downtown Seattle at King Street Center. Although no landfill neighbors have yet expressed an interest, we are hopeful that we will soon benefit from their additional perspective on this important advisory committee.

**I've heard there has been legal action against the landfill in the past. What's the history there?**

Cedar Hills was originally permitted at a time when there were few regulations in place to govern the design and operation of landfills. There were also very few neighbors around the facility when it first opened in 1965. Since then, environmental regulations have become increasingly rigorous. As the community around the landfill grew, expectations for how essential public facilities should operate were also raised substantially.

Our regulators and elected officials today hold Cedar Hills Landfill accountable for meeting stringent environmental and operational requirements, and for taking all reasonable measures to reduce impacts to the community.

Regrettably, problems with landfill operations in years past prompted legal action by people who lived nearby. We've taken a number of corrective actions to address the issues that led to legal settlements, and we are committed to honoring the terms of these agreements moving forward.

We have and will continue to honor our settlement agreements.

## COMP PLAN ADOPTION and UPDATES

**What is the current situation with regard to capacity at the Cedar Hills Regional Landfill?**

According to population and economic projections, and current recycling rates, the existing cells at the Cedar Hills Regional Landfill will be full around 2028. The Comp Plan directs King County to extend the life of the landfill and gives us the needed time to identify and evaluate the best future disposal alternatives.

**How is King County planning to further develop the landfill?**

King County will not expand the landfill beyond its current boundaries. Our long-term plan centers on extending the life of the landfill by maximizing capacity on the existing footprint. This would entail building a new cell, relocating support facilities to a different location on the landfill property, and using that space for solid waste disposal. This could extend the landfill's operational life nearly two decades, and provide enough of a planning window to have a new alternative in place when the landfill closes.

**What long-term waste disposal alternatives were considered in the Comp Plan?**

The Comp Plan presented Waste-to-Energy and waste export by rail as alternatives to further landfill development. These alternatives are workable options that come with tradeoffs around cost, environmental impact, community impact and risk.

A Waste-to-Energy (mass burn) facility, which would incinerate garbage to generate electricity, offers opportunities to explore advanced technologies for waste disposal. It is the most technically and financially complex option outlined.

Rail transport to an out-of-county landfill is a viable alternative. The City of Seattle transports its collected waste to landfills in eastern Washington and Oregon. But rail capacity has limitations, and the increasing demand for rail transport among both public and private entities as our region keeps growing adds uncertainty to the cost and feasibility of this option.

After considering the alternatives, the Comp Plan recommends that the Cedar Hills Landfill be further developed, maximizing its capacity as we continue working with public and private partnerships to increase the volume and value of recycling. Further development of the landfill is the most cost-effective and feasible option to serve our region's need for responsible waste disposal at this point in time.

The Cedar Hills Regional Landfill will eventually fill up. Future Comp Plan updates will explore alternatives for when local landfill capacity is no longer available.

**Will the Cedar Hills Regional Landfill ever be allowed to build above its current permitted height?**

It's important to emphasize that the landfill currently has permitted height requirements, and that King County would not violate the terms of permits or settlement agreements around landfill development, including height limitations. Any future development at the landfill would be subject to a project planning and permitting process that would involve public notification as well as the opportunity to provide comment or input that would inform design guidelines.

**How can I get more information on the Solid Waste Comp Plan, or make my views known?**

People can read the Comp Plan online at www.kingcounty.gov/SWDCompPlan. The Comp Plan is currently undergoing review and approval by the 37 cities that contract with King County for regional waste disposal services. Also, many projects featured in the Comp Plan will have their own unique public processes related to siting, design, permitting and construction. People will continue to have opportunities to be informed and involved in the implementation of projects and programs outlined in the Comp Plan.

## COST and FINANCES (Comp Plan Alternatives)

**What is the cost difference between the three disposal options identified in the comp plan?**

The financial and environmental costs of the viable disposal alternatives were evaluated in the Comp Plan, which is outlined in Table 6-1 on Page 162.

Table 6-1. Comparison of key disposal option characteristics (planning level estimates)

| Comparative Attribute | Further Develop Cedar Hills | Waste Export To An Out-of-County Landfill | Waste To Energy Facility |
|---|---|---|---|
| *Cost per Ton*[1] | $41 | $55 | $136 |
| *Life Cycle Greenhouse Gas Emissions (EPA's WARM Model)* | (134,000)[2] MTCO2e | (78,000)[2] MTCO2e | 12,000 to 80,000[3] MTCO2e |
| *Annual Greenhouse Gas Emissions (EPA's eGGRT)* | 91,000[4] MTCO2e/year | 91,000[4] MTCO2e/year | 1,200,000 MTCO2e/year |
| *Recycling Rate* | No change | No change | 2% increase |
| *Risks* | SEPA, Permitting | Rail Capacity, Control | Siting, Sizing |

1 Estimated cost per ton in 2029.
2 WARM model calculation for 2029. (King County SWD). For more information, see Appendix D.
3 WARM model calculation.(Normandeau 2017).
4 Landfill options show estimated emissions in 2029.

Extending the life of the landfill is the most cost-effective and has the lowest climate impact while we plan for the future of regional waste management after the landfill is full.

## ENVIRONMENTAL HEALTH

**What about the health and safety of neighbors?**

The Cedar Hills Regional Landfill is staffed 24/7 with skilled professionals who are trained and certified in the best management practices established by the Solid Waste Association of North America, or SWANA. By far the most commonly reported issue is odor.

Protecting our workers and the public is a top priority. Our landfill operations are subject to permit conditions and regulations by Public Health – Seattle & King County, the US Environmental Protection Agency (EPA), Puget Sound Clean Air Agency (PSCAA) and the Washington State Department of Ecology to safeguard public health, the environment, and the nearby community. SWD Operations is responsible for ensuring compliance for 33 groundwater monitoring wells near an aquifer, seven stormwater monitoring points, and over 700 gas wells.

We regularly monitor and report on the quality of the air, groundwater, leachate (landfill wastewater) and stormwater, and we restrict or prohibit the disposal of many types of waste that could be harmful or toxic.

Greater detail about our environmental monitoring is available in the Cedar Hills Landfill 2018 Annual Report, which is online at https://your.kingcounty.gov/dnrp/library/solid-waste/facilities/CHRLF-annual-report-2018.pdf. People can also call us at 206-477-4466 to request an emailed or paper copy.

**What does King County do to reduce impacts of the landfill to nearby communities?**

To control odors and reduce potential for wildlife to get into and carry away garbage, the active areas at the landfill are covered before the end of each working day. Staff also monitor for odors, and specially trained Nasal Rangers on staff do around-the-clock odor checks five times a day. People who notice odors, or any other issue they feel is related to the landfill operations, can call the Solid Waste Division at 206-477-4466 to get a response right away. People should always call 911 first if they believe there is a potential emergency, or a risk to public safety, health or property.

**Are there unlined areas at the landfill?**

Environmental controls have been in place at Cedar Hills since the 1980s, and that includes installation of protective bottom linings, as well as covering refuse areas daily to reduce impacts like odors and birds. There are two unlined areas of the landfill – the Main Hill and the Southeast Pit. Both are located on the east side of the landfill and were developed before regulations requiring bottom liners were established. Those two areas are equipped with environmental controls, including having a cap on top to prevent infiltration, as well as leachate and landfill gas collection.

## LANDFILL COVER MATERIAL

**What type of cover material is used at the landfill?**

King County takes daily action to prevent odors, control wildlife, and deter rodents and pests by covering active areas of the landfill daily. The cover also improves gas collection, which works on a vacuum system.

Active area side slopes are covered with soil, and a thick, durable cloth tarp is placed on the top at the end of each working day. When the tarp is covering the area, the landfill gas collection pipes are operating on a vacuum to capture landfill gas and send it to Bio Energy Washington for processing.

The type of cover the division is allowed to use is decided by regulators. The Comp Plan directs King County to implement best practices around landfill cover, which is consistent with our current practices, but includes additional reporting requirements.

## LANDFILL GAS MANAGEMENT

**What is the status of energy recovery at the landfill now?**

It's important to point out that innovation is already happening at our current facilities. Through partnerships with Puget Sound Energy and Bio Energy Washington, landfill gas collected at Cedar Hills produces enough renewable energy to heat 19,000 homes annually, which reduces greenhouse gas emissions and supports broader County goals to address climate change. Some of the gas produced is converted to electricity, some gas is cleaned of impurities and returned to the regional pipeline.

Revenue from the landfill gas-to-energy partnership brought in $8 million in 2017 which helps offset solid waste disposal operational costs.

**How is landfill gas managed?**

High-tech equipment is used to monitor, control, and measure the landfill gas characteristics and volume as it is captured within the vacuum-based system. King County performs quarterly surface scans of the landfill to seek out potential fugitive emissions and address them as appropriate. It is the frequent re-evaluation of the system performance and maintenance that ensures the system is well-managed and functions optimally.

Once collected, landfill gas is conveyed via pipeline to Bio Energy Washington for processing. Some of the gas is converted to electricity for use on site by Bio Energy Washington, however most is cleaned of impurities and made into compressed natural gas and sold to Puget Sound Energy.

While international standards for measuring landfill gas vary from country to country, in the U.S., the EPA serves as the chief regulator and establishes the measurement models. To inform the most accurate data points for input to the EPA models, King County conducts periodic waste characterization studies.

**What about landfill gas odors?**

At Cedar Hills, all supervisors, leads and landfill gas operators have been trained to recognize odors and evaluate the source and concentration levels of reported and detected odors. The training also features tools and techniques specifically designed to counteract desensitization to certain odors. The landfill gas staff has developed a site-wide monitoring program to include daily site-wide odor observations five times a day, day and night. These observations are recorded on paper as well as in an electronic database.

Anyone who detects the smell of natural gas, or believes there is a gas leak or any other emergency related to landfill operation should call 911.

## ODOR MANAGEMENT/AIR QUALITY

**How is air quality managed around the landfill, especially controlling odors?**

The Cedar Hills Regional Landfill is staffed 24/7 with skilled professionals who are trained and certified in the best management practices established by the Solid Waste Association of North America, or SWANA. Around-the-clock odor checks are conducted five times a day on and offsite on weekdays and three times a day on weekends by operations experts trained in odor detection. In addition to these regularly scheduled checks, specially trained staff monitor areas commonly associated with prior odor complaints.

**What tools or monitoring devices are used to detect and control odors?**

The division uses Nasal Ranger training and technology to monitor and detect odors. The Nasal Ranger system is used across many sectors including state and local governments, wastewater treatment operations, landfill operations, environmental health agencies, and even police departments to determine presence and strength of odors. Use of the equipment takes the subjectivity out of odor measurement and provides a consistent standard for field staff to document odor strength. The Nasal Ranger training data is even used as a guide for regulatory enforcement in some jurisdictions.

Prevention is our most effective strategy. To control odors, and reduce potential for wildlife to get into and carry away garbage, the active areas at the landfill are covered before the end of each working day.

**Who permits air quality for the Cedar Hills Regional Landfill?**

Puget Sound Clean Air Agency (PSCAA) serves as the regulator over SWD's operations for all matters relating to air quality. People can call PSCAA to report complaints, but we also ask that they call our 24/7 hotline at 206-477-4466 so we can diagnose and correct any issues that might be related to landfill operation.

**How many odor complaints were reported in the past year?**

Puget Sound Clean Air Agency reported 160 complaints called in in 2018. By contrast, in 2018 the division received 14 complaints to SWD's odor hotline. An analysis of the 2018 neighborhood odor checks confirms that refuse accounts for less than five percent of the odors detected.

Though neighbors always have the option to contact PSCAA, we encourage them to contact us as well because if there is a problem related to our operation, we can take corrective action right away.

**I live near the landfill. If I detect odors of garbage or natural gas, who do I call?**

Anyone who detects the smell of natural gas, or believes there is a gas leak or any other landfill-related emergency should call 911.

Neighbors are encouraged to report a non-emergency problem by calling our 24/7 hotline at 206-477-4466. Complaints to the issue-reporting hotline receive immediate response.

## RECYCLING RATES

**How does the Comp Plan address recycling?**

The Comp Plan identifies strategies for how the County will manage recycling for the next six to 20 years. Developed with the division's partnering cities and two advisory committees, a main priority of the 2019 Plan is how to achieve a 70 percent recycling rate.

The current recycling rate in King County is 54 percent, far exceeding the national average of 34 percent. But we can do more. We estimate as much as 70 percent of what goes to the landfill every day – about 95 semi-truckloads – is recyclable or reusable material.

**What are some specific examples of recycling actions outlined in the Comp Plan?**

The 2019 Plan provides a menu of recycling actions cities and the county can take to enhance recycling in their jurisdictions.

For example, about a third of the material that goes to the landfill is food waste that could be composted and used to nourish crops and return nutrients to the soil. King County convened an Organics Summit earlier this spring comprised of cities, haulers, waste management experts and academics to identify strategies to develop markets for this material.

Construction and demolition waste (C&D) makes up one-third of the solid waste generated in the county. King County requires that readily recyclable C&D materials (metal, cardboard, wood, concrete, asphalt, brick and drywall) be recycled, which furthers the division's Zero Waste and carbon emissions reduction efforts. In 2018, the division added an additional C&D recycling facility to the privately managed locations that manage C&D, bringing the total number of approved facilities to fourteen.

Education is also part of our strategy. A record 245 King County schools (more than 151,000 students) are currently participating in the Green Schools program that helps teach students important lessons on recycling and conservation. New features of the program include a food rescue initiative that diverts unopened and uneaten food from being wasted. In 2018, nearly 13,000 of food and drinks were rescued and redistributed to communities in need.

Finally, we're making our services more accessible and affordable as part of our commitment to equity and social justice. The new Cleanup LIFT program, modeled after Metro Transit's Orca LIFT, provides a $12 discount to low-income self-haul customers who recycle yard waste, clean wood and refrigerant-type appliances at a County recycling and transfer station.

**Which areas have the highest recycling rates?**

Recycling rates vary among our regional communities. Single family recycling rates range from a high of 65 percent in some areas to as low as 34 percent. For multi-family housing, rates range from 61 percent to as low as 5 percent.

Education is an important part of recycling, as is ongoing coordination with haulers and cities. People can make the biggest environmental impact by recycling right. That means making sure recyclable materials are empty, clean and dry before being put in the bin.

## SEISMIC CONCERNS

**Are there known faults on or close to the landfill?**

According to the most recent studies to inform landfill development, there are no known earthquake faults within a mile of the Cedar Hills Landfill. The new landfill cells are not located in any known seismic impact zone nor within a mile of any Holocene faulting (activity in the last 11,000 years), which is a Washington Administrative Code (WAC) requirement.

## WASTE-TO-ENERGY

**Is King County considering a Waste-to-Energy facility?**

King County is open to the possibility of new technologies for regional waste management, and future comprehensive plan updates could further explore new alternatives, including a Waste-to-Energy option. But without further development, the landfill is currently slated to reach capacity by 2028 and a nine-year time frame to site, permit, build, finance and commission a complex facility is not realistic. A Waste-to-Energy facility still requires landfill disposal capacity.

**What about the possibility of a waste-to-energy facility in the future after Cedar Hills is full?**

The Comp Plan directs King County's Performance, Strategy, and Budget (PSB) office to work with the Solid Waste Division to prepare a progress report by December 31, 2021 on long-term disposal options.

Concurrently, PSB is managing a consultant contract for a waste-to-energy study that is scheduled for completion by October 2019. The study will help inform future work.

In consultation with our city partners, it is anticipated that the post-Cedar Hills disposal method will be selected as part of the next Comp Plan update.

King County is open to the possibility of new technologies for regional waste management, and future comprehensive plan updates could further explore new alternatives, including a Waste-to-Energy option.

We recognize many in our region are supporters of this option, and invite them to engage in with other stakeholders and community members in regional discussions around future planning efforts.

## WATER QUALITY/AQUIFER

**What steps does King County take to protect water quality?**

The division is responsible for routine water quality monitoring and reporting on 68 groundwater wells onsite and around the site perimeter.

# Solid Waste Division

A regional aquifer flows beneath portions of the Cedar Hills Regional Landfill from the South to the Eastern border. SWD monitors the regional aquifer at 19 wells on a quarterly basis and monitors an additional 14 wells semi-annually. Incoming water quality is impacted by the former Queen City Farm, a Superfund site Boeing is responsible to clean up, which is located just to the south of Cedar Hills. Our monitoring shows that groundwater leaving the landfill site is in compliance with federal drinking water standards.

**I heard that an aquifer near the landfill is at risk of contamination by 2058. Is that true?**

No. The aquifer beneath the landfill is not at risk of contamination in 2058 because action is underway now to address legacy contamination that originated at a Boeing-managed Superfund site south of the landfill. A remediation study is being developed to identify the most appropriate cleanup actions of the historic contamination and to ensure it doesn't leave the site. Portions of the study have already been approved by Ecology while exploration of additional efforts is pursued.

The former Queen City Farm, now a Superfund site Boeing is responsible to clean up, was found to have contributed to historic contamination discovered at Cedar Hills in the 1980s that was confined to areas of the landfill that continue to be closely monitored. King County continues to send our quarterly groundwater reports and annual reports to the EPA and Boeing.

Alternate formats available: 206-477-4466, TTY Relay: 711

# 2019 Comprehensive Solid Waste Management Plan
## Policies, Actions, and Goals Matrix

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| **2 – The Existing Solid Waste System** | **Policy ES-1** | County | | Maintain a public and private mix of solid waste transfer and processing facilities. |
| | **Policy ES-2** | County | | Work with the division's advisory committees, the cities, and the Solid Waste Interlocal Forum on solid waste management planning and decisions. |
| | **Policy ES-3** | County | | Incorporate principles of equity and social justice into solid waste system planning. |
| | **Policy ES-4** | County | | Consider climate change impacts and sustainability when planning for facilities, operations, and programs. |
| **3 – Forecasting and Data** | **Policy FD-1** | County | | Monitor and report the amount, composition, and source of solid waste entering the transfer and disposal system. |
| | **Policy FD-2** | County | | Update the solid waste tonnage forecast to support short- and long-term planning and budgeting for facilities and operations. |
| | **Policy FD-3** | County | | Monitor and report waste prevention and recycling activity, including the amount of materials recycled, programmatic achievements, and the strength of commodity markets. |
| | **Policy FD-4** | County | | Continue to monitor new and emerging technologies to identify opportunities for their use in managing solid waste and recyclables. |
| | **Action 1-fd** | **Cities**<br>County<br>Hauler | No activity | Standardize the sampling methodology and frequency in tonnage reports submitted to the division and the cities by the collection companies to improve data accuracy. |
| | **Action 2-fd** | County | | Perform solid waste, recycling, organics, and construction and demolition characterization studies at regular intervals to support goal development and tracking. |
| | **Action 3-fd** | County | | Monitor forecast data and update as needed. |
| | **Action 4-fd** | County<br>**Cities**<br>Ecology | No activity | Develop voluntary agreements with recycling companies that will improve data reporting and resolve data inconsistencies. |

**2019 Comprehensive Solid Waste Management Plan**
**Policies, Actions, and Goals Matrix**

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| **4 – Sustainable Materials Management** | **Goal** | County **Cities** | Kirkland supports the zero waste of resources hierarchy and the 70% recycling diversion goal. Kirkland recycling diversion rates for 2018:<br>Single family: 64%<br>Multifamily: 28%<br>Commercial: 23%<br>Combined: 47% | Achieve Zero Waste of Resources – to eliminate the disposal of materials with economic value – by 2030, with an interim goal of 70 percent recycling through a combination of efforts in the following order of priority:<br>a. Waste prevention and reuse,<br>b. Product stewardship,<br>c. Recycling and composting, and<br>d. Beneficial use. |
| | **Policy S-1** | County | | Set achievable targets for reducing waste generation and disposal and increasing recycling and reuse. |
| | **Policy S-2** | County | | Enhance, develop, and implement waste prevention and recycling programs that will increase waste diversion from disposal using a combination of tools:<br>a. Infrastructure,<br>b. Education and promotion,<br>c. Incentives,<br>d. Mandates,<br>e. Enforcement, and<br>f. Partnerships. |
| | **Policy S-3** | County | | Advocate for product stewardship in the design and management of manufactured products and greater responsibility for manufacturers to divert these products from the waste stream. |
| | **Policy S-4** | County | | Prevent waste generation by focusing on upstream activities, including encouraging sustainable consumption behaviors, such as buying only what one needs, buying durable, buying secondhand, sharing, reusing, repairing, and repurposing. |
| | **Policy S-5** | County | | Work with regional partners to find the highest value end uses for recycled and composted materials, support market development, and develop circular supply loops to serve production needs. |
| **4 – Sustainable Materials Management (cont.)** | **Policy S-6** | County | | Strive to ensure that materials diverted from the King County waste stream for recycling, composting, and reuse are handled and processed using methods that are protective of human health and the environment. |
| | **Policy S-7** | County | | Provide for efficient collection of solid waste, recyclables, and organics, while protecting public health and the environment, promoting equitable service, and maximizing the diversion of recyclables and organics from disposal. |
| | **Policy S-8** | County | | Promote efficient collection and processing systems that work together to minimize contamination and residual waste, maximize diversion from disposal, and provide adequate capacity. |
| | **Action 1-s** | **Cities** County | The City of Kirkland is actively working on improving internal waste reduction and recycling. Improvements include paper towel composting in facility restrooms, recycling bins and signs in conference room bins and work stations, and battery and CFL recycling. Future policies will include | Lead by example by improving waste prevention and recycling in public-sector operations, facilities, and at sponsored events, as well as through the purchase of sustainable products. |

**2019 Comprehensive Solid Waste Management Plan**
**Policies, Actions, and Goals Matrix**

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| | | | consideration of internal food service ware, disposable plastic water bottle, and environmentally-responsible purchasing policies. | |
| | **Action 2-s** | County **Cities** Haulers | Kirkland actively participates in regional partnership activities, like the Organics Contamination Reduction Workgroup and the Responsible Recycling Task Force. | Form a regional responsible recycling forum to work with public and private partners to address production, use, and end-of-life management of goods. The forum will identify ways to strengthen recyclables markets, reduce contamination, and improve the quality and quantity of recyclable materials through more uniform city/county recycling approaches, education and outreach, and other means. |
| | **Action 3-s** | County **Cities** | In partnership with other Eastside cities, Kirkland has drafted a regional waste prevention and reduction campaign that remains unfunded due to a reduction in the availability of Ecology grant funding. | Provide regional education outreach support and incentive programs to overcome barriers for residents and businesses to effectively prevent waste. Emphasize the primary importance of purchase and product use decisions that prevent waste, and secondary importance of recycling items/materials that couldn't be prevented. Work in partnership with other governments, non-governmental organizations, and the private sector to maximize the effectiveness of these efforts. |
| | **Action 4-s** | County | Kirkland supports and works with King County Green Schools. Kirkland partnered with the LWSD to implement a School Food Share program. | Provide waste prevention and recycling education programs in schools throughout the county, and help schools and school districts establish, maintain, and improve the programs. |
| **4 – Sustainable Materials Management (cont.)** | **Action 5-s** | **Cities** County Haulers | Kirkland is a leader in contamination reduction efforts, partnering with Waste Management to implement comprehensive contamination tagging in both recycling and organics carts. | Continue to educate customers on proper recycling techniques to reduce contamination of recyclables and organic feedstocks going to the materials recovery facilities and compost facilities. |
| | **Action 6-s** | **Cities** County | Kirkland actively works on outreach programs to all sectors. | Increase educational outreach and promotion to single-family, multi-family, and non-residential customers to encourage recycling and reduce waste. |
| | **Action 7-s** | County **Cities** | In 2018, Kirkland promoted food composting to single family residents via a "Keep food out of the trash" cart tag. | Increase single-family food scrap recycling through a three-year educational cart tagging program. |
| | **Action 8-s** | **Cities** County | Kirkland incentivizes and promotes food scrap recycling through its multifamily and commercial organics programs which are offered at no additional cost. | Continue to develop infrastructure and increase regional and local educational outreach, incentives and promotion to increase recycling of food scraps and food-soiled paper. These efforts should target single-family and multi-family residential developments, as well as nonresidential buildings such as schools, institutions, and businesses. |
| | **Action 9-s** | County | Kirkland is currently beginning a review of City purchasing policies for potential inclusion in the Sustainability Master Plan | Provide information and technical assistance to external agencies, such as local governments, schools, colleges, and other public and private organizations to increase their purchase of sustainable products. Support implementation of the county's Sustainable Purchasing Policy through waste reduction, recycling, use of recyclable products, and green building. |

**2019 Comprehensive Solid Waste Management Plan**
**Policies, Actions, and Goals Matrix**

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| | **Action 10-s** | County | | Work with public and private partners to support the development of reuse and recycling value chains, including markets, for target products and materials. Employ incentives and material-specific projects that reduce or eliminate barriers to reuse and recycling. |
| | **Action 11-s** | County | The Kirkland Solid Waste Division is supportive extended product stewardship programs and legislation and is an active member on the Northwest Product Stewardship Council Steering Committee. | Pursue product stewardship strategies through a combination of voluntary and mandatory programs for products that contain toxic materials, are difficult and expensive to manage, and/or need sustainable financing, including, but not limited to, paint, carpet, fluorescent bulbs and tubes, mercury thermostats, batteries, unwanted medicine, mattresses, e-waste, paper and packaging, plastic bags and film, and sharps. Strategies may include Right to Repair legislation and framework legislation for addressing producer responsibility. |
| **4 – Sustainable Materials Management (cont.)** | **Action 12-s** | County | | Explore options to increase recycling and resource recovery through innovative methods and technologies. |
| | **Action 13-s** | County **Cities** | Kirkland is constantly reviewing options to increase recycling diversion and implementing those options where reasonable and practicable. | Assess and develop options if selected actions are not enough to achieve an overall 70 percent recycling rate. |
| | **Action 14-s** | **Cities** County | Kirkland implemented its single use plastic bag reduction policy in 2016. | Reduce consumer use of common single-use items – for example, promote reusable shopping and produce bags. |
| | **Action 15-s** | County **Cities** | In 2019, Kirkland partnered with King County Green Schools, Triangle Associates, and LWSD to pilot food share in four Kirkland schools where unused edible food is offered to students and/or non-profits. | Work with food producers, grocers, restaurants, and schools to prevent food waste and to increase food recovery through donation of surplus meals and staple food items to local food banks. |
| | **Action 16-s** | County **Cities** | Kirkland participates in the Responsible Recycling Task Force and has collaborated with other Waste Management-served cities on amending the accepted recyclables list. | Develop a process and criteria to amend the designated recyclables list if conditions warrant adding or removing recyclables. |

## 2019 Comprehensive Solid Waste Management Plan
## Policies, Actions, and Goals Matrix

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| | **Action 17-s** | County | Kirkland recognizes these goals and intends to include them in the Sustainability Master Plan.<br><br>Kirkland's progress towards the targets through May 2019:<br>Generation (per capita): 18.2 lbs/wk<br>Generation (per employee: 24.5 lbs/wk<br>Disposal (per capita): 7.8 lbs/wk<br>Disposal (per employee): 13.9 lbs/wk | Use the following targets to measure the progress toward the goal of zero waste of resources:<br>1. Generation rate target:<br>• Per capita: 20.4 pounds/week by 2030, and<br>• Per employee: 42.2 pounds/week by 2030.<br>2. Recycling rate target: Interim goal of 70 percent.<br>3. Disposal rate target:<br>• Per capita: 5.1 pounds/week by 2030, and<br>• Per employee: 4.1 pounds/week by 2030.<br>These targets should be evaluated at least every three years when data becomes available from the waste monitoring studies. |
| | **Action 18-s** | County | | Develop a target for reducing greenhouse gas emissions from disposed waste by 2030, with 2007 emissions used as a baseline for comparison. |
| **4 – Sustainable Materials Management (cont.)** | **Action 19-s** | County | | Continue to support the cities' implementation of the Plan through the county waste reduction and recycling grant program and allocation of Local Solid Waste Financial Assistance funds from the Washington State Department of Ecology. The county should strive to maintain the level of funding to cities, increasing waste reduction and recycling grant amounts as Local Solid Waste Financial Assistance funding decreases; and should revise or amend grant criteria to reflect priority Comprehensive Plan actions. |
| | **Action 20-s** | County | | Work collaboratively with cities and other stakeholders to develop a new competitive grant program funded from the tip fee that would be available to private entities, non-profits, and cities to support innovative programs that help meet plan goals. |
| | **Action 21-s** | **Cities**<br>County | Kirkland has offered residential recycling collection events for several years. The list of accepted items is reviewed each year based upon public demand and recyclability. | Evaluate options to transition away from recycling collection events as enhanced recycling services are provided at renovated transfer stations, improved bulky item collection becomes available and cost-effective curbside, and product stewardship programs emerge. |
| | **Action 22-s** | County<br>**Cities** | Kirkland has implemented several waste reduction and recycling grant projects and welcomes the opportunity to collaborate with regional partners in developing a list of projects. | Develop a list of effective waste prevention and recycling efforts that can be implemented using existing and new grant funds. |
| | **Action 23-s** | **Cities**<br>County | Kirkland has a green building program that includes priority permit review and green building consultation. Further work may come out of the Sustainability Master Plan. | Adopt green building policies and regulations that support the design of buildings and structures that are carbon neutral, are energy efficient, and use recycled materials. |
| | **Action 24-s** | County | | Assist cities in developing green building policies and practices; encourage green building through Leadership in Energy and Environmental Design™ (LEED®), Built Green™, Living Building Challenge, and other certification programs. |

# 2019 Comprehensive Solid Waste Management Plan
## Policies, Actions, and Goals Matrix

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| | **Action 25-s** | County | | Provide technical assistance and promote proper deconstruction, building reuse, and reuse of building materials. |
| | **Action 26-s** | County **Cities** | Kirkland has reviewed and supports King County's C&D policies. | Work collaboratively with cities to implement building codes that require compliance with construction and demolition debris recycling and handling requirements contained in county code. The county will provide outreach/promotion for city permitting and enforcement staff. |
| **4 – Sustainable Materials Management (cont.)** | **Action 27-s** | County | | Continue to explore options to increase the diversion of construction and demolition debris from disposal in the landfill, particularly for wood, metal, cardboard, asphalt shingles, carpet, and gypsum wallboard. |
| | **Action 28-s** | County | | Increase regional recycling of construction and demolition materials through education and enforcement of construction and demolition debris recycling requirements. |
| | **Action 29-s** | County | | Ensure that construction and demolition debris is managed in an environmentally sound manner by privately owned landfills via enforcement of construction and demolition debris handling requirements contained in county code. |
| | **Action 30-s** | County UTC | | Involve the Vashon/Maury Island community and service providers to develop the appropriate type of recycling services provided curbside and at the transfer station. Include Vashon in the county's collection service standards for curbside services. |
| | **Action 31-s** | **Cities** County | In 2019, Kirkland lowered the cost of bulky waste collection for single family and multifamily properties. Kirkland is currently considering options to enhance the bulky waste offerings to multifamily properties. | Explore options to increase the efficiency and reduce the price of curbside and multi-family collection of bulky items, while diverting as many items as possible for reuse or recycling. |
| | **Action 32-s** | **Cities** County | Kirkland has adopted the minimum collection standards. | Adopt the single and multi-family minimum collection standards. |
| | **Action 33-s** | County UTC | | Consider improvements to single-family collection services in the unincorporated area to increase the recycling rate. |
| | **Action 34-s** | **Cities** | Recycling services are offered to Kirkland businesses at no additional cost. | Include non-residential recycling services in city contracts (consistent with state law). |
| | **Action 35-s** | **Cities** | Commercial recycling is embedded in Kirkland's rate structure and is provided at no additional cost. | Consider implementing an incentive-based rate structure for nonresidential garbage customers to encourage recycling. |
| | **Action 36-s** | County **Cities** | Kirkland has codified requirements for multifamily recycling and has pre-approved enclosure plans for new multifamily and commercial | Update and enforce building code requirements to ensure adequate and conveniently located space for garbage, recycling, and organics collection containers in multi-family, commercial, and mixed-use buildings. |

# 2019 Comprehensive Solid Waste Management Plan
# Policies, Actions, and Goals Matrix

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| | | | development. Staff intends to pursue a policy that makes recycling service mandatory for commercial customers in 2019. | |
| | **Action 37-s** | County **Cities** | Kirkland has a comprehensive multifamily recycling program. Significant staff and budgetary resources are devoted to assisting MF properties through personalized technical assistance, recycling supplies, and education which has resulted in an increase in a drastic increase in recycling diversion. | Make recycling at multi-family complexes convenient by implementing best practices. |
| **5 – Solid Waste Transfer and Processing System** | **Policy T-1** | County | | Provide solid waste services to commercial collection companies and self-haul customers at transfer stations, and to self-haul customers at drop boxes. |
| | **Policy T-2** | County | | Provide solid waste transfer services in the urban and rural areas of the county that may be tailored to local and facility conditions and interlocal agreements with King County cities. |
| | **Policy T-3** | County | | Engage cities and communities in the siting and development of facilities, and in developing mitigation measures for impacts related to the construction, operation, and maintenance of transfer facilities, as allowed by applicable local, state, and federal laws. |
| | **Policy T-4** | County | | Build, maintain, and operate Solid Waste Division facilities with the highest green building and sustainable development practices. |
| | **Policy T-5** | County | | Provide for collection of recyclable materials at all transfer facilities – recognizing resource limitations, availability of markets, and service area needs – focusing on maximum diversion of recyclables from the waste stream and on materials that are not easily recycled at the curb or through a readily available producer or retailer provided program. |
| | **Action 1-t** | County | Kirkland is actively engaged with the County and its regional partners in the Northeast Recycling and Transfer Station siting process. | Except as noted in action 2-t, continue to implement transfer station modernization as set forth in the *Solid Waste Transfer and Waste Management Plan* and approved by the Metropolitan King County Council in 2007, including siting and building a new Northeast recycling and transfer station and closing the Houghton station when the new station is complete. Adapt the siting process included in the *Solid Waste Transfer and Waste Management Plan* to meet community needs in the Northeast service area. |
| | **Action 2-t** | County | | Although approved for closure under the Solid Waste Transfer and Waste Management Plan, reserve the option to retain the Renton station until the new urban transfer facilities have been completed and the impact of closure has been fully evaluated. |

**2019 Comprehensive Solid Waste Management Plan**
**Policies, Actions, and Goals Matrix**

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| 5 – Solid Waste Transfer and Processing System (cont.) | Action 3-t | County | | Evaluate adding a second scale and an additional collection container at the Cedar Falls Drop Box to improve capacity. |
| | Action 4-t | County | | After the new recycling and transfer stations (including the new South station) are sited, if service level assessments indicate the need for additional capacity in the rural areas, consider siting drop box facilities. |
| | Action 5-t | County<br>Cities | | Periodically evaluate the level of service criteria to ensure that the criteria remain relevant. |
| | Action 6-t | County | | Explore prospects for the transfer of commercial loads of organics through county transfer stations. |
| | Action 7-t | County | | Continue to implement a resource recovery program at new recycling and transfer facilities to remove targeted materials from the waste stream. |
| | Action 8-t | MRFs | | Encourage recycling processors to continue to improve facility sorting and processing equipment and practices to remove contaminants and separate recyclables into marketable commodity grades. |
| | Action 9-t | County<br>**Cities**<br>PH<br>MRFs | | In collaboration with stakeholders, pursue and identify new technologies and expanded processing capacity to serve the region, and more sustainably manage organic waste. |
| | Action 10-t | County | | Continue to evaluate and assess the feasibility of advanced materials recovery and anaerobic digestion at division facilities. |
| | Action 11-t | County<br>**Cities** | | In the event of an emergency, reserve the transfer system for municipal solid waste and make the recycling of related debris a priority. |
| | Action 12-t | **Cities**<br>County | | Identify potential temporary debris management sites where emergency debris can be stored until it is sorted for recycling or proper disposal. |
| | Action 13-t | **Cities**<br>County | Kirkland provides education and outreach on proper sharp disposal. | Provide education and outreach on the proper management of home generated sharps. |
| 6 – Landfill Management and Solid Waste Disposal | Policy D-1 | County | | Operate and maintain the Cedar Hills Regional Landfill to meet or exceed the highest federal, state, and local standards for protection of public health and the environment. |
| | Policy D-2 | County | | Maximize the capacity and lifespan of the Cedar Hills Regional Landfill. |

**2019 Comprehensive Solid Waste Management Plan**
**Policies, Actions, and Goals Matrix**

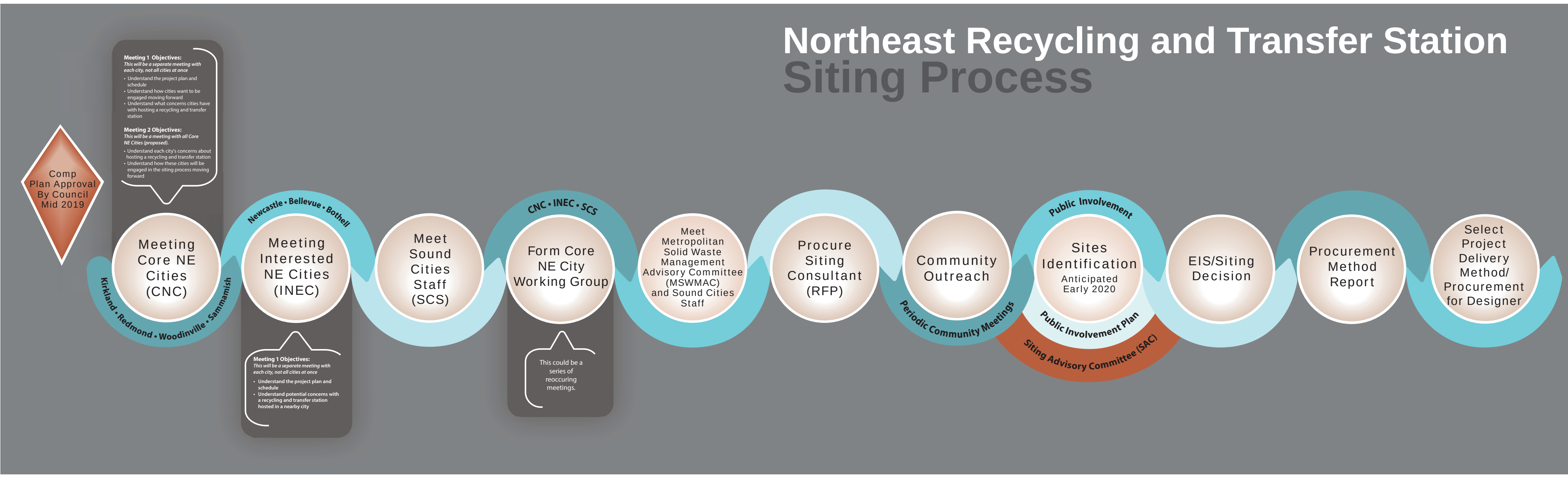
| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| | **Policy D-3** | County | | Monitor and maintain closed landfills to meet or exceed the highest federal, state, and local standards for protection of public health and the environment. |
| | **Policy D-4** | County | | Plan for future disposal when Cedar Hills Regional Landfill closes to ensure no gap in service. Siting a replacement landfill located in King County will not be considered. |
| | **Policy D-5** | County | | Garbage shall not be disposed of, nor shall soils be stockpiled, within 1,000 feet of the property line at the landfill, in accordance with the Settlement Agreement. The solid waste division shall reserve sufficient funds to acquire any parcels from willing sellers as necessary to establish or maintain the buffer. |
| | **Action 1-d** | County<br>**Cities**<br>ACs | | Further develop the Cedar Hills regional landfill to maximize disposal capacity. To account for technological advances, do not specify the next disposal method after ultimate Cedar Hills closure in this Plan. Conduct analysis of post Cedar Hills disposal options prior to the next Plan update to ensure adequate lead time for selecting, planning for, and implementing the next disposal method. |
| | **Action 2-d** | County | | Continue to track, evaluate, and test other disposal and conversion technologies for their potential to handle all or a portion of the county's future waste. Provide updates on findings to division advisory committees on a regular basis. |
| | **Action 3-d** | County<br>**Cities**<br>ACs | Kirkland has engaged with regional partners on a Debris Management Plan. | To prepare for potential emergencies, work with state and regional authorities to coordinate an updated Debris Management Plan for King County. |
| | **Action 4-d** | County | | Investigate beneficial reuse options for closed landfills, designing monitoring and environmental systems that will facilitate reuse of the properties, provide potential revenue, and provide continued benefit to the surrounding communities. |
| | **Action 5-d** | County | | Implement a bird management plan for Cedar Hills Regional Landfill. |
| **7 – Solid Waste System Finance** | **Policy F-1** | County | | Keep tipping fees as low as reasonable, while covering the costs of effectively managing the system, protecting the environment, encouraging recycling and providing service to customers. |

## 2019 Comprehensive Solid Waste Management Plan
## Policies, Actions, and Goals Matrix

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| **7 – Solid Waste System Finance (cont.)** | **Action 1-f** | County | | Adopt the following as division policies:<br>(A) Assess fees for use of the solid waste transfer and disposal system at the point of service.<br>(B) The fee charged to customer classes will be the same at all facilities, unless the Metropolitan King County Council determines a change in the rate structure is necessary to maintain service levels, comply with regulations and permits, and to address low income needs.<br>(C) Utilize the assets of the King County Solid Waste Division consistent with the conditions established in the Amended and Restated Solid Waste Interlocal Agreement with the cities.<br>(D) The County General Fund will not charge use fees or receive other consideration from the Solid Waste Division for use of any transfer facility property in use as of November 6, 2013. The division's use of assets acquired by other separate County funds is subject to use fees. If the division ceases to use a property, all proceeds from the sale or other use of such property are due to the owner of record.<br>(E) Maintain reserve funds and routinely evaluate the funds for long-term adequacy and set contributions to maintain reasonable rate stability.<br>(F) Finance capital projects using an appropriate combination of cash and debt depending upon the life of the asset, financial benefits such as rate stability, and interest rates.<br>(G) Use solid waste fees to fund mitigation payments to cities for impacts directly attributable to solid waste facilities per Revised Code of Washington 36.58.080 and the Amended and Restated Solid Waste Interlocal Agreement.<br>(H) Use solid waste fees to fund required mitigation for solid waste facilities, including mitigation mandated by federal, state, and local regulations and permits.<br>(I) Continue to evaluate and implement fiscally responsible operational changes to support a sustainable business model and maintain the assets of the solid waste facilities.<br>(J) Include a target fund balance in the Solid Waste Division financial plan equal to at least 30 days of operating expenses.<br>(K) Establish a minimum balance in the Rate Stabilization Reserve to mitigate the risks associated with a moderate-level economic recession.<br>(L) Maintain the Landfill Post-Closure Maintenance Fund at a level to ensure that environmental monitoring and maintenance of the closed landfills will be fully funded through the end of their regulated post-closure maintenance periods, as defined by applicable law. |

**2019 Comprehensive Solid Waste Management Plan**
**Policies, Actions, and Goals Matrix**

| Chapter | # | Resp | Kirkland Activities | Text of Policy / Recommended Action |
|---|---|---|---|---|
| **7 – Solid Waste System Finance (cont.)** | **Action 2-f** | County | | Maintain a Solid Waste Division financial forecast and cash-flow projection of four years or more. |
| | **Action 3-f** | County | | Subject to approval from the Metropolitan King County Council, define customer classes and establish equitable fees for each customer class based on services provided, benefits received, use of the system, and the costs, incurred or avoided, of providing those services. |
| | **Action 4-f** | County | | Consider alternatives to the current rate methodology, such as incorporating a transaction fee into the rate structure. |
| | **Action 5-f** | County | | Study the cost of providing services to self-haul customers, and to other customer classes if needed. |
| | **Action 6-f** | County | | Consider discounts for low-income customers consistent with RCW 81.77.195. |
| | **Action 7-f** | County **Cities** | | Continue to explore new revenue sources to help finance the solid waste system. |
| | **Action 8-f** | County **Cities** | Staff will monitor any proposed solid waste fee contributions to an Environmental Reserve Fund and any benefits accrued to the City. | The Executive may establish an Environmental Reserve Fund with revenue from solid waste fees for the benefit of the signatories to the Amended and Restated Interlocal Agreement. |
| | **Action 9-f** | County | | Develop the procedures to establish and maintain the Rate Stabilization Reserve. |
| | **Action 10-f** | County | | Maintain the following solid waste funds:<br>• Landfill Reserve,<br>• Landfill Post-Closure Maintenance,<br>• Capital Equipment Recovery Program, and<br>• Construction Fund. |
| | **Action 11-f** | County | | When possible, manage solid waste rates through smaller, more frequent increases, which in combination with the rate stabilization reserve, smooths rate increases over time. |


Northeast Recycling and Transfer Station
Siting Process
Comp Plan Approval By Council Mid 2019
Meeting 1 Objectives:
This will be a separate meeting with each city, not all cities at once
• Understand the project plan and schedule
• Understand how cities want to be engaged moving forward
• Understand what concerns cities have with hosting a recycling and transfer station
Meeting 2 Objectives:
This will be a meeting with all Core NE Cities (proposed).
• Understand each city's concerns about hosting a recycling and transfer station
• Understand how these cities will be engaged in the siting process moving forward
Meeting Core NE Cities (CNC)
Kirkland • Redmond • Woodinville • Sammamish
Newcastle • Bellevue • Bothell
Meeting Interested NE Cities (INEC)
Meeting 1 Objectives:
This will be a separate meeting with each city, not all cities at once
• Understand the project plan and schedule
• Understand potential concerns with a recycling and transfer station hosted in a nearby city
Meet Sound Cities Staff (SCS)
CNC • INEC • SCS
Form Core NE City Working Group
This could be a series of reoccuring meetings.
Meet Metropolitan Solid Waste Management Advisory Committee (MSWMAC) and Sound Cities Staff
Procure Siting Consultant (RFP)
Community Outreach
Periodic Community Meetings
Public Involvement
Sites Identification Anticipated Early 2020
Public Involvement Plan
Siting Advisory Committee (SAC)
EIS/Siting Decision
Procurement Method Report
Select Project Delivery Method/ Procurement for Designer

King County
Department of
Natural Resources and Parks
**Solid Waste Division**

# South County Recycling and Transfer Station Siting
## Pass/Fail Criteria

Developed by the King County Solid Waste Division, August 2012

| | **Pass/Fail Criteria:** Based on the mission, vision, and values of King County, these Pass/Fail criteria establish minimum standards that must be met to qualify for further consideration. |
|---|---|
| 1.1 | Site is within the service area. |
| 1.2 | Site is within the contiguous Urban Growth Area. |
| 1.3 | Site is located outside of a FEMA defined 100-year flood plain. |
| 1.4 | Site is free of historical, archeological, or cultural designations. |
| 1.5 | Site is not designated as farmland preservation, park, or open space. |

King County
Department of
Natural Resources and Parks
**Solid Waste Division**

South County Recycling and Transfer Station Siting
**Functional Criteria**
Developed by the King County Solid Waste Division, August 2012

| | |
|---|---|
| | **Functional Criteria:** These criteria provide guidance on optimal engineering, operating, and transportation conditions. It is unlikely that any one site will meet all functional criteria. Rather, each criterion's relative importance must be considered in order to identify the best site. |
| 2.1 | Site is appropriately zoned and consistent with local area land use plans. |
| 2.2 | Surrounding land uses and zoning designations are compatible. |
| 2.3 | Active area would be approximately 100 feet or more from the nearest residence. |
| 2.4 | Site is located approximately 1,000 feet or more from parks and schools. |
| 2.5 | Site maintains an equitable distribution of County Solid Waste facilities (i.e. less than 30 minutes travel time for 90% of all users) |
| 2.6 | Site provides equitable distribution of environmental impacts so that no racial, cultural, or socio- economic group is unduly impacted. |
| 2.7 | Site can be developed without impact to identified critical wildlife habitat. |
| 2.8 | Site contains a manageable amount of critical areas. |
| 2.9 | Potential traffic impacts of facility operation can be minimized and/or mitigated. |
| 2.10 | Roadways near the site have the capacity to handle increased truck traffic; quality and nature of the access route is compatible. |
| 2.11 | Site is within approximately ½-mile of a major arterial or freeway/state highway (I-5, State Routes: 161,164, 167, or 18) |
| 2.12 | Site has potential access to a rail line. |
| 2.13 | Shape of site is conducive to the typical layout of a transfer station. |
| 2.14 | Site is approximately 15 – 20 acres (not necessarily a single parcel). |
| 2.15 | Topography on the developable area of the site is flat or gently sloping. |
| 2.16 | Utilities are readily accessible. |
| 2.17 | Water table beneath the site is conducive to the use (i.e. deeper as opposed to shallow). |
| 2.18 | Site would not require extensive/ expensive effort related to current tenant and/or business relocation. |
| 2.19 | Site is not a key component of a city's or community's economic development plan(s). |
| 2.20 | Site cost is within budget. |

# RESOLUTION R-5379

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND APPROVING THE 2019 COMPREHENSIVE SOLID WASTE MANAGEMENT PLAN FOR THE KING COUNTY SOLID WASTE SYSTEM.

WHEREAS, the 2019 Comprehensive Solid Waste Management Plan (2019 Plan) is supportive of the City Council's operational values encouraging regional partnerships, its commitment to efficiency in providing public services, and accountability to the community; and

WHEREAS, the policies, goals and actions in the 2019 Plan are supportive of the City Council's Environmental Goal to protect the natural environment through an integrated natural resource management system; and

WHEREAS, the purpose of the 2019 Plan is to plan for solid waste and materials reduction, collection, and handling and management services and programs in the geographic area for which King County has comprehensive planning authority for solid waste management by law or by interlocal agreement, or both; and

WHEREAS, the 2019 Plan was prepared in accordance with RCW 70.95.080 and RCW 75.95.110, which requires that each County within the state, in cooperation with the various cities located within such county, prepare and periodically review and update a coordinated, comprehensive solid waste management plan, as necessary, every five years; and

WHEREAS, King County and all cities in King County except Seattle and Milton have executed the 2013 Amended and Restated Interlocal Agreement ("the interlocal agreement"). Under the interlocal agreement, King County serves as the planning authority for solid waste; and

WHEREAS, King County worked with the City representatives serving on the Metropolitan Solid Waste Advisory Committee to help develop the 2019 Plan; and

WHEREAS, the 2019 Plan updates and replaces the 2001 Comprehensive Solid Waste Management Plan approved by City of Kirkland Ordinance 3828 (February 2002); and

WHEREAS, On April 17, 2019, the King County Regional Policy Committee, acting as the Metropolitan King County Council Solid Waste Interlocal Forum, recommended adoption of Ordinance 18893 for approval of the 2019 Plan; and

WHEREAS, on April 24, 2019 the Metropolitan King County Council adopted Ordinance 18893, which approved the 2019 Plan; and

WHEREAS, the interlocal agreement sets a 120-day period for cities to take action to approve or disapprove the 2019 Plan. The 2019 Plan cannot receive final approval unless cities representing at least 75 percent of the incorporated population of the cities that take action in the 120-day period approve the 2019 Plan. The 120-day period runs from receipt by a city of the 2019 Plan recommended by the Regional Policy Committee and approved by the Metropolitan King County Council; and

WHEREAS, the 2019 Plan was received by the City of Kirkland on Monday, May 20, 2019 thereby starting the 120-day adoption period; and

WHEREAS, after city approval the 2019 Plan is subject to final approval by the Washington State Department of Ecology.

NOW, THEREFORE, be it resolved by the City Council of the City of Kirkland as follows:

Section 1. The 2019 Comprehensive Solid Waste Management Plan, herein incorporated by reference, is hereby adopted.

Passed by majority vote of the Kirkland City Council in open meeting this _____ day of ___________, 2019.

Signed in authentication thereof this ____ day of ______, 2019.

___________________________________
Penny Sweet, Mayor

Attest:

____________________________
Kathi Anderson, City Clerk

ORDINANCE O-4695

AN ORDINANCE OF THE CITY OF KIRKLAND RELATING TO REFUSE AND GARBAGE AND AMENDING TITLE 16 OF THE KIRKLAND MUNICIPAL CODE.

The City Council of the City of Kirkland do ordain as follows:

Section 1. Kirkland Municipal Code Section 16.04.220 is repealed.

Section 2. Kirkland Municipal Code Section 16.08.001 is amended to read as follows:

16.08.001 Legislative findings and policy.

The Kirkland city council finds and declares:

(1) Title 70.95 of the Revised Code of Washington finds ~~Section 1(6) of Chapter 431 Laws of 1989, the Washington State Legislature found~~:

(A) ~~It is the responsibility of every person to minimize his or her production of waste and to separate recyclable or hazardous materials from mixed waste.~~Waste reduction must become a fundamental strategy for solid waste management. It is therefore necessary to change manufacturing and purchasing practices and waste generation behaviors to reduce the amount of waste that becomes a governmental responsibility.

(B) It should be the goal of every person and business to minimize their production of wastes and to separate recyclable or hazardous materials from mixed waste.

(~~B~~ C) It is the responsibility of state, county and city governments to provide for a waste management infrastructure to fully implement waste reduction and source separation strategies, and to process and dispose of remaining waste in a manner that is environmentally safe and economically sound. It is further the responsibility of state, county and city government to monitor the cost effectiveness and environmental safety of combusting separated waste, processing mixed municipal solid waste, ~~mixed waste~~ and recycling programs.

(2) The city and King County entered into an amended and restated solid waste interlocal agreement whereby the parties agreed that they shall cooperate in the county's development of a comprehensive solid waste management plan.

(3) King County has prepared~~, and~~ proposed and approved a final ~~2001~~ 2019 comprehensive solid waste management plan and submitted it to the city for approval and adoption.

(4) The city ~~through the Suburban Cities Association~~ participates in the Metropolitan Solid Waste Advisory Committee and the Solid Waste Advisory Committee which have ~~solid waste interlocal forum (King County regional policy committee acting as solid waste interlocal forum) which through Resolution No. RPC 2001-0001A adopted October 25,~~

~~2001, has~~ recommended approval and adoption of the final 2001 comprehensive solid waste management plan.

(5) ~~Section 10 of Chapter 431 Laws of the State of Washington 1989 regular session amending~~ RCW 70.95.160 authorizes the city to determine that King County shall not exercise any powers regarding the levels and type of service and rate structures for any aspect of solid waste collection within the city.

(6) The city believes that effective waste stream reduction programs, including recycling and "pay-as-you-throw" variable rate structure, must be so structured as to be compatible with the health and safety goal of elimination of dumping on public and private property.

(7) RCW 70.95.080 ~~and Chapter 431 Laws of 1989~~ and the King County solid waste management plan as adopted in Section 16.08.002 of this chapter require the city to establish in accordance with the time lines set forth therein, through a joint city/county solid waste comprehensive program, policies and programs for waste stream reduction and recycling of recyclable waste materials.

Section 3. Kirkland Municipal Code Section 16.08.002 is amended to read as follows:

16.08.002 Plan—Adopted.

The final ~~2001~~2019 King County Comprehensive Solid Waste Management Plan is adopted.

Section 4. Kirkland Municipal Code Section 16.08.012 is amended to read as follows:

16.08.012 Waste stream reduction plan.

The waste stream reduction plan applicable to the entire city of Kirkland is composed of the following elements:

(1) Goal. The goal of the waste stream reduction plan is to divert from the solid waste disposal stream certain types or classes of materials and thereby reduce the amount of solid waste delivered to the King County approved solid waste disposal sites, including the Cedar Hills Regional Landfill. Performance goals are established related to the ~~waste~~ recycling diversion rate, waste generation target, and waste disposal target as identified in the 2019 Comprehensive Solid Waste Management Plan. ~~tonnage of waste reduced and percentage of customers at each service level have been established to monitor progress.~~

(2) Program Elements.

(A) Effective January 1, 1990, the city established a local program for collection and disposal of household hazardous waste materials through its participation in the King County Hazardous Waste Program. ~~(The program elements are contained in Exhibit A to Kirkland Resolution R3566.)~~

(B) Provision for alternative collection and/or handling of special commercial wastes as defined in Section 16.04.155, in order that special commercial wastes, which either are or have potential to be nonsolid waste materials which have been determined by the King County solid waste division to be nonacceptable for disposal at Cedar Hills and thereby require a special handling. ~~(The program elements are set forth in Exhibit A to Kirkland Resolution R3466.)~~

(C) Cooperate and jointly participate with the King County solid waste division in programs for waste reduction, education and publicity, including programs supporting use by all segments of the community of products manufactured in whole or in part from recycled materials.

~~(D) Yard Waste Recycling. The city of Kirkland has determined there is within the King County area a market for the recovery and utilization of yard waste. The city, during 1989, conducted a pilot voluntary yard waste pickup collection recycling program, which resulted in a thirty-seven-percent diversion from and reduction in the Kirkland to Cedar Hills waste stream. Beginning in March 1990, the city has instituted a source separated yard waste curbside collection and recycling program on a voluntary basis for residential customers. (The program elements are contained in Exhibit A to Resolution R3466.)~~

(D ~~E~~) ~~Other~~ Recyclable Materials. The accepted list of residential and commercial recyclables is adopted by reference to the current list of accepted recyclables in the City's Comprehensive Garbage, Recyclables, and Compostable Collection Agreement. ~~Subject to the then existence of economically viable markets for the following recyclable materials, establishment of programs either mandatory or voluntary within the implementation timelines, required by Chapter 431 Laws of 1989 (and, where possible, the earlier timelines proposed by the King County solid waste division), to include collection and disposal for recycling of the following:~~

~~(i) Newspapers;~~

~~(ii) Mixed papers;~~

~~(iii) Glass bottles, recyclable plastic bottles and aluminum cans;~~

~~(iv) Organic waste;~~

~~(v) Electronic waste;~~

~~(vi) Textile waste;~~

~~(vii) The voluntary recycling by or for commercial customers of cardboard, newspapers, mixed, computer and office papers, yard waste, and construction waste. Depending on cost analysis and available markets, these recycling programs may be carried out through utilization of any of the following collection and disposal options: utilizing the current city solid waste contract collector, a third party collector or drop box or recycling buy-back centers. Where drop box or recycling buy-back centers are not utilized, recycling collection shall to the extent feasible be accomplished curbside;~~

~~(viii)~~ Other recyclable materials at such time as there exists for each such material an economically viable market may be added or deleted by the Public Works Director or designee.

~~(F) Penalty for Excessive Waste Generation. Whenever a solid waste customer receives notice from the solid waste collector of excessive waste generation, such customer shall make application to the city of Kirkland for an excessive waste generation permit.~~

~~The city shall, upon request of the customer, issue an excessive waste generator permit and shall notify the solid waste collector of its issuance.~~

~~There shall be no charge for the issuance of an excessive waste generator permit. However, the city reserves the right to hereafter impose a waste stream reduction incentive charge or excessive waste generator permit fee on excessive waste generators. The imposition of such fee or charge and the amount thereof shall be established by ordinance.~~

(E ~~G~~) Multifamily Residential Recycling. Multifamily residential customers shall participate in placement for collection for recycling, at a minimum, the following materials: newspapers, mixed papers, and recyclable bottles, cans and plastic containers. Recyclable materials will be collected on the same pickup schedule as solid waste collections. Recyclable materials shall be placed in property-labeled detachable containers or carts distributed by the city's solid waste collection contractor. Where space is available, detachable containers shall be used in lieu of carts. All multifamily property owners shall provide residents with a minimum total weekly volume of recycling capacity equal to or greater than the total weekly volume of garbage capacity. To the greatest extent possible, garbage, recycling and compost containers should be co-located. The public works director or designee may vary the requirements of this subsection at his or her discretion or upon the request of the property owner if, in the opinion of the director, the variance is necessary or reasonable. The variance must be in writing and may be revoked by the director at any time if the necessity for the variance ceases to exist or for any other reason determined by the director or designee, which determination shall not be made unreasonably. The revocations will be effective on a date or time selected by the director, which may be immediately if circumstances so require.

(F) Commercial Recycling. Commercial customers shall participate in collection for recycling, at a minimum, the following materials: newspapers, mixed papers, and recyclable bottles, cans and plastic containers. Recyclable materials shall be placed in property-labeled detachable containers or carts distributed by the city's solid waste collection contractor. Commercial properties shall have a minimum total weekly volume of recycling capacity equal to or greater than the total weekly volume of garbage capacity. To the greatest extent possible, garbage, recycling and compost containers should be co-located. The public works director or designee may vary the requirements of this subsection at his or her discretion or upon the request of the property owner if, in the opinion of the director, the variance is necessary or reasonable. The variance must be in writing and may be revoked by the director at any time if the necessity for the variance ceases to exist or for any other reason determined by the director or designee, which determination shall not be made unreasonably. The revocations will be effective on a date or time selected by the director, which may be immediately if circumstances so require. Nothing this section prevents a commercial generator of recyclable materials from contracting directly with a recycling collection service provider not under contract with the City of Kirkland, pursuant to RCW 35.21.158.

Section 5. If any provision of this ordinance or its application to any person or circumstance is held invalid, the remainder of the ordinance or the application of the provision to other persons or circumstances is not affected.

Section 6. This ordinance shall be in force and effect five days from and after its passage by the Kirkland City Council and publication pursuant to Section 1.08.017, Kirkland Municipal Code in the summary form attached to the original of this ordinance and by this reference approved by the City Council.

Passed by majority vote of the Kirkland City Council in open meeting this _____ day of _______________, 2019.

Signed in authentication thereof this _____ day of ______, 2019.

______________________________
Penny Sweet, Mayor

Attest:

______________________________
Kathi Anderson, City Clerk

Approved as to Form:

______________________________
Kevin Raymond, City Attorney

PUBLICATION SUMMARY
OF ORDINANCE NO. O-4695

AN ORDINANCE OF THE CITY OF KIRKLAND RELATING TO REFUSE AND GARBAGE AND AMENDING TITLE 16 OF THE KIRKLAND MUNICIPAL CODE.

SECTION 1. Repeals Section 16.04.220 of the Kirkland Municipal Code to eliminate the definition for excess waste generator.

SECTION 2. Amends Section 16.08.001 of the Kirkland Municipal Code regarding findings and policy related to refuse and garbage.

SECTION 3. Amenda Section 16.08.002 Of the Kirkland Municipal Code to adopt the final 2019 King County Comprehensive Solid Waste Management Plan.

SECTION 4. Amends Section 16.08.012 of the Kirkland Municipal Code regarding the waste stream reduction plan.

SECTION 5. Provides a severability clause for the ordinance.

SECTION 6. Authorizes publication of the ordinance by summary, which summary is approved by the City Council pursuant to Section 1.08.017 Kirkland Municipal Code and establishes the effective date as five days after publication of summary.

The full text of this Ordinance will be mailed without charge to any person upon request made to the City Clerk for the City of Kirkland. The Ordinance was passed by the Kirkland City Council at its meeting on the _____ day of ______________________, 2019.

I certify that the foregoing is a summary of Ordinance O-4695 approved by the Kirkland City Council for summary publication.

__________________________________
Kathi Anderson, City Clerk

**CITY OF KIRKLAND**
**Department of Public Works**
**123 Fifth Avenue, Kirkland, WA 98033 425.587.3800**
**www.kirklandwa.gov**

**MEMORANDUM**

**To:** Kurt Triplett, City Manager

**From:** Kathy Brown, Public Works Director
Ray Steiger P.E., Public Works Superintendent
Josh Pantzke, Utility Manager

**Date:** July 10, 2019

**Subject:** ADOPTION OF THE CITY OF KIRKLAND GENERAL SEWER PLAN

## RECOMMENDATION:

City Council approves the attached Ordinance renaming and adopting the City of Kirkland General Sewer Plan, December 2018 update (GSP), as attached and as approved by the Washington State Department of Ecology (Ecology).

Approval of the proposed Ordinance will adopt the GSP, which will be codified in Chapter 15.44 of the *Kirkland Municipal Code*.

## BACKGROUND DISCUSSION:

The City provides sanitary sewer collection service for over 10,000 customer connections serving a population of approximately 30,000 people within the City. The remainder of the city, primarily the new neighborhoods of Finn Hill, Juanita and Kingsgate, as well as portions of Totem Lake, are served by the Northshore Utility District or the Woodinville Water District (see Attachment A, Service Area). Residential customers comprise about 94% of all customer accounts, with the remaining 6% being commercial accounts. All of Kirkland's wastewater is conveyed to King County Wastewater Treatment Division's Eastside Interceptor. Providing this service requires periodic improvements to the City's sewer system and adoption of a general sewer plan is required by RCW chapter 90.48.110.

The GSP was created in accordance with regulations set forth in the Washington Administrative Code 173-240-050. The primary purposes of the GSP are to describe the existing sewer system and service area, forecast future service demands, review/document policies and design criteria for sewer system operation and improvements, review/document the operations and maintenance program and staffing requirements, and to identify a schedule of improvements and a financial plan to accomplish the improvements.

In the past, Kirkland codes and policies have referred to similar documents as the *Sewer Comprehensive Plan*. Both the *Revised Code of Washington* and the *Washington Administrative Code* identify a planning document for a sewerage system as a "general sewer plan."

Accordingly, to make Kirkland's planning document consistent with the language in State law, staff is using this update of the plan to also convert to the term "general sewer plan" throughout.

The City's last general sewer plan update was approved by Ecology in 2010 and adopted by Council shortly thereafter. Below are changes that have occurred since the last update:

- The City signed a contract extension with King County for sewage conveyance and treatment in 2014, extending our agreement to July 1, 2056;

- The City, in coordination with other wholesale customers, is negotiating a new, long-term contract with King County;

- From 2010 through 2018, 3.6 miles of pipe have been installed through new development, with over one mile in 2017 alone;

- Eight of the top ten projects identified in the 2010 GSP Capital Improvement Program have been completed; the current GSP reflects the adopted 2019-2024 CIP; and

- In 2018, the City transferred ownership of the NE 124th Street drainage basin to the Northshore Utility District.

The GSP was developed by City staff and RH2 Consultants beginning in 2015. It was submitted to Ecology in May 2018, and Ecology returned review comments to the City in July 2018. The final GSP document has incorporated comments and responses provided by the cities of Bellevue, Redmond, Woodinville Water District, Cascade Water Alliance, Northshore Utility District, and King County. The final GSP was resubmitted to Ecology on December 28, 2018, and the City received approval February 21, 2019.

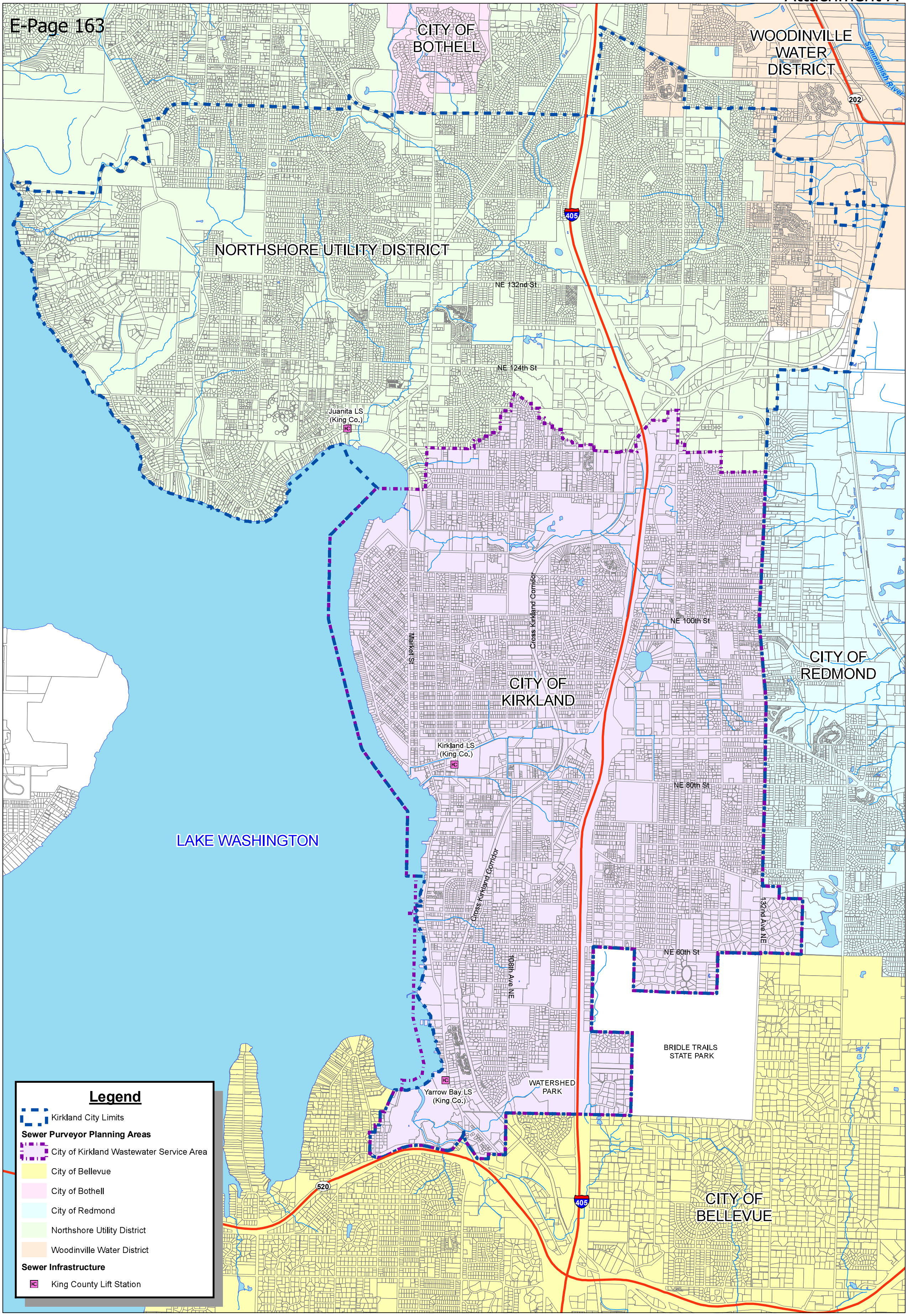
During the update process of the GSP, accelerated development activity and new proposals for future development required the City to pause to consider the effects of those proposed developments on the City's systems such as utilities and transportation. Doing so extended the GSP timeline. Additionally, the upcoming, significant reconstruction of the I-405/NE 85th Street interchange has caused private property owners to evaluate substantial redevelopment on the NE 85th Street corridor and has caused the City to embark on a transit station area plan. The potential private redevelopment and the results of the station area plan also would impact the GSP. The system model created with this GSP includes population and demand forecasts to 2035. However, were the possibilities of greater population densities to become more likely, the City once again will need to reexamine its utility system capacities.

The financial analysis performed as part of the GSP forecasts revenue requirements from 2016 through 2021 and indicates a potential need for rate increases from 1.6 percent to 5.8 percent. Actual increases as adopted by the Council on October 2, 2018 within the 2019/2020 Rate Model Update range from 1.6 percent to 3.95 percent. The water and sewer utilities will be performing a cost of services analysis in 2020, which will give an in-depth financial analysis and generally project five years into the future. Additionally, recognizing that the GSP is a planning document with capital project cost estimates reflecting a snapshot in time, individual CIP project cost estimates are updated in each adopted CIP budget.

If necessary in the future, staff will bring forward an addendum to the GSP to reflect the increased capacity and financial needs.

Adoption of the GSP by ordinance is required by RCW 35.67.030. Concurrent with this adoption, chapter 15.44.020(a) of the *Kirkland Municipal Code* will be amended by the Ordinance to reflect that a new GSP has been adopted.

Attachment A: Service Area
Attachment B: Proposed Ordinance Adopting the Kirkland General Sewer Plan
Attachment C: December 2018 City of Kirkland General Sewer Plan
Attachment D: Appendices
Attachment E: Publication Summary




J:\DATA\KIR\115-090\GIS\MAPS\FIGURE 2-1 SEWER SERVICE AREA.MXD BY: KGOMEZ PLOT DATE: DEC 14, 2018 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,400 feet

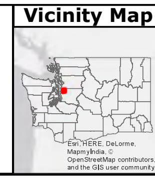
0 700 1,400 2,800 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

# Figure 2-1
## Sewer Service Area
## *City of Kirkland General Sewer Plan*

**Vicinity Map**




This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

# ORDINANCE O-4696

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF KIRKLAND ADOPTING THE KIRKLAND GENERAL SEWER PLAN.

WHEREAS, the City of Kirkland Department of Public Works ("Department") has determined that improvements to the City's sewer system are needed; and

WHEREAS, the Department prepared a General Sewer Plan ("GSP"), dated December 2018, for the City sewer service area as required by RCW 90.48.110 if a City is going to improve its sewer system; and

WHEREAS, the GSP has been submitted to all neighboring agencies and cities for their review and comment for consistency with their respective plans; and

WHEREAS, the GSP has also been submitted to the Washington State Department of Ecology as required by RCW 90.48.110 and WAC 173-240-050, which has been approved; and

WHEREAS, the Council has determined the GSP should be adopted and by ordinance as required by RCW 35.67.030.

NOW, THEREFORE, the City Council of the City of Kirkland do ordain as follows:

Section 1. The City of Kirkland General Sewer Plan dated December 2018, is herein adopted by reference as the comprehensive sewer system plan for the Kirkland sewer service area.

Section 2. Kirkland Municipal Code Section 15.44.020 is amended to read as follows:

15.44.020 Adoption by reference.
(a) The sanitary sewer comprehensive plan prepared~~, published~~ and recommended by the Kirkland department of public works under the title "City of Kirkland ~~Comprehensive~~ General Sewer ~~System~~ Plan" dated ~~April 1993~~December 2018, including worded text, maps, attachments and appendices thereto are by this reference adopted as the sanitary sewer comprehensive plan for the Kirkland sanitary sewer service area.

~~(b) Said publication has been endorsed with the title and number of the ordinance codified in this chapter, dated and signed by the mayor, attested to by the finance and administration department (ex officio city clerk) and is incorporated herein as a part of this chapter.~~

~~(c) The comprehensive sanitary sewer plan heretofore adopted for the Kirkland sanitary sewer service area by this section of the Kirkland Municipal Code is amended and supplemented as set forth in Exhibit A attached to the ordinance codified in this subsection, and by this~~

~~reference incorporated herein. Exhibit A dated April 1993, was prepared, published and recommended by the Kirkland department of public works~~.

(d) A copy of the ordinance <u>and the General Sewer Plan</u> ~~codified in subsection (c) and this subsection (d) including Exhibit A~~ shall be recorded in the office of the city clerk and copies shall be filed in the following city departments for the use of the general public and the affected departments of the city: department of public works, planning and building department. Copies shall also be filed with such other local, county and state agencies as may be required by law.

<u>Section 3</u>. If any provision of this ordinance or its application to any person or circumstance is held invalid, the remainder of the ordinance or the application of the provision to other persons or circumstances is not affected.

<u>Section 4</u>. This ordinance shall be in force and effect five days from and after its passage by the Kirkland City Council and publication pursuant to Section 1.08.017, Kirkland Municipal Code in the summary form attached to the original of this ordinance and by this reference approved by the City Council.

Passed by majority vote of the Kirkland City Council in open meeting this _____ day of ___________, 2019.

Signed in authentication thereof this ____ day of ______, 2019.

______________________________
Penny Sweet, Mayor

Attest:

______________________________
Kathi Anderson, City Clerk

Approved as to Form:

______________________________
Kevin Raymond, City Attorney

E-Page 166

Exhibit A
O-4696

# City of Kirkland

## GENERAL SEWER PLAN

Prepared By

RH2 ENGINEERS PLANNERS SCIENTISTS

Final December 2018
Adopted July 2019

THIS PAGE INTENTIONALLY LEFT BLANK

# City of Kirkland General Sewer Plan

***Final December 2018***

***Adopted July 2019***

***Mayor***
*Amy Walen*

***Deputy Mayor***
*Jay Arnold*

***City Council***
*Jon Pascal*
*Penny Sweet*
*Toby Nixon*
*Dave Asher*
*Doreen Marchione*

***Public Works Director***
*Kathy Brown*

***Prepared by:***

***City of Kirkland***
*123 Fifth Avenue*
*Kirkland, WA 98033*
*Contact: Erin Devoto*
*Phone: 425-587-3900*

*RH2 Engineering, Inc.*
*22722 29th Drive SE, Suite 210*
*Bothell, WA 98021*
*Contact: Kenny Gomez, P.E.*
*(425) 951-5416*

THIS PAGE INTENTIONALLY LEFT BLANK

# Certification

This General Sewer Plan for the City of Kirkland was prepared under the direction of the following registered professional engineers.


Kenny Gomez, P.E.

Signed:
8/14/2017


John Hendron, P.E.

Signed:
8/14/2017


Richard L. Ballard, P.E.

Signed:
8/14/2017

THIS PAGE INTENTIONALLY LEFT BLANK

# City of Kirkland
# General Sewer Plan
# Table of Contents

**EXECUTIVE SUMMARY**

**TABLES**

**CHARTS**



**FIGURES**



**APPENDICES**

THIS PAGE INTENTIONALLY LEFT BLANK

# Executive Summary

## PURPOSE OF THE PLAN

The City of Kirkland's (City) sewer system is a major infrastructure, most of which is invisible to the customers it serves. The sewer system requires qualified staff to operate and maintain an ongoing capital improvement program to replace old components to meet the requirements mandated by federal and state laws. The primary purpose of the City's General Sewer Plan (GSP) is to identify and schedule sewer system improvements that correct existing deficiencies, afford sufficient hydraulic capacity, and ensure a safe and reliable sewer system for current and future customers.

## SUMMARY OF KEY ELEMENTS

### *Sewer Service Area*

The City's sewer service area is located within the City limits and bordered on the west by Lake Washington, on the east by the City of Redmond, on the north by Northshore Utility District (Northshore), and on the south by the City of Bellevue. The sewer utility serves the southern portion of the City, while Northshore generally provides service to the part of the City that is north of NE 116$^{th}$ Street. The City's existing sewer service area encompasses approximately 5,630 acres (8.8 square miles).

At the time this GSP was being drafted, the City and Northshore were working on a mutual agreement to have Northshore assume ownership of the NE 124$^{th}$ Street sewer drainage basin. This agreement was completed in 2017. For the purposes of this GSP, the NE 124$^{th}$ Street sewer drainage basin was included in the City's sewer service area for all historical data and projections. However, the wastewater flow projections for this sewer drainage basin are not shown separated from the other sewer drainage basins in this GSP. In addition, the wastewater collection system for this sewer drainage basin, except for **Figure 2-4**, and the proposed wastewater collection system improvements for this sewer drainage basin are not shown in this GSP since this area is now maintained and operated by Northshore.

Approximately 64 percent of the land area within the City's sewer service area is currently designated for single-family residential use (or low density residential); approximately 10 percent is designated for multi-family residential use (or medium/high density residential); approximately 11 percent is designated for park or open space use; approximately 7 percent is designated for commercial use; approximately 5 percent is designated for office commercial use; approximately 2 percent is designated for industrial use; approximately 1 percent is designated for institutional use; and less than 1 percent is designated for transit oriented development.

In 2014, there were approximately 10,433 sewer service connections throughout the City's sewer system. Of these connections, 9,825 were residential services and 608 were commercial.

The City's 2014 sewer system population was estimated to be 29,481 and is expected to grow to 38,981 by 2035, which is an average annual growth rate of 1.3 percent. The City's population is expected to grow from 82,590 in 2014 to 95,913 by 2035, which is an average annual growth rate of 0.7 percent.

The City's sewer system is made up of 6 pump stations, approximately 122 linear miles of gravity sewer piping, and approximately 6,230 linear feet (LF) of force main. In general, the City's sanitary sewer system conveys wastewater to King County's (County) Eastside Interceptor that passes through the City's wastewater service boundary. The interceptor transports collected flows south to the County's wastewater treatment plant located in Renton, Washington. A summary of the sewer system characteristics is provided in **Table ES-1**.

**Table ES-1**
**2014 Sewer System Summary**

| Description | Data |
|---|---|
| City Population | 82,590 |
| Sewer Service Area Population | 29,481 |
| Sewer Service Area Employees | 30,124 |
| Number of Parcels on Septic System (In City's Wastewater Service Area) | 785 |
| Wastewater Service Area (acres) | 5,630 |
| Total Connections | 10,433 |
| Residential Domestic AAF per Capita (gpcd) | 63 |
| Commercial Domestic AAF per Employee (gped) | 18 |
| Domestic AAF per ERU (gpd per ERU) | 136 |
| Total Domestic AAF (MGD) | 2.41 |
| Number of Sewer Drainage Basins | 13 |
| Number of Pump Stations and Total Firm Capacity | 6 (2,217 gpm) |
| Total Length of Gravity Sewer Main (miles) | ~ 121.9 |
| Total Length of Force Main (miles) | ~ 1.2 |

The City's existing sewer service area is comprised of 13 major drainage basins. Approximately 123 linear miles of sewer piping ranging in size from 6 to 36 inches serves the sewer system customers. As shown in **Table ES-2**, most of the sewer pipe (approximately 79 percent) within the sewer service area is 8-inch-diameter pipe.

**Table ES-2**
**Sewer Piping Inventory**

**Gravity Main**

| Diameter (inches) | Length (feet) | Length (miles) | % of Total |
|---|---|---|---|
| 6 | 63,221 | 12.0 | 9.8% |
| 8 | 505,801 | 95.8 | 78.6% |
| 10 | 15,307 | 2.9 | 2.4% |
| 12 | 27,031 | 5.1 | 4.2% |
| 15 | 11,186 | 2.1 | 1.7% |
| 16 | 28 | 0.01 | 0.004% |
| 18 | 8,605 | 1.6 | 1.3% |
| 20 | 1,344 | 0.3 | 0.2% |
| 21 | 8,785 | 1.7 | 1.4% |
| 24 | 1,797 | 0.3 | 0.3% |
| 36 | 306 | 0.1 | 0.05% |
| **Total** | **643,411** | **121.9** | **100%** |

**Force Main**

| Diameter (inches) | Length (feet) | Length (miles) | % of Total |
|---|---|---|---|
| 4 | 3,235 | 0.6 | 52% |
| 6 | 2,220 | 0.4 | 36% |
| 8 | 776 | 0.15 | 12% |
| **Total** | **6,231** | **1.2** | **100%** |

**Collection System**

| Diameter (inches) | Length (feet) | Length (miles) | % of Total |
|---|---|---|---|
| Combined Total | 649,642 | 123.0 | 100% |

## *Existing Facilities*

The City currently owns and maintains six wastewater lift stations. The characteristics of each lift station are presented in **Table ES-3**.

**Table ES-3**
**Lift Station Characteristics**

| Lift Station Name | Force Main Diameter (in) | Total Dynamic Head (TDH) (ft) | Design Capacity (gpm)* | Drawdown Test Capacity (gpm) | Firm Capacity (gpm) |
|---|---|---|---|---|---|
| Rose Point | 6 | 66 | 250 | 300 | 300 |
| South Bay | 4 | 190 | 150 | 180 | 180 |
| Yarrow Bay II | 4 | 46 | 125 | 71 | 71 |
| Waverly Park | 6 | 104 | 320 | 282 | 282 |
| Trend | 4 | 25 | 120 | 176 | 176 |
| Lake Plaza | 8 | 45 | 750 | 750 | 1,300 |

*gpm = gallons per minute

## *Existing Wastewater Characteristics and Flows*

The 2008 through 2014 total average annual flow (AAF) rates for the City's lift stations are shown in **Table ES-4**. **Table ES-5** provides the total domestic AAF rates in the City's sewer system for 2012 through 2014.

**Table ES-4**
**Historical AAFs at the City's Lift Stations**

| | Historical AAF (gpd)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Year | | | | | | | Average |
| Lift Station | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | (2008 - 2014) |
| Lake Plaza | 243,000 | 283,500 | 270,000 | 216,000 | 256,500 | 243,000 | 229,500 | 248,786 |
| Rose Point | 14,400 | 14,400 | 21,600 | 10,800 | 14,400 | 18,000 | 21,600 | 16,457 |
| South Bay | 4,320 | 8,640 | 4,320 | 4,320 | 4,320 | 4,320 | 4,320 | 4,937 |
| Trend | 5,280 | 8,448 | 8,448 | 6,336 | 6,336 | 8,448 | 8,544 | 7,406 |
| Waverly Park | 20,304 | 33,840 | 27,072 | 27,072 | 30,456 | 27,072 | 37,224 | 29,006 |
| Yarrow Bay II | 4,260 | 5,112 | 5,112 | 4,260 | 4,686 | 4,260 | 4,260 | 4,564 |

*gpd = gallons per day

**Table ES-5**
**City's Historical Wastewater Flows**

| Description | Year 2012 | Year 2013 | Year 2014 | Average (2012 - 2014) |
|---|---|---|---|---|
| **Single-family Accounts** | | | | |
| Sewer Accounts (ERUs) | 9,002 | 9,075 | 9,206 | 9,094 |
| Sewer Population | 19,354 | 19,511 | 19,793 | 19,553 |
| Domestic AAF (gpd) | 1,349,912 | 1,223,743 | 1,255,936 | 1,276,530 |
| **Multi-family Accounts** | | | | |
| Sewer Accounts | 624 | 621 | 619 | 621 |
| Sewer ERUs | 3,910 | 4,301 | 4,506 | 4,239 |
| Sewer Population[1] | 8,407 | 9,248 | 9,689 | 9,115 |
| Domestic AAF (gpd) | 586,398 | 580,009 | 614,773 | 593,727 |
| **Total of Residential Accounts** | | | | |
| Domestic AAF (gpd) | 1,936,309 | 1,803,752 | 1,870,709 | 1,870,257 |
| Sewer Accounts | 9,626 | 9,696 | 9,825 | 9,716 |
| Sewer ERUs | 12,912 | 13,376 | 13,712 | 13,334 |
| Sewer Population[1] | 27,762 | 28,759 | 29,481 | 28,667 |
| Domestic AAF per ERU (gpd per ERU) | 150 | 135 | 136 | 140 |
| Domestic AAF per Capita (gpcd) | 70 | 63 | 63 | 65 |
| **Commercial Accounts** | | | | |
| Domestic AAF (gpd) | 497,168 | 474,588 | 541,418 | 504,392 |
| Sewer Accounts | 611 | 612 | 608 | 610 |
| Sewer ERUs | 3,315 | 3,519 | 3,969 | 3,601 |
| Employees[2] | 30,124 | 37,981 | 30,124 | 32,743 |
| Domestic AAF per Employee (gped)[3] | 17 | --- | 18 | 17 |
| **Total** | | | | |
| Domestic AAF (gpd) | 2,433,477 | 2,278,341 | 2,412,128 | 2,374,648 |
| Sewer Accounts | 10,237 | 10,308 | 10,433 | 10,326 |
| Sewer ERUs | 16,228 | 16,896 | 17,681 | 16,935 |
| Domestic AAF per ERU (gpd per ERU) | 150 | 135 | 136 | 140 |

NOTES:
1. Existing multi-family residential population in the sewer service area is estimated based on average single-family residential winter water consumption per connection and total multi-family residential winter water consumption.
2. No data is available for the number of employees in the City's sewer service area in 2013 or 2014. The number of employees in 2013 are the employees in the City limits, which include the annexation areas that are not in the City's sewer service area. The number of employees in 2014 are assumed to be the same as 2012 since there was a slight decrease in the number of commercial accounts.
3. Domestic AAF per employee was not determined for 2013 because accurate information is not available for the number of employees in the City's sewer service area for 2013.

## *Peaking Factors*

Projected flows are used to further analyze how well the existing sewer system will perform in the future and determine improvements required to maintain or improve system function. In order to establish projected flow scenarios for a sewer system, peaking factors need to be determined for the existing system, which can then be applied to projected future flow rates. **Table ES-6** presents the domestic AAF rates and the estimated peak hour flow (PHF) factor for each sewer drainage basin, which were then used to estimate existing and projected future domestic wastewater PHFs generated by the City's sewer customers.

**Table ES-6**
**Peaking Factors for the City's Sewer Drainage Basins**

| Basin Name | Domestic AAF (gpd) | Domestic PHF Peaking Factor (PHF/AAF) |
|---|---|---|
| 116th Avenue NE | 9,880 | 4.19 |
| Eastside Interceptor | 1,215,100 | 2.67 |
| Juanita | 214,000 | 3.40 |
| Juanita Bay | 23,270 | 4.04 |
| Kirkland | 550,295 | 3.02 |
| Lake Plaza | 160,015 | 3.51 |
| Rose Point | 18,245 | 4.09 |
| South Bay | 4,290 | 4.29 |
| Trend | 6,190 | 4.25 |
| Watershed Park | 6,450 | 4.24 |
| Waverly Park | 13,145 | 4.14 |
| Yarrow Bay | 171,790 | 3.48 |
| Yarrow Bay II | 3,830 | 4.30 |

NOTE:
-Flows shown in this table are rounded off and approximate.

## *Inflow and Infiltration*

The analyses presented in this GSP include peak hour inflow and infiltration (I/I) flow rates consistent with the County's Regional Infiltration and Inflow Control Program. The County estimated peak hour I/I flow rates throughout the King County Department of Natural Resources and Parks, Wastewater Treatment Division's (KCWTD) regional wastewater system as part of the 2009 through 2011 Decennial Flow Monitoring. The County estimated peak hour I/I flow rates in the City's sewer service area to range from 1,396 to 9,218 gallons per acre per day (gpad), which are relatively high I/I flow rates. The areas with the highest peak hour I/I flow rates include the downtown area and sections of the City's sewer service area adjacent to Lake Washington and Yarrow Bay; the areas with the lowest peak hour I/I flow rates include the eastern and northern regions of the City's sewer system.

Total peak hour I/I flow for each of the City's existing sewer drainage basins was based on the County's estimated peak hour I/I flow rates and the sewered area in each of the City's sewer drainage basins. The existing peak hour I/I flow rate per acre and total peak hour I/I flow rate for each of the City's existing sewer drainage basins for a 20-year storm peak hour event are shown in **Table ES-7**.

**Table ES-7**
**Existing 20-year Peak Hour I/I Flow Rates**

| Basin Name | Peak Hour I/I per Acre (gpad) | Sewered Basin Area (acres) | Total Peak Hour Basin I/I (gpd) |
|---|---|---|---|
| 116th Avenue NE | 3,875 | 34 | 130,474 |
| Eastside Interceptor | 4,894 | 2,125 | 10,401,916 |
| Juanita | 4,938 | 538 | 2,654,827 |
| Juanita Bay | 1,702 | 12 | 21,198 |
| Kirkland | 9,180 | 677 | 6,212,415 |
| Lake Plaza | 9,199 | 140 | 1,290,340 |
| Rose Point | 4,965 | 25 | 123,978 |
| South Bay | 5,071 | 7 | 34,596 |
| Trend | 6,356 | 19 | 119,927 |
| Watershed Park | 3,871 | 8 | 31,016 |
| Waverly Park | 8,957 | 45 | 407,456 |
| Yarrow Bay | 8,475 | 184 | 1,556,817 |
| Yarrow Bay II | 8,463 | 8 | 67,271 |

## *Existing and Projected Wastewater Flow Rates*

Population projections for the 2021 and 2035 planning horizons were used to calculate projected flow rates. **Table ES-8** summarizes the existing and projected flow rates for the City's sewer drainage basins.

**Table ES-8**
**Projected Sewer Drainage Basin Domestic AAF and Total PHF Rates**

| | Existing (2014) | | | | Projected 2021 | | | | Projected 2035 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin Name | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) |
| 116th Avenue NE | 9,880 | 30 | 90 | 120 | 17,065 | 50 | 115 | 165 | 18,300 | 55 | 170 | 225 |
| Eastside Interceptor | 1,215,100 | 2,255 | 7,225 | 9,480 | 1,430,120 | 2,655 | 7,400 | 10,050 | 1,806,165 | 3,350 | 7,805 | 11,155 |
| Juanita | 214,000 | 505 | 1,845 | 2,350 | 263,595 | 620 | 1,870 | 2,490 | 331,280 | 780 | 1,930 | 2,710 |
| Juanita Bay | 23,270 | 65 | 15 | 80 | 26,320 | 75 | 15 | 90 | 26,550 | 75 | 15 | 90 |
| Kirkland | 550,295 | 1,155 | 4,315 | 5,465 | 852,525 | 1,785 | 4,320 | 6,105 | 1,017,870 | 2,130 | 4,325 | 6,460 |
| Lake Plaza | 160,015 | 390 | 895 | 1,285 | 194,760 | 475 | 895 | 1,370 | 201,845 | 490 | 895 | 1,390 |
| Rose Point | 18,245 | 50 | 85 | 140 | 20,605 | 60 | 85 | 145 | 22,985 | 65 | 85 | 150 |
| South Bay | 4,290 | 15 | 25 | 35 | 4,845 | 15 | 25 | 40 | 4,920 | 15 | 35 | 45 |
| Trend | 6,190 | 20 | 85 | 100 | 7,155 | 20 | 85 | 105 | 8,360 | 25 | 85 | 110 |
| Watershed Park | 6,450 | 20 | 20 | 40 | 7,285 | 20 | 20 | 45 | 7,550 | 20 | 20 | 45 |
| Waverly Park | 13,145 | 40 | 285 | 320 | 14,845 | 45 | 285 | 325 | 16,640 | 50 | 285 | 330 |
| Yarrow Bay | 171,790 | 415 | 1,080 | 1,495 | 199,820 | 485 | 1,085 | 1,570 | 283,560 | 685 | 1,100 | 1,790 |
| Yarrow Bay II | 3,830 | 10 | 45 | 60 | 4,325 | 15 | 45 | 60 | 4,380 | 15 | 45 | 60 |
| Yarrow Bay (Bellevue)[1] | 264,320 | 365 | 975 | 1,340 | 272,160 | 380 | 975 | 1,350 | 287,840 | 400 | 975 | 1,375 |

NOTES:
-Flows shown in this table are rounded off and approximate.
1. These existing and projected wastewater flows are for the City of Bellevue's (Bellevue) Yarrow Bay Sewer Drainage Basin that discharges to the City's Yarrow Bay Sewer Drainage Basin. Wastewater flows from Bellevue's Yarrow Bay Sewer Drainage Basin are not included in the City's historical and projected wastewater flow totals presented in this chapter.

Current lift station pumping capacity and flow rate projections are provided in **Table ES-9**. As shown in the table below, capacity upgrades to the Waverly Park and Lake Plaza Lift Stations may be necessary to handle future flows.

**Table ES-9**
**Projected Lift Station Domestic AAF and Total PHF Rates**

| Lift Station | Firm Capacity (gpm) | Existing (2014) Domestic AAF (gpd) | Existing (2014) Total PHF (gpm) | Projected 2021 Domestic AAF (gpd) | Projected 2021 Total PHF (gpm) | Projected 2035 Domestic AAF (gpd) | Projected 2035 Total PHF (gpm) |
|---|---|---|---|---|---|---|---|
| Lake Plaza | 1,157 | 160,015 | **1,285** | 194,760 | **1,370** | 201,845 | **1,390** |
| Rose Point | 297 | 18,245 | 140 | 20,605 | 145 | 22,985 | 150 |
| South Bay | 161 | 4,290 | 35 | 4,845 | 40 | 4,920 | 45 |
| Trend | 211 | 6,190 | 100 | 7,155 | 105 | 8,360 | 110 |
| Waverly Park | 285 | 13,145 | **320** | 14,845 | **325** | 16,640 | **330** |
| Yarrow Bay II | 106 | 3,830 | 60 | 4,325 | 60 | 4,380 | 60 |

NOTES:
-Flows shown in this table are rounded off and approximate.
-Highlighted flows exceed the current firm capacity of the lift station.

## Summary of Improvements

A general description of the recommended improvements and an overview of the deficiencies they will resolve are presented in **Chapter 7**. A condensed version of the proposed improvements implementation schedule is presented in **Table ES-10**. The Capital Improvement Plan (CIP) numbers for recommended improvements to the existing sewer mains that were identified prior to this GSP have an “SM” prefix. The CIP numbers for recommended improvements to the existing sewer mains that were identified in this GSP, but not identified prior to this GSP, have an “EX” prefix. These “EX” improvements are all identified under SM14 (Annual Sanitary Pipeline Replacement Program). The CIP numbers for recommended improvements to existing facilities, such as lift stations and force mains, have an “F” prefix. The CIP numbers for recommended planning studies have an “M” prefix. Some improvements will be necessary to serve areas in the City’s sewer service area that will be redeveloped with higher densities or to add sewer system extensions to serve unsewered neighborhoods in the City’s sewer service area. The CIP numbers for developer-funded improvements have a “DF” prefix.

## Table ES-10
## Proposed Improvements Implementation Schedule

| CIP No. | Project Description: In | From | To | Size: Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank | Planned Year of Project and Estimated Cost (x 1,000): 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sewer Main Improvements** | | | | | | | | | | | | | | | | | | | | |
| SM1 | 6th Street S Sewer Main Replacement (SS 0051) | | | 950 | 15", 12" | $965,000 | 30 | M | | $146 | $819 | | | | | | | | | |
| SM2 | 108th Avenue NE Sewer Main Replacement (SS 0052) | | | 4,000 | 12", 8" | $5,506,000 | 59 | H | | | $711 | $3,236 | $1,559 | | | | | | | |
| SM3 | NE 108th Street Sewer Main Replacement (SS 0062) | | | 3,000 | 18", 15" | $6,569,500 | 38 | M | | | | | $3,390 | $3,179 | | | | | | |
| SM4 | 1st Street Sewer Main Replacement (SS 0069) | | | 4,170 | 8" | $3,820,000 | 51 | H | $354 | $3,466 | | | | | | | | | | |
| SM5 | 5th Street Sewer Main Replacement (SS 0070) | | | 1,430 | 12", 8" | $1,284,000 | 41 | H | $420 | $865 | | | | | | | | | | |
| SM6 | 6th Street Sewer Main Replacement (SS 0071) | | | 325 | 8" | $287,000 | 59 | H | $287 | | | | | | | | | | | |
| SM7 | Kirkland Avenue Sewer Main Replacement (SS 0072) | | | 1,550 | 12" | $2,298,400 | 54 | H | | | $285 | $2,013 | | | | | | | | |
| SM8 | 3rd Avenue S and 2nd Street S Sewer Main Replacement (SS 0079) | | | 780 | 8" | $361,600 | 65 | H | $362 | | | | | | | | | | | |
| SM9 | 3rd and Central Way Sanitary Sewer Crossing (SS 0082) | | | 90 | 30" | $300,000 | 30 | M | $300 | | | | | | | | | | | |
| SM10 | West of Market Sewer Main Replacement (SS 0077) | | | 45,000 | 12", 8" | $21,681,000 | 65 | H | | | | | $225 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $8,956 | |
| SM11 | Annual Sewer Critical Areas Ordinance / Surface Water Design Manual Support (SS 7777) | | | --- | --- | $700,000 | --- | --- | | $700 | | | | | | | | | | |
| SM12 | Annual Sanitary Pipeline Replacement Program (SS 8888) | | | --- | --- | $1,333,200 | --- | --- | | | | | | $400 | $933 | | | | | |
| SM13 | Annual Sanitary Pump Station/System Upgrade Program (SS 9999) | | | --- | --- | $1,333,200 | --- | --- | | | | | | $400 | $933 | | | | | |
| SM14 | Annual Sanitary Pipeline Replacement Program (CIP EX2 through CIP EX322) | | | 275,000 | 36", 30", 24", 18", 15", 12", 8", 6" | $236,158,000 | --- | --- | | | | | | | | $3,413 | $2,315 | $2,373 | $55,190 | $172,867 |
| **Total - Sewer Main Improvements** | | | | | | **$282,596,900** | **---** | **---** | **$1,722** | **$5,176** | **$1,815** | **$5,250** | **$5,174** | **$6,480** | **$4,366** | **$5,913** | **$4,815** | **$4,873** | **$64,146** | **$172,867** |
| **Facility Improvements** | | | | | | | | | | | | | | | | | | | | |
| F1 | Rose Point Sewer Lift Station Replacement (SS 0073) | | | | | $1,110,000 | --- | --- | $1,110 | | | | | | | | | | | |
| F2 | Trend Lift Station Abandonment | | | | | $3,551,000 | --- | --- | | | | | | | | $710 | $1,420 | $1,420 | | |
| F3 | Waverly Park Lift Station Improvements | | | | | $1,178,000 | --- | --- | | | | | | | | $236 | $471 | $471 | | |
| **Total - Facility Improvements** | | | | | | **$5,839,000** | **---** | **---** | **$1,110** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$946** | **$1,892** | **$1,892** | **$0** | **$0** |
| **Miscellaneous and Planning Improvements** | | | | | | | | | | | | | | | | | | | | |
| M1 | Reclaimed Water (Purple Pipe) Opportunity Fund (SS 0084) | | | | | $5,000,000 | --- | --- | | | | | | | | | | | $5,000 | |
| M2 | Inflow and Infiltration Study | | | | | $250,000 | --- | --- | | | | | | | | $63 | $150 | $38 | | |
| M3 | General Sewer Plan Update (Update Every 10 Years) | | | | | $600,000 | --- | --- | | | | | | | | | | $150 | $150 | $300 |
| **Total - Miscellaneous Improvements** | | | | | | **$5,850,000** | **---** | **---** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$63** | **$150** | **$188** | **$5,150** | **$300** |
| **Total Estimated Project Costs of City-funded Improvements** | | | | | | **$294,285,900** | **---** | **---** | **$2,832** | **$5,176** | **$1,815** | **$5,250** | **$5,174** | **$6,480** | **$4,366** | **$6,921** | **$6,857** | **$6,952** | **$69,296** | **$173,167** |
| **Developer-funded Improvements - 2021 Projections** | | | | | | | | | | | | | | | | | | | | |
| DF1 | Lake Plaza Lift Station Improvements | | | | | $1,257,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| ~~DF2~~ | ~~~120th Ave NE~~ | ~~NE 124th St~~ | ~~~NE 122nd Way~~ | ~~1,050~~ | ~~12"~~ | ~~$877,000~~ | ~~Timing of Project Based on Timing of Future Developments~~ | | | | | | | | | | | | | |
| DF3 | NE 112th St | 120th Ave NE | Cross Kirkland Corridor | 250 | 12" | $209,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF4 | Slater Ave NE | ~NE 103rd Pl | ~NE 102nd Pl | 425 | 24" | $576,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| **Total - Developer-funded Improvements - Prior to 2021** | | | | | | **$2,042,000** | **Timing of Projects Based on Timing of Future Developments** | | | | | | | | | | | | | |
| **Developer-funded Improvements - 2035 Projections** | | | | | | | | | | | | | | | | | | | | |
| ~~DF5~~ | ~~W of 120th Ave NE~~ | ~~~NE 122nd Way~~ | ~~~NE 120th St~~ | ~~600~~ | ~~12"~~ | ~~$501,000~~ | ~~Timing of Project Based on Timing of Future Developments~~ | | | | | | | | | | | | | |
| DF6 | NE 112th St | 117th Pl NE | 116th Pl NE | 300 | 12" | $251,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF7 | 124th Ave NE | NE 112th Pl | NE 112th St | 275 | 12" | $230,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF8 | NE 97th St | Slater Ave NE | ~50' E of Slater Ave NE | 50 | 24" | $45,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF9 | NE 97th St<br>124th Ave NE<br>NE 95th St | 124nd Ln NE<br>NE 97th St<br>124th Ave NE | 124th Ave NE<br>NE 95th St<br>125th Ave NE | 1,175 | 18" | $1,025,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF10 | 128th Ave NE | ~75' N of NE 91st Ln | NE 91st Ln | 75 | 15" | $157,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF11 | Waverly Way | ~120' NE of Slater Ave NE | ~360' NE of 2nd St W | 750 | 18" | $654,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF12 | NE 70th Street | ~126th Ave NE | ~127th Ave NE | 325 | 12" | $272,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| **Total - Developer-funded Improvements - Prior to 2035** | | | | | | **$2,634,000** | **Timing of Projects Based on Timing of Future Developments** | | | | | | | | | | | | | |
| **Total Estimated Project Costs of Developer-funded Improvements** | | | | | | **$4,676,000** | **Timing of Projects Based on Timing of Future Developments** | | | | | | | | | | | | | |

NOTES:
- Cost estimates for **CIP SM1** through **CIP SM13** and **CIP F1** were provided by the City.
- Estimated costs presented in this table are in 2017 dollars.
- Projects that are struck through were removed because they are located in the area that was acquired by Northshore in 2017 (NE 124th Street Sewer Drainage Basin). Costs for these projects were omitted from this table.

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed sewer projects in the City and around the Puget Sound area and are presented in 2017 dollars. The cost estimates include construction and indirect costs. The recommended existing sewer main improvements that were identified prior to this GSP (i.e., the improvements identified under CIP SM1 through CIP SM13) were prioritized by the City based on the perceived need for the improvements. The recommended existing collection system improvements that were not identified prior to this GSP (i.e., the improvements identified under CIP SM14) were prioritized based on the criteria presented in **Chapter 7**. The schedule for the developer-funded projects will be dependent on the timing and design of the specific development areas. A general schedule has been established for planning purposes; it is anticipated that this estimated schedule will be modified as development occurs. In addition, the City retains the flexibility to reschedule, expand, or reduce CIP projects when new information becomes available for review and analysis.

## *Operation and Maintenance*

**Chapter 8** addresses the operation and maintenance (O&M) program and staff for the City's sewer system. Currently, there are nine personnel assigned to the O&M of the sewer system. It is recommended that the City hire additional personnel to staff sewer O&M needs, as shown in **Table ES-11**. In addition, the collection system may need additional maintenance as the sewer system population continues to grow, and the City may need to hire additional staff to maintain the gravity sewers, force mains, and pump stations.

**Table ES-11**
**Staffing Recommendation**

| Population | 29,481 | | 25,000 | 50,000 | 29,481 | | 25,000 | 50,000 |
|---|---|---|---|---|---|---|---|---|
| **Occupational Title** | **City's Wastewater Division** | **Recommended Number of Staff[1]** | | | **City's Wastewater Division** | **Recommended Man Hours per Week[1]** | | |
| Utility Manager[1] | 1 | 1.0 | 1 | 1 | 13 | 24 | 20 | 40 |
| Supervisor[1] | 1 | 0.2 | - | 1 | 20 | 7 | - | 40 |
| Lead[1] | 1 | 1.0 | 1 | 1 | 10 | 24 | 20 | 40 |
| Senior Maintenance[1] | 2 | 1.2 | 1 | 2 | 80 | 31 | 20 | 80 |
| Utility Workers[1] | 3 | 2.2 | 2 | 3 | 120 | 71 | 60 | 120 |
| Maintenance Equipment Operator | - | 1.2 | 1 | 2 | - | 47 | 40 | 80 |
| Construction Equipment Operator | - | 1.0 | 1 | 1 | - | 24 | 20 | 40 |
| Laborer | - | 2.0 | 2 | 2 | - | 47 | 40 | 80 |
| Maintenance Mechanic II[2] | - | 0.4 | - | - | - | 16 | - | - |
| Maintenance Mechanic I[3] | - | 0.4 | - | - | - | 16 | - | - |
| Maintenance Mechanic Helper[3] | - | 0.4 | - | - | - | 16 | - | - |
| Pretreatment Technician | 1 | - | - | - | 20 | - | - | - |
| **Total Staff[4]** | **9** | **10.9** | **9** | **13** | **263** | **322** | **220** | **520** |

NOTES:
1. Recommended number of staff and man hours per week are interpolated from information provided by Water Pollution Control Federation Manual of Practice No. 7 "Operations and Maintenance of Wastewater Collection Systems." Utility Manager referred to as Superintendent, Supervisor referred to as Maintenance Supervisor, Lead referred to as Foreman, Senior Maintenance referred to as Maintenance II and Mason II, and Utility Worker referred to as Maintenance I and Mason I in Water Pollution Control Federation Manual of Practice No. 7 "Operations and Maintenance of Wastewater Collection Systems."
2. Multiply number of lift stations maintained by 2.67 to approximate number of man hours per week recommended. The City has six lift stations that it maintains.
3. Multiply number of lift station visits per week by 2.67 to approximate number of man hours per week recommended. The City has six lift stations that it visits each week for maintenance.
4. Some staff, such as clerks and construction inspectors, have been omitted from this list due to support the Wastewater Division receives from other divisions and departments.

## *Financial Summary*

Improvements to the system are primarily necessary to resolve existing system deficiencies, but they will also improve operations, replace older aging infrastructure, and accommodate future sewer customers. Improvements identified for the first 6 years of the capital improvement program

(2016 to 2022) are estimated to cost approximately $31,092,900 (in 2017 dollars), which results in an average expenditure of approximately $4,442,000 per year (in 2017 dollars). Scheduled improvements within the City's 20-year capital improvement program (2016 to 2035) are estimated to cost approximately $121,118,900 (in 2017 dollars).

As the existing infrastructure continues to age, managing and funding the sewer system CIP is essential for maintaining a safe and reliable sewer collection system for the City's customers. Based on the City's geographic information system (GIS) data, approximately 65 percent of the City's existing sewer collection system is greater than 40 years old or has an unknown age. As funding becomes available, the City should consider a more aggressive sewer main repair and replacement program or develop asset management strategies to address future infrastructure needs.

The financial analysis is intended to illustrate the feasibility of funding the operation, maintenance, and capital improvements planned for the sewer system for the next 6 years. The City continues to maintain the sewer utility in a healthy financial position and is taking steps with this GSP to ensure future stability of the sewer utility's financial status. The revenue needs forecast provides for between 1.6 percent and 5.8 percent composite rate increases each year through 2021.

The City has established rates that are affordable to its customers and has earned a reputation for providing high-quality customer service. The City's proven financial strength will ensure that customers will continue to receive the same high-quality level of service they have come to expect.

**THIS PAGE INTENTIONALLY LEFT BLANK**

# Introduction

1

## SEWER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Kirkland (City) is a municipal corporation that owns and operates a public sewer collection system. The sewer utility is managed by the Wastewater Division of the City's Public Works' Utilities Division. The sewer utility serves the southern portion of the City, while Northshore Utility District (Northshore) generally provides service to the part of the City that is north of NE 116$^{th}$ Street.

## OVERVIEW OF EXISTING SYSTEM

The City's existing sewer service area is approximately 5,630 acres (8.80 square miles) and is generally a blend of commercial, single-family, and multi-family neighborhoods. In 2014, approximately 29,481 people received sewer service through 9,825 residential customer connections. The City also provides service to an additional 608 commercial connections.

The City's sewer utility consists of one manager, one supervisor, and seven collections staff. The collections staff maintains 6 wastewater lift stations, approximately 122 linear miles of gravity sewer piping, and approximately 6,230 linear feet (LF) of force main. In general, the City's sanitary sewer system conveys wastewater to King County's (County) Eastside Interceptor that passes through the City's wastewater service boundary. The interceptor transports collected flows south to the County's wastewater treatment plant located in Renton, Washington. A majority of the wastewater that enters the east side of the system is conveyed to the Eastside Interceptor by gravity. A majority of the wastewater entering the system on the west side of the Eastside Interceptor is conveyed by pumping or gravity to one of three County-operated lift stations that pump directly to the Eastside Interceptor. One basin in the northern section of the system collects and deposits wastewater into Northshore's sewer system, and three basins in the southern section of the system collect and deposit wastewater into the City of Bellevue's (Bellevue) sewer system. Bellevue's Yarrow Bay Sewer Drainage Basin discharges wastewater to the City's sewer system. A summary of wastewater utility data is provided in **Table 1-1**.

At the time this GSP was being drafted, the City and Northshore were working on a mutual agreement to have Northshore assume ownership of the NE 124$^{th}$ Street sewer drainage basin. This agreement was completed in 2017. For the purposes of this GSP, the NE 124$^{th}$ Street sewer drainage basin was included in the City's sewer service area for all historical data and projections. However, the wastewater flow projections for this sewer drainage basin are not shown separated from the other sewer drainage basins in this GSP. In addition, the wastewater collection system for this sewer drainage basin, except for **Figure 2-4**, and the proposed wastewater collection system improvements for this sewer drainage basin are not shown in this GSP since this area is now maintained and operated by Northshore.

**Table 1-1**
**2014 Sewer System Summary**

| Description | Data |
|---|---|
| City Population | 82,590 |
| Sewer Service Area Population | 29,481 |
| Sewer Service Area Employees | 30,124 |
| Number of Parcels on Septic System (In City's Wastewater Service Area) | 785 |
| Wastewater Service Area (acres) | 5,630 |
| Total Connections | 10,433 |
| Residential Domestic AAF per Capita (gpcd) | 63 |
| Commercial Domestic AAF per Employee (gped) | 18 |
| Domestic AAF per ERU (gpd per ERU) | 136 |
| Total Domestic AAF (MGD) | 2.41 |
| Number of Sewer Drainage Basins | 13 |
| Number of Pump Stations and Total Firm Capacity | 6 (2,217 gpm) |
| Total Length of Gravity Sewer Main (miles) | ~ 121.9 |
| Total Length of Force Main (miles) | ~ 1.2 |

## AUTHORIZATION AND PURPOSE

In July 2015, the City authorized RH2 Engineering, Inc., (RH2) to prepare a General Sewer Plan (GSP) in accordance with Washington Administrative Code (WAC) 173-240-050. The previous GSP was prepared for the City in 2010. The purpose of this updated GSP is as follows.

≠ To evaluate existing sewer flow data and project future flows.

≠ To analyze the existing sewer system to determine if it meets minimum requirements mandated by the Washington State Department of Ecology, and the City's own policies and design criteria.

≠ To determine the overall reliability and vulnerability of existing wastewater lift stations.

≠ To identify sewer system improvements that will resolve existing system deficiencies and accommodate future system needs.

≠ To prepare a schedule of improvements that meets the goals of the City's financial program.

## SUMMARY OF PLAN CONTENTS

A brief summary of the content of the chapters in this GSP is as follows.

≠ **Chapter 1** introduces the reader to the City's sewer system, the objectives of the GSP, and the GSP's organization.

≠ **Chapter 2** presents the sewer service area and describes the existing sewer system.

≠ **Chapter 3** presents related plans, land use, and population characteristics.

≠ **Chapter 4** identifies existing wastewater flow rates and projects future rates.

≠ **Chapter 5** presents the City's operational policies and design criteria.

≠ **Chapter 6** discusses the sewer system analyses and existing system deficiencies.

- **Chapter 7** presents the proposed sewer system improvements, their estimated costs, and a schedule for implementation.
- **Chapter 8** discusses the City's sewer system operations and maintenance program.
- **Chapter 9** summarizes the financial status of the sewer utility and presents a plan for funding the sewer improvements.

## DEFINITION OF TERMS

The following terms are used throughout this GSP.

**Connection Charge**: A charge for a share of the City's wastewater system that each service connection must pay as a condition of being allowed to connect to the City's wastewater system. The proportionate share is based on the historic value of the system.

**Flow:** The quantity (volume) of wastewater conveyed during a certain time period. Flows are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm). Flow rates pertinent to the analysis and design of wastewater systems are as follows.

- **Average Annual Flow (AAF):** The total amount of wastewater collected by the system in a year divided by the number of days in the year.
- **Maximum Day Flow (MDF):** The maximum amount of wastewater collected by the system during a 24-hour time period of a given year.
- **Peak Hour Flow (PHF):** The maximum amount of wastewater collected by the system, during a 1-hour time period of a given year.

**Equivalent Residential Units (ERUs):** One ERU represents the amount of domestic wastewater produced by one single-family residence for a specific wastewater system. The domestic wastewater flow from other customer classes can be expressed in terms of ERUs by dividing the domestic wastewater flow of each of the other customer classes by the domestic wastewater flow represented by one ERU.

**Head:** A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

**Inflow and Infiltration**: The combination of groundwater and surface water that enters the sewer system. Infiltration is typically groundwater entering the sewer system through defects in the sewer system infrastructure, such as fractured pipes and leaking manholes and pipe joints. Inflow is typically surface water that enters the sewer system from sources such as roof and street drains and leaky manhole covers.

**Purveyor:** An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons, or other entity owning or operating a public wastewater system. Purveyor also means the authorized agents of such entities.

## LIST OF ABBREVIATIONS

The abbreviations listed below in **Table 1-2** are used throughout this GSP.

## Table 1-2
## Abbreviations

| Abbreviation | Description |
|---|---|
| AAF | Average Annual Flow |
| AC | Asbestos Cement |
| AWWC | Average Winter Water Consumption |
| Bellevue | City of Bellevue |
| CIP | Capital Improvement Plan |
| City | City of Kirkland |
| County | King County |
| DI | Ductile Iron |
| Ecology | Washington State Department of Ecology |
| EPA | U.S. Environmental Protection Agency |
| ERP | Emergency Response Plan |
| ERU | Equivalent Residential Unit |
| FOG | Fats, Oils, and Grease |
| fps | Feet per Second |
| GIS | Geographic Information System |
| GMA | Growth Management Act |
| gpad | Gallons per Acre per Day |
| gpcd | Gallons per Capita per Day |
| gpd | Gallons per Day |
| gped | Gallons per Employee per Day |
| gpm | Gallons per Minute |
| GSP | General Sewer Plan |
| HDPE | High Density Polyethylene |
| hp | Horsepower |
| I/I | Inflow and Infiltration |
| KCWTD | King County Department of Natural Resources and Parks, Wastewater Treatment Division |
| L&I | Labor and Industries |
| LF | Linear Feet |
| LID | Local Improvement District |
| MDF | Maximum Day Flow |
| MGD | Million Gallons per Day |
| MUTCD | Manual on Uniform Traffic Control Devices |
| Northshore | Northshore Utility District |
| NPDES | National Pollutant Discharge Elimination System |
| O&M | Operations and Maintenance |
| OSHA | Occupational Safety and Health Administration |
| PHF | Peak Hour Flow |
| PSRC | Puget Sound Regional Council |
| PVC | Polyvinyl Chloride |
| RCW | Revised Code of Washington |
| Redmond | City of Redmond |
| RTU | Remote Terminal Unit |
| SCADA | Supervisory Control and Data Acquisition |
| SEPA | State Environmental Policy Act |
| SSO | Sanitary Sewer Overflow |
| State | State of Washington |
| TAZ | Traffic Analysis Zone |
| TDH | Total Dynamic Head |
| UGA | Urban Growth Area |
| ULID | Utility Local Improvement District |
| WAC | Washington Administrative Code |
| WISHA | Washington Industrial Safety and Health Act |
| WSDOT | Washington State Department of Transportation |
| WWTP | Wastewater Treatment Plant |

# Sewer System Description

2

## INTRODUCTION

This chapter describes the City of Kirkland's (City) sewer service area, the existing sewer system, and its individual components. The results of the evaluation and analyses of the existing sewer system are presented in **Chapters 4** and **6.**

## SEWER SERVICE AREA

### *History*

The City's two most recent sewer plans were completed in 1993 and 2010. The following information was provided in the 2010 *General Sewer Plan* (GSP) prepared by Roth Hill, LLC, and is presented below to preserve the historical information.

The sanitary collection system for the City was first constructed in the downtown area in the early 1940s as part of the federal government war housing projects. By 1950, approximately 30 percent of the sewer collection system was constructed. A primary wastewater treatment plant was also constructed in the vicinity of 3rd Street and Central Way as part of the war housing projects, with an outfall to Lake Washington. In 1959, the King County Department of Natural Resources and Parks, Wastewater Treatment Division (KCWTD), formally known as the Municipality of Metropolitan Seattle (METRO), prepared a regional plan for the wastewater collection and treatment facilities. KCWTD assumed the operation of the regional interceptors and wastewater treatment systems, which included the City's primary wastewater treatment plant, in 1962. The primary wastewater treatment plant was eventually abandoned and a KCWTD owned and operated lift station was constructed to convey wastewater flows to the new interceptor. Currently, all of the City's wastewater discharges to KCWTD facilities. The Rose Hill sewer system was assumed by the City in 1989, and City-constructed sewer improvements in that area have allowed connection to the City's sewer collection system.

The City was incorporated in 1905 and provides sewer service to 29,481 people within the sewer service area. The City is located in King County (County), Washington, along the eastern shore of Lake Washington. The City boundary currently encompasses an area of approximately 18.2 square miles that extends north to NE 145th Street, furthest east to the Sammamish River, and furthest south to State Route 520. The City's sewer service area is located within the City limits and is bordered on the west by Lake Washington, on the east by the City of Redmond (Redmond), on the north by Northshore Utility District (Northshore), and on the south by the City of Bellevue (Bellevue), shown in **Figure 2-1**.

The City's sanitary sewer collection system consists of 6 lift stations, approximately 6,230 linear feet (LF) of force main, and approximately 122 linear miles of gravity sewer main. The properties currently served by the sewer system are generally a blend of commercial, single-family, and multi-family neighborhoods. A majority of the City's wastewater flows by gravity or is pumped to the County's Eastside Interceptor, which runs through the City, and is conveyed south through the County's conveyance system to the South Treatment Plant located in Renton. Flows from several sewer drainage basins discharge north into Northshore's facilities and south into Bellevue's facilities. There are no existing connections to Redmond's sanitary sewer system. **Figure 2-2** is a map of the existing sewer system based on gravity main diameter, **Figure 2-3A** is a map of the existing sewer system based on gravity main installation year, and **Figure 2-3B** is a map of the existing sewer system based on gravity main material.

## Geology and Topography

The City is known for its walkable downtown with a waterfront along Lake Washington, as well as its parks and trails, including the Cross-Kirkland Corridor. It is home to many high-technology industry employees, as well as some high-technology industry offices.

Valleys and lowlands have been carved into the terrain by several water courses, including Juanita Creek, Forbes Creek, and Cochran Springs. Glacially created basins and depressions are occupied by lakes such as Lake Washington, Forbes Lake, Totem Lake, and their associated wetlands.

The topography of the area served by the City varies greatly in elevation. The east side of the service area is the highest, with the land sloping downward from 132nd Avenue NE to Lake Washington. The ground elevations vary from approximately 500 feet above mean sea level in the Bridle Trails area, to approximately 20 feet above mean sea level along Lake Washington.

The contours for the City's sewer service area are shown in **Figure 2-4**.

## Climate

The climate in the City is typical of King County. The average total annual precipitation for the City is approximately 36 inches per year. Precipitation most often occurs as rainfall between the months of October and April, with the heaviest rains generally occurring during the month of November. The average July, which on average is the City's warmest month, temperature for the City is approximately 66 degrees Fahrenheit with an average daily maximum temperature of 76 degrees Fahrenheit. The average December, which on average is the City's coolest month, temperature for the City is approximately 41 degrees Fahrenheit with an average daily minimum temperature of 36 degrees Fahrenheit.

# EXISTING SEWER FACILITIES

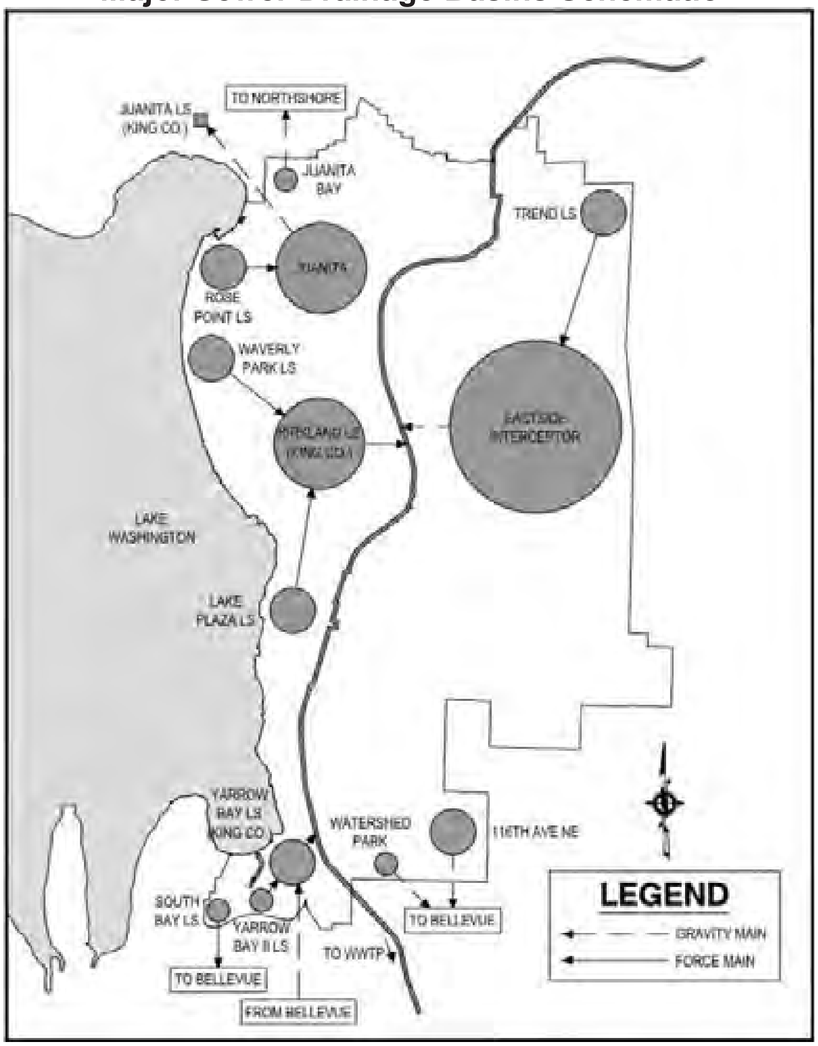
The City owns, operates, and maintains the wastewater collection system, which includes the collection system piping and six wastewater lift stations. The County continues to operate several facilities within the City's sewer service boundary, including three wastewater lift stations and the Eastside Interceptor. The sewer service area is smaller than the City limits and is shown in **Figures 2-1** and **2-2.** In 2011, the City annexed the areas of Finn Hill, North Juanita, and Kingsgate. These annexations have increased the City limits so that it is the same as the Urban Growth Area (UGA). Northshore currently serves the annexed areas, and there are currently no plans for the City to assume these annexed areas.

## Sewer Drainage Basins

The City's existing sewer service area is comprised of 13 major sewer drainage basins and 40 minor sewer basins, as shown in **Figure 2-4**. The minor sewer drainage basins were delineated by others and provided in a digital format by the City's Geographic Information System (GIS) department. The major sewer basins included in this GSP were created by combining adjacent minor basins with similar characteristics and outfalls to simplify the City's sewer drainage basins.

In general, the sanitary sewer system conveys wastewater to the County's Eastside Interceptor that passes through the City's wastewater service boundary. The interceptor transports collected flows south to the County's wastewater treatment plant located in Renton, Washington. A majority of the wastewater that enters the east side of the system is conveyed to the Eastside Interceptor by gravity. A majority of the wastewater entering the system on the west side of the Eastside Interceptor is conveyed by pumping or gravity to one of three County-operated lift stations that pump directly to the Eastside Interceptor. One basin in the northern section of the system collects and deposits wastewater into Northshore's sewer system, and three basins in the southern section of the system collect and deposit wastewater into Bellevue's sewer system. Bellevue's Yarrow Bay Sewer Drainage Basin discharges wastewater to the City's sewer system. **Figure 2-5** shows a schematic representation of the general location and flow path for each of the 13 major sewer drainage basins.

**Figure 2-5**
**Major Sewer Drainage Basins Schematic**




## *Collection Piping*

The City has approximately 122 linear miles of gravity sewer piping, including collection sewers and interceptors. There are approximately 6,230 LF of force main throughout the system. **Table 2-1** summarizes the pipe by diameter. **Figure 2-2** illustrates pipe sizes and locations.

**Table 2-1**
**Sewer Piping Inventory**

**Gravity Main**

| Diameter (inches) | Length (feet) | Length (miles) | % of Total |
|---|---|---|---|
| 6 | 63,221 | 12.0 | 9.8% |
| 8 | 505,801 | 95.8 | 78.6% |
| 10 | 15,307 | 2.9 | 2.4% |
| 12 | 27,031 | 5.1 | 4.2% |
| 15 | 11,186 | 2.1 | 1.7% |
| 16 | 28 | 0.01 | 0.004% |
| 18 | 8,605 | 1.6 | 1.3% |
| 20 | 1,344 | 0.3 | 0.2% |
| 21 | 8,785 | 1.7 | 1.4% |
| 24 | 1,797 | 0.3 | 0.3% |
| 36 | 306 | 0.1 | 0.05% |
| **Total** | **643,411** | **121.9** | **100%** |

**Force Main**

| Diameter (inches) | Length (feet) | Length (miles) | % of Total |
|---|---|---|---|
| 4 | 3,235 | 0.6 | 52% |
| 6 | 2,220 | 0.4 | 36% |
| 8 | 776 | 0.15 | 12% |
| **Total** | **6,231** | **1.2** | **100%** |

**Collection System**

| Diameter (inches) | Length (feet) | Length (miles) | % of Total |
|---|---|---|---|
| Combined Total | 649,642 | 123.0 | 100% |

## *Lift Stations*

The City currently owns, operates, and maintains six wastewater lift stations. Five of the wastewater lift stations have a wetwell/drywell configuration, while the sixth is a submersible-type lift station. Each sewage lift station either has a stand-alone emergency generator or a pig tail to connect to an emergency generator. The operation of the pumps in the lift stations are controlled by the water level in the wetwells. The characteristics of each lift station are summarized in **Table 2-2**, and a description of each lift station follows. During the development of this GSP update, City staff conducted drawdown tests at each lift station. For modeling purposes, the flow rates recorded during the City-conducted drawdown tests were considered to be the firm capacities of each lift station. The City performed additional drawdown tests in 2018. Tests were performed on each pump individually and with two pumps in operation at each lift station. The measurements and results from these tests can be found in **Appendix E**.

**Table 2-2**
**Lift Station Characteristics**

| Lift Station Name | Force Main Diameter (in) | Total Dynamic Head (TDH) (ft) | Design Capacity (gpm)* | Drawdown Test Capacity (gpm) | Firm Capacity (gpm) |
|---|---|---|---|---|---|
| Rose Point | 6 | 66 | 250 | 297 | 297 |
| South Bay | 4 | 190 | 150 | 161 | 161 |
| Yarrow Bay II | 4 | 46 | 125 | 106 | 106 |
| Waverly Park | 6 | 104 | 320 | 285 | 285 |
| Trend | 4 | 25 | 120 | 211 | 211 |
| Lake Plaza[1,2] | 8 | 45 | 750 | 1,157 | 1,157 |

NOTES:
*gpm = gallons per minute
1. The design capacity provided for Lake Plaza Lift Station is for one pump in operation. The drawdown test capacity and firm capacity provided for Lake Plaza Lift Station are for two pumps in operation.
2. The drawdown testing performed by the City indicated that the capacity of the Lake Plaza Lift Station with one pump in operation is 801 gpm.

### Rose Point Lift Station

Rose Point Lift Station

The Rose Point Lift Station, located at 1803 10th Street West, was constructed in 1977. This wetwell/drywell lift station is located at the northwest end of the collection system near Juanita Bay. The lift station has two pumps, each with a design capacity of 250 gallons per minute (gpm) at 66 feet of discharge head. This station has a 6-inch-diameter ductile iron (DI) force main with an approximate length of 1,800 LF. It also includes a portable engine generator connection for backup power; standby power is provided via an on-site engine generator. The station's overflow system discharges to Lake Washington by Kiwanis Park near the water surface level. The overflow pipe was plugged with a mechanical plug from within the lift station wetwell in July 2018. The City has no known history of overflows occurring at Rose Point Lift Station in the last decade.

A replacement for the Rose Point Lift Station is currently being designed, which is 90-percent complete, and is anticipated to have construction completed in 2019. The proposed lift station includes decommissioning of the station's overflow system. The proposed lift station is anticipated to have two submersible pumps and a firm capacity of 300 gpm at 67 feet of discharge head. The proposed lift station is anticipated to have a wetwell, valve vault, control building, and backup diesel generator. In addition, the existing wetwell will be utilized as emergency offline storage for the proposed lift station.

### South Bay Lift Station

South Bay Lift Station

The South Bay Lift Station, located at 3814 97th Avenue NE, was constructed in 1987 and serves the primarily residential neighborhood in the southwest corner of the wastewater service area. This is a wetwell/drywell lift station with two pumps, each with a design capacity of 150 gpm at 190 feet discharge head. This station has a 4-inch diameter DI force main with an approximate length of 1,350 LF. It does not have a designated overflow system but does have a secondary wetwell sized for 4 days of storage under average day flow conditions. This station has a portable engine generator connection for backup power.

### Yarrow Bay II Lift Station

Yarrow Bay II Lift Station

The Yarrow Bay II Lift Station, located at 3701 101st Way NE, was constructed in 1995 and serves several multi-family residences in the area. This is a wetwell/drywell lift station with two pumps, each with a design capacity of 125 gpm at 46 feet discharge head. This station has a 4-inch diameter DI force main with an approximate length of 820 LF. This station does not have an overflow. Standby power is provided via an on-site engine generator.

As shown in **Table 2-2**, the drawdown pump tests performed by the City at this lift station indicate the current capacity of each pump is less than the design capacity. The lower pumping rates have not been investigated by the City yet. The lower pumping rates could be due to a number of reasons including, but not limited to, the difference in the pump intake and discharge elevations constructed being greater than what was designed, pump impellors becoming worn, or a restriction or buildup of material in the force main. The City will continue to monitor these pumps and may further investigate this manner if it develops into an issue for this lift station.

### Waverly Park Lift Station

Waverly Park Lift Station

The Waverly Park Lift Station is located at 633 Waverly Park Way and was constructed in 2005. It is located on the western edge of the collection system along Lake Washington. This is a submersible lift station with two pumps, each with a design capacity of 320 gpm at 104 feet discharge head. This station has a 6-inch diameter DI force main with an approximate length of 105 LF. This station does not have an overflow. Standby power is provided via an on-site engine generator. This station also has a portable engine generator connection for backup power.

As shown in **Table 2-2**, the drawdown pump tests performed by the City at this lift station indicate the current capacity of each pump is less than the design capacity. The lower pumping rates have not been investigated by the City yet. The lower pumping rates could be due to a number of reasons including, but not limited to, the difference in the pump intake and discharge elevations constructed being greater than what was designed, pump impellors becoming worn, or a restriction or buildup of material in the force main. The City will continue to monitor these pumps and may further investigate this manner if it develops into an issue for this lift station.

#### Trend Lift Station

The Trend Lift Station, located at NE 112th Street and 132nd Avenue NE, was constructed in 1968 and serves less than 40 residences in the area. This wetwell/drywell lift station is located at the northeastern end of the collection system. The lift station has two pumps, each with a design capacity of 120 gpm at 25 feet of discharge head. This station has a 4-inch DI force main with an approximate length of 1,140 LF. This station has a portable engine generator connection for backup power.

**Trend Lift Station**

The City is developing a plan to abandon the Trend Lift Station in the future. The City would like to replace this lift station with gravity sewer main.

#### Lake Plaza Lift Station

The Lake Plaza Lift Station is located at 70 Kirkland Avenue and was constructed in 1997. This wetwell/drywell lift station has three pumps, each with a design capacity of 750 gpm at 45 feet of discharge head. This station has an 8-inch DI force main with an approximate length of 725 LF. Standby power is provided via an on-site engine generator.

**Lake Plaza Lift Station**

The drawdown pump tests performed by the City at the Lake Plaza Lift Station indicate each pump running individually has a capacity of 801 gpm, and the firm capacity of this lift station with two pumps in operation is 1,157 gpm, as provided in **Table 2-2**. The capacity of this lift station with two pumps in operation is not twice of what it is with one pump in operation because all three of the lift station pumps discharge through the same force main and the friction losses in this force main increase exponentially as the flow rate increases with two pumps in operation.

### *Wastewater Treatment and Disposal Facilities*

The wastewater generated in the City's sewer service area is conveyed to the County's South Wastewater Treatment Plant (South WWTP) through the County's Eastside Interceptor. The County's South WWTP is located at 1200 Monster Road SW, Renton, Washington. This facility is designated as a U.S. Environmental Protection Agency (EPA) major facility due to the magnitude of its daily discharge volume. The South WWTP treats domestic, commercial, and industrial wastewater. It is an activated sludge biological treatment plant that uses chlorine for disinfection. The treated effluent is discharged to the central Puget Sound off the Duwamish Head in West Seattle.

A copy of the current National Pollutant Discharge Elimination System (NPDES) permit for the South WWTP is in **Appendix A**. The City's current agreement with the County (**Appendix B**) does not include any details regarding committed capacity for the City or regulation of flow rates discharged by the City. The City last renewed its agreement in 2014. However, the County is in the process of updating its service agreements with its wholesale sewer customers. The City anticipates it will likely renew its service agreement with the County during the County's current effort to renew contracts.

### Telemetry and Supervisory Control

Successful operation of any municipal sewer system requires gathering and using accurate sewer system information. A telemetry and supervisory control system gathers information and can efficiently control a system by automatically optimizing facility operations. A telemetry and supervisory control system also provides instant alarm notification to operations personnel in the event of equipment failure, operation problem, flood, fire or other emergency situations.

The City completed installation of a supervisory control and data acquisition (SCADA) frame-relay-based telemetry system in the year 2012, which is operated at the City of Kirkland SCADA Telemetry Operations Room. The new frame relay systems are proven to be much more reliable and provide better service than the City's old RUGID system, which operated over the phone lines. Each of the existing lift stations, with the exception of Trend Lift Station, has a remote terminal unit (RTU) compatible with the new SCADA system. The Trend Lift Station has the old RUGID system. These old RUGID system still operates sufficiently, and the telemetry is still functional at Trend Lift Station.

The City is in the process of implementing a SCADA hardware and software replacement program. As part of process, the City's data backup protocol has been updated. The City now has a dedicated off-site server, which is used to store backup data. Only a secured VPN connection is used to access the City's SCADA system remotely.

### Industrial Wastewater Facilities/Characterization

Most of the land zoned for industrial use in the City limits is located along the Cross Kirkland Corridor. At this time, it is not anticipated that any major industrial expansion will occur within the City, and it is anticipated that land zoned for light industrial and office commercial use will replace the existing industrial land use zoning over time. The City's 2015 *Comprehensive Plan* indicates that:

> As new industrial development shifts elsewhere in the region, Kirkland's Light Industry/Office areas will serve two vital roles. First, existing development is in demand for a variety of uses that can be accommodated in the existing building stock. Second, over time, more high-tech companies will locate new development in these areas and benefit from the availability of large parcels with access to the Cross Kirkland Corridor and Eastside Rail Corridor and proximity to vibrant neighborhoods.

A list of the known establishments currently producing industrial wastewater is provided in **Appendix H**. In addition, the letters of authorization and authorization permits, where applicable, for the listed establishments in the City's sewer service area are also provided in **Appendix H**.

### Projects Completed Since the 2010 GSP

The Plan was last updated in the year 2010. The City has undergone several projects since the previous Plan was first prepared in 2008. **Table 2-3** provides a list of the projects that have been completed since the City's previous GSP.

**Table 2-3**
**Collection System Improvement Projects Completed Since 2010 GSP**

| Project | Year | Project Description |
|---|---|---|
| 2007 Emergency Sewer Program | 2008 | Over 4,500 linear feet (lf) of new sewer main installed and 84 new sewer connections provided in the South Rose Hill and Juanita neighborhoods. |
| Developer Contributions | 2008 | Approximately 3,361 lf of sewer main extensions installed. |
| Developer Contributions | 2009 | Approximately 2,920 lf of sewer main extensions installed. |
| 2009 Emergency Sewer Program | 2010 | Approximately 2,350 lf of new sewer main installed and 49 new sewer connections provided in the North Rose Hill and South Rose Hill neighborhoods. |
| Developer Contributions | 2010 | Approximately 1,261 lf of sewer main extensions installed. |
| Developer Contributions | 2011 | Approximately 47 lf of sewer main extensions installed. |
| Sewer Telemetry Upgrades | 2012 | RUGID telemetry system, which operated over a phone line, replaced with a new frame relay SCADA system. |
| Developer Contributions | 2012 | Approximately 1,965 lf of sewer main extensions installed. |
| NE 53rd Street Sewer Main Replacement | 2013 | Approximately 850 lf of sewer main replaced and 2 manholes replaced/rehabilitated along NE 53rd Street between 108th Avenue NE and 111th Avenue NE. |
| Developer Contributions | 2013 | Approximately 2,339 lf of sewer main extensions installed. |
| 2011 Emergency Sewer Program | 2014 | Approximately 3,961 lf of new sewer main installed and 53 new sewer connections provided. |
| Developer Contributions | 2014 | Approximately 2,725 lf of sewer main extensions installed. |

The City has not replaced or eliminated any lift stations since the 2010 GSP was prepared. However, the pumps at the Lake Plaza Lift Station have been replaced with higher capacity pumps since the 2010 GSP was prepared.

The Rose Point Lift Station is almost 40 years old and has insufficient pumping capacity at peak flows during major storm events. In addition, this station includes an overflow system that discharges to Lake Washington. A replacement for the Rose Point Lift Station is currently being designed and is anticipated to be constructed in 2017.

## ADJACENT SEWER SYSTEMS

There are several nearby sewer service systems that are adjacent to the City's sewer service area. The following list includes the nearby wastewater systems.

- City of Bellevue
- City of Redmond
- Northshore Utility District (which provides sewer service to portions of the Cities of Bothell, Kenmore, and Kirkland)
- Woodinville Water District (which provides sewer service to portions of the Cities of Bothell, Kirkland, and Woodinville, and unincorporated King County)

### City of Bellevue

Bellevue is adjacent to the City's sewer service area along the southern boundary. All areas along this boundary are sewered except for the Yarrow Bay Wetlands located near Points Drive and Watershed Park near NE 41$^{st}$ Drive. The City discharges into Bellevue's facilities at three locations: near 116$^{th}$ Avenue NE and NE 39$^{th}$ Street; near Points Drive NE just east of 96$^{th}$ Avenue NE; and near the intersection of NE 41st Drive and 108th Avenue NE near Watershed Park. These Bellevue facilities ultimately transport the wastewater to the County's facilities. Bellevue discharges into the City's facilities at two locations: along NE Points Drive near 103rd Place NE; and along Northup Way just east of 108th Avenue NE. These City facilities ultimately transport the wastewater to the County's Yarrow Bay Lift Station. The agreements between Bellevue and the City are included in **Appendix B**.

### City of Redmond

Redmond is adjacent to the City's sewer service boundary along 132nd Avenue NE. Any extensions adjacent to and along this sewer boundary are coordinated between Redmond and the City. There are currently no connections along this boundary.

Where the City's and Redmond's sewer service areas border each other along 132nd Avenue NE, the City and Redmond are currently discussing an agreement to serve the adjacent sewer system where it is appropriate. The goal of this agreement is to eliminate parallel sewer mains, reduce sewer improvement and maintenance costs, and provide sewer service without installing lift stations where feasible.

### Northshore Utility District

In general, Northshore's service area is north of NE 116th Street. The City discharges to Northshore's facilities at two locations: near NE 124th Street and 116th Avenue NE; and near the intersection of NE 116th Street and 100th Avenue NE. These facilities ultimately transport the wastewater to the adjacent County facilities. Existing agreements between Northshore and the City are included in **Appendix B**.

At the time this GSP was being drafted, the City and Northshore were working on a mutual agreement to have Northshore assume ownership of the NE 124th Street sewer drainage basin. This agreement was completed in 2017. Minor Sewer Drainage Basin No. 32 (**Figure 2-4**) was the only basin transferred to Northshore as part of this agreement.

### Woodinville Water District

Woodinville Water District (WWD) provides water and sewer service to customers in portions of the northeastern section of the City limits. WWD provides sewer service to approximately 126 residential homes and 1 commercial account, and water service to approximately 1,961 residences in the City, according to WWD. Northshore provides sewer service to the City's residents that are located between WWD and the City's sewer service areas. There are currently no connections between WWD and the City's sewer systems and no plans in the near future to connect the two sewer systems.

### King County

The County owns, operates, and maintains three lift stations along the western edge of the City limits. The County also owns associated gravity and collection piping within the City's sewer service boundary and the Eastside Interceptor (72 to 84 inches) located along the Burlington Northern and Santa Fe Railway. The County's Kirkland Lift Station, which was rebuilt in 2014 (**Figure 2-4**), serves a majority of the City's downtown area and is located near the intersection of 3rd Street and Park

Lane. The County's Yarrow Bay Lift Station serves the southwest portion of the wastewater collection system and is located adjacent to Lake Washington Boulevard near Yarrow Bay. The County's Juanita Lift Station serves the northwest portion of the wastewater collection system and is located adjacent to the intersection of NE Juanita Drive and 93rd Avenue NE.

## CITY OF KIRKLAND WATER SYSTEM

### *City of Kirkland*

The City provides water service to customers throughout its corporate limits, except for the Finn Hill, North Juanita, and Kingsgate neighborhoods that were annexed in 2011. The neighborhoods that were annexed by the City in 2011 are served by Northshore and WWD. With the 2013 Totem Valley assumption, the City also serves a small area outside of the City limits in the County in the northeast corner of the water service area. The City's existing water service area boundary encompasses approximately 9.8 square miles. Redmond provides water service to customers generally east of 132nd Avenue NE, and Bellevue serves customers to the south of the City.

This section provides a brief description of the existing water system and the current operation of the facilities. The water service area and system facilities are shown in **Figure 2-6**.

None of the City's wastewater facilities are located adjacent to major drinking water facilities for the City or adjacent drinking water purveyors. As a result of this separation, the City's wastewater facilities are unlikely to conflict with or impact the drinking water facilities or supplies for the City or neighboring purveyors.

#### Pressure Zones

The City serves customers within an elevation range of approximately 20 feet near the shores of Lake Washington to approximately 500 feet in the Bridle Trails area. The wide elevation range requires that the water pressure be increased or reduced to maintain pressures that are safe and sufficient to meet the flow requirements of the system.

#### Supply Facilities

##### *Introduction*

All water in the City's system is currently supplied by the City of Seattle (Seattle) supply system from its Tolt and Cedar River supply pipelines. The City is primarily served with water that originates from the Tolt River System but will on occasion receive water from the Cedar River system. Water supplied to the City from the Cedar River source is expected only during emergency or routine maintenance periods. Water from these sources is delivered to the City in a 48-inch transmission main routed along 132nd Avenue NE. Water is provided to the City's system from this transmission main through three active joint-use facility supply stations.

The City is not aware of any active public springs or wells within the City limits. However, there are a number of private wells adjacent to the City's sewer service area, as shown in **Figure 2-6**.

### *Water Treatment*

All water treatment is currently provided by Seattle. Currently, water treatment for the Tolt River supply includes screening, ozonation, coagulation and flocculation, filtration, chlorination, fluoridation, and corrosion control. The Cedar River supply currently is treated through screening, fluoridation, corrosion control, and disinfection with chlorine. Ozonation and ultraviolet light treatment were added to the Cedar River Treatment Plant in 2004.

## Pump Station Facilities

The City's water system has two booster pump station facilities that provide supply to the 545 and 650 Zones. A summary of the pumping facilities is shown in **Table 2-4** from the City's *Comprehensive Water System Plan*.

**Table 2-4**
**Booster Pump Station Facilities Summary**

| Pump Station | Suction Pressure Zone | Discharge Pressure Zone | Year Constructed | Existing Pumping Capacity | Number of Pumps | Pump Type | Pump Motor Size (hp) | Kirkland Ownership Percentage |
|---|---|---|---|---|---|---|---|---|
| 650 Zone BPS | 545 | 650 | 2004 | 5,250 | 6 | Centrifugal | (4) 75, (2) 25 | 86.0% |
| 545 Zone BPS | 450 | 545 | 1991 | 2,500 | 1 | Vertical Turbine | 30 | 66.0% |

## Storage Facilities

The City's water system has two storage facilities that provide storage to the 450 and 545 Zones. A summary of the storage facilities is shown in **Table 2-5** from the City's *Comprehensive Water System Plan*.

**Table 2-5**
**Storage Facilities Summary**

| Reservoir | Location | Pressure Zone | Year Constructed | Material | Capacity (MG) | Diameter (feet) | Base Elevation (feet) | Overflow Elevation (feet) | Kirkland Ownership Percentage |
|---|---|---|---|---|---|---|---|---|---|
| South Reservoir | 13013 NE 65th Street | 545 | 1971 | Steel | 11.2 | 195 | 495.08 | 545.08 | 57.2% |
| North Reservoir | 10733 132nd Ave NE | 450 | 1994 | Steel | 14.3 | 154 | 347.08 | 450.08 | 66.0% |

## Distribution and Transmission System

The City's water system contains more than 170 linear miles of water main ranging in size from 2 inches to 24 inches. Most of the water main (approximately 54 percent) within the service area is 8 inches in diameter, and an additional 24 percent of the water main is 10 inches in diameter or larger.

All the water main in the City's system is constructed of either asbestos cement, steel, cast iron, concrete, polyvinyl chloride (PVC), galvanized iron, and ductile iron, with 63 percent of the system constructed of ductile iron pipe. All new water main installations are required to use ductile iron pipe in accordance with the City's development and construction standards. Per industry standard, the life expectancy of water main is generally 50 years. At least 24 percent of water main within the system is at least 40 years old and is reaching or has reached its projected life expectancy. The majority of this older water main is asbestos cement or cast iron. The remainder of the water main in the City's water system is primarily 30 years old or less and is generally in good condition.

### *Water System Interties*

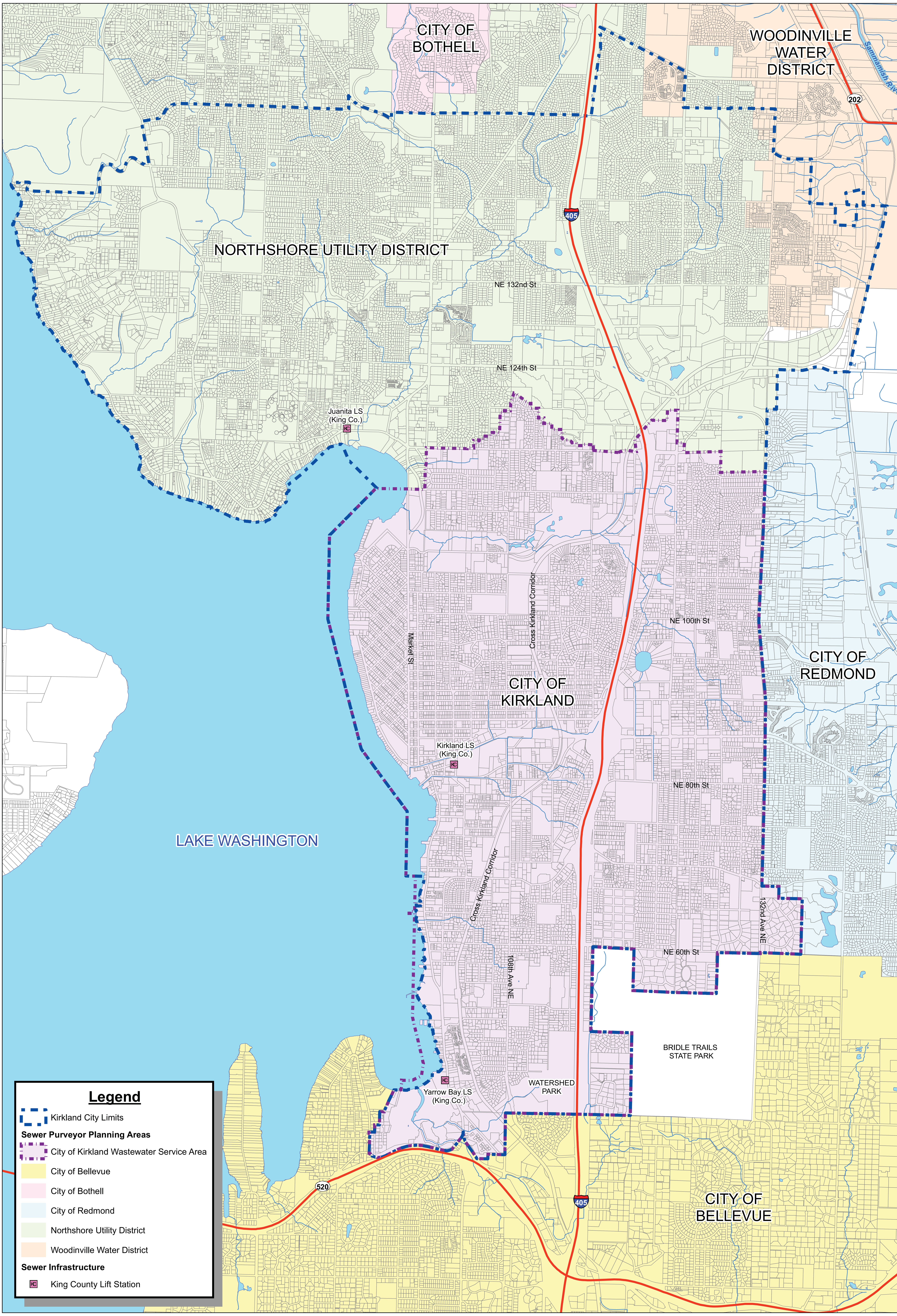
Water system interties are physical connections between two adjacent water systems. Interties are normally separated by a closed isolation valve or control valve. Emergency supply interties provide water from one system to another during emergency situations only. An emergency situation may occur when a water system loses its main source of supply or a major transmission main, or during firefighting situations, and is unable to provide a sufficient quantity of water to its customers. Normal supply interties provide water from one system to another during non-emergency situations and are typically supplying water at all times.

#### Emergency Supply Interties

The City's water system has two emergency interties with Bellevue. One intertie with Bellevue is at approximately NE Northup Way and 104$^{th}$ Avenue NE. The second intertie with Bellevue is at the intersection of 132$^{nd}$ Avenue NE and NE 60$^{th}$ Street.

The City also has two existing emergency interties with Northshore in the Totem Lake area. One intertie is located at the NE Totem Lake Way dead end. The second intertie is located at approximately NE 118$^{th}$ Street and 115$^{th}$ Avenue NE.

**THIS PAGE INTENTIONALLY LEFT BLANK**




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,400 feet

0 700 1,400 2,800 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

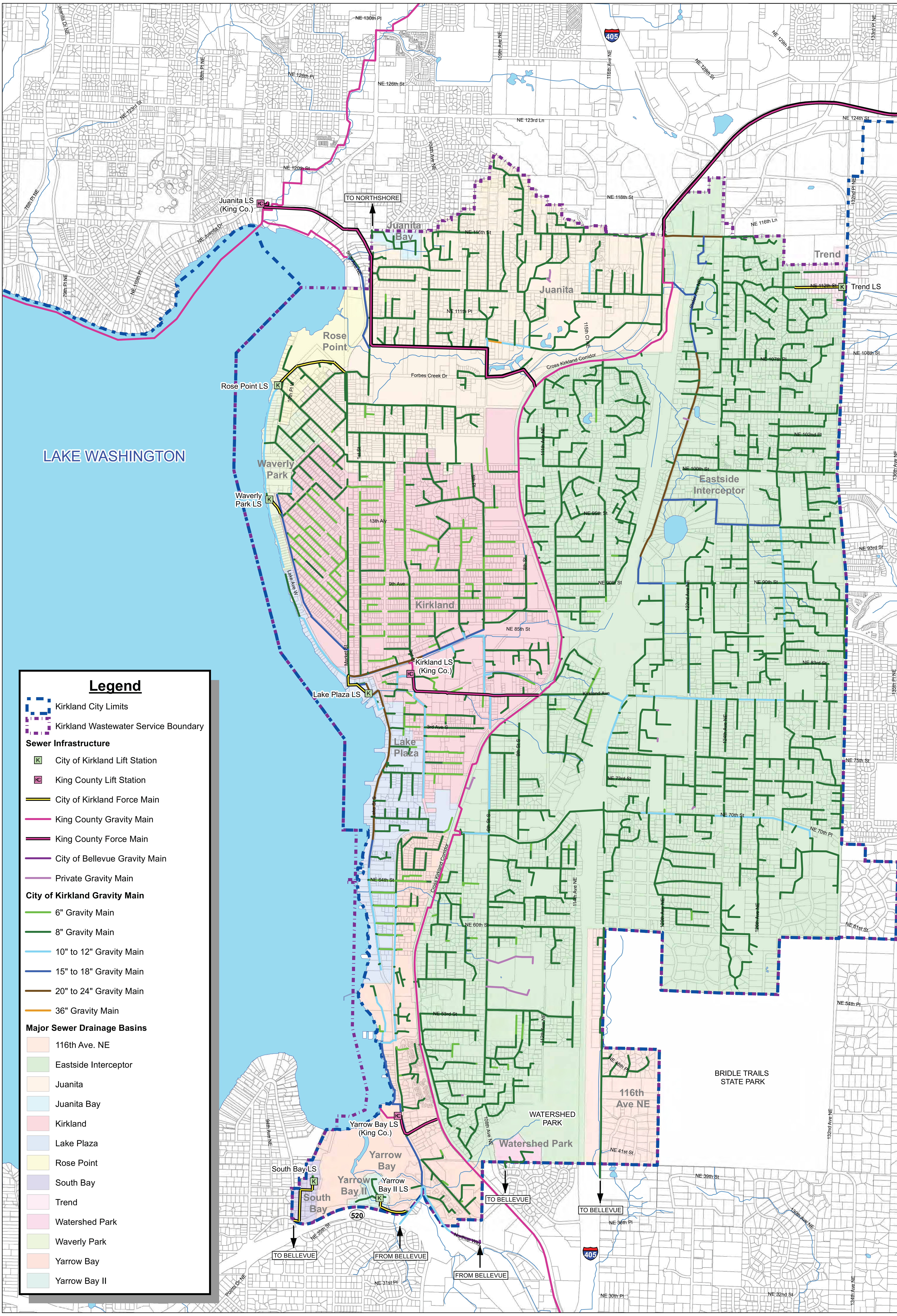
# Figure 2-1
## Sewer Service Area
## *City of Kirkland General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

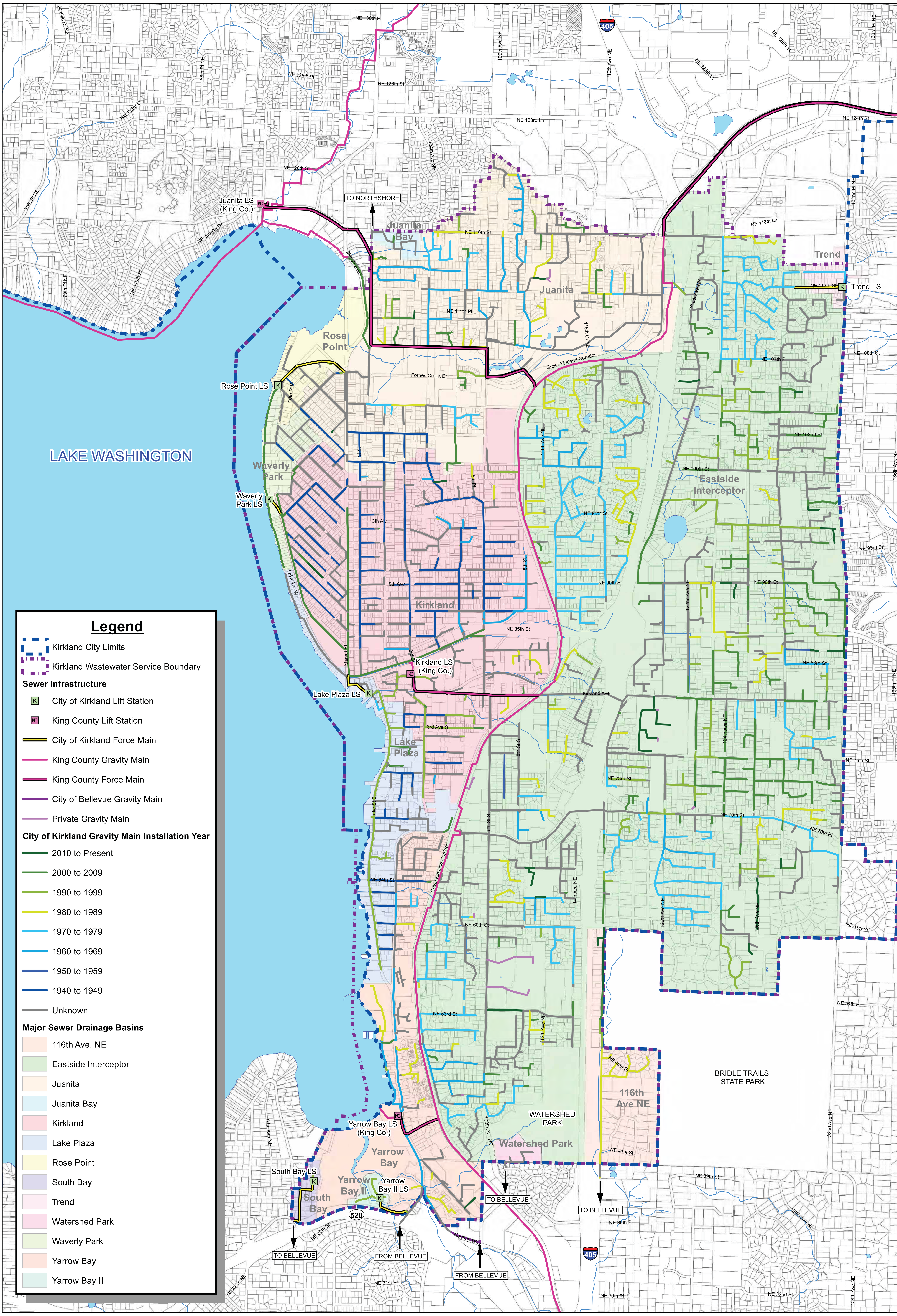
# Figure 2-2
# Existing Sewer System
## City of Kirkland
## General Sewer Plan

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

E-Page 210




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2 | NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

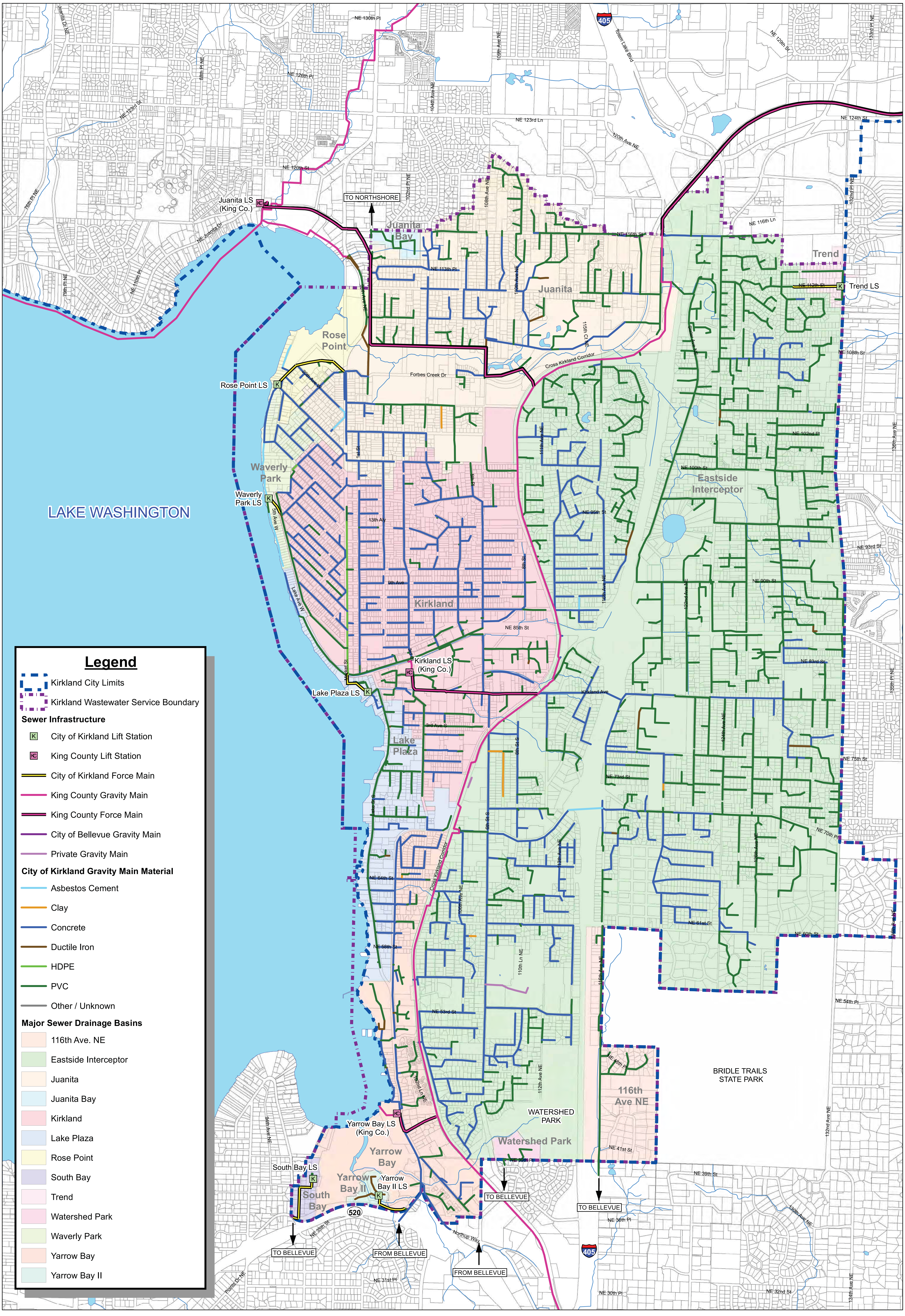
CITY OF KIRKLAND WASHINGTON

# Figure 2-3A
# Existing Sewer Main Age
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

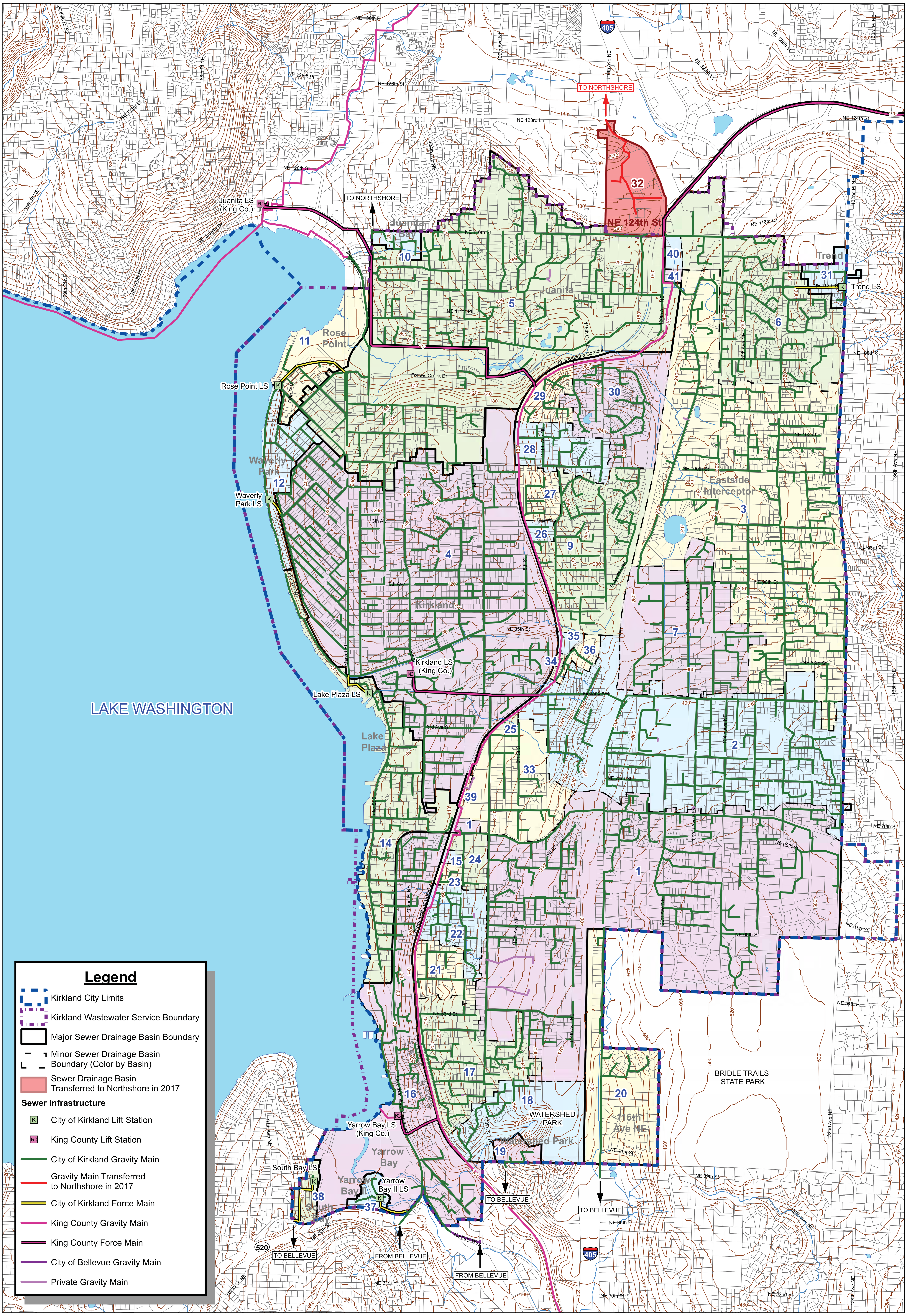
CITY OF KIRKLAND WASHINGTON

# Figure 2-3B
# Existing Sewer Main Material
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

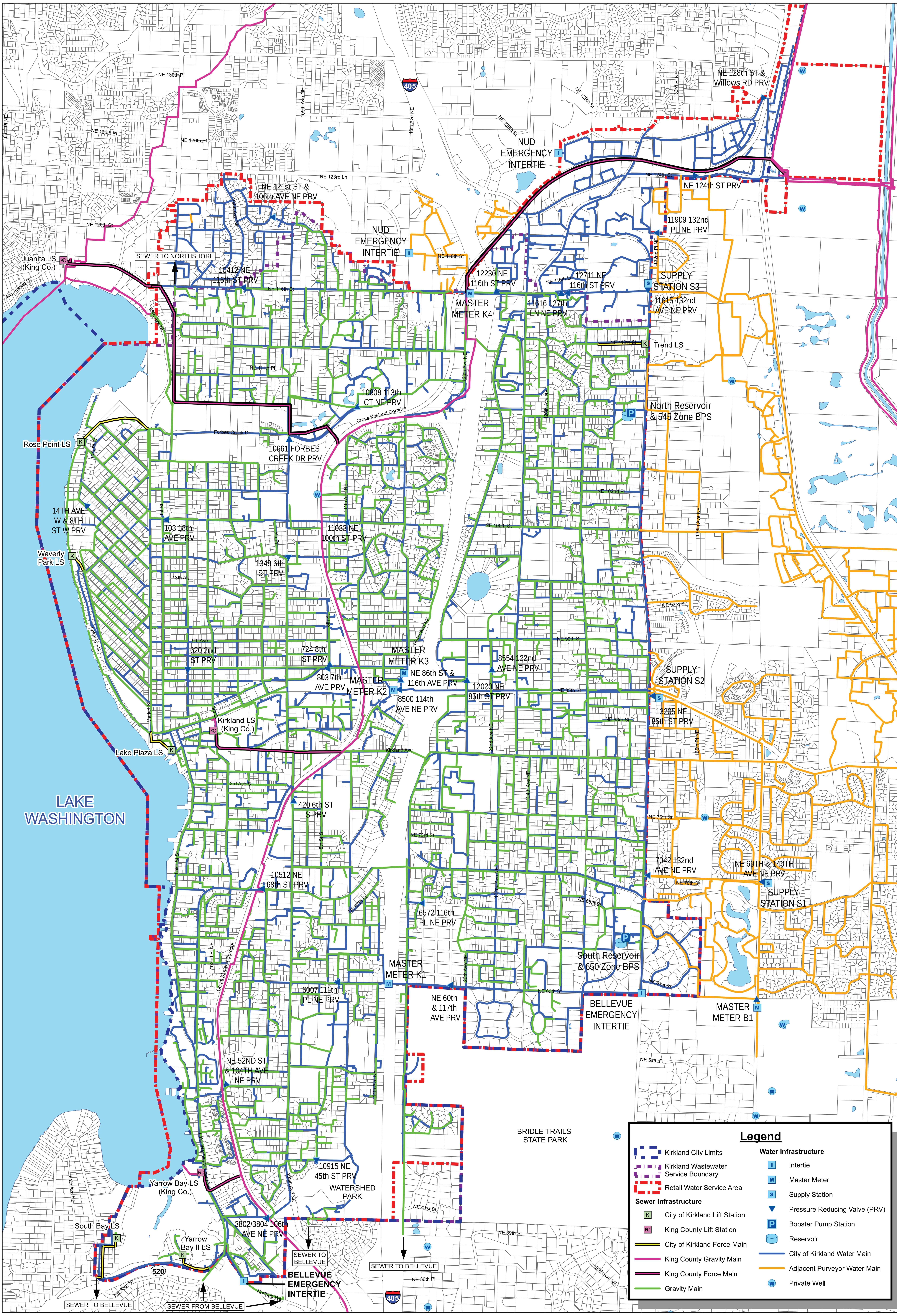
# Figure 2-4
## Minor Sewer Drainage Basins
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

# Figure 2-6
# Existing Water and Sewer Systems
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.

# Land Use and Population

3

## INTRODUCTION

The City of Kirkland's (City) *Comprehensive Plan* was originally prepared in 1977 and was last updated in 2015. The *Comprehensive Plan* underwent a major revision in 1995 to meet the requirements of the State of Washington Growth Management Act (GMA) and again in 2004 to meet updated requirements of GMA legislation. The City annually updates its *Comprehensive Plan* to ensure that it reflects the current issues of the City. The GMA requires, among other things, consistency between land use and utility plans and their implementation. This chapter demonstrates the compatibility of the General Sewer Plan (GSP) with other plans; identifies the designated land uses within the existing and future service area; and presents population projections within the City's planning area.

## COMPATIBILITY WITH OTHER PLANS

### *Introduction*

To ensure that this GSP is consistent with the land use policies that guide it and other related plans, the following planning documents were examined.

- Growth Management Act
- City of Kirkland *Comprehensive Plan*
- King County *Comprehensive Plan*
- King County *Countywide Planning Policies*
- King County *Regional Wastewater Services Plan*
- City of Bellevue *Wastewater System Plan*
- City of Redmond *General Sewer Plan*
- Northshore Utility District *Wastewater Comprehensive Plan*

### *Growth Management Act*

The State of Washington GMA of 1990 (and its multiple amendments) defined four goals relevant to this GSP:

1. Growth should be in urban areas;
2. There should be consistency between land use and utility plans and their implementation;
3. There should be concurrency of growth with public facilities and services; and
4. Critical areas should be designated and protected.

#### **Urban Growth Area**

The GMA requires that King County (County) and the City cooperate in designating an Urban Growth Area (UGA). As part of the development of its 1995 *Comprehensive Plan*, the City designated a UGA and planned for the population (determined by the number of new housing units) and employment growth targets established by the County Growth Management Planning Council. In

2011, the City annexed its designated UGA and no longer has a planning area beyond the City's corporate limits.

### Consistency

The GMA requires planning consistency from two perspectives. First, it requires consistency of plans among jurisdictions. This means that plans and policies of the City and County must be consistent per the Revised Code of Washington (RCW) 36.70A.100. Second, the GMA requires the implementation of the plan be consistent with the comprehensive plans (RCW 36.70A.120).

The City has several interlocal agreements with the Cities of Redmond (Redmond) and Bellevue (Bellevue), Northshore Utility District (Northshore), and the County. The GSP must be consistent with these agencies planning documents; therefore, the sewer planning documents for these agencies have been reviewed for consistency with this GSP.

### Concurrency

Concurrency means that adequate public facilities and services are provided at the time growth occurs. For example, growth should not occur where schools, roads, and other public facilities are overloaded. To achieve this objective, the GMA directs growth to areas already served or readily served by public facilities and services (RCW 36.70A.110). It also requires that when public facilities and services cannot be maintained at an acceptable level of service, new development should be prohibited (RCW 36.70A.110).

### Critical Areas

The GMA requires that critical areas be designated and protected. Critical areas include fish and wildlife habitat, flood zones, aquifer recharge areas, streams, creeks, rivers, lakes, wetlands and other surface water, and geologic hazard areas, such as steep slopes and liquefaction zones. The State Environmental Policy Act (SEPA) Checklist in **Appendix C** addresses other environmental concerns.

## *City of Kirkland Comprehensive Plan*

The City's *Comprehensive Plan* establishes a vision, goals and policies, and implementation strategies for managing growth. The City's *Comprehensive Plan* recently underwent a significant update which was adopted in 2015. The 2015 *Comprehensive Plan* is the vision for the City from 2015 through 2035.

The Land Use Element of the City's *Comprehensive Plan* is the City's vision of how growth and development should occur over a 20-year horizon. While the Land Use Element goals and policies set forth general standards for locating land uses, the Land Use Map, which has been reproduced and is shown in **Figure 3-1**, indicates geographically where certain types of uses may be appropriate. The Land Use Element articulates many of the same goals and concerns of the GMA. Like the GMA, the Land Use Element seeks to accommodate population and employment growth while maintaining the City's residential character and protecting environmentally sensitive areas. It seeks to promote a strong local economy and vital commercial and industrial districts by focusing economic development within them and establishing development regulations. The utilities, public services, and capital facilities elements ensure that new development will be adequately serviced without compromising existing levels of service, similar to the principal of concurrency as defined in the

GMA. The City's GSP is reviewed and taken into consideration during the development of and subsequent revisions to the Utilities and Capital Facilities Elements of the Comprehensive Plan.

Since the 2011 *Comprehensive Plan*, the City has annexed several surrounding areas and increased its size to approximately 11,700 acres, or 18.2 square miles. The City annexed the Bridleview neighborhood, which only included lots on septic systems. The annexation of the City's UGA, which included the Finn Hill, North Juanita, and Kingsgate neighborhoods, with approximately 31,000 people, increased the City's population to approximately 81,480 in 2012. Although the area of the City and the associated population increased with this annexation, Northshore continues to provide sewer service to the annexation area; therefore, the City's sewer service area did not expand with these annexations.

Some undeveloped lots still exist throughout the City limits, and infilling is expected and encouraged in these areas. The City will be capable of accommodating housing and employment growth projections of 8,361 residential units and employment of 22,435 jobs within the City limits by 2035, according to the land capacity analysis prepared for the 2015 *Comprehensive Plan*. The future Totem Lake Urban Center is expected to be the major growth center and is currently served by Northshore.

### King County Comprehensive Plan

The County's *Comprehensive Plan,* which was lasted updated in December 2016, provides a legal framework for managing growth and making decisions regarding land use in unincorporated King County. The wastewater collected within the City's sewer service area is conveyed to the County's Eastside Interceptor and South Treatment Plant for treatment (see **Chapter 2** for additional information).

### King County Countywide Planning Policies

The County Council adopted the *Countywide Planning Policies* (CPPs) in July 1992. The policies have been amended several times since, with the last amendment occurring in December 2012. The CPPs serve as the framework for the County's and cities' own comprehensive plans, including the City's *Comprehensive Plan*. Consistent with the GMA's goals, the CPPs establish UGAs within the County to encourage growth in urban areas. The CPPs also guide development in rural, unincorporated King County. Similar to the City's *Comprehensive Plan*, the County's policy goals seek to reduce urban sprawl, protect rural areas, provide affordable housing throughout the County, and coordinate protection of environmentally sensitive areas.

### King County Regional Wastewater Services Plan

The County's Regional Wastewater Services Plan (RWSP) was developed based on input from citizens, stakeholders, and the County's Regional Water Quality Committee and adopted in November 1999. The RWSP has been amended serval times since it was adopted and was last updated in May 2013.

The purpose of the RWSP is to protect public health and the environment by conveying wastewater, treating wastewater, reclaiming wastewater, and recycling biosolids for residents in the County's wastewater service area. Among its many objectives, he RWSP aims to meet these goals while meeting regulatory requirements and maximizing the public's existing investment in the wastewater system.

### City of Bellevue Wastewater System Plan

Bellevue is adjacent to the City's sewer service area along the southern boundary. The City discharges into Bellevue's facilities at three locations: near 116th Avenue NE and NE 39th Street; at the cul-de-sac on NE 39th Place just north of 111th Avenue NE; and on Points Drive NE just east of 92nd Avenue NE. These Bellevue facilities ultimately transport the wastewater to the County's facilities. Bellevue discharges into the City's facilities at two locations: along NE Points Drive near 103rd Place NE; and along Northup Way just east of 108th Avenue NE. These City facilities ultimately transport the wastewater to the County's Yarrow Bay Lift Station. The agreements between Bellevue and the City are included in **Appendix B**.

### City of Redmond General Sewer Plan

Redmond is adjacent to the City's sewer service boundary along 132nd Avenue NE. Any extensions adjacent to and along this sewer boundary are coordinated between Redmond and the City.

### Northshore Utility District Wastewater Comprehensive Plan

Northshore serves some areas within the City from NE 145th Street south to the Northshore corporate boundary. The City currently discharges to Northshore's facilities at one location near the intersection of NE 116th Street and 100th Avenue NE. The City used to discharge to Northshore's facilities at another location (near NE 124th Street and 116th Avenue NE) as well, but this area was transferred to Northshore in 2017, as discussed in **Chapter 2**. These Northshore facilities ultimately transport the wastewater to the adjacent County facilities. Existing agreements between Northshore and the City are included in **Appendix B**.

## LAND USE

The City limits currently encompass an area of approximately 11,700 acres, as shown in **Figure 2-1**. The City's sewer service area, at approximately 5,630 total acres, is considerably smaller than the City limits. Northshore provides a majority of the sewer service in the northern portion of the City limits.

The City's land use designations, as shown in the Land Use Map on **Figure 3-1**, guide City development. **Figure 3-1** represents the future land uses in the City, with the exception of future changes in land use as a result of City-initiated neighborhood plan updates and private citizen requests.

The area served by the City is a mix of residential and commercial uses, comprised largely of single-family residents, as shown on **Figure 3-1** and **Table 3-1**. Approximately 64 percent of the land area within the sewer service area is currently designated for single-family residential use (or low density residential); approximately 10 percent is designated for multi-family residential use (or medium/high density residential); approximately 11 percent is designated for park or open space use; approximately 7 percent is designated for commercial use; approximately 5 percent is designated for office commercial use; approximately 2 percent is designated for industrial use; approximately 1 percent is designated for institutional use; and less than 1 percent is designated for transit oriented development. Multi-family residential, commercial, and industrial development is concentrated in several areas throughout the City, primarily along Interstate 405 and Lake Washington.

**Table 3-1**
**Land Use Designations**

| Land Use Type | Existing Sewer Service Area |
|---|---|
| Single-family Residential (Low Density Residential) | 64.2% |
| Multi-family Residential (Medium/High Density Residential) | 10.4% |
| Park/Open Space | 10.7% |
| Commercial | 6.8% |
| Office Commercial | 4.5% |
| Industrial | 2.2% |
| Institutions | 1.1% |
| Transit Oriented Development | 0.1% |
| **Total** | **100.0%** |

## POPULATION

### *Household Trends*

The City is primarily residential, comprised of a nearly even split of single-family and multi-family residents. In 2010, approximately 50 percent of the residential units were single-family, and 50 percent were multi-family. Between 2000 and 2010, the City experienced a 9 percent increase in multi-family housing units and an 8 percent increase in single-family housing units. The City's trend toward developing more multi-family units than single-family units and mixed-use development is expected to continue through buildout.

The average household size in the City for 2008 through 2014 was 2.15 persons per household. The average household size in all the County was 2.39 persons per household. The lower average household size in the City reflects the higher percentage of multi-family homes in the City's community.

For the City, the average household size for owner-occupied units in 2014 was 2.3, and the average household size for renter-occupied units was 1.94.

The following household sizes were provided by the City's subconsultant, BERK, Inc., for the 2015 to 2035 projections.

- Average household size = 2.04
- Single-family household size = 2.73
- Multi-family household size = 1.83

The average household size of 2.04 was used for this GSP update for the 2015 to 2035 projections, which is a weighted average that is based on more future multi-family growth.

## Existing and Future Population

The County has continued to experience steady population growth and additional physical developments in recent years. The population of East King County increased by more than 15 percent from 2000 to 2009. The population of the City increased approximately 8 percent during the same period. Because the City is already highly developed, population growth since 2010 is largely due to redevelopment, which explains the lower growth rate compared to the County as a whole. Prior to this, the City's population steadily increased as new areas were annexed and development occurred. **Table 3-2** illustrates the historical population growth since 1910. The Bridleview annexation of 2009, and the Finn Hill, North Juanita, and Kingsgate annexations of 2011 are included as of 2012. The Washington State Office of Financial Management (OFM) reported the City's population in 2014, with the annexations, was 82,590 people.

**Table 3-2**
**Population Trends within City Limits**

| Year | Population[1] |
|---|---|
| **Historical** | |
| 1910 | 532 |
| 1920 | 1,354 |
| 1930 | 1,714 |
| 1940 | 2,048 |
| 1950 | 4,713 |
| 1960 | 6,025 |
| 1970 | 15,070 |
| 1980 | 18,785 |
| 1990 | 40,052 |
| 2000 | 45,054 |
| 2010 | 48,787 |
| 2011 | 49,020 |
| 2012 | 81,480 |
| 2013 | 81,730 |
| 2014 | 82,590 |

NOTE:
1. The historical population represents the population within the City limits per OFM data. The 2010 and 2011 populations do not reflect the annexations of Bridleview (2009) or Finn Hill, North Juanita, and Kingsgate (2011). Annexation populations are included in 2012 through 2014.

The historical population data shown in **Table 3-2** represents the population within the established City limits for each year. The recent 2009 and 2011 annexations are included in the population data as of 2012.

The population projections shown in **Table 3-3** represent the City's growth target for new housing units based on the City's Planning Department projections on future growth trends and household size, the County's Growth Management Planning Council under the authority of the GMA, and the County's CPPs.

**Table 3-3**
**Population Projections**

| Year | City Population | Sewer Service Area Population[1,2] | Commercial Connections |
|---|---|---|---|
| 2014 (Existing) | 82,590 | 29,481 | 608 |
| 2021 (+6 years) | 87,260 | 32,141 | 699 |
| 2025 (+10 years) | 89,793 | 34,095 | 757 |
| 2035 (+20 years) | 95,913 | 38,981 | 902 |

NOTES:
1. Existing multi-family residential population in the sewer service area estimated based on average single-family residential winter water consumption per connection and total multi-family residential winter water consumption.
2. Projected sewer service area population includes an estimated 34 septic system conversions per year.

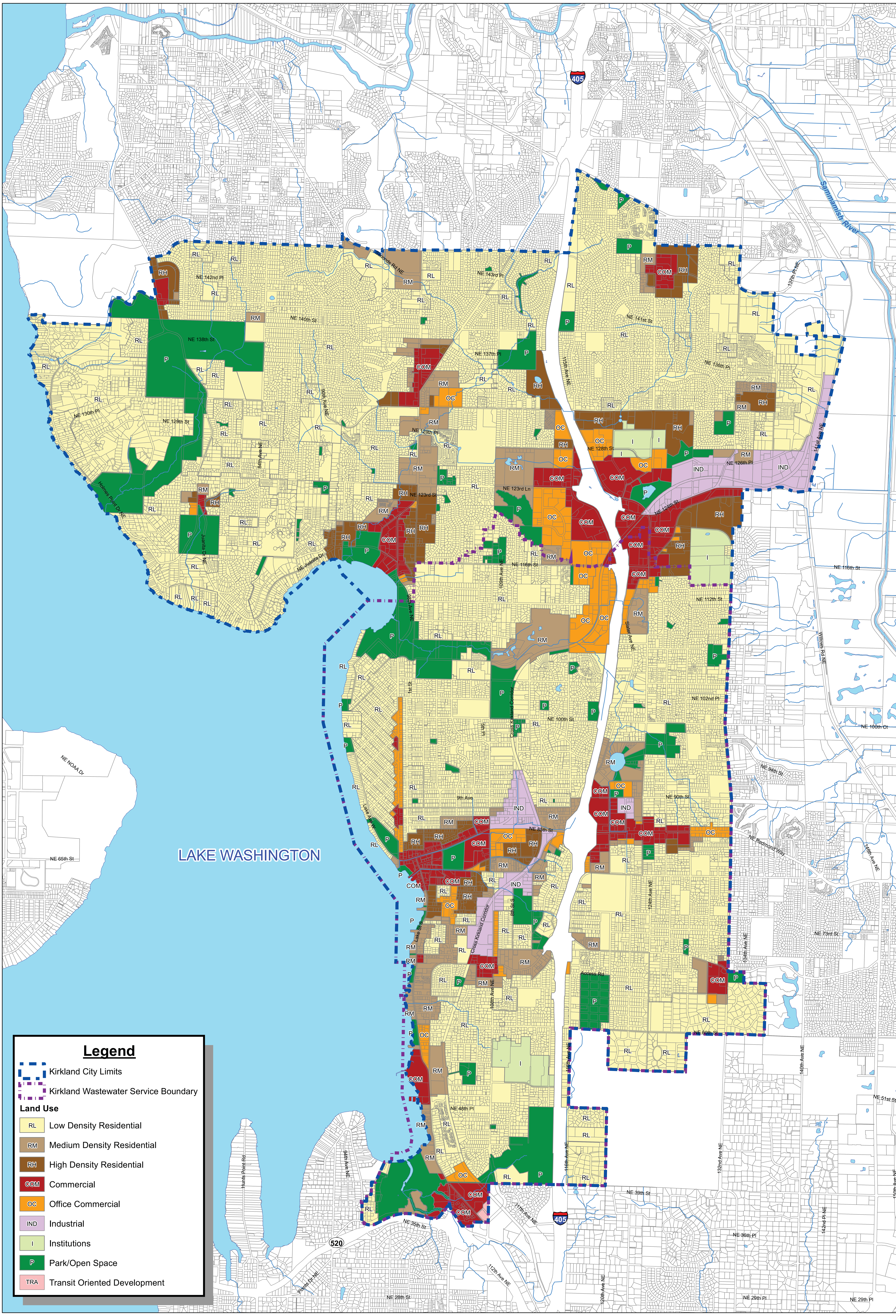
The existing sewer service area population, shown in **Table 3-3**, was calculated by using the total number of existing single-family and multi-family housing units and the average household size in the City for 2008 through 2014 of 2.15 persons per household). The existing number of multi-family housing units served by the City's sewer system was estimated based on average single-family residential winter water consumption per connection and total multi-family residential winter water consumption, discussed further in **Chapter 4**.

The existing and projected future single-family and multi-family housing units for each of the City's Traffic Analysis Zones (TAZ), shown in **Figure 3-2**, and development projects, currently under permit review or undergoing construction, were used to determine the projected future sewer service area populations and locations. The number of projected future housing units from the TAZs, combined with the projected average household size of 2.04 persons per household, determined the projected future sewer service area population. In addition, City staff provided the planning-level estimate of septic system connections per year based on historical data (**Appendix D**). This is included in the estimated sewer service area population. **Table 3-3** shows the projected future population growth of the City and the City's sewer service area. The City's population is expected to increase by 9.9 percent between 2021 and 2035, which translates to an average annual growth rate of approximately 0.7 percent.

The existing and projected future employees for each of the City's Traffic Analysis Zones (TAZ), shown in **Figure 3-2**, and development projects, currently under permit review or undergoing construction, were used to determine the projected future sewer service area employees, commercial connections (**Table 3-3**), and locations.

These population and employee projections, along with the historical wastewater flow and average winter water consumption data presented in **Chapter 4**, form the basis for determining the future needs of the City's sewer system. This analysis and the results are presented in **Chapter 4**.

At the time this GSP was being drafted, the City and Northshore were working on a mutual agreement to have Northshore assume ownership of the NE 124th Street sewer drainage basin. For the purposes of this GSP, the NE 124th Street sewer drainage basin was included in the City's sewer service area for all projections.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 1,500 feet

0 750 1,500 3,000 Feet

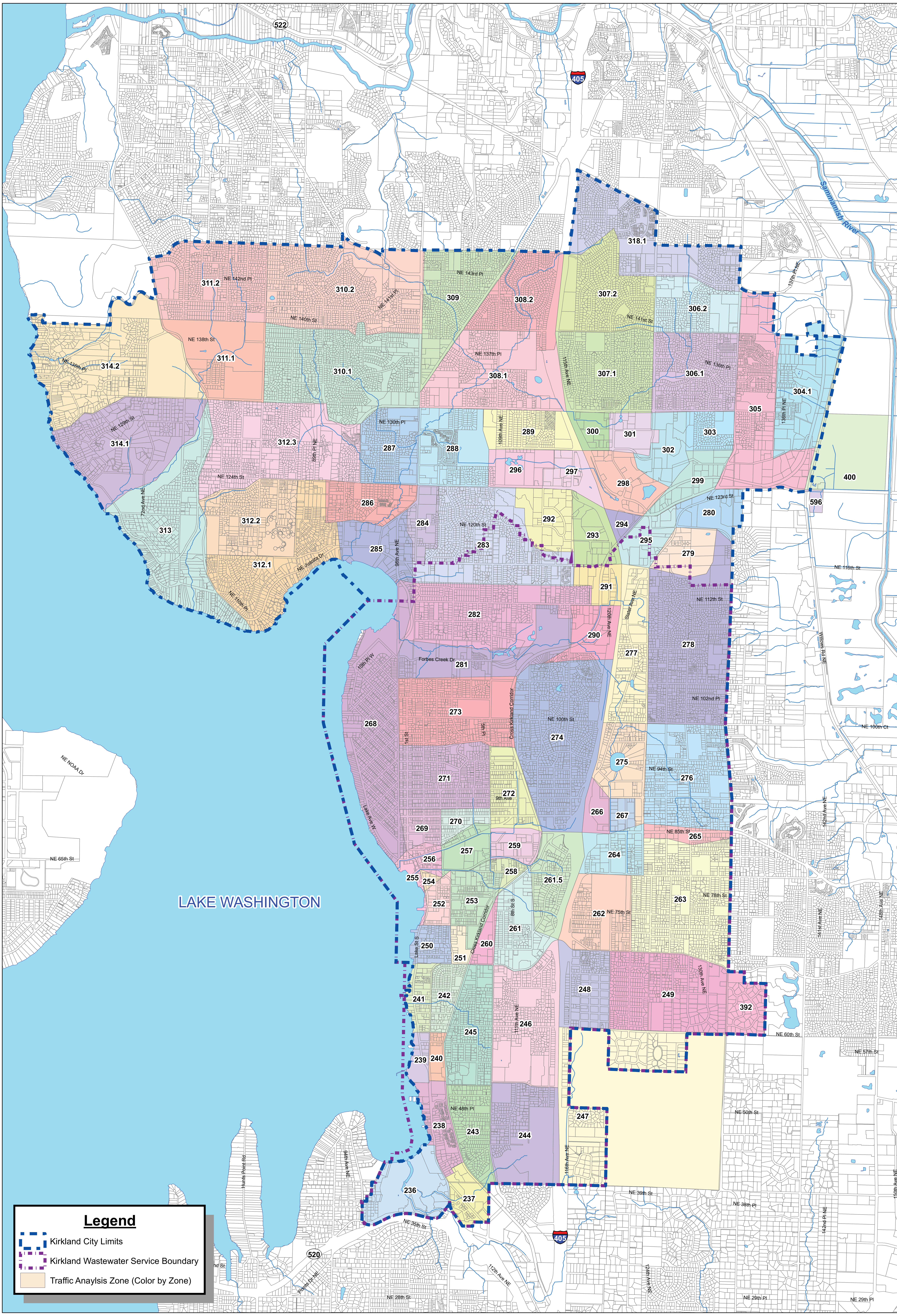
DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

# Figure 3-1
# Land Use
## City of Kirkland
## General Sewer Plan

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,500 feet

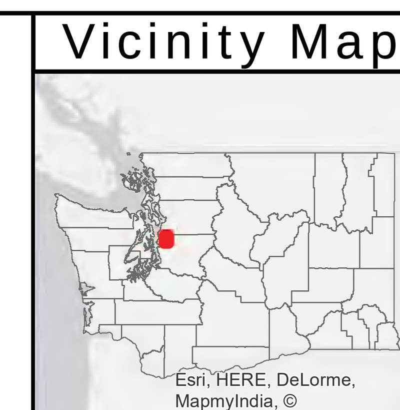
0 750 1,500 3,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

# Figure 3-2
# Traffic Analysis Zones
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map




This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.

# Flow Analysis

4

## INTRODUCTION

A detailed analysis of flow and loading is crucial to the planning efforts of a sewer service provider. When analyzing a sewer system, the first step is to identify current flows to determine if the existing system can provide adequate service to its existing customers under the most crucial conditions in accordance with federal and state laws. A future sewer system analysis identifies projected flow to determine where the system will need to be improved to satisfy future growth while continuing to meet federal and state laws.

Flows in a sewer system are used to determine the size of gravity collection piping, lift station facilities, and force main piping needed. Several different flow scenarios were analyzed for the City of Kirkland's (City) sewer system and are addressed in this chapter, including average annual flow, peak hour flow, and projected future flows. Existing and projected equivalent residential units (ERUs), existing and projected infiltration and inflow, and peaking factors are also presented.

## EXISTING AND PROJECTED SEWER SERVICE POPULATION

### *King County Wastewater Treatment Division Flow Forecasts*

The King County Wastewater Treatment Division (KCWTD) prepared an *Updated Planning Assumptions for Wastewater Flow Forecasting* document in July 2014. The purpose of this document was to update future flow forecasts to ensure that KCWTD's regional wastewater system keeps pace with growth and protects public health, the environment, and the economy. The KCWTD sewer model included information contained in the local agency sewer comprehensive plans in the KCWTD regional sewer service area, population and growth forecasts from the Puget Sound Regional Council (PSRC), flow and rainfall data, land use and topography, water consumption data, and planning assumptions. The KCWTD sewer models are calibrated approximately every 10 years, with the last update occurring in 2010.

As part of the update, KCWTD collected and reviewed indoor water consumption data for the major water purveyors in the KCWTD regional service area. Residential consumption was estimated to be 54 gallons per capita per day (gpcd), commercial was 18 gallons per employee per day (gped), and industrial was 45 to 56 gped for outside the Seattle area. A 10-percent reduction in water consumption was assumed between 2010 and 2030. KCWTD also assumed a 20 percent per decade conversion of septic users to municipal sewer systems.

In addition, KCWTD updated its model basin inflow and infiltration (I/I) rates based on flow data collected during the 2009 through 2011 Decennial Flow Monitoring. Peak hour I/I for new construction was adjusted to a rate of 2,000 gallons per acre per day (gpad), and peak hour I/I for existing and new construction was determined to increase at a degradation rate of 7 percent per decade.

The information contained in KCWTD's *Updated Planning Assumptions for Wastewater Flow Forecasting* document and determined from the 2009 through 2011 Decennial Flow Monitoring as part of the *Regional Inflow and Infiltration Program* was taken into consideration and used when there was a lack of City specific data, such as with I/I rates.

### City of Kirkland Sewer Service Population

As presented in **Chapter 3**, the estimated population within the City limits was 82,590 in 2014, and the sewer service area population is estimated to be 29,481.

The sewer service population is based on a 2014 average household size of 2.15 for both single-family and multi-family households, based on data provided by the City's consultant, BERK, Inc. that is assisting with the City's 2015 *Comprehensive Plan*. The existing number of single-family housing units served by the City's sewer system was estimated based on the existing number of connections. The existing number of multi-family housing units served by the City's sewer system was estimated based on the average winter water consumption (AWWC) per single-family residential connection and the total multi-family residential AWWC. For the purposes of this General Sewer Plan (GSP), it was assumed that single-family and multi-family households have the same amount of AWWC. AWWC was used to determine the existing wastewater flows in the City's sewer system, which is described further in the **Existing Wastewater Flow** section.

The City's wastewater collection service area is considerably smaller than the City limits. Northshore Utility District provides a majority of the sewer service in the northern portion of the City limits. The City's wastewater service area is not expected to expand in the future, and the population increase in the City's wastewater service area will be attributed to redevelopment with higher densities and in-fill.

It is estimated that there are 785 parcels in the City's sewer service area that have a septic system. Once these systems fail, the City's code requires that the homeowners connect to the City's municipal wastewater system if the parcel is located within 330 feet of an existing sewer main. For planning-level purposes, it is estimated by City staff that approximately 34 parcels per year will convert from septic systems to connect to the City's sewer system, based on historical permitting data. This was included in the future sewer population projections.

As noted in **Chapter 3**, the City is planning for a 2035 City population of 95,913. The estimated sewer service area population in 2035 is anticipated to be 38,981, which is approximately 41 percent of the projected City population. In addition, the commercial connections are expected to increase from 608 in 2014 to 902 in 2035.

## EXISTING WASTEWATER FLOW RATES

Existing wastewater flow rates were determined by compiling historical winter water consumption data for each connection currently being served by the City's sewer collection system. For billing purposes, the City calculates an AWWC value for each single-family residence connected to the sewer collection system. AWWC is defined as the average water consumption for each connection observed over the 7-month period between November 1$^{st}$ and May 31$^{st}$. The AWWC was calculated for each sewer service connection using the City's methodology and used to determine the existing domestic average annual flow (AAF) in the City's sewer collection system. The AWWC provides a good estimate of wastewater flows under existing conditions since it can be assumed that nearly all of the water used is discharged into the wastewater system, as there is minimal, if any, irrigation that occurs between November 1$^{st}$ and May 31$^{st}$. Although the City only utilizes AWWC values for determining sewer rates for single-family residential connections, this

GSP utilized AWWC flow rates for all sewer service connections to be consistent with estimating the domestic AAFs.

The City's methodology for calculating AWWC incorporates water consumption data over a 7-month period; however, water consumption is currently billed every 2 months. The result is that the AWWC for customers receiving bills in odd months (January, March, etc.) will include four meter readings between October and May, and customers receiving bills in even months (February, April, etc.) will include three meter readings between November and April. Despite potential errors caused by this method of calculating AWWC, the provided consumption data was the most accurate data available, and this AWWA calculation method, consistent with the City's billing rate calculations for single-family residential sewer connections, was used for the flow analyses presented in this chapter. To be conservative, the AWWC was used to estimate the domestic AAF for the year that the 7-month period began in (i.e., the AWWC calculated for the 7-month period between November 1, 2012, and May 31, 2013, was used for the 2012 domestic AAF).

The City's water consumption data included information for single-family residential connections with septic systems. These customers were billed for water consumption but were excluded from sewer billing rates. These connections were excluded from estimating the domestic AAF in the sewer system but were incorporated into future flow projections.

The 2014 domestic AAF for all residential connections was 1.87 million gallons per day (MGD) or 63 gpcd. The value does not include infiltration and inflow, wastewater generated by commercial customers, or discharge factors (percent of drinking water consumption that is recovered as wastewater in the sewer system). For comparison, the King County *Updated Planning Assumptions for Wastewater Flow Forecasting* estimated the flow for residential customers to be 54 gpcd, which included a discharge factor of 0.8 or 0.9 depending on the data source.

**Table 4-1** summarizes the estimated domestic AAF by class and total domestic AAFs to King County's Eastside Interceptor for 2012 through 2014.

## Table 4-1
## City's Historical Wastewater Flows

| Description | Year 2012 | Year 2013 | Year 2014 | Average (2012 - 2014) |
|---|---|---|---|---|
| **Single-family Accounts** | | | | |
| Sewer Accounts (ERUs) | 9,002 | 9,075 | 9,206 | 9,094 |
| Sewer Population | 19,354 | 19,511 | 19,793 | 19,553 |
| Domestic AAF (gpd) | 1,349,912 | 1,223,743 | 1,255,936 | 1,276,530 |
| **Multi-family Accounts** | | | | |
| Sewer Accounts | 624 | 621 | 619 | 621 |
| Sewer ERUs | 3,910 | 4,301 | 4,506 | 4,239 |
| Sewer Population[1] | 8,407 | 9,248 | 9,689 | 9,115 |
| Domestic AAF (gpd) | 586,398 | 580,009 | 614,773 | 593,727 |
| **Total of Residential Accounts** | | | | |
| Domestic AAF (gpd) | 1,936,309 | 1,803,752 | 1,870,709 | 1,870,257 |
| Sewer Accounts | 9,626 | 9,696 | 9,825 | 9,716 |
| Sewer ERUs | 12,912 | 13,376 | 13,712 | 13,334 |
| Sewer Population[1] | 27,762 | 28,759 | 29,481 | 28,667 |
| Domestic AAF per ERU (gpd per ERU) | 150 | 135 | 136 | 140 |
| Domestic AAF per Capita (gpcd) | 70 | 63 | 63 | 65 |
| **Commercial Accounts** | | | | |
| Domestic AAF (gpd) | 497,168 | 474,588 | 541,418 | 504,392 |
| Sewer Accounts | 611 | 612 | 608 | 610 |
| Sewer ERUs | 3,315 | 3,519 | 3,969 | 3,601 |
| Employees[2] | 30,124 | 37,981 | 30,124 | 32,743 |
| Domestic AAF per Employee (gped)[3] | 17 | --- | 18 | 17 |
| **Total** | | | | |
| Domestic AAF (gpd) | 2,433,477 | 2,278,341 | 2,412,128 | 2,374,648 |
| Sewer Accounts | 10,237 | 10,308 | 10,433 | 10,326 |
| Sewer ERUs | 16,228 | 16,896 | 17,681 | 16,935 |
| Domestic AAF per ERU (gpd per ERU) | 150 | 135 | 136 | 140 |

NOTES:
1. Existing multi-family residential population in the sewer service area is estimated based on average single-family residential winter water consumption per connection and total multi-family residential winter water consumption.
2. No data is available for the number of employees in the City's sewer service area in 2013 or 2014. The number of employees in 2013 are the employees in the City limits, which include the annexation areas that are not in the City's sewer service area. The number of employees in 2014 are assumed to be the same as 2012 since there was a slight decrease in the number of commercial accounts.
3. Domestic AAF per employee was not determined for 2013 because accurate information is not available for the number of employees in the City's sewer service area for 2013.

Based on the limited data available, the trend appears to be a decrease in single-family flows with an increase in multi-family flows. This could indicate the direction of the City's growth, with more multi-family units being developed compared to single-family homes.

An estimation of wastewater generated by employees was also approximated using water consumption data for the same time period. The City limits and sewer service area were almost the same in 2012. After the annexations of several neighborhoods (see **Chapter 3**), the City limits were expanded but the sewer service area remained the same. For this reason, an approximation of employees in the City's sewer service area for 2013 and 2014 was not available. For the purposes of these analyses, the employees in 2014 are assumed to be the same as 2012 since there was a slight decrease in the number of commercial accounts.

The 2014 domestic AAF for all commercial connections was 0.54 MGD or 18 gped. The value does not include infiltration and inflow, wastewater generated by residential customers, or discharge factors. For comparison, the King County *Updated Planning Assumptions for Wastewater Flow Forecasting* also estimated the flow for residential customers to be 18 gped.

## PEAKING FACTORS

Once existing flow rates are measured and defined, projected flow rates can be developed. Projected flows are used to further analyze how well the existing system will perform in the future, and to determine improvements required to maintain or improve system function. In order to establish projected flow scenarios for a sewer system, peaking factors need to be determined for the existing system, which can then be applied to projected future flow rates. Peaking factors are the ratio of higher flows, such as maximum day flow (MDF) or peak hour flow (PHF), to the AAF. **Table 4-2** shows the lift station AAF rates, **Table 4-3** shows the lift station MDF rates, and **Table 4-4** shows the MDF peaking factors at the City's lift stations over the 2008 through 2014 period.

**Table 4-2**
**Historical AAFs at the City's Lift Stations**

| Historical AAF (gpd) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Year | | | | | | | Average |
| Lift Station | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | (2008 - 2014) |
| Lake Plaza | 243,000 | 283,500 | 270,000 | 216,000 | 256,500 | 243,000 | 229,500 | 248,786 |
| Rose Point | 14,400 | 14,400 | 21,600 | 10,800 | 14,400 | 18,000 | 21,600 | 16,457 |
| South Bay | 4,320 | 8,640 | 4,320 | 4,320 | 4,320 | 4,320 | 4,320 | 4,937 |
| Trend | 5,280 | 8,448 | 8,448 | 6,336 | 6,336 | 8,448 | 8,544 | 7,406 |
| Waverly Park | 20,304 | 33,840 | 27,072 | 27,072 | 30,456 | 27,072 | 37,224 | 29,006 |
| Yarrow Bay II | 4,260 | 5,112 | 5,112 | 4,260 | 4,686 | 4,260 | 4,260 | 4,564 |

**Table 4-3**
**Historical MDFs at the City's Lift Stations**

| Historical MDF (gpd) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Year | | | | | | | Average |
| Lift Station | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | (2008 - 2014) |
| Lake Plaza | 486,000 | 436,500 | 495,000 | 454,500 | 648,000 | 481,500 | 414,000 | 487,929 |
| Rose Point | 21,600 | 43,200 | 106,200 | 28,800 | 59,400 | 30,600 | 54,000 | 49,114 |
| South Bay | 7,560 | 10,800 | 17,280 | 10,800 | 19,440 | 10,800 | 11,880 | 12,651 |
| Trend | 7,392 | 17,952 | 28,512 | 12,672 | 22,176 | 14,784 | 19,008 | 17,499 |
| Waverly Park | 28,764 | 77,832 | 155,664 | 87,984 | 159,048 | 59,220 | 106,596 | 96,444 |
| Yarrow Bay II | 5,538 | 6,390 | 9,372 | 5,964 | 5,964 | 8,520 | 10,650 | 7,485 |

**Table 4-4**
**Summary of MDF Peaking Factors at the City's Lift Stations**

| | MDF Peaking Factor (MDF/AAF) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Year | | | | | | | Average |
| Lift Station | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | (2008 - 2014) |
| Lake Plaza | 2.00 | 1.54 | 1.83 | 2.10 | 2.53 | 1.98 | 1.80 | 1.97 |
| Rose Point | 1.50 | 3.00 | 4.92 | 2.67 | 4.13 | 1.70 | 2.50 | 2.92 |
| South Bay | 1.75 | 1.25 | 4.00 | 2.50 | 4.50 | 2.50 | 2.75 | 2.75 |
| Trend | 1.40 | 2.13 | 3.38 | 2.00 | 3.50 | 1.75 | 2.22 | 2.34 |
| Waverly Park | 1.42 | 2.30 | 5.75 | 3.25 | 5.22 | 2.19 | 2.86 | 3.28 |
| Yarrow Bay II | 1.30 | 1.25 | 1.83 | 1.40 | 1.27 | 2.00 | 2.50 | 1.65 |

Peaking factors for collection system pipe and lift station sizing are typically based on PHF rates. There are no direct measurements for PHFs at the City's lift stations, so this value could not be obtained for comparison. All the City-owned lift stations, with the exception of the Lake Plaza Lift Station, have smaller service areas, where it is typical to have larger peaking factors compared to lift stations that serve a larger area of a sewer system. In addition, the Rose Point, South Bay, Trend, Waverly Park, and Yarrow Bay II Lift Stations are smaller lift stations in comparison to the Lake Plaza Lift Station. The values presented in **Table 4-4** are in the range of peaking factors considered typical since these lift stations' serve smaller areas, which can present higher peaking factors.

For the purposes of this GSP, an existing PHF factor was estimated for each sewer drainage basin (**Table 4-5**). These values were determined based on the following information.

- An equivalent population determined for each of the sewer drainage basins, based on the domestic AAF for the sewer drainage basin and the City's residential domestic AAF per capita (63 gpcd).
- Figure C1-1 in the Washington State Department of Ecology's (Ecology) *Criteria for Sewage Works Design* (commonly referred to as the "Orange Book"), which provides peaking factor guidelines based on population.

**Table 4-5**
**Peaking Factors for the City's Sewer Drainage Basins**

| Basin Name | Domestic AAF (gpd) | Domestic PHF Peaking Factor (PHF/AAF) |
|---|---|---|
| 116th Avenue NE | 9,880 | 4.19 |
| Eastside Interceptor | 1,215,100 | 2.67 |
| Juanita | 214,000 | 3.40 |
| Juanita Bay | 23,270 | 4.04 |
| Kirkland | 550,295 | 3.02 |
| Lake Plaza | 160,015 | 3.51 |
| Rose Point | 18,245 | 4.09 |
| South Bay | 4,290 | 4.29 |
| Trend | 6,190 | 4.25 |
| Watershed Park | 6,450 | 4.24 |
| Waverly Park | 13,145 | 4.14 |
| Yarrow Bay | 171,790 | 3.48 |
| Yarrow Bay II | 3,830 | 4.30 |

NOTE:
-Flows shown in this table are rounded off and approximate.

The peaking factors presented in **Table 4-5** were used to estimate existing and projected future domestic wastewater PHFs generated by the City's sewer customers.

## INFLOW AND INFILTRATION

A sanitary sewer system must be able to carry the domestic wastewater generated by utility customers and the extraneous I/I that is a part of every sewer collection system. Excessive I/I in a sewer collection system can lead to serious issues within the collection system that may include wastewater system backups and overflows to accelerating the structural deficiencies of the collection system. Excessive I/I can also inflate capacity requirements of the proposed collection and treatment system infrastructure.

I/I is the combination of groundwater and surface water that enters the sewer system. Infiltration is typically groundwater entering the sewer system through defects in the sewer system infrastructure, such as fractured pipes and leaking manholes and pipe joints. Inflow is typically surface water that enters the sewer system from sources such as roof and street drains and leaky manhole covers.

Reducing sewer collection system I/I is essential for two purposes: 1) it results in a lowered risk of sanitary sewer overflows; and 2) it reduces the cost of conveying and treating wastewater. By reducing or eliminating I/I sources, the extraneous I/I water that previously occupied the conveyance and treatment systems can now be occupied by sewage. This leads to delaying projects to improve conveyance and treatment systems that were needed because of this extraneous I/I water.

The goals of King County (County) include the reduction of direct I/I and long-term I/I control. Direct I/I reduction represents rehabilitation or replacement projects, while long-term I/I control refers to policy, administrative, financial, and technical measures.

Any I/I studies that are conducted in the future should follow the guidelines defined in Chapters 1-7 and 1-8 of Ecology's Orange Book. A proposed I/I evaluation is recommended in the City's Capital Improvement Program (CIP) in **Chapter 7**.

For the purposes of these analyses, the peak hour I/I flow rates were based on a 20-year storm peak hour event and were distributed uniformly throughout each sewer drainage basin based on a gallon per acre per day (gpad) basis. The analyses presented in this chapter and the City's sewer system model include peak hour I/I flow rates consistent with the County's Regional Infiltration and Inflow Control Program. The County estimated peak hour I/I flow rates throughout KCWTD's regional wastewater system as part of the 2009 through 2011 Decennial Flow Monitoring. The County estimated peak hour I/I flow rates in the City's sewer service area to range from 1,396 to 9,218 gpad (**Figure 4-1**), which are relatively high I/I flow rates. The areas with the highest peak hour I/I flow rates include the downtown area and sections of the City's sewer service area adjacent to Lake Washington and Yarrow Bay; the areas with the lowest peak hour I/I flow rates include the eastern and northern regions of the City's sewer system.

Total peak hour I/I flow for each of the City's existing sewer drainage basins were based on the County's estimated peak hour I/I flow rates and the sewered area (based on the County's GIS data) in each of the City's sewer drainage basins. The existing peak hour I/I flow rate per acre and total peak hour I/I flow rate for each of the City's existing sewer drainage basins for a 20-year storm peak hour event are shown in **Table 4-6**.

**Table 4-6**
**Existing 20-year Peak Hour I/I Flow Rates**

| Basin Name | Peak Hour I/I per Acre (gpad) | Sewered Basin Area (acres) | Total Peak Hour Basin I/I (gpd) |
|---|---|---|---|
| 116th Avenue NE | 3,875 | 34 | 130,474 |
| Eastside Interceptor | 4,894 | 2,125 | 10,401,916 |
| Juanita | 4,938 | 538 | 2,654,827 |
| Juanita Bay | 1,702 | 12 | 21,198 |
| Kirkland | 9,180 | 677 | 6,212,415 |
| Lake Plaza | 9,199 | 140 | 1,290,340 |
| Rose Point | 4,965 | 25 | 123,978 |
| South Bay | 5,071 | 7 | 34,596 |
| Trend | 6,356 | 19 | 119,927 |
| Watershed Park | 3,871 | 8 | 31,016 |
| Waverly Park | 8,957 | 45 | 407,456 |
| Yarrow Bay | 8,475 | 184 | 1,556,817 |
| Yarrow Bay II | 8,463 | 8 | 67,271 |

Projected total peak hour I/I flow rates for each of the City's sewer drainage basins were based on the total existing peak hour I/I flow rates, potentially sewered area (based on the County's GIS data) in the sewer drainage basin, and a peak hour I/I flow rate of 2,000 gpad for the potentially sewered area. This is consistent with the County's regional modeling, which assumes 2,000 gpad for new construction.

For the purposes of this GSP, it was assumed the potentially sewered area would be sewered by 2035, and that sewering these areas would occur based on a linear growth rate. This is more aggressive than the County's regional modeling, which assumes potentially sewered areas being developed at a rate of 20 percent per decade. For the analyses presented in this chapter, the potentially sewered areas were estimated to have a peak hour I/I flow rate of 600 gpad for 2021 (6-year) and 2,000 gpad for 2035 (20-year) based on these assumptions.

The projected additional I/I flow rates of 600 gpad (for 2021) and 2,000 gpad (for 2035) for new construction were multiplied by the area of the potentially sewered areas (which are currently unsewered) in each basin to estimate the additional I/I flow for 2021 and 2035, respectively. The projected total peak hour I/I flows for each basin were estimated by adding the projected additional I/I flow for new construction to the existing total peak hour I/I flow for that basin. The total peak hour I/I flow for each scenario was converted from gallons per day (gpd) to gallons per minute (gpm). The formulas below were used to estimate I/I flow rates in each sewer drainage basin for this GSP.

$$\begin{bmatrix}\text{Existing (2014)}\\ \text{Total Peak Hour I/I}\\ \text{(gpm)}\end{bmatrix} = \begin{bmatrix}\text{Peak Hour I/I}\\ \text{per Acre}\\ \text{(gpad)}\end{bmatrix} \times \begin{bmatrix}\text{Sewered Area}\\ \text{(acres)}\end{bmatrix} \times \left[\frac{1\text{ day}}{1440\text{ minutes}}\right]$$

$$\begin{bmatrix}\text{Projected 2021}\\ \text{Total Peak Hour I/I}\\ \text{(gpm)}\end{bmatrix} = [600\text{ gpad}] \times \begin{bmatrix}\text{Potentially}\\ \text{Sewered Area}\\ \text{(acres)}\end{bmatrix} \times \left[\frac{1\text{ day}}{1440\text{ minutes}}\right] + \begin{bmatrix}\text{Existing (2014)}\\ \text{Total Peak Hour I/I}\\ \text{(gpm)}\end{bmatrix}$$

$$\begin{bmatrix}\text{Projected 2035}\\ \text{Total Peak Hour I/I}\\ \text{(gpm)}\end{bmatrix} = [2{,}000\text{ gpad}] \times \begin{bmatrix}\text{Potentially}\\ \text{Sewered Area}\\ \text{(acres)}\end{bmatrix} \times \left[\frac{1\text{ day}}{1440\text{ minutes}}\right] + \begin{bmatrix}\text{Existing (2014)}\\ \text{Total Peak Hour I/I}\\ \text{(gpm)}\end{bmatrix}$$

For the purposes of this GSP, it was assumed the existing I/I flow rates would not further degrade over time in the City's existing sewer system, and that the City's staff would perform maintenance on the City's sewer system in a manner that would prevent further degradation of the existing sewer system. The City's regular maintenance program includes a rotation cleaning schedule of its gravity collection system, and City staff also perform visual inspections to identify any maintenance issues that may contribute to I/I and make repairs as necessary. In addition, the results of improvement projects to correct I/I in an existing sewer system can be highly variable in effectiveness for I/I reduction and are difficult to predict.

A maximum day I/I per sewered area quotient was estimated for each of the City's lift stations for 2008 through 2014 from the difference between maximum day flow and minimum day flow divided by the sewered area served by the lift station, shown in **Table 4-7**. On average, from 2008 through 2014, according to **Table 4-7**, the Lake Plaza and Waverly Park Lift Stations have the highest maximum day I/I per sewered area quotient, and the Yarrow Bay II and Trend Lift Stations have the lowest maximum day I/I per sewered area quotient.

**Table 4-7**
**Maximum Day I/I per Sewered Area Quotients for the City's Lift Stations**

| Maximum Day I/I per Sewered Area Quotient (gpad) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Year | | | | | | | Average |
| Lift Station | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | (2008 - 2014) |
| Lake Plaza | 1,829 | 1,604 | 2,053 | 1,861 | 3,016 | 2,021 | 1,636 | 2,003 |
| Rose Point | 433 | 1,298 | 3,821 | 865 | 1,946 | 649 | 1,442 | 1,493 |
| South Bay | 791 | 633 | 2,216 | 1,266 | 2,374 | 1,108 | 1,266 | 1,379 |
| Trend | 168 | 672 | 1,119 | 392 | 895 | 504 | 672 | 632 |
| Waverly Park | 260 | 1,190 | 2,938 | 1,413 | 2,976 | 818 | 1,748 | 1,621 |
| Yarrow Bay II | 214 | 268 | 643 | 322 | 268 | 643 | 911 | 467 |

## PROJECTED WASTEWATER FLOW RATES

The planning period (2035) growth rate is projected to add a total of 9,499 additional people and 15,545 additional employees to the sewer system population. Traffic Analysis Zone (TAZ) mapping and data for existing and projected future single-family and multi-family housing units and employees and development projects, currently under permit review or undergoing construction, were used to determine the future population projections and their distribution. Refer to **Chapter 3** for more information regarding the development of both population growth scenarios. Future flow rates estimated for the 2021 (6-year) and 2035 (20-year) planning horizons were based on these population and employee projections.

The projected flows and the flow distribution throughout the City's sewer service area were developed using the following assumptions.

- The existing AAF per capita for 2014 is approximately 63 gpcd, excluding I/I, as shown in **Table 4-1**. The existing AAF per capita for 2014 is low for recent years and lower than Ecology's sewer system design guidelines, which estimates 100 gpcd for residential AAF.
- The existing AAF per employee for 2014 is approximately 18 gped, excluding I/I, as shown in **Table 4-1**. The existing AAF per employee is in accordance with Ecology's sewer system design guidelines, which estimates 15 to 35 gped for AAF of factory workers.
- Existing peak hour I/I in the City's sewer service area will range from 1,396 to 9,218 gpad for a 20-year storm peak hour event in the currently sewered areas in each of the City's sewer drainage basins, as previously discussed in the **Inflow and Infiltration** section of this chapter.
- For planning purposes, the future AAF per capita will be 76 gpcd, excluding I/I. This is in accordance with the projected water demand of 95 gpcd in the City's *Comprehensive Water System Plan*, which was last revised in 2015, and the assumption that 80 percent of the water consumed is discharged to the sewer system, which is in accordance with King County's *Updated Planning Assumptions for Wastewater Flow Forecasting*. The projected water demands

from the City's *Comprehensive Water System Plan* includes both residential and commercial water demands.

- An estimated 34 septic system conversions per year for 2016 through 2035, as provided by City staff based on historical data.
- For planning purposes, the future AAF per employee will be 20 gped excluding I/I, which is in accordance with Ecology's sewer system design guidelines.
- Future peak hour I/I in the City's sewer service area will be the existing peak hour I/I plus 600 gpad for 2021 (6-year) and 2,000 gpad for 2035 (20-year) in the currently potentially sewered areas in each of the City's sewer drainage basins, as previously discussed in the **Inflow and Infiltration** section of this chapter.
- At the time this GSP was being drafted, the City and Northshore were working on a mutual agreement to have Northshore assume ownership of the NE 124th Street sewer drainage basin. This agreement was completed in 2017. For the purposes of this GSP, the NE 124th Street sewer drainage basin was included in the City's sewer service area for all projections. However, the wastewater flow projections for this sewer drainage basin are not shown separated from the other sewer drainage basins in this GSP.

The projected future wastewater flows resulting from the increase in population and I/I anticipated for both the 2021 and 2035 time periods were allocated throughout the City's sewer service area. The existing and projected flows are summarized in **Table 4-8**. The flow projections are included in **Appendix E**.

**Table 4-8**
**Projected Sewer Drainage Basin Domestic AAF and Total PHF Rates**

| | Existing (2014) | | | | Projected 2021 | | | | Projected 2035 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin Name | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) |
| 116th Avenue NE | 9,880 | 30 | 90 | 120 | 17,065 | 50 | 115 | 165 | 18,300 | 55 | 170 | 225 |
| Eastside Interceptor | 1,215,100 | 2,255 | 7,225 | 9,480 | 1,430,120 | 2,655 | 7,400 | 10,050 | 1,806,165 | 3,350 | 7,805 | 11,155 |
| Juanita | 214,000 | 505 | 1,845 | 2,350 | 263,595 | 620 | 1,870 | 2,490 | 331,280 | 780 | 1,930 | 2,710 |
| Juanita Bay | 23,270 | 65 | 15 | 80 | 26,320 | 75 | 15 | 90 | 26,550 | 75 | 15 | 90 |
| Kirkland | 550,295 | 1,155 | 4,315 | 5,465 | 852,525 | 1,785 | 4,320 | 6,105 | 1,017,870 | 2,130 | 4,325 | 6,460 |
| Lake Plaza | 160,015 | 390 | 895 | 1,285 | 194,760 | 475 | 895 | 1,370 | 201,845 | 490 | 895 | 1,390 |
| Rose Point | 18,245 | 50 | 85 | 140 | 20,605 | 60 | 85 | 145 | 22,985 | 65 | 85 | 150 |
| South Bay | 4,290 | 15 | 25 | 35 | 4,845 | 15 | 25 | 40 | 4,920 | 15 | 35 | 45 |
| Trend | 6,190 | 20 | 85 | 100 | 7,155 | 20 | 85 | 105 | 8,360 | 25 | 85 | 110 |
| Watershed Park | 6,450 | 20 | 20 | 40 | 7,285 | 20 | 20 | 45 | 7,550 | 20 | 20 | 45 |
| Waverly Park | 13,145 | 40 | 285 | 320 | 14,845 | 45 | 285 | 325 | 16,640 | 50 | 285 | 330 |
| Yarrow Bay | 171,790 | 415 | 1,080 | 1,495 | 199,820 | 485 | 1,085 | 1,570 | 283,560 | 685 | 1,100 | 1,790 |
| Yarrow Bay II | 3,830 | 10 | 45 | 60 | 4,325 | 15 | 45 | 60 | 4,380 | 15 | 45 | 60 |
| Yarrow Bay (Bellevue)[1] | 264,320 | 365 | 975 | 1,340 | 272,160 | 380 | 975 | 1,350 | 287,840 | 400 | 975 | 1,375 |

NOTES:
-Flows shown in this table are rounded off and approximate.
1. These existing and projected wastewater flows are for the City of Bellevue's (Bellevue) Yarrow Bay Sewer Drainage Basin that discharges to the City's Yarrow Bay Sewer Drainage Basin. Wastewater flows from Bellevue's Yarrow Bay Sewer Drainage Basin are not included in the City's historical and projected wastewater flow totals presented in this chapter.

Wastewater flows from the City of Bellevue's (Bellevue) Yarrow Bay Sewer Drainage Basin are discharged to the City's Yarrow Bay Sewer Drainage Basin. The existing and projected sewer flows for Bellevue Yarrow Bay Sewer Drainage Basin, summarized in **Table 4-8**, were estimated based on Tables 4-6 and 4-7 of Bellevue's 2014 Wastewater System Plan and assuming a linear growth rate. Wastewater flows from Bellevue's Yarrow Bay Sewer Drainage Basin are included in the hydraulic modeling results but are not included in the City's historical and projected wastewater flow totals presented in this chapter.

Current lift station pumping capacity and flow rate projections are provided in **Table 4-9**. The Trend Lift Station is planned to be eliminated and abandoned in the future. However, it is uncertain when this will occur, so the projections in **Tables 4-8** and **4-9** do not reflect projects to install gravity main so that the Trend Lift Station can be eliminated and abandoned. These improvements are discussed further in **Chapter 7**.

**Table 4-9**
**Projected Lift Station Domestic AAF and Total PHF Rates**

| Lift Station | Firm Capacity (gpm) | Existing (2014) Domestic AAF (gpd) | Existing (2014) Total PHF (gpm) | Projected 2021 Domestic AAF (gpd) | Projected 2021 Total PHF (gpm) | Projected 2035 Domestic AAF (gpd) | Projected 2035 Total PHF (gpm) |
|---|---|---|---|---|---|---|---|
| Lake Plaza | 1,157 | 160,015 | **1,285** | 194,760 | **1,370** | 201,845 | **1,390** |
| Rose Point | 297 | 18,245 | 140 | 20,605 | 145 | 22,985 | 150 |
| South Bay | 161 | 4,290 | 35 | 4,845 | 40 | 4,920 | 45 |
| Trend | 211 | 6,190 | 100 | 7,155 | 105 | 8,360 | 110 |
| Waverly Park | 285 | 13,145 | **320** | 14,845 | **325** | 16,640 | **330** |
| Yarrow Bay II | 106 | 3,830 | 60 | 4,325 | 60 | 4,380 | 60 |

NOTES:
-Flows shown in this table are rounded off and approximate.
-Highlighted flows exceed the current firm capacity of the lift station.

As indicated in **Table 4-9**, Lake Plaza and Waverly Park Lift Stations are at capacity. The City has indicated it has not had any overflow events from 2008 to the present. However, the PHF rates presented in **Tables 4-8** and **4-9** are based on a 20-year storm peak hour event, which the City has not experienced between 2008 and 2014.

The City is also planning to perform an I/I study in the future to identify areas of its system with significant I/I and cost-effective improvements that could be implemented to reduce I/I in the City's sewer system. These I/I improvements could reduce or mitigate the I/I component of the PHFs in the City's sewer collection system.

In addition, the City's sewer hydraulic model would likely be converted to EPA-SWMM, or similar hydraulic modeling program, as part of the I/I study. Using EPA-SWMM to perform the hydraulic modeling would provide a more realistic representation of flows in the sewer system than SewerCAD®, which was used to hydraulically model the City's sewer system. EPA-SWMM models flow attenuation in a sewer collection system as wastewater travels downstream in the model, whereas SewerCAD® models flows in a sewer collection system as a compilation of all upstream flows and does not account for flow attenuation. Modeling the City's sewer system in EPA-SWMM, as part of the I/I study, could show there is enough flow attenuation in the City's sewer drainage basins that the PHFs at the Lake Plaza and Waverly Park Lift Stations are lower than the firm capacity of these lift stations.

Capacity upgrades to the Lake Plaza and Waverly Park Lift Stations may be necessary to handle future flows. These improvements and the I/I study are discussed further in **Chapter 7**.

## PROJECTED FLOW RATES WITH WATER USE EFFICIENCY

Future wastewater flow projections were computed with and without drinking water savings expected from implementing Water Use Efficiency (WUE) measures contained in the Cascade Water Alliance (Cascade) WUE Program in Appendix K of the City's *Comprehensive Water System Plan*. Cascade's WUE Program presents a regional goal of saving 0.6 MGD on an annual basis and 1.0 MGD on a peak season basis by 2020. The City's portion of Cascade's regional goal is approximately 53,000 gallons of drinking water per day (gpd) on an annual basis. Beyond 2020, the wastewater flow projections with the WUE Program do not include additional drinking water savings beyond the initial goal.

The projected domestic AAF was reduced to reflect the WUE goals and used as the basis for future wastewater flow projections with the implementation of the WUE Program. Applying the City's water use reduction goals to the 2014 AAF rates results in the projected wastewater flow rates shown in **Table 4-10**.

**Table 4-10**
**Projected Sewer System Domestic AAF and Total PHF Rates**

| | Existing (2014) | | | | Projected 2021 | | | | Projected 2035 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Description | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) | Domestic AAF (gpd) | Domestic PHF (gpm) | Peak Hour I/I (gpm) | Total PHF (gpm) |
| System Flow w/o WUE | 2,412,130 | 5,015 | 16,125 | 21,145 | 3,150,675 | 6,615 | 16,365 | 22,985 | 3,875,930 | 8,115 | 16,930 | 25,040 |
| System Flow with WUE | --- | --- | --- | --- | 3,097,875 | 6,505 | 16,365 | 22,870 | 3,823,130 | 8,000 | 16,930 | 24,930 |

NOTES:
-Flows shown in this table are rounded off and approximate.

**Table 4-10** presents the future 6-year and 20-year wastewater flow projections for the City's sewer system with and without WUE estimated reductions in water use from achieving WUE goals described in the WUE Program. The projected domestic PHFs with WUE shown were computed from the ratio of the projected AAFs with and without WUE reductions.

The analysis and evaluation of the existing wastewater system with proposed improvements, as presented in **Chapters 4**, **6**, and **7**, is based on 20-year projected wastewater flow data without WUE reductions. This ensures that the future system will be sized properly to meet all requirements, whether or not additional water use reductions are achieved. However, the City will continue to pursue further reductions in water use by implementing the WUE Program.

## SUMMARY

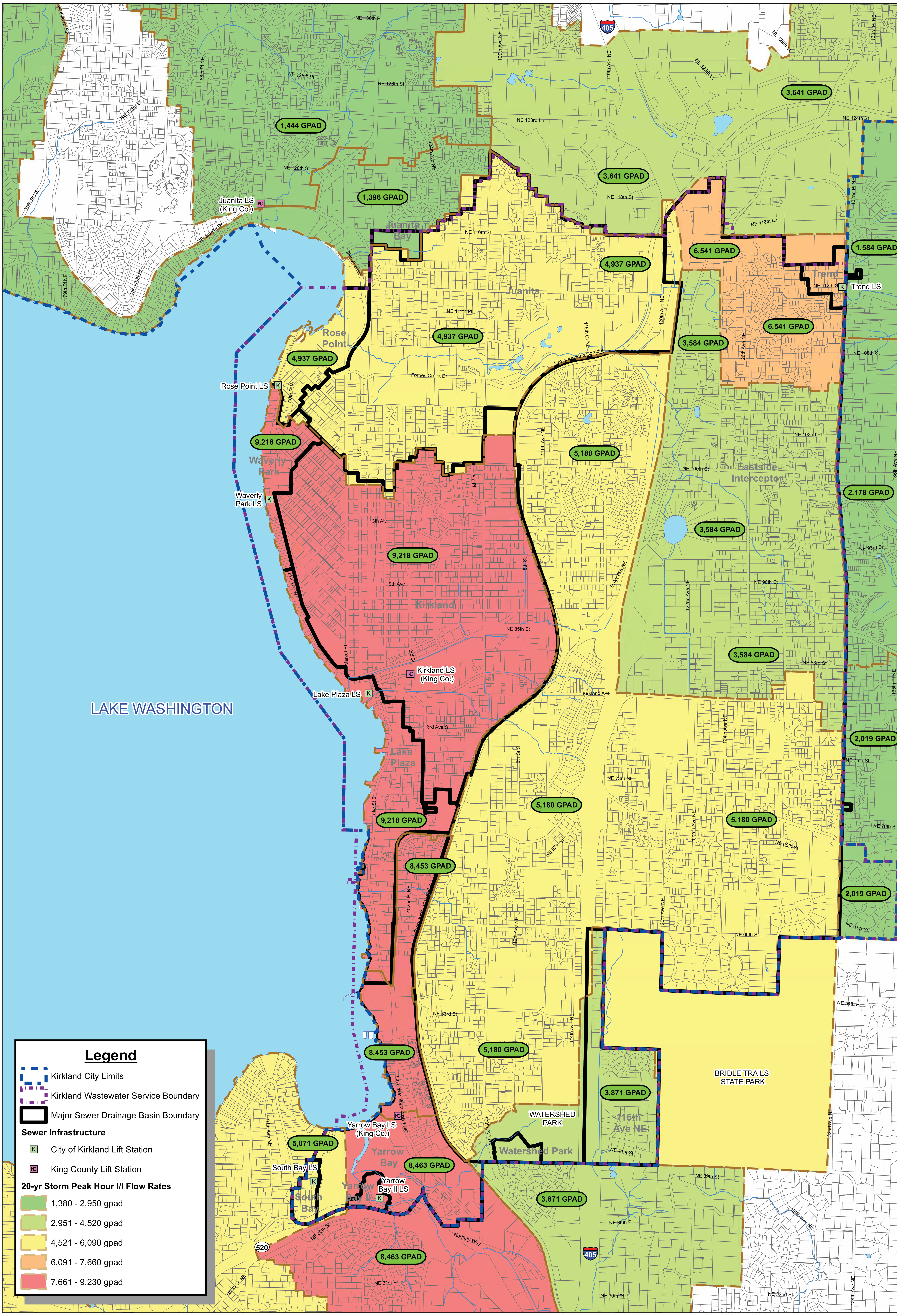
**Table 4-11** provides a summary of the population and flow information presented in this chapter.

**Table 4-11**
**Population and Flow Analysis Summary**

| Description | Existing (2014) | Projected 2021 | Projected 2035 |
|---|---|---|---|
| **Population Data** | | | |
| City Population | 82,590 | 87,260 | 95,913 |
| Sewer Service Area Population[1] | 29,481 | 32,141 | 38,981 |
| Sewer Service Area Employees | 30,124 | 35,399 | 45,669 |
| Sewer Service Area ERUs | 17,681 | 20,322 | 25,000 |
| **Wastewater Flow Basis Data** | | | |
| Residential Domestic AAF per Capita (gpcd) | 63 | 76 | 76 |
| Commercial Domestic AAF per Employee (gped) | 18 | 20 | 20 |
| Domestic AAF per ERU (gpd per ERU) | 136 | 155 | 155 |
| **Domestic Wastewater Flow (MGD)[2]** | | | |
| Total Residential Domestic AAF | 1.87 | 2.44 | 2.96 |
| Total Commercial Domestic AAF | 0.54 | 0.71 | 0.91 |
| Total Domestic AAF | 2.41 | 3.15 | 3.88 |

NOTES:
1. Projected sewer service area population includes an estimated 34 septic system conversions per year.
2. Flows shown in this table are rounded off and approximate.

The projected domestic flows presented in this chapter were estimated assuming a future AAF per capita of 76 gpcd and a future AAF per employee of 20 gpcd, which are greater than the historical flow rates. In addition, future sewer flow rates for commercial and industrial developments are difficult to estimate without specific information about the proposed developments. If the AAF per capita and AAF per employee remain below projections, it is possible that the City may not reach some of the capacity deficiencies identified in **Chapter 6** in the 20-year planning period based on flow. Therefore, the City should continue to monitor AWWC on a yearly basis.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

# Figure 4-1
# 20-yr Storm Peak Hour I/I Flow Rates
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.

THIS PAGE INTENTIONALLY LEFT BLANK

# Policies and Design Criteria 5

## INTRODUCTION

The City of Kirkland (City) operates and plans sewer service for the City and associated sewer service area residents and businesses according to the design criteria, laws, and policies that originate from the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology).

These laws, design criteria, and policies guide the City's operation and maintenance of the sewer system on a daily basis, as well as the City's plan for growth and improvements. Their overall objective is to ensure the City provides high-quality sewer service at a fair and reasonable cost to its customers. They also set the standards the City must meet to ensure that the sewer system is adequate to meet existing and future flows. The system's ability to handle these flows is detailed in **Chapter 6**, and the recommended improvements are identified in **Chapter 7**.

The City's Wastewater Division has implemented policies and programs that follow what is outlined in EPA's *Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems* to better manage, operate, and maintain its sewer system, investigate capacity constrained areas of the sewer system, proactively prevent sanitary sewer overflows (SSOs), and help maintain the value of the City's investment in its sewer system. The City's CMOM policies and programs include, but are not limited to, the following.

- Knowing and assessing the condition of the sewer system.
- Planning and scheduling work on the City's sewer system components based on their condition and performance.
- Planning and scheduling repairs and rehabilitation of the City's sewer system components based on their condition and performance.
- Developing a fats, oils, and grease (FOG) program to eliminate FOG within the City's sewer system.
- Training personnel.

The City Council adopts regulations and policies that cannot be less stringent or in conflict with those established by the federal and state governments. The City's policies take the form of ordinances, memoranda, and operational procedures, many of which are summarized in this chapter. Other publications, such as the City's Municipal Zoning Codes and Sanitary Sewer Pre-approved Notes, Design Criteria, and Plans (**Appendix F**), outline design standards and procedures for the development of the City's sanitary sewer system. Some of the standards presented in this chapter were provided in the 2010 *General Sewer Plan* prepared by Roth Hill, LLC, and are presented below to preserve the City's sewer standards.

The policies associated with the following categories are presented in this chapter.

- Regulations
- Customer Service
- Collection Systems
- Lift Stations

- Operational
- Organizational
- Financial

## REGULATIONS

### National Pollutant Discharge Elimination System Permit

The State of Washington (State) regulates the federal effluent limitations with the National Pollutant Discharge Elimination System (NPDES) program. Wastewater discharges into the waters of the State shall have a NPDES waste discharge permit from Ecology. The City does not have a NPDES waste discharge permit because it discharges its wastewater to King County's (County) Eastside Interceptor, which conveys the wastewater to the County's South Wastewater Treatment Plant (WWTP), as discussed in **Chapter 2**. A copy of the NPDES waste discharge permit for the South WWTP is included in **Appendix A**.

## CUSTOMER SERVICE POLICIES

### Sewer Service and Connection

- The City will strive to provide sewer service to the people within the City's sewer service area, provided all policies related to service can be met.
- The City will coordinate and establish agreements with neighboring utility districts, cities, and the County to provide sewer service in and adjacent to the City's sewer service area. These agreements will establish a permanent sewer service area.
- The City will support and participate in applicable regional plans to provide and maintain a reliable and adequate sewer system.
- The City will coordinate closely with adjacent jurisdictions to determine applicable regulatory requirements, growth projections, and opportunities for joint projects. Interlocal agreements will be prepared between the pertinent parties on all joint projects.
- The City will participate in mutual aid agreements with adjacent jurisdictions, the County, and the State when necessary.
- Sewer system service extensions will be allowed to provide sewer service in the City's sewer service area if the project is consistent with adopted Zoning and Municipal Codes and sewer utility policies.
- Prior to the connection of any property to the City's sewer system, the sewer main lines must be extended to the subject property's farthest property line by way of public right-of-way or easement.
- The sewer main shall be owned and maintained by the City. The side sewer service line and any associated appurtenances from the main to the building shall be owned and maintained by the property owner (Kirkland Municipal Code 15.28.135).

### *Septic Systems*

- ≠ Properties with existing single-family dwellings within the City's sewer service area with a septic system that is failing or has failed must connect to the City's sewer system if the property is within 330 feet of an existing sewer main.
- ≠ Properties with existing multi-family dwellings within the City's sewer service area with a septic system that is failing or has failed must connect to the City's sewer system if the property is within 660 feet of an existing sewer main.
- ≠ The City is aware of Engrossed Senate Bill (ESB) 5871, which became effective on July 24, 2015, and requires cities, towns, and counties to offer an administrative appeals process to consider denials of permit applications to repair or replace a septic system where connection to a sewer system is required for single-family residences. The City will review appeals to repair or replace septic systems as they are submitted in accordance with ESB 5871.
- ≠ Properties with a single-family dwelling located more than 330 feet from an existing sewer main, or a multi-family dwelling located more than 660 feet from an existing sewer main, may request to connect to the sewer system (requiring construction of a sewer main extension to be connected). Whenever a sewer main extension is required to make such a connection possible, the City shall plan, design, and construct such extension within a reasonable time pursuant to the criteria for sewer main extension projects and construction priorities in accordance with applicable City Municipal Codes.

## COLLECTION SYSTEM POLICIES AND DESIGN CRITERIA

### *Sanitary Sewer Design Criteria*

- ≠ All sewer lines and facilities within the City shall be designed in accordance with good engineering practice by a professional engineer with the minimum design criteria presented in the *Criteria for Sewage Works Design*, prepared by Ecology, August 2008, or as superseded by subsequent updates. Chapter C1 of this document includes standards and guidelines for design considerations (e.g., minimum pipe sizes, pipe slopes, and wastewater velocities), maintenance considerations, estimating wastewater flow rates, manhole locations, leak testing, and separation from other underground utilities. These criteria have been established to ensure that the sanitary sewers convey the sewage and protect the public health and environment. The sewer lines shall also conform to the latest regulatory requirements relating to design.
- ≠ The City shall establish construction contract standards. Sewers shall be designed and constructed in accordance with the City's most current Sanitary Sewer Pre-approved Notes, Design Criteria, and Plans (**Appendix F**).
- ≠ Future capacity requirements will be estimated by using existing customer connections, a geographic information system (GIS) parcel-based analysis, and projected future household, population, and employment data as provided by the Puget Sound Regional Council (PSRC).
- ≠ In accordance with all applicable federal, State, and local regulations, the City will design its sewer system facilities with sufficient capacity to handle the anticipated peak daily flow under normal conditions without any overflows to the environment.

## Gravity Sewer Design Criteria

≠ All gravity sewers shall be a minimum of 8 inches in diameter and sized as required by flow calculations.

≠ All new gravity sewers shall be designed to have a minimum velocity of 2.0 feet per second when flowing full.

≠ All new gravity sewers shall be designed with a minimum slope according to what is listed in Table C1-1 of Ecology's *Criteria for Sewage Works Design* (e.g., a minimum slope of 0.40 feet per 100 feet for 8-inch-diameter gravity sewer).

≠ Normal depth of gravity sewers shall be 7 feet to 12 feet. All other depths shall be approved by the Public Works Department.

≠ Manholes shall be a minimum of 48 inches in diameter and shall be spaced at intervals not to exceed 400 feet.

≠ Manholes shall conform to Washington State Department of Transportation (WSDOT) and American Public Works Association standards. See the City's Sanitary Sewer Pre-approved Notes, Design Criteria, and Plans (**Appendix F**) for specific criteria.

## Separation between Sanitary Sewer and Other Utilities

≠ A minimum horizontal separation of 10 feet is required between sewer and water lines (edge to edge).

≠ The City's Sanitary Sewer Pre-approved Notes, Design Criteria, and Plans (**Appendix F**) will be followed, and the guidelines provided in Ecology's *Criteria for Sewage Works Design* should be followed for difficult spacing or other situations.

## Design Period

≠ The design period is the length of time that a given facility will provide safe, adequate, and reliable service. The design period selected is based on the economic life of a given facility, which is determined by the structural integrity of the facility, the rate of degradation, the replacement cost, the cost of increasing the capacity of the facility, and the projected population growth rate serviced by the facility.

≠ The life expectancy for new sanitary sewers, using current design practices, is in excess of 50 years.

## Force Main Design Criteria

≠ All force mains within the City shall be designed in accordance with good engineering practice by a professional engineer with the minimum design criteria presented in the *Criteria for Sewage Works Design*, prepared by Ecology, August 2008, or as superseded by subsequent updates. Chapter C2 of this document contains design considerations for force mains.

### Side Sewer Design Criteria

- Side sewers shall be constructed in accordance with all applicable City, local, and State regulations. See the City's Municipal Code and Sanitary Sewer Pre-approved Notes, Design Criteria, and Plans (**Appendix F**) for specific criteria.

## LIFT STATION POLICIES AND DESIGN CRITERIA

- Lift stations shall be designed in accordance with the City's most current Sanitary Sewer Pre-approved Notes, Design Criteria, and Plans (**Appendix F**) and Ecology's *Criteria for Sewage Works Design*.
- Lift stations will consist of electrical and mechanical equipment that maintenance staff can easily understand and diagnose for problems. Maintenance staff responsible for lift station operation will be trained for the operation and maintenance of mechanical and electrical systems. All information necessary for lift station maintenance and operation will be located onsite.
- Telemetry and supervisory control systems will be available to optimize lift station operations, diagnose impending equipment failure, analyze sewage flow rates, reduce operating costs, and centrally monitor and control all lift station facilities.
- The City will equip each lift station with provisions for emergency power generation, unless the wetwell and tributary main capacity above the high-water alarm is sufficient to hold the peak flow expected during the maximum power outage duration as experienced during the last 10 years. The emergency power generation may consist of a connection for portable generation or an in-place generator set. The emergency generator will provide power to the lift station in the event of a power failure. Lift stations with wetwells that have insufficient storage to provide adequate emergency response time will be equipped with an on-site emergency generator, or additional storage will be installed to provide adequate response time.

## OPERATIONAL POLICIES

### Maintenance

- Equipment breakdown is given highest maintenance priority, and repairs should be made as soon as possible.
- Equipment should be replaced when it becomes obsolete.
- Worn parts should be repaired, replaced, or rebuilt before they represent a high failure probability.
- Equipment that is out of service should be returned to service as soon as possible.
- A preventive maintenance schedule shall be established for all facilities, equipment, and processes.
- Spare parts shall be stocked for all equipment items whose failure will impact the ability to meet other policy standards.
- Tools shall be obtained and maintained to repair all items whose failure will impact the ability to meet other policy standards.

- Dry, heated shop space shall be available to all maintenance personnel to maintain facilities.
- Written records and reports will be maintained on each facility and item of equipment showing operation and maintenance history.

### *Temporary and Emergency Services*

- The City shall, on a regular basis, update its Emergency Response Plan (ERP). The ERP focuses on problems created by major disasters (such as earthquakes, floods, and winter storms) as part of the City's operations program. The ERP will ensure that adequate emergency provisions and procedures are in place to operate the sewer system.
- The City shall update its Hazard Mitigation and Emergency Response Plans as necessary. These plans include natural and manmade hazards and identify how people and property may be damaged when a hazardous situation occurs. These plans will be available to the public as provided for by existing regulations.
- The City encourages all employees to call the City Response Team at 425-581-3900 24 hours a day if they notice a pipe leak of any kind. This includes sewer overflows and drinking water leaks. The City's procedure for responding to pipe leaks includes the City employee or City Response Team calling Ecology's Northwest Office at 425-649-7000 and reporting the pipe leak to the Environmental Report Tracking System (ERTS), even for drinking water leaks.
- When responding to a sewer overflow, City procedure is to evaluate the situation, determine best management practices, and implement those practices to prevent further contamination. This includes, but is not limited to, using Vactor trucks to clean up leaks and clean out blockages, roadway cleanup, sandbagging, and providing emergency power when appropriate.

### *Reliability*

- The City shall invest sufficient resources to ensure that the sewer system is constructed, operated, and maintained to ensure consistent and reliable service is provided to its customers.

## ORGANIZATIONAL POLICIES

### *Staffing*

- The sewer utility staffing levels are established by the City Council based on the City's financial resources and needs of the sewer utility.
- All maintenance personnel will be trained in the skills, procedures, and techniques necessary to efficiently perform their job descriptions. The City will pay fees and employee labor for necessary certification testing and annual renewal fees. Personnel certification and training will comply with State-established standards.
- The City encourages employee participation in workshops, seminars, and other educational programs to improve efficiency and effectiveness of maintenance personnel.
- The City is committed to providing safe and healthy working conditions at all facilities in compliance with all applicable rules, laws, and regulations pertaining to the safety and health of its employees. The City will update its Safety Manual as required by federal and State laws.

# FINANCIAL POLICIES

## *General*

- The City will set rates, charges, and fees to maintain sufficient funds to operate, maintain, and upgrade its sewer system as necessary to provide safe and reliable sewer service to its customers. These rates will comply with State regulations and be evaluated in conjunction with the annual budget process to ensure that forecasted expenses and impacts of regulations are reflected in the rate structure.
- Each lot or parcel of real property required to be connected with the City's sewer system shall be subjected to a monthly sewer charge whether such lot or parcel of real property is actually connected to the sewer system. This monthly sewer charge will be waived if the property owner can establish, to the satisfaction of the City Engineer, that the lot or parcel is connected to a septic system approved by the County.
- The sewer connection charge(s) must be paid prior to issuance of the permit by the City and shall be determined for each individual connection as requested by the applicant in accordance with the City's Municipal Code.
- The City shall collect sewer extension charges for owners of properties that individually benefit from publicly built sewer extension facilities, except for those property owners who previously paid for their fair share of such an extension through a Local Improvement District (LID) or Utility LID (ULID).
- The cost of any modification to the system shall be borne by each property abutting upon or benefiting from such modifications or by the owners of such property.
- If sewer system facilities must be installed or upgraded as a result of a developer's impacts, the new facilities or upgrades shall conform to the City's policies, criteria, and standards and shall be accomplished at the developer's expense. The City, however, shall be responsible for any portion of the costs that are attributable to general facilities, such as over-sizing or over-depth requirements, and offer latecomers fees to developers.
- If written application for service is approved by the City, the application shall be considered as a contract in which the applicant agrees to abide by such rates, rules, and regulations in effect at the time of signing the application or as may be adopted thereafter by the City and to pay all charges, rates, and fees promptly.
- In addition to all other user rates and service connection fees required to be paid to the City, service call fees may apply when made at the request of the owner or occupant of the premises for assistance in locating and/or repairing a plugged sanitary sewer drain in accordance with the City's Municipal Code.
- The City shall manage its income and expenses in a self-supporting manner in compliance with applicable laws and regulations and its own financial policies.
- The City shall establish a Capital Improvement Plan (CIP) that describes the anticipated improvements or modifications to the sewer system, planned replacement of aging facilities, upgrades to existing facilities to provide additional capacity for projected growth, and construction of general facilities to aid growth. The CIP will be completed on a biennium basis.

≠ A working capital reserve will be maintained to cover unanticipated emergencies, bad debts, and fluctuations in cash flow.

≠ The City will maintain information systems that provide sufficient financial and statistical information to ensure conformance with rate-setting policies and objectives.

### *Connection Charges*

The owners of properties that have not been assessed, charged, or borne an equitable share of the cost of the sewer collection facilities shall pay one or more of the following connection charges prior to connection to a sewer main.

1. Latecomers Fees: Latecomers fees are negotiated with the City, developers, and property owners for the reimbursement of a pro rata portion of the original costs of sewer system extensions and facilities and are documented in a Recovery Contract or City resolution, depending on the application.
2. Connection Charge: The connection charge shall be assessed against any property connecting to the sewer system. This charge is for the major facilities that deliver the sewage to the County's Eastside Interceptor. This charge reimburses customers who have paid for the facilities described and for building capacity to accommodate growth.
3. Developer Extension Charges: These charges are for the administration, review, and inspection of a developer extension project.
4. Developer-funded Improvements: These are costs incurred by a developer to upgrade and increase capacity in the sewer system to accommodate the increase in flow from a proposed development.
5. King County Sewer Treatment Capacity Charge: The capacity charge shall be assessed against any property connecting to a sewer system served by the County. This charge is paid directly to the County for the County's major facilities that deliver the sewage to a WWTP and for the facilities to treat and dispose of the sewage. This charge reimburses customers who have paid for the facilities described and for building capacity to accommodate growth.

# Wastewater Collection Evaluation

6

## INTRODUCTION

The City of Kirkland (City) will require improvements to its collection system to accommodate growth in the City's sewer service area and collection system extensions and to repair damaged and deteriorating facilities. This chapter presents the evaluation of the City's existing sewer collection system. Individual sewer system components were analyzed to determine their ability to meet policies and design criteria under both existing and projected future flow conditions. The policies and design criteria are presented in **Chapter 5**, and the sewer system analysis is presented in **Chapter 4**. A description of the existing sewer system facilities and current operation is presented in **Chapter 2**.

## SEWER MODEL BACKGROUND

### *Hydraulic Model*

#### Background

Version 8i (SELECTseries 5) of the SewerCAD® program, developed by Bentley Systems, Inc., was used to develop a hydraulic model of the existing sewer collection system, which included gravity mains, force mains, and sewer lift stations. Pipe location, length, diameter, and material and manhole rim and invert elevations were imported to the hydraulic model based on geographic information system (GIS) data provided by the City for sewer facility attributes and contours within the City's sewer service area. The elevation data was spot checked in some areas with the City's as-built drawings. Minimum slope and cover values were also used in the model when no other information was available. These areas are annotated in the model. The output from the hydraulic model was used to evaluate the capacity of the existing collection system and identify general recommendations to handle existing and projected 6-year (2021) and 20-year (2035) sanitary sewer flow rates. The model can be updated and maintained for use as a tool to aid in future planning and design.

The City conducted pump down capacity testing for the lift stations as part of this General Sewer Plan (GSP). The pump down numbers received by the City were used in the model and are discussed further in **Chapter 2**.

The developed hydraulic model includes all gravity mains, lift stations, and force mains owned and operated by the City. Wastewater infrastructure owned and operated by King County (County) are not included in the hydraulic model and the capacity of these system components was not evaluated. These analyses assumed that the County's wastewater infrastructure has sufficient capacity for both existing and projected flow scenarios.

#### Model Limitations

Due to the number of data gaps and assumptions used in the model, the accuracy of the GIS information provided from the City should be confirmed prior to undertaking any replacement or rehabilitation projects. The results of the modeling should be considered approximate and additional investigations, such as field surveys, flow monitoring, and lift station pump down tests should be performed in the vicinity of any proposed improvements prior to design and construction. If it is found that the input information differs significantly from actual conditions, the model should be updated accordingly and rerun to confirm the original results.

The modeling was performed using a steady state analysis, which shows all flows reaching all downstream points simultaneously. This is conservative and not truly representative of conditions that occur, since it takes some time for wastewater to travel downstream through the sewer system, which stores and attenuates peak flows.

### Flow Data

The hydraulic model was constructed to simulate peak flows in the years 2014, 2021, and 2035. All of these hydraulic scenarios were based on historical winter water consumption, domestic sanitary flow projections, and the County's inflow and infiltration (I/I) flow rates for a 20-year storm peak hour event, as described in **Chapter 4.** The City's existing collection system can be broken into 13 sewer drainage basins and 39 subbasins, as shown in **Figure 2-4**. **Table 4-8** presents existing and projected domestic average annual flows (AAF) and peak hour flows (PHF) for each sewer drainage basin based on the estimated peaking factors for domestic sewer flows and the County's I/I flow rates, as described in **Chapter 4**. Similarly, **Table 4-9** presents this information for each of the City's lift stations. In order to model the flow loadings throughout the existing sewer system, the historical 2014 to 2015 average winter water consumption (AWWC) was compiled to estimate the existing (2014) domestic AAF for each connection currently being served by the City's sewer collection system. These sewer flows were distributed throughout the manholes in the hydraulic model based on locations of the parcels served.

Population and employment data received from the City's Planning Department provided the basis for distributing future flows throughout the City. As discussed in **Chapter 4**, projected domestic wastewater flows were estimated assuming a future AAF per capita of 76 gallons per capita per day (gpcd) and future AAF per employee of 20 gallons per employee per day (gped).

Wastewater flows from the City of Bellevue's (Bellevue) Yarrow Bay Sewer Drainage Basin, presented in **Table 4-8**, are discharged to the City's Yarrow Bay Sewer Drainage Basin. Wastewater flows from Bellevue's Yarrow Bay Sewer Drainage Basin were distributed at manholes in the hydraulic model based on the discharge locations of this basin to the City's Yarrow Bay Sewer Drainage Basin.

### Facilities

The hydraulic model of the existing sewer system contains all active existing system facilities owned and operated by the City. Available information for each lift station, such as pump capacity, total dynamic head (TDH), horsepower, wetwell diameter, wetwell depth, and force main diameter, is included in the model. For simplicity, the lift stations are modeled as constant discharge pumps so that they produce a constant discharge regardless of head conditions.

## *Hydraulic Analyses Results*

Hydraulic analyses were performed with the existing flow rates (2014), as well as future flow rates for the 2021 (6-year) and 2035 (20-year) projections. In the evaluation, the criteria for listing a sewer pipe as deficient is that the peak hour flow exceeds 80 percent of the pipe flow capacity. The results of the hydraulic analyses are given in **Appendix G**. **Figure 7-1** provides current system deficiencies and improvements for existing flows. **Figure 7-2** provides capacity deficiencies and improvements for anticipated developments for the 2021 projections. **Figure 7-3** provides capacity deficiencies and improvements for anticipated developments for the 2035 projections.

Some of the improvements presented in this chapter are from the 2010 GSP prepared by Roth Hill, LLC, and/or the City's Capital Improvement Plan (CIP).

## COLLECTION SYSTEM AND LIFT STATION ANALYSES

### *Gravity Collection System Pipe Capacity Analysis and Deficiencies*

Construction of the City's wastewater collection system began in the early 1940s in the downtown portion of the City as part of the federal government war housing projects. The City has approximately 122 miles of sewer piping, including collection sewers and interceptors. Approximately 79 percent of the existing system is 8-inch-diameter gravity main, totaling approximately 96 miles. **Chapter 2** provides additional history and background on the City's wastewater collection and treatment system.

#### Existing System (2014)

The hydraulic analysis of the existing collection system indicates that there are several sections of the collection system in the Eastside Interceptor, Juanita, Kirkland, and Yarrow Bay Sewer Drainage Basins that have insufficient capacity at peak hour flows and may need to be upsized.

- In the Eastside Interceptor Sewer Drainage Basin, a portion of the pipelines located along 124th Avenue NE, NE 112th Street, approximately NE 112th Street, Slater Avenue NE, 128th Avenue NE, NE 95th Street, NE 90th Street, Kirkland Avenue, NE 80th Street, NE 70th Street, NE 68th Street, 108th Avenue NE, 120th Avenue NE, and 130th Avenue NE have insufficient capacity at peak hour flows. These projects are included in CIPs SM2, SM7, EX22, EX23, EX48, EX49, EX75, EX133, EX134, EX135, EX136, EX138, EX214, EX215, EX236, EX248, EX269, and EX275, EX320, and EX321.

- In the Juanita Sewer Drainage Basin, a portion of the pipelines located along 98th Avenue NE, NE 108th Street, Forbes Creek Drive, approximately NE 109th Place, 1st Street, and 20th Avenue have insufficient capacity at peak hour flows. These projects are included in CIPs SM3, EX10, EX30, EX38, EX40, EX41, and EX42.

- In the Kirkland Sewer Drainage Basin, a portion of the pipelines located along 6th Street, Waverly Way, Market Street, Central Way, and 3rd Street have insufficient capacity at peak hour flows. These projects are included in CIPs SM6, SM9, EX117, EX142, EX143, EX154, and EX157.

- In the Yarrow Bay Sewer Drainage Basin, a portion of the pipelines located along Lakeview Drive, Lake Washington Boulevard NE, and Northup Way have insufficient capacity at peak hour flows. These projects are included in CIPs EX222, EX289, EX309, and EX319.

Based on the modeling results, there are approximately 19,375 linear feet (LF) of sewer mains that are hydraulically deficient at existing peak hour flows. Improvements to resolve these hydraulic capacity deficiencies, along with other recommended improvements for the City's existing sewer collection system, are included in **Figure 7-1** and the CIP in **Chapter 7**. The flow projections for 2035 were used to establish the proposed pipe diameters for the pipe capacity upgrades. Sewer mains with insufficient capacity for existing peak flows were scored to prioritize sewer main improvements, discussed further in **Chapter 7**.

### 2021 (6-year) System Projection

Based on the hydraulic analysis of the system using projected flow rates for 2021, and assuming the improvements to resolve the existing deficiencies will be completed, sections of the collection system in the Eastside Interceptor and Juanita Sewer Drainage Basins will need to be upsized.

- In the Eastside Interceptor Sewer Drainage Basin, a portion of the pipelines located along Slater Avenue NE will need to be upsized. This project is included in CIP DF4.
- In the Juanita Sewer Drainage Basin, a portion of the pipeline located along NE 112th Street will need to be upsized. This project is included in CIP DF3.

Based on the modeling results, there are approximately 675 LF of sewer mains that are hydraulically deficient at projected 2021 peak hour flows. Improvements to resolve these hydraulic capacity deficiencies are included in **Figure 7-2** and the CIP in **Chapter 7**. The pipe size upgrades for the 2021 flow projections were determined based on the capacity of the existing pipes, with improvements to resolve the existing deficiencies completed, being reached at the projected 2021 flow rate. However, the flow projections for 2035 were used to establish the proposed pipe diameters for the pipe capacity upgrades. All of the growth and related improvements for 2021 are necessary to accommodate flow from future developments when constructed.

### 2035 (20-year) System Projection

Based on the hydraulic analysis of the system using projected flow rates for 2035, and assuming the improvements to resolve the existing and projected 2021 deficiencies will be completed, sections of the collection system in the Eastside Interceptor, Juanita, and Kirkland Sewer Drainage Basins will need to be upsized.

- In the Eastside Interceptor Sewer Drainage Basin, a portion of the pipelines located along NE 97th Street, 124th Avenue NE, NE 95th Street, 128th Avenue NE, and NE 70th Street will need to be upsized. These projects are included in CIP DF7, DF8, DF9, DF10, and DF12.
- In the Juanita Sewer Drainage Basin, a portion of the pipeline located along NE 112th Street will need to be upsized. This project is included in CIP DF6.
- In the Kirkland Sewer Drainage Basin, a portion of the pipeline located along Waverly Way will need to be upsized. This project is included in CIP DF11.

Based on the modeling results, there are approximately 2,950 LF of sewer mains that are hydraulically deficient at projected 2035 peak hour flows. Improvements to resolve these hydraulic capacity deficiencies are included in **Figure 7-3** and the CIP in **Chapter 7**. The pipe size upgrades for the 2035 flow projections were determined based on the capacity of the existing pipes, with improvements to resolve the existing and projected 2021 deficiencies completed, being reached at the projected 2035 flow rate. The flow projections for 2035 were used to establish the proposed pipe diameters for the pipe capacity upgrades. All of the growth and related improvements for 2035 are necessary to accommodate flow from future developments when constructed.

### *Other Existing Gravity Collection System Deficiencies*

The projects listed in the previous sections are a result of the hydraulic modeling effort for 2014, 2021, and 2035. In addition to these projects, City staff desire to repair and rehabilitate other regions of the collection system due to their condition or frequently required maintenance. The 2010 GSP also identified some collection system improvements that have not been implemented yet. These projects are described in CIP SM1 through CIP SM13 and are shown on **Figure 7-1** in **Chapter 7**.

In addition, the City has also compiled databases for the video inspections it has recorded for the existing sewer collection system, shown in **Figure 6-1**, and operations and maintenance (O&M) costs the City has incurred for the years 2010 through 2015, shown in **Figure 6-2**. These databases were used as categories in the scoring for prioritizing sewer main improvements, discussed further in **Chapter 7**.

### *Inflow and Infiltration Analysis and Deficiencies*

Prior to 1962, stormwater systems were commonly connected to the sewer system. In addition, older pipes typically did not have joints with gaskets. Consequently, the sewer system suffered from excessive I/I. I/I increases the volume of flow a sewer system must convey, causing facilities to be sized larger than otherwise necessary. I/I also increases the cost of treating the wastewater at the County facilities. Consequently, if I/I can be located and reduced, the size and cost of improvements and O&M can also be reduced.

As indicated in the I/I section of **Chapter 4**, the County has estimated peak hour I/I flow rates in the City's sewer service area to range from 1,396 to 9,218 gallons per acre per day (gpad), which are relatively high I/I flow rates. These high I/I flow rates indicate that there might be an I/I problem in the City's sewer collection system. There are several projects that are included in the CIP in **Chapter 7** that will address known I/I areas.

Excessive I/I can cause collection system failures and impacts the available capacity in the City's sewer collection system. Therefore, the City should always be aware of the potential for I/I and continue efforts to construct new systems to prevent I/I and maintain existing facilities and pipelines as needed to remove I/I. The City should conduct an I/I study to confirm the areas of the collection system with high I/I and determine cost-effective sewer rehabilitation measures to remove any excessive I/I. This study is addressed in CIP M2, which is discussed further in **Chapter 7**.

### *Lift Station Capacity Analysis and Deficiencies*

The City's existing sewer system has six lift stations. All of the City's existing lift stations were constructed in the last 48 years. **Chapter 2** provides additional history and background on the City's lift stations.

#### Existing System

The hydraulic analysis of the City's existing lift stations shows that the Lake Plaza and Waverly Park Lift Stations need to be upgraded to accommodate peak flows. Further analysis of the Lake Plaza and Waverly Park Lift Stations are recommended to confirm the capacity of the lift stations and determine what upgrades will be necessary for the lift stations to handle existing and future flows. The capacity upgrades to the Lake Plaza and Waverly Park Lift Stations are discussed further in **Chapter 7**. The hydraulic analysis of the system using existing flow rates indicates there are no other capacity issues with the City's existing lift stations. All future lift station and related force main improvements are recommended to be designed for 2035 projected flows.

As discussed previously, capacity analyses of the lift station are based on estimated peak hour flows. According to discussions with the system operators, there are no known capacity deficiencies in the City's existing lift stations. Flows at the lift stations should continue to be monitored to determine if influent flow during peak events begins to approach or exceed the pumping capacity of the lift stations.

#### 2021 (6-year) System Projection

Future developer-funded lift station improvements may be required as redevelopment with higher densities occurs within the City's sewer service area. Future developer-funded lift station and related force main improvements are recommended to be designed for 2035 projected flows.

Based on the hydraulic analysis of the lift stations using projected flow rates for 2021, and assuming the improvements to resolve the existing lift station deficiencies will be completed, there will be no additional capacity issues with the City's lift stations by 2021.

#### 2035 (20-year) System Projection

Future developer-funded lift station improvements may be required as redevelopment with higher densities occurs within the City's sewer service area. Future developer-funded lift station and related force main improvements are recommended to be designed for 2035 projected flows.

Based on the hydraulic analysis of the lift stations using projected flow rates for 2035, and assuming the improvements to resolve the existing and projected 2021 lift station deficiencies will be completed, there will be no additional capacity issues with the City's lift stations by 2035.

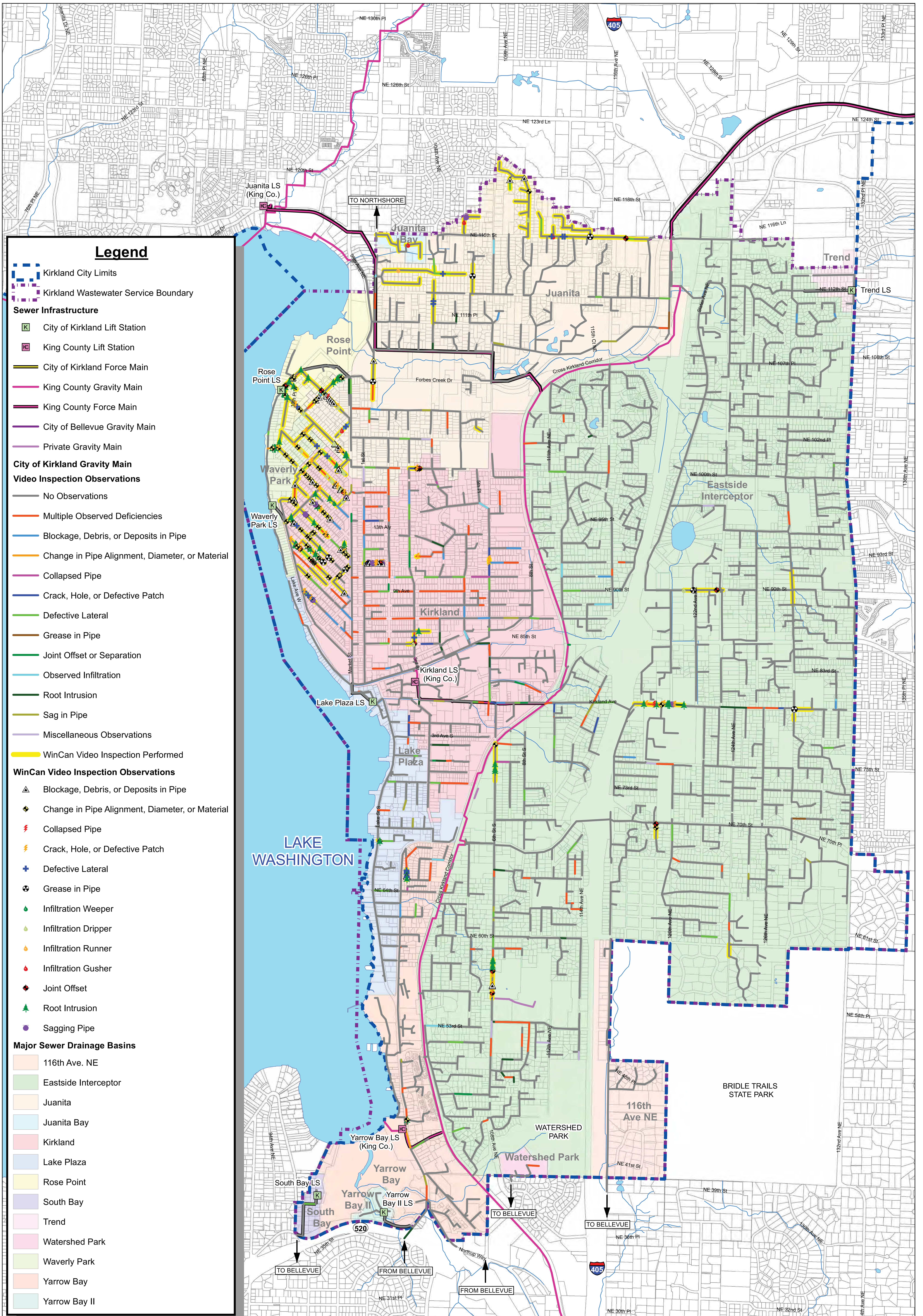
### *Other Existing Lift Station Facility Deficiencies*

**Rose Point Lift Station Upgrades** – The Rose Point Lift Station is almost 40 years old and is completely below ground with the exception of a small control panel that stands adjacent to the lift station. The Rose Point Lift Station was planned for relocation/reconstruction in the 2010 GSP due to age-related deterioration and a concern the station has insufficient pumping capacity to hydraulically pass peak flows during major storm events. A replacement for the Rose Point Lift Station is anticipated to have construction completed by the end of 2017.

The lift station improvements include a new wetwell/valve vault layout, control system, and emergency generator set. Construction of the proposed lift station will involve reusing the existing wetwell and converting the drywell to emergency offline storage. This improvement is addressed in CIP F1, which is discussed further in **Chapter 7**.

**Trend Lift Station** – The Trend Lift Station is almost 50 years old, but is generally in good working order. However, removing the lift station from service will reduce the City's O&M costs. It is recommended that this lift station be decommissioned and a gravity line from a manhole upstream of the Trend Lift Station be routed to one of three locations: south to another part of the City's existing sewer system; north to Northshore Utility District's existing sewer system; or east to the City of Redmond's existing sewer system through a developer extension. This improvement is addressed in CIP F2, which is discussed further in **Chapter 7**.

For modeling purposes, it was assumed that the Trend Lift Station would remain in operation to be conservative when determining downstream pipe capacities.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

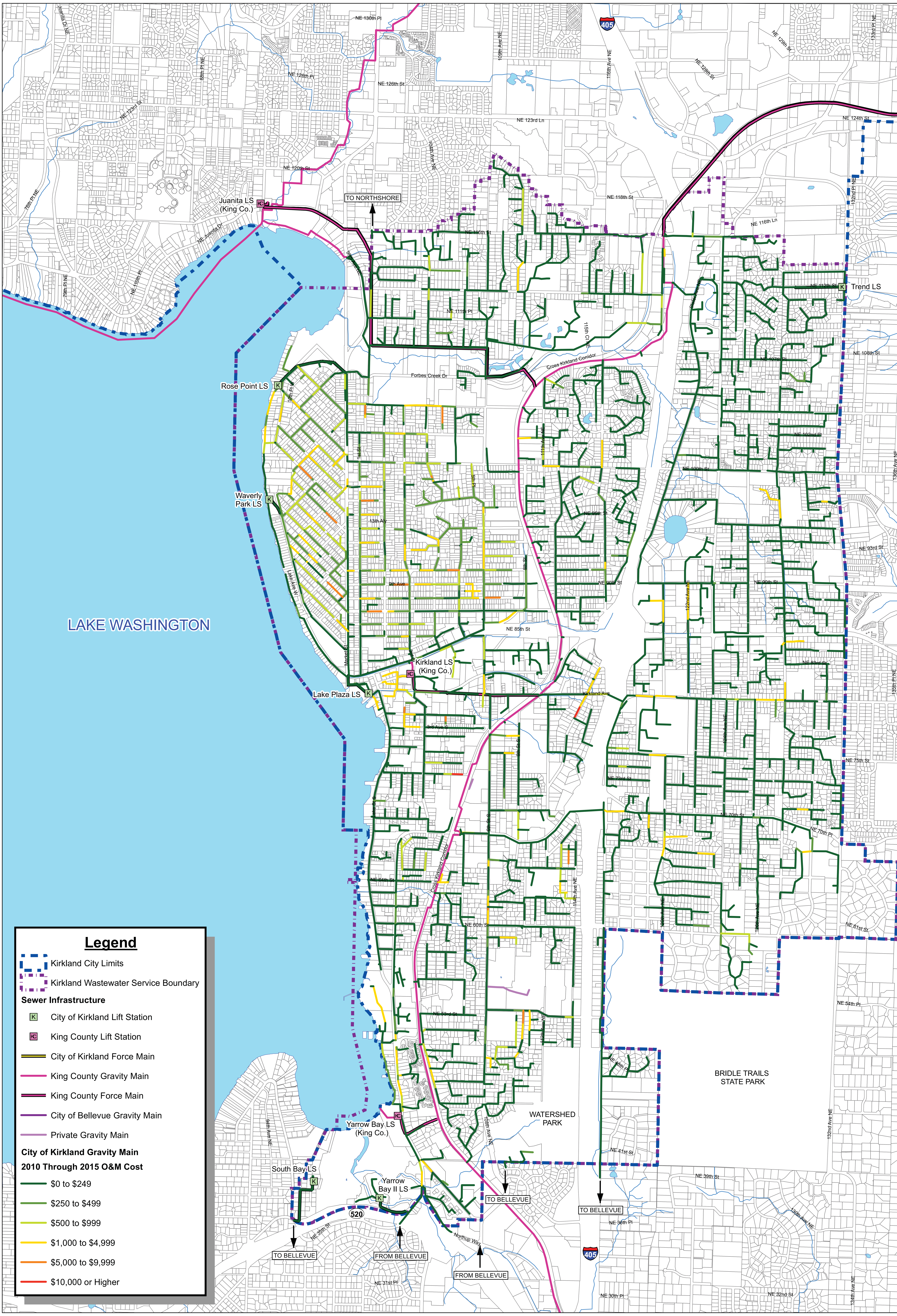
# Figure 6-1
# Video Inspection Observations
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

CITY OF KIRKLAND WASHINGTON

# Figure 6-2
# 2010 Through 2015 Sewer O&M Cost
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.

# Capital Improvement Plan

7

## INTRODUCTION

This chapter presents proposed improvements to the City of Kirkland's (City) sewer system that are necessary to resolve existing system deficiencies and plan for the projected sewer customer growth. The sewer system improvements were identified from an evaluation of the results of the system analyses presented in **Chapter 6**. The sewer system improvements were sized to meet the system's existing and future demand conditions.

A Capital Improvement Plan (CIP) number has been assigned to each improvement, as shown in **Figures 7-1**, **7-2**, and **7-3**. The improvements are organized and presented in this chapter according to the following primary categories.

- Existing System Improvements
- 2021 (6-year) System Improvements
- 2035 (20-year) System Improvements

Improvements for gravity collection piping, lift stations, force mains, and miscellaneous projects are listed under each of the three primary categories. The remainder of this chapter presents a brief description of each group of improvements, the criteria for prioritizing, the basis for the cost estimates, and the schedule for implementation.

For planning purposes, the improvement projects described herein are based on one alternative route or conventional concept for providing the necessary improvement. Other methods of achieving the same result, such as obtaining flow capacity increases by adding one large gravity main versus using multiple gravity pipes, force main/gravity main combinations, or multiple force mains, should be considered during predesign to ensure the best and lowest cost alternative design is selected. Further evaluation should be performed when more information is available regarding when and where future developments will occur.

## DESCRIPTION OF IMPROVEMENTS

This section provides a general description of each group of improvements and an overview of the deficiencies they will resolve. Some of the improvements are necessary to resolve existing system deficiencies.

The CIP numbers for recommended improvements to the existing sewer mains that were identified prior to this General Sewer Plan (GSP) (i.e., they were identified in the 2010 GSP prepared by Roth Hill, LLC, and/or the City's CIP) have an "SM" prefix (example: SM1 – 6th Street S Sewer Main Replacement). The City has commenced planning for the "SM" improvements and some of them are already in the design or construction phase.

The CIP numbers for recommended improvements to the existing sewer mains that were identified in this GSP, but not identified prior to this GSP, have an "EX" prefix (example: EX1 – NE 118th Street Sewer Main Replacement). These "EX" improvements are all identified under SM14 (Annual Sanitary Pipeline Replacement Program).

The CIP numbers for recommended improvements to existing facilities, such as lift stations and force mains, have an "F" prefix (example: F1 – Rose Point Sewer Lift Station Replacement). The CIP numbers for recommended planning studies have an "M" prefix (example: M2 – Inflow and Infiltration Study).

Some improvements will be necessary to serve areas in the City's sewer service area that will be redeveloped with higher densities. The major pipe and facility improvements that will be required when development occurs in these areas are considered to be developer-funded projects. The CIP numbers for developer-funded improvements have a "DF" prefix (example: DF1).

Additional projects include localized on-site sewer main improvements that are not associated with the existing overall sewer collection/interceptor system but will be necessary when the property served by the sewer system is redeveloped or expanded. The costs associated with all these improvements shall be borne by the developers, rather than the existing sewer customers. The locations of improvements in the unsewered areas are not shown, as they will be designed in the future to fit those neighborhoods as the sewer system is extended.

The required capacity and timing of each recommended improvement is provided for budgeting and financial projection purposes only. The actual design parameters should be evaluated at the design phase of the project, using the hydraulic model or another accepted engineering procedure. Updated population, employee, and flow data should be used when available to ensure the proposed facilities are adequately sized to handle build-out flows.

All the projections presented in this GSP will be completed in accordance with the City's construction standards.

## *Existing System Improvements*

The following improvements were identified by City staff, from the results of the system analyses, from previously prepared CIPs, as discussed in **Chapter 6**. These improvements are necessary to serve the existing sewer service area. The improvements include the major pipeline and facility construction that is required to properly serve the existing sewer service area. The improvement costs shall be borne by the existing customers, unless over-sizing of the improvements provides a benefit to developers.

The existing improvements are based on existing peak hour flow rates; however, the proposed pipe diameters for recommended replacement pipelines are based on the peak hour flow projections for 2035. The existing system improvements are illustrated in **Figure 7-1**. RH2 Engineering, Inc.'s analysis shows the best apparent replacement alignment based on information currently available. A variety of alternatives are possible for the CIP projects listed, and alternatives should and will be considered during the design of each project.

### CIP SM1: 6th Street S Sewer Main Replacement

**City's Existing Project No.:** SS 0051
**Estimated Cost:** $965,000
**Proposed Years:** 2017 through 2018

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Eastside Interceptor Sewer Drainage Basin along 6th Street S between NE 68th Street and approximately 8th Avenue S has a flow capacity deficiency currently, shown on **Figure 7-1**.

**Improvement:** The 2010 GSP identified that approximately 950 linear feet (LF) of 8- and 10-inch concrete gravity sewer main needs to be replaced along 6th Street S between NE 68th Street and approximately 8th Avenue S. A preliminary design investigation should be performed to evaluate the feasibility of replacing the existing sewer main utilizing trenchless construction methods versus replacing the existing sewer main utilizing open-cut methods with 15-inch polyvinyl chloride (PVC) pipe.

### CIP SM2: 108th Avenue NE Sewer Main Replacement

**City's Existing Project No.:** SS 0052
**Estimated Cost:** $5,506,000
**Proposed Years:** 2018 through 2020

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Eastside Interceptor Sewer Drainage Basin along 108th Avenue NE between NE 68th Street and NE 53rd Street is concrete pipe that has significant structural deficiencies that require higher maintenance and a flow capacity deficiency, shown on **Figure 7-1**.

**Improvement:** The 2010 GSP identified that approximately 4,000 LF of 8-inch concrete gravity sewer main needs to be replaced and/or rehabilitated along 108th Avenue NE between NE 68th Street and NE 53rd Street. A preliminary design investigation should be performed to evaluate the feasibility of rehabilitating the existing sewer main versus the need to replace the existing sewer main with 8- to 12-inch PVC.

### CIP SM3: NE 108th Street Sewer Main Replacement

**City's Existing Project No.:** SS 0062
**Estimated Cost:** $6,569,500
**Proposed Years:** 2020 through 2021

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Juanita Sewer Drainage Basin along NE 108th Street between approximately Forbes Creek at 100th Avenue NE and 108th Avenue NE is concrete and ductile iron (DI) pipe that has significant infiltration and inflow (I/I) and has a flow capacity deficiency, shown on **Figure 7-1**.

**Improvement:** The 2010 GSP identified that approximately 3,000 LF of 8- and 12-inch concrete and DI gravity sewer main needs to be replaced and/or rehabilitated along NE 108th Street between approximately Forbes Creek at 100th Avenue NE and 108th Avenue NE. A preliminary design investigation should be performed, which would include video inspection, to evaluate the feasibility of rehabilitating the existing sewer main versus the need to replace the existing sewer main with 15- to 18-inch PVC pipe.

### CIP SM4: 1st Street Sewer Main Replacement

**City's Existing Project No.:** SS 0069
**Estimated Cost:** $3,820,000
**Proposed Years:** 2016 through 2017

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Kirkland Sewer Drainage Basin along 1st Street between Central Way and 16th Avenue, shown on **Figure 7-1**, is concrete and PVC pipe. The concrete sewer pipe was installed prior to 1950, has exceeded its design life, and is deteriorating. In addition, some of the sewer mains have a 6-inch diameter, which is smaller than the current minimum requirement of 8 inches.

**Improvement:** The 2010 GSP identified that approximately 4,170 LF of 6- and 8-inch concrete and PVC gravity sewer main needs to be replaced along 1st Street between Central Way and 16th Avenue with 8-inch PVC pipe.

### CIP SM5: 5th Street Sewer Main Replacement

**City's Existing Project No.:** SS 0070
**Estimated Cost:** $1,284,000
**Proposed Years:** 2016 through 2017

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Kirkland Sewer Drainage Basin along 5th Street between Central Way and 9th Avenue, shown on **Figure 7-1**, is concrete and PVC pipe. The concrete sewer pipe was installed prior to 1950, has exceeded its design life, and is deteriorating.

**Improvement:** The 2010 GSP identified that approximately 1,430 LF of 8- and 12-inch concrete and PVC gravity sewer main needs to be replaced along 5th Street between Central Way and 9th Avenue with 8- and 12-inch PVC pipe.

### CIP SM6: 6th Street Sewer Main Replacement

**City's Existing Project No.:** SS 0071
**Estimated Cost:** $287,000
**Proposed Year:** 2016

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Kirkland Sewer Drainage Basin along 6th Street between 10th Avenue and 11th Avenue is concrete pipe that has a flow capacity deficiency currently, shown on **Figure 7-1**. The concrete sewer pipe was installed prior to 1950 and has a 6-inch diameter, which is smaller than the current minimum requirement of 8 inches.

**Improvement:** The 2010 GSP identified that approximately 325 LF of 6-inch concrete gravity sewer main needs to be replaced along 6th Street between 10th Avenue and 11th Avenue with 8-inch PVC pipe.

### CIP SM7: Kirkland Avenue Sewer Main Replacement

**City's Existing Project No.:** SS 0072
**Estimated Cost:** $2,298,400
**Proposed Year:** 2018 though 2019

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Eastside Interceptor Sewer Drainage Basin along Kirkland Avenue NE between the Cross Kirkland Corridor and Interstate 405 (I-405) is concrete pipe that has a flow capacity deficiency for peak hour flow projections, shown on **Figure 7-1**.

**Improvement:** The 2010 GSP identified that approximately 1,550 LF of 8-inch concrete gravity sewer main needs to be replaced along Kirkland Avenue NE between the Cross Kirkland Corridor and I-405 with 12-inch PVC pipe.

### CIP SM8: 3rd Avenue S and 2nd Street S Sewer Main Replacement

**City's Existing Project No.:** SS 0079
**Estimated Cost:** $361,600
**Proposed Year:** 2016

**Deficiency:** This deficiency was identified in the City's CIP. The sewer collection system in the Kirkland Sewer Drainage Basin along 2nd Street S between 1st Avenue S and 3rd Avenue S and along 3rd Avenue S between 2nd Street S and State Street S is 6-inch concrete pipe that was installed prior to 1950, shown on **Figure 7-1**.

**Improvement:** Approximately 780 LF of 6-inch concrete gravity sewer main needs to be replaced along 2nd Street S between 1st Avenue S and 3rd Avenue S and along 3rd Avenue S between 2nd Street S and State Street S with 8-inch PVC pipe.

**Note:** This project was finished in early 2017, during completion of this GSP update.

### CIP SM9: 3rd and Central Way Sanitary Sewer Crossing

**City's Existing Project No.:** SS 0082
**Estimated Cost:** $300,000
**Proposed Year:** 2016

**Deficiency:** This deficiency was identified in the City's CIP. The sewer collection system in the Kirkland Sewer Drainage Basin that crosses Central Way near the intersection of Central Way and 3rd Street is DI and PVC pipe that has a flow capacity deficiency currently, shown on **Figure 7-1**.

**Improvement:** Approximately 90 LF of 24-inch DI and PVC gravity sewer main needs to be replaced near the intersection of Central Way and 3rd Street with 30-inch pipe. The sewer main for this project may have limited cover, so the pipe may need to be DI. In addition, the existing manholes in the project vicinity may need to be replaced with manholes that have a greater than 48-inch diameter to accommodate the larger sewer mains.

**Note:** During the completion of this GSP update, additional survey and modeling suggested the existing pipe provides sufficient capacity for this planning period and this CIP was removed from the City's adopted CIP. For continuity, this CIP is shown in this chapter and **Table 7-2**.

### CIP SM10: West of Market Sewer Main Replacement

**City's Existing Project No.:** SS 0077
**Estimated Cost:** $21,681,000
**Proposed Years:** 2020 through 2030

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The sewer collection system in the Market Neighborhood, from Market Street to Lake Washington and from Waverly Way to Forbes Creek Drive, is composed of concrete, PVC, asbestos cement (AC), and DI sewer pipes. Most of the sewer mains in the Market Neighborhood are concrete pipe that was installed prior to 1950, has exceeded its design life, and has excessive I/I. In addition, some of the sewer mains have a 6-inch diameter, which is smaller than the current minimum requirement of 8 inches. This project is located in the Juanita, Kirkland, Lake Plaza, Rose Point, and Waverly Park Sewer Drainage Basins, shown on **Figure 7-1**.

**Improvement:** The 2010 GSP identified that approximately 45,000 LF of 6- to 12-inch gravity sewer main in the Market Neighborhood, from Market Street to Lake Washington and from Waverly Way to Forbes Creek Drive, needs to be rehabilitated and/or replaced with 8- to 12-inch PVC.

### CIP SM11: Annual Sewer Critical Areas Ordinance/Surface Water Design Manual Support

**City's Existing Project No.:** SS 7777
**Estimated Cost:** $700,000
**Proposed Years:** 2017

**Deficiency:** This deficiency was identified in the City's CIP. The City changed its design and construction requirements for City right-of-way capital projects with the 2016 City updates to Critical Areas Ordinance (CAO) Codes (Kirkland Municipal Code Chapters 83, 85, and 90) and the 2016 City adoption of the April 24, 2016, King County, Washington, *Surface Water Design Manual* (SWDM).

**Improvement:** Provide for the additional design and construction costs for City right-of-way capital projects to comply with the requirement changes of the 2016 City updates to CAO Codes (Kirkland Municipal Code Chapters 83, 85, and 90) and the 2016 City adoption of the April 24, 2016, King County, Washington, SWDM.

### CIP SM12: Annual Sanitary Pipeline Replacement Program

**City's Existing Project No.:** SS 8888
**Estimated Cost:** $1,333,200
**Proposed Years:** 2021 through 2022

**Deficiency:** This deficiency was identified in the City's CIP. A large portion of the City's sewer collection system contains concrete and asbestos cement sewer main that is old and prone to problems. In addition, some areas of the City's sewer collection system have higher maintenance requirements. The City desires to replace sewer pipelines, as necessary, to improve overall system reliability and reduce maintenance costs for the sewer collection system.

**Improvement:** Replacement of sewer pipelines, as necessary, to improve overall system reliability and reduce maintenance costs.

### CIP SM13: Annual Sanitary Pump Station/System Upgrade Program

**City's Existing Project No.:** SS 9999
**Estimated Cost:** $1,333,200
**Proposed Years:** 2021 through 2022

**Deficiency:** This deficiency was identified in the City's CIP. The City desires to install sewer pump station upgrades, as necessary, to improve overall system reliability and reduce maintenance costs for the pump stations.

**Improvement:** Installation of sewer pump station upgrades, as necessary, to improve overall system reliability and reduce maintenance costs.

### CIP SM14: Annual Sanitary Pipeline Replacement Program

**Total Estimated Cost:** $236,363,000
**Proposed Years:** 2023 through 2060

**Deficiency:** The sewer collection system has additional deficiencies other than the deficiencies that are identified in CIP SM1 through CIP SM13, shown on **Figure 7-1**. These deficiencies include, but are not limited to, sewer mains that have a flow capacity deficiency currently according to the hydraulic model, have exceeded their design life and are constructed of a material that could be deteriorating (such as concrete and AC), and/or a 6-inch diameter, which is smaller than the current minimum requirement of 8 inches.

**Improvement:** This CIP includes all recommended improvements to the existing sewer mains that were not identified prior to this GSP, which are listed as CIP EX2 through CIP EX322. Approximately 275,000 LF of gravity sewer main needs to be replaced and/or rehabilitated in the City's sewer collection system. These projects are presented in **Tables 7-2** and **7-3** (located at the end of this chapter) with their priority ranking, which is discussed in the **Prioritizing Improvements** section of this chapter.

Note, CIP EX1 was removed as this improvement is located in the area that was acquired by the Northshore Utility District in 2017 (NE 124th Street Sewer Drainage Basin). Costs for this project were omitted from this chapter.

### CIP F1: Rose Point Sewer Lift Station Replacement

**City's Existing Project No.:** SS 0073
**Estimated Cost:** $1,110,000
**Proposed Year:** 2016

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The Rose Point Lift Station is almost 40 years old and completely below ground, with the exception of a small control panel that stands adjacent to the lift station. The Rose Point Lift Station was planned for relocation/reconstruction in the 2010 GSP due to age-related deterioration and a concern the station has insufficient pumping capacity to hydraulically pass peak flows during major storm events. A replacement for the Rose Point Lift Station is currently being designed and is anticipated to be constructed in 2016.

**Improvement:** Replace the existing lift station. The proposed lift station will include a new wetwell/valve vault layout, control system, and emergency generator set. Construction of the proposed lift station will involve reusing the existing wetwell and converting the drywell to emergency, off-line storage.

### CIP F2: Trend Lift Station Abandonment

**Estimated Cost:** $3,551,000
**Proposed Years:** 2023 through 2025

**Deficiency:** This deficiency was identified in the City's 2010 GSP. The Trend Lift Station is almost 50 years old and nearing the end of its design life. This lift station does not have an on-site engine generator for standby power and has an old RUGID system for telemetry. In addition, elimination of the lift station reduces the burden on the operation and maintenance staff. The installation of a gravity sewer line from the Trend Lift Station to existing gravity sewer main will eliminate the need for the Trend Lift Station.

**Improvement:** Construct 8-inch gravity sewer pipe to convey sewer flows from the Trend Sewer Drainage Basin to existing gravity sewer main. The City currently has three alternatives for rerouting sewer flows that it will consider when abandoning the Trend Lift Station.

1. Install approximately 4,300 LF of gravity sewer main from Trend Lift Station south and connect to the City's existing sewer system near the intersection of NE $100^{th}$ Street and $132^{nd}$ Avenue NE. If this alternative is implemented, this CIP item should be completed after CIP EX22, EX48, EX75, EX135, and EX136.
2. Install approximately 3,300 LF of gravity sewer main from the Trend Lift Station north and connect to Northshore Utility District's (Northshore) existing sewer system near the intersection of NE $120^{th}$ Street and $132^{nd}$ Avenue NE. An interlocal agreement with Northshore would be required and additional improvements in Northshore's sewer system may be needed to implement this alternative.
3. Install approximately 800 LF of gravity sewer main from the Trend Lift Station north or south as necessary and connect to the City of Redmond's (Redmond) existing sewer system through a developer extension along $132^{nd}$ Avenue NE near the Trend Lift Station. There is currently a development under construction at the intersection of NE $110^{th}$ Place and $132^{nd}$ Avenue NE and another development being considered east of the intersection of NE $112^{th}$ Place and $132^{nd}$ Avenue NE that could be connected to. An interlocal agreement with Redmond would be required and additional improvements in Redmond's sewer system may be needed to implement this alternative.

The Trend Lift Station can be abandoned after sewer flows are rerouted from the lift station. If CIP F2 is constructed, CIP EX23 may not be necessary.

If the second alternative is implemented, additional CIP projects will likely be necessary to increase the capacity of some of the sewer mains in the Eastside Interceptor Sewer Drainage Basin between the proposed discharge location (near the intersection of NE $120^{th}$ Street and $132^{nd}$ Avenue NE) and the corresponding connection to King County's (County) Eastside Interceptor.

The cost for this CIP was estimated based on the first alternative, which is estimated to have the highest capital cost of the three alternatives presented for the sewer mains needed to redirect sewer flows from the Trend Sewer Drainage Basin to the new discharge location. The estimated cost for this CIP does not account for any additional improvements that may be necessary to convey sewer flows from the proposed discharge locations to the corresponding connection to the County's sewer system.

### CIP F3: Waverly Park Lift Station Improvements

**Estimated Cost:** $1,178,000
**Proposed Years:** 2023 through 2025

**Deficiency:** The Waverly Park Lift Station has a firm capacity of approximately 285 gallons per minute (gpm). This is insufficient for the estimated existing peak hour flow, and the pumping capacity could be exceeded during a 20-year storm peak hour event, as described in **Chapter 4**.

**Improvement:** Upgrade the lift station capacity so it can handle at least approximately 330 gpm. The Waverly Park Lift Station was constructed in 2005 and is generally in good condition. The design capacity of this lift station is 320 gpm. Additional pump testing should be performed to evaluate if the firm capacity of this lift station is actually greater than what the City determined it was during the drawdown tests performed as part of this GSP update. These improvements will include replacement of both pumps at the lift station, electrical gear to handle larger horsepower pumps, and the on-site generator. The scope and cost for these improvements may be reduced depending on the improvements that are necessary to increase the capacity of this lift station.

### CIP M1: Reclaimed Water (Purple Pipe) Opportunity Fund

**City's Existing Project No.:** SS 0084
**Estimated Cost:** $5,000,000
**Proposed Years:** 2030 through 2035

**Deficiency:** Reclaimed water, also commonly referred to as recycled water, from the County's recently constructed Brightwater Treatment Plant could be utilized in the future as a potential water source for non-potable purposes in the City, such as street cleaning, sewer main flushing, and irrigation.

**Improvement:** Reclaimed water from the Brightwater Treatment Plant could be conveyed to the City in the future through a transmission main in the Eastside Rail Corridor and/or the Cross Kirkland Corridor. The City is a member of the Cascade Water Alliance (Cascade) and is currently provided water supply under a contract between Seattle Public Utility (SPU) and Cascade. Cascade is currently partnered with the County to perform a reclaimed water feasibility study in and near the Sammamish Valley Corridor. Cascade is working with the County to adjust some of the reclaimed water laws and guidelines, so the County could potentially provide reclaimed water from the Brightwater Treatment Plant to members of Cascade in areas where reclaimed water makes sense. As a member of Cascade, the City is participating in this coordinated effort. As part of this effort, the City has identified a list of potential reclaimed water user in the City's water service area (**Appendix I**), which includes the top 20 water users and top 10 irrigation users in the City's water service area.

### CIP M2: Inflow and Infiltration Study

**Estimated Cost:** $250,000
**Proposed Years:** 2023 through 2025

**Deficiency:** This deficiency was identified in the City's 2010 GSP. As indicated in the I/I section of **Chapter 4**, the County has estimated peak hour I/I flow rates in the City's sewer service area to range from 1,396 to 9,218 gallons per acre per day (gpad), which are relatively high I/I flow rates. These high I/I flow rates indicate that there is a substantial I/I problem in the City's sewer collection system. The areas with the highest peak hour I/I flow rates include the downtown area and sections of the City's sewer service area adjacent to Lake Washington and Yarrow Bay; the areas with the lowest peak hour I/I flow rates include the eastern and northern regions of the City's sewer system.

**Improvement:** It is recommended that the City conduct an I/I study on its sewer collection system to confirm the results of the County's I/I evaluation and locate the affected collection system areas to determine cost-effective sewer rehabilitation measures to remove excessive I/I. This program will work towards eliminating sources of I/I, replacing or refurbishing mains, manholes, and service lines, and disconnecting in-flow sources.

Approximately $75,000 should be allocated to in-stream flow monitoring for this I/I study. As part of this I/I study, additional hydraulic analyses should be performed with this flow monitoring data using a more sophisticated, fully dynamic hydraulic modeling program, such as EPA-SWMM, to more accurately determine the locations of high I/I and if they can be cost-effectively rehabilitated. A fully dynamic hydraulic modeling program will provide a more accurate representation of flows in the City's sewer collection system during peak hour conditions by incorporating processes such as flow attenuation. A fully dynamic hydraulic modeling program may show that some of the CIP projects identified in this GSP to resolve sewer main and lift station capacity deficiencies are not necessary.

### CIP M3: General Sewer Plan Update

**Estimated Cost:** $600,000
**Proposed Years:** 2025, 2035, 2045, and 2055

**Deficiency:** The City's GSP should be updated every 10 years.

**Improvement:** The City will update its GSP every 10 years. In addition, the City may elect to perform a review of the GSP at the 5-year mark and adjust the projections and improvements as necessary.

## *2021 System Improvements*

The 2021 improvements were identified from the results of the system analyses discussed in **Chapter 6**. All these improvements are the result of projected capacity deficiencies based on 2021 peak hour flow projections. These improvements will be necessary to serve areas that are anticipated to redevelop with higher densities in the City's sewer service area. The improvements include the major pipeline and facility construction that will be required to properly serve these areas. The improvement costs shall be borne by the developers, rather than the existing customers, unless over-sizing of the improvements provides benefit to the existing customers. Additional developer-funded projects that are not described in this section would include localized, on-site improvements that are not associated with overall collection systems outside of the property being developed but would be necessary to serve the interior portions of the development area.

The pipe diameter upgrades for the 2021 peak hour flow projections are scheduled based on 2021 flow rate exceeding the capacity of the existing pipes. However, the proposed pipe diameters for the pipe capacity upgrades are based on the peak hour flow projections for 2035. The 2021 improvements are based on the assumption that the existing improvements are complete. The 2021 system improvements are illustrated in **Figure 7-2**. A variety of alternatives are possible for the CIP projects listed, and further evaluation should be performed when more information is available regarding when and where future developments will occur.

### CIP DF1: Lake Plaza Lift Station Improvements

**Estimated Cost:** $1,257,000

**Deficiency:** The Lake Plaza Lift Station has a firm capacity of approximately 1,157 gpm. This is insufficient for the estimated existing peak hour flow, and the pumping capacity could be exceeded during a 20-year storm peak hour event, as described in **Chapter 4**.

**Improvement:** Upgrade the lift station capacity so it can handle at least approximately 1,390 gpm. The Lake Plaza Lift Station was constructed in 1997 and is generally in good condition. The design capacity of each pump at this lift station is 750 gpm. Additional pump testing should be performed to evaluate if the firm capacity of this lift station is actually greater than what the City determined it was during the drawdown tests performed as part of this GSP update. These improvements will include replacement of all three pumps at the lift station, electrical gear to handle larger horsepower pumps, and the on-site generator. The scope and cost for these improvements may be reduced depending on the improvements that are necessary to increase the capacity of this lift station.

### CIP DF3 through CIP DF4: 2021 Developer-funded Improvements

**Total Estimated Cost:** $785,000

**Deficiency:** The capacity of some of the City's sewer mains will be exceeded if residential, commercial, and industrial growth occur as projected, as shown on **Figure 7-2**.

**Improvement:** These CIP projects include all the developer-funded sewer main improvements recommended based on the 2021 flow projections. Replace approximately 675 LF of existing gravity sewer mains with larger diameter pipe, as shown in **Table 7-2** (located at the end of this chapter).

Note, CIP DF2 was removed as this improvement is located in the area that was acquired by the Northshore Utility District in 2017 (NE 124$^{th}$ Street Sewer Drainage Basin). Costs for this project were omitted from this chapter.

## *2035 System Improvements*

The 2035 improvements were identified from the results of the system analysis discussed in **Chapter 6**. All these improvements are the result of projected capacity deficiencies based on 2035 peak hour flow projections. These additional improvements will be necessary to serve areas that are anticipated to redevelop with higher densities in the City's sewer service area. The improvements include the major pipeline and facility construction that will be required to properly serve the system. The improvement costs shall be borne by the developers, rather than the existing customers, unless over-sizing of the improvements provides benefit to the existing customers. Additional developer-funded projects that are not described below would include localized on-site improvements that are not associated with the overall collection system outside of the property being developed but would be necessary to serve the interior portions of the development area.

The 2035 improvements are based on the 2035 peak hour flow rate projections and the assumption that the 2021 improvements are complete. The additional system improvements required for 2035 are illustrated in **Figure 7-3**. A variety of alternatives are possible for the CIP projects listed. Further evaluation should be performed when more information is available regarding when and where future developments will occur.

### CIP DF6 through CIP DF12: 2035 Developer-funded Improvements

**Total Estimated Cost:** $2,634,000

**Deficiency:** The capacity of some of the City's sewer mains will be exceeded if residential, commercial, and industrial growth occur as projected, as shown on **Figure 7-3**.

**Improvement:** These CIP projects include all the developer-funded sewer main improvements recommended based on the 2035 flow projections. Replace approximately 2,950 LF of existing gravity sewer mains with larger diameter pipe, as shown in **Table 7-2** (located at the end of this chapter).

Note, CIP DF5 was removed as this improvement is located in the area that was acquired by the Northshore Utility District in 2017 (NE 124$^{th}$ Street Sewer Drainage Basin). Costs for this project were omitted from this chapter.

## ESTIMATING COSTS OF IMPROVEMENTS

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed sewer projects in the City and around the Puget Sound area, are presented in 2017 dollars, and do not include future escalation. The costs were developed from a combination of recent bids on construction projects, vendor quotes, cost curves, scale-up and scale-down factors, and size and cost comparisons with similar projects. These project costs are developed for guidance in project evaluation from information available at the time of preparation. Additional costs were included for projects located partially in or within 50 feet of a wetland. No costs are included for extraordinary circumstances, such as potential discovery and remediation of contaminated materials or actions that may be required to address the existence of cultural artifacts. The project costs presented in the CIP are capital cost estimates, and do not represent life-cycle cost estimates.

The cost estimates include the estimated construction cost of the improvement, construction contingency, 10.0 percent sales tax, and indirect costs estimated at 35 percent of the construction cost for engineering preliminary design, final design, construction management services, permitting, and legal and administrative services.

Cost estimates for projects in the CIP are considered to be Class 5 estimates, based on standards established by the American Association of Cost Engineers (AACE). Class 5 estimates are described as generally being prepared with very limited information and subsequently have wide accuracy ranges. The typical accuracy range for this cost estimate class is from -20 percent to -50 percent on the low side and from +30 percent to +100 percent on the high side. Class 5 estimates are prepared for any number of strategic business planning purposes including, but not limited to, market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.

The final cost of the projects will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule, and other variable factors. As a result, the final project costs will likely vary from those presented. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

## PRIORITIZING IMPROVEMENTS

### *Sewer Main Improvements*

The recommended existing sewer main improvements that were identified prior to this GSP (i.e., the improvements identified under CIP SM1 through CIP SM13) were prioritized by the City based on the perceived need for the improvement to be completed prior to projects with fewer deficiencies or less risk of damage due to failure of the system. The recommended existing collection system improvements that were not identified prior to this GSP (i.e., the improvements identified under CIP SM14) were prioritized based on the criteria presented in this section to identify projects with the most deficiencies and greatest need for improvement.

**Table 7-1** lists criteria that were established for prioritizing the sewer main improvements. The criteria are based on the severity of the physical and capacity deficiencies of the existing sewer mains. The criteria are arranged in eight different categories with a weight factor assigned to each category. The

Existing Peak Hour Flow (PHF) Pipe Capacity, Video Inspection Results, and Historical Operations and Maintenance (O&M) Costs categories were given the most weight.

## Table 7-1
## Sewer Main Improvements Priority Ranking Criteria

| Score | Category | Weight Factor | Weighted Score |
|---|---|---|---|
| | **Existing PHF Pipe Capacity** | | |
| 5 | Ex. PHF is 100% or Higher of Pipe Capacity or 6-inch Diameter Gravity Main | 3 | 15 |
| 4 | Ex. PHF is 95% to 99% of Pipe Capacity | 3 | 12 |
| 3 | Ex. PHF is 90% to 94% of Pipe Capacity | 3 | 9 |
| 2 | Ex. PHF is 85% to 89% of Pipe Capacity | 3 | 6 |
| 1 | Ex. PHF is 80% to 84% of Pipe Capacity | 3 | 3 |
| 0 | Ex. PHF is Less Than 80% of Pipe Capacity | 3 | 0 |
| | **Video Inspection Results** | | |
| 5 | Collapsed Pipe | 3 | 15 |
| 4 | Crack, Hole, Surface Spalling, or Defective Patch | 3 | 12 |
| 3 | Observed Infiltration | 3 | 9 |
| 2 | Blockage, Debris, or Deposits in Pipe<br>Grease in Pipe<br>Joint Offset or Separation<br>Root Intrusion<br>Sag in Pipe | 3 | 6 |
| 1 | Change in Pipe Alignment, Diameter, or Material<br>Defective Lateral<br>Miscellaneous Observations | 3 | 3 |
| | **Historical O&M Costs (Jan. 2010 through Dec. 2015)** | | |
| 5 | $10,000 or Higher | 3 | 15 |
| 4 | $5,000 to $9,999 | 3 | 12 |
| 3 | $1,000 to $4,999 | 3 | 9 |
| 2 | $500 to $999 | 3 | 6 |
| 1 | $250 to $499 | 3 | 3 |
| 0 | $0 to $249 | 3 | 0 |
| | **Coordination with Other Projects in the Same Area** | | |
| 5 | Adjacent to Funded CIP Project | 2 | 10 |
| 4 | Adjacent to Unfunded CIP Project | 2 | 8 |
| 2 | Adjacent to Unscheduled High-priority Water CIP Project | 2 | 4 |
| 1 | Adjacent to Unscheduled Low-priority Water CIP Project | 2 | 2 |
| 0 | Not Adjacent to Identified CIP Project | 2 | 0 |
| | **Existing Sewer Main Material** | | |
| 5 | Asbestos Cement | 2 | 10 |
| 4 | Concrete, Clay | 2 | 8 |
| 3 | Unknown | 2 | 6 |
| 0 | Ductile Iron, HDPE, PVC | 2 | 0 |
| | **Existing Sewer Main Year of Installation** | | |
| 5 | Before 1950 or Unknown | 2 | 10 |
| 4 | 1950 to 1959 | 2 | 8 |
| 3 | 1960 to 1969 | 2 | 6 |
| 2 | 1970 to 1979 | 2 | 4 |
| 1 | 1980 to 1989 | 2 | 2 |
| 0 | After 1989 | 2 | 0 |
| | **Existing PHF** | | |
| 5 | High Flow (Ex. PHF of 1,000 gpm or Higher) | 1 | 5 |
| 4 | Medium to High Flow (Ex. PHF of 500 to 999 gpm) | 1 | 4 |
| 3 | Medium Flow (Ex. PHF of 250 to 499 gpm) | 1 | 3 |
| 2 | Low to Medium Flow (Ex. PHF of 100 to 249 gpm) | 1 | 2 |
| 1 | Low Flow (Ex. PHF is Less Than 100 gpm) | 1 | 1 |
| | **Proximity to Environmental Sensitive Areas (Landslide Hazard, Seismic Hazard, and/or Wetland)** | | |
| 4 | Within 50 ft of at Least 2 Types of Environmental Sensitive Areas | 1 | 4 |
| 2 | Within 50 ft of 1 Type of Environmental Sensitive Area | 1 | 2 |
| 0 | Not Within 50 ft of Any Environmental Sensitive Area | 1 | 0 |

The Existing PHF Pipe Capacity category ranks the sewer main improvements based on the ability of the existing sewer mains to convey the existing peak hour flow through the sewer mains. Capacity evaluations are determined from the results of the hydraulic analyses addressed in **Chapter 6**, or if the sewer mains have a 6-inch diameter (which is smaller than the current minimum diameter requirement of 8 inches). The Video Inspection Results category ranks the sewer mains based on the types of defects the City currently has on record. The Historical O&M Costs category ranks the sewer main improvements based on the cost of labor and materials reported by the City to operate and maintain the sewer mains from January 2010 through December 2015. The Coordination with Other Projects in Same Area category ranks the sewer main improvements based on other City projects scheduled in the same area (within 35 feet) of the proposed improvement. The Existing Sewer Main Material category ranks the sewer main improvements based on the material of the existing sewer main. The Existing Sewer Main Year of Installation category ranks the sewer main improvements based on the age of the existing sewer main. The Existing PHF category ranks the sewer main improvements based on the existing peak hour flow through the sewer mains, as determined from the results of the hydraulic analyses addressed in **Chapter 6**. The Proximity to Environmental Sensitive Areas category ranks the sewer main improvements based on if there are any environmental sensitive areas (landslide hazard, seismic hazard, and/or wetland) within 50 feet of the improvement.

The sewer main priority ranking criteria was applied to the sewer main replacement projects that are not identified as developer-funded improvement projects. These sewer main replacement projects are presented in **Tables 7-2** and **7-3** (located at the end of this chapter) with their priority ranking (which was based on the highest scoring pipe for each CIP), and are also shown in **Figure 7-1**. **Figure 7-4** shows the priority rankings of all sewer mains replacement projects identified in this CIP that are not identified as developer-funded improvement projects. **Table 7-3** (located at the end of this chapter) presents the recommended improvement projects for the Annual Sanitary Pipeline Replacement Program (CIP SM14) sorted by priority rank, which is discussed in the **Prioritizing Improvements** section of this chapter.

### *Facility and Miscellaneous Improvements*

The City prioritized the facility improvements based on existing deficiencies, safety concerns, maintenance requirements, and capacity requirements. The miscellaneous improvements were prioritized based on regulatory requirements and assessment of the sewer system needs. The priority order of these improvements is reflected in the schedule of improvements, which is presented in **Table 7-2**.

### *Developer-funded Improvements*

Priority and schedule for developer-funded projects is dependent on the timing and design of specific development areas. For planning purposes, a general schedule has been established for the developer-funded projects; however, the estimated schedule will need to be modified as development occurs.

Future projects that are not identified as part of this CIP may become necessary. Such projects may be required to remedy an emergency or address unforeseen problems. Due to budgetary constraints, the completion of such projects may require modifications to the recommended CIP. The City retains the flexibility to reschedule, expand, or reduce the projects included in the CIP and add new projects to the CIP, as best determined by City Council, when new information becomes available for review and analysis.

## SCHEDULE OF IMPROVEMENTS

The results of prioritizing the improvements were used to assist in establishing an implementation schedule that can be used by the City for preparing its 6-year CIP. The implementation schedule for the proposed improvements is shown in **Table 7-2**. Developer-funded improvement projects are planned to start in 2016. The City will identify and schedule the repair/replacement projects during the annual budget process. This provides the City with the flexibility to coordinate these projects with road or other projects within the same area. The developer-funded improvement projects and their associated cost estimates are also shown in **Table 7-2**. However, the implementation dates for these improvements are likely to change, due to the uncertainty of the timing of the future developments that will be responsible for these improvements.

### *Future Project Cost Adjustments*

All cost estimates shown in the tables are presented in year 2017 dollars. Therefore, it is recommended that future costs be adjusted to account for the effects of inflation and changing construction market conditions at the actual time of project implementation. Future costs can be estimated using the Engineering News Record Construction Cost Index for the Seattle area or by applying an estimated rate of inflation that reflects the current and anticipated future market conditions.

The CIP presented in **Table 7-2** is based on the information currently available. As the City implements the recommendations, the cost and timing of projects may be revised. The two elements that are most likely to affect the costs and schedule of projects in the CIP table are:

- Condition assessment, particularly of the lift stations; and
- Collection system flow monitoring.

Once these activities are completed or under way, the City can reassess the priority and timing of the projects in the CIP.

## Table 7-2
## Proposed Improvements Implementation Schedule

| CIP No. | Project Description: In | From | To | Size: Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank | Planned Year of Project and Estimated Cost (x 1,000): 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Sewer Main Improvements** | | | | | | | | | | | | | | |
| SM1 | 6th Street S Sewer Main Replacement (SS 0051) | | | 950 | 15", 12" | $965,000 | 30 | M | | $146 | $819 | | | | | | | | | |
| SM2 | 108th Avenue NE Sewer Main Replacement (SS 0052) | | | 4,000 | 12", 8" | $5,506,000 | 59 | H | | | $711 | $3,236 | $1,559 | | | | | | | |
| SM3 | NE 108th Street Sewer Main Replacement (SS 0062) | | | 3,000 | 18", 15" | $6,569,500 | 38 | M | | | | | $3,390 | $3,179 | | | | | | |
| SM4 | 1st Street Sewer Main Replacement (SS 0069) | | | 4,170 | 8" | $3,820,000 | 51 | H | $354 | $3,466 | | | | | | | | | | |
| SM5 | 5th Street Sewer Main Replacement (SS 0070) | | | 1,430 | 12", 8" | $1,284,000 | 41 | H | $420 | $865 | | | | | | | | | | |
| SM6 | 6th Street Sewer Main Replacement (SS 0071) | | | 325 | 8" | $287,000 | 59 | H | $287 | | | | | | | | | | | |
| SM7 | Kirkland Avenue Sewer Main Replacement (SS 0072) | | | 1,550 | 12" | $2,298,400 | 54 | H | | | $285 | $2,013 | | | | | | | | |
| SM8 | 3rd Avenue S and 2nd Street S Sewer Main Replacement (SS 0079) | | | 780 | 8" | $361,600 | 65 | H | $362 | | | | | | | | | | | |
| SM9 | 3rd and Central Way Sanitary Sewer Crossing (SS 0082) | | | 90 | 30" | $300,000 | 30 | M | $300 | | | | | | | | | | | |
| SM10 | West of Market Sewer Main Replacement (SS 0077) | | | 45,000 | 12", 8" | $21,681,000 | 65 | H | | | | | $225 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $8,956 | |
| SM11 | Annual Sewer Critical Areas Ordinance / Surface Water Design Manual Support (SS 7777) | | | --- | --- | $700,000 | --- | --- | | $700 | | | | | | | | | | |
| SM12 | Annual Sanitary Pipeline Replacement Program (SS 8888) | | | --- | --- | $1,333,200 | --- | --- | | | | | | $400 | $933 | | | | | |
| SM13 | Annual Sanitary Pump Station/System Upgrade Program (SS 9999) | | | --- | --- | $1,333,200 | --- | --- | | | | | | $400 | $933 | | | | | |
| SM14 | Annual Sanitary Pipeline Replacement Program (CIP EX2 through CIP EX322) | | | 275,000 | 36", 30", 24", 18", 15", 12", 8", 6" | $236,158,000 | --- | --- | | | | | | | | $3,413 | $2,315 | $2,373 | $55,190 | $172,867 |
| **Total - Sewer Main Improvements** | | | | | | **$282,596,900** | **---** | **---** | **$1,722** | **$5,176** | **$1,815** | **$5,250** | **$5,174** | **$6,480** | **$4,366** | **$5,913** | **$4,815** | **$4,873** | **$64,146** | **$172,867** |
| | | | | | | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | | | | | | | |
| ~~EX1~~ | ~~NE 118th St~~ | ~~117th Ave NE~~ | ~~118th Ave NE~~ | ~~250~~ | ~~8"~~ | ~~$205,000~~ | ~~21~~ | ~~L~~ | | | | | | | | | | | | ~~$205~~ |
| EX2 | NE 116th St | 111th Pl NE | 111th Ave NE | 150 | 8" | $123,000 | 29 | M | | | | | | | | | | | | $123 |
| EX3 | NE 116th St | ~200' W of 117th Ave NE | ~117th Ave NE | 200 | 8" | $164,000 | 35 | M | | | | | | | | | | | | $164 |
| EX4 | NE 116th St (Freeway Crossing) | 120th Ave NE | 124th Ave NE | 1,450 | 24", 8" | $1,354,000 | 35 | M | | | | | | | | | | | | $1,354 |
| EX5 | 103rd Pl NE<br>NE 114th Pl<br>NE 115th Pl<br>105th Pl NE<br>105th Pl NE | NE 113th Pl<br>103rd Pl NE<br>103rd Pl NE<br>NE 115th Pl<br>~NE 114th Ln | ~NE 115th Ln<br>~115' W of 103rd Pl NE<br>105th Pl NE<br>NE 116th St<br>NE 114th St | 1,850 | 8" | $1,511,000 | 33 | M | | | | | | | | | | | | $1,511 |
| EX6 | 106th Ave NE | NE 112th St | ~NE 114th St | 775 | 8" | $633,000 | 28 | M | | | | | | | | | | | | $633 |
| EX7 | 108th Ave NE | NE 112th St | ~NE 115th Ln | 1,225 | 8" | $1,001,000 | 26 | L | | | | | | | | | | | | $1,001 |
| EX8 | 109th Ave NE | NE 112th St | ~NE 115th Ln | 1,250 | 8" | $1,021,000 | 17 | L | | | | | | | | | | | | $1,021 |
| EX9 | 120th Ave NE | ~300' S of NE 116th St | ~445' S of NE 116th St | 150 | 8" | $123,000 | 36 | M | | | | | | | | | | | | $123 |
| EX10 | 98th Ave NE | Old Market St Trail | ~NE 108th St | 2,250 | 36" | $2,679,000 | 24 | L | | | | | | | | | | | | $2,679 |
| EX11 | 98th Ave NE | Old Market St Trail | ~NE 113th Pl | 425 | 12", 8" | $593,000 | 15 | L | | | | | | | | | | | | $593 |
| EX12 | 100th Ave NE | NE 110th St | NE 113th St | 1,025 | 8" | $1,123,000 | 32 | M | | | | | | | | | | | | $1,123 |
| EX13 | NE 113th St<br>101st Ave NE<br>NE 113th Pl | 100th Ave NE<br>NE 113th St<br>101st Ave NE | 101st Ave NE<br>NE 113th Pl<br>~106th Ave NE | 2,125 | 8" | $1,735,000 | 31 | M | | | | | | | | | | | | $1,735 |
| EX14 | 101st Ave NE<br>NE 112th Pl<br>103rd Ave NE | NE 113th St<br>101st Ave NE<br>NE 112th Pl | NE 112th Pl<br>103rd Ave NE<br>~NE 113th St | 1,100 | 8" | $899,000 | 17 | L | | | | | | | | | | | | $899 |
| EX15 | 104th Ave NE | NE 108th St | ~NE 112th Pl | 1,575 | 8" | $1,286,000 | 31 | M | | | | | | | | | | | | $1,286 |
| EX16 | NE 112th St | ~ 155' W of 104th Ave NE | ~ 195' E of 105th Ave NE | 850 | 8" | $694,000 | 29 | M | | | | | | | | | | | | $694 |
| EX17 | NE 112th St | 106th Ave NE | ~109th Pl NE | 975 | 8" | $796,000 | 30 | M | | | | | | | | | | | | $796 |
| EX18 | NE 112th St<br>110th Ave NE | 111th Ave NE<br>NE 112th St | 110th Ave NE<br>~NE 114th St | 925 | 8" | $756,000 | 33 | M | | | | | | | | | | | | $756 |
| EX19 | ~111th Ave NE<br>~NE 112th Pl | NE 112th St<br>~111th Ave NE | ~NE 113th Pl<br>~112th Ave NE | 1,025 | 8" | $1,174,000 | 27 | L | | | | | | | | | | | | $1,174 |
| EX20 | ~118th Ave NE | NE 112th St | ~NE 113th Pl | 450 | 8" | $368,000 | 21 | L | | | | | | | | | | | | $368 |
| EX21 | 120th Ave NE | ~NE 112th Pl | ~NE 113th Pl | 350 | 8" | $286,000 | 27 | L | | | | | | | | | | | | $286 |
| EX22 | ~NE 112th St | I-405 | Slater Ave NE | 225 | 24" | $350,000 | 40 | H | | | | | | | | | | | | $350 |

[1] Projects that are struck through were removed because they are located in the area that was acquired by Northshore in 2017 (NE 124th Street Sewer Drainage Basin). Costs for these projects were omitted from this table.

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | | | | | | | |
| EX23 | NE 112th St | ~105' W of 127th Pl NE | 127th Pl NE | 125 | 12" | $105,000 | 22 | L | | | | | | | | | | | | $105 |
| EX24 | NE 110th St<br>105th Ave NE | 105th Ave NE<br>NE 110th St | 105th Ave NE<br>~NE 111th Ave Pl | 1,025 | 8" | $837,000 | 29 | M | | | | | | | | | | | | $837 |
| EX25 | NE 110th St<br>106th Ave NE | 108th Ave NE<br>NE 110th St | 106th Ave NE<br>NE 112th St | 1,175 | 8" | $960,000 | 30 | M | | | | | | | | | | | | $960 |
| EX26 | ~NE 108th Pl | NE 110th St | ~NE 111th Ave Pl | 575 | 8" | $470,000 | 19 | L | | | | | | | | | | | | $470 |
| EX27 | 106th Ave NE<br>~NE 111th Ave Pl | NE 110th St<br>~108th Ave NE | ~NE 111th Ave Pl<br>~109th Ave NE | 500 | 8" | $409,000 | 27 | L | | | | | | | | | | | | $409 |
| EX28 | 108th Ave NE | NE 108th St | NE 110th St | 500 | 12", 8" | $410,000 | 25 | L | | | | | | | | | | | | $410 |
| EX29 | NE 108th St | 108th Ave NE | 109th Ave NE | 275 | 8" | $225,000 | 27 | L | | | | | | | | | | | | $225 |
| EX30 | 108th Ave NE<br>~NE 108th St<br>Forbes Creek Dr<br>~NE 109th Place | NE 108th St<br>108th Ave NE<br>~NE 108th St<br>Forbes Creek Dr | NE 108th St<br>Forbes Creek Dr<br>~NE 109th Place<br>120th Ave NE | 4,375 | 36", 15", 12" | $3,709,000 | 41 | H | | | | | | | | | | | | $3,709 |
| EX31 | ~111th Ct NE<br>~111th Ave NE<br>~NE 110th St | ~NE 108th St<br>NE 110th St<br>~111th Ct NE | NE 110th St<br>NE 112th St<br>112th Ave NE | 1,650 | 8" | $1,348,000 | 26 | L | | | | | | | | | | | | $1,348 |
| EX32 | NE 111th Pl | ~129th Pl NE | ~130th Ave NE | 225 | 8" | $184,000 | 19 | L | | | | | | | | | | | | $184 |
| EX33 | 126th Pl NE<br>NE 109th St | NE 107th Pl<br>126th Pl NE | NE 109th St<br>127th Pl NE | 975 | 8" | $796,000 | 15 | L | | | | | | | | | | | | $796 |
| EX34 | 127th Ave NE | NE 107th Pl | ~NE 108th St | 225 | 8" | $184,000 | 15 | L | | | | | | | | | | | | $184 |
| EX35 | 128th Ave NE<br>NE 108th Pl | NE 107th Pl<br>128th Ave NE | NE 108th Pl<br>129th Pl NE | 1,000 | 8" | $817,000 | 29 | M | | | | | | | | | | | | $817 |
| EX36 | Rose Point Ln | ~140' S of NE 108th Ave | ~NE 108th Ave | 150 | 8" | $248,000 | 32 | M | | | | | | | | | | | | $248 |
| EX37 | Lake Shoreline<br>(Along Lakeshore) | ~5th Ave W | Rose Point Ln | 4,175 | 12", 8" | $6,263,000 | 23 | L | | | | | | | | | | | | $6,263 |
| EX38 | Forbes Creek Dr | ~100th Ave NE | 9th St W | 750 | 12", 8" | $619,000 | 47 | H | | | | | | | | | | | $619 | |
| EX39 | Market St | Forbes Creek Dr | 20th Ave | 625 | 8" | $511,000 | 33 | M | | | | | | | | | | | | $511 |
| EX40 | Market St | Forbes Creek Dr | ~18th Pl | 1,700 | 12", 8" | $1,390,000 | 41 | H | | | | | | | | | | | | $1,390 |
| EX41 | 20th Ave | Market St | ~230' E of 1st St | 650 | 8" | $531,000 | 35 | M | | | | | | | | | | | | $531 |
| EX42 | 100th Ave NE | NE 108th St | Forbes Creek Dr | 675 | 12" | $857,000 | 42 | H | | | | | | | | | | | $857 | |
| EX43 | Forbes Creek Dr<br>NE 107th Pl | NE 107th Pl<br>Forbes Creek Dr | ~109th Ave NE<br>Forbes Creek Dr | 1,150 | 8" | $1,280,000 | 27 | L | | | | | | | | | | | | $1,280 |
| EX44 | 108th Ave NE | NE 108th St | Forbes Creek Dr | 650 | 8" | $766,000 | 33 | M | | | | | | | | | | | | $766 |
| EX45 | 111th Ave NE | Cross Kirkland Corridor | ~25' SE of Cross Kirkland Corridor | 25 | 8" | $21,000 | 21 | L | | | | | | | | | | | | $21 |
| EX46 | ~NE 107th St | 116th Ave NE | ~170' W of 116th Ave NE | 175 | 8" | $143,000 | 19 | L | | | | | | | | | | | | $143 |
| EX47 | ~115th Pl NE | NE 104th St | ~NE 103rd Pl | 300 | 8" | $245,000 | 26 | L | | | | | | | | | | | | $245 |
| EX48 | Slater Ave NE | NE 106th St | NE 105th St | 175 | 30" | $166,000 | 38 | M | | | | | | | | | | | | $166 |
| EX49 | 124th Ave NE<br>124th Ave NE | ~145' N of NE 104th St<br>NE 103rd Pl | ~165' S of NE 104th St<br>~90' S of NE 103rd Pl | 425 | 12", 8" | $350,000 | 17 | L | | | | | | | | | | | | $350 |
| EX50 | NE 107th Pl | ~125th Ave NE | Mark Twain Park | 1,700 | 8" | $1,388,000 | 30 | M | | | | | | | | | | | | $1,388 |
| EX51 | 128th Ave NE | NE 107th Pl | NE 106th Pl | 450 | 8" | $368,000 | 29 | M | | | | | | | | | | | | $368 |
| EX52 | NE 106th Pl | 128th Ave NE | 129th Pl NE | 625 | 8" | $511,000 | 29 | M | | | | | | | | | | | | $511 |
| EX53 | 129th Pl NE | NE 106th Pl | 129th Pl NE cul-de-sac | 200 | 8" | $164,000 | 22 | L | | | | | | | | | | | | $164 |
| EX54 | NE 104th St | 130th Ave NE | ~80' E of 130th Ave NE | 100 | 8" | $82,000 | 27 | L | | | | | | | | | | | | $82 |
| EX55 | Market St | 20th Ave W | 7th St W | 125 | 8" | $103,000 | 23 | L | | | | | | | | | | | | $103 |
| EX56 | 1st St | 20th Ave | ~19th Pl | 500 | 8" | $409,000 | 55 | H | | | | | | | | | | | $409 | |
| EX57 | ~19th Pl | 20th Ave | ~190' E of 20th Ave | 1,825 | 8" | $1,490,000 | 39 | M | | | | | | | | | | | | $1,490 |
| EX58 | 1st St | 19th Ave | ~125' N of 18th Ave | 550 | 8" | $450,000 | 27 | L | | | | | | | | | | | | $450 |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| | | | | | | Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | |
| EX59 | 2nd St | 19th Ave | ~130' N of 18th Ave | 550 | 8" | $450,000 | 30 | M | | | | | | | | | | | | $450 |
| EX60 | 3rd St | 19th Ave | ~130' N of 18th Ave | 550 | 8" | $450,000 | 30 | M | | | | | | | | | | | | $450 |
| EX61 | 4th St | 19th Ave | ~155' S of 19th Ave | 175 | 8" | $143,000 | 41 | H | | | | | | | | | | | | $143 |
| EX62 | Market St | 18th Ave W | 18th Ave | 325 | 8" | $266,000 | 36 | M | | | | | | | | | | | | $266 |
| EX63 | 18th Ave | Market St | ~240' E of 2nd St | 1,075 | 8" | $878,000 | 27 | L | | | | | | | | | | | | $878 |
| EX64 | 18th Ave | 3rd St | ~4th Pl | 825 | 8" | $674,000 | 39 | M | | | | | | | | | | | | $674 |
| EX65 | 4th St | ~230' N of 18th Ave | 15th Ave | 1,200 | 8" | $980,000 | 58 | H | | | | | | | | | | | $980 | |
| EX66 | 4th Pl | 20th Ave | ~120' N of 19th Ave | 525 | 8" | $429,000 | 52 | H | | | | | | | | | | | $429 | |
| EX67 | ~165' N of NE 102nd Pl<br>~235' W of 111th Ave NE | Cross Kirkland Corridor<br>~165' N of NE 102nd Pl | 111th Ave NE<br>~NE 103rd Pl | 850 | 8" | $694,000 | 43 | H | | | | | | | | | | | $694 | |
| EX68 | 111th Ave NE | NE 100th St | ~NE 103rd Pl | 950 | 8" | $776,000 | 25 | L | | | | | | | | | | | | $776 |
| EX69 | ~165' N of NE 102nd Pl<br>~131' W of 112th Ave NE<br>112th Ave NE<br>NE 103rd Pl | 111th Ave NE<br>~165' N of NE 102nd Pl<br>~165' N of NE 102nd Pl<br>112th Ave NE | 112th Ave NE<br>NE 102nd Pl<br>NE 103rd Pl<br>NE 103rd Pl cul-de-sac | 875 | 8" | $715,000 | 19 | L | | | | | | | | | | | | $715 |
| EX70 | NE 103rd St | ~114th Pl NE | ~290' W of 116th Ave NE | 175 | 8" | $143,000 | 29 | M | | | | | | | | | | | | $143 |
| EX71 | NE 100th St | 116th Ave NE | 111th Ave NE | 1,350 | 8" | $1,103,000 | 39 | M | | | | | | | | | | | | $1,103 |
| EX72 | 112th Ave NE<br>Highlands Park<br>NE 103rd Pl | NE 100th St<br>112th Ave NE<br>Highlands Park | NE 102nd St<br>NE 103rd Pl<br>114th Pl NE | 1,150 | 8" | $939,000 | 25 | L | | | | | | | | | | | | $939 |
| EX73 | 114th Ave NE<br>114th Pl NE | NE 100th St<br>114th Ave NE | 114th Pl NE<br>~NE 103rd Pl | 475 | 8" | $388,000 | 27 | L | | | | | | | | | | | | $388 |
| EX74 | 116th Ave NE | ~NE 97th Ln | ~NE 101st Pl | 925 | 8" | $756,000 | 40 | H | | | | | | | | | | | | $756 |
| EX75 | Slater Ave NE | ~NE 100th Pl | NE 100th Pl | 225 | 24" | $350,000 | 34 | M | | | | | | | | | | | | $350 |
| EX76 | Waverly Park Way | Waverly Beach Park | 10th Ave W Alley | 50 | 12" | $42,000 | 5 | L | | | | | | | | | | | | $42 |
| EX77 | Waverly Park Way<br>6th St W | Waverly Beach Park<br>Waverly Park Way | 6th St W<br>10th Ave W | 250 | 15", 8" | $206,000 | 16 | L | | | | | | | | | | | | $206 |
| EX78 | 7th Ave W Alley | 5th St W | 4th St W | 550 | 8" | $450,000 | 57 | H | | | | | | | | | | | $450 | |
| EX79 | Market St | 3rd St W | 11th Ave W | 175 | 8" | $143,000 | 50 | H | | | | | | | | | | | $143 | |
| EX80 | 5th St W<br>16th Ave<br>Market St | 16th Ave W<br>Market St<br>16th Ave | Market St<br>2nd St<br>~17th Pl | 1,075 | 8" | $878,000 | 57 | H | | | | | | | | | | | $878 | |
| EX81 | 1st St<br>17th Pl | 18th Ave<br>1st St | ~85' S of 17th Pl<br>17th Pl cul-de-sac | 600 | 8" | $490,000 | 35 | M | | | | | | | | | | | | $490 |
| EX82 | 14th Ave | Market St | ~100' E of Market St | 125 | 8" | $103,000 | 36 | M | | | | | | | | | | | | $103 |
| EX83 | 10th Ave | Market St | ~135' E of Market St | 150 | 8" | $123,000 | 51 | H | | | | | | | | | | | $123 | |
| EX84 | 15th Ave | 1st St | ~145' W of 2nd St | 425 | 8" | $347,000 | 60 | H | | | | | | | | | $347 | | | |
| EX85 | 14th Ave | 1st St | ~130' W of 2nd St | 425 | 8" | $347,000 | 57 | H | | | | | | | | | | | $347 | |
| EX86 | 13th Ave | 1st St | ~125' W of 2nd St | 425 | 8", 6" | $343,000 | 42 | H | | | | | | | | | | | $343 | |
| EX87 | 12th Ave | 1st St | ~125' W of 2nd St | 425 | 8" | $347,000 | 48 | H | | | | | | | | | | | $347 | |
| EX88 | 11th Ave | 1st St | ~140' W of 2nd St | 425 | 8" | $347,000 | 42 | H | | | | | | | | | | | $347 | |
| EX89 | 11th Ave | 1st St | 2nd St | 575 | 8" | $470,000 | 25 | L | | | | | | | | | | | | $470 |
| EX90 | 2nd St | 10th Ave | 18th Ave | 2,450 | 8" | $2,001,000 | 49 | H | | | | | | | | | | | $2,001 | |
| EX91 | 9th Ave<br>2nd St | 1st St<br>9th Ave | 2nd St<br>9th Ave Alley | 725 | 8", 6" | $583,000 | 45 | H | | | | | | | | | | | $583 | |
| EX92 | 13th Ave | 3rd St | ~225' W of 3rd St | 250 | 8" | $205,000 | 45 | H | | | | | | | | | | | $205 | |
| EX93 | 10th Ave | 3rd St | ~115' E of 2nd St | 400 | 8" | $327,000 | 56 | H | | | | | | | | | | | $327 | |
| EX94 | 9th Ave | 3rd St | ~125' E of 2nd St | 450 | 8" | $368,000 | 68 | H | | | | | | | | $368 | | | | |
| EX95 | 3rd St | 18th Ave | ~17th Pl | 250 | 8" | $205,000 | 27 | L | | | | | | | | | | | | $205 |
| EX96 | 3rd St | Central Way | ~17th Ave | 4,150 | 8" | $3,389,000 | 57 | H | | | | | | | | | | | $3,389 | |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | | | | | | | |
| EX97 | 17th Ave | 4th St | 17th Ave cul-de-sac | 225 | 8" | $184,000 | 30 | M | | | | | | | | | | | | $184 |
| EX98 | 3rd Pl | 15th Ave | 3rd Pl cul-de-sac | 375 | 8" | $307,000 | 26 | L | | | | | | | | | | | | $307 |
| EX99 | 5th St | 15th Ave | ~265' N of 15th Ave | 275 | 8" | $225,000 | 19 | L | | | | | | | | | | | | $225 |
| EX100 | 5th Pl | 15th Ave | ~225' N of 15th Ave | 250 | 8" | $205,000 | 26 | L | | | | | | | | | | | | $205 |
| EX101 | 15th Ave | 6th St | ~200' E of 3rd St | 1,575 | 8" | $1,482,000 | 36 | M | | | | | | | | | | | | $1,482 |
| EX102 | 6th St | 11th Ave | ~15th Ave | 1,225 | 8" | $1,001,000 | 44 | H | | | | | | | | | | | $1,001 | |
| EX103 | 14th Pl | 6th St | Peter Kirk Elementary School | 325 | 8" | $266,000 | 39 | M | | | | | | | | | | | | $266 |
| EX104 | 4th St | 13th Ave | ~14th Ave | 475 | 8" | $573,000 | 22 | L | | | | | | | | | | | | $573 |
| EX105 | 5th St | 9th Ave | ~195' N of 13th Ave | 1,500 | 8", 6" | $1,224,000 | 41 | H | | | | | | | | | | | | $1,224 |
| EX106 | 13th Ave | 4th St | ~135' E of 3rd St | 675 | 8" | $552,000 | 57 | H | | | | | | | | | | | $552 | |
| EX107 | 11th Pl | 4th St | ~150' E of 3rd St | 675 | 8" | $552,000 | 65 | H | | | | | | | | | $552 | | | |
| EX108 | 13th Ave<br>4th St | 5th Ln<br>13th Ave | 4th St<br>~145' S of 11th Pl | 1,275 | 8" | $1,041,000 | 42 | H | | | | | | | | | | | $1,041 | |
| EX109 | ~12th Ave | 5th St | 5th Pl | 325 | 8" | $266,000 | 35 | M | | | | | | | | | | | | $266 |
| EX110 | 4th St | 10th Ave | ~11th Ave | 300 | 8" | $245,000 | 41 | H | | | | | | | | | | | $245 | |
| EX111 | 10th Ave | 5th St | ~280' E of 3rd St | 900 | 8" | $735,000 | 50 | H | | | | | | | | | | | $735 | |
| EX112 | 9th Ave | 5th St | ~130' E of 3rd St | 1,000 | 8" | $817,000 | 57 | H | | | | | | | | | | | $817 | |
| EX113 | 12th Ave | 6th St | ~250' W of 8th St | 725 | 8" | $592,000 | 48 | H | | | | | | | | | | | $592 | |
| EX114 | 11th Ave | 6th St | ~310' W of 8th St | 650 | 8" | $531,000 | 51 | H | | | | | | | | | | | $531 | |
| EX115 | 10th Ave | ~175' E of 5th St | ~330' W of 8th St | 1,025 | 8" | $837,000 | 54 | H | | | | | | | | | | | $837 | |
| EX116 | ~5th Pl<br>9th Ave<br>8th Ave Alley | 8th Ave<br>~5th Pl<br>~135' E of 5th St | 9th Ave<br>~155' E of 5th St<br>~90' W of 6th St | 850 | 12", 8" | $698,000 | 51 | H | | | | | | | | | | | $698 | |
| EX117 | 6th St | Central Way | 10th Ave | 1,350 | 8" | $1,103,000 | 29 | M | | | | | | | | | | | | $1,103 |
| EX118 | 9th Ave | 6th St | ~390' E of 6th St | 400 | 8" | $327,000 | 39 | M | | | | | | | | | | | | $327 |
| EX119 | 8th St | 7th Ave | 11th Ave | 1,300 | 8" | $1,062,000 | 26 | L | | | | | | | | | | | | $1,062 |
| EX120 | 9th Ave | ~4555' E of 6th St | ~275' E of 8th St | 775 | 8" | $633,000 | 30 | M | | | | | | | | | | | | $633 |
| EX121 | 112th Ave NE | NE 87th St | ~115' S of NE 100th St | 3,275 | 12", 8" | $2,675,000 | 33 | M | | | | | | | | | | | | $2,675 |
| EX122 | NE 97th St<br>~114th Ave NE | 112th Ave NE<br>NE 97th St | ~130' W of 116th Ave NE<br>Observation Dr | 1,500 | 8" | $1,225,000 | 29 | M | | | | | | | | | | | | $1,225 |
| EX123 | NE 95th St<br>~114th Ave NE | 112th Ave NE<br>NE 95th St | ~130' W of 116th Ave NE<br>~210' N of NE 95th St | 1,350 | 8" | $1,103,000 | 23 | L | | | | | | | | | | | | $1,103 |
| EX124 | 116th Ave NE | ~90' S of NE 88th St | NE 97th St | 2,650 | 8", 6" | $2,158,000 | 42 | H | | | | | | | | | | | $2,158 | |
| EX125 | NE 94th St | 112th Ave NE | ~195' S of NE 95th St | 850 | 8" | $694,000 | 17 | L | | | | | | | | | | | | $694 |
| EX126 | 114th Ave NE<br>NE 94th St<br>~290' W of 116th Ave NE | NE 94th St<br>114th Ave NE<br>NE 94th St | NE 94th St<br>~290' W of 116th Ave NE<br>~NE 94th Pl | 625 | 8" | $511,000 | 17 | L | | | | | | | | | | | | $511 |
| EX127 | NE 92nd St | 112th Ave NE | ~140' W of 116th Ave NE | 1,000 | 8" | $817,000 | 17 | L | | | | | | | | | | | | $817 |
| EX128 | NE 91st St | 112th Ave NE | ~180' E of 114th Ave NE | 750 | 8" | $613,000 | 23 | L | | | | | | | | | | | | $613 |
| EX129 | NE 91st St | 116th Ave NE | ~265' W of 116th Ave NE | 300 | 8" | $245,000 | 30 | M | | | | | | | | | | | | $245 |
| EX130 | NE 90th St | 112th Ave NE | ~180' W of 116th Ave NE | 975 | 8" | $796,000 | 24 | L | | | | | | | | | | | | $796 |
| EX131 | NE 90th St<br>Slater Ave NE<br>~117th Ave NE | 116th Ave NE<br>NE 90th St<br>Slater Ave NE | Slater Ave NE<br>~117th Ave NE<br>~265' S of NE 95th St | 1,500 | 8" | $1,225,000 | 31 | M | | | | | | | | | | | | $1,225 |
| EX132 | NE 92nd St | ~117th Ave NE | ~NE 90th St | 375 | 8" | $307,000 | 45 | H | | | | | | | | | | | $307 | |
| EX133 | ~Slater Ave NE | ~NE 92nd St | ~NE 91st St | 325 | 18" | $284,000 | 21 | L | | | | | | | | | | | | $284 |
| EX134 | NE 90th St | ~245' W of 120th Ave NE | 120th Ave NE | 300 | 24" | $436,000 | 33 | M | | | | | | | | | | | | $436 |
| EX135 | NE 95th St | 125th Ave NE | 126th Ave NE | 375 | 18" | $512,000 | 12 | L | | | | | | | | | | | | $512 |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP No. | Project Description: In | Project Description: From | Project Description: To | Size: Length (LF) | Size: Diameter (in.) | Estimated Cost | Rank Points | Priority Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | | |
| EX136 | 128th Ave NE | NE 100th St | NE 95th St | 1,250 | 12" | $1,224,000 | 44 | H | | | | | | | | | | | $1,224 | |
| EX137 | NE 94th St<br>129th Ave NE<br>130th Ave NE | NE 94th St cul-de-sac<br>NE 94th St<br>NE 94th St | 130th Ave NE<br>129th Ave NE cul-de-sac<br>~NE 94th Ct | 700 | 8" | $572,000 | 19 | L | | | | | | | | | | | | $572 |
| EX138 | 128th Ave NE | NE 91st Ln | NE 91st St | 100 | 15" | $190,000 | 43 | H | | | | | | | | | | | $190 | |
| EX139 | 2nd St W<br>Market St | 7th Ave W Alley<br>2nd St W | Market St<br>8th Ave W | 175 | 8" | $143,000 | 51 | H | | | | | | | | | | | $143 | |
| EX140 | 6th Ave | Market St | ~130' W of Market St | 150 | 8" | $123,000 | 50 | H | | | | | | | | | | | $123 | |
| EX141 | 5th Ave | Market St | ~130' W of Market St | 150 | 8" | $123,000 | 44 | H | | | | | | | | | | | $123 | |
| EX142 | Waverly Way | Market St | ~400' NW of Market St | 400 | 18" | $349,000 | 18 | L | | | | | | | | | | | | $349 |
| EX143 | Market St | Central Way | 4th Ave | 600 | 12" | $501,000 | 30 | M | | | | | | | | | | | | $501 |
| EX144 | 8th Ave | 1st St | 2nd St | 525 | 8" | $429,000 | 51 | H | | | | | | | | | | | $429 | |
| EX145 | 8th Ave | 3rd St | ~85' E of 2nd St | 475 | 8" | $388,000 | 44 | H | | | | | | | | | | | $388 | |
| EX146 | 7th Ave<br>~165' E of 1st St<br>7th Ave Alley | 1st St<br>7th Ave<br>~165' E of 1st St | ~80' W of 2nd St<br>7th Ave Alley<br>~175' W of 2nd St | 850 | 8" | $694,000 | 61 | H | | | | | | | | | | $694 | | |
| EX147 | 7th Ave | 3rd St | ~80' E of 2nd St | 500 | 8" | $409,000 | 58 | H | | | | | | | | | | | $409 | |
| EX148 | 6th Ave | 1st St | ~85' W of 2nd St | 475 | 8" | $388,000 | 39 | M | | | | | | | | | | | | $388 |
| EX149 | 6th Ave | ~240' W of 4th St | ~80' E of 2nd St | 825 | 8" | $674,000 | 50 | H | | | | | | | | | | | $674 | |
| EX150 | 5th Ave<br>2nd St | 1st St<br>5th Ave | 2nd St<br>5th Ave Alley | 650 | 8" | $531,000 | 50 | H | | | | | | | | | | | $531 | |
| EX151 | 5th Ave | 3rd St | ~85' E of 2nd St | 500 | 8" | $409,000 | 53 | H | | | | | | | | | | | $409 | |
| EX152 | 4th Ave | 3rd St | 2nd St | 575 | 8" | $470,000 | 31 | M | | | | | | | | | | | | $470 |
| EX153 | 3rd Ave | 2nd Pl S | ~180' E of 1st St | 625 | 8" | $511,000 | 53 | H | | | | | | | | | | | $511 | |
| EX154 | Central Way | ~2nd St | Market St | 850 | 30" | $804,000 | 17 | L | | | | | | | | | | | | $804 |
| EX155 | Lakeshore Plaza | ~1st St | ~55' W of 1st St | 75 | 12" | $63,000 | 30 | M | | | | | | | | | | | | $63 |
| EX156 | Commercial Alley<br>Park Ln | ~245' W of Main St<br>Commercial Alley | Park Ln<br>~125' E of Lake St S | 125 | 8" | $103,000 | 35 | M | | | | | | | | | | | | $103 |
| EX157 | Main St | Park Ln | ~155' N of Kirkland Ave | 275 | 15" | $234,000 | 31 | M | | | | | | | | | | | | $234 |
| EX158 | 8th Ave | ~130' W of 6th St | ~130' E of 3rd St | 1,425 | 8" | $1,164,000 | 55 | H | | | | | | | | | | | $1,164 | |
| EX159 | 8th Ave | 6th St | ~360' E of 6th St | 375 | 8" | $307,000 | 48 | H | | | | | | | | | | | $307 | |
| EX160 | 7th Ave | ~130' E of 3rd St | ~8th St | 2,425 | 8" | $1,980,000 | 50 | H | | | | | | | | | | | $1,980 | |
| EX161 | 4th St | Central Way | 7th Ave | 875 | 8" | $715,000 | 34 | M | | | | | | | | | | | | $715 |
| EX162 | 5th Ave | 4th St | ~160' E of 3rd St | 425 | 8" | $347,000 | 55 | H | | | | | | | | | | | $347 | |
| EX163 | ~130' N of Central Way | 4th St | ~210' W of 4th St | 225 | 8" | $184,000 | 28 | M | | | | | | | | | | | | $184 |
| EX164 | | Peter Kirk Park | | 50 | 8" | $41,000 | 26 | L | | | | | | | | | | | | $41 |
| EX165 | Kirkland Ave | 3rd St | ~5th St | 1,100 | 8" | $899,000 | 31 | M | | | | | | | | | | | | $899 |
| EX166 | 6th St | ~5th Ave W | 1st Ave S | 1,675 | 12", 8" | $1,393,000 | 62 | H | | | | | | | | | | $1,393 | | |
| EX167 | 6th Ave | 6th St | 7th Ave | 850 | 8" | $694,000 | 35 | M | | | | | | | | | | | | $694 |
| EX168 | Kirkland Way | 6th St | ~9th Ln | 1,025 | 8", 6" | $813,000 | 41 | H | | | | | | | | | | | | $813 |
| EX169 | Residential Easement | ~3rd Ave | ~55' S of 3rd Ave | 75 | 8", | $62,000 | 11 | L | | | | | | | | | | | | $62 |
| EX170 | NE 88th St | 112th Ave NE | ~113th Ln NE | 450 | 8" | $368,000 | 21 | L | | | | | | | | | | | | $368 |
| EX171 | 114th Ave NE<br>NE 88th St | NE 87th St<br>114th Ave NE | NE 88th St<br>116th Ave NE | 900 | 8" | $735,000 | 32 | M | | | | | | | | | | | | $735 |
| EX172 | NE 87th St | 112th Ave NE | ~95 W of 116th Ave NE | 1,025 | 8", 6" | $819,000 | 23 | L | | | | | | | | | | | | $819 |
| EX173 | 114th Ave NE<br>NE 86th St | NE 87th St<br>114th Ave NE | NE 86th St<br>NE 86th St cul-de-sac | 600 | 8" | $490,000 | 13 | L | | | | | | | | | | | | $490 |
| EX174 | ~NE 85th St | Cross Kirkland Corridor | ~80' E of Cross Kirkland Corridor | 100 | 8" | $82,000 | 23 | L | | | | | | | | | | | | $82 |
| EX175 | ~3rd Ave | Cross Kirkland Corridor | ~80' E of Cross Kirkland Corridor | 100 | 8" | $82,000 | 17 | L | | | | | | | | | | | | $82 |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | | | | | | | |
| EX176 | Slater St | Kirkland Ave | Ohde Ave | 675 | 8" | $552,000 | 55 | H | | | | | | | | | | | $552 | |
| EX177 | ~130th Ave NE<br>NE 85th St | ~NE 86th St<br>~130th Ave NE | NE 85th St<br>~80' E of 130th Ave NE | 250 | 8" | $205,000 | 1 | L | | | | | | | | | | | | $205 |
| EX178 | ~160' S of NE 85th St | 128th Ave NE | ~420' E of 128th Ave NE | 425 | 8" | $347,000 | 38 | M | | | | | | | | | | | | $347 |
| EX179 | NE 84th St | 128th Ave NE | ~130th Ave NE | 600 | 8" | $490,000 | 29 | M | | | | | | | | | | | | $490 |
| EX180 | 128th Ave NE<br>NE 83rd St | NE 84th St<br>128th Ave NE | NE 83rd St<br>131st Ave NE | 1,350 | 8" | $1,103,000 | 25 | L | | | | | | | | | | | | $1,103 |
| EX181 | 128th Ave NE | NE 80th St | ~NE 81st Pl | 400 | 8" | $327,000 | 38 | M | | | | | | | | | | | | $327 |
| EX182 | Lake Plaza Lift Station | | | 25 | 18" | $22,000 | 17 | L | | | | | | | | | | | | $22 |
| EX183 | Commercial Alley | Kirkland Ave | Lake St S | 575 | 12", 8" | $480,000 | 28 | M | | | | | | | | | | | | $480 |
| EX184 | Kirkland Ave<br>~State St S | Main St<br>Kirkland Ave | ~State St S<br>~3rd St | 425 | 8" | $347,000 | 40 | H | | | | | | | | | | | | $347 |
| EX185 | 1st Ave S | State St S | 2nd St S | 275 | 8" | $225,000 | 35 | M | | | | | | | | | | | | $225 |
| EX186 | Kirkland Ave | Kirkland Way | ~5th Pl S | 650 | 8" | $531,000 | 46 | H | | | | | | | | | | | $531 | |
| EX187 | 2nd Ave S<br>3rd St S | State St S<br>2nd Ave S | 2nd St S<br>~140' S of 2nd Ave S | 600 | 8" | $490,000 | 38 | M | | | | | | | | | | | | $490 |
| EX188 | 2nd Ave S<br>4th St S | State St S<br>2nd Ave S | 4th St S<br>~165' S of 2nd Ave S | 625 | 8" | $511,000 | 52 | H | | | | | | | | | | | $511 | |
| EX189 | ~3rd Ave S<br>2nd St S | Lake St S<br>~3rd Ave S | ~35 E of Lake St S<br>4th Ave S | 200 | 8" | $164,000 | 50 | H | | | | | | | | | | | $164 | |
| EX190 | 5th Ave S | ~145' E of 2nd St S | ~3rd St S | 150 | 8" | $123,000 | 39 | M | | | | | | | | | | | | $123 |
| EX191 | ~365' N of 10th Ave S | Lake St S | 1st St S | 275 | 8" | $225,000 | 39 | M | | | | | | | | | | | | $225 |
| EX192 | 4th Ave S | ~45' E of State St S | ~4th Pl S | 750 | 8" | $613,000 | 44 | H | | | | | | | | | | | $613 | |
| EX193 | 5th Ave S | ~135' E of State St S | 5th St S | 775 | 8" | $633,000 | 48 | H | | | | | | | | | | | $633 | |
| EX194 | 6th Ave S | ~35' E of State St S | 5th St S | 825 | 8" | $674,000 | 36 | M | | | | | | | | | | | | $674 |
| EX195 | 7th Ave S<br>3rd Pl S | ~25' E of State St S<br>7th Ave S | 5th St S<br>~210' S of 7th Ave S | 1,075 | 8", 6" | $864,000 | 65 | H | | | | | | | | | $864 | | | |
| EX196 | Kirkland Ave | 6th St | Cross Kirkland Corridor | 1,275 | 12", 8" | $1,059,000 | 42 | H | | | | | | | | | | | $1,059 | |
| EX197 | 6th St S | Kirkland Ave | 3rd Ave S | 775 | 12" | $647,000 | 27 | L | | | | | | | | | | | | $647 |
| EX198 | ~410' N of 5th Ave S | 6th St S | 8th St S | 675 | 8" | $552,000 | 44 | H | | | | | | | | | | | $552 | |
| EX199 | 6th St S | ~410' N of 5th Ave S | ~445' N of 9th Ave S | 1,300 | 12", 8" | $1,078,000 | 33 | M | | | | | | | | | | | | $1,078 |
| EX200 | 5th Ave S<br>7th St S | 6th St S<br>5th Ave S | 7th St S<br>~8th Ave S | 1,375 | 8" | $1,123,000 | 44 | H | | | | | | | | | | | $1,123 | |
| EX201 | 8th St S | ~3rd Ave S | ~130' N of 9th Ave S | 1,850 | 8" | $1,511,000 | 29 | M | | | | | | | | | | | | $1,511 |
| EX202 | 10th St S | Kirkland Ave | ~4th Ave S | 1,025 | 8" | $1,072,000 | 42 | H | | | | | | | | | | | $1,072 | |
| EX203 | ~340' S of Kirkland Ave | 10th St S | ~380' E of 10th St S | 400 | 8" | $476,000 | 22 | L | | | | | | | | | | | | $476 |
| EX204 | Slater St S<br>North Ave<br>115th Pl NE | Kirkland Ave<br>Slater St S<br>~600' N of North Ave | North Ave<br>115th Pl NE<br>NE 75th St | 1,950 | 8" | $1,592,000 | 52 | H | | | | | | | | | | | $1,592 | |
| EX205 | NE 80th St<br>(Freeway Crossing) | 116th Ave NE | ~Kirkland Cemetery | 1,700 | 12" | $1,486,000 | 48 | H | | | | | | | | | | | $1,486 | |
| EX206 | 116th Ave NE | NE 80th St | NE 74th St | 1,525 | 12", 8" | $1,268,000 | 31 | M | | | | | | | | | | | | $1,268 |
| EX207 | Lake Washington High School | | | 475 | 8" | $388,000 | 1 | L | | | | | | | | | | | | $388 |
| EX208 | ~115' N of NE 75th St | 116th Ave NE | 118th Ave NE | 475 | 8" | $388,000 | 33 | M | | | | | | | | | | | | $388 |
| EX209 | NE 75th St | 116th Ave NE | ~245' E of 118th Ave NE | 1,600 | 8" | $1,307,000 | 50 | H | | | | | | | | | | | $1,307 | |
| EX210 | NE 74th St | 116th Ave NE | ~118th Ave NE | 475 | 8" | $388,000 | 31 | M | | | | | | | | | | | | $388 |
| EX211 | 120th Ave NE | NE 75th St | ~195' S of NE 73rd St | 850 | 8" | $694,000 | 29 | M | | | | | | | | | | | | $694 |
| EX212 | 116th Ave NE | ~NE 70th Pl | ~NE 68th Pl | 725 | 8" | $592,000 | 28 | M | | | | | | | | | | | | $592 |
| EX213 | ~119th Ave NE | NE 70th Pl | Holy Family School | 375 | 8" | $307,000 | 17 | L | | | | | | | | | | | | $307 |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| | | | | | | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | | | | | | | |
| EX214 | ~120th Ave NE | ~95' N of NE 70th St | ~NE 61st St | 2,775 | 12", 8", 6" | $2,275,000 | 45 | H | | | | | | | | | | | $2,275 | |
| EX215 | NE 80th St | 123rd Ave NE | 128th Ave NE | 1,675 | 12", 8" | $1,396,000 | 49 | H | | | | | | | | | | | $1,396 | |
| EX216 | 126th Ave NE | NE 80th St | NE 78th Pl | 450 | 8" | $368,000 | 24 | L | | | | | | | | | | | | $368 |
| EX217 | 127th Pl NE | NE 80th St | ~375' S of NE 80th St | 375 | 8" | $307,000 | 26 | L | | | | | | | | | | | | $307 |
| EX218 | 128th Ave NE<br>~128th Pl NE<br>NE 75th St | NE 80th St<br>~NE 78th St<br>128th Pl NE | ~NE 78th St<br>NE 75th St<br>~130' W of 130th Ave NE | 1,875 | 8" | $1,531,000 | 27 | L | | | | | | | | | | | | $1,531 |
| EX219 | NE 76th St<br>130th Ave NE<br>~NE 77th Ct | 128th Pl NE<br>NE 76th St<br>130th Ave NE | 130th Ave NE<br>~NE 77th Ct<br>~131st Ave NE | 1,250 | 8" | $1,021,000 | 16 | L | | | | | | | | | | | | $1,021 |
| EX220 | ~NE 68th St | Lake St S | ~Lakeview Dr | 1,000 | 8" | $817,000 | 32 | M | | | | | | | | | | | | $817 |
| EX221 | State St S<br>NE 68th St<br>~104th Ave NE | 10th Ave S<br>State St S<br>NE 68th St | NE 68th St<br>~104th Ave NE<br>~10th Ave S | 1,050 | 8" | $858,000 | 21 | L | | | | | | | | | | | | $858 |
| EX222 | Lakeview Dr<br>Lake Washington Blvd NE | ~NE 68th Pl<br>~101st Ct NE | ~101st Ct NE<br>~NE 52nd St | 4,675 | 18", 15", 12", 8" | $3,962,000 | 40 | H | | | | | | | | | | | | $3,962 |
| EX223 | 102nd Ave NE<br>NE 65th St<br>103rd Ave NE | Lakeview Dr<br>102nd Ave NE<br>NE 65th St | NE 65th St<br>103rd Ave NE<br>~85' S of NE 67th St | 1,600 | 8" | $1,307,000 | 36 | M | | | | | | | | | | | | $1,307 |
| EX224 | NE 68th Pl | 102nd Ave NE | 103rd Ave NE | 675 | 8" | $552,000 | 33 | M | | | | | | | | | | | | $552 |
| EX225 | 102nd Pl NE<br>NE 67th St<br>104th Ave NE | NE 65th St<br>102nd Pl NE<br>NE 67th St | NE 67th St<br>104th Ave NE<br>~NE 68th Pl | 1,350 | 8" | $1,103,000 | 30 | M | | | | | | | | | | | | $1,103 |
| EX226 | ~NE 66th Ln | NE 66th Ln | ~120' W of Lakeview Dr | 100 | 8" | $82,000 | 3 | L | | | | | | | | | | | | $82 |
| EX227 | NE 64th St | ~35' E of Lake Washington Blvd NE | Lakeview Dr | 600 | 8" | $490,000 | 39 | M | | | | | | | | | | | | $490 |
| EX228 | ~102nd Ave NE<br>~110' N of NE 64th St | NE 64th St<br>~102nd Ave NE | ~110' N of NE 64th St<br>~70' W of 103rd Ave NE | 525 | 8" | $429,000 | 57 | H | | | | | | | | | | | $429 | |
| EX229 | NE 64th St | Lakeview Dr | 103rd Ave NE | 675 | 8" | $552,000 | 36 | M | | | | | | | | | | | | $552 |
| EX230 | NE 63rd St | ~60' E of Lake Washington Blvd NE | Lakeview Dr | 525 | 8" | $429,000 | 36 | M | | | | | | | | | | | | $429 |
| EX231 | NE 62nd St | ~50' E of Lake Washington Blvd NE | Lakeview Dr | 475 | 8" | $388,000 | 36 | M | | | | | | | | | | | | $388 |
| EX232 | NE 62nd St<br>102nd Pl NE | Lakeview Dr<br>NE 62nd St | 103rd Pl NE<br>~ 280' N of NE 62nd St | 800 | 8" | $654,000 | 38 | M | | | | | | | | | | | | $654 |
| EX233 | NE 60th St | Lake Washington Blvd NE | Lakeview Dr | 450 | 8" | $368,000 | 38 | M | | | | | | | | | | | | $368 |
| EX234 | NE 60th St<br>~103rd Pl NE | Lakeview Dr<br>NE 60th St | ~65' E of Lakeview Dr<br>~150' S of NE 60th St | 225 | 8", 6" | $176,000 | 21 | L | | | | | | | | | | | | $176 |
| EX235 | NE 68th St | ~115' W of 106th Ave NE | ~200' E of 106th Ave NE | 375 | 12", 8" | $308,000 | 36 | M | | | | | | | | | | | | $308 |
| EX236 | NE 68th St<br>106th Ave NE<br>~NE 64th St | ~95' W of 106th Ave NE<br>NE 68th St<br>106th Ave NE | 106th Ave NE<br>~NE 64th St<br>~330' E of 106th Ave NE | 1,650 | 15", 8" | $1,351,000 | 46 | H | | | | | | | | | | | $1,351 | |
| EX237 | ~104th Pl NE | ~NE 64th St | ~NE 65th Pl | 200 | 8" | $164,000 | 53 | H | | | | | | | | | | | $164 | |
| EX238 | ~NE 64th St<br>105th Ave NE<br>~NE 65th Pl | Cross Kirkland Corridor<br>~NE 64th St<br>105th Ave NE | 105th Ave NE<br>~NE 65th Pl<br>~135' W of 106th Ave NE | 625 | 8" | $511,000 | 30 | M | | | | | | | | | | | | $511 |
| EX239 | ~NE 63rd St | Cross Kirkland Corridor | 106th Ave NE | 600 | 8" | $490,000 | 25 | L | | | | | | | | | | | | $490 |
| EX240 | NE 61st Ct | 104th Ave NE | ~125' W of 104th Ave NE | 125 | 6" | $95,000 | 13 | L | | | | | | | | | | | | $95 |
| EX241 | NE 60th St<br>~104th Ave NE<br>105th Ave NE | ~104th Ave NE<br>NE 60th St<br>NE 60th St | 105th Ave NE<br>~NE 59th St<br>~NE 59th St | 1,100 | 8", 6" | $894,000 | 21 | L | | | | | | | | | | | | $894 |

# Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| | | | | | | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | | | | | | | |
| EX242 | 105th Ave NE | ~NE 63rd St | ~NE 60th Ln | 650 | 8" | $531,000 | 21 | L | | | | | | | | | | | | $531 |
| EX243 | ~NE 62nd St | 105th Ave NE | 106th Ave NE | 225 | 8" | $184,000 | 23 | L | | | | | | | | | | | | $184 |
| EX244 | 106th Ave NE<br>~NE 57th St | ~NE 62nd St<br>106th Ave NE | NE 57th St<br>NE 55th St | 2,100 | 8", 6" | $1,705,000 | 23 | L | | | | | | | | | | | | $1,705 |
| EX245 | NE 60th Ln | 106th Ave NE | ~225' E of 106th Ave NE | 250 | 8" | $205,000 | 21 | L | | | | | | | | | | | | $205 |
| EX246 | 9th Ave S<br>~112th Ave NE | 6th St S<br>9th Ave S | ~112th Ave NE<br>~10th Ave S | 1,400 | 8" | $1,143,000 | 29 | M | | | | | | | | | | | | $1,143 |
| EX247 | 8th St S<br>~435' S of 9th Ave S | 9th Ave S<br>8th St S | ~NE 68th St<br>~111th Ave NE | 875 | 8" | $715,000 | 25 | L | | | | | | | | | | | | $715 |
| EX248 | ~NE 68th St<br>~118th Pl NE<br>(Freeway Crossing) | 108th Ave NE<br>NE 70th Pl | 118th Pl NE<br>NE 69th Pl | 3,925 | 12", 8" | $3,387,000 | 42 | H | | | | | | | | | | | $3,387 | |
| EX249 | 111th Ave NE | NE 68th St | ~NE 67th St | 200 | 8" | $164,000 | 36 | M | | | | | | | | | | | | $164 |
| EX250 | 111th Ave NE | NE 68th St | ~120' N of NE 67th St | 250 | 8" | $205,000 | 23 | L | | | | | | | | | | | | $205 |
| EX251 | ~NE 66th Pl | 108th Ave NE | ~108th Pl NE | 250 | 8" | $205,000 | 39 | M | | | | | | | | | | | | $205 |
| EX252 | NE 66th Pl<br>110th Ave NE<br>NE 65th St | NE 66th Pl cul-de-sac<br>NE 66th Pl<br>110th Ave NE | 110th Ave NE<br>NE 65th St<br>114th Ave NE | 1,700 | 8" | $1,388,000 | 34 | M | | | | | | | | | | | | $1,388 |
| EX253 | 112th Ave NE | NE 65th St | NE 67th St | 275 | 8" | $225,000 | 23 | L | | | | | | | | | | | | $225 |
| EX254 | 113th Ave NE<br>NE 67th St | NE 65th St<br>113th Ave NE | NE 67th St<br>~114th Ave NE | 1,100 | 8" | $899,000 | 35 | M | | | | | | | | | | | | $899 |
| EX255 | ~435' N of NE 65th St<br>~170' E of 113th Ave NE<br>114th Ave NE | 113th Ave NE<br>~520' N of NE 65th St<br>~605' N of NE 65th St | 114th Ave NE<br>~120' N of NE 65th St<br>~75' N of NE 65th St | 1,300 | 8", 6" | $1,056,000 | 39 | M | | | | | | | | | | | | $1,056 |
| EX256 | ~113th Ave NE<br>~NE 64th St<br>NE 63rd St<br>113th Ave NE<br>~NE 62nd St | NE 65th St<br>~113th Ave NE<br>~113th Ave NE<br>NE 63rd St<br>113th Ave NE | NE 63rd St<br>113th Ave NE<br>113th Ave NE<br>~NE 62nd St<br>114th Ave NE | 1,200 | 8" | $980,000 | 39 | M | | | | | | | | | | | | $980 |
| EX257 | ~NE 62nd St | 111th Ave NE | ~113th Ave NE | 950 | 8" | $776,000 | 23 | L | | | | | | | | | | | | $776 |
| EX258 | 111th Pl NE | NE 62nd St | ~115' N of NE 60th St | 525 | 8" | $429,000 | 17 | L | | | | | | | | | | | | $429 |
| EX259 | 112th Ave NE<br>NE 61st Pl | NE 62nd St<br>112th Ave NE | NE 61st Pl<br>~113th Ave NE | 900 | 8" | $735,000 | 21 | L | | | | | | | | | | | | $735 |
| EX260 | NE 60th St<br>114th Ave NE | 108th Ave NE<br>NE 60th St | 114th Ave NE<br>~NE 55th St | 3,300 | 8" | $2,863,000 | 28 | M | | | | | | | | | | | | $2,863 |
| EX261 | ~NE 68th Pl<br>117th Ave NE<br>NE 67th St<br>~116th Pl NE | 116th Ave NE<br>~NE 68th Pl<br>117th Ave NE<br>NE 67th St | 117th Ave NE<br>NE 67th St<br>116th Pl NE<br>116th Ave NE | 1,425 | 8" | $1,164,000 | 15 | L | | | | | | | | | | | | $1,164 |
| EX262 | NE 67th Pl | 117th Ave NE | NE 68th Pl | 625 | 8" | $511,000 | 13 | L | | | | | | | | | | | | $511 |
| EX263 | 119th Ave NE | NE 70th Pl | ~NE 67th Pl | 800 | 8" | $654,000 | 24 | L | | | | | | | | | | | | $654 |
| EX264 | NE 70th St | ~250' W of 120th Ave NE | ~80' E of 123rd Ave NE | 925 | 8" | $756,000 | 29 | M | | | | | | | | | | | | $756 |
| EX265 | ~NE 68th Pl | 120th Ave NE | ~160' W of 122nd Ave NE | 525 | 8" | $429,000 | 24 | L | | | | | | | | | | | | $429 |
| EX266 | 122nd Ave NE<br>~135' N of NE 68th Pl<br>~123rd Ave NE<br>NE 68th Pl | NE 70th St<br>122nd Ave NE<br>~135' N of NE 68th Pl<br>~123rd Ave NE | ~135' N of NE 68th Pl<br>~123rd Ave NE<br>NE 68th Pl<br>~122nd Pl NE | 1,075 | 8" | $878,000 | 27 | L | | | | | | | | | | | | $878 |
| EX267 | ~NE 67th St<br>123rd Ave NE | ~120th Ave NE<br>NE 67th St | 123rd Ave NE<br>NE 66th St | 1,475 | 8" | $1,205,000 | 28 | M | | | | | | | | | | | | $1,205 |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | | | | | | | |
| EX268 | ~NE 65th Pl<br>NE 66th St | ~120th Ave NE<br>~120th Pl NE | ~120th Pl NE<br>~175' W of 123rd Ave NE | 1,100 | 8" | $899,000 | 15 | L | | | | | | | | | | | | $899 |
| EX269 | ~NE 65th St<br>~124th Ave NE<br>NE 60th St<br>Residential Parking Lot | ~119th Ave NE<br>NE 65th St<br>~124th Ave NE<br>NE 60th St | ~124th Ave NE<br>NE 60th St<br>~170' W of 126th Ave NE<br>~126th Ave NE | 3,725 | 12", 8" | $3,044,000 | 34 | M | | | | | | | | | | | | $3,044 |
| EX270 | NE 64th St | 120th Ave NE | ~50' W of 123rd Ave NE | 1,075 | 8" | $878,000 | 13 | L | | | | | | | | | | | | $878 |
| EX271 | NE 62nd St | 120th Ave NE | ~80' W of 123rd Ave NE | 1,100 | 8" | $899,000 | 13 | L | | | | | | | | | | | | $899 |
| EX272 | 120th Pl NE<br>NE 61st St | NE 62nd St<br>120th Pl NE | NE 61st St<br>~70' W of 123rd Ave NE | 1,100 | 8" | $899,000 | 19 | L | | | | | | | | | | | | $899 |
| EX273 | 122nd Ave NE | NE 62nd St | ~185' S of NE 62nd St | 200 | 8" | $164,000 | 13 | L | | | | | | | | | | | | $164 |
| EX274 | Ben Franklin Elementary School | | | 350 | 8" | $286,000 | 19 | L | | | | | | | | | | | | $286 |
| EX275 | 130th Ave NE | ~NE 68th Pl | ~NE 67th St | 300 | 12" | $251,000 | 26 | L | | | | | | | | | | | | $251 |
| EX276 | NE 59th St | ~60' E of Lake Washington Blvd NE | Lakeview Dr | 350 | 8" | $286,000 | 38 | M | | | | | | | | | | | | $286 |
| EX277 | NE 59th St | Lakeview Dr | ~175' E of Lakeview Dr | 175 | 8" | $143,000 | 38 | M | | | | | | | | | | | | $143 |
| EX278 | NE 58th St | ~50' E of Lake Washington Blvd NE | Lakeview Dr | 300 | 8" | $245,000 | 38 | M | | | | | | | | | | | | $245 |
| EX279 | NE 58th St | Lakeview Dr | ~170' E of Lakeview Dr | 175 | 8" | $143,000 | 38 | M | | | | | | | | | | | | $143 |
| EX280 | 101st Ct NE | Residential Driveway | | 250 | 8" | $205,000 | 21 | L | | | | | | | | | | | | $205 |
| EX281 | NE 55th St<br>106th Ave NE | Cross Kirkland Corridor<br>NE 55th St | 106th Ave NE<br>~435' S of NE 55th St | 1,775 | 8" | $1,450,000 | 31 | M | | | | | | | | | | | | $1,450 |
| EX282 | 104th Ave NE<br>NE 58th St | NE 55th St<br>104th Ave NE | NE 58th St<br>~225' E of 105th Ave NE | 1,300 | 8" | $1,062,000 | 15 | L | | | | | | | | | | | | $1,062 |
| EX283 | 105th Ave NE | NE 58th St | ~365' S of NE 58th St | 375 | 8" | $307,000 | 15 | L | | | | | | | | | | | | $307 |
| EX284 | NE 59th St | 106th Ave NE | NE 59th St cul-de-sac | 275 | 8" | $225,000 | 36 | M | | | | | | | | | | | | $225 |
| EX285 | NE 58th St | 106th Ave NE | NE 58th St cul-de-sac | 125 | 8" | $103,000 | 21 | L | | | | | | | | | | | | $103 |
| EX286 | NE 59th St<br>110th Ave NE | 108th Ave NE<br>NE 59th St | 110th Ave NE<br>NE 58th Pl | 800 | 8" | $654,000 | 48 | H | | | | | | | | | | | $654 | |
| EX287 | 112th Pl NE<br>NE 59th Pl<br>NE 58th Pl | NE 60th St<br>112th Pl NE<br>112th Pl NE | NE 58th Pl<br>NE 59th Pl cul-de-sac<br>~185' E of 112th Pl NE | 1,200 | 8" | $980,000 | 15 | L | | | | | | | | | | | | $980 |
| EX288 | ~NE 52nd St<br>(In Lake) | Commercial Parking Lot | | 200 | 8" | $300,000 | 20 | L | | | | | | | | | | | | $300 |
| EX289 | Lake Washington Blvd NE<br>Lake Shoreline<br>(Along Lakeshore) | ~NE 44th St<br>~NE 45th St | ~NE 45th St<br>~185' N of NE 52nd St | 2,550 | 24", 18",<br>12", 8" | $3,456,000 | 33 | M | | | | | | | | | | | | $3,456 |
| EX290 | ~NE 53rd St | Lake Washington Blvd NE | ~55' E of Lake Washington Blvd NE | 75 | 8" | $62,000 | 13 | L | | | | | | | | | | | | $62 |
| EX291 | Lake Washington Blvd NE | ~NE 44th St | NE 52nd St | 1,450 | 8" | $1,184,000 | 38 | M | | | | | | | | | | | | $1,184 |
| EX292 | ~NE 48th Pl | Lake Washington Blvd NE | ~102nd Ln NE | 325 | 8" | $266,000 | 64 | H | | | | | | | | $266 | | | | |
| EX293 | ~NE 47th St<br>~95' W of 102nd Ln NE | Lake Washington Blvd NE<br>~NE 47th St | ~75' E of Lake Washington Blvd NE<br>~NE 46th St | 350 | 8" | $286,000 | 59 | H | | | | | | | | | | $286 | | |
| EX294 | Cross Kirkland Corridor<br>NE 53rd St<br>106th Ave NE | ~NE 49th St<br>Cross Kirkland Corridor<br>NE 53rd St | NE 53rd St<br>~270' E of 106th Ave NE<br>~185' N of NE 53rd St | 2,250 | 8" | $2,060,000 | 33 | M | | | | | | | | | | | | $2,060 |
| EX295 | NE 52nd St<br>107th Ave NE | Cross Kirkland Corridor<br>NE 52nd St | ~70' E of 107th Ave NE<br>107th Ave NE cul-de-sac | 1,525 | 8" | $1,246,000 | 29 | M | | | | | | | | | | | | $1,246 |
| EX296 | Cross Kirkland Corridor<br>105th Ave NE | ~NE 49th St<br>NE 44th St | NE 44th St<br>~NE 42nd Pl | 2,050 | 8" | $1,988,000 | 29 | M | | | | | | | | | | | | $1,988 |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| | | | | | Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | | | | | | | | |
| EX297 | NE 48th Pl<br>106th Ave NE<br>~155' N of NE 48th Pl | Cross Kirkland Corridor<br>~135' S of NE 48th Pl<br>106th Ave NE | 106th Ave NE<br>~155' N of NE 48th Pl<br>~106th Pl NE | 1,075 | 8", 6" | $870,000 | 41 | H | | | | | | | | | | | | $870 |
| EX298 | Residential Easement<br>NE 47th Pl | Cross Kirkland Corridor<br>~105th Ave NE | ~105th Ave NE<br>~107th Ave NE | 1,175 | 8", 6" | $957,000 | 17 | L | | | | | | | | | | | | $957 |
| EX299 | ~NE 46th St<br>108th Ave NE<br>NE 53rd St<br>114th Ave NE<br>NE 50th Pl | Cross Kirkland Corridor<br>NE 46th St<br>108th Ave NE<br>NE 53rd St<br>114th Ave NE | 108th Ave NE<br>NE 53rd St<br>114th Ave NE<br>Watershed Park<br>NE 50th Pl cul-de-sac | 5,575 | 8" | $4,726,000 | 38 | M | | | | | | | | | | | | $4,726 |
| EX300 | 105th Ave NE<br>NE 45th St | NE 46th St<br>105th Ave NE | NE 45th St<br>~106th Pl NE | 575 | 8" | $470,000 | 36 | M | | | | | | | | | | | | $470 |
| EX301 | ~170' S of NE 45th St<br>~106th Pl NE<br>NE 45th St<br>108th Ave NE | ~Cross Kirkland Corridor<br>~170' S of NE 45th St<br>~106th Pl NE<br>NE 45th St | ~106th Pl NE<br>NE 45th St<br>108th Ave NE<br>~155' N of NE 45th St | 1,350 | 8" | $1,103,000 | 21 | L | | | | | | | | | | | | $1,103 |
| EX302 | Residential Easement | 105th Ave NE | 106th Pl NE | 400 | 8" | $327,000 | 20 | L | | | | | | | | | | | | $327 |
| EX303 | NE 48th St<br>111th Ave NE | 108th Ave NE<br>NE 48th St | 111th Ave NE<br>NE 50th Pl | 1,200 | 8" | $980,000 | 38 | M | | | | | | | | | | | | $980 |
| EX304 | 109th Ave NE<br>NE 49th St<br>~110th Ave NE | NE 48th St<br>109th Ave NE<br>NE 49th St | NE 49th St<br>~110th Ave NE<br>Emerson High School | 1,425 | 8" | $1,164,000 | 46 | H | | | | | | | | | | | $1,164 | |
| EX305 | ~150' W of 109th Ave NE<br>~NE 47 th Pl | NE 48th St<br>~150' W of 109th Ave NE | ~NE 47th Pl<br>~109th Ave NE | 375 | 8", 6" | $297,000 | 30 | M | | | | | | | | | | | | $297 |
| EX306 | Residential Easement | 109th Ave NE | ~109th Pl NE | 500 | 8", 6" | $402,000 | 30 | M | | | | | | | | | | | | $402 |
| EX307 | 110th Ave NE<br>NE 47th Pl | NE 48th St<br>110th Ave NE | NE 47th Pl<br>NE 47th Pl cul-de-sac | 350 | 8" | $286,000 | 29 | M | | | | | | | | | | | | $286 |
| EX308 | ~NE 50th Pl | 112th Ave NE | ~295' E of 112th Ave NE | 300 | 8" | $245,000 | 27 | L | | | | | | | | | | | | $245 |
| EX309 | Lake Washington Blvd NE<br>~NE Points Dr | ~NE 44th St<br>Lake Washington Blvd NE | ~NE Points Dr<br>State Route 520 | 2,800 | 24", 18", 12" | $2,779,000 | 66 | H | | | | | | | | $2,779 | | | | |
| EX310 | NE 43rd St | Lake Washington Blvd NE | ~102nd Ln NE | 375 | 8" | $307,000 | 26 | L | | | | | | | | | | | | $307 |
| EX311 | ~105th Ave NE | Commercial Parking Lot | | 125 | 6" | $95,000 | 13 | L | | | | | | | | | | | | $95 |
| EX312 | 106th Pl NE | 107th Pl NE | 105th Ave NE | 550 | 8" | $450,000 | 23 | L | | | | | | | | | | | | $450 |
| EX313 | Residential Easement<br>107th Pl NE<br>NE 44th St<br>108th Ave NE<br>NE 42nd Pl | Cross Kirkland Corridor<br>106th Pl NE<br>107th Pl NE<br>NE 44th St<br>107th Pl NE | 107th Pl NE<br>NE 44th St<br>108th Ave NE<br>NE 45th St<br>NE 42nd Pl cul-de-sac | 1,800 | 12", 8" | $1,472,000 | 32 | M | | | | | | | | | | | | $1,472 |
| EX314 | 97th Ave NE | ~150' S of NE 39th Pl | ~NE 39th Pl | 150 | 8" | $123,000 | 18 | L | | | | | | | | | | | | $123 |
| EX315 | ~NE 37th Ct<br>101st Way NE<br>NE 38th Ct | ~140' E of 101st Way NE<br>NE 37th Ct<br>101st Way NE | ~260' W of 100th Ln NE<br>NE 38th Ct<br>~105' E of 101st Way NE | 1,325 | 8" | $1,082,000 | 5 | L | | | | | | | | | | | | $1,082 |
| EX316 | NE 38th Pl | Lake Washington Blvd NE | ~180' NW of 107th Ln NE | 1,375 | 12", 8" | $1,218,000 | 35 | M | | | | | | | | | | | | $1,218 |
| EX317 | ~NE 39th St | NE 38th Pl | Commercial Parking Lot | 200 | 8" | $164,000 | 39 | M | | | | | | | | | | | | $164 |
| EX318 | ~180' NW of 107th Ln NE | NE 38th Pl | Commercial Parking Lot | 750 | 8" | $613,000 | 36 | M | | | | | | | | | | | | $613 |
| EX319 | Northup Way | Lake Washington Blvd NE | ~106th Pl NE | 1,300 | 15" | $1,238,000 | 47 | H | | | | | | | | | | | $1,238 | |
| EX320 | 124th Ave NE | NE 116th St | ~20' S of NE 116th St | 25 | 12" | $21,000 | 33 | M | | | | | | | | | | | | $21 |
| EX321 | 124th Ave NE | ~NE 113th Ct | NE 112th Pl | 275 | 12" | $230,000 | 23 | L | | | | | | | | | | | | $230 |
| EX322 | 111th Ave NE | NE 53rd St | ~NE 50th Pl | 675 | 8" | $552,000 | 63 | H | | | | | | | | | $552 | | | |
| **Total - Sewer Main Improvements** | | | | | | **$236,158,000** | **---** | **---** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$3,413** | **$2,315** | **$2,373** | **$55,190** | **$172,867** |

## Table 7-2
## Proposed Improvements Implementation Schedule (Continued)

| CIP | Project Description | | | Size | | Estimated | Rank | Priority | Planned Year of Project and Estimated Cost (x 1,000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | In | From | To | Length (LF) | Diameter (in.) | Cost | Points | Rank | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026-2035 | 2035+ |
| | | | | | | **Facility Improvements** | | | | | | | | | | | | | | |
| F1 | Rose Point Sewer Lift Station Replacement (SS 0073) | | | | | $1,110,000 | --- | --- | $1,110 | | | | | | | | | | | |
| F2 | Trend Lift Station Abandonment | | | | | $3,551,000 | --- | --- | | | | | | | | $710 | $1,420 | $1,420 | | |
| F3 | Waverly Park Lift Station Improvements | | | | | $1,178,000 | --- | --- | | | | | | | | $236 | $471 | $471 | | |
| **Total - Facility Improvements** | | | | | | **$5,839,000** | **---** | **---** | **$1,110** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$946** | **$1,892** | **$1,892** | **$0** | **$0** |
| | | | | | | **Miscellaneous and Planning Improvements** | | | | | | | | | | | | | | |
| M1 | Reclaimed Water (Purple Pipe) Opportunity Fund (SS 0084) | | | | | $5,000,000 | --- | --- | | | | | | | | | | | $5,000 | |
| M2 | Inflow and Infiltration Study | | | | | $250,000 | --- | --- | | | | | | | | $63 | $150 | $38 | | |
| M3 | General Sewer Plan Update (Update Every 10 Years) | | | | | $600,000 | --- | --- | | | | | | | | | | $150 | $150 | $300 |
| **Total - Miscellaneous Improvements** | | | | | | **$5,850,000** | **---** | **---** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$63** | **$150** | **$188** | **$5,150** | **$300** |
| **Total Estimated Project Costs of City-funded Improvements** | | | | | | **$294,285,900** | **---** | **---** | **$2,832** | **$5,176** | **$1,815** | **$5,250** | **$5,174** | **$6,480** | **$4,366** | **$6,921** | **$6,857** | **$6,952** | **$69,296** | **$173,167** |
| | | | | | | **Developer-funded Improvements - 2021 Projections** | | | | | | | | | | | | | | |
| DF1 | Lake Plaza Lift Station Improvements | | | | | $1,257,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| ~~DF2~~ | ~~~120th Ave NE~~ | ~~NE 124th St~~ | ~~~NE 122nd Way~~ | ~~1,050~~ | ~~12"~~ | ~~$877,000~~ | ~~Timing of Project Based on Timing of Future Developments~~ | | | | | | | | | | | | | |
| DF3 | NE 112th St | 120th Ave NE | Cross Kirkland Corridor | 250 | 12" | $209,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF4 | Slater Ave NE | ~NE 103rd Pl | ~NE 102nd Pl | 425 | 24" | $576,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| **Total - Developer-funded Improvements - Prior to 2021** | | | | | | **$2,042,000** | **Timing of Projects Based on Timing of Future Developments** | | | | | | | | | | | | | |
| | | | | | | **Developer-funded Improvements - 2035 Projections** | | | | | | | | | | | | | | |
| ~~DF5~~ | ~~W of 120th Ave NE~~ | ~~~NE 122nd Way~~ | ~~~NE 120th St~~ | ~~600~~ | ~~12"~~ | ~~$501,000~~ | ~~Timing of Project Based on Timing of Future Developments~~ | | | | | | | | | | | | | |
| DF6 | NE 112th St | 117th Pl NE | 116th Pl NE | 300 | 12" | $251,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF7 | 124th Ave NE | NE 112th Pl | NE 112th St | 275 | 12" | $230,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF8 | NE 97th St | Slater Ave NE | ~50' E of Slater Ave NE | 50 | 24" | $45,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF9 | NE 97th St<br>124th Ave NE<br>NE 95th St | 124nd Ln NE<br>NE 97th St<br>124th Ave NE | 124th Ave NE<br>NE 95th St<br>125th Ave NE | 1,175 | 18" | $1,025,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF10 | 128th Ave NE | ~75' N of NE 91st Ln | NE 91st Ln | 75 | 15" | $157,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF11 | Waverly Way | ~120' NE of Slater Ave NE | ~360' NE of 2nd St W | 750 | 18" | $654,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| DF12 | NE 70th Street | ~126th Ave NE | ~127th Ave NE | 325 | 12" | $272,000 | Timing of Project Based on Timing of Future Developments | | | | | | | | | | | | | |
| **Total - Developer-funded Improvements - Prior to 2035** | | | | | | **$2,634,000** | **Timing of Projects Based on Timing of Future Developments** | | | | | | | | | | | | | |
| **Total Estimated Project Costs of Developer-funded Improvements** | | | | | | **$4,676,000** | **Timing of Projects Based on Timing of Future Developments** | | | | | | | | | | | | | |

NOTES:
- Cost estimates for **CIP SM1** through **CIP SM13** and **CIP F1** were provided by the City.
- Estimated costs presented in this table are in 2017 dollars.
- Projects that are struck through were removed because they are located in the area that was acquired by Northshore in 2017 (NE 124th Street Sewer Drainage Basin). Costs for these projects were omitted from this table.

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | |
| EX94 | 9th Ave | 3rd St | ~125' E of 2nd St | 450 | 8" | $368,000 | 68 | H |
| EX309 | Lake Washington Blvd NE<br>~NE Points Dr | ~NE 44th St<br>Lake Washington Blvd NE | ~NE Points Dr<br>State Route 520 | 2,800 | 24", 18", 12" | $2,779,000 | 66 | H |
| EX107 | 11th Pl | 4th St | ~150' E of 3rd St | 675 | 8" | $552,000 | 65 | H |
| EX195 | 7th Ave S<br>3rd Pl S | ~25' E of State St S<br>7th Ave S | 5th St S<br>~210' S of 7th Ave S | 1,075 | 8", 6" | $864,000 | 65 | H |
| EX292 | ~NE 48th Pl | Lake Washington Blvd NE | ~102nd Ln NE | 325 | 8" | $266,000 | 64 | H |
| EX322 | 111th Ave NE | NE 53rd St | ~NE 50th Pl | 675 | 8" | $552,000 | 63 | H |
| EX166 | 6th St | ~5th Ave W | 1st Ave S | 1,675 | 12", 8" | $1,393,000 | 62 | H |
| EX146 | 7th Ave<br>~165' E of 1st St<br>7th Ave Alley | 1st St<br>7th Ave<br>~165' E of 1st St | ~80' W of 2nd St<br>7th Ave Alley<br>~175' W of 2nd St | 850 | 8" | $694,000 | 61 | H |
| EX84 | 15th Ave | 1st St | ~145' W of 2nd St | 425 | 8" | $347,000 | 60 | H |
| EX293 | ~NE 47th St<br>~95' W of 102nd Ln NE | Lake Washington Blvd NE<br>~NE 47th St | ~75' E of Lake Washington Blvd NE<br>~NE 46th St | 350 | 8" | $286,000 | 59 | H |
| EX65 | 4th St | ~230' N of 18th Ave | 15th Ave | 1,200 | 8" | $980,000 | 58 | H |
| EX147 | 7th Ave | 3rd St | ~80' E of 2nd St | 500 | 8" | $409,000 | 58 | H |
| EX78 | 7th Ave W Alley | 5th St W | 4th St W | 550 | 8" | $450,000 | 57 | H |
| EX80 | 5th St W<br>16th Ave<br>Market St | 16th Ave W<br>Market St<br>16th Ave | Market St<br>2nd St<br>~17th Pl | 1,075 | 8" | $878,000 | 57 | H |
| EX85 | 14th Ave | 1st St | ~130' W of 2nd St | 425 | 8" | $347,000 | 57 | H |
| EX96 | 3rd St | Central Way | ~17th Ave | 4,150 | 8" | $3,389,000 | 57 | H |
| EX106 | 13th Ave | 4th St | ~135' E of 3rd St | 675 | 8" | $552,000 | 57 | H |
| EX112 | 9th Ave | 5th St | ~130' E of 3rd St | 1,000 | 8" | $817,000 | 57 | H |
| EX228 | ~102nd Ave NE<br>~110' N of NE 64th St | NE 64th St<br>~102nd Ave NE | ~110' N of NE 64th St<br>~70' W of 103rd Ave NE | 525 | 8" | $429,000 | 57 | H |
| EX93 | 10th Ave | 3rd St | ~115' E of 2nd St | 400 | 8" | $327,000 | 56 | H |
| EX56 | 1st St | 20th Ave | ~19th Pl | 500 | 8" | $409,000 | 55 | H |
| EX158 | 8th Ave | ~130' W of 6th St | ~130' E of 3rd St | 1,425 | 8" | $1,164,000 | 55 | H |
| EX162 | 5th Ave | 4th St | ~160' E of 3rd St | 425 | 8" | $347,000 | 55 | H |
| EX176 | Slater St | Kirkland Ave | Ohde Ave | 675 | 8" | $552,000 | 55 | H |
| EX115 | 10th Ave | ~175' E of 5th St | ~330' W of 8th St | 1,025 | 8" | $837,000 | 54 | H |
| EX151 | 5th Ave | 3rd St | ~85' E of 2nd St | 500 | 8" | $409,000 | 53 | H |
| EX153 | 3rd Ave | 2nd Pl S | ~180' E of 1st St | 625 | 8" | $511,000 | 53 | H |
| EX237 | ~104th Pl NE | ~NE 64th St | ~NE 65th Pl | 200 | 8" | $164,000 | 53 | H |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description | | | Size | | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | In | From | To | Length (LF) | Diameter (in.) | | | |
| Annual Sanitary Pipeline Replacement Program (SM14) | | | | | | | | |
| EX66 | 4th Pl | 20th Ave | ~120' N of 19th Ave | 525 | 8" | $429,000 | 52 | H |
| EX188 | 2nd Ave S<br>4th St S | State St S<br>2nd Ave S | 4th St S<br>~165' S of 2nd Ave S | 625 | 8" | $511,000 | 52 | H |
| EX204 | Slater St S<br>North Ave<br>115th Pl NE | Kirkland Ave<br>Slater St S<br>~600' N of North Ave | North Ave<br>115th Pl NE<br>NE 75th St | 1,950 | 8" | $1,592,000 | 52 | H |
| EX83 | 10th Ave | Market St | ~135' E of Market St | 150 | 8" | $123,000 | 51 | H |
| EX114 | 11th Ave | 6th St | ~310' W of 8th St | 650 | 8" | $531,000 | 51 | H |
| EX116 | ~5th Pl<br>9th Ave<br>8th Ave Alley | 8th Ave<br>~5th Pl<br>~135' E of 5th St | 9th Ave<br>~155' E of 5th St<br>~90' W of 6th St | 850 | 12", 8" | $698,000 | 51 | H |
| EX139 | 2nd St W<br>Market St | 7th Ave W Alley<br>2nd St W | Market St<br>8th Ave W | 175 | 8" | $143,000 | 51 | H |
| EX144 | 8th Ave | 1st St | 2nd St | 525 | 8" | $429,000 | 51 | H |
| EX79 | Market St | 3rd St W | 11th Ave W | 175 | 8" | $143,000 | 50 | H |
| EX111 | 10th Ave | 5th St | ~280' E of 3rd St | 900 | 8" | $735,000 | 50 | H |
| EX140 | 6th Ave | Market St | ~130' W of Market St | 150 | 8" | $123,000 | 50 | H |
| EX149 | 6th Ave | ~240' W of 4th St | ~80' E of 2nd St | 825 | 8" | $674,000 | 50 | H |
| EX150 | 5th Ave<br>2nd St | 1st St<br>5th Ave | 2nd St<br>5th Ave Alley | 650 | 8" | $531,000 | 50 | H |
| EX160 | 7th Ave | ~130' E of 3rd St | ~8th St | 2,425 | 8" | $1,980,000 | 50 | H |
| EX189 | ~3rd Ave S<br>2nd St S | Lake St S<br>~3rd Ave S | ~35 E of Lake St S<br>4th Ave S | 200 | 8" | $164,000 | 50 | H |
| EX209 | NE 75th St | 116th Ave NE | ~245' E of 118th Ave NE | 1,600 | 8" | $1,307,000 | 50 | H |
| EX90 | 2nd St | 10th Ave | 18th Ave | 2,450 | 8" | $2,001,000 | 49 | H |
| EX215 | NE 80th St | 123rd Ave NE | 128th Ave NE | 1,675 | 12", 8" | $1,396,000 | 49 | H |
| EX87 | 12th Ave | 1st St | ~125' W of 2nd St | 425 | 8" | $347,000 | 48 | H |
| EX113 | 12th Ave | 6th St | ~250' W of 8th St | 725 | 8" | $592,000 | 48 | H |
| EX159 | 8th Ave | 6th St | ~360' E of 6th St | 375 | 8" | $307,000 | 48 | H |
| EX193 | 5th Ave S | ~135' E of State St S | 5th St S | 775 | 8" | $633,000 | 48 | H |
| EX205 | NE 80th St<br>(Freeway Crossing) | 116th Ave NE | ~Kirkland Cemetery | 1,700 | 12" | $1,486,000 | 48 | H |
| EX286 | NE 59th St<br>110th Ave NE | 108th Ave NE<br>NE 59th St | 110th Ave NE<br>NE 58th Pl | 800 | 8" | $654,000 | 48 | H |
| EX38 | Forbes Creek Dr | ~100th Ave NE | 9th St W | 750 | 12", 8" | $619,000 | 47 | H |
| EX319 | Northup Way | Lake Washington Blvd NE | ~106th Pl NE | 1,300 | 15" | $1,238,000 | 47 | H |
| EX186 | Kirkland Ave | Kirkland Way | ~5th Pl S | 650 | 8" | $531,000 | 46 | H |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description | | | Size | | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | In | From | To | Length (LF) | Diameter (in.) | | | |
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX236 | NE 68th St<br>106th Ave NE<br>~NE 64th St | ~95' W of 106th Ave NE<br>NE 68th St<br>106th Ave NE | 106th Ave NE<br>~NE 64th St<br>~330' E of 106th Ave NE | 1,650 | 15", 8" | $1,351,000 | 46 | H |
| EX304 | 109th Ave NE<br>NE 49th St<br>~110th Ave NE | NE 48th St<br>109th Ave NE<br>NE 49th St | NE 49th St<br>~110th Ave NE<br>Emerson High School | 1,425 | 8" | $1,164,000 | 46 | H |
| EX91 | 9th Ave<br>2nd St | 1st St<br>9th Ave | 2nd St<br>9th Ave Alley | 725 | 8", 6" | $583,000 | 45 | H |
| EX92 | 13th Ave | 3rd St | ~225' W of 3rd St | 250 | 8" | $205,000 | 45 | H |
| EX132 | NE 92nd St | ~117th Ave NE | ~NE 90th St | 375 | 8" | $307,000 | 45 | H |
| EX214 | ~120th Ave NE | ~95' N of NE 70th St | ~NE 61st St | 2,775 | 12", 8", 6" | $2,275,000 | 45 | H |
| EX102 | 6th St | 11th Ave | ~15th Ave | 1,225 | 8" | $1,001,000 | 44 | H |
| EX136 | 128th Ave NE | NE 100th St | NE 95th St | 1,250 | 12" | $1,224,000 | 44 | H |
| EX141 | 5th Ave | Market St | ~130' W of Market St | 150 | 8" | $123,000 | 44 | H |
| EX145 | 8th Ave | 3rd St | ~85' E of 2nd St | 475 | 8" | $388,000 | 44 | H |
| EX192 | 4th Ave S | ~45' E of State St S | ~4th Pl S | 750 | 8" | $613,000 | 44 | H |
| EX198 | ~410' N of 5th Ave S | 6th St S | 8th St S | 675 | 8" | $552,000 | 44 | H |
| EX200 | 5th Ave S<br>7th St S | 6th St S<br>5th Ave S | 7th St S<br>~8th Ave S | 1,375 | 8" | $1,123,000 | 44 | H |
| EX67 | ~165' N of NE 102nd Pl<br>~235' W of 111th Ave NE | Cross Kirkland Corridor<br>~165' N of NE 102nd Pl | 111th Ave NE<br>~NE 103rd Pl | 850 | 8" | $694,000 | 43 | H |
| EX138 | 128th Ave NE | NE 91st Ln | NE 91st St | 100 | 15" | $190,000 | 43 | H |
| EX42 | 100th Ave NE | NE 108th St | Forbes Creek Dr | 675 | 12" | $857,000 | 42 | H |
| EX86 | 13th Ave | 1st St | ~125' W of 2nd St | 425 | 8", 6" | $343,000 | 42 | H |
| EX88 | 11th Ave | 1st St | ~140' W of 2nd St | 425 | 8" | $347,000 | 42 | H |
| EX108 | 13th Ave<br>4th St | 5th Ln<br>13th Ave | 4th St<br>~145' S of 11th Pl | 1,275 | 8" | $1,041,000 | 42 | H |
| EX124 | 116th Ave NE | ~90' S of NE 88th St | NE 97th St | 2,650 | 8", 6" | $2,158,000 | 42 | H |
| EX196 | Kirkland Ave | 6th St | Cross Kirkland Corridor | 1,275 | 12", 8" | $1,059,000 | 42 | H |
| EX202 | 10th St S | Kirkland Ave | ~4th Ave S | 1,025 | 8" | $1,072,000 | 42 | H |
| EX248 | ~NE 68th St<br>~118th Pl NE<br>(Freeway Crossing) | 108th Ave NE<br>NE 70th Pl | 118th Pl NE<br>NE 69th Pl | 3,925 | 12", 8" | $3,387,000 | 42 | H |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description: In | From | To | Size: Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | | | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | |
| EX30 | 108th Ave NE<br>~NE 108th St<br>Forbes Creek Dr<br>~NE 109th Place | NE 108th St<br>108th Ave NE<br>~NE 108th St<br>Forbes Creek Dr | NE 108th St<br>Forbes Creek Dr<br>~NE 109th Place<br>120th Ave NE | 4,375 | 36", 15", 12" | $3,709,000 | 41 | H |
| EX40 | Market St | Forbes Creek Dr | ~18th Pl | 1,700 | 12", 8" | $1,390,000 | 41 | H |
| EX61 | 4th St | 19th Ave | ~155' S of 19th Ave | 175 | 8" | $143,000 | 41 | H |
| EX105 | 5th St | 9th Ave | ~195' N of 13th Ave | 1,500 | 8", 6" | $1,224,000 | 41 | H |
| EX110 | 4th St | 10th Ave | ~11th Ave | 300 | 8" | $245,000 | 41 | H |
| EX168 | Kirkland Way | 6th St | ~9th Ln | 1,025 | 8", 6" | $813,000 | 41 | H |
| EX297 | NE 48th Pl<br>106th Ave NE<br>~155' N of NE 48th Pl | Cross Kirkland Corridor<br>~135' S of NE 48th Pl<br>106th Ave NE | 106th Ave NE<br>~155' N of NE 48th Pl<br>~106th Pl NE | 1,075 | 8", 6" | $870,000 | 41 | H |
| EX22 | ~NE 112th St | I-405 | Slater Ave NE | 225 | 24" | $350,000 | 40 | H |
| EX74 | 116th Ave NE | ~NE 97th Ln | ~NE 101st Pl | 925 | 8" | $756,000 | 40 | H |
| EX184 | Kirkland Ave<br>~State St S | Main St<br>Kirkland Ave | ~State St S<br>~3rd St | 425 | 8" | $347,000 | 40 | H |
| EX222 | Lakeview Dr<br>Lake Washington Blvd NE | ~NE 68th Pl<br>~101st Ct NE | ~101st Ct NE<br>~NE 52nd St | 4,675 | 18", 15", 12", 8" | $3,962,000 | 40 | H |
| EX57 | ~19th Pl | 20th Ave | ~190' E of 20th Ave | 1,825 | 8" | $1,490,000 | 39 | M |
| EX64 | 18th Ave | 3rd St | ~4th Pl | 825 | 8" | $674,000 | 39 | M |
| EX71 | NE 100th St | 116th Ave NE | 111th Ave NE | 1,350 | 8" | $1,103,000 | 39 | M |
| EX103 | 14th Pl | 6th St | Peter Kirk Elementary School | 325 | 8" | $266,000 | 39 | M |
| EX118 | 9th Ave | 6th St | ~390' E of 6th St | 400 | 8" | $327,000 | 39 | M |
| EX148 | 6th Ave | 1st St | ~85' W of 2nd St | 475 | 8" | $388,000 | 39 | M |
| EX190 | 5th Ave S | ~145' E of 2nd St S | ~3rd St S | 150 | 8" | $123,000 | 39 | M |
| EX191 | ~365' N of 10th Ave S | Lake St S | 1st St S | 275 | 8" | $225,000 | 39 | M |
| EX227 | NE 64th St | ~35' E of Lake Washington Blvd NE | Lakeview Dr | 600 | 8" | $490,000 | 39 | M |
| EX251 | ~NE 66th Pl | 108th Ave NE | ~108th Pl NE | 250 | 8" | $205,000 | 39 | M |
| EX255 | ~435' N of NE 65th St<br>~170' E of 113th Ave NE<br>114th Ave NE | 113th Ave NE<br>~520' N of NE 65th St<br>~605' N of NE 65th St | 114th Ave NE<br>~120' N of NE 65th St<br>~75' N of NE 65th St | 1,300 | 8", 6" | $1,056,000 | 39 | M |
| EX256 | ~113th Ave NE<br>~NE 64th St<br>NE 63rd St<br>113th Ave NE<br>~NE 62nd St | NE 65th St<br>~113th Ave NE<br>~113th Ave NE<br>NE 63rd St<br>113th Ave NE | NE 63rd St<br>113th Ave NE<br>113th Ave NE<br>~NE 62nd St<br>114th Ave NE | 1,200 | 8" | $980,000 | 39 | M |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description | | | Size | | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | In | From | To | Length (LF) | Diameter (in.) | | | |
| | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | |
| EX317 | ~NE 39th St | NE 38th Pl | Commercial Parking Lot | 200 | 8" | $164,000 | 39 | M |
| EX48 | Slater Ave NE | NE 106th St | NE 105th St | 175 | 30" | $166,000 | 38 | M |
| EX178 | ~160' S of NE 85th St | 128th Ave NE | ~420' E of 128th Ave NE | 425 | 8" | $347,000 | 38 | M |
| EX181 | 128th Ave NE | NE 80th St | ~NE 81st Pl | 400 | 8" | $327,000 | 38 | M |
| EX187 | 2nd Ave S<br>3rd St S | State St S<br>2nd Ave S | 2nd St S<br>~140' S of 2nd Ave S | 600 | 8" | $490,000 | 38 | M |
| EX232 | NE 62nd St<br>102nd Pl NE | Lakeview Dr<br>NE 62nd St | 103rd Pl NE<br>~ 280' N of NE 62nd St | 800 | 8" | $654,000 | 38 | M |
| EX233 | NE 60th St | Lake Washington Blvd NE | Lakeview Dr | 450 | 8" | $368,000 | 38 | M |
| EX276 | NE 59th St | ~60' E of Lake Washington Blvd NE | Lakeview Dr | 350 | 8" | $286,000 | 38 | M |
| EX277 | NE 59th St | Lakeview Dr | ~175' E of Lakeview Dr | 175 | 8" | $143,000 | 38 | M |
| EX278 | NE 58th St | ~50' E of Lake Washington Blvd NE | Lakeview Dr | 300 | 8" | $245,000 | 38 | M |
| EX279 | NE 58th St | Lakeview Dr | ~170' E of Lakeview Dr | 175 | 8" | $143,000 | 38 | M |
| EX291 | Lake Washington Blvd NE | ~NE 44th St | NE 52nd St | 1,450 | 8" | $1,184,000 | 38 | M |
| EX299 | ~NE 46th St<br>108th Ave NE<br>NE 53rd St<br>114th Ave NE<br>NE 50th Pl | Cross Kirkland Corridor<br>NE 46th St<br>108th Ave NE<br>NE 53rd St<br>114th Ave NE | 108th Ave NE<br>NE 53rd St<br>114th Ave NE<br>Watershed Park<br>NE 50th Pl cul-de-sac | 5,575 | 8" | $4,726,000 | 38 | M |
| EX303 | NE 48th St<br>111th Ave NE | 108th Ave NE<br>NE 48th St | 111th Ave NE<br>NE 50th Pl | 1,200 | 8" | $980,000 | 38 | M |
| EX9 | 120th Ave NE | ~300' S of NE 116th St | ~445' S of NE 116th St | 150 | 8" | $123,000 | 36 | M |
| EX62 | Market St | 18th Ave W | 18th Ave | 325 | 8" | $266,000 | 36 | M |
| EX82 | 14th Ave | Market St | ~100' E of Market St | 125 | 8" | $103,000 | 36 | M |
| EX101 | 15th Ave | 6th St | ~200' E of 3rd St | 1,575 | 8" | $1,482,000 | 36 | M |
| EX194 | 6th Ave S | ~35' E of State St S | 5th St S | 825 | 8" | $674,000 | 36 | M |
| EX223 | 102nd Ave NE<br>NE 65th St<br>103rd Ave NE | Lakeview Dr<br>102nd Ave NE<br>NE 65th St | NE 65th St<br>103rd Ave NE<br>~85' S of NE 67th St | 1,600 | 8" | $1,307,000 | 36 | M |
| EX229 | NE 64th St | Lakeview Dr | 103rd Ave NE | 675 | 8" | $552,000 | 36 | M |
| EX230 | NE 63rd St | ~60' E of Lake Washington Blvd NE | Lakeview Dr | 525 | 8" | $429,000 | 36 | M |
| EX231 | NE 62nd St | ~50' E of Lake Washington Blvd NE | Lakeview Dr | 475 | 8" | $388,000 | 36 | M |
| EX235 | NE 68th St | ~115' W of 106th Ave NE | ~200' E of 106th Ave NE | 375 | 12", 8" | $308,000 | 36 | M |
| EX249 | 111th Ave NE | NE 68th St | ~NE 67th St | 200 | 8" | $164,000 | 36 | M |
| EX284 | NE 59th St | 106th Ave NE | NE 59th St cul-de-sac | 275 | 8" | $225,000 | 36 | M |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX300 | 105th Ave NE<br>NE 45th St | NE 46th St<br>105th Ave NE | NE 45th St<br>~106th Pl NE | 575 | 8" | $470,000 | 36 | M |
| EX318 | ~180' NW of 107th Ln NE | NE 38th Pl | Commercial Parking Lot | 750 | 8" | $613,000 | 36 | M |
| EX3 | NE 116th St | ~200' W of 117th Ave NE | ~117th Ave NE | 200 | 8" | $164,000 | 35 | M |
| EX4 | NE 116th St<br>(Freeway Crossing) | 120th Ave NE | 124th Ave NE | 1,450 | 24", 8" | $1,354,000 | 35 | M |
| EX41 | 20th Ave | Market St | ~230' E of 1st St | 650 | 8" | $531,000 | 35 | M |
| EX81 | 1st St<br>17th Pl | 18th Ave<br>1st St | ~85' S of 17th Pl<br>17th Pl cul-de-sac | 600 | 8" | $490,000 | 35 | M |
| EX109 | ~12th Ave | 5th St | 5th Pl | 325 | 8" | $266,000 | 35 | M |
| EX156 | Commercial Alley<br>Park Ln | ~245' W of Main St<br>Commercial Alley | Park Ln<br>~125' E of Lake St S | 125 | 8" | $103,000 | 35 | M |
| EX167 | 6th Ave | 6th St | 7th Ave | 850 | 8" | $694,000 | 35 | M |
| EX185 | 1st Ave S | State St S | 2nd St S | 275 | 8" | $225,000 | 35 | M |
| EX254 | 113th Ave NE<br>NE 67th St | NE 65th St<br>113th Ave NE | NE 67th St<br>~114th Ave NE | 1,100 | 8" | $899,000 | 35 | M |
| EX316 | NE 38th Pl | Lake Washington Blvd NE | ~180' NW of 107th Ln NE | 1,375 | 12", 8" | $1,218,000 | 35 | M |
| EX75 | Slater Ave NE | ~NE 100th Pl | NE 100th Pl | 225 | 24" | $350,000 | 34 | M |
| EX161 | 4th St | Central Way | 7th Ave | 875 | 8" | $715,000 | 34 | M |
| EX252 | NE 66th Pl<br>110th Ave NE<br>NE 65th St | NE 66th Pl cul-de-sac<br>NE 66th Pl<br>110th Ave NE | 110th Ave NE<br>NE 65th St<br>114th Ave NE | 1,700 | 8" | $1,388,000 | 34 | M |
| EX269 | ~NE 65th St<br>~124th Ave NE<br>NE 60th St<br>Residential Parking Lot | ~119th Ave NE<br>NE 65th St<br>~124th Ave NE<br>NE 60th St | ~124th Ave NE<br>NE 60th St<br>~170' W of 126th Ave NE<br>~126th Ave NE | 3,725 | 12", 8" | $3,044,000 | 34 | M |
| EX5 | 103rd Pl NE<br>NE 114th Pl<br>NE 115th Pl<br>105th Pl NE<br>105th Pl NE | NE 113th Pl<br>103rd Pl NE<br>103rd Pl NE<br>NE 115th Pl<br>~NE 114th Ln | ~NE 115th Ln<br>~115' W of 103rd Pl NE<br>105th Pl NE<br>NE 116th St<br>NE 114th St | 1,850 | 8" | $1,511,000 | 33 | M |
| EX18 | NE 112th St<br>110th Ave NE | 111th Ave NE<br>NE 112th St | 110th Ave NE<br>~NE 114th St | 925 | 8" | $756,000 | 33 | M |
| EX39 | Market St | Forbes Creek Dr | 20th Ave | 625 | 8" | $511,000 | 33 | M |
| EX44 | 108th Ave NE | NE 108th St | Forbes Creek Dr | 650 | 8" | $766,000 | 33 | M |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX121 | 112th Ave NE | NE 87th St | ~115' S of NE 100th St | 3,275 | 12", 8" | $2,675,000 | 33 | M |
| EX134 | NE 90th St | ~245' W of 120th Ave NE | 120th Ave NE | 300 | 24" | $436,000 | 33 | M |
| EX199 | 6th St S | ~410' N of 5th Ave S | ~445' N of 9th Ave S | 1,300 | 12", 8" | $1,078,000 | 33 | M |
| EX208 | ~115' N of NE 75th St | 116th Ave NE | 118th Ave NE | 475 | 8" | $388,000 | 33 | M |
| EX224 | NE 68th Pl | 102nd Ave NE | 103rd Ave NE | 675 | 8" | $552,000 | 33 | M |
| EX289 | Lake Washington Blvd NE<br>Lake Shoreline<br>(Along Lakeshore) | ~NE 44th St<br>~NE 45th St | ~NE 45th St<br>~185' N of NE 52nd St | 2,550 | 24", 18",<br>12", 8" | $3,456,000 | 33 | M |
| EX294 | Cross Kirkland Corridor<br>NE 53rd St<br>106th Ave NE | ~NE 49th St<br>Cross Kirkland Corridor<br>NE 53rd St | NE 53rd St<br>~270' E of 106th Ave NE<br>~185' N of NE 53rd St | 2,250 | 8" | $2,060,000 | 33 | M |
| EX320 | 124th Ave NE | NE 116th St | ~20' S of NE 116th St | 25 | 12" | $21,000 | 33 | M |
| EX12 | 100th Ave NE | NE 110th St | NE 113th St | 1,025 | 8" | $1,123,000 | 32 | M |
| EX36 | Rose Point Ln | ~140' S of NE 108th Ave | ~NE 108th Ave | 150 | 8" | $248,000 | 32 | M |
| EX171 | 114th Ave NE<br>NE 88th St | NE 87th St<br>114th Ave NE | NE 88th St<br>116th Ave NE | 900 | 8" | $735,000 | 32 | M |
| EX220 | ~NE 68th St | Lake St S | ~Lakeview Dr | 1,000 | 8" | $817,000 | 32 | M |
| EX313 | Residential Easement<br>107th Pl NE<br>NE 44th St<br>108th Ave NE<br>NE 42nd Pl | Cross Kirkland Corridor<br>106th Pl NE<br>107th Pl NE<br>NE 44th St<br>107th Pl NE | 107th Pl NE<br>NE 44th St<br>108th Ave NE<br>NE 45th St<br>NE 42nd Pl cul-de-sac | 1,800 | 12", 8" | $1,472,000 | 32 | M |
| EX13 | NE 113th St<br>101st Ave NE<br>NE 113th Pl | 100th Ave NE<br>NE 113th St<br>101st Ave NE | 101st Ave NE<br>NE 113th Pl<br>~106th Ave NE | 2,125 | 8" | $1,735,000 | 31 | M |
| EX15 | 104th Ave NE | NE 108th St | ~NE 112th Pl | 1,575 | 8" | $1,286,000 | 31 | M |
| EX131 | NE 90th St<br>Slater Ave NE<br>~117th Ave NE | 116th Ave NE<br>NE 90th St<br>Slater Ave NE | Slater Ave NE<br>~117th Ave NE<br>~265' S of NE 95th St | 1,500 | 8" | $1,225,000 | 31 | M |
| EX152 | 4th Ave | 3rd St | 2nd St | 575 | 8" | $470,000 | 31 | M |
| EX157 | Main St | Park Ln | ~155' N of Kirkland Ave | 275 | 15" | $234,000 | 31 | M |
| EX165 | Kirkland Ave | 3rd St | ~5th St | 1,100 | 8" | $899,000 | 31 | M |
| EX206 | 116th Ave NE | NE 80th St | NE 74th St | 1,525 | 12", 8" | $1,268,000 | 31 | M |
| EX210 | NE 74th St | 116th Ave NE | ~118th Ave NE | 475 | 8" | $388,000 | 31 | M |
| EX281 | NE 55th St<br>106th Ave NE | Cross Kirkland Corridor<br>NE 55th St | 106th Ave NE<br>~435' S of NE 55th St | 1,775 | 8" | $1,450,000 | 31 | M |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX17 | NE 112th St | 106th Ave NE | ~109th Pl NE | 975 | 8" | $796,000 | 30 | M |
| EX25 | NE 110th St<br>106th Ave NE | 108th Ave NE<br>NE 110th St | 106th Ave NE<br>NE 112th St | 1,175 | 8" | $960,000 | 30 | M |
| EX50 | NE 107th Pl | ~125th Ave NE | Mark Twain Park | 1,700 | 8" | $1,388,000 | 30 | M |
| EX59 | 2nd St | 19th Ave | ~130' N of 18th Ave | 550 | 8" | $450,000 | 30 | M |
| EX60 | 3rd St | 19th Ave | ~130' N of 18th Ave | 550 | 8" | $450,000 | 30 | M |
| EX97 | 17th Ave | 4th St | 17th Ave cul-de-sac | 225 | 8" | $184,000 | 30 | M |
| EX120 | 9th Ave | ~4555' E of 6th St | ~275' E of 8th St | 775 | 8" | $633,000 | 30 | M |
| EX129 | NE 91st St | 116th Ave NE | ~265' W of 116th Ave NE | 300 | 8" | $245,000 | 30 | M |
| EX143 | Market St | Central Way | 4th Ave | 600 | 12" | $501,000 | 30 | M |
| EX155 | Lakeshore Plaza | ~1st St | ~55' W of 1st St | 75 | 12" | $63,000 | 30 | M |
| EX225 | 102nd Pl NE<br>NE 67th St<br>104th Ave NE | NE 65th St<br>102nd Pl NE<br>NE 67th St | NE 67th St<br>104th Ave NE<br>~NE 68th Pl | 1,350 | 8" | $1,103,000 | 30 | M |
| EX238 | ~NE 64th St<br>105th Ave NE<br>~NE 65th Pl | Cross Kirkland Corridor<br>~NE 64th St<br>105th Ave NE | 105th Ave NE<br>~NE 65th Pl<br>~135' W of 106th Ave NE | 625 | 8" | $511,000 | 30 | M |
| EX305 | ~150' W of 109th Ave NE<br>~NE 47 th Pl | NE 48th St<br>~150' W of 109th Ave NE | ~NE 47th Pl<br>~109th Ave NE | 375 | 8", 6" | $297,000 | 30 | M |
| EX306 | Residential Easement | 109th Ave NE | ~109th Pl NE | 500 | 8", 6" | $402,000 | 30 | M |
| EX2 | NE 116th St | 111th Pl NE | 111th Ave NE | 150 | 8" | $123,000 | 29 | M |
| EX16 | NE 112th St | ~ 155' W of 104th Ave NE | ~ 195' E of 105th Ave NE | 850 | 8" | $694,000 | 29 | M |
| EX24 | NE 110th St<br>105th Ave NE | 105th Ave NE<br>NE 110th St | 105th Ave NE<br>~NE 111th Ave Pl | 1,025 | 8" | $837,000 | 29 | M |
| EX35 | 128th Ave NE<br>NE 108th Pl | NE 107th Pl<br>128th Ave NE | NE 108th Pl<br>129th Pl NE | 1,000 | 8" | $817,000 | 29 | M |
| EX51 | 128th Ave NE | NE 107th Pl | NE 106th Pl | 450 | 8" | $368,000 | 29 | M |
| EX52 | NE 106th Pl | 128th Ave NE | 129th Pl NE | 625 | 8" | $511,000 | 29 | M |
| EX70 | NE 103rd St | ~114th Pl NE | ~290' W of 116th Ave NE | 175 | 8" | $143,000 | 29 | M |
| EX117 | 6th St | Central Way | 10th Ave | 1,350 | 8" | $1,103,000 | 29 | M |
| EX122 | NE 97th St<br>~114th Ave NE | 112th Ave NE<br>NE 97th St | ~130' W of 116th Ave NE<br>Observation Dr | 1,500 | 8" | $1,225,000 | 29 | M |
| EX179 | NE 84th St | 128th Ave NE | ~130th Ave NE | 600 | 8" | $490,000 | 29 | M |
| EX201 | 8th St S | ~3rd Ave S | ~130' N of 9th Ave S | 1,850 | 8" | $1,511,000 | 29 | M |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | | | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | |
| EX211 | 120th Ave NE | NE 75th St | ~195' S of NE 73rd St | 850 | 8" | $694,000 | 29 | M |
| EX246 | 9th Ave S<br>~112th Ave NE | 6th St S<br>9th Ave S | ~112th Ave NE<br>~10th Ave S | 1,400 | 8" | $1,143,000 | 29 | M |
| EX264 | NE 70th St | ~250' W of 120th Ave NE | ~80' E of 123rd Ave NE | 925 | 8" | $756,000 | 29 | M |
| EX295 | NE 52nd St<br>107th Ave NE | Cross Kirkland Corridor<br>NE 52nd St | ~70' E of 107th Ave NE<br>107th Ave NE cul-de-sac | 1,525 | 8" | $1,246,000 | 29 | M |
| EX296 | Cross Kirkland Corridor<br>105th Ave NE | ~NE 49th St<br>NE 44th St | NE 44th St<br>~NE 42nd Pl | 2,050 | 8" | $1,988,000 | 29 | M |
| EX307 | 110th Ave NE<br>NE 47th Pl | NE 48th St<br>110th Ave NE | NE 47th Pl<br>NE 47th Pl cul-de-sac | 350 | 8" | $286,000 | 29 | M |
| EX6 | 106th Ave NE | NE 112th St | ~NE 114th St | 775 | 8" | $633,000 | 28 | M |
| EX163 | ~130' N of Central Way | 4th St | ~210' W of 4th St | 225 | 8" | $184,000 | 28 | M |
| EX183 | Commercial Alley | Kirkland Ave | Lake St S | 575 | 12", 8" | $480,000 | 28 | M |
| EX212 | 116th Ave NE | ~NE 70th Pl | ~NE 68th Pl | 725 | 8" | $592,000 | 28 | M |
| EX260 | NE 60th St<br>114th Ave NE | 108th Ave NE<br>NE 60th St | 114th Ave NE<br>~NE 55th St | 3,300 | 8" | $2,863,000 | 28 | M |
| EX267 | ~NE 67th St<br>123rd Ave NE | ~120th Ave NE<br>NE 67th St | 123rd Ave NE<br>NE 66th St | 1,475 | 8" | $1,205,000 | 28 | M |
| EX19 | ~111th Ave NE<br>~NE 112th Pl | NE 112th St<br>~111th Ave NE | ~NE 113th Pl<br>~112th Ave NE | 1,025 | 8" | $1,174,000 | 27 | L |
| EX21 | 120th Ave NE | ~NE 112th Pl | ~NE 113th Pl | 350 | 8" | $286,000 | 27 | L |
| EX27 | 106th Ave NE<br>~NE 111th Ave Pl | NE 110th St<br>~108th Ave NE | ~NE 111th Ave Pl<br>~109th Ave NE | 500 | 8" | $409,000 | 27 | L |
| EX29 | NE 108th St | 108th Ave NE | 109th Ave NE | 275 | 8" | $225,000 | 27 | L |
| EX43 | Forbes Creek Dr<br>NE 107th Pl | NE 107th Pl<br>Forbes Creek Dr | ~109th Ave NE<br>Forbes Creek Dr | 1,150 | 8" | $1,280,000 | 27 | L |
| EX54 | NE 104th St | 130th Ave NE | ~80' E of 130th Ave NE | 100 | 8" | $82,000 | 27 | L |
| EX58 | 1st St | 19th Ave | ~125' N of 18th Ave | 550 | 8" | $450,000 | 27 | L |
| EX63 | 18th Ave | Market St | ~240' E of 2nd St | 1,075 | 8" | $878,000 | 27 | L |
| EX73 | 114th Ave NE<br>114th Pl NE | NE 100th St<br>114th Ave NE | 114th Pl NE<br>~NE 103rd Pl | 475 | 8" | $388,000 | 27 | L |
| EX95 | 3rd St | 18th Ave | ~17th Pl | 250 | 8" | $205,000 | 27 | L |
| EX197 | 6th St S | Kirkland Ave | 3rd Ave S | 775 | 12" | $647,000 | 27 | L |
| EX218 | 128th Ave NE<br>~128th Pl NE<br>NE 75th St | NE 80th St<br>~NE 78th St<br>128th Pl NE | ~NE 78th St<br>NE 75th St<br>~130' W of 130th Ave NE | 1,875 | 8" | $1,531,000 | 27 | L |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description: In | From | To | Size: Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX266 | 122nd Ave NE<br>~135' N of NE 68th Pl<br>~123rd Ave NE<br>NE 68th Pl | NE 70th St<br>122nd Ave NE<br>~135' N of NE 68th Pl<br>~123rd Ave NE | ~135' N of NE 68th Pl<br>~123rd Ave NE<br>NE 68th Pl<br>~122nd Pl NE | 1,075 | 8" | $878,000 | 27 | L |
| EX308 | ~NE 50th Pl | 112th Ave NE | ~295' E of 112th Ave NE | 300 | 8" | $245,000 | 27 | L |
| EX7 | 108th Ave NE | NE 112th St | ~NE 115th Ln | 1,225 | 8" | $1,001,000 | 26 | L |
| EX31 | ~111th Ct NE<br>~111th Ave NE<br>~NE 110th St | ~NE 108th St<br>NE 110th St<br>~111th Ct NE | NE 110th St<br>NE 112th St<br>112th Ave NE | 1,650 | 8" | $1,348,000 | 26 | L |
| EX47 | ~115th Pl NE | NE 104th St | ~NE 103rd Pl | 300 | 8" | $245,000 | 26 | L |
| EX98 | 3rd Pl | 15th Ave | 3rd Pl cul-de-sac | 375 | 8" | $307,000 | 26 | L |
| EX100 | 5th Pl | 15th Ave | ~225' N of 15th Ave | 250 | 8" | $205,000 | 26 | L |
| EX119 | 8th St | 7th Ave | 11th Ave | 1,300 | 8" | $1,062,000 | 26 | L |
| EX164 | | Peter Kirk Park | | 50 | 8" | $41,000 | 26 | L |
| EX217 | 127th Pl NE | NE 80th St | ~375' S of NE 80th St | 375 | 8" | $307,000 | 26 | L |
| EX275 | 130th Ave NE | ~NE 68th Pl | ~NE 67th St | 300 | 12" | $251,000 | 26 | L |
| EX310 | NE 43rd St | Lake Washington Blvd NE | ~102nd Ln NE | 375 | 8" | $307,000 | 26 | L |
| EX28 | 108th Ave NE | NE 108th St | NE 110th St | 500 | 12", 8" | $410,000 | 25 | L |
| EX68 | 111th Ave NE | NE 100th St | ~NE 103rd Pl | 950 | 8" | $776,000 | 25 | L |
| EX72 | 112th Ave NE<br>Highlands Park<br>NE 103rd Pl | NE 100th St<br>112th Ave NE<br>Highlands Park | NE 102nd St<br>NE 103rd Pl<br>114th Pl NE | 1,150 | 8" | $939,000 | 25 | L |
| EX89 | 11th Ave | 1st St | 2nd St | 575 | 8" | $470,000 | 25 | L |
| EX180 | 128th Ave NE<br>NE 83rd St | NE 84th St<br>128th Ave NE | NE 83rd St<br>131st Ave NE | 1,350 | 8" | $1,103,000 | 25 | L |
| EX239 | ~NE 63rd St | Cross Kirkland Corridor | 106th Ave NE | 600 | 8" | $490,000 | 25 | L |
| EX247 | 8th St S<br>~435' S of 9th Ave S | 9th Ave S<br>8th St S | ~NE 68th St<br>~111th Ave NE | 875 | 8" | $715,000 | 25 | L |
| EX10 | 98th Ave NE | Old Market St Trail | ~NE 108th St | 2,250 | 36" | $2,679,000 | 24 | L |
| EX130 | NE 90th St | 112th Ave NE | ~180' W of 116th Ave NE | 975 | 8" | $796,000 | 24 | L |
| EX216 | 126th Ave NE | NE 80th St | NE 78th Pl | 450 | 8" | $368,000 | 24 | L |
| EX263 | 119th Ave NE | NE 70th Pl | ~NE 67th Pl | 800 | 8" | $654,000 | 24 | L |
| EX265 | ~NE 68th Pl | 120th Ave NE | ~160' W of 122nd Ave NE | 525 | 8" | $429,000 | 24 | L |
| EX37 | Lake Shoreline<br>(Along Lakeshore) | ~5th Ave W | Rose Point Ln | 4,175 | 12", 8" | $6,263,000 | 23 | L |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | |
| EX55 | Market St | 20th Ave W | 7th St W | 125 | 8" | $103,000 | 23 | L |
| EX123 | NE 95th St<br>~114th Ave NE | 112th Ave NE<br>NE 95th St | ~130' W of 116th Ave NE<br>~210' N of NE 95th St | 1,350 | 8" | $1,103,000 | 23 | L |
| EX128 | NE 91st St | 112th Ave NE | ~180' E of 114th Ave NE | 750 | 8" | $613,000 | 23 | L |
| EX172 | NE 87th St | 112th Ave NE | ~95 W of 116th Ave NE | 1,025 | 8", 6" | $819,000 | 23 | L |
| EX174 | ~NE 85th St | Cross Kirkland Corridor | ~80' E of Cross Kirkland Corridor | 100 | 8" | $82,000 | 23 | L |
| EX243 | ~NE 62nd St | 105th Ave NE | 106th Ave NE | 225 | 8" | $184,000 | 23 | L |
| EX244 | 106th Ave NE<br>~NE 57th St | ~NE 62nd St<br>106th Ave NE | NE 57th St<br>NE 55th St | 2,100 | 8", 6" | $1,705,000 | 23 | L |
| EX250 | 111th Ave NE | NE 68th St | ~120' N of NE 67th St | 250 | 8" | $205,000 | 23 | L |
| EX253 | 112th Ave NE | NE 65th St | NE 67th St | 275 | 8" | $225,000 | 23 | L |
| EX257 | ~NE 62nd St | 111th Ave NE | ~113th Ave NE | 950 | 8" | $776,000 | 23 | L |
| EX312 | 106th Pl NE | 107th Pl NE | 105th Ave NE | 550 | 8" | $450,000 | 23 | L |
| EX321 | 124th Ave NE | ~NE 113th Ct | NE 112th Pl | 275 | 12" | $230,000 | 23 | L |
| EX23 | NE 112th St | ~105' W of 127th Pl NE | 127th Pl NE | 125 | 12" | $105,000 | 22 | L |
| EX53 | 129th Pl NE | NE 106th Pl | 129th Pl NE cul-de-sac | 200 | 8" | $164,000 | 22 | L |
| EX104 | 4th St | 13th Ave | ~14th Ave | 475 | 8" | $573,000 | 22 | L |
| EX203 | ~340' S of Kirkland Ave | 10th St S | ~380' E of 10th St S | 400 | 8" | $476,000 | 22 | L |
| ~~EX1~~ | ~~NE 118th St~~ | ~~117th Ave NE~~ | ~~118th Ave NE~~ | ~~250~~ | ~~8"~~ | ~~$205,000~~ | ~~21~~ | ~~L~~ |
| EX20 | ~118th Ave NE | NE 112th St | ~NE 113th Pl | 450 | 8" | $368,000 | 21 | L |
| EX45 | 111th Ave NE | Cross Kirkland Corridor | ~25' SE of Cross Kirkland Corridor | 25 | 8" | $21,000 | 21 | L |
| EX133 | ~Slater Ave NE | ~NE 92nd St | ~NE 91st St | 325 | 18" | $284,000 | 21 | L |
| EX170 | NE 88th St | 112th Ave NE | ~113th Ln NE | 450 | 8" | $368,000 | 21 | L |
| EX221 | State St S<br>NE 68th St<br>~104th Ave NE | 10th Ave S<br>State St S<br>NE 68th St | NE 68th St<br>~104th Ave NE<br>~10th Ave S | 1,050 | 8" | $858,000 | 21 | L |
| EX234 | NE 60th St<br>~103rd Pl NE | Lakeview Dr<br>NE 60th St | ~65' E of Lakeview Dr<br>~150' S of NE 60th St | 225 | 8", 6" | $176,000 | 21 | L |
| EX241 | NE 60th St<br>~104th Ave NE<br>105th Ave NE | ~104th Ave NE<br>NE 60th St<br>NE 60th St | 105th Ave NE<br>~NE 59th St<br>~NE 59th St | 1,100 | 8", 6" | $894,000 | 21 | L |
| EX242 | 105th Ave NE | ~NE 63rd St | ~NE 60th Ln | 650 | 8" | $531,000 | 21 | L |
| EX245 | NE 60th Ln | 106th Ave NE | ~225' E of 106th Ave NE | 250 | 8" | $205,000 | 21 | L |

[1] Projects that are struck through were removed because they are located in the area that was acquired by Northshore in 2017 (NE 124th Street Sewer Drainage Basin). Costs for these projects were omitted from this table.

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | |
| EX259 | 112th Ave NE<br>NE 61st Pl | NE 62nd St<br>112th Ave NE | NE 61st Pl<br>~113th Ave NE | 900 | 8" | $735,000 | 21 | L |
| EX280 | 101st Ct NE | Residential Driveway | | 250 | 8" | $205,000 | 21 | L |
| EX285 | NE 58th St | 106th Ave NE | NE 58th St cul-de-sac | 125 | 8" | $103,000 | 21 | L |
| EX301 | ~170' S of NE 45th St<br>~106th Pl NE<br>NE 45th St<br>108th Ave NE | ~Cross Kirkland Corridor<br>~170' S of NE 45th St<br>~106th Pl NE<br>NE 45th St | ~106th Pl NE<br>NE 45th St<br>108th Ave NE<br>~155' N of NE 45th St | 1,350 | 8" | $1,103,000 | 21 | L |
| EX288 | ~NE 52nd St<br>(In Lake) | Commercial Parking Lot | | 200 | 8" | $300,000 | 20 | L |
| EX302 | Residential Easement | 105th Ave NE | 106th Pl NE | 400 | 8" | $327,000 | 20 | L |
| EX26 | ~NE 108th Pl | NE 110th St | ~NE 111th Ave Pl | 575 | 8" | $470,000 | 19 | L |
| EX32 | NE 111th Pl | ~129th Pl NE | ~130th Ave NE | 225 | 8" | $184,000 | 19 | L |
| EX46 | ~NE 107th St | 116th Ave NE | ~170' W of 116th Ave NE | 175 | 8" | $143,000 | 19 | L |
| EX69 | ~165' N of NE 102nd Pl<br>~131' W of 112th Ave NE<br>112th Ave NE<br>NE 103rd Pl | 111th Ave NE<br>~165' N of NE 102nd Pl<br>~165' N of NE 102nd Pl<br>112th Ave NE | 112th Ave NE<br>NE 102nd Pl<br>NE 103rd Pl<br>NE 103rd Pl cul-de-sac | 875 | 8" | $715,000 | 19 | L |
| EX99 | 5th St | 15th Ave | ~265' N of 15th Ave | 275 | 8" | $225,000 | 19 | L |
| EX137 | NE 94th St<br>129th Ave NE<br>130th Ave NE | NE 94th St cul-de-sac<br>NE 94th St<br>NE 94th St | 130th Ave NE<br>129th Ave NE cul-de-sac<br>~NE 94th Ct | 700 | 8" | $572,000 | 19 | L |
| EX272 | 120th Pl NE<br>NE 61st St | NE 62nd St<br>120th Pl NE | NE 61st St<br>~70' W of 123rd Ave NE | 1,100 | 8" | $899,000 | 19 | L |
| EX274 | Ben Franklin Elementary School | | | 350 | 8" | $286,000 | 19 | L |
| EX142 | Waverly Way | Market St | ~400' NW of Market St | 400 | 18" | $349,000 | 18 | L |
| EX314 | 97th Ave NE | ~150' S of NE 39th Pl | ~NE 39th Pl | 150 | 8" | $123,000 | 18 | L |
| EX8 | 109th Ave NE | NE 112th St | ~NE 115th Ln | 1,250 | 8" | $1,021,000 | 17 | L |
| EX14 | 101st Ave NE<br>NE 112th Pl<br>103rd Ave NE | NE 113th St<br>101st Ave NE<br>NE 112th Pl | NE 112th Pl<br>103rd Ave NE<br>~NE 113th St | 1,100 | 8" | $899,000 | 17 | L |
| EX49 | 124th Ave NE<br>124th Ave NE | ~145' N of NE 104th St<br>NE 103rd Pl | ~165' S of NE 104th St<br>~90' S of NE 103rd Pl | 425 | 12", 8" | $350,000 | 17 | L |
| EX125 | NE 94th St | 112th Ave NE | ~195' S of NE 95th St | 850 | 8" | $694,000 | 17 | L |
| EX126 | 114th Ave NE<br>NE 94th St<br>~290' W of 116th Ave NE | NE 94th St<br>114th Ave NE<br>NE 94th St | NE 94th St<br>~290' W of 116th Ave NE<br>~NE 94th Pl | 625 | 8" | $511,000 | 17 | L |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

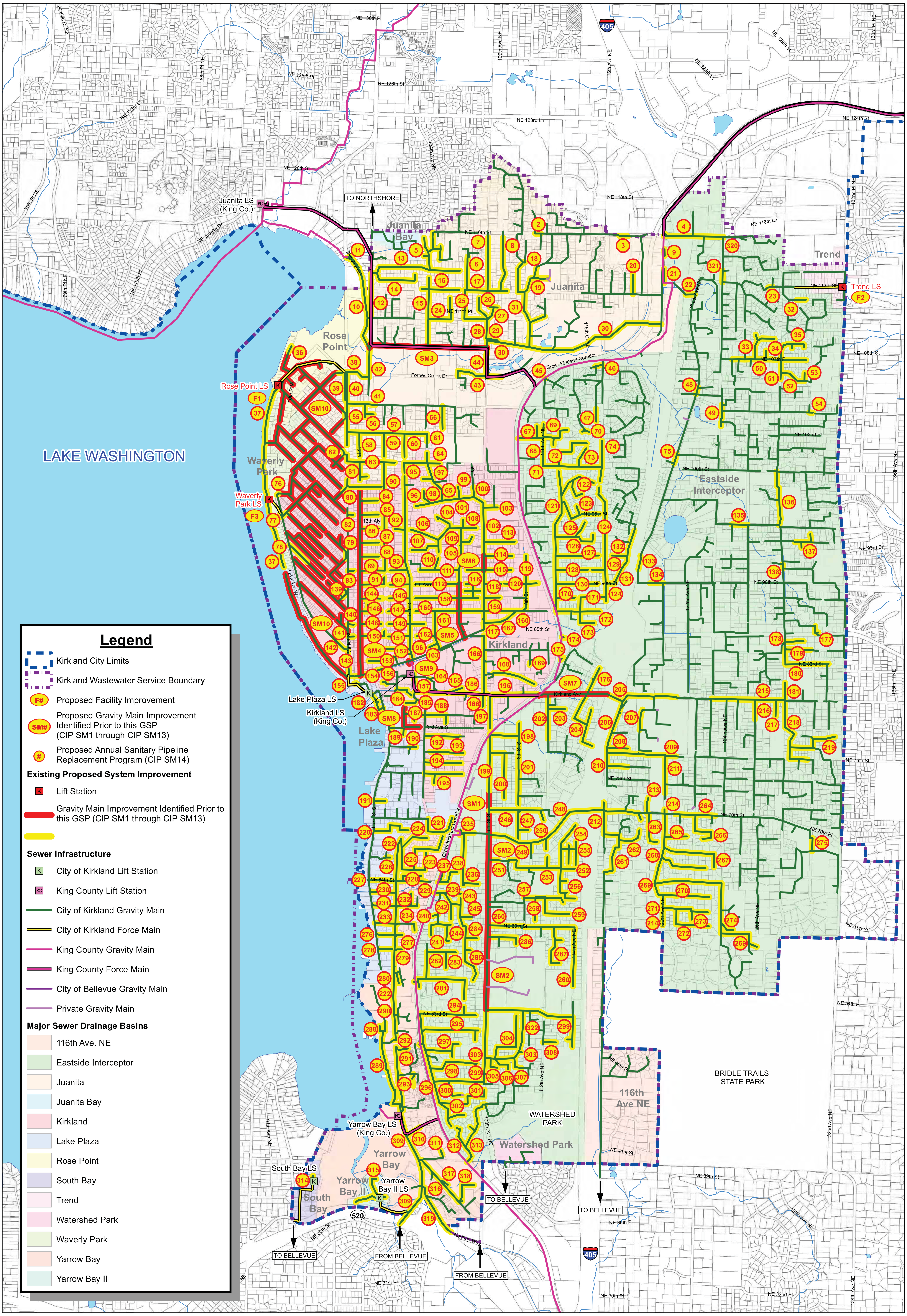
| CIP No. | Project Description | | | Size | | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| | In | From | To | Length (LF) | Diameter (in.) | | | |
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX127 | NE 92nd St | 112th Ave NE | ~140' W of 116th Ave NE | 1,000 | 8" | $817,000 | 17 | L |
| EX154 | Central Way | ~2nd St | Market St | 850 | 30" | $804,000 | 17 | L |
| EX175 | ~3rd Ave | Cross Kirkland Corridor | ~80' E of Cross Kirkland Corridor | 100 | 8" | $82,000 | 17 | L |
| EX182 | | Lake Plaza Lift Station | | 25 | 18" | $22,000 | 17 | L |
| EX213 | ~119th Ave NE | NE 70th Pl | Holy Family School | 375 | 8" | $307,000 | 17 | L |
| EX258 | 111th Pl NE | NE 62nd St | ~115' N of NE 60th St | 525 | 8" | $429,000 | 17 | L |
| EX298 | Residential Easement<br>NE 47th Pl | Cross Kirkland Corridor<br>~105th Ave NE | ~105th Ave NE<br>~107th Ave NE | 1,175 | 8", 6" | $957,000 | 17 | L |
| EX77 | Waverly Park Way<br>6th St W | Waverly Beach Park<br>Waverly Park Way | 6th St W<br>10th Ave W | 250 | 15", 8" | $206,000 | 16 | L |
| EX219 | NE 76th St<br>130th Ave NE<br>~NE 77th Ct | 128th Pl NE<br>NE 76th St<br>130th Ave NE | 130th Ave NE<br>~NE 77th Ct<br>~131st Ave NE | 1,250 | 8" | $1,021,000 | 16 | L |
| EX11 | 98th Ave NE | Old Market St Trail | ~NE 113th Pl | 425 | 12", 8" | $593,000 | 15 | L |
| EX33 | 126th Pl NE<br>NE 109th St | NE 107th Pl<br>126th Pl NE | NE 109th St<br>127th Pl NE | 975 | 8" | $796,000 | 15 | L |
| EX34 | 127th Ave NE | NE 107th Pl | ~NE 108th St | 225 | 8" | $184,000 | 15 | L |
| EX261 | ~NE 68th Pl<br>117th Ave NE<br>NE 67th St<br>~116th Pl NE | 116th Ave NE<br>~NE 68th Pl<br>117th Ave NE<br>NE 67th St | 117th Ave NE<br>NE 67th St<br>116th Pl NE<br>116th Ave NE | 1,425 | 8" | $1,164,000 | 15 | L |
| EX268 | ~NE 65th Pl<br>NE 66th St | ~120th Ave NE<br>~120th Pl NE | ~120th Pl NE<br>~175' W of 123rd Ave NE | 1,100 | 8" | $899,000 | 15 | L |
| EX282 | 104th Ave NE<br>NE 58th St | NE 55th St<br>104th Ave NE | NE 58th St<br>~225' E of 105th Ave NE | 1,300 | 8" | $1,062,000 | 15 | L |
| EX283 | 105th Ave NE | NE 58th St | ~365' S of NE 58th St | 375 | 8" | $307,000 | 15 | L |
| EX287 | 112th Pl NE<br>NE 59th Pl<br>NE 58th Pl | NE 60th St<br>112th Pl NE<br>112th Pl NE | NE 58th Pl<br>NE 59th Pl cul-de-sac<br>~185' E of 112th Pl NE | 1,200 | 8" | $980,000 | 15 | L |
| EX173 | 114th Ave NE<br>NE 86th St | NE 87th St<br>114th Ave NE | NE 86th St<br>NE 86th St cul-de-sac | 600 | 8" | $490,000 | 13 | L |
| EX240 | NE 61st Ct | 104th Ave NE | ~125' W of 104th Ave NE | 125 | 6" | $95,000 | 13 | L |
| EX262 | NE 67th Pl | 117th Ave NE | NE 68th Pl | 625 | 8" | $511,000 | 13 | L |
| EX270 | NE 64th St | 120th Ave NE | ~50' W of 123rd Ave NE | 1,075 | 8" | $878,000 | 13 | L |
| EX271 | NE 62nd St | 120th Ave NE | ~80' W of 123rd Ave NE | 1,100 | 8" | $899,000 | 13 | L |
| EX273 | 122nd Ave NE | NE 62nd St | ~185' S of NE 62nd St | 200 | 8" | $164,000 | 13 | L |

**Table 7-3**
**Annual Sanitary Pipeline Replacement Program Sorted by Priority Ranking (Continued)**

| CIP No. | Project Description In | From | To | Size Length (LF) | Diameter (in.) | Estimated Cost | Rank Points | Priority Rank |
|---|---|---|---|---|---|---|---|---|
| **Annual Sanitary Pipeline Replacement Program (SM14)** | | | | | | | | |
| EX290 | ~NE 53rd St | Lake Washington Blvd NE | ~55' E of Lake Washington Blvd NE | 75 | 8" | $62,000 | 13 | L |
| EX311 | ~105th Ave NE | Commercial Parking Lot | | 125 | 6" | $95,000 | 13 | L |
| EX135 | NE 95th St | 125th Ave NE | 126th Ave NE | 375 | 18" | $512,000 | 12 | L |
| EX169 | Residential Easement | ~3rd Ave | ~55' S of 3rd Ave | 75 | 8", | $62,000 | 11 | L |
| EX76 | Waverly Park Way | Waverly Beach Park | 10th Ave W Alley | 50 | 12" | $42,000 | 5 | L |
| EX315 | ~NE 37th Ct<br>101st Way NE<br>NE 38th Ct | ~140' E of 101st Way NE<br>NE 37th Ct<br>101st Way NE | ~260' W of 100th Ln NE<br>NE 38th Ct<br>~105' E of 101st Way NE | 1,325 | 8" | $1,082,000 | 5 | L |
| EX226 | ~NE 66th Ln | NE 66th Ln | ~120' W of Lakeview Dr | 100 | 8" | $82,000 | 3 | L |
| EX177 | ~130th Ave NE<br>NE 85th St | ~NE 86th St<br>~130th Ave NE | NE 85th St<br>~80' E of 130th Ave NE | 250 | 8" | $205,000 | 1 | L |
| EX207 | Lake Washington High School | | | 475 | 8" | $388,000 | 1 | L |
| **Total - Sewer Main Improvements** | | | | | | **$236,158,000** | **---** | **---** |

[1] Projects that are struck through were removed because they are located in the area that was acquired by Northshore in 2017 (NE 124th Street Sewer Drainage Basin). Costs for these projects were omitted from this table.

THIS PAGE INTENTIONALLY LEFT BLANK




NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

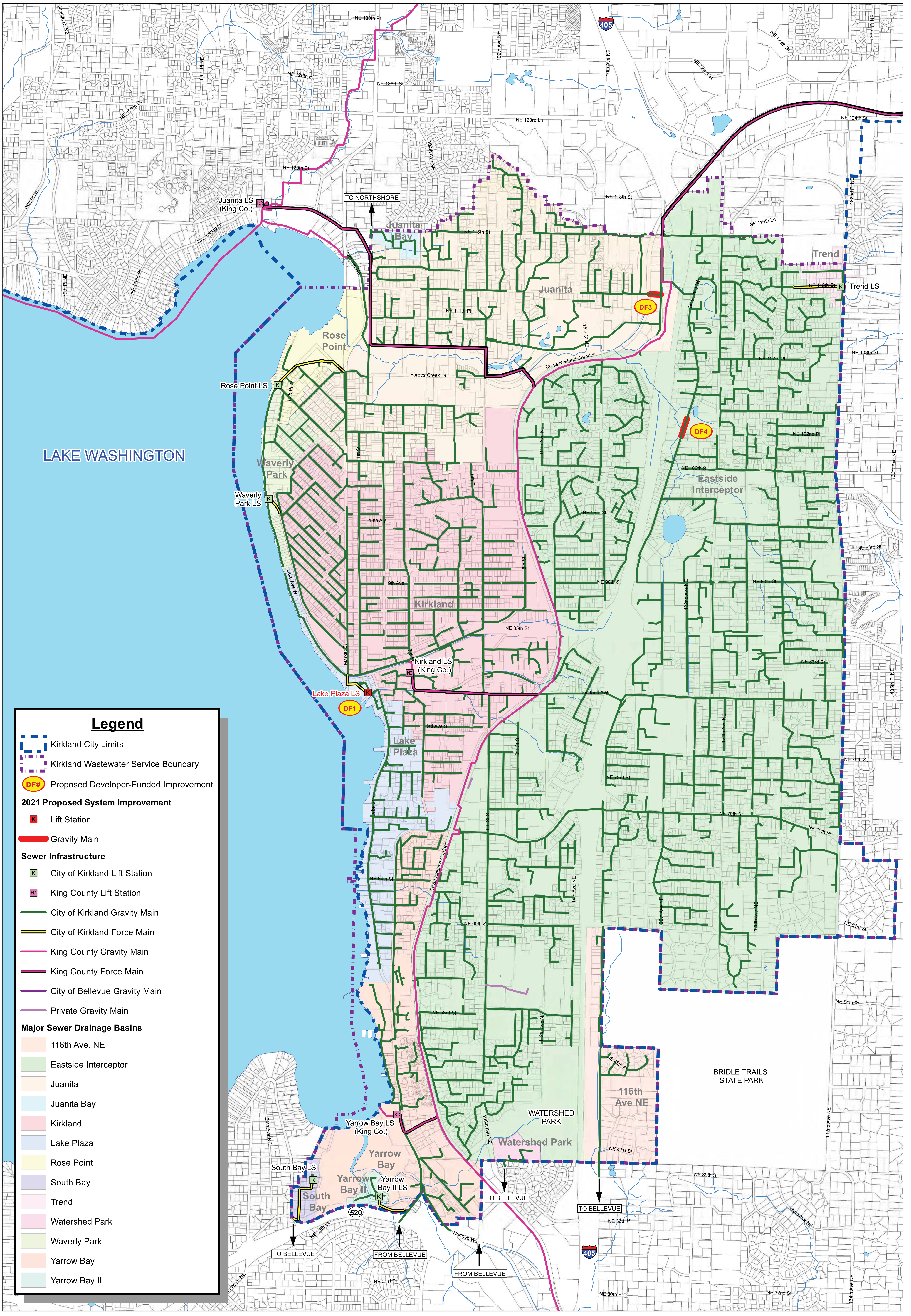
# Figure 7-1
# Existing Sewer Deficiencies
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

# Figure 7-2

## Projected 2021 Sewer Deficiencies

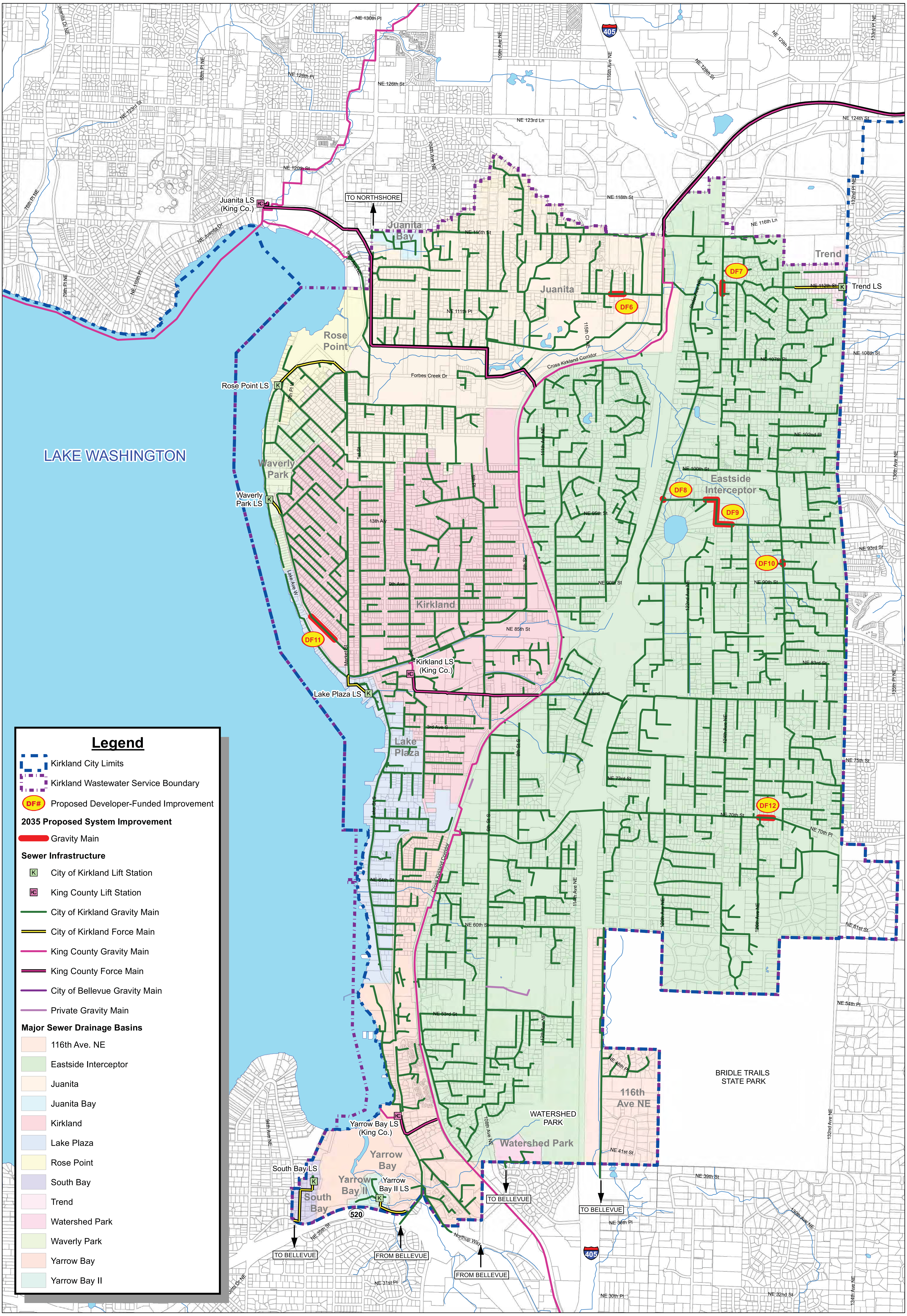
## *City of Kirkland General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

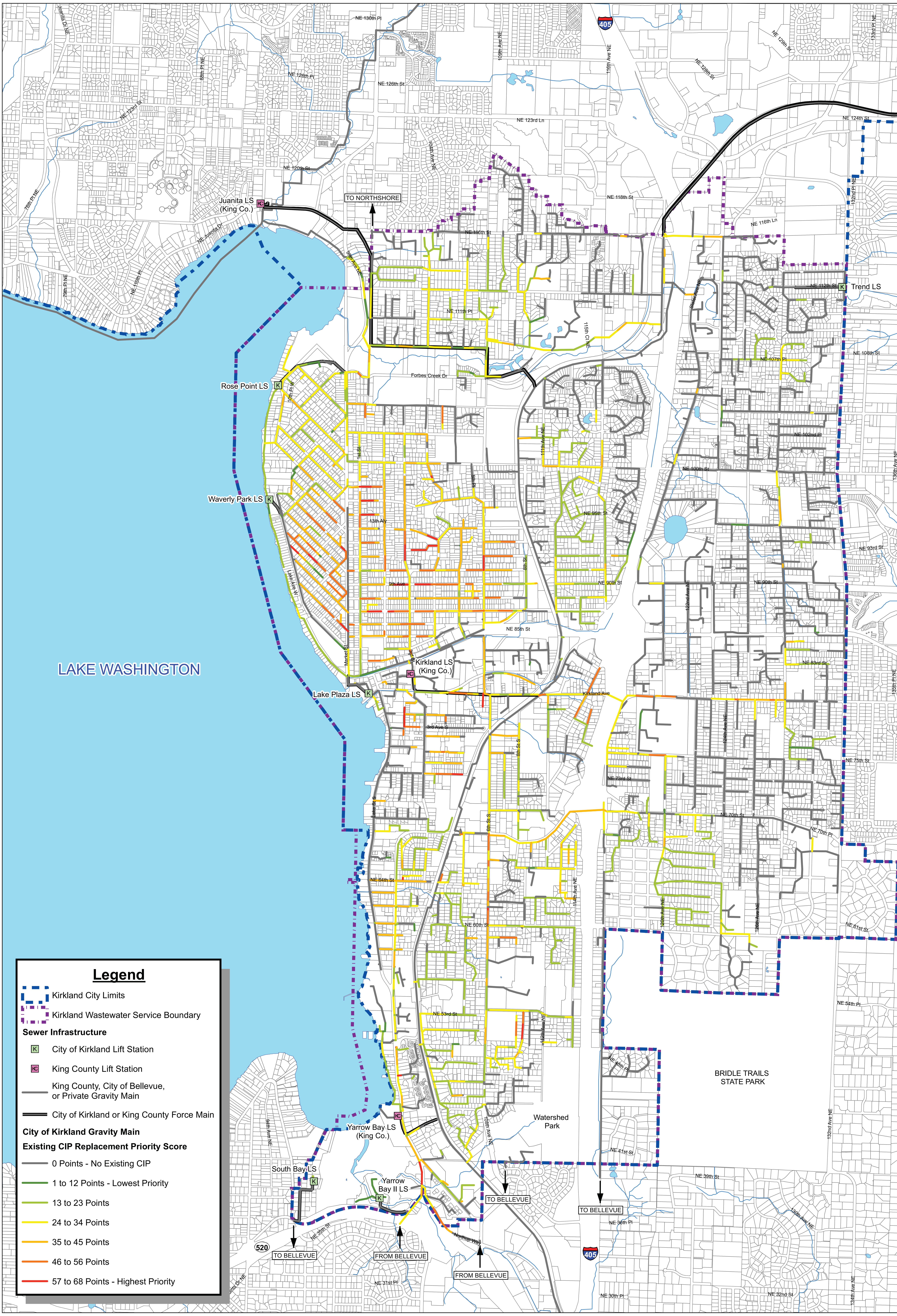
CITY OF KIRKLAND WASHINGTON

# Figure 7-3
# Projected 2035 Sewer Deficiencies
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.




COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

# Figure 7-4
# Existing CIP Priority Score
## *City of Kirkland*
## *General Sewer Plan*

Vicinity Map


This map is a graphic representation derived from the City of Kirkland Geographic Information System. It was designed and intended for City of Kirkland staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Kirkland.

# Operations and Maintenance 8

## INTRODUCTION

The City of Kirkland's (City) sewer system operations and maintenance (O&M) program consists of the following elements.

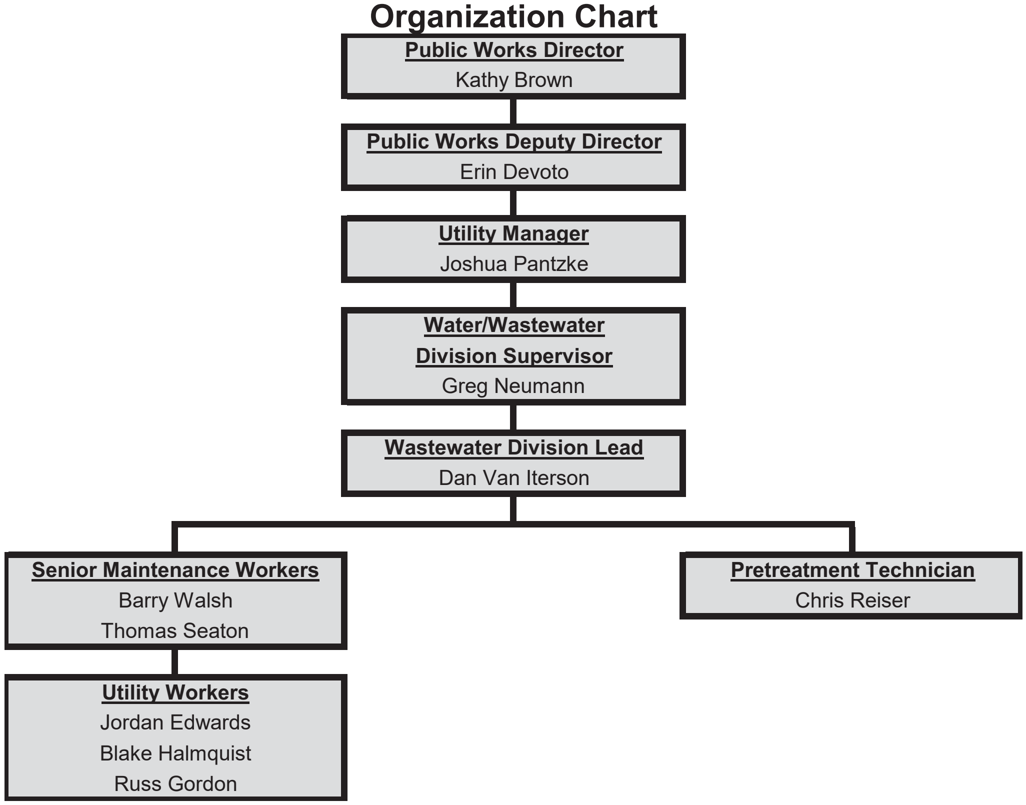
- ≠ Normal Operations
- ≠ Preventative Maintenance
- ≠ Emergency Operations
- ≠ Maintenance

## NORMAL OPERATIONS

### *City Personnel*

The City's Department of Public Works functions under the direction of a Public Works Director, who is appointed by the City Manager. The current wastewater O&M staff consist of maintenance and service personnel that function under the direction of the Utility Manager and Water/Wastewater Division Supervisor, as shown in **Chart 8-1**. The sewer system tasks that are performed by the O&M staff include inspection, testing, installation, and repair of system facilities, routine operation and preventive maintenance, recordkeeping, administrative tasks, general clerical work, and corrective or breakdown maintenance required in response to emergencies.

**Chart 8-1**
**Organization Chart**



## Personnel Responsibilities

The key responsibilities of the sewer O&M staff are summarized below.

**Public Works Director** – Directs the activities of all divisions in the Public Works Department. Coordinates strategic, financial, and operational activities with other City departments and oversees the operation and administration of the City's Water, Wastewater, Stormwater, Street and Grounds, and Operations Divisions.

**Public Works Deputy Director** – Under the direction of the Public Works Director, provides leadership and manages all divisions in the Public Works Department in accordance with professional and administrative standards, municipal ordinances, and general established policies. Assists the Public Works Director in the day-to-day operations of the Public Works Department, personnel, budget, administration and work program tasks and oversees the activities of the Public Works Department in the Public Works Director's absence.

**Utility Manager** – Plans, directs, organizes, and administers all activities of the Water, Wastewater, and Stormwater Divisions to provide efficient, effective, and timely services. Performs a full range of managerial duties that are complex in both breadth and depth. Responds to issues that are often obscure, politically sensitive, and have considerable public exposure. Responsible for personnel management, financial administration, long-range strategic planning, and development and implementation of complex operational changes. Manages and coordinates regional wastewater utility activities with other cities, districts, State of Washington (State) agencies, and regional organizations for recommendation to the Public Works Director, Public Works Deputy Director, City Manager, and City Council.

**Water/Wastewater Division Supervisor** – Plans, directs, organizes, and administers all activities of the Water and Wastewater Divisions to provide efficient, effective, and timely services. Performs a full range of managerial duties that are complex in both breadth and depth. Responds to issues that are often obscure, politically sensitive, and have considerable public exposure. Responsible for personnel management, financial administration, long-range strategic planning, and development and implementation of complex operational changes.

**Wastewater Division Lead** – Under the direction of the Water/Wastewater Division Supervisor. Oversees the scheduling of daily sewer O&M staff. Plans, organizes, and supervises the work of employees assigned to the maintenance staff. Trains staff as necessary.

**Senior Maintenance Worker** – Performs maintenance of the City's sewer system and appurtenances. Coordinates field crew activities. May operate heavy and specialized equipment.

**Utility Worker** – Performs general operational, maintenance, repair, and construction tasks ensuring the effective operations of the City's sewer system. May operate heavy and specialized equipment. Performs varied manual labor.

**Pretreatment Technician** – Performs compliance inspections. Monitors and samples wastewater discharges to determine classification. Assists with development and implementation of compliance and education information to eliminate fats, oils, and grease (FOG), as well as non-dispersible products within the City's sewer collection wastewater system.

## *Staff Certification*

**Table 8-1** shows the current certifications of the City's wastewater O&M staff. It is City policy to maintain a well-qualified, technically trained staff. The City annually allocates funds for personnel training, certification, and membership in professional organizations. The City believes that the time and money invested in training, certification, and professional organizations are repaid many times in improved safety, skills, and confidence.

**Table 8-1**
**Staff Certification**

| Employee | Position | Certification(s) |
|---|---|---|
| Joshua Pantzke | Utility Manager | WWC-1 |
| Dan Van Iterson | Lead | WWC-2, CCS |
| Barry Walsh | Senior Maintenance Worker | N/C |
| Thomas Seaton | Senior Maintenance Worker | WWC-1, PACP |
| Jordan Edwards | Utility Worker | WWC-1 |
| Blake Halmquist | Utility Worker | WWC-1 |
| Russ Gordon | Utility Worker | WWC-1 |
| Chris Reiser | Pretreatment Technician | WWC-2 |

CERTIFICATION DEFINITIONS:
-WWC - Wastewater Collection Specialist
-PACP - Pipeline Assessment and Certification Program
-CCS - Cross-connection Control Specialist
-N/C - None Currently

## *Available Equipment*

The City's Department of Public Works has several types of equipment available to the Wastewater Division for the daily O&M routine of the sewer system. The equipment is stored at the City's maintenance facility. If additional equipment is required for specific projects, the City will rent or contract with a local contractor for the services needed. The City has a central fleet operation, and other divisions and departments have equipment that can supplement that assigned to the Wastewater Division, if needed. The City also maintains a central warehouse of supplies that is adequate for routine (and most emergency) needs. There is a computerized inventory system that lists all "in-stock" supplies, including location and quantity. A list of major equipment used in the normal operation of the sewer system is shown in **Table 8-2**. In addition, equipment from other City divisions, such as Water, Stormwater, and Public Grounds, is available if needed.

**Table 8-2**
**Wastewater Division Equipment List**

| Vehicle ID No. | Description |
|---|---|
| **Wastewater Division Equipment** | |
| **U-10** | 2015 Ford F550 Utility Truck |
| **K-02** | 2015 Ford E450 Pipeline Inspection Camera Truck |
| **V-03** | 2006 International Aquatech Eductor Truck |
| **F-19** | 2008 F550 2/3 Yard Dump Body with Crane |
| **PU-76** | 2009 Ford F150 Pickup |
| **Green** | Portable 25KW Emergency Generator - Trailer Mounted |
| | Miscellaneous Small Tools, etc. |
| **Equipment Available from Other Departments/Divisions** | |
| **TL-37 and TL-38** | 2013 Olympic Tilt Backhoe Trailer |
| **TR-11 and TR-12** | 2009 Case 580SM Backhoe (4x2) |
| **PU-71, PU-77, and PU-78** | 2008 Ford F350 Pickup Extended Cab |
| **D-01 and D-03** | 2006 International 5-yard Dumptruck |
| **TL-6A and TL-15A** | 1998 Atlas Copco Air Compressor |
| | Miscellaneous Small Tools, etc. |
| **Communications Equipment** | |
| | Cell Phones for All Division Members |

## *Service, Equipment, and Supply Vendors*

The list in **Table 8-3** identifies the typical vendors for service, materials, and supplies. The City maintains adequate supplies and materials for normal operation. The suppliers are local and maintain adequate materials for unusual needs.

**Table 8-3**
**Service, Equipment, and Supply Vendors List**

| Name | Address | Phone | Products |
|---|---|---|---|
| Ace Hardware | 6613 132nd Ave NE<br>Kirkland, WA 98033 | 425-376-0327 | Small equipment and plumbing parts |
| Allwest Underground | 8419 219th St SE<br>Woodinville, WA 98072 | 425-398-2353 | Submersible pump |
| Atwood Fabricating | PO Box 12765<br>Mill Creek, WA 98082 | 425-486-4608 | Birdcage, alum atrium debris barrier, and trash racks |
| Cadman Building Materials | 18816 NE 80th St<br>Redmond, WA 98052 | 425-868-7334 | Fast Patch and calcium |
| Central Welding Co. | 13305 38th Ave NE<br>Marysville, WA 98271 | 360-658-5617 | Uniforms |
| Cessco, Inc. | 926 5th Ave S<br>Kent, WA 98032 | 425-291-9292 | Gas |
| Contech Engineered Solutions | 16445 Collections Center Drive<br>Chicago, IL 60693 | 800-338-1122 | Storm filters |
| Cues | 3600 Rio Vista Ave,<br>Orlando FL 32805 | 407-849-0190 | Camera repairs and accessories |
| DMH Industrial | 2701 Hewitt Avenue<br>Everett, WA 98201 | 425-259-3124 | Pump motor service and parts |
| EJ USA, Inc. | PO Box 644873<br>Pittsburgh, PA 15264 | 800-626-4653 | Castings |
| Goodsell Power Equipment | 11414 120th Ave NE<br>Kirkland, WA 98033 | 425-766-8877 | Small equipment and repair |
| Grainger Industrial Supply | 2221 120th Ave NE<br>Bellevue, WA 98005 | 425-643-7754 | Coated gloves |
| Granite | 4116 Bakerview Spur<br>Bellingham, WA 98226 | 360-671-2251 | Concrete risers |
| HD Fowler | PO Box 160<br>Bellevue, WA 98009 | 425-746-8400 | PVC pipe |
| Home Depot | 18333 120th Ave NE<br>Bothell, WA 98011 | 425-806-9300 | Small equipment and parts |
| Industrial Scientific | 1001 Oakdale Road<br>Oakdale, PA 15071 | 412-788-4353 | Parts for iNET system |
| Lowe's Home Centers | 11959 Northup Way<br>Bellevue, WA 98005 | 425-646-9031 | Small equipment and parts |
| Masons Supply Co. | 6018 234th St SE<br>Woodinville, WA 98072 | 425-487-6161 | Speed plugs |
| NAPA | 11626 Slater Ave NE<br>Kirkland, WA 98034 | 425-823-2251 | Parts for generator |
| Owen | PO Box 30959<br>Portland, OR 97294 | 800-992-3656 | Cameras |
| RH2 Engineering, Inc. | 22722 29th Dr SE, Suite 210<br>Bothell, WA 98021 | 425-951-5400 | Professional services |
| Sanderson Safety Supply Co. | 1101 SE 3rd Avenue<br>Portland, OR 97214 | 503-238-5700 | Gloves |
| Sound Safety Products Co. | PO Box 5496<br>Everett, WA 98206 | 425-259-0026 | Uniforms and safety equipment |
| Tacoma Screw Products | 2001 Center Street<br>Tacoma, WA 98409 | 800-562-8192 | Screws, tape, and cable ties |
| Verizon | --- | --- | Telemetry |
| Waste Management | Columbia Ridge Landfill<br>18177 Cedar Springs Lane<br>Arlington, OR 97812 | 541-454-2030 | Disposal |

## Routine Operations

Routine operations involve the analysis, formulation, and implementation of procedures to ensure the facilities are functioning efficiently and meeting the demands of the system. The utility's maintenance procedures are good, with repairs being made promptly.

## Continuity of Service

As a municipality, the City has the structure, stability, authority, and responsibility to ensure that sewer service will be continuous. For example, changes in the City Council or staff would not have a pronounced effect on the City's customers or quality of service.

## Operations and Maintenance Records

### Facilities Operations and Maintenance Manuals

O&M manuals are available for staff members' reference. These manuals are kept on file in the equipment maintenance file at the maintenance office. The City intends to maintain its policies of requiring complete O&M manuals for all new equipment and facilities.

### Mapping and As-built Drawing Records

Maintenance of drawings is essential to maintenance crews, City planners, developers, and anyone else needing to know how the sewer system is laid out throughout the City. For this reason, multiple copies of drawings are kept. One copy of record drawings and mapping information is submitted to the City on Mylar. These drawings are tagged and stored for future reference. A database is used to track drawing location and information. A Geographic Information System (GIS) master drawing of the sewer system is maintained by the Public Works Department GIS technician to provide an accurate sewer system map for use by all City personnel. The master drawing is created from record and field drawings that contain sewer main information such as size, material, depth, and the year installed. The drawing records are currently available through the City's online interactive mapping portal (maps.kirkland.gov). Personnel in the Wastewater Division are equipped with portable tablets and have access to this interactive mapping portal remotely during routine field work.

### Operations and Maintenance Records

Records are stored at the maintenance office or in the City's computer database for the following items.

- Pump motor tests
- Wastewater flow records
- Wastewater system maintenance
- Sewer collection notes
- Side sewer connections
- Sewer main cleaning/inspection

## Safety Procedures and Equipment

Safety is the concern and responsibility of all sewer O&M staff. To maintain the highest level of safety, the City actively educates and trains employees as to safe working procedures. Safety equipment and other resources are always available to employees. The City is fully dedicated to providing a safe and secure work environment for each of its employees.

The following procedures are to be followed for O&M tasks that involve the most common potential work place hazards in the City's sewer system.

### Working in Confined Spaces

Standard Procedure – Follow State requirements for confined space entry.

### Working around Heavy Equipment

Standard Procedure – Obtain proper training and follow all safety procedures. Use noise protection equipment and follow standard Labor and Industries (L&I) safety procedures.

### Working in Traffic Areas

Standard Procedure – Wear proper clothing and provide adequate signage and flagging for work area. Follow standard Washington State Department of Transportation and L&I safety procedures. Certified flaggers are to be used when traffic management requires flagging around a work site.

### Working on or around Tall Structures

Standard Procedure – Follow proper safety harness procedures for working on tall structures and follow standard L&I safety procedures.

### Working in or around Pump Stations

Standard Procedure – Obtain proper training and follow all safety procedures for working on pumps and electrical equipment. Use noise protection equipment.

### Working on Asbestos Cement (AC) Pipe

Standard Procedure – Obtain proper training and follow all safety procedures for working with asbestos materials.

The sewer utility personnel are required to take training courses regarding the following topics: asbestos cement pipe handling; confined spaces; hazardous waste; fall protection; hearing protection; competent persons; electrical hazards; heavy equipment operation; CPR; first aid; traffic flagging; lockout-tagout; and blood-borne pathogens.

The City's facilities are equipped with confined space entry equipment, oxygen-gas meters, and lockout-tagout equipment. Each City vehicle is equipped with first aid and blood-borne handling kits. The City also owns flagging signs and equipment for safe handling of traffic.

The Public Works Department follows all appropriate Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations in its day to day operations and complies with the following State requirements.

≠ Washington Administrative Code (WAC) 296-809 – Entry into confined spaces.
≠ WAC 296-155-650 to 66411 Part N – Shoring of open ditches.
≠ WAC 296-155-429 – Lockout-tagout for work on energized or de-energized equipment or circuits.

- WAC 296-155 Part C1 – Fall restraint for access to pump stations, vaults, and manholes.
- *Manual on Traffic Control Devices* (MUTCD) – Traffic control for work in the public right-of-way.

## EMERGENCY OPERATIONS

### Capabilities

The City is well equipped to accommodate short-term system failures and abnormalities. The City's capabilities are as follows.

#### Emergency Equipment

The City is equipped with the necessary tools to deal with common emergencies. If a more serious emergency should develop, the City will hire a local contractor who has a stock of spare parts necessary to make repairs to alleviate the emergency condition.

#### Emergency Telephone

Key or on-call personnel can be reached by calling the City's Public Works Department at 425-587-3900. If an emergency occurs outside of normal working hours, the after-hours service contacts the Public Works on-call person. This person checks the emergency situation and calls the necessary crew to respond and resolve the situation.

#### On-call Personnel

The on-call person is equipped with a service vehicle and required to respond to a call within 30 minutes. A list of emergency telephone numbers is provided to each on-call employee. New employees are not placed on-call until they are familiar with the systems and maintenance procedures and are properly certified as may be required.

#### Material Readiness

Some critical repair parts, tools, and equipment are on-hand and kept in fully operational condition. As repair parts are used, they are re-ordered. Inventories are kept current and are adequate for most common emergencies that can reasonably be anticipated. The City has ready access to an inventory of repair parts, including parts required for repair of each type and size of pipe within the service area. Additionally, the City has been provided with after-hours emergency contact phone numbers for key material suppliers, which gives the City 24-hour access to parts not kept in inventory.

## PREVENTIVE MAINTENANCE

Maintenance schedules that meet or exceed the manufacturer's recommendations have been established for all critical components in the sewer system. The following schedule is used as a minimum for preventive maintenance, and manufacturers' recommendations should be followed where conflict exists.

### Sewer Collection System

| ***Frequency*** | ***Task or Activity*** |
|---|---|
| Monthly | Clean Downtown Kirkland sewer mains with known FOG problems. |
| Every 1 to 6 Months, Depending on History of Maintenance in Area | Inspect, rod, and clean sewer lines with known root intrusion and/or FOG problems. Sewer lines included in these additional "hot spot" cleaning activities are selected based on historical maintenance logs, operator experience, and sewer main video inspection results. |
| Every 6 Months | Flush difficult access sewer mains. |
| Annually | Inspect all manholes. |
| Every 3 Years | Clean entire sewer collection system. |
| Every 5 Years | Video inspect all sewer mains. Routine sewer main maintenance and repairs based on video inspections. |

### Sewage Lift Stations

| ***Frequency*** | ***Task or Activity*** |
|---|---|
| Daily | Receive and analyze telemetry readings. |
| Weekly | Evaluate pump station reports. |
| Every 2 Weeks | Clean Lake Plaza Lift Station wetwell. |
| Monthly | Change filters, clean probes, clean priming tanks, and run vibration tests. |
| Annually | Clean all lift station wetwells, except Lake Plaza. |
| As Needed | Change motor oil. |
| As Needed | Take inventory of parts, pumps, and motors. |
| As Needed | Routine maintenance of lift station structures and surrounding site. |

### Engine Generator Sets

Note: The City contracts with a service company to conduct all maintenance on the generators at the lift stations and the portable generator. Generator maintenance is not performed by City personnel.

| ***Frequency*** | ***Task or Activity*** |
|---|---|
| Weekly | Exercise generators under load. |
| As Needed | Operate to achieve normal operating temperatures; observe output. |
| As Needed | Routine maintenance in accordance with manufacturer's recommendations. |
| As Needed | Replace fluids and filters in accordance with manufacturer's recommendations (or more frequently depending on amount of use). |
| As Needed | Perform tune-up; replace parts as necessary. |

### Telemetry and Control System

| ***Frequency*** | ***Task or Activity*** |
|---|---|
| Daily | Backup program and data. |
| As Needed | Visually inspect cabinets and panels for damage, dust, and debris. |
| As Needed | Inspect inside of cabinets and panels for damage, dust, and debris. |
| As Needed | Vacuum clean all modules. |
| As Needed | Test alarm indicator units. |
| As Needed | Clean and flush all pressure sensitive devices. |

| *Frequency* | *Task or Activity* |
|---|---|
| As Needed | Visually inspect all meters to coordinate remote stations. |
| As Needed | Check master and remote telemetry units for proper operation; repair as necessary. |

### Tools and Equipment

| *Frequency* | *Task or Activity* |
|---|---|
| **Rolling Stock** | |
| Weekly | Check all fluid levels and brakes. Fluid levels and brakes are checked each time the equipment is used if less than weekly. |
| As Needed | Replace fluids and filters in accordance with manufacturer's recommendations (or more frequently depending on type of use); preventative maintenance per manufacturer's recommendations. |
| **Tools** | |
| As Needed | Clean after each use; lubricate and maintain as necessary; inspect for damage and wear before each use; preventative maintenance performed per manufacturer's recommendation. |

## STAFFING

The preventive maintenance procedures, as well as the normal and emergency operations of the utility, are described in the previous sections. The hours of labor and supervisory activity required to effectively provide these ongoing O&M schedules form the basis for determining adequate staffing levels.

### Current Staff

As previously indicated, the City's Wastewater Division staff currently includes nine personnel assigned to the operation and maintenance of the sewer system. The staff is made up of supervisory personnel and utility workers as shown in **Chart 8-1**.

### Staffing Requirements

The estimated number of staff and hours of work recommended to provide optimum operation and maintenance of the sewer system is shown in **Table 8-4**. This table identifies the typical staffing time for maintenance tasks, operational tasks, capital improvements tasks, and construction of sewer collection system facilities as presented in Water Pollution Control Federation Manual of Practice No. 7, *Operation and Maintenance of Wastewater Collection Systems*. **Table 8-4** does not include some of the staff that are needed to operate a sewer system, such as clerks and construction inspectors, due to assistance the Wastewater Division receives from other divisions and departments.

## Table 8-4
## Staffing Recommendation

| Population | 29,481 | 29,481 | 25,000 | 50,000 | 29,481 | 29,481 | 25,000 | 50,000 |
|---|---|---|---|---|---|---|---|---|
| Occupational Title | City's Wastewater Division | Recommended Number of Staff[1] | | | City's Wastewater Division | Recommended Man Hours per Week[1] | | |
| Utility Manager[1] | 1 | 1.0 | 1 | 1 | 13 | 24 | 20 | 40 |
| Supervisor[1] | 1 | 0.2 | - | 1 | 20 | 7 | - | 40 |
| Lead[1] | 1 | 1.0 | 1 | 1 | 10 | 24 | 20 | 40 |
| Senior Maintenance[1] | 2 | 1.2 | 1 | 2 | 80 | 31 | 20 | 80 |
| Utility Workers[1] | 3 | 2.2 | 2 | 3 | 120 | 71 | 60 | 120 |
| Maintenance Equipment Operator | - | 1.2 | 1 | 2 | - | 47 | 40 | 80 |
| Construction Equipment Operator | - | 1.0 | 1 | 1 | - | 24 | 20 | 40 |
| Laborer | - | 2.0 | 2 | 2 | - | 47 | 40 | 80 |
| Maintenance Mechanic II[2] | - | 0.4 | - | - | - | 16 | - | - |
| Maintenance Mechanic I[3] | - | 0.4 | - | - | - | 16 | - | - |
| Maintenance Mechanic Helper[3] | - | 0.4 | - | - | - | 16 | - | - |
| Pretreatment Technician | 1 | - | - | - | 20 | - | - | - |
| **Total Staff[4]** | **9** | **10.9** | **9** | **13** | **263** | **322** | **220** | **520** |

NOTES:
1. Recommended number of staff and man hours per week are interpolated from information provided by Water Pollution Control Federation Manual of Practice No. 7 "Operations and Maintenance of Wastewater Collection Systems." Utility Manager referred to as Superintendent, Supervisor referred to as Maintenance Supervisor, Lead referred to as Foreman, Senior Maintenance referred to as Maintenance II and Mason II, and Utility Worker referred to as Maintenance I and Mason I in Water Pollution Control Federation Manual of Practice No. 7 "Operations and Maintenance of Wastewater Collection Systems."
2. Multiply number of lift stations maintained by 2.67 to approximate number of man hours per week recommended. The City has six lift stations that it maintains.
3. Multiply number of lift station visits per week by 2.67 to approximate number of man hours per week recommended. The City has six lift stations that it visits each week for maintenance.
4. Some staff, such as clerks and construction inspectors, have been omitted from this list due to support the Wastewater Division receives from other divisions and departments.

Based on the suggested staffing requirements in **Table 8-4**, approximately 8 full-time staff equivalents (approximately 322 man hours) are recommended to operate and maintain the City's sewer system. However, the City's current staff of approximately 6.6 full-time staff equivalents (approximately 263 man hours, excluding Public Works Director) is not quite sufficient to provide the optimum level of service. At the current staffing level, the City is capable of adequately operating the sewer system and complying with the minimum requirements of the Washington State Department of Ecology. Approximately one and a half (1.5) additional full-time staff equivalents (approximately 58 man hours) would achieve optimum operation and maintenance of the sewer system. The City will add staff in the future, as necessary and as allowed by the budget, to meet the increasing requirements of system O&M due to customer growth and increased regulatory requirements.

THIS PAGE INTENTIONALLY LEFT BLANK

# Financial Plan

9

## INTRODUCTION

The purpose of the financial plan is to provide reasonable assurance that the City of Kirkland (City) has and will have the financial ability to maintain and operate the utility on an ongoing basis and has the capacity to obtain sufficient funds to construct the sewer system improvements as identified in **Chapter 7**.

The financial plan can only provide this qualified assurance if it considers the "total system" costs of providing sewer service – both operating and capital. To meet these objectives, the financial plan includes the following elements.

- **Past Financial Performance**
    - *Comparative Statement of Revenues, Expenses and Changes in Fund Net Position 2010-2015*
    - *Comparative Statement of Net Position 2010-2015*
    - *Debt Service Schedules*
- **Funding Sources**
- **Capital Financing Plan**
    - *6-Year Capital Improvement Plan (CIP) with revenue sources 2016-2021*
    - *Total Sewer System Projects 2016-2035*
- **Projected Financial Performance**
    - *Revenue Requirement Forecast 2016-2021*
- **Current Rate Structures and Conservation Objectives**

## PAST FINANCIAL PERFORMANCE

The City's primary function is to provide necessary inspections, repairs and maintenance to ensure the proper collection and conveyance of wastewater to treatment facilities at the lowest reasonable price.

The historical financial statements presented in the next section clearly show the financial viability and strength of the City to continue providing a high level of service. The sewer system is part of a combined water/sewer fund, so the financial statements reflect the combined utility results.

### *Comparative Financial Statements*

**Table 9-1** shows a consolidated statement of revenues and expenses and changes in fund net position from 2010 through 2015. Key points regarding the statement are discussed following the table.

## Table 9-1
## Statement of Revenues, Expenses, and Changes in Fund Net Position

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| **Operating Revenues** | | | | | | |
| **Total Sewer Revenue** | **$9,298,339** | **$10,441,242** | **$10,923,599** | **$12,799,113** | **$13,011,728** | **$13,785,763** |
| **Total Water Revenue** | **$8,914,061** | **$8,939,704** | **$9,773,109** | **$11,934,452** | **$12,787,232** | **$13,665,757** |
| Miscellaneous Revenue | 174,662 | 355,260 | 369,683 | 357,540 | 346,843 | 345,447 |
| **TOTAL OPERATING REVENUE** | **$18,387,062** | **$19,736,206** | **$21,066,391** | **$25,091,105** | **$26,145,803** | **$27,796,967** |
| **Operating Expenses** | | | | | | |
| Source of Supply/Sewer Treatment | $9,234,945 | $10,456,514 | $10,420,583 | $11,475,452 | $11,502,844 | $12,255,213 |
| Regional Water Connection Pass Through | 246,205 | 303,253 | 564,471 | 731,931 | 857,168 | 996,830 |
| Other Operating | 887,643 | 781,380 | 1,011,423 | 977,930 | 1,016,592 | 1,026,916 |
| Maintenance | 1,121,380 | 1,162,647 | 1,231,668 | 1,300,422 | 1,370,310 | 1,325,973 |
| Customer Accounts | 545,794 | 563,072 | 775,527 | 648,351 | 667,907 | 756,699 |
| Administration Costs | 2,010,772 | 2,203,650 | 2,301,127 | 2,258,874 | 2,135,718 | 2,347,212 |
| Taxes | 532,590 | 817,454 | 636,159 | 3,786,806 | 3,430,964 | 3,611,932 |
| Depreciation | 2,328,940 | 2,378,109 | 2,419,489 | 2,462,774 | 2,535,487 | 2,642,280 |
| **TOTAL OPERATING EXPENSES** | **$16,908,269** | **$18,666,079** | **$19,360,447** | **$23,642,540** | **$23,516,990** | **$24,963,055** |
| **OPERATING INCOME** | **$1,478,793** | **$1,070,127** | **$1,705,944** | **$1,448,565** | **$2,628,813** | **$2,833,912** |
| **Non-Operating Revenues (Expenses)** | | | | | | |
| Interest and Investment Income | $207,848 | $179,206 | $141,654 | $45,323 | $230,419 | $202,100 |
| Interest Expense | (142,694) | (107,227) | (67,793) | (38,416) | (16,597) | (7,308) |
| Grant Income | | 112,832 | 5,909 | | | |
| Gain (Loss) on Disposal of Assests | | | | (722) | (31) | (11,124) |
| Amortization of Debt Issue Costs | (51,216) | (47,640) | (19,980) | | | |
| **TOTAL NON-OPERATING REVENUES (EXPENSES)** | **$13,938** | **$137,171** | **$59,790** | **$6,185** | **$213,791** | **$183,668** |
| **INCOME BEFORE CONTRIBUTIONS AND TRANSFERS** | **$1,492,731** | **$1,207,298** | **$1,765,734** | **$1,454,750** | **$2,842,604** | **$3,017,580** |
| Operating Transfer In | | | | | | |
| Operating Transfer Out | ($115,466) | (143,000) | (100,000) | (190,000) | (135,400) | (233,505) |
| Capital Contributions | | | | | | |
| Sewer Capital Facilities Charges | 212,614 | 200,756 | 502,118 | 302,017 | 884,385 | 860,927 |
| Other Contributions | 1,416,812 | 732,466 | 1,220,158 | 1,698,825 | 3,033,675 | 2,159,904 |
| **INCREASE IN NET POSITION** | **$3,006,691** | **$1,997,520** | **$3,388,010** | **$3,265,592** | **$6,625,264** | **$5,804,906** |
| **Net Position** | | | | | | |
| Net Position -- Beginning of Year | $100,862,974 | $103,869,665 | $105,867,185 | $109,255,195 | $112,520,787 | $119,146,051 |
| Change in Accounting Principle GASB 68 | | | | | | (837,996) |
| **NET POSITION -- END OF YEAR** | **$103,869,665** | **$105,867,185** | **$109,255,195** | **$112,520,787** | **$119,146,051** | **$124,112,961** |

*Note: Inputs were obtained from the City's annual financial statements.*

- Sewer service revenues grew from 2010 through 2015 primarily as a result of rate increases. Water service revenues are not considered available to the sewer utility; therefore, the service revenues are separated for the two utilities. The remaining comments on historical financial information are related to the utilities' combined financial performance.
- Operating income before depreciation and amortization ranged between 17 percent and 21 percent of total operating revenue until 2013 when it dropped to 15.6 percent returning to 19.8 percent in 2014. Overall, this is an indicator of excellent cash flow from operations.
- The City's net income before capital contributions as a percent of total revenue ranged from approximately 6 percent to 11 percent.

≠ **Table 9-2** shows the statement of net position from 2010 through 2015. Key points regarding the statement for the combined water/sewer utility are discussed following the table.

## Table 9-2
## Statement of Net Position

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| **ASSETS** | | | | | | |
| **Current Assets** | | | | | | |
| Cash and Cash Equivalents | $ 9,653,247 | $ 13,441,294 | $ 10,238,478 | $ 10,155,971 | $ 10,555,783 | $ 10,401,472 |
| Investments | 5,868,776 | 5,015,214 | 10,821,007 | 14,316,471 | 17,497,848 | 17,139,945 |
| Total Cash | **$15,522,023** | **$18,456,508** | **$21,059,485** | **$24,472,442** | **$28,053,631** | **$27,541,417** |
| Customer Accounts Receivable | $ 3,708,463 | $ 4,178,759 | $ 4,171,240 | $ 4,389,194 | $ 4,740,288 | $ 4,580,029 |
| Due from Other Funds | 7,453 | 11,221 | 11,687 | 17,654 | 12,298 | 17,941 |
| Intergovernmental Receivable | 66,749 | 21,798 | 9,885 | 11,793 | 16,338 | 78,756 |
| Assessments Receivable | 10,970 | 18,567 | 20,337 | 21,527 | 22,452 | 21,285 |
| Interest Receivable | 220,963 | 180,628 | 194,036 | 191,244 | 200,108 | 174,099 |
| Contracts Receivable | 2,619,229 | 2,191,477 | 1,909,307 | 2,244,730 | 1,911,420 | 1,563,450 |
| Restricted Asset - Deposits/Prepayments | | 11,945 | | | 258 | |
| Inventory of Materials | 388,813 | 432,365 | 373,658 | 376,745 | 314,967 | 313,635 |
| **TOTAL CURRENT ASSETS** | **$22,544,663** | **$25,503,268** | **$27,749,635** | **$31,725,329** | **$35,271,760** | **$34,290,612** |
| **Restricted Assets** | | | | | | |
| Water/Sewer Bond Reserve | $822,275 | $821,130 | $ 488,200 | $484,500 | | |
| **Interfund Loan Receivable** | | | | | | |
| Loans | | | | | | $ 4,698,991 |
| Interest | | | | | | 6,488 |
| **TOTAL INTERFUND LOAN RECEIVABLE** | **$0** | **$0** | **$0** | **$0** | **$0** | **$4,705,479** |
| **Fixed Assets** | | | | | | |
| Utility Plant | $116,946,959 | $120,196,524 | $ 121,084,974 | $124,525,037 | $ 128,162,490 | $ 136,093,536 |
| Construction Work in Progress | 5,455,806 | 2,723,742 | 4,453,102 | 2,804,143 | 4,532,302 | 1,007,059 |
| Less: Accumulated Depreciation | (33,574,252) | (35,952,361) | (38,368,516) | (40,819,976) | (43,353,918) | (45,839,018) |
| **TOTAL FIXED ASSETS** | **$88,828,513** | **$86,967,905** | **$87,169,560** | **$86,509,204** | **$89,340,874** | **$91,261,577** |
| **Deferred Charges** | | | | | | |
| Deferred Charges Related to Bond Refunding | 67,621 | 19,980 | | | | |
| **TOTAL ASSETS** | **$112,263,072** | **$113,312,283** | **$115,407,395** | **$118,719,033** | **$124,612,634** | **$ 130,257,668** |
| **DEFERRED OUTFLOW PENSION RELATED** | | | | | | **$69,232** |

**Table 9-2**
**Statement of Net Position (Continued)**

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| **LIABILITIES** | | | | | | |
| **Current Liabilities** | | | | | | |
| Accounts Payable | $ 26,228 | $ 52,284 | $ 99,235 | $ 55,987 | $ 389,511 | $ 480,595 |
| Employee Wages Payable | 71,853 | 67,505 | 74,742 | 80,485 | 79,869 | 80,364 |
| Employee Benefits Payable | 57,470 | 51,067 | 68,214 | 64,202 | 66,695 | 66,499 |
| Unearned Revenue | 2,625,621 | 2,217,044 | 1,936,573 | 2,273,047 | 1,911,420 | 1,589,889 |
| Due to Other Funds | 354 | 1,952 | 365 | 461,881 | 504,201 | 484,896 |
| Intergovernmental Payable | 241,999 | 808,581 | 866,242 | 975,897 | 921,399 | 1,088,231 |
| Accrued Interest Payable - PWTF Loans | 9,695 | 8,160 | 6,625 | 5,125 | 3,501 | 3,156 |
| Current Portion of Public Works Trust Fund Loans | 387,178 | 387,178 | 387,178 | 343,843 | 226,914 | 192,552 |
| **TOTAL CURRENT LIABILITIES** | **$3,420,398** | **$3,593,771** | **$3,439,174** | **$4,260,467** | **$4,103,510** | **$3,986,182** |
| **Current Liabilities (Payable from Restricted Assets)** | | | | | | |
| Deposits Payable | | | $ 12,710 | $ 17,001 | | |
| Accrued Interest Payable - W/S Bonds | 9,141 | 6,238 | 3,117 | 1,583 | | |
| Current Portion of Long Term Debt | 730,000 | 765,000 | 460,000 | 475,000 | | |
| **TOTAL CURRENT LIABILITIES PAYABLE FROM RESTRICTED ASSETS** | **$739,141** | **$771,238** | **$475,827** | **$493,584** | **$0** | **$0** |
| **Long-Term Liabilities** | | | | | | |
| Revenue Bonds (Net of Current Portion) | $ 1,700,000 | $ 935,000 | $ 475,000 | | | |
| Public Works Trust Fund Loans (net of current portion) | 2,519,500 | 2,132,322 | 1,745,145 | 1,428,145 | 1,346,399 | 1,326,572 |
| Net Pension Liability | | | | | | 769,310 |
| Employee Benefits Payable | 14,368 | 12,767 | 17,054 | 16,050 | 16,674 | 16,625 |
| **TOTAL LIABILITIES** | **$8,393,407** | **$7,445,098** | **$6,152,200** | **$6,198,246** | **$5,466,583** | **$6,098,689** |
| **DEFERRED INFLOW PENSION RELATED** | | | | | | **$115,250** |
| **Net Position** | | | | | | |
| Invested in Capital Assets Net of Related Debt | $83,491,835 | $82,748,404 | $84,102,237 | $84,262,216 | $87,767,561 | $89,742,453 |
| Restricted for Debt Service | 822,275 | 821,130 | 488,200 | 484,500 | | |
| Unrestricted | 19,555,555 | 22,297,651 | 24,664,758 | 27,774,071 | 31,378,490 | 34,370,508 |
| **TOTAL NET POSITION** | **$103,869,665** | **$105,867,185** | **$109,255,195** | **$112,520,787** | **$119,146,051** | **$124,112,961** |

*Note: Inputs were obtained from the City's annual financial statements.*

≠ The City's current ratio (current assets divided by current liabilities) ranged from 5:1 in 2010 to 9:1 in 2015. A ratio of 2:1 is generally considered very good. The City has healthy liquidity.

≠ The long-term debt relative to total assets ranged from approximately 4 percent in 2010 to 2 percent in 2015.

## *Existing Long-term Debt*

At the end of 2015 the sewer utility had four Public Works Trust Fund (PWTF) loans. **Table 9-3** shows the schedule of annual debt service payments throughout the term of each debt obligation. The sewer utility is responsible for 100 percent of the 1999, 2001, and 2004 loans. The 2012 Public Works Trust Fund loan is a $4,038,000 loan of which the sewer utility will be responsible for $2,070,400 and the water utility will be responsible for the balance. **Table 9-3** reflects debt service for the sewer utility's portion. Although final draws for the 2012 loan will not be received until 2017, debt service payments for the 2012 loan in **Table 9-3** reflect what debt service will be after all draws have been received. **Table 9-2** reflects the draws that have been received through December 31, 2015.

**Table 9-3**
**Schedule of Long-term Debt (Sewer Share)**

| Year | 2012 PWTF Loan $2,070,400 NE 80th Street Sewermain Replacement | | | 2004 PWTF Loan $1,086,300 Central Way Sewer Replacement | | |
|---|---|---|---|---|---|---|
| | Principal | Interest | Total | Principal | Interest | Total |
| 2016 | $9,410 | $680 | $10,090 | $57,332 | $2,580 | $59,912 |
| 2017 | $96,873 | $3,141 | $100,014 | $57,333 | $2,293 | $59,626 |
| 2018 | $130,423 | $7,265 | $137,688 | $57,333 | $2,006 | $59,339 |
| 2019 | $130,423 | $9,130 | $139,553 | $57,332 | $1,720 | $59,052 |
| 2020 | $130,423 | $8,477 | $138,900 | $57,333 | $1,433 | $58,766 |
| 2021 | $130,423 | $7,825 | $138,248 | $57,332 | $1,147 | $58,479 |
| 2022 | $130,423 | $7,173 | $137,596 | $57,333 | $860 | $58,193 |
| 2023 | $130,423 | $6,521 | $136,944 | $57,333 | $573 | $57,906 |
| 2024 | $130,423 | $5,869 | $136,292 | $57,332 | $287 | $57,619 |
| 2025 | $130,423 | $5,217 | $135,640 | | | |
| 2026 | $130,423 | $4,565 | $134,988 | **$515,993** | **$12,899** | **$528,892** |
| 2027 | $130,423 | $3,913 | $134,336 | | | |
| 2028 | $130,423 | $3,261 | $133,684 | | | |
| 2029 | $130,423 | $2,608 | $133,031 | | | |
| 2030 | $130,423 | $1,956 | $132,379 | | | |
| 2031 | $130,423 | $1,304 | $131,727 | | | |
| 2032 | $130,423 | $652 | $131,075 | | | |
| **Totals** | **$2,062,628** | **$79,557** | **$2,142,185** | | | |

| Year | 2001 PWTF Loan $1,848,000 Juanita Lift Station Construction | | | 1999 PWTF Loan $227,500 Juanita Lift Station Design | | |
|---|---|---|---|---|---|---|
| | Principal | Interest | Total | Principal | Interest | Total |
| 2016 | $102,969 | $3,089 | $106,058 | $12,535 | $501 | $13,036 |
| 2017 | $102,969 | $2,574 | $105,543 | $12,535 | $376 | $12,911 |
| 2018 | $102,969 | $2,059 | $105,028 | $12,535 | $251 | $12,786 |
| 2019 | $102,968 | $1,545 | $104,513 | $12,535 | $125 | $12,660 |
| 2020 | $102,968 | $1,030 | $103,998 | | | |
| 2021 | $102,968 | $515 | $103,483 | | | |
| **Totals** | **$617,811** | **$10,812** | **$628,623** | **$50,140** | **$1,253** | **$51,393** |

## FUNDING SOURCES

The City may fund the sewer capital improvement program from a variety of sources. In general, these sources can be summarized as: 1) governmental grant and loan programs; 2) publicly issued debt (tax-exempt or taxable); 3) cash resources; and 4) connection fees (Capital Facilities Charges). Each source is described below.

## Government Programs

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining grant programs are generally underfunded and extremely competitive. Nonetheless, the benefit of even the very low-interest loans makes the effort of applying worthwhile. State programs identified as potential funding sources for the utility improvements set forth in this General Sewer Plan (GSP) are discussed next.

**Public Works Trust Fund** – The Public Works Trust Fund (PWTF) is a commonly used, low-cost revolving-loan fund established by the 1985 State Legislature to provide financial assistance to local governments for public works projects. Eligible projects must improve public health and safety, respond to environmental issues, promote economic development or upgrade system performance. Currently there are no loans available in this program.

**Community Economic Revitalization Board** – Managed by the Department of Commerce, this program provides grants and loans to fund public facilities that support specific private-sector business growth and expansion. Eligible projects include water, sewer, and other public improvements.

**Department of Ecology** – The Department of Ecology's Water Quality Financial Assistance Program sponsors one grant or loan program that could apply to the City's wastewater system: the State Revolving Fund Loan program. While some of these funding sources go to wastewater programs, projects such as the development and implementation of groundwater, and wellhead protection programs, are also included.

## Public Debt

**Revenue Bonds** – Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility, and the debt obligation does not extend to the City's other revenue sources. With this limited commitment, revenue bonds typically require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by ordinance as a condition of the bond sale.

Revenue bonds can be issued in Washington without a public vote. There is no bonding limit, except perhaps the practical limit of the utility's ability to generate sufficient revenue to repay the debt and provide coverage. In some cases, poor credit might make issuing bonds problematic. In the case of the City, strong historical financial performance bodes well for this form of financing. For the most part, tax-exempt bonds may be issued by a governmental agency for its capital projects, with the exception of funding needs that serve private sector or non-governmental interests such as mutual water companies and homeowner's associations (which are classified as 501c corporations). Generally speaking, if more than 10 percent of a capital project provides direct benefit and service to the private sector (e.g., a business or mutual water company receiving wholesale water), the associated revenue bonds will likely be taxable. It is important that each agency perform due diligence in this regard where there is a question of private versus public benefit.

## *City Cash Reserves*

The City has combined water and sewer reserves that include a Working Capital Reserve, an Operating Capital Reserve, and a Capital Contingency Reserve. The rate revenue needs analysis for sewer must consider reserves available to the sewer utility. Allocation of the reserve balances as of year-end 2015 were made to water and sewer separately based on rate revenue for the Working Capital and Operating Capital reserves and CIP spending for the Capital Contingency Reserves. **Table 9-4** shows a summary of the projected balances through 2021. The table anticipates the need for revenue bonds in 2020. This will be evaluated as capital projects change or other funding sources become available, such as low interest rate loans.

**Table 9-4**
**Cash Balance Summary for Sewer Utility**

| *As of December 31:* | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Working Capital Reserve | 1,525,233 | 1,525,233 | 1,525,233 | 1,525,233 | 1,525,233 | 1,525,233 |
| Operating Capital Reserve | 2,347,137 | 2,347,137 | 2,347,137 | 1,479,137 | 1,479,137 | 1,479,137 |
| Capital Contingency Reserve | 6,497,841 | 4,260,004 | 5,541,754 | 4,598,791 | 3,429,162 | 3,389,248 |
| Debt Reserve | | | | | 25,969 | 221,955 |
| **TOTAL ENDING CASH BALANCES** | **$10,370,211** | **$8,132,374** | **$9,414,124** | **$7,603,161** | **$6,459,501** | **$6,615,573** |

** Ending 2015 balances were allocated to water and sewer and projected forward.*

## *Capital Facilities Charges*

Capital Facilities Charges (CFCs) are legal sources of funding provided through development and growth in customers, typically used by utilities to support capital needs. CFCs are a form of connection charges as authorized in the RCW 35.92.025. CFCs are imposed on new customers as a condition of service. Typically, the basis for the CFC is the total original capital cost the utility will or has incurred to provide the sewer system. The underlying premise of the CFC is that growth (i.e., future customers) will pay upfront for growth-related costs that would not have been necessary absent the increase in customer base.

The purpose of the CFC is two-fold: 1) to provide funding sources for capital financing; and 2) to recover an equitable level of investment in the system from new customers. In the absence of such a charge, growth-related costs would be borne, in large part, by existing customers. In addition, the current customers' net investment in the utility would be diluted by the addition of new customers absent a CFC. This dilution, if allowed, would in effect be a subsidy to new connections.

A brief description of the components that can be included in the CFC is provided below.

≠ <u>Existing Cost Basis</u> – Legal interpretations of state statutes have provided guidelines for connection charges (CFCs). CFCs should reflect the actual original cost of the utility system and can include interest on that cost at the rate of interest applicable at the time of construction for up to a 10-year period, not to exceed 100 percent of the construction costs. This cost is net of donated facilities and non-utility cash payments, whether from grants, developers or through Local Improvement District assessments. Although not required by state law, outstanding debt principal (net of existing cash balances) is then subtracted from this cost basis to avoid double-charging, in recognition that debt service is repaid through rates.

- ≠ Future Cost Basis – Legal interpretations also suggest that future facilities needed to serve growth, as well as regulatory system improvements can be included in the connection charge. The future cost basis can include utility capital projects planned for construction and identified in an approved comprehensive system planning document. Projects directly funded by developers, grants or special property assessments are not included in the calculation. Replacement projects are most often excluded from the calculation unless needed to increase the size of the system. The original cost of replacement projects is already included in the existing cost basis. Further, replacement costs are typically recovered through user rates.
- ≠ Customer Base/System Capacity – The sum of the existing cost basis and future cost basis is then divided by the total customer base to determine the maximum allowable connection charge. The customer base represents the equivalent residential units (ERUs) that can be supported by the planned system capacity.

The City's current CFC is $3,106 per ERU. **Table 9-5** summarizes the CFC analysis using future projects identified in **Chapter 7**. ERUs for this calculation are based on what is reported to King County Wastewater Treatment Division for billing purposes, which is different than how ERUs are calculated in **Chapter 4**. In addition to the annual growth rate used in the 2015 sewer rate study of 0.85 percent, future ERUs include an estimate of septic system conversions based on historical data, resulting in an annual growth rate of 1.03 percent. Our study results indicate that the current CFC is sufficient, and no change is recommended.

**Table 9-5**
**Capital Facilities Charges**

| EXISTING COST BASIS | | | Notes |
|---|---|---|---|
| **Plant-in-Service** | | | |
| Utility Capital Assets | | $ 64,958,533 | Original cost of plant-in-service as of 2015 |
| less: Contributed Capital | | (35,522,506) | CIAC, Grants, and other contributed capital |
| plus: Interest on Non-Contributed Plant | | 12,872,141 | Interest on assets up to a maximum 10-year period |
| Existing Cash Balances | $ 10,244,060 | | Beginning cash balances for year 2015 |
| less: Debt Principal Outstanding | (3,246,573) | | Total principal outstanding for the existing debt |
| less: Net Debt Principal Outstanding | | $ - | Debt principal outstanding, net of cash reserves |
| **Total Existing Cost Basis** | | **$ 42,308,168** | |
| **FUTURE COST BASIS** | | | |
| **Capital Improvement Plan** | | | |
| Total Future Projects | | $ 154,163,281 | Total 20-year Sewer General Plan |
| less: Identified Repair & Replacement Projects | | (137,585,522) | R&R projects are not eligible for CFC |
| less: Contributed Future Upgrade & Expansion Assets | | | Not eligible for recovery through CFC |
| **Total Future Cost Basis** | | **$ 16,577,759** | |
| **CUSTOMER BASE** | | | |
| Existing Equivalent Residential Units | | 15,469 | 2015 Equivalent Residential Units |
| Future Equivalent Residential Units (Incremental) | | 3,533 | Projected incremental CIP Capacity |
| **Total Customer Base** | | **19,002** | Projected CIP Capacity 2035 |
| **RESULTING CHARGE** | | | |
| Total Cost Basis | | $ 58,885,927 | |
| Total Customer Base | | 19,002 | |
| **TOTAL CHARGE PER ERU [a]** | | **$ 3,099** | |
| Existing Water Capital Facilities Charge | | $ 3,106 | |

[a] Increases with meter size

## CAPITAL FINANCING PLAN

Existing capital reserves (funded in part by system replacement contributions from rates), annual interest earnings, CFC collections, and the potential issue of revenue bonds during the 6-year period are anticipated to fund projected costs. **Table 9-6** shows the annual funding sources for the 6-year forecast period.

**Table 9-6**
**6-Year Capital Financing Plan 2016-2021 (Inflated $)**

| CAPITAL IMPROVEMENT PROGRAM | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| **Replacement Projects** | $ 1,650,550 | $ 4,972,180 | $ 1,537,520 | $ 4,444,140 | $ 4,156,710 | $ 5,285,720 |
| **Upgrade/Expansion Projects** | 1,181,750 | 204,220 | 277,780 | 805,360 | 1,017,090 | 1,193,880 |
| **Total Capital Projects** | **$ 2,832,300** | **$ 5,176,400** | **$ 1,815,300** | **$ 5,249,500** | **$ 5,173,800** | **$ 6,479,600** |

| CAPITAL FINANCING PLAN | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| **Funding Sources** | | | | | | |
| Capital Reserves | $ 2,832,300 | $ 5,176,400 | $ 1,815,300 | $ 5,249,500 | $ 4,832,717 | $ 3,905,497 |
| Revenue Bonds | - | - | - | - | 341,083 | 2,574,103 |
| **Total Funding Sources** | **$ 2,832,300** | **$ 5,176,400** | **$ 1,815,300** | **$ 5,249,500** | **$ 5,173,800** | **$ 6,479,600** |

The 20-year proposed improvements identified in the draft of the current GSP total $154.2 million. In both the 6- and 20-year forecasts, capital costs are escalated with a projected construction cost inflation rate (4 percent annually) to the year of planned spending. Funding sources will be evaluated as capital projects change and will be a combination of existing capital reserves (funded in part by system replacement contributions from rates), annual interest earnings, CFC collections, and the potential issue of revenue bonds or low interest rate loans.

## PROJECTED FINANCIAL PERFORMANCE

### *Basis for Revenue Requirements*

The revenue requirement analysis determines the amount of rate revenue needed in a given year to meet that year's expected financial obligations.

The cash flow test identifies cash requirements for the utility in the year addressed. Those requirements can include cash operating and maintenance expenses, debt service, directly funded capital outlays, capital transfers and any projected additions to reserves. The total cash needs were then compared to projected utility revenues. Any projected shortfalls were identified, and the level of rate increase necessary to make up the shortfall was estimated.

The City's internal coverage policy is currently 1.50 times all utility debt, meaning that revenues must be sufficient to meet operating expenses plus a factor, set at a minimum of 1.50 times annual debt service on all utility debt (revenue bonds and PWTF loans). The coverage factor adds some protection for bondholders against the risk of poor financial performance in any given fiscal year. The excess cash flow derived from the added coverage can be used for capital costs.

A number of forecast assumptions are used in the analysis.

≠ Revenue is calculated to increase with growth in future years, which is projected to be about 0.85 percent per year.

≠ Operation and maintenance expenses are escalated at 3 percent for general cost inflation.

≠ Capital expenses are escalated at 4 percent per year.

≠ In addition to maintenance and operations costs, the revenue requirements include capital costs for debt service, directly rate-funded capital projects and rate-funded system reinvestment transfers to CIP funds.

≠ The City's fund interest earnings rate is assumed to be 0.5 percent.

≠ The forecast assumes a Public Works Trust Fund loan interest rate of 0.5 percent with a 20-year term.

**Table 9-7** summarizes the projected financial performance and rate requirements for 2016 through 2021.

### Table 9-7
### Revenue Requirement Forecast

| REVENUE REQUIREMENTS SUMMARY | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| **Revenues** | | | | | | |
| Rate Revenues Under Existing Rates - Local | $ 4,777,850 | $ 4,818,462 | $ 4,859,419 | $ 4,900,724 | $ 4,942,380 | $ 4,984,390 |
| Rate Revenues - King County Treatment | $ 7,795,650 | $ 8,271,563 | $ 8,341,871 | $ 8,852,251 | $ 8,927,495 | $ 9,235,574 |
| Non-Rate Revenues | 146,228 | 158,643 | 169,433 | 170,553 | 178,023 | 179,552 |
| **Total Revenues** | **$ 12,719,728** | **$ 13,248,668** | **$ 13,370,723** | **$ 13,923,528** | **$ 14,047,898** | **$ 14,399,516** |
| **Expenses** | | | | | | |
| Operating & Maintenance Expenses | $ 2,542,039 | $ 2,596,863 | $ 2,655,673 | $ 2,721,304 | $ 2,785,486 | $ 2,856,475 |
| King County Treatment Expense | $ 7,795,650 | $ 8,271,563 | $ 8,341,871 | $ 8,852,251 | $ 8,927,495 | $ 9,235,574 |
| Existing Debt Service | 188,510 | 316,713 | 315,144 | 313,576 | 299,472 | 298,029 |
| New Debt Service | - | - | - | - | 25,969 | 221,955 |
| Rate-Funded System Reinvestment | 1,866,757 | 2,155,293 | 2,363,702 | 2,689,266 | 2,944,041 | 3,157,867 |
| **Total Expenses** | **$ 12,392,956** | **$ 13,340,432** | **$ 13,676,390** | **$ 14,576,397** | **$ 14,982,463** | **$ 15,769,900** |
| **Net Revenue from Rate Increases** | **$ -** | **$ 91,764** | **$ 305,667** | **$ 652,869** | **$ 934,564** | **$ 1,370,384** |
| **Net Annual Surplus/(Deficiency)** | **$ 326,772** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** |
| **Annual Rate Adjustment - Local** | **0.00%** | **1.90%** | **4.30%** | **6.62%** | **4.93%** | **7.22%** |
| **Cumulative Rate Adjustment - Local** | **0.00%** | **1.90%** | **6.29%** | **13.32%** | **18.91%** | **27.49%** |
| **Annual Rate Adjustment - Treatment** | **0.00%** | **5.21%** | **0.00%** | **5.22%** | **0.00%** | **2.58%** |
| **Cumulative Rate Adjustment - Treatment** | **0.00%** | **5.21%** | **5.21%** | **10.71%** | **10.71%** | **13.56%** |
| **Annual Rate Adjustment - Composite** | **0.00%** | **3.95%** | **1.60%** | **5.76%** | **1.90%** | **4.42%** |
| **Cumulative Rate Adjustment - Composite** | **0.00%** | **3.95%** | **5.62%** | **11.70%** | **13.82%** | **18.86%** |

The revenue needs forecast provides for between 1.6 percent and 5.8 percent rate increases each year through 2021. Rate increases by customer class may be more or less than these percentages. Contributing to these increases are King County Wastewater Treatment Division rate increases for sewer treatment which generally occur every other year. These increases are shown in **Table 9-7**.

## RATE STRUCTURE

### *Existing Retail Rates*

The City's existing sewer rates for single-family residential customers are comprised of a fixed monthly charge of $58.12 that includes an allowance for the first 300 cubic feet (3 ccf) of average winter water consumption for the bi-monthly billing period. Usage above 3 ccf is billed at $4.63 per ccf. Multi-family and commercial customers are charged $58.48 monthly, which includes an allowance for the first 600 cubic feet (6 ccf) of water consumption. Usage above 6 ccf is billed at $9.79 per ccf.

## CONCLUSION

The City continues to maintain the sewer utility in a healthy financial position and is taking steps with this GSP to ensure future stability of the sewer utility's financial status.

# APPENDIX A

## King County South WWTP NPDES Permit

**THIS PAGE INTENTIONALLY LEFT BLANK**

Issuance Date: July 1, 2015
Effective Date: August 1,2015
Expiration Date: July 31, 2020

# National Pollutant Discharge Elimination System
# Waste Discharge Permit No. WA0029581

State of Washington
DEPARTMENT OF ECOLOGY
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1342 et seq.

**King County Wastewater Treatment Division**
King Street Center, KSC-NR-0512
Seattle, Washington 98104-3855

is authorized to discharge in accordance with the Special and General Conditions that follow.

| Plant Location: | Receiving Water: |
|---|---|
| King County South Wastewater Treatment Plant<br>1200 Monster Road SW<br>Renton, WA 98057 | Puget Sound – Central |
| **Treatment Type:**<br>Activated Sludge with chlorine disinfection | |

Kevin C. Fitzpatrick
Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office
Washington State Department of Ecology

# Table of Contents

## Summary of Permit Report Submittals

Refer to the Special and General Conditions of this permit for additional submittal requirements.

| Permit Section | Submittal | Frequency | First Submittal Date |
|---|---|---|---|
| S3.A | Discharge Monitoring Report (DMR) | Monthly | September 15, 2015 |
| S3.A | Permit application and priority pollutant data in WQWebDMR | Annually | July 31, 2016 |
| S3.F | Reporting Permit Violations | As necessary | |
| S4.B | Plans for Maintaining Adequate Capacity | As necessary | |
| S4.D | Notification of New or Altered Sources | As necessary | |
| S4.E | Wasteload Assessment | 1/permit cycle | October 31, 2018 |
| S5.F | Bypass Notification | As necessary | |
| S5.G | Operations and Maintenance Manual Update | As necessary | |
| S6.A.4 | Pretreatment Report | 1/year | April 30, 2016 |
| S8 | Spill Control Plan Update | As necessary | |
| S9.A | Sediment Sampling and Analysis Plan | 1/permit cycle | December 1, 2016 |
| S9.B | Sediment Data Report | 1/permit cycle | December 1, 2018 |
| S10.A | Acute Toxicity Effluent Test Results - Submit with Permit Renewal Application | 2 tests/permit cycle, 1 submittal/permit cycle | Tests: 2018, 1st and 3rd quarters. Submittal: July 31, 2019 |
| S11.A | Chronic Toxicity Effluent Test Results with Permit Renewal Application | 2 tests/permit cycle, 1 submittal/permit cycle | Tests: 2018, 2nd and 4th quarters. Submittal: July 31, 2019 |
| S13 | Application for Permit Renewal | 1/permit cycle | July 31, 2019 |
| G4 | Reporting Planned Changes | As necessary | |
| G5 | Engineering Report for Construction or Modification Activities | As necessary | |

# Special Conditions

## S1. Discharge limits

### *S1.A. Effluent limits*

**Puget Sound (Marine) Outfall No. 001**

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a level in excess of, that identified and authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date of this permit, the Permittee may discharge treated municipal wastewater to the Puget Sound at the permitted locations subject to compliance with the following limits:

| **Effluent Limits: Outfall 001 (Puget Sound)**<br>*North Diffuser Lat/Long:* 47.602778˚, -122.429000˚<br>*South Diffuser Lat/Long:* 47.599722˚, -122.429028˚ | | |
|---|---|---|
| **Parameter** | **Average Monthly** [a] | **Average Weekly** [b] |
| Carbonaceous Biochemical Oxygen Demand (5-day) ($CBOD_5$) | 25 milligrams/liter (mg/L)<br>30,000 pounds/day (lbs/day)<br>85% removal of influent $CBOD_5$ | 40 mg/L<br>48,000 lbs/day |
| Total Suspended Solids (TSS) | 30 mg/L<br>36,000 lbs/day<br>85% removal of influent TSS | 45 mg/L<br>54,000 lbs/day |
| | **Average Monthly** | **Maximum Daily** [c] |
| Total Residual Chlorine | 500 µg/L | 750 µg/L |
| | **Instantaneous Minimum** | **Instantaneous Maximum** |
| pH [d] | 6.0 standard units | 9.0 standard units |
| | **Monthly Geometric Mean** | **Weekly Geometric Mean** |
| Fecal Coliform Bacteria [e] | 200/100 milliliter (mL) | 400/100 mL |

[a] Average monthly effluent limit is the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

[b] Average weekly discharge limit is the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

[c] Maximum daily effluent limit is the highest allowable daily discharge. The daily discharge is the average discharge of a pollutant measured during a calendar day. This does not apply to pH.

[d] Report the instantaneous maximum and minimum pH monthly. Do not average pH values.

[e] Ecology provides directions to calculate the monthly and the weekly geometric mean in publication No. 04-10-020, *Information Manual for Treatment Plant Operators* available at: http://www.ecy.wa.gov/pubs/0410020.pdf

**Green River (Freshwater) - Outfall No. 002**

Beginning on the effective date of this permit and lasting through the expiration date, the Permittee is authorized to discharge treated municipal wastewater at the Green River outfall for maintenance purposes only under the following conditions:

1. The Permittee must obtain approval from Ecology at least five (5) working days in advance of the discharging to the Green River for maintenance purposes.
2. The duration of the discharge must not exceed four (4) hours.
3. The discharge must comply with the limits specified below.

| **Effluent Limits: Outfall 002A (Green River)** *Lat/Long:* 47.467500˚, -122.244167˚ | |
|---|---|
| **Parameter** | **Maximum Daily** [1] |
| Effluent Flow, MGD [2] | Must be less than or equal to: 0.25 * Green River Flow (MGD) / 5 |
| $CBOD_5$ | 20 mg/L |
| Total Suspended Solids | 20 mg/L |
| Total Residual Chlorine | 95 µg/L |
| pH | Shall not be outside the range 6.0 to 9.0 |
| | **Maximum Geometric Mean** |
| Fecal Coliform | 200/100 mL |

[1] Maximum daily effluent limit is the highest allowable daily discharge. In this case, the daily discharge is the average measurement over the discharge duration.

[2] Effluent flow limit is based on a dilution factor of 5, which is required to assure compliance with water quality criteria.

4. The Permittee may only discharge when the Green River flow is greater than 500 cfs.
5. The Permittee must treat any maintenance discharges to the Green River using secondary treatment, disinfection, and dechlorination.
6. The Permittee must monitor the discharge as required in S2.A to ensure that effluent limits are met.
7. The Permittee must sample receiving water turbidity as detailed in S2.A.
8. Any discharge from the treatment plant that results in water quality violations or contributes significantly to a fish kill is a violation of this permit.
9. The Permittee may only discharge, as a result of maintenance activities, during the out-going tide (after a high tide and before the subsequent low tide).
10. The Permittee should consider fish migration patterns when scheduling maintenance discharges.

## *S1.B. Mixing zone authorization*

**Outfall 001 – Puget Sound (marine)**

The following paragraphs define the maximum boundaries of the mixing zones:

*Chronic mixing zone*

The chronic mixing zone consists of circles surrounding each discharge port with radii of 825 feet measured from the center of each port. The mixing zone extends from the bottom to the top of the water column. The concentration of pollutants at the edge of the chronic zone must meet chronic aquatic life criteria and human health criteria.

*Acute mixing zone*

The extended acute mixing zone consists of circles surrounding each discharge port with radii of 82 feet measured from the center of each port. The mixing zone extends from the bottom to the top of the water column. The concentration of pollutants at the edge of the acute zone must meet acute aquatic life criteria.

| Outfall 001 - Available Dilution (dilution factor) | |
|---|---|
| Acute Aquatic Life Criteria | 186 |
| Chronic Aquatic Life Criteria | 225 |
| Human Health Criteria - Carcinogen | 428 |
| Human Health Criteria - Non-carcinogen | 428 |

**Outfall 002 – Green River (freshwater)**

The Green River outfall is used as an emergency/backup outfall and is permitted for maintenance purposes only; emergency discharges from this outfall are permitted under S5.F. No chronic mixing zone is granted because maintenance discharges are permitted for durations of 4 hours or less.

*Acute mixing zone*

The acute mixing zone encompasses 25% of the river flow in accordance with WAC 173-201A-400(12). The resulting dilution factor is 5.0. The mixing zone extends 100 feet upstream, 300 feet downstream, and from the bottom to the top of the water column. The concentration of pollutants at the edge of the acute zone must meet acute aquatic life criteria.

| Outfall 002 - Available Dilution (dilution factor) | |
|---|---|
| Chronic Dilution Ratio* | Not Applicable |
| Acute Dilution Ratio | 5.0:1 |

* Maintenance discharges are permitted for durations of 4 hours or less and therefore a chronic dilution factor is not applicable.

## S2. Monitoring requirements

### *S2.A. Monitoring schedules*

The Permittee must monitor in accordance with the following schedules and must use the laboratory method, detection level (DL), and quantitation level (QL) specified in Appendix A or corresponding Sampling Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) documents. Alternative methods from 40 CFR Part 136 are acceptable for those parameters without limits, and if the DL and QL are equivalent to those specified in Appendix A, corresponding SAP/QAPP documents, or sufficient to produce a measurable quantity.

**Monitoring Requirements for Outfall 001 – Puget Sound**

| Parameter | Units | Minimum Sampling Frequency | Sample Type |
|---|---|---|---|
| **(1) Wastewater influent** (raw sewage from the collection system into the treatment facility) | | | |
| $BOD_5$ | mg/L | 1/week | 24-hour composite [a] |
| | lbs/day [b] | 1/week | Calculation |
| $CBOD_5$ | mg/L | 4/week | 24-hour composite |
| | lbs/day [b] | 4/week | Calculation |
| TSS | mg/L | 4/week | 24-hour composite |
| | lbs/day [b] | 4/week | Calculation |
| **(2) Final wastewater effluent** (wastewater exiting the last treatment process or operation) | | | |
| Flow | MGD | Continuous [c] | Metered/recorded |
| $CBOD_5$ [d] | mg/L | 4/week | 24-hour composite |
| | lbs/day [b] | 4/week | Calculation |
| | % removal [e] | Monthly | Calculation |
| TSS | mg/L | 4/week | 24-hour composite |
| | lbs/day [b] | 4/week | Calculation |
| | % removal [e] | Monthly | Calculation |
| Chlorine (Total Residual) | µg/L | Continuous | Metered/recorded |
| Fecal Coliform [f] | # /100 ml | 5/week | Grab [g] |
| pH [h] | Standard Units | Continuous | Metered/recorded |
| Total Ammonia | mg/L as N | Monthly | 24-hour composite |
| | lbs/day [b] | Monthly | Calculation |
| Nitrate plus Nitrite Nitrogen | mg/L as N | Monthly | 24-hour composite |
| Total Kjeldahl Nitrogen (TKN) | mg/L as N | Monthly | 24-hour composite |
| Total Phosphorus | mg/L as P | Monthly | 24-hour composite |
| Soluble Reactive Phosphorus | mg/L as P | Monthly | 24-hour composite |
| Cyanide | micrograms/liter (µg/L) | 2/year: Aug & Jan | Grab |

| Parameter | Units | Minimum Sampling Frequency | Sample Type |
|---|---|---|---|
| Total Phenolic Compounds | µg/L | 2/year: Aug & Jan | Grab |
| Priority Pollutants (PP) – Total Metals [i] | µg/L<br>ng/L for mercury | 2/year: Aug & Jan | 24-hour composite<br>Grab for mercury |
| PP – Volatile Organic Compounds [i] | µg/L | 2/year: Aug & Jan | Grab |
| PP – Acid-extractable Compounds [i] | µg/L | 2/year: Aug & Jan | 24-hour composite |
| PP – Base-neutral Compounds [i] | µg/L | 2/year: Aug & Jan | 24-hour composite |
| PP – PCBs [i] | µg/L | 2/year: Aug & Jan | 24-hour composite |
| **(3) Whole effluent toxicity testing –** As specified in Permit Conditions S10 & S11 | | | |
| Acute Toxicity Testing | | 2/permit cycle | 24-hour composite |
| Chronic Toxicity Testing | | 2/permit cycle | 24-hour composite |
| **(4) Pretreatment** - As specified in Permit Condition S6 | | | |
| **(5) Permit Application Requirements – Final Wastewater Effluent** | | | |
| Dissolved Oxygen | mg/L | 1/year in Aug | Grab |
| Oil and Grease (HEM) | mg/L | 1/year in Aug | Grab |
| Total Dissolved Solids | mg/L | 1/year in Aug | 24-hour composite |
| Total Hardness | mg/L | 1/year in Aug | 24-hour composite |
| Alkalinity | mg/L as $CaCO_3$ | 1/year in Aug | Grab |
| Temperature | ˚C | 1/year in Aug | Grab |
| **(6) Sediment** - As specified in Permit Condition S9 | | | |

[a] 24-hour composite means a series of individual samples collected over a 24-hour period into a single container, and analyzed as one sample.

[b] lbs/day = Concentration (in mg/L) x Flow (in MGD) x Conversion Factor (8.34). Calculate using the average flow measured during the sample collection period.

[c] "Continuous" means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The time interval for the associated data logger must be no greater than 30 minutes. The Permittee must sample every six hours when continuous monitoring is not possible.

[d] Effluent samples for $CBOD_5$ analysis may be taken before or after the disinfection process. If taken after, dechlorinate and reseed the sample.

[e] $$\%\ \text{removal} = \frac{\text{Influent monthly average conc. (mg/L)} - \text{Effluent monthly average conc. (mg/L)}}{\text{Influent monthly average concentration (mg/L)}} \times 100$$

[f] Report a numerical value for fecal coliforms following the procedures in Ecology's *Information Manual for Wastewater Treatment Plant Operators*, Publication Number 04-10-020 available at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html. Do not report a result as too numerous to count (TNTC).

[g] Grab means an individual sample collected over a fifteen (15) minute, or less, period.

[h] Report the instantaneous maximum and minimum pH daily. Do not average pH values.

[i] Record and report the effluent flow discharged on the day of the priority pollutant samples.
See Appendix A or corresponding SAP/QAPP for the required detection (DL) or quantitation (QL) levels.
Report single analytical values below detection as "less than (detection level)" where (detection level) is the numeric value specified in Appendix A.
Report single analytical values between the detection and quantitation levels with qualifier code of 'j' following the value. If unable to obtain the required DL and QL due to matrix effects, the Permittee must submit a matrix specific MDL and a QL with appropriate laboratory documentation.

**Monitoring Requirements for Outfall 002A – Green River**

| Parameter | Units | Minimum Sampling Frequency | Sample Type |
|---|---|---|---|
| **(1) Wastewater Final Effluent** (wastewater exiting the last treatment process or operation) | | | |
| Effluent Flow - maximum | MGD | Continuous | Metered/recorded |
| Duration | Hours | Once per event | Measurement |
| $CBOD_5$ | mg/L | Once per event | Composite of equal volume grab samples during event |
| TSS | mg/L | Once per event | Composite of equal volume grab samples during event |
| pH | s.u. | Continuous | Metered/recorded |
| Fecal Coliform | # /100 ml | Once per event | Grab |
| Total Residual Chlorine | µg/L | Continuous | Metered/recorded |
| Dilution Factor * | None | Once per event | Calculated |
| **(2) Downstream of Discharge - 300 feet** | | | |
| River Flow | cfs | Once per event | Measurement |
| Turbidity | NTU | Once per event | Grab |
| **(3) Upstream of Discharge** | | | |
| Turbidity | NTU | Once per event | Grab |

* Dilution Factor =  [0.25 * River Flow, MGD] / [Effluent Flow, MGD], report as comment on DMR

### *S2.B. Sampling and analytical procedures*

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters. The Permittee must conduct representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions that may affect effluent quality.

Sampling and analytical methods used to meet the monitoring requirements specified in this permit must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 (or as applicable in 40 CFR subchapters N [Parts 400–471] or O [Parts 501-503])  unless otherwise specified in this permit . Ecology may only specify alternative methods for parameters without permit limits and for those parameters without an EPA approved test method in 40 CFR Part 136.

### *S2.C. Flow measurement and continuous monitoring devices*

The Permittee must:

1. Select and use appropriate flow measurement and continuous monitoring devices and methods consistent with accepted scientific practices.

2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard, the manufacturer's recommendation, and approved O&M manual procedures for the device and the wastestream.
3. Calibrate continuous monitoring instruments consistent with the manufacturer's recommendation.
4. Maintain calibration records for at least three years.

### *S2.D. Laboratory accreditation*

The Permittee must ensure that all monitoring data required by Ecology for permit specified parameters is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Flow and internal process control parameters are exempt from this requirement.

## S3. Reporting and recording requirements

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to Ecology is a violation of the terms and conditions of this permit.

### *S3.A. Discharge monitoring reports*

The first monitoring period begins on the effective date of the permit. Permittee must:

1. Summarize, report, and submit monitoring data obtained during each monitoring period on the electronic discharge monitoring report (DMR) form provided by Ecology within the Water Quality Permitting Portal. Include data for each of the parameters tabulated in Special Condition S2 and as required by the form. Report a value for each day sampling occurred and for the summary values (when applicable) included on the electronic form.

   To find out more information and to sign up for the Water Quality Permitting Portal go to: http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html
2. Enter the "No Discharge" reporting code for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate, if the Permittee did not discharge wastewater or a specific pollutant during a given monitoring period.
3. Report single analytical values below detection as "less than the detection level (DL)" by entering < followed by the numeric value of the detection level (e.g. < 2.0) on the DMR. If the method used did not meet the minimum DL and quantitation level (QL) identified in the permit, report the actual QL and DL in the comments or in the location provided.
4. **Not** report zero for bacteria monitoring. Report as required by the laboratory method.
5. Calculate the geometric mean values for bacteria using:

a. The reported numeric value for all bacteria samples measured above the detection value except when it took multiple samples in one day. If the Permittee takes multiple samples in one day it must use the arithmetic average for that day in the geometric mean calculation.

b. The detection value for those samples measured below detection.

6. Report the test method used for analysis in the comments if the laboratory used an alternative method not specified in the permit and as allowed in Appendix A.

7. Calculate average values and total values (unless otherwise specified in the permit) using:

   a. The reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value.

   b. One-half the detection value (for values reported below detection) if the lab detected the parameter in another sample from the same monitoring point for the reporting period.

   c. Zero (for values reported below detection) if the lab did not detect the parameter in another sample for the reporting period.

8. Report single-sample grouped parameters (for example: priority pollutants) on the WQWebDMR form and include sample date, concentration detected, detection limit (DL) (as necessary), laboratory quantitation level (QL) (as necessary), and CAS number. The Permittee must also submit an electronic copy of the laboratory report as an attachment using WQWebDMR. The contract laboratory reports must also include information on the chain of custody, QA/QC results, and documentation of accreditation for the parameter.

9. Ensure that DMRs are electronically submitted no later than the dates specified below, unless otherwise specified in this permit.

10. Submit DMRs in WQWebDMR for parameters with the monitoring frequencies specified in S2 (monthly, annually, etc.) at the reporting schedule identified below. The Permittee must:

    a. Submit **monthly** DMRs by the 15th day of the following month.

    b. Submit **annual** DMRs by July 31st for the previous calendar year. These submittals must include the permit renewal application monitoring data, priority pollutant, cyanide, and phenolic compound data as required in Special Condition S2.A. The annual sampling period is the calendar year.

### ***S3.B. Permit submittals and schedules***

The Permittee must use the *Water Quality Permitting Portal – Permit Submittals* application to submit all other written permit-required reports by the date specified in the permit.

When another permit condition requires submittal of a paper (hard-copy) report, the Permittee must ensure that it is postmarked or received by Ecology no later than the dates specified by this permit. Send these paper reports to Ecology at:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

### *S3.C. Records retention*

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

### *S3.D. Recording of results*

For each measurement or sample taken, the Permittee must record the following information:

1. The date, exact place, method, and time of sampling or measurement.
2. The individual who performed the sampling or measurement.
3. The dates the analyses were performed.
4. The individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

### *S3.E. Additional monitoring by the Permittee*

If the Permittee monitors any pollutant more frequently than required by Special Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR unless otherwise specified by Special Condition S2.

### *S3.F. Reporting permit violations*

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
2. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.

a. *Immediate reporting*

The Permittee must **immediately** report to Ecology and the Department of Health, Shellfish Program, and Public Health of Seattle-King County (phone numbers listed below), all:

- Failures of the disinfection system
- Collection system overflows
- Plant bypasses discharging to marine surface waters
- Any other failures of the sewage system (pipe breaks, etc.)

The Permittee must also *immediately* report any collection system overflows discharging to a waterbody used as a source of drinking water to Ecology, the Department of Health Drinking Water Program, and Public Health of Seattle-King County.

| | |
|---|---|
| Ecology - Northwest Regional Office | 425-649-7000 |
| Department of Health - Shellfish Program | 360-236-3330 (business hours)<br>360-789-8962 (after business hours) |
| Public Health of Seattle-King County | 206-477-8177 |
| Department of Health, Drinking Water Program | 800-521-0323 (business hours)<br>877-481-4901 (after business hours) |

Additionally, for any sanitary sewer overflow (SSO) that discharges to a municipal separate storm sewer system (MS4), the Permittee must notify the appropriate MS4 owner or operator.

b. *Twenty-four-hour reporting*

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at the telephone number listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances:

i. Any noncompliance that may endanger health or the environment, unless previously reported under immediate reporting requirements.

ii. Any unanticipated bypass that causes an exceedance of an effluent limit in the permit (See Part S5.F, “Bypass Procedures”).

iii. Any upset that causes an exceedance of an effluent limit in the permit (see G15, “Upset”).

iv. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1.A of this permit.

v. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

c. *Report within five days*

The Permittee must also submit a written report within five business days of the time that the Permittee becomes aware of any reportable event under subparts a or b, above. The report must contain:

i. A description of the noncompliance and its cause.

ii. The period of noncompliance, including exact dates and times.

iii. The estimated time the Permittee expects the noncompliance to continue if not yet corrected.

iv. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

v. If the noncompliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

d. *Waiver of written reports*

Ecology may waive the written report required in subpart c, above, on a case-by-case basis upon request if the Permittee has submitted a timely oral report.

e. *All other permit violation reporting*

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for S3.A ("Reporting"). The reports must contain the information listed in subpart c, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

### *S3.G. Other reporting*

1. Spills of oil or hazardous materials

   The Permittee must report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280 and chapter 173-303-145. You can obtain further instructions at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm .

2. Failure to submit relevant or correct facts

   Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to Ecology, it must submit such facts or information promptly.

### *S3.H. Maintaining a copy of this permit*

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors.

# S4. Facility loading

## *S4.A. Design criteria*

The flows or waste loads for the permitted facility must not exceed the following design criteria:

| | |
|---|---|
| Maximum Month Design Flow (MMDF) | 144 MGD |
| $BOD_5$ Influent Loading for Maximum Month | 251,000 lbs/day |
| TSS Influent Loading for Maximum Month | 235,000 lbs/day |

## *S4.B. Plans for maintaining adequate capacity*

1. Conditions triggering plan submittal

   The Permittee must submit a plan and a schedule for continuing to maintain capacity to Ecology when:

   a. The actual flow or waste load reaches 85 percent of any one of the design criteria in S4.A for three consecutive months.

   b. The projected plant flow or loading would reach design capacity within five years.

2. Plan and schedule content

   The plan and schedule must identify the actions necessary to maintain adequate capacity for the expected population growth and to meet the limits and requirements of the permit. The Permittee must consider the following topics and actions in its plan.

   a. Analysis of the present design and proposed process modifications.

   b. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.

   c. Limits on future sewer extensions or connections or additional waste loads.

   d. Modification or expansion of facilities.

   e. Reduction of industrial or commercial flows or waste loads

   Engineering documents associated with the plan must meet the requirements of WAC 173-240-060, "Engineering Report," and be approved by Ecology prior to any construction.

## *S4.C. Duty to mitigate*

The Permittee must take all reasonable steps to minimize or prevent any discharge or biosolids use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

### *S4.D. Notification of new or altered sources*

1. The Permittee must submit written notice to Ecology whenever any new discharge or a substantial change in volume or character of an existing discharge into the wastewater treatment plant is proposed which:
    a. Would interfere with the operation of, or exceed the design capacity of, any portion of the wastewater treatment plant.
    b. Is not part of an approved general sewer plan or approved plans and specifications.
    c. Is subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act.
2. This notice must include an evaluation of the wastewater treatment plant's ability to adequately transport and treat the added flow and/or waste load, the quality and volume of effluent to be discharged to the treatment plant, and the anticipated impact on the Permittee's effluent [40 CFR 122.42(b)].

### *S4.E. Wasteload assessment*

The Permittee must conduct an assessment of its influent flow and waste load and submit a report to Ecology by October 31, 2018. The report must contain:

1. A description of compliance or noncompliance with the permit effluent limits.
2. A comparison between the existing and design:
    a. Monthly average dry weather and wet weather flows.
    b. Maximum month flows.
    c. Peak flows.
    d. $BOD_5$ loadings.
    e. Total suspended solids loadings.
3. The percent change in the above parameters since the previous report.
4. The present and design population or population equivalent.
5. The projected population growth rate.
6. The estimated date upon which the Permittee expects the wastewater treatment plant to reach design capacity, according to the most restrictive of the parameters above.
7. An Infiltration and Inflow (I/I) update that describes:
    a. For the collection system owned and operated by the County:
        i. The results of recent I/I monitoring
        ii. A summary of recent I/I improvement projects.
        iii. Projects planned to improve I/I.

b. For the collection systems owned and operated by component agencies:
   i. Measures taken to encourage component agencies to control I/I.
   ii. Any known I/I concerns.
   iii. Steps planned to further encourage I/I reduction projects.

## S5. Operation and maintenance

The Permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances), which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes keeping a daily operation logbook (paper or electronic), adequate laboratory controls, and appropriate quality assurance procedures. This provision of the permit requires the Permittee to operate backup or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of this permit.

### *S5.A. Certified operator*

This permitted facility must be operated by an operator certified by the state of Washington for at least a Class IV plant. This operator must be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class III plant must be in charge during all regularly scheduled shifts.

### *S5.B. Operation and maintenance program*

The Permittee must:

1. Institute an adequate operation and maintenance program for the entire sewage system.
2. Keep maintenance records on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed.
3. Make maintenance records available for inspection at all times.

### *S5.C. Short-term reduction*

The Permittee must schedule any facility maintenance, which might require interruption of wastewater treatment and degrade effluent quality, during non-critical water quality periods and carry this maintenance out according to the approved O&M manual or as otherwise approved by Ecology.

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limits on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee must:

1. Give written notification to Ecology, if possible, thirty (30) days prior to such activities.
2. Detail the reasons for, length of time of, and the potential effects of the reduced level of treatment.

This notification does not relieve the Permittee of its obligations under this permit.

### *S5.D. Electrical power failure*

The Permittee must ensure that adequate safeguards prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electrical power failure at the treatment plant and/or sewage lift stations. Adequate safeguards include, but are not limited to, alternate power sources, standby generator(s), or retention of inadequately treated wastes.

The Permittee must maintain Reliability Class II (EPA 430-99-74-001) at the wastewater treatment plant. Reliability Class II requires a backup power source sufficient to operate all vital components and critical lighting and ventilation during peak wastewater flow conditions. Vital components used to support the secondary processes (i.e., mechanical aerators or aeration basin air compressors) need not be operable to full levels of treatment, but must be sufficient to maintain the biota.

### *S5.E. Prevent connection of inflow*

The Permittee must strictly enforce its sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system within King County control.

### *S5.F. Bypass procedures*

This permit prohibits a bypass, which is the intentional diversion of waste streams from any portion of a treatment facility. Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

   This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass which is unavoidable, unanticipated, and results in noncompliance of this permit.

   This permit authorizes such a bypass only if:

a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

b. No feasible alternatives to the bypass exist, such as:

- The use of auxiliary treatment facilities.
- Retention of untreated wastes.
- Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
- Transport of untreated wastes to another treatment facility.

c. Ecology is properly notified of the bypass as required in Special Condition S3.F of this permit.

3. If bypass is anticipated and has the potential to result in noncompliance of this permit.

a. The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

- A description of the bypass and its cause.
- An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
- A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
- The minimum and maximum duration of bypass under each alternative.
- A recommendation as to the preferred alternative for conducting the bypass.
- The projected date of bypass initiation.
- A statement of compliance with SEPA.
- A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
- Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

b. For probable construction bypasses, the Permittee must notify Ecology of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during the project planning and design process. The project-specific engineering report or facilities plan as well as the plans and specifications must include details of probable construction bypasses to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

c. Ecology will consider the following prior to issuing an administrative order for this type of bypass:

- If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
- If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.
- If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass by issuing an administrative order under RCW 90.48.120.

### *S5.G. Operations and maintenance (O&M) manuals*

1. O&M manual submittal and requirements

The Permittee must:

a. Review the O&M Manuals at least annually.

b. Submit to Ecology for review and approval substantial changes or updates to the O&M Manuals.

c. Keep the approved O&M Manuals at the permitted facility.

d. Follow the instructions and procedures of the manuals.

2. O&M manual components

In addition to the requirements of WAC 173-240-080 (1) through (5), the O&M manuals must include:

a. Emergency procedures for cleanup in the event of wastewater system upset or failure.

b. A review of system components which if failed could pollute surface water or could impact human health. Provide a procedure for a routine schedule of checking the function of these components.

c. Wastewater system maintenance procedures that contribute to the generation of process wastewater.

d. Reporting protocols for submitting reports to Ecology to comply with the reporting requirements in the discharge permit.

e. Any directions to maintenance staff when cleaning or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine).

f. The treatment plant process control monitoring schedule.

## S6. Pretreatment

### *S6.A. General requirements*

1. The Permittee must implement the Industrial Pretreatment Program in accordance with King County Code 28.84.060 as amended by King County Ordinance No. 11963 on January 1, 1996, legal authorities, policies, procedures, and financial provisions described in the Permittee's approved pretreatment program submittal entitled "Industrial Pretreatment Program" and dated April 27, 1981; any approved revisions thereto; and the General Pretreatment Regulations (40 CFR Part 403). At a minimum, the Permittee must undertake the following pretreatment implementation activities:

    a. Enforce categorical pretreatment standards under Section 307(b) and (c) of the Federal Clean Water Act (hereinafter, the Act), prohibited discharge standards as set forth in 40 CFR 403.5, local limits, or state standards, which ever are most stringent or apply at the time of issuance or modification of a local industrial waste discharge permit. Locally derived limits are defined as pretreatment standards under Section 307(d) of the Act and are not limited to categorical industrial facilities.

    b. Issue industrial waste discharge permits to all significant industrial users [SIUs, as defined in 40 CFR 403.3(v)(i)(ii)] contributing to the treatment system, including those from other jurisdictions. Industrial waste discharge permits must contain as a minimum, all the requirements of 40 CFR 403.8 (f)(l)(iii). The Permittee must coordinate the permitting process with Ecology regarding any industrial facility which may possess a state waste discharge permit issued by Ecology.

    c. Maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by industrial users to the treatment works. The Permittee must maintain records for at least a three-year period.

    d. Perform inspections, surveillance, and monitoring activities on industrial users to determine or confirm compliance with pretreatment standards and requirements. The Permittee must conduct a thorough inspection of SIUs annually, except Middle-Tier Categorical Industrial Users, as defined by 40 CFR 403.8(f)(2)(v)(B)&(C), need only be inspected once every two years. The Permittee must conduct regular local monitoring of SIU wastewaters commensurate with the character and volume of the wastewater but not less than once per year except for Middle-Tier Categorical Industrial Users which may be sampled once every two years. The Permittee must collect and analyze samples in accordance with 40 CFR Part 403.12(b)(5)(ii)-(v) and 40 CFR Part 136.

e. Enforce and obtain remedies for non-compliance by any industrial users with applicable pretreatment standards and requirements. Once violations have been identified, the Permittee must take timely and appropriate enforcement action to address the non-compliance. The Permittee's action must follow its enforcement response procedures and any amendments, thereof.

f. Publish, at least annually in a newspaper of general circulation within the Permittee's service area, a list of all non-domestic users which, at any time in the previous 12 months, were in significant non-compliance as defined in 40 CFR 403.8(f)(2)(vii).

g. If the Permittee elects to conduct sampling of an SIU's discharge in lieu of requiring user self-monitoring, it must satisfy all requirements of 40 CFR Part 403.12. This includes monitoring and record keeping requirements of sections 403.12(g) and (o). For SIU's subject to categorical standards (i.e., CIUs), the Permittee may either complete baseline and initial compliance reports for the CIU (when required by 403.12(b) and (d)) or require these of the CIU. The Permittee must ensure SIUs are provided the results of sampling in a timely manner, inform SIUs of their right to sample, their obligations to report any sampling they do, to respond to non-compliance, and to submit other notifications. These include a slug load report (403.12(f)), notice of changed discharge (403.12(j)), and hazardous waste notifications (403.12(p)). If sampling for the SIU, the Permittee must not sample less than once in every six month period unless the Permittee's approved program includes procedures for reduction of monitoring for Middle-Tier or Non-Significant Categorical Users per 403.12(e)(2) and (3) and those procedures have been followed.

h. Develop and maintain a data management system designed to track the status of the Permittee's industrial user inventory, industrial user discharge characteristics, and compliance status.

i. Maintain adequate staff, funds, and equipment to implement its pretreatment program.

j. Establish, where necessary, contracts or legally binding agreements with contributing jurisdictions to ensure compliance with applicable pretreatment requirements by commercial or industrial users within these jurisdictions. These contracts or agreements must identify the agency responsible for the various implementation and enforcement activities to be performed in the contributing jurisdiction.

2. Per 40 CFR 403.8(f)(2)(vii), the Permittee must evaluate each Significant Industrial User to determine if a Slug Control Plan is needed to prevent slug discharges which may cause interference, pass-through, or in any other way result in violations of the Permittee's regulations, local limits or permit conditions. The Slug Control Plan evaluation shall occur within one year of a user's designation as a SIU. In accordance with 40 CFR 403.8(f)(1)(iii)(B)(6) the Permittee shall include slug discharge control requirements in an SIU's permit if the Permittee determines that they are necessary.

3. Whenever Ecology determines that any waste source contributes pollutants to the Permittee's treatment works in violation of Subsection (b), (c), or (d) of Section 307 of the Act, and the Permittee has not taken adequate corrective action, Ecology will notify the Permittee of this determination. If the Permittee fails to take appropriate enforcement action within 30 days of this notification, Ecology may take appropriate enforcement action against the source or the Permittee.

4. Pretreatment Report

   The Permittee must provide to Ecology an annual report that briefly describes its program activities during the previous calendar year. By April 30th, the Permittee must send the annual report to Ecology at:

   Water Quality Permit Coordinator
   Department of Ecology
   Northwest Regional Office
   3190 160th Avenue SE
   Bellevue, WA  98008-5452

   The report must include the following information:

   a. An updated listing of non-domestic industrial dischargers.

   b. Results of wastewater sampling at the treatment plant as specified in Subsection S6.B below. The Permittee must calculate removal rates for each pollutant and evaluate the adequacy of the existing local limits in prevention of treatment plant interference, pass through of pollutants that could affect receiving water quality and biosolids contamination.

   c. Status of program implementation, including:

      i. Any substantial modifications to the pretreatment program as originally approved by Ecology, including staffing and funding levels.

      ii. Any interferences, upsets, or permit violations experienced at the WWTP that are directly attributable to wastes from industrial users.

      iii. Listing of industrial users inspected and/or monitored, and a summary of the results.

      iv. Listing of industrial users scheduled for inspection and/or monitoring for the next year, and expected frequencies.

v. Listing of industrial users notified of promulgated pretreatment standards and/or local standards as required in 40 CFR 403.8(f)(2)(iii). The list must indicate which industrial users are on compliance schedules and the final date of compliance for each.

vi. Listing of industrial users issued industrial waste discharge permits.

vii. Planned changes in the pretreatment program implementation plan.

d. Status of compliance activities, including:

i. Listing of industrial users that failed to submit baseline monitoring reports or any other reports required under 40 CFR 403.12 and in the Permittee's pretreatment program, dated April 27, 1981.

ii. Listing of industrial users that were at any time during the reporting period not complying with federal, state, or local pretreatment standards or with applicable compliance schedules for achieving those standards, and the duration of such non-compliance.

iii. Summary of enforcement activities and other corrective actions taken or planned against non-complying industrial users. The Permittee must supply to Ecology a copy of the public notice of facilities that were in significant non-compliance.

5. The Permittee must request and obtain approval from Ecology before making any significant changes to the approved local pretreatment program. The Permittee must follow the procedure in 40 CFR 403.18 (b) and (c).

***S6.B. Monitoring requirements***

The Permittee must monitor its influent, effluent, and biosolids at the South Plant WWTP for the priority pollutants identified in Tables II and III of Appendix D of 40 CFR Part 122 as amended, any compounds identified as a result of Condition S6.B.4, and any other pollutants expected from nondomestic sources using U.S. EPA-approved procedures for collection, preservation, storage, and analysis. The Permittee must test influent, effluent, and biosolids samples for the priority pollutant metals (Table III, 40 CFR 122, Appendix D) on a quarterly basis throughout the term of this permit. The Permittee must test influent, effluent, and biosolids samples for the organic priority pollutants (Table II, 40 CFR 122, Appendix D) on an annual basis.

1. The Permittee must sample South Plant WWTP influent and effluent on a day when industrial discharges are occurring at normal to maximum levels. The Permittee must obtain 24-hour composite samples for the analysis of acid and base/neutral extractable compounds and metals. The Permittee must collect samples for the analysis of volatile organic compounds and samples must be collected using grab sampling techniques at equal intervals for a total of four grab samples per day.

   The laboratory may run a single analysis for volatile pollutants (using GC/MS procedures approved by 40 CFR 136 ) for each monitoring day by compositing equal volumes of each grab sample directly in the GC purge and trap apparatus in the laboratory, with no less than 1 ml of each grab included in the composite.

Unless otherwise indicated, all reported test data for metals must represent the total amount of the constituent present in all phases, whether solid, suspended, or dissolved, elemental or combined including all oxidation states.

The Permittee must handle, prepare, and analyze all wastewater samples taken for GC/MS analysis using procedures approved by 40 CFR 136.

2. The Permittee must collect a biosolids sample concurrently with a wastewater sample as a single grab sample of residual biosolids. Sampling and analysis must be performed using procedures approved by 40 CFR 136 unless the Permittee requests an alternate method and Ecology has approved.
3. The Permittee must take cyanide, phenols, and oils as grab samples. Oils must be hexane soluble or equivalent, and should be measured in the influent and effluent only.
4. In addition to quantifying pH, oil and grease, and all priority pollutants, the Permittee must make a reasonable attempt to identify all other substances and quantify all pollutants shown to be present by gas chromatograph/mass spectrometer (GC/MS) analysis using procedures approved by 40 CFR 136. The Permittee should attempt to make determinations of pollutants for each fraction, which produces identifiable spectra on total ion plots (reconstructed gas chromatograms). The Permittee should attempt to make determinations from all peaks with responses 5% or greater than the nearest internal standard. The 5% value is based on internal standard concentrations of 30 μg/l, and must be adjusted downward if higher internal standard concentrations are used or adjusted upward if lower internal standard concentrations are used. The Permittee may express results for non-substituted aliphatic compounds as total hydrocarbon content. The Permittee must use a laboratory whose computer data processing programs are capable of comparing sample mass spectra to a computerized library of mass spectra, with visual confirmation by an experienced analyst. For all detected substances which are determined to be pollutants, the Permittee must conduct additional sampling and appropriate testing to determine concentration and variability, and to evaluate trends.

### *S6.C. Reporting of monitoring results*

The Permittee must include a summary of monitoring results in the Annual Pretreatment Report.

### *S6.D. Local limit development*

As sufficient data become available, the Permittee must, in consultation with Ecology, reevaluate their local limits in order to prevent pass through or interference. If Ecology determines that any pollutant present causes pass through or interference, or exceeds established biosolids standards, the Permittee must establish new local limits or revise existing local limits as required by 40 CFR 403.5. Ecology may also require the Permittee to revise or establish local limits for any pollutant discharged from the treatment works that has a reasonable potential to exceed the water quality standards, sediment standards, or established effluent limits, or causes whole effluent toxicity. Ecology makes this determination in the form of an Administrative Order.

Ecology may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern. Any permit modification is subject to formal due process procedures under state and federal law and regulation.

## S7. Solid wastes

### *S7.A. Solid waste handling*

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

### *S7.B. Leachate*

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

## S8. Spill control plan

### *S8.A Spill control plan submittals and requirements*

The Permittee must:

1. Review the existing spill plan at least annually and update the spill plan as needed.
2. Send significant changes to the plan to Ecology.
3. Follow the plan and any supplements throughout the term of the permit.

### *S8.B. Spill control plan components*

The spill control plan must include the following:

1. A list of all oil and petroleum products and other materials used and/or stored on-site, which when spilled, or otherwise released into the environment, designate as dangerous waste (DW) or extremely hazardous waste (EHW) by the procedures set forth in WAC 173-303-070. Include other materials used and/or stored on-site which may become pollutants or cause pollution upon reaching state's waters.

2. A description of preventive measures and facilities (including an overall facility plot showing drainage patterns) which prevent, contain, or treat spills of these materials.
3. A description of the reporting system the Permittee will use to alert responsible managers and legal authorities in the event of a spill.
4. A description of operator training to implement the plan.

The Permittee may submit plans and manuals required by 40 CFR Part 112, contingency plans required by Chapter 173-303 WAC, or other plans required by other agencies, which meet the intent of this section.

## S9. Sediment monitoring

### *S9.A. Sediment sampling and analysis plan*

The Permittee must submit to Ecology for review and approval a sediment sampling and analysis plan for sediment monitoring by December 1, 2016. The purpose of the plan is to recharacterize sediment (the nature and extent of chemical contamination and biological toxicity) quality in the vicinity of the Permittee's discharge locations. The Permittee must sample the top 10 cm of sediment at the same eight stations sampled during the previous permit term, and the sediments must be analyzed for the 47 chemicals with SMS numeric criteria as well as conventional analytes. The Permittee must follow the guidance provided in the current version of the *Sediment Source Control Standards User Manual*, *Appendix B: sediment sampling and analysis plan.*

### *S9.B. Sediment data report*

Following Ecology approval of the sediment sampling and analysis plan, the Permittee must collect sediments between August 15$^{th}$ and September 30$^{th}$ of 2017. The Permittee must submit to Ecology a sediment data report containing the results of the sediment sampling and analysis no later than December 1, 2018. The sediment data report must conform to the approved sediment sampling and analysis plan. The report must document when the data was successfully loaded into EIM as required below.

In addition to a sediment data report, submit the sediment chemical and any biological data to Ecology's EIM database (http://www.ecy.wa.gov/eim/). Data must be submitted to EIM according to the instructions on the EIM website. The data submittal portion of the EIM website (http://www.ecy.wa.gov/eim/submitdata.htm) provides information and help on formats and requirements for submitting tabular data.

## S10. Acute toxicity

### *S10.A. Testing when there is no permit limit for acute toxicity*

The Permittee must:

1. Conduct acute toxicity testing on final effluent once in the first quarter of 2018 and once in the third quarter of 2018.
2. Conduct acute toxicity testing on a series of at least five concentrations of effluent, including 100% effluent and a control.
3. Use each of the following species and protocols for each acute toxicity test:

| Acute Toxicity Tests | Species | Method |
|---|---|---|
| Fathead minnow 96-hour static-renewal test | *Pimephales promelas* | EPA-821-R-02-012 |
| Daphnid 48-hour static test | *Ceriodaphnia dubia, Daphnia pulex,* or *Daphnia magna* | EPA-821-R-02-012 |

4. Submit the results to Ecology with the permit renewal application.

### *S10.B. Sampling and reporting requirements*

1. The Permittee must submit all reports for toxicity testing in accordance with the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. Reports must contain toxicity data, bench sheets, and reference toxicant results for test methods. In addition, the Permittee must submit toxicity test data in electronic format (CETIS export file preferred) for entry into Ecology's database.
2. The Permittee must collect 24-hour composite effluent samples for toxicity testing. The Permittee must cool the samples to 0 - 6 degrees Celsius during collection and send them to the lab immediately upon completion. The lab must begin the toxicity testing as soon as possible but no later than 36 hours after sampling was completed.
3. The laboratory must conduct water quality measurements on all samples and test solutions for toxicity testing, as specified in the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*.
4. All toxicity tests must meet quality assurance criteria and test conditions specified in the most recent versions of the EPA methods listed in Subsection C and the Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If Ecology determines any test results to be invalid or anomalous, the Permittee must repeat the testing with freshly collected effluent.
5. The laboratory must use control water and dilution water meeting the requirements of the EPA methods listed in Section A or pristine natural water of sufficient quality for good control performance.

6. The Permittee must collect effluent samples for whole effluent toxicity testing just prior to the chlorination step in the treatment process.
7. The Permittee may choose to conduct a full dilution series test during compliance testing in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the acute critical effluent concentration (ACEC). The ACEC equals 0.54% effluent.
8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing must comply with the acute statistical power standard of 29% as defined in WAC 173-205-020. If the test does not meet the power standard, the Permittee must repeat the test on a fresh sample with an increased number of replicates to increase the power.

## S11. Chronic toxicity

### *S11.A. Testing when there is no permit limit for chronic toxicity*

The Permittee must:

1. Conduct chronic toxicity testing on final effluent once in the second quarter of 2018 and once in the fourth quarter of 2018.
2. Conduct chronic toxicity testing on a series of at least five concentrations of effluent and a control. This series of dilutions must include the acute critical effluent concentration (ACEC). The ACEC equals 0.54% effluent. The series of dilutions should also contain the CCEC of 0.44% effluent.
3. Compare the ACEC to the control using hypothesis testing at the 0.05 level of significance as described in Appendix H, EPA/600/4-89/001.
4. Submit the results to Ecology with the next permit renewal application.
5. Perform chronic toxicity tests with all of the following species and the most recent version of the following protocols:

| Saltwater Chronic Test | Species | Method |
|---|---|---|
| Topsmelt survival and growth | *Atherinops affinis* | EPA/600/R-95/136 |
| Mysid shrimp survival and growth | *Americamysis bahia* (formerly *Mysidopsis bahia*) | EPA-821-R-02-014 |

### *S11.B. Sampling and reporting requirements*

1. The Permittee must submit all reports for toxicity testing in accordance with the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. Reports must contain toxicity data, bench sheets, and reference toxicant results for test methods. In addition, the Permittee must submit toxicity test data in electronic format (CETIS export file preferred) for entry into Ecology's database.

2. The Permittee must collect 24-hour composite effluent samples for toxicity testing. The Permittee must cool the samples to 0 - 6 degrees Celsius during collection and send them to the lab immediately upon completion. The lab must begin the toxicity testing as soon as possible but no later than 36 hours after sampling was completed.
3. The laboratory must conduct water quality measurements on all samples and test solutions for toxicity testing, as specified in the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*.
4. All toxicity tests must meet quality assurance criteria and test conditions specified in the most recent versions of the EPA methods listed in Section C and the Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If Ecology determines any test results to be invalid or anomalous, the Permittee must repeat the testing with freshly collected effluent.
5. The laboratory must use control water and dilution water meeting the requirements of the EPA methods listed in Subsection C or pristine natural water of sufficient quality for good control performance.
6. The Permittee must collect effluent samples for whole effluent toxicity testing just prior to the chlorination step in the treatment process.
7. The Permittee may choose to conduct a full dilution series test during compliance testing in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the CCEC and the ACEC. The CCEC and the ACEC may either substitute for the effluent concentrations that are closest to them in the dilution series or be extra effluent concentrations. The CCEC equals 0.44% effluent. The ACEC equals 0.54% effluent.
8. All whole effluent toxicity tests that involve hypothesis testing must comply with the chronic statistical power standard of 39% as defined in WAC 173-205-020. If the test does not meet the power standard, the Permittee must repeat the test on a fresh sample with an increased number of replicates to increase the power.

## S12. Use of effluent from effluent transfer system

The Permittee may distribute effluent from the effluent transfer system (ETS) for use and return to the ETS for discharge via Outfall #001 of this permit – without modification of this permit – under the following conditions:

1. The distributed ETS effluent must meet all treatment and disinfection requirements of Condition S1 of this permit.
2. The effluent is used at the Boeing facility in the approved, closed loop, noncontact chiller project.

3. The Permittee may distribute ETS effluent to a similar closed-loop, noncontact system only after it requests and receives specific written approval from both the Departments of Ecology and Health.
4. The effluent returned to the ETS system for discharge via Outfall #001 must meet all permit requirements for that discharge.
5. The Permittee obtains, files, and enforces a signed user contract assuring compliance with all requirements of the approved project. All new contracts must be approved by the Departments of Ecology and Health and signed by all parties prior to any distribution of the effluent.
6. The Permittee immediately notifies all users during instances of noncompliance.

No other uses of ETS effluent are authorized under this permit.

## S13. Application for permit renewal or modification for facility changes

The Permittee must submit an application for renewal of this permit by July 31, 2019.

The Permittee must also submit a new application or supplement at least one hundred eighty (180) days prior to commencement of discharges, resulting from the activities listed below, which may result in permit violations. These activities include any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility.

# General Conditions

## G1. Signatory requirements

1. All applications, reports, or information submitted to Ecology must be signed and certified.
   a. In the case of corporations, by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
      - A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or
      - The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

   b. In the case of a partnership, by a general partner.
   c. In the case of sole proprietorship, by the proprietor.
   d. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

   Applications for permits for domestic wastewater facilities that are either owned or operated by, or under contract to, a public entity shall be submitted by the public entity.
2. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   a. The authorization is made in writing by a person described above and submitted to Ecology.
   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
3. Changes to authorization. If an authorization under paragraph G1.2, above, is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G1.2, above, must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section must make the following certification:

   "I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

## G2. Right of inspection and entry

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

1. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit.
2. To have access to and copy, at reasonable times and at reasonable cost, any records required to be kept under the terms and conditions of this permit.
3. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.
4. To sample or monitor, at reasonable times, any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

## G3. Permit actions

This permit may be modified, revoked and reissued, or terminated either at the request of any interested person (including the Permittee) or upon Ecology's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 40 CFR 122.64 or WAC 173-220-150 according to the procedures of 40 CFR 124.5.

1. The following are causes for terminating this permit during its term, or for denying a permit renewal application:
   a. Violation of any permit term or condition.
   b. Obtaining a permit by misrepresentation or failure to disclose all relevant facts.
   c. A material change in quantity or type of waste disposal.
   d. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

e. A change in any condition that requires either a temporary or permanent reduction, or elimination of any discharge or biosolids use or disposal practice controlled by the permit.

f. Nonpayment of fees assessed pursuant to RCW 90.48.465.

g. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

2. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:

a. A material change in the condition of the waters of the state.

b. New information not available at the time of permit issuance that would have justified the application of different permit conditions.

c. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.

d. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.

e. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.

f. Ecology has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.

g. Incorporation of an approved local pretreatment program into a municipality's permit.

3. The following are causes for modification or alternatively revocation and reissuance:

a. When cause exists for termination for reasons listed in 1.a through 1.g of this section, and Ecology determines that modification or revocation and reissuance is appropriate.

b. When Ecology has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer (General Condition G7) but will not be revoked and reissued after the effective date of the transfer except upon the request of the new Permittee.

## G4. Reporting planned changes

The Permittee must, as soon as possible, but no later than one hundred eighty (180) days prior to the proposed changes, give notice to Ecology of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in:

1. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).
2. A significant change in the nature or an increase in quantity of pollutants discharged.

3. A significant change in the Permittee's biosolids use or disposal practices. Following such notice, and the submittal of a new application or supplement to the existing application, along with required engineering plans and reports, this permit may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

## G5. Plan review required

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with chapter 173-240 WAC. Engineering reports, plans, and specifications must be submitted at least one hundred eighty (180) days prior to the planned start of construction unless a shorter time is approved by Ecology. Facilities must be constructed and operated in accordance with the approved plans.

## G6. Compliance with other laws and statutes

Nothing in this permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

## G7. Transfer of this permit

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee must notify the succeeding owner or controller of the existence of this permit by letter, a copy of which must be forwarded to Ecology.

1. Transfers by Modification

   Except as provided in paragraph (2) below, this permit may be transferred by the Permittee to a new owner or operator only if this permit has been modified or revoked and reissued under 40 CFR 122.62(b)(2), or a minor modification made under 40 CFR 122.63(d), to identify the new Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

2. Automatic Transfers

   This permit may be automatically transferred to a new Permittee if:

   a. The Permittee notifies Ecology at least thirty (30) days in advance of the proposed transfer date.

   b. The notice includes a written agreement between the existing and new Permittees containing a specific date transfer of permit responsibility, coverage, and liability between them.

   c. Ecology does not notify the existing Permittee and the proposed new Permittee of its intent to modify or revoke and reissue this permit. A modification under this subparagraph may also be minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the written agreement.

## G8. Reduced production for compliance

The Permittee, in order to maintain compliance with its permit, must control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

## G9. Removed substances

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

## G10. Duty to provide information

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

## G11. Other requirements of 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

## G12. Additional monitoring

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

## G13. Payment of fees

The Permittee must submit payment of fees associated with this permit as assessed by Ecology.

## G14. Penalties for violating permit conditions

Any person who is found guilty of willfully violating the terms and conditions of this permit is deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit may incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is deemed to be a separate and distinct violation.

## G15. Upset

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limits if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the Permittee can identify the cause(s) of the upset.
2. The permitted facility was being properly operated at the time of the upset.
3. The Permittee submitted notice of the upset as required in Special Condition S3.E.
4. The Permittee complied with any remedial measures required under S3.E of this permit.

In any enforcement action the Permittee seeking to establish the occurrence of an upset has the burden of proof.

## G16. Property rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

## G17. Duty to comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

## G18. Toxic pollutants

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

## G19. Penalties for tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two (2) years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both.

## G20. Compliance schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than fourteen (14) days following each schedule date.

## G21. Service agreement review

The Permittee must submit to Ecology any proposed service agreements and proposed revisions or updates to existing agreements for the operation of any wastewater treatment facility covered by this permit. The review is to ensure consistency with chapters 90.46 and 90.48 RCW as required by RCW 70.150.040(9). In the event that Ecology does not comment within a thirty-day (30) period, the Permittee may assume consistency and proceed with the service agreement or the revised/updated service agreement.

# Appendix A

### *LIST OF POLLUTANTS WITH ANALYTICAL METHODS, DETECTION LIMITS AND QUANTITATION LEVELS*

The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table for permit and application required monitoring unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136, or EPA has granted the laboratory written permission to use the method.
- The Permittee knows that an alternate, less sensitive method (higher DL and QL) from those listed below is sufficient to produce measurable results in their effluent.
- If the Permittee is unable to obtain the required DL and QL due to matrix effects (such as for treatment plant influent or CSO effluent), the Permittee must strive to achieve to lowest possible DL and QL and report the DL and QL in the required report.

If the Permittee uses an alternative method, not specified in the permit and as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

All pollutants that have numeric limits in Section S1 of this permit must be analyzed with the methods specified below. When the permit requires the Permittee to measure the base neutral compounds in the list of priority pollutants, it must measure all of the base neutral pollutants listed in the table below. The list includes EPA required base neutral priority pollutants and several additional polynuclear aromatic hydrocarbons (PAHs). The Water Quality Program added several PAHs to the list of base neutrals below from Ecology's Persistent Bioaccumulative Toxics (PBT) List. It only added those PBT parameters of interest to Appendix A that did not increase the overall cost of analysis unreasonably.

Ecology added this appendix to the permit in order to reduce the number of analytical "non-detects" in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost.

***CONVENTIONAL PARAMETERS***

| Pollutant & CAS No. *(if available)* | Recommended Analytical Protocol | Detection (DL)[1], µg/L unless specified | Quantitation Level (QL)[2], µg/L unless specified |
|---|---|---|---|
| Biochemical Oxygen Demand | SM5210-B | | 2 mg/L |
| Total Suspended Solids | SM2540-D | | 5 mg/L |
| Total Ammonia (as N) | SM4500-NH3-B and C/D/E/G/H Kerouel & Aminot 1997 | | 0.3 mg/L |
| Dissolved oxygen | SM4500-OC/OG | | 0.2 mg/L |
| Temperature (max. 7-day avg.) | Analog recorder or use micro-recording devices known as thermistors | | 0.2º C |
| pH | SM4500-$H^+$ B | N/A | N/A |

***NONCONVENTIONAL PARAMETERS***

| Pollutant & CAS No. (if available) | Recommended Analytical Protocol | Detection (DL)[1], µg/L unless specified | Quantitation Level (QL)[2], µg/L unless specified |
|---|---|---|---|
| Total Alkalinity | SM2320-B | | 5.0 mg/L as CaCO3 |
| Chlorine, Total Residual | SM4500 Cl G 4500 Cl D/E, Hach 8370 | | 50.0 |
| Fecal Coliform | SM 9221E,9222 B, D | N/A | Specified in method - sample aliquot dependent |
| Total Coliform | SM 9221B, 9222B,9223B | N/A | Specified in method - sample aliquot dependent |
| Nitrate + Nitrite Nitrogen (as N) | SM4500-NO3- E/F/H | | 200 |
| Nitrogen, Total Kjeldahl (as N) | SM4500-$N_{org}$B/C and SM4500$NH_3$-B/C/D/EF/G/H EPA 351.2 | | 500 |
| Nitrogen, Total (as N) | SM4500-N-C | 50 | 100 |
| Soluble Reactive Phosphorus (as P) | SM4500- PE/PF | 100 | 100 |
| Phosphorus, Total (as P) | SM 4500 PB followed by SM4500-PE/PF | 100 | 300 |

| Pollutant & CAS No. (if available) | Recommended Analytical Protocol | Detection (DL)[1], µg/L unless specified | Quantitation Level (QL)[2], µg/L unless specified |
|---|---|---|---|
| Oil and Grease (HEM) | 1664 A or B | 1,400 | 5,000 |
| Salinity | SM2520-B | | 3 practical salinity units or scale (PSU or PSS) |
| Settleable Solids | SM2540 -F | | Sample and limit dependent |
| Sulfate (as mg/L $SO_4$) | SM4110-B, 4500-SO4 E | | 7.1 mg/L |
| Sulfide (as mg/L S) | SM4500-$S^2$F/D/E/G | | 200 |
| Sulfite (as mg/L $SO_3$) | SM4500-SO3B | | 2000 |
| Total dissolved solids | SM2540 C | | 98 mg/L |
| Total Hardness | SM2340B C, 200.7, 200.8 | | 200 as $CaCO_3$ |
| Aluminum, Total (7429-90-5) | 200.8 | 2.0 | 10 |
| Barium Total (7440-39-3) | 200.8 | 0.5 | 2.0 |
| BTEX (benzene +toluene + ethylbenzene + m,o,p xylenes) | EPA SW 846 8021/8260 | 1 | 2 |
| Boron Total (7440-42-8) | 200.8 | 2.0 | 10.0 |
| Cobalt, Total (7440-48-4) | 200.8 | 0.05 | 0.25 |
| Iron, Total (7439-89-6) | 200.7, 200.8 | 12.5 | 50 |
| Magnesium, Total (7439-95-4) | 200.7, 200.8 | 10 | 50 |
| Molybdenum, Total (7439-98-7) | 200.8 | 0.1 | 0.5 |
| Manganese, Total (7439-96-5) | 200.8 | 0.1 | 0.5 |
| NWTPH Dx [4] | Ecology NWTPH Dx | 250 | 250 |
| NWTPH Gx [5] | Ecology NWTPH Gx | 250 | 250 |
| Tin, Total (7440-31-5) | 200.8 | 0.3 | 1.5 |
| Titanium, Total (7440-32-6) | 200.8 | 0.5 | 2.5 |

| Pollutant & CAS No. (if available) | Recommended Analytical Protocol | Detection (DL)[1], µg/L unless specified | Quantitation Level (QL)[2], µg/L unless specified |
|---|---|---|---|
| **METALS, CYANIDE & TOTAL PHENOLS** | | | |
| Antimony, Total (7440-36-0) | 200.8 | 0.3 | 1.0 |
| Arsenic, Total (7440-38-2) | 200.8 | 0.1 | 0.5 |
| Beryllium, Total (7440-41-7) | 200.8 | 0.1 | 0.5 |
| Cadmium, Total (7440-43-9) | 200.8 | 0.05 | 0.25 |
| Chromium (hex) dissolved (18540-29-9) | SM3500-Cr B | 5 | 10 |
| Chromium, Total (7440-47-3) | 200.8 | 0.2 | 1.0 |
| Copper, Total (7440-50-8) | 200.8 | 0.4 | 2.0 |
| Lead, Total (7439-92-1) | 200.8 | 0.1 | 0.5 |
| Mercury, Total (7439-97-6) | 1631E | 0.0002 | 0.0005 |
| Nickel, Total (7440-02-0) | 200.8 | 0.1 | 0.5 |
| Selenium, Total (7782-49-2) | 200.8 | 1.0 | 1.0 |
| Silver, Total (7440-22-4) | 200.8 | 0.04 | 0.2 |
| Thallium, Total (7440-28-0) | 200.8 | 0.09 | 0.36 |
| Zinc, Total (7440-66-6) | 200.8 | 0.5 | 2.5 |
| Cyanide, Total (57-12-5) | 335.4, SM4500-CN-C,E | 5 | 10 |
| Cyanide, Weak Acid Dissociable | SM4500-CN I | 5 | 10 |
| Cyanide, Free Amenable to Chlorination (Available Cyanide) | SM4500-CN G | 5 | 10 |
| Phenols, Total | EPA 420.1 | | 50 |
| **ACID COMPOUNDS** | | | |
| 2-Chlorophenol (95-57-8) | 625 | 1.0 | 2.0 |
| 2,4-Dichlorophenol (120-83-2) | 625 | 0.5 | 1.0 |
| 2,4-Dimethylphenol (105-67-9) | 625 | 0.5 | 1.0 |
| 4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol) | 625/1625B | 2.0 | 4.0 |
| 2,4 dinitrophenol (51-28-5) | 625 | 1.5 | 3.0 |
| 2-Nitrophenol (88-75-5) | 625 | 0.5 | 1.0 |
| 4-nitrophenol (100-02-7) | 625 | 1.0 | 2.0 |
| Parachlorometa cresol (59-50-7) (4-chloro-3-methylphenol) | 625 | 1.0 | 2.0 |
| Pentachlorophenol (87-86-5) | 625 | 0.5 | 1.0 |

| Pollutant & CAS No. (if available) | Recommended Analytical Protocol | Detection (DL)[1], µg/L unless specified | Quantitation Level (QL)[2], µg/L unless specified |
|---|---|---|---|
| Phenol (108-95-2) | 625 | 2.0 | 4.0 |
| 2,4,6-Trichlorophenol (88-06-2) | 625 | 2.0 | 4.0 |
| **VOLATILE COMPOUNDS** | | | |
| Acrolein (107-02-8) | 624 | 5 | 10 |
| Acrylonitrile (107-13-1) | 624 | 1.0 | 2.0 |
| Benzene (71-43-2) | 624 | 1.0 | 2.0 |
| Bromoform (75-25-2) | 624 | 1.0 | 2.0 |
| Carbon tetrachloride (56-23-5) | 624/601 or SM6230B | 1.0 | 2.0 |
| Chlorobenzene (108-90-7) | 624 | 1.0 | 2.0 |
| Chloroethane (75-00-3) | 624/601 | 1.0 | 2.0 |
| 2-Chloroethylvinyl Ether (110-75-8) | 624 | 1.0 | 2.0 |
| Chloroform (67-66-3) | 624 or SM6210B | 1.0 | 2.0 |
| Dibromochloromethane (124-48-1) | 624 | 1.0 | 2.0 |
| 1,2-Dichlorobenzene (95-50-1) | 624 | 1.9 | 7.6 |
| 1,3-Dichlorobenzene (541-73-1) | 624 | 1.9 | 7.6 |
| 1,4-Dichlorobenzene (106-46-7) | 624 | 4.4 | 17.6 |
| Dichlorobromomethane (75-27-4) | 624 | 1.0 | 2.0 |
| 1,1-Dichloroethane (75-34-3) | 624 | 1.0 | 2.0 |
| 1,2-Dichloroethane (107-06-2) | 624 | 1.0 | 2.0 |
| 1,1-Dichloroethylene (75-35-4) | 624 | 1.0 | 2.0 |
| 1,2-Dichloropropane (78-87-5) | 624 | 1.0 | 2.0 |
| 1,3-dichloropropene (mixed isomers) (1,2-dichloropropylene) (542-75-6) [6] | 624 | 1.0 | 2.0 |
| Ethylbenzene (100-41-4) | 624 | 1.0 | 2.0 |
| Methyl bromide (74-83-9) (Bromomethane) | 624/601 | 5.0 | 10.0 |
| Methyl chloride (74-87-3) (Chloromethane) | 624 | 1.0 | 2.0 |
| Methylene chloride (75-09-2) | 624 | 5.0 | 10.0 |
| 1,1,2,2-Tetrachloroethane (79-34-5) | 624 | 1.9 | 2.0 |
| Tetrachloroethylene (127-18-4) | 624 | 1.0 | 2.0 |
| Toluene (108-88-3) | 624 | 1.0 | 2.0 |
| 1,2-Trans-Dichloroethylene (156-60-5) (Ethylene dichloride) | 624 | 1.0 | 2.0 |
| 1,1,1-Trichloroethane (71-55-6) | 624 | 1.0 | 2.0 |
| 1,1,2-Trichloroethane (79-00-5) | 624 | 1.0 | 2.0 |
| Trichloroethylene (79-01-6) | 624 | 1.0 | 2.0 |
| Vinyl chloride (75-01-4) | 624/SM6200B | 1.0 | 2.0 |
| **BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)** | | | |
| Acenaphthene (83-32-9) | 625 | 0.2 | 0.4 |
| Acenaphthylene (208-96-8) | 625 | 0.3 | 0.6 |
| Anthracene (120-12-7) | 625 | 0.3 | 0.6 |
| Benzidine (92-87-5) | 625 | 20 | 40 |
| Benzyl butyl phthalate (85-68-7) | 625 | 0.3 | 0.6 |
| Benzo(*a*)anthracene (56-55-3) | 625 | 0.3 | 0.6 |
| Benzo(b)fluoranthene (3,4-benzofluoranthene) (205-99-2) [7] | 610/625 | 0.8 | 1.6 |
| **Benzo(j)fluoranthene (205-82-3)** [7] | 625 | 0.5 | 1.0 |
| Benzo(k)fluoranthene (11,12-benzofluoranthene) (207-08-9) [7] | 610/625 | 0.8 | 1.6 |
| **Benzo(r,s,t)pentaphene (189-55-9)** | 625 | 1.3 | 5.0 |
| Benzo(*a*)pyrene (50-32-8) | 610/625 | 0.5 | 1.0 |
| Benzo(*ghi*)Perylene (191-24-2) | 610/625 | 0.5 | 1.0 |
| Bis(*2-chloroethoxy)*methane (111-91-1) | 625 | 5.3 | 21.2 |
| Bis(*2-chloroethyl*)ether (111-44-4) | 611/625 | 0.3 | 1.0 |
| Bis(*2-chloroisopropyl*)ether (39638-32-9) | 625 | 0.5 | 1.0 |
| Bis(*2-ethylhexyl*)phthalate (117-81-7) | 625 | 0.3 | 1.0 |
| 4-Bromophenyl phenyl ether (101-55-3) | 625 | 0.3 | 0.5 |
| 2-Chloronaphthalene (91-58-7) | 625 | 0.3 | 0.6 |
| 4-Chlorophenyl phenyl ether (7005-72-3) | 625 | 0.3 | 0.5 |

| Pollutant & CAS No. (if available) | Recommended Analytical Protocol | Detection (DL)[1], µg/L unless specified | Quantitation Level (QL)[2], µg/L unless specified |
|---|---|---|---|
| Chrysene (218-01-9) | 610/625 | 0.3 | 0.6 |
| **Dibenzo (a,h)acridine (226-36-8)** | 610M/625M | 2.5 | 10.0 |
| **Dibenzo (a,j)acridine (224-42-0)** | 610M/625M | 2.5 | 10.0 |
| Dibenzo(a-*h*)anthracene (53-70-3)(1,2,5,6-dibenzanthracene) | 625 | 0.8 | 1.6 |
| Dibenzo(a,e)pyrene (192-65-4) | 610M/625M | 2.5 | 10.0 |
| Dibenzo(a,h)pyrene (189-64-0) | 625M | 2.5 | 10.0 |
| 3,3-Dichlorobenzidine (91-94-1) | 605/625 | 2.0 | 4.0 |
| Diethyl phthalate (84-66-2) | 625 | 1.9 | 7.6 |
| Dimethyl phthalate (131-11-3) | 625 | 1.6 | 6.4 |
| Di-n-butyl phthalate (84-74-2) | 625 | 0.5 | 1.0 |
| 2,4-dinitrotoluene (121-14-2) | 609/625 | 1.0 | 2.0 |
| 2,6-dinitrotoluene (606-20-2) | 609/625 | 1.0 | 2.0 |
| Di-n-octyl phthalate (117-84-0) | 625 | 0.3 | 0.6 |
| 1,2-Diphenylhydrazine (*as Azobenzene*) (122-66-7) | 1625B, 625 | 5.0 | 20 |
| Fluoranthene (206-44-0) | 625 | 0.3 | 0.6 |
| Fluorene (86-73-7) | 625 | 0.3 | 0.6 |
| Hexachlorobenzene (118-74-1) | 612/625 | 0.3 | 0.6 |
| Hexachlorobutadiene (87-68-3) | 625 | 0.5 | 1.0 |
| Hexachlorocyclopentadiene (77-47-4) | 1625B/625 | 2.0 | 4.0 |
| Hexachloroethane (67-72-1) | 625 | 0.5 | 1.0 |
| Indeno(*1,2,3-cd*)Pyrene (193-39-5) | 610/625 | 0.5 | 1.0 |
| Isophorone (78-59-1) | 625 | 0.5 | 1.0 |
| **3-Methyl cholanthrene (56-49-5)** | 625 | 2.0 | 8.0 |
| Naphthalene (91-20-3) | 625 | 0.4 | 0.75 |
| Nitrobenzene (98-95-3) | 625 | 0.5 | 1.0 |
| N-Nitrosodimethylamine (62-75-9) | 607/625 | 2.0 | 4.0 |
| N-Nitrosodi-n-propylamine (621-64-7) | 607/625 | 0.5 | 1.0 |
| N-Nitrosodiphenylamine (86-30-6) | 625 | 1.0 | 2.0 |
| **Perylene (198-55-0)** | 625 | 1.9 | 7.6 |
| Phenanthrene (85-01-8) | 625 | 0.3 | 0.6 |
| Pyrene (129-00-0) | 625 | 0.3 | 0.6 |
| 1,2,4-Trichlorobenzene (120-82-1) | 625 | 0.3 | 0.6 |
| **PCBs** | | | |
| PCB-1242 [8] | 608 | 0.25 | 0.5 |
| PCB-1254 | 608 | 0.25 | 0.5 |
| PCB-1221 | 608 | 0.25 | 0.5 |
| PCB-1232 | 608 | 0.25 | 0.5 |
| PCB-1248 | 608 | 0.25 | 0.5 |
| PCB-1260 | 608 | 0.13 | 0.5 |
| PCB-1016 [8] | 608 | 0.13 | 0.5 |

1. Detection level (DL) or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.
2. Quantitation Level (QL) also known as Minimum Level of Quantitation (ML) – TThe smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).
3. Soluble Biochemical Oxygen Demand method note: First, filter the sample through a Millipore Nylon filter (or equivalent) - pore size of 0.45-0.50 um (prep all filters by filtering 250 ml of laboratory grade deionized water through the filter and discard). Then, analyze sample as per method 5210-B.
4. NWTPH Dx - Northwest Total Petroleum Hydrocarbons Diesel Extended Range – see http://www.ecy.wa.gov/biblio/97602.html
5. NWTPH Gx - Northwest Total Petroleum Hydrocarbons Gasoline Extended Range – see http://www.ecy.wa.gov/biblio/97602.html
6. 1, 3-dichloroproylene (mixed isomers) You may report this parameter as two separate parameters: cis-1, 3-dichlorpropropene (10061-01-5) and trans-1, 3-dichloropropene (10061-02-6).
7. Total Benzofluoranthenes – Because Benzo(b)fluoranthene, Benzo(j)fluoranthene and Benzo(k)fluoranthene co-elute you may report these three isomers as total benzofluoranthenes.
8. PCB 1016 & PCB 1242 – You may report these two PCB compounds as one parameter called PCB 1016/1242.

**THIS PAGE INTENTIONALLY LEFT BLANK**

# Fact Sheet for NPDES Permit WA0029581
## King County South Wastewater Treatment Plant
July 1, 2015

## Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for King County's South Wastewater Treatment Plant (South Plant).

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for King County's South Plant, NPDES permit WA0029581, are available for public review and comment from April 16, 2015 until May 17, 2015. For more details on preparing and filing comments about these documents, please see *Appendix A - Public Involvement Information.*

King County reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, wastewater discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as *Appendix G - Response to Comments*, and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

## Summary

King County owns and operates the South Plant WWTP which treats domestic, commercial, and industrial wastewater using an activated sludge biological treatment process with chlorine disinfection before discharging the treated effluent to central Puget Sound off the Duwamish Head in West Seattle. Ecology issued the previous permit for this facility on September 30, 2009. The proposed permit contains the same effluent limits for total suspended solids, fecal coliform, pH, and chlorine as the permit issued in 2009. At the request of King County, the proposed permit replaces $BOD_5$ (5-day biological oxygen demand) effluent limits with equivalent $CBOD_5$ (5-day carbonaceous biological oxygen demand) limits. The proposed permit also reduces fecal coliform monitoring from 7 times each week to 5 times each week as supported by statistical analysis. The proposed permit does not include any other significant changes from the previous permit.

# Table of Contents

## List of Tables

## List of Figures



# I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC).
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC).
- Water quality criteria for surface waters (chapter 173-201A WAC).
- Water quality criteria for groundwaters (chapter 173-200 WAC).
- Whole effluent toxicity testing and limits (chapter 173-205 WAC).
- Sediment management standards (chapter 173-204 WAC).
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC).

These rules require any treatment facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See *Appendix A - Public Involvement Information* for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comments. Ecology will summarize the responses to comments and any changes to the permit in *Appendix G*.

# II. Background Information

**Table 1. General Facility Information**

| **Facility Information** | |
|---|---|
| Applicant | King County Department of Natural Resources and Parks<br>Wastewater Treatment Division<br>201 S. Jackson Street, MS KSC-NR-0500<br>Seattle, WA 98104-3855 |
| Facility Name and Address | King County South Wastewater Treatment Plant<br>1200 Monster Road SW<br>Renton, WA 98057 |
| Contact at Facility | Process Control Supervisor, (206) 263-1810 |
| Responsible Official | Christie True<br>Director, King County DNRP<br>201 S. Jackson Street, Seattle, WA 98104 |
| Type of Treatment | Secondary Treatment, Activated Sludge |
| Facility Location (NAD83/WGS84 reference datum) | Latitude: 47.467683<br>Longitude: -122.240323 |
| Discharge Waterbody Name and Location (NAD83/WGS84 reference datum) | Puget Sound *North Diffuser* *South Diffuser*<br>Latitude: 47.602778˚ 47.599722˚<br>Longitude: -122.429000˚ -122.429028˚<br><br>Emergency/Maintenance (Green River)<br>Latitude: 47.470750˚<br>Longitude: -122.241861˚ |

| **Permit Status** | |
|---|---|
| Renewal Date of Previous Permit | September 30, 2009 |
| Application for Permit Renewal Submittal Date | September 25, 2013 |
| Date of Ecology Acceptance of Application | October 15, 2013 |

| **Inspection Status** | |
|---|---|
| Date of Last Sampling Inspection | April 14-15, 2008 |
| Date of Last Non-sampling Inspection Date | January 13, 2015 |

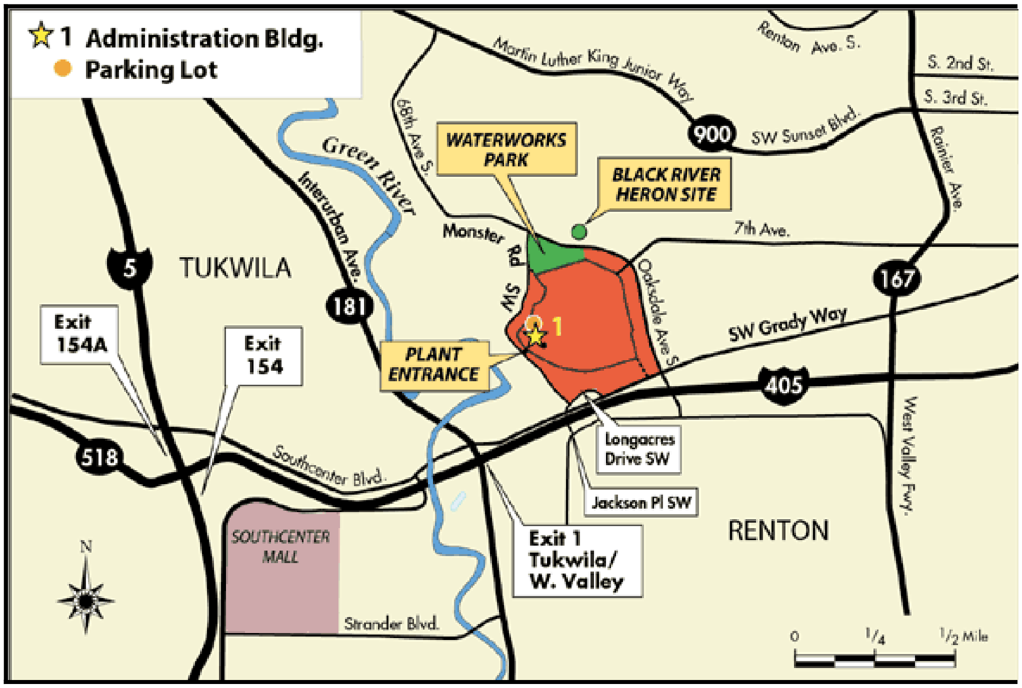



**Figure 1. Facility Location Map**

## A. Facility description

### *History*

In 1958, voters in Seattle and King County created Metro, an agency charged with creating a regional wastewater conveyance and treatment system. The South Wastewater Treatment Plant located in Renton is often referred to by County staff as the South Treatment Plant (South Plant or STP). Metro completed construction of the plant in 1965. The original plant had the capacity to treat 24 million gallons per day (MGD) of wastewater to secondary treatment levels using an activated sludge biological process. The third, and latest, expansion of the plant began in 1991 and was considered complete in 2000-2001. This last upgrade brings the plant design capacity to 144 MGD maximum month flow. In 2003, the County replaced the 90-ton railcar chlorine system with an interim sodium hypochlorite (12.5% NaOCl solution) disinfection facility because the City of Renton required the County to remove gaseous chlorine from the site. The County completed construction of a permanent 12.5% sodium hypochlorite disinfection facility in early 2010. In 2005, the County expanded the solids dewatering facility by replacing eight belt filter presses (50-gpm each) with three high-solids centrifuges (325-gpm capacity each).

South Plant is designated as an EPA major facility due to the magnitude of its daily discharge volume.

### *Treatment processes*

Figure 2 displays the flow schematic for the South Plant facility.

*Headworks* - Under normal flow conditions, the raw sewage flows through four bar screens with 3/8" openings for rags and plastics removal. Flows exceeding approximately 150 MGD are screened with barscreens with 7/16 inch openings. The screenings are conveyed down a trough to the grinder pumps, then cleaned and dewatered in preparation for disposal at a landfill. The raw (influent) pumps lift the wastewater 40 feet to a division channel providing for gravity flow through the remaining treatment processes. The wastewater flows through the aerated grit channels to allow for grit to settle out. The grit is pumped to the cyclones, discharged to the classifiers, and then into dumpsters.

*Primary Treatment* - The division channel splits flow between a north set of 4 primary clarifiers and south set of 8 primary clarifiers. The north clarifiers use return flights and tipping troughs to capture and remove scum and grease. The south clarifiers use surface water spray to move scum and grease to a helical screw located at the upstream end of the tank; the return flights stay submerged on the south clarifiers. Primary clarifier effluent overflows via launders with submerged orifices. The launders saw-tooth weirs allow it to handle higher flows. Primary effluent flows by gravity to the aeration tanks. Primary sludge is continuously pumped from the bottom of the clarifiers to the dissolved air flotation tanks (DAFTs) for further treatment.

*Secondary Treatment* - Secondary treatment is accomplished using an activated sludge process. There are 4 aeration basins with fine bubble diffusers. The first part of each aeration basin is anaerobic when operating in the selector mode. Operators adjust the dissolved oxygen and sludge age to achieve a settable sludge. The wastewater flows from the aeration basins to the mixed liquor channel then on to the secondary clarifiers. There are 6 secondary clarifier pods each with 4 clarifiers for a total of 24 secondary clarifiers. Each pod has an effluent control center (ECC) where flow and turbidity are monitored. Pumps return the solids that settle out in the secondary clarifiers back to the aeration basins as return activated sludge (RAS) or pump them to solids handling as waste activated sludge (WAS).

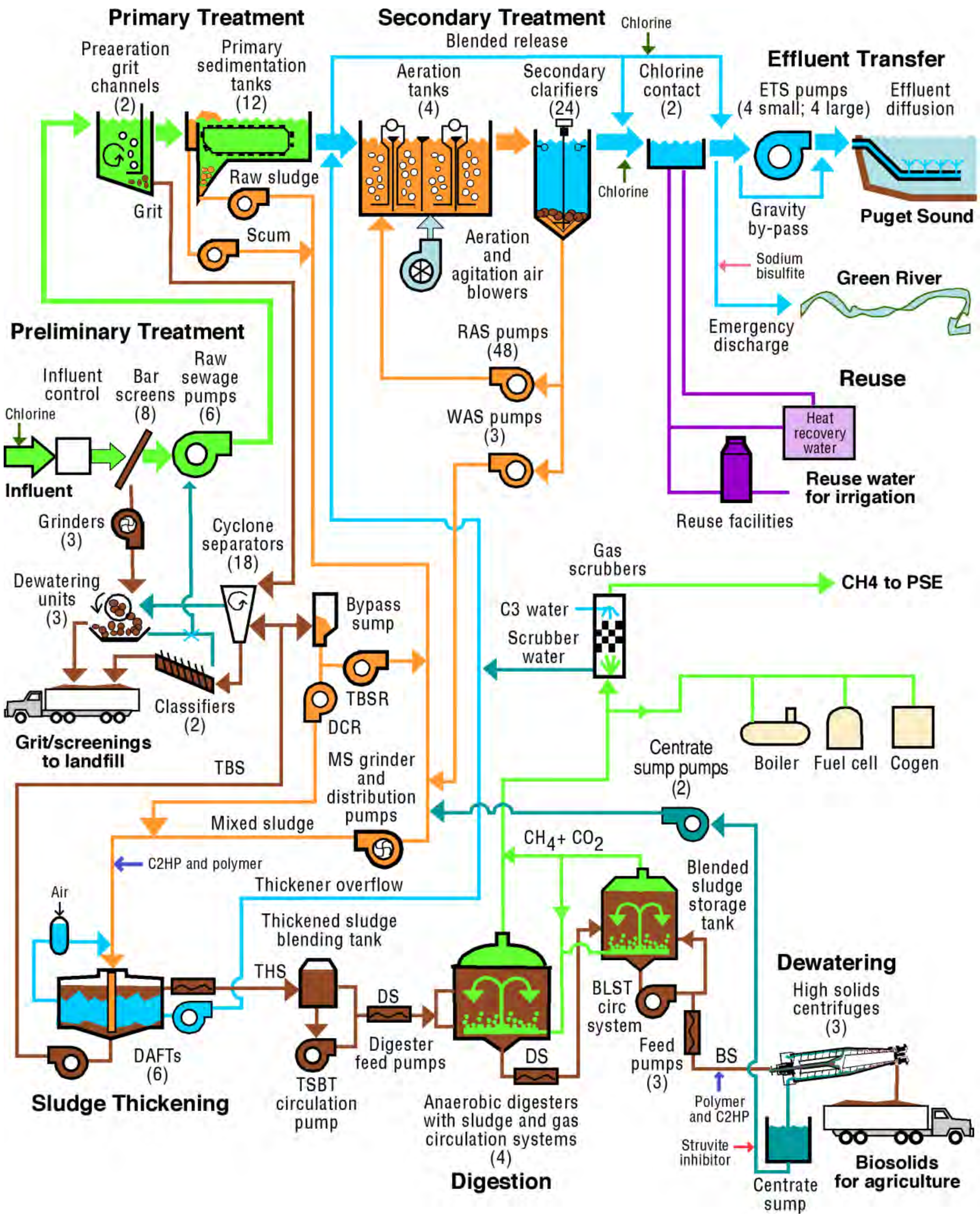



**Figure 2. South Wastewater Treatment Plant – Simplified Process Flow Schematic**

*Disinfection and Effluent Pumping* - Beginning in June 2003, the facility converted to sodium hypochlorite for disinfection in order to eliminate handling of chlorine gas. Hypochlorite is added at several locations along the chlorine contact channels. The chlorinated effluent flows through the chlorine contact channel to the forebay tank located before the effluent pumps. The effluent pumps discharge the treated wastewater from the forebay to the plant's Puget Sound outfall located 12 miles away off of Alki Point.

*Solids* - Solids from the primary clarifiers, WAS from the secondary clarifiers, and scum are pumped to the DAFTs. The DAFTs (4 older tanks, 2 new larger tanks) thicken the sludge. Inside these tanks, a mixture of sludge, polymer, and air form a thick layer of sludge that floats to the surface. A scraper arm controls the thickness of the floating sludge blanket and moves solids out of the DAFT to the Thickened Sludge Blending Tank. The water layer below the sludge blanket in the DAFT is pumped to the aeration tanks. The thin sludge layer that forms on the bottom of the DAFT is pumped to grit cyclones for degritting and sent back to the DAFTS for reprocessing.

The contents of the thickened sludge blending tank are pumped on level control to 1 of 4 anaerobic digesters. Operators collect daily process control samples of the digester sludge. The digested sludge is transferred to the 5$^{th}$ digester that serves as the blended sludge storage tank. Polymer is added as a coagulant to the sludge as it is pumped from the blended sludge storage tanks to the centrifuges. The centrifuges produce a biosolids product that is about 20-25% solids. The biosolids are hauled to beneficial reuse sites in Eastern Washington (agriculture applications), and Western Washington (forest applications and commercial composting).

*Odor Control* - Odor control consists of a couple different air scrubbing systems. Chemical scrubbers use caustic and hypochlorite solutions to control odors from the secondary treatment area, the primary treatment area, the sludge thickeners, and the dewatering area. Carbon scrubbers control odors in the sludge thickening and dewatering areas. In addition, the facility maintains a biofilter to control odors on the influent interceptor collection system.

*Emergency Backup Power* - The facility's two independent power feeders to the plant provide redundancy. In addition, an emergency generator powers essential services, for example, lighting, alarms, security, etc., although it is not sufficient to power the influent pumps or other plant processes. An 8-Mega Watt (MW) cogeneration facility is also located on-site. It consists of two 3.5-MW gas turbine generators and a 1-MW steam turbine generator. The cogeneration facility is fueled by pipeline natural gas or scrubbed digester gas produced at the South Plant.

*Industrial and Commercial Users* - Ecology delegated King County the authority to run a Pretreatment Program. King County's South Plant application for permit renewal lists 53 industrial users that discharge to the collection system. There are 28 non-categorical Significant Industrial Users (SIUs) and 25 Categorical Industrial Users (CIUs). Please refer to Appendix F for a list of the industrial users.

### *Discharge outfalls*

*Puget Sound Outfall 001*

Figure 3 shows the location South Plant's marine outfall. Secondary treated and disinfected effluent is discharged from the facility via a 12-mile long 8-foot diameter transfer line. The outfall consists of two pipelines, each extending over 10,000 feet northwest into the Puget Sound from Duwamish Head. For nearshore protection, the initial portion is supported by legs and the remainder of the outfall rests along the seafloor in a shallow trench. An outfall junction structure is located at the end of the effluent transfer system (ETS) force main just west of Luna Park in West Seattle. The structure contains a 64-inch diameter manifold connecting the 96-inch ETS to the two 64-inch diameter outfall lines. The diffuser sections are on the final 500-ft of each leg. Each diffuser has 168-sweep radius diffuser ports (a total of 336 diffuser ports), each 14 inches long and 4 inches in diameter. The diffusers are staggered side-to-side every 3 feet. Each diffuser port is made of a copper-nickel alloy to inhibit bio-fouling. The diffusers are about 625 feet deep as measured during MLLW conditions.

The County inspected the marine outfall in 2004-2005 and 2011. The extensive inspections concluded that all external components of the outfalls and associated structures appeared in good condition with no evidence of damage or need for remedial action. The diffusers were flowing freely. The 2011 inspection report noted that sediments have buried significant portions of both pipelines and that there is a minor suspension between stations 61 and 62 on pipeline B.

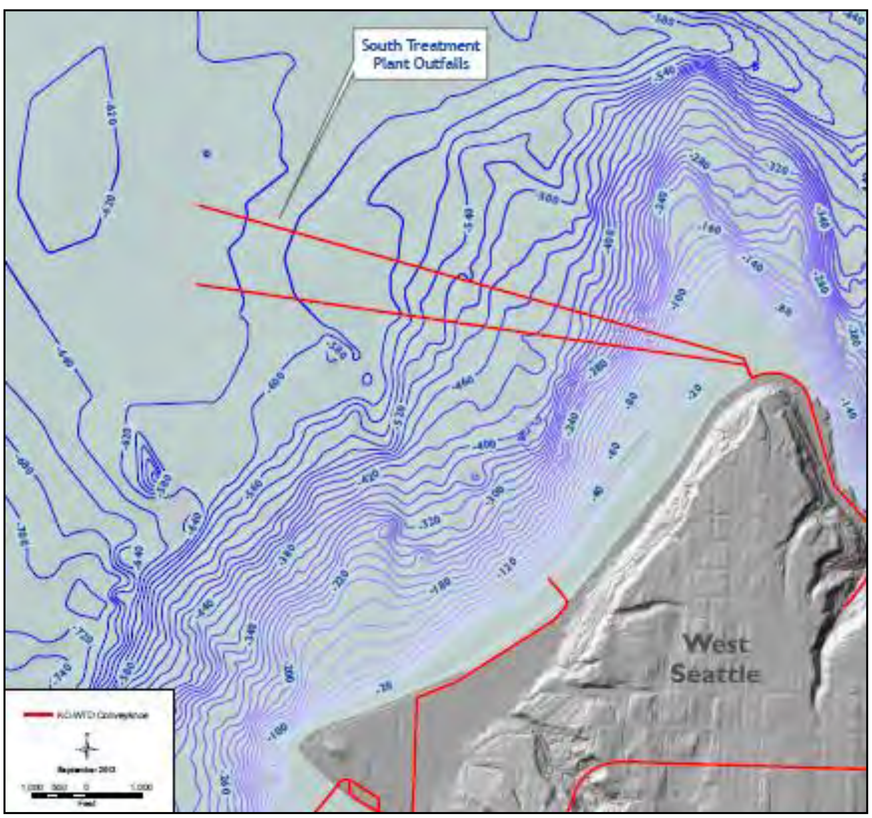



**Figure 3. South Plant marine outfall location.**

*Green River Outfall (Maintenance & Emergency Purposes Only)*

Figure 4 shows the Green River outfall location. This outfall was the South Plant's sole discharge point prior to the construction of the marine outfall in 1987. The County increased the firm capacity (total capacity with one pump out of service) of the effluent transfer system (ETS), which carries flow to the marine outfall, to 325 MGD with the pumping system upgrade in 1999. With all pumps running, the predicted capacity is 340-360 MGD (depending on the tide). The proposed permit authorizes the treatment plant to discharge to the Green River for maintenance purposes only.

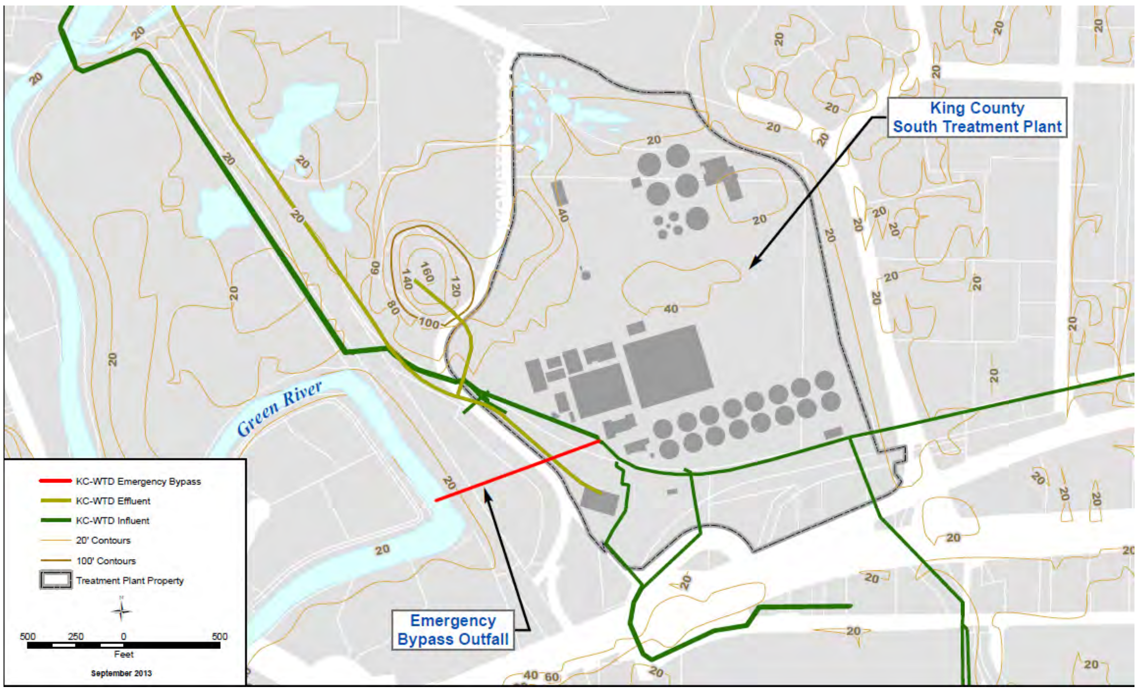



**Figure 4. South Plant emergency backup Green River outfall location.**

An emergency discharge is an unplanned and unavoidable discharge which is necessary to prevent sewage overflows or damage to the plant. Emergency discharges could occur during a severe, heavy rain event when the flow exceeds the capacity of the ETS, or in the extreme event that the ETS loses significant capacity due to multiple equipment failures or power failure.

Maintenance discharges are performed periodically to ensure that the outfall will function normally during an emergency event. During a maintenance discharge, the County uses a sufficient flow rate of disinfected and dechlorinated effluent to flush sediment from the diffuser ports. The proposed permit specifically authorizes discharges to the Green River for maintenance purposes.

The diffuser is a 12-foot by 12-foot structure that is 44 feet long extending into the river. There are 8 discharge ports located on the downstream side of the diffuser. The top of each port is at the elevation of the river bottom.

During the last permit cycle, King County conducted one maintenance discharge on the Green River outfall. The County timed the discharge to minimize impacts during fish passage windows. During the discharge the County monitored effluent quality and the impacts to the receiving water 300' downstream as required by their permit.

### *Collection system status*

The South Plant serves an area of 152 square miles. King County owns and operates the major sewer interceptors and pump stations that carry the wastewater to the treatment plant. The component agencies, listed in Table 2 individually own, operate, and maintain the pipelines and other conveyance facilities that carry wastewater to the County's interceptors. Wastewater is conveyed to the treatment plant via three interceptors, the Tukwila Interceptor, the South Interceptor, and the Eastside Interceptor and by the 20 pump stations in the system. The County monitors and controls the collection system using a SCADA (Supervisory Control and Data Acquisition) system located at South Plant.

The South Plant serves 25 jurisdictions and utility districts as noted in the County's 2013 NPDES permit application and as listed in Table 2.

**Table 2. Agencies Tributary to South Plant**

| Cities | Sewer/Utility Districts | Other |
|---|---|---|
| Algona | Cedar River Water And Sewer District | Muckleshoot Indian Tribe |
| Auburn | Coal Creek Utility District | Sammamish State Park |
| Bellevue | Lakehaven Utility District | Shorewood Apartments |
| Black Diamond | Northeast Sammamish Sewer And Water District | |
| Issaquah | Northshore Utility District | |
| Kent | Sammamish Plateau Water And Sewer District | |
| Kirkland | Seattle Public Utilities | |
| Mercer Island | Skyway Water And Sewer District | |
| Pacific | Soos Creek Water And Sewer District | |
| Redmond | Valley View Sewer District | |
| Renton | | |
| Tukwila | | |

*Inflow and Infiltration* - King County created a Regional Infiltration and Inflow (I/I) Control Program in 1999 as part of the Regional Wastewater Services Plan (RWSP) to explore the feasibility of regional I/I control. The purpose of the program is to reduce the amount of peak wet weather flow entering the County's wastewater conveyance system when it is cost-effective to do so. Reduction of I/I in the system may prevent sanitary sewer overflows and decrease the costs of conveying and treating extraneous flows.

In response to the RWSP I/I Control Program policies, County staff, working in a consensus-based approach with the local sewer agencies, conducted a comprehensive 6-year, $41 million, I/I control study. The study began in 2000 and culminated with the County Executive's recommendation for a regional I/I control program. The following work was completed as part of this study:

- Levels of I/I for each local agency tributary to the regional system were defined through extensive flow monitoring and modeling program (2001-2002).
- 10 pilot projects were selected and constructed in 12 local agency jurisdictions to demonstrate the effectiveness of collection system rehabilitation projects and to test various technologies and gain cost information (2003-2004).

- Final draft model standards, procedures, policies, and guidelines were developed (October 2004) for use by local agencies to reduce I/I in their systems.
- A thorough benefit-cost analysis was conducted to determine the cost-effectiveness of I/I reduction (November 2005).
- A long-term regional I/I control plan was developed; approved by the King County Council in May 2006.
- King County worked with the local sewer agencies to conduct an I/I reduction feasibility analysis and selected three initial I/I reduction project areas (2007-2009).
- The Skyway Water and Sewer District I/I reduction project (2010-2014).

For more information see the full report on the County's I/I Program website.

*CSO Status* - All component agencies that provide flow to South Plant are separated sanitary systems with the exception of a small portion (approximately 4%) of the Seattle system that is a combined system. South Plant will continue to treat a portion of the flow from the Henderson CSO and Martin Luther King (MLK) diversion structure combined systems during the term of this permit. During heavy rain events, King County's West Point WWTP treats some of the flow. The MLK/Henderson/Norfolk project provides a tunnel for the storage and primary sedimentation of flows from Henderson, Martin Luther King, and Norfolk CSOs. During small rain events, the tunnel stores CSO flows for transfer to the South Plant for secondary treatment. During the largest storms and when the tunnel fills, any flows that exceed tunnel storage capacity are treated, disinfected, and discharged through the Norfolk CSO (which is permitted under King County's West Point WWTP permit).

### *Capacity analysis*

With its application for permit renewal, King County submitted a *Flow and Waste Load Assessment*. Table 3 summarizes South Plant's design capacity and its current and projected flow and loadings through 2018. The County projected that all of the flows and loadings between 2014 and 2018 will be below South Plant's current design capacity assuming an average growth rate of 1% per annum. When Brightwater WWTP started operation in November 2012, South Plant's annual average flow decreased about 8 mgd and its wet weather season flow decreased about 16 mgd, as expected.

**Table 3. Current and Projected (2009-2014) Influent Flow and Loadings**

| Parameter | Design Capacity | 2009-2014 Max [1] | Projected 2018 [2] |
|---|---|---|---|
| Flow Average Wet Weather, MGD | 115 | 100 | 82 |
| Flow Max Month, MGD | 144 | 108 | 112 |
| BOD Max Month Load, lbs/day | 251,000 | 222,000 [3]<br>185,000 [2,4] | 195,000 |
| TSS Max Month Load, lbs/day | 235,000 | 218,000 [3]<br>180,000 [2,4] | 185.000 |

[1] Source: DMR data reported by King County
[2] Source: King County's *2014 Annual Flow and Wasteload Assessment Memorandum.*
[3] Values are artificially inflated due to leaky seals in secondary clarifier.
[4] Values estimated using solids mass balance.

*Facility Bypasses* - King County's South Plant historically utilized flow blending to manage peak flow events. The South Plant had no blending events between February 2009 and September 2014; a significant reduction from the twelve that occurred between October 2004 and February 2009. The County initiates blending only when solids started to wash out of the secondary process or when secondary flows are notably above 190-200 MGD. According to King County operators, blending reduces washout of secondary solids from the secondary clarifiers. This permit does not authorize the use of flow blending, but rather relies on the bypass provision in Special Condition S5 of the permit to address any bypassing of treatment units.

***Solid wastes/Residual solids***

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, and screenings are drained and disposed of as solid waste at a landfill. Primary and waste secondary sludge are co-thickened in the dissolved air flotation tanks. The thickened sludge is fed to the anaerobic, mesophilic digesters. The County blends and stores digested sludge in a tank then dewaters the sludge using centrifuges to produce biosolids. The biosolids are applied to forest and agriculture lands under a permit from the King County Health Department.

The County periodically analyzes the biosolids for various chemical contaminants. Regulatory and compliance issues regarding biosolids are managed by the Department of Ecology's Biosolids Program.

***Reuse - Secondary treated effluent***

A separate state Reclaimed Water Permit covers the existing South Plant water reclamation facility including the distribution of the Class A water it produces.

Condition S12 of the proposed NPDES permit authorizes the County to distribute effluent from the ETS to Boeing for a specifically-identified use. King County is permitted to enlist other customers along the ETS corridor for noncontact use of the secondary treated effluent, with return to the ETS for discharge at the Puget Sound Outfall, provided the County receives written approval from both Ecology and the Department of Health. Ecology approval is required for each application of direct reuse to ensure that such use does not cause a violation of the state water quality standards. The intent of the NPDES permit is to allow the Permittee flexibility to provide noncontact reuse water to customers with sufficient safeguards to ensure that the water quality standards are not violated.

At the writing of this permit, King County had one customer using treated secondary effluent in this manner. The Boeing Company uses secondary treated effluent in a closed-loop chiller system primarily during the summer months at the Boeing Training Center in Renton.

## B. Description of the receiving water

The South Plant WWTP discharges to the Puget Sound. Ecology used ambient data from sampling station LSNT01 in King County's 2013 receiving water study to assess compliance with water quality standards. This sampling station is located approximately five miles south of the South Plant outfall (47.533333˚, -121.433333˚).

**Table 4. Ambient Background Data [1]**

| Parameter | Value |
|---|---|
| Temperature (highest annual 1-DADMax) | 12.7° C (at 1.3 m below surface) |
| pH (minimum / maximum) | 7.4 / 8.0 std units |
| Salinity (minimum) | 27.7 pss |
| Alkalinity (10th percentile) | 97.5 mg/L $CaCO_3$ |
| Dissolved Oxygen (10th percentile) | 5.8 mg/L |
| Total Ammonia (max) | 0.085 mg/L as N |
| Fecal Coliform (max) | 1 / 100 mL |
| TSS (max) | 7.5 mg/L |
| Antimony (90th percentile), Dissolved / Total | 0.172 / 0.178 µg/L |
| Arsenic (90th percentile), Dissolved / Total | 1.450 / 1.450 µg/L |
| Cadmium (90th percentile), Dissolved / Total | 0.073 / 0.081 µg/L |
| Chromium (90th percentile), Dissolved / Total [2] | 0.150 / 0.145 µg/L |
| Copper (90th percentile), Dissolved / Total | 0.354 / 0.428 µg/L |
| Lead (90th percentile), Dissolved / Total | 0.006 / 0.045 µg/L |
| Mercury (90th percentile), Dissolved / Total | 0.00020 / 0.00038 µg/L |
| Nickel (90th percentile), Dissolved / Total | 0.427 / 0.476 µg/L |
| Silver (90th percentile), Dissolved / Total | 0.026 / 0.029 µg/L |
| Zinc (90th percentile), Dissolved / Total [2] | 0.605 / 0.538 µg/L |

[1] Data source: *King County Receiving Water Characterization Study - Final Report*, June 2013.

[2] Data reported in 2013 report shows 90th percentile of dissolved fraction as slightly larger than total concentration. This discrepancy is likely within the precision of the analytical method.

## C. Wastewater influent characterization

King County reported the concentration of influent pollutants in discharge monitoring reports. The influent wastewater is characterized as shown in Table 5.

**Table 5. Wastewater Influent Characterization**

| Parameter | Units | # of Samples | Average Value | Maximum Value |
|---|---|---|---|---|
| $BOD_5$ | mg/L | ≈1000 | 269 | 612 |
| | lbs/day | ≈1000 | 180,387 | 394,229 |
| TSS | mg/L | ≈1000 | 262 | 834 |
| | lbs/day | ≈1000 | 175,762 | 461,223 |

## D. Wastewater effluent characterization

King County reported the concentration of pollutants in the discharge in their permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from November 2009 through July 2014. The wastewater effluent is characterized as listed in Table 6.

**Table 6. Wastewater Effluent Characterization**

| Parameter | Units | # of Samples | | Average Monthly Average | | Maximum Monthly Average | |
|---|---|---|---|---|---|---|---|
| $BOD_5$ | mg/L | ≈1000 | | 17 | | 28 | |
| | lbs/day | ≈1000 | | 10,734 | | 19,456 | |
| TSS | mg/L | ≈1000 | | 11 | | 20 | |
| | lbs/day | ≈1000 | | 7,425 | | 14,755 | |
| | | | | **Maximum Monthly Geometric Mean** | | **Maximum Weekly Geometric Mean** | |
| Fecal Coliforms | #/100 mL | ≈1800 | | 159 | | 272 | |
| | | | | **Minimum Value** | | **Maximum Value** | |
| pH | Standard units | *Continuous monitoring* | | 6.5 | | 9.0 | |
| Temperature – 1DADMax | Deg C | ≈1800 | | $95^{th}$ percentile = 22.3 | | | |
| | | | | **Maximum Monthly Average** | | **Maximum Daily Maximum** | |
| Chlorine, Total Residual | µg/L | Continuous | | 110 | | 360 | |
| Ammonia, as N | mg/L | ≈60 | | 38 | | 45 | |
| | lbs/day | ≈60 | | 21,500 | | 28,500 | |
| Total Kjeldahl Nitrogen, as N | mg/L | ≈60 | | 42 | | 50 | |
| Nitrate + Nitrite, as N | mg/L | ≈60 | | 16 | | 18 | |
| Phosphorus, total, as P | mg/L | ≈60 | | 4.6 | | 6.7 | |
| Phosphate, ortho, as P | mg/L | ≈60 | | 3.9 | | 5.4 | |
| **Detected Chemicals** | **Units** | **# of Samples** | **Minimum** | **Maximum** | **$95^{th}$ Percentile** | **$50^{th}$ Percentile** | **cv** |
| 1,4-Dichlorobenzene | ug/L | 23 | 0.50 | 4.32 | 4.26 | 0.50 | 1.03 |
| 2,4,6-Trichlorophenol | ug/L | 22 | 0.25 | 1.20 | 1.20 | 0.95 | 0.33 |
| 2,4-Dichlorophenol | ug/L | 22 | 0.12 | 1.67 | 1.66 | 0.28 | 0.91 |
| Antimony, Total | ug/L | 29 | 0.15 | 0.64 | 0.63 | 0.42 | 0.28 |
| Arsenic, Total | ug/L | 29 | 1.10 | 1.75 | 1.74 | 1.38 | 0.12 |
| Bis(2-Ethylhexyl) Phthalate | ug/L | 22 | 0.33 | 5.10 | 3.23 | 1.37 | 0.62 |
| Cadmium, Total | ug/L | 29 | 0.03 | 0.11 | 0.05 | 0.03 | 0.61 |
| Chloroform | ug/L | 23 | 0.50 | 1.70 | 1.39 | 0.50 | 0.50 |
| Chromium, Total | ug/L | 29 | 0.45 | 0.97 | 0.90 | 0.57 | 0.22 |
| Copper, Total | ug/L | 29 | 5.62 | 13.80 | 13.28 | 9.73 | 0.24 |
| Cyanide, Weak & Diss. | ug/L | 28 | 2.5 | 18.4 | 12.1 | 2.5 | 0.91 |
| Diethyl Phthalate | ug/L | 22 | 0.07 | 0.57 | 0.50 | 0.24 | 0.52 |
| Lead, Total | ug/L | 29 | 0.25 | 1.63 | 0.90 | 0.34 | 0.66 |
| Mercury | ug/L | 29 | 0.0027 | 0.0068 | 0.0065 | 0.0051 | 0.21 |
| Nickel, Total | ug/L | 29 | 1.90 | 3.53 | 3.15 | 2.32 | 0.17 |
| Nonylphenol Isomer | ug/L | 2 | 3.02 | 3.26 | -- | -- | 0.05 |
| Silver, Total | ug/L | 29 | 0.02 | 0.14 | 0.13 | 0.07 | 0.51 |
| Tetrachloroethylene | ug/L | 23 | 0.50 | 1.40 | 1.22 | 0.50 | 0.43 |
| Zinc, Total | ug/L | 29 | 23.00 | 44.60 | 43.72 | 31.20 | 0.18 |

### *Whole effluent toxicity testing*

The County conducted acute toxicity tests in August 2012 and February 2013, and chronic toxicity tests in October 2012 and February 2013. Acute toxicity tests were conducted with Daphnia pulex (water flea) and Pimephales promelas (fathead minnow). Chronic toxicity tests were conducted with Atlantic Mysid and topsmelt. Please refer to Appendix D for toxicity test results.

For acute toxicity, the performance standard is the median survival in 100% effluent being equal to or greater than 80% and no individual test result showing less than 65% survival in 100% effluent. For the tests conducted in 2012 and 2013, the lowest survival in 100% effluent was 95%.

For chronic toxicity, the performance standard is no chronic toxicity test demonstrating a statistically-significant difference in response between the control and a test concentration equal to the acute critical effluent concentration (ACEC). South WWTP had no chronic toxicity near the previous ACEC of 0.54% effluent in any recent test.

Since the discharge met the performance standards for toxicity in the previous permit cycle, the proposed permit does not include WET limits but includes WET monitoring as required for permit renewal.

## E. Sediment characterization

Ecology has promulgated sediment management standards under Chapter 173-204 WAC. The sediment management standards contain numeric chemical and biological criteria that protect benthic organisms that live in the sediment of the marine waters of Puget Sound. These standards state that Ecology may require permitted facilities to evaluate the potential for the discharge to cause a violation of applicable standards.

Between 1994 and 1997, King County performed annual sediment sampling from 0 to 2 cm depth at locations near the two outfalls (EIM Data User Study ID RENT9497). In October 1997, the County measured concentrations of hexachlorobenzene at three locations (RT700NS, RT625ND, RT625SD) that exceeded the sediment quality standards numeric criteria. In October 1995, one location (LSDS02) exceeded CSL numeric criteria for benzoic acid. One sample, RT625SD, had bis(2-ethylhexyl) phthalate concentration of 42 ppm, compared to the SQS criteria of 47 ppm OC (total organic carbon normalized). For four chemicals (1,2,4-trichlorobenzene, benzyl alcohol, hexachlorobenzene, and hexachlorobutadiene) many of the samples had non-detect concentrations with reported detection limits above the sediment quality standard numeric criteria.

In October 1999, King County performed sediment sampling from 0 to 2 cm depth at 13 sample locations near the two outfalls (EIM Data User Study ID RENT99). Sediment samples were analyzed for the 47 chemicals with numeric criteria in the sediment management standards. The County did not detect the following four chemicals (2,4-dimethyl phenol, 2-methylphenol, benzyl alcohol, and hexachlorobutadiene), but most of the samples had reported detection limits above the sediment quality standards numeric criteria. Most of the other 47 chemicals were not present at detectable levels below the SQS numeric criteria. The County measured low concentrations of PAHs, PCBs, phthalates, and metals below the numeric criteria for benthic toxicity.

In November 2001, King County performed sediment sampling from 0 to 2 cm depth at 13 sample locations near the two marine outfalls (EIM Data User Study ID RENT01). Sediment samples were analyzed for the 47 chemicals with numeric criteria in the sediment management standards. All samples met the sediment quality standards (SQS) numeric criteria. One sample (RT625SD) had a bis(2-ethylhexyl) phthalate concentration of 43 ppm, compared to the SQS criteria of 47 ppm. All other samples had bis(2-ethylhexyl) phthalate concentrations below 10 ppm. Five samples had detection limits for 2-methylphenol that were slightly above the sediment quality standards criteria, but were not detected in the sediment nor in the effluent. Most of the 47 chemicals were not present at detectable levels. The County measured low concentrations of PAH, phthalates, and metals below the numeric criteria for benthic toxicity.

In 2011, results from station STP625SP (sample ID: L53537-12) showed elevated bis(2-ethylhexyl) phthalate concentrations at 116 ppm OC, exceeding the SMS cleanup screening level (CSL) of 78 ppm OC. Based on the low level concentrations of bis(2-ethylhexyl) phthalate from the other stations and historical data from previous sampling events, King County determined the sample to be anomalous and elected to re-analyze the sample from remaining preserved sample matrix in triplicate to verify if the result was reproducible. Results from the triplicate analysis were 3.6, 3.7, and 3.2 ppm OC. These concentrations were then averaged along with the original measurement to yield 31.6 ppm OC, below the SQS criterion. Ecology approves of and appreciates the additional steps King County took to verify the integrity of a potentially anomalous result. Bis(2-ethylhexyl) phthalate can easily be imparted to a sample by a number of processes (e.g., airborne deposition during sample collection or transfer, a small piece of plastic not representative of the bulk sample matrix, handling cross-contamination).

In summary, historic sediment monitoring does not indicate sediment toxicity or a violation of the sediment management standards at this site. The proposed permit includes additional sediment monitoring to ensure continued compliance because of the large volume of discharge, some past instances of detection limits above the SQS numeric criteria, and 1997 concentrations in the chemical analyses of sediments above SQS near the site.

## F. Summary of compliance with previous permit issued

The previous permit placed effluent limits on $BOD_5$, TSS, total residual chlorine, pH, and fecal coliform. The South Plant facility complied with effluent limits and permit conditions throughout the duration of the previous permit except for late DMR submittals in February 2010, March 2010, April 2010, and January 2012. The facility also exceeded the 85% loading criteria for TSS and $BOD_5$ for several months, which, while not a violation, would typically trigger capacity planning, according to permit condition S4. However, King County sufficiently demonstrated that these elevated loadings were due to leaking primary and secondary clarifier seals through which solids were routed back to the influent line causing artificially high influent numbers. King County fixed these seals in the summer of 2014 and loading values have decreased accordingly.

Ecology assessed compliance based on its review of the facility's information in Ecology's Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

## G. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

# III. Proposed Permit Limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

## A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology-approved design criteria for this facility's treatment plant, as listed in Table 7, were obtained from the October 1993 Plans and Specifications (*Metro's Regional Treatment Plant in Renton, Liquid Stream Improvements IIIB Part C*, Volume 9 of 11) and the October 1997 *East Division Reclamation Plant Stage 2 Liquid Stream Improvements – III2B.1*. Both documents were prepared by Brown and Caldwell Consultants and associated firms.

## B. Technology-based effluent limits

Federal and state regulations define technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for domestic wastewater.

**Table 7. Design Criteria for King County South Wastewater Treatment Plant**

| Parameter | Design Quantity |
|---|---|
| Monthly average flow (max. month) | 144 MGD |
| Monthly average dry weather flow (AWDF) | 96 MGD |
| Monthly average wet weather flow (AWWF) | 115 MGD |
| Instantaneous peak flow | 325 MGD |
| Maximum Month $BOD_5$ influent loading | 251,000 lb/day |
| Maximum Month TSS influent loading | 235,000 lb/day |

The table below identifies technology-based limits for pH, fecal coliform, $BOD_5$, and TSS, as listed in chapter 173-221 WAC. Section III.F of this fact sheet describes the potential for water quality-based limits.

**Table 8. Technology-based Limits**

| Parameter | Average Monthly Limit | Average Weekly Limit |
|---|---|---|
| $BOD_5$ (concentration) | 30 mg/L | 45 mg/L |
| | In addition, the $BOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration. | |
| $CBOD_5$ (concentration) | 25 mg/L | 40 mg/L |
| | In addition, the $CBOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration. | |
| TSS (concentration) | 30 mg/L | 45 mg/L |
| | In addition, the TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration. | |
| Chlorine | 0.5 mg/L | 0.75 mg/L |

| Parameter | Monthly Geometric Mean Limit | Weekly Geometric Mean Limit |
|---|---|---|
| Fecal Coliform | 200 organisms/100 mL | 400 organisms/100 mL |
| **Parameter** | **Daily Minimum** | **Daily Maximum** |
| pH | 6.0 standard units | 9.0 standard units |

King County requested Ecology replace $BOD_5$ limits with $CBOD_5$ limits because they were measuring artificially high $BOD_5$ levels as a result of nitrifying bacteria in the sampling system. Ecology granted this substitution, as allowable under WAC 173-221-050.

Ecology derived the technology-based monthly average limit for chlorine from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, *Wastewater Engineering, Treatment, Disposal and Reuse*, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/L.

Technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for carbonaceous oxygen demand ($CBOD_5$) and total suspended solids as follows:

Mass Limit = CL x DF x CF

where:

CL = Technology-based concentration limits listed in the above table

DF = Maximum Monthly Average Design flow (MGD)

CF = Conversion factor of 8.34

The resulting technology-based mass limits are summarized in Table 9.

**Table 9. Technology-based Mass Limits**

| Parameter | Concentration Limit (mg/L) | Mass Limit (lbs/day) |
|---|---|---|
| $CBOD_5$ Monthly Average | 25 | 30,000 |
| $CBOD_5$ Weekly Average | 40 | 48,000 |
| TSS Monthly Average | 30 | 36,000 |
| TSS Weekly Average | 45 | 54,000 |

## C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

### *Numerical criteria for the protection of aquatic life and recreation*

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

### *Numerical criteria for the protection of human health*

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

### *Narrative criteria*

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

### *Antidegradation*

*Description*--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

*Facility Specific Requirements*--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

### *Mixing zones*

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit end-of-pipe discharge exposure to prevent harm to water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400(7)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Most aquatic life *acute* criteria are based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Most aquatic life *chronic* criteria are based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400) for the Puget Sound outfall 001. The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. *Ecology must specify both the allowed size and location in a permit.*

   The proposed permit specifies the sizes and locations of the allowed mixing zone (as specified below).

2. *The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.*

   Ecology has determined that the treatment provided meets the requirements of AKART (see "Technology-based Limits").

3. *Ecology must consider critical discharge conditions.*

   Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

   Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html.

   The critical conditions used for modeling the Puget Sound and Green River outfalls are listed in Table 10 and Table 11.

**Table 10. Critical Conditions Used to Model the Puget Sound Outfall 001**

| Critical Condition | Value |
|---|---|
| Water depth at MLLW | 623 feet |
| Density profile with a difference of 0.61 sigma-t units between -607 feet and the surface | |
| 90th percentile current speeds for acute mixing zone | 0.14 -0.39 m/sec |
| 50th percentile current speeds for chronic and human health mixing zones | 0.069 – 0.125 m/sec |
| Maximum average monthly effluent flow for chronic and human health non-carcinogen | 144 MGD |
| Annual average flow for human health carcinogen | 106 MGD |
| Maximum daily flow for acute mixing zone | 235 MGD |
| 1 DAD MAX effluent temperature | 12°C |

Ecology obtained ambient data at critical conditions in the vicinity of the Puget Sound outfall from the King County Study called *Effluent Dilution Modeling for South Wastewater Treatment Plant Outfall Study* conducted in September 2013.

**Table 11. Critical Conditions Used to Model the Green River Outfall 002**

| Critical Condition | Value |
|---|---|
| Minimum Green River daily average flow: June 1 – October 31<br>Minimum Green River daily average flow: November 1 – May 31 | 500 cfs<br>1000 cfs |
| Maximum daily discharge flow: June 1 – October 31<br>Maximum daily discharge flow: November 1 – May 31 | 16 MGD<br>32 MGD |

Ecology obtained critical condition ambient data in the vicinity of the Green River outfall from various studies as entered into Ecology's EIM database and from USGS's website.

4. *Supporting information must clearly indicate the mixing zone would not:*
   - Have a reasonable potential to cause the loss of sensitive or important habitat.
   - Substantially interfere with the existing or characteristic uses.
   - Result in damage to the ecosystem.
   - Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column.

Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharges, the receiving waters characteristics, and the discharge locations. Based on this review, Ecology concluded that the discharges do not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. *The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.*

   Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundaries of the mixing zones if permit limits are met.

6. *The size of the mixing zone and the concentrations of the pollutants must be minimized.*

   At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

   Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

   Because of the above reasons, Ecology has effectively minimized the sizes of the mixing zones authorized in the proposed permit.

7. *Maximum size of chronic mixing zone.*

   The authorized chronic mixing zone for the Puget Sound discharge does not exceed the maximum size restriction. Ecology did not authorize a chronic mixing zone for the Green River discharge.

8. *Acute mixing zone.*

*Puget Sound Outfall No. 001*

- *The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.*

  Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone.

- *The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.*

  As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- *Comply with size restrictions.*

  The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

*Green River Outfall No. 002 (maintenance)*

WAC 173-201A-400(8) limits freshwater acute mixing zones to 2.5% of river flow or less. King County must use flows larger than 2.5% of the Green River flow to achieve the maintenance goal of clearing settled sediments from the outfall diffuser ports. WAC 173-201A-400(12) allows extended mixing zones if: (1) the discharge existed prior to November 24, 1992, or (2) if the altered size results in greater protection of existing and characteristic uses. Maintenance discharges at the Green River outfall meet both of these requirements. The outfall existed prior to 1992 and the discharge impacts to salmon migration are minimized if King County performs maintenance discharges during summer months when the river flow is low. Ecology continues to permit discharges from this outfall for maintenance purposes because this outfall provides a backup discharge option should the primary outfall line become unuseable or not meet capacity requirements.

Ecology therefore granted a mixing zone that encompasses 25% of the Green River flow for maintenance discharges. These discharges will occur infrequently and are permitted for a maximum duration of 4 hours. During the previous permit cycle, King County discharged to the Green River once in five years.

9. *Overlap of mixing zones.*

The mixing zones authorized in this permit do not overlap other mixing zones.

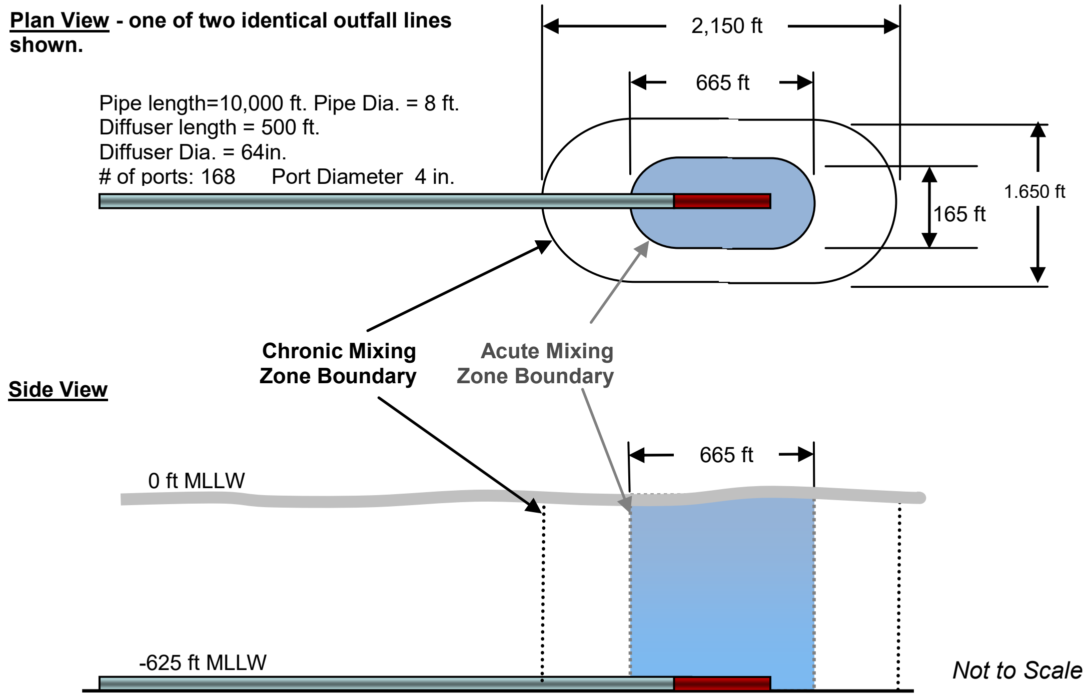



**Figure 5. South Plant's Outfall 001 Mixing Zone Diagram.**

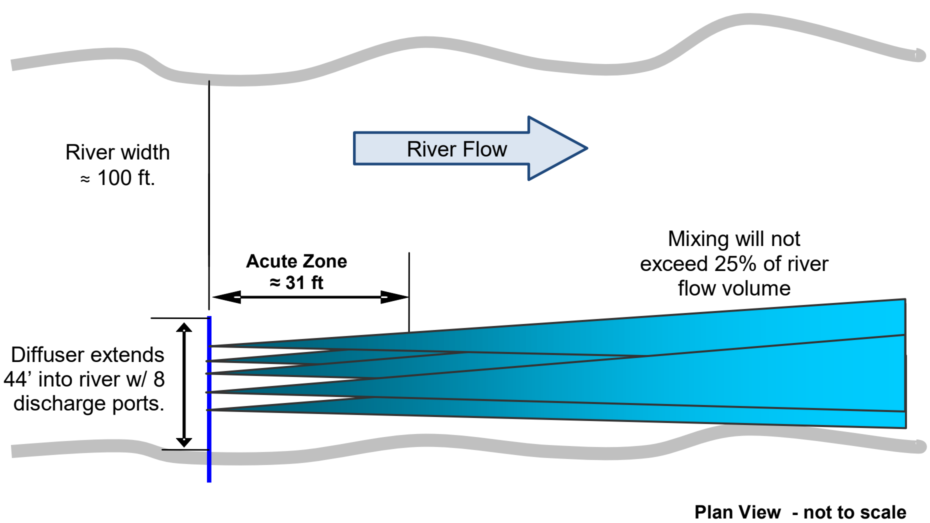



**Figure 6. South Plant's Outfall 002 Mixing Zone Diagram (Green River)**

## D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The tables included below summarize the criteria applicable to the receiving waters' designated uses.

### *Puget Sound Outfall No. 001 (marine)*

Aquatic life uses for marine discharges are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

a. Extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
b. Excellent quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
c. Good quality salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
d. Fair quality salmonid and other fish migration.

The *Aquatic Life Uses* and the associated criteria for this receiving water are identified below.

**Table 12. Marine Aquatic Life Uses and Associated Criteria**

| **Extraordinary Quality** | |
|---|---|
| Temperature Criteria – Highest 1D Max | 13°C (55.4°F) |
| Dissolved Oxygen Criteria – Lowest 1-Day Min | 7.0 mg/L |
| Turbidity Criteria | • 5 NTU over background when the background is 50 NTU or less; or<br>• A 10 percent increase in turbidity when the background turbidity is more than 50 NTU. |
| pH Criteria | pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units. |

To protect shellfish harvesting, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

The *recreational use categories include* primary contact recreation and secondary contact recreation. The recreational uses for this receiving water are identified below.

**Table 13. Recreational Uses**

| Recreational Use | Criteria |
|---|---|
| Primary Contact Recreation | Fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies /100 mL. |

The *miscellaneous marine water uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

***Green River Discharge (freshwater):***

Aquatic Life Uses for freshwater discharges are designated based on the presence of, or the intent to provide protection for, the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for the Green River at the Emergency Outfall location are identified below.

**Table 14. Aquatic Life Uses & Associated Criteria**

| **Salmonid Spawning, Rearing, and Migration** | |
|---|---|
| Temperature Criteria – Highest 7DAD Max | 17.5°C (63.5°F) |
| Dissolved Oxygen Criteria – Lowest 1-Day Min | 8.0 mg/L |
| Turbidity Criteria | • 5 NTU over background when the background is 50 NTU or less; or<br>• A 10 percent increase in turbidity when the background turbidity is more than 50 NTU. |
| pH Criteria | pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units. |

The *recreational uses* are extraordinary primary contact recreation, primary contact recreation, and secondary contact recreation. The recreational uses for this receiving water are identified below.

**Table 15. Recreational Uses and Associated Criteria**

| Recreational Use | Criteria |
|---|---|
| Primary Contact Recreation | Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 mL. |

The *water supply uses* are domestic, agricultural, industrial, and stock watering.

The *miscellaneous freshwater uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

## E. Water quality impairments

Central Puget Sound is not listed for any 303(d) impairments in the vicinity of the South Plant WWTP outfall 001. Ecology is conducting a South Puget Sound Dissolved Oxygen study which should be finalized in the next few years.

Ecology lists the Green River as a category 5 waterbody for dissolved oxygen and bacteria in their 2012 303(d) assessment. EPA approved Ecology's Green River Temperature TMDL in 2011. In 1992 Ecology issued an ammonia-nitrogen TMDL in the Green/Duwamish system that identified a zero ammonia-nitrogen wasteload allocation for King County's Renton South Plant (except during emergencies and planned short-term maintenance). King County responded to this TMDL by relocating their South Plant WWTP outfall to the Puget Sound.

## F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-160 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements all known, available, and reasonable methods of treatment and prevention (AKART) as described above in the technology-based limits section. When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring whole effluent toxicity (WET) testing when there is a reasonable potential for the discharge to contain toxics. Ecology's analysis of the need for WET testing for this discharge is described later in the fact sheet.

## G. Evaluation of surface water quality-based effluent limits for numeric criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand ($BOD_5$) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

***Puget Sound Outfall No. 001***

The two 64 inch diameter diffusers at Outfall 001 are 500 feet long. The diffusers each have 168 staggered four inch diameter ports which are spaced 3 feet apart. The diffusers are approximately 625 feet deep mean lower low water (MLLW).

*Chronic Mixing Zone* --WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports and may not occupy more than 25% of the width of the water body as measured during MLLW.

The horizontal dimensions of the chronic mixing zone for Outfall 001 are 2150 by 1650 feet. The mixing zone extends from the bottom to the top of the water column.

*Acute Mixing Zone*--WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone for Outfall 001 extends 82.5 feet in any direction from each discharge port.

Ecology provided a thorough review of the County's data, dilution factors, and modeling in 2009 and again in 2014. Ecology verified that the County used conservative assumptions and provided rigorous modeling to obtain the dilution factors. Using updated density profile and plant flow data, King County concluded that the dilution factors are the same as those predicted in 2009 due to very similar plant flow conditions. Design flow rates were used for the chronic mixing zone and human health mixing zone analyses so those did not change from the previous analysis. The dilution factors are listed Table 16.

**Table 16. Dilution Factors**

| Criteria | Acute | Chronic |
|---|---|---|
| Aquatic Life | 186 | 225 |
| Human Health, Carcinogen | | 428 |
| Human Health, Non-carcinogen | | 428 |

Ecology determined the impacts of dissolved oxygen deficiency, nutrients, pH, fecal coliform, turbidity, chlorine, ammonia, metals, other toxics, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

*Dissolved Oxygen--$BOD_5$ and Ammonia Effects*--Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand ($BOD_5$) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water.

Ecology modeled the impact of $BOD_5$ on the receiving water at critical conditions using an effluent concentration of 45 mg/L (the technology-based effluent limit for $BOD_5$) and an oxidation rate of 0.23/day (see Appendix E). Ecology predicts no violation of the surface water quality standards for dissolved oxygen due to the impacts of $BOD_5$, therefore, the proposed permit contains the technology-based effluent limits for $CBOD_5$. The permit does not contain a limit for ammonia for dissolved oxygen impacts; ammonia toxicity is examined elsewhere in this fact sheet.

*pH*--Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.

*Fecal Coliform*--Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 225. Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

*Turbidity*--Ecology evaluated the impact of turbidity based on the range of total suspended solids in the effluent and turbidity of the receiving water. Ecology expects no violations of the turbidity criteria outside the designated mixing zone provided the facility meets its technology-based total suspended solids permit limits.

*Toxic Pollutants*--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: chlorine, ammonia, antimony, arsenic, bis(2-ethylhexyl)phthalate, cadmium, chloroform, chromium, copper, cyanide, diethyl phthalate, lead, mercury, nickel, silver, tetrachloroethylene, zinc, 1,4-dichlorobenzene, 2,4,6-trichlorophenol, 2,4-dichlorophenol, and nonylphenol isomer. Ecology conducted a reasonable potential analysis (see Appendix E) on these parameters to determine if any required effluent limits are necessary in this permit.

King County provided ambient data in their 2013 receiving water study and the following parameters were detected in the receiving water: ammonia, antimony, arsenic, cadmium, chlorine, chromium (hex), copper, lead, mercury, nickel, silver, and zinc. Ecology used the 90% concentrations for these pollutants in the reasonable potential analysis and assumed zero for ambient concentrations if data was not available.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used the available receiving water information from King County's 2013 ambient study and Ecology spreadsheet tools.

Ecology determined that none of the toxics detected in the effluent pose a reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

For chlorine, calculations show that technology-based limits are more stringent than water quality-based limits. The discharge will meet the chlorine water quality criteria if the technology-based limits are met.

*Temperature*--The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements: annual summer maximum threshold criteria, supplemental spawning and rearing season criteria, incremental warming restrictions, and protections against acute effects. Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

*Annual summer maximum and supplementary spawning/rearing criteria* - Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

*Incremental warming criteria* - The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

*Protections for temperature acute effects –*

Instantaneous lethality to passing fish: The upper 99$^{th}$ percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

*Reasonable Potential Analysis for Annual summer maximum and incremental warming criteria -* Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum and the incremental warming criteria at the edge of the chronic mixing zone during critical conditions (see Appendix E). No reasonable potential exists to exceed the temperature criterion where:

(Criterion + 0.3) > [Criterion + (Teffluent95 – Criterion)/DF].
(13 + 0.3) > (13 + (22.3 – 13.0)/225)
13.3 > 13.04

King County reported temperature data with their monthly discharge monitoring reports; Ecology used the 95$^{th}$ percentile of the 1DADmax value reported. Using a dilution factor of 225 and maximum daily temperature of 12.7°C for the receiving water, the predicted maximum daily temperature at the mixing zone boundary is 12.74°C. Thus, under the worst case scenario, the effluent discharge from this facility results in warming of the ambient temperature by 0.04°C, which is less than the allowable warming temperature of 0.3°C. Therefore, the proposed permit does not include a temperature limit.

### *Green River Outfall No. 002 (maintenance only)*

Ecology limits maintenance discharges to four hours therefore chronic water quality standards do not apply. Ecology calculated the acute dilution factor based the conditions expected during discharges for maintenance purposes. Ecology also assumed dilution with 25% of the river flow, consistent with WAC 173-201A-400(12). The resultant dilution factor is 5.0, as shown in Table 17.

**Table 17. Dilution Factors - Green River Outfall No. 002**

| Green River Outfall | Acute | Chronic |
|---|---|---|
| Aquatic Life – Maintenance | 5.0 | Not Applicable |
| Aquatic Life – Emergency | Permitted Under S5.F | Not Applicable |

Ecology assessed compliance with water quality standards using this dilution factor. To guarantee this dilution is achieved under the various flow conditions of the river, and to allow larger discharge volumes during the winter months when the river flows are higher, the permit includes the flow restrictions listed in Table 18.

**Table 18. Discharge flow restrictions to achieve required dilution in the Green River**

| | Minimum Green River daily average flow | Maximum daily discharge flow |
|---|---|---|
| June 1 – October 31 | 500 cfs | 16 MGD (25 cfs) |
| November 1 – May 31 | 1000 cfs | 32 MGD (50 cfs) |

The dilution factor was calculated assuming the effluent mixes with 25% of the river flow (0.25*500/25=5.0). This dilution applies to *planned maintenance* discharges only; *emergency* discharges are permitted under Special Condition S5.F. Effluent limits were not imposed for emergency use because it is Ecology's understanding that such use will only occur under extreme and unpredictable circumstances.

*Dissolved Oxygen--$BOD_5$*—The DO water quality criteria for freshwater are based on lowest 1-day minimums. Since the duration of maintenance discharges at the Green River outfall is at maximum 4 hours, Ecology assumes that the one day average DO in the receiving water will not be impacted significantly by this discharge.

*Temperature*—The temperature water quality criteria for freshwater are based on seven day averages. Since the duration of maintenance discharges at the Green River outfall is at maximum 4 hours, Ecology assumes that the seven day average temperature in the receiving water will not be significantly impacted by this discharge.

*Fecal Coliform*—The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 200 organisms per 100 ml and a chronic dilution factor of 5.0. The resulting fecal coliform at the edge of the chronic dilution zone is 65 per 100 ml. Under critical conditions there is no predicted violation of the water quality standards for surface waters with the technology-based limit. Therefore, the technology-based effluent limit for fecal coliform bacteria was placed in the proposed permit.

*Toxic Pollutants*—Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. A reasonable potential calculation on the priority pollutants measured during the previous permit term showed no reasonable potential for any toxins measured except for chlorine, see Appendix E. Ecology derived effluent limits for chlorine using methods from EPA, 1991 and the acute criteria, as shown in Appendix E. Ecology also confirmed that there is no reasonable potential for the Green River discharge to exceed the ammonia water quality criteria when effluent and river flows meet the requirements of the proposed permit.

## H. Human health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern for human health, based on the facility's status as an EPA major discharger and data indicating the discharge contains regulated chemicals. Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of any of the 91 numeric human health-based criteria and that effluent limits for human health pollutants are not needed.

## I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

Even though sediment sampling conducted during the previous permit term showed no violations of the sediment quality standards, Ecology determined that this discharge has potential to cause a violation of the sediment quality standards because:

- Many significant industrial users discharge to the facility's collection system
- This facility is considered an EPA major facility and discharges a very large volume of treated municipal wastewater to the Puget Sound.
- In some of the past testing, detection limits were above the SQS numeric criteria.
- In 1997, three locations had detected concentrations of hexachlorobenzene above the SQS numeric criteria for benthic toxicity.

The proposed permit includes a condition requiring King County to:

- Sample and analyze sediments in the vicinity of South Plant's outfall to characterize sediment quality (the nature and extent of chemical contamination and biological toxicity) in the vicinity of the Permittee's discharge locations. Specifically, sediment sampling will be required for 0 to 10 cm depth at 8 locations near the two diffusers.

Chemical analysis of the 47 chemicals in the sediment management standards plus conventional analytes will be required at all 8 sites. Bioassays will be performed, if the chemical concentrations are near or above the sediment management standards numeric chemical criteria.

- The Permittee must develop a *Sampling and Analysis Plan* in accordance with the current Sediment Sampling and Analysis Plan Appendix. The *Sampling and Analysis Plan* must be approved by Ecology before performing sediment sampling. After the sediment sampling is completed, the Permittee must submit a Sediment Data Report and Environmental Information Management (EIM) templates to Ecology for review and approval.
- If the sediment evaluation shows toxicity at any station, the Permittee must perform additional testing to investigate the source of sediment toxicity.

## J. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.
- *Chronic toxicity tests measure various sublethal toxic responses*, such as reduced growth or reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (https://fortress.wa.gov/ecy/publications/SummaryPages/9580.html), which is referenced in the permit. Ecology recommends that King County send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during previous permit terms showed no reasonable potential for effluent discharges to cause receiving water acute or chronic toxicity. The proposed permit will not include WET limits. King County must retest the effluent before submitting an application for permit renewal.

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization. King County may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.

- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

## K. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The South Plant WWTP does not discharge wastewater to the ground under this NPDES permit, therefore no permit limits are required to protect groundwater. Groundwater impacts will be addressed in the facility's reclaimed water permit.

## L. Comparison of effluent limits with the previous permit

For marine outfall 001, the proposed limits are the same as those in the 2009 permit except as listed in Table 19.

**Table 19. Comparison of Previous and Proposed Effluent Limits for Outfall 001**

| | | Previous Effluent Limits | | Proposed Effluent Limits | |
|---|---|---|---|---|---|
| **Parameter** | **Basis of Limit** | **Average Monthly** | **Average Weekly** | **Average Monthly** | **Average Weekly** |
| $BOD_5$ | Technology | 30 mg/L<br>36,000 lbs/day | 45 mg/L<br>54,000 lbs/day | None - replaced with $CBOD_5$ limits | |
| $CBOD_5$ | Technology | none | | 25 mg/L<br>30,000 lbs/day | 40 mg/L<br>48,000 lbs/day |

# IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

## A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is generally consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for municipal activated sludge facilities with design flows greater than 5 MGD.

King County requested a reduction in monitoring frequency for fecal coliform from 7 times each week to 4 times each week. Consistent with Ecology's *Permit Writers' Manual,* Ecology used EPA guidance (EPA memorandum from Robert Perciasepe and Steven A. Herman to Regional Administrators, April 1996), to assess data from the past two years for treatment plant reliability and data consistency and concluded that a reduction in monitoring frequency to 5 times each week for fecal coliform is warranted. The analysis is summarized in Appendix E.

Permittees receiving monitoring frequency reductions are still expected to take all appropriate measures to minimize pollutants levels as well as to minimize variability (variance), regardless of any reductions in monitoring frequencies granted from the baseline levels. To remain eligible for these reductions, the permittee may not have any violations for effluent limitations of the parameters for which reductions have been granted or failure to submit DMRs, or may not be subject to a new formal enforcement action. For facilities that do not maintain performance levels, Ecology may require increased monitoring by minor permit modification or Administrative Order. Permittees should also be aware that the probability of reporting a violation increases as the monitoring frequency decreases due to a smaller sample set from which to calculate weekly and monthly geometric mean values.

Ecology included additional nutrient monitoring in the proposed permit. Ecology will use this data if a TMDL is developed for dissolved oxygen; such a TMDL will likely establish waste load allocations for nutrients.

Monitoring of biosolids quantity and quality is necessary to determine the appropriate uses of the biosolids. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

As a pretreatment publicly owned treatment works (POTW), King County is required to sample influent, primary clarifier effluent, final effluent, and biosolids for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass-through the plant to the biosolids or the receiving water. King County will use the monitoring data to develop local limits which commercial and industrial users must meet.

The proposed permit requires King County to monitor for sediments, whole effluent toxicity, and priority pollutants to further characterize the discharges. These pollutants could have a significant impact on the quality of the surface water.

## B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for General Chemistry and Microbiology, as listed in Table 20. The County's environmental lab at W. Ewing Street is additionally accredited for trace metals by ICP-OES and ICP-MS, mercury, inorganics, organics by GC and GC-MS, bioassays, and microbiology in matrices including liquids, sediments, and tissues.

**Table 20. Lab Accredited Parameters**

| Parameter Name | Analyte ID | Method Name | Method Code |
|---|---|---|---|
| Solids, Total Volatile | 1970 | EPA 160.4_1971 | 10010409 |
| Turbidity | 2055 | SM 2130 B-01 | 20048219 |
| Alkalinity | 1505 | SM 2320 B-97 | 20045607 |
| Hardness, Total (as CaCO3) | 1755 | SM 2340 C-97 | 20047603 |
| Specific Conductance | 1610 | SM 2510 B-97 | 20048606 |
| Solids, Total | 1950 | SM 2540 B-97 | 20049405 |
| Solids, Total Dissolved | 1955 | SM 2540 C-97 | 20050402 |
| Solids, Total Suspended | 1960 | SM 2540 D-97 | 20051201 |
| Chlorine (Residual), Total | 1940 | SM 4500-Cl D-00 | 20080108 |
| Chlorine (Residual), Total | 1940 | SM 4500-Cl G-00 | 20081612 |
| pH | 1900 | SM 4500-H+ B-00 | 20105219 |
| Ammonia | 1515 | SM 4500-NH3 F-97 | 20023556 |
| Nitrite | 1835 | SM 4500-NO2¯ B-00 | 20113104 |
| Nitrate | 1805 | SM 4500-NO3¯ F-00 | 20117617 |
| Nitrate + Nitrite | 1820 | SM 4500-NO3¯ F-00 | 20117617 |
| Nitrogen, Total Kjeldahl | 1795 | SM 4500-Norg B-97 | 20119204 |
| Dissolved Oxygen | 1880 | SM 4500-O G-01 | 20121408 |
| Orthophosphate | 1870 | SM 4500-P F-99 | 20125013 |
| Phosphorus, total | 1910 | SM 4500-P F-99 | 20125013 |
| Biochemical Oxygen Demand (BOD) | 1530 | SM 5210 B-01 | 20135006 |
| Chemical Oxygen Demand (COD) | 1565 | SM 5220 D-97 | 20136805 |
| Total coliforms-count | 2500 | SM 9222 B (M-endo)-97 | 20203207 |
| Fecal coliform-count | 2530 | SM 9222 D (m-FC)-97 | 20210008 |

# V. Other Permit Conditions

## A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

## B. Prevention of facility overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require King County to:

- Take the actions detailed in proposed permit Special Condition S4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S4 restricts the amount of flow.

If a municipality intends to apply for Ecology-administered funding for the design or construction of a facility project, the plan must meet the standard of a "Facility Plan", as defined in WAC 173-98-030. A complete "Facility Plan" includes all elements of an "Engineering Report" along with State Environmental Review Process (SERP) documentation to demonstrate compliance with 40 CFR 35.3140 and 40 CFR 35.3145, and a cost effectiveness analysis as required by WAC 173-98-730. The municipality should contact Ecology's regional office as early as practical before planning a project that may include Ecology-administered funding.

## C. Operation and maintenance

The proposed permit contains Special Condition S5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that King County takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

## D. Pretreatment

***Duty to enforce discharge prohibitions***

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes "pass-through" or "interference". This general prohibition is from 40 CFR §403.5(a). Appendix C of this fact sheet defines these terms.
- The second section reinforces a number of specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:

  a. Are prohibited due to dangerous waste rules.

  b. Are explosive or flammable.

  c. Have too high or low of a pH (too corrosive, acidic or basic).

  d. May cause a blockage such as grease, sand, rocks, or viscous materials.

  e. Are hot enough to cause a problem.

  f. Are of sufficient strength or volume to interfere with treatment.

  g. Contain too much petroleum-based oils, mineral oil, or cutting fluid.

  h. Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, with the exception of the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:

  a. Cooling water in significant volumes.

b. Stormwater and other direct inflow sources.

c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Ecology delegated authority to King County for permitting, monitoring, and enforcement over industrial users discharging to their treatment system to provide more direct and effective control of pollutants. Ecology oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (chapter 90.48 RCW and chapter 173-216 WAC).

## E. Solid wastes

To prevent water quality problems the facility is required in permit Special Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of biosolids from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC *Biosolids Management*, and chapter 173-350 WAC *Solid Waste Handling Standards*. The disposal of other solid waste is under the jurisdiction of Public Health – Seattle and King County.

Requirements for monitoring biosolids and record keeping are included in this permit. Ecology will use this information, required under 40 CFR 503, to develop or update local limits.

## F. Spill plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

King County developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the facility to update this plan as needed.

## G. General conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual domestic wastewater NPDES permits issued by Ecology.

# VI. Permit Issuance Procedures

## A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

## B. Proposed permit issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

# VII. References for Text and Appendices

Ecology, December 2011. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html)

Ecology, October 2010 (revised). *Water Quality Program Guidance Manual – Procedures to Implement the State's Temperature Standards through NPDES Permits*. Publication Number 06-10-100 (https://fortress.wa.gov/ecy/publications/summarypages/0610100.html)

Ecology, Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Ecology, Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/permits/guidance.html)

EPA, 1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

EPA, 1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

EPA, 1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

EPA, 1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

King County, September 2011. *Diving Inspection, Repair Work Order 2009, King County Contract Number C00398C08, Work Order No. 06- Renton Effluent Transfer System Outfall Inspections, August 29-30 and September 16, 2011.*

King County, *2013 Receiving Water Characterization Study, King County NPDES Monitoring Program, Final Report for Brightwater, South, Vashon, and West Point Treatment Plants and Alki, Carkeek, Elliott West, and Henderson/MLK CSO Storage and Treatment Facilities,* June 2013.

Water Pollution Control Federation, 1976. *Chlorination of Wastewater*.

# Appendix A — Public Involvement Information

Ecology proposes to reissue a permit to King County's South Plant Wastewater Treatment Plant. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Draft on April 16, 2015, in the *Seattle Times* to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Told where copies of the draft permit and fact sheet were available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offered to provide the documents in an alternate format to accommodate special needs.
- Asked people to tell us how well the proposed permit would protect the receiving water.
- Invited people to suggest fairer conditions, limits, and requirements for the permit.
- Invited comments on Ecology's determination of compliance with antidegradation rules.
- Urged people to submit their comments, in writing, before the end of the comment period.
- Told how to request a public hearing about the proposed NPDES permit.
- Explained the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting,* which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

You may obtain further information from Ecology by telephone, 425-649-7201, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

The primary author of this permit and fact sheet is Alison Evans, P.E.

# Appendix B — Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

## ADDRESS AND LOCATION INFORMATION

| Street Addresses | Mailing Addresses |
|---|---|
| **Department of Ecology**<br>Attn: Appeals Processing Desk<br>300 Desmond Drive SE<br>Lacey, WA 98503 | **Department of Ecology**<br>Attn: Appeals Processing Desk<br>PO Box 47608<br>Olympia, WA 98504-7608 |
| **Pollution Control Hearings Board**<br>1111 Israel RD SW<br>STE 301<br>Tumwater, WA 98501 | **Pollution Control Hearings Board**<br>PO Box 40903<br>Olympia, WA 98504-0903 |

# Appendix C — Glossary

**1-DMax or 1-day maximum temperature** -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

**7-DADMax or 7-day average of the daily maximum temperatures** -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

**Acute toxicity** -- The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

**AKART** -- The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

**Alternate point of compliance** -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site-specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

**Ambient water quality** -- The existing environmental condition of the water in a receiving water body.

**Ammonia** -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Annual average design flow** (AADF) -- The average of the daily flow volumes anticipated to occur over a calendar year.

**Average monthly (intermittent) discharge limit** -- The average of the measured values obtained over a calendar months time taking into account zero discharge days.

**Average monthly discharge limit** -- The average of the measured values obtained over a calendar month's time.

**Background water quality** -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

**Best management practices** (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**$BOD_5$** -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although $BOD_5$ is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass** -- The intentional diversion of waste streams from any portion of a treatment facility.

**Categorical pretreatment standards** -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

**Chlorine** -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic toxicity** -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean water act** (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Compliance inspection-without sampling** -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance inspection-with sampling** -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

**Composite sample** -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction activity** -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

**Continuous monitoring** -- Uninterrupted, unless otherwise noted in the permit.

**Critical condition** -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Date of receipt** -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

**Detection limit** -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

**Dilution factor (DF)** -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Distribution uniformity** -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

**Early warning value** -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

**Enforcement limit** -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

**Engineering report** -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal coliform bacteria** -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab sample** -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

**Groundwater** -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

**Industrial user** -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial wastewater** -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of biosolids use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Local limits** -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

**Major facility** -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum daily discharge limit** -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Maximum day design flow (MDDF)** -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

**Maximum month design flow (MMDF)** -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

**Maximum week design flow (MWDF)** -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

**Method detection level (MDL)** -- See Detection Limit.

**Minor facility** -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing zone** -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

**National pollutant discharge elimination system (NPDES)** -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

**pH** -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

**Pass-through** -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**Peak hour design flow (PHDF)** -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

**Peak instantaneous design flow (PIDF)** -- The maximum anticipated instantaneous flow.

**Point of compliance** -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

**Potential significant industrial user (PSIU)** --A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day; or

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation level (QL)** -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x $10^n$, where n is an integer (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in

Clean Water Act Programs Submitted to the US Environmental Protection Agency, December 2007).

**Reasonable potential** -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

**Responsible corporate officer** -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

**Sample Maximum --** No sample may exceed this value.

**Significant industrial user (SIU) --**

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

   Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

   *The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**Slug discharge** -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

**Solid waste** -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

**Soluble $BOD_5$** -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble $BOD_5$ test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard $BOD_5$ test is sufficient to remove the particulate organic fraction.

**State waters** -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater** -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based effluent limit** -- A permit limit based on the ability of a treatment method to reduce the pollutant.

**Total coliform bacteria** -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

**Total dissolved solids** -- That portion of total solids in water or wastewater that passes through a specific filter.

**Total maximum daily load (TMDL)** -- A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

**Total suspended solids (TSS)** -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset** -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water quality-based effluent limit** -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

# Appendix D — Facility Data

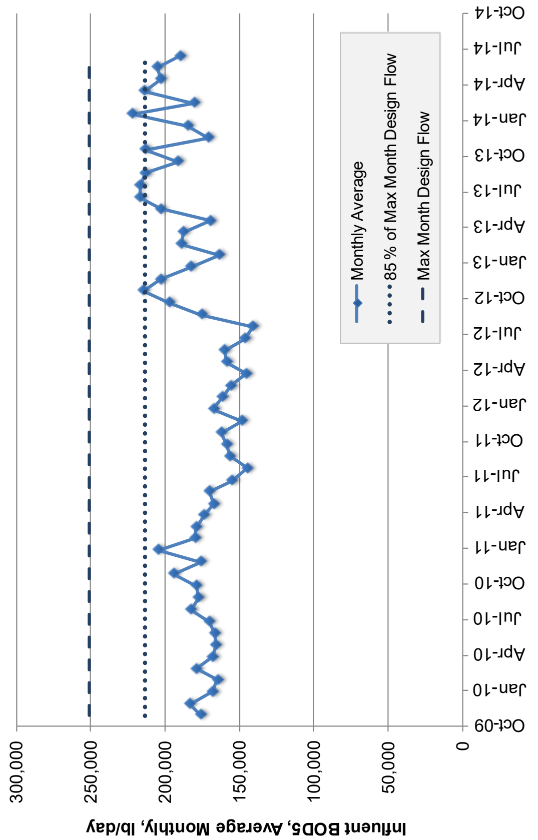
## South Plant Treatment Plant DMR Data, p1

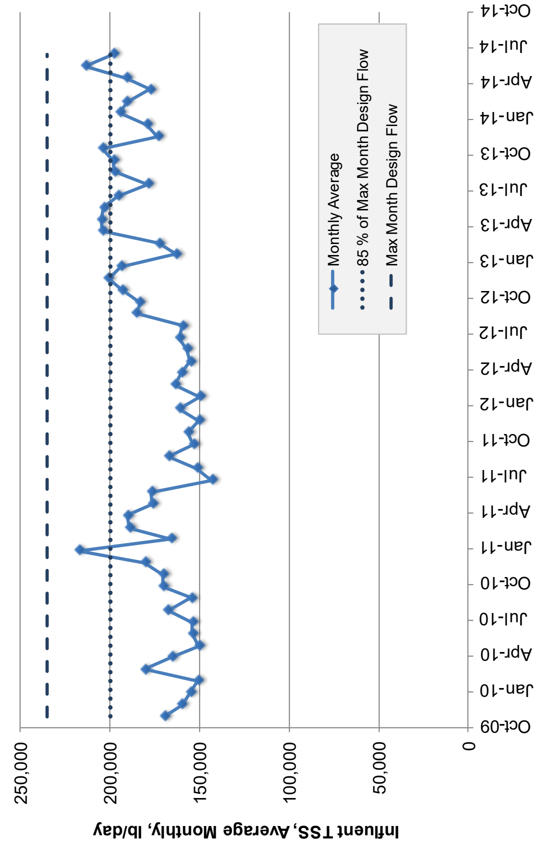
| | Influent | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | BOD5, lbs/day | | BOD5, mg/L | | TSS, lbs/day | | TSS, mg/L | |
| | Ave | Max Day | Ave | Max Day | Ave | Max Day | Ave | Max Day |
| 1-Nov-09 | 175,786 | 211,308 | 223 | 352 | 169,848 | 246,943 | 208 | 324 |
| 1-Dec-09 | 183,306 | 332,985 | 266 | 424 | 159,913 | 231,832 | 232 | 370 |
| 1-Jan-10 | 168,147 | 241,798 | 215 | 351 | 155,202 | 330,664 | 198 | 480 |
| 1-Feb-10 | 164,761 | m | 244 | 312 | 151,071 | m | 225 | 396 |
| 1-Mar-10 | 179,039 | 249,166 | 272 | 385 | 180,583 | 315,826 | 275 | 488 |
| 1-Apr-10 | 167,946 | 246,263 | 261 | 379 | 165,768 | 450,433 | 255 | 670 |
| 1-May-10 | 165,624 | 230,106 | 276 | 388 | 150,474 | 198,081 | 251 | 334 |
| 1-Jun-10 | 166,440 | 261,358 | 254 | 389 | 154,447 | 252,623 | 235 | 376 |
| 1-Jul-10 | 170,141 | 222,879 | 295 | 368 | 153,959 | 201,308 | 268 | 380 |
| 1-Aug-10 | 182,458 | 290,225 | 318 | 492 | 167,765 | 249,779 | 292 | 452 |
| 1-Sep-10 | 177,641 | 332,704 | 299 | 598 | 154,554 | 218,094 | 259 | 392 |
| 1-Oct-10 | 179,208 | 223,214 | 276 | 357 | 170,304 | 227,171 | 260 | 338 |
| 1-Nov-10 | 194,124 | 273,729 | 263 | 405 | 170,560 | 241,413 | 229 | 352 |
| 1-Dec-10 | 175,762 | 241,760 | 208 | 324 | 180,904 | 299,403 | 207 | 348 |
| 1-Jan-11 | 204,352 | 293,586 | 232 | 411 | 217,739 | 386,978 | 241 | 524 |
| 1-Feb-11 | 180,070 | 345,932 | 234 | 365 | 166,165 | 390,476 | 215 | 412 |
| 1-Mar-11 | 179,000 | 224,735 | 205 | 277 | 189,251 | 263,765 | 215 | 286 |
| 1-Apr-11 | 173,917 | 205,417 | 213 | 275 | 190,296 | 285,424 | 233 | 362 |
| 1-May-11 | 167,428 | 204,613 | 243 | 292 | 176,745 | 311,720 | 255 | 422 |
| 1-Jun-11 | 170,413 | 338,452 | 303 | 612 | 177,232 | 461,223 | 315 | 834 |
| 1-Jul-11 | 154,978 | 211,984 | 308 | 405 | 143,322 | 229,257 | 285 | 438 |
| 1-Aug-11 | 145,016 | 215,236 | 295 | 432 | 151,940 | 251,493 | 310 | 500 |
| 1-Sep-11 | 156,338 | 193,614 | 278 | 345 | 167,313 | 222,235 | 298 | 396 |
| 1-Oct-11 | 158,597 | 227,512 | 258 | 381 | 153,671 | 193,605 | 250 | 310 |
| 1-Nov-11 | 161,977 | 332,784 | 243 | 329 | 156,607 | 440,299 | 231 | 356 |
| 1-Dec-11 | 148,584 | 195,328 | 222 | 279 | 150,383 | 201,949 | 225 | 308 |
| 1-Jan-12 | 167,679 | 222,817 | 199 | 291 | 161,236 | 215,670 | 192 | 308 |
| 1-Feb-12 | 161,548 | 394,229 | 191 | 395 | 150,204 | 204,434 | 179 | 220 |
| 1-Mar-12 | 155,921 | 268,615 | 171 | 352 | 164,060 | 240,672 | 178 | 254 |
| 1-Apr-12 | 145,377 | 211,446 | 186 | 293 | 160,490 | 259,798 | 206 | 360 |
| 1-May-12 | 158,915 | 257,584 | 225 | 364 | 155,573 | 277,124 | 218 | 388 |
| 1-Jun-12 | 160,285 | 230,916 | 228 | 358 | 156,971 | 314,764 | 223 | 450 |
| 1-Jul-12 | 145,938 | 196,237 | 236 | 300 | 161,321 | 270,776 | 258 | 384 |
| 1-Aug-12 | 141,345 | 247,545 | 231 | 399 | 159,390 | 217,334 | 261 | 356 |
| 1-Sep-12 | 175,722 | 319,701 | 282 | 512 | 185,307 | 387,138 | 298 | 620 |
| 1-Oct-12 | 197,141 | 304,342 | 310 | 460 | 183,482 | 250,089 | 287 | 378 |
| 1-Nov-12 | 214,482 | 301,129 | 292 | 405 | 193,361 | 275,598 | 261 | 356 |
| 1-Dec-12 | 203,348 | 275,843 | 219 | 323 | 200,959 | 346,657 | 216 | 360 |
| 1-Jan-13 | 182,552 | 258,445 | 243 | 314 | 194,018 | 325,381 | 257 | 420 |
| 1-Feb-13 | 163,418 | 190,017 | 249 | 314 | 163,181 | 204,786 | 247 | 314 |
| 1-Mar-13 | 188,925 | 283,645 | 287 | 386 | 172,661 | 239,882 | 264 | 368 |
| 1-Apr-13 | 187,747 | 237,920 | 262 | 350 | 204,029 | 315,923 | 284 | 444 |
| 1-May-13 | 169,832 | 231,505 | 283 | 399 | 204,938 | 308,674 | 342 | 532 |
| 1-Jun-13 | 202,850 | 269,575 | 342 | 444 | 203,550 | 269,195 | 345 | 476 |
| 1-Jul-13 | 216,794 | 322,387 | 376 | 494 | 196,005 | 313,603 | 341 | 552 |
| 1-Aug-13 | 216,566 | 260,021 | 373 | 451 | 178,790 | 212,416 | 308 | 368 |
| 1-Sep-13 | 213,021 | 329,739 | 346 | 536 | 197,869 | 439,650 | 317 | 527 |
| 1-Oct-13 | 191,616 | 251,976 | 294 | 363 | 198,353 | 300,526 | 304 | 482 |
| 1-Nov-13 | 213,018 | 258,867 | 324 | 405 | 204,517 | 312,442 | 310 | 432 |
| 1-Dec-13 | 170,975 | 250,344 | 283 | 421 | 173,736 | 275,682 | 288 | 464 |
| 1-Jan-14 | 184,916 | 237,451 | 285 | 383 | 179,512 | 263,822 | 274 | 338 |
| 1-Feb-14 | 222,114 | 311,698 | 300 | 502 | 194,514 | 334,934 | 258 | 436 |
| 1-Mar-14 | 180,805 | 319,387 | 202 | 290 | 190,746 | 335,141 | 212 | 396 |
| 1-Apr-14 | 213,848 | 269,082 | 310 | 399 | 177,724 | 385,088 | 249 | 304 |
| 1-May-14 | 203,296 | 260,502 | 310 | 430 | 191,069 | 273,211 | 291 | 378 |
| 1-Jun-14 | 205,529 | 262,273 | 377 | 489 | 213,783 | 320,735 | 392 | 598 |
| 1-Jul-14 | 189,979 | 241,744 | 374 | 464 | 198,475 | 373,434 | 392 | 735 |
| AVE: | 178,887 | 261,137 | 268 | 390 | 175,366 | 288,689 | 262 | 418 |
| MIN: | 141,345 | 190,017 | 171 | 275 | 143,322 | 193,605 | 178 | 220 |
| MAX: | 222,114 | 394,229 | 377 | 612 | 217,739 | 461,223 | 392 | 834 |
| 5th %tile: | | | | | | | | |
| 95th %tile: | | | | | | | | |
| 85% | 213,350 | | | | 199,750 | | | |
| Limits | 251,000 | | | | 235,000 | | | |

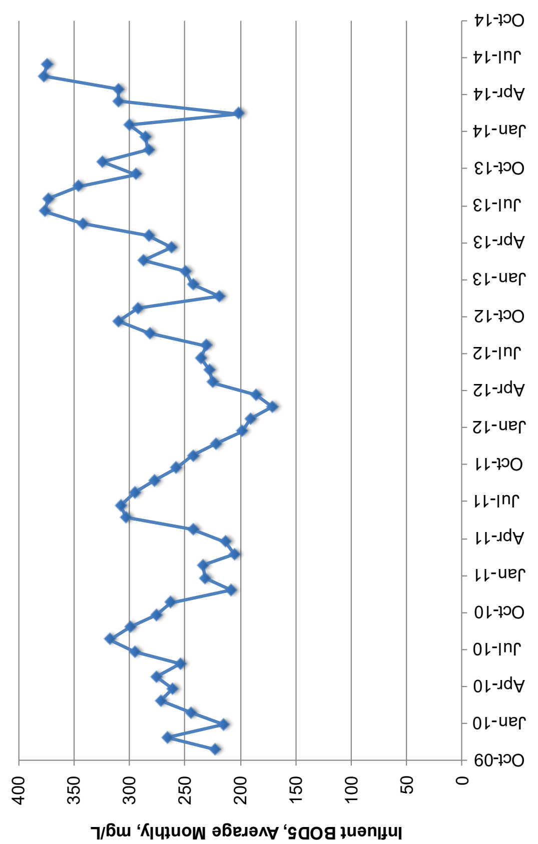
### South Plant Treatment Plant DMR Data, p2

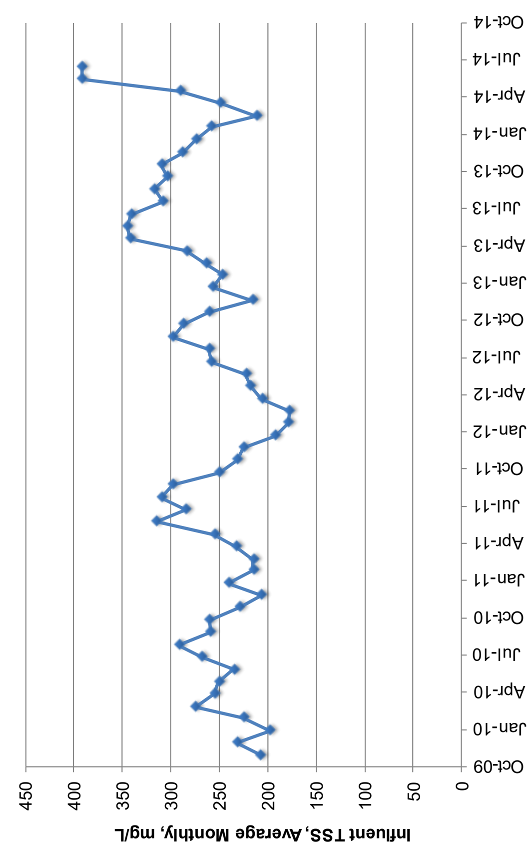
| | Effluent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flow, MGD | | BOD5, lbs/day | | BOD5, mg/L | | BOD5, % Removal | TSS, lbs/day | | TSS, mg/L | | TSS, % Removal | Fecal Coliform, #/100 ml | | pH | | Res. Chlorine, mg/L | | TKN, mg/L as N | | Ammonia, lbs/day | | Ammonia, mg/L | | Nitrate+ Nitrite, mg/L as N | | Ortho Phos, mg/L as P | | Total Phos, mg/L as P | | Temp, deg C | |
| | Ave | Max Day | Mnth Ave | Wk Ave | Mnth Ave | Wkly Ave | Ave | Mnth Ave | Wk Ave | Mnth Ave | Wk Ave | Ave | GEM | GM7 | max | min | Mnth Ave | Max Day | Mnth Ave | Max Day | Mnth Ave | Max Day | Mnth Ave | Max Day | Mnth Ave | Max Day | Mnth Ave | Max Day | Mnth Ave | Max Day | Ave | Max |
| 1-Nov-09 | 96 | 141 | 17055 | 20190 | 22 | 25 | 90 | 9081 | 10107 | 11 | 12 | 95 | 90 | 205 | 7.1 | 6.3 | 0.05 | 0.05 | 28 | 39 | 18,168 | 22,819 | 25 | 37 | 1.8 | 2.1 | 1.8 | 2.1 | 2.4 | 3.1 | | |
| 1-Dec-09 | 78 | 108 | 18322 | 20380 | 28 | 30 | 90 | 11718 | 13476 | 18 | 19 | 93 | 106 | 143 | 7.4 | 6.8 | 0.05 | 0.05 | 32 | 37 | 17,834 | 19,517 | 28 | 33 | 1.4 | 2.8 | 1.5 | 1.7 | 2.0 | 2.4 | 15.3 | 16.1 |
| 1-Jan-10 | 92 | 134 | 13746 | 15453 | 18 | 21 | 92 | 11265 | 13141 | 15 | 17 | 92 | 61 | 80 | 7.4 | 7.0 | 0.06 | 0.31 | 30 | 37 | 18,716 | 23,068 | 25 | 31 | 0.6 | 1.5 | 1.1 | 1.3 | 1.7 | 1.9 | 14.2 | 14.9 |
| 1-Feb-10 | 76 | 95 | 12354 | 13516 | 20 | 22 | 92 | 9312 | 10557 | 15 | 17 | 94 | 78 | 96 | 7.4 | 6.9 | 0.11 | 0.05 | 33 | 39 | 18,709 | 20,573 | 30 | 34 | 0.7 | 0.8 | 1.2 | 1.5 | 1.8 | 2.3 | 14.9 | 15.4 |
| 1-Mar-10 | 75 | 108 | 13239 | 14477 | 21 | 21 | 93 | 11023 | 16798 | 18 | 23 | 94 | 51 | 94 | 7.3 | 7.0 | 0.05 | 0.05 | 35 | 41 | 18,741 | 22,483 | 31 | 37 | 0.8 | 1.3 | 1.5 | 1.5 | 2.3 | 2.9 | 15.9 | 15.3 |
| 1-Apr-10 | 72 | 90 | 10892 | 13737 | 18 | 24 | 94 | 12039 | 12680 | 20 | 21 | 92 | 81 | 197 | 7.2 | 6.0 | 0.05 | 0.05 | 34 | 41 | 18,342 | 21,426 | 31 | 37 | 0.1 | 0.2 | 1.8 | 2.4 | 3.0 | 6.3 | 15.7 | 16.4 |
| 1-May-10 | 65 | 78 | 10077 | 10409 | 19 | 19 | 94 | 8663 | 11825 | 16 | 22 | 94 | 65 | 104 | 6.8 | 6.4 | 0.05 | 0.05 | 38 | 45 | 18,144 | 20,831 | 34 | 39 | 0.5 | 0.6 | 1.9 | 2.3 | 2.5 | 2.9 | 17.0 | 17.6 |
| 1-Jun-10 | 73 | 91 | 12343 | 16559 | 20 | 26 | 93 | 9957 | 12076 | 16 | 19 | 94 | 135 | 187 | 6.8 | 6.5 | 0.05 | 0.05 | 35 | 43 | 17,907 | 21,504 | 30 | 33 | 0.4 | 0.8 | 1.3 | 1.9 | 2.0 | 3.0 | 17.9 | 18.9 |
| 1-Jul-10 | 63 | 69 | 8920 | 9930 | 17 | 20 | 95 | 5332 | 5753 | 10 | 11 | 96 | 127 | 272 | 7.2 | 6.3 | 0.05 | 0.05 | 31 | 41 | 14,208 | 16,958 | 27 | 33 | 3.8 | 4.6 | 1.5 | 1.6 | 1.7 | 2.4 | 20.0 | 20.1 |
| 1-Aug-10 | 63 | 67 | 6277 | 6930 | 12 | 13 | 96 | 5160 | 5969 | 10 | 12 | 97 | 66 | 109 | 7.3 | 6.9 | 0.05 | 0.05 | 26 | 33 | 11,346 | 15,975 | 22 | 29 | 6.1 | 8.4 | 2.5 | 5.1 | 3.2 | 5.7 | 21.3 | 22.1 |
| 1-Sep-10 | 67 | 86 | 6082 | 7517 | 11 | 14 | 96 | 4455 | 5016 | 8 | 9 | 97 | 32 | 57 | 7.2 | 6.4 | 0.05 | 0.07 | 17 | 32 | 8,068 | 15,145 | 15 | 28 | 8.6 | 12.6 | 3.9 | 5.4 | 4.6 | 6.7 | 21.1 | 21.4 |
| 1-Oct-10 | 73 | 106 | 9783 | 11457 | 16 | 17 | 95 | 5538 | 6181 | 9 | 10 | 97 | 17 | 26 | 7.1 | 6.4 | 0.06 | 0.07 | 22 | 33 | 11,606 | 17,176 | 18 | 29 | 5.9 | 14.2 | 2.6 | 4.4 | 2.7 | 4.7 | 19.6 | 20.6 |
| 1-Nov-10 | 84 | 114 | 11561 | 12503 | 16 | 16 | 94 | 6638 | 7132 | 9 | 9 | 96 | 76 | 108 | 7.2 | 6.9 | 0.05 | 0.05 | 26 | 30 | 15,389 | 19,480 | 21 | 26 | 1.9 | 3.6 | 0.4 | 0.5 | 0.8 | 1.0 | 17.4 | 18.3 |
| 1-Dec-10 | 105 | 235 | 14323 | 22730 | 16 | 17 | 92 | 9752 | 16627 | 11 | 12 | 95 | 65 | 263 | 7.2 | 6.1 | 0.05 | 0.11 | 24 | 33 | 18,484 | 22,738 | 22 | 29 | 1.6 | 3.6 | 2.1 | 3.6 | 2.0 | 3.9 | 15.1 | 16.4 |
| 1-Jan-11 | 108 | 159 | 15493 | 19285 | 18 | 19 | 92 | 14755 | 18750 | 16 | 18 | 93 | 34 | 59 | 7.6 | 6.9 | 0.05 | 0.05 | 26 | 31 | 18,803 | 21,156 | 23 | 28 | 0.5 | 0.8 | 1.4 | 2.0 | 1.6 | 2.2 | 13.9 | 14.7 |
| 1-Feb-11 | 86 | 111 | 13999 | 16210 | 19 | 22 | 92 | 10780 | 12662 | 15 | 16 | 93 | 43 | 63 | 8.0 | 6.9 | 0.05 | 0.15 | 33 | 43 | 20,228 | 22,115 | 28 | 33 | 0.8 | 1.6 | 1.1 | 1.3 | 1.7 | 1.9 | 14.4 | 17.6 |
| 1-Mar-11 | 101 | 156 | 13148 | 16472 | 15 | 21 | 93 | 14444 | 18056 | 17 | 18 | 92 | 20 | 32 | 7.6 | 6.6 | 0.05 | 0.11 | 28 | 34 | 20,948 | 26,987 | 25 | 31 | 0.5 | 0.5 | 1.1 | 1.5 | 1.7 | 2.2 | 13.7 | 14.4 |
| 1-Apr-11 | 94 | 147 | 10124 | 12971 | 13 | 14 | 94 | 10860 | 14070 | 14 | 15 | 94 | 33 | 79 | 7.5 | 6.6 | 0.05 | 0.13 | 30 | 37 | 20,065 | 23,115 | 27 | 33 | 0.4 | 0.6 | 1.2 | 1.5 | 1.7 | 2.0 | 14.6 | 15.8 |
| 1-May-11 | 77 | 126 | 10068 | 12907 | 16 | 17 | 94 | 7413 | 9948 | 11 | 13 | 96 | 51 | 67 | 7.5 | 7.0 | 0.05 | 0.05 | 34 | 42 | 19,679 | 25,361 | 30 | 38 | 0.7 | 1.2 | 2.0 | 2.9 | 2.4 | 3.2 | 16.2 | 17.1 |
| 1-Jun-11 | 61 | 66 | 10149 | 12009 | 20 | 24 | 94 | 5187 | 5631 | 10 | 11 | 97 | 22 | 47 | 7.5 | 6.7 | 0.05 | 0.09 | 29 | 34 | 12,378 | 14,742 | 24 | 29 | 4.6 | 5.5 | 2.1 | 2.4 | 2.5 | 3.2 | 18.2 | 19.1 |
| 1-Jul-11 | 56 | 60 | 10904 | 15119 | 23 | 32 | 93 | 4460 | 6187 | 9 | 13 | 97 | 31 | 48 | 7.5 | 6.6 | 0.05 | 0.16 | 19 | 30 | 6,837 | 11,182 | 15 | 24 | 9.3 | 15.5 | 2.2 | 3.5 | 2.4 | 4.0 | 19.9 | 20.9 |
| 1-Aug-11 | 53 | 68 | 5924 | 6922 | 13 | 15 | 96 | 4096 | 4849 | 9 | 11 | 97 | 27 | 65 | 7.6 | 6.5 | 0.05 | 0.07 | 19 | 31 | 6,706 | 13,274 | 15 | 29 | 9.5 | 12.2 | 2.6 | 4.0 | 2.8 | 4.5 | 21.1 | 21.7 |
| 1-Sep-11 | 62 | 70 | 7339 | 7884 | 14 | 15 | 95 | 4621 | 6057 | 9 | 11 | 97 | 77 | 106 | 7.6 | 6.8 | 0.06 | 0.11 | 30 | 40 | 15,233 | 19,079 | 29 | 36 | 5.2 | 9.1 | 2.0 | 3.6 | 2.3 | 4.5 | 21.1 | 28.5 |
| 1-Oct-11 | 67 | 85 | 7269 | 7920 | 13 | 15 | 95 | 5334 | 6186 | 10 | 11 | 97 | 39 | 67 | 7.5 | 7.1 | 0.06 | 0.1 | 31 | 42 | 14,651 | 19,949 | 26 | 34 | 4.0 | 5.4 | 1.6 | 3.2 | 1.8 | 3.5 | 19.1 | 19.8 |
| 1-Nov-11 | 74 | 147 | 13394 | 23581 | 21 | 28 | 92 | 10295 | 21437 | 15 | 25 | 94 | 90 | 106 | 7.4 | 6.9 | 0.05 | 0.13 | 27 | 32 | 15,058 | 23,573 | 25 | 29 | 4.1 | 6.5 | 1.9 | 2.6 | 2.8 | 4.7 | 16.6 | 17.8 |
| 1-Dec-11 | 73 | 93 | 8280 | 11528 | 13 | 17 | 94 | 6876 | 8791 | 11 | 13 | 95 | 22 | 38 | 7.5 | 6.4 | 0.05 | 0.07 | 34 | 39 | 18,851 | 22,033 | 31 | 36 | 0.9 | 1.2 | 2.1 | 2.7 | 2.6 | 4.7 | 15.2 | 15.7 |
| 1-Jan-12 | 97 | 165 | 17706 | 24488 | 22 | 27 | 90 | 12085 | 18022 | 14 | 19 | 93 | 56 | 68 | 7.1 | 6.4 | 0.06 | 0.09 | 22 | 28 | 16,295 | 18,668 | 20 | 26 | 2.1 | 3.0 | 1.6 | 2.4 | 2.2 | 4.8 | 14.4 | 15.4 |
| 1-Feb-12 | 94 | 127 | 11135 | 15403 | 14 | 17 | 93 | 9074 | 10900 | 12 | 14 | 94 | 27 | 75 | 7.2 | 6.3 | 0.05 | 0.1 | 28 | 36 | 18,868 | 22,211 | 25 | 32 | 0.9 | 1.1 | 1.5 | 2.3 | 1.8 | 2.7 | 14.2 | 14.8 |
| 1-Mar-12 | 106 | 160 | 11753 | 18736 | 13 | 16 | 92 | 12429 | 19676 | 13 | 18 | 92 | 80 | 115 | 8.2 | 6.2 | 0.05 | 0.05 | 29 | 41 | 21,542 | 28,515 | 25 | 33 | 0.6 | 1.1 | 1.5 | 2.0 | 2.0 | 2.5 | 14.2 | 15.1 |
| 1-Apr-12 | 88 | 114 | 9349 | 14493 | 13 | 20 | 94 | 6304 | 7541 | 9 | 9 | 96 | 33 | 45 | 7.0 | 6.7 | 0.05 | 0.08 | 31 | 39 | 19,510 | 24,574 | 27 | 33 | 0.3 | 0.8 | 1.3 | 1.8 | 1.7 | 2.3 | 15.8 | 16.7 |
| 1-May-12 | 80 | 107 | 12404 | 16593 | 19 | 24 | 92 | 5929 | 6571 | 9 | 10 | 96 | 85 | 97 | 6.9 | 6.1 | 0.05 | 0.11 | 20 | 35 | 11,836 | 25,791 | 17 | 32 | 5.1 | 11.2 | 3.3 | 4.0 | 4.1 | 5.1 | 17.8 | 18.9 |
| 1-Jun-12 | 77 | 89 | 8194 | 11470 | 13 | 18 | 95 | 6227 | 8745 | 10 | 14 | 96 | 49 | 155 | 6.9 | 6.3 | 0.05 | 0.05 | 6 | 13 | 2,350 | 5,427 | 4 | 9 | 13.1 | 14.7 | 3.5 | 3.6 | 4.0 | 4.5 | 19.2 | 20.4 |
| 1-Jul-12 | 68 | 84 | 5315 | 6462 | 9 | 12 | 96 | 4101 | 4688 | 7 | 9 | 97 | 55 | 100 | 6.7 | 6.2 | 0.05 | 0.06 | 5 | 7.8 | 1,249 | 2,487 | 2 | 5 | 12.6 | 14.0 | 3.7 | 4.1 | 4.0 | 4.6 | 21.2 | 22.1 |
| 1-Aug-12 | 66 | 72 | 6643 | 10009 | 12 | 17 | 95 | 4276 | 5130 | 8 | 10 | 97 | 46 | 64 | 7.1 | 6.4 | 0.06 | 0.1 | 12 | 19 | 3,586 | 8,090 | 6 | 14 | 10.3 | 12.7 | 3.9 | 4.2 | 4.2 | 5.2 | 22.4 | 23.0 |
| 1-Sep-12 | 68 | 74 | 8585 | 9214 | 15 | 16 | 95 | 4573 | 5018 | 8 | 9 | 97 | 33 | 59 | 7.2 | 6.4 | 0.05 | 0.1 | 19 | 25 | 9,169 | 14,017 | 16 | 25 | 6.0 | 9.6 | 2.6 | 3.7 | 3.2 | 4.2 | 22.3 | 22.8 |
| 1-Oct-12 | 70 | 115 | 10873 | 15112 | 19 | 23 | 94 | 4345 | 5382 | 7 | 10 | 98 | 26 | 32 | 7.2 | 6.3 | 0.06 | 0.1 | 28 | 34 | 14,973 | 18,346 | 26 | 34 | 1.8 | 3.1 | 1.4 | 2.1 | 2.0 | 3.5 | 20.7 | 22.0 |
| 1-Nov-12 | 85 | 153 | 13296 | 14204 | 20 | 25 | 94 | 6040 | 9325 | 8 | 10 | 97 | 45 | 147 | 7.0 | 6.6 | <.06 | 0.1 | 26 | 49 | 12,718 | 15,343 | 19 | 27 | 5.4 | 6.8 | 0.9 | 1.9 | 1.2 | 2.2 | 18.1 | 19.6 |
| 1-Dec-12 | 106 | 154 | 19456 | 27070 | 22 | 27 | 90 | 9965 | 15507 | 11 | 15 | 95 | 68 | 136 | 7.0 | 6.4 | <.05 | 0.07 | 21 | 26 | 15,550 | 19,028 | 18 | 22 | 2.6 | 3.7 | 1.4 | 1.9 | 1.5 | 2.1 | 15.7 | 16.7 |
| 1-Jan-13 | 85 | 150 | 12720 | 15471 | 18 | 23 | 93 | 8585 | 10412 | 12 | 13 | 96 | 62 | 93 | 6.9 | 6.5 | <.05 | <.05 | 31 | 41 | 17,749 | 23,138 | 25 | 35 | 0.6 | 1.1 | 1.3 | 1.9 | 1.7 | 2.5 | 14.8 | 15.7 |
| 1-Feb-13 | 72 | 91 | 8820 | 9525 | 15 | 17 | 95 | 6382 | 7059 | 11 | 11 | 96 | 135 | 238 | 6.9 | 6.7 | <.05 | 0.13 | 33 | 38 | 17,653 | 20,357 | 29 | 33 | 1.3 | 3.4 | 1.7 | 2.3 | 2.0 | 2.8 | 15.1 | 15.6 |
| 1-Mar-13 | 73 | 95 | 11587 | 13862 | 19 | 24 | 94 | 6887 | 7640 | 11 | 13 | 96 | 25 | 45 | 6.9 | 6.5 | <.05 | 0.06 | 25 | 32 | 13,514 | 19,413 | 22 | 27 | 4.5 | 6.4 | 2.4 | 2.6 | 2.8 | 3.3 | 15.4 | 16.5 |
| 1-Apr-13 | 82 | 122 | 11288 | 12040 | 16 | 19 | 94 | 8240 | 9516 | 12 | 13 | 96 | 28 | 43 | 6.9 | 6.4 | <.06 | 0.21 | 25 | 38 | 14,990 | 21,588 | 23 | 35 | 1.9 | 3.9 | 2.2 | 2.7 | 2.6 | 3.1 | 15.9 | 16.8 |
| 1-May-13 | 66 | 77 | 7217 | 10499 | 13 | 18 | 96 | 6104 | 7052 | 11 | 12 | 97 | 35 | 55 | 7.0 | 6.9 | <.05 | <.05 | 41 | 48 | 21,277 | 25,087 | 38 | 45 | 0.2 | 0.2 | 1.8 | 3.1 | 2.4 | 3.7 | 18.1 | 18.8 |
| 1-Jun-13 | 65 | 71 | 9891 | 16012 | 18 | 28 | 95 | 5296 | 7201 | 10 | 13 | 97 | 25 | 45 | 7.1 | 6.5 | <.05 | 0.13 | 31 | 50 | 13,878 | 23,006 | 26 | 42 | 3.4 | 7.6 | 2.9 | 3.8 | 3.5 | 4.5 | 20.1 | 22.1 |
| 1-Jul-13 | 63 | 73 | 11008 | 15203 | 21 | 29 | 95 | 8231 | 11895 | 16 | 23 | 96 | 33 | 74 | 6.8 | 6.2 | <.05 | 0.09 | 11 | 20 | 3,606 | 7,345 | 7 | 14 | 15.6 | 16.4 | 3.6 | 4.0 | 4.6 | 5.4 | 21.9 | 22.8 |
| 1-Aug-13 | 64 | 75 | 6447 | 8335 | 12 | 16 | 97 | 4270 | 4274 | 8 | 8 | 98 | 17 | 21 | 6.7 | 6.0 | <.05 | 0.07 | 4 | 7.3 | 387 | 1,339 | 1 | 3 | 15.6 | 17.7 | 3.9 | 4.4 | 4.4 | 4.8 | 22.9 | 23.3 |
| 1-Sep-13 | 69 | 113 | 8512 | 11946 | 14 | 20 | 96 | 5211 | 6748 | 9 | 11 | 97 | 55 | 123 | 9.0 | 6.2 | <.05 | 0.09 | 5 | 9.4 | 1,312 | 4,920 | 2 | 6 | 14.7 | 17.3 | 3.4 | 4.0 | 4.2 | 5.0 | 22.3 | 23.2 |
| 1-Oct-13 | 69 | 95 | 15938 | 20544 | 28 | 38 | 92 | 6038 | 7844 | 11 | 11 | 97 | 159 | 267 | 7.1 | 6.2 | <.05 | 0.16 | 25 | 36 | 12,338 | 18,864 | 22 | 34 | 5.9 | 13.7 | 1.7 | 2.6 | 2.1 | 3.2 | 19.8 | 20.5 |
| 1-Nov-13 | 69 | 92 | 6375 | 8036 | 11 | 14 | 97 | 6621 | 7480 | 12 | 13 | 97 | 19 | 31 | 7.1 | 6.6 | <.05 | 0.07 | 26 | 37 | 13,442 | 18,295 | 23 | 34 | 3.9 | 7.2 | 1.2 | 1.7 | 1.4 | 2.1 | 18.2 | 19.2 |
| 1-Dec-13 | 64 | 80 | 6242 | 6700 | 12 | 13 | 96 | 5944 | 6548 | 11 | 13 | 96 | 47 | 91 | 7.2 | 6.8 | <.05 | <.05 | 42 | 47 | 18,949 | 22,425 | 36 | 42 | 0.2 | 0.2 | 1.1 | 1.5 | 1.7 | 2.0 | 16.2 | 16.7 |
| 1-Jan-14 | 72 | 107 | 10488 | 13239 | 17 | 20 | 94 | 6650 | 9484 | 11 | 15 | 96 | 44 | 60 | 7.0 | 6.6 | <.05 | <.05 | 35 | 50 | 17,568 | 22,220 | 30 | 39 | 0.8 | 2.0 | 0.5 | 0.7 | 1.1 | 1.7 | 15.3 | 15.7 |
| 1-Feb-14 | 86 | 158 | 16731 | 23519 | 23 | 34 | 92 | 8764 | 12620 | 12 | 14 | 96 | 47 | 72 | 6.9 | 6.4 | <.06 | 0.12 | 24 | 32 | 13,521 | 18,124 | 20 | 29 | 2.3 | 5.2 | 0.6 | 1.5 | 1.1 | 2.0 | 14.1 | 14.7 |
| 1-Mar-14 | 104 | 164 | 10187 | 13374 | 12 | 13 | 95 | 7055 | 8780 | 8 | 9 | 96 | 25 | 42 | 7.0 | 6.4 | <.06 | 0.3 | 23 | 29 | 17,541 | 21,329 | 21 | 25 | 0.8 | 2.1 | 0.9 | 1.4 | 1.4 | 2.1 | 14.4 | 16.0 |
| 1-Apr-14 | 76 | 106 | 12732 | 18619 | 20 | 26 | 94 | 5171 | 6747 | 8 | 9 | 97 | 62 | 154 | 7.0 | 6.2 | <.07 | 0.36 | 22 | 33 | 11,633 | 19,180 | 18 | 31 | 7.5 | 16.8 | 2.4 | 3.3 | 2.8 | 4.0 | 16.1 | 17.1 |
| 1-May-14 | 73 | 103 | 8067 | 10052 | 13 | 16 | 96 | 4768 | 5511 | 8 | 9 | 97 | 17 | 57 | 7.0 | 6.3 | <.06 | 0.15 | 20 | 32 | 10,289 | 13,640 | 16 | 24 | 7.6 | 10.6 | 2.3 | 2.4 | 2.8 | 3.5 | 18.1 | 19.3 |
| 1-Jun-14 | 59 | 63 | 7307 | 10949 | 15 | 22 | 96 | 5391 | 8428 | 11 | 17 | 97 | 49 | 74 | 7.0 | 6.3 | <.05 | 0.14 | 15 | 36 | 5,197 | 12,059 | 11 | 24 | 12.1 | 15.5 | 2.6 | 3.2 | 3.1 | 4.2 | 20.2 | 21.3 |
| 1-Jul-14 | 56 | 70 | 4517 | 5054 | 10 | 11 | 98 | 3237 | 4280 | 7 | 9 | 98 | 48 | 62 | 7.2 | 6.3 | <.06 | 0.16 | 13 | 21 | 4,400 | 7,641 | 10 | 16 | 12.5 | 16.9 | 2.7 | 3.6 | 2.4 | 3.7 | 22.1 | 22.7 |
| AVE: | 77 | 107 | 10734 | 13769 | 17 | 20 | 94 | 7425 | 9579 | 11 | 14 | 96 | 54 | 96 | 7.2 | 6.5 | 0.05 | 0.10 | 25 | 34 | 13,895 | 18,329 | 22 | 29 | 4.3 | 6.4 | 2.0 | 2.7 | 2.4 | 3.5 | 17.6 | 18.6 |
| MIN: | 53 | 60 | 4517 | 5054 | 9 | 11 | 90 | 3237 | 4274 | 7 | 8 | 92 | 17 | 21 | 6.7 | 6.0 | 0.05 | 0.05 | 4 | 7 | 387 | 1,339 | 1 | 3 | 0.1 | 0.2 | 0.4 | 0.5 | 0.8 | 1.0 | 13.7 | 14.4 |
| MAX: | 108 | 235 | 19456 | 27070 | 28 | 38 | 98 | 14755 | 21437 | 20 | 25 | 98 | 159 | 272 | 9.0 | 7.1 | 0.11 | 0.36 | 42 | 50 | 21,542 | 28,515 | 38 | 45 | 16 | 18 | 3.9 | 5.4 | 4.6 | 6.7 | 22.9 | 28.5 |
| 5th %tile: | | | | | | | | | | | | | 18.6 | | | | | | | | | | | | | | | | | | | |
| 95th %tile: | | | | | | | | | | | | | | 243 | | | | 0.25 | | | | | | 40 | | | | | | | 22.3 | |
| 85% | 122 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Limits | 144 | | 36,000 | 54,000 | 30 | 45 | 85 | 36,000 | 54,000 | 30 | 45 | 85 | 200 | 400 | 6.0 | 9.0 | 0.50 | 0.75 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | cv= | 0.63 | | | | | | | | | | | | | | |

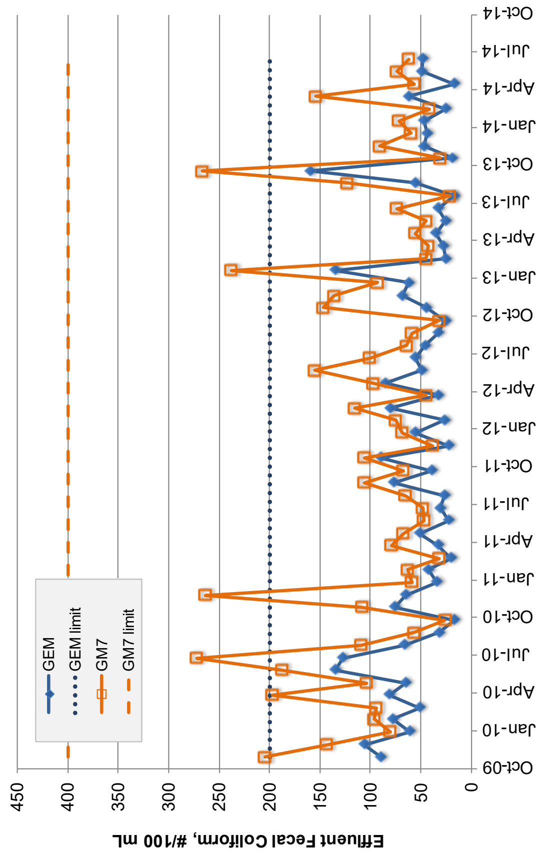
Exceeds Permit Limit

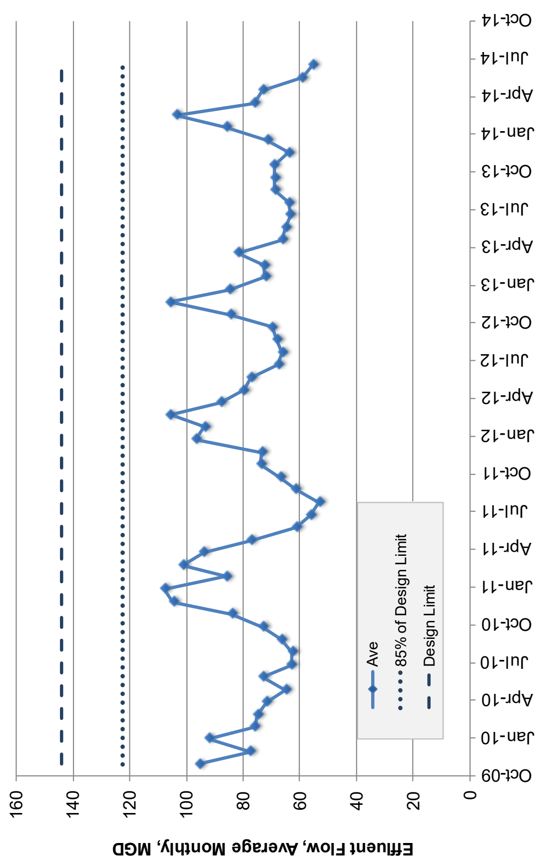

Influent BOD5, Average Monthly, lb/day
Monthly Average
85 % of Max Month Design Flow
Max Month Design Flow

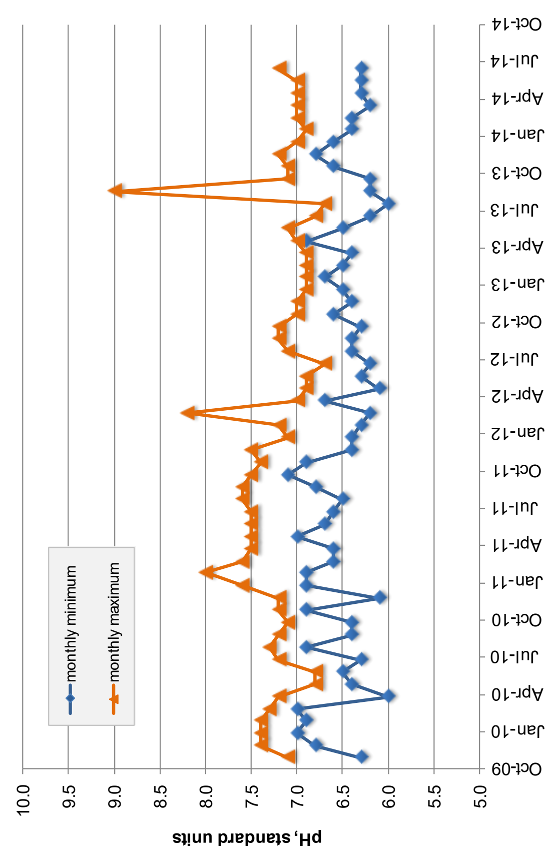

Influent TSS, Average Monthly, lb/day
Monthly Average
85 % of Max Month Design Flow
Max Month Design Flow

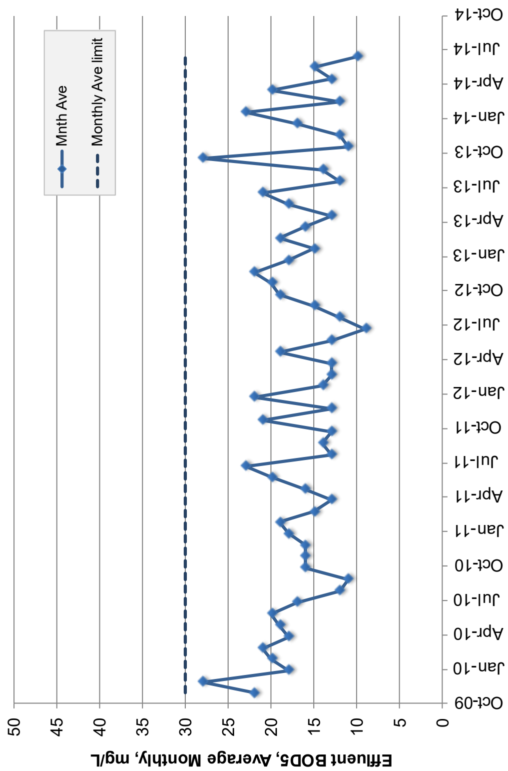

Influent BOD5, Average Monthly, mg/L

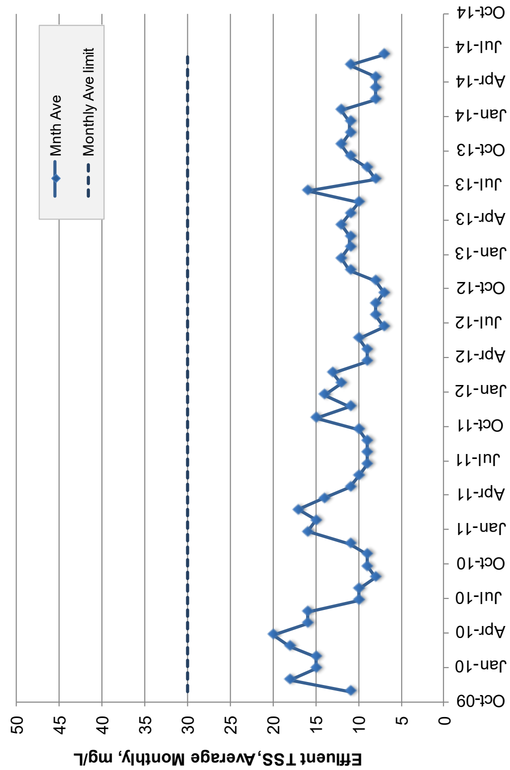

Influent TSS, Average Monthly, mg/L

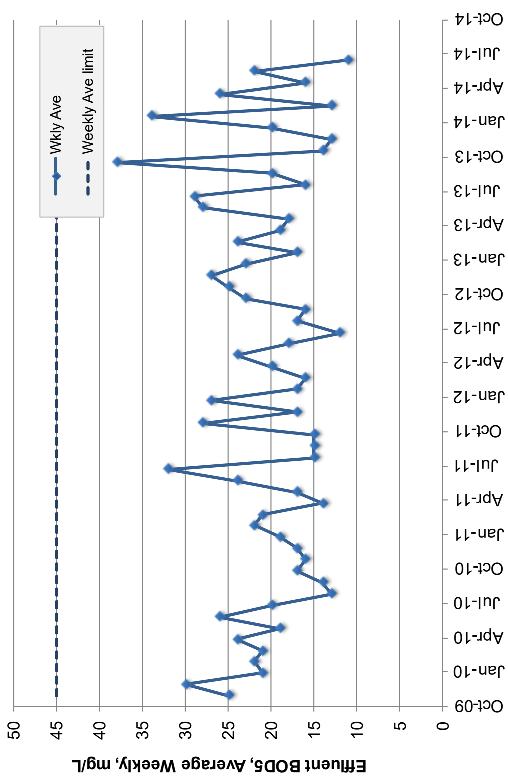

Effluent Fecal Coliform, #/100 mL
GEM
GEM limit
GM7
GM7 limit

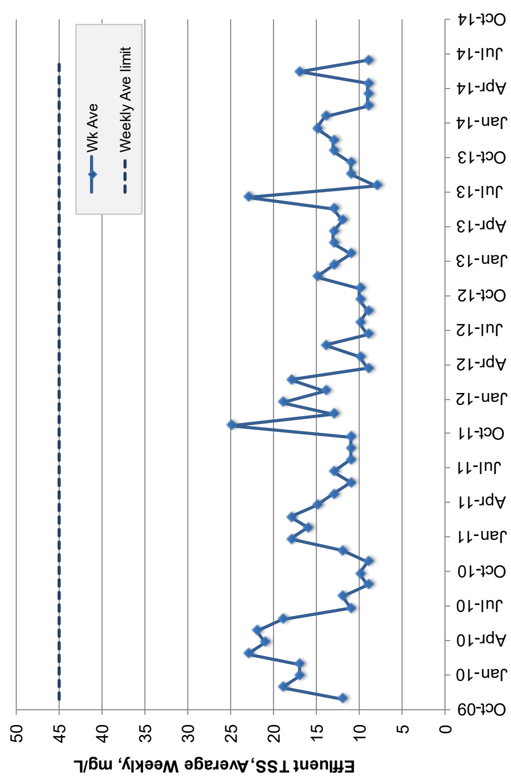

Effluent Flow, Average Monthly, MGD
Ave
85% of Design Limit
Design Limit

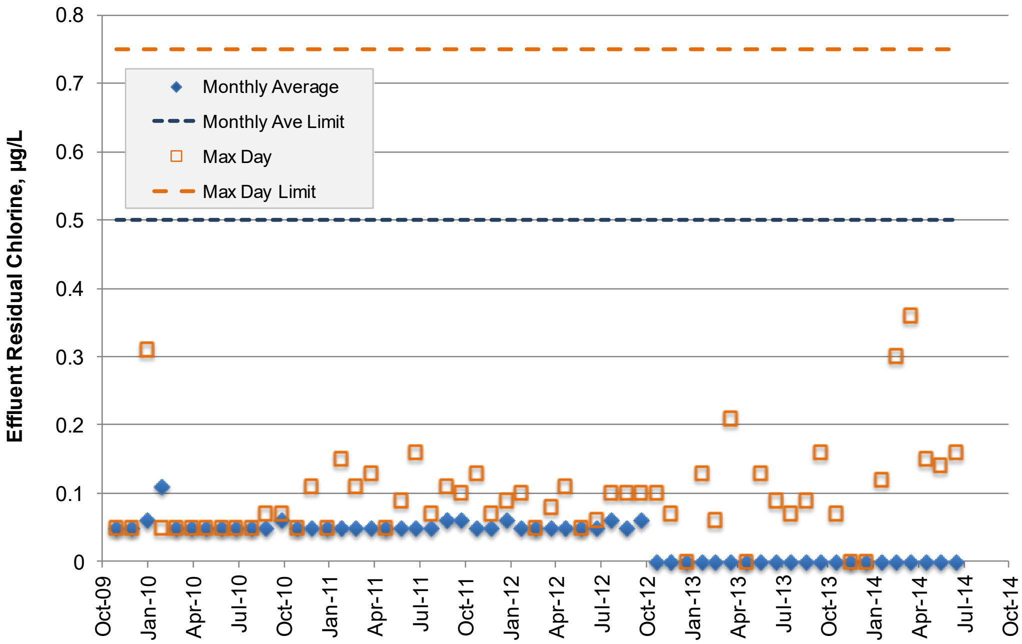

pH, standard units
monthly minimum
monthly maximum


Effluent BOD5, Average Monthly, mg/L
Mnth Ave
Monthly Ave limit


Effluent TSS,Average Monthly, mg/L
Mnth Ave
Monthly Ave limit


Effluent BOD5, Average Weekly, mg/L
Wkly Ave
Weekly Ave limit


Effluent TSS,Average Weekly, mg/L
Wk Ave
Weekly Ave limit


Effluent Residual Chlorine, µg/L
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Monthly Average
Monthly Ave Limit
Max Day
Max Day Limit
Oct-09
Jan-10
Apr-10
Jul-10
Oct-10
Jan-11
Apr-11
Jul-11
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14

## King County South Plant Acute WET Test Results

| Test Code | Date Collected | Organism | Endpoint | NOEC | LOEC | PMSD | % Survival |
|---|---|---|---|---|---|---|---|
| AQTX1261 | 2/7/1997 | rainbow trout | 96-hour Survival | 0.68 | 100 | 20% | 23% |
| AQTX1253 | 4/14/1997 | fathead minnow | 96-hour Survival | 0.68 | 100 | 11% | 78% |
| AQTX1522 | 8/19/1997 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | | 100% |
| AQTX003007 | 9/23/1997 | fathead minnow | 96-hour Survival | 100 | > 100 | 13% | 90% |
| AQTX1640 | 11/18/1997 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | | 100% |
| AQTX1639 | 11/18/1997 | fathead minnow | 96-hour Survival | 50 | 100 | 7% | 88% |
| AQTX1884 | 2/26/1998 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 9% | 95% |
| AQTX1883 | 2/26/1998 | fathead minnow | 96-hour Survival | 100 | > 100 | 8% | 95% |
| AQTX1888 | 5/19/1998 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 8% | 100% |
| AQTX1887 | 5/19/1998 | fathead minnow | 96-hour Survival | 100 | > 100 | 5% | 100% |
| AQTX002998 | 8/4/1999 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | | 100% |
| AQTX002997 | 8/4/1999 | fathead minnow | 96-hour Survival | 100 | > 100 | | 100% |
| AQTX002994 | 7/19/2001 | fathead minnow | 96-hour Survival | 100 | > 100 | 12% | 93% |
| AQTX002993 | 7/19/2001 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | | 100% |
| AQTX002989 | 12/5/2001 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | | 100% |
| AQTX002990 | 12/5/2001 | fathead minnow | 96-hour Survival | 100 | > 100 | 11% | 100% |
| RMAR1177 | 2/8/2008 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 14% | 75% |
| RMAR1178 | 2/11/2008 | fathead minnow | 96-hour Survival | 100 | > 100 | 11% | 88% |
| RMAR1210 | 4/2/2008 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 5% | 100% |
| RMAR1208 | 4/7/2008 | fathead minnow | 96-hour Survival | 100 | > 100 | 29% | 78% |
| RMAR1298 | 7/9/2008 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 9% | 100% |
| RMAR1296 | 8/18/2008 | fathead minnow | 96-hour Survival | 100 | > 100 | 19% | 85% |
| RMAR1327 | 10/8/2008 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 5% | 100% |
| RMAR1325 | 10/13/2008 | fathead minnow | 96-hour Survival | 100 | > 100 | 9% | 93% |
| RMAR2684 | 8/21/2012 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 11% | 100% |
| RMAR2683 | 8/21/2012 | fathead minnow | 96-hour Survival | 100 | > 100 | 8% | 98% |
| RMAR2829 | 2/6/2013 | *Daphnia pulex* | 48-hour Survival | 100 | > 100 | 5% | 100% |
| RMAR2831 | 2/11/2013 | fathead minnow | 96-hour Survival | 100 | > 100 | 5% | 95% |

**King County South Plant Chronic WET Test Results**

| Test Code | Collected | Organism | Endpoint | NOEC | LOEC | PMSD |
|---|---|---|---|---|---|---|
| AQTX1262 | 2/7/1997 | *Ceriodaphnia dubia* | 7-day Survival | 0.68 | > 0.68 | |
| | | | Reproduction | 0.68 | > 0.68 | 23% |
| AQTX1252 | 4/11/1997 | fathead minnow | 7-day Survival | 0.68 | > 0.68 | 3% |
| | | | Biomass | 0.68 | > 0.68 | 14% |
| | | | Weight | 0.68 | > 0.68 | 14% |
| RMAR0141 | 9/12/1997 | Atlantic mysid | 7-day Survival | 25 | 50 | 7% |
| | | | Biomass | 12.5 | 25 | 10% |
| | | | Weight | 12.5 | 25 | 11% |
| RMAR0142 | 9/12/1997 | inland silverside | 7-day Survival | 50 | 100 | 3% |
| | | | Biomass | 25 | 50 | 17% |
| | | | Weight | 25 | 50 | 17% |
| AQTX1651 | 12/3/1997 | Atlantic mysid | 7-day Survival | 50 | 100 | 12% |
| | | | Biomass | 6.25 | 12.5 | 17% |
| | | | Weight | 0.76 | 6.25 | 15% |
| AQTX1652 | 12/3/1997 | inland silverside | 7-day Survival | 50 | 100 | 12% |
| | | | Biomass | 25 | 50 | 11% |
| | | | Weight | 25 | 50 | 10% |
| AQTX1886 | 3/4/1998 | Atlantic mysid | 7-day Survival | 50 | 100 | 16% |
| | | | Biomass | 25 | 50 | 20% |
| | | | Weight | 100 | > 100 | 31% |
| AQTX1885 | 3/4/1998 | inland silverside | 7-day Survival | 50 | 100 | 15% |
| | | | Biomass | 25 | 50 | 15% |
| | | | Weight | 25 | 50 | 13% |
| AQTX1890 | 6/3/1998 | Atlantic mysid | 7-day Survival | 25 | 50 | 20% |
| | | | Biomass | 25 | 50 | 22% |
| | | | Weight | 25 | 50 | 23% |
| AQTX1889 | 6/3/1998 | inland silverside | 7-day Survival | 50 | 100 | |
| | | | Biomass | 50 | 100 | 25% |
| | | | Weight | 50 | > 50 | 22% |
| AQTX002996 | 8/11/1999 | Atlantic mysid | 7-day Survival | 50 | 100 | 19% |
| | | | Biomass | 25 | 50 | 28% |
| | | | Weight | 100 | > 100 | 80% |
| AQTX002995 | 8/11/1999 | inland silverside | 7-day Survival | 25 | 50 | 10% |
| | | | Biomass | 12.5 | 25 | 17% |
| | | | Weight | 12.5 | 25 | 17% |
| AQTX002991 | 7/11/2001 | Atlantic mysid | 7-day Survival | 50 | 100 | 23% |
| | | | Biomass | 50 | 100 | 26% |
| | | | Biomass | 50 | 100 | 26% |
| AQTX002992 | 7/11/2001 | inland silverside | 7-day Survival | 12.5 | 25 | 11% |
| | | | Biomass | 25 | 50 | 22% |
| | | | Weight | 50 | > 50 | 24% |
| AQTX002988 | 11/28/2001 | Atlantic mysid | 7-day Survival | 50 | 100 | 17% |
| | | | Biomass | 50 | 100 | 23% |
| | | | Weight | 50 | 100 | 22% |
| AQTX002987 | 11/28/2001 | inland silverside | 7-day Survival | 50 | 100 | 18% |
| | | | Biomass | 50 | 100 | 18% |
| | | | Weight | 50 | 100 | 17% |
| RMAR1180 | 2/6/2008 | Atlantic mysid | 7-day Survival | 12.5 | 25 | 15% |
| | | | Biomass | 0.43 | 12.5 | 15% |
| | | | Weight | 0.43 | 12.5 | 15% |
| RMAR1179 | 2/6/2008 | topsmelt | 7-day Survival | 12.5 | 25 | 13% |
| | | | Biomass | 0.43 | 12.5 | 16% |
| | | | Weight | 0.43 | 12.5 | 11% |
| RMAR1207 | 4/2/2008 | Atlantic mysid | 7-day Survival | 50 | 100 | 12% |
| | | | Biomass | 12.5 | 25 | 14% |
| | | | Weight | 0.43 | 12.5 | 12% |
| RMAR1209 | 4/2/2008 | topsmelt | 7-day Survival | 25 | 50 | 12% |
| | | | Biomass | 12.5 | 25 | 15% |
| | | | Weight | 12.5 | 25 | 13% |
| RMAR1299 | 7/9/2008 | Atlantic mysid | 7-day Survival | 50 | 100 | 13% |
| | | | Biomass | 12.5 | 25 | 13% |
| | | | Weight | 12.5 | 25 | 12% |
| RMAR1297 | 7/9/2008 | topsmelt | 7-day Survival | 50 | 100 | 15% |
| | | | Biomass | 25 | 50 | 22% |
| | | | Weight | 25 | 50 | 19% |
| RMAR1328 | 10/8/2008 | Atlantic mysid | 7-day Survival | 50 | 100 | 16% |
| | | | Biomass | 25 | 50 | 15% |
| | | | Weight | 25 | 50 | 12% |
| RMAR1326 | 10/8/2008 | topsmelt | 7-day Survival | 50 | 100 | 7% |
| | | | Biomass | 50 | 100 | 20% |
| | | | Weight | 50 | > 50 | 19% |
| RMAR2771 | 10/31/2012 | Atlantic mysid | 7-day Survival | 50 | 100 | 16% |
| | | | Biomass | 25 | 50 | 17% |
| | | | Weight | 25 | 50 | 16% |
| RMAR2770 | 10/31/2012 | topsmelt | 7-day Survival | 50 | 100 | 16% |
| | | | Biomass | 25 | 50 | 24% |
| | | | Weight | 25 | 50 | 16% |
| RMAR2828 | 2/6/2013 | Atlantic mysid | 7-day Survival | 50 | 100 | 13% |
| | | | Biomass | 12.5 | 25 | 15% |
| | | | Weight | 0.54 | 12.5 | 10% |
| RMAR2830 | 2/6/2013 | topsmelt | 7-day Survival | 50 | 100 | 14% |
| | | | Biomass | 25 | 50 | 18% |
| | | | Weight | 25 | 50 | 15% |

# Appendix E — Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found in the PermitCalc workbook on Ecology's webpage at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.

### *Simple Mixing:*

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (MC) is based on the following calculation:

MC = [EC + (AC x DF)]/(1 + DF)

where:

EC = Effluent Concentration

AC = Ambient Concentration

DF = Dilution Factor

### *Reasonable Potential Analysis:*

The process and formulas for determining reasonable potential and effluent limits are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

### *Calculation of Water Quality-Based Effluent Limits:*

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 1991) and shown below.

1. Calculate the acute wasteload allocation $WLA_a$ by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation ($WLA_c$) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

   $WLA_a$ = (acute criteria x $DF_a$) – [(background conc.x ($DF_a$ - 1)]

   $WLA_c$ = (chronic criteria x $DF_c$) – [(background conc. x ($DF_c$ -1)]

   where: $DF_a$ = Acute Dilution Factor

   $DF_c$ = Chronic Dilution Factor

2. Calculate the long term averages ($LTA_a$ and $LTA_c$) which will comply with the wasteload allocations $WLA_a$ and $WLA_c$.

   $LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[CV^2 + 1]$

   $z = 2.326$

   CV = coefficient of variation = std. dev./mean

   $LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[(CV^2 \div 4) + 1]$

   $z = 2.326$

3. Use the smallest LTA of the $LTA_a$ or $LTA_c$ to calculate the maximum daily effluent limit and the monthly average effluent limit.

*Maximum Daily Limit = MDL*

MDL = LTA x $e^{[Z\sigma - 0.5\sigma^2]}$ where: $\sigma^2 = \ln[CV^2 + 1]$
z = 2.326 (99th percentile occurrence)
LTA = Limiting long term average

*Average Monthly Limit = AML*

AML = LTA x $e^{[Z\sigma_n - 0.5\sigma_n^2]}$ where: $\sigma_n^2 = \ln[(CV^2 \div n) + 1]$
n = number of samples/month
z = 1.645 (95th percentile occurrence)
LTA = Limiting long term average

## Mixing Model Output Files

**Critical Case: South TP 17-December 2001 Acute 90% Currents**

/ UM3. Case 2; ambient file P:\plumes\vplumes\South\South.012.db; Diffuser table record 1: ----------------------------------

Ambient Table:

| Depth | Amb-cur | Amb-dir | Amb-sal | Amb-tem | Amb-pol | Decay | Far-spd | Far-dir | Disprsn | Density |
|---|---|---|---|---|---|---|---|---|---|---|
| m | m/s | deg | psu | C | kg/kg | s-1 | m/s | deg | m0.67/s2 | sigma-T |
| 0.0 | 0.39 | 0.0 | 29.57 | 10.0 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 22.75 |
| 5.0 | 0.39 | 0.0 | 29.98 | 9.99 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.07 |
| 15.0 | 0.39 | 0.0 | 30.0 | 10.0 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.08 |
| 25.0 | 0.39 | 0.0 | 30.01 | 10.01 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.09 |
| 35.0 | 0.39 | 0.0 | 30.02 | 10.02 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.09 |
| 45.0 | 0.39 | 0.0 | 30.03 | 10.03 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.1 |
| 55.0 | 0.14 | 0.0 | 30.05 | 10.05 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.11 |
| 65.0 | 0.14 | 0.0 | 30.07 | 10.06 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.13 |
| 75.0 | 0.14 | 0.0 | 30.11 | 10.1 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.16 |
| 85.0 | 0.14 | 0.0 | 30.14 | 10.1 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.18 |
| 95.0 | 0.14 | 0.0 | 30.2 | 10.11 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.22 |
| 105.0 | 0.14 | 0.0 | 30.23 | 10.12 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.24 |
| 115.0 | 0.14 | 0.0 | 30.23 | 10.13 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.24 |
| 125.0 | 0.18 | 0.0 | 30.3 | 10.12 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.29 |
| 135.0 | 0.18 | 0.0 | 30.33 | 10.1 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.32 |
| 145.0 | 0.18 | 0.0 | 30.38 | 10.13 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.36 |
| 155.0 | 0.18 | 0.0 | 30.38 | 10.13 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.36 |
| 165.0 | 0.14 | 0.0 | 30.39 | 10.13 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.36 |
| 175.0 | 0.14 | 0.0 | 30.39 | 10.13 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.36 |
| 185.0 | 0.14 | 0.0 | 30.39 | 10.13 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0003 | 23.36 |

Diffuser table:

| P-dia | P-elev | V-angle | H-angle | Ports | Spacing | SttTime | EndTime | Incrmnt | AcuteMZ | ChrncMZ | P-depth | Ttl-flo | Eff-sal | Temp | Polutnt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (in) | (ft) | (deg) | (deg) | () | (ft) | (hr) | (hr) | (hr) | (ft) | (ft) | (ft) | (MGD) | (psu) | (C) | (kg/kg) |
| 4.0 | 5.0 | 60.0 | 0.0 | 168.0 | 3.0 | 3.0 | 27.0 | 3.0 | 82.0 | 823.0 | 623.0 | 117.0 | 0.0 | 12.0 | 100.0 |
| P-dia | P-elev | V-angle | H-angle | Ports | Spacing | SttTime | EndTime | Incrmnt | AcuteMZ | ChrncMZ | P-depth | Ttl-flo | Eff-sal | Temp | Polutnt |
| (in) | (ft) | (deg) | (deg) | () | (ft) | (hr) | (hr) | (hr) | (ft) | (ft) | (ft) | (MGD) | (psu) | (C) | (kg/kg) |
| 4.0 | 5.0 | 60.0 | 0.0 | 168.0 | 3.0 | 3.0 | 27.0 | 3.0 | 82.0 | 823.0 | 623.0 | 117.0 | 0.0 | 12.0 | 100.0 |

Simulation:

Froude number: 24.43; effluent density (sigma-T) -0.43777851; effluent velocity 3.764(m/s);

| Step | Depth | Amb-cur | P-dia | Polutnt | Dilutn | x-posn | y-posn |
|---|---|---|---|---|---|---|---|
| | (ft) | (cm/s) | (in) | (kg/kg) | () | (ft) | (ft) |
| 0 | 623.0 | 14.0 | 4.0 | 100.0 | 1.0 | 0.0 | 0.0; |
| 100 | 619.2 | 14.0 | 26.0 | 13.8 | 7.099 | 2.606 | 0.0; |
| 119 | 617.7 | 14.0 | 36.01 | 9.475 | 10.33 | 3.794 | 0.0; merging; |
| 200 | 596.4 | 14.0 | 249.4 | 1.905 | 51.29 | 22.94 | 0.0; |
| 265 | 521.8 | 16.16 | 971.2 | 0.526 | 185.7 | 82.29 | 0.0; acute zone; |
| 300 | 443.1 | 18.0 | 2023.2 | 0.263 | 371.4 | 151.5 | 0.0; |
| 312 | 406.8 | 17.96 | 2730.3 | 0.208 | 470.7 | 190.8 | 0.0; trap level; |
| 323 | 383.8 | 14.98 | 3475.1 | 0.179 | 544.8 | 221.7 | 0.0; begin overlap; |
| 382 | 348.3 | 14.0 | 5032.6 | 0.155 | 628.8 | 337.1 | 0.0; local maximum rise or fall; |

**Critical Case: South TP 21-Sept 1999 Chronic 50% Currents**

```
     1 : case 3 (NRFIELD)
   3.1536       168     0.1016    60.0000   188.5000
   0.0690    90.0000     1.8300
       20     0.998945     0.0000    16.0000
   0.0000 1.0221621    29.5120    12.9160     0.1250     0.0000
   5.0000 1.0222872    29.5920    12.5800     0.1250     0.0000
  15.0000 1.0223851    29.6490    12.2900     0.1250     0.0000
  25.0000 1.0223939    29.6530    12.2600     0.1250     0.0000
  35.0000 1.0225008    29.7250    11.9800     0.1250     0.0000
  45.0000 1.0226498    29.8500    11.6900     0.1250     0.0000
  55.0000 1.0227789    29.9660    11.4700     0.0510     0.0000
  65.0000 1.0227952    29.9800    11.4400     0.0510     0.0000
  75.0000 1.0228463    30.0320    11.3800     0.0510     0.0000
  85.0000 1.0228694    30.0570    11.3600     0.0510     0.0000
  95.0000 1.0228750    30.0640    11.3600     0.0510     0.0000
 105.0000 1.0228966    30.0870    11.3400     0.0510     0.0000
 115.0000 1.0229409    30.1370    11.3100     0.0510     0.0000
 125.0000 1.0229897    30.1840    11.2400     0.0750     0.0000
 135.0000 1.0230134    30.2120    11.2300     0.0750     0.0000
 145.0000 1.0230953    30.2970    11.1400     0.0750     0.0000
 155.0000 1.0231742    30.3850    11.0800     0.0750     0.0000
 165.0000 1.0232422    30.4590    11.0200     0.0690     0.0000
 175.0000 1.0232739    30.4950    11.0000     0.0690     0.0000
 185.0000 1.0233255    30.5460    10.9310     0.0690     0.0000
```

```
 Results:

 Lengthscale ratios       s/lb     lm/lb
                          .078      .071
   .07  = Froude number, u3/b, F
  61.4  = Height to wastefield top, ze (m)
 127.1  = Wastefield submergence below surface (m)
  42.5  = Wastefield thickness, he = (m)
  40.1  = Height to level of cmax, zm (m)
  47.2  = Mixing region length, xi (m)
   187. = Minimum dilution, Sm
   215. = Flux-average dilution, Sfa =1.15 x Sm

FARFIELD CALCULATION Constant Diffusivity 0.0003 m^2/3/s
based on Wastefield width of 152.9 m

Distance (m)  Dilution
251     225
```

---

**Critical Case: South TP 19-Sept 2000 Human Health 50% Currents**

```
   2 : case 3 (NRFIELD)

   2.3214       168    0.1016   60.0000  188.5000
   0.0690   90.0000    1.8300
       20     0.998945    0.0000   16.0000
   0.0000 1.0222418   29.7070   13.2870    0.1250    0.0000
   5.0000 1.0225323   29.9990   12.9500    0.1250    0.0000
  15.0000 1.0226990   30.1190   12.5600    0.1250    0.0000
  25.0000 1.0227208   30.1300   12.4900    0.1250    0.0000
  35.0000 1.0227912   30.1870   12.3500    0.1250    0.0000
  45.0000 1.0228862   30.2500   12.1000    0.1250    0.0000
  55.0000 1.0229816   30.3330   11.9300    0.0510    0.0000
  65.0000 1.0230198   30.3680   11.8700    0.0510    0.0000
  75.0000 1.0230740   30.4190   11.7900    0.0510    0.0000
  85.0000 1.0231034   30.4450   11.7400    0.0510    0.0000
  95.0000 1.0231583   30.4970   11.6600    0.0510    0.0000
 105.0000 1.0231858   30.5230   11.6200    0.0510    0.0000
 115.0000 1.0231940   30.5310   11.6100    0.0510    0.0000
 125.0000 1.0232333   30.5630   11.5300    0.0750    0.0000
 135.0000 1.0232487   30.5780   11.5100    0.0750    0.0000
 145.0000 1.0232641   30.5930   11.4900    0.0750    0.0000
 155.0000 1.0232862   30.6190   11.4800    0.0750    0.0000
 165.0000 1.0232903   30.6240   11.4800    0.0690    0.0000
 175.0000 1.0233009   30.6350   11.4700    0.0690    0.0000
 185.0000 1.0233087   30.6430   11.4620    0.0690    0.0000
 Results:

 Lengthscale ratios       s/lb     lm/lb
                          .049      .030

   .09  = Froude number, u3/b, F

  96.8  = Height to wastefield top, ze (m)
  91.7  = Wastefield submergence below surface (m)
  67.0  = Wastefield thickness, he = (m)
  63.3  = Height to level of cmax, zm (m)
  74.5  = Mixing region length, xi (m)

   361. = Minimum dilution, Sm
   415. = Flux-average dilution, Sfa =1.15 x Sm

FARFIELD CALCULATION Constant Diffusivity 0.0003 m^2/3/s
based on Wastefield width of 152.9 m

Distance (m)  Dilution
251     428.
```

## Calculation of $BOD_5$ Oxidation with Temperature Adjustment

| INPUT | | Notes |
|---|---|---|
| Effluent $BOD_5$ (mg/L) | 45 | Tech-based permitted max w eekly value |
| Effluent Dissolved Oxygen (DO) (mg/L) | 1 | Conservative estimate, small impact on results |
| Receiving Water Temperature (deg C) | 12.7 | 1 DADMax value from KC's ambient study |
| Receiving Water DO (mg/L) | 5.8 | KC's 2013 Receving Water Rpt -10th percentile |
| DO WQ Standards (mg/L) | 7 | |
| Chronic Mixing Dilution Factor | 225 | |
| Time for effluent to travel from outfall to chronic mixing boundary (days) | 0.580 | Small impact, so approximate-->Mixing document show s min current = 0.005 m/s, therefore to reach chronic boundary at 825' (251 m) w ould take approx 0.58 days. |
| Oxidation rate of BOD, base e at 20 deg C, $k_1$ (day^-1)* | 0.23 | *$k_1$ = 0.12-0.23 $day^{-1}$ for effluent from biological treatment process (*Metcalf and Eddy Wastewater Engineering Treatment and Reuse. Fourth edition* , page 86. 2003.) |
| **OUTPUT** | | |
| Effluent Ultimate BOD (mg/L) | 65.9 | |
| Oxidation rate of BOD at ambient temperature, base e (day^-1) | 0.16 | |
| BOD oxidized between outfall and chronic mixing zone (mg/L) | 6.0 | |
| **RESULTS** | | |
| DO at chronic mixing zone | 5.75 | |
| Difference between ambient DO and DO at chronic mixing boundary | 0.05 | |
| **There is no reasonable potential of not meeting the DO criteria under these conditions.** | | |

## Calculation of Fecal Coliform at Chronic Mixing Zone

| INPUT | | |
|---|---|---|
| Chronic Dilution Factor | 225 | |
| Receiving Water Fecal Coliform, #/100 ml | 1 | Maximum value from KC's 2013 ambient study |
| Effluent Fecal Coliform - worst case, #/100 ml | 400 | Maximum permitted limit |
| Surface Water Criteria, #/100 ml | *14* | |
| **OUTPUT** | | |
| **Fecal Coliform at Mixing Zone Boundary, #/100 ml** | **3** | |
| Difference between mixed and ambient, #/100 ml | 2 | |

**Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.**

## Reasonable Potential Calculation

| | |
|---|---|
| **Facility** | King County South Plant WWTP |
| **Water Body Type** | Marine |

| Dilution Factors: | Acute | Chronic |
|---|---|---|
| Aquatic Life | 186 | 225 |
| Human Health Carcinogenic | | 428 |
| Human Health Non-Carcinogenic | | 428 |

| | **Pollutant, CAS No. & NPDES Application Ref. No.** | | AMMONIA, Criteria as Total NH3 | ANTIMONY (INORGANIC) 7440360 1M | ARSENIC (dissolved) 7440382 2M | BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B | CADMIUM - 7440439 4M Hardness dependent | CHLOROFORM 67663 11V | CHROMIUM(HEX) 18540299 | COPPER - 744058 6M Hardness dependent | CYANIDE 57125 14M | 1,4 DICHLOROBENZENE 106467 22B | 2,4 DICHLOROPHENOL 120832 2A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Effluent Data** | # of Samples (n) | | 60 | 29 | 29 | 22 | 29 | 23 | 29 | 29 | 28 | 23 | 22 |
| | Coeff of Variation (Cv) | | 0.6 | 0.28 | 0.12 | 0.62 | 0.61 | 0.5 | 0.22 | 0.24 | 0.91 | 1.03 | 0.91 |
| | Effluent Concentration, ug/L (Max. or 95th Percentile) | | 45,000 | | 1.74 | | 0.05 | | 0.9 | 13.3 | 12.1 | | |
| | Calculated 50th percentile Effluent Conc. (when n>10) | | | 0.42 | | 1.37 | | 0.5 | | | 2.5 | 0.5 | 0.28 |
| **Receiving Water Data** | 90th Percentile Conc., ug/L | | 0.085 | | 1.45 | | 0.073 | | 0.15 | 0.354 | 0 | | |
| | Geo Mean, ug/L | | | 0.172 | | 0 | | 0 | | | 0 | 0 | 0 |
| **Water Quality Criteria** | Aquatic Life Criteria, ug/L | Acute | 9,900 | - | 69 | - | 42 | - | 1100 | 4.8 | 0.91 | - | - |
| | | Chronic | 1,487 | - | 36 | - | 9.3 | - | 50 | 3.1 | 2.8 | - | - |
| | WQ Criteria for Protection of Human Health, ug/L | | - | 4300 | - | 5.9 | - | 470 | - | - | 220000 | 2600 | 790 |
| | Metal Criteria Translator, decimal | Acute | - | - | 1 | - | 0.994 | - | 0.993 | 0.83 | - | - | - |
| | | Chronic | - | - | - | - | 0.994 | - | 0.993 | 0.83 | - | - | - |
| | Carcinogen? | | N | N | Y | Y | N | Y | N | N | N | N | N |

**Aquatic Life Reasonable Potential**

| | | | AMMONIA | ANTIMONY | ARSENIC | BIS(2-ETHYLHEXYL) PHTHALATE | CADMIUM | CHLOROFORM | CHROMIUM(HEX) | COPPER | CYANIDE | 1,4 DICHLOROBENZENE | 2,4 DICHLOROPHENOL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effluent percentile value | | | 0.950 | | 0.950 | | 0.950 | | 0.950 | 0.950 | 0.950 | | |
| s | $s^2=\ln(CV^2+1)$ | | 0.555 | | 0.120 | | 0.562 | | 0.217 | 0.237 | 0.777 | | |
| Pn | $Pn=(1\text{-confidence level})^{1/n}$ | | 0.951 | | 0.902 | | 0.902 | | 0.902 | 0.902 | 0.899 | | |
| Multiplier | | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | 1.00 | | |
| Max concentration (ug/L) at edge of... | | Acute | 242 | | 1.452 | | 0.073 | | 0.154 | 0.411 | 0.065 | | |
| | | Chronic | 200 | | 1.451 | | 0.073 | | 0.153 | 0.401 | 0.054 | | |
| **Reasonable Potential? Limit Required?** | | | **NO** | | **NO** | | **NO** | | **NO** | **NO** | **NO** | | |

**Human Health Reasonable Potential**

| | | AMMONIA | ANTIMONY | ARSENIC | BIS(2-ETHYLHEXYL) PHTHALATE | CADMIUM | CHLOROFORM | CHROMIUM(HEX) | COPPER | CYANIDE | 1,4 DICHLOROBENZENE | 2,4 DICHLOROPHENOL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| s | $s^2=\ln(CV^2+1)$ | | 0.2747 | | 0.5703 | | 0.4724 | | | 0.7767 | 0.8504 | 0.7767 |
| Pn | Pn=(1-confidence level)1/n | | 0.902 | | 0.873 | | 0.878 | | | 0.899 | 0.878 | 0.873 |
| Multiplier | | | 0.7012 | | 0.5222 | | 0.5769 | | | 0.372 | 0.3715 | 0.4128 |
| Dilution Factor | | | 428 | | 428 | | 428 | | | 428 | 428 | 428 |
| Max Conc. at edge of Chronic Zone, ug/L | | | 0.1726 | | 0.0032 | | 1.2E-03 | | | 0.0058 | 0.0012 | 0.0007 |
| **Reasonable Potential? Limit Required?** | | | **NO** | | **NO** | | **NO** | | | **NO** | **NO** | **NO** |

**Comments/Notes:**

**References:** WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

## Reasonable Potential Calculation - Page 2

| | |
|---|---|
| **Facility** | King County South Plant WWTP |
| **Water Body Type** | Marine |

| Dilution Factors: | Acute | Chronic |
|---|---|---|
| Aquatic Life | 186 | 225 |
| Human Health Carcinogenic | | 428 |
| Human Health Non-Carcinogenic | | 428 |

| **Pollutant, CAS No. & NPDES Application Ref. No.** | | DIETHYLPHTHALATE 84662 24B | LEAD - 7439921 7M Dependent on hardness | MERCURY 7439976 8M | NICKEL - 7440020 9M - Dependent on hardness | NONYLPHENOL | SILVER - 7740224 11M dependent on hardness. | TETRACHLOROETHYLENE 127184 24V | TRICHLOROPHENOL 2,4,6 88062 11A | ZINC- 7440666 13M hardness dependent | CHLORINE (Total Residual) 7782505 | Polychlorinated Biphenyls (PCB's)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Effluent Data** | # of Samples (n) | 22 | 29 | 29 | 29 | 2 | 29 | 23 | 22 | 29 | 1800 | 11 |
| | Coeff of Variation (Cv) | 0.52 | 0.66 | 0.21 | 0.17 | 0.6 | 0.51 | 0.43 | 0.33 | 0.18 | 0.64 | 0.561 |
| | Effluent Concentration, ug/L (Max. or 95th Percentile) | 0.5 | 0.9 | 0.0065 | 3.15 | 3.26 | 0.13 | | | 43.7 | 750 | 0.12 |
| | Calculated 50th percentile Effluent Conc. (when n>10) | 0.24 | | 0.0051 | 2.32 | | | 0.5 | 0.95 | | | 0.06 |
| **Receiving Water Data** | 90th Percentile Conc., ug/L | | 0.006 | 0.0002 | 0.427 | 0 | 0.026 | | | 0.605 | 0 | 0 |
| | Geo Mean, ug/L | 0 | | 0.0002 | 0.427 | | | 0 | 0 | | | 0 |
| **Water Quality Criteria** | Aquatic Life Criteria, ug/L Acute | - | 210 | 1.8 | 74 | 7 | 1.9 | - | - | 90 | 13 | 10 |
| | Aquatic Life Criteria, ug/L Chronic | - | 8.1 | 0.025 | 8.2 | 1.7 | - | - | - | 81 | 7.5 | 0.03 |
| | WQ Criteria for Protection of Human Health, ug/L | 120000 | - | 0.15 | 4600 | - | - | 8.85 | 6.5 | - | - | 0.0002 |
| | Metal Criteria Translator, decimal Acute | - | 0.951 | 0.85 | 0.99 | - | 0.85 | - | - | 0.946 | - | - |
| | Metal Criteria Translator, decimal Chronic | - | 0.951 | - | 0.99 | - | - | - | - | 0.946 | - | - |
| | Carcinogen? | N | N | N | N | N | N | Y | Y | N | N | Y |

**Aquatic Life Reasonable Potential**

| | | DEHP | Lead | Mercury | Nickel | Nonylphenol | Silver | Tetrachloroethylene | Trichlorophenol | Zinc | Chlorine | PCBs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effluent percentile value | | | 0.950 | 0.950 | 0.950 | 0.950 | 0.950 | | | 0.950 | 0.950 | 0.950 |
| s | $s^2=\ln(CV^2+1)$ | | 0.601 | 0.208 | 0.169 | 0.555 | 0.481 | | | 0.179 | 0.586 | 0.523 |
| Pn | $Pn=(1\text{-confidence level})^{1/n}$ | | 0.902 | 0.902 | 0.902 | 0.224 | 0.902 | | | 0.902 | 0.998 | 0.762 |
| Multiplier | | | 1.00 | 1.00 | 1.00 | 3.79 | 1.00 | | | 1.00 | 1.00 | 1.63 |
| Max concentration (ug/L) at edge of... | Acute | | 0.011 | 0.000 | 0.441 | 0.067 | 0.026 | | | 0.824 | 4.032 | 0.001 |
| | Chronic | | 0.010 | 0.000 | 0.439 | 0.055 | 0.026 | | | 0.786 | 3.333 | 0.001 |
| **Reasonable Potential? Limit Required?** | | | **NO** | **NO** | **NO** | **NO** | **NO** | | | **NO** | **NO** | **NO** |

**Human Health Reasonable Potential**

| | | DEHP | Lead | Mercury | Nickel | Nonylphenol | Silver | Tetrachloroethylene | Trichlorophenol | Zinc | Chlorine | PCBs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| s | $s^2=\ln(CV^2+1)$ | 0.4892 | | 0.2077 | 0.1688 | | | 0.4119 | 0.3215 | | | 0.5231 |
| Pn | Pn=(1-confidence level)1/n | 0.873 | | 0.902 | 0.902 | | | 0.878 | 0.873 | | | 0.762 |
| Multiplier | | 0.5727 | | 0.7646 | 0.804 | | | 0.619 | 0.6933 | | | 0.6893 |
| Dilution Factor | | 428 | | 428 | 428 | | | 428 | 428 | | | 428 |
| Max Conc. at edge of Chronic Zone, ug/L | | 0.0006 | | 0.0002 | 0.4314 | | | 1.2E-03 | 0.0022 | | | 0.0001 |
| **Reasonable Potential? Limit Required?** | | **NO** | | **NO** | **NO** | | | **NO** | **NO** | | | **NO** |

**Comments/Notes:** * PCBS were analyzed and reported as total arochlors using methods 608 and 8082A; all samples were below detection (0.059-0.24 ug/L depending on the sample). Values presented represent 1/2 MDL.

**References:** WAC 173-201A,
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

## Marine Un-ionized Ammonia Criteria Calculation

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-

| INPUT | |
|---|---|
| 1. Receiving Water Temperature, deg C (90th percentile): | 12.7 |
| 2. Receiving Water pH, (90th percentile): | 8.0 |
| 3. Receiving Water Salinity, g/kg (10th percentile): | 27.7 |
| 4. Pressure, atm (EPA criteria assumes 1 atm): | 1.0 |
| 5. Unionized ammonia criteria (mg un-ionized $NH_3$ per liter) from EPA 440/5-88-004: | |
| Acute: | 0.233 |
| Chronic: | 0.035 |
| **OUTPUT** | |
| Using mixed temp and pH at mixing zone boundaries? | No |
| 1. Molal Ionic Strength (not valid if >0.85): | 0.568 |
| 2. pKa8 at 25 deg C (Whitfield model "B"): | 9.311 |
| 3. Percent of Total Ammonia Present as Unionized: | 1.9% |
| 4. Total Ammonia Criteria (mg/L as $NH_3$): | |
| Acute: | 12.04 |
| Chronic: | 1.81 |
| **RESULTS** | |
| **Total Ammonia Criteria (mg/L as N)** | |
| **Acute:** | **9.90** |
| **Chronic:** | **1.49** |

## Aquatic Life and Human Health Limits Calculations - Outfall 001

| | |
|---|---|
| **Facility** | King County South Plant WWTP |
| **Water Body Type** | Marine |

| Dilution Factors: | Acute | Chronic |
|---|---|---|
| Aquatic Life | 186 | 225 |
| Human Health Carcinogenic | | 428 |
| Human Health Non-Carcinogenic | | 428 |

| Pollutant, CAS No. & NPDES Application Ref. No. | | | CHLORINE (Total Residual) 7782505 | | Technology-based Limits | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Effluent Data** | Coeff of Variation (Cv) | | 0.6 | | | | | | |
| **Receiving Water Data** | 90th Percentile Conc., ug/L | | 0 | | | | | | |
| | Geo Mean, ug/L | | | | | | | | |
| **Water Quality Criteria** | Aquatic Life Criteria, ug/L | Acute | 13 | | | | | | |
| | | Chronic | 7.5 | | | | | | |
| | WQ Criteria for Protection of | | - | | | | | | |
| | Metal Criteria Translator, decimal | Acute | - | | | | | | |
| | | Chronic | - | | | | | | |
| | Carcinogen? | | N | | | | | | |

**Aquatic Life Limit Calculation**

| | | | | |
|---|---|---|---|---|
| # of Compliance Samples Expected per month | | 30 | | |
| LTA Coeff. Var. (CV), decimal | | 0.6 | | |
| Permit Limit Coeff. Var. (CV), decimal | | 0.6 | | |
| Waste Load Allocations, ug/L | Acute | 2418 | | |
| | Chronic | 1688 | | |
| Long Term Averages, ug/L | Acute | 776 | | |
| | Chronic | 890 | | |
| Limiting LTA, ug/L | | 776 | | |
| Metal Translator or 1? | | 1.00 | | |
| **Average Monthly Limit (AML), ug/L** | | **924** | | **500** |
| **Maximum Daily Limit (MDL), ug/L** | | **2418** | | **750** |

**References:** WAC 173-201A,
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

## Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: http://www.ecy.wa.gov/biblio/0610100.html

| INPUT | |
|---|---|
| 1. Chronic Dilution Factor at Mixing Zone Boundary | 225 |
| 2. Annual max 1DADMax Ambient Temperature (Background 90th percentile) | 12.7 °C |
| 3. 1DADMax Effluent Temperature (95th percentile) | 22.3 °C |
| 4. Aquatic Life Temperature WQ Criterion | 13.0 °C |
| **OUTPUT** | |
| 5. Temperature at Chronic Mixing Zone Boundary: | 12.74 °C |
| 6. Incremental Temperature Increase or decrease: | 0.04 °C |
| 7. Incremental Temperature Increase 12/(T-2) if T≤ crit: | 1.12 °C |
| 8. Maximum Allowable Temperature at Mixing Zone Boundary: | 13.00 °C |
| **A. If ambient temp is warmer than WQ criterion** | |
| 9. Does temp fall within this warmer temp range? | NO |
| 10. Temp increase allowed at mixing zone boundary, if required: | --- |
| **B. If ambient temp is cooler than WQ criterion but within 12/($T_{amb}$-2) and within 0.3 °C of th** | |
| 11. Does temp fall within this incremental temp. range? | NO |
| 12. Temp increase allowed at mixing zone boundary, if required: | --- |
| **C. If ambient temp is cooler than (WQ criterion-0.3) but within 12/($T_{amb}$-2) of the criterion** | |
| 13. Does temp fall within this Incremental temp. range? | YES |
| 14. Temp increase allowed at mixing zone boundary, if required: | NO LIMIT |
| **D. If ambient temp is cooler than (WQ criterion - 12/($T_{amb}$-2))** | |
| 15. Does temp fall within this Incremental temp. range? | NO |
| 16. Temp increase allowed at mixing zone boundary, if required: | --- |
| **RESULTS** | |
| **17. Do any of the above cells show a temp increase?** | **NO** |
| **18. Temperature Limit if Required?** | **NO LIMIT** |

## *Green River Outfall Calculations*

### Spread of a Plume from a Point Source in a River with Boundary Effects from the Shoreline

Based on the method of Fischer et al. (1979) with correction for the effective origin of effluent.

Approach: perform a very quick analysis to assess plume as if discharged from a single port (the Green River outfall has 8 ports). Assess dilution at acute mixing zone boundary (31' downstream). Note that this is a very rough estimate calculation, performed quickly due to limited resources.

| INPUT | | Notes |
|---|---|---|
| 1. Effluent Discharge Rate (MGD) | 20.2 | |
| or, Effluent Discharge Rate (cfs) | 31.3 | *Assumes dilution of 5 using 25% of river flow & single port (conservative, diffuser has 8 ports).* |
| 2. Receiving Water Characteristics Downstream from Discharge: | | |
| River Depth (ft) | 7.00 | |
| River Flow (cfs) (7Q10 chronic & acute, 30Q5 for non-carc, harm. mean for carc) | 500 | |
| % of stream flow allowed for Dilution Factor (e.g., 25% for chronic & 2.5% for acute) | 25 | |
| Stream Velocity (fps) | 0.71 | |
| Channel Width (ft) | 100 | |
| Stream Slope (ft/ft) or Manning roughness "n" | 0.00097 | |
| 0 if slope or 1 if Manning "n" in previous cell | 0 | |
| 3. Discharge Distance from Nearest Shoreline (ft) | 44 | |
| 4. Location of Point of Interest to Estimate Dilution: | | |
| Distance Downstream to Point of Interest (ft) | 31 | |
| Distance From Nearest Shoreline (ft) | 44 | |
| 5. Transverse Mixing Coefficient Constant (usually 0.6): | 0.6 | |
| 6. Original Fischer Method (enter 0) or Effective Origin Modification (enter 1) | 0 | |
| 7. Is the Plume bounded by the shoreline? | Yes | |
| **OUTPUT** | | |
| 1. Source Conservative Mass Input Rate: | | |
| Concentration of Conservative Substance (%) | 100.00 | |
| Source Conservative Mass Input Rate (cfs*%) | 3,125.00 | |
| 2. Shear Velocity based on slope (ft/sec) | 0.468 | |
| Shear Velocity based on Manning "n" (using Prasuhn equations 8-26 and 8-54 assuming hydraulic | | |
| Darcy-Weisbach friction factor "f" | #N/A | |
| Shear Velocity from Darcy-Weisbach "f" (ft/sec) | #N/A | |
| Selected Shear Velocity for next step (ft/sec) | 0.468 | |
| 3. Transverse Mixing Coefficient (ft2/sec) | 1.964 | |
| 4. Plume Characteristics Accounting for Shoreline Effect (Fischer et al., 1979): | | |
| Co | 6.25E+00 | |
| x' | 8.52E-03 | |
| y'o | 4.40E-01 | |
| y' at point of interest | 4.40E-01 | |
| Solution using superposition equation (Fischer eqn 5.9): | | |
| Term for n= -2 | 1.52E-204 | |
| Term for n= -1 | 1.11E-51 | |
| Term for n= 0 | 1.00E+00 | |
| Term for n= 1 | 1.05E-16 | |
| Term for n= 2 | 9.93E-125 | |
| *Upstream Distance from Outfall to Effective Origin of Effluent Source (ft)* | #N/A | |
| Effective Distance Downstream from Effluent to Point of Interest (ft) | 31.0 | |
| x' Adjusted for Effective Origin | 8.52E-03 | |
| C/Co (dimensionless) | 3.06E+00 | |
| Concentration at Point of Interest (Fischer Eqn 5.9) | 1.91E+01 | |
| Unbounded Plume half-width (ft) | 26.1 | |
| Distance from near shore to discharge point (ft) | 44.0 | |
| Distance from far shore to discharge point (ft) | 56.0 | |
| **RESULTS** | | |
| **W, Plume width bounded by shoreline (ft)** | **52** | |
| **W, Unbounded Plume Width at Point of Interest (ft)** | **52** | |
| **Approximate Downstream Distance to Complete Mix (ft)** | **456** | |
| **Theoretical Dilution Factor at Complete Mix** | **16** | |
| **Calculated Flux-Average Dilution Factor Across Entire Plume Width** | **8** | |
| **Calculated Dilution Factor at Point of Interest** | **5.2** | *Conservative result since assessed as a single port discharge, diffuser actually has 8 ports. Plumes from ports likely overlap, but dilution would be higher than calculated here.* |

## Calculation of Fecal Coliform at Chronic Mixing Zone

| INPUT - Green River Outfall | | |
|---|---|---|
| Acute Dilution Factor | 5.0 | |
| Receiving Water Fecal Coliform, #/100 ml | 31 | Geomean- EIM data (2004-2011) |
| Effluent Fecal Coliform - worst case, #/100 ml | 200 | Maximum permitted limit |
| Surface Water Criteria, #/100 ml | *100* | |
| **OUTPUT** | | |
| **Fecal Coliform at Mixing Zone Boundary, #/100 ml** | **65** | |

**Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.**

## Aquatic Life Limit Calculations

| | |
|---|---|
| **Facility** | Green River Emergency Outfall |
| **Water Body Type** | Freshwater |

| **Pollutant, CAS No. & NPDES Application Ref. No.** | | | **CHLORINE (Total Residual) 7782505** |
|---|---|---|---|
| **Acute Dilution Factor** | | | 5.0 |
| **Effluent Data** | Coeff of Variation (Cv) | | 0.6 |
| **Receiving Water Data** | 90th Percentile Conc., ug/L | | 0 |
| **Water Quality Criteria** | Aquatic Life Criteria, ug/L | Acute | 19 |
| | Metal Criteria Translator, decimal | Acute | - |
| | Carcinogen? | | N |

**Aquatic Life Limit Calculation**

| | | |
|---|---|---|
| # of Compliance Samples Expected per month | | 4 |
| LTA Coeff. Var. (CV), decimal | | 0.6 |
| Permit Limit Coeff. Var. (CV), decimal | | 0.6 |
| Waste Load Allocations, ug/L | Acute | 95 |
| Long Term Averages, ug/L | Acute | 30.5 |
| Limiting LTA, ug/L | | 30.5 |
| Metal Translator or 1? | | 1.00 |
| **Maximum Daily Limit (MDL), ug/L** | | **95** |

**References:** WAC 173-201A,
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

## Reasonable Potential Calculation - Green River Outfall, page 1 of 2

| | |
|---|---|
| **Facility** | Green River Emergency Outfall |
| **Water Body Type** | Freshwater |

| Dilution Factor: | Acute |
|---|---|
| Aquatic Life | 5.0 |

| **Pollutant, CAS No. & NPDES Application Ref. No.** | | | AMMONIA, Criteria as Total NH3 | ANTIMONY (INORGANIC) 7440360 1M | ARSENIC (dissolved) 7440382 2M | BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B | CADMIUM - 7440439 4M Hardness dependent | CHLOROFORM 67663 11V | CHROMIUM(HEX) 18540299 | COPPER - 744058 6M Hardness dependent | CYANIDE 57125 14M | 1,4 DICHLOROBENZENE 106467 22B | 2,4 DICHLOROPHENOL 120832 2A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Effluent Data** | # of Samples (n) | | 257 | 29 | 29 | 22 | 29 | 23 | 29 | 29 | 28 | 23 | 22 |
| | Coeff of Variation (Cv) | | 0.6 | 0.28 | 0.12 | 0.62 | 0.61 | 0.5 | 0.22 | 0.24 | 0.91 | 1.03 | 0.91 |
| | Effluent Concentration, ug/L (Max. or 95th Percentile) | | 45,000 | | 1.74 | | 0.05 | | 0.9 | 13.3 | 12.1 | | |
| | Calculated 50th percentile Effluent Conc. (when n>10) | | | 0.42 | | 1.37 | | 0.5 | | | 2.5 | 0.5 | 0.28 |
| **Receiving Water Data** | 90th Percentile Conc., ug/L | | 70 | | 1.45 | | 0.073 | | 0.15 | 0.354 | 0 | | |
| | Geo Mean, ug/L | | | 0.172 | | 0 | | 0 | | | 0 | 0 | 0 |
| **Water Quality Criteria** | Aquatic Life Criteria, ug/L | Acute | 9,644 | - | 360 | - | 1.131 | - | 15 | 6.072 | 22 | - | - |
| | Metal Criteria Translator, | Acute | - | - | 1 | - | 0.943 | - | 0.982 | 0.996 | - | - | - |
| | Carcinogen? | | N | N | Y | Y | N | Y | N | N | N | N | N |

**Aquatic Life Reasonable Potential**

| | | AMMONIA | ANTIMONY | ARSENIC | BIS(2-ETHYLHEXYL) PHTHALATE | CADMIUM | CHLOROFORM | CHROMIUM(HEX) | COPPER | CYANIDE | 1,4 DICHLOROBENZENE | 2,4 DICHLOROPHENOL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effluent percentile value | | 0.950 | | 0.950 | | 0.950 | | 0.950 | 0.950 | 0.950 | | |
| s | $s^2=\ln(CV^2+1)$ | 0.555 | | 0.120 | | 0.562 | | 0.217 | 0.237 | 0.777 | | |
| Pn | $Pn=(1\text{-confidence level})^{1/n}$ | 0.988 | | 0.902 | | 0.902 | | 0.902 | 0.902 | 0.899 | | |
| Multiplier | | 1.00 | | 1.00 | | 1.00 | | 1.00 | 1.00 | 1.00 | | |
| Max concentration (ug/L) at edge of... | Acute | 9,056 | | 1.508 | | 0.068 | | 0.297 | 2.933 | 2.420 | | |
| **Reasonable Potential? Limit Required?** | | **NO** | | **NO** | | **NO** | | **NO** | **NO** | **NO** | | |

**Comments/Notes:**

**References:** WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

## Reasonable Potential Calculation - Green River Outfall, page 2 of 2

| | |
|---|---|
| **Facility** | Green River Emergency Outfall |
| **Water Body Type** | Freshwater |

| Dilution Factor: | Acute |
|---|---|
| Aquatic Life | 5.0 |

| **Pollutant, CAS No. & NPDES Application Ref. No.** | | DIETHYLPHTHALATE 84662 24B | LEAD - 7439921 7M Dependent on hardness | MERCURY 7439976 8M | NICKEL - 7440020 9M - Dependent on hardness | NONYLPHENOL | SILVER - 7740224 11M dependent on hardness. | TETRACHLOROETHYLENE 127184 24V | TRICHLOROPHENOL 2,4,6 88062 11A | ZINC- 7440666 13M hardness dependent | Polychlorinated Biphenyls (PCB's)* | CHLORINE (Total Residual) 7782505 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Effluent Data** | # of Samples (n) | 22 | 29 | 29 | 29 | 2 | 29 | 23 | 22 | 29 | 11 | 1800 |
| | Coeff of Variation (Cv) | 0.52 | 0.66 | 0.21 | 0.17 | 0.6 | 0.51 | 0.43 | 0.33 | 0.18 | 0.561 | 0.64 |
| | Effluent Concentration, ug/L (Max. or 95th Percentile) | 0.5 | 0.9 | 0.007 | 3.15 | 3.26 | 0.13 | | | 43.7 | 0.12 | 100 |
| | Calculated 50th percentile Effluent Conc. (when n>10) | 0.24 | | 0.005 | 2.32 | | | 0.5 | 0.95 | | 0.06 | |
| **Receiving Water Data** | 90th Percentile Conc., ug/L | | 0.006 | 2E-04 | 0.427 | 0 | 0.026 | | | 0.605 | 0 | 0 |
| | Geo Mean, ug/L | 0 | | 2E-04 | 0.427 | | | 0 | 0 | | 0 | |
| **Water Quality Criteria** | Aquatic Life Criteria, ug/L Acute | - | 19.28 | 2.1 | 561.1 | 28 | 0.526 | - | - | 45.31 | 2 | 19 |
| | Metal Criteria Translator, Acute | - | 0.466 | 0.85 | 0.998 | - | 0.85 | - | - | 0.996 | - | - |
| | Carcinogen? | N | N | N | N | N | N | Y | Y | N | Y | N |

**Aquatic Life Reasonable Potential**

| | | DIETHYLPHTHALATE | LEAD | MERCURY | NICKEL | NONYLPHENOL | SILVER | TETRACHLOROETHYLENE | TRICHLOROPHENOL | ZINC | PCB's | CHLORINE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effluent percentile value | | | 0.950 | 0.950 | 0.950 | 0.950 | 0.950 | | | 0.950 | 0.950 | 0.950 |
| s | $s^2=\ln(CV^2+1)$ | | 0.601 | 0.208 | 0.169 | 0.555 | 0.481 | | | 0.179 | 0.523 | 0.586 |
| Pn | $Pn=(1\text{-confidence level})^{1/n}$ | | 0.902 | 0.902 | 0.902 | 0.224 | 0.902 | | | 0.902 | 0.762 | 0.998 |
| Multiplier | | | 1.00 | 1.00 | 1.00 | 3.79 | 1.00 | | | 1.00 | 1.63 | 1.00 |
| Max concentration (ug/L) at edge of... | Acute | | 0.089 | 0.001 | 0.970 | 2.474 | 0.043 | | | 9.189 | 0.039 | 20 |
| **Reasonable Potential? Limit Required?** | | | **NO** | **NO** | **NO** | **NO** | **NO** | | | **NO** | **NO** | **YES** |

**Comments/Notes:** * PCBS were analyzed and reported as total arochlors using methods 608 and 8082A; all samples were below detection (0.059-0.24 ug/L depending on the sample). Values presented represent 1/2 MDL.

**References:** WAC 173-201A,
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

## Freshhwater Ammonia Criteria Calculation

### Green River Outfall - Maintenance Only

Based on Chapter 173-201A WAC, amended November 20, 2006

| INPUT | | Notes |
|---|---|---|
| 1. Receiving Water Temperature (deg C): | 16.7 °C | EIM User Location ID = KCM-3106 |
| 2. Receiving Water pH: | 7.7 | EIM User Location ID = KCM-3106 (min=6.3, max=7.7) |
| 3. Is salmonid habitat an existing or designated use? | Yes | |
| 4. Are non-salmonid early life stages present or absent? | Present | |
| **OUTPUT** | | |
| Using mixed temp and pH at mixing zone boundaries? | no | |
| Ratio | 13.489 | |
| FT | 1.400 | |
| FPH | 1.201 | |
| pKa | 9.509 | |
| Unionized Fraction | 0.015 | |
| Unionized ammonia NH3 criteria (mg/L as $NH_3$) | | |
| Acute: | 0.179 | |
| Chronic: | 0.035 | |
| **RESULTS** | | |
| **Total ammonia nitrogen criteria (mg/L as N):** | | |
| Acute: | 9.644 | |
| Chronic: | 1.896 | |

### South Plant WWTP - Fecal Coliform Sample Frequency Calculations

KC has requested for a reduction in fecal monitoring from 7/week to 4 /week, or 16/month. Based on past performance, O&M records, and on the fact that they operate at approx 20-40% of the their permit levels (depending on how calculated), a sample freq of 19/month (or 5 times/wk) is granted for fecal coliform.

| | **ln(fecal)** |
|---|---|
| Mean | 3.7 |
| Standard Error | 0.0 |
| Median | 3.7 |
| Standard Deviation | 1.0 |
| Sample Variance | 1.0 |
| Minimum | 0.1 |
| Maximum | 9.0 |
| Sum | 3833 |
| Count | 1029 |
| Confidence Level (95.000%) | 0.1 |
| Coeff of Var | 0.27 |
| d (10% of mean) | 0.37 |
| d (20% of mean) | 0.75 |
| dr, relative error | 0.10 |
| dr, relative error | 0.20 |
| Z (95% confidence level) | 1.645 |
| Z (90% confidence level) | 1.282 |
| **95% confid level, 10% rel error** | |
| **A.) n - samples per month** | **19** |
| C.) n | 19 |
| D.) n | 59 |

# Appendix F — Significant Industrial Users

| Company Name | Permit Number | Local Limits | Categorical Limits | If categorical, which category and sub-category |
|---|---|---|---|---|
| A.O. Smith Water Products Company | 7718-05 | Yes | Yes | METAL FINISHING- CFR 433 |
| Accurate Industries | 7864-01 | Yes | Yes | METAL FINISHING- CFR 433 |
| Aero Controls, Inc. - Pike Street | 7708-03 | Yes | Yes | METAL FINISHING- CFR 433 |
| Aramark Uniform & Career Apparel LLC | 7836-01 | Yes | No | NA |
| B.S.B. Diversified Co. Inc. | 7575-04 | Yes | No | NA |
| Baker Commodities Inc. | 7556-03 | Yes | No | NA |
| Black Oxide, LLC | 7702-04 | Yes | Yes | METAL FINISHING- CFR 433 |
| Boeing Commercial Airplane- Auburn | 7599-06 | Yes | Yes | METAL FINISHING- CFR 433 |
| Boeing Commercial Airplane - Renton | 7630-04 | Yes | Yes | METAL FINISHING- CFR 433 |
| Boeing Electronics Center | 7508-04 | Yes | Yes | METAL FINISHING- CFR 433 |
| Burlington Environmental LLC - Kent | 7159-08 | Yes | Yes | Centralized Waste 437B PSES |
| Cedar Grove Composting, Inc. | 7652-04 | Yes | No | NA |
| Coca-Cola Bottling Co of Washington | 7022-05 | Yes | No | NA |
| Darigold, Inc. - Issaquah Plant | 7075-05 | Yes | No | NA |
| Davis Wire Corporation | 7243-04 | Yes | No | NA |
| Electrofinishing Inc. | 7578-03 | Yes | Yes | METAL FINISHING- CFR 433 |
| Exotic Metals Forming Company | 7672-05 | Yes | Yes | METAL FINISHING- CFR 433 |
| G & K Services | 7857-01 | Yes | No | NA |
| Hexcel Corporation | 7808-02 | Yes | No | NA |
| Honeywell International Inc. | 7206-05 | Yes | Yes | ELECT. COMPS - CFR 469 |
| Hytek Finishes Company | 7569-03 | Yes | Yes | METAL FINISHING- CFR 433 |
| Kenworth Truck Company | 7627-04 | Yes | Yes | METAL FINISHING- CFR 433 |
| KC RSD - Renton Decant Facility | 7756-04 | Yes | No | NA |
| KC SWD - Bow Lake Transfer Station | 7882-01 | Yes | No | NA |
| King County SWD - Cedar Hills Landfill | 7842-01 | Yes | No | NA |
| KC SWD - Factoria Transfer Station | 7586-04 | Yes | No | NA |
| KC SWD - Houghton Transfer Station | 7879-01 | Yes | No | NA |
| KC SWD - Renton Transfer Station | 7880-01 | Yes | No | NA |
| King's Command Foods Inc. | 7742-03 | Yes | No | NA |
| Mikron Industries | 7749-04 | Yes | Yes | PLASTIC PROD MANF.-463 |
| Oberto Brands | 7706-05 | Yes | No | NA |
| Pacific Propeller International LLC | 7235-04 | Yes | Yes | ELECTROPLATING- CFR 413 |
| Port of Seattle, SeaTac Inter. Airport, BW | 7772-02 | Yes | No | NA |
| Port of Seattle, SeaTac Inter. Airport, IWS | 7810-02 | Yes | No | NA |
| Protective Coatings Inc. | 7242-04 | Yes | Yes | ELECTROPLATING- CFR 413 |
| Qualawash Holdings LLC | 7153-04 | Yes | No | NA |
| Ralcorp Frozen Bakery Products | 7671-04 | Yes | No | NA |
| Red Dot Corporation | 7866-02 | Yes | Yes | METAL FINISHING- CFR 433 |
| Rexam Beverage Can Company | 7085-07 | Yes | Yes | COIL COATING- CFR 465 |
| Safeway Inc.- Beverage Plant | 7042-04 | Yes | No | NA |
| Safeway Inc.- Milk and Ice Cream Plant | 7832-02 | Yes | No | NA |
| Seattle, City of- SPU - Kent Highlands | 7115-03 | Yes | No | NA |
| Shasta Beverages | 7881-01 | Yes | No | NA |
| Silicon Designs Inc. | 7887-01 | Yes | Yes | ELECT. COMPS - CFR 469 |
| Skills Inc. -Auburn Facility | 7719-05 | Yes | Yes | METAL FINISHING- CFR 433 |
| Smith Fabrication Inc. | 7801-02 | Yes | Yes | METAL FINISHING- CFR 433 |
| Stoller Metals, Inc. | 7823-03 | Yes | Yes | METAL FINISHING- CFR 433 |
| Tim's Cascade Snacks | 7865-01 | Yes | No | NA |
| Triple B Corporation | 7855-01 | Yes | No | NA |
| Tri-Way Industries Inc. | 7746-04 | Yes | Yes | METAL FINISHING- CFR 433 |
| Vectra Fitness Inc. | 7760-03 | Yes | Yes | METAL FINISHING- CFR 433 |
| Western Pneumatic Tube Co. | 7604-04 | Yes | Yes | METAL FINISHING- CFR 433 |
| WSDOT- SR 520 Bridge Replacement and HOV Program Construction Site | 7868-02 | Yes | No | NA |

# Appendix G — Response to Comments

***King County Entity Review Comments***

Significant comments are listed below; comments that provided clarification and/or corrections are not listed.

| Comment Number | Page | Section/ permit or factsheet | Comments | Suggested Resolution/Change | Commentor | Ecology Response |
|---|---|---|---|---|---|---|
| 1 | 4 | permit - Summary of Submittals | S3.A submission lists Permit Application as annual. Typo? Also PP data is sent annually but does it have to be in March 31 each year? | remove application reference and revise date to XXX | Betsy Cooper | WebDMR annual submittals require a due date. Changed to July 31, consistent with West Point and with annual CSO report submittal. |
| 5 | 6 | S1A - green river | the mixing zone calculation appear to have changes because 500cfs was used in the calculation. We have concern that this overly restricts the MZ. | We would like to discuss this with you. Perhaps their should be a reconsideration of the assumptions to reflect the differences in flow rates seasonal. | Betsy Cooper | Due to unnecessary restrictions as pointed out by KC, Ecology changed the effluent flow limit for the Green River discharge to a calculated value based on a dilution factor of 5 which is required to assure wq criteria are met. The County must calculate the maximum flow allowed based on the existing river flow and not exceed that flow. |
| 13 | 17 | S4.E I&I | This section is calling for a new I&I analysis | KC undertook, several years ago, an extensive monitoring program and analysis of I&I in the service area and engaged the component agencies in process of considering i&I control. We are continuing to consider I&& actions and are engaged in the discussion of I&I with our component agencies. We would like to discuss the proposed evaluation with you to understand the intent of the effort and understand future that Ecology feels needs to be understood more fully. | | Full I/I evaluation not required, looking to quantify inflow and infiltration (in gallons per day per capita) in separated basins using EPA procedure described in Publication No. 97-03 at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.<br>KC discussion: KC historically reported I/I in gallons per acre per day for KC owned and maintained systems only: most of system is not KC owned and maintained. KC interceptor hard to assess, major flows from outside agencies. Overall general characterization in system done a few years ago. In the early 2000s KC evaluated I/I, 400 flow monitors in separated systems, worked hard to assess I/I, came back in 2010/2011, deployed 50 meters a second time. Not just in KC pipe, throughout service area. Steve forwarded KC's I/I online library with historical information. Component agencies: some more aggressively reducing I/I, others not so much (pumping energy a big factor), KC's contract with local agencies makes enforecement difficult. City of Renton 50-90 connections. KC's approach is more incentive-based encouraging a cooperative relationship.<br>Conclusion: replaced I/I study with an I/I summary as part of the Wasteload Assessment Report. |
| 14 | 19 | S5.E prevent connection of | requirement is broader than KC jurisdiction | Please add "with in KC control" at the end of the sentence. | Betsy Cooper | Text added. |
| 15 | 21 | S5.g.b. O&M manual components | intro paragraph requires that the O&M manuals "must be consistent with the guidance in Table G1-3 in the Criteria for sewage works Design (Orange Book), 2008" | This statement of requirement with the Orange Book Table was not in the WP permit. Since the components of the manual are listed we request that this statement be removed so that the WP and SP permit are the same. Also since the Orange Book is guidance so it should not be "required" in a permit. | Betsy Cooper | Commented noted and text revised. |
| 16 | 22 | S.6.A.1.b Pretreatment - general | S6.A1.b contains a sentence at the end of the paragraph that West point doesn't have" Once issued, an industrial waste discharge permit takes precedence over a state-issued waste discharge permit . | We have no disagreement, would just like to discuss the intent of this statement. | Ed Abbasi /Despina | Outdated shell language was replaced with Pretreatment language from West Point permit, minus CSO-related requirements. |

| Comment Number | Page | Section/ permit or factsheet | Comments | Suggested Resolution/Change | Commentor | Ecology Response |
|---|---|---|---|---|---|---|
| 17 | 24 | S.6.A.1.j Pretreatment - general | SP S.6.A1.j includes the statement "In addition, the Permittee must develop a Memorandum of Understanding (or Inter-local Agreement) that outlines the specific roles, responsibilities, and pretreatment activities of each jurisdiction. | As in all other KC permits we have had this statement removed since we already have legal/contractual requirements in place. We suggest this be removed. | Betsy Cooper | Outdated shell language was replaced with Pretreatment language from West Point permit, minus CSO-related requirements. |
| 18 | 24 | S.6.A2. Pretreatment - general | This section requires development and submission of an updated Accidental Spill Prevention Program by April 30th 2019 | This is a new requirement. Please explain what is the intent of the requirement and to what facilities, Industries it is to be applied. | Betsy Cooper | Outdated shell language was replaced with Pretreatment language from West Point permit, minus CSO-related requirements. |
| 19 | 25 | S6.A 5 Pretreatment | Pretreatment Report due date of March 31. | We would like to request Ecology change the due date for the Pretreatment Report from March 31 to April 30. This is to allow KC staff more time to compile all the data and review it before submitting the report. Much of the data needed for the report isn't available until late January to mid-February with a very short window to process and review. This will also allow for additional QC steps and the needed review steps for such additional QC. | Despina Strong | OK to shift submittal date by one month. However KC knows West Point submittal will remain at March 31st until next permit issuance; Despina stated KC will continue to meet this comliance requirement. Start new date with S Plant and eventually all other facilities will fall in line. |
| 22 | 26 | S.6.B.9 Pretreatment - general | This is a new language in S.6.B.9 with RSP that is missing from West point; "Sludge metals priority pollutant sampling and analysis must conform to U.S. EPA SW 846 6000/7000 Series Methods unless the Permittee requests an alternate method and Ecology has approved" . However these methods are for water samples only. | Indicate only that the methods must be approved by Ecology rather than require specific methods. Or like the metals comment further on, mandate that the GC/MS data must conform to the U.S. EPA SW 846 8000 Series Methods for GC/MS volatile and semi-volatile samples. | Environmental Lab | Outdated shell language was replaced with Pretreatment language from West Point permit, minus CSO-related requirements. |
| 23 | 26 | Permit S6(B)* in conjunction with Appendix A | This section refers handling, preparing and analyzing "all wastewater samples" with "EPA Methods 624 and 625". However it raises two questions 1) these methods are not appropriate for the sludge or other solids analyses which some might consider part of the requirement described in Section S.6.B.8. and 2) since the statement is in the Pretreatment Section of the permit, it could also be considered applying to wastewaters other then are treatment plants, such as Permittees. | We suggest this section should be consistent with WP by requiring procedure approved by 40 CFR 136 and SW 846 depending on the matrix instead of specific methods. | Environmental Lab/Abbasi/ Strong | Outdated shell language was replaced with Pretreatment language from West Point permit, minus CSO-related requirements. |
| 26 | 29 | Main Permit /S9.B. | calls for report of sediment data by August 31,2018 | We request that date be modified to December 31, 2018 - the same period for report prep as in the West Point permit | Betsy Cooper | Dates changed to Dec 1, 2018 for consistency with WP permit. Also changed the SAP submittal to Dec 1, 2016 to be consistent with WP permit. |
| 29 | NA | Permit / Fact Sheet | General Comment: Since Ecology is issuing several NPDES permits to King County, could it consider creating a stand alone appendix for pretreatment program? Currently NPDES permits issued to two of King County's facilities have different requirements; A stand alone Pretreatment appendix could be updated every time a permit is issued and be effective in all active permits. The issue is consistency with compliance across plant areas. | This is a suggestion for Ecology to consider. It is has merit perhaps it could be instituted for the next permit renewal (BW). | Ed Abbasi /Despina | Agreed, something to consider with BW issuance. For this permit, the Pretreatment language was replaced with West Point language minus CSO-related requirements. KC requests all 5 facilities to be consistent, maybe an appendix that gets updated with each permit issuance. 'Appendix B'? or separate document. |

## *Public Review Comments*

Ecology received comments from King County and the Puget Soundkeeper Alliance during the 30-day public notice period. While drafting responses to these comments, Ecology noted and corrected typos in *Table 6* for $BOD_5$ and TSS effluent data.

**King County's comment: "**EPA is currently in the process of updating a number of sections under the 40 CFR Part 136 Clean Water Act [Update Rule for the Analysis of Effluent Proposed Rule: Vol. 80, No. 33, Thursday February 19, 2015]. While King County is commenting directly to EPA on many aspects of these proposed changes, due to the timing of the South Plant's NPDES new permit, we feel we should also provide comments to the WDOE during the permit renewal process regarding the impacts of the proposed changes. The proposed Determination of the Method Detection Limits portion of the 40 CFR Part 136 Clean Water Act will have a significant impact on our ability to fully comply with the proposed permit criteria listed in Appendix A.

EPA's proposed revisions to Appendix B, Part 136 (Definition and Procedure for the Determination of the Method Detection Limit – Revision 2) are specifically designed to make Method Detection Limits (MDLs) more "realistic" (i.e. higher) than the current procedure. Once promulgated, these changes require lab results to be collected over the course of a full year, therefore we can't predict at this time how much our MDLs will increase with the new procedure. While we know that we can meet the Appendix A MDLs with EPA's current MDL procedure (in reagent water), we are much less optimistic that this will be the case if the proposed EPA Rule is adopted as it is currently stated.

It is worth noting that the EPA has listed method-specific MDLs for many of the compounds in DOE's Appendix A, and that most are significantly higher than the listed MDLs in Appendix A. EPA anticipates that these method-listed MDLs will be achievable with the new procedure. We therefore would like to suggest to DOE that the permit writers include some language into our current draft permit that would allow enough flexibility for possible changes to Appendix A to account for EPA's proposed rule changes. Ideally this could occur without having to reopen the permit. Another possible approach would be to use the EPA method listed MDLs for methods 608, 624, and 625 in Appendix A since we are reasonably confident that we could meet these limits even with the new MDL procedure."

Ecology's response: *Ecology and the County have been in discussions regarding EPA's proposed revisions to 40 CFR Part 136. Until EPA's proposed updates are finalized, the County has agreed to strive to meet the method detection limits (MDLs) and quantifications limits (QLs) in Appendix A of active permits. If an MDL and/or QL cannot be achieved, the King County Environmental Labs will conduct additional QC samples on sample batches. They will use low level matrix spikes to show that the analysis was not able to meet the Appendix A detection limits in the given matrix. The County will submit a detailed description of the additional analysis with the priority pollutant data.*

*Once EPA promulgates the updates to 40CFR 136 and it becomes clear how the changes will impact analytical methods, Ecology will engage the County in discussions on how to move forward to ensure both the requirements of the active permits and the revised methods can be met.*

**Puget Soundkeeper Alliance's comments (via Smith & Lowney, P.L.L.C.):**

Comment #1: "The King County South Wastewater Treatment Plant ("County Plant") is one of the single largest wastewater discharges to Puget Sound, adding up to almost 150 million gallons per day of treated municipal wastewater to the Sound. The contamination of Puget Sound by toxic pollutants is widespread and well-documented. Waste streams comprising the County's Plant's influent are heterogeneous and include not only domestic wastewater but also industrial discharges from a wide variety of industrial facilities, as well as stormwater from urban streets and facilities. Consequently, a wide spectrum of toxic pollutants is introduced to the County Plant and many of these can be expected to pass through the County Plant because they are not susceptible to efficient or effective removal by the treatment works. These pollutants are likely to include persistent bioaccumulative toxics ("PBTs"), such as PCBs, flame retardants, and pharmaceuticals. The permit should include rigorous effluent monitoring to determine whether toxic pollutants are being discharged at levels of concern, which would warrant the addition of effluent limitations or implementation of other measures to reduce or eliminate these discharges. As one of the largest dischargers operated by the largest county in the state, one that depends intimately on the health of Puget Sound for its economy and quality of life, the County Plant is an excellent place to start enhanced efforts to detect and control discharges of the numerous toxic pollutants that threaten the Sound.

While the draft permit does include a monitoring requirement for the EPA list of priority pollutants, this is inadequate to the task. First, the priority pollutant list excludes numerous toxic pollutants that are likely to be found in the discharge and that ought to be subject to NPDES regulatory controls in fulfillment of federal objectives to eliminate toxic discharges, 33 U.S.C. § 1251(a)(3), and the mandates of state law, RCW 90.48.010 and .520. A recent report by the EPA Office of the Inspector General (Report No 14-P-0363, Sept. 29, 2014, "More Action Is Needed to Protect Water Resources From Unmonitored Hazardous Chemicals") describes an aspect of this problem. Consistent with the findings of this report, a review of the toxic release inventory ("TRI") reports submitted by the Significant Industrial Users listed in the draft fact sheet appendix F reveals that the following facilities have reported discharges of toxic pollutants that are not among those on the priority pollutants list:

Boeing Commercial Airplane Group – Renton: diethanolamine, methyl isobutyl ketone, toluene
Boeing Commercial Airplane Group – Auburn: hydrogen fluoride, methyl isobutyl ketone, toluene
Hexel Corp.: tetrabromobisphenol A
Kenworth Truck Co.: ethylene glycol
Protective Coatings: N-butyl alcohol, nitric acid
Rexam Beverage Can Co: hydrogen fluoride, N-butyl alcohol
Western Pneumatic Tube Co.: hydrogen fluoride, nitric acid

The permit should require screening monitoring for these and other toxic pollutants that are likely to be present in the discharge."

*Ecology's Response to Comment #1: Ecology appreciates the comments concerning the potential for toxicity in the South Plant WWTP discharge. In developing this permit, Ecology used priority pollutant data that King County collected from the South Plant WWTP effluent 22-29 times (depending on the pollutant) during the previous 5 year permit term. A summary of the priority pollutants that were detected in the effluent is included in Table 6 of this fact sheet (toluene was tested as required but was below detection, <1 ug/L, in all 23 samples). In addition to the required priority pollutant monitoring, King County conducted analysis on parameters such as PCB arochlors (see data in the response to comment #3 below). Ecology would be happy to provide the Puget Sound Alliance or other interested parties with this data if requested.*

*Ecology has established criteria for approximately 160 pollutants based on the National Toxics Rule (40 CFR 131.36) and the EPA National Recommended WQ Criteria (2004, 69 FR 342) (see WAC 173-201A). Ecology performed a reasonable potential analysis for each pollutant detected in the effluent for which a water quality standard has been established to determine the potential for a water quality exceedance (see Appendix E of the fact sheet). Ecology set a limit for chlorine based on this analysis and determined that all other parameters in the South Plant WWTP effluent meet their respective criteria.*

*While it may seem ideal to characterize the effluent for the pollutants listed above from the various industrial dischargers, Ecology considers other factors in determining monitoring requirements. N-butyl alcohol and ethylene glycol (automotive antifreeze) are both amenable to biological breakdown during biological treatment* *at the sewage treatment plant; these organic compounds are food for the bacteria. Nitric acid breaks down to its molecular components of hydrogen, nitrogen, and oxygen. Individual chemicals from industrial processes are often undetectable after mixing with the other sewerage flows in the system. Ecology does not require monitoring for some of these parameters because (1) Washington State has not promulgated surface water criteria for the parameter, (2) pretreatment activities remove or greatly reduce the pollutant at the source, and/or (3)the pollutant is diluted or converted and is therefore not detectable in the effluent.*

*Often times the appropriate control method is to prevent the pollutant from entering the collection system through a reliable pretreatment program. This approach is supported by federal regulations. King County's Industrial Waste Program (KCIW) is responsible for regulating permitted and authorized discharges from significant industrial users. Ecology delegated pretreatment authority to King County and inspects their program annually. KCIW screens each industrial user individually and sets case-by-case local limits for PCB (Aroclor) and other pollutants with the aim to ensure industrial discharges do not contribute pollutants at levels that will cause measurable levels in the biosolids or exceed safe employee exposure levels. Occasionally KCIW sets limits for pollutants that do not have water quality criteria in order to minimize employee exposure. As part of KCIW's permit renewal process, they require base neutral acid and PCB characterization at select facilities to ensure pretreatment requirements continue to be met. In addition to meeting the case-specific limits, all potential dischargers of PCBs are required to use best practical treatment technology (usually granular activated carbon filtration) and to sample each batch after treatment and prior to discharge to the WWTP collection system. At this time, Ecology believes KCIW is doing an exemplary job and that the pretreatment requirements of permit condition S6 are appropriate for source characterization.*

*Another method Ecology uses to assess effluent toxicity is whole effluent toxicity (WET) testing. WET testing is a regulatory tool under the Clean Water Act that captures the effects of additive toxicity and other possible toxicity interactions specific to a given effluent. WET testing involves exposing living organisms (vertebrates, invertebrates) to set concentrations of the permitttee's effluent over a period of time and recording the results. WET testing is performed to determine both the acute (short term) and the chronic (longer term) effects of the effluent on sensitive species. The permittee must meet specific WET performance standards. For acute toxicity, a median of at least 80% survival in 100% effluent with no single test showing less than 65% survival in 100% effluent must be observed. For chronic toxicity, no toxicity in a concentration of effluent representing the edge of the acute mixing zone may be observed. More information regarding WET testing can be found at Ecology's WET testing website (http://www.ecy.wa.gov/programs/wq/wet/index.html). WET testing results for the South Plant WWTP are presented in Appendix D for 1997-2013. This facility passed all WET tests with greater than 95% survival of all species in 100% effluent concentration during the previous permit term. The WET testing frequency in the permit reflects South Plant's past WET performance and is consistent with the application of the WET requirements.*

*The proposed South Plant NPDES permit requires semi-annual monitoring of the priority pollutants listed in Appendix A of the permit (including conventional parameters, metals, cyanide, total phenols, acid compounds, volatile compounds, and base neutral compounds including several persistent bioaccumulative toxics). Additionally, the pretreatment section of the permit (Section 6) requires quarterly metals monitoring and annual organics monitoring of the influent, effluent, and biosolids. In response to this comment, Ecology is adding PCBs to the monitoring requirements so these pollutants can be better assessed during the next permit issuance. Ecology believes this level of monitoring provides adequate data to reassess compliance with the State's water quality standards at the next permit issuance.*

*In general, this comment applies more to Ecology's agency-wide policies, application of the State's WQ standards, and the sufficiency of EPA's National Toxics Rule, rather than to how these standards were applied to this individual permit. Ecology developed this permit consistent with the State's water quality standards, the methods described in its Permit Writers' Manual, and relevant Federal laws and rules.*

Comment #2: "Second, screening monitoring is ineffective if the laboratory analytical methods used have detection and quantitation levels far in excess of pollutant concentrations of concern. Rather than default to the EPA-approved analytical methods for toxics screening, Ecology should evaluate the availability of newer and superior analytical methods and require their use for toxic pollutant screening wherever appropriate."

*Ecology's Response to Comment #2: Ecology agrees that analytic detection and quantitation levels must be low enough to ensure compliance with water quality criteria. Ecology added Appendix A to its permit for this very reason to ensure permittees meet the detection and quantitation levels necessary for adequate assessment. Consistent with WAC 173-201A-260(3)(h), Appendix A was developed in accordance with the "Guidelines Establishing Test Procedures for the Analysis of Pollutants" (40 C.F.R. Part 136). Use of Part 136 test methods is required by 40 CFR Part 122.41(j)(4).*

*In general, this comment applies more to Ecology's agency-wide policies and application of the State's WQ standards and EPA required testing methods, rather than to how these standards were applied to this individual permit. Ecology developed this permit consistent with the State's water quality standards, the methods described in its Permit Writers' Manual, and relevant Federal laws and rules. Furthermore, Puget Soundkeeper Alliance filed an appeal of NPDES permit WA0031968 (PCHB 13-137). Puget Soundkeeper Alliance had a full and fair opportunity to raise this same issue before the PCHB during that appeal. Ecology will continue to follow the required testing methodologies set out in federal regulations until the rule is altered by EPA or some other relevant legal determination is made.*

Comment #3: "Relatedly, the fact sheet reports (pp. 35 – 36) that a statistical reasonable potential determination for the 91 numeric human health-based criteria established under the National Toxics Rule ("NTR") was negative, eliminating the need for numeric effluent limitations for these 91 pollutants. Draft fact sheet appendix E seems to indicate that a dilution factor of 428 was used in these calculations. Soundkeeper objects to the use of mixing zones or dilution factors for PBTs, including those assigned criteria under the NTR. EPA has repeatedly cautioned that mixing zones are inappropriate to PBTs, and has even banned them from the Great Lakes. Mixing zones should be disallowed "because [bioaccumulative chemicals of concern, "BCCs," also known as PBTs], due to their persistent and bioaccumulative nature, are incompatible with mixing zones. By definition, BCCs are chemicals that do not degrade over time. These chemicals accumulate in organisms living in the water and become more concentrated as they move up the food chain – from biota to fish and wildlife to humans. Because the effects of these chemicals are not mitigated by dilution, using a mixing zone to 'dilute' BCC discharges is not appropriate." 65 Fed.Reg. 67638, 67640-641 (Nov. 13, 2000).

Soundkeeper notes that there are fish consumption advisories in place for Puget Sound in the vicinity of the discharge based on PBT fish tissue contamination, that there are 303(d)-listings for PBTs in the Sound, and that the Sound has a well-documented PCB contamination problem. Given these factors, Soundkeeper asserts that, with respect to the PBTs present in the County Plant discharge, Ecology has not and cannot identify "supporting information that clearly indicates that the [outfall 001] mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health," which means that no mixing zone may be authorized under WAC 173-201A-400(4). Accordingly, the reasonable potential analysis for NTR human health criteria for PBTs should be redone without consideration of dilution."

*Ecology's Response to Comment #3: We understand and appreciate the concern over elevated levels of PCBs in aquatic species in the Puget Sound. The best approach for PCB reduction is through source control. King County's Industrial Waste Program is actively identifying and eliminating sources of PCBS as described in the response to comment #1 above. The limited data available show PCBs consistently below detection as shown below:*

**South Plant WWTP Effluent – Total Aroclor data**

| Collection Date | Method | Value | MDL, ug/L | RDL, ug/L |
|---|---|---|---|---|
| 8/1/2011 | EPA 608 | <MDL | 0.24 | 0.472 |
| 8/2/2011 | EPA 608 | <MDL | 0.24 | 0.472 |
| 8/3/2011 | EPA 608 | <MDL | 0.24 | 0.472 |
| 3/5/2012 | EPA 608 | <MDL | 0.12 | 0.472 |
| 3/6/2012 | EPA 608 | <MDL | 0.12 | 0.472 |
| 3/7/2012 | EPA 608 | <MDL | 0.12 | 0.472 |
| 8/20/2012 | EPA 608/SW846 3520C*8082A | <MDL | 0.059 | 0.236 |
| 8/21/2012 | EPA 608/SW846 3520C*8082A | <MDL | 0.059 | 0.236 |
| 8/22/2012 | EPA 608/SW846 3520C*8082A | <MDL | 0.059 | 0.236 |
| 2/6/2013 | EPA 608/SW846 3520C*8082A | <MDL | 0.094 | 0.377 |
| 2/4/2013 | EPA 608/SW846 3520C*8082A | <MDL | 0.094 | 0.377 |

*This data illustrates that the South Plant WWTP effluent easily meets the acute aquatic life criteria of 10 ug/L, and, while the detection limits are higher than the chronic aquatic life criteria of 0.03 ug/L, no sample shows an exceedance of these detection limits, with 3 samples tested as below 0.059 ug/L. Ecology understands that EPA is revisiting EPA method 608 for PCBs to refine the methodology. Furthermore, in its challenge to NPDES permit WA0031968 (PCHB 13-137), Puget Soundkeeper Alliance had a full and fair opportunity to raise this same issue before the PCHB. Ecology will continue to follow the required testing methodologies set out in federal regulations until the rule is altered by EPA or some other relevant legal determination is made.*

*In general, this comment applies more to Ecology's agency-wide policies and application of the State's WQ standards than to how these standards were applied to this individual permit. Ecology developed this permit consistent with the State's water quality standards and the methods described in its Permit Writers' Manual. The human health criteria were calculated taking bioaccumulation factors into consideration. The standards allow mixing zones for those human health parameters and those standards were implemented in the draft South Plant WWTP NPDES permit.*

*Ecology did consider the narrative criteria described in Chapter 173-201A-260 WAC when it determined permit limits and conditions. Ecology considered the narrative criteria when it evaluated the characteristics of the wastewater and implementation of all known, available, and reasonable methods of treatment and prevention (AKART) as described in the technology-based limits section of the fact sheet. When Ecology determined that the facility is meeting AKART it considered the pollutants in the wastewater and the adequacy of treatment to prevent the violation of narrative criteria.*

Comment #4: "Soundkeeper also has serious concerns about water quality protection with regard to the outfall 002 discharge to the Green River. The draft fact sheet explains that a dilution factor of 5 accompanies the mixing zone granted for the Green River discharge. There is no reference to a receiving water or mixing zone study for this discharge – was one prepared? If not, what is the basis for its establishment and the assignment of a dilution factor of 5? It appears that, while the dilution factor is identified as 5 in a couple of places, the footnote to the monitoring table on draft permit p. 10 states it as "= [0.25 * River Flow, MGD]/[Effluent Flow, MGD]." What is the dilution factor for this outfall and on what is it based?

The purported Green River mixing zone is also not adequately described in the draft permit in violation of WAC 173-201A-400(1) and WAC 173-220-130(3)(c) (requiring that permits specify the "dimensions" of a mixing zone). Neither the shape nor the horizontal distance across the river are specified. One result of this inadequate description is the inability to discern whether the mixing zone comports with the restriction to 25% the width of the river. WAC 173-201A-400(7)(a)(iii). What shape is the mixing zone and how wide is it?"

*Ecology's Response to Comment #4: Ecology's approach to the mixing calculation for the Green River maintenance discharge differs from other WWTP discharges due to the infrequent discharge events (one four hour discharge in the past 5 years) and uncertain receiving water conditions during the short discharges. The NPDES permit allows for a discharge through the Green River outfall for maintenance purposes only. To minimize impacts to migrating salmon, King County consulted with the Washington State Department of Fish and Wildlife to schedule maintenance discharges around fish passage windows. Ecology wants to encourage this approach and therefore is proposing a sliding calculation to limit effluent flow to assure compliance with water quality criteria. Instead of using the critical flow condition for the mixing calculation, Ecology is proposing to use real-time river flow to ensure adequate mixing occurs during the actual discharge.*

*Ecology conducted a reasonable potential analysis using effluent priority pollutant data (see Appendix E), and concluded that a dilution factor of 5 is (1) conservative (the previous permit included a dilution factor of 9) and (2) minimizes the mixing zone while assuring compliance with the criteria. Based on these results, the proposed permit limits effluent flow based on the river flow during the time of discharge. The proposed permit includes the following limits on the Green River discharge:*

1. *Effluent flow must be less than or equal to [0.25 * River Flow]/5. This limits mixing to 25% of the river flow, consistent with WAC 173-201A-400 (7)(a), and assures a minimum dilution factor of 5 (sufficient dilution to meet water quality criteria).*
2. *The duration of the discharge must not exceed four (4) hours.*
3. *The Permittee may discharge only when the Green River flow is greater than 500 cfs.*

*This approach is consistent with WAC 173-201A-400(7)(a). Due to limited resources and the infrequent nature of this discharge, Ecology is proposing to limit the mixing zone to 25% of the river flow as described in WAC 173-201A-400(7)(a)(ii). Since this diffuser extends 44 feet into the river with 8 discharge ports, mixing, and therefore dilution, will occur fairly rapidly. The proposed permit also requires monitoring 300' downstream of the diffuser to monitor impacts to the receiving water.*

*The mixing zone for outfall 002 is greater than 25% of the width of the river, because the diffuser is 44 feet long and the river width is approximately 100 feet. Exceptions to the numeric size criteria for mixing zones are allowed by WAC 173-201A-400(12) in cases where the discharge existed prior to November 24.1992.*

*In response to this comment, Ecology added a mixing zone diagram in Section III.C of the fact sheet and a mixing zone analysis to Appendix E. The mixing zone analysis confirms that a dilution greater than 5 is achieved before the acute mixing zone boundary 31 feet downstream of the diffuser.*

Comment #5: "Soundkeeper also doubts that consideration of a Green River mixing zone and dilution factor in reasonable potential analysis for the PBTs present in the County Plant's effluent is appropriate for the same reasons as it is inappropriate for outfall 001. Although discharged at relatively low concentrations, the substantial flow volume may result in significant and harmful loads of toxic pollutants to the Green River. Specific to PCBs, recent King County ambient water quality data indicates that the Green River violates the ambient NTR criteria for PCBs. Of course, the Green River flows into the Duwamish, which is very heavily contaminated with PCBs and the subject of a Superfund cleanup effort. There is no remaining assimilative capacity in the Green River for PCBs and possibly for other toxic pollutants, so no mixing zone should be allowed. *See, e.g.,* 63 Fed.Reg. 36742, 36791 (July 7, 1998) ("EPA's mixing zone guidance emphasizes that the determination by a State or Tribe that a mixing zone is appropriate must be preceded by a separate determination that there is available assimilative capacity in the receiving water."); Water Quality Standards Handbook, EPA-820-B-14-004 (Sept. 2014) at 5.1.2. Ecology has not and cannot identify "supporting information that clearly indicates that the [outfall 002] mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health," with regard to PCBs, other PBTs, and toxic pollutants in general, which means that no mixing zone may be authorized under WAC 173-201A-400(4)."

*Ecology's Response to Comment #5: The Green River maintenance discharges occur infrequently (only one occurrence in the past 5 years) and for very short durations (limited to 4 hours maximum). The secondary treated effluent is expected to have de minimis PCB loading to the Green and Duwamish Rivers. With that said, Ecology assessed compliance with water standards by performing reasonable potential analyses for each pollutant detected in the South Plant's effluent. This analysis looks at the quantities of pollutants in the effluent and determines whether the aquatic life or human health will be negatively impacted based on the water quality criteria. The analysis can be found in Appendix E of the fact sheet. Based on these calculations, Ecology is confident the States's water quality standards will be met if the County meets the permit's flow and duration restrictions for the Green River discharges.*

*However, again, this comment applies more to Ecology's agency-wide policies and application of the State's WQ standards than to how these standards were applied to this individual permit. Ecology developed this permit consistent with the State's water quality standards and the methods described in its Permit Writers' Manual. The human health criteria were calculated taking bioaccumulation factors into consideration. The standards allow mixing zones for those human health parameters and those standards were implemented in the draft South Plant WWTP NPDES permit.  Additionally, Puget Soundkeeper Alliance's appeal of NPDES permit WA0031968 (PCHB 13-137) provided it with full and fair opportunity to raise these types of policy issues before the PCHB.*

*Ecology is in the process of modifying the state's water quality standards for toxics (173-201A WAC) in light of updated fish consumption data. Ecology solicited comments during the public review period which ended March 23, 2015. Hopefully Puget Soundkeeper Alliance provided comments during that process. Final adoption of the new rule is expected in July or August 2015.*

Comment #6: "The draft fact sheet discusses sediment monitoring in the vicinity of outfall 001, and describes the periodic violations of sediment quality standards for toxics found, as well as Ecology's determination of reasonable potential for sediment impacts at outfall 001 based on facility characteristics. Where is the evaluation of sediment impacts on the maintenance discharge to the Green River? Shouldn't the sediment reasonable potential determination also apply to the Green River discharge? Potential Green River sediment impacts must be evaluated under WAC 173-204 Part IV. If such potential exists, the County Plant must seek a sediment impact zone or comply with effluent limitations adequate to ensure against sediment quality standards violations. The draft permit appears not to include such limitations."

*Ecology's Response to Comment #6: Ecology is confident that the very infrequent maintenance discharges of secondary treated effluent to the Green River will not measurably alter the sediment chemistry in the vicinity of the outfall. These discharges occur approximately once every 4-5 years and are limited by the permit in volume and duration (limited to 4 hours). In addition, the facility is very efficient at removing solids; the average TSS concentration over the past 5 years was 11 mg/L. The reason for the Green River discharge is to clear accumulated sediments, due to river transport, away from the outfall's diffuser ports. The transport of sediment in the Green river is substantial and any sediment monitoring that could be required would not represent or align with the very infrequent and intermittent nature of treated secondary effluent to Green River. Ecology has collected sediment data from many WWTP outfalls that discharge continuously and have found the vast majority of sites meet sediment quality standards.*

**THIS PAGE INTENTIONALLY LEFT BLANK**

# APPENDIX B

## Service Agreements

**THIS PAGE INTENTIONALLY LEFT BLANK**

# RESOLUTION R-5048

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AUTHORIZING THE CITY MANAGER TO SIGN THE 2014 AMENDMENT TO THE AGREEMENT FOR SEWAGE DISPOSAL BETWEEN THE CITY OF KIRKLAND AND KING COUNTY.

WHEREAS, King County and the City of Kirkland entered into a long-term agreement for sewage disposal dated May 5, 1961, as amended and previously extended on April 19, 1973, March 19, 1987, and October 2, 1992, (collectively referred to as the "Basic Agreement"); and

WHEREAS, the County and City have negotiated certain proposed amendments to the Basic Agreement including exploring and partnering on the provision of recycled water; and

WHEREAS, the proposed amendments further include coordination on several operational issues and steps for collaboration; and

WHEREAS, the proposed extension of the Basic Agreement, with the proposed amendments, would be for a period of 20 years or until July 1, 2056; and

WHEREAS, the Council finds that it is in the best interest of the residents of the City of Kirkland to approve the 2014 Amendment to the Agreement for Sewage Disposal;

NOW, THEREFORE, be it resolved by the City Council of the City of Kirkland as follows:

Section 1. The City Manager is authorized to sign the 2014 Amendment to Agreement for Sewage Disposal attached as Attachment A to this Resolution and incorporated by reference.

Passed by majority vote of the Kirkland City Council in open meeting this 6th day of May, 2014.

Signed in authentication thereof this 6th day of May, 2014.

Amy Walen
MAYOR

Attest:

Kathi Anderson
City Clerk

MF 0/14
CON / 14

CITY OF KIRKLAND

KING COUNTY

2014 AMENDMENT TO AGREEMENT FOR SEWAGE DISPOSAL

THIS AMENDMENT made as of the 30th day of December, 2014 between the City of Kirkland, a municipal corporation of the State of Washington (hereinafter referred to as "the City") and King County, a political subdivision of the State of Washington (hereinafter referred to as "the County");

A. WHEREAS, the County and the City have entered into a long-term agreement for sewage disposal dated May 5, 1961, as amended and previously extended on April 19, 1973, March 19, 1987 and October 2, 1992 (hereinafter collectively referred to as the "Basic Agreement"); and

B. WHEREAS, the County and City have discussed certain changes to, and a second extension of, the Basic Agreement; and

C. WHEREAS, the County and City have also agreed to coordinate on several operational issues and the steps for collaboration are outlined in Exhibit A to this Amendment;

D. WHEREAS, the City has agreed in principle to the County's proposed extension and amendments to the Basic Agreement which benefit the County's wastewater ratepayers; and

F. WHEREAS, the County and the City concur that the below changes and extension of the Basic Agreement are in the best interests of the parties and the ratepayers of both the City and the County;

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

Section 1. Amendment of Basic Agreement. Section 5.3 of the Basic Agreement is amended by adding the following new subparagraph (d). The additional charge described in this subparagraph 5.3(d) shall not be made until and unless this new subparagraph (d) is included within the sewage disposal agreements of all other Participants.

*"(d) An additional charge may be made to recover unforeseen costs to operate and maintain the metropolitan sewerage system or meet debt requirements if the County Executive declares and the County Council by a supermajority vote (two thirds of members) finds that an emergency exists and the system cannot be adequately maintained, and debt requirements or debt policies met, without such additional charge. The additional charge shall then be effective no earlier than the first day of the fourth month following the emergency declaration described in this subparagraph 3(d) and shall be billed and collected in the same manner as the monthly rate referenced in subparagraph 3(c). The additional charge described in this subparagraph 3(d) may be incorporated into the next rate setting cycle but will otherwise terminate within twelve months of the effective date."*

Section 2. Amendment of Basic Agreement. Section 5.4 of the Basic Agreement is amended by deleting the section and replacing it with the following:

*"4. (a) The County shall impose a charge or charges (hereinafter the capacity charge) directly on the future customers of a Participant for purposes of paying for capacity in Metropolitan Sewerage Facilities. The proceeds of the capacity charge shall be used only for capital expenditures or defeasance of outstanding revenue bonds prior to maturity. The capacity charge shall be set at a level to ensure that, in combination with the monthly sewer rate described in subsection 3 above, 95 percent of the costs incurred to provide the wastewater conveyance, treatment, and biosolids capacity to serve new customers are recovered from new customers, to the fullest extent permitted by applicable law."*

*(b) The City shall, at the County's request, provide such information regarding new Residential Customers and Residential Customer Equivalents as may be reasonable and appropriate for purposes of implementing the capacity charge."*

<u>Section 3.</u> <u>Amendment of Basic Agreement.</u> The Basic Agreement is amended by deleting Section 18 and replacing it with a new Section 18 as follows:

*"<u>Section 18.</u> <u>Amendments.</u> The City agrees to amend and hereby concurs in any amendment to this agreement which incorporates any changes in the terms for sewage disposal and payment therefore as may be proposed by the County and agreed to by at least 90 percent of the Participants and by those Participants that represent, in total, at least 90 percent of the residential customers and residential customer equivalents then served by the Metropolitan Sewerage System."*

<u>Section 4.</u> <u>Amendment of Basic Agreement.</u> The Basic Agreement is amended by adding a new Section 19 as follows:

*"<u>Section 19.</u> <u>Option to Accept Other Amendments.</u> If the Basic Agreements with any other Participants are amended or otherwise modified to include terms, conditions, or provisions not included in the Basic Agreement or this amendment, the City shall have the option of incorporating said terms, conditions or provisions into its Basic Agreement. The County shall then expedite and approve any amendments to the Basic Agreement as may be necessary and appropriate for such purpose."*

<u>Section 5.</u> <u>Amendment of Basic Agreement.</u> The Basic Agreement is amended by adding a new Section 20 as follows:

*"<u>Section 20.</u> <u>Operational Issues Requiring Coordination between the City and County.</u>*

*Staff from the City and County have identified shared operational issues and interests as follows:*

1. *Installation of a permanent back-up power source at WTD's Yarrow Bay Pump Station;*
2. *Use of additives and other technologies to remove fats, oils and grease from the local sewer system;*

3. *Potential for use of on-site sewage systems that are not designed to discharge into the sanitary sewer system;*

4. *Odor control at WTD's York Pump Station discharge;*

5. *Inspection of Kirkland's 72-inch stormwater outfall and bathymetry study beyond outfall area; and*

6. *Exploration of sustainable practices, such as serving Kirkland with recycled water.*

*The City and County agree to work on these items in a cooperative manner as outlined in Exhibit A to this Amendment."*

Section 6. Extension of Basic Agreement. The Agreement for Sewage Disposal between the King County and City of Kirkland dated May 2, 1961, as amended, is hereby extended for a period of 20 years and shall continue in full force and effect until July 1, 2056. The agreement dated May 2, 1961, as subsequently amended and extended shall constitute the entire Agreement for Sewage Disposal between the parties.

IN WITNESS WHEREOF, the parties have executed this agreement as of the day and year first written above; said agreement to be effective upon execution.

City of Kirkland
By Marilynne Beard
Title Deputy City Manager

Attest:
Anja Mullin

King County
By [signature]
Title Director, KC DNRP

Attest:
Paige E. Myers

# EXHIBIT A

The City of Kirkland ("City") and the Wastewater Treatment Division of the King County Department of Natural Resources and Parks ("County") intend to work on the following items in a cooperative manner.

Section 1. Permanent Back-up Power at Yarrow Bay
A generator has been temporarily installed at the County's Yarrow Bay Pump Station to provide a back-up power source that will come on-line should the electrical feeds from two separate substations fail. This generator was installed by the Washington State Department of Transportation ("WSDOT") to comply with the City's permit requirements for WSDOT's SR 520 bridge construction project.

Prior to completion of the SR 520 project, the County agrees to purchase the generator from WSDOT, or a similar generator that will remain on-site as a back-up power source. The City will assist with its internal permitting to avoid delays through the permit system. The City will also assist the County with any necessary communications efforts to the surrounding community regarding retention of the generator on-site.

Section 2. Use of Additives to Reduce Fats, Oils and Grease (FOG)
Nationally, some sewer agencies are exploring the use of chemical, enzyme, or bacterial substances to break up FOG as it enters sewer lines. Concerns have been raised regarding the impact of additives to sewer pipes or wastewater treatment plant operations. Some emulsifying agents may cause other collection system or treatment plant problems down the line.

The County agrees to work with City staff to explore a possible pilot project for the use of additives or other FOG removing technologies in the city's sewer system, provided the County has the opportunity to review the proposed technology prior to its use and the technology complies with all applicable rules and regulations.

Section 3. Zero Discharge On-Site Wastewater Treatment Systems
The County strives for energy efficiency in its operations and incorporates sustainable features in many of its facilities. The County also stays abreast of technology developments and trends related to its industry. Technologies are emerging for on-site wastewater treatment systems that are designed not to discharge into the sanitary sewer system, although these buildings may still require a connection to the local sewer. These on-site systems are part of a wide range of opportunities in sustainable building technologies systems or fixtures that do not present a human or environmental health risk.

The County agrees to explore the impact of emerging technologies on the regional sewer system. This may result in establishing new policies including, but not limited to, protecting the County system if these new technologies overflow into the conveyance system. This also may involve charges if outfalls are activated and used.

Section 4. Odor Control at WTD's York Pump Station Discharge

The County will continue to assess its odor control efforts at its York Pump Station discharge, located near the intersection of 120th Avenue NE and NE 116th Street in the City of Kirkland. This will occur through the County's odor control task force and operations and maintenance at that location. The County commits to changing odor control filter medium on a regular cycle and will alert the City's Public Works Operations staff when the medium has been changed out.

Section 5. Stormwater Outfall at Third Street and Central Way

The City and County agree to coordinate, including a cost share of 50 percent, for the inspection (not to exceed total cost of $5,000) of the City's 72-inch stormwater outfall that is located near Third Street and Central Way. The City will lead the effort to complete inspection of the outfall. WTD's cost share for the inspection will not exceed $2,500.

The County will coordinate a bathymetry study (study of the underwater depth of the lake) for the lake area beyond the current outfall location. City will provide all existing information it has on file to date. The County's contribution to this study will not exceed $25,000. The results of the study will be reviewed with the City's Public Works Director to determine if further action is needed.

The County has recently upgraded the downtown pump station in the City of Kirkland with significant improvements to the wet well and pump systems. If an overflow occurs at the pump station within the first two years of full operation, the County agrees to fully address any environmental impacts to the area and will commit to repair the system problem as soon as practicable. The County and City commit to further discussions on solutions to this system if overflows impact the public swimming beach.

Section 6. Exploration of providing recycled water to the City of Kirkland

The City has expressed a desire to explore the use of non-potable recycled water as the Cross Kirkland Corridor is developed. The County agrees to meet and partner with the City on exploring this sustainable practice and work together to seek any grants that further the goal of increasing use of recycled water and moving forward with feasible projects.

CITY OF KIRKLAND

MUNICIPALITY OF METROPOLITAN SEATTLE

AMENDMENT TO AGREEMENT
FOR SEWAGE DISPOSAL

THIS AMENDMENT made as of the 2nd day of October, 1992 between the City of Kirkland, a municipal corporation of the State of Washington (hereinafter referred to as the "City") and the Municipality of Metropolitan Seattle, a metropolitan municipal corporation of the State of Washington (hereinafter referred to as "Metro");

WITNESSETH:

WHEREAS, the parties have entered into a long term Agreement for Sewage Disposal dated May 5, 1961, as amended (hereinafter referred to as the "Basic Agreement"); and

WHEREAS, an advisory committee composed of elected and appointed officials in the metropolitan area was appointed by the Metropolitan Council to examine the structure of Metro's charges to its participants; and

WHEREAS, said advisory committee, following extensive research, study and deliberations, has recommended certain changes in the structure of Metro's charges to its participants and implementation of said changes requires amendment of the Basic Agreement; and

WHEREAS, the parties have determined that the recommendations are in the best public interest and therefore desire to amend said Basic Agreement to implement said recommendations;

NOW, THEREFORE, it is hereby agreed as follows:

Section 1. Amendment of Section 5 of the Basic Agreement. Section 5 of the Basic Agreement is hereby amended to read as follows:

"Section 5. Payment for Sewage Disposal. For the disposal of sewage hereafter collected by the City and delivered to Metro the City shall pay to Metro on or before the last day of each month during the term of this Agreement, a sewage disposal charge determined as provided in this Section 5.

1. For the quarterly periods ending March 31, June 30, September 30 and December 31 of each year every Participant shall submit a written report to Metro setting forth:

(a) the number of Residential Customers billed by such Participant for local sewerage charges as of the last day of the quarter,

(b) the total number of all customers billed for local sewerage charges by such Participant as of such day, and

(c) the total water consumption during such quarter for all customers billed for local sewerage charges by such Participant other than Residential Customers.

The quarterly water consumption report shall be taken from water meter records and may be adjusted to exclude water which does not enter the sanitary facilities of the customer. Where actual sewage flow from an individual customer is metered, the metered sewage flows shall be reported in lieu of adjusted water consumption. The total quarterly water consumption report in cubic feet shall be divided by 2,250 to determine the number of Residential Customer equivalents represented by each Participant's customers other than single family residences.

Metro shall maintain a permanent record of the quarterly customer reports from each Participant.

The City's first quarterly report shall cover the first quarterly period following the date when sewage is first delivered to Metro and shall be submitted within thirty days following the end of the quarter. Succeeding reports shall be made for each quarterly period thereafter and shall be submitted within thirty (30) days following the end of the quarter.

2. (a) To form a basis for determining the monthly sewage disposal charge to be paid by each Participant during any particular quarterly period, Metro shall ascertain the number of Residential Customers and Residential Customer equivalents of each Participant. This determination shall be made by taking the sum of the actual number of Residential customers reported as of the last day of the next to the last preceding quarter and the average number of Residential Customer Equivalents per quarter reported for the four quarters ending with said next to the last preceding quarter, adjusted for each Participant to eliminate any Residential Customers or Residential Customer equivalents whose sewage is delivered to a governmental agency other than Metro or other than a Participant for disposal outside of the Metropolitan Area.

(b) For the initial period until the City shall have submitted six consecutive quarterly reports, the reported number of Residential Customers and Residential Customer equivalents of the City shall be determined as provided in this subparagraph (b). On or before the tenth day of each month beginning with the month prior to the month in which sewage from the City is first delivered to Metro, the City shall submit a written statement of the number of Residential Customers and Residential Customer equivalents estimated to be billed by the City during the next succeeding month. For the purpose of determining the basic reported number of Residential Customers and Residential Customer equivalents of the City for such next succeeding month, Metro may at its discretion adopt either such estimate or the actual number of Residential Customers and Residential Customer equivalents reported by the City as of the last day of the next to the last preceding reported quarter. After the City shall have furnished six consecutive quarterly reports the reported number of Residential Customers and Residential Customer equivalents of the City shall be determined as provided in the immediately preceding subparagraph (a).

(c) If the City shall fail to submit the required monthly and/or quarterly reports when due, Metro may make its own estimate of the number of Residential Customers and Residential Customer equivalents of the City and such estimate shall constitute the reported number for the purpose of determining sewage disposal charges.

3. The monthly sewage disposal charge payable to Metro shall be determined as follows:

(a) Prior to July 1st of each year Metro shall determine its total monetary requirements for the disposal of sewage during the next succeeding calendar year. Such requirements shall include the cost of administration, operation, maintenance, repair and replacement of the Metropolitan Sewerage System, establishment and maintenance of necessary working capital and reserves, the requirements of any resolution providing for the issuance of revenue bonds of Metro to finance the acquisition, construction or use of sewerage facilities, plus not to exceed 1% of the foregoing requirements for general administrative overhead costs.

(b) To determine the monthly rate per Residential Customer or Residential Customer equivalent to be used during said next succeeding calendar year, the total monetary requirements for disposal of sewage as determined in subparagraph 3(a) of this section shall be divided by twelve and the resulting quotient shall be divided by the total number of Residential Customers and Residential Customer equivalents of all Participants for the October-December quarter preceding said July 1st; provided, however, that the monthly rate shall not be less than Two Dollars ($2.00) per month per Residential Customer or Residential Customer equivalent at any time during the period ending July 31, 1972.

(c) The monthly sewage disposal charge paid by each Participant to Metro shall be obtained by multiplying the monthly rate by the number of Residential Customers and Residential Customer equivalents of the Participant. An additional charge may be made for sewage or wastes of unusual quality or composition requiring special treatment, or Metro may require pretreatment of such sewage or wastes.

4. The parties acknowledge that, by resolution of the Metropolitan Council, Metro may impose a charge or charges directly on the future customers of a Participant for purposes of paying for capacity in Metropolitan Sewage Facilities and that such charges shall not constitute a breach of this agreement or any part thereof. The proceeds of said charge or charges, if imposed, shall be used only for capital expenditures or defeasance of outstanding revenue bonds prior to maturity.

In the event such a charge or charges are imposed, the City shall, at Metro's request, provide such information regarding new residential customers and residential customer equivalents as may be reasonable and appropriate for purposes of implementing such a charge or charges.

5. A statement of the amount of the monthly sewage disposal charge shall be submitted by Metro to each

Participant on or before the first day of each month and payment of such charge shall be due on the last day of such month. If any charge or portion thereof due to Metro shall remain unpaid for fifteen days following its due date, the Participant shall be charged with and pay to Metro interest on the amount unpaid from its due date until paid at the rate of 6% per annum, and Metro may, upon failure to pay such amount, enforce payment by any remedy available at law or equity.

6. The City irrevocably obligates and binds itself to pay its sewage disposal charge out of the gross revenues of the sewer system of the City. The City further binds itself to establish, maintain and collect charges for sewer service which will at all times be sufficient to pay all costs of maintenance and operation of the sewer system of the City, including the sewage disposal charge payable to Metro hereunder and sufficient to pay the principal of and interest on any revenue bonds of the City which shall constitute a charge upon such gross revenues. It is recognized by Metro and the City that the sewage disposal charge paid by the City to Metro shall constitute an expense of the maintenance and operation of the sewer system of the City. The City shall provide in the issuance of future sewer revenue bonds of the City that expenses of maintenance and operations of the sewer system of the City shall be paid before payment of principal and interest of such bonds. The City shall have the right to fix its own schedule of rates and charges for sewer service provided that same shall produce revenue sufficient to meet the covenants contained in this Agreement.

<u>Section 2. Amendment of Section 6 of the Basic Agreement</u>. Section 6 of the Basic Agreement is hereby amended to read as follows:

"Section 6. Responsibility of the City. The City shall be responsible for the delivery to the Metropolitan Sewerage System of sewage collected by the City, for construction, maintenance and operation of Local Sewerage Facilities, and for the payment of all costs incident to the collection of such sewage and its delivery to the Metropolitan Sewerage System.

In addition, the City will undertake continual rehabilitation and replacement of its local sewage facilities for purposes of preventing, reducing and eliminating the entry of extraneous water into such facilities and will expend annually, averaged over five (5) years, an amount equal to two (2) cents per inch of diameter per foot of its local sewage facilities, excluding combined sewers and force mains, for said rehabilitation and replacement. The amount of this expenditure requirement may be increased from time to time by the Metropolitan Council to reflect general inflation. Rehabilitation and replacement projects undertaken pursuant to this section shall be constructed in accordance with criteria adopted by the Metropolitan Council and included in Metro's Rules and Regulations. In the event the City fails to comply with the rehabilitation and replacement expenditure requirements described in this section, the City shall pay such charge as may be determined by Metro for quantities of storm or ground water entering its Local Sewage Facilities in excess of the minimum standard established by the general Rules and Regulations of Metro.

Section 3. Amendment of Basic Agreement to Add a New Section. A new Section 18 shall be added to the Basic Agreement to read as follows:

"Section 18. Future Amendments. The City agrees to amend and hereby concurs in any amendment to this agreement which incorporates any changes in the terms for sewage disposal and/or payment therefore as may be proposed by Metro and agreed to by those Participants that shall represent, in total, not less than 90% of the Residential Customers and Residential Customer Equivalents then served by the Metropolitan Sewerage System."

Section 4. Effective Date of Amendment. This amendment shall take effect at the beginning of the first quarter following the date first written above with quarters beginning January 1, April 1, July 1, and October 1.

Section 5. Basic Agreement Unchanged. Except as otherwise provided in this amendment, all provisions of the basic agreement shall remain in full force and effect as written therein.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first written above.

CITY OF KIRKLAND

Terrence L. Ellis
City Manager

ATTEST:

City Clerk

MUNICIPALITY OF
METROPOLITAN SEATTLE

~~Gary Zimmerman~~
Chair of the Council

ATTEST:

Bonnie Mattson

CITY OF KIRKLAND

MUNICIPALITY OF METROPOLITAN SEATTLE

EXTENSION OF AGREEMENT FOR SEWAGE DISPOSAL

WHEREAS, the City of Kirkland (the "City") and the Municipality of Metropolitan Seattle (the "Municipality") are parties to a certain Agreement for Sewage Disposal (the "Agreement") dated May 5, 1961, as amended, pursuant to which the City delivers to the Municipality for treatment and disposal all the sewage and industrial wastes it collects from its service area; and

WHEREAS, the Agreement expires by its terms on July 1, 2016; and

WHEREAS, it is in the best interests of the City and the Municipality that the expiration date of the Agreement be extended in order to allow the Municipality to sell and issue its sewer revenue bonds with maturities extending beyond 2016;

NOW, THEREFORE, in consideration of the mutual covenants contained herein and in the Agreement, it is hereby agreed as follows:

The Agreement for Sewage Disposal between the City of Kirkland and the Municipality of Metropolitan Seattle dated May 5, 1961, as amended, is hereby extended for a period of twenty years and shall continue in full force and effect until July 1, 2036.

It is further agreed that all other provisions of said Agreement shall remain unchanged, and the Agreement dated May 5, 1961, as amended, as extended herein shall constitute the entire Agreement for Sewage Disposal between the parties.

DATED: This 19th day of March, ~~1985~~ 1987

CITY OF KIRKLAND

By Doris Cooper 11-15-85
Doris Cooper, Mayor

ATTEST:

Janice Perry
Deputy City Clerk

MUNICIPALITY OF METROPOLITAN SEATTLE

By Gary A Zimmerman
Gary Zimmerman
Chairman of the Council

ATTEST:

Bonnie Mattson
Bonnie Mattson
Clerk of the Council

Executed in 6 counterparts of which this is counterpart No. 4

MUNICIPALITY OF METROPOLITAN SEATTLE

CITY OF KIRKLAND

1st SUPPLEMENTAL AGREEMENT
JOINT USE OF PORTION OF EASTSIDE INTERCEPTOR, SECTION 14

THIS AGREEMENT, made and executed as of this 19th day of April, 1973, between the CITY OF KIRKLAND, a municipal corporation of the State of Washington (hereinafter referred to as the "City"), and the MUNICIPALITY OF METROPOLITAN SEATTLE, a municipal corporation of the State of Washington (hereinafter referred to as "Metro");

W I T N E S S E T H:

WHEREAS, the parties have heretofore entered into a long-term agreement for Sewage Disposal dated May 5, 1961 (hereinafter referred to as the "Basic Agreement"); and

WHEREAS, the parties desire to amend certain portions of the Basic Agreement to reflect changed conditions and policies; and

WHEREAS, Metro has constructed the Eastside Interceptor, Section 14 (hereinafter referred to as the "Interceptor"), to serve as a facility of the Metropolitan Sewerage System; and

WHEREAS, the City desires to use portions of the Interceptor as a Local Sewerage Facility;

NOW, THEREFORE, in consideration of the mutual covenants contained herein, it is hereby agreed as follows:

Section 1. Definition of Terms. The defined terms used in this contract shall have the meanings set forth in the Basic Agreement. Where manhole numbers are referred to, reference is made to Metro Contract Document 64-10, Schedule 3 for the Eastside Interceptor, Section 14, copies of which are on file with Metro and the City.

Section 2. Amendment of Basic Agreement - Delivery and Acceptance of Sewage. Section 2 of the Basic Agreement is hereby amended to read as follows:

"Section 2. Delivery and Acceptance of Sewage. The City shall deliver to Metro all of the sewage and industrial waste collected by the City and Metro shall accept the sewage and waste delivered for treatment and disposal as hereinafter provided subject to such reasonable rules and regulations as may be adopted from time to time by the Metropolitan Council. Metro shall not directly accept sewage or waste from any person, firm or private corporation which is located within the boundaries of or is delivering its sewage into the Local Sewerage Facility of the City without the written consent of the City."

Section 3. Joint Use of Portions of Interceptor. The City and Metro agree that the Interceptor between Manhole R02-71 and Manhole R02-72 shall serve as both a Metropolitan and a Local Sewerage Facility for such Participants as have authority to provide local service. The City shall have the right to make direct local connections to said sewer for which the City shall pay to Metro, before making said connection, the sum of $8.00 per front foot of property served on each side of the interceptor alignment; that is, a total of $16.00 per front foot of property served if local service is given on both sides of the Interceptor. Said amount represents the estimated cost of providing sewer service by constructing an eight-inch (8") local sewer on the same alignment as the Interceptor throughout that portion where local connections are allowed. Prior to any local connection, the City shall submit to Metro for approval a plot plan indicating the amount of frontage and property to be served, and shall make payment to Metro of the agreed upon amount. Upon such approval and payment, the City shall own an eight-inch (8") equivalent share of the Interceptor where local service is given on both sides of the Interceptor, and one-half thereof where service is given on only one side. Local connections to the Interceptor may be made by the City in such a manner as shall be approved by Metro. The City shall hold Metro harmless from any loss, cost, charge, liability or expense resulting from or arising out of damage to the Interceptor or to the persons or property of others caused by the making of such connections or the City's failure to observe any covenant of this Agreement.

<u>Section 4.</u> <u>Construction and Maintenance of Local Sewerage Facilities</u>. The City shall construct, operate and maintain at its expense or cause others to construct, operate and maintain at their expense, and in good working order and condition, any side sewers or Local Sewerage Facilities connected to the Interceptor up to and including the tee connection. Metro shall have no responsibility for construction, operation or maintenance of such side sewers or Local Sewerage Facilities.

<u>Section 5.</u> <u>Maintenance and Operation of Interceptor</u>. Metro shall continue to operate, maintain and own all portions of the Interceptor except as otherwise expressly provided herein. The City shall have no responsibility for operation or maintenance of the Interceptor.

<u>Section 6.</u> <u>Amendment to Basic Agreement - Termination</u>. Section 12 of the Basic Agreement is hereby amended to read as follows:

> "<u>Section 12.</u> <u>Effective Date and Term of Contract</u>. This Agreement shall be in full force and effect and binding upon the parties hereto upon the execution of the Agreement and shall continue in full force and effect until July 1, 2016."

Section 7. Basic Agreement Otherwise Unchanged. Except as otherwise provided in this Agreement, all provisions of the Basic Agreement shall remain in full force and effect as written therein.

Section 8. Assignment. Neither of the parties hereto shall have the right to assign this agreement or any of its rights and obligations hereunder nor to terminate its obligations hereunder by dissolution or otherwise without first securing the written consent of the other party, and this agreement shall be binding upon and inure to the benefit of the respective successors of the parties hereto.

Section 9. Execution of Documents. This Agreement shall be executed in six counterparts, any one of which shall be regarded for all purposes as one original.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

CITY OF KIRKLAND

By William C. Woods
Mayor William C. Woods

ATTEST:

Tom J. Adison

MUNICIPALITY OF METROPOLITAN SEATTLE

BY C. Carey Donworth
C. Carey Donworth
Chairman of the Council

ATTEST:

B. J. Carol
B. J. Carol
Clerk of the Council

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

On this 19th day of March, 1973, before me the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared William C. Woods and Tom J. Anderson, to me known to be the Mayor Dir. of Admin. & Fin., respectively, of the CITY OF KIRKLAND, the Municipal Corporation that executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned and on oath stated that they were authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

Arthur E. Knutson
Notary Public in and for the State of Washington, residing at Kirkland

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

On this 19TH day of APRIL, 1973, before me the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworm, personally appeared C. CAREY DONWORTH and B. J. CAROL, to me known to be the Chairman of the Council and Clerk of the Council, respectively, of the MUNICIPALITY OF METROPOLITAN SEATTLE, the municipal corporation that executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned and on oath stated that they were authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Jack A. Hakola
Notary Public in and for the State of Washington, residing at SEATTLE

RH2 ENGINEERING, P.S.
Date RECEIVED JUL 17 1991
File No.
Route To: Seen:
JG 7/18
1316.07

ORDINANCE NO. 835

AN ORDINANCE of the City of Kirkland, Washington, authorizing the execution of a contract for sewage disposal with the Municipality of Metropolitan Seattle containing provision for reimbursement to the city for the use of certain city sewerage facilities.

BE IT ORDAINED by the Mayor and City Council of the City of Kirkland as follows:

Section 1. The Mayor and Clerk are hereby authorized and directed on behalf of the City of Kirkland to enter into, execute and deliver a contract with the Municipality of Metropolitan Seattle which shall be substantially in the form set forth in Exhibit "A" attached hereto and by this reference made a part hereof.

Section 2. Said contract shall be executed in ten counterparts and shall bear the date of and be effective upon its execution by the Municipality of Metropolitan Seattle.

Section 3. This ordinance shall take effect upon its passage and publication in the manner provided by law.

ADOPTED by the Council of the City of Kirkland at a regular meeting thereof and approved by its Mayor this 1st day of May, 1961.

Mayor

ATTEST:

George A. Compton
City Clerk

I hereby certify that the foregoing is a true and correct copy of an Ordinance of the City of Kirkland and that the same was published or posted according to law, said Ordinance being No. 835 and entitled "An Ordinance as above.
Geo. A. Compton, City Clerk."

RESOLUTION NO. 87

A RESOLUTION of the Council of the Municipality of Metropolitan Seattle authorizing the execution of a contract for sewage disposal with the City of Kirkland.

WHEREAS, the Municipality of Metropolitan Seattle has heretofore adopted a comprehensive plan for the disposal of sewage for the Metropolitan Area; and

WHEREAS, it has determined that the acquisition, construction, operation and maintenance of the facilities required to carry out such plan is feasible; and

WHEREAS, in order to carry out said plan it is necessary and desirable that contracts be entered into with those cities and sewer districts desiring to deliver their sewage to the Metropolitan Sewer System for disposal; and

WHEREAS, the Municipality has considered the terms and conditions incident to the acceptance of sewage for disposal, including the charges necessary therefor;

NOW, THEREFORE, BE IT RESOLVED by the Council of the Municipality of Metropolitan Seattle as follows:

Section 1. That the Municipality shall enter into an agreement with the City of Kirkland providing for the disposal of certain sewage collected by the City and that such agreement shall be substantially in the form of Exhibit "A" attached hereto and by this reference made a part hereof.

Section 2. That the Chairman and Clerk of the Council be and they are hereby authorized and directed to execute such contract on behalf of the Municipality to bear the date of and to be effective upon its execution by the City of Kirkland.

ADOPTED by the Council of the Municipality of Metropolitan Seattle at a regular meeting thereof held this 20th day of April, 1961.

/s/ C. Carey Donworth
C. Carey Donworth
Chairman of the Council

ATTEST:

/s/ Maralyn Sullivan
Maralyn Sullivan
Clerk of the Council

I, MARALYN SULLIVAN, duly selected, qualified and Clerk of the Council of the Municipality of Metropolitan Seattle, DO HEREBY CERTIFY that the foregoing resolution is a true and correct copy of Resolution No. 87 of said Council duly adopted at a regular meeting thereof held on the 20th day of April, 1961, signed by the Chairman of such Council in attendance at such meeting and attested by myself in authentication of such adoption.

Maralyn Sullivan
Clerk

Executed in 10 counterparts of which this is counterpart No. 10

AGREEMENT FOR SEWAGE DISPOSAL

THIS AGREEMENT made and executed this 5TH day of MAY, 1961, between the CITY OF KIRKLAND, a municipal corporation of the State of Washington, hereinafter referred to as the "City" and the MUNICIPALITY OF METROPOLITAN SEATTLE, a municipal corporation of the State of Washington, hereinafter referred to as "Metro,"

W I T N E S S E T H:

WHEREAS, the public health, welfare and safety of the residents of the City and the residents of the metropolitan area require the elimination of existing sources of water pollution and the preservation of the fresh and salt water resources of the area; and

WHEREAS, growth of population, topographic conditions and preservation of water resources require that certain major sewage disposal works be constructed and operated and that the cities and special districts within the metropolitan area dispose of their sewage in accordance with a comprehensive plan for the metropolitan area; and

WHEREAS, Metro was established by vote of the people in the metropolitan area pursuant to Chapter 35.58 RCW for the purpose of performing the function of metropolitan sewage disposal, has adopted a comprehensive plan for the disposal of sewage from the metropolitan area and intends to develop the facilities needed to carry out such plan and to issue revenue bonds to finance such development; and

WHEREAS, to carry out the purposes of Metro and perform its authorized function and to provide for the disposal of sewage from the City into the metropolitan sewage disposal system it is necessary that a contract be now entered into establishing certain rights and duties of the parties incident thereto;

NOW, THEREFORE, in consideration of the mutual covenants contained herein, IT IS HEREBY AGREED as follows:

Section 1. Definition of Terms. The following words and phrases used in this contract shall have the meanings hereinafter set forth in this section:

(a) The words "Comprehensive Plan" shall mean the Comprehensive Sewage Disposal Plan for the metropolitan area adopted in Resolution No. 23 of the Municipality of Metropolitan Seattle and as same may be hereafter amended from time to time in the manner required by law.

(b) The words "Metropolitan Sewerage System" shall mean all of the facilities to be constructed, acquired or used by Metro as a part of the Comprehensive Plan. The Metropolitan Sewerage System shall generally include sewage disposal facilities with capacity to receive sewage from natural drainage areas of approximately one thousand acres or more. The Metropolitan Sewerage System shall thus include trunk or interceptor sewer facilities extending to a point within each tributary, and natural drainage area, where not more than one thousand acres remain to be served beyond the upper terminus of such trunk or interceptor sewer.

(c) The words "Local Sewerage Facilities" shall mean all facilities owned or operated by the Participant for the local collection of sewage to be delivered to the Metropolitan Sewerage System.

(d) The words "Metropolitan Area" shall mean the area contained within the boundaries of the Municipality of Metropolitan Seattle as now or hereafter constituted.

(e) The word "Participant" shall mean each city, town, county, sewer district, municipal corporation, person, firm or private corporation which shall dispose of any portion of its sanitary sewage into the Metropolitan Sewerage System and shall have entered into a contract with Metro providing for such disposal.

(f) The words "Residential Customer" shall mean a single family residence billed by a Participant for sewerage charges.

Section 2. Delivery and Acceptance of Sewage. From and after July 1, 1962, the City shall deliver to the Metropolitan Sewerage System all of the sewage and industrial wastes collected by it and Metro shall accept the sewage and wastes delivered for treatment subject to such reasonable rules and regulations as may be adopted from time to time by the Metropolitan Council. Metro shall not directly accept sewage or wastes from any person, firm, corporation or governmental agency which is located within the boundaries of or is delivering its sewage into the Local Sewerage Facilities of any Participant without the written consent of such Participant.

Section 3. Construction of Facilities. Metro shall construct, acquire or otherwise secure the right to use all facilities required for the disposal of sewage delivered to Metro pursuant to this Agreement and shall perform all services required for the maintenance, operation, repair, replacement or improvement of the Metropolitan Sewerage System, including any additions and betterments thereto.

Section 4. Connection of Local Sewerage Facilities to the Metropolitan Sewerage System. Local Sewerage Facilities of the City shall be connected to the Metropolitan Sewerage System at such time as any portion of the Metropolitan Sewerage System shall be available to receive sewage collected by such facilities. Metro shall, at its sole expense, connect those Local Sewerage Facilities of the City which are now in existence or which shall be constructed in accordance with the rules and regulations of Metro prior to the availability of the Metropolitan Sewerage System. Local Sewerage Facilities constructed after the Metropolitan Sewerage System shall have been made available to the area served by such Local Sewerage Facilities shall be connected to the Metropolitan Sewerage System at the expense of the Participant in accordance with the rules and regulations of Metro.

Section 5. Payment for Sewage Disposal. For the disposal of sewage collected by the City and delivered to Metro, the City shall pay to Metro on or before the last day of each month during the term of this agreement, commencing with the month of July, 1962, a sewage disposal charge determined as provided in this Section 5.

1. For the quarterly periods ending March 31, June 30, September 30 and December 31 of each year every Participant shall submit a written report to Metro setting forth (a) the number of Residential Customers billed by such Participant for local sewerage charges as of the last day of the quarter, (b) the total number of all customers billed by such Participant as of such day and (c) the total water consumption during such

quarter for all customers billed by such Participant other than Residential Customers. The quarterly water consumption report shall be taken from water meter records and may be adjusted to exclude water which does not enter the sanitary facilities of a customer. Where actual sewage flow from an individual customer is metered, the metered sewage flows shall be reported in lieu of adjusted water consumption. The total quarterly water consumption report in cubic feet shall be divided by 2,700 to determine the number of Residential Customer equivalents represented by each Participant's customers other than single family residences. The first report shall cover the quarterly period ending December 31, 1960 and shall be submitted on or before March 1, 1961. Succeeding reports shall be made for each quarterly period thereafter and shall be submitted within thirty (30) days following the end of the quarter. Metro shall maintain a permanent record of the quarterly customer reports from each Participant.

2. To form a basis for determining the monthly sewage disposal charge to be paid by each Participant during any particular quarterly period Metro shall ascertain the number of Residential Customers and Residential Customer equivalents of each Participant for each such quarterly period beginning with the July-September quarter of the year 1962. This determination shall be made by taking the sum of the actual number of Residential Customers reported as of the last day of the next to the last preceding quarter and the average number of Residential Customer equivalents per quarter reported for the four quarters ending with said next to the last preceding quarter, adjusted to eliminate any Residential Customers or Residential Customer equivalents whose sewage is delivered to a governmental

agency other than Metro or other than a Participant for disposal outside of the Metropolitan Area.

3. For the period from July 1, 1962 to December 31, 1963, the monthly rate for each Residential Customer and Residential Customer equivalent of the City shall be Two dollars ($2.00) and the monthly sewage disposal charge to be paid by each Participant to Metro shall be obtained by multiplying the number of Residential Customers and Residential Customer equivalents of the Participant as determined in subparagraph 2 of this section by the monthly rate of Two dollars.

4. For each calendar year after the year 1963, the monthly sewage disposal charge payable to Metro shall be determined as follows:

a) Prior to July 1st of each year Metro shall determine its total monetary requirements for the disposal of sewage during the next succeeding calendar year. Such requirements shall include the cost of administration, operation, maintenance, repair and replacement of the Metropolitan Sewerage System, establishment and maintenance of necessary working capital and reserves, the requirements of any resolution providing for the issuance of revenue bonds of Metro to finance the acquisition, construction or use of sewerage facilities, plus not to exceed 1% of the foregoing requirements for general administrative overhead costs.

b) To determine the monthly rate per Residential Customer or Residential Customer equivalent to be used during said next succeeding calendar year, the total monetary requirements for disposal of sewage as determined in subparagraph 4(a) of this section shall be divided by twelve and the resulting quotient shall be divided by the total number of Residential Customers and Residential Customer equivalents of all Participants ascertained in accordance with subparagraph 2 of this section for the October-December quarter preceding said July 1st; provided, however, that the monthly rate shall not be less than Two dollars ($2.00) per month per Residential Customer or Residential Customer equivalent at any time during the period ending July 31, 1972.

c) The monthly sewage disposal charge paid by each Participant to Metro shall be obtained by multiplying the monthly rate by the number of Residential Customers and Residential Customer equivalents of the Participant determined as provided in Paragraph 2 of this section. An additional charge may be made for sewage or wastes of unusual quality or composition requiring special treatment, or Metro may require pretreatment of such sewage or wastes. An additional charge may be made for quantities of storm or ground waters entering those Local Sewerage Facilities which are constructed after January 1, 1961 in excess of the minimum standard established by the general rules and regulations of Metro.

5. A statement of the amount of the monthly sewage disposal charge shall be submitted by Metro to each Participant on or before the first day of each month during the term of this agreement commencing with the month of July 1962 and payment of such charge shall be due on the last day of such month. If any charge or portion thereof due to Metro shall remain unpaid for fifteen days following its due date, the Participant shall be charged with and pay to Metro interest on the amount unpaid from its due date until paid at the rate of 6% per annum, and Metro may, upon failure to pay such amount, enforce payment by any remedy available at law or equity.

6. The City irrevocably obligates and binds itself to pay its sewage disposal charge out of the gross revenues of the combined water and sewerage system of the City. The City further binds itself to establish, maintain and collect rates and charges for water and for sewage disposal service sufficient to pay all costs of maintenance and operation of the combined water and sewerage system of the City, including the sewage disposal charge payable to Metro hereunder, and sufficient to pay the principal of and interest on any revenue bonds of the City which shall constitute a charge upon such gross revenue. It is recognized by Metro and the City that the sewage disposal charge paid by the City to Metro shall constitute an expense of maintenance and operation of the combined water and sewerage system of the City prior in lien to any water and sewer revenue bonds of the City to be hereafter issued. It is further recognized that the City shall have the right to fix its own schedule of water and sewerage rates and charges, provided that same shall produce revenue to meet the covenants contained in this agreement.

Section 6. Responsibility of Participant. Each Participant shall be responsible for the delivery to the Metropolitan Sewerage System of sewage collected by such Participant, for the construction, maintenance and operation of Local Sewerage Facilities, and for the payment of all costs incident to the collection of such sewage and its delivery to the Metropolitan Sewerage System.

Section 7. Records. Permanent books and records shall be kept by Metro of the rates established, the volumes of sewage delivered and discharged into the Metropolitan Sewerage System wherever such volumes are measured and the number of Residential Customers and Residential Customer equivalents reported by each Participant, in addition to complete books of account showing all costs incurred in connection with the Metropolitan Sewerage

System. Such records shall be maintained beginning with the commencement of operation of any part of the Metropolitan Sewerage System.

Section 8. Development of Metropolitan Sewerage System. It is contemplated that the Metropolitan Sewerage System will be developed in stages and the nature of facilities to be constructed, acquired or used and the time of such construction, acquisition or use shall be determined by Metro, it being contemplated that Metro shall ultimately provide sewage disposal service for the entire Metropolitan Area.

Section 9. Use of Facilities Owned or Operated by the City. Effective July 1, 1962, or such earlier date as may be mutually agreed upon (hereinafter called "takeover date"), Metro shall have the exclusive right to use and the duty to maintain, operate, repair and replace the facilities owned by the City which are described in Exhibit "A" attached hereto and by this reference made a part hereof, subject to the continued availability of such facilities to receive, transport or treat sewage delivered by the City. From and after the takeover date Metro shall acquire, construct, maintain, operate, repair and replace all facilities now or hereafter required for the treatment and disposal of sewage delivered by the City and the City shall make payment for such treatment and disposal as provided in Section 5 of this Agreement.

For the privilege of using the facilities described in Exhibit "A" and for the easement rights hereby granted to Metro by the City of Kirkland as described in Exhibit "B" attached hereto and by this reference made a part hereof, Metro shall pay to the City of Kirkland a total amount of One Hundred Twenty One Thousand Nine Hundred Dollars ($121,900.00) (hereinafter called "amount of reimbursement"). If the City shall construct improvements or additions to the facilities described in Exhibit "A" with the approval of Metro after the date of this Agreement and prior to the takeover date, the City shall be reimbursed for the actual cost thereof in cash within thirty (30) days following the said takeover date in addition to the amount of reimbursement set forth above. The right of Metro to use facilities designated as "temporary" shall expire six months following the date of completion as determined by Metro of permanent metropolitan facilities adequate to replace such temporary' facilities. The City shall continue to own the facilities described in this Section 9 and shall continue to pay the principal of and interest on any bonds issued to pay in whole or in part the cost of acquisition and construction of such facilities, provided that facilities which are designated as "permanent" shall be conveyed by the City to Metro by quit claim deed upon payment of all presently outstanding revenue bonds or general obligation bonds of the City secured by or issued to acquire or construct said facilities.

The City shall give written notice to Metro prior to June 1, 1961, setting forth the manner in which the amount of reimbursement shall be paid. The City may elect to receive all or any portion of said amount in cash within thirty (30) days following the date of delivery of revenue bonds issued by Metro for the purpose of providing funds therefor and, in any event, not later than July 1, 1962 (hereinafter called "cash payment date") and may elect to receive any portion which is not paid on said cash payment date together with interest thereon at the rate of 4% per annum from said date, in the form of a credit against the City's monthly sewage disposal charge in equal monthly amounts sufficient to amortize such unpaid amount of reimbursement and interest thereon prior to July 1, 1977. The City may at any time after the cash payment date elect to receive any unpaid portion of the amount of reimbursement in cash with interest at the rate of 4% per annum to date of final payment by giving written notice to Metro at least one year prior to the date such final payment is to be made.

Section 10. Insurance and Liability for Damages. Each Participant with a population of less than 100,000 shall secure and maintain with responsible insurers all such insurance as is customarily maintained with respect to sewerage systems of like character against loss of or damage to the respective sewerage facilities of each and against public and other liability to the extent that such insurance can be secured and maintained at reasonable cost. Any liability incurred by Metro as a result of the operation of the Metropolitan Sewerage System shall be the sole liability of Metro and any liability incurred by the City as a result of the operation of the Local Sewerage Facilities of the City shall be the sole liability of the City.

Section 11. Assignment. Neither of the parties hereto shall have the right to assign this Agreement or any of its rights and obligations hereunder nor to terminate its obligations hereunder by dissolution or otherwise without first securing the written consent of the other party and this Agreement shall be binding upon and inure to the benefit of the respective successors and assigns of the parties hereto. In the event that the City should be dissolved, the local sewer facilities owned and operated by the City shall by such act of dissolution be assigned and transferred to Metro subject to any outstanding debts of the City incurred for the construction or acquisition of such facilities and subject to the obligation of Metro to continue to provide sewer service to the residents served by such local facilities upon payment of the reasonable costs thereof.

Section 12. Effective Date and Term of Contract. This Agreement shall be in full force and effect and binding upon the parties hereto upon the execution of the Agreement and shall continue in full force and effect for a period of fifty years unless prior to the takeover date Metro shall not have entered into a firm commitment for the sale of revenue bonds to finance any portion of the Comprehensive Plan, then in such event only, this Agreement shall be terminated as of said date. Metro shall make every reasonable effort to secure such a commitment prior to said date.

Section 13. Notice. Whenever in this Agreement notice is required to be given, the same shall be given by Registered Mail addressed to the respective parties at the following addresses:

Municipality of Metropolitan Seattle
152 Denny Way, Seattle 9, Washington

City of Kirkland
Kirkland, Washington

unless a different address shall be hereafter designated in writing by either of the parties.

The date of giving such notice shall be deemed to be the date of mailing thereof. Billings for and payments of sewage disposal costs may be made by regular mail.

Section 14. Execution of Documents. This Agreement shall be executed in ten counterparts, any of which shall be regarded for all purposes as one original. Each party agrees that it will execute any and all deeds, instruments, documents and resolutions or ordinances necessary to give effect to the terms of this Agreement.

Section 15. Waiver. No waiver by either party of any term or condition of this Agreement shall be deemed or construed as a waiver of any other term or condition, nor shall a waiver of any breach be deemed to constitute a waiver of any subsequent breach whether of the same or a different provision of this Agreement.

Section 16. Remedies. In addition to the remedies provided by law, this Agreement shall be specifically enforceable by either party.

Section 17. Entirety. This Agreement merges and supersedes all prior negotiations, representations and agreements between the parties hereto relating to the subject matter hereof and constitutes the entire contract between the parties concerning the disposal of sewage by the City and acceptance of such sewage by Metro for disposal.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

CITY OF KIRKLAND

By ______________________
Byron Baggaley
Mayor

ATTEST:

George A. Compton
City Clerk

MUNICIPALITY OF METROPOLITAN SEATTLE

By ______________________
C. Carey Donworth
Chairman of the Council

ATTEST:

Maralyn Sullivan
Clerk of the Council

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

On this 5th day of May, 1961, before me personally appeared BYRON BAGGALEY and GEORGE A. COMPTON, to me known to be the Mayor and City Clerk, respectively, of the City of Kirkland, a municipal corporation, and acknowledged the within and foregoing instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument and that the seal affixed is the corporate seal of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

Notary Public in and for the State of Washington, residing at Kirkland

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

On this 27 day of April, 1961, before me personally appeared C. CAREY DONWORTH and MARALYN SULLIVAN, to me known to be the Chairman of the Council and Clerk of the Council, respectively, of the Municipality of Metropolitan Seattle, a municipal corporation, and acknowledged the within and foregoing instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument and that the seal affixed is the corporate seal of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

Arthur S. Shorey
Notary Public in and for the State of Washington, residing at Seattle

# EXHIBIT "A"

## TEMPORARY FACILITIES

FACILITY

Sewage treatment plant and associated improvements located on the following described property situated in King County, State of Washington, to wit:

Beginning at the meander corner between Sections 5 and 8, Township 25 North, Range 5 E.W.M., and running thence along section line north 89° 39' 00" east 60.15 feet; thence north 22° 21' 00" west 183.71 feet; thence north 70° 04' 15" east, 496.71 feet to the true point of beginning; thence continuing north 70° 04' 15" east, a distance of 319.13 feet; thence north 0° 21' 00" east a distance of 198.76 feet, thence south 70° 04' 15" west a distance of 319.13 feet; thence south 0" 21' 00" west, a distance of 198.76 feet to the true point of beginning.

EXHIBIT "B"

Description of Permanent Sewage Pumping Station Easement

A perpetual easement for the purpose of installing, constructing, maintaining, operating, repairing and replacing an underground sewage pumping station with all connecting sewer lines, manholes, underground power, telephone, water or other utility lines or pipelines and appurtenances thereto, together with the right of ingress and egress to said station and the right to maintain an access stairway over, upon and under the westerly 10 feet of the easement property, said easement property being located in the City of Kirkland, King County, State of Washington, and more particularly described as follows:

> Th prt of govt lot 5 sect 5 twp 25 N R 5 E W.M. daf Beg at the meander cor betw sects 5 and 8 twp 25 N R 5 E W.M.; th N 89°39'00" E alng the Sly In of sd govt lot 5 a distance of 459.32 ft to the Sly production of the Ely ln of 2nd St; th N 0°21'00" W 273.13 ft to the SEly ln of 1st Ave as cyed to the City of Kirk and by dd recdd under aud file No. 3883807 rec of sd co; th N 70°04'15" E alng sd SEly ln 95.52 ft; th N 89°39'00"E 210.99 ft to the W ln 3rd St as cyed to the City of Kirk in said deed; th N 0°21'00" W 60 ft along th W ln of said 3rd St to the true point of beginning; th S 89°21'00"W 10 ft; th N 0°21'00" W 60 ft;th N 89°39'00"E 10 ft to the W ln of said 3rd St; th N 89°39'00"E 60 ft; th S 0°21'00"E 60 ft; th S 89°31'00"W 60 ft to T.P.O.B.

reserving, however, to the city all right, title and interest which may be used and enjoyed without interfering with the easement rights herein conveyed and, in particular, to continue to use and maintain as a city street the surface of that portion of said property now used for a street following construction or repair of the pumping station thereunder and the restoration by Metro of any street improvements damaged by such construction or repair.

# INTERGOVERNMENTAL COOPERATION AGREEMENT BETWEEN THE CITY OF BELLEVUE AND THE CITY OF KIRKLAND

## FOR

## PROVIDING SANITARY SEWER SERVICE TO SOUTH KIRKLAND PARK AND RIDE GARAGE

This Intergovernmental Cooperation Agreement ("Agreement") effective this 6th day of Sept., 2012, is entered into between the CITY OF BELLEVUE, a Washington municipal corporation ("Bellevue") and the CITY OF KIRKLAND, a Washington municipal corporation ("Kirkland"), regarding the provision of sanitary sewer services to the South Kirkland Park and Ride project.

## RECITALS

**WHEREAS,** Bellevue is a non-charter optional municipal code city incorporated under the laws of the State of Washington, with authority to enact laws and enter into agreements to promote the health, safety, and welfare of its citizens and for other lawful purposes; and

**WHEREAS,** Kirkland is a non-charter optional municipal code city incorporated under the laws of the State of Washington, with authority to enact laws and enter into agreements to promote the health, safety, and welfare of its citizens and for other lawful purposes; and

**WHEREAS**, King County Metro Transit ("KCMT") owns a parcel of land measuring approximately 3.8 acres at the NE corner of 108th Avenue and NE 38th Place (the "Property"), which parcel is split by the jurisdictional boundary between Bellevue and Kirkland; and

**WHEREAS**, KCMT has operated the South Kirkland Park and Ride ("SKPR") on the Property since 1978; and

**WHEREAS**, KCMT has applied to construct improvements on the SKPR facility, including construction of multifamily housing, affordable housing, a 3.25 story parking garage and related improvements; and

**WHEREAS**, the proposed multifamily and affordable housing will be on the west side of the Property on the Kirkland Portion of the Property; and

**WHEREAS,** the proposed parking garage will be located on the southeast corner of the Property and oriented in an east-west direction along 108$^{th}$ Avenue NE on the Bellevue portion of the Property. The east and south boundaries of the SKPR within Bellevue's jurisdiction contain ascending steep slopes (over 40 percent slopes), which are deemed critical areas under Bellevue's Land Use Code, Part 20.25H; and

**WHEREAS**, Bellevue's Utilities Department provides sanitary sewer services to residents and ratepayers within the City of Bellevue corporate limits and Kirkland's Public Works Department provides sanitary sewer service to residents and ratepayers within the City of Kirkland corporate limits; and

**WHEREAS,** the nearest sanitary sewer to the SKPR in Bellevue is a Metro trunk line located above the steep slope critical area to the east of the SKPR. Providing sanitary sewer to the proposed parking garage would require constructing a line to connect the proposed parking garage to the Metro trunk line. This construction would require disturbing the steep slope critical area, and the corresponding elevation of the new sanitary sewer line would require installation of pumping facilities to pump effluent uphill to the Metro trunk line; and

**WHEREAS,** Kirkland provides sanitary sewer to the SKPR and has connections available on **NE 38th Street** that could provide sanitary sewer service to that portion of the proposed parking garage located within Bellevue's jurisdiction; and

**WHEREAS,** based on the potential construction impacts to the steep slope critical area and the requirement to pump effluent to address grade change challenges, it is economically and technologically inefficient for Bellevue to provide sanitary sewer service to the proposed parking garage; and

**WHEREAS**, the City of Bellevue and the City of Kirkland both strive to provide the most efficient means of providing sanitary sewer service to their residents and ratepayers; and

**WHEREAS,** in support of the multi-jurisdictional cooperative efforts for this Essential Public Facility the parties agree that Kirkland would be best able to provide sanitary sewer service for the proposed parking garage to be constructed on the property; and

WHEREAS, the Kirkland and Bellevue are authorized to enter into this Agreement pursuant to and in accordance with the State Interlocal Cooperation Act, Chapter 39.34 RCW.

**NOW, THEREFORE**, in consideration of mutual promises and covenants contained herein, the parties agree to the terms and conditions as follows:

**1.0 Provision of Sanitary Sewer Service**

1.1. Bellevue authorizes Kirkland to provide sanitary sewer service for that portion of the SKPR located within Bellevue's jurisdiction. See Attachment A to this Agreement.

1.2. Kirkland agrees to do all things necessary and/or appropriate to provide sanitary sewer services for that portion of the SKPR property that exists within Bellevue's jurisdiction.

1.3. As the designated provider of sanitary sewer services, Kirkland shall process all permits and approvals required for sanitary sewer service connection and/or operation required for redevelopment of the SKPR.

## 2.0 Indemnification

2.1. Kirkland shall indemnify, defend and hold harmless Bellevue, its employees, servants, and agents from any and all claims, demands, suits, actions, damages, recoveries, judgments, costs, or expenses (including without limitation, attorneys' and expert witness fees) arising or growing out of or in connection with or related to, either directly or indirectly the provision of sanitary sewer service to the SKPR, except to the extent such claims arise from the sole or partial negligence, error or omissions of Bellevue, its employees, servants, and agents. Kirkland agrees that this its obligations under this subparagraph extend to any claim, demand and/or cause of action brought by or, or on behalf of, any of its employees or agents. For this purpose, Kirkland, by mutual negotiation, hereby waives, as respects Bellevue, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW. In the event Bellevue incurs any judgment, award, and/or cost arising therefrom including attorneys' fees to enforce the provisions of this article, all such fees, expenses, and costs shall be recoverable from Kirkland.

2.2 Bellevue shall indemnify, defend and hold harmless Kirkland, its employees, servants, and agents from any and all claims, demands, suits, actions, damages, recoveries, judgments, costs, or expenses (including without limitation, attorneys' and expert witness fees) arising or growing out of or in connection with or related to, either directly or indirectly the provision of sanitary sewer service to the SKPR, except to the extent such claims arise from the sole or partial negligence, error or omissions of Kirkland, its employees, servants, and agents. Bellevue agrees that this its obligations under this subparagraph extend to any claim, demand and/or cause of action brought by or, or on behalf of, any of its employees or agents. For this purpose, Bellevue, by mutual negotiation, hereby waives, as respects Kirkland, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW. In the event Kirkland incurs any judgment, award, and/or cost arising therefrom including attorneys' fees to enforce the provisions of this article, all such fees, expenses, and costs shall be recoverable from Bellevue.

## 3.0 General Provisions

3.1 This Agreement shall be interpreted, construed, and enforced in accordance with the laws of the State of Washington. Venue for any action under this Agreement shall be King County, Washington.

3.2 This Agreement shall be binding upon and inure to the benefit of the successors and assigns of Bellevue and Kirkland.

3.3 This Agreement is made and entered into for the sole protection and benefit of the parties hereto and their successors and assigns. No other person shall have any right of action based upon any provision of this Agreement.

3.4 This Agreement has been reviewed and revised by legal counsel for all parties and no presumption or rule that ambiguity shall be construed against the party drafting the document shall apply to the interpretation or enforcement of this Agreement. These parties intend this Agreement to be interpreted to the full extent authorized by applicable law.

3.5 This Agreement, including its exhibits, may be amended only by a written instrument executed by each of the parties hereto.

3.6 This Agreement constitutes the entire agreement of the parties with respect to the subject matter of this Agreement, and supersedes any and all prior negotiations (oral and written), understandings and agreements with respect hereto.

3.7 This Agreement may be executed in several counterparts, each of which shall be deemed an original, and all counterparts together shall constitutes by tone and the same instrument.

3.8 This Agreement shall take effect upon execution of the Agreement after authorization by Bellevue's City Council and Kirkland's City Council. This Agreement shall remain in effect until terminated by either party by 180 days prior written notice to the other party.

3.9 A copy of this Agreement shall be filed with the Bellevue and Kirkland City Clerks and the County Auditor.

**4. Notices.** All notices required under this Agreement shall be deemed sufficient if sent in writing by U.S. Mail or by electronic mail. All notices shall be delivered to the following addresses or to any other or additional addresses as may be specified from time to time by notice to either party. Notices shall be deemed received on the day sent electronically or 3 business days after the notice is placed in the U.S. Mail

Bellevue: Utilities Director
City of Bellevue
P.O. Box 90012
Bellevue, WA 98009-9012

With a copy to: City Attorney
City of Bellevue
P.O. Box 90012
Bellevue, WA 98009-9012

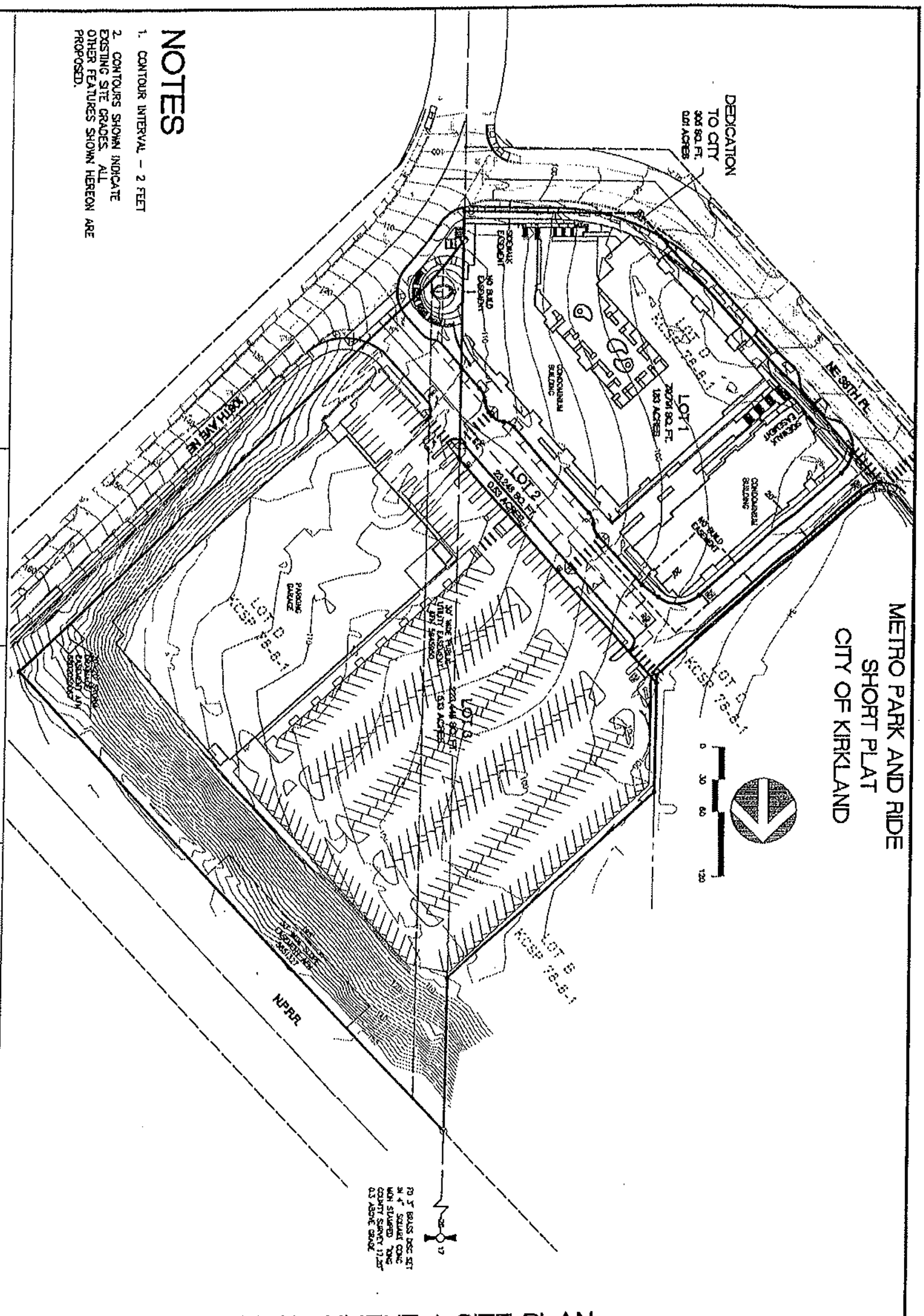
Kirkland: Public Works Director
City of Kirkland
123 5th Avenue
Kirkland, WA 98033

With a copy to: City Attorney
City of Kirkland
123 5th Avenue
Kirkland, WA 98033

**IN WITNESS WHEREOF**, each of the parties has executed this Agreement by having its authorized representative affix his/her name in the appropriate space below:

| CITY OF BELLEVUE | CITY OF KIRKLAND |
|---|---|
| By: Brad Miyake | By: Kurt Triplett |
| Title: City Manager - Deputy | Title: City Manager |
| Date: 8-9-12 | Date: 9/7/12 |

| | |
|---|---|
| Approved as to form: | Approved as to form: |
| Lacey L. Hatch | Oskar Rey |




# NOTES

1. CONTOUR INTERVAL – 2 FEET
2. CONTOURS SHOWN INDICATE EXISTING SITE GRADES. ALL OTHER FEATURES SHOWN HEREON ARE PROPOSED.

## SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY, MADE BY ME OR UNDER MY DIRECTION, IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF ____________ ON ________ 20__.

SURVEYOR ____________

CERTIFICATE NO. ____________

DOUGLAS E. VOGT — STATE OF WASHINGTON — 35017 — REGISTERED PROFESSIONAL LAND SURVEYOR

CITY OF KIRKLAND WASHINGTON

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

PORTION OF:
N 1/2, SEC. 20
T. 25 N, R.5 E, W.M.

| DWN. BY | DATE | JOB NO. |
|---|---|---|
| AALA | 04-16-12 | KIRK0000-C001 |
| CHKD. BY | SCALE | SHEET |
| DEV | 1" = 60' | 3 OF 3 |

# ATTACHMENT A SITE PLAN

SOUTH KIRKLAND PARK AND RIDE

CITY OF KIRKLAND
123 FIFTH AVENUE KIRKLAND, WASHINGTON 98033-6189 (206) 828-1243

# DEPARTMENT OF PUBLIC WORKS
## MEMORANDUM OF UNDERSTANDING

**To:** Daryl Bunger, City of Bellevue

**From:** Fred French, City of Kirkland

**Date:** May 24, 1989

**Subject:** SANITARY SEWER MAIN IN POINTS DRIVE

It will be the understanding between the cities of Kirkland and Bellevue that the City of Kirkland will own, operate, and maintain the sanitary sewer main within the Points Drive right-of-way from the first manhole north of SR 520 and to the north. The City of Bellevue will continue to own, operate, and maintain the lines under and south of SR 520 to the first manhole on the north side. The cities will consider the lines to be within respective jurisdictions for the purposes of issuing permission to access and connect, including street cuts.

This understanding will not extend to any other land use issues and is only intended to simplify the operation of each utility by using the SR 520 right-of-way as an effective utility district boundary.

Fred French, Principal Engineer, Kirkland

Daryl Bunger 6-8-89
Daryl Bunger, Development Operations Manager, Bellevue

BUNGER.MAY/FF:cw

RESOLUTION R 3118

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AUTHORIZING AND DIRECTING THE CITY MANAGER TO SIGN ON BEHALF OF THE CITY OF KIRKLAND, THAT CERTAIN INTERLOCAL GOVERNMENTAL AGREEMENT WITH THE CITY OF BELLEVUE, FOR THE PROVISION OF SANITARY SEWER SERVICE WITHIN THAT AREA OF KIRKLAND LYING WEST OF AND ADJACENT TO BRIDLE TRAILS STATE PARK.

Whereas, both Kirkland and Bellevue are authorized by state law to enter into cooperative agreements; and

Whereas, that area of the City of Kirkland within its sanitary sewer system service area, adjacent to Bridle Trails State Park as more specificallly described in Exhibit A hereto, and by this reference incorporated herein, is not presently connected to the Kirkland sanitary sewer system, and because of the topography of the area may not readily be so connected; and

Whereas, the service area and corporate boundaries of the City of Bellevue and its sanitary sewer system lie adjacent to the subject area, and the subject area can conveniently be connected into a Bellevue sewer system facility existing or under construction; and

Whereas, both parties are desirous where possible and convenient to mutually assist one another, now, therefore,

Be it resolved by the City Council of the City of Kirkland as follows:

Section 1. The proposed interlocal governmental cooperative agreement between the City of Kirkland and the City of Bellevue, for the provision of sanitary sewer service to that area of Kirkland lying west of and adjacent to Bridle Trails State Park, as set forth in Exhibit A, attached to the original of this resolution and by this reference incorporated herein, is approved by the City Council. The City Manager for the City of Kirkland is authorized to sign said agreement on behalf of the City of Kirkland.

Passed by majority vote of the Kirkland City Council in regular, open meeting this 17th day of September, 1984.

FILED NO. 9747
CITY OF BELLEVUE
DATE 10-2-84
CITY CLERK
O'Connell
Res. 4438

AGREEMENT

This agreement made and entered into this day by and between the City of Kirkland, an optional code city, hereinafter referred to as "Kirkland" and the City of Bellevue, an optional code city, hereinafter referred to as "Bellevue",

WITNESSETH:

WHEREAS, both Kirkland and Bellevue are authorized by State law to enter into cooperative agreements; and

WHEREAS, the area described and designated on Exhibit "A" (attached hereto and by this reference incorporated herein) as subject are of the City of Kirkland sanitary sewer system; and

WHEREAS, said area is not presently connected to the Kirkland sanitary sewer system, and because of the topography of the area, may not readily be so connected; and

WHEREAS, the service area and corporate boundaries of the City of Bellevue and its sanitary sewer system lie adjacent to the subject area and the subject area can conveniently be connected into a Bellevue sewer system facility existing or under construction; and

WHEREAS, both parties are desirous where possible and convenient to mutually assist one another.

NOW, THEREFORE, in consideration of the agreements herein contained, it is agreed as follows:

Section 1. All sanitary sewer facilities to be constructed within the subject area described and designated on Exhibit "A", as attached hereto and by this reference incorporated herein, shall upon construction and acceptance, become for all purposes, including customer service charges and maintenance, part of the Kirkland sanitary sewer system, but may, nevertheless, be connected into the Bellevue sewer system sanitary facility line lying within twenty feet and at the point so designated as "connection point" on Exhibit "A".

Section 2. Bellevue agrees to accept all sewage entering into its system through said connection point and to convey same through its system to its connection with the Municipality of Metropolitan Seattle System.

Section 3. No part of the cost of construction of the sanitary sewer facilities to be constructed within subject area, nor any of its future maintenance or repair, shall be borne by the City of Bellevue.

Section 4. City of Kirkland agrees to pay over to City of Bellevue as to each property within subject area, as it makes sewer connection, an amount equal to $0.02 per square foot of area of each property. In addition thereto, Kirkland will pay to Bellevue a monthly service trunkage charge in an amount equal to 12¢ per month per residential customer or residential equivalent, actually connected and served by the facilities of the Kirkland sewer system within the subject area.

Section 5. Neither party shall by virtue of this agreement acquire any proprietory or governmental interest in the sewer system or sewer line of the other party. Each party shall be solely responsible for the operation and maintenance of its own system of sewage collection and shall save the other party harmless from any claim for damage, real or imaginary, made by a third party, and alleging negligence or misfeasance in the operation or maintenance of the other party's system, or in the acts or ommissions of its own officers or employees.

Section 6. This writing embodies the entire agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein. This agreement may be amended only by written instrument signed by both parties.

Section 7. No waiver by either party of any term of condition of this agreement shall be deemed or construed as a waiver of any other term or condition, nor shall a waiver of any subsequent breach, whether of the same or of a different provision of this agreement.

Section 8. This agreement shall terminante upon six (6) months written notice given by either party to the other party. In the event of termination under this paragraph, all costs of disconnection shall be borne by the party requesting the termination.

---

THIS AGREEMENT SIGNED this 19th day of September, 1984.

CITY OF KIRKLAND

By Tom J. Anderson

Tom J. Anderson, Acting City Manager

---

THIS AGREEMENT SIGNED this 1st day of October, 1984.

CITY OF BELLEVUE

By

Execution of this agreement approved and authorized on behalf of:

the City of Bellevue by Resolution No. 4428 adopted this 1st day of October, 1984; and

the City of Kirkland by Resolution No. R3118, of the Kirkland City Council, adopted this 17th day of Sept., 1984.

Approved as to form:

City Attorney Kirkland

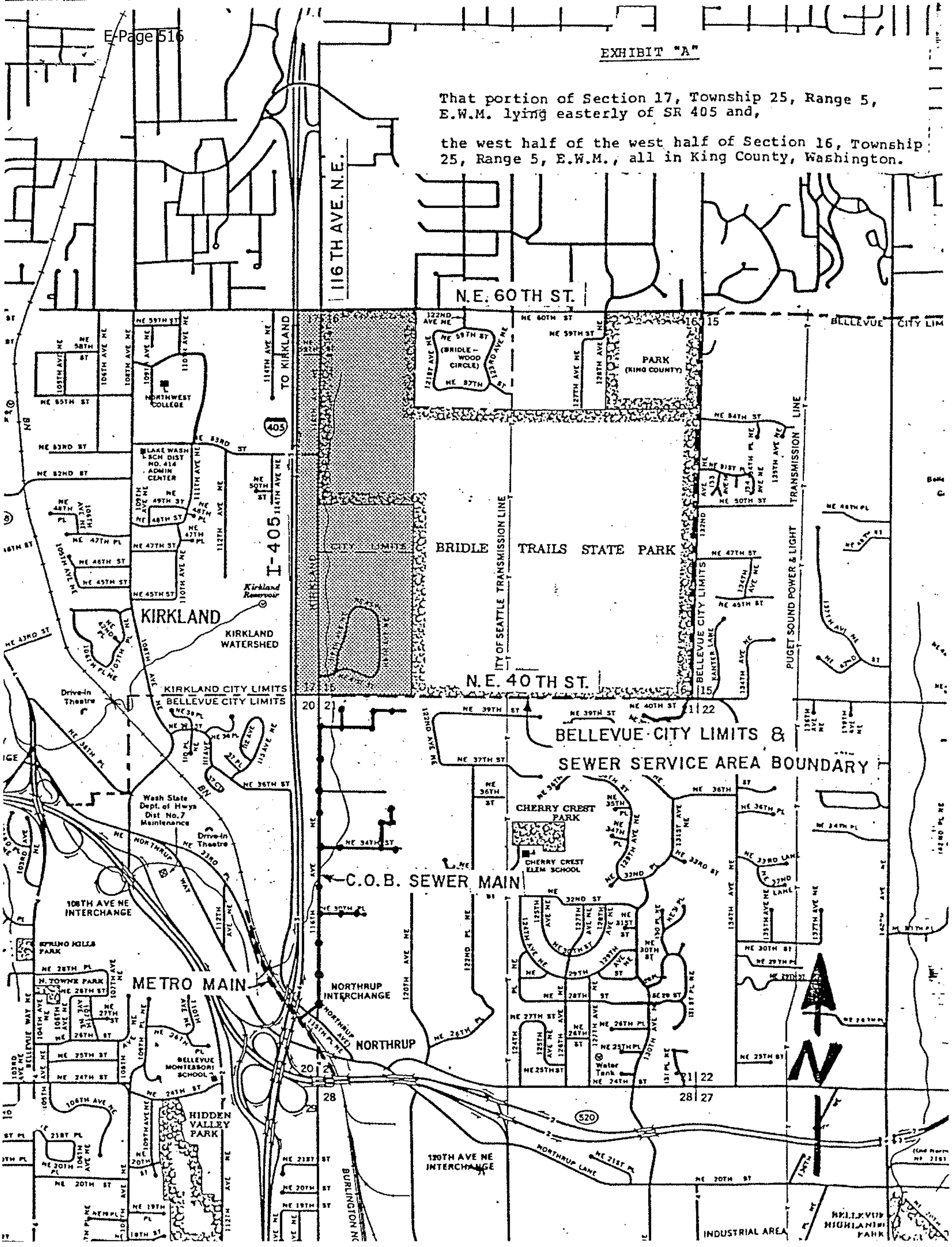
City Attorney Bellevue

4894J

EXHIBIT "A"

That portion of Section 17, Township 25, Range 5, E.W.M. lying easterly of SR 405 and,

the west half of the west half of Section 16, Township 25, Range 5, E.W.M., all in King County, Washington.



FILED NO. 6329
CITY OF BELLEVUE
DATE 7-28-80
CITY CLERK [signature]

AGREEMENT BETWEEN
THE CITY OF KIRKLAND, THE CITY OF BELLEVUE AND BELLEVUE INN, INC.

THIS AGREEMENT entered into this 28 day of July, 1980, is by and between THE CITY OF KIRKLAND, THE CITY OF BELLEVUE AND BELLEVUE INN, INC.

WHEREAS BELLEVUE INN, INC., the owner of the hereinafter described real property situated within the City of Kirkland, has requested sewer connection and service for said real property; and

WHEREAS the City of Kirkland sewer system presently does not have facilities available within the area in which said real property is located, and to which said real property could connect and be provided with sewer services; and

WHEREAS the City of Bellevue has a sewer system with existing facilities within the public rights-of-way adjacent to said real property and into which temporary connections could be made; and

WHEREAS all parties agreed that said real property may be temporarily connected to and serviced by the City of Bellevue sewer system until such time as the Kirkland sewer system has extended their facilities into the area and can provide sewer service to said real property;

NOW, THEREFORE, in consideration of the terms and agreements hereinafter set forth, the parties agree as follows:

1. The City of Kirkland and the City of Bellevue agree that the owner may connect the real property, hereinafter described, into and be served by the Bellevue sewer system in accordance with the requirements and payment of costs set forth in Exhibit A attached hereto and incorporated herein; and for so long as said real property is so connected to the Bellevue sewer system, the occupants of said property shall be treated as customers of the Bellevue sewer system for all purposes including the billing and collection of service charges. Provided, however, that this arrangement shall continue pursuant to this agreement only until such time as the facilities of the City of Kirkland sewer system may be extended into the general area in which the real property is situate, and at such time as a service connection for said real property shall be disconnected from the Bellevue sewer system.

2. The owner of the hereinafter described real property agrees and covenants with the City of Kirkland that said property shall be disconnected from the Bellevue sewer system facilities and reconnected to the City of Kirkland sewer system facilities at such time, after the Kirkland sewer system facilities have been extended into the area within which said real property is located, as notice to make such connections to the Kirkland sewer system is given by the City of Kirkland.

3. At the time that said real property shall connect into the Kirkland sewer system, there shall be paid to the City of Kirkland by Bellevue Inn, Inc., their successors or assigns, all connection charges, fees and assessments, as

would be required to be paid for connecting said real property at that time to the particular City of Kirkland utility system, not withstanding the existence of this agreement; provided, however, that the sum of said charges, fees and assessments shall be reduced by the amount, if any, paid by the owner to the City of Bellevue for the privilege of connecting to the said Bellevue sewer system at the time that the temporary connection is made pursuant to this agreement.

4. It is the intention of all of the parties hereto that the obligations imposed upon the hereinafter described real property, and agreed to and assumed by the owners thereof, shall run with the land; and a copy of this agreement shall be recorded as a public record in the office of the King County Department of records and elections.

454-5051

CITY OF KIRKLAND

BY ______________________

CITY OF BELLEVUE

BY ______________________

BELLEVUE INN, INC.

______________________ President

842- 106th NE.

Bellevue, Wash.

STATE OF WASHINGTON )<br>
) ss<br>
COUNTY OF KING )

On this 17th day of June, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared KENNETH D. McMILLAN to me known to be the individual described in and who executed the foregoing and acknowledged to me that he signed the said AGREEMENT as his free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

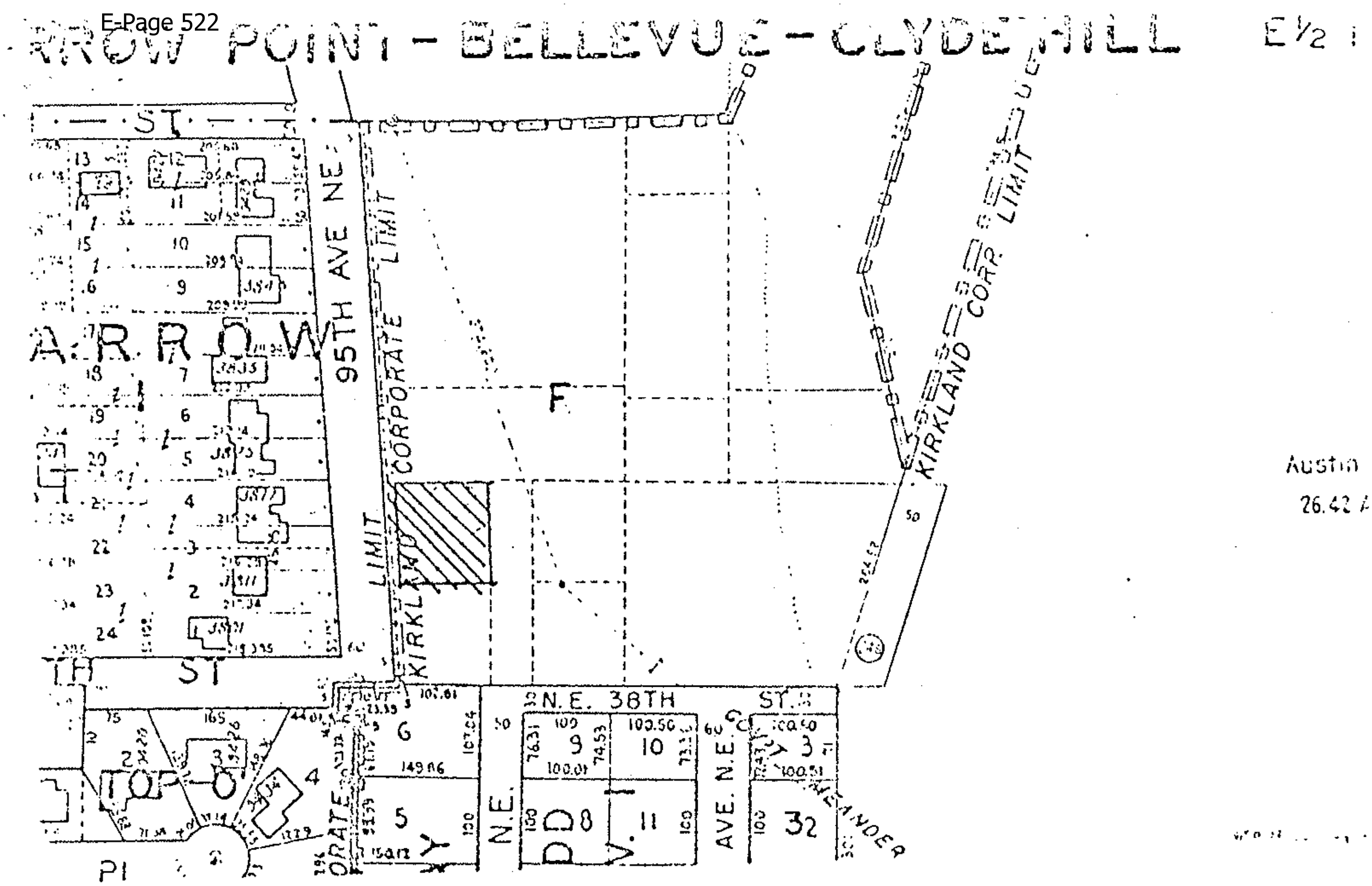
NOTARY PUBLIC in and for the State of Washington, residing at ~~Redmond~~. Seattle

STATE OF WASHINGTON )
) SS
COUNTY OF KING )

On this 8th day of July, 19 80, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Allen B. Locke and ________________, to me known to be the individual described in and who executed the foregoing instrument, and acknowledged to me that he signed and sealed this said instrument as his free and voluntary act and deed for the uses and purposes therein mentioned.

Given under my hand and official seal this 8th day of July, 19 80.

Notary Public in and for the State of Washington, residing at Kirkland.




THAT PORTION OF TRACT "F" OF YARROW, ACCORDING TO THE PLAT RECORDED IN VOLUME 15 OF PLATS, PAGE 92, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID TRACT "F"; THENCE EASTERLY ALONG THE SOUTHERLY LINE THEREOF 107.71 FEET; THENCE NORTH 1°29'18" EAST 130 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; THENCE CONTINUING NORTH 1°29'18" EAST 100 FEET; THENCE NORTH 88°30'42" WEST TO THE WEST LINE OF SAID TRACT "F"; THENCE SOUTHERLY ALONG SAID WEST LINE TO A POINT WHICH BEARS NORTH 88°30'42" WEST FROM THE TRUE POINT OF BEGINNING; THENCE SOUTH 88°30'42" EAST TO THE TRUE POINT OF BEGINNING; EXCEPT THE WESTERLY 5 FEET THEREOF.

TOGETHER WITH AN EASEMENT FOR DRIVEWAY AND UTILITIES OVER THE WESTERLY 5 FEET OF THE FOLLOWING:

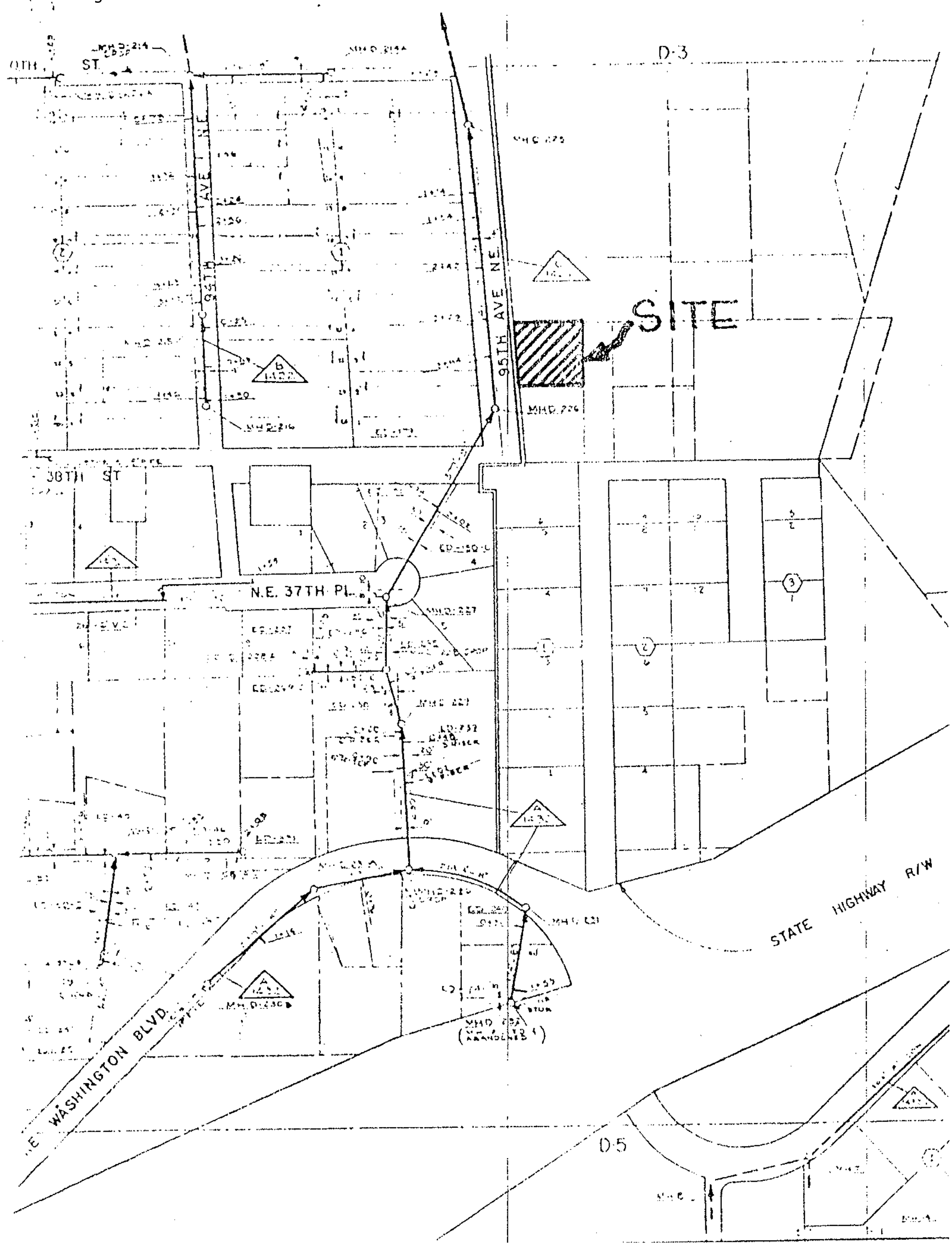
THAT PORTION OF TRACT "F" OF YARROW, ACCORDING TO THE PLAT RECORDED IN VOLUME 15 OF PLATS, PAGE 92, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID TRACT "F"; THENCE EASTERLY ALON[G] THE SOUTHERLY LINE THEREOF 107.71 FEET; THENCE NORTH 1°29'18" EAST 130 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIPTION; THENCE CONTINUIN[G] NORTH 1°29'18" EAST 100 FEET; THENCE NORTH 88°30'42" WEST TO THE WEST LIN[E] OF SAID TRACT "F"; THENCE SOUTHERLY ALONG SAID WEST LINE TO A POINT WHICH BEARS NORTH 88°30'42" WEST FROM THE TRUE POINT OF BEGINNING; THENCE SOUTH 88°30'42" EAST TO THE TRUE POINT OF BEGINNING.

EXHIBIT "A"

Costs

| | |
|---|---|
| Trunkage | 1.6¢ per square foot of area served |
| Service Charge | 12¢ per month per residential customer or residential equivalent |


D-3
SITE
95TH AVE NE
95TH AVE NE
38TH ST
N.E. 37TH PL
MHD 226
MHD 227
MHD 221
MHD 214
STATE HIGHWAY R/W
WASHINGTON BLVD
D-5

WL

ORIGINAL

CITY OF BELLEVUE, WASHINGTON

RESOLUTION NO. 3610

A RESOLUTION authorizing execution of an agreement between the City of Kirkland and the City of Bellevue and Bellevue Inn, Inc. to provide sanitary sewer service to an area within the City of Kirkland.

THE CITY COUNCIL OF THE CITY OF BELLEVUE, WASHINGTON, DOES RESOLVE AS FOLLOWS:

Section 1. The City Manager or her designee is hereby authorized and directed to execute, on behalf of the City, that certain agreement between the City of Kirkland and the City of Bellevue and Bellevue Inn, Inc., to provide sanitary sewer service to an area within the City of Kirkland, which has been given Clerk's Receiving No. 6329.

PASSED by the City Council this 28 day of July, 1980, and signed in authentication of its passage this 28 day of July, 1980.

(SEAL)

Richard M. Foreman, Mayor

Attest:

Patricia K. Weber, City Clerk

AGENDA OF THE CITY COUNCIL
CITY OF BELLEVUE

AGENDA NO: SS 2 (b)

MEETING DATE: 7/21/80

SUBJECT: Agreement with City of Kirkland to Provide Sewer Service

ISSUE: Is providing sewer service to properties within City of Kirkland that cannot at present be served by Kirkland in the public interest?

DEPARTMENT: Public Works/Utilities
STAFF CONTACT: Walter E. Davis, Jr.
TELEPHONE: 6965
OTHER DEPT. COORDINATION: Legal

AGENDA LOCATION:

| | |
|---|---|
| PUBLIC HEARING | |
| LAND USE REPORT | |
| BID | |
| CONSENT | |
| OTHER RESOLUTIONS AND ORDINANCES | |
| UNFINISHED BUS. | |
| NEW BUSINESS | |
| STUDY SESSION | X |
| DISCUSSION | |
| INFORMATION | X |

EXPENDITURE REQUIRED: $ Semi-annual billing
AMOUNT BUDGETED: $ -0-
APPROPRIATION REQUESTED: $ -0-
REVENUE SOURCE: -0-
FINANCIAL DEPARTMENT SIGNATURE: N/A
FISCAL IMPACT: N/A

ENFORCEMENT IMPACT: N/A

CLASS OF SUPPORTING DATA:

| | |
|---|---|
| ORDINANCE | |
| RESOLUTION | X |
| REPORT | |
| MINUTE ORDER | |

EXHIBITS:
A. Site map
B. Agreement
C.

HISTORICAL BACKGROUND: None

RECOMMENDATION: Pass resolution authorizing City Manager to execute Agreement with City of Kirkland.

SUMMARY: Sanitary sewer service to the property in this proposed agreement located along 95th Avenue N.E. at approximately N.E. 38th Street will be provided by an existing City of Bellevue line running north into Yarrow Point. We will collect a trunkage charge (one time) from the Developer (Bellevue Inn, Inc.) and monthly will collect from the residents a use fee.

WED/mb

COUNCIL: PLEASE RETAIN THIS MATERIAL FOR REVIEW AT MEETING OF 7/28/80

5/2/80

FILED NO. 6330
CITY OF BELLEVUE
DATE 7-28-80
CITY CLERK

ORIGINAL

AGREEMENT BETWEEN
THE CITY OF KIRKLAND, THE CITY OF BELLEVUE AND YARROW POINT PARTNERS

THIS AGREEMENT entered into this 28 day of July, 1980, is by and between THE CITY OF KIRKLAND, THE CITY OF BELLEVUE and YARROW POINT PARTNERS.

WHEREAS Yarrow Point Partners, the owner of the hereinafter described real property situated within the City of Kirkland, has requested sewer connection and service for said real property; and

WHEREAS the City of Kirkland sewer system presently does not have facilities available within the area in which said real property is located, and to which said real property could connect and be provided with sewer services; and

WHEREAS the City of Bellevue has a sewer system with existing facilities within the public rights-of-way adjacent to said real property and into which temporary connections could be made; and

WHEREAS all parties agreed that said real property may be temporarily connected to and serviced by the City of Bellevue sewer system until such time as the Kirkland sewer system has extended their facilities into the area and can provide sewer service to said real property;

NOW, THEREFORE, in consideration of the terms and agreements hereinafter set forth, the parties agree as follows:

1. The City of Kirkland and the City of Bellevue agree that the owner may connect the real property, hereinafter described, into and be served by the Bellevue sewer system in accordance with the requirements and payment of costs set forth in Exhibit A attached hereto and incorporated herein; and for so long as said real property is so connected to the Bellevue sewer system, the occupants of said property shall be treated as customers of the Bellevue sewer system for all purposes including the billing and collection of service charges. Provided, however, that this arrangement shall continue pursuant to this agreement only until such time as the facilities of the City of Kirkland sewer system may be extended into the general area in which the real property is situate, and at such time as a service connection for said real property shall be made to the City of Kirkland sewer system and said real property shall be disconnected from the Bellevue sewer system.

2. The owner of the hereinafter described real property agrees and covenants with the City of Kirkland that said property shall be disconnected from the Bellevue sewer system facilities and reconnected to the City of Kirkland sewer system facilities at such time, after the Kirkland sewer system facilities have

been extended into the area within which said real property is located, as notice to make such connections to the Kirkland sewer system is given by the City of Kirkland.

3. At the time that said real property shall connect into the Kirkland sewer system, there shall be paid to the City of Kirkland by Yarrow Point Partners, their successors or assigns, all connection charges, fees and assessments, as would be required to be paid for connecting said real property at that time to the particular City of Kirkland utility system, not withstanding the existence of this agreement; provided, however, that the sum of said charges, fees and assessments shall be reduced by the amount, if any, paid by the owner to the City of Bellevue for the privilege of connecting to the said Bellevue sewer system at the time that the temporary connection is made pursuant to this agreement.

4. It is the intention of all of the parties hereto that the obligations imposed upon the hereinafter described real property, and agreed to and assumed by the owners thereof, shall run with the land; and a copy of this agreement shall be recorded as a public record in the office of the King County Department of records and elections.

The real property subject to this agreement is described as:

Beginning at the intersection of the south line of Block F of Yarrow, according to plat recorded in Vol. 15 of Plats, page 92, in King County, Washington and the west line of Govt. Lot 8 in Sect. 19, Township 25 North, Range 5 E. W.M. in King County, Washington; Thence North 88°16'08" West 190.00 feet; Thence North 1°29'18" East 335.00 feet to the true point of beginning; Thence South 88°30'42" East 150.00 feet; Thence North 1°29'18" East to the Northerly line of said Tract F; Thence westerly along said Northerly line to the Northwest corner thereof; Thence Southerly along the Westerly line of said Tract F to a point which bears North 88°30'42" West from the true point of beginning; Thence South 88°30'42" East to the true point of beginning; EXCEPT the Westerly 5 feet & the Northerly 5 feet thereof; TOGETHER WITH an easement for road & utility purposes over a strip of land 50 feet in width, lying South of above described tract & lying North of Northeast 38th Street, the West line of said 50 foot strip bearing South 1°29'18" West from the true point of beginning of above described main tract.

OWNERS, YARROW POINT PARTNERS

CITY OF KIRKLAND

By [signature]

CITY OF BELLEVUE

By [signature]

[signature]
DOUGLAS J. DODDS

Carolyn J. Dodds
CAROLYN J. DODDS

Bruce J. Dodds
BRUCE J. DODDS

Mary J. Dodds
MARY J. DODDS

Richard U. Chapin
RICHARD U. CHAPIN

STATE OF WASHINGTON )
) ss
COUNTY OF KING )

On this 11th day of June, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared DOUGLAS J. DODDS to me known to be the individual described in and who executed the foregoing and acknowledged to me that he signed the said AGREEMENT as his free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

Shirley A. Pass
NOTARY PUBLIC in and for the State of Washington, residing at Redmond

STATE OF WASHINGTON )
)ss.
COUNTY OF KING )

On this 11th day of June, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared CAROLYN J. DODDS to me known to be the individual described in and who executed the foregoing and acknowledged to me that he signed the said AGREEMENT as her free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

Shirley A. Pass
NOTARY PUBLIC in and for the State of Washington, residing at Redmond

STATE OF WASHINGTON )
) ss
COUNTY OF KING )

On this 11th day of June, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared BRUCE J. DODDS to me known to be the individual described in and who executed the foregoing and acknowledged to me that he signed the said AGREEMENT as his free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

Shirley A. Pass
NOTARY PUBLIC in and for the State of Washington, residing at Redmond

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

On this 11th day of June, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared MARY J. DODDS to me known to be the individual described in and who executed the foregoing and acknowledged to me that he signed the said AGREEMENT as her free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

Shirley A. Pass
NOTARY PUBLIC in and for the State of Washington, residing at Redmond

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

On this 11th day of June, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared RICHARD U. CHAPIN, to me known to be the individual described in and who executed the foregoing and acknowledged to me that he signed the said AGREEMENT as his free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

Shirley A. Pass
NOTARY PUBLIC in and for the State of Washington, residing at Redmond

STATE OF WASHINGTON )
)ss.
COUNTY OF KING )

On this 8th day of July, 1980, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared ALLEN B. LOCKE to me known to be the City Manager of THE CITY OF KIRKLAND of the municipal corporation that executed the within and foregoing instrument, acknowledge the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned, and on oath stated that was authorized to execute said instrument.

WITNESS my hand and official seal hereto affixed this day and year in this certificate above written.

Sally J. Rice
NOTARY PUBLIC in and for the State of Washington, residing at Redmond

STATE OF WASHINGTON)
) ss.
COUNTY OF KING )

On this ______ day of ____________, 19___, before, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn personally appeared

to me known to be the of THE CITY OF BELLEVUE of the coporation that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument.

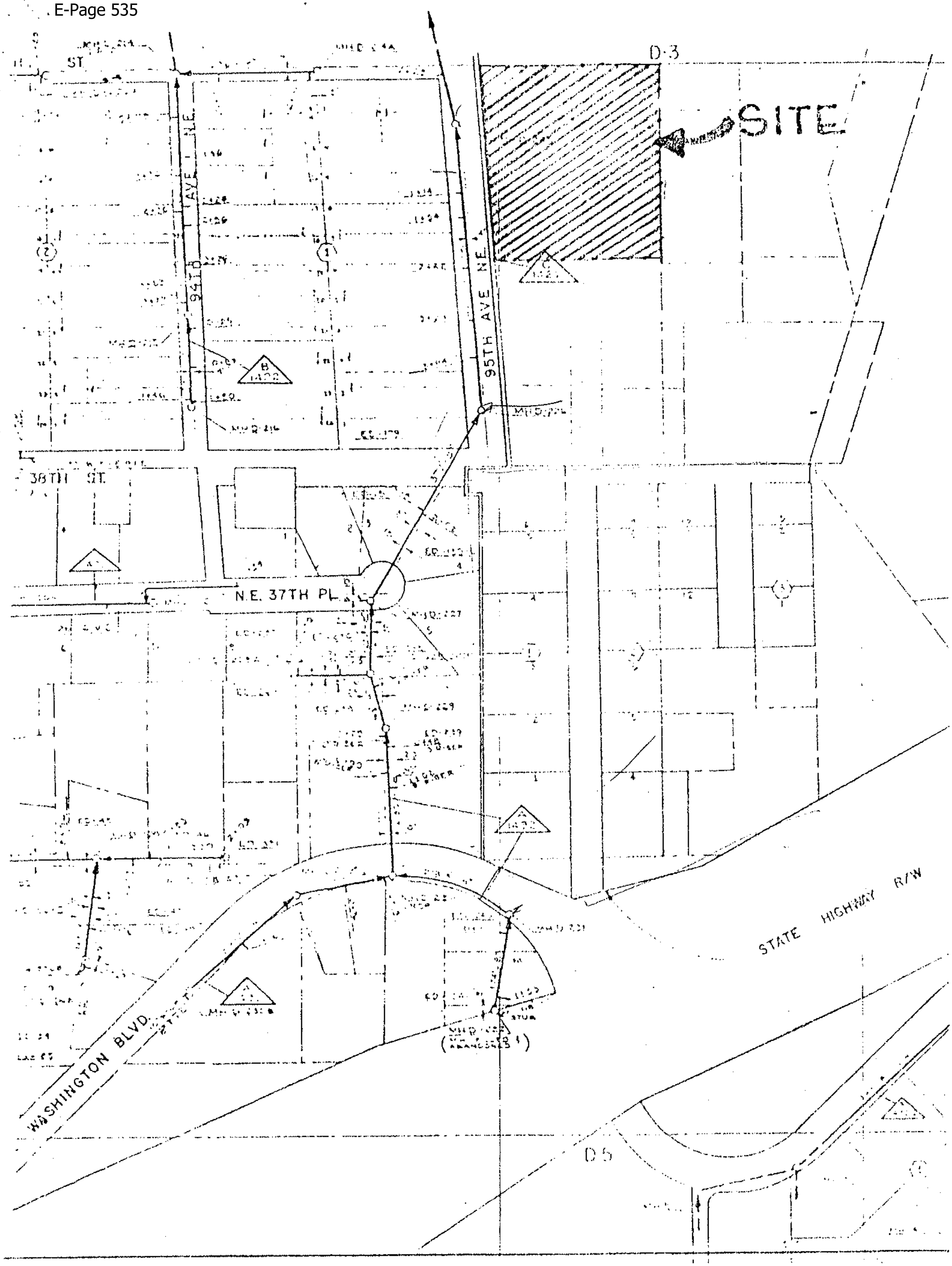
WINTESS my hand and official seal hereto affixed this day and year in this certificate above written.

NOTARY PUBLIC in and for the State of Washington, residing at

EXHIBIT "A"

Costs

| | |
|---|---|
| Trunkage | 1.6¢ per square foot of area served |
| Service Charge | 12¢ per month per residential customer or residential equivalent |


D-3
SITE
94TH AVE NE
95TH AVE NE
38TH ST
N.E. 37TH PL.
STATE HIGHWAY R/W
WASHINGTON BLVD.
D-5

ORIGINAL

CITY OF BELLEVUE, WASHINGTON

RESOLUTION NO. 3609

A RESOLUTION authorizing execution of an agreement between the City of Kirkland and the City of Bellevue and Yarrow Point Partners to provide sanitary sewer service to an area within the City of Kirkland.

THE CITY COUNCIL OF THE CITY OF BELLEVUE, WASHINGTON, DOES RESOLVE AS FOLLOWS:

Section 1. The City Manager or her designee is hereby authorized and directed to execute, on behalf of the City, that certain agreement between the City of Kirkland and the City of Bellevue and Yarrow Point Partners to provide sanitary sewer service to an area within the City of Kirkland, which has been given Clerk's Receiving No. 6330.

PASSED by the City Council this 28 day of July, 1980, and signed in authentication of its passage this 28 day of July, 1980.

(SEAL)

Richard M. Foreman

Richard M. Foreman, Mayor

Attest:

Patricia K. Weber

Patricia K. Weber, City Clerk

RESOLUTION NO. R - 2687

A RESOLUTION OF THE KIRKLAND CITY COUNCIL AUTHORIZING THE CITY MANAGER TO SIGN ON BEHALF OF THE CITY OF KIRKLAND AN AGREEMENT WITH THE CITY OF BELLEVUE TO PROVIDE SANITARY SEWER SERVICE TO AN AREA WITHIN THE CITY OF KIRKLAND ADJACENT TO THE CITY OF BELLEVUE WITHIN THE VICINITY OF WATERSHED PARK.

WHEREAS, both the City of Kirkland and the City of Bellevue are authorized by State law to enter into interlocal governmental cooperative agreements; and

WHEREAS, the area described and designated within Exhibit "A" (attached hereto and by this reference incorporated herein) as subject area lies within the City of Kirkland and sewer service area of the City of Kirkland Sanitary Sewer System; and

WHEREAS; said area is not presently connected to the Kirkland Sanitary Sewer System, and because of the topography of the area may not readily be so connected; and

WHEREAS, the service area and corporate boundaries of the City of Bellevue and its sanitary sewer system lie adjacent to the subject area and the subject area can conveniently be connected into a Bellevue Sewer System facility existing or under construction; and

WHEREAS, both parties are desirous where possible and convenient to mutually assist one another,.

NOW, THEREFORE, be it resolved by the City Council of the City of Kirkland as follows:

Section 1. That certain agreement relating to sanitary sewer service, attached to the original of this Resolution as Exhibit "A" and by this reference incorporated herein, is hereby approved by the Kirkland City Council, and the City Manager for the City of Kirkland is hereby authorized and directed to sign said contract on behalf of the City of Kirkland.

PASSED by majority vote of the Kirkland City Council in regular meeting on the 17th day of December, 1979

SIGNED IN AUTHENTICATION thereof on the 17th day of December, 1979.

s/ Robert L. Neir
MAYOR

ATTEST:

s/ Tom J. Anderson
Director of Administration & Finance
(ex officio City Clerk)

I hereby certify that the foregoing is a true and correct copy of a Resolution of the City of Kirkland and that the same was published or posted according to law, said Resolution being No. R-2687 and entitled "A Resolution as above.

[illegible] — City Clerk

FILED NO. 5892
CITY OF BELLEVUE
DATE 1-25-80
CITY CLERK P. Welen
Res # 3505

AGREEMENT

This agreement made and entered into this day by and between the City of Kirkland, an optional code city, hereinafter referred to as "Kirkland" and the City of Bellevue, an optional code city, hereinafter referred to as "Bellevue",

W I T N E S S E T H :

WHEREAS, both Kirkland and Bellevue are authorized by State law to enter into cooperative agreements; and

WHEREAS, the area described and designated on Exhibit "A" (attached hereto and by this reference incorporated herein) as subject area of the City of Kirkland sanitary sewer system; and

WHEREAS, said area is not presently connected to the Kirkland sanitary sewer system, and because of the topography of the area, may not readily be so connected; and

WHEREAS, the service area and corporate boundaries of the City of Bellevue and its sanitary sewer system lie adjacent to the subject area and the subject area can conveniently be connected into a Bellevue sewer system facility existing or under construction; and

WHEREAS, both parties are desirous where possible and convenient to mutually assist one another.

NOW, THEREFORE, in consideration of the agreements herein contained, it is agreed as follows:

Section 1. All sanitary sewer facilities to be constructed within the subject area described and designated on Exhibit "A", as attached hereto and by this reference incorporated herein, shall upon construction and acceptance, become for all purposes, including customer service charges and maintenance, part of the Kirkland sani ry sewer system, but may, nevertheless, be connected into the Bel vue sewer system sanitary facility line lying within ten fe (10') and at the point so designated as "connection point" on Exhibit "A".

Section 2. Bellevue agrees to accept all sewage entering into its system through sa d connection point and to convey same through its sytem to ts connection with the municipality of Metropolitan Seattle System.

Section 3. No part of the cost of construction of the sanitary sewer facilities to be constructed within subject area, nor any of its future maintenance or repair, shall be borne by the City of Bellevue.

Section 4. City of Kirkland agrees to pay over to City of Bellevue as to each pr perty within subject area, as it makes sewer connection, an amount equal to 1.6¢ per square foot of area of each property. In addition thereto, Kirkland will pay to Bellevue a monthly service trunkage charge in an amount equal to 12¢ per m nth per residential customer or residential equivalent, actually connected and served by the facilities of the Kirkla d sewer system within the subject area.

Section 5. Neither party shall by virtue of this agreement acquire any proprietory or governmental interest in the sewage system or sewer line of the other party. Each party shall be solely responsible for the operation and maintenance of its own system of sewage collection and shall save the other party hamless from any claim for damage, real or imaginary, made by a third party, and alleging negligence or misfeasance in the operation or maintenance of the other party's system, or in the acts or ommissions of its own officers or employees.

Section 6. This writing embodies the entire agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein. This agreement may be amended only by written instrument signed by both parties.

Section 7. No waiver by either party of any term or condition of this agreement shall be deemed or construed as a waiver of any other term or condition, nor shall a waiver of any subsequent breach, whether of the same or of a different provision of this agreement.

Section 8. This agreement shall terminate upon six (6) months written notice given by either party to the other party. In the event of termination under this paragraph, all costs of disconnection shall be borne by the party requesting the termination.

THIS AGREEMENT SIGNED the 28 day of January, 1979.

CITY OF KIRKLAND

By Allan B. [illegible]

CITY OF BELLEVUE

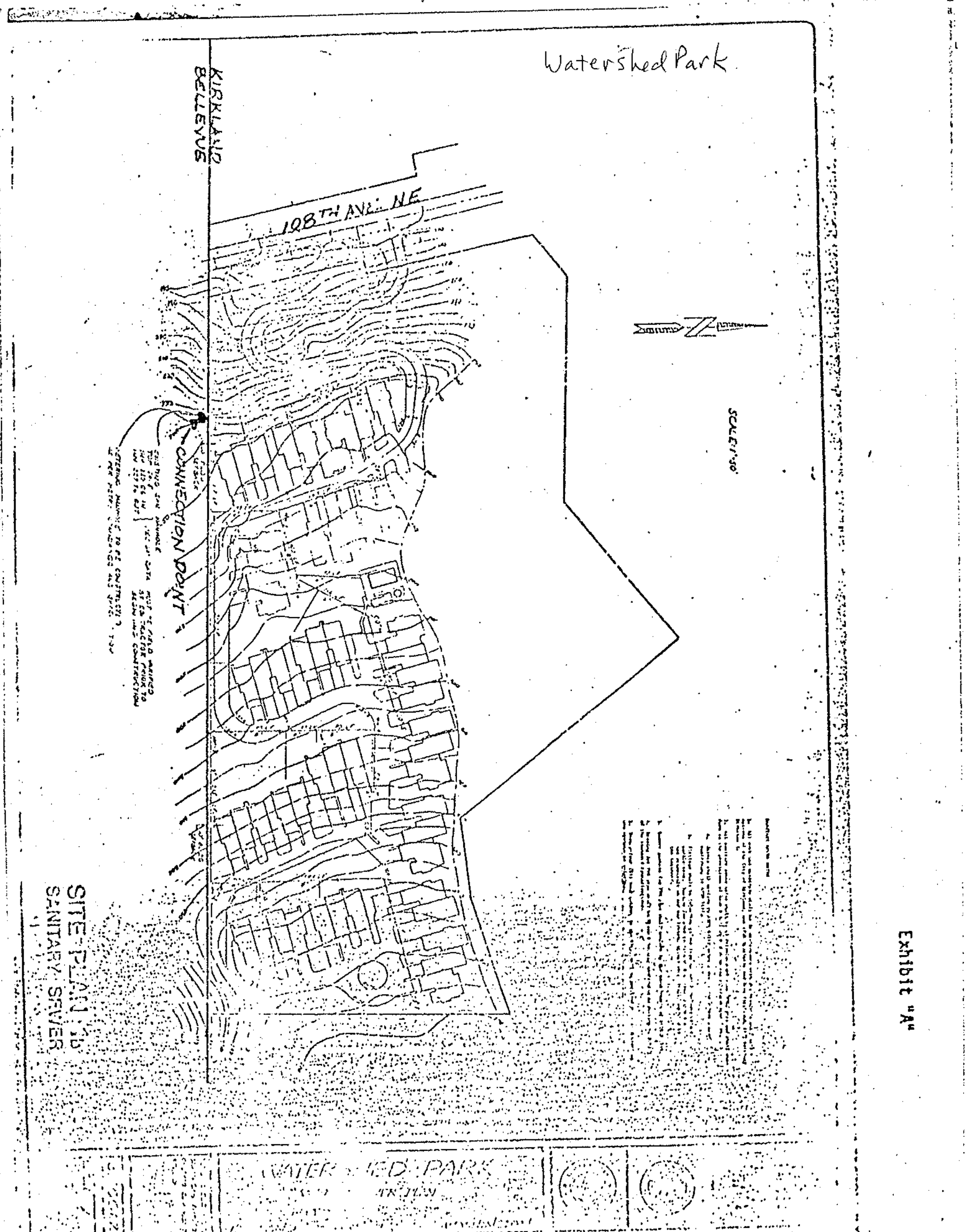
By [illegible]

Execution of this agreement approved on behalf of the City of Bellevue by resolution of its City Council, adopted the 28 day of January, 1979, and authorized by the City of Kirkland by Resolution No. R-2687 of the Kirkland City Council, adopted the 17th day of December, 1979.

Approved as to form:

William C. Graves
Assistant City Attorney

Watershed Park



1-15-80

ORIGINAL

CITY OF BELLEVUE, WASHINGTON

RESOLUTION NO. 3505

A RESOLUTION authorizing execution of an agreement between the City of Kirkland and the City of Bellevue to provide sanitary sewer service to an area within the City of Kirkland.

THE CITY COUNCIL OF THE CITY OF BELLEVUE, WASHINGTON, DOES RESOLVE AS FOLLOWS:

Section 1. The Acting City Manager or his designee is hereby authorized and directed to execute, on behalf of the City, that certain agreement between the City of Kirkland and the City of Bellevue to provide sanitary sewer service to an area within the City of Kirkland, which has been given Clerk's Receiving No. 5892

PASSED by the City Council this 28 day of January, 1980, and signed in authentication of its passage this 28 day of January, 1980.

(SEAL)

Richard M. Foreman, Mayor

Attest:

Patricia K. Weber, City Clerk

# INTERLOCAL AGREEMENT
## Transfer of Service Area, Amendment and Termination of the Wheeling Agreement and Construction of Improvements

This agreement ("Agreement") is made this 19th day of April, 2017, between the Northshore Utility District, a municipal corporation in King County, Washington ("District") and the City of Kirkland, a municipal corporation in King County, Washington ("City"). City and District are collectively referred to as "Parties."

## RECITALS

(a). City and District are both providers of public water and sewer services within the limits of City. While City serves the southern portion of its corporate boundaries, District serves the northern portion including the Totem Lake Area ("TLA").

(b). District provides sanitary sewer service to the TLA drainage basin (as identified in Exhibit "A") via a major sewer trunk line, flowing east-to-west, known as the Totem Lake Trunk.

(c). City provides sanitary sewer service to one of its drainage sub-basins (the "116 Basin"), located along 116th Avenue NE as identified in Exhibit "A", by discharging the sewage collection into District's system for conveyance or "wheeling" to King County for treatment, via the Totem Lake Trunk generally following the alignment of NE 124th Street, from approximately 132nd Avenue NE to the King County trunk line connection at approximately 100th Ave NE. This arrangement is covered by the terms of an existing inter-local agreement, dated January 4, 1976, and attached as thereafter amended as Exhibit "B", ("Wheeling Agreement").

(d). Wheeling Agreement allows District to preserve the capacity of the Totem Lake Trunk for the demand of its own service area and allows either party to terminate the arrangement with a one-year written notice.

(e). City has made certain land use plans identified as "Totem Lake Housing Incentive Areas" in its comprehensive planning document, which will add more housing units to TLA and is expected to increase the flow volume through the Totem Lake Trunk.

(f). Totem Lake Trunk is currently at or over capacity and cannot accommodate additional sewage flow.

(g). A developer, the Wolff Company, has proposed the re-development of the Lifebridge Church site within 116 Basin. If constructed, the proposed re-development project will add approximately 550 dwelling units to TLA drainage basin. Other major projects, presently under construction or identified for re-development, will also add a significant number of dwelling units to the sewer system drainage basin served by the Totem Lake Trunk.

(h). To adequately prepare to serve the additional future housing units in TLA drainage basin, including the 116 Basin, improvements to the District sanitary sewer system must be constructed. These improvements consist of one or more of the followings:

- Slip-lining of the Totem Lake Trunk to increase capacity.
- Construction of an additional sewer main generally parallel to the existing Totem Lake Trunk to bypass the Totem Lake Trunk.
- Construction of a trunk line that will convey wastewater flows from the TLA easterly along the NE 124th Street corridor into the King County system located in the Sammamish Valley.
- Other sewer system improvements as may be necessary to expand the capacity of the District's sanitary sewer system to serve future developments in TLA drainage basin.

The improvements required to accommodate the increase in demand for service in TLA drainage basin, as described above, shall hereinafter be referred to as "TLA Sewer Improvements."

(i). District has the resources and is willing to build the TLA Sewer Improvements to address the increase demand in TLA drainage basin and to take over as the direct retail sewer service provider of the 116 Basin under the conditions described in this Agreement.

**AGREEMENT**

In consideration of the terms and conditions contained herein, the Parties now agree as follows:

1. On a date agreed to by both Parties, but no later than June 30, 2017 ("Transfer Date"), City shall transfer all sewer accounts and local collection facilities within the 116 Basin to District at no cost to District and the Wheeling Agreement shall be deemed amended as of the Transfer Date to allow termination to occur under the Wheeling Agreement, which shall also occur as of the Transfer Date by entering into this Agreement. City will pay District the pro rata wheeling charge owed under the Wheeling Agreement through that date. District shall take over as the direct provider of retail sewer service to all connections within the 116 Basin in the same manner that it serves all other customers of District. To accomplish the transfer, the Parties agree to the followings:

    (a) City shall provide District with electronic and hard copy files of customer accounts information, as-built drawings of facilities if available, all information related to sanitary sewer service operation and maintenance, such as service records, repairs, video records, grease interceptors, etc. of the 116 Basin.

    (b) If necessary, City shall assign to District all easements for the location of local collection facilities within the 116 Basin.

(c) City shall assign and provide copies of any special agreements affecting the local sewer facilities to be transferred.

(d) District and City will work together to notify impacted customers and ensure a smooth billing transition on the Transfer Date.

2. District shall provide a letter of service availability with normal stipulations, including the execution of this Agreement, to the Wolff Company for the re-development of the Lifebridge Church site. District will provide the same to any other developers within the TLA upon request following the execution of this Agreement.

3. District shall start the planning and construction of TLA Sewer Improvements immediately following the execution of this Agreement at District expense.

4. District has established a cost estimate for the TLA Sewer Improvements of approximately $9 million. This estimate is divided by the 4,657 additional equivalent multi-family dwelling units, as provided by the City Planning staff, anticipated to be served by the TLA Sewer Improvements to arrive at a Capacity Expansion Connection Charge (CECC) of $1,926 per equivalent multiple-family dwelling unit. The final CECC may be more or less than $1,926 depending on the actual cost of the TLA Sewer Improvements but it shall still be calculated by dividing by 4,657. The CECC may also be adjusted by District in future years for inflation. The CECC will be charged to all new connections served by the TLA Sewer Improvements or the Totem Lake Trunk over and above District's regular sewer connection charges.

5. Starting with the collection of the first CECC, District shall keep accurate records of the number of new connections in TLA. District shall also keep accurate records of the engineering, design, construction, labor, material, permitting and all other costs incurred for the TLA Sewer Improvements.

6. If another capital project of similar scale, and under similar circumstances, is required within the jurisdictional boundaries of another city served by the District and said capital project will benefit only that city, District will require that city to enter into a similar Agreement.

7. City agrees to collect the CECC from future developments to be served by TLA Sewer Improvements or the Totem Lake Trunk at the rate in effect at that time and pay those CECCs to District until 4,657 equivalent multiple-family dwelling units have connected in TLA drainage basin or for 20 years after any assumption, whichever first occurs, should it choose to exercise its statutory authority pursuant to Chapter 35.13A RCW or other statutes to assume jurisdiction over District or any District responsibilities, property, facilities, equipment or utility customers located within areas served by the TLA Sewer Improvements or the Totem Lake Trunk. Said payments by City shall be separate and in

addition to any statutory obligations that City may have in the event of the above-mentioned assumption.

8. A copy of this Interlocal Agreement shall be filed with the City Clerk and the King County Recorder's Office.

9. This agreement shall go into effect immediately upon being signed by both Parties.

10. District agrees to defend, indemnify and hold harmless City, its elected and appointed officials, officers, agents, and employees from and against any and all claims, losses and liability for injuries, sickness, death or property damage, arising from any act, error or omission in the performance of the Agreement, except to the extent caused by the sole negligence of City.

11. City agrees to defend, indemnify and hold harmless District, its elected and appointed officials, officers, agents, and employees from and against any and all claims, losses and liability for injuries, sickness, death or property damage, arising from any act, error or omission in the performance of the Agreement, except to the extent caused by the sole negligence of District.

12. This Agreement constitutes the final and completely integrated agreement between the Parties concerning the subject matter herein and shall supersede all prior agreements, oral or otherwise regarding its subject matter. No modification or amendment of this Agreement shall be valid or effective unless evidenced in writing and signed by both parties.

**CITY:**

CITY OF KIRKLAND

By Kurt Triplett

Kurt Triplett, City Manager

**Approved as to Form:**

OFFICE OF THE CITY ATTORNEY

By Wm R Evans

Wm. R. Evans
Assistant City Attorney

**DISTRICT:**

NORTHSHORE UTILITY DISTRICT

By ________________________

Fanny Yee, its General Manager

**Approved as to Form:**

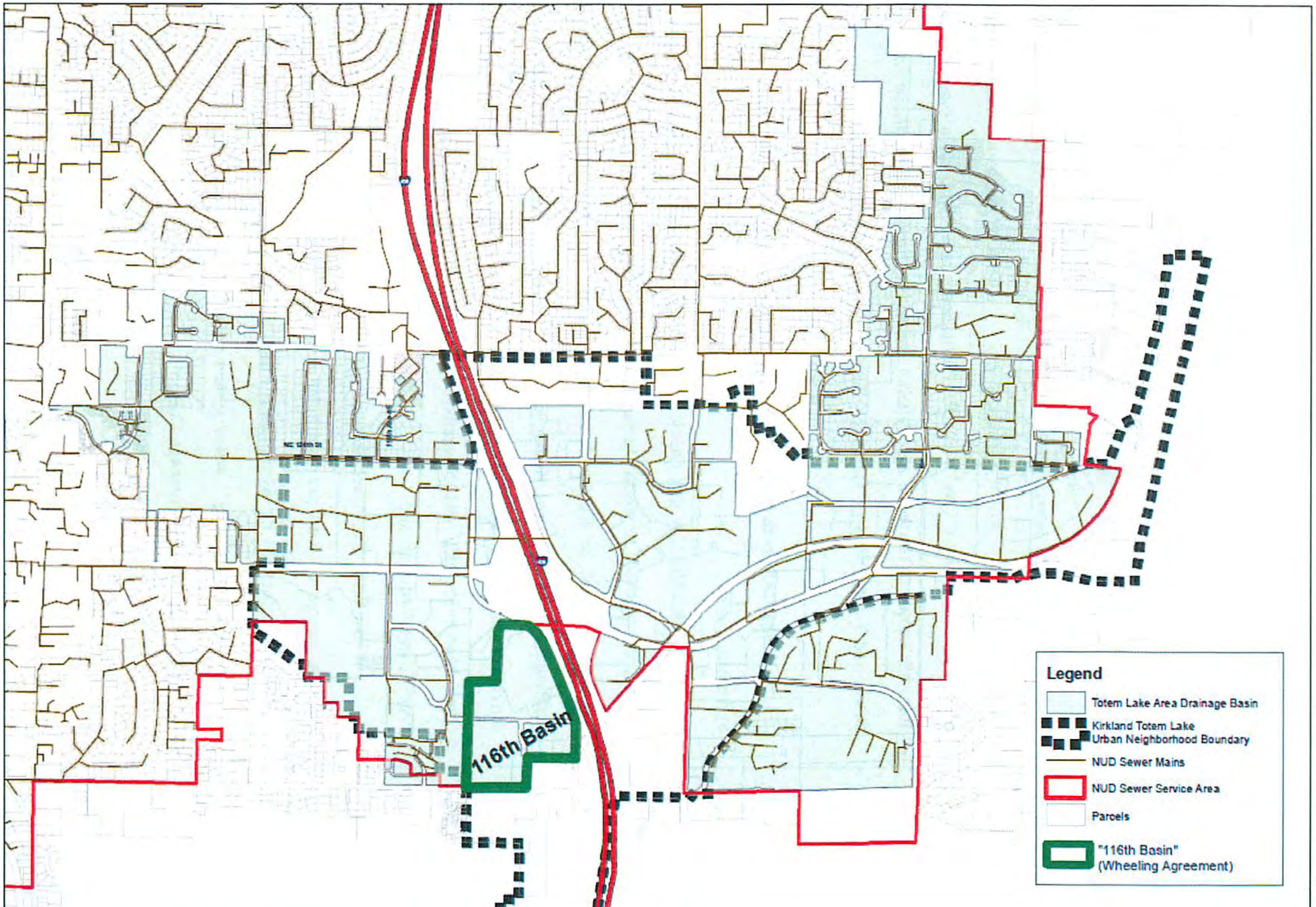
DISTRICT GENERAL COUNSEL

By ________________________

Kinnon Williams
Inslee Best Doezie and Ryder, PS

Kirkland and NUD Interlocal Agreement
Transfer of Service Area, Amendment &
Termination of the Wheeling Agreement
& Construction of Improvements

# EXHIBIT A



# Exhibit B
Wheeling Agreement

1996-1-3-NUD Resolution.

## FIRST AMENDMENT TO SEWER SERVICE AGREEMENTS

This First Amendment to Sewer Service Agreements ("First Amendment") is made and entered into this 8 day of JANUARY, 1996, by and between the City of Kirkland, an optional code city ("City"), and the Northshore Utility District, a municipal corporation formerly known as Northeast Lake Washington Sewer District and Northeast Lake Washington Sewer and Water District ("District"), for the purposes set forth below.

RECITALS:

WHEREAS, both City and District are authorized by state law to enter into cooperative agreements, and

WHEREAS, City and District previously entered into an Agreement dated March 3, 1978, copy attached, in which District agreed to provide sewer service to the property within the City described on Exhibit A to the Agreement, and City and District entered into an additional Agreement dated November 5, 1979, copy attached, in which District agreed to provide sewer service to the property within the City described on Exhibit A to the Agreement (such March 3, 1978 and November 5, 1979 agreements collectively referred to as the "Agreements" herein), and

WHEREAS, the Agreements provided that City shall pay District a monthly sewer trunkage charge of $.40 per month for residential customer or residential unit equivalent ("ERU") as defined by the Metropolitan King County Council ("METRO") actually connected to and served by the City's sewer system within the areas described on Exhibit A in the Agreements (the "Sewer Trunkage Charge"), and

# Exhibit B
## Wheeling Agreement

WHEREAS, the District's operation and maintenance expenses have increased substantially since the parties entered into the Agreements and District has requested that the Agreements be amended to (a) change the monthly Sewer Trunkage Charge to $1.85 per ERU to reimburse District for its operation and maintenance expenses incurred relating to the sewer service provided under the Agreements, and (b) provide for the adjustment of such Sewer Trunkage Charges hereinafter for District operation and maintenance expenses incurred to provide sewer service under the Agreements, and

WHEREAS, City is agreeable to such amendment of the Agreements subject to the terms and conditions below,

NOW, THEREFORE, in consideration of the Agreements set forth herein, the parties agree to amend the Agreements as follows:

1. Equivalent Residential Unit. Commencing January 1, 1993, METRO's definition of an ERU was changed from 900 cu.ft. of water usage per month to 750 cu.ft. per month. For the purposes of computing Sewer Trunkage Charges under this First Amendment, the 750 cu.ft. per month definition shall be used; provided that if the METRO definition of an ERU changes in the future, the definition of an ERU for the purposes herein shall change accordingly effective the date of such change. The parties also acknowledge that METRO merged into King County on January 1, 1995 and that the King County Department of Metropolitan Services succeeded to Metro's duties and functions and that such King County department shall be considered METRO for the purposes of this First Amendment.

2. Sewer Trunkage Charges. Section 4 of the Agreements are amended to provide that the monthly Sewer Trunkage Charge shall be increased to $1.85 per month per ERU commencing the 1 day of FEBRUARY, 1996. In addition, such Sewer Trunkage
PA

## Exhibit B
Wheeling Agreement

Charge shall be adjusted every two years thereafter. The adjustment shall be based on District's operation and maintenance expenses, as defined in the District's accounting records, including but not limited to, the District's general ledger and income statement ("Expenses"), but excluding Metro service charges. Effective every two (2) years from the date of this First Amendment, the monthly Sewer Trunkage Charge per ERU in the Agreements shall be determined as follows:

(a) The District's Expenses for the prior year shall be identified;

(b) The Total number of ERUs reported by the District to Metro for the final reporting period of the preceding year plus the total number of ERUs which are the subject of the Agreements reported by the City to Metro for the final reporting period of the preceding year shall be identified;

(c) The Expenses as determined in paragraph 2(a) herein shall be divided by the total number of ERUs as determined in paragraph 2(b) herein to determine the adjusted Sewer Trunkage Charge. City shall thereafter pay such adjusted Sewer Trunkage Charge per ERU in the Agreements to the District until such charge is adjusted further as provided herein.

3. No Other Changes. Except as expressly modified herein, the Agreements shall remain unchanged and in full force and effect.

4. Effective Date. This First Amendment shall take effect upon its approval by the District's Board of Commissioners and the City of Kirkland Council.

SIGNED this 4th day of January, ~~1995~~ 1996

CITY OF KIRKLAND

By: Terrence L. Ellis
Its: City Manager

F:\DMS\JWM\0087642.01 12/18/95 - 3 -

# Exhibit B
## Wheeling Agreement

Approved as to form:

OFFICE OF THE CITY ATTORNEY

By: ______________________

NORTHSHORE UTILITY DISTRICT

By: ______________________
Its: PRESIDENT

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

I certify that I know or have satisfactory evidence that ______________ is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the ______________ of the City of Kirkland to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated______________________

______________________
NAME:______________________
(Print Name)
Notary Public in and for the State of Washington.
Commission Expires: ______________

**Exhibit B**
Wheeling Agreement

STATE OF WASHINGTON )
) ss.
COUNTY OF KING )

I certify that I know or have satisfactory evidence that D. BRUCE GARDINER is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the PRESIDENT of Northshore Utility District to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

RONALD A. GEHRKE
COMMISSION EXPIRES
NOTARY PUBLIC
3-30-98
STATE OF WASHINGTON

Dated JAN 0 8 1996

NAME: RONALD A GEHRKE
(Print Name)
Notary Public in and for the State of Washington.
Commission Expires: 3-30-98

F:\DMS\JWM\0087642.01 12/18/95

# Exhibit B
Wheeling Agreement

**NORTHSHORE UTILITY DISTRICT**
**KING COUNTY, WASHINGTON**

**RESOLUTION NO. 1996-1-3**

**A RESOLUTION OF THE BOARD OF COMMISSIONERS OF THE NORTHSHORE UTILITY DISTRICT OF KING COUNTY, WASHINGTON, APPROVING THE FIRST AMENDMENT TO SEWER SERVICE AGREEMENTS WITH THE CITY OF KIRKLAND.**

**WHEREAS**, Fanny Yee, District Comptroller, has requested that the District Board of Commissioners approve an amendment to certain sewer service agreements with the City of Kirkland to increase Kirkland's payments to the District for the wheeling of sewer service; now, therefore,

**BE IT RESOLVED** by the Board of Commissioners of the Northshore Utility District of King County, Washington, that the First Amendment to Sewer Service Agreements in the form attached hereto as Exhibit "A" and incorporated herein by this reference with the City of Kirkland is hereby approved, and that D. Bruce Gardiner is authorized and directed to execute such Amendment on behalf of the District.

**ADOPTED** by the Board of Commissioners of the Northshore Utility District of King County at the regular open public meeting thereof held January 8, 1996.

D. BRUCE GARDINER

TRUDY ROLLA

COPY

KINNON WILLIAMS

MICHAL McALLISTER

D. A. ELLIS

# Exhibit B
## Wheeling Agreement

ORIGINAL

RESOLUTION 1979-11-5

(also known as agreement 2)

A RESOLUTION of Northeast Lake Washington Sewer District of King County, Washington, authorizing execution of Joint Use Agreement between Northeast Lake Washington Sewer District and City of Kirkland.

Kirk. Res R-2655

WHEREAS, the District has common boundaries with the City of Kirkland, hereinafter referred to as "City": and

WHEREAS, the district received a request from City to provide sanitary sewer service to property located within City; and

WHEREAS, said area is not presently connected to the existing City Sewer system, and because of the topography of the area may not readily be so connected; and

WHEREAS, the subject area can conveniently connect into the existing district facilities; and

WHEREAS, both districts are authorized by Chapter 39.34 of the Revised Code of Washington to enter into Intergovernmental Cooperative Agreements; and

WHEREAS, both District and City are desirous of assisting one another; now, therefore,

BE IT RESOLVED that Northeast Lake Washington Sewer District is hereby authorized and directed to enter into an Intergovernmental Cooperative Agreements with the City of Kirkland, attached hereto and labeled Exhibit A incorporated herein by this reference, and the Commissioners are authorized to execute the same on behalf of the District.

PASSED BY THE BOARD OF COMMISSIONERS of Northeast Lake Washington Sewer District of King County, Washington at the regular meeting held November 5, 1979.

D. A. ELLIS, President & Commissioner

RUSSEL D. COFFEY, Secretary & Commissioner

C. W. DAVIDSON, Commissioner

# Exhibit B
## Wheeling Agreement

AGREEMENT 1:7 Orig.

THIS AGREEMENT made and entered into this day, by and between the City of Kirkland, an optional code city, hereafter referred to as "city"; and Northeast Lake Washington Sewer District of King County, Washington, a municipal corporation, hereinafter sometimes referred to as "sewer district".

W I T N E S S E T H

WHEREAS, both city and sewer district are authorized by state law to enter into cooperative agreements, and

WHEREAS, the area described and designated on Exhibit A, attached hereto and by this referenced incorporated in full herein, as subject area lies within the City of Kirkland and the sewer service area of the City of Kirkland Sanitary Sewer System, and

WHEREAS, the North Kirkland Improvement Project (L.I.D. 115) includes the installation of sanitary sewer service facilities within said subject area, and

WHEREAS, said area is not presently connected to the existing Kirkland Sanitary Sewer System, and because of the topography of the area may not readily be so connected, and

WHEREAS, the service area and corporate boundaries of Northeast Lake Washington Sewer District lie adjacent to subject area, and subject area can conveniently connect into the existing Northeast Lake Washington Sewer System facilities, and

**Exhibit B**
Wheeling Agreement

WHEREAS, both parties are desirous where possible and convenient to mutually assist one another under terms and conditions as set forth herein, now, therefore,

IN CONSIDERATION of the agreements herein contained, it is agreed as follows:

Section 1. All sanitary sewer facilities to be constructed within the subject area as a part of or in connection with Local Improvement District No. 115, and the North Kirkland Improvement Project (which facilities are described and designated on Exhibit A, as attached hereto, and by this reference incorporated herein), shall upon construction and acceptance become for all purposes including customer service charges and maintenance, part of the Kirkland Sanitary Sewer System, but may nevertheless, be connected into the Northeast Lake Washington Sewer District sanitary sewer trunkage facilities at the point or points so designated as "connection point" on Exhibit A. Prior to making connection, city shall notify sewer district of the intended date of connection so that sewer district may cause its engineers to be physically present and to inspect and approve the connection to the sewer district's system. All costs of making said connection in complying with all federal, state and other applicable regulatory agency requirements shall be at the sole cost and expense of city.

Section 2. Sewer district agrees to accept sewage only from the area described in Exhibit A entering into its system

**Exhibit B**
Wheeling Agreement

through said designated connection point and agrees to convey the same through its system to its connection with the municipality of Metropolitan Seattle System. The providing of this service by sewer district to city shall be subject to all requirements, rules and regulations of the municipality of Metropolitan Seattle (METRO), and agrees to pay all fees due METRO with respect to the sewage entering sewer district's system. Should it hereafter be claimed or asserted by sewer district or METRO that there are excessive flows due to infiltration or other reasons from the area described in Exhibit A resulting in increased METRO charges to sewer district, then city agrees to install a metering device to measure the flow entering district's system at the connection points.

Section 3. It is acknowledged that city has designed and constructed the sewer system within Exhibit A and that all costs of construction and of said connection to the system of sewer district shall be at the sole cost and expense of city and no part of the cost of construction of sanitary sewer facilities to be constructed within the area described in Exhibit A nor any of its maintenance, repair, replacement or restoration shall be borne of paid by sewer district.

Section 4. City agrees to pay to district the sum of $ 35,633.89 as a connection charge for connecting the area described in Exhibit A to the system of the district which sum shall be paid as a condition precedent to the city making

**Exhibit B**
Wheeling Agreement

the connection to the sewer district sewage system. Said payment has been based upon the sewer district existing requirement for connection charges of $750 per gross acre.

In addition thereto, city will pay to sewer district a monthly sewer trunkage charge in an amount equal to forty cents ($0.40) per month for residential customer or residential equivalent (residential equivalent being computed per requirements of METRO) actually connected to and served by the facilities of City of Kirkland Sewer System within the area described in Exhibit A. City will maintain and provide records to sewer district of all customers, residential and commercial, and water flow for commercial customers so that the residential equivalent can be computed from time to time as requested by sewer district of city. Said monthly service trunkage charge shall be billed by sewer district to city from time to time but, in no event, less than annually. City agrees to report monthly to sewer district the number of residential customers or residential equivalents added to the system of city within the area described in Exhibit A for the preceding calendar month so that at all times district shall have an accurate count of residential customers or residential equivalents within the area described in Exhibit A.

<u>Section 5</u>. Sewer district reserves the right to provide sanitary sewer service within the sewer district boundary including those properties lying immediately west of and within the same drainage basin which could be served by way of connection into the City of Kirkland system described in Section 1 above. Said drainage basin is delineated on the map included as part

**Exhibit B**
Wheeling Agreement

of Exhibit A. The City of Kirkland may likewise provide sewer services by way of connection into the sewer facilities described in Section 1 to those properties within the same drainage basin which are within the City of Kirkland provided that if services provided to property within the City of Kirkland by connection to a system that ultimately connects to the sewer district sewer system, then the property to be served must be real property included on Exhibit A and for which the connection charge has been computed and paid as provided for in Section 4. City may not provide sewer service to any real property, or residential equivalent customers whose sewage will flow into the sewer district's system unless said property is located on and a part of the real property described in Exhibit A, and connection fees have been paid as provided in Section 4 hereof. It is recognized that sewer district has a vested interest in limiting and defining the flow that will enter sewer district system in that district has to reserve capacity for other areas of sewer district that will not hereafter require sewer service by connecting to the sewer service of district that is providing services to city pursuant to this agreement.

Section 6. Neither party shall by virtue of this agreement acquire any proprietary or governmental interest in the sewage system or sewerline of the other party. Each party shall be solely responsible for the operation, maintenance, restoration and replacement of its own system of sewers.

Section 7. No waiver by either party of any term or condition of this agreement shall be deemed or construed as a waiver of any other term or condition.

# Exhibit B
## Wheeling Agreement

Section 8. : .h party agrees and decla: that this agreement is a valid exercise of the mutual assistance and interlocal governmental cooperation authority granted to the respective parties under the laws of the State of Washington, and to that end each of the parties agrees to defend and support this agreement as being for the benefit of the health, safety, and general welfare of the general public, and each party further agrees to cooperate with the other party with respect to any appearance which may be required by either party in any proceeding before any other governmental agency.

Section 9. This agreement may be terminated by either party giving twelve (12) months notice to the other party of intent to terminate this agreement whereupon the termination date shall be upon expiration of twelve (12) months from date of receipt of said notice. In the event of termination under this paragraph, all costs of disconnection and replacement and restoration shall be paid by city.

THIS AGREEMENT signed this ___ day of ___________, 1979.

NORTHEAST LAKE WASHINGTON SEWER
DISTRICT OF KING COUNTY, WASHINGTON

BY ______________________________
President, Board of Commissioners

BY ______________________________
Secretary, Board of Commissioners

CITY OF KIRKLAND

BY ______________________________

The execution of this agreement approved on behalf of Northeast Lake Washington Sewer District by resolution of its Board of Commissioners, adopted the _____ day of __________, 197___, and authorized by the City of Kirkland by Resolution No. R-2655 of the Kirkland City Council adopted the 17th day of September, 1979.

# Exhibit B
## Wheeling Agreement

RESOLUTION NO. R - 2655

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AUTHORIZING THE MAYOR TO SIGN ON BEHALF OF THE CITY OF KIRKLAND A CERTAIN AGREEMENT BETWEEN THE CITY OF KIRKLAND AND NORTHEAST LAKE WASHINGTON SEWER DISTRICT RELATING TO SANITARY SEWER FACILITIES WITHIN THE NORTH KIRKLAND IMPROVEMENT PROJECT AREA (L.I.D. NO. 115).

WHEREAS, a portion of the area lying within the North Kirkland Improvement Project (L.I.D. No. 115) as described in the agreement between the City of Kirkland and the Northeast Lake Washington Sewer District, a copy of which is attached to the original of this Resolution and by this reference incorporated herein, lies within the City of Kirkland and the sewer service area of the City of Kirkland's Sanitary Sewer System; and

WHEREAS, said area is not presently connected to the Kirkland Sanitary Sewer System, and because of the topography of the area, cannot readily be so connected; and

WHEREAS, the service area and corporate boundaries of the Northeast Lake Washington Sewer District lie adjacent to said area, said area can conveniently connect into the existing Northeast Lake Washington Sewer facilities; and

WHEREAS, both the City and sewer district are authorized by State law to enter into intergovernmental cooperative agreements;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Kirkland as follows:

Section 1. The Mayor is hereby authorized and directed to sign on behalf of the City of Kirkland that certain agreement, a copy of which is attached to the original of this Resolution and by this reference incorporated herein. Said agreement permits the City of Kirkland to connect a portion of the Kirkland Sanitary Sewer System, constructed within the area described in said agreement, and lying within the North Kirkland Improvement Project area (L.I.D. No. 115), into the existing Northeast Lake Washington Sewer System facility in the vicinity of 116th Avenue N.E. and N.E. 124th Street.

Section 2. Said agreement shall become effective upon its being properly signed by both the City of Kirkland, as herein authorized, and by the Northeast Lake Washington Sewer District.

**Exhibit B**
Wheeling Agreement

PASSED by majority vote of the Kirkland City Council in regular meeting on the 17th day of September, 1979.

SIGNED IN AUTHENTICATION thereof on the 17th day of September, 1979.

MAYOR Pro Tem

ATTEST:

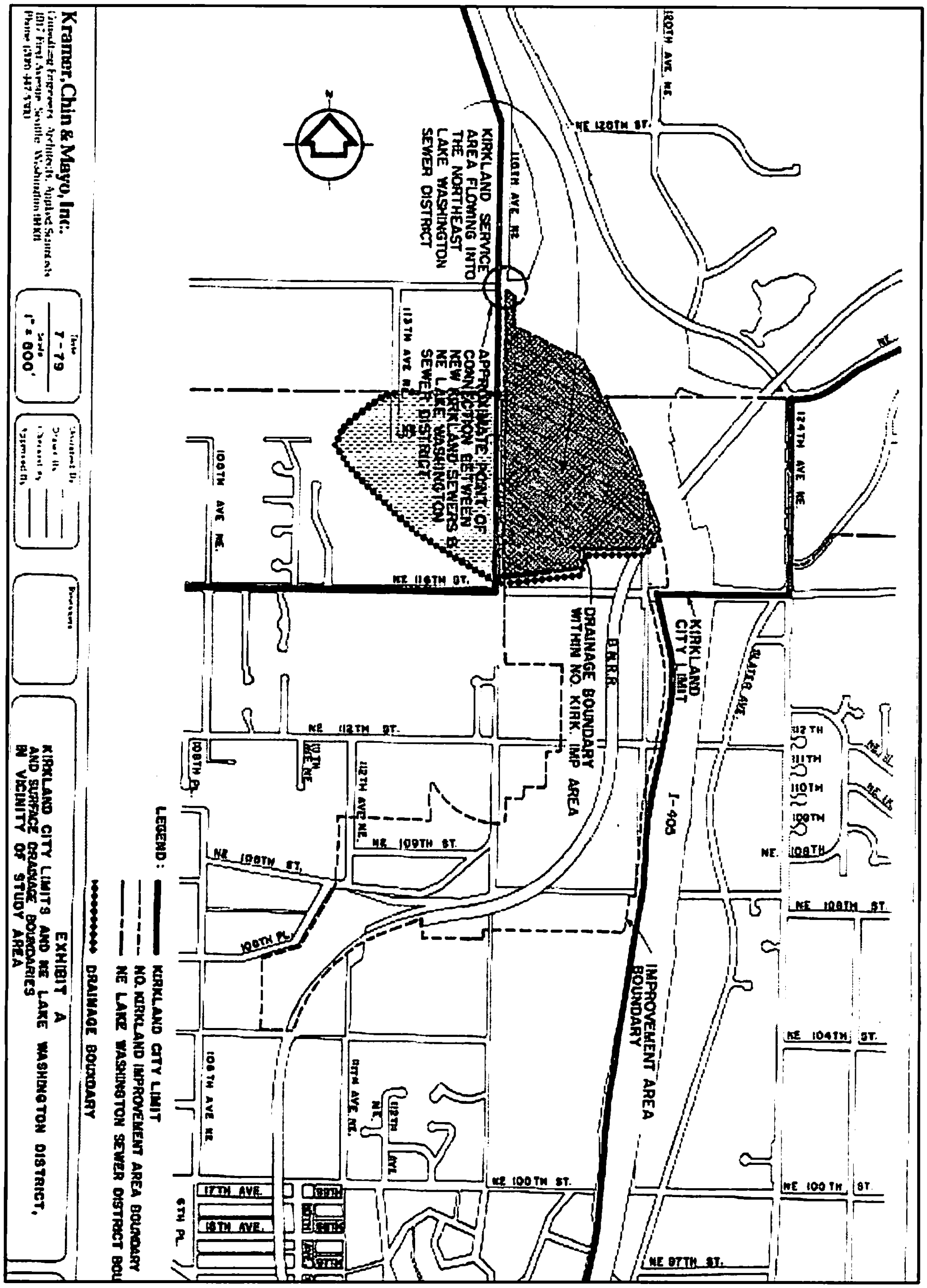
Director of Administration & Finance
(ex officio City Clerk)

I hereby certify that the foregoing is a true and correct copy of a Resolution of the City of Kirkland and that the same was published or posted according to law, said Resolution being No. R-2655 and entitled "A Resolution as above

Deputy City Clerk

R-2655

# Exhibit B
## Wheeling Agreement



2001 083

# Northshore Utility District

OFFICIAL FILE

ADDRESS
6830 NE 185th Street
Kenmore, WA 98028-2701

P.O. Box 82489
Kenmore, WA 98028-0489

TELEPHONES
Engineering: (425)398-4401
Administration: (425)398-4402
Operations: (425)398-4403
Information: (425)398-4400

FAX NUMBERS
Engineering: (425)398-4435
Administration: (425)398-4430
Operations: (425)398-4432
Purchasing: (425)398-4434

Website: Http://www.nud.net



COPY

April 5, 2001

City of Kirkland
City Hall
123 Fifth Avenue
Kirkland, WA 98033-6189

Attention: Bill Evans, Assistant City Attorney

Subject: Acceptance of Franchise

Dear Mr. Evans,

Please accept this letter as written acceptance of the Franchise Agreement between the City of Kirkland and Northshore Utility District. The City of Kirkland Ordinance number is 3767.

I have attached Resolution No. 2000-11-20 of Northshore Utility District approving the Franchise Agreement with the City of Kirkland. This resolution, passed on November 20th, 2000, approves the franchise (and the terms therein) and authorizes the General Manager to sign it and deliver it to the City of Kirkland for their approval. Given that there was no signature block for the District, we simply handled this last November by phone and email, noting our Board action approving the Franchise. This letter confirms those communications.

As requested, and in accordance with Section 15 of the Franchise, the Washington Government Entity Pool faxed written evidence of our insurance to you earlier this week. I have also provided a copy of that confirmation here.

Sincerely,

R Daniel Olson

R. Daniel Olson, P.E.
General Manager

Attachments: NUD Resolution 2000-11-20
Written confirmation of insurance from WGEP



*Accountable Management - Responsible Usage*

# NORTHSHORE UTILITY DISTRICT
# KING COUNTY, WASHINGTON

## Resolution No. 2000-11-20

**A RESOLUTION of Northshore Utility District Approving Franchise Agreement with the City of Kirkland.**

Background

1. The District owns and operates certain facilities within the roads and rights-of-way located within the City of Kirkland.

2. The District previously operated these facilities under the authority of a franchise from King County. That franchise has expired and the roads and rights-of-way in which the facilities are located are now under the jurisdiction of the City of Kirkland.

3. The District staff has negotiated with the City of Kirkland for a Franchise Agreement for the District's continued operation of facilities within the City of Kirkland's roads and rights-of-way, a copy of which is attached hereto.

4. The District staff recommends the Board of Commissioners approve the Franchise Agreement and authorize the General Manager to sign it and deliver it to the City of Kirkland for their approval.

Now it is resolved that:

Action

5. The Board of Commissioners approves the Franchise Agreement and authorizes the General Manager to sign it and deliver it to the City of Kirkland for their approval.

ADOPTED by the Board of Commissioners of Northshore Utility District at an open public meeting held on NOV 2 0 2000.

Commissioner

Commissioner

Commissioner

Commissioner

Commissioner

FILE

# EVIDENCE OF COVERAGE

WASHINGTON GOVERNMENTAL ENTITY POOL
P.O. BOX 19330, Spokane, WA 99219
Tel. 800-462-8418 or 509/838-0910
Fax 509/747-3875

| Post-it® Fax Note 7671 | Date 4-6-01 # of pages ▶ 1 |
|---|---|
| To FANNY YEE | From KATHY |
| Co./Dept. NORTHSHORE | Co. WGEP |
| Phone # UTILITY | Phone # 8004628418 |
| Fax # 425.398.4430 | Fax # 509.747.3875 |

**INSURED / PARTICIPANT**
Northshore Utility District
6830 NE 185th
Kenmore, Washington 98028-2701

**CERTIFICATE HOLDER**
City of Kirkland
123 Fifth Avenue
Kirkland, Washington 98033-6189

This is to certify that the policies of insurance and memorandum of coverage listed below have been issued to the insured named above for the policy period indicated, notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the coverage afforded by the policies and memorandum of coverage described herein is subject to all terms, exclusions and conditions of such policies.

**EFFECTIVE DATE:** September 1, 2000 **EXPIRATION DATE:** August 31, 2001

| COVERAGE | | LIMIT | |
|---|---|---|---|
| **Comprehensive General Liability/Auto Liability** | | | |
| Washington Governmental Entity Pool | $ | 250,000 | Self-Insured Retention |
| Company: NPX Program | $ | 20,000,000 | Per Occurrence |
| | | None | Aggregate |
| | | | Member Deductible Applies |
| **Employment Practice Liability** | | | |
| Washington Governmental Entity Pool | $ | 250,000 | Self-Insured Retention |
| Company: NPX Program | $ | 20,000,000 | Per Occurrence |
| | $ | 20,250,000 | Aggregate |
| | | | Member Deductible Applies |
| **Public Officials Liability** | | | |
| Washington Governmental Entity Pool | $ | 250,000 | Self-Insured Retention |
| Company: NPX Program | $ | 20,000,000 | Per Occurrence |
| | $ | 20,250,000 | Aggregate |
| | | | Member Deductible Applies |
| **Property / Mobile Equipment** | | | |
| Washington Governmental Entity Pool | | | Property on File with WGEP |
| Company: NPX Program | | | Member Deductible Applies |
| **Automobile Physical Damage** | | | |
| Washington Governmental Entity Pool | | | Per Schedule on File with WGEP |
| **Boiler and Machinery** | | | |
| Washington Governmental Entity Pool | | | Limits on File with WGEP |
| Company: NPX Program | | | Member Deductible Applies |
| **Employee Dishonest Bond** | | | |
| Washington Governmental Entity Pool | | | Per Schedule on File with WGEP |

**Certificate holder is to be shown as additional insured in respects to the Franchise Agreement (Section 15) between the City of Kirkland and Northshore Utility District.**

EOC-2001

Authorized Representative
DATE: Wednesday, April 04, 2001

N:\WINWORD\Kathy\Evidence of Coverage\Northshore Utility District\City of Kirkland-2001.doc

#2001UD2
Northshore Utility District

OFFICIAL FILE

COPY

ORDINANCE 3767

AN ORDINANCE OF THE CITY OF KIRKLAND GRANTING NORTHSHORE UTILITY DISTRICT, A WASHINGTON MUNICIPAL CORPORATION, THE RIGHT, PRIVILEGE, AUTHORITY AND FRANCHISE TO CONSTRUCT AND MAINTAIN, REPAIR, REPLACE, OPERATE UPON, OVER, UNDER, ALONG AND ACROSS THE FRANCHISE AREA FOR PURPOSES OF ITS WATER & SEWER UTILITY BUSINESS.

WHEREAS, pursuant to Resolution R-4223 the City Council authorized the City Manager to negotiate a franchise agreement with the Northshore Utility District ("NUD"); and

WHEREAS, NUD and the City have successfully negotiated such an agreement;

NOW THEREFORE, City Council of the City of Kirkland do ordain as follows:

Section 1. Definitions. Where used in this franchise (the "Franchise") these terms have the following meanings:

(a) "NUD" means Northshore Utility District, a Washington municipal corporation, and its respective successors and assigns.

(b) "City" means the City of Kirkland, a municipal corporation of the State of Washington, and its respective successors and assigns.

(c) "Franchise Area" means any, every and all of the roads, streets, avenues, alleys, highways, rights-of-way and unrestricted utility easements of the City as now laid out, platted, dedicated or improved; and any, every and all roads, streets, avenues, alleys, highways and rights-of-way that may hereafter be laid out, platted, dedicated or improved within the present limits of the City and as such limits may be hereafter extended.

(d) "Facilities" means tanks, meters, pipes, mains, services, valves, manholes, pressure reducing valves ("PRVs"), pump stations, meter stations, lines, and all necessary or convenient facilities and appurtenances thereto, whether the same be located over or under ground.

(e) "Ordinance" means this Ordinance No. 3767, which sets forth the terms and conditions of this Franchise.

(f) "Revenues" means the value proceeding or accruing from the performance of NUD's water and sewer business, including operations incidental thereto, but without any deduction on account of the cost of the commodity furnished or sold, the cost of materials used, labor costs, interest, delivery costs, taxes, or any other expense paid or accrued and without any deduction on account of losses; provided that it shall not include late fees, impact or mitigation fees, or connection charges.

Section 2. Franchise.

A. Facilities within Franchise Area. The City does hereby grant to NUD the right, privilege, authority and franchise to:

(a) Construct, support, attach, and connect Facilities between, maintain, repair, replace, enlarge, operate and use Facilities in, upon, over, under, along, through and across the Franchise Area for purposes of its water and sewer utility business as defined in RCW 82.04.065.

B. Permission Required to Enter Onto Other City Property. Nothing contained in this Ordinance is to be construed as granting permission to NUD to go upon any other public place other than those types of public places specifically designated as the Franchise Area in this Ordinance. Permission to go upon any other property owned or controlled by the City must be sought on a case-by-case basis from the City.

C. Compliance with Laws and Regulations. At all times during the term of this Franchise, NUD shall fully comply with all applicable federal, state, and local laws and regulations.

Section 3. Non-interference of Facilities.

NUD's Facilities shall be located, relocated and maintained within the Franchise Area so as not to unreasonably interfere with the free and safe passage of pedestrian and vehicular traffic and ingress or egress to or from the abutting property and in accordance with the laws of the State of Washington. Nothing herein shall preclude NUD from effecting temporary road closures as reasonably necessary during construction or maintenance of its Facilities provided NUD receives prior City approval, which shall not be unreasonably withheld. Whenever it is necessary for NUD, in the exercise of its rights under this Franchise, to make any excavation in the Franchise Area, NUD shall, upon completion of such excavation, restore the surface of the Franchise Area to the specifications established within the City of Kirkland Public Works Policies and pre-approved plans and in accordance with standards of general applicability imposed by the City by ordinance, administrative order; provided, however, if the surface of the affected Franchise Area has an Overall Condition Index (OCI)* rating of 40 or less prior to NUD's excavation, then the area shall be restored with a permanent asphalt patch per City of Kirkland Pre-approved Plans in lieu of an asphalt street overlay.

If NUD should fail to leave any portion of any Franchise Area so excavated in a condition that meets the City's specifications per the Public Works Policies and Standards, then, subject to the foregoing sentence, the City may after notice of not less than five (5) days to NUD, which notice shall not be required in case of an emergency, order any and all work considered necessary to restore to a safe condition that portion of the Franchise Area so excavated, and NUD shall pay to the City the reasonable cost of such work; which shall include among other things the overhead expense of the City in obtaining completion of said work. The parties agree that this provision may be renegotiated upon the request of either party.

*The City of Kirkland's Overall Condition Index (OCI) rating is based upon standard pavement condition rating methodologies as recognized by the Washington State Department of Transportation (WSDOT) and the Northwest Pavement Managers Association (NWPMA).

B. Any surface or subsurface failure occurring during the term of this Agreement and caused by any excavation by NUD shall be repaired to the City's specifications, within fifteen (15) days or upon five (5) days written notice to NUD by the City; if NUD fails to so timely repair, then the City shall order all work necessary to restore the damaged area to a safe and acceptable condition and NUD shall pay the reasonable costs of such work to the City.

<u>Section 4. Relocation of Facilities.</u>

A. Whenever the City causes the grading or widening of the Franchise Area or undertakes construction of any water, sanitary sewer or storm drainage line, lighting, signalization, sidewalk improvement, pedestrian amenities, or other public street improvement (for purposes other than those described in section 4[B] below) and such project requires the relocation of NUD's then existing Facilities within the Franchise Area, the City shall:

(a) Provide NUD, at least ninety (90) days prior to the commencement of such project, written notice that a project is expected to require relocation; and

(b) Provide NUD with reasonable plans and specifications for such grading, widening, or construction and a proposed new location within the Franchise Area for NUD's Facilities.

After receipt of such notice and such plans and specifications, NUD shall relocate such Facilities within the Franchise Area so as to accommodate such street and utility improvement project; provided, however, NUD may, after receipt of written notice requesting a relocation of its Facilities, submit to the City written alternatives to such relocations. The City shall within a reasonable time evaluate such alternatives and advise NUD in writing whether one or more of the alternatives is suitable to accommodate work that would otherwise necessitate relocation of the Facilities. If so requested by the City, NUD shall submit such additional information as is reasonably necessary to assist the City in making such evaluation. The City shall give each alternative full and fair consideration. In the event the City ultimately reasonably determines that there is no other reasonable or feasible alternative, then NUD shall relocate its Facilities as otherwise provided in this Section 4. The City shall cooperate with NUD to designate a substitute location for its Facilities within the Franchise Area. City will establish a date by which Facilities will be relocated, which date will be not less than sixty (60) days after written notice to NUD as to the facility to be relocated. NUD must finish relocation of each such Facility by the date so established. The cost of relocating such Facilities existing within the present limits of the City shall be paid as follows:

(a) if the relocation occurs within six (6) years after NUD initially constructed such Facility, then the relocation shall be at the City's sole cost;

(b) if the relocation occurs more than six (6) years but within ten (10) years after NUD initially constructed such Facility, then the City shall pay fifty percent (50%) of the cost of such relocation and NUD shall pay the remaining fifty percent (50%); and

(c) if the relocation occurs more than ten (10) years after NUD initially constructed such Facility, then the relocation shall be at NUD's sole cost.

(d) For the purpose of planning, NUD and the City shall provide each other with a copy of their respective current adopted Capital Improvement Plan annually and upon request by the other party.

B. Whenever any person or entity, other than the City, requires the relocation of NUD's Facilities to accommodate the work of such person or entity within the Franchise Area, or whenever the City requires the relocation of NUD's Facilities within the Franchise Area for the benefit of any person or entity other than the City, then NUD shall have the right as a condition of such relocation to require such person or entity to:

(a) make payment to NUD at a time and upon terms acceptable to NUD for any and all costs and expense incurred by NUD in the relocation of NUD's Facilities; and

(b) protect, defend, indemnify and save NUD harmless from any and all claims and demands made against it on account of injury or damage to the person or property of another arising out of or in conjunction with the relocation of NUD's Facilities, to the extent such injury or damage is caused by the negligence or willful misconduct of the person or entity requesting the relocation of NUD's Facilities or other negligence or willful misconduct of the agents, servants or employees of the person or entity requesting the relocation of NUD's Facilities.

C. Any condition or requirement imposed by the City upon any person or entity (including, without limitation, any condition or requirement imposed pursuant to any contract or in conjunction with approvals or permits for zoning, land use, construction or development) which necessitates the relocation of NUD's Facilities within the Franchise Area shall be subject to the provisions of subsection 4(B). However, in the event the City reasonably determines (and promptly notifies NUD in writing of such determination) that the primary purpose of imposing such condition or requirement upon such person or entity which necessitates such relocation is to cause the construction of an improvement on the City's behalf and in a manner consistent with City approved improvement plans (as described in 4[A] above) within a segment of the Franchise Area then:

NUD shall require only those costs and expenses incurred by NUD in integrating and connecting such relocated Facilities with NUD's other Facilities to be paid to NUD by such person or entity, and NUD shall otherwise relocate its Facilities within such segment of the Franchise Area in accordance with the provisions of subsection 4(A) above.

The provisions of this Section 4(C) shall in no manner preclude or restrict NUD from making any arrangements it may deem appropriate when responding to a request for relocation of its Facilities by any person or entity other than the City, where the facilities to be constructed by such person or entity are not or will not become City owned, operated or maintained facilities, provided that such arrangements do not unduly delay a City construction project.

D. This Section 4 shall govern all relocations of NUD's Facilities required in accordance with this Franchise. Any cost or expense in connection with the location or relocation of any Facilities existing under benefit of easement or other rights not arising under this Franchise, excluding rights arising under any prior King County franchise, shall be borne fifty percent (50%) by NUD and fifty percent (50%) by the City. Costs for location or relocation of any Facilities existing under any prior King County franchise shall be borne solely by NUD.

E. NUD recognizes the need for the City to maintain adequate width for installation and maintenance of City owned utilities such as, but not limited to, sanitary sewer, water, storm drainage and telecommunication facilities. Thus, the City reserves the right to maintain reasonable clear zones within the public right-of-way for installation and maintenance of said utilities. The clear zones for each right-of-way segment shall be noted and conditioned with the issuance of each right-of-way permit. If adequate clear zones are unable to be achieved on a particular right-of-way, NUD shall locate in an alternate right-of-way, obtain easements from private property owners, or propose alternate construction methods which maintain and/or enhance the existing clear zones.

Section 5. Indemnification. NUD shall indemnify, defend and hold the City, its agents, officers, employees, volunteers and assigns harmless from and against any and all claims, demands, liability, loss, cost, damage or expense of any nature whatsoever, including all costs and attorney's fees, made against them on account of injury, sickness, death or damage to persons or property which is caused by or arises out of, in whole or in part, the willful, tortious or negligent acts, failures and/or omissions of NUD or its agents, servants, employees, contractors, subcontractors or assigns in the construction, operation or maintenance of its Facilities or in exercising the rights granted NUD in this Franchise; provided, however, such indemnification shall not extend to injury or damage caused by the negligence or willful misconduct of the City, its agents, officers, employees, volunteers or assigns.

In the event any such claim or demand be presented to or filed with the City, the City shall promptly notify NUD thereof, and NUD shall have the right, at its election and at its sole cost and expense, to settle and compromise such claim or demand, provided further, that in the event any suit or action be begun against the City based upon any such claim or demand, the City shall likewise promptly notify NUD thereof, and NUD shall have the right, at its election and its sole cost and expense, to settle and compromise such suit or action, or defend the same at its sole cost and expense, by attorneys of its own election.

Section 6. Default. If NUD shall fail to comply with any of the provisions of this Franchise, unless otherwise provided for herein, the City may serve upon NUD a written order to so comply within thirty (30) days from the date such order is received by NUD. If NUD is not in compliance with this Franchise after expiration of said thirty (30) day period, the City may act to remedy the violation and may charge the costs and expenses of such action to NUD. The City may act without the thirty (30) day notice in case of an emergency. The City may in addition, by ordinance adopted no sooner than five (5) days after notice of the City Council hearing (at which NUD will have an opportunity to be heard) on the impending ordinance is given to NUD, declare an immediate forfeiture of this Franchise, provided, however, if any material failure to comply with this Franchise by NUD cannot be corrected with due diligence within said thirty (30) day period (NUD's obligation to comply and to proceed with due diligence being subject to unavoidable delays and events beyond its control, in which case the time within which NUD may so comply shall be extended for such time as may be reasonably necessary and so long as NUD commences promptly and diligently to effect such compliance), provided good faith dispute does not exist concerning such compliance.

In addition to other remedies provided herein, if NUD is not in compliance with requirements of the Franchise, and if a good faith dispute does not exist concerning such compliance, the City may place a moratorium on issuance of pending NUD right-of-way use permits until compliance is achieved.

Section 7. Non-exclusive Franchise. This Franchise is not and shall not be deemed to be an exclusive Franchise. This Franchise shall not in any manner prohibit the City from granting other and further franchises over, upon, and along the Franchise Area which do not interfere with NUD's rights under this Franchise. This Franchise shall not prohibit or prevent the City from using the Franchise Area or affect the jurisdiction of the City over the same or any part thereof.

Section 8. Franchise Term. Subject to the provisions of Section 9 below, this Franchise is and shall remain in full force and effect for a period of ten (10) years from and after January 1, 2001, provided that on January 1, 2006, and on January 1 every five (5) years thereafter, the term shall automatically be extended for an additional five (5) years, unless either NUD or the City gives the other party written notice of non-renewal prior to any such renewal date, in which case this Franchise shall terminate five (5) years after such renewal date; and provided further, however, NUD shall have no rights under this Franchise nor shall NUD be bound by the terms and conditions of this Franchise unless NUD shall, within thirty (30) days after the effective date of the Ordinance, file with the City its written acceptance of this Franchise, in a form acceptable to the City Attorney.

Section 9. Non-assumption. In consideration for the franchise fee and acceptance of the other terms and conditions of this Franchise, the City agrees that it will not exercise its statutory authority (RCW Chapter 35.13A as currently written ) to assume jurisdiction over NUD or any NUD responsibilities, property, facilities or equipment within the City's corporate limits, including future annexed areas, for a minimum of ten (10) years from the date NUD files its written acceptance pursuant to Section 8 above or within (5) five years of annexation to the extent of the City's current planning area (which extends approximately to 145th Street), whichever is later.

Section 10. Franchise fee. In consideration for the rights granted NUD under this Agreement for existing sewer and water lines in the Franchise Area, NUD agrees to pay to the City a franchise fee equal to five percent (5%) of NUD's Revenues collected from NUD's customers with billing addresses that are within the corporate boundaries of the City. Fees for each calendar quarter shall be due thirty (30) days following the end of the calendar quarter. Should NUD be prevented by judicial or legislative action from collecting a franchise fee on all or a part of the Revenues, NUD shall be excused from the collection and distribution of that portion of the franchise fee. Should a court of competent jurisdiction declare, or a change in law make the franchise fee to be collected on behalf of the City invalid, in whole or in part, or should a court of competent jurisdiction hold that the collection of the franchise fee by NUD is in violation of a pre-existing contractual obligation of NUD, then NUD's obligation to collect and distribute a franchise fee to the City under this Section shall be terminated in accordance with and to the degree required to comply with such court action. NUD agrees that the franchise fee established by this Section is appropriate and that NUD will not be a party to or otherwise support legal or legislative action intended to result in judicial determinations or legislative action referred to above. City shall defend, indemnify and hold NUD harmless from and against any and all claims, suits, actions or liabilities (including costs and attorneys' fees) incurred or asserted against NUD directly or indirectly arising out of NUD's collection of the franchise fee as provided in this Franchise.

Section 11. Compliance with codes and regulations.

A. The rights, privileges and authority herein granted are subject to and governed by this ordinance and all other applicable ordinances and codes of the City of Kirkland, as they now exist or may hereafter be amended. Nothing in this ordinance limits the City's lawful power to exercise its police power to protect the safety and welfare of the general public. Any location, relocation, erection or excavation by NUD shall be performed by NUD in accordance with applicable federal, state and city rules and regulations, including the City Public Works Policies and Pre-approved Plans, and any required permits, licenses or fees, and applicable safety standards then in effect or any Memorandum of Understanding with NUD.

B. Upon written inquiry, NUD shall provide a specific reference to either the federal, state or local law or the Washington Utilities and Transportation Commission ("WUTC") order or action establishing a basis for NUD's actions related to a specific franchise issue.

C. In the event that any territory served by NUD is annexed to the City after the effective date of this Franchise, such territory shall be governed by the terms and conditions contained herein upon the effective date of such annexation.

Section 12. Location of Facilities and Equipment. All Facilities and equipment to be installed within the Franchise Area shall be installed underground; provided, however, that such Facilities may be installed above ground if so authorized by the City, which authorization shall not be unreasonably withheld, conditioned or delayed, consistent with the provisions of the City's Land Use Code and applicable development pre-approved plans.

Section 13. Record of Installations and Service. With respect to excavations by NUD and the City within the Franchise Area, NUD and the City shall each comply with its respective obligations pursuant to Chapter 19.122, RCW and any other applicable state law.

Upon written request of the City, NUD shall provide the City with the most recent update available of any plan of potential improvements to its Facilities within the Franchise Area; provided, however, any such plan so submitted shall be for informational purposes within the Franchise Area, nor shall such plan be construed as a proposal to undertake any specific improvements within the Franchise Area.

As built drawings of the precise location of any Facilities placed by NUD in any street, alley, avenue, highway, easement, etc., shall be made available to the City within ten (10) working days of request.

Section 14. Shared Use of Excavations. NUD and the City shall exercise best efforts to coordinate construction work either may undertake within the Franchise Area so as to promote the orderly and expeditious performance and completion of such work as a whole. Such efforts shall include, at a minimum, reasonable and diligent efforts to keep the other party and other utilities within the Franchise Areas informed of its intent to undertake such construction work. NUD and the City shall further exercise best efforts to minimize any delay or hindrance to any construction work undertaken by themselves or other utilities within the Franchise Area.

If at any time, or from time to time, either NUD, the City, or another franchisee, shall cause excavations to be made within the Franchise Area, the party causing such excavation to be made shall afford the others, upon receipt of a written request to do so, an opportunity to use such excavation, provided that:

(a) Such joint use shall not unreasonably delay the work of the party causing the excavation to be made;

(b) Such joint use shall be arranged and accomplished on terms and conditions satisfactory to both parties. The parties shall each cooperate with other utilities in the Franchise Area to minimize hindrance or delay in construction.

The City reserves the right to not allow open trenching for five (5) years following a street overlay or improvement project. NUD shall be given written notice at least ninety (90) days prior to the commencement of the project. Required trenching due to an emergency will not be subject to five (5) year street trenching moratoriums.

The City reserves the right to require NUD to joint trench with other facilities if both parties are anticipating trenching within the same portion of the Franchise Area and provided that the terms of (a) and (b) above are met.

Section 15. Insurance. NUD shall maintain in full force and effect throughout the term of this Franchise, a minimum of One Million Dollars ($1,000,000.00) liability insurance for property damage and bodily injury.

The City shall be named as an additional insured on any policy of liability insurance obtained by NUD for the purpose of complying with the requirements of this Section.

In satisfying the insurance requirement set forth in this section, NUD may self-insure against such risks in such amounts as are consistent with good utility practice. NUD shall provide the City with sufficient written evidence, the sufficiency of which shall be determined at the reasonable discretion of the City, upon request, that such insurance (or self-insurance) in being so maintained by NUD. Such written evidence shall include, to the extent available from NUD's insurance carrier, a written certificate of insurance with respect to any insurance maintained by NUD in compliance with this Section.

Section 16. Tariff Changes. If NUD shall file, pursuant to Chapter 80.28 RCW, with the WUTC (or its successor) any tariff affecting the City's rights arising under this Franchise, NUD shall give the City Clerk written notice thereof within five (5) days of the date of such filing.

Section 17. Assignment. All of the provisions, conditions, and requirements herein contained shall be binding upon NUD, and no right, privilege, license or authorization granted to NUD hereunder may be assigned or otherwise transferred without the prior written authorization and approval of the City, which the City may not unreasonably withhold, condition or delay. Notwithstanding the foregoing, NUD may assign this agreement to an affiliate, parent or subsidiary or as part of any corporate financing, reorganization or refinancing which does not require assignment to any but an affiliate, parent or subsidiary without the consent of, but upon notice to, the City.

Section18. Notice. Unless applicable law requires a different method of giving notice, any and all notices, demands or other communications required or desired to be given hereunder by any party (collectively, "notices") shall be in writing and shall be validly given or made to another party if delivered either personally or by Federal Express or other overnight delivery service of recognized standing, or if deposited in the United States Mail, certified, registered, or express mail with postage prepaid, or if sent by facsimile transmission with electronic confirmation. If such notice is personally delivered, it shall be conclusively deemed given at the time of such delivery. If such notice is delivered by Federal Express or other overnight delivery service of recognized standing, it shall be deemed given one (1) business day after the deposit thereof with such delivery service. If such notice is mailed as provided herein, such shall be deemed given three (3) business days after the deposit thereof in the United States Mail. If such notice is sent by facsimile transmission, it shall be deemed given at the time of the sender's receipt of electronic confirmation. Each such notice shall be deemed given only if properly addressed to the party to whom such notice is to be given as follows:

To City: City Clerk
City of Kirkland
123 Fifth Avenue
Kirkland, WA 98033-6169
Fax: (425) 576-2921

To NUD: General Manager
Northshore Utility District
6830 NE 185th St.
Kenmore, WA 98028
Fax:(425) 398-4435

With copy to: Andrew Maron
Short Cressman & Burgess PLLC
999 Third Avenue, Suite 3000
Seattle, WA 98104-4088
Fax: (206) 340-8856

Any party hereto may change its address for the purpose of receiving notices as herein provided by a written notice given in the manner aforesaid to the other party hereto.

Section 19. Miscellaneous. If any term, provision, condition or portion of this Franchise shall be held to be invalid, such invalidity shall not affect the validity of the remaining portions of this Franchise which shall continue in full force and effect. The headings of sections and paragraphs of this Franchise are for convenience of reference only and are not intended to restrict, affect, or be of any weight in the interpretation or construction of the provisions of such sections or paragraphs.

In addition to the franchise fee due under Section 10 above, NUD shall pay for the City's reasonable administrative costs in drafting and processing this franchise agreement and all work related thereto. NUD shall further be subject to all permit fees associated with activities undertaken through the authority granted in this franchise ordinance or under the laws of the City. Where the City incurs cost and expenses for review, inspection, or supervision of activities undertaken through the authority granted in this franchise or any ordinances relating to the subject for which a permit fee is not established, NUD shall pay such costs and expenses directly to the City. In addition to the above, NUD shall promptly reimburse the City for any and all costs it reasonably incurs in response to any emergency involving NUD's facilities.

City has the right, but not the obligation, to take over control and ownership of Franchise's facilities in the Franchise Area, specifically including the water and sewer plant network, without compensation, if: (1) such facilities are abandoned; or (2) in the event this Franchise is terminated and Franchisee does not remove such facilities at its own expense within a reasonable period of time. Furthermore, the City is specifically interested in retaining abandoned water and sewer lines for use as conduit for communication purposes and NUD shall notify the City at least 180 days prior to abandonment of any water or sewer line.

This Franchise may be amended only by written instrument, signed by both parties, which specifically states that it is an amendment to this Franchise, and is approved and executed in accordance with the laws of the State of Washington. Without limiting the generality of the foregoing, this Franchise (including, without limitation, Section 5 above) shall govern and supersede and shall not be changed, modified, deleted, added to, supplemented or otherwise amended by any permit, approval, license, agreement or other document required by or obtained from the City in conjunction with the exercise (or failure to exercise) by NUD of any and all rights, benefits, privileges, obligations, or duties in and under this Franchise, unless such permit, approval, license, agreement or document specifically:

(a) references this Franchise; and

(b) states that it supersedes this Franchise to the extent it contains terms and conditions which change, modify, delete, add to, supplement or otherwise amend the terms and conditions of this Franchise.

In the event of any conflict or inconsistency between the provisions of this Franchise and the provisions of any such permit, approval, license, agreement of other document, the provisions of this Franchise shall control.

This Franchise is subject to the provisions of any applicable tariff now or hereafter on file with the WUTC or its successor. In the event of any conflict of inconsistency between the provisions of this Franchise and such tariff, the provisions of such tariff shall control.

Section 20. Effective date. This Ordinance, being in compliance with RCW 35A.47.040, shall be in force and effect five (5) days from and after its passage by the Kirkland City Council and publication pursuant to Section 1.08.017 Kirkland Municipal Code in the summary form attached to the original of this ordinance and by this reference approved by the City Council.

Passed by majority vote of the Kirkland City Council in open meeting this 11th day of December, 2000.

Signed in authentication thereof this 11th day of December, 2000.

MAYOR

0-3767

Attest:

City Clerk

Approved as to Form:

City Attorney

Ord\NUD franchise agreement

# PUBLICATION SUMMARY OF ORDINANCE NO. 3767

AN ORDINANCE OF THE CITY OF KIRKLAND GRANTING NORTHSHORE UTILITY DISTRICT, A WASHINGTON MUNICIPAL CORPORATION, THE RIGHT, PRIVILEGE, AUTHORITY AND FRANCHISE TO CONSTRUCT, AND MAINTAIN, REPAIR, REPLACE, REMOVE AND OPERATE UPON, OVER, UNDER, ALONG AND ACROSS THE FRANCHISE AREA FOR PURPOSES OF ITS WATER AND SEWER UTILITY BUSINESS.

SECTIONS 1-15. Provide for: the grant to Northshore Utility District of a franchise for a water and sewer utility business for ten years on specified terms and conditions with the possibility of 5 year extensions thereafter, payment of franchise fees to the City and non-assumption of NUD facilities within Kirkland for 10 years after acceptance or 5 years after annexation, whichever is later.

SECTIONS 16-19. Set forth administrative provisions for the franchise and concerning its legal effect.

SECTION 20. Authorizes publication of the ordinance by summary, which summary is approved by the City Council pursuant to Section 1.08.017 Kirkland Municipal Code and establishes the effective date as five days after publication of summary.

The full text of this ordinance will be mailed without charge to any person upon request made to the City Clerk for the City of Kirkland. The ordinance was passed by the Kirkland City Council at its regular meeting on the 11th day of december, 2000.

I certify that the foregoing is a summary of Ordinance 3767 approved by the Kirkland City Council for summary publication.

City Clerk

Ord\NUDpubsum

RESOLUTION NO. R-2655

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AUTHORIZING THE MAYOR TO SIGN ON BEHALF OF THE CITY OF KIRKLAND A CERTAIN AGREEMENT BETWEEN THE CITY OF KIRKLAND AND NORTHEAST LAKE WASHINGTON SEWER DISTRICT RELATING TO SANITARY SEWER FACILITIES WITHIN THE NORTH KIRKLAND IMPROVEMENT PROJECT AREA (L.I.D. NO. 115).

WHEREAS, a portion of the area lying within the North Kirkland Improvement Project (L.I.D. No. 115) as described in the agreement between the City of Kirkland and the Northeast Lake Washington Sewer District, a copy of which is attached to the original of this Resolution and by this reference incorporated herein, lies within the City of Kirkland and the sewer service area of the City of Kirkland's Sanitary Sewer System; and

WHEREAS, said area is not presently connected to the Kirkland Sanitary Sewer System, and because of the topography of the area, cannot readily be so connected; and

WHEREAS, the service area and corporate boundaries of the Northeast Lake Washington Sewer District lie adjacent to said area, said area can conveniently connect into the existing Northeast Lake Washington Sewer facilities; and

WHEREAS, both the City and sewer district are authorized by State law to enter into intergovernmental cooperative agreements;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Kirkland as follows:

Section 1. The Mayor is hereby authorized and directed to sign on behalf of the City of Kirkland that certain agreement, a copy of which is attached to the original of this Resolution and by this reference incorporated herein. Said agreement permits the City of Kirkland to connect a portion of the Kirkland Sanitary Sewer System, constructed within the area described in said agreement, and lying within the North Kirkland Improvement Project area (L.I.D. No. 115), into the existing Northeast Lake Washington Sewer System facility in the vicinity of 116th Avenue N.E. and N.E. 124th Street.

Section 2. Said agreement shall become effective upon its being properly signed by both the City of Kirkland, as herein authorized, and by the Northeast Lake Washington Sewer District.

AGREEMENT

THIS AGREEMENT made and entered into this day, by and between the City of Kirkland, an optional code city, hereafter referred to as "city"; and Northeast Lake Washington Sewer District of King County, Washington, a municipal corporation, hereinafter sometimes referred to as "sewer district".

W I T N E S S E T H

WHEREAS, both city and sewer district are authorized by state law to enter into cooperative agreements, and

WHEREAS, the area described and designated on Exhibit A, attached hereto and by this referenced incorporated in full herein, as subject area lies within the City of Kirkland and the sewer service area of the City of Kirkland Sanitary Sewer System, and

WHEREAS, the North Kirkland Improvement Project (L.I.D. 115) includes the installation of sanitary sewer service facilities within said subject area, and

WHEREAS, said area is not presently connected to the existing Kirkland Sanitary Sewer System, and because of the topography of the area may not readily be so connected, and

WHEREAS, the service area and corporate boundaries of Northeast Lake Washington Sewer District lie adjacent to subject area, and subject area can conveniently connect into the existing Northeast Lake Washington Sewer System facilities, and

WHEREAS, both parties are desirous where possible and convenient to mutually assist one another under terms and conditions as set forth herein, now, therefore,

IN CONSIDERATION of the agreements herein contained, it is agreed as follows:

Section 1. All sanitary sewer facilities to be constructed within the subject area as a part of or in connection with Local Improvement District No. 115, and the North Kirkland Improvement Project (which facilities are described and designated on Exhibit A, as attached hereto, and by this reference incorporated herein), shall upon construction and acceptance become for all purposes including customer service charges and maintenance, part of the Kirkland Sanitary Sewer System, but may nevertheless, be connected into the Northeast Lake Washington Sewer District sanitary sewer trunkage facilities at the point or points so designated as "connection point" on Exhibit A. Prior to making connection, city shall notify sewer district of the intended date of connection so that sewer district may cause its engineers to be physically present and to inspect and approve the connection to the sewer district's system. All costs of making said connection in complying with all federal, state and other applicable regulatory agency requirements shall be at the sole cost and expense of city.

Section 2. Sewer district agrees to accept sewage only from the area described in Exhibit A entering into its system through said designated connection point and agrees to convey the same through its system to its connection with the municipality of Metropolitan Seattle System. The providing of this service by sewer district to city shall be subject to all requirements, rules and regulations of the municipality of Metropolitan Seattle (METRO), and agrees to pay all fees due METRO with respect to the sewage entering sewer district's system. Should it hereafter be claimed or asserted by sewer district or METRO that there are excessive flows due to infiltration or other reasons from the area described in Exhibit A resulting in increased METRO charges to sewer district, then city agrees to install a metering device to measure the flow entering district's system at the connection points.

Section 3. It is acknowledged that city has designed and constructed the sewer system within Exhibit A and that all costs of construction and of said connection to the system of sewer district shall be at the sole cost and expense of city and no part of the cost of construction of sanitary sewer facilities to be constructed within the area described in Exhibit A nor any of its maintenance, repair, replacement or restoration shall be borne of paid by sewer district.

Section 4. City agrees to pay to district the sum of $35,633.89 as a connection charge for connecting the area described in Exhibit A to the system of the district which sum shall be paid as a condition precedent to the city making the connection to the sewer district sewage system. Said payment has been based upon the sewer district existing requirement for connection charges of $750 per gross acre.

In addition thereto, city will pay to sewer district a monthly sewer trunkage charge in an amount equal to forty cents ($0.40) per month for residential customer or residential equivalent (residential equivalent being computed per requirements of METRO) actually connected to and served by the facilities of City of Kirkland Sewer System within the area described in Exhibit A. City will maintain and provide records to sewer district of all customers, residential and commercial, and water flow for commercial customers so that the residential equivalent can be computed from time to time as requested by sewer district of city. Said monthly service trunkage charge shall be billed by sewer district to city from time to time but, in no event, less than annually. City agrees to report monthly to sewer district the number of residential customers or residential equivalents added to the system of city within the area described in Exhibit A for the preceding calendar month so that at all times district shall have an accurate count of residential customers or residential equivalents within the area described in Exhibit A.

<u>Section 5</u>. Sewer district reserves the right to provide sanitary sewer service within the sewer district boundary including those properties lying immediately west of and within the same drainage basin which could be served by way of connection into the City of Kirkland system described in Section 1 above. Said drainage basin is delineated on the map included as part

of Exhibit A. The City of Kirkland may likewise provide sewer services by way of connection into the sewer facilities described in Section 1 to those properties within the same drainage basin which are within the City of Kirkland provided that if services provided to property within the City of Kirkland by connection to a system that ultimately connects to the sewer district sewer system, then the property to be served must be real property included on Exhibit A and for which the connection charge has been computed and paid as provided for in Section 4. City may not provide sewer service to any real property, or residential equivalent customers whose sewage will flow into the sewer district's system unless said property is located on and a part of the real property described in Exhibit A, and connection fees have been paid as provided in Section 4 hereof. It is recognized that sewer district has a vested interest in limiting and defining the flow that will enter sewer district system in that district has to reserve capacity for other areas of sewer district that will not hereafter require sewer service by connecting to the sewer service of district that is providing services to city pursuant to this agreement.

Section 6. Neither party shall by virtue of this agreement acquire any proprietary or governmental interest in the sewage system or sewerline of the other party. Each party shall be solely responsible for the operation, maintenance, restoration and replacement of its own system of sewers.

Section 7. No waiver by either party of any term or condition of this agreement shall be deemed or construed as a waiver of any other term or condition.

Section 8. Each party agrees and declares that this agreement is a valid exercise of the mutual assistance and interlocal governmental cooperation authority granted to the respective parties under the laws of the State of Washington, and to that end each of the parties agrees to defend and support this agreement as being for the benefit of the health, safety, and general welfare of the general public, and each party further agrees to cooperate with the other party with respect to any appearance which may be required by either party in any proceeding before any other governmental agency.

Section 9. This agreement may be terminated by either party giving twelve (12) months notice to the other party of intent to terminate this agreement whereupon the termination date shall be upon expiration of twelve (12) months from date of receipt of said notice. In the event of termination under this paragraph, all costs of disconnection and replacement and restoration shall be paid by city.

THIS AGREEMENT signed this ____ day of ____________, 197__.

NORTHEAST LAKE WASHINGTON SEWER
DISTRICT OF KING COUNTY, WASHINGTON

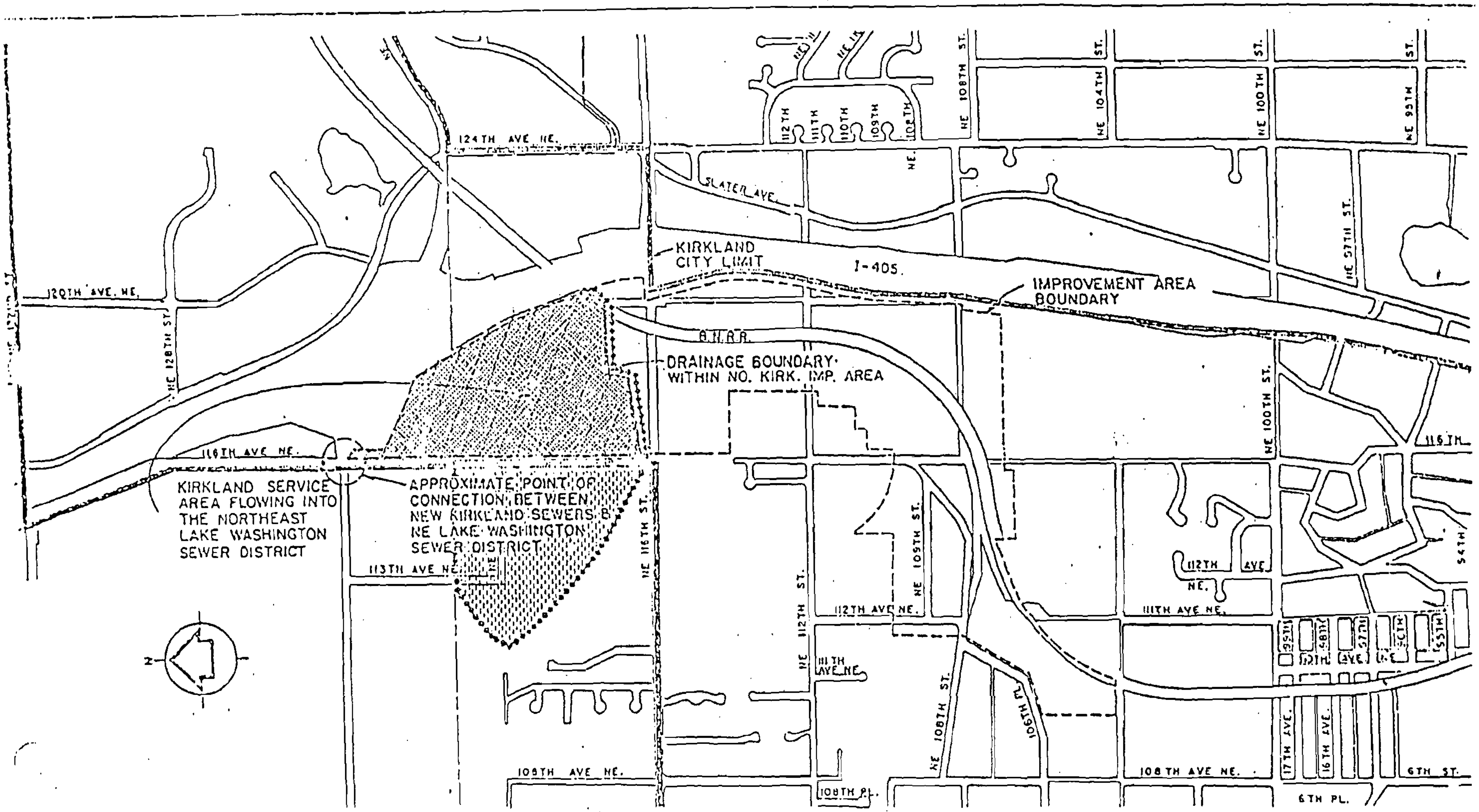
BY ______________________________
President, Board of Commissioners

BY ______________________________
Secretary, Board of Commissioners

CITY OF KIRKLAND

BY ______________________________

The execution of this agreement approved on behalf of Northeast Lake Washington Sewer District by resolution of its Board of Commissioners, adopted the _____ day of __________, 197___, and authorized by the City of Kirkland by Resolution No. __________ of the Kirkland City Council adopted the ____ day of ______________, 197___.




LEGEND: KIRKLAND CITY LIMIT
NO. KIRKLAND IMPROVEMENT AREA BOUNDARY
NE LAKE WASHINGTON SEWER DISTRICT BOUNDARY
DRAINAGE BOUNDARY

Kramer, Chin & Mayo, Inc.
Consulting Engineers, Architects, Applied Scientists
1917 First Avenue, Seattle, Washington 98101
Phone (206) 447-5300

Date 7-79
Scale 1" = 800'

Designed By
Drawn By
Checked By
Approved By

Revisions

EXHIBIT A
KIRKLAND CITY LIMITS AND NE LAKE WASHINGTON DISTRICT, AND SURFACE DRAINAGE BOUNDARIES IN VICINITY OF STUDY AREA

Drawing Number
Sheet Number 1 of 1

CITY OF KIRKLAND

NORTHEAST LAKE WASHINGTON SEWER DISTRICT

MUNICIPALITY OF METROPOLITAN SEATTLE

JUANITA SYSTEM IMPROVEMENT AGREEMENT

THIS AGREEMENT, made as of the 3 day of November, 1982, between the City of Kirkland, a municipal corporation of the State of Washington (hereinafter referred to as "the City"), Northeast Lake Washington Sewer and Water District, a municipal corporation of the State of Washington (hereinafter referred to as "the District"), and the Municipality of Metropolitan Seattle, a metropolitan municipal corporation of the State of Washington (hereinafter referred to as "Metro");

W I T N E S S E T H:

WHEREAS, the City and the District have entered into long-term agreements with Metro for sewage disposal dated May 5, 1961 and May 16, 1963 (hereinafter referred to as the "Basic Agreements"); and

WHEREAS, Metro desires to modify and improve certain Metro facilities; and

WHEREAS, said modifications and improvements cannot be undertaken without modifications to certain City and District facilities; and

WHEREAS, it is in the interest of the parties that said modifications and improvements be undertaken;

NOW, THEREFORE, it is hereby agreed as follows:

Section 1. Definitions. The defined terms used in this Agreement shall have the meanings set forth in the Basic Agreements.

Section 2. Design and Construction of Certain Facilities. It shall be the sole responsibility of Metro to design, construct, or otherwise undertake the following:

a. A force main from the City's Kirkland Pumping Station to a point of connection with the District's 21-inch diameter gravity sewer at 98th Avenue N.E. approximately 500 feet south of N.E. Juanita Drive.

b. Modifications to the City's Kirkland Pumping Station necessary to insure operational compatibility with related new facilities.

c. A 12-inch diameter gravity sewer line between Metro's Juanita Heights Pumping Station and the City's Kirkland Pumping Station.

d. Connection of the City's sewer line currently tributary to Metro's Juanita Heights pumping station to the gravity sewer described in item c. of this Section 2.

Plans and specifications for the construction described in this Section 2 shall be in accordance with City specifications and shall be subject to review and approval by the City prior to commencement of construction.

Section 3. Work Involving City Facilities. The City authorizes Metro to construct all modifications to City facilities necessitated by the construction described in Section 2 subject to City review and approval of construction plans and specifications.

Section 4. Ownership and Maintenance of Completed Facilities. From and after the date of completion of the construction described in Section 2, the City shall own, operate, maintain, repair, replace, and be completely responsible for the following facilities as generally depicted on Exhibit A attached hereto:

a. The force main from the City's Kirkland Pumping Station to its point of connection to the District's 21 inch diameter gravity sewer.

b. The 12 inch diameter gravity sewer described in Section 2.c. from the site of Metro's abandoned Juanita Height's Pumping Station to the City's Kirkland Pumping Station.

Section 5. Acceptance of Contractor's Work. Prior to final acceptance of the contractor's work by Metro, the City shall be provided an opportunity to inspect the construction described in Section 2 and make recommendations regarding deficiencies or incomplete work in accordance with the construction contract. It shall be the responsibility of Metro to pursue remedies enabled by the contractor's guaranty, and Metro agrees to pursue said remedies at the request of the City.

Section 6. Legal Relations. Metro shall take such reasonable actions as may be requested by the City to formalize the transfer of title to facilities conveyed to the City by the completion of construction as set forth in Section 2. From and after said completion, the City shall idemnify and hold harmless Metro from and against any and all claims, litigation, demands and suits for any personal injuries and property damage suffered or incurred by any person arising from the operation, maintenance, repair or replacement of said facilities.

Section 7. Connection to District Facilities. The district authorizes the connection of the force main described in Section 2.a. to its 21 inch diameter gravity sewer generally at the point of connection described in Section 2.a. The connection shall be made in accordance with design and construction standards of the District. The District does not transfer any title, right or interest in its facilities to the City, and the City shall not be permitted to connect its facilities to the District's facilities at any other point along the District's 21-inch diameter sewer line.

Section 8. Use of District Facilities. Following completion of the construction described in Section 2.a. and connection to District facilities as described in Section 7, the District will transport to Metro's Juanita Bay Pumping Station all sewage delivered by the City up to a maximum of 1,500 gpm to the District's 21 inch diameter gravity sewer via said connection for as long as the City may require. Capacity available to transport sewage delivered by the City shall not, in any event, be less than one-half the total capacity of said 21 inch diameter sewer line.

Section 9. Payment to the District by Metro. In consideration for the use of District facilities by the City as described in Section 8, Metro shall pay to the District $75,000, which represents one half the construction cost of the District's 21 inch diameter sewer line referred to in Section 8. Said payment is in consideration of the District's agreement to transport sewage delivered by the City to Metro's Juanita Bay pumping station and said payment is not payment for the transfer of any title, right or interest in the District's 21 inch diameter sewer line to the City.

Section 10. Payment to the District by the City. The City agrees to annually reimburse the District for one-half of future costs incurred by the District for maintenance, repair, and replacement of the District's 21 inch diameter sewer referred to in Section 8 between 98th Street Northeast and Metro's Juanita Bay Pumping Station. Said reimbursement to the District shall be made following submittal to the City of a properly documented invoice. The City's share of the foregoing costs shall not exceed $750 for the first year following connection to the District's 21 inch diameter sewer line. Thereafter the City shall pay one-half of the costs incurred by the District for maintenance, repair and replacement of the District's 21-inch diameter sewer line.

Section 11. Payment to the City by Metro. In consideration for future reimbursement payments to be made by the City as described in Section 10, Metro shall pay to the City $20,000 following commencement of operation of the facilities described in Section 2.

Section 12. Basic Agreement Unchanged. Except as otherwise provided in this Agreement, all provisions of the Basic Agreement shall remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date and year first written above.

City of Kirkland

Mayor

Attest:

Northeast Lake Washington Sewer District

Commissioner

Commissioner

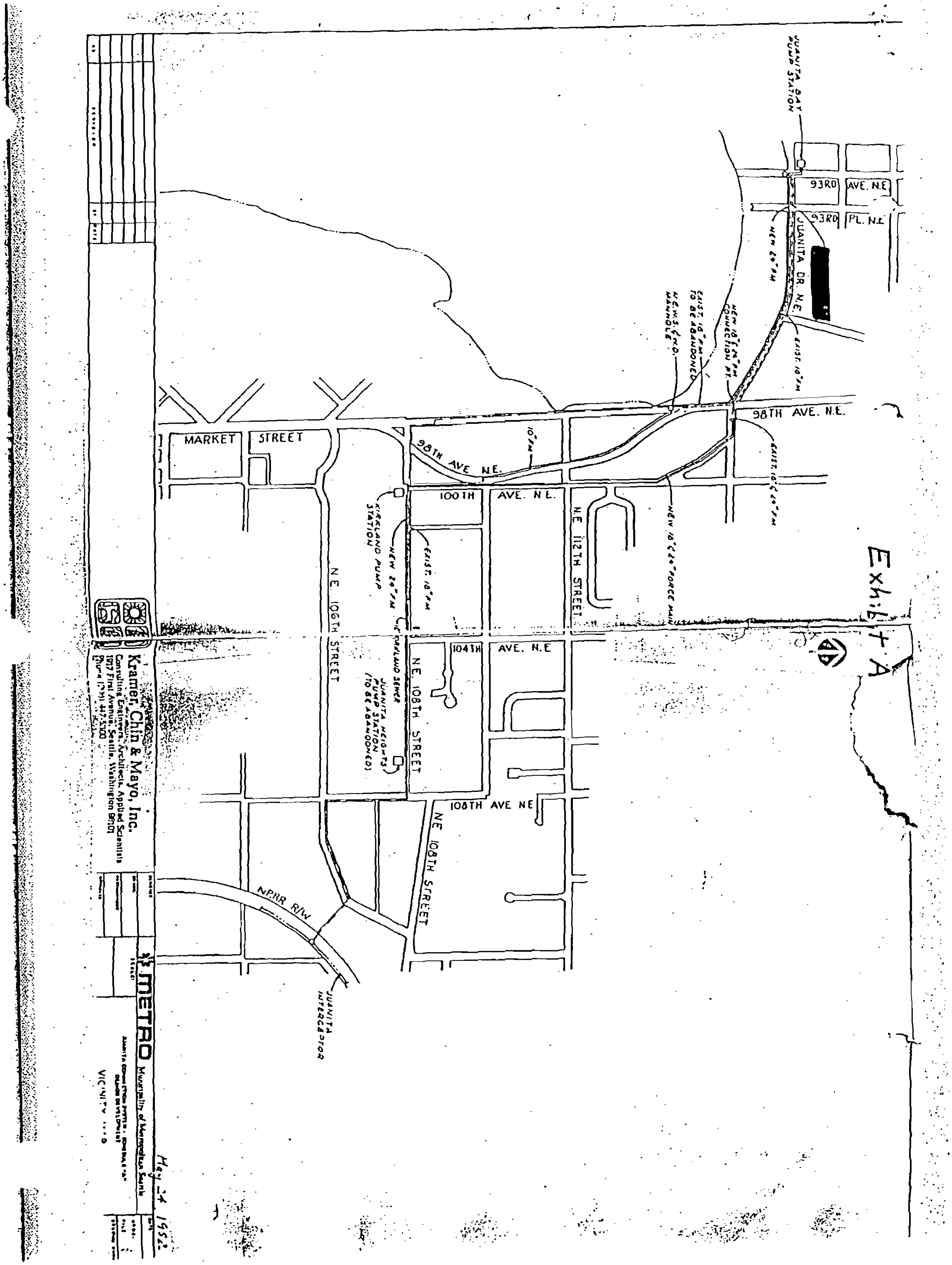
Commissioner

Attest:

Minicipality of Metropolitan Seattle

Executive Director

Attest:


JUANITA BAY PUMP STATION
93RD AVE. N.E
93RD PL. N.E
JUANITA DR. N.E.
NEW 20" FM
EXIST. 10" FM
NEW 16" CONNECTION PT.
EXIST. 10" FM TO BE ABANDONED
98TH AVE. N.E.
98TH AVE N.E.
10" FM
MARKET STREET
100TH AVE. N.E.
NE 112TH STREET
NE 106TH STREET
KIRKLAND PUMP STATION
NEW 20" FM
EXIST. 10" FM
NEW 16" & 20" FORCE MAIN
104TH AVE. N.E
NE 108TH STREET
KIRKLAND SEWER
JUANITA HEIGHTS PUMP STATION (TO BE ABANDONED)
108TH AVE NE
NE 108TH STREET
NPRR R/W
JUANITA INTERCEPTOR
Exhibit A
Kramer, Chin & Mayo, Inc.
Consulting Engineers, Architects, Applied Scientists
1917 First Avenue, Seattle, Washington 98101
METRO
Municipality of Metropolitan Seattle
VICINITY MAP
May 24 1982

RESOLUTION NO. R-2492

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AUTHORIZING THE MAYOR TO SIGN ON BEHALF OF THE CITY A CERTAIN AGREEMENT BETWEEN THE CITY OF KIRKLAND AND NORTH-EAST LAKE WASHINGTON SEWER DISTRICT.

WHEREAS, that portion of the Northwest quarter of the Northwest quarter of the Northwest quarter of Section 32, Township 26, North Range 5, E.W.M., as described in the Agreement between the City of Kirkland and the North-east Lake Washington Sewer District, copy of which is attached to the original of this resolution, and by this reference incorporated herein, lies within the City of Kirkland and the sewer service area of the City of Kirkland sanitary sewer system, and

WHEREAS, said area is not presently connected to the Kirkland sanitary sewer system and because of the topography of the area will not readily be so connected, and

WHEREAS, the service area and corporate boundaries of Northeast Lake Washington Sewer District lie adjacent to said area and said area can conveniently connect into the existing Northeast Lake Washington sewer system facilities, and

WHEREAS, both the City and the Sewer District are authorized by state law to enter into cooperative agreements,

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Kirkland as follows:

Section 1. The Mayor is hereby authorized and directed to sign on behalf of the City of Kirkland that certain agreement, copy of which is attached to the original of this resolution, and by this reference incorporated herein. Said agreement permits the City of Kirkland to connect a portion of the Kirkland sanitary sewer system to be constructed within the area described in said agreement into the existing Northeast Lake Washington Sewer System facility lying within Northeast 116th Street.

Section 2. Said agreement shall become effective upon its being properly signed by both the City of Kirkland, as herein authorized and by the Northeast Lake Washington Sewer District.

PASSED BY MAJORITY VOTE of the Kirkland City Council in regular meeting on the 6th day of February, 1978.

SIGNED IN AUTHENTICATION thereof on the 6th day of February, 1978.

Robert H Kein

MAYOR

ATTEST:

Tom L Anderson

Director of Administration & Finance
(ex officio City Clerk)

AGREEMENT

THIS AGREEMENT made and entered into this day by and between the CITY OF KIRKLAND, an optional code city hereinafter sometimes referred to as "City," and NORTHEAST LAKE WASHINGTON SEWER DISTRICT, a municipal corporation, hereinafter sometimes referred to as "Sewer District."

WITNESSETH:

WHEREAS, both City and Sewer District are authorized by state law to enter into cooperative agreements, and

WHEREAS, the area described and designated on Exhibit A (attached hereto and by this reference incorporated herein) as subject area lies within the City of Kirkland and the Sewer Service Area of the City of Kirkland sanitary sewer system, and

WHEREAS, said area is not presently connected to the Kirkland sanitary sewer system, and because of the topography of the area may not readily be so connected, and

WHEREAS, the service area and corporate boundaries of Northeast Lake Washington Sewer District lie adjacent to subject area, and subject area can conveniently connect into the existing Northeast Lake Washington Sewer System facilities, and

WHEREAS, both parties are desirous, where possible and convenient, to mutually assist one another,

NOW, THEREFORE, in consideration of the agreements



R-2492

herein contained, it is agre d as follows:

Section 1. All sanitary sewer facilities to be constructed within the subject area, described and designated on Exhibit A as attached hereto and by this reference incorporated herein, shall upon construction and acceptance become for all purposes, including customer service charges and maintenance, part of the Kirkland sanitary sewer system but may, nevertheless, be connected into the Northeast Lake Washington Sewer District sanitary sewer line lying within Northeast 116th Street (at M-N 13-1) and at the point so designated as connection point on Exhibit A.

Section 2. Sewer District agrees to accept all sewage entering into its system through said connection point and to convey same through its system to its connection with the municipality of metropolitan Seattle system.

Section 3. No part of the cost of construction of the sanitary sewer facilities to be constructed within subject area, nor any of its future maintenance or repair, shall be borne by the Lake Washington Sewer District.

Section 4. City of Kirkland agrees to pay over to Sewer District as to each property within the subject area as it makes sewer connection, an amount equal to two cents (2¢) per square foot of area of each property. In addition thereto, the City will pay to Sewer District a monthly service trunkage charge in an amount equal to forth cents (40¢) per month per residential customer or residential equivalent actually connected and served by the facilities of the Kirkland Sewer System within the subject area.

Section 5. Neither party shall by virtue of this agreement acquire any proprietary or governmental interest in the sewage system or sewer line of the other party. Each party shall be solely responsible for the operation and maintenance of its own system of sewage collection and shall save the other party harmless from any claim for damage, real or imaginary, made by a third party, and alleging negligence or misfeasance in the operation or maintenance of the other party's system, or acts or omissions of its officers or employees.

Section 6. Each party shall seek and maintain with responsible insurers all such insurance as is customarily maintained with respect to sewage systems of like character and loss of or damage to the respective sewer facilities of each and against public and other liability to the extent that such insurance can be secured and maintained at a reasonable cost. Each party shall supply to the other party upon request a certificate showing such insurance to be in force.

Section 7. No waiver by either party of any term or condition of this agreement shall be deemed or construed as a waiver of any other term or condition nor shall a waiver of any subsequent breach, whether of the same or of a different provision of this agreement.

Section 8. This agreement shall terminate upon twelve (12) months' written notice given by either party to the other party. In the event of termination under this paragraph, all costs of disconnection shall be borne by the party requesting the termination.

THIS AGREEMENT SIGNED the ____ day of ________________, 1978.

NORTHEAST LAKE WASHINGTON SEWER DISTRICT

By ______________________________

CITY OF KIRKLAND

By Robert K. Klein

Execution of this Agreement approved on behalf of the Northeast Lake Washington Sewer District by resolution of its Board of Commissioners adopted the ____ day of ________________, 1978, and authorized by the City of Kirkland by Resolution No. 2492 of the Kirkland City Council, adopted the 6th day of February, 1978.

# PUBLIC WORKS EMERGENCY RESPONSE MUTUAL AID AGREEMENT

## FOR

# SIGNATORY AGENCIES IN THE STATE OF WASHINGTON

## INTRODUCTION

The purpose of the Public Works Emergency Response Mutual Aid Agreement is to permit signatory agencies to make the most efficient use of their powers by enabling them to coordinate resources and to maximize funding reimbursement during disasters/emergencies.

This Agreement will allow signatory agencies to support each other during disasters/emergencies to protect life and property, when the event is beyond the capabilities of the affected entity. This Agreement provides the mechanism for an immediate response to the Requesting Agency provided the Responding Agency has the resources and expertise necessary and available.

When faced with a disaster or emergency, public works agencies have a responsibility to maintain service and recover in the most expedient way. This can best be accomplished by preparation, coordination and cooperation with other public works agencies. Agencies are charged with the responsibility of coordinating efforts and compiling damage and recovery information on disasters and then reporting to the appropriate authority. Then the State requests aid and assistance from the federal government.

The following definitions for disaster and emergency are from the State Comprehensive Disaster Plan and were used in this Public Works Emergency Response Mutual Aid Agreement:

> Disaster - An event expected or unexpected, in which a community's available, pertinent resources are expended; or the need for resources exceeds availability; and in which a community undergoes severe danger; incurring losses so that the social or economic structure of the community is disrupted; and the fulfillment of some or all of the community's essential functions are prevented.
>
> Emergency - An event, expected or unexpected, involving shortages of time and resources; that places life, property or the environment, in danger; that requires response beyond routine incident response resources.

The reference guide is designed to be useful to individual agencies during a proclaimed emergency -- whether it be to borrow a piece of equipment for a specific job or request crews to assist in repair of a major failure. The reference guide will be updated and revised periodically, please insert the revisions immediately.

# AGREEMENT

# PUBLIC WORKS
# EMERGENCY RESPONSE
# MUTUAL AID AGREEMENT

WHEREAS, the purpose of this pre-disaster agreement between the agencies is to provide for immediate assistance to protect life and property;

WHEREAS, this Agreement is authorized under State of Washington, RCW's 35 (City), 36 (County), 38.52 (Emergency Management), 39.34 (Interlocal Agreement) and 47 (Public Highway Transportation (DOT)); which is activated only in the event of a proclamation of an emergency by the local and/or state government approving authority;

WHEREAS, the agency asking for assistance from any signatory agency will herein be referred to as the Requesting Agency;

WHEREAS, the signatory agency agreeing to assist another signatory agency asking for assistance will herein be referred to as the Responding Agency;

WHEREAS, it is necessary and desirable that this Agreement be executed for the exchange of mutual aid; with the intent to supplement not supplant agency personnel.

NOW, THEREFORE, it is hereby agreed by each and all of the parties signatory to the Agreement as follows:

1. Each agency signatory to this Agreement agrees to furnish, upon its sole discretion, those resources and services it deems to be available to each other signatory agency hereto as necessary to assist in the prevention, response, recovery and mitigation of proclaimed emergencies/disasters.

2. It is hereby understood that this Agreement shall not supplant pre-existing mutual aid agreements nor deny the right of any agency hereto to negotiate other mutual aid agreements.

3. The Responding Agency shall assist in only those situations for which it has determined it has qualified personnel, appropriate equipment and necessary materials. Resources of the Responding Agency that are made available to the Requesting Agency shall, whenever possible,

remain under the control and direction of the Responding Agency. The Requesting Agency shall coordinate the activities and resources of all Responding Agencies.

4. It is hereby understood that the Responding Agency will be reimbursed (e.g., labor, equipment, materials and other related expenses as applicable, including loss or damage to equipment) at its adopted usual and customary rates. The Responding Agency shall submit an itemized voucher of costs to the Executive Head of the Requesting Agency within sixty (60) days after completion of work (RCW 38.52.080). Unless otherwise agreed, the Responding Agency shall receive reimbursement within ninety (90) days after the voucher submittal date.

5. The Responding Agency shall have no responsibilities or incur any liabilities because it does not provide resources and/or services to any other party to this Agreement. The Responding Agency shall retain the right to withdraw some or all of its resources at any time. Notice of intention to withdraw shall be communicated to the Requesting Agency's designated official, or the official's designee, as soon as practicable.

6. All privileges, immunities, rights, duties and benefits of officers and employees of the Responding Agency shall apply while those officers and employees are performing functions and duties on behalf of the Requesting Agency, unless otherwise provided by law. Employees of the Responding Agency remain employees of the Responding Agency while performing functions and duties on behalf of the Requesting Agency (RCW 38.52.080).

7. To the extent permitted by law, the Requesting Agency shall protect, defend, hold harmless and indemnify all other Responding signatory Agencies, and their officers and employees from any and all claims, suits, costs, damages of any nature, or causes of action, including the cost of defense and attorneys fees, by reason of the acts or omissions, whether negligent, willful, or reckless, of its own officers, employees, agency or any other person arising out of or in connection with any acts or activities authorized by this agreement, and will pay all judgments, if any, rendered. This obligation shall not include such claims, costs, damages or other expenses which may be caused by the sole negligence of the Responding Agencies or their authorized agents or employees.

8. Authorization and approval of this Agreement shall be in a manner consistent with the Agency's current procedures. This Agreement shall be effective upon approval by two or more agencies and shall remain in effect as long as two or more agencies are parties to this Agreement. Upon execution of this Agreement, the agency shall send an original or a certified copy of the agreement to the Washington State Department of Transportation, Highways & Local Programs Service Center. Highways & Local Programs shall maintain a list of all signatory agencies and send an updated list to all agencies whenever an agency is added or removed from the list.

9. Any agency signatory to this Agreement may cancel its participation in this Agreement by giving written notice to the Washington State Department of Transportation, Highways & Local Programs Service Center.

10. This Agreement is for the benefit of the signatory agencies only and no other person or entity shall have any rights whatsoever under this Agreement as a third party beneficiary.

**THIS PAGE INTENTIONALLY LEFT BLANK**

# APPENDIX C

## SEPA Checklist

THIS PAGE INTENTIONALLY LEFT BLANK

CITY OF KIRKLAND
Planning & Building Department
123 5th Avenue, Kirkland, WA 98033
425.587.3600 ~ www.kirklandwa.gov

**MEMORANDUM**

**To:** Eric R. Shields, AICP, SEPA Responsible Official

**From:** **Aoife Blake, Planner**

**Date:** September 20, 2017

**File:** SEP16-00300

**Subject:** STATE ENVIRONMENTAL POLICY ACT (SEPA) DETERMINATION GENERAL SEWER PLAN UPDATE

## GENERAL

The applicant, The City of Kirkland, is proposing a regular update to the City's General Sewer Plan. The applicant is proposing to update and improve the existing sewer plan to meet future needs as outlined by the City's Comprehensive Plan. All future individual construction projects proposed under the General Sewer Plan will be reviewed through an independent SEPA review. The proposed plan update has been reviewed for compliance with all applicable codes and laws.

## ANALYSIS

The SEPA "threshold determination" is the formal decision as to whether the proposal is likely to cause a significant adverse environmental impact for which mitigation cannot be identified. If it is determined that a proposal may have a significant adverse impact that cannot be mitigated, an Environmental Impact Statement (EIS) would be required.

Many environmental impacts are mitigated by City codes and development regulations. For example, the Kirkland Zoning Code has regulations that protect sensitive areas, limit noise, provide setbacks, establish height limits, etc. Where City regulations have been adopted to address an environmental impact, it is presumed that such regulations are adequate to achieve sufficient mitigation [WAC 197-11-660(1)(e) and (g)].

I have had an opportunity to review the Environmental Checklist dated June 22, 2017 (see Attachment 1) for the plan update referenced above.

## CONCLUSION

Based on my review of all available information and adopted policies of the City, I have not identified any significant adverse environmental impacts. Therefore, I recommend that a Determination of Non-Significance be issued for this proposed action.

## ATTACHMENTS

1. Environmental Checklist
2. General Sewer Plan

☒ I concur ☐ I do not concur

Comments:____________________________________________________________

September 20, 2017
Eric R. Shields, Planning & Building Director Date

cc: Josh Pantzke, City of Kirkland, Department of Public Works

September 26, 2017

Josh Pantzke,
City of Kirkland, Department of Public Works,
915 8th Street
Kirkland, WA 98033

Dear Mr. Pantzke,

**Subject: Environmental Determination, File No. SEP16-00300**

The City has completed its environmental review of your application and has issued a Determination of non-significance for the proposed project (attached).

Should you wish to appeal the SEPA determination, a written appeal must be submitted to the City by October 10, 2017. The appeal should include a concise statement of the matter being appealed, the specific components or aspects being appealed, the rationale for contention on appeal, and a statement of standing to appeal. The fee for appealing the Environmental Determination is $220.46.

Should you have any questions regarding this letter, please contact me at 425.587.3262, and refer to File No. SEP16-00300.

Sincerely,

PLANNING AND BUILDING DEPARTMENT

Aoife Blake

Aoife Blake
Planner

Attachment: Environmental Determination

**THIS PAGE INTENTIONALLY LEFT BLANK**

**CITY OF KIRKLAND**
Planning and Building Department
123 5th Avenue, Kirkland, WA 98033
www.kirklandwa.gov ~ 425.587.3600

# DETERMINATION OF NON-SIGNIFICANCE (DNS)

**Case No.:** SEP16-00300 **DATE ISSUED:** September 26, 2017

**Project Name:** General Sewer Plan Update

**Project Location:** Citywide

**Project Description:** Non Project Action for Adoption of the General Sewer Plan Update

**Proponent:** City of Kirkland, Public Works Department

**Project Planner:** Aoife Blake, Planner

Lead agency is the City of Kirkland

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

☒ There is no comment period for this DNS.

**Responsible official:** September 20, 2017

Eric R. Shields, AICP, Planning & Building Director Date
City of Kirkland
Planning & Building Department
123 Fifth Avenue, Kirkland, WA 98033 – 425.587.3600

☒ There is no administrative appeal period for this DNS (KMC 24.02.230(a))

**Distribute this notice with a copy of the Environmental Checklist to:**

GENERAL NOTICING

- Department of Ecology - Environmental Review
- Muckleshoot Tribal Council - Environmental Division, Tribal Archeologist
- Muckleshoot Tribal Council - Environmental Division, Fisheries Division Habitat
- Cascade Water Alliance – Director of Planning
- All Neighborhood Associations
- Lake Washington School District No. 414: Budget Manager and Director of Support Services
- Washington State Dept. of Archaeology & Historic Preservation
- King County Dept. of Transportation - Employer Transportation Representative
- Seattle & King County Public Health - SEPA Coordinator
- Houghton Community Council

AGENCIES WITH JURISDICTION, AFFECTED AGENCIES, AND/OR INTERESTED PARTIES

- Department of Ecology - Environmental Review Department of Fish and Wildlife – Olympia
- Muckleshoot Tribal Council - Environmental Division, Fisheries Division Habitat Program
- Washington State Parks & Recreation Commission – Agency Director
- Eastside Audubon Society
- Northshore Utility District - Operations Department, Engineering Director, and Senior Civil Engineer
- Seattle City Light - Department of Finance and Administration
- King County Wastewater Treatment Division – SEPA Lead and Property Agent
- City of Bellevue - Director, Planning Dept.
- City of Redmond - Director, Planning Dept.
- Puget Sound Regional Council - SEPA Review

**cc:** Applicant

Distributed by: KSBays September 26, 2017

(Karin S. Bayes, Office Specialist) Date

CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033
425.587.3225 - www.kirklandwa.gov

# SEPA ENVIRONMENTAL CHECKLIST

UPDATED MAY 2015

## Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

## Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use “not applicable” or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

## Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

## Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

## A. Background

1. Name of proposed project, if applicable: 2017 General Sewer Plan (GSP) Update

2. Name of applicant: City of Kirkland Public Works Department

3. Address and phone number of applicant and contact person:

   Josh Pantzke
   123 5th Avenue, Kirkland, WA 98033
   (425) 587-3917

4. Date checklist prepared: June 15, 2017

5. Agency requesting checklist: City of Kirkland, Department of Planning and Community Development

6. Proposed timing or schedule (including phasing, if applicable):

   The adoption of the GSP is scheduled to be completed in 2017. The GSP addresses the policies, design criteria, and recommendations needed to construct, maintain, and manage the City's sewer system for proposed land use development, as dictated by the comprehensive land use plans. The GSP will be updated or supplemented on a regular basis.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

   Yes. Future sewer improvements will be based on the GSP. Any future design or construction will complete an appropriate SEPA review. The City's GPS is updated on a 6-year renewal basis. Any desired changes to the recommendations within the Plan will require a comprehensive plan amendment. It is recommended that this plan be updated next in 2023.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

   None.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

   None at this time.

10. List any government approvals or permits that will be needed for your proposal, if known.

Washington State Department of Ecology and Kirkland City Council.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The 2017 GSP Update will provide a sewer planning document for the City of Kirkland (City) that meets the requirements of Washington Administrative Code (WAC) 173-240-050. The City's most recent GSP was completed in 2010; since that time, changes in growth and development timing have caused the 2010 GSP to be outdated. The GSP provides planning for sewer improvements within the City's sewer service area, which serves approximately 29,481 people and encompasses approximately 5,630 total acres.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The City's sewer service area is located within King County and is bordered on the west by Lake Washington, on the east by the City of Redmond (Redmond), on the north by the Northshore Utility District, and on the south by the City of Bellevue. The City's sewer service boundaries have been established by agreements and policies, but could be altered by annexation. The ability to serve customers will be considered as part of any annexation and any future boundary change will be addressed in appropriate updates or amendments to this Plan.

## B. ENVIRONMENTAL ELEMENTS

### 1. Earth

a. General description of the site: Urban area composed of flat, hilly, and steep slopes.

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____________

b. What is the steepest slope on the site (approximate percent slope)?

Approximately 45-percent slopes are present in some areas of the sewer service area.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Based on a review of the Natural Resources Conservation Service's Web Soil Survey for the City's sewer service area, the primary soil types (i.e., soil types accounting for more than 1 percent of the service area) include Alderwood gravelly sandy loam; Arents, Alderwood material; Everett very gravelly sandy loam; Indianola loamy sand; Kitsap silt loam; Ragnar-Indianola association; and Seattle muck.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Many areas on the slopes of Lake Washington have been identified as having soil types that are susceptible to erosion. The current landslide map for the City indicates that certain parts within the sewer service area may be susceptible to landslide hazards.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

No filling, excavation, or grading are proposed. This SEPA Checklist is for the City's GSP. No projects identified in the GSP are expected to require grading or filling of a site. All trench backfilling will be done with the native material taken from the trench unless it does not meet backfill standards. If native material is deemed un-suitable, import backfill material will be used. All imported backfill material will be addressed in the environmental review during specific project design phases.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Not for City's GSP. There is a potential for erosion impacts during the construction of specific projects.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

N/A for the City's GSP. Sewer projects do not generally create impervious surfaces and if a specific project should add impervious surface it will be identified at the time of the SEPA review for that specific project.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Temporary erosion and sedimentation control (TESC) plans, in conformance with City requirements, will be included as part of the project design and specifications. On-site inspection during construction will occur to monitor and correct any potential erosion problems.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Potential for vehicular and equipment emissions may affect the ambient air quality for short periods of time during construction of specific sewer system projects. These impacts will be addressed during the review process for the specific projects.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Measures for reducing or controlling emissions and other air impacts will be addressed during the review process for the specific projects.

3. Water

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Several streams are present in the sewer service area, including Juanita Creek and Forbes Creek. Many wetland areas have also been identified within the service area. Lake Washington borders the City to the west, and Forbes Lake is also present in the sewer service area.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Any project identified within the GSP that is within 200 feet of the described waters will be addressed through the SEPA and Shoreline Permit review process specific to that project. It is the City's goal to avoid construction in or around wetlands, lakes, or streams. It is, however, reasonable to anticipate that work on existing pipelines in the vicinity of wetlands, lakes, or streams, or other engineering constraints, may result in few alternative options for new construction. If work is required in or around wetlands, lakes, or streams the issue will be addressed in the SEPA review for that specific project. Additional compliance may be required through the City's Critical Areas Ordinance, depending on the nature of the proposed sewer project. Reasonable efforts will be made to maintain the integrity, restoration, and/or replacement of all impacted wetland areas and buffers, as required by state and local regulations.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Any fill and dredged material that may be placed in or removed from surface water, streams, or wetlands will be addressed in the SEPA review of individual projects. All City codes, as well as any outside state or federal agency requirements, will be met as provided in any SEPA process.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No, it is not anticipated that there will be any discharge to or withdrawal from surface waters as a result of the projects identified within the GSP.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Portions of specific projects may be located within the 100-year floodplain. When applicable, these projects will address the issue in the SEPA review process specific to those individual projects. All City codes, as well as any outside agency requirements, will be met as provided for in the SEPA finding.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No, it is not anticipated that there will be any discharge of waste materials to surface waters as a result of the projects identified within the GSP.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None.

***N/A – none***

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

There will be no runoff that can be directly attributed to the adoption of this GSP or any completed project as described within the GSP. Any runoff that may occur during construction of a specific project will be subject to City codes, as well as outside agency requirements identified in the project's SEPA finding.

2) Could waste materials enter ground or surface waters? If so, generally describe.

No.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Proposed measures to reduce or control surface, ground, and runoff water impacts will be addressed in the SEPA review of individual projects. All City codes, as well as any outside agency requirements, will be met as provided for in the SEPA findings for specific projects.

4. Plants

a. Check the types of vegetation found on the site:

__x_deciduous tree: alder, maple, aspen, other
__x_evergreen tree: fir, cedar, pine, other
__x_shrubs
__x_grass
____pasture
____crop or grain
____Orchards, vineyards or other permanent crops.
__x_wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
__x_water plants: water lily, eelgrass, milfoil, other
__x_other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

It is expected that localized impacts to vegetation could occur as a result of clearing to accommodate construction of proposed sewer facilities. Any potential removal or alteration of vegetation will be addressed in the SEPA review of individual projects. All City codes will be followed and any necessary removal will be mitigated at the time of application.

c. List threatened and endangered species known to be on or near the site.

The presence of any threatened or endangered species will be addressed in the SEPA review of individual projects.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Any proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation will be addressed in the SEPA review of specific projects.

e. List all noxious weeds and invasive species known to be on or near the site.

The presence of noxious weeds and invasive species will be addressed in the SEPA review of individual projects.

## 5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other ________

The presence of animals will be addressed in the SEPA review process for specific projects.

b. List any threatened and endangered species known to be on or near the site.

Some protected species have been observed in the sewer service area, but it is not expected that the proposed GSP would adversely impact these species in the long term. Short-term construction impacts may occur. These impacts would be discussed in the SEPA review of the specific projects and avoided wherever possible.

c. Is the site part of a migration route? If so, explain.

Yes. Anadromous fish, such as salmon and steelhead, migrate through Lake Washington and into lakes, tributaries, and streams for spawning. Additionally, the region is part of the Pacific Flyway for migratory birds. For instance, waterfowl, including Canadian geese, visit large wetland areas bordering Lake Washington during their seasonal migration.

d. Proposed measures to preserve or enhance wildlife, if any:

Any potential measures to preserve or enhance wildlife will be addressed in the SEPA review of individual projects.

e. List any invasive animal species known to be on or near the site.

The presence of any invasive species will be included in the SEPA review for specific projects.

## 6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Some facilities identified within the GSP will require electrical energy to run pumps and the telemetry system.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

All facilities will be constructed utilizing efficient energy use systems that will not affect safety or reliability.

## 7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No.

1) Describe any known or possible contamination at the site from present or past uses.

None known.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

Any hazardous chemical/conditions that might affect project development and design will be addressed in the SEPA review for specific projects.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Any toxic or hazardous chemicals that might be stored, used, or produced will be addressed in the SEPA review for specific projects.

4) Describe special emergency services that might be required.

The City's Public Works Department is on-call to address any emergency that may occur.

5) Proposed measures to reduce or control environmental health hazards, if any:

N/A.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Existing noise will not affect construction or operations of projects proposed within the GSP.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

There will not be any noise associated with the adoption of the GSP. The projects identified in the GSP will have short-term noise impacts associated with the construction process.

3) Proposed measures to reduce or control noise impacts, if any:

As projects are developed pursuant to the GSP, the construction of those projects will meet all City codes, including those regulating noise.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Current land use within the planning area varies from business/commercial/industrial to single-family and multi-family residential to vacant land. This proposal will not affect current land uses.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No.

c. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No.

d. Describe any structures on the site.

Structures throughout the sewer service area vary from residential to industrial, including single-family, multi-family, commercial, retail, office, and light manufacturing.

e. Will any structures be demolished? If so, what?

Demolition of structures before or during construction of any GSP identified project is not anticipated. If a structure must be demolished it will be addressed through the SEPA review for a specific project.

f. What is the current zoning classification of the site?

The GSP covers all areas of the City's sewer service area and involves all zoning within the City code.

g. What is the current comprehensive plan designation of the site?

Varies, including commercial, residential, light industrial, park, and other.

h. If applicable, what is the current shoreline master program designation of the site?

The service area includes some properties within the shoreline master program (SMP) designation, as follows:

- Residential – Low;
- Residential – Medium-High;
- Natural;
- Urban Conservancy; and
- Urban Mixed.

i. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Some of the projects identified within the GSP are in areas that may be classified as "environmentally sensitive" in categories such as steep slopes, erodible soils, streams, lakes, and wetlands. These projects will be addressed in the SEPA review of the individual project to determine the alternative with the least environmental impact. All City codes, as well as any outside agency requirements, will be met as provided for in the SEPA finding.

j. Approximately how many people would reside or work in the completed project?

Presently, the City's sewer system services approximately 29,481 people. The GSP addresses sewer needs for full development under current comprehensive land use plans.

k. Approximately how many people would the completed project displace?

None.

l. Proposed measures to avoid or reduce displacement impacts, if any:

N/A.

m. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The GSP is prepared to be consistent with the City's Comprehensive Plan and with the GSP documents for adjacent municipalities. The Public Works Department will maintain coordination with the Comprehensive Land Use Plan by updating or amending the GSP as needed. To ensure compatibility, the GSP will be reviewed by all applicable state agencies and adjacent utilities.

n. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

N/A.

## 9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

N/A.

## 10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

N/A.

b. What views in the immediate vicinity would be altered or obstructed?

Any view that may be altered or obstructed will be addressed in the SEPA review for individual projects.

b. Proposed measures to reduce or control aesthetic impacts, if any:

If any projects identified within the GSP have aesthetic impacts they will be addressed in the SEPA review of that project. All City codes, as well as outside agency requirements, will be met as provided in any SEPA finding.

## 11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

No light or glare will be produced by the adoption of the GSP. The projects identified within the GSP may create temporary increases in ambient lighting during construction activities.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

Any potential lighting impacts due to construction activities for specific projects will be addressed in the SEPA review for that project.

## 12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

The City offers numerous designated and informal recreational opportunities, including parks, community centers, beaches, and docks, etc.

b. Would the proposed project displace any existing recreational uses? If so, describe.

The City does not anticipate any permanent impacts to existing recreational uses. Some of the projects identified within the GSP may have temporary impacts, such as access problems during construction.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Any impacts would be discussed in the SEPA review of individual projects. All City codes, as well as any outside agency requirements, will be met as provided in the SEPA finding.

## 13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

The sewer service area contains 11 homes, buildings, and/or sites on the national, state, and/or local preservation registers according to the Washington Information System for Architectural & Archeological Records Data (WISAARD).

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

To be determined during the SEPA review of individual projects.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

N/A.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Any measures that may be necessary to reduce or control impacts to cultural and historic resources will be mitigated at the time individual projects are reviewed per SEPA requirements. If any evidence of historical, archaeological, scientific, or cultural importance is discovered, there will be a cessation of construction activity until a proper survey can be completed.

14. Transportation

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

The transportation system within the service area consists of major transportation corridors, arterials, City streets, and local access roads. The transportation corridors include Interstate 405 and State Route 520. The City's sewer system is planned and constructed, in the most part, to utilize public street rights-of-way and alleys.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

Yes – transit service is available throughout the service area.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

N/A.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Projects within the GSP will not require any new roadways. Construction impacts may make it necessary to make temporary improvements to accommodate access or to restore an existing roadway.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

N/A.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

There will be temporary increases in vehicular trips during construction of specific projects identified in the GSP.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No.

h. Proposed measures to reduce or control transportation impacts, if any:

If any of the identified projects have impacts to transportation, such as detours or other measures, the impacts will be discussed in the SEPA checklist submitted for those specific projects. All City codes, as well as any outside agency requirements, will be met as provided in the SEPA findings.

## 15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

If any of the identified projects have impacts on public services, the impacts will be discussed in the SEPA checklist submitted for those specific projects. All City codes, as well as any outside agency requirements, will be met as provided in the SEPA findings.

## 16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other ___________

N/A. The available utilities will be addressed in the SEPA review of individual projects.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The proposed utilities will be addressed in the SEPA review of individual projects.

## C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: ____________________

Name of signee __Josh Pantzke__

Position and Agency/Organization __City of Kirkland Utility Manager__

Date Submitted: __June 22, 2017__

# D. Supplemental Sheet for Nonproject Actions

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The GSP references separate, preliminary capital improvement projects (CIPs) that could individually facilitate increases in discharges to receiving water, and affect the quality of the effluent and the loading of contaminants to those receiving waters. These changes in quality and quantity would be within (or restricted by) limits specified by permit under state and federal law. This non-project action itself is not likely to increase emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise. Potential concerns will be addressed in the SEPA review for specific projects contained within the GSP.

Proposed measures to avoid or reduce such increases are:

The return of water supply as wastewater flows to the Puget Sound are addressed in the Wastewater Utility's NPDES operating permit. The Washington State Department of Ecology monitors compliance with permit conditions intended to avoid or mitigate impacts from these discharges.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

The scope of the GSP is unlikely to affect plants, animals, fish, or marine life. Any impacts associated with specific projects will be addressed in the individual project SEPA review process.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Protections are afforded through SEPA review and compliance with the City's Environmentally Critical Areas regulations and the requirements of the Endangered Species Act, among other local, state, and federal regulations.

3. How would the proposal be likely to deplete energy or natural resources?

The GSP will not deplete energy or natural resources. Any concern of this nature will be addressed in the SEPA review for specific projects.

Proposed measures to protect or conserve energy and natural resources are:

N/A.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

   This non-project action itself is not likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection. Any concern of this nature will be addressed in the SEPA review process for specific projects.

   Proposed measures to protect such resources or to avoid or reduce impacts are:

   The redevelopment of existing facilities will be accomplished in a manner consistent with the protection of environmentally sensitive areas and with measures to mitigate any potential impacts. Any concern of this nature will be addressed in the SEPA review process for specific projects.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

   The City's Comprehensive Plan was reviewed to ensure that this GSP is compatible with land and shoreline use. Existing land and shoreline uses are unlikely to be affected by projects laid out in the plan. However, any specific project's effect on land and shoreline use will be discussed in the SEPA review process.

   Proposed measures to avoid or reduce shoreline and land use impacts are:

   The GSP would not allow uses that are incompatible with existing land use plans. Any concern of this nature will be addressed in the SEPA review process on a project by project basis.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

   The GSP is not likely to increase demands on transportation or public services and utilities.

   Proposed measures to reduce or respond to such demand(s) are:

   N/A.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

   The GSP is in accordance with local, state, and federal law, and the requirements for the protection of the environment.

# APPENDIX D

## Septic Property Count – September 2015

**THIS PAGE INTENTIONALLY LEFT BLANK**

## NUMBER OF SEPTIC SYSTEMS IN CITY SERVICE AREA

1) IT pulled tax parcels that are shown within Springbrook (database) as being on septic (not paying wastewater charges) and created:
   a. A database with these parcels (788 parcels flagged as being on septic)
   b. A GIS layer with same.
2) CIP mapped, confirmed, identified parcels are within city service boundary:
   a. 10 properties fall outside the city service boundary. 7 of them will likely be served by the city system even though they are in Northshore – this is by mutual agreement that they are topographically best-served by the city (2012/13 communications). Leaves 785 parcels currently on septic served by Kirkland.
3) Selected all tax parcels within 50 feet of existing sewer main (465 parcels)
   a. Removed all selections that while within 50 feet, would require by code that parcel extend main to farthest property line – considered so prohibitively expensive as to make them essentially not have access to sewer (currently 37 properties)
4) **So the numbers are:**
   - 785 parcels currently on septic, within/served by City of Kirkland Wastewater System
   - 465 parcels have current access to wastewater system connection
   - 320 parcels currently do not have direct access to the wastewater system (either because they are too far away from a main, or they would likely have to expend a considerable amount of money to extend the main to their farthest property line per code before getting a connection permit, even though they at some property point, are within 50 feet of an existing main – could be some flexibility as determined by Development Engineering on a case-by-case basis)
   - 785/34 ~ 23 years to convert all septic to sewer (using the average calculated below)

*This exercise used records that likely contain some errors, did not assess impediments to connection (topography, sensitive areas, easements needed, etc.), and utilized judgments about ability of some properties to connect to a nearby sewer main (see 3a above).*

## CONVERSIONS FROM SEPTIC TO SEWER

Data provided by Development Engineering (from City Permit Records – difficult to get anything earlier)

| YEAR | Septic/New Sewer Connection (House Stays) | ESP Connections (from Overview) | Total Connection Average | New Sewer Connection (House Demoed) | Connections by Development (New Main, or Connection to Existing). Unable to say how many of these are also conversions from septic to sewer. |
|---|---|---|---|---|---|
| 2015 | 15 | | 15 | 117 | 102 |
| 2014 | 56 | | 56 | 155 | 99 |
| 2013 | 40 | | 40 | 133 | 93 |
| 2011 | | 3 | 3 | | |
| 2009 | | 9 | 9 | | |
| 2007 | | 33 | 33 | | |
| 2005 | | 25 | 25 | | |
| 2003 | | 62 | 62 | | |
| 2001 | | 50 | 50 | | |
| 1999 | | 38 | 38 | | |
| | | | | | |
| AVG | 37 | 31 | 33 | | |
| **Average all Columns** | **34** | | | | |
| | | | | | |
| | | | | | |
| Data from EnerGov and provided by Development Eng (Katy C.) | | | | | |

**THIS PAGE INTENTIONALLY LEFT BLANK**

# APPENDIX E

## Lift Station Flow Data, Domestic Wastewater Flow Projections, and I/I Analysis Data

THIS PAGE INTENTIONALLY LEFT BLANK

# LIFT STATION WET WELL MEASUREMENTS

# YARROW PT. LIFT STATION

Measurements to get:

1. Transducer to bottom of wet well: 7”
2. Low wet well float: 1’6”
3. Actual pump off measurement: 1.8’
4. Control panel readout pump off measurement: 2.0’
5. Actual lead pump on measurement: 2.6’
6. Control panel lead pump on measurement: 3.0’
7. Lag pump on measurement not measured
8. Inlet measurement: 4.2’
9. High wet well float measurement: 3’11”
10. Overflow measurement: 4.2’
11. Transducer/ control panel measurement level versus actual level (is the measurement different): 2.6’ actual, 3.0’ readout.
12. Wet well dimensions, width, length, height. Or diameter and height.
    6’ diameter x 6.1 ft. from catwalk to bottom, catwalk to top 48” diameter x 177” high
    Total depth = 20.8’ , 4.2’ - bottom to inlet invert
    Dry well dimensions – Pump room - 9’ x8’ x 7’10” high, Barrel – 14.5 ft. high by 6’ diameter. Total depth = 22.25’
13. Pump down test was conducted with the inflow diverted into V-3 (vactor truck).
    GPM calculations based on 211 gallons per foot of wet well, 3.14 x (36x36) X12 = 48833 cubic inches / 1728 cubic inches per cubic foot = 28.26 cubic feet x 7.48 gallons per cubic foot = 211 gallons per foot of wet well.
    Pump 1 - .5’ of drop in 60 seconds = 106 GPM
    Pump 2 - .55’ of drop in 60 seconds = 116 GPM
    Both pumps together - .6’ of drop in 60 seconds = 126 GPM.
14. Wet well capacity:
    Bottom of well to bottom of invert: 886 gallons
    Bottom of well to bottom of catwalk: 1287 gallons
    211 gallons per foot of wet well.
15. 2 – Cornell pumps, 6” pump inlet pumping into a single 6” force main.
    Pump cycle operates with a Yokogawa pump control and a pressure transducer that is monitored by a Magelis interface for telemetry and mechanical floats for backup.
    Station has a standby generator. There is no portable standby generator hookup or bypass pumping capability.

# LIFT STATION WET WELL MEASUREMENTS

# WAVERLY LIFT STATION

Measurements to get:

1. Transducer to bottom of wet well: 1.3’
2. Low wet well float: 1.1’
3. Actual pump off measurement: 2’
4. Control panel readout pump off measurement: 1.9’
5. Actual lead pump on measurement: 3.5’
6. Control panel lead pump on measurement: 3.5’
7. Lag pump on measurement: Telemetry 3.6’
8. Inlet measurement: 5.4’
9. High wet well float measurement: 5.1’
10. Overflow measurement 5.4’, same as inlet invert.
11. Transducer/ control panel measurement level versus actual level (is the measurement different) 3.75’ actual versus 3.7’ control panel.
12. Wet well dimensions, width, length, height. Or diameter and height:
    6’ diameter x 5.4’ to invert of inlet.
    Total depth 15.9’ to top of frame.
13. Pump down test, inflow pipe was plugged with a mechanical plug.
    GPM calculations based on 211 gallons per foot of wet well.
    Pump 1 – 1.35’ drop in 60 seconds = 285 GPM
    Pump 2 – 1.4’ drop in 60 seconds = 295 GPM
    Both pumps together – 2’ drop in 60 seconds = 422 GPM
    3.14x(36x36)x12 = 48833 cubic inches / 1728 cubic inches per cubic foot. = 28.26 cubic feet x 7.48 gal per cubic ft. = 211 gallons per foot
14. Wet well capacity:
    1141 gallons to invert of inflow.
    1352 gallons to top of inlet.
    211 gallons per foot of wet well.
15. 2 – HOMA submersible pumps. Pump cycles operate through transducer level monitored by the Magelis interface and telemetry with mechanical float backup.
    12” inlet pipe, 2 – 6” force mains that Y into 1 - 8” force main.
    Station has backup standby generator, a hookup for a portable generator if standby generator fails and bypass pump capability.

# LIFT STATION WET WELL MEASUREMENTS

# TREND LIFT STATION

## Measurements to get:

1. Transducer to bottom of wet well: Transducer sits on bottom of the wet well.
2. Low wet well float: 15”
3. Actual pump off measurement: 16.5”
4. Control panel readout pump off measurement: 44
5. Actual lead pump on measurement: 31”
6. Control panel lead pump on measurement: 56.5
7. Lag pump on measurement: High Float, 36”
8. Inlet measurement: 2 inlets – 56” and 45”
9. High wet well float measurement: 36”
10. Overflow measurement: 45”
11. Transducer/ control panel measurement level versus actual level (is the measurement different): ON control panel - 56.5, actual – 31”; OFF control panel – 44, actual – 16.5”
12. Wet well dimensions, width, length, height. Or diameter and height. bottom of wet well to catwalk: 72” diameter x 72” high; barrel – bottom of throat to catwalk, 48” diameter x 134” high; frame and cover/throat, 24” diameter x 26” high. Total depth from frame and cover to bottom of wet well – 232” or 19’4”.
13. Both inflow pipes were plugged with mechanical plugs
    GPM calculations based on 211 gallons per foot of wet well.
    Pump 1 – 1’ drop in 60 seconds = 211 GPM
    Pump 2 – 1’ drop in 60 seconds = 211 GPM
    Both pumps together – 1’ drop in 60 seconds = 211 GPM
    3.14 x (36)x(36) x 12” = 48833 cubic inches / 1728 cubic inches per cubic ft. = 28.26 cubic feet x 7.48 gal per cubic ft. = 211 GPM
14. Wet well capacity: 792 gallons.
15. 2 – Cornell pumps with ball check valves. 2 – 4” inflow pipes, 1 – 4” force main.
    Pump cycles operate with Yokogawa pump controls and a pressure transducer that is monitored by a Rugid computer for telemetry. Backup system is mechanical floats.
    Station doesn’t have standby generator power, a portable generator needs to be hooked up if power fails.
    Station doesn’t have bypass pumping capability.

# LIFT STATION WET WELL MEASUREMENTS

## SOUTH BAY LIFT STATION

Measurements to get:

1. Transducer to bottom of wet well. 6" to top side of "V", 16" to bottom of "V"
2. Low wet well float : 2', control panel readout : 1'
3. Actual pump off measurement : 2.5'
4. Control panel readout pump off measurement : 1.5'
5. Actual lead pump on measurement : 4'
6. Control panel lead pump on measurement : 2.7'
7. Lag pump on measurement : High Float
8. Inlet measurement : 4'
9. High wet well float measurement : 5'6", control panel readout : 4.2'
10. Overflow measurement : 29" from overflow inlet invert to bottom of channel invert in manhole that feeds wet-well.
11. Transducer/ control panel measurement level versus actual level (is the measurement different) : Control panel : 2.7, actual : 4'
12. Wet well dimensions, width, length, height. Or diameter and height. Primary wet-well : 8'L x 3'W x 8'4"H = 1495 Gal capacity; Secondary wet-well : 12'9"L x 15'W x 12'3"H total, 5'11"H to inlet invert = 7033 gal capacity to inlet invert. Barrel section : 3'W x 3'L x 46"H, total depth of secondary wet-well = 193" or 16'.;
    Dry-well measurements : Control room : 9'L x 8'W x 8'3"H, Barrel 4'W x 4'L x 8'4", Total depth = 16'7"
13. 8'x3'x1' = 24 cubic feet x 7.48 gal per cubic feet = 179.5 gallons per foot.
    Inflow plugged with a mechanical plug
    Pump 1 – measured @ 60 seconds – 3.5' pumped down to 2.6'=.9'x179.5Gal = 161 GPM
    Pump 2 – measured @ 60 seconds – 3.5' pumped down to 2.5'=1'x179.5Gal = 179.5GPM
    Both pumps together measured @ 60 seconds – 5.5' pumped down to 5' = .5' x 179.5 Gal = 89.75 GPM
14. 2 – Cornell pumps with ball check valves, 2 – 4" inflow pipes, 1 – 6" force main. Pump cycles operate with Yokogawa pump controls and a pressure transducer monitored by a Magelis interface for telemetry that sends its signal through Yarrow Pt. via radio read. Backups are mechanical floats.
15. Station has a secondary wet well which has 1 inflow, suction sits on bottom of well.
    Station doesn't have standby generator, if power fails, a portable generator must be hooked up.
    Station doesn't have bypass pumping capability.

# LIFT STATION WET WELL MEASUREMENTS

# ROSE PT. LIFT STATION

Measurements to get:

1. Transducer to bottom of wet well: 1'
2. Low wet well float: 1'
3. Actual pump off measurement: 1.8'
4. Control panel readout pump off measurement: 18.5
5. Actual lead pump on measurement: 2.75'
6. Control panel lead pump on measurement: 30.0
7. Lag pump on measurement: Not measured.
8. Inlet measurement: 3'2"
9. High wet well float measurement: 3.5'
10. Overflow measurement: 3'2", same as inlet invert.
11. Transducer/ control panel measurement level versus actual level (is the measurement different): 2.75' or 33" actual versus 30.0 control panel.
12. Wet well dimensions, width, length, height. Or diameter and height:
    Wet well – 3'w x 6'l x 7' and 7'8"deep, from catwalk to bottom, (floor is angled deeper to the west). 3' x 6' x 7'9" above catwalk = 15.41' total depth.
    Dry well dimensions – pump room floor to catwalk 6'2" x 6'5" x 8', catwalk to top of frame 6'2" x 6'5" x 7'9" = 15.75' total depth.
13. Pump down test was conducted with inflow plugged with a mechanical plug.
    GPM calculations based on 135 gallons per foot of wet well, 3' x 6' x 1' = 18 cubic ft. x 7.48 gallons per cubic foot. = 135.
    Pump 1: 2.2' drop in 60 seconds = 297 GPM
    Pump 2: 2.25' drop in 60 seconds = 303 GPM
    Both pumps together: 2.5' drop in 60 seconds = 337.5 GPM
14. Wet well capacity: 426 gallons to invert of inlet
    987 gallons to bottom of catwalk
    135 gallons per foot of wet well.
15. 2 – CRAME-DEIMING pumps, pump cycles operate off of Yokogawa pump controls and a pressure transducer, monitored by a Magelis interface for telemetry with mechanical floats as backup. 1 - 6" force main, 8" inflow.
    Station doesn't have a standby generator, if power fails, a portable generator must be hooked up to the station. Station can be bypass pumped into the downstream manhole (Manhole I.D. #1) adjacent to 1803 10th St W. in an emergency.

# LIFT STATION WET WELL MEASUREMENTS

# LK. PLAZA LIFT STATION

## Measurements to get:

1. Transducer to bottom of wet well: 1”
2. Low wet well float
3. Actual pump off measurement:  4.5’
4. Control panel readout pump off measurement: 2.5
5. Actual lead pump on measurement: 7.45’
6. Control panel lead pump on measurement: 5.0
7. Lag pump on measurement: Readout – 5.5, Actual 8.0 Lag pump didn’t start.
8. Inlet measurement: 74” from floor to bottom of inlet, 16” inlet pipe.
9. High wet well float measurement
10. Overflow measurement 10.86’. Overflow is in manhole #1036, overflows into the secondary wet well.
11. Transducer/ control panel  measurement level versus actual level (is the measurement different): 5.0 versus 7.45’
12. Wet well dimensions, width, length, height. Or diameter and height: See notes last 2 pages. Total dimensions are 34.5’ x 4’ x18.5’ high. The operating area from the catwalk down to the floor is separated by a weir that has a beaver slide under the inlet pipe. The dimensions of the area behind the weir on the inlet side are: 7.5’ x 4’, the weir is 3’4” from the floor to 7’ above the floor and is 12” thick. The pump side of the operating area is 27’ x 4’ x 10’2” high to the top of the catwalk. There are also 3 columns that protrude into the wet well area whose dimensions are 36’ wide on one side and 24” wide on the other by 12” deep.
    Secondary wet well dimensions are: 8’ x 8’ x 12’4” high. Barrel 3’ x 3’ x7’8”. Total 20’deep
    Inlet invert: 4’8”, 16” inlet, outlet pickup to pump 1: 2’2”, floor to invert, 8” pipe.
    Secondary wet well floats: Alarm float 10”, low float 3’6”, high float 6’.
13. Pump down test: Test was performed with the inflow diverted to the secondary wet well.
    GPM calculations based on 890 gallons per foot of wet well, (see notes last 2 pages).
    Pump down @ 1 minute run time
    Pump 1 solo – Start 7’, Stop 6.1’ = .9’ x 890 = 801 GPM
    Pump 1, 2 together – Start 6.8’, Stop 5.5’ = 1.3’ x 890 = 1157 GPM
    Pump 1, 3 together – Start 6.8’, Stop 5.5’ = 1.3’ x 890 = 1157 GPM
    Pump 2 solo – Start 6.8’, Stop 5.9’ = .9’ x 890 = 801 GPM

Pump 2, 3 together – Start 6.9’, Stop 5.5’ = 1.4’ x 890 = 1246 GPM
Pump 3 solo – Start 6.8’, Stop 5.9’ = .9’ x 890 = 801 GPM

14. Wet well capacity: approximately 890 gallons per foot of wet well
    9665 gallons to overflow @ 10.86’
    9048 gallons to top of catwalk
    6630 gallons to start of normal pump cycle
    4005 gallons at shut off of normal pump cycle
    3.27 minutes of run time per cycle @ 801 GPM
15. Station has 3 – WMCO pumps. The pumps alternate 1, 2, 3, to keep run times as even as possible. Pump cycles operate through a Yokogawa pump controller and pressure transducer monitored by a Magelis interface for telemetry with mechanical floats as backup. The pumps can be turned off and on remotely from the Maintenance Center and Telemetry laptop computer.
    The station has a secondary wet well for emergencies that can be used to operate the station with mechanical floats but can only pump through pump #1.
    Force main is 8” ductile iron, pump inlets are 8”. Inflow inlet to both primary and secondary wet wells is 16”. Primary wet well can be isolated from the secondary by shutting the valve between manhole 1036 and primary wet well hatch in the sidewalk.
    Station has a backup standby generator, a hookup for a portable generator if the standby generator fails and bypass pump capability.

## City of Kirkland Lift Station Flow Data

| Year | Description | Lift Station | | | | | |
|---|---|---|---|---|---|---|---|
| | | Lake Plaza | Rose Point | South Bay | Trend | Waverly Park | Yarrow Bay II |
| --- | Sewered Area (acres) | 140 | 25 | 7 | 19 | 45 | 8 |
| 2008 | Maximum Day Flow (gpd) | 486,000 | 21,600 | 7,560 | 7,392 | 28,764 | 5,538 |
| | Average Annual Flow (gpd) | 243,000 | 14,400 | 4,320 | 5,280 | 20,304 | 4,260 |
| | Minimum Day Flow (gpd) | 229,500 | 10,800 | 2,160 | 4,224 | 16,920 | 3,834 |
| | Maximum Day Flow Peaking Factor | 2.00 | 1.50 | 1.75 | 1.40 | 1.42 | 1.30 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 1,829 | 433 | 791 | 168 | 260 | 214 |
| 2009 | Maximum Day Flow (gpd) | 436,500 | 43,200 | 10,800 | 17,952 | 77,832 | 6,390 |
| | Average Annual Flow (gpd) | 283,500 | 14,400 | 8,640 | 8,448 | 33,840 | 5,112 |
| | Minimum Day Flow (gpd) | 211,500 | 10,800 | 6,480 | 5,280 | 23,688 | 4,260 |
| | Maximum Day Flow Peaking Factor | 1.54 | 3.00 | 1.25 | 2.13 | 2.30 | 1.25 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 1,604 | 1,298 | 633 | 672 | 1,191 | 268 |
| 2010 | Maximum Day Flow (gpd) | 495,000 | 106,200 | 17,280 | 28,512 | 155,664 | 9,372 |
| | Average Annual Flow (gpd) | 270,000 | 21,600 | 4,320 | 8,448 | 27,072 | 5,112 |
| | Minimum Day Flow (gpd) | 207,000 | 10,800 | 2,160 | 7,392 | 21,996 | 4,260 |
| | Maximum Day Flow Peaking Factor | 1.83 | 4.92 | 4.00 | 3.38 | 5.75 | 1.83 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 2,054 | 3,821 | 2,216 | 1,119 | 2,939 | 643 |
| 2011 | Maximum Day Flow (gpd) | 454,500 | 28,800 | 10,800 | 12,672 | 87,984 | 5,964 |
| | Average Annual Flow (gpd) | 216,000 | 10,800 | 4,320 | 6,336 | 27,072 | 4,260 |
| | Minimum Day Flow (gpd) | 193,500 | 7,200 | 2,160 | 5,280 | 23,688 | 3,408 |
| | Maximum Day Flow Peaking Factor | 2.10 | 2.67 | 2.50 | 2.00 | 3.25 | 1.40 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 1,861 | 865 | 1,266 | 392 | 1,414 | 322 |
| 2012 | Maximum Day Flow (gpd) | 648,000 | 59,400 | 19,440 | 22,176 | 159,048 | 5,964 |
| | Average Annual Flow (gpd) | 256,500 | 14,400 | 4,320 | 6,336 | 30,456 | 4,686 |
| | Minimum Day Flow (gpd) | 225,000 | 10,800 | 3,240 | 5,280 | 23,688 | 3,834 |
| | Maximum Day Flow Peaking Factor | 2.53 | 4.13 | 4.50 | 3.50 | 5.22 | 1.27 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 3,016 | 1,946 | 2,374 | 895 | 2,977 | 268 |
| 2013 | Maximum Day Flow (gpd) | 481,500 | 30,600 | 10,800 | 14,784 | 59,220 | 8,520 |
| | Average Annual Flow (gpd) | 243,000 | 18,000 | 4,320 | 8,448 | 27,072 | 4,260 |
| | Minimum Day Flow (gpd) | 198,000 | 14,400 | 3,240 | 5,280 | 21,996 | 3,408 |
| | Maximum Day Flow Peaking Factor | 1.98 | 1.70 | 2.50 | 1.75 | 2.19 | 2.00 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 2,022 | 649 | 1,108 | 504 | 819 | 643 |
| 2014 | Maximum Day Flow (gpd) | 414,000 | 54,000 | 11,880 | 19,008 | 106,596 | 10,650 |
| | Average Annual Flow (gpd) | 229,500 | 21,600 | 4,320 | 8,544 | 37,224 | 4,260 |
| | Minimum Day Flow (gpd) | 184,500 | 18,000 | 3,240 | 6,336 | 27,072 | 3,408 |
| | Maximum Day Flow Peaking Factor | 1.80 | 2.50 | 2.75 | 2.22 | 2.86 | 2.50 |
| | Maximum Day I/I per Sewered Area Quotient (gpad) | 1,637 | 1,442 | 1,266 | 672 | 1,749 | 911 |

## City of Kirkland Domestic Wastewater Flow Projections

| Year | Total City Population | City Sewer Service Area Population [1] | Domestic AAF per Capita (gpcd) | Residential Domestic AAF (gpd) | City Sewer Service Area Employees [2] | Domestic AAF per Employee (gped) | Commercial Domestic AAF (gpd) | Total Domestic AAF (gpd) | Domestic AAF per ERU (gpd per ERU) | Residential ERUs | Commercial ERUs | Total ERUs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2014 | 82,590 | 29,481 | 63 | 1,870,709 | 30,124 | 18 | 541,418 | 2,412,128 | 136 | 13,712 | 3,969 | 17,681 |
| 2015 | 83,460 | 28,509 | 76 | 2,166,684 | 30,878 | 20 | 617,551 | 2,784,234 | 155 | 13,975 | 3,983 | 17,958 |
| 2016 | 84,093 | 29,114 | 76 | 2,212,686 | 31,631 | 20 | 632,622 | 2,845,308 | 155 | 14,272 | 4,080 | 18,352 |
| 2017 | 84,727 | 29,720 | 76 | 2,258,689 | 32,385 | 20 | 647,692 | 2,906,381 | 155 | 14,568 | 4,178 | 18,746 |
| 2018 | 85,360 | 30,325 | 76 | 2,304,691 | 33,138 | 20 | 662,763 | 2,967,454 | 155 | 14,865 | 4,275 | 19,140 |
| 2019 | 85,993 | 30,930 | 76 | 2,350,694 | 33,892 | 20 | 677,834 | 3,028,528 | 155 | 15,162 | 4,372 | 19,534 |
| 2020 | 86,627 | 31,535 | 76 | 2,396,696 | 34,645 | 20 | 692,905 | 3,089,601 | 155 | 15,459 | 4,469 | 19,928 |
| **2021** | 87,260 | 32,141 | 76 | 2,442,699 | 35,399 | 20 | 707,975 | 3,150,674 | **155** | **15,755** | 4,566 | **20,322** |
| 2022 | 87,893 | 32,629 | 76 | 2,479,831 | 36,132 | 20 | 722,647 | 3,202,478 | 155 | 15,995 | 4,661 | 20,656 |
| 2023 | 88,526 | 33,118 | 76 | 2,516,963 | 36,866 | 20 | 737,319 | 3,254,282 | 155 | 16,234 | 4,756 | 20,990 |
| 2024 | 89,160 | 33,607 | 76 | 2,554,095 | 37,600 | 20 | 751,991 | 3,306,086 | 155 | 16,474 | 4,850 | 21,324 |
| 2025 | 89,793 | 34,095 | 76 | 2,591,227 | 38,333 | 20 | 766,663 | 3,357,890 | 155 | 16,713 | 4,945 | 21,658 |
| 2026 | 90,405 | 34,584 | 76 | 2,628,359 | 39,067 | 20 | 781,334 | 3,409,693 | 155 | 16,953 | 5,040 | 21,992 |
| 2027 | 91,017 | 35,072 | 76 | 2,665,491 | 39,800 | 20 | 796,006 | 3,461,497 | 155 | 17,192 | 5,134 | 22,326 |
| 2028 | 91,629 | 35,561 | 76 | 2,702,623 | 40,534 | 20 | 810,678 | 3,513,301 | 155 | 17,432 | 5,229 | 22,661 |
| 2029 | 92,241 | 36,049 | 76 | 2,739,755 | 41,267 | 20 | 825,350 | 3,565,105 | 155 | 17,671 | 5,323 | 22,995 |
| 2030 | 92,853 | 36,538 | 76 | 2,776,887 | 42,001 | 20 | 840,022 | 3,616,909 | 155 | 17,911 | 5,418 | 23,329 |
| 2031 | 93,465 | 37,027 | 76 | 2,814,019 | 42,735 | 20 | 854,694 | 3,668,712 | 155 | 18,150 | 5,513 | 23,663 |
| 2032 | 94,077 | 37,515 | 76 | 2,851,151 | 43,468 | 20 | 869,365 | 3,720,516 | 155 | 18,390 | 5,607 | 23,997 |
| 2033 | 94,689 | 38,004 | 76 | 2,888,283 | 44,202 | 20 | 884,037 | 3,772,320 | 155 | 18,629 | 5,702 | 24,331 |
| 2034 | 95,301 | 38,492 | 76 | 2,925,415 | 44,935 | 20 | 898,709 | 3,824,124 | 155 | 18,869 | 5,797 | 24,665 |
| **2035** | 95,913 | 38,981 | 76 | 2,962,547 | 45,669 | 20 | 913,381 | 3,875,928 | **155** | **19,108** | 5,891 | **25,000** |

NOTES:
*These projections include the City's NE 124th Street 124th Street Sewer Drainage Basin, which was assumed by Northshore in 2018.
1. Existing multi-family residential population in the sewer service area is estimated based on average single-family residential winter water consumption per connection and total multi-family residential winter water consumption.
2. No data is available for the number of employees in the City's sewer service area in 2013 or 2014. The number of employees in 2013 are the employees in the City limits, which include the annexation areas that are not in the City's sewer service area. The number of employees in 2014 are assumed to be the same as 2012 since there was a slight decrease in the number of commercial accounts.
-AAF = Average Annual Flow
-ERU = Equivalent Residential Unit
-gpcd = gallons per capita per day
-gpd = gallons per day
-gped = gallons per employee per day

## 2010 King County 20-year Peak Hour Sewer I/I Flow Rate Data

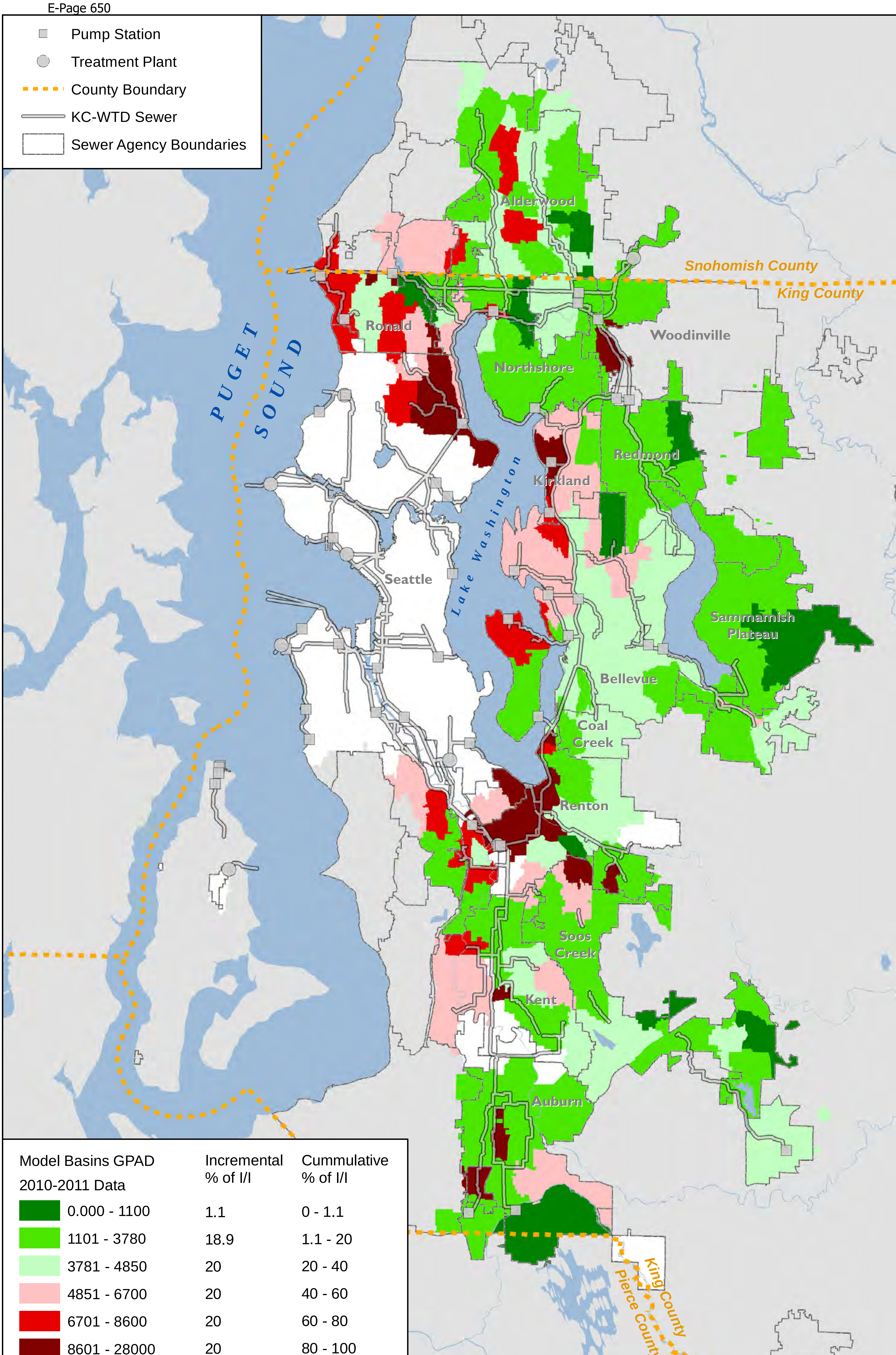
| 2010 King County Sewer Drainage Basin | 2010 I/I (gpad) |
|---|---|
| M_ESI14058 | 5,180 |
| M_ESI9032 | 3,871 |
| M_HOLMS001A | 1,396 |
| M_KRK001 | 6,541 |
| M_KRK004 | 4,937 |
| M_KRK008 | 9,218 |
| M_KRK010 | 8,453 |
| M_KRK012 | 8,463 |
| M_KRK015 | 3,584 |
| M_MEDNT001 | 5,071 |
| M_NLKS013 | 2,178 |
| M_NUD029 | 3,641 |
| M_NWLKS001 | 2,019 |
| M_SAMVL110_S | 1,584 |

## 2010 King County Sewer Drainage Basins Area Data

| 2010 King County Sewer Drainage Basin | Sewered Area (acres) | Potentially Sewered Area (acres) | Not Sewerable Area (acres) | Total Area (acres) |
|---|---|---|---|---|
| M_ESI14058 | 1,383.0 | 232.9 | 316.7 | 1,932.6 |
| M_ESI9032 | 42.2 | 57.5 | 94.4 | 194.1 |
| M_HOLMS001A | 11.6 | 0.0 | 0.0 | 11.6 |
| M_KRK001 | 205.1 | 13.8 | 19.2 | 238.0 |
| M_KRK004 | 576.8 | 61.8 | 197.9 | 836.5 |
| M_KRK008 | 857.1 | 8.5 | 60.0 | 925.6 |
| M_KRK010 | 118.3 | 0.0 | 10.4 | 128.7 |
| M_KRK012 | 75.3 | 6.0 | 51.7 | 133.0 |
| M_KRK015 | 541.8 | 163.7 | 93.6 | 799.1 |
| M_MEDNT001 | 6.8 | 15.4 | 20.0 | 42.2 |
| M_NLKS013 | 0.6 | 4.3 | 0.0 | 4.9 |
| M_NUD029 | 46.5 | 10.3 | 3.8 | 60.6 |
| M_NWLKS001 | 2.1 | 2.5 | 0.0 | 4.6 |
| M_SAMVL110_S | 0.7 | 1.5 | 0.0 | 2.2 |

## City of Kirkland 20-year Peak Hour Sewer I/I Flow Rate Calculations

| City of Kirkland Sewer Drainage Basin | 2010 King County Sewer Drainage Basin | Sewered Area (acres) | Potentially Sewered Area (acres) | Not Sewerable Area (acres) | Total Area (acres) | 2010 County Basin I/I (gpad) | Existing (2014) City Basin I/I (gpd) | Existing (2014) City Basin I/I Total (gpd) | 2021 Potentially Sewered Area I/I (gpad) | 2021 Projected City Basin I/I (gpd) | 2021 Projected City Basin I/I Total (gpd) | 2035 Potentially Sewered Area I/I (gpad) | 2035 Projected City Basin I/I (gpd) | 2035 Projected City Basin I/I Total (gpd) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 116th Avenue NE | M_ESI9032 | 33.6 | 57.4 | 27.4 | 118.3 | 3,871 | 129,967 | 130,474 | 600 | 164,389 | 164,899 | 2,000 | 244,706 | 245,225 |
| | M_ESI14058 | 0.1 | 0.0 | 5.5 | 5.6 | 5,180 | 506 | | | 510 | | | 519 | |
| Eastside Interceptor | M_ESI14058 | 1,382.6 | 232.9 | 303.8 | 1,919.3 | 5,180 | 7,161,518 | 10,401,916 | | 7,301,256 | 10,652,750 | | 7,627,313 | 11,238,029 |
| | M_ESI9032 | 0.6 | 0.2 | 61.6 | 62.3 | 3,871 | 2,200 | | | 2,291 | | | 2,502 | |
| | M_KRK001 | 187.0 | 13.8 | 19.2 | 219.9 | 6,541 | 1,222,943 | | | 1,231,193 | | | 1,250,444 | |
| | M_KRK004 | 6.2 | 0.0 | 7.7 | 13.9 | 4,937 | 30,753 | | | 30,753 | | | 30,753 | |
| | M_KRK008 | 0.8 | 0.3 | 0.2 | 1.3 | 9,218 | 7,012 | | | 7,213 | | | 7,681 | |
| | M_KRK010 | 3.2 | 0.0 | 1.9 | 5.1 | 8,453 | 27,269 | | | 27,269 | | | 27,269 | |
| | M_KRK012 | 0.3 | 0.0 | 0.0 | 0.3 | 8,463 | 2,618 | | | 2,618 | | | 2,618 | |
| | M_KRK015 | 541.7 | 163.7 | 92.7 | 798.1 | 3,584 | 1,941,634 | | | 2,039,858 | | | 2,269,049 | |
| | M_NLKS013 | 0.6 | 4.3 | 0.0 | 4.9 | 2,178 | 1,264 | | | 3,841 | | | 9,852 | |
| | M_NUD029 | 0.1 | 0.0 | 0.0 | 0.1 | 3,641 | 446 | | | 446 | | | 446 | |
| | M_NWLKS001 | 2.1 | 2.5 | 0.0 | 4.6 | 2,019 | 4,259 | | | 5,738 | | | 9,188 | |
| | M_SAMVL110_S | 0.0 | 0.5 | 0.0 | 0.5 | 1,584 | 0 | | | 274 | | | 914 | |
| Juanita | M_ESI14058 | 0.0 | 0.0 | 1.1 | 1.1 | 5,180 | 70 | 2,654,827 | | 70 | 2,691,234 | | 70 | 2,776,184 |
| | M_HOLMS001A | 0.2 | 0.0 | 0.0 | 0.2 | 1,396 | 307 | | | 307 | | | 307 | |
| | M_KRK004 | 535.0 | 60.7 | 137.4 | 733.1 | 4,937 | 2,641,546 | | | 2,677,941 | | | 2,762,862 | |
| | M_KRK008 | 0.8 | 0.0 | 0.0 | 0.8 | 9,218 | 7,034 | | | 7,034 | | | 7,034 | |
| | M_KRK015 | 0.0 | 0.0 | 0.9 | 0.9 | 3,584 | 60 | | | 60 | | | 60 | |
| | M_NUD029 | 1.6 | 0.0 | 0.0 | 1.6 | 3,641 | 5,811 | | | 5,823 | | | 5,851 | |
| Juanita Bay | M_HOLMS001A | 11.4 | 0.0 | 0.0 | 11.4 | 1,396 | 15,886 | 21,198 | | 15,886 | 21,200 | | 15,886 | 21,205 |
| | M_KRK004 | 1.1 | 0.0 | 0.0 | 1.1 | 4,937 | 5,312 | | | 5,314 | | | 5,319 | |
| Kirkland | M_ESI14058 | 0.3 | 0.0 | 6.0 | 6.3 | 5,180 | 1,485 | 6,212,415 | | 1,503 | 6,217,548 | | 1,543 | 6,229,526 |
| | M_KRK004 | 5.6 | 1.0 | 9.2 | 15.8 | 4,937 | 27,713 | | | 28,314 | | | 29,718 | |
| | M_KRK008 | 670.8 | 7.5 | 42.1 | 720.4 | 9,218 | 6,183,216 | | | 6,187,731 | | | 6,198,265 | |
| Lake Plaza | M_KRK008 | 137.2 | 0.7 | 13.3 | 151.2 | 9,218 | 1,264,873 | 1,290,340 | | 1,265,275 | 1,290,742 | | 1,266,213 | 1,291,680 |
| | M_KRK010 | 3.0 | 0.0 | 0.0 | 3.0 | 8,453 | 25,467 | | | 25,467 | | | 25,467 | |
| Rose Point | M_KRK004 | 24.8 | 0.0 | 43.3 | 68.1 | 4,937 | 122,474 | 123,978 | | 122,474 | 123,978 | | 122,474 | 123,978 |
| | M_KRK008 | 0.2 | 0.0 | 0.0 | 0.2 | 9,218 | 1,504 | | | 1,504 | | | 1,504 | |
| South Bay | M_MEDNT001 | 6.8 | 6.1 | 2.1 | 15.1 | 5,071 | 34,596 | 34,596 | | 38,285 | 38,285 | | 46,894 | 46,894 |
| Trend | M_KRK001 | 18.2 | 0.0 | 0.0 | 18.2 | 6,541 | 118,811 | 119,927 | | 118,811 | 120,533 | | 118,812 | 121,947 |
| | M_SAMVL110_S | 0.7 | 1.0 | 0.0 | 1.7 | 1,584 | 1,116 | | | 1,722 | | | 3,136 | |
| Watershed Park | M_ESI9032 | 8.0 | 0.0 | 4.0 | 12.0 | 3,871 | 31,016 | 31,016 | | 31,016 | 31,016 | | 31,016 | 31,016 |
| Waverly Park | M_KRK004 | 2.7 | 0.0 | 0.0 | 2.7 | 4,937 | 13,513 | 407,456 | | 13,513 | 407,456 | | 13,513 | 407,456 |
| | M_KRK008 | 42.7 | 0.0 | 4.4 | 47.1 | 9,218 | 393,943 | | | 393,943 | | | 393,943 | |
| Yarrow Bay | M_ESI14058 | 0.0 | 0.0 | 0.3 | 0.3 | 5,180 | 0 | 1,556,817 | | 0 | 1,565,965 | | 0 | 1,587,310 |
| | M_ESI9032 | 0.0 | 0.0 | 1.4 | 1.4 | 3,871 | 2 | | | 2 | | | 2 | |
| | M_KRK008 | 4.6 | 0.0 | 0.0 | 4.6 | 9,218 | 42,492 | | | 42,492 | | | 42,492 | |
| | M_KRK010 | 112.0 | 0.0 | 8.5 | 120.5 | 8,453 | 947,074 | | | 947,074 | | | 947,074 | |
| | M_KRK012 | 67.0 | 6.0 | 48.8 | 121.8 | 8,463 | 567,249 | | | 570,872 | | | 579,323 | |
| | M_MEDNT001 | 0.0 | 9.2 | 17.9 | 27.1 | 5,071 | 0 | | | 5,526 | | | 18,419 | |
| Yarrow Bay II | M_KRK012 | 7.9 | 0.0 | 2.9 | 10.8 | 8,463 | 67,271 | 67,271 | | 67,273 | 67,273 | | 67,279 | 67,279 |




King County
Department of Natural Resources and Parks
**Wastewater Treatment Division**

N

2 1 0 2
Miles
October 2015

The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a survey product. King County shall not be liable for any general, special, indirect, incidential, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: Q:\WTD\Projects\II_Study\Projects\MdlBsnGPAD_20yrPeak_20150522.mxd oneilsh

**WORKING DRAFT**

**Maximum Calculated 20-Year Peak I/I Hourly Flow Rates**
*2010-2011 Data*

## City of Bellevue's Yarrow Point Sewer Drainage Basin (Basin No. 6) Flows

| Description | From City of Bellevue's 2014 Wastewater System Plan | | Estimated Flows | | |
|---|---|---|---|---|---|
| | 2012 (Existing) | Projected 2030 | 2014 (Existing) | Projected 2021 | Projected 2035 |
| Average Daily Sanitary Flow (gpm) | 182 | 196 | 184 | 189 | 200 |
| Peak Sanitary Flow (gpm) | 364 | 392 | 367 | 378 | 400 |
| Peak I/I (gpm) | 973 | 973 | 973 | 973 | 973 |
| Total Peak Flow (gpm) | 1,337 | 1,365 | 1,340 | 1,351 | 1,373 |

# APPENDIX F

## Sanitary Sewer Pre-Approved Notes, Design Criteria, and Plans

**THIS PAGE INTENTIONALLY LEFT BLANK**

# INDEX

## SANITARY SEWER POLICIES



## SANITARY SEWER PRE-APPROVED NOTES, DESIGN CRITERIA, & PLANS

# SANITARY SEWER - PLAN NOTES

1. A pre-construction conference shall be held prior to the start of construction. The Contractor shall be responsible for securing all necessary permits prior to construction.

2. All construction and materials shall conform to City of Kirkland Department of Public Works and current WSDOT/APWA standards and specifications for road, bridge, and municipal construction.

3. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The Contractor shall be responsible for verification of the locations shown and for discovery of possible additional utilities not shown so as to avoid damage or disturbance. The underground utility location service shall be contacted for field location prior to any construction. The owner or his representative shall be contacted if a utility conflict exists. For utility location in King County, call 1-800-424-5555. The Contractor is responsible to ensure that utility locates are maintained throughout the life of the project.

4. It shall be the Contractor's responsibility to coordinate his activities with local utility companies to ensure that all utilities are installed according to these plans and the requirements of the individual utility companies.

5. All manholes shall conform to WSDOT/APWA standards, eccentric cones with manufacturer-approved gaskets and 1/2" polypropylene-encapsulated safety steps and ladders. All manholes shall have cast iron rings and ductile iron covers. Lids shall have 2" raised letters marked "SEWER." All cleanouts shall have cast iron rings and covers marked "CO" that are in paved areas.

6. All side sewers shall be tested for acceptance at the same time the main sewer is tested. Side sewer locations shall be verified in the field prior to construction and backfilling. All side sewers shall be capped with a watertight plug, have a cleanout and test tee installed, and shall be marked for location with a 2" x 4" stake painted white, marked sewer, with 3' exposed, and the depth of the cap written on the stake. See Standard Detail S.18. The stake shall be secured to the end of the plug with wire a minimum of 16 gauge. Initial side sewer installation shall run to the property line. The remaining side sewer shall not be installed until testing and acceptance of the sewer trunk line by the City of Kirkland is completed. Number and location of side sewers shown are approximate only and may be changed as required during construction. Contractor shall notify Engineer when exact locations are determined and provide the Engineer and the City of Kirkland Department of Public Works with an as-built. If approved by the Public Works Department, all double-sided sewer wyes must be at the property line.

7. All main-line trenches shall be compacted prior to testing sewer lines for acceptance.

8. Pressure testing of gravity sewer mains shall conform to the following standards: (1) air testing will require a minimum of 4 psi for 15 minutes with no pressure drop; (2) water testing will require a minimum of 10' of head in a standpipe at the test location for 15 minutes with no drop in the water level in the standpipe. Either test is acceptable.

9. Pressure testing of force mains and laterals will require an air test of 25 psi minimum for 15 minutes with no pressure drop.

10. New connections to existing manholes or sewer lines shall be sealed off until upstream construction is finished, tested, cleaned, and accepted. All construction debris and water shall be removed prior to opening the seal.

11. All PVC sewer pipe and fittings shall meet the requirements of ASTM Specifications D-3034 for 4" to 15" diameter and ASTM F679 for 18" to 27" diameter. Pipe shall be SDR-35 and shall conform to standard specifications. Bedding and backfill shall meet WSDOT and APWA specifications.

12. Minimum slope for side sewers shall be two percent (2%).

13. An approved copy of the sewer plan must be on site whenever construction is in progress.

14. Prior to construction of sewer lines, the necessary lot corners must be set, and the Contractor shall be responsible for the verification of the location of pipes, manholes, and invert elevations.

15. Pipe anchors, if used, shall be installed: not over 36' center to center on grades from 20 percent to 35 percent; not over 24' center to center on grades from 35 percent to 50 percent; and not over 16' center to center on grades 50 percent and greater.

16. All manholes shall have a minimum of 0.10' to a maximum of 1.00' drop between invert in and invert out.

17. PVC sewer pipe shall be tested for deflection according to WSDOT/APWA specifications.

18. All trench backfill shall be compacted to 95 percent density in roadways, roadway shoulders, roadway prism and driveways, and 85 percent density in unpaved areas. All pipe zone compaction shall be 95 percent.

19. It shall be the responsibility of the Contractor to adjust all manhole lids and cleanout lids to match final asphalt elevations in roadways or ground elevations in landscaped areas.

20. When tying into existing manholes that are below minimum standards, the existing manhole must be upgraded to meet current standards.

21. All new sewer main extensions shall be videoed prior to final acceptance.

# SANITARY SEWER - DESIGN CRITERIA

## I. MATERIALS

A. Pipe

1. PVC pipe shall conform to the provisions of ASTM D-3034 for SDR-35 wall thickness. Pipe joints shall be rubber gasket type. Solvent cement joints shall not be used.

2. Pipe fittings shall be furnished with bells and spigots which are integral with the pipe wall.

3. PVC pipe for force mains and laterals shall be Schedule 40 with glue joints. Run tracer wire along length of force main/lateral pipe.

4. Ductile iron pipe, Class 50, shall be used when minimum cover or minimum separation from water main cannot be obtained.

B. Manhole

1. Concrete manhole adapters shall be Kor-n-seal boot or an approved equal.

2. Manholes shall be pre-cast and shall conform to Standard Plan No. S.09, S.10, and S.11. All holes for inlet and outlet pipe shall be blocked out when manhole sections are cast.

3. Ladder rungs and steps shall be 1/2" polypropylene-coated, safety-type step, 12" minimum width. Ladder side bars shall be 9/16" round bar, polypropylene coated (see Standard Plan No. S.14).

4. Manhole frames shall be cast iron and covers shall be ductile iron with a combined weight of not less than 360 pounds, and shall have a minimum clear opening of 23-3/4". Frames and covers shall be equal to Olympic Foundry MH 30D/T. Cover to be marked "SEWER" in 2" raised letters. In unimproved areas and easements, manhole shall extend a minimum of 6" and a maximum of 18" above grade. Manhole ring cover shall have three recessed 5/8" x 1-1/4" stainless steel socket head cap screws for locking.

5. Reducing cones shall provide an eccentric reduction from 48" to 24" and shall not be less than 17" in height.

6. Manhole sections shall be jointed with flexible joint using rubber gaskets conforming to ASTM C443. Joints shall be watertight.

## II. JOINTING

A. Care shall be taken in making all joints in order to secure complete watertightness.

B. Deflection in the pipe shall not be allowed either vertically or horizontally unless instructed by the Engineer. If a deflection is necessary, as determined by the Engineer, the allowable deflection shall not exceed that recommended by the pipe manufacturer.

## III. CONNECTION TO EXISTING LINES

A. The method of making connections to existing lines shall be approved by the Engineer prior to construction. No existing lines shall be abandoned and no new lines shall be put in operation until the new lines have been tested and accepted by the Engineer.

B. It is the Contractor's sole responsibility to maintain the existing sewer lines in service before the new lines are put in operation.

C. PVC pipe connections into new concrete manholes shall be made using Kor-n-seal boot or approved equal. Connections to existing concrete manholes shall be made by using a PVC manhole adaptor (sand collar).

D. Grouting shall be non-shrink type.

## IV. MANHOLES

A. Drop manhole assembly shall be constructed using PVC fitting with gasket-fitted joints. Glue jointing is not acceptable. Drop assembly shall conform to Standard Plan No. S.12. No outside drops are allowed. Dry manholes shall be allowed only when no other feasible alternative exists.

B. Flow line inverts shall be channeled using concrete and shall be finished with smooth flow line and surface finished. When connecting into an existing manhole, the new flow channel shall interface with the existing channel. Channeling shall conform to Standard Plan No. S.13.

C. All joints in the manhole shall be sealed against leaks.

D. The manhole cover shall be adjusted to final grade with approved methods.

E. Ladders and steps shall be secured and grouted in the new manholes before the manhole is put into service.

F. Manholes shall be constructed at all horizontal and vertical bends and at changes in pipe material.

## V. TESTING

A. Lamping of lines to check deflection in the pipe will be conducted prior to any pressure tests.

B. Mandreling and/or video taping the sewer main may be required by the Public Works Department.

C. A 15-minute, 4 psi air test with no pressure drop will be required to ensure joint seals.

D. Force laterals require a 15 minute, 25 psi air test with no pressure drop.

## VI. LATERALS

A. Joint-Use Laterals

1. Minimum pipe size shall be 6".

2. Maximum of two houses can be served on a single 6" line, unless otherwise approved by the Public Works Department.

3. One cleanout must be installed for every 100' of length and at each elbow greater than 22 1/2 degrees. Place locator tape on cap when outside of paved surface.

4. Any lateral under a structure such as a rockery and with less than 3' of cover below the structure base shall be ductile iron for 5' on each side of the structure.

5. Backflow valve/check valve will be required by the Engineer per Title 15 of the Kirkland Municipal Code.

6. Testing of laterals shall conform to Title 15 of the Kirkland Municipal Code.

B. Single-Family Laterals

1. Minimum pipe size off the main channel to the property/right-of-way line shall be 6".

2. Minimum cover of 6' is required at the property/right-of-way line.

3. One service lateral for each family unit, unless otherwise approved by the Public Works Department.

4. Location of lateral shall be at lowest property corner or as conditions dictate.

5. Any lateral under a structure such as a rockery and with less than 3' of cover below the structure base shall be ductile iron for 5' on each side of the structure.

6. Backflow valve/check valve may be required by the Engineer.

C. Multifamily Laterals

Backflow valve/check valve will be required by the Engineer per Title 15 of the Kirkland Municipal Code.

D. Laterals for commercial and multifamily applications shall be tied into a manhole whenever possible. When this is not feasible, laterals shall be connected to the sewer main by one of the following approved methods:

1. Cut in a wye connection

2. PVC saddle

3. Romac sewer saddle

4. Inserta Tee

5. Thermal Fusion for HDPE Mains.

E. Existing Lateral

1. Existing PVC laterals may be reused. A video inspection must be submitted for review to determine size and condition.

2. All other lateral types must be replaced to meet current specifications.

3. Existing 6” concrete laterals may be slip line. A video inspection must be submitted for review to determine size and condition.

## VII. SEWER LIFT STATIONS - PRIVATE

A. General Requirements

1. All pumps within lift stations must be submersible grinder pumps, manufactured by Hydromatic or equal.

2. All equipment and accessories shall be standard manufactured items and those coming in direct contact with sewage shall be specifically manufactured for such use.

3. The pressure piping downstream of the lift station must tie into a 6-inch side sewer which flows by gravity into the sewer main. No direct connections of force laterals and sewer mains will be allowed.

4. Lift station chamber must be either concrete or fiberglass.

5. The lift station must be cycled on/off ten times to ensure all floats and alarms function properly before being signed off by the City. This test must be witnessed by the Public Works Inspector.

B. Single-Family Lift Stations - Specific Requirements

1. Lift station to be a minimum of a simplex system (one pump).

2. There shall be a minimum of three mercury level control floats; one for turning the pump ON, the second for turning the pump OFF, and the third for a high-water alarm.

3. Grinder pump shall be two HP minimum, which is adequate for a single residence with up to 70 feet of head.

4. Audio and visual alarm panel to be located inside the single-family residence.

5. Pre-designed lift station packages are acceptable.

C. Commercial and Multi-Family Lift Stations - Specific Requirements

1. Lift station to be a duplex system (dual pumps) and must be designed by a licensed professional engineer.

2. Audio and visual alarms are required. Alarms are to be located within the building structure near the maintenance office or property manager's office.

3. For multi-family projects, the Public Works Department shall determine if the development is to be served by individual lift stations for each unit/building or if the entire development may be served by one lift station. When the entire development is to be served by one lift station, a three-party maintenance agreement between the City of Kirkland, the development, and a lift station maintenance company shall be recorded with the property.

## VIII. CONSTRUCTION

A. Through Sewer Main Line

1. Minimum pipe size shall be 8" (size as required by flow calculations).

2. Maximum distance between manholes shall not exceed 400'.

3. Normal depth of pipe shall be 7' to 12'. All other depths to be approved by the Public Works Department.

B. Dead End Sewer Main Line

Dead end sewer main shall terminate with a manhole unless otherwise approved by the Public Works Department.

C. Required Separation Between Water Lines and Sanitary Sewers (Reference Standard Detail No. S.02).

1. *Horizontal Separation (Parallel)* - A minimum horizontal separation of ten (10) feet between gravity sanitary sewers and any potable water lines shall be maintained, whenever possible. The distance shall be measured from edge to edge.

2. *Unusual Conditions (Parallel)* - When local conditions prevent a horizontal separation as described above, a gravity sewer line may be laid closer than ten (10) feet to a water line provided:

a) It is laid in a separate trench; or it is laid in the same trench with the water line that is located at one side on a bench of undisturbed earth; and

b) In either case, the elevation of the crown of the gravity sewer must be at least 18 inches below the invert of the water line. When this vertical separation cannot be obtained, the gravity sewer shall be constructed of materials and joints that are equivalent to water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling.

3. *Vertical Separation (Perpendicular)* - Sewer lines crossing water lines shall be laid below the water lines to provide a separation of at least 18 inches between the invert of the water line and the crown of the sewer line, whenever possible.

4. *Unusual Conditions (Perpendicular)* - When local conditions prevent a vertical separation as described above, the following construction shall be used:

   a) Gravity sewers passing over or under water lines shall be:

      i. Constructed of material described in Standard Detail No. S.02. The one segment of the maximum standard length of pipe (but no less than 18 feet long) shall be used with the pipes centered to maximize joint separation; or

      ii. Constructed of standard gravity sewer material encased in concrete or in a 1/4" thick continuous steel casing with all voids pressure-grouted with sand-cement grout.

      iii. The length of the sewer pipe, in both i. and ii. above, shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.

   b) Water lines passing under gravity sewers, in addition, shall be protected by providing:

      i. A vertical separation of at least 18 inches between the invert of the sewer and the crown of the water line;

      ii. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the water lines; and

      iii. The length of the sewer pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.

   c) Pressure sewers shall only be constructed under water lines with ductile iron pipe or standard sewer pipe in a steel casing for a distance of at least ten (10) feet on each side of the crossing.

D. Trench and Bedding Detail

1. Trench section shall conform to Standard Plan No. S.01.

2. The trench width to 6" above the top of pipe shall not be greater than 1 1/2 times the outside diameter of pipe plus 18", except that the trench width shall be such as to provide adequate space for workmen to place and joint the pipe properly and safely. Trench walls shall be kept vertical, except the walls of the trenches above an elevation 6" above the top of pipe may be sloped back to prevent the banks from sloughing into the ditch.

3. When soft or unstable material is encountered at the subgrade which, in the opinion of the City Engineer, will not uniformly support the pipe, such material shall be excavated to an additional depth as required by the City Engineer and backfilled with foundation rock material placed in 12" lifts and compacted to 95 percent of the maximum dry density to the pipe foundation grade.

   Where unusually bad foundation conditions are encountered at the bottom of the trench, the City Engineer may order special foundation material to be placed.

4. Wherever necessary to prevent caving, excavations in sand, gravel, sandy soil, or other unstable material shall be adequately sheeted and braced. Where sheeting and bracing are used, the trench width may be increased accordingly. Trench sheeting shall remain in place until the pipe has been laid, tested for defects, and repaired if necessary, and the earth around it compacted to a depth of 2' over the top of the pipe.

5. Excavation for manholes and other appurtenances shall be sufficient to leave 12" minimum and 24" maximum clearance on all sides.

6. Joints shall not be left uncovered except in the immediate area of pipe laying. Under no circumstances shall water be permitted to rise in the trench until after the pipe has been placed, tested, and backfilled.

7. Regardless of the method of densification used, materials shall be brought up at substantially the same rate on both sides of the pipe, and care shall be taken so that the pipe is not floated or displaced. Fill material shall not be dropped directly on the pipe.

8. Pipe zone material shall consist of excavated or imported material free from roots or other organic material, mud, muck, and frozen material.

9. Pipe zone material shall be densified by compaction using mechanical tamping to a density of 95 percent of maximum dry soil density using a modified proctor. Equipment with suitably-shaped tamping feet shall be used to compact the material and ensure that the specified soil density is obtained beneath the haunches of the pipe. At the time of placement, the materials shall have the optimum moisture content required for compaction and the moisture content shall be uniform throughout each layer. Materials shall be placed in layers not more than 6" thick after each compaction.

10. Trench backfill above the pipe zone to the surface of the finish grade or native ground shall be placed so that the resulting density will be 95 percent of maximum dry soil density, modified proctor, within travelled ways and 85 percent of maximum dry soil density for areas outside travelled ways. Backfill material shall be placed in continuous horizontal layers not exceeding 12" in thickness. This will be strictly adhered to for all pipes placed in the right-of-way.

11. Native backfill shall be mounded to a height of 4" over the top of the trench for ordinary backfill outside travelled ways.

12. Material for backfilling around manholes and other appurtenances shall be gravel barrow. Materials shall be deposited in a manner to ensure that the manhole or other appurtenance is not disturbed from the proper alignment, and backfill shall be compacted to the ground surface.

13. All interior bracing placed inside the pipe by the manufacturer shall be removed only after the backfill is complete.

**CITY OF KIRKLAND**
123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

# DEPARTMENT OF PUBLIC WORKS
# PRE-APPROVED PLANS POLICY

## Policy S-1: REQUIREMENTS FOR CONSTRUCTION NEAR LAKEFRONT SEWER LINE

A public sewer main that is accessed by means of a public sewer easement traverses certain lakefront properties within the City of Kirkland. Since this line crosses private property, and needs to be maintained by the City, the following requirements must be met for new construction in these areas.

1. There must be no encroachment into the easement at the ground surface by a structure.

2. Under certain circumstances, a cantilevered building design may be allowed into the easement. Up to 4 feet may be allowed for the 2nd and 3rd floors of a structure, providing 10 feet of vertical clearance is maintained between the finished grade and the underside of the cantilevered portion of the building.

3. Re-routing of the sewer main will be considered on a case by case basis, at the discretion of the Public Works Department; minimum pipe slopes must be maintained.

4. The City may request addition easement width if the current easement is determined to be inadequate, or does not meet the requirements of Easement Width Requirements, Policy G-1.

5. Building or wall footings that abut the easement may be required to extend to a depth equal to, or greater than, the depth of the sewer main.

6. At the discretion of the City, shoring/piling construction may be necessary to protect the sewer main during construction of the residential foundation.

7. The owner must sign a Hold-Harmless Agreement when installing landscaping plants or appurtenances within the easement.

**CITY OF KIRKLAND**
123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

# DEPARTMENT OF PUBLIC WORKS
# PRE-APPROVED PLANS POLICY

## Policy S-2: CLOSED CIRCUIT CAMERA REQUIREMENTS FOR SEWER MAINS

All newly installed sewer main lines meeting any of the following conditions will need to inspected with a closed circuit camera.

1. Any sanitary main section that is installed at less than 1%.

2. Any sewer main that is in excess of 200' from manhole to manhole.

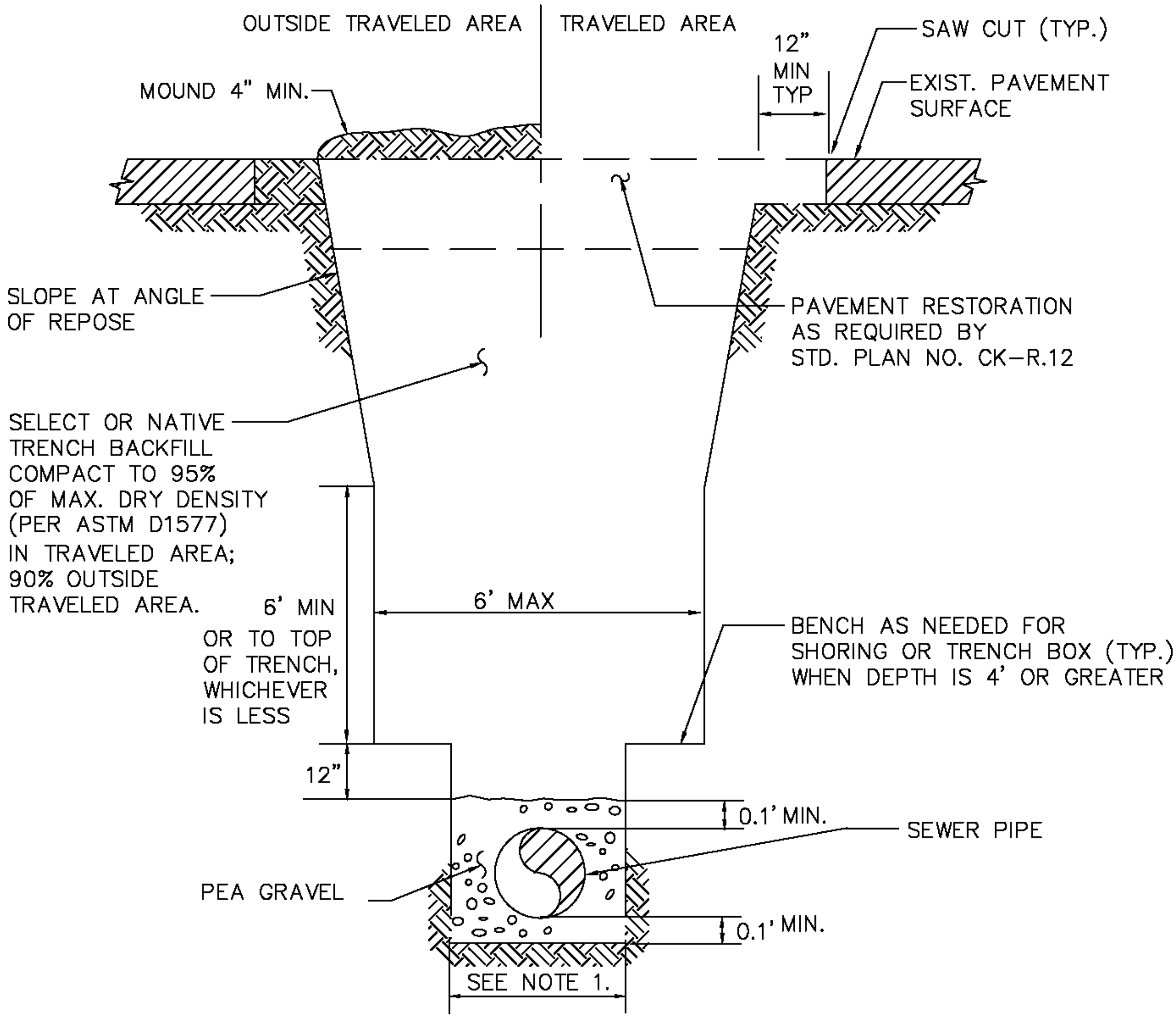
3. Any sewer main terminated with a temporary clean-out.

4. Any sewer main line section that has more than (2) laterals coming into it (manhole to manhole).

5. Any sewer main that the City Inspector determines needs to be inspected due to ground conditions, poor installation techniques or suspicion of problems.

Any sewer main which is inspected with closed circuit camera at the completion of a project shall be re-inspected with a closed circuit camera at the end of the two-year maintenance period.

All main lines must be flushed clean and all the water must be exhausted by gravity (not by mechanical means) before sending the closed circuit camera through the main. This will give water a chance to settle in any potential low spots.




NOTES

1. TRENCH BACKFILL BELOW TOP 4 FEET MAY BE NATIVE MATERIALS OR AS REQUIRED BY THE SPECIFICATIONS, OR AS DIRECTED BY THE PUBLIC WORKS INSPECTOR.

2. MAXIMUM WIDTH OF TRENCH AT TOP OF PIPE
   * 30 INCHES FOR PIPE UP TO AND INCLUDING 12" NOMINAL DIAMETER.
   * O.D. PLUS 16 INCHES FOR PIPE LARGER THAN 12" NOMINAL DIAMETER.

3. IN PAVED AREAS USE CRUSHED ROCK BACKFILL
   * FULL DEPTH OF TRENCH WHERE SEWER MAIN CROSSES PERPENDICULAR TO THE TRAVELED LANE OR DRIVEWAY.
   * TOP FOUR FEET WHERE SEWER MAIN RUNS PARALLEL TO THE TRAVELED LANE, UNLESS EXISTING MATERIAL IS DETERMINED BY THE ENGINEER TO BE SUITABLE FOR BACKFILL.

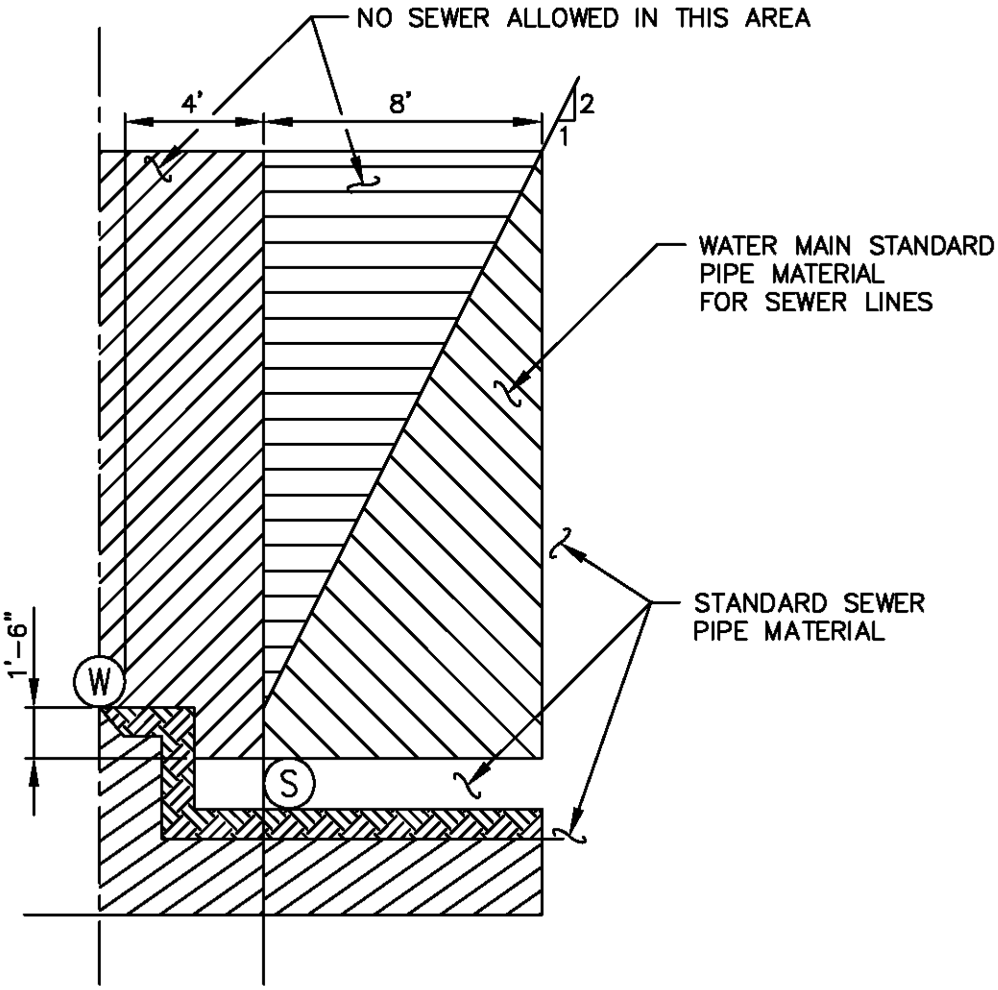
4. THE STREET SHALL BE OVERLAID WHEN THE ASPHALT ROADWAY IS LESS THAN 5YRS OLD FOR UTILITY CROSSINGS, THE STREET SHALL BE OVERLAID AT LEAST 15 FEET ON EACH SIDE OF THE TRENCH. SEE OVERLAY POLICY R-7.

CITY OF KIRKLAND

PLAN NO. CK-S.01

CITY OF KIRKLAND WASHINGTON

SANITARY SEWER TRENCH DETAIL




PARALLEL CONSTRUCTION

TABLE 1

WATER MAIN STANDARD PIPE MATERIAL

| AWWA STANDARD | | | |
|---|---|---|---|
| TYPE OF PIPE | PIPE | JOINT | FITTINGS |
| DUCTILE IRON | C 1.52 | C 111 | C 110 |
| CONCRETE CYLINDER | C 303 | | |

NOTE:

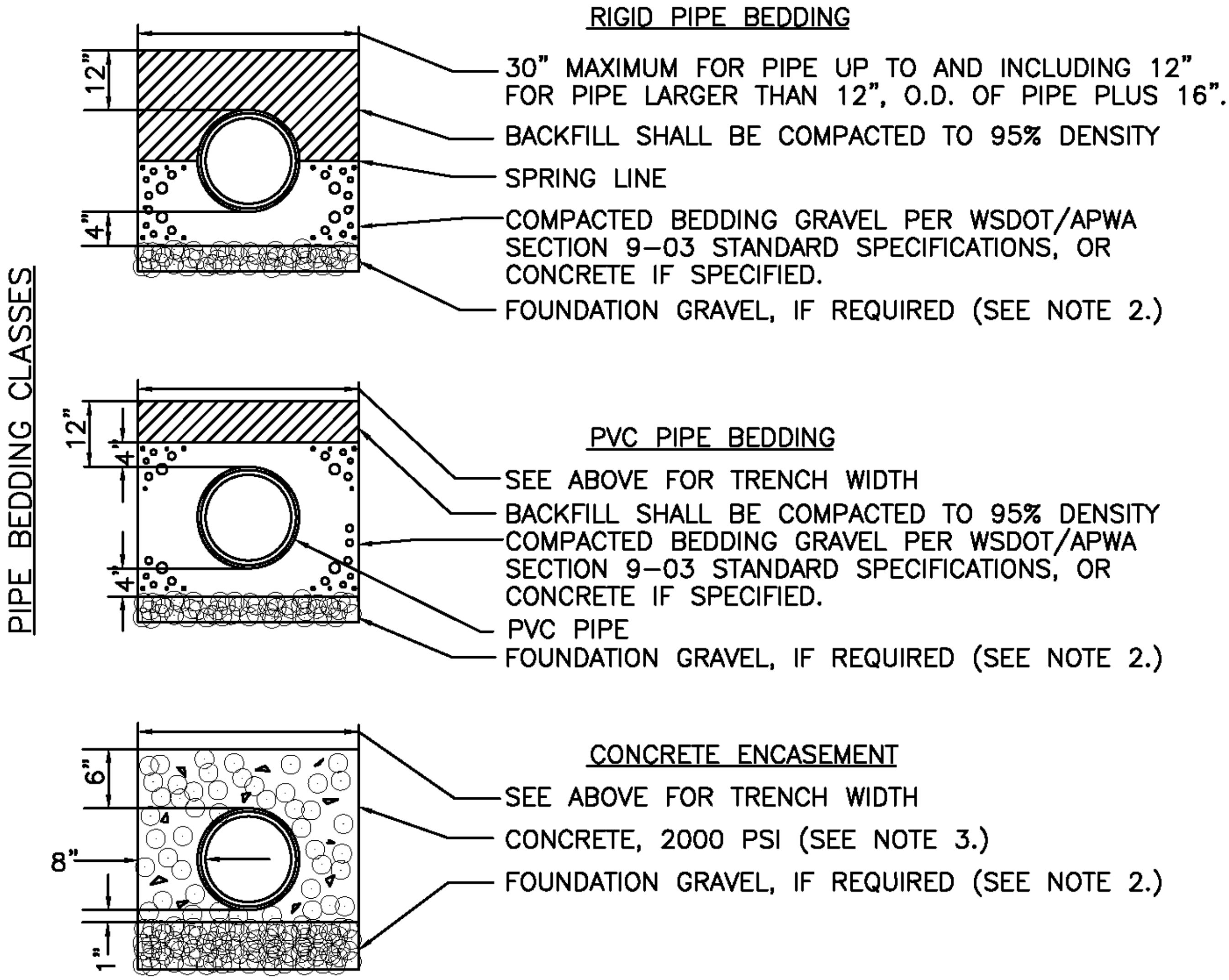
1. TO BE USED WHEN 10' MINIMUM SEPARATION CANNOT BE OBTAINED.

CITY OF KIRKLAND

PLAN NO. CK-S.02

WATER AND SEWER SPACING AND CLEARANCE

LAST REVISED: 2/3/05




NOTES:

1. COMPACTED CRUSHED SURFACING TOP COURSE PER WSDOT/APWA SECTION 9-03.9(3) STANDARD SPECIFICATIONS CAN ALSO BE USED AS BEDDING GRAVEL.
2. EXCAVATE UNSTABLE MATERIAL DOWN TO FIRM SOIL AND REPLACE WITH FOUNDATION GRAVEL PER SECTION 9-03.9(1) OF THE STANDARD SPECIFICATIONS
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANCHORING PIPE TO PREVENT FLOTATION DURING CONCRETE PLACEMENT.

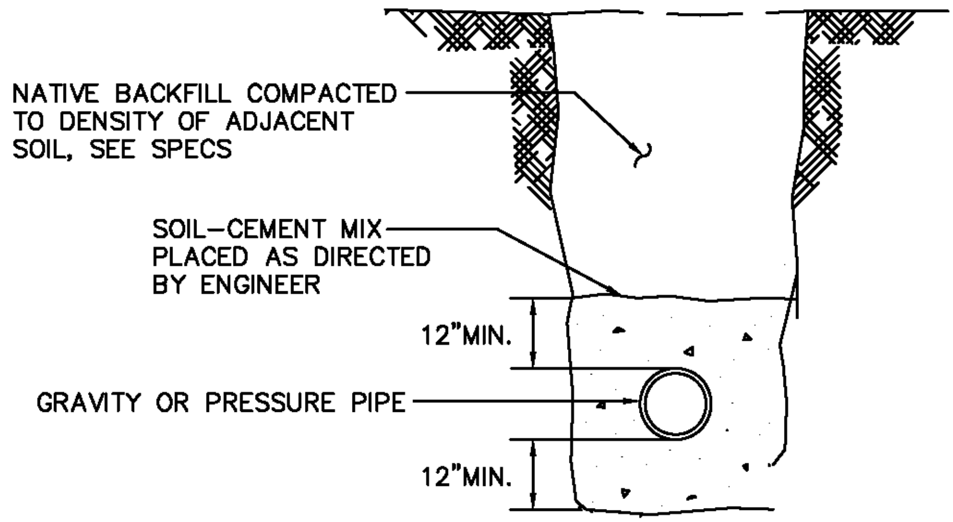
CITY OF KIRKLAND

PLAN NO. CK-S.03

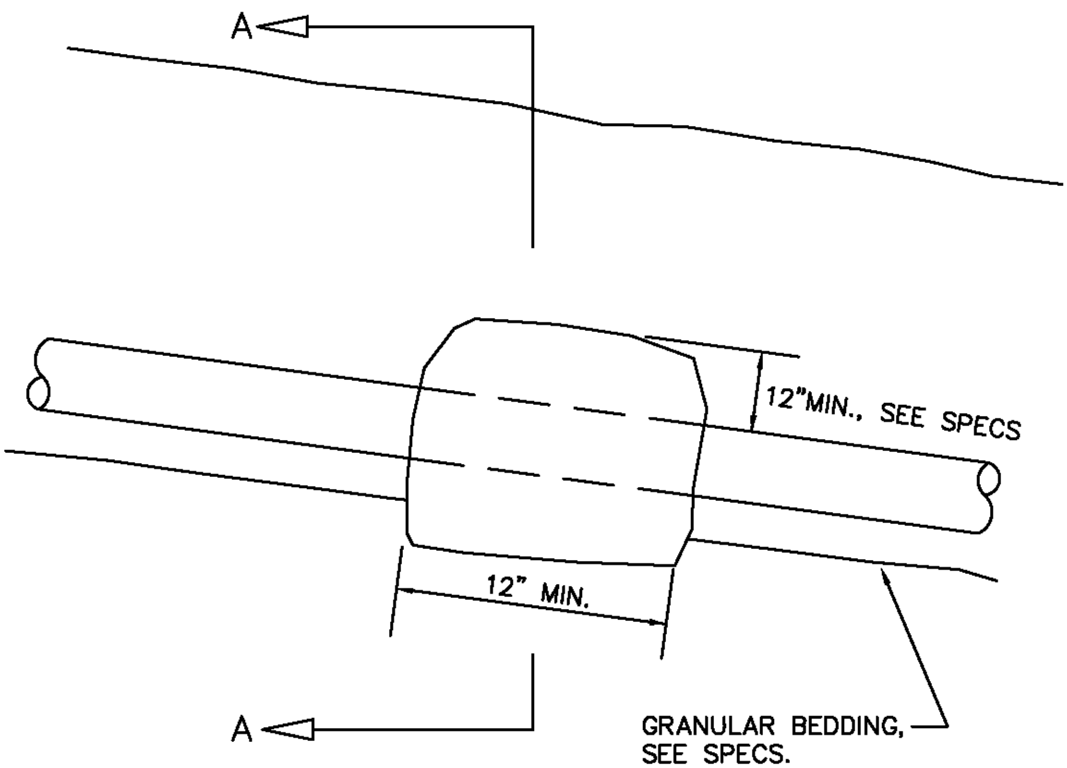
CITY OF KIRKLAND WASHINGTON

PIPE BEDDING

LAST REVISED: 11/30/99




SECTION A–A

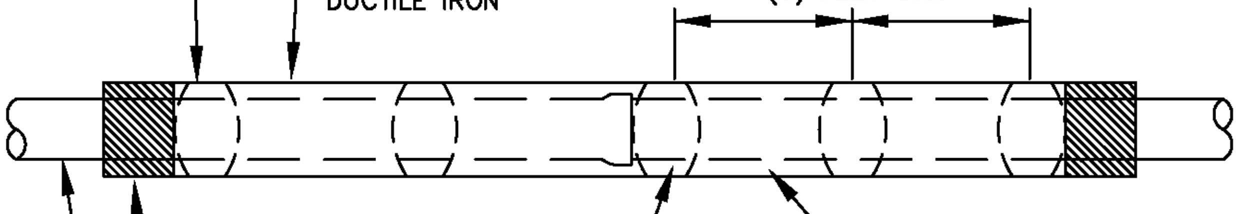



NOTE:

1. SOIL CEMENT BLOCKS PLACED OVER AND AROUND PIPE. TAMPED INTO PLACE BEFORE PLACING BACKFILL. USE 10% CEMENT WITH 90% NATIVE SOIL AND WATER TO SUIT TO FORM A DRY MIX THAT WILL HOLD ITS SHAPE WHEN MOLDED INTO A BALL. SOIL CEMENT BLOCKS REQUIRED ON SLOPES 20% OR GREATER.

| CITY OF KIRKLAND |
|---|
| PLAN NO. CK–S.04 |
| SOIL/CEMENT PIPE ANCHOR |

LAST REVISED: 11/30/99




CASING SPACERS (SEE APPROVED MATERIALS LIST)

| | | | |
|---|---|---|---|
| CARRIER PIPE DIAMETER | 8" | 10" | 12" |
| CASING DIAMETER | 14" | 16" | 20" |
| STEEL CASING THICKNESS | 0.25" | 0.25" | 0.25" |
| SPACER BAND WIDTH | 12" | 12" | 12" |

ANTICORROSIVE COATING THICKNESS:
CASING – 8 MILLS DFT

NOTES:

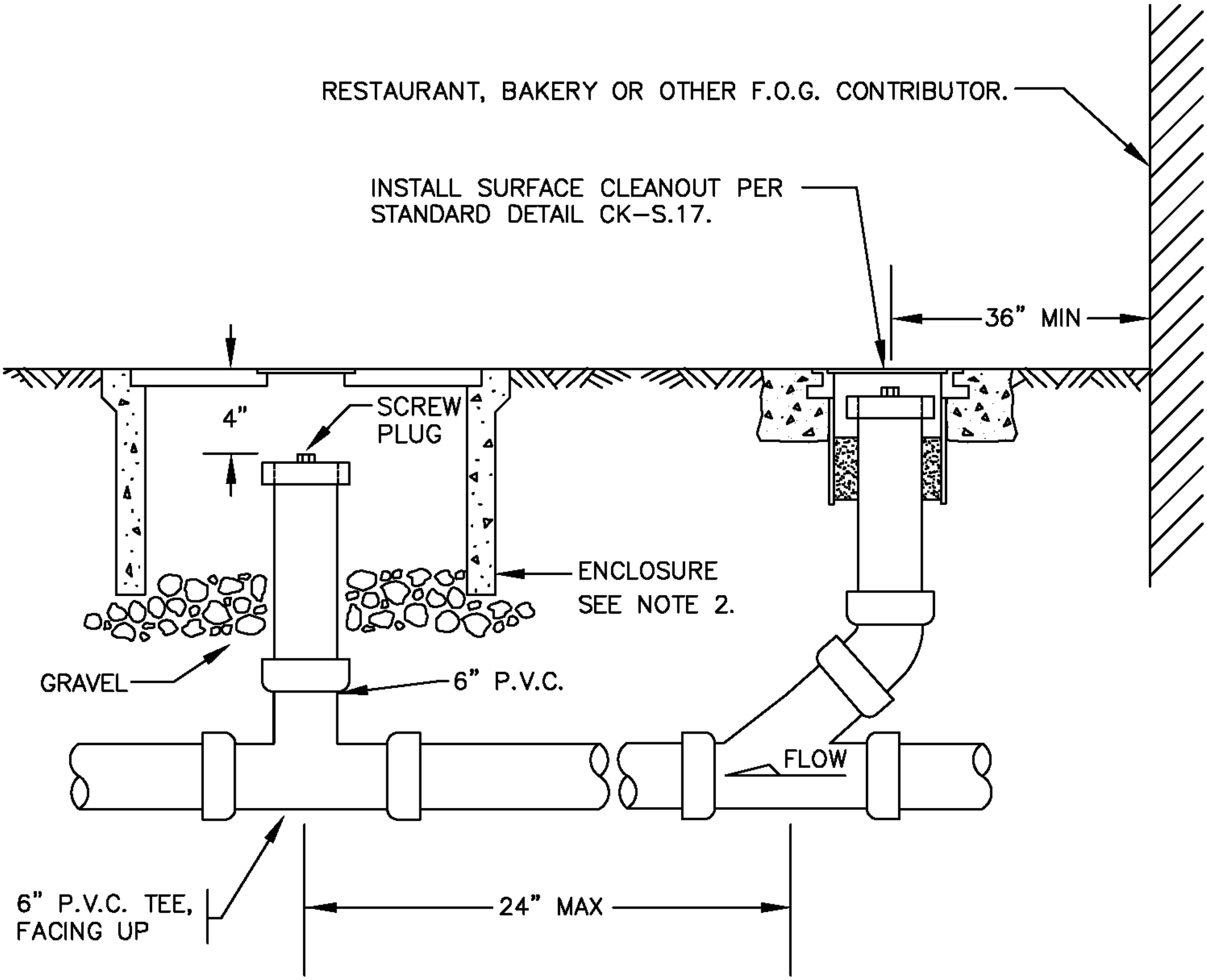
1. CASING SPACERS SHALL BE "CENTER POSITIONING" TYPE.
2. MINIMUM RUNNER WIDTH SHALL BE 2 INCHES.
3. RUNNER HEIGHT SHALL BE SIZED TO PROVIDE:
   A. MINIMUM 0.75" BETWEEN CARRIER PIPE BELL AND CASING PIPE WALL AT ALL TIMES.
   B. MINIMUM 1" CLEARANCE BETWEEN RUNNERS AND TOP OF CASING WALL TO PREVENT JAMMING DURING INSTALLATION.
4. STEEL CASING DIAMETERS ARE "OUTSIDE DIAMETER" FOR 16" AND LARGER.

CITY OF KIRKLAND

PLAN NO. CK–S.05

CITY OF KIRKLAND WASHINGTON

CASING INSTALLATION




NOTES:

1. INSTALL SAMPLING TEE ON EXISTING OR NEW SIDE SEWER.
2. CONCRETE METER BOX, FOGTITE OR EQUAL.
   FOGTITE 1-D IN NONTRAVELED AREAS.
   FOGTITE B-10T IN SIDEWALK.
   FOGTITE J-20S IN AREAS WITH VEHICULAR TRAFFIC (DIAMOND PLATE FRAME).

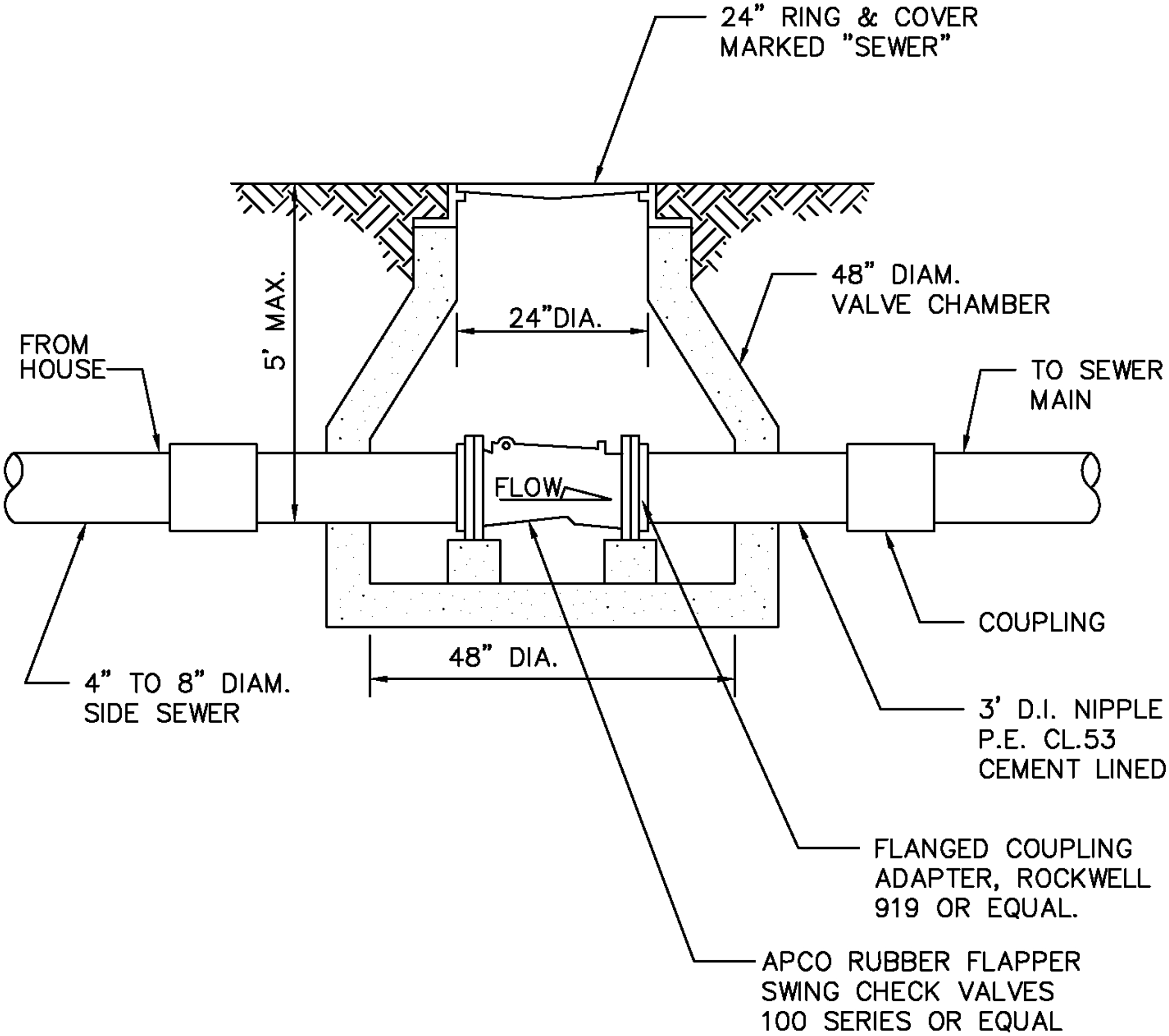
CITY OF KIRKLAND

PLAN NO. CK-S.06

CITY OF KIRKLAND WASHINGTON

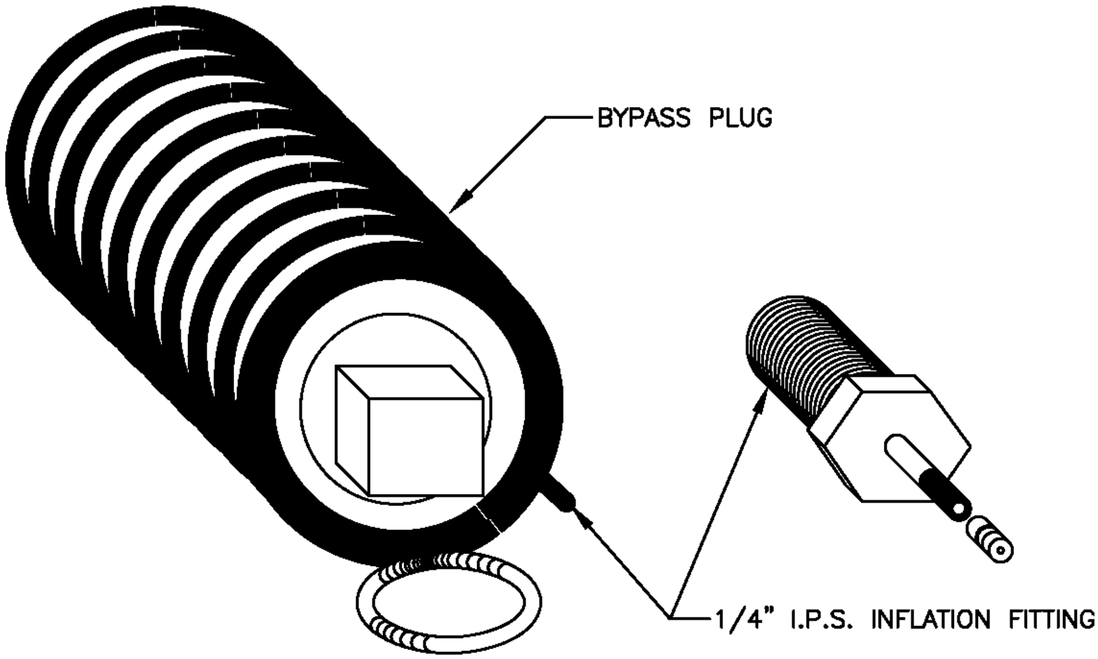
SAMPLING TEE

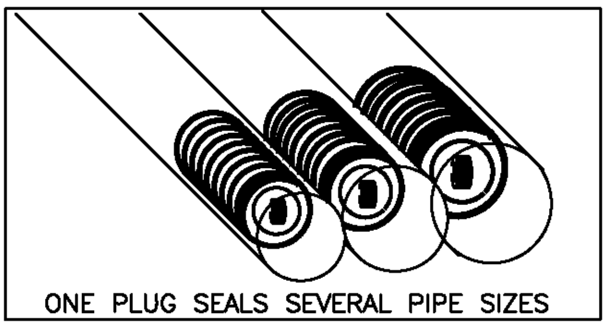
LAST REVISED: 11/30/99

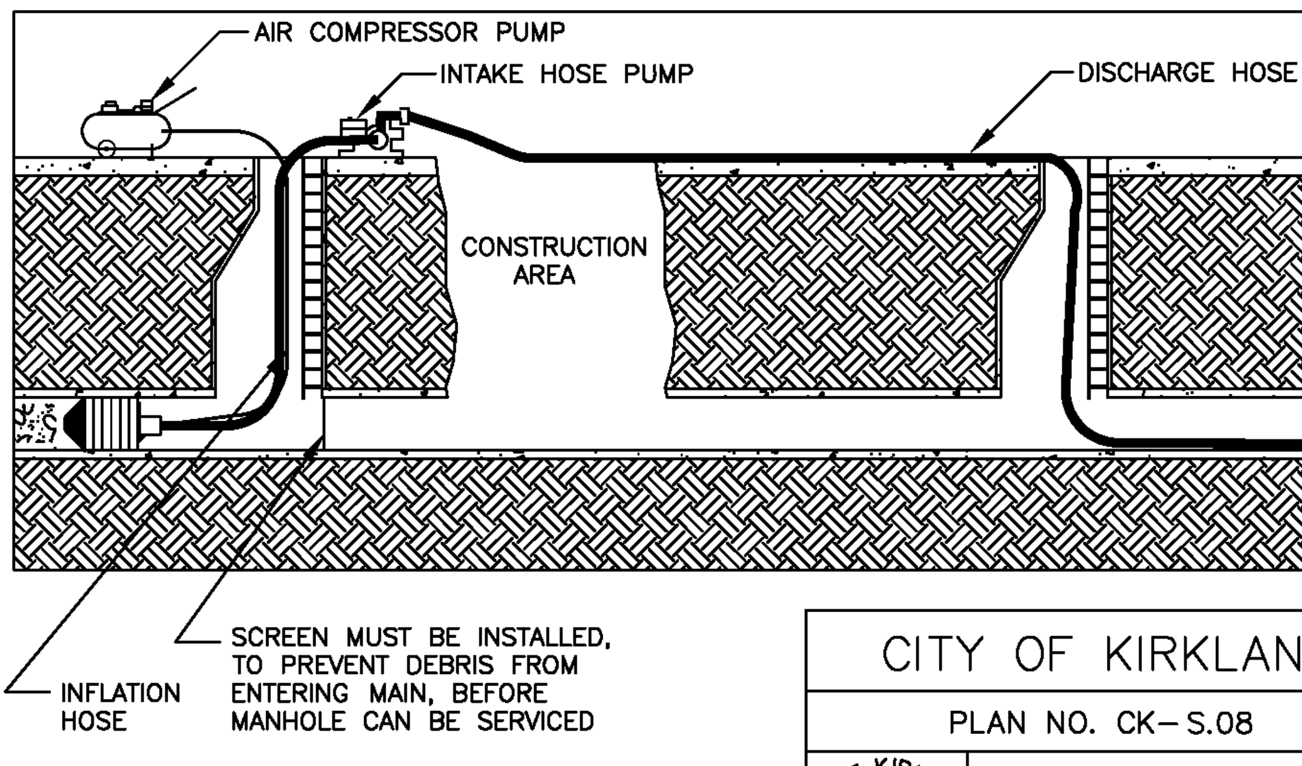



| CITY OF KIRKLAND | |
|---|---|
| PLAN NO. CK– S.07 | |
| CITY OF KIRKLAND WASHINGTON | CHECK VALVE ASSEMBLY FOR JOINT USE SIDE SEWER (4" TO 8" DIAMETER) |

LAST REVISED: 11/30/99



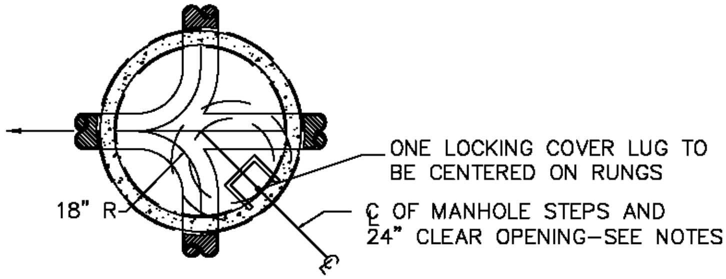

CITY OF KIRKLAND

PLAN NO. CK-S.08

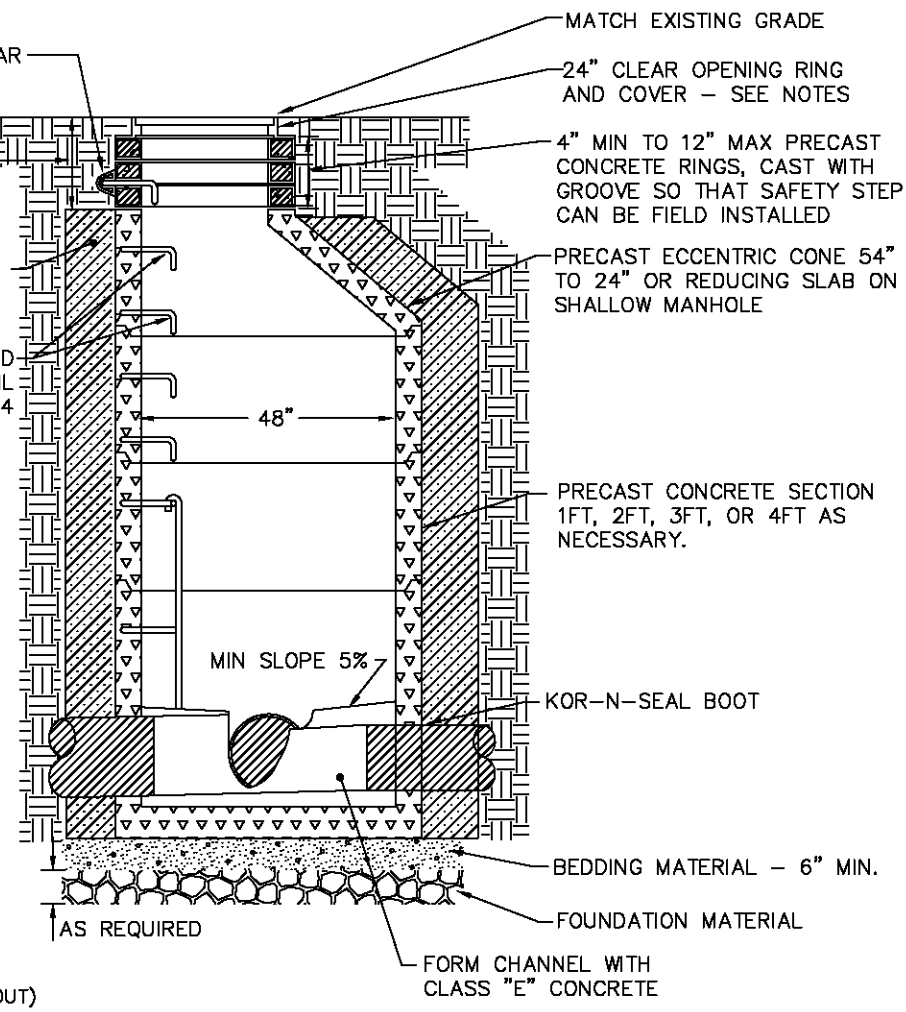
CITY OF KIRKLAND WASHINGTON

SEWER MAIN
BYPASS PLUG

LAST REVISED: 01/24/2013




PLAN VIEW




NOTES:

1. LOCKING MANHOLE RING AND COVER SHALL HAVE 24" CLEAR OPENING PER S.15, S.16, S.16A.
2. MANHOLE SHOWN IS 48" INSIDE DIAMETER, 5" WALL THICKNESS. MAX. PIPE SIZE FOR THE 48" MANHOLE IS 21".
3. ALL HOLES FOR INLET AND OUTLET PIPE SHALL BE BLOCKED OUT WHEN SECTIONS ARE CAST.
4. ALL MANHOLE JOINTS SHALL USE A CONFINED RUBBER GASKET AND GROUTED (INSIDE AND OUT) TO MEET ASTM C–443 SPECIFICATIONS.
5. ALL PIPE THROUGH MANHOLE WALL SHALL HAVE A "KOR–N–SEAL" BOOT OR EQUAL.
6. MANHOLE STEPS SHALL BE 1/2" DIA. DEFORMED REINFORCING BARS
7. BEDDING AND FOUNDATION MATERIAL REQUIRED AS SHOWN ON DETAL AND AS NOTED IN THE SPECIFICATIONS. NATIVE MATERIAL MAY BE USED IF APPROVED BY ENGINEER.
8. LOCATION OF MANHOLE STEPS SHALL NOT BE OVER FLOW LINES AND SHALL BE APPROVED BY THE ENGINEER
9. 54" MANHOLE 27" MAX. PIPE
   72" MANHOLE 36" MAX. PIPE
   96" MANHOLE 48" MAX. PIPE

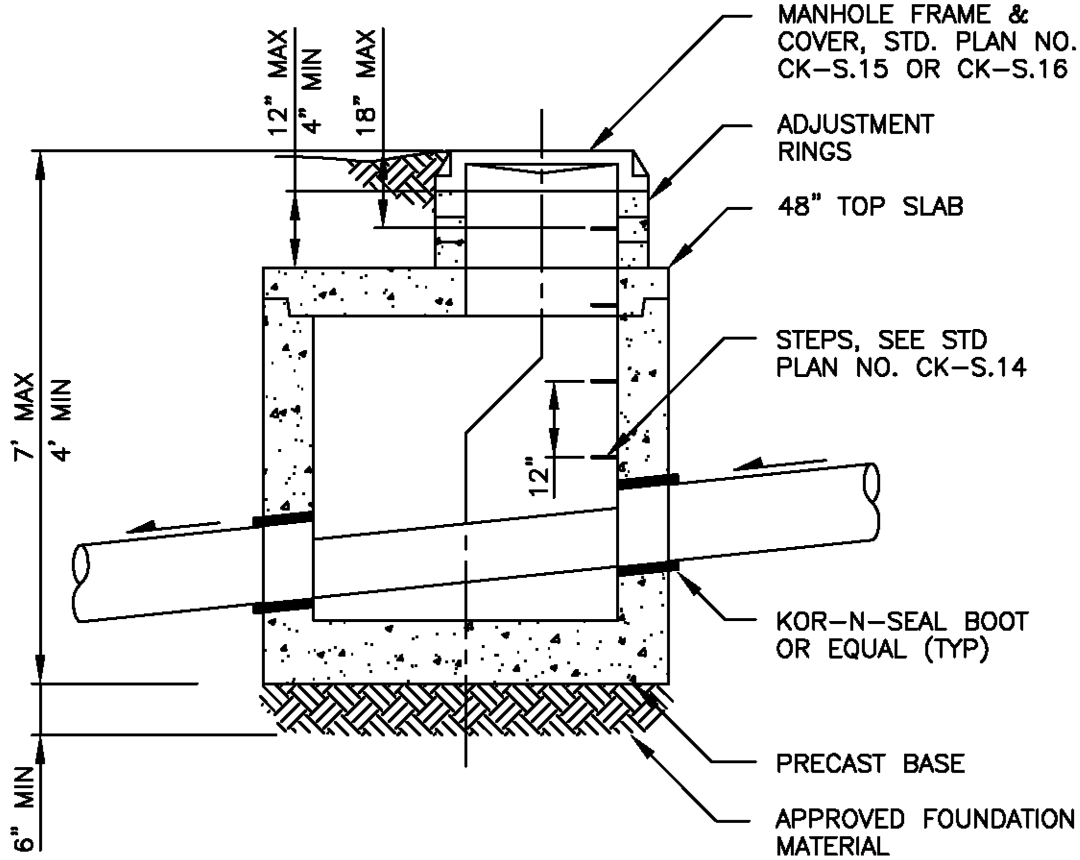
CITY OF KIRKLAND

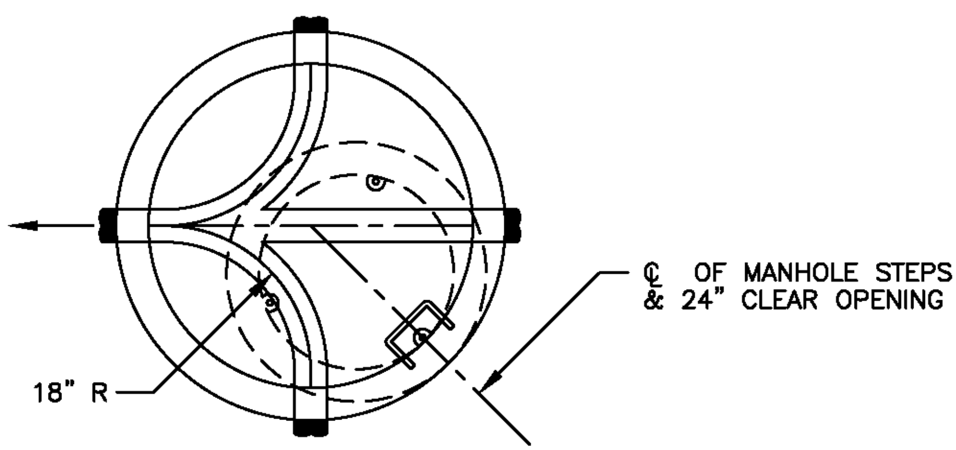
PLAN NO. CK–S.09

CITY OF KIRKLAND WASHINGTON

STANDARD 48" SANITARY SEWER MANHOLE

LAST REVISED: 11/30/99



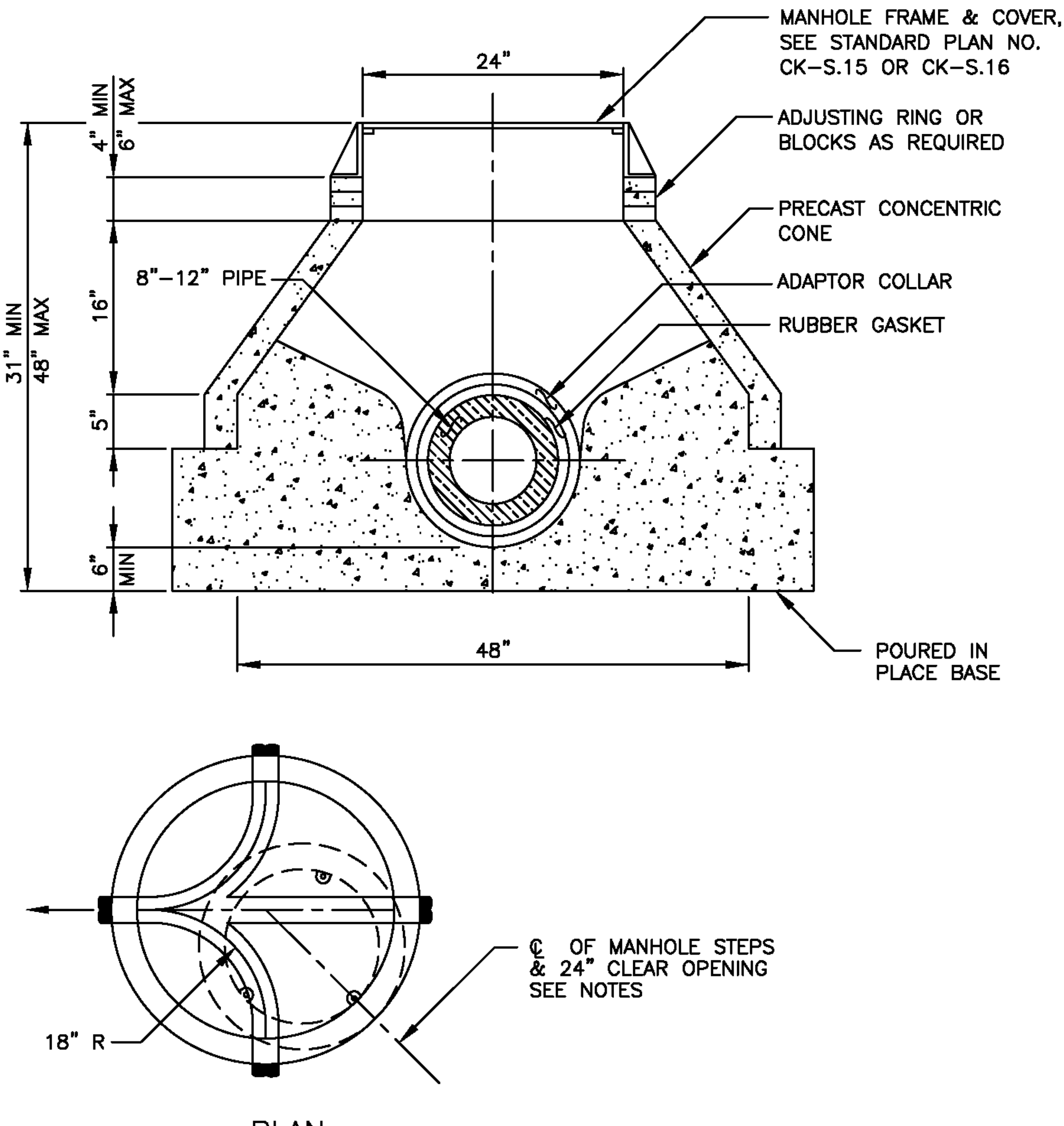

PLAN

CITY OF KIRKLAND

PLAN NO. CK-S.10

SHALLOW MANHOLE ASSEMBLY

LAST REVISED: 11/30/99



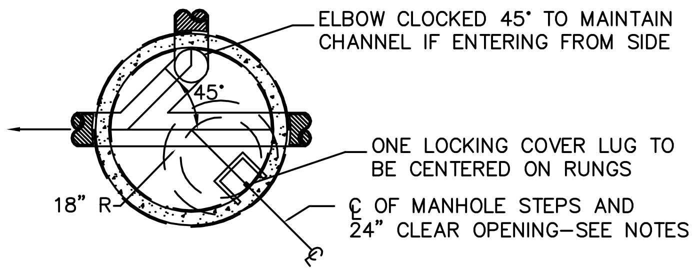

PLAN

CITY OF KIRKLAND

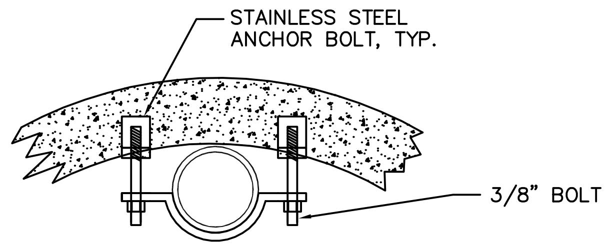
PLAN NO. CK– S.11

EXTRA SHALLOW MANHOLE ASSEMBLY

LAST REVISED:1/15/15

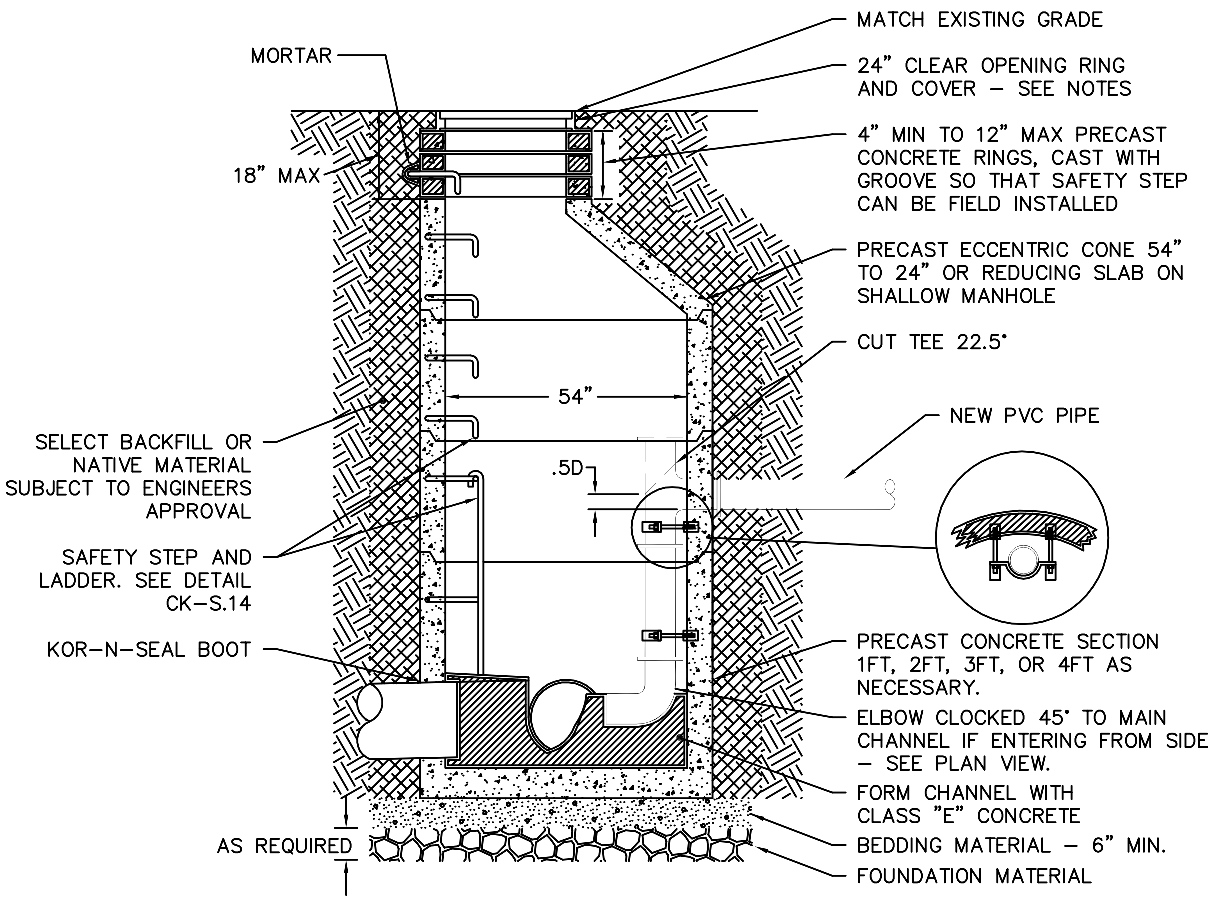



PLAN VIEW




STAINLESS STEEL PIPE STRAPPING

PLAN VIEW




NOTES:

1. USE ONLY WHEN APPROVED BY PUBLIC WORKS.
2. NO EXTERNAL DROPS ALLOWED.

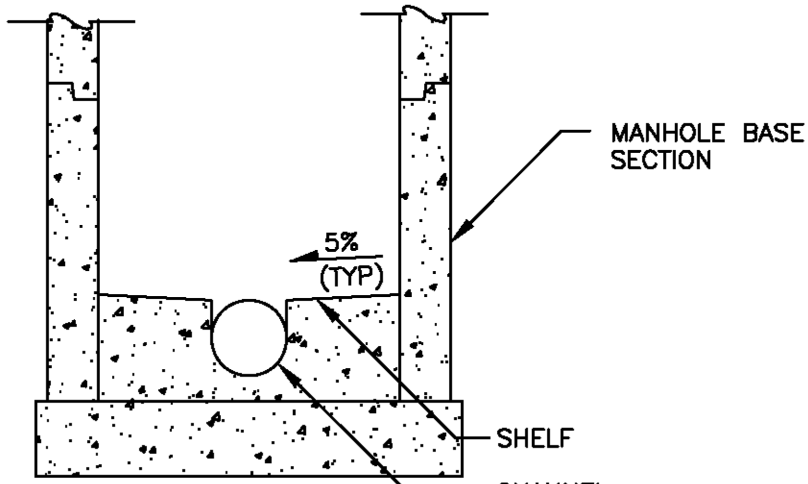
CITY OF KIRKLAND

PLAN NO. CK– S.12

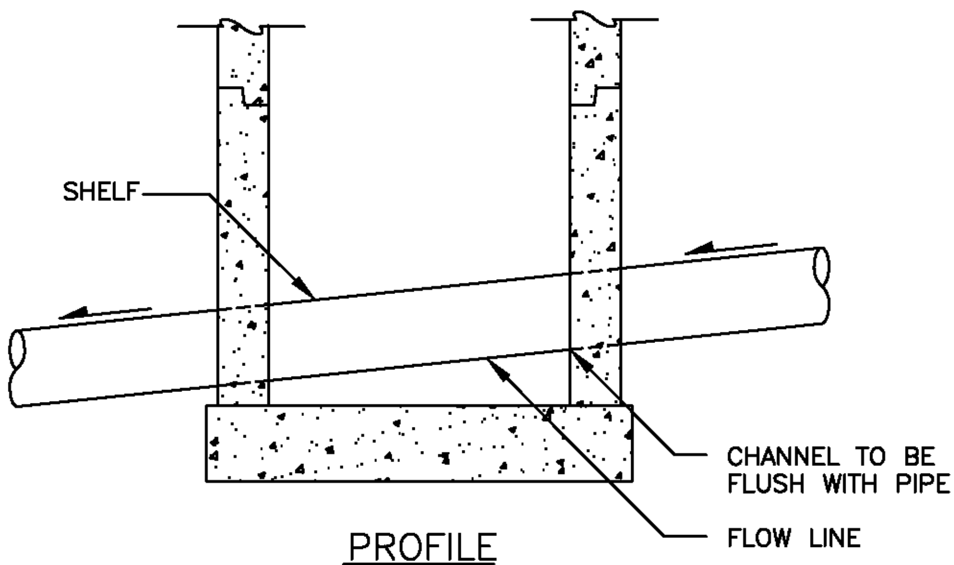
CITY OF KIRKLAND WASHINGTON

SANITARY SEWER INTERNAL DROP CONNECTON

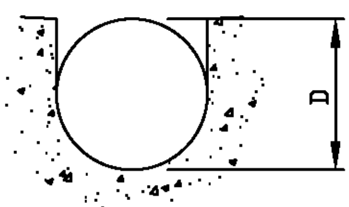
LAST REVISED: 11/30/99




CROSS SECTION




PROFILE




CHANNEL SECTION

NOTES

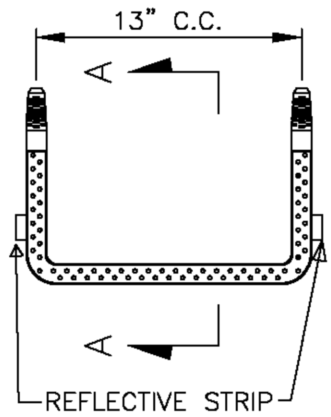
1. DEPTH OF CHANNEL MUST BE SAME AS PIPE DIAMETER.
2. MINIMUM 0.1' DROP ACROSS CHANNEL; MAXIMUM 1.0' DROP ACROSS CHANNEL.

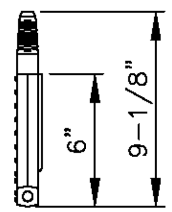
CITY OF KIRKLAND

PLAN NO. CK-S.13

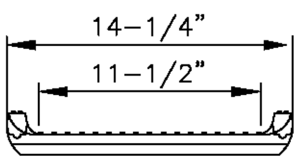
SEWER MANHOLE MAIN CHANNEL AND SHELF

LAST REVISED: 01/24/2013

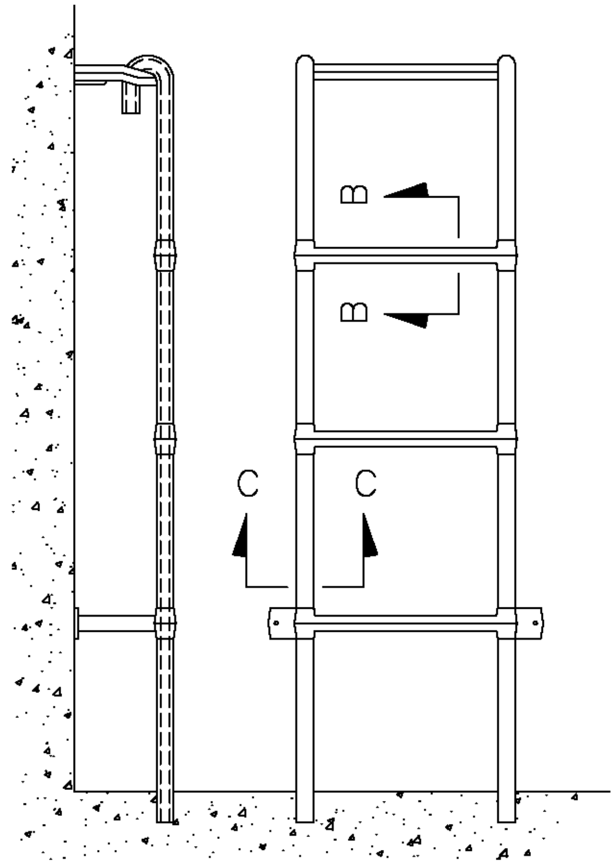



SECTION A-A

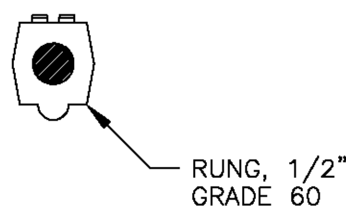



P-14938
POLYPROPYLENE STEP




## SPECIFICATIONS

1. ALL STEPS SHALL MEET THE REQUIREMENTS OF ASTM C-478, AASHTO M-199, WISHA AND ALL ASHA SPECIFICATION.
2. THE POLYPROPYLENE SHALL CONFORM TO ASTM D-4101. ASTM D-4101.
3. THE 1/2" GRADE 60 DEFORMED REINFORCING BAR SHALL MEET ASTM A-615.
4. STEP REFLECTORS OR BRIGHT COLORED STEPS REQUIRED.

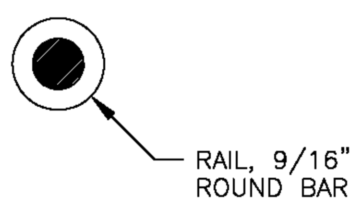



SECTION B-B

## INSTALLATION

1. THE STEP CAN BE CAST IN PLACE.
2. DRIVEN INTO PREFORMED HOLES WITH CONCRETE CURED TO 3,000 PSI MINIMUM.
3. DRIVEN INTO 2 PARALLEL 1" DIAMETER HOLES DRILLED 13" OR 10" ON CENTER, 3-1/2" DEEP.
4. DRILL 2 1-1/8" OR 1-1/4" HOLES, 3-1/2" DEEP, APPLY EPOXY IN THE HOLE AND AROUND THE BARBS OF THE STEP. PUSH THE STEP INTO THE HOLES ALLOWING THE EPOXY TO FLOW OUT TO THE SQUARE SHOULDER OF THE STEP.

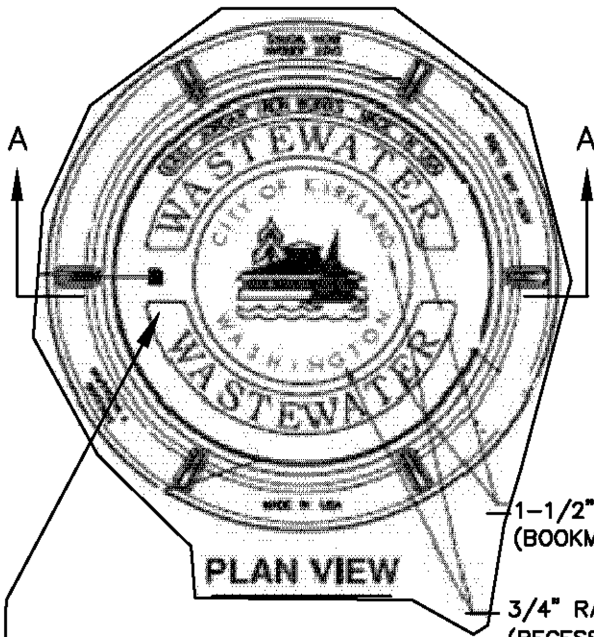
ANY OF THE ABOVE METHODS WILL RESIST A PULLOUT FORCE OF OVER 1,500 LBS.



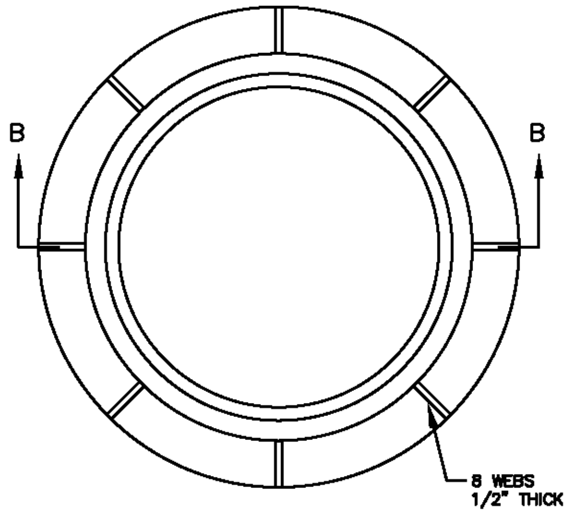

SECTION C-C

| CITY OF KIRKLAND | |
|---|---|
| PLAN NO. CK-S.14 | |
| CITY OF KIRKLAND WASHINGTON | LADDER AND MANHOLE STEPS |

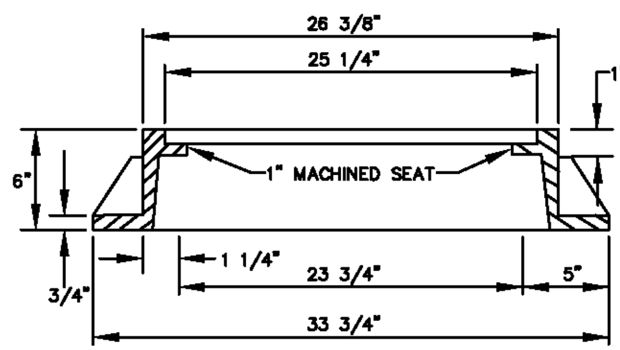
LAST REVISED: 3/26/08



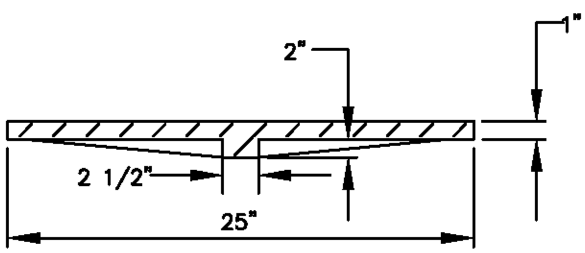

PLAN VIEW




RING PLAN




FRAME SECTION B–B

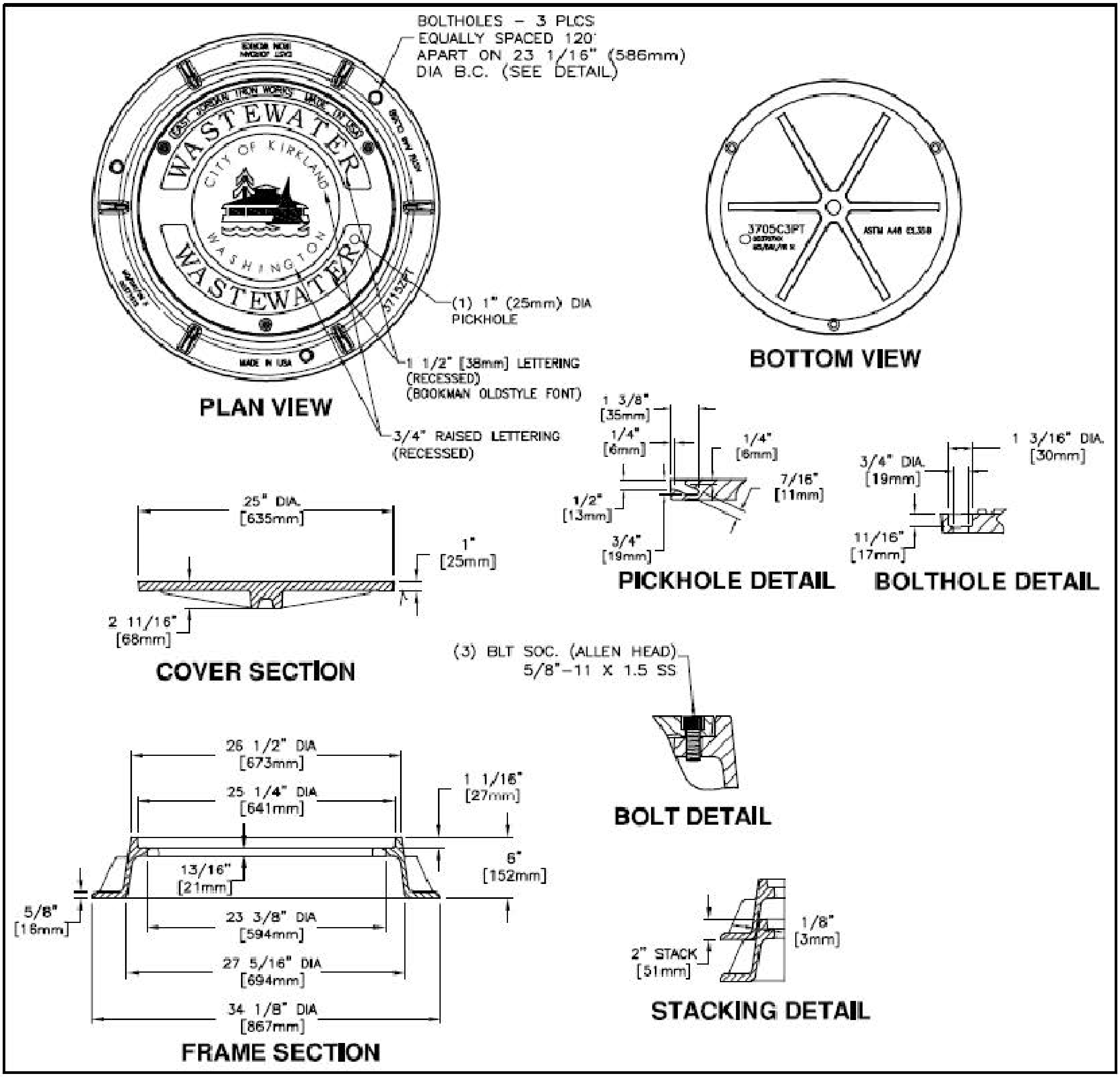



COVER SECTION A–A

NOTES:

1. COVER MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 141 LBS.
2. FRAME MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 134 LBS.
3. COVERS SHALL HAVE THE TEXT IN LETTERING NOTED ON PLAN VIEW ABOVE.
4. PRODUCT SUPPLIED BY EAST JORDAN IRON WORKS, OLYMPIC FOUNDRY, OR APPROVED EQUAL.

| CITY OF KIRKLAND |
|---|
| PLAN NO. CK– S.15 |
| 24" MANHOLE RING AND COVER |




NOTES

1. USE WITH THREE LOCKING BOLTS 5/8"-11 BOLT SOCKET (ALLEN HEAD), 2" LONG DRILL HOLES SPACED 120° APART ON 23-1/16" DIA B.C.

2. COVER MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 141 LBS.

3. FRAME MATERIAL IS DUCTILE IRON ASTM A48 CL35B, WITH A MINIMUM WEIGHT OF 134 LBS.

4. DRILL AND TAP THREE 5/8"-11 NC HOLES THROUGH RING AT 120° AND 23-1/16" DIA B.C.

5. PRODUCT SUPPLIED BY EAST JORDAN IRON WORKS, OLYMPIC FOUNDRY, OR APPROVED EQUAL.

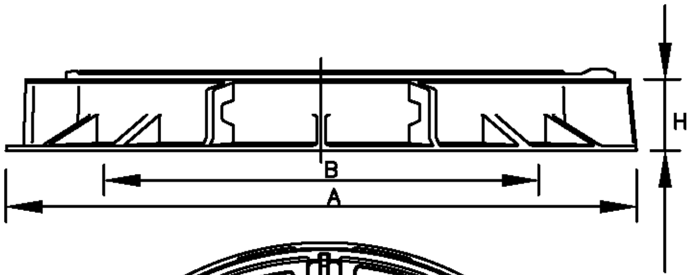
CITY OF KIRKLAND

PLAN NO. CK-S.16

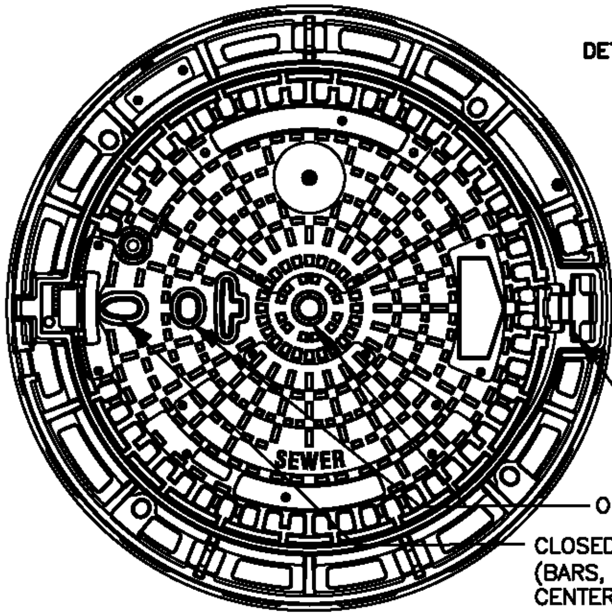
24" MANHOLE FRAME W/LOCKING COVER

LAST REVISED: 03/23/09

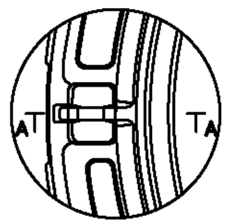
# 24 INCH MANHOLE COVER AND FRAME

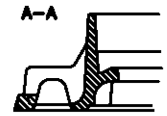



| DIMENSIONS (INCHES) | | | WEIGHT (lbs) | |
|---|---|---|---|---|
| A | B | H | COVER AND FRAME | COVER ONLY |
| 33 1/2" | 24 | 4 | 195 | 122 |




DETAIL A : LIFTING HOLES




NOTES:

1. VERIFY SLOTTED FRAMES ARE THOROUGHLY FILLED IN WITH MORTAR FOR EFFICIENT INTERACTION WITH IRON AND STRUCTURE.
2. VERIFY BEDDING MORTAR IS NOT IN CONTACT WITH EITHER HINGE HOUSING OR CUSHIONING INSERT.
3. VERIFY GASKET IS PROPERLY CLAMPED ON ITS FRAME GROOVE ALONG ITS ENTIRE LENGTH.
4. GASKET CAN BE REPLACED; USE ONLY ORIGINAL PAMREX GASKET, AVAILABLE THROUGH AUTHORIZED DEALERS.
5. PAMREX 24 INCH IS FITTED WITH AN INFILTRATION PLUG LOCATED IN THE HINGE HOUSING OF THE FRAME. VERIFY PLUG IS PROPERLY INSTALLED BEFORE INSTALLING THE FRAME.
6. REQUIRED ON ARTERIALS ONLY (PRINCIPLE AND MINOR). MAY ALSO BE REQUIRED ON SOME HIGH VOLUME COLLECTORS BY PUBLIC WORKS ENGINEER.
7. TO BE USED FOR SEWER AND STORM MANHOLES ON NEW AND REPLACED LIDS.
8. TO BE USED IN TRAVEL LANES ONLY. PARKING LANES, BIKE LANES, CENTER TURN LANES, ETC. ARE EXEMPT.
9. CITY OF KIRKLAND LOGO NOT REQUIRED.
10. LID MUST BE COVERED WITH TAR PAPER BEFORE OVERLAY.

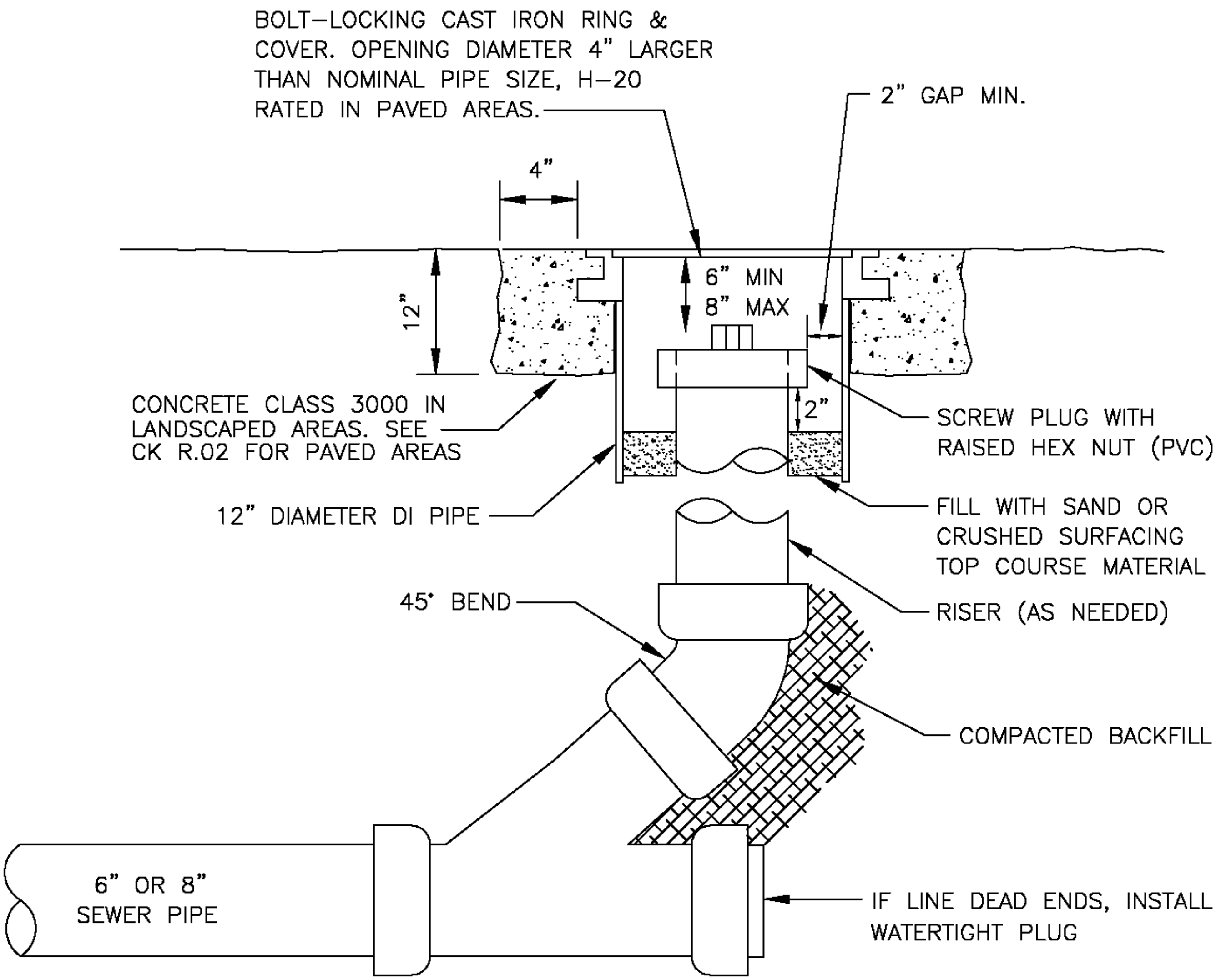
CITY OF KIRKLAND

PLAN NO. CK-S.16A

CITY OF KIRKLAND WASHINGTON

MODIFIED 24" MANHOLE FRAME W/ LOCKING COVER

LAST REVISED: 1/15/14



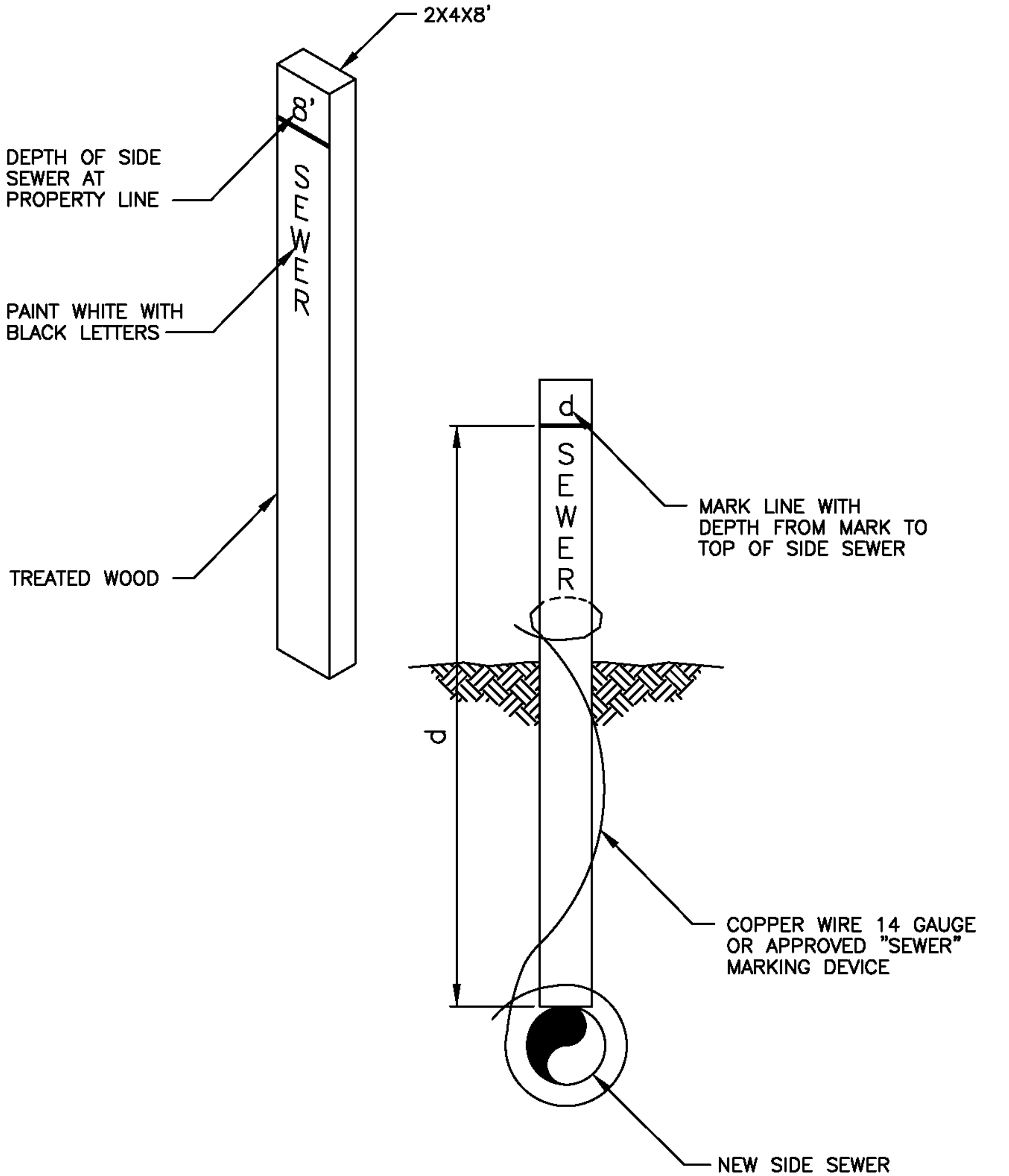

NOTES

1. CAST IRON COVER SHALL READ "SEWER".

2. LOCKING BOLTS FOR COVER SHALL BE 5/8" –11 NC STAINLESS STEEL TYPE 304 SOCKET (ALLEN) HEAD BOLTS, 2 INCHES LONG.

| | |
|---|---|
| CITY OF KIRKLAND | |
| PLAN NO. CK–S.17 | |
| CITY OF KIRKLAND WASHINGTON | CLEANOUT |

LAST REVISED: 11/30/99



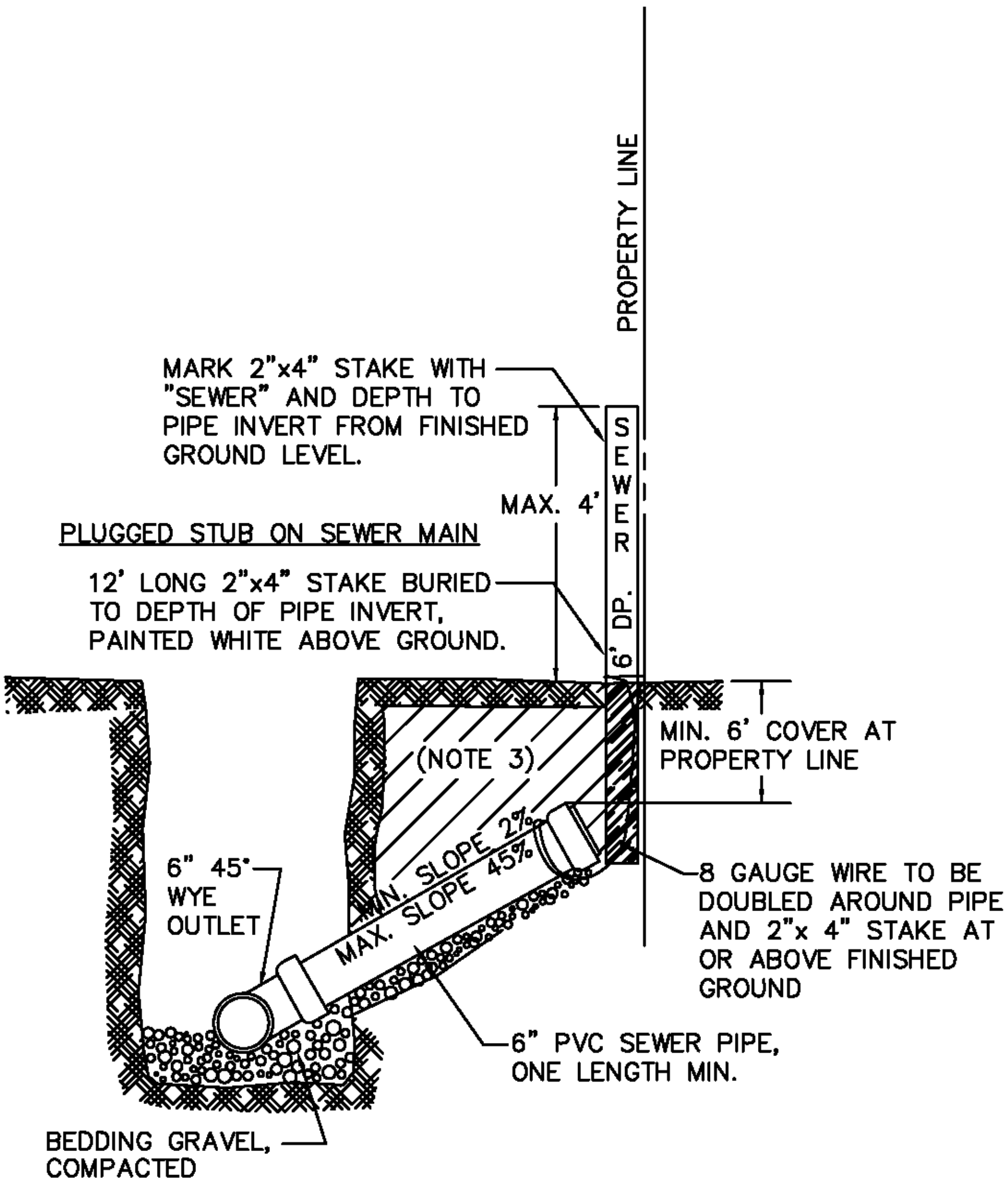

CITY OF KIRKLAND

PLAN NO. CK-S.18

CITY OF KIRKLAND WASHINGTON

SIDE SEWER MARKER POST

LAST REVISED: 11/30/99




NOTES:

1. WHERE SIDE SEWER CONNECTS TO MANHOLE: INVERT OF SIDE SEWER SHALL BE EQUAL TO OR ABOVE MAIN SEWER CROWN, BUT NOT TO EXCEED 18" ABOVE INVERT OF MAIN SEWER. (FOR COMMERCIAL AND MULTIFAMILY APPLICATIONS ONLY)
2. UNLESS OTHERWISE INDICATED ON PLAN, SIDE SEWER SHALL BE MIN. OF 6' DEEP AT PROPERTY LINE, OR 5' LOWER THAN THE LOWEST ELEVATION, WHICHEVER IS LOWER.
3. TRENCH BACKFILL SHALL BE PER CITY OF KIRKLAND STD. PLAN NO. CK–S.01.

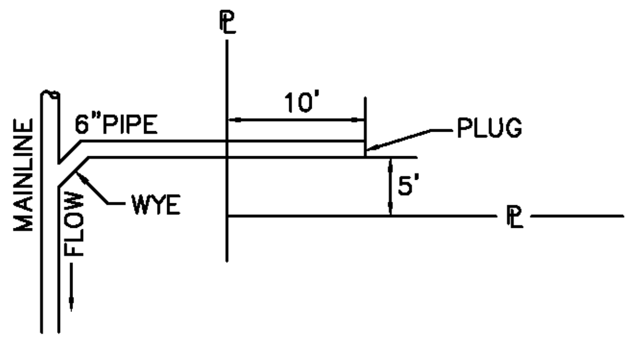
CITY OF KIRKLAND

PLAN NO. CK–S.19

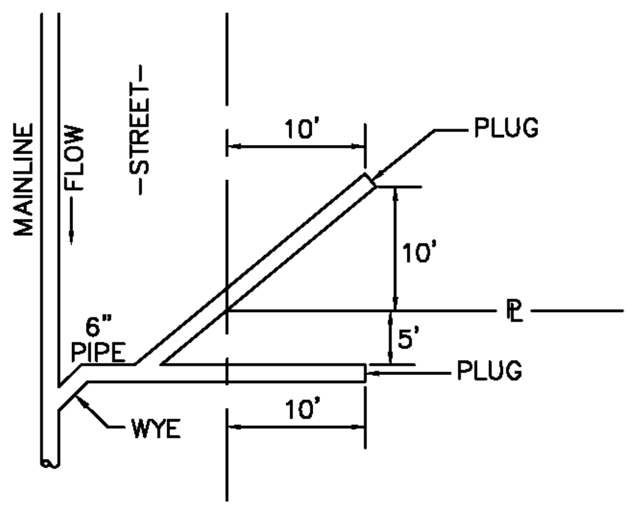
CITY OF KIRKLAND WASHINGTON

SIDE SEWER STUB "PROFILE VIEW"

LAST REVISED: 11/30/99




SINGLE SERVICE




DOUBLE SERVICE

NOTES:

1. WHERE SIDE SEWER CONNECTS TO MANHOLE: INVERT OF SIDE SEWER SHALL BE EQUAL TO OR ABOVE MAIN SEWER CROWN, BUT NOT TO EXCEED 18" ABOVE INVERT OF MAIN SEWER. (FOR COMMERCIAL AND MULTIFAMILY APPLICATIONS ONLY)
2. UNLESS OTHERWISE INDICATED ON PLAN, SIDE SEWER SHALL BE MIN. OF 6' DEEP AT PROPERTY LINE, OR 5' LOWER THAN THE LOWEST ELEVATION, WHICHEVER IS LOWER.
3. TRENCH BACKFILL SHALL BE PER CITY OF KIRKLAND STD. PLAN NO. CK-S.01.

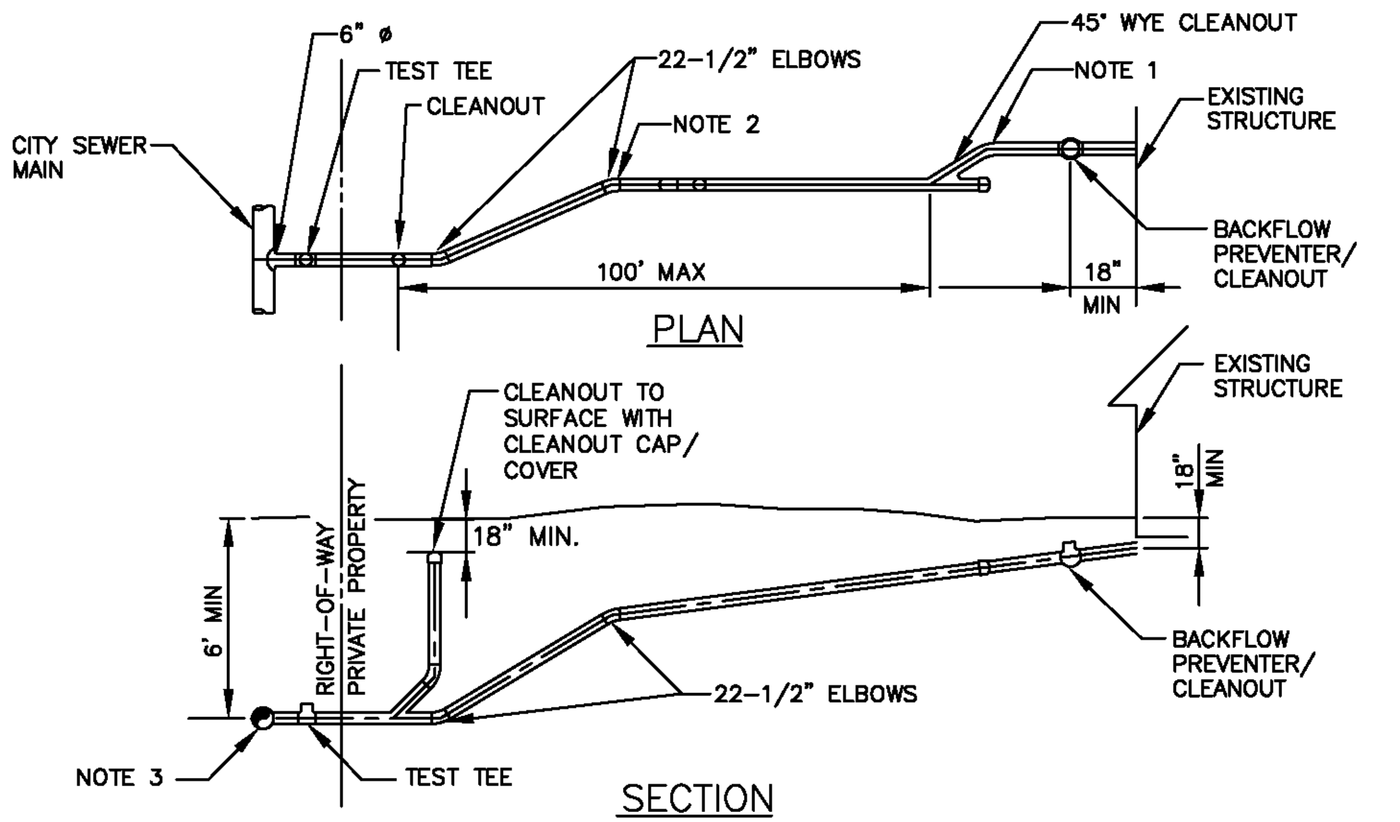
CITY OF KIRKLAND

PLAN NO. CK- S.19A

CITY OF KIRKLAND WASHINGTON

SIDE SEWER STUB
"PLAN VIEW"

LAST REVISED: 11/30/00




NOTES

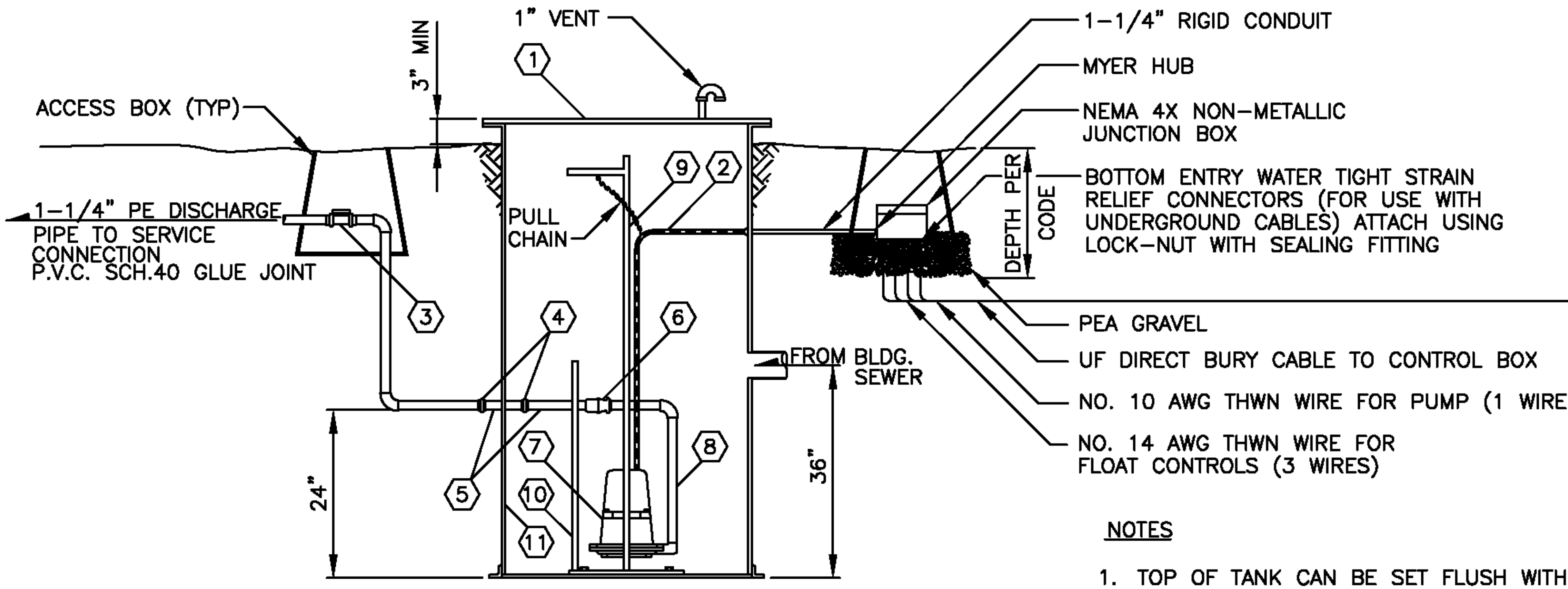
1. ELBOWS SHALL NOT BE GREATER THAN 45 DEGREES.
2. CLEAN OUT IS REQUIRED FOR EACH PIPE LENGTH GREATER THAN 100' AND FOR EACH 90 DEGREES ACCUMULATED ELBOW PER 100'.
3. RIGHT-OF-WAY RESTORATION SHALL MATCH OR EXCEED THE ORIGINAL CONDITION AND BE IN ACCORDANCE WITH THE CITY STANDARD.
4. BACKFILL FOR PAVED AREA SHALL BE 3/4" MINUS CRUSHED SURFACING TOP COURSE, COMPACTED IN 12" LIFTS.
5. ALL HOUSE PLUMBING OUTLETS MUST BE CONNECTED TO THE SEWER. NO DOWNSPOUTS OR STORM DRAINAGE MAY BE CONNECTED TO THE SEWER SYSTEM.
6. 18" MINIMUM COVERAGE OF PIPE.
7. 6' MINIMUM COVERAGE AT PROPERTY LINE.
8. LAY PIPE IN STRAIGHT LINE BETWEEN BENDS. MAKE ALL CHANGES IN GRADE OR LINE WITH A 1/8 BEND OR WYE. 90 DEGREE CHANGE WITH 1/8 BEND AND WYE.
9. 6" SEWER PIPE MINIMUM SIZE IN STREET, AND ELSEWHERE AS DIRECTED BY ENGINEER. 2% MINIMUM GRADE (UNLESS DIRECTED BY ENGINEER) 50% MAXIMUM.
10. 4" SEWER PIPE MINIMUM SIZE ON PROPERTY. 2% MINIMUM GRADE, 100% (45 DEGREE) MAXIMUM.
11. TEST "T" WITH PLUG AT WYE.
12. CONSTRUCTION IN STREET MUST BE DONE BY A REGISTERED/LICENSED CONTRACTOR.
13. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT SIDE SEWER ORDINANCES.
14. ALL CONSTRUCTION REQUIRES A PERMIT AND PAYMENT OF FEE, COMPLETE LEGAL DESCRIPTION OF PROPERTY AND DIMENSIONS.
15. BACKFLOW PREVENTER (CHECK VALVE) IS REQUIRED:
    A. IF CONNECTED TO A COMBINED SIDE SEWER.
    B. IF CONNECTION AT HOUSE IS LOWER THAN BOTH UPSTREAM AND DOWNSTREAM MANHOLE LID.
16. AS-BUILT DRAWING SHOWING LOCATION OF SIDE SEWER IN RELATION TO THE HOUSE IS REQUIRED AFTER INSTALLATION.
17. BEDDING TO BE CLASS C (GRAVEL BORROW) FOR RIGID PIPE AND CLASS F (PEA GRAVEL) FOR FLEXIBLE PIPE (APWA), SECTION 61.
18. ASTM D-3034 OR SDR-35.

CITY OF KIRKLAND

PLAN NO. CK-S.20

CITY OF KIRKLAND WASHINGTON

RESIDENTIAL SIDE SEWER INSTALLATION




GRINDER LIFT STA.
DETAIL
NTS

## MATERIALS LIST

1. 24" DIA GALVANIZED COVER
2. POWER CONDUIT
3. 1-1/4" PVC TRUE UNION BALL VALVE (SS) HAYWARD OR EQUAL
4. 1-1/4" GALVANIZED UNION
5. 1-1/4' GALVANIZED NIPPLES
6. CHECK VALVE AND PUMP DISCONNECT HYDROMATIC, GOULD OR EQUAL.
7. 2 HP GRINDER PUMP - SEE NOTES
8. 1-1/4" GALVANIZED PIPING, APPROXIMATELY 1.2' LONG
9. HOT DIPPED GALVANIZED STEEL RAIL GUIDE SYSTEM
10. HOT DIPPED GALVANIZED PUMP TECH SHORT RAIL
11. 24" X 60" FIBERGLASS TANK

## NOTES

1. TOP OF TANK CAN BE SET FLUSH WITH GROUND, IF A CONCRETE PAD IS POURED AROUND THE LIFT STATION AND SLOPED AWAY FROM THE STATION. KEEP ROCKS AND DEBRIS OUT OF STATION.

2. ACCESS BOX:
   TRAFFIC AREAS - EQUAL TO CARSON MODEL 1419-14B WITH 1419-2B COVER

   TRAFFIC AREAS- H-20 RATED CONCRETE BOX EQUAL TO FOGTITE B9-1/2 METER BOX

   LIDS SHALL BE MARKED ELECTRICAL OR SEWER RESPECTIVELY OR HAVE NO MARKINGS AT ALL.

3. CONTROL FLOATS NOT SHOWN FOR CLARITY.

LAST REVISED:01/07/08

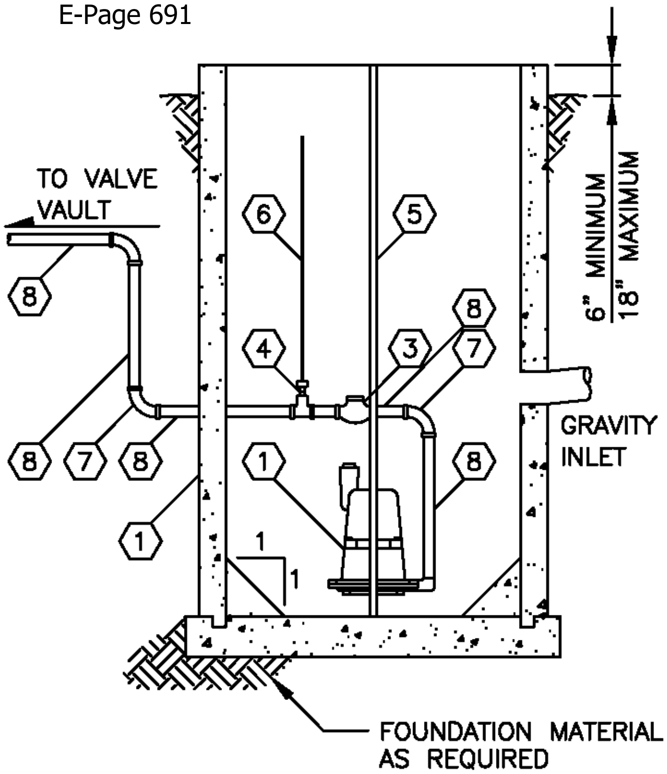
CITY OF KIRKLAND

PLAN NO. CK-S.21

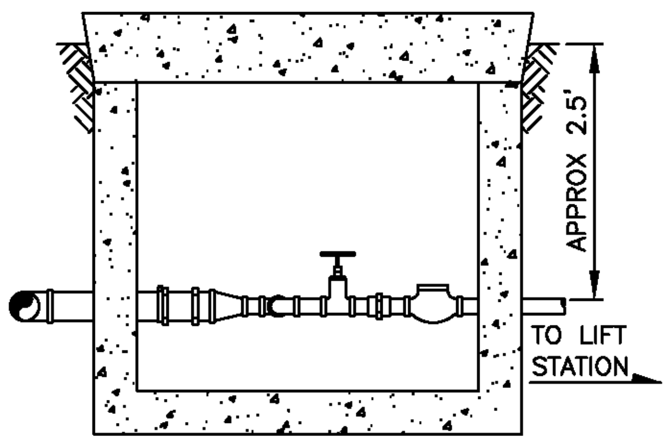
CITY OF KIRKLAND WASHINGTON

SINGLE FAMILY
SIMPLEX SEWER
LIFT STATION

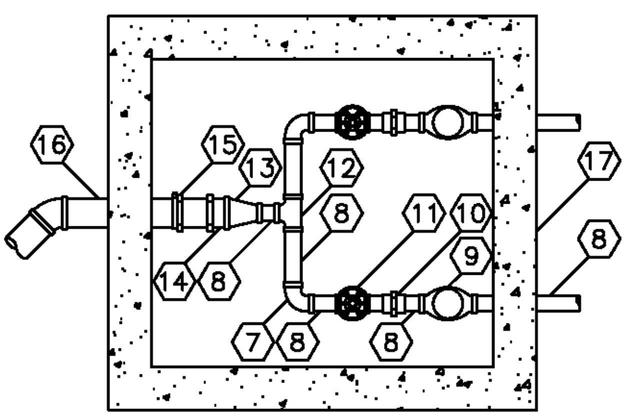
LAST REVISED: 11/30/99




LIFT STATION ELEVATION




VALVE VAULT ELEVATION




VALVE VAULT PLAN

## EQUIPMENT SCHEDULE

ITEMS 1 THRU 6 BASED ON HYDR-O-RAIL, HYDR-O GRND DUPLEX PACKAGE LIFT STATION AS MANUFACTURED BY HYDROMATIC PUMP COMPANY.

1. 2 EXPLOSION-PROOF SUBMERSIBLE SEWAGE GRINDER PUMPS EQUAL TO HYDROMATIC 02FX500 5HP, 1750 RPM MOTOR. DESIGN POINT: GPM AT 54' TDH.
2. 60" LD CONCRETE MANHOLE WITH GROUTED HOPPER BOTTOM AS SHOWN.
3. 2" BALL CHECK AGAINST HYDRAULICALLY SEALED DISCHARGE FLANGE EQUAL TO HYDROMATIC.
4. 2" GATE VALVE
5. 1-1/2" GALVANIZED GUIDE RAILS (2 EACH PER PUMP)
6. GATE VALVE EXTENSION (1 EACH PER VALVE)
7. 2" C.I. 90° BEND (S X S)
8. 2" C.I. PIPE (S X S)
9. 2" BALL CHECK (S X S)
10. 2" UNION
11. 2" GATE VALVE (S X S)
12. 2" C. I. TEE
13. 2" X 2-1/2" C.I. REDUCER (S X S)
14. 2-1/2" C.I. PIPE (S X S)
15. 2-1/2" COUPLING - C.I. TO PVC
16. 2-1/2" PVC PIPE & FITTINGS - ASTM D 2241 SDR 26. SEE SITE PLAN FOR CONTINUATION.
17. CONCRETE VAULT - 3.5' H X 3.5' L X 3.5' W EQUAL TO UTILITY VAULT MODEL 444-LA WITH 44-332P COVER. DRAIN TO NEAREST STORM DRAIN FACILITY.

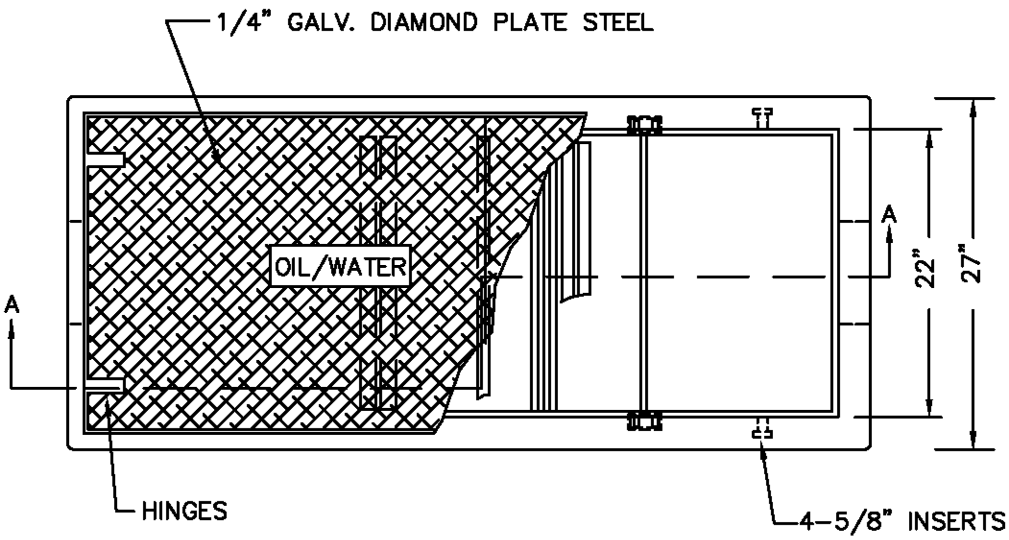
CITY OF KIRKLAND

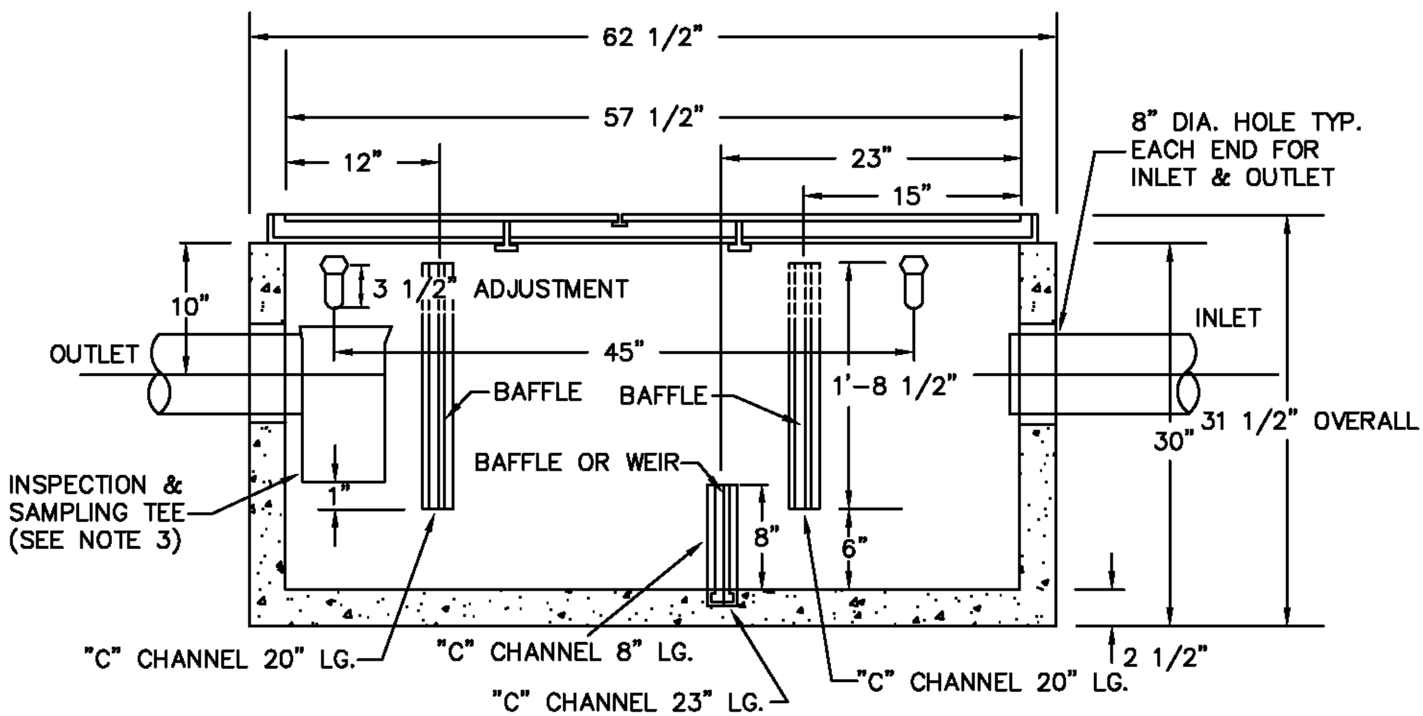
PLAN NO. CK- S.22

CITY OF KIRKLAND WASHINGTON

COMMERCIAL AND MULTI-FAMILY DUPLEX SEWER LIFT STATION

LAST REVISED: 11/30/99




SECTION A-A

NOTES:

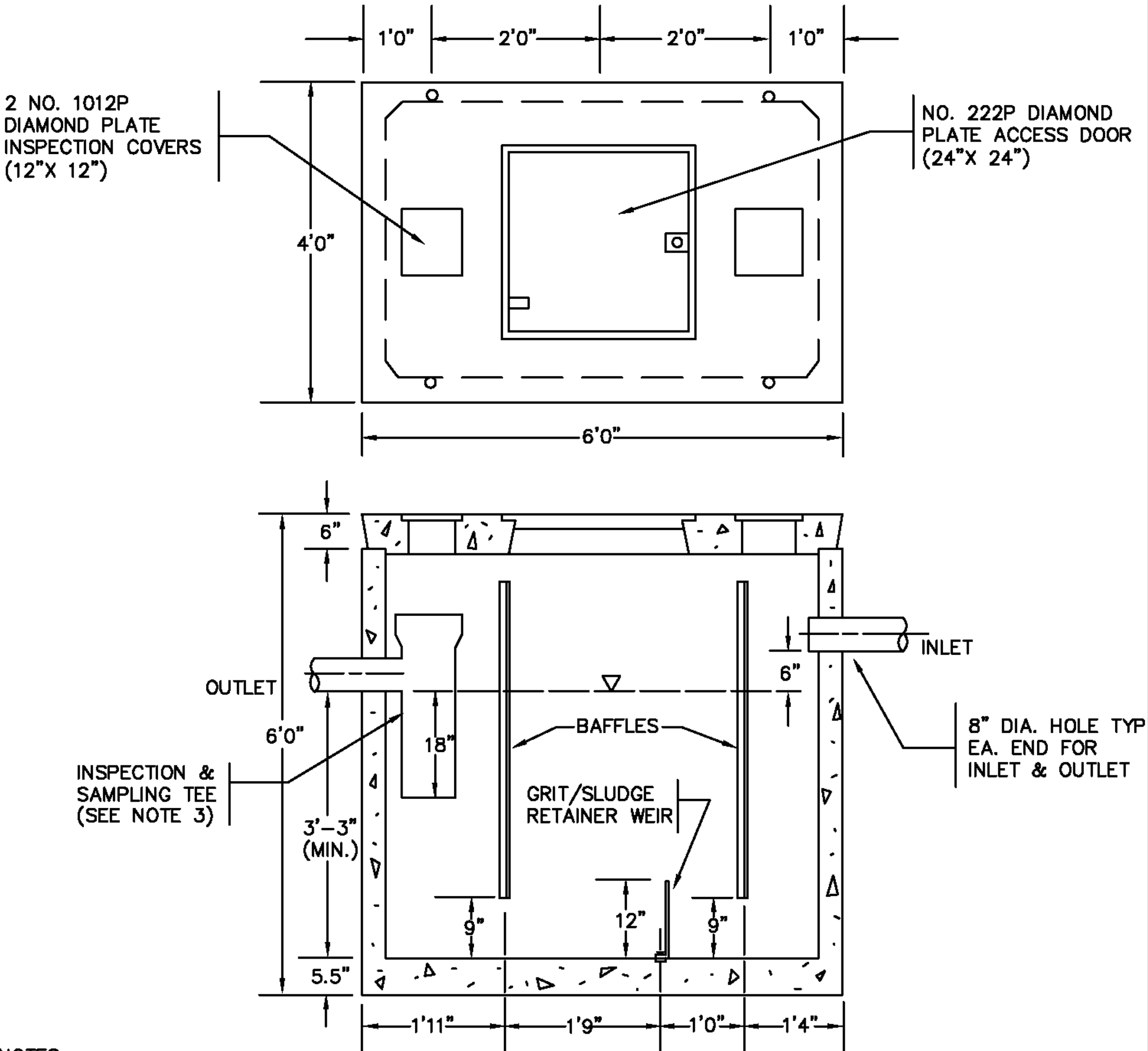
1. UTILITY VAULT COMPANY, INC., #25-SA, OR EQUAL. PRESET VAULT SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
2. LOCATE WITHIN 20 FEET OF DRIVE FOR ACCESS BY MAINTENANCE VEHICLE.
3. INSPECTION AND SAMPLING TEE TO BE INSTALLED BY CONTRACTOR. LINE-SIZED PVC TEE SHALL BE USED WHERE LINE IS 6" DIA. OR GREATER. SIX INCH PVC TEE SHALL BE USED WHERE LINE-SIZE IS LESS THAN 6" DIA.
4. FILL WITH CLEAN WATER PRIOR TO STARTUP OF SYSTEM.
5. GRAY AND BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.
6. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.

CITY OF KIRKLAND

PLAN NO. CK-S.23

100 GALLON BAFFLE TYPE OIL/WATER SEPARATOR

LAST REVISED: 11/30/99




NOTES:

1. UTILITY VAULT COMPANY, INC., #660-SA, OR EQUAL. PRESET VAULT SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
2. LOCATE WITHIN 20 FEET OF DRIVE FOR ACCESS BY MAINTENANCE VEHICLE.
3. INSPECTION AND SAMPLING TEE TO BE INSTALLED BY CONTRACTOR. LINE-SIZED PVC TEE SHALL BE USED WHERE LINE IS 6" DIA. OR GREATER. SIX INCH PVC TEE SHALL BE USED WHERE LINE-SIZE IS LESS THAN 6" DIA.
4. FILL WITH CLEAN WATER PRIOR TO STARTUP OF SYSTEM.
5. GRAY AND BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.
6. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.

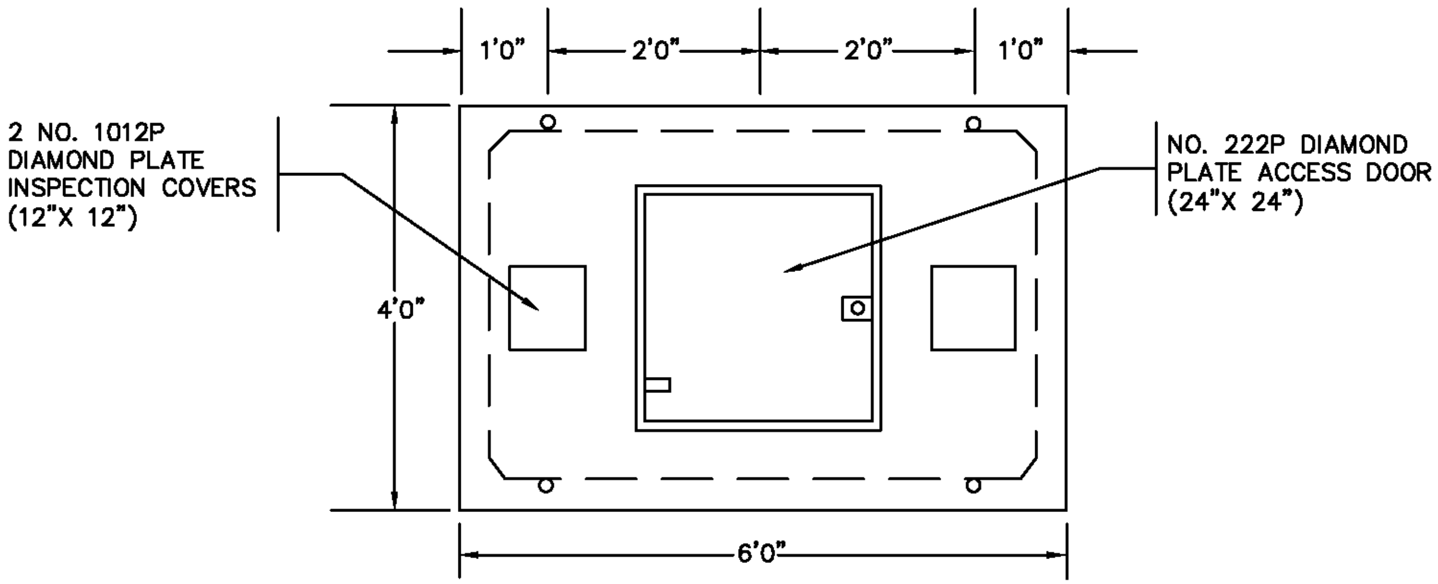
CITY OF KIRKLAND

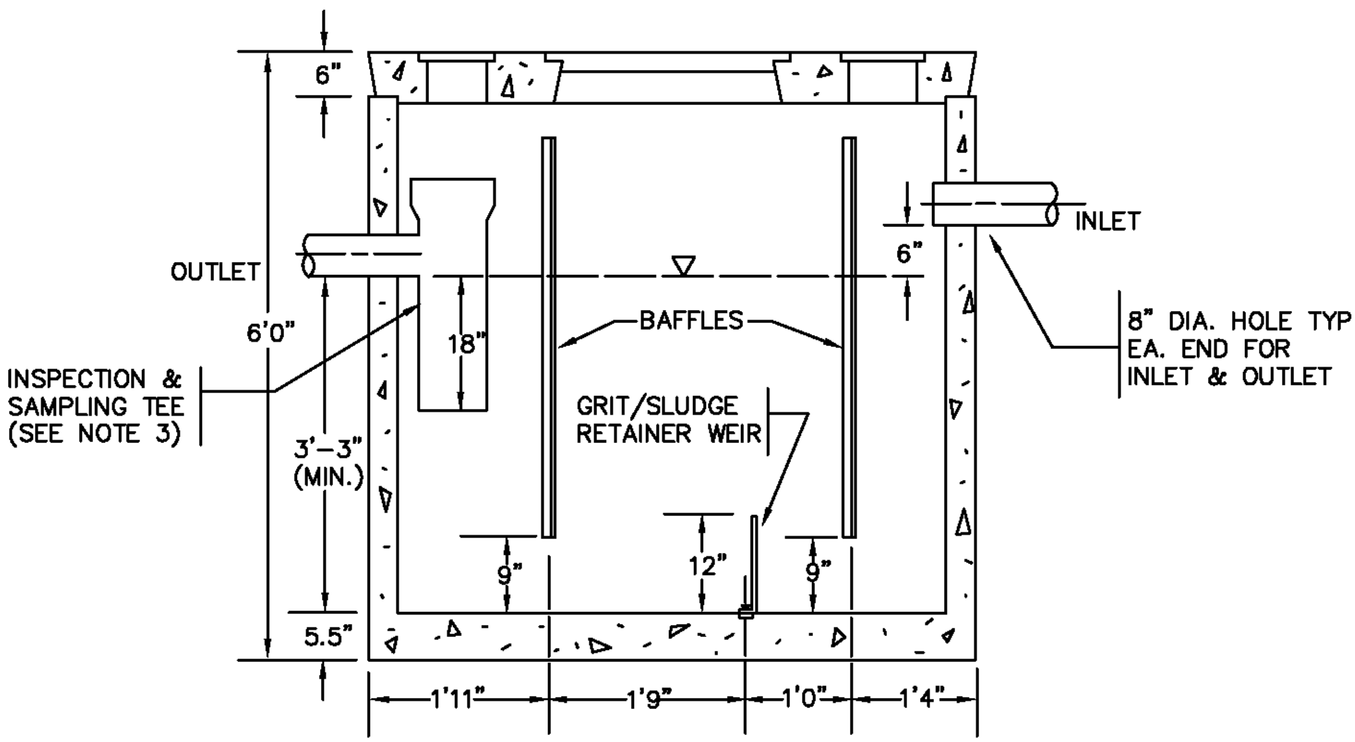
PLAN NO. CK-S.24

CITY OF KIRKLAND WASHINGTON

450 GALLON BAFFLE TYPE OIL/WATER SEPARATOR

LAST REVISED: 11/30/99




NOTES:

1. UTILITY VAULT COMPANY, INC., #577-SA, OR EQUAL. PRESET VAULT SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
2. LOCATE WITHIN 20 FEET OF DRIVE FOR ACCESS BY MAINTENANCE VEHICLE.
3. INSPECTION AND SAMPLING TEE TO BE INSTALLED BY CONTRACTOR. LINE-SIZED PVC TEE SHALL BE USED WHERE LINE IS 6" DIA. OR GREATER. SIX INCH PVC TEE SHALL BE USED WHERE LINE-SIZE IS LESS THAN 6" DIA.
4. FILL WITH CLEAN WATER PRIOR TO STARTUP OF SYSTEM.
5. GRAY AND BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.
6. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NON-SHRINK GROUT.

| WATER DEPTH | GALLONS | FLOW RATE AT 45 MINUTE RETENTION |
|---|---|---|
| 4'-0" | 800 | 17.8 G.P.M. |
| 5-0" | 1000 | 22.2 G.P.M. |

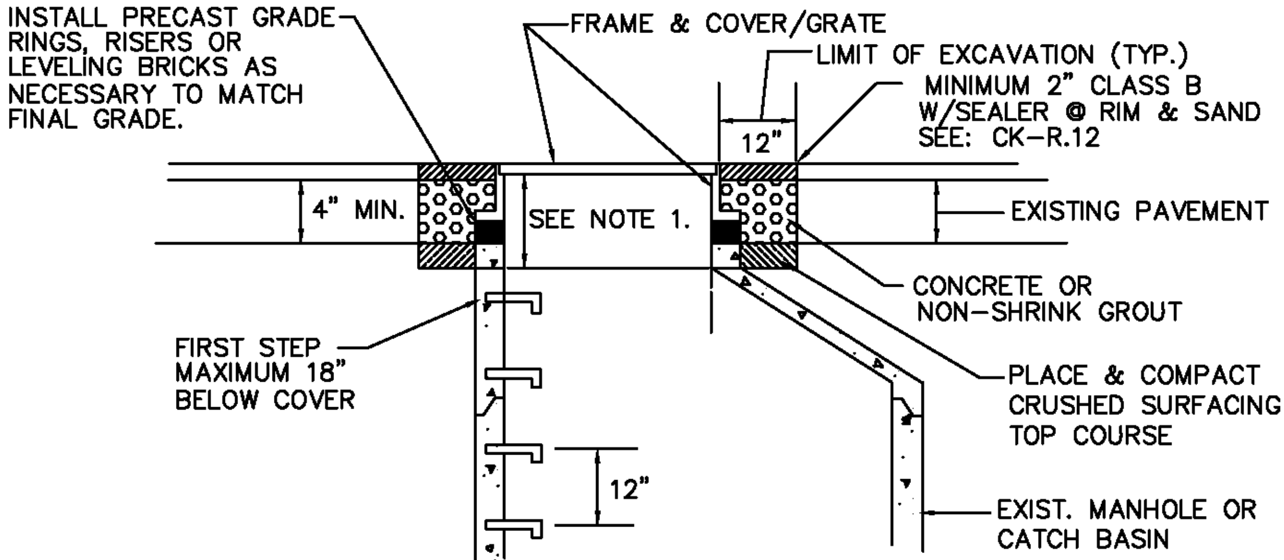
CITY OF KIRKLAND

PLAN NO. CK-S.25

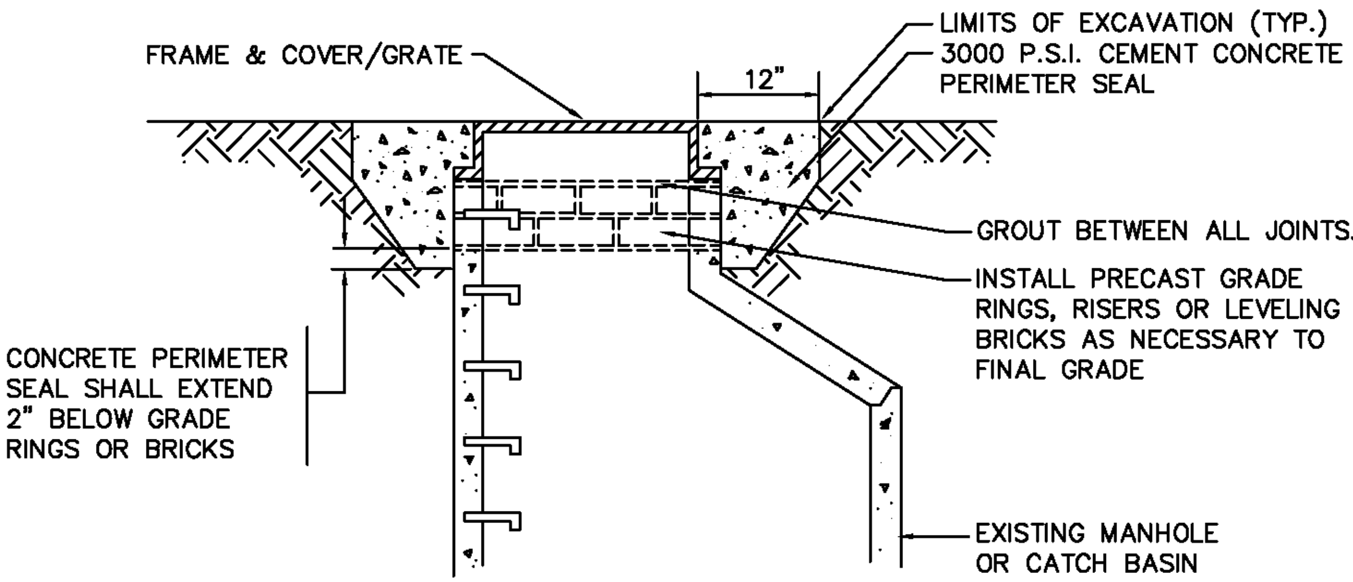
CITY OF KIRKLAND WASHINGTON

800 & 1000 GALLON BAFFLE TYPE OIL/ WATER SEPARATOR

LAST REVISED: 11/30/99



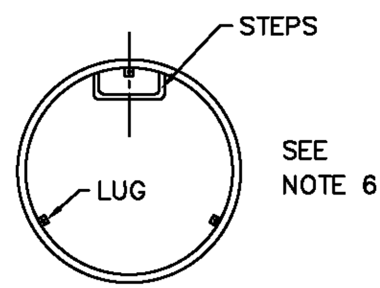

PAVED AREAS




UNPAVED AREAS

NOTES:

1. WHERE DEPTH OF NECK EXCEEDS 18 INCHES, ADJUST MANHOLE/CATCH BASIN TO GRADE BY INSERTING NEW BARREL SECTION BETWEEN THE CONE/SLAB AND EXISTING BARREL.
2. GRADE RINGS, RISERS, BRICK AND FRAME SHALL BE SET IN 3/4" NON–SHRINK GROUT, GROUT BETWEEN ALL JOINTS. ALL SURFACES MUST BE CLEAN OF DEBRIS AND DIRT, AND WETTED PRIOR TO GROUTING. GROUT SMOOTH INSIDE AND OUTSIDE SURFACES.
3. STEPS OR HAND HOLDS SHALL BE ADDED AS NEEDED.
4. PRECAST GRADE RINGS AND RISERS MUST BE CAST WITH GROOVE TO ALLOW FIELD INSTALLATION OF SAFETY STEP.
5. REPLACE EXISTING FRAME AND COVER/GRATE IF NON–STANDARD.
6. IF REQUIRED: LOCKING MH FRAMES SHALL BE POSITIONED WITH ONE LUG CENTERED OVER STEPS.




LOCKING MH FRAME PLAN VIEW

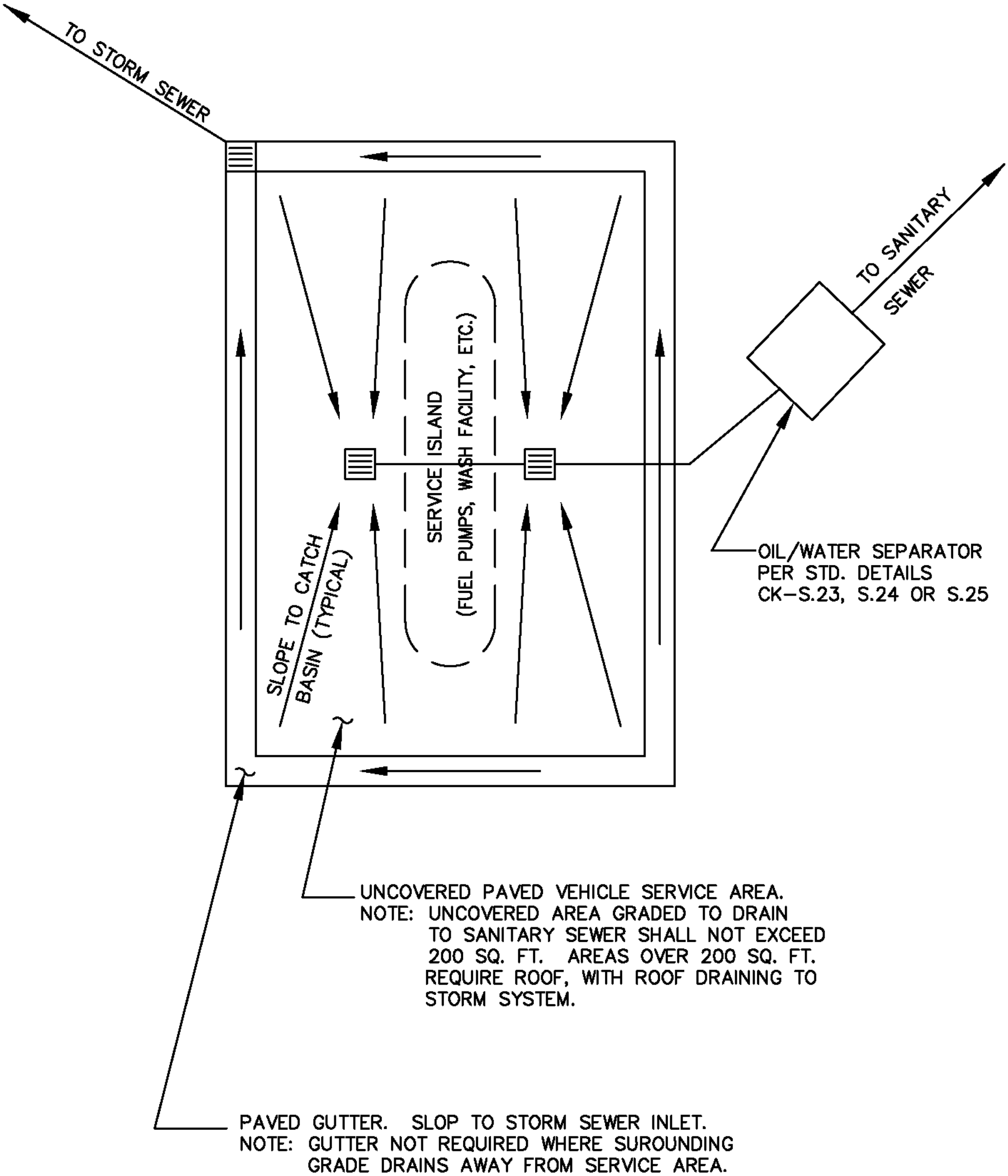
CITY OF KIRKLAND

PLAN NO. CK–S.26

CITY OF KIRKLAND WASHINGTON

MANHOLE FRAME AND GRATE ADJUSTMENT

LAST REVISED: 11/30/99



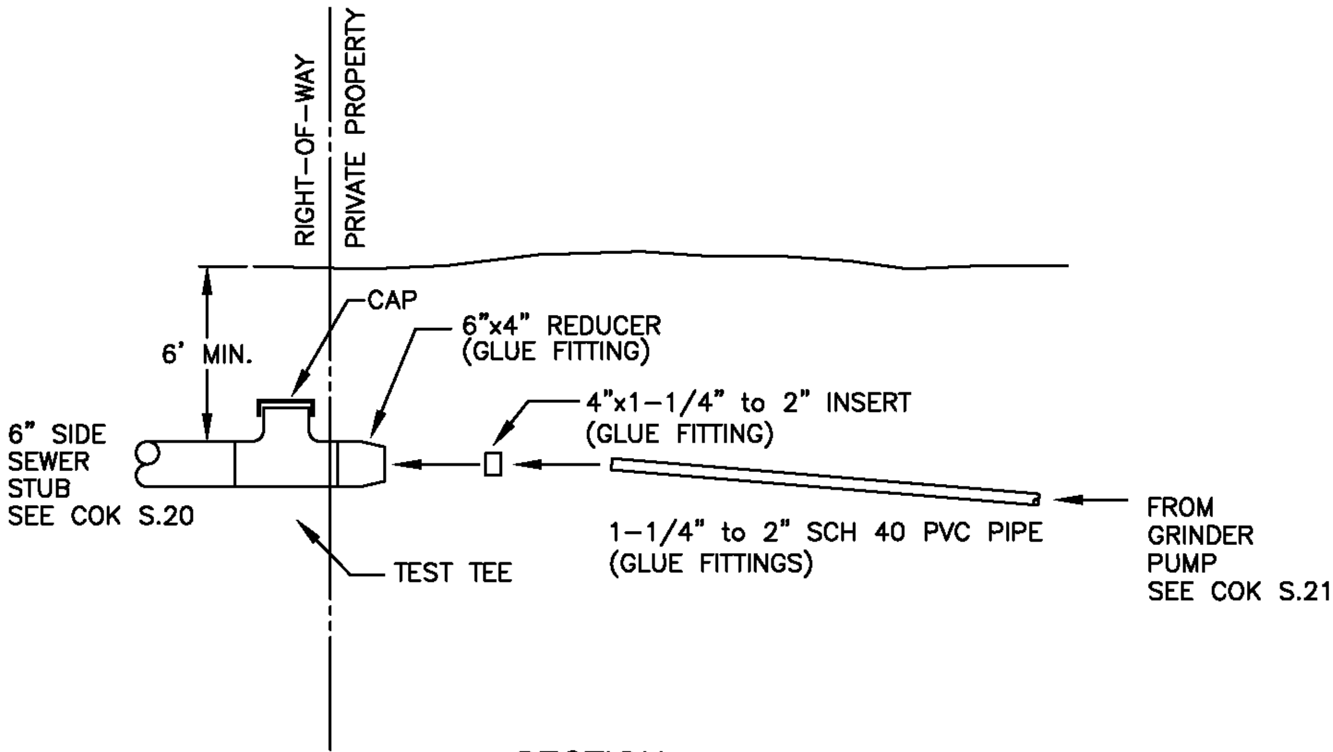

CITY OF KIRKLAND

PLAN NO. CK–S.27

CITY OF KIRKLAND WASHINGTON

PAVED VEHICLE
SERVICE AREA
DRAINAGE DETAIL

LAST REVISED: 11/30/99




SECTION

NOTES

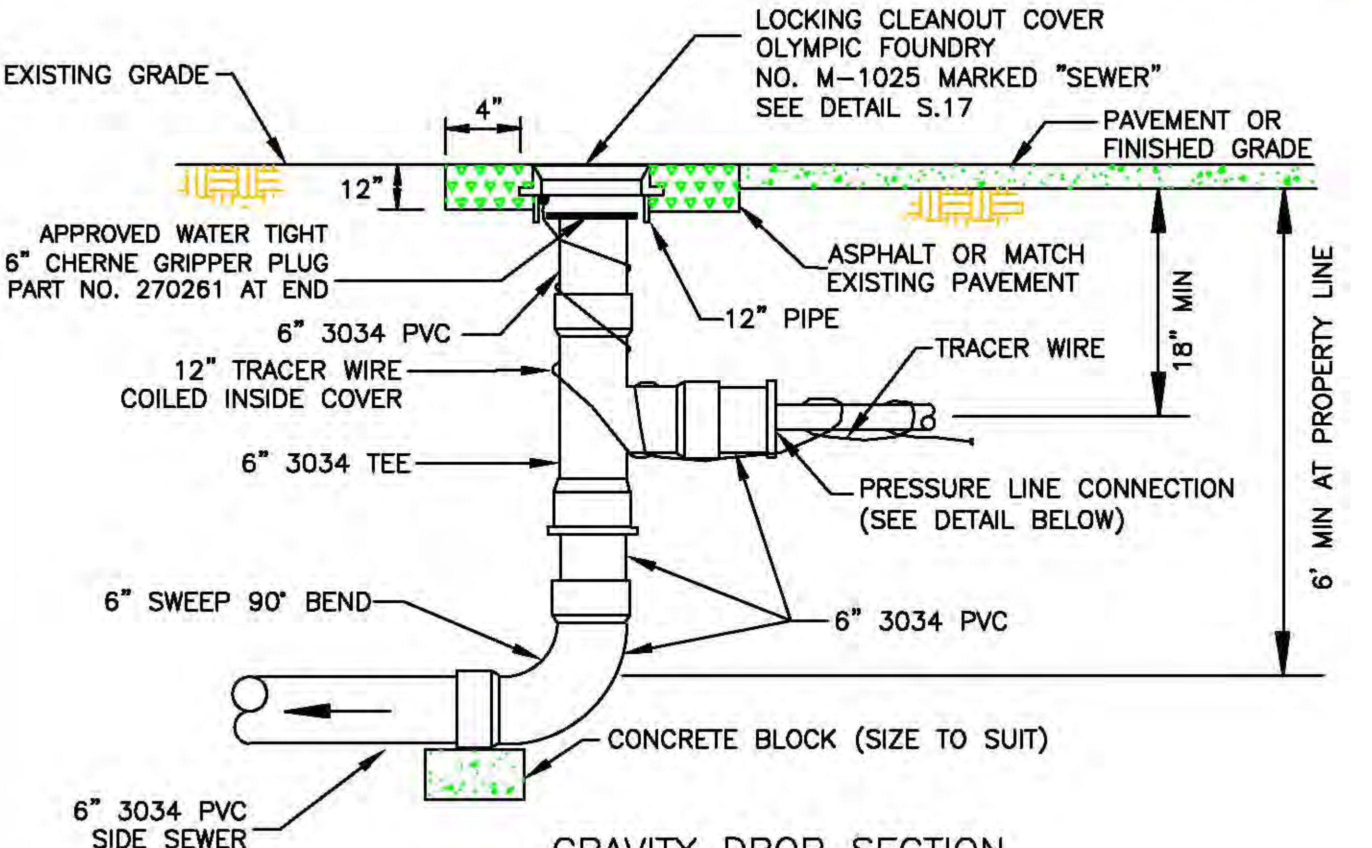
1. GRINDER PUMP DISCHARGE LINE MUST FLOW INTO A 6 INCH P.V.C. GRAVITY LINE. SIDE SEWER STUB.
2. 6 FOOT MINIMUM COVERAGE AT PROPERTY LINE AND IN RIGHT-OF-WAY.
3. 18 INCH MINIMUM COVERAGE OF PIPE ON PRIVATE PROPERTY.
4. RIGHT OF WAY RESTORATION SHALL MATCH OR EXCEED THE ORIGINAL CONDITION AND BE IN ACCORDANCE WITH THE CITY STANDARD.
5. BEDDING TO BE CLASS F PEA GRAVEL FOR GRINDER PUMP FORCE MAIN.
6. GRINDER PUMP FORCE MAIN SHALL BE LAID STRAIGHT WITH MINIMUM DEFLECTION.
7. PROTECTIVE STEEL CASING IS REQUIRED IF:
   A. LESS THAN 3 FEET OF COVERAGE IS ATTAINABLE UNDER A DRIVING SURFACE.
   B. UTILITY SEPARATION IS LESS THAN ADEQUATE.

CITY OF KIRKLAND

PLAN NO. CK-S.28

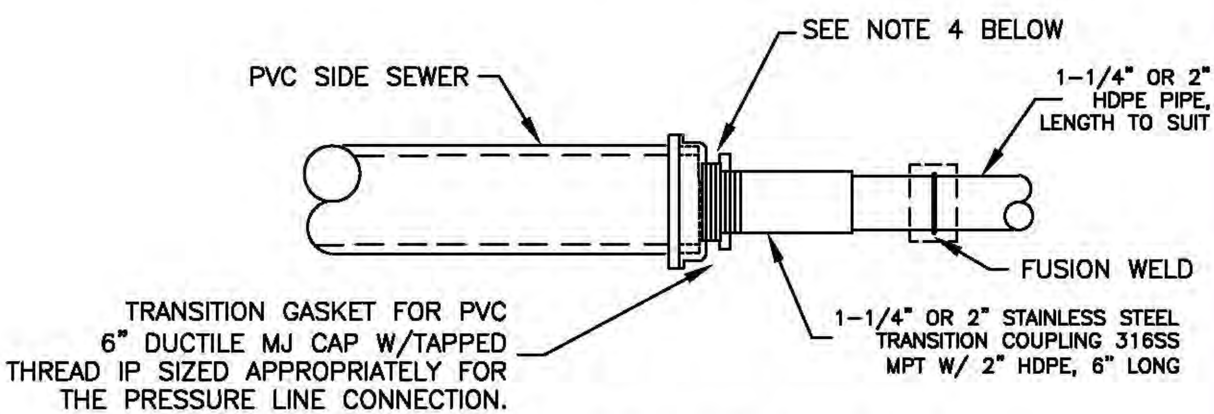
SINGLE FAMILY SIMPLEX SEWER LIFT STATION GRAVITY/FORCE-MAIN CONNECTION

LAST REVISED:02/12/10




## GRAVITY DROP SECTION

NOT TO SCALE




## PRESSURE LINE CONNECTION

NOT TO SCALE

NOTES

1. ALL PVC FITTINGS SHALL BE GASKETED.
2. NO COLLECTION VALVE BOX REQUIRED.
3. CAP MAY BE BURIED 18" BELOW GRADE WITH PVC CAP, IF NOT PLACED UNDER HARD SURFACES.
4. FOR 1-1/4" SERVICE USE 2"x1-1/4" BRASS BUSHING FOR 2" TAP.
5. FOR 2" SERVICE, OMIT BUSHING.

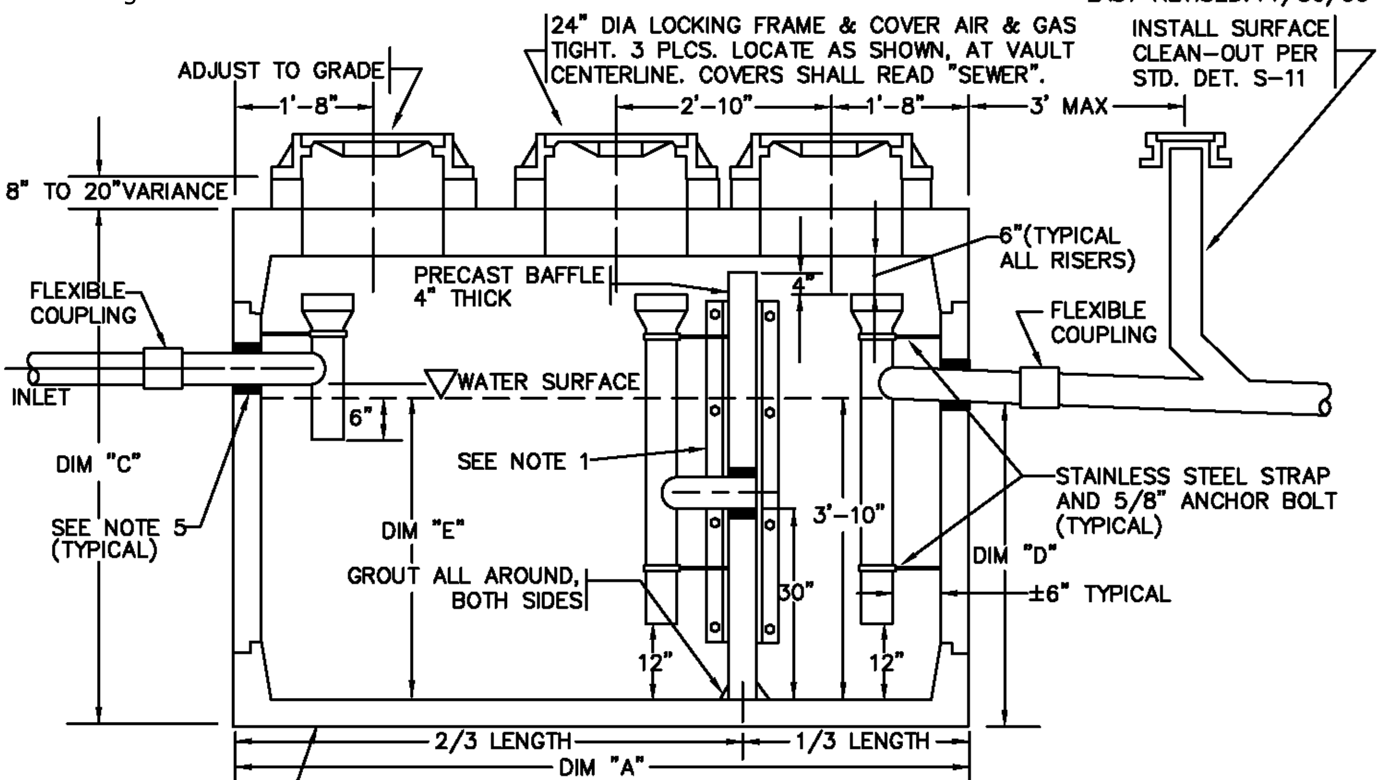
CITY OF KIRKLAND

PLAN NO. CK- S.28A

CITY OF KIRKLAND WASHINGTON

SHALLOW FORCE MAIN CONNECTION

LAST REVISED: 11/30/99




PRECAST CONCRETE VAULT, UTILITY VAULT CO., INC., OR EQUAL (SEE NOTE 2). SEE CHART BELOW FOR DIMENSIONS REQUIRED FOR EACH GALLON CAPACITY, VAULT OUTSIDE WIDTH IS DIMENSION "B".

NOTES:

1. IF VAULT IS NOT SLOTTED TO ACCEPT PRECAST CONC. BAFFLE THEN PRECAST CONC. BAFFLE SHALL BE HELD IN PLACE BY (2) 3"x3"x3/8" ANGLE (4FT. LONG) ATTACHED TO VAULT WALL WITH (4 EA.) 1/2" BOLTS AND NUTS (WITH WASHERS) SPACED 14"O.C. ANGLE AND FASTENERS SHALL BE STAINLESS STEEL OR GALVANIZED AND ASPHALT COATED.
2. PRECAST VAULT AND BAFFLE SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE CORE-DRILLED. PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
3. POSITION RISERS BELOW ACCESS OPENINGS TO ALLOW CLEAR ACCESS TO RISER AND VAULT CHAMBER.
4. LOCATE INTERCEPTOR WITHIN 20' OF DRIVE FOR ACCESS BY MAINT. VEHICLE.
5. CONNECTIONS TO CONCRETE WALLS WITH P.V.C. PIPE REQUIRE KOR-N-SEAL CONNECTOR. SEAL ALL PIPE CONNECTIONS WITH NONSHRINK GROUT.
6. LINE-SIZED P.V.C. PIPE SHALL BE USED THROUGHOUT WHERE LINE IS 6"DIA. OR GREATER. SIX INCH P.V.C. SHALL BE USED THROUGHOUT WHERE LINE IS LESS THAN 6"DIA.
7. GRAY-WATER ONLY. BLACK-WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER.
8. CLEAN-OUT REQUIRED 3' MAX. DOWNSTREAM OF INTERCEPTOR.
9. FILL WITH CLEAN WATER PRIOR TO START UP OF SYSTEM.
10. FOR CAPACITIES LESS THAN 1500 GALLONS, SUBSTITUTE 12" DIA. CAST IRON COVER AND FRAME FOR "CENTER" MANHOLE. LOCATE DIRECTLY ABOVE TEE. OLYMPIC FOUNDRY 5931 OR EQUAL.

| GALLON CAPACITY | | 600 | 750 | 1000 | 1500 | 2000 | 2500 | 3000 | 4000 | 5000 | 6000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| UV CO. MODEL No. | | 577-GA | 577-GA | 4484-GA | 5106-GA | 612-GA | 612-GA | 814-GA | 814-GA | 818-GA | 818-GA |
| LENGTH | DIM "A" | 7'-0" | 7'-0" | 9'-0" | 11'-2" | 12'-8" | 12'-8" | 15'-7" | 15'-7" | 19'-11" | 19'-11" |
| WIDTH | DIM "B" | 4'-8" | 4'-8" | 5'-0" | 5'-8" | 6'-8" | 6'-8" | 9'-7" | 9'-7" | 9'-11" | 9'-11" |
| HEIGHT | DIM "C" | 7'-0" | 7'-0" | 7'-2" | 7'-2" | 8'-0" | 8'-0" | 8'-6 1/2" | 8'-6 1/2" | 8'-11" | 10'-5" |
| | DIM "D" | 3'-6" | 4'-3" | 4'-2" | 4'-4" | 4'-7" | 5'-6" | 5'-0" | 6'-3" | 6'-2" | 7'-2" |
| WATER DEPTH | DIM "E" | 3'-2" | 3'-11" | 3'-10" | 4'-0" | 3'-10" | 4'-9" | 3'-9" | 5'-0" | 4'-9" | 5'-9" |

CITY OF KIRKLAND

PLAN NO. CK-S.29

CITY OF KIRKLAND WASHINGTON

GREASE INTERCEPTOR

# APPENDIX G

## SewerCAD Results

THIS PAGE INTENTIONALLY LEFT BLANK

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin 3 | Kirkland_Manholes-3128 | 323.94 | Kirkland_Manholes-3129 | 308.71 | 343.2 | 4.44 | 8 | PVC | 0.01 | 1,485 | 0 | 8 | 8 | 0.6 | | |
| CO-1 | Kirkland_Manholes-293 | 22.09 | Kirkland_Manholes-310 | 21.69 | 516.5 | 0.08 | 12 | Concrete | 0.013 | 445 | 1 | 18 | 18 | 4.2 | SM14-Ex-EX37 | |
| CO-2 | Kirkland_Manholes-310 | 21.69 | Kirkland_Manholes-311 | 21.29 | 254.7 | 0.16 | 12 | Concrete | 0.013 | 634 | 3 | 27 | 30 | 4.7 | SM14-Ex-EX37 | |
| CO-6 | Kirkland_Manholes-1496 | 491.57 | Kirkland_Manholes-1461 | 483.24 | 408.5 | 2.04 | 8 | PVC | 0.01 | 1,007 | 0 | 4 | 4 | 0.4 | | |
| CO-8 | Kirkland_Manholes-1271 | 222.62 | Kirkland_Manholes-1272 | 197.83 | 531.9 | 4.66 | 8 | PVC | 0.01 | 1,522 | 0 | 8 | 8 | 0.6 | | |
| CO-9 | Kirkland_Manholes-1272 | 197.83 | Kirkland_Manholes-1273 | 182.86 | 225.5 | 6.64 | 8 | PVC | 0.01 | 1,817 | 3 | 16 | 20 | 1.1 | | |
| CO-11 | Kirkland_Manholes-3102 | 53.77 | Kirkland_Manholes-2664 | 53.2 | 380.4 | 0.15 | 12 | Concrete | 0.013 | 619 | 121 | 401 | 522 | 84.3 | SM14-Ex-EX222 | |
| CO-13 | Kirkland_Manholes-2664 | 53.2 | Kirkland_Manholes-2204 | 53 | 65.8 | 0.3 | 12 | Concrete | 0.013 | 881 | 121 | 407 | 528 | 59.9 | SM14-Ex-EX222 | |
| CO-14 | Kirkland_Manholes-2204 | 53 | Kirkland_Manholes-3101 | 52.44 | 123.2 | 0.45 | 12 | Concrete | 0.013 | 1,078 | 124 | 425 | 549 | 50.9 | SM14-Ex-EX222 | |
| CO-15 | Kirkland_Manholes-978 | 222.9 | Kirkland_Manholes-979 | 219.9 | 335.8 | 0.89 | 8 | PVC | 0.01 | 666 | 8 | 51 | 59 | 8.8 | | |
| CO-17 | Kirkland_Manholes-979 | 219.9 | MH-327 | 219.64 | 97.4 | 0.27 | 8 | PVC | 0.01 | 364 | 8 | 55 | 63 | 17.4 | | |
| CO-18 | MH-327 | 219.64 | Kirkland_Manholes-980 | 219.4 | 90.3 | 0.27 | 8 | PVC | 0.01 | 364 | 12 | 64 | 76 | 20.8 | | |
| CO-19 | Kirkland_Manholes-1011 | 226.35 | MH-327 | 219.64 | 167.6 | 4 | 8 | PVC | 0.01 | 1,411 | 4 | 4 | 8 | 0.6 | | |
| CO-20 | Kirkland_Manholes-1907 | 380.32 | Kirkland_Manholes-1909 | 380 | 67.5 | 0.47 | 8 | PVC | 0.01 | 485 | 17 | 12 | 29 | 6 | | |
| CO-21 | Kirkland_Manholes-1909 | 380 | Kirkland_Manholes-1366 | 377.95 | 352.1 | 0.58 | 8 | PVC | 0.01 | 538 | 43 | 75 | 118 | 22 | | |
| CO-22 | Kirkland_Manholes-638 | 236.51 | Kirkland_Manholes-637 | 235.38 | 223.4 | 0.51 | 21 | PVC | 0.01 | 6,576 | 454 | 1,534 | 1,987 | 30.2 | | |
| CO-23 | Kirkland_Manholes-637 | 235.38 | Kirkland_Manholes-633 | 234.78 | 246.2 | 0.24 | 21 | PVC | 0.01 | 4,564 | 458 | 1,538 | 1,995 | 43.7 | | |
| CO-25 | Kirkland_Manholes-2644 | 74.88 | Kirkland_Manholes-2655 | 44.22 | 203.4 | 15.07 | 8 | PVC | 0.01 | 2,737 | 12 | 73 | 85 | 3.1 | | |
| CO-26 | Kirkland_Manholes-2642 | 102.55 | MH-328 | 82.65 | 111.2 | 17.89 | 8 | PVC | 0.01 | 2,982 | 1 | 12 | 13 | 0.5 | | |
| CO-27 | MH-328 | 82.65 | Kirkland_Manholes-2644 | 74.88 | 76.8 | 10.12 | 8 | PVC | 0.01 | 2,242 | 4 | 30 | 35 | 1.5 | | |
| CO-28 | Kirkland_Manholes-3144 | 94.3 | Kirkland_Manholes-3143 | 93.65 | 162.7 | 0.4 | 6 | PVC | 0.01 | 207 | 2 | 6 | 9 | 4.1 | SM14-Ex-EX293 | |
| CO-29 | Kirkland_Manholes-3143 | 93.65 | MH-328 | 82.65 | 108.8 | 10.11 | 6 | PVC | 0.01 | 1,041 | 3 | 12 | 15 | 1.5 | SM14-Ex-EX293 | |
| CO-30 | Kirkland_Manholes-2662 | 11.52 | Kirkland_Manholes-2661 | 11.28 | 48.5 | 0.49 | 18 | Concrete | 0.013 | 3,316 | 229 | 601 | 830 | 25 | SM14-Ex-EX289 | |
| CO-31 | Kirkland_Manholes-2661 | 11.28 | Kirkland_Manholes-2851 | 10.8 | 93.8 | 0.51 | 18 | Concrete | 0.013 | 3,373 | 254 | 777 | 1,031 | 30.6 | SM14-Ex-EX289 | |
| CO-32 | Kirkland_Manholes-3203 | 49.55 | Kirkland_Manholes-2660 | 26.87 | 244.8 | 9.27 | 8 | PVC | 0.01 | 2,146 | 6 | 36 | 42 | 2 | | |
| CO-33 | Kirkland_Manholes-2660 | 26.87 | Kirkland_Manholes-2661 | 11.28 | 44 | 35.46 | 8 | PVC | 0.01 | 4,198 | 25 | 170 | 195 | 4.6 | | |
| CO-34 | Kirkland_Manholes-2221 | 60.29 | Kirkland_Manholes-2225 | 40.46 | 244.8 | 8.1 | 8 | PVC | 0.01 | 2,007 | 11 | 52 | 63 | 3.1 | | |
| CO-35 | Kirkland_Manholes-2225 | 40.46 | Kirkland_Manholes-2228 | 25 | 165.9 | 9.32 | 8 | PVC | 0.01 | 2,152 | 18 | 71 | 89 | 4.2 | | Drop Connection |
| CO-36 | Kirkland_Manholes-2081 | 95.66 | Kirkland_Manholes-2218 | 82.71 | 188.1 | 6.88 | 8 | PVC | 0.01 | 1,850 | 1 | 6 | 7 | 0.4 | | |
| CO-37 | Kirkland_Manholes-2218 | 82.71 | Kirkland_Manholes-2221 | 60.29 | 246.5 | 9.1 | 8 | PVC | 0.01 | 2,126 | 7 | 26 | 33 | 1.6 | | |
| CO-38 | Kirkland_Manholes-2227 | 45.3 | Kirkland_Manholes-2226 | 43.3 | 93.8 | 2.13 | 8 | PVC | 0.01 | 1,029 | 2 | 6 | 9 | 0.8 | | |
| CO-39 | Kirkland_Manholes-2226 | 43.3 | Kirkland_Manholes-2225 | 40.46 | 248.3 | 1.14 | 8 | PVC | 0.01 | 754 | 6 | 13 | 19 | 2.5 | | |
| CO-41 | Kirkland_Manholes-1046 | 162.86 | Kirkland_Manholes-3175 | 156.47 | 218.7 | 2.92 | 8 | PVC | 0.01 | 1,205 | 74 | 277 | 352 | 29.2 | | |
| CO-42 | Kirkland_Manholes-1043 | 180.32 | Kirkland_Manholes-3126 | 177.5 | 189.3 | 1.49 | 8 | PVC | 0.01 | 861 | 26 | 98 | 124 | 14.4 | | |
| CO-43 | Kirkland_Manholes-3126 | 177.5 | Kirkland_Manholes-1046 | 162.86 | 197.5 | 7.41 | 8 | PVC | 0.01 | 1,920 | 28 | 111 | 139 | 7.2 | | |
| CO-44 | Kirkland_Manholes-61 | 205.17 | Kirkland_Manholes-64 | 204.5 | 110.3 | 0.61 | 8 | Concrete | 0.013 | 423 | 8 | 30 | 38 | 8.9 | SM14-Ex-EX6 | |
| CO-45 | Kirkland_Manholes-64 | 204.5 | Kirkland_Manholes-65 | 199.61 | 323.5 | 1.51 | 8 | Concrete | 0.013 | 667 | 10 | 34 | 44 | 6.6 | SM14-Ex-EX6 | |
| CO-47 | Kirkland_Manholes-2410 | 409.57 | Kirkland_Manholes-2408 | 405.44 | 108.3 | 3.82 | 8 | PVC | 0.01 | 1,377 | 0 | 4 | 4 | 0.3 | | |
| CO-48 | Kirkland_Manholes-2135 | 110 | Kirkland_Manholes-2156 | 109.44 | 35 | 1.6 | 8 | PVC | 0.01 | 892 | 8 | 32 | 40 | 4.5 | | |
| CO-49 | Kirkland_Manholes-2156 | 109.44 | Kirkland_Manholes-2157 | 100.18 | 171 | 5.42 | 8 | PVC | 0.01 | 1,641 | 8 | 39 | 47 | 2.9 | | |
| CO-50 | Kirkland_Manholes-2190 | 132.39 | Kirkland_Manholes-2189 | 112.21 | 288.2 | 7 | 8 | PVC | 0.01 | 1,866 | 6 | 25 | 30 | 1.6 | | |
| CO-51 | Kirkland_Manholes-2189 | 112.21 | Kirkland_Manholes-2186 | 104.5 | 321.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 11 | 33 | 44 | 4 | | |
| CO-52 | Kirkland_Manholes-2169 | 142.85 | Kirkland_Manholes-2168 | 127.32 | 219.5 | 7.07 | 6 | Concrete | 0.013 | 670 | 1 | 16 | 18 | 2.6 | SM14-Ex-EX193 | |
| CO-53 | Kirkland_Manholes-2168 | 127.32 | Kirkland_Manholes-2167 | 120.69 | 65.4 | 10.14 | 6 | Concrete | 0.013 | 802 | 2 | 25 | 27 | 3.4 | SM14-Ex-EX193 | |
| CO-54 | Kirkland_Manholes-2165 | 94.99 | Kirkland_Manholes-2164 | 90.37 | 91.4 | 5.05 | 8 | PVC | 0.01 | 1,585 | 8 | 49 | 57 | 3.6 | | |
| CO-55 | Kirkland_Manholes-2164 | 90.37 | Kirkland_Manholes-2140 | 88.47 | 43.9 | 4.33 | 8 | PVC | 0.01 | 1,468 | 8 | 58 | 66 | 4.5 | | |
| CO-56 | Kirkland_Manholes-1703 | 58 | Kirkland_Manholes-1704 | 54.53 | 111.1 | 3.12 | 6 | Concrete | 0.013 | 445 | 5 | 16 | 22 | 4.8 | SM14-Ex-EX153 | |
| CO-57 | Kirkland_Manholes-1704 | 54.53 | Kirkland_Manholes-1705 | 33.28 | 211.8 | 10.03 | 6 | Concrete | 0.013 | 798 | 5 | 25 | 30 | 3.7 | SM14-Ex-EX153 | |
| CO-58 | Kirkland_Manholes-1810 | 85.96 | Kirkland_Manholes-1808 | 66.8 | 280.2 | 6.84 | 8 | Concrete | 0.013 | 1,418 | 65 | 286 | 351 | 24.8 | SM4 | |
| CO-59 | Kirkland_Manholes-1808 | 66.8 | Kirkland_Manholes-1807 | 44.26 | 183.9 | 12.26 | 8 | Concrete | 0.013 | 1,899 | 66 | 294 | 360 | 19 | SM4 | |
| CO-60 | Kirkland_Manholes-1718 | 72.96 | Kirkland_Manholes-1717 | 58.55 | 301.8 | 4.77 | 8 | Concrete | 0.013 | 1,185 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX165 | |
| CO-61 | Kirkland_Manholes-1717 | 58.55 | Kirkland_Manholes-1719 | 46.02 | 243.6 | 5.14 | 8 | Concrete | 0.013 | 1,230 | 26 | 49 | 75 | 6.1 | SM14-Ex-EX165 | |
| CO-62 | Kirkland_Manholes-1605 | 146.86 | Kirkland_Manholes-1606 | 138.24 | 64.3 | 13.41 | 6 | PVC | 0.01 | 1,199 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX120 | |
| CO-63 | Kirkland_Manholes-1606 | 138.24 | Kirkland_Manholes-1604 | 117.22 | 209.3 | 10.04 | 6 | PVC | 0.01 | 1,038 | 0 | 16 | 16 | 1.6 | SM14-Ex-EX120 | |
| CO-64 | Kirkland_Manholes-3029 | 503.06 | Kirkland_Manholes-1462 | 498.98 | 186.9 | 2.18 | 8 | Concrete | 0.013 | 801 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX273 | |
| CO-66 | Kirkland_Manholes-1468 | 502.5 | Kirkland_Manholes-1462 | 498.98 | 381.4 | 0.92 | 8 | Concrete | 0.013 | 521 | 2 | 4 | 6 | 1.2 | SM14-Ex-EX271 | |
| CO-67 | Kirkland_Manholes-1462 | 498.98 | Kirkland_Manholes-1463 | 498.43 | 46.4 | 1.18 | 8 | Concrete | 0.013 | 590 | 4 | 12 | 16 | 2.8 | SM14-Ex-EX271 | |
| CO-69 | Kirkland_Manholes-1251 | 198.9 | Kirkland_Manholes-1252 | 181.71 | 334.6 | 5.14 | 8 | Concrete | 0.013 | 1,229 | 29 | 156 | 185 | 15.1 | SM14-Ex-EX101 | |
| CO-70 | Kirkland_Manholes-1250 | 210.15 | Kirkland_Manholes-1251 | 198.9 | 400 | 2.81 | 8 | Concrete | 0.013 | 910 | 22 | 140 | 162 | 17.8 | SM14-Ex-EX101 | |
| CO-71 | Kirkland_Manholes-1310 | 231.57 | Kirkland_Manholes-1251 | 198.9 | 267.1 | 12.23 | 8 | Concrete | 0.013 | 1,897 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX99 | |
| CO-72 | Kirkland_Manholes-230 | 172.81 | Kirkland_Manholes-228 | 142.32 | 167.5 | 18.2 | 8 | PVC | 0.01 | 3,008 | 42 | 119 | 161 | 5.4 | | |
| CO-73 | Kirkland_Manholes-3115 | 187.58 | Kirkland_Manholes-228 | 142.32 | 414 | 10.93 | 8 | PVC | 0.01 | 2,331 | 2 | 4 | 7 | 0.3 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-74 | Kirkland_Manholes-1287 | 140.18 | Kirkland_Manholes-1288 | 139.29 | 58.2 | 1.53 | 6 | Concrete | 0.013 | 311 | 29 | 165 | 194 | 62.1 | SM14-Ex-EX105 | |
| CO-75 | Kirkland_Manholes-1288 | 139.29 | Kirkland_Manholes-1289 | 131.61 | 344.5 | 2.23 | 6 | Concrete | 0.013 | 376 | 32 | 173 | 205 | 54.6 | SM14-Ex-EX105 | |
| CO-77 | Kirkland_Manholes-1255 | 163.1 | Kirkland_Manholes-1256 | 151.53 | 106.9 | 10.82 | 8 | Concrete | 0.013 | 1,784 | 4 | 33 | 37 | 2.1 | SM14-Ex-EX104 | |
| CO-78 | Kirkland_Manholes-1253 | 189.17 | MH-329 | 183.73 | 57.5 | 9.46 | 8 | Concrete | 0.013 | 1,668 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX104 | |
| CO-80 | Kirkland_Manholes-1254 | 186 | MH-329 | 183.73 | 30.2 | 7.52 | 8 | Concrete | 0.013 | 1,488 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX104 | |
| CO-81 | MH-329 | 183.73 | Kirkland_Manholes-1255 | 163.1 | 274.1 | 7.53 | 8 | Concrete | 0.013 | 1,488 | 3 | 25 | 28 | 1.9 | SM14-Ex-EX104 | |
| CO-83 | Kirkland_Manholes-279 | 76.14 | Kirkland_Manholes-278 | 56.62 | 239.7 | 8.14 | 8 | Concrete | 0.013 | 1,548 | 28 | 6 | 35 | 2.2 | SM10 | |
| CO-84 | Kirkland_Manholes-271 | 91.78 | Kirkland_Manholes-272 | 84 | 313.5 | 2.48 | 8 | Concrete | 0.013 | 854 | 48 | 130 | 178 | 20.8 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| CO-85 | Kirkland_Manholes-272 | 84 | Kirkland_Manholes-273 | 69.52 | 161.1 | 8.99 | 8 | Concrete | 0.013 | 1,626 | 50 | 134 | 184 | 11.3 | SM10 | |
| CO-89 | Kirkland_Manholes-1221 | 265 | Kirkland_Manholes-1210 | 257.02 | 313.6 | 2.54 | 6 | Concrete | 0.013 | 402 | 4 | 14 | 19 | 4.6 | SM14-Ex-EX90 | |
| CO-90 | Kirkland_Manholes-1208 | 237.71 | Kirkland_Manholes-1207 | 214.35 | 271 | 8.62 | 6 | Concrete | 0.013 | 739 | 12 | 39 | 51 | 6.9 | SM14-Ex-EX90 | |
| CO-91 | Kirkland_Manholes-1207 | 214.35 | Kirkland_Manholes-1206 | 193.92 | 362.6 | 5.63 | 6 | Concrete | 0.013 | 598 | 15 | 47 | 62 | 10.4 | SM14-Ex-EX90 | |
| CO-92 | Kirkland_Manholes-1142 | 218.06 | Kirkland_Manholes-1146 | 215.3 | 316.4 | 0.87 | 6 | Concrete | 0.013 | 235 | 8 | 33 | 41 | 17.6 | SM4 | |
| CO-93 | Kirkland_Manholes-1223 | 241.1 | Kirkland_Manholes-1146 | 215.3 | 349.8 | 7.38 | 6 | Concrete | 0.013 | 684 | 3 | 8 | 11 | 1.6 | SM14-Ex-EX86 | |
| CO-94 | Kirkland_Manholes-1199 | 190.02 | Kirkland_Manholes-1198 | 189.72 | 153.8 | 0.19 | 8 | Concrete | 0.013 | 239 | 8 | 8 | 17 | 7 | SM14-Ex-EX80 | |
| CO-95 | Kirkland_Manholes-1141 | 204.1 | Kirkland_Manholes-1198 | 189.72 | 107.3 | 13.4 | 8 | Concrete | 0.013 | 1,985 | 5 | 33 | 37 | 1.9 | SM14-Ex-EX80 | |
| CO-96 | Kirkland_Manholes-3104 | 114.41 | Kirkland_Manholes-3103 | 113.84 | 31.2 | 1.83 | 8 | PVC | 0.01 | 953 | 15 | 107 | 122 | 12.9 | SM10 | |
| CO-97 | Kirkland_Manholes-517 | 138.64 | Kirkland_Manholes-3103 | 113.84 | 358.5 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 8 | 9 | 0.5 | SM10 | |
| CO-98 | Kirkland_Manholes-3196 | 122.5 | Kirkland_Manholes-503 | 118 | 198.4 | 2.27 | 6 | Concrete | 0.013 | 379 | 3 | 16 | 19 | 5.1 | SM10 | |
| CO-100 | Kirkland_Manholes-503 | 118 | Kirkland_Manholes-504 | 108.24 | 276.3 | 3.53 | 6 | Concrete | 0.013 | 473 | 4 | 25 | 28 | 6 | SM14-Ex-EX78 | |
| CO-101 | Kirkland_Manholes-504 | 108.24 | Kirkland_Manholes-510 | 78.8 | 269.3 | 10.93 | 6 | Concrete | 0.013 | 833 | 5 | 33 | 38 | 4.5 | SM14-Ex-EX78 | |
| CO-102 | Kirkland_Manholes-2573 | 298.95 | Kirkland_Manholes-2572 | 298.88 | 17.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 18 | 4.1 | | |
| CO-103 | Kirkland_Manholes-2959 | 355.76 | Kirkland_Manholes-2572 | 298.88 | 327.6 | 17.36 | 8 | PVC | 0.01 | 2,938 | 1 | 4 | 5 | 0.2 | | |
| CO-104 | Kirkland_Manholes-2783 | 269.77 | Kirkland_Manholes-2784 | 262.56 | 166.7 | 4.32 | 8 | PVC | 0.01 | 1,466 | 6 | 40 | 45 | 3.1 | | |
| CO-105 | Kirkland_Manholes-2578 | 278.46 | Kirkland_Manholes-2783 | 269.77 | 170.6 | 5.09 | 8 | PVC | 0.01 | 1,591 | 5 | 36 | 41 | 2.6 | | |
| CO-106 | Kirkland_Manholes-2921 | 73.76 | Kirkland_Manholes-2920 | 63.77 | 70.3 | 14.2 | 8 | PVC | 0.01 | 2,657 | 2 | 17 | 19 | 0.7 | | |
| CO-107 | Kirkland_Manholes-2920 | 63.77 | Kirkland_Manholes-177 | 35.5 | 126.7 | 22.31 | 8 | | 0.012 | 2,775 | 3 | 21 | 24 | 0.9 | | |
| CO-109 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1221 | 265 | 237.1 | 0.4 | 6 | Concrete | 0.013 | 159 | 2 | 6 | 8 | 5.1 | SM14-Ex-EX90 | |
| CO-110 | Kirkland_Manholes-2686 | 221.84 | Kirkland_Manholes-2690 | 217.58 | 240.3 | 1.77 | 8 | Concrete | 0.013 | 722 | 10 | 32 | 42 | 5.8 | SM14-Ex-EX201 | |
| CO-111 | Kirkland_Manholes-2690 | 217.58 | Kirkland_Manholes-2691 | 211.09 | 233.1 | 2.78 | 8 | Concrete | 0.013 | 905 | 11 | 36 | 47 | 5.2 | SM14-Ex-EX201 | |
| CO-112 | Kirkland_Manholes-2612 | 250.12 | Kirkland_Manholes-2613 | 203.91 | 357.8 | 12.91 | 8 | Concrete | 0.013 | 1,949 | 4 | 8 | 12 | 0.6 | SM14-Ex-EX297 | |
| CO-113 | Kirkland_Manholes-2613 | 203.91 | Kirkland_Manholes-3164 | 171.21 | 256.4 | 12.76 | 8 | Concrete | 0.013 | 1,937 | 6 | 12 | 18 | 0.9 | SM14-Ex-EX297 | |
| CO-114 | Kirkland_Manholes-488 | 256.69 | Kirkland_Manholes-489 | 206.41 | 218.5 | 23.01 | 8 | PVC | 0.01 | 3,382 | 1 | 4 | 5 | 0.2 | | |
| CO-115 | Kirkland_Manholes-834 | 245.56 | Kirkland_Manholes-489 | 206.41 | 278.5 | 14.06 | 8 | PVC | 0.01 | 2,644 | 2 | 4 | 6 | 0.2 | | |
| CO-116 | Kirkland_Manholes-599 | 92.8 | Kirkland_Manholes-600 | 91.95 | 330.6 | 0.26 | 6 | Concrete | 0.013 | 128 | 1 | 16 | 18 | 13.8 | SM14-Ex-EX160 | |
| CO-120 | Kirkland_Manholes-601 | 92.05 | Kirkland_Manholes-602 | 90.22 | 280.5 | 0.65 | 6 | Concrete | 0.013 | 203 | 10 | 16 | 27 | 13.1 | SM14-Ex-EX160 | |
| CO-123 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-604 | 92.41 | 322.7 | 0.77 | 6 | Concrete | 0.013 | 221 | 2 | 4 | 6 | 2.8 | SM14-Ex-EX160 | |
| CO-124 | Kirkland_Manholes-594 | 105.16 | Kirkland_Manholes-595 | 103.44 | 177 | 0.97 | 12 | Concrete | 0.013 | 1,576 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX116 | |
| CO-125 | MH-321 | 218.02 | MH-322 | 217.7 | 80.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| CO-126 | MH-322 | 217.7 | Kirkland_Manholes-2446 | 217.36 | 85 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.3 | | |
| CO-127 | MH-315 | 235.18 | MH-316 | 235.06 | 29.4 | 0.41 | 6 | Concrete | 0.013 | 161 | 1 | 4 | 5 | 2.9 | | |
| CO-128 | MH-316 | 235.06 | Kirkland_Manholes-2602 | 234.19 | 216.7 | 0.4 | 6 | Concrete | 0.013 | 159 | 1 | 8 | 9 | 5.9 | SM14-Ex-EX300 | |
| CO-130 | MH-330 | 93.13 | Kirkland_Manholes-601 | 92.05 | 270.2 | 0.4 | 6 | Concrete | 0.013 | 159 | 0 | 8 | 9 | 5.4 | SM14-Ex-EX160 | |
| CO-133 | Kirkland_Manholes-2269 | 398.2 | Kirkland_Manholes-2266 | 392.8 | 346.8 | 1.56 | 8 | Concrete | 0.013 | 677 | 19 | 103 | 122 | 18.1 | SM14-Ex-EX261 | |
| CO-139 | Kirkland_Manholes-2703 | 250.19 | MH-333 | 250.73 | 32.9 | 1.64 | 8 | PVC | 0.01 | 904 | 2 | 12 | 14 | 1.6 | | |
| CO-140 | MH-333 | 250.73 | MH-334 | 252.1 | 150.3 | 0.91 | 8 | PVC | 0.01 | 673 | 1 | 8 | 9 | 1.4 | | |
| CO-141 | MH-334 | 252.1 | MH-335 | 253.55 | 221.6 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 4 | 5 | 0.8 | | |
| CO-142 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1214 | 261.31 | 224.5 | 2.07 | 6 | Concrete | 0.013 | 362 | 2 | 6 | 8 | 2.3 | SM14-Ex-EX90 | |
| CO-143 | Kirkland_Manholes-2593 | 284.96 | Kirkland_Manholes-2604 | 283.17 | 324.7 | 0.55 | 8 | Concrete | 0.013 | 403 | 24 | 91 | 0 | 0 | SM14-Ex-EX299 | |
| CO-148 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-602 | 90.22 | 228.3 | 2.05 | 8 | Concrete | 0.013 | 776 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX160 | |
| CO-149 | MH-336 | 98.65 | Kirkland_Manholes-276 | 92.16 | 227.3 | 2.86 | 8 | Concrete | 0.013 | 916 | 0 | 3 | 3 | 0.3 | SM10 | |
| CO-150 | MH-337 | 92.45 | Kirkland_Manholes-279 | 76.14 | 213.9 | 7.63 | 8 | Concrete | 0.013 | 1,498 | 0 | 3 | 3 | 0.2 | SM10 | |
| CO-151 | MH-338 | 119.57 | Kirkland_Manholes-308 | 114.39 | 316.2 | 1.64 | 8 | Concrete | 0.013 | 694 | 0 | 9 | 9 | 1.3 | SM10 | |
| CO-152 | MH-339 | 159.67 | Kirkland_Manholes-524 | 157.52 | 274.1 | 0.78 | 8 | Concrete | 0.013 | 480 | 0 | 8 | 8 | 1.7 | SM10 | |
| CO-154 | MH_Selection_06-13-2016-11 | 20.6 | O-26 | 20.25 | 45 | 0.78 | 48 | Concrete | 0.013 | 56,862 | 1,146 | 4,222 | 6,953 | 12.2 | | Updated per as-built drawings |
| KC_Main-2 | KC_Manholes-18 | 10.29 | KC_Manholes-19 | 10.24 | 10.1 | 0.5 | 15 | Concrete | 0.013 | 2,043 | 734 | 2,048 | 2,854 | 139.7 | SM14-Ex-EX289 | |
| KC_Main-28 | KC_Manholes-19 | 10.24 | O-6 | 10 | 47.9 | 0.5 | 15 | Concrete | 0.013 | 2,052 | 782 | 2,054 | 2,908 | 141.7 | SM14-Ex-EX289 | |
| Kirkland_Main-1 | Kirkland_Manholes-2 | 142.59 | Kirkland_Manholes-3 | 141.09 | 316.3 | 0.47 | 8 | PVC | 0.01 | 486 | 0 | 1 | 1 | 0.3 | | |
| Kirkland_Main-2 | Kirkland_Manholes-4 | 139.47 | Kirkland_Manholes-5 | 138.65 | 146.8 | 0.56 | 8 | PVC | 0.01 | 527 | 14 | 4 | 19 | 3.5 | | |
| Kirkland_Main-3 | Kirkland_Manholes-3 | 141.09 | Kirkland_Manholes-4 | 139.47 | 325.9 | 0.5 | 8 | PVC | 0.01 | 497 | 14 | 3 | 17 | 3.4 | | |
| Kirkland_Main-4 | Kirkland_Manholes-6 | 127.8 | Kirkland_Manholes-7 | 127.07 | 145 | 0.5 | 8 | PVC | 0.01 | 500 | 15 | 7 | 23 | 4.5 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-5 | Kirkland_Manholes-5 | 138.65 | Kirkland_Manholes-6 | 127.8 | 166.2 | 6.53 | 8 | PVC | 0.01 | 1,801 | 15 | 6 | 21 | 1.1 | | |
| Kirkland_Main-6 | Kirkland_Manholes-8 | 108.29 | Kirkland_Manholes-9 | 99.39 | 204.3 | 4.36 | 8 | PVC | 0.01 | 1,471 | 16 | 12 | 28 | 1.9 | | |
| Kirkland_Main-7 | Kirkland_Manholes-7 | 127.07 | Kirkland_Manholes-8 | 108.29 | 154 | 12.2 | 8 | PVC | 0.01 | 2,462 | 16 | 10 | 27 | 1.1 | | |
| Kirkland_Main-8 | Kirkland_Manholes-9 | 99.39 | Kirkland_Manholes-99 | 74.09 | 252.3 | 10.03 | 8 | PVC | 0.01 | 2,233 | 58 | 13 | 71 | 3.2 | | |
| Kirkland_Main-10 | Kirkland_Manholes-10 | 249.23 | Kirkland_Manholes-11 | 247.5 | 365.2 | 0.47 | 8 | PVC | 0.01 | 485 | 1 | 4 | 4 | 0.9 | | |
| Kirkland_Main-11 | Kirkland_Manholes-11 | 247.5 | Kirkland_Manholes-12 | 246.57 | 355.7 | 0.26 | 8 | PVC | 0.01 | 360 | 2 | 8 | 10 | 2.8 | | |
| Kirkland_Main-12 | Kirkland_Manholes-12 | 246.57 | Kirkland_Manholes-650 | 246.28 | 73.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3.1 | | |
| Kirkland_Main-13 | Kirkland_Manholes-13 | 266.08 | Kirkland_Manholes-917 | 265.16 | 206.5 | 0.45 | 8 | PVC | 0.01 | 471 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-14 | Kirkland_Manholes-14 | 260.99 | Kirkland_Manholes-15 | 248.41 | 274.7 | 4.58 | 8 | PVC | 0.01 | 1,509 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-15 | Kirkland_Manholes-16 | 249.63 | Kirkland_Manholes-15 | 248.41 | 56 | 2.18 | 8 | PVC | 0.01 | 1,041 | 16 | 75 | 91 | 8.8 | | |
| Kirkland_Main-16 | Kirkland_Manholes-17 | 247.29 | Kirkland_Manholes-650 | 246.28 | 284.1 | 0.36 | 8 | PVC | 0.01 | 420 | 19 | 87 | 107 | 25.3 | | |
| Kirkland_Main-17 | Kirkland_Manholes-3034 | 97.65 | Kirkland_Manholes-3033 | 93.75 | 20 | 19.51 | 8 | PVC | 0.01 | 3,114 | 0 | 4 | 5 | 0.1 | | |
| Kirkland_Main-18 | Kirkland_Manholes-3033 | 93.75 | Kirkland_Manholes-3032 | 86.58 | 55.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 0 | 9 | 9 | 0.3 | | |
| Kirkland_Main-19 | Kirkland_Manholes-3032 | 86.58 | Kirkland_Manholes-22 | 82.71 | 39.7 | 9.76 | 8 | PVC | 0.01 | 2,202 | 0 | 13 | 13 | 0.6 | | |
| Kirkland_Main-20 | Kirkland_Manholes-22 | 82.71 | Kirkland_Manholes-1 | 73.25 | 125.9 | 7.51 | 8 | PVC | 0.01 | 1,932 | 1 | 17 | 18 | 0.9 | | |
| Kirkland_Main-21 | Kirkland_Manholes-15 | 248.41 | Kirkland_Manholes-17 | 247.29 | 382.5 | 0.29 | 8 | PVC | 0.01 | 382 | 17 | 83 | 100 | 26.3 | | |
| Kirkland_Main-22 | Kirkland_Manholes-18 | 254.35 | Kirkland_Manholes-16 | 249.63 | 106.2 | 4.45 | 8 | PVC | 0.01 | 1,487 | 15 | 72 | 86 | 5.8 | | |
| Kirkland_Main-23 | Kirkland_Manholes-19 | 254.88 | Kirkland_Manholes-18 | 254.35 | 102.4 | 0.52 | 8 | PVC | 0.01 | 507 | 14 | 68 | 81 | 16 | | |
| Kirkland_Main-24 | Kirkland_Manholes-23 | 269.98 | Kirkland_Manholes-19 | 254.88 | 324.5 | 4.65 | 8 | PVC | 0.01 | 1,521 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-25 | Kirkland_Manholes-622 | 255 | Kirkland_Manholes-19 | 254.88 | 84.5 | 0.14 | 8 | PVC | 0.01 | 266 | 12 | 60 | 72 | 26.9 | | |
| Kirkland_Main-26 | Kirkland_Manholes-624 | 257.73 | Kirkland_Manholes-623 | 256.4 | 95.1 | 1.4 | 8 | PVC | 0.01 | 834 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-27 | Kirkland_Manholes-623 | 256.4 | Kirkland_Manholes-622 | 255 | 306.3 | 0.46 | 8 | PVC | 0.01 | 477 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-28 | Kirkland_Manholes-625 | 258 | Kirkland_Manholes-622 | 255 | 179.1 | 1.67 | 8 | PVC | 0.01 | 912 | 10 | 48 | 57 | 6.3 | | |
| Kirkland_Main-29 | Kirkland_Manholes-28 | 182.96 | Kirkland_Manholes-29 | 182.79 | 41.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 8 | 1.8 | | |
| Kirkland_Main-30 | Kirkland_Manholes-29 | 182.79 | Kirkland_Manholes-25 | 175.02 | 121.6 | 6.39 | 8 | PVC | 0.01 | 1,783 | 16 | 43 | 59 | 3.3 | | |
| Kirkland_Main-31 | Kirkland_Manholes-36 | 251.25 | Kirkland_Manholes-35 | 222.04 | 280.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-32 | Kirkland_Manholes-35 | 222.04 | Kirkland_Manholes-34 | 221.71 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.6 | | |
| Kirkland_Main-33 | Kirkland_Manholes-34 | 221.71 | Kirkland_Manholes-32 | 220.36 | 300.4 | 0.45 | 8 | PVC | 0.01 | 473 | 5 | 13 | 18 | 3.7 | | |
| Kirkland_Main-34 | Kirkland_Manholes-32 | 220.36 | Kirkland_Manholes-33 | 219.84 | 21.3 | 2.44 | 8 | PVC | 0.01 | 1,102 | 6 | 17 | 23 | 2.1 | | |
| Kirkland_Main-35 | Kirkland_Manholes-33 | 219.84 | Kirkland_Manholes-31 | 218.88 | 40.1 | 2.39 | 8 | PVC | 0.01 | 1,091 | 6 | 21 | 28 | 2.5 | | |
| Kirkland_Main-36 | Kirkland_Manholes-37 | 238.46 | Kirkland_Manholes-31 | 218.88 | 419.9 | 4.66 | 8 | PVC | 0.01 | 1,523 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-37 | Kirkland_Manholes-31 | 218.88 | Kirkland_Manholes-30 | 193.77 | 330.5 | 7.6 | 8 | PVC | 0.01 | 1,943 | 9 | 30 | 39 | 2 | | |
| Kirkland_Main-38 | Kirkland_Manholes-30 | 193.77 | Kirkland_Manholes-29 | 182.79 | 147.1 | 7.46 | 8 | PVC | 0.01 | 1,926 | 12 | 34 | 46 | 2.4 | | |
| Kirkland_Main-39 | Kirkland_Manholes-40 | 185.88 | Kirkland_Manholes-41 | 184.86 | 116.1 | 0.88 | 8 | PVC | 0.01 | 661 | 0 | 9 | 9 | 1.3 | | |
| Kirkland_Main-40 | Kirkland_Manholes-41 | 184.86 | Kirkland_Manholes-38 | 173.18 | 108.4 | 10.78 | 8 | PVC | 0.01 | 2,314 | 1 | 13 | 14 | 0.6 | | |
| Kirkland_Main-41 | Kirkland_Manholes-39 | 193.85 | Kirkland_Manholes-40 | 185.88 | 407 | 1.96 | 8 | PVC | 0.01 | 987 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-42 | Kirkland_Manholes-54 | 66.84 | Kirkland_Manholes-103 | 59.75 | 133.4 | 5.31 | 8 | Concrete | 0.013 | 1,250 | 35 | 154 | 189 | 15.1 | SM14-Ex-EX13 | |
| Kirkland_Main-43 | Kirkland_Manholes-47 | 192.83 | Kirkland_Manholes-48 | 169.78 | 343.8 | 6.71 | 8 | Concrete | 0.013 | 1,404 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX13 | |
| Kirkland_Main-44 | Kirkland_Manholes-48 | 169.78 | Kirkland_Manholes-49 | 164.6 | 338.4 | 1.53 | 8 | Concrete | 0.013 | 671 | 3 | 9 | 12 | 1.7 | SM14-Ex-EX13 | |
| Kirkland_Main-45 | Kirkland_Manholes-49 | 164.6 | Kirkland_Manholes-50 | 161.4 | 179.7 | 1.78 | 8 | Concrete | 0.013 | 724 | 22 | 111 | 133 | 18.4 | SM14-Ex-EX13 | |
| Kirkland_Main-46 | Kirkland_Manholes-50 | 161.4 | Kirkland_Manholes-51 | 157.39 | 303.6 | 1.32 | 8 | Concrete | 0.013 | 623 | 23 | 115 | 139 | 22.2 | SM14-Ex-EX13 | |
| Kirkland_Main-47 | Kirkland_Manholes-51 | 157.39 | Kirkland_Manholes-52 | 124.84 | 333.7 | 9.75 | 8 | Concrete | 0.013 | 1,694 | 25 | 119 | 145 | 8.5 | SM14-Ex-EX13 | |
| Kirkland_Main-48 | Kirkland_Manholes-59 | 155.25 | Kirkland_Manholes-58 | 153.05 | 131 | 1.68 | 8 | Concrete | 0.013 | 703 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX14 | |
| Kirkland_Main-49 | Kirkland_Manholes-58 | 153.05 | Kirkland_Manholes-57 | 140.82 | 263.2 | 4.65 | 8 | Concrete | 0.013 | 1,169 | 2 | 9 | 10 | 0.9 | SM14-Ex-EX14 | |
| Kirkland_Main-50 | Kirkland_Manholes-57 | 140.82 | Kirkland_Manholes-56 | 112.82 | 272.1 | 10.29 | 8 | Concrete | 0.013 | 1,740 | 4 | 13 | 17 | 1 | SM14-Ex-EX14 | |
| Kirkland_Main-51 | Kirkland_Manholes-56 | 112.82 | Kirkland_Manholes-55 | 79.92 | 269.4 | 12.21 | 8 | Concrete | 0.013 | 1,895 | 6 | 17 | 23 | 1.2 | SM14-Ex-EX14 | |
| Kirkland_Main-52 | Kirkland_Manholes-55 | 79.92 | Kirkland_Manholes-54 | 66.84 | 152.2 | 8.59 | 8 | Concrete | 0.013 | 1,590 | 8 | 21 | 29 | 1.8 | SM14-Ex-EX14 | |
| Kirkland_Main-53 | Kirkland_Manholes-52 | 124.84 | Kirkland_Manholes-53 | 83.26 | 336 | 12.38 | 8 | Concrete | 0.013 | 1,908 | 27 | 124 | 151 | 7.9 | SM14-Ex-EX13 | |
| Kirkland_Main-54 | Kirkland_Manholes-53 | 83.26 | Kirkland_Manholes-54 | 66.84 | 148.1 | 11.08 | 8 | Concrete | 0.013 | 1,806 | 27 | 128 | 155 | 8.6 | SM14-Ex-EX13 | |
| Kirkland_Main-55 | Kirkland_Manholes-62 | 222.28 | Kirkland_Manholes-63 | 216.98 | 205.6 | 2.58 | 8 | PVC | 0.01 | 1,132 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-56 | Kirkland_Manholes-63 | 216.98 | Kirkland_Manholes-60 | 215.88 | 80.7 | 1.36 | 8 | PVC | 0.01 | 823 | 2 | 9 | 10 | 1.3 | | |
| Kirkland_Main-57 | Kirkland_Manholes-60 | 215.88 | Kirkland_Manholes-61 | 215.72 | 40.6 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 13 | 16 | 3.5 | | Drop Connection |
| Kirkland_Main-58 | Kirkland_Manholes-65 | 199.61 | Kirkland_Manholes-66 | 186.65 | 326.2 | 3.97 | 8 | Concrete | 0.013 | 1,081 | 11 | 38 | 49 | 4.6 | SM14-Ex-EX6 | |
| Kirkland_Main-59 | Kirkland_Manholes-66 | 186.65 | Kirkland_Manholes-67 | 185.01 | 47 | 3.49 | 8 | Concrete | 0.013 | 1,013 | 37 | 102 | 140 | 13.8 | SM14-Ex-EX17 | |
| Kirkland_Main-61 | Kirkland_Manholes-72 | 160.29 | Kirkland_Manholes-70 | 152.59 | 265.8 | 2.9 | 8 | Concrete | 0.013 | 923 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX15 | |
| Kirkland_Main-62 | Kirkland_Manholes-985 | 205.92 | Kirkland_Manholes-986 | 204.38 | 192.7 | 0.8 | 8 | Concrete | 0.013 | 485 | 29 | 137 | 165 | 34.1 | SM14-Ex-EX3 | |
| Kirkland_Main-63 | Kirkland_Manholes-242 | 21.02 | Kirkland_Manholes-2761 | 12.79 | 68 | 12.1 | 8 | PVC | 0.01 | 2,453 | 60 | 265 | 325 | 13.2 | | |
| Kirkland_Main-64 | Kirkland_Manholes-1033 | 173.21 | Kirkland_Manholes-450 | 130.07 | 239 | 18.05 | 8 | PVC | 0.01 | 2,996 | 4 | 13 | 16 | 0.5 | | |
| Kirkland_Main-65 | Kirkland_Manholes-71 | 153 | Kirkland_Manholes-70 | 152.59 | 153.6 | 0.27 | 8 | Concrete | 0.013 | 280 | 1 | 4 | 5 | 1.9 | SM14-Ex-EX16 | |
| Kirkland_Main-66 | Kirkland_Manholes-69 | 159.19 | Kirkland_Manholes-70 | 152.59 | 340.9 | 1.94 | 8 | Concrete | 0.013 | 755 | 4 | 9 | 12 | 1.6 | SM14-Ex-EX16 | |
| Kirkland_Main-67 | Kirkland_Manholes-68 | 178.61 | Kirkland_Manholes-69 | 159.19 | 346.1 | 5.61 | 8 | Concrete | 0.013 | 1,285 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX16 | |
| Kirkland_Main-68 | Kirkland_Manholes-73 | 249.05 | Kirkland_Manholes-74 | 244.74 | 143 | 3.01 | 8 | PVC | 0.01 | 1,224 | 0 | 4 | 4 | 0.4 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-69 | Kirkland_Manholes-77 | 217.04 | Kirkland_Manholes-78 | 207.46 | 342.9 | 2.79 | 8 | Concrete | 0.013 | 907 | 9 | 21 | 30 | 3.3 | SM14-Ex-EX7 | |
| Kirkland_Main-70 | Kirkland_Manholes-76 | 225.56 | Kirkland_Manholes-77 | 217.04 | 294.1 | 2.9 | 8 | Concrete | 0.013 | 923 | 5 | 17 | 22 | 2.4 | SM14-Ex-EX7 | |
| Kirkland_Main-71 | Kirkland_Manholes-75 | 235.08 | Kirkland_Manholes-76 | 225.56 | 281.9 | 3.38 | 8 | Concrete | 0.013 | 997 | 3 | 13 | 16 | 1.6 | SM14-Ex-EX7 | |
| Kirkland_Main-72 | Kirkland_Manholes-74 | 244.74 | Kirkland_Manholes-75 | 235.08 | 281.2 | 3.44 | 8 | Concrete | 0.013 | 1,005 | 2 | 9 | 10 | 1 | SM14-Ex-EX7 | |
| Kirkland_Main-75 | Kirkland_Manholes-79 | 197.48 | Kirkland_Manholes-66 | 186.65 | 235.2 | 4.6 | 8 | Concrete | 0.013 | 1,164 | 24 | 60 | 84 | 7.2 | SM14-Ex-EX17 | |
| Kirkland_Main-76 | Kirkland_Manholes-78 | 207.46 | Kirkland_Manholes-79 | 197.48 | 229.3 | 4.35 | 8 | Concrete | 0.013 | 1,132 | 23 | 55 | 78 | 6.9 | SM14-Ex-EX17 | |
| Kirkland_Main-78 | Kirkland_Manholes-46 | 167.44 | Kirkland_Manholes-43 | 166.66 | 144 | 0.54 | 8 | Concrete | 0.013 | 399 | 0 | 9 | 9 | 2.1 | SM14-Ex-EX5 | |
| Kirkland_Main-79 | Kirkland_Manholes-43 | 166.66 | Kirkland_Manholes-44 | 166.02 | 96.1 | 0.67 | 8 | Concrete | 0.013 | 443 | 18 | 90 | 108 | 24.3 | SM14-Ex-EX5 | |
| Kirkland_Main-80 | Kirkland_Manholes-45 | 166.8 | Kirkland_Manholes-44 | 166.02 | 115.5 | 0.68 | 8 | Concrete | 0.013 | 446 | 0 | 4 | 4 | 1 | SM14-Ex-EX5 | |
| Kirkland_Main-81 | Kirkland_Manholes-27 | 172.24 | Kirkland_Manholes-26 | 167.35 | 165.4 | 2.96 | 8 | Concrete | 0.013 | 932 | 2 | 21 | 23 | 2.5 | SM14-Ex-EX5 | |
| Kirkland_Main-82 | Kirkland_Manholes-26 | 167.35 | Kirkland_Manholes-43 | 166.66 | 133.3 | 0.52 | 8 | Concrete | 0.013 | 390 | 18 | 77 | 95 | 24.3 | SM14-Ex-EX5 | |
| Kirkland_Main-84 | Kirkland_Manholes-38 | 173.18 | Kirkland_Manholes-27 | 172.24 | 235.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 2 | 17 | 19 | 5.5 | SM14-Ex-EX5 | |
| Kirkland_Main-85 | Kirkland_Manholes-24 | 172.7 | Kirkland_Manholes-26 | 167.35 | 274.1 | 1.95 | 8 | Concrete | 0.013 | 758 | 16 | 51 | 67 | 8.9 | SM14-Ex-EX5 | |
| Kirkland_Main-86 | Kirkland_Manholes-42 | 173.4 | Kirkland_Manholes-46 | 167.44 | 195.7 | 3.04 | 8 | Concrete | 0.013 | 946 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX5 | |
| Kirkland_Main-87 | Kirkland_Manholes-25 | 175.02 | Kirkland_Manholes-24 | 172.7 | 94.4 | 2.46 | 8 | Concrete | 0.013 | 850 | 16 | 47 | 63 | 7.4 | SM14-Ex-EX5 | |
| Kirkland_Main-88 | Kirkland_Manholes-44 | 166.02 | Kirkland_Manholes-49 | 164.6 | 321.6 | 0.44 | 8 | Concrete | 0.013 | 360 | 18 | 98 | 116 | 32.3 | SM14-Ex-EX5 | |
| Kirkland_Main-90 | Kirkland_Manholes-81 | 88.9 | Kirkland_Manholes-143 | 71.16 | 340.9 | 5.2 | 8 | PVC | 0.01 | 1,608 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-91 | Kirkland_Manholes-70 | 152.59 | Kirkland_Manholes-82 | 150.35 | 263.6 | 0.85 | 8 | Concrete | 0.013 | 500 | 7 | 21 | 29 | 5.7 | SM14-Ex-EX15 | |
| Kirkland_Main-92 | Kirkland_Manholes-85 | 147.38 | Kirkland_Manholes-84 | 141.87 | 73.4 | 7.51 | 8 | Concrete | 0.013 | 1,486 | 3 | 9 | 12 | 0.8 | SM14-Ex-EX24 | |
| Kirkland_Main-93 | Kirkland_Manholes-83 | 157.35 | Kirkland_Manholes-85 | 147.38 | 229.6 | 4.34 | 8 | Concrete | 0.013 | 1,130 | 1 | 4 | 6 | 0.5 | SM14-Ex-EX24 | |
| Kirkland_Main-95 | Kirkland_Manholes-82 | 150.35 | Kirkland_Manholes-86 | 148.26 | 180.8 | 1.16 | 8 | Concrete | 0.013 | 583 | 8 | 26 | 34 | 5.8 | SM14-Ex-EX15 | |
| Kirkland_Main-96 | Kirkland_Manholes-87 | 163.95 | Kirkland_Manholes-147 | 139.14 | 319.7 | 7.76 | 8 | Concrete | 0.013 | 1,511 | 40 | 111 | 151 | 10 | SM14-Ex-EX25 | |
| Kirkland_Main-97 | Kirkland_Manholes-67 | 185.01 | Kirkland_Manholes-87 | 163.95 | 332 | 6.34 | 8 | Concrete | 0.013 | 1,366 | 38 | 107 | 144 | 10.6 | SM14-Ex-EX25 | |
| Kirkland_Main-98 | Kirkland_Manholes-88 | 192.85 | Kirkland_Manholes-89 | 177.59 | 273.6 | 5.58 | 8 | Concrete | 0.013 | 1,281 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX26 | |
| Kirkland_Main-99 | Kirkland_Manholes-90 | 174.66 | Kirkland_Manholes-91 | 170.09 | 87.7 | 5.21 | 8 | Concrete | 0.013 | 1,238 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX27 | |
| Kirkland_Main-100 | Kirkland_Manholes-92 | 172.99 | Kirkland_Manholes-91 | 170.09 | 82 | 3.53 | 8 | Concrete | 0.013 | 1,019 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX27 | |
| Kirkland_Main-101 | Kirkland_Manholes-91 | 170.09 | Kirkland_Manholes-152 | 157.79 | 45.8 | 26.87 | 8 | Concrete | 0.013 | 2,811 | 3 | 13 | 15 | 0.5 | SM14-Ex-EX27 | Slope verified in as-builts |
| Kirkland_Main-103 | Kirkland_Manholes-98 | 253.76 | Kirkland_Manholes-97 | 241.6 | 353.8 | 3.44 | 8 | Concrete | 0.013 | 1,005 | 3 | 4 | 7 | 0.7 | SM14-Ex-EX8 | |
| Kirkland_Main-104 | Kirkland_Manholes-2944 | 250.07 | Kirkland_Manholes-2943 | 249.65 | 93.4 | 0.45 | 8 | PVC | 0.01 | 473 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-105 | Kirkland_Manholes-97 | 241.6 | Kirkland_Manholes-95 | 228.66 | 356.1 | 3.63 | 8 | Concrete | 0.013 | 1,034 | 5 | 9 | 14 | 1.3 | SM14-Ex-EX8 | |
| Kirkland_Main-106 | Kirkland_Manholes-95 | 228.66 | Kirkland_Manholes-96 | 228 | 106.1 | 0.62 | 8 | Concrete | 0.013 | 428 | 7 | 13 | 20 | 4.7 | SM14-Ex-EX8 | |
| Kirkland_Main-107 | Kirkland_Manholes-96 | 228 | Kirkland_Manholes-93 | 223.12 | 245.5 | 1.99 | 8 | Concrete | 0.013 | 765 | 8 | 17 | 25 | 3.3 | SM14-Ex-EX8 | |
| Kirkland_Main-108 | Kirkland_Manholes-93 | 223.12 | Kirkland_Manholes-94 | 210.17 | 176.3 | 7.35 | 8 | Concrete | 0.013 | 1,470 | 9 | 21 | 30 | 2.1 | SM14-Ex-EX8 | |
| Kirkland_Main-109 | Kirkland_Manholes-94 | 210.17 | Kirkland_Manholes-78 | 207.46 | 295.3 | 0.92 | 8 | Concrete | 0.013 | 520 | 12 | 30 | 42 | 8.1 | SM14-Ex-EX17 | |
| Kirkland_Main-110 | Kirkland_Manholes-1024 | 212.11 | Kirkland_Manholes-94 | 210.17 | 143.5 | 1.35 | 8 | Concrete | 0.013 | 631 | 1 | 4 | 6 | 0.9 | SM14-Ex-EX17 | |
| Kirkland_Main-111 | Kirkland_Manholes-106 | 44.49 | Kirkland_Manholes-242 | 21.02 | 301.2 | 7.79 | 8 | Concrete | 0.013 | 1,514 | 46 | 209 | 255 | 16.8 | SM14-Ex-EX12 | |
| Kirkland_Main-112 | Kirkland_Manholes-105 | 48.51 | Kirkland_Manholes-106 | 44.49 | 358.2 | 1.12 | 8 | Concrete | 0.013 | 575 | 44 | 205 | 249 | 43.3 | SM14-Ex-EX12 | |
| Kirkland_Main-113 | Kirkland_Manholes-103 | 59.75 | Kirkland_Manholes-105 | 48.51 | 350.5 | 3.21 | 8 | Concrete | 0.013 | 971 | 43 | 201 | 244 | 25.1 | SM14-Ex-EX12 | |
| Kirkland_Main-114 | Kirkland_Manholes-104 | 60.14 | Kirkland_Manholes-103 | 59.75 | 61 | 0.64 | 8 | PVC | 0.01 | 564 | 8 | 43 | 51 | 9 | | |
| Kirkland_Main-115 | Kirkland_Manholes-102 | 61.04 | Kirkland_Manholes-104 | 60.14 | 158.9 | 0.57 | 8 | PVC | 0.01 | 531 | 7 | 38 | 46 | 8.6 | | |
| Kirkland_Main-116 | Kirkland_Manholes-101 | 61.95 | Kirkland_Manholes-102 | 61.04 | 98.7 | 0.92 | 8 | PVC | 0.01 | 676 | 7 | 34 | 41 | 6.1 | | |
| Kirkland_Main-117 | Kirkland_Manholes-99 | 74.09 | O-41 | 72.48 | 38.5 | 4.19 | 8 | PVC | 0.01 | 1,443 | 65 | 15 | 80 | 5.5 | | |
| Kirkland_Main-119 | Kirkland_Manholes-107 | 262.65 | Kirkland_Manholes-2737 | 259.86 | 239.4 | 1.17 | 8 | PVC | 0.01 | 761 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-120 | Kirkland_Manholes-109 | 325.4 | Kirkland_Manholes-110 | 324.77 | 37.7 | 1.67 | 8 | PVC | 0.01 | 912 | 11 | 53 | 64 | 7.1 | | |
| Kirkland_Main-121 | Kirkland_Manholes-110 | 324.77 | Kirkland_Manholes-111 | 324 | 11.2 | 6.85 | 8 | PVC | 0.01 | 1,846 | 18 | 76 | 93 | 5.1 | | |
| Kirkland_Main-122 | Kirkland_Manholes-108 | 326.5 | Kirkland_Manholes-109 | 325.4 | 336.7 | 0.33 | 8 | PVC | 0.01 | 403 | 9 | 30 | 40 | 9.8 | | |
| Kirkland_Main-123 | Kirkland_Manholes-112 | 326.56 | Kirkland_Manholes-110 | 324.77 | 134.2 | 1.33 | 8 | PVC | 0.01 | 814 | 6 | 15 | 21 | 2.6 | | |
| Kirkland_Main-124 | Kirkland_Manholes-113 | 357.54 | Kirkland_Manholes-112 | 326.56 | 558 | 5.55 | 8 | PVC | 0.01 | 1,661 | 4 | 8 | 12 | 0.7 | | |
| Kirkland_Main-125 | Kirkland_Manholes-134 | 351.46 | Kirkland_Manholes-835 | 347 | 314.9 | 1.42 | 8 | PVC | 0.01 | 839 | 2 | 4 | 6 | 0.7 | | Drop Connection |
| Kirkland_Main-126 | Kirkland_Manholes-128 | 355.4 | Kirkland_Manholes-127 | 354 | 128.2 | 1.09 | 8 | PVC | 0.01 | 737 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-127 | Kirkland_Manholes-127 | 354 | Kirkland_Manholes-126 | 343.91 | 279.9 | 3.6 | 8 | PVC | 0.01 | 1,339 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-128 | Kirkland_Manholes-126 | 343.91 | Kirkland_Manholes-125 | 337.71 | 240.8 | 2.58 | 8 | PVC | 0.01 | 1,131 | 5 | 12 | 17 | 1.5 | | |
| Kirkland_Main-129 | Kirkland_Manholes-125 | 337.71 | Kirkland_Manholes-838 | 337.31 | 98.6 | 0.41 | 8 | PVC | 0.01 | 449 | 6 | 16 | 22 | 4.9 | | |
| Kirkland_Main-130 | Kirkland_Manholes-129 | 356.73 | Kirkland_Manholes-130 | 350.77 | 205.5 | 2.9 | 8 | Concrete | 0.013 | 924 | 3 | 4 | 7 | 0.7 | SM14-Ex-EX32 | |
| Kirkland_Main-131 | Kirkland_Manholes-130 | 350.77 | Kirkland_Manholes-131 | 322.01 | 184.9 | 15.56 | 8 | PVC | 0.01 | 2,781 | 4 | 8 | 12 | 0.4 | | |
| Kirkland_Main-132 | Kirkland_Manholes-133 | 323.35 | Kirkland_Manholes-131 | 322.01 | 242.6 | 0.55 | 8 | PVC | 0.01 | 524 | 25 | 72 | 97 | 18.4 | | |
| Kirkland_Main-133 | Kirkland_Manholes-842 | 324.88 | Kirkland_Manholes-133 | 323.35 | 209.8 | 0.73 | 8 | PVC | 0.01 | 602 | 24 | 68 | 91 | 15.1 | | |
| Kirkland_Main-134 | Kirkland_Manholes-131 | 322.01 | Kirkland_Manholes-132 | 319.83 | 182.3 | 1.2 | 8 | PVC | 0.01 | 771 | 30 | 83 | 113 | 14.7 | | |
| Kirkland_Main-135 | Kirkland_Manholes-132 | 319.83 | Kirkland_Manholes-116 | 315.23 | 159 | 2.89 | 8 | PVC | 0.01 | 1,199 | 31 | 87 | 119 | 9.9 | | |
| Kirkland_Main-136 | Kirkland_Manholes-115 | 335.3 | Kirkland_Manholes-116 | 315.23 | 256.3 | 7.83 | 8 | PVC | 0.01 | 1,973 | 3 | 8 | 187 | 9.5 | | |
| Kirkland_Main-137 | Kirkland_Manholes-114 | 360.4 | Kirkland_Manholes-115 | 335.3 | 252.2 | 9.95 | 8 | PVC | 0.01 | 2,224 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-138 | Kirkland_Manholes-1806 | 38.89 | Kirkland_Manholes-2926 | 31.46 | 54.5 | 13.64 | 8 | Concrete | 0.013 | 2,003 | 87 | 311 | 398 | 19.8 | SM4 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-139 | Kirkland_Manholes-2926 | 31.46 | Kirkland_Manholes-1396 | 27.46 | 24.1 | 16.61 | 8 | PVC | 0.01 | 2,873 | 87 | 319 | 406 | 14.1 | SM4 | |
| Kirkland_Main-140 | Kirkland_Manholes-123 | 328.2 | Kirkland_Manholes-124 | 326.1 | 151.9 | 1.38 | 8 | PVC | 0.01 | 829 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-141 | Kirkland_Manholes-124 | 326.1 | Kirkland_Manholes-109 | 325.4 | 313.3 | 0.22 | 8 | PVC | 0.01 | 333 | 2 | 15 | 17 | 5.2 | | |
| Kirkland_Main-142 | Kirkland_Manholes-122 | 345.33 | Kirkland_Manholes-108 | 326.5 | 238.6 | 7.89 | 8 | PVC | 0.01 | 1,981 | 9 | 23 | 32 | 1.6 | | |
| Kirkland_Main-143 | Kirkland_Manholes-120 | 360.7 | Kirkland_Manholes-121 | 358.16 | 294.2 | 0.86 | 8 | PVC | 0.01 | 655 | 3 | 8 | 11 | 1.7 | | |
| Kirkland_Main-144 | Kirkland_Manholes-121 | 358.16 | Kirkland_Manholes-122 | 345.33 | 387.6 | 3.31 | 8 | PVC | 0.01 | 1,283 | 6 | 15 | 21 | 1.6 | | |
| Kirkland_Main-145 | Kirkland_Manholes-119 | 359.58 | Kirkland_Manholes-118 | 354.26 | 105.6 | 5.04 | 8 | PVC | 0.01 | 1,583 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-146 | Kirkland_Manholes-118 | 354.26 | Kirkland_Manholes-117 | 315.69 | 251.8 | 15.32 | 8 | PVC | 0.01 | 2,760 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-147 | Kirkland_Manholes-117 | 315.69 | Kirkland_Manholes-116 | 315.23 | 331.8 | 0.14 | 8 | PVC | 0.01 | 263 | 3 | 12 | 15 | 5.6 | | |
| Kirkland_Main-148 | Kirkland_Manholes-116 | 315.23 | Kirkland_Manholes-137 | 298.8 | 246.4 | 6.67 | 8 | PVC | 0.01 | 1,821 | 38 | 111 | 325 | 17.8 | | |
| Kirkland_Main-149 | Kirkland_Manholes-137 | 298.8 | Kirkland_Manholes-1076 | 298.68 | 103.3 | 0.12 | 8 | PVC | 0.01 | 240 | 40 | 119 | 336 | 139.6 | SM14-Ex-EX23 | |
| Kirkland_Main-150 | Kirkland_Manholes-138 | 300.28 | Kirkland_Manholes-137 | 298.8 | 187.2 | 0.79 | 8 | PVC | 0.01 | 627 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-151 | Kirkland_Manholes-135 | 297.13 | Kirkland_Manholes-136 | 295.76 | 244.5 | 0.56 | 8 | PVC | 0.01 | 528 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-152 | Kirkland_Manholes-136 | 295.76 | Kirkland_Manholes-1064 | 278.57 | 324.4 | 5.3 | 8 | PVC | 0.01 | 1,623 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-154 | Kirkland_Manholes-139 | 305.82 | Kirkland_Manholes-1078 | 305.14 | 98 | 0.69 | 8 | PVC | 0.01 | 587 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-156 | Kirkland_Manholes-140 | 281.69 | Kirkland_Manholes-141 | 277.32 | 84.7 | 5.16 | 8 | PVC | 0.01 | 1,601 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-157 | Kirkland_Manholes-141 | 277.32 | Kirkland_Manholes-142 | 276.94 | 95.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | Drop Connection |
| Kirkland_Main-158 | Kirkland_Manholes-142 | 255.54 | Kirkland_Manholes-1090 | 254.86 | 50.7 | 1.34 | 8 | PVC | 0.01 | 817 | 1 | 12 | 13 | 1.6 | | |
| Kirkland_Main-160 | Kirkland_Manholes-111 | 324 | TREND_WETWELL | 317.75 | 16.6 | 37.69 | 8 | PVC | 0.01 | 4,328 | 18 | 83 | 102 | 2.3 | | |
| Kirkland_Main-161 | Kirkland_Manholes-144 | 88.96 | Kirkland_Manholes-146 | 84.42 | 39.5 | 11.5 | 8 | PVC | 0.01 | 2,391 | 6 | 17 | 23 | 1 | | |
| Kirkland_Main-162 | Kirkland_Manholes-86 | 148.26 | Kirkland_Manholes-157 | 123.36 | 221.1 | 11.26 | 8 | Concrete | 0.013 | 1,820 | 9 | 30 | 39 | 2.2 | SM14-Ex-EX15 | |
| Kirkland_Main-163 | Kirkland_Manholes-84 | 141.87 | Kirkland_Manholes-155 | 126.86 | 190.9 | 7.86 | 8 | Concrete | 0.013 | 1,521 | 4 | 13 | 17 | 1.1 | SM14-Ex-EX24 | |
| Kirkland_Main-164 | Kirkland_Manholes-156 | 125.08 | Kirkland_Manholes-157 | 123.36 | 264.1 | 0.65 | 8 | Concrete | 0.013 | 438 | 6 | 21 | 28 | 6.3 | SM14-Ex-EX24 | |
| Kirkland_Main-165 | Kirkland_Manholes-157 | 123.36 | Kirkland_Manholes-158 | 121.97 | 144.6 | 0.96 | 8 | Concrete | 0.013 | 532 | 17 | 55 | 72 | 13.6 | SM14-Ex-EX15 | |
| Kirkland_Main-166 | Kirkland_Manholes-147 | 139.14 | Kirkland_Manholes-148 | 138.62 | 289.8 | 0.18 | 8 | Concrete | 0.013 | 230 | 42 | 115 | 157 | 68.4 | SM14-Ex-EX25 | |
| Kirkland_Main-167 | Kirkland_Manholes-148 | 138.62 | Kirkland_Manholes-149 | 122.95 | 57.1 | 27.47 | 8 | Concrete | 0.013 | 2,842 | 42 | 119 | 162 | 5.7 | SM14-Ex-EX25 | |
| Kirkland_Main-168 | Kirkland_Manholes-149 | 122.95 | Kirkland_Manholes-150 | 116.05 | 168.5 | 4.1 | 8 | Concrete | 0.013 | 1,098 | 42 | 124 | 166 | 15.1 | SM14-Ex-EX25 | |
| Kirkland_Main-169 | Kirkland_Manholes-153 | 130.01 | Kirkland_Manholes-150 | 116.05 | 56.4 | 24.77 | 8 | Concrete | 0.013 | 2,699 | 5 | 17 | 22 | 0.8 | SM14-Ex-EX26 | |
| Kirkland_Main-170 | Kirkland_Manholes-150 | 116.05 | Kirkland_Manholes-159 | 80.68 | 226.3 | 15.63 | 8 | Concrete | 0.013 | 2,144 | 52 | 166 | 218 | 10.2 | SM14-Ex-EX28 | |
| Kirkland_Main-171 | Kirkland_Manholes-151 | 132.11 | Kirkland_Manholes-150 | 116.05 | 132.2 | 12.15 | 8 | Concrete | 0.013 | 1,891 | 3 | 21 | 25 | 1.3 | SM14-Ex-EX27 | |
| Kirkland_Main-172 | Kirkland_Manholes-152 | 157.79 | Kirkland_Manholes-151 | 132.11 | 148.9 | 17.25 | 8 | Concrete | 0.013 | 2,252 | 3 | 17 | 20 | 0.9 | SM14-Ex-EX27 | |
| Kirkland_Main-173 | Kirkland_Manholes-174 | 143.33 | Kirkland_Manholes-153 | 130.01 | 57.7 | 23.09 | 8 | Concrete | 0.013 | 2,606 | 4 | 13 | 17 | 0.7 | SM14-Ex-EX26 | |
| Kirkland_Main-174 | Kirkland_Manholes-89 | 177.59 | Kirkland_Manholes-174 | 143.33 | 179.4 | 19.1 | 8 | Concrete | 0.013 | 2,370 | 3 | 9 | 12 | 0.5 | SM14-Ex-EX26 | |
| Kirkland_Main-175 | Kirkland_Manholes-155 | 126.86 | Kirkland_Manholes-156 | 125.08 | 248.1 | 0.72 | 8 | Concrete | 0.013 | 459 | 5 | 17 | 22 | 4.7 | SM14-Ex-EX24 | |
| Kirkland_Main-176 | Kirkland_Manholes-158 | 121.97 | Kirkland_Manholes-160 | 41.73 | 324.9 | 24.69 | 8 | Concrete | 0.013 | 2,695 | 18 | 60 | 78 | 2.9 | SM14-Ex-EX15 | |
| Kirkland_Main-177 | Kirkland_Manholes-160 | 41.73 | Kirkland_Manholes-175 | 34.4 | 159.3 | 4.6 | 8 | Concrete | 0.013 | 1,163 | 19 | 64 | 83 | 7.1 | SM14-Ex-EX15 | |
| Kirkland_Main-178 | Kirkland_Manholes-168 | 22.33 | Kirkland_Manholes-166 | 21.44 | 221.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-179 | Kirkland_Manholes-165 | 60.59 | Kirkland_Manholes-166 | 21.44 | 398.8 | 9.82 | 8 | PVC | 0.01 | 2,209 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-180 | Kirkland_Manholes-166 | 21.44 | Kirkland_Manholes-167 | 21.4 | 9.5 | 0.4 | 8 | PVC | 0.01 | 445 | 2 | 13 | 15 | 3.4 | | Drop Connection |
| Kirkland_Main-181 | Kirkland_Manholes-143 | 71.16 | Kirkland_Manholes-164 | 59.16 | 83.9 | 14.3 | 8 | PVC | 0.01 | 2,666 | 13 | 47 | 60 | 2.2 | | |
| Kirkland_Main-182 | Kirkland_Manholes-146 | 84.42 | Kirkland_Manholes-143 | 71.16 | 154.2 | 8.6 | 8 | PVC | 0.01 | 2,067 | 10 | 38 | 49 | 2.4 | | |
| Kirkland_Main-183 | Kirkland_Manholes-163 | 106.36 | Kirkland_Manholes-146 | 84.42 | 161.9 | 13.55 | 8 | PVC | 0.01 | 2,596 | 4 | 17 | 21 | 0.8 | | |
| Kirkland_Main-184 | Kirkland_Manholes-161 | 132.09 | Kirkland_Manholes-162 | 124.37 | 152 | 5.08 | 8 | PVC | 0.01 | 1,589 | 3 | 9 | 11 | 0.7 | | |
| Kirkland_Main-185 | Kirkland_Manholes-162 | 124.37 | Kirkland_Manholes-163 | 106.36 | 185.8 | 9.69 | 8 | PVC | 0.01 | 2,195 | 4 | 13 | 16 | 0.7 | | |
| Kirkland_Main-186 | Kirkland_Manholes-169 | 21.92 | Kirkland_Manholes-167 | 19.46 | 234.8 | 1.05 | 12 | Concrete | 0.013 | 1,637 | 303 | 1,101 | 1,404 | 85.8 | SM3 | |
| Kirkland_Main-187 | Kirkland_Manholes-170 | 23.23 | Kirkland_Manholes-169 | 21.92 | 100.1 | 1.31 | 12 | Concrete | 0.013 | 1,829 | 300 | 1,084 | 1,384 | 75.7 | SM3 | |
| Kirkland_Main-188 | Kirkland_Manholes-2762 | 13.1 | Kirkland_Manholes-2761 | 12.79 | 196.5 | 0.16 | 18 | PVC | 0.01 | 2,434 | 446 | 1,555 | 2,302 | 94.6 | SM14-Ex-EX10 | |
| Kirkland_Main-189 | Kirkland_Manholes-173 | 34.1 | Kirkland_Manholes-172 | 31.43 | 44.6 | 5.99 | 8 | PVC | 0.01 | 1,725 | 3 | 13 | 15 | 0.9 | | |
| Kirkland_Main-190 | Kirkland_Manholes-178 | 67.04 | Kirkland_Manholes-179 | 37.91 | 174.4 | 16.71 | 8 | PVC | 0.01 | 2,882 | 4 | 9 | 13 | 0.4 | | |
| Kirkland_Main-191 | Kirkland_Manholes-154 | 101.95 | Kirkland_Manholes-178 | 67.04 | 253.3 | 13.78 | 8 | PVC | 0.01 | 2,617 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-192 | Kirkland_Manholes-188 | 58.06 | Kirkland_Manholes-187 | 54.23 | 46.2 | 8.28 | 12 | Concrete | 0.013 | 4,602 | 202 | 661 | 864 | 18.8 | SM14-Ex-EX30 | |
| Kirkland_Main-193 | Kirkland_Manholes-187 | 54.23 | Kirkland_Manholes-185 | 53.13 | 306 | 0.36 | 36 | Concrete | 0.013 | 17,947 | 203 | 666 | 869 | 4.8 | SM14-Ex-EX30 | |
| Kirkland_Main-194 | Kirkland_Manholes-159 | 80.68 | Kirkland_Manholes-186 | 56.15 | 205.5 | 11.94 | 8 | Concrete | 0.013 | 1,874 | 52 | 171 | 223 | 11.9 | SM14-Ex-EX28 | |
| Kirkland_Main-195 | Kirkland_Manholes-189 | 57.91 | Kirkland_Manholes-186 | 56.15 | 258.6 | 0.68 | 8 | Concrete | 0.013 | 447 | 2 | 4 | 6 | 1.3 | SM14-Ex-EX29 | |
| Kirkland_Main-196 | Kirkland_Manholes-186 | 56.15 | Kirkland_Manholes-185 | 53.13 | 48.4 | 6.24 | 12 | Concrete | 0.013 | 3,994 | 55 | 179 | 234 | 5.9 | SM14-Ex-EX28 | |
| Kirkland_Main-197 | Kirkland_Manholes-185 | 53.13 | Kirkland_Manholes-183 | 41.05 | 170.7 | 7.08 | 12 | Ductile Iron | 0.012 | 4,608 | 258 | 849 | 1,108 | 24 | SM14-Ex-EX30 | |
| Kirkland_Main-198 | Kirkland_Manholes-182 | 53.5 | Kirkland_Manholes-181 | 38.4 | 151.6 | 9.96 | 8 | PVC | 0.01 | 2,225 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-199 | Kirkland_Manholes-314 | 150.22 | Kirkland_Manholes-315 | 148.46 | 139.8 | 1.26 | 8 | PVC | 0.01 | 791 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-200 | Kirkland_Manholes-315 | 148.46 | Kirkland_Manholes-316 | 147.8 | 125.4 | 0.53 | 8 | PVC | 0.01 | 512 | 0 | 9 | 9 | 1.7 | | |
| Kirkland_Main-201 | Kirkland_Manholes-316 | 147.8 | Kirkland_Manholes-317 | 146.79 | 246.9 | 0.41 | 8 | PVC | 0.01 | 451 | 89 | 316 | 405 | 89.9 | SM14-Ex-EX30 | |
| Kirkland_Main-202 | Kirkland_Manholes-1205 | 19.63 | Kirkland_Manholes-1850 | 19.39 | 404.6 | 0.06 | 8 | Concrete | 0.013 | 132 | 1 | 6 | 7 | 5.4 | SM10 | |
| Kirkland_Main-203 | Kirkland_Manholes-1187 | 22.69 | Kirkland_Manholes-1188 | 22.09 | 184.7 | 0.32 | 10 | sbestos Ceme | 0.011 | 662 | 1 | 9 | 9 | 1.4 | SM14-Ex-EX37 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-204 | Kirkland_Manholes-1188 | 22.09 | Kirkland_Manholes-1189 | 21.99 | 127.3 | 0.08 | 10 | sbestos Ceme | 0.011 | 326 | 2 | 18 | 19 | 5.9 | SM14-Ex-EX37 | |
| Kirkland_Main-205 | Kirkland_Manholes-1189 | 21.99 | Kirkland_Manholes-1202 | 18.39 | 139.2 | 2.59 | 10 | sbestos Ceme | 0.011 | 1,869 | 3 | 27 | 30 | 1.6 | SM14-Ex-EX37 | |
| Kirkland_Main-206 | Kirkland_Manholes-1202 | 18.39 | Kirkland_Manholes-1203 | 18.22 | 388.5 | 0.04 | 10 | sbestos Ceme | 0.011 | 243 | 5 | 35 | 40 | 16.6 | SM14-Ex-EX37 | |
| Kirkland_Main-207 | Kirkland_Manholes-1203 | 18.22 | Kirkland_Manholes-1204 | 17.89 | 122.5 | 0.27 | 10 | sbestos Ceme | 0.011 | 603 | 6 | 44 | 50 | 8.3 | SM14-Ex-EX37 | |
| Kirkland_Main-208 | Kirkland_Manholes-1204 | 17.89 | Kirkland_Manholes-516 | 17.69 | 304.6 | 0.07 | 10 | sbestos Ceme | 0.011 | 298 | 7 | 53 | 60 | 20.2 | SM14-Ex-EX37 | |
| Kirkland_Main-209 | Kirkland_Manholes-1197 | 181.82 | Kirkland_Manholes-1196 | 172.3 | 310.3 | 3.07 | 8 | | 0.012 | 1,029 | 1 | 41 | 42 | 4.1 | | |
| Kirkland_Main-210 | Kirkland_Manholes-1196 | 172.3 | Kirkland_Manholes-1195 | 162.64 | 327.7 | 2.95 | 8 | | 0.012 | 1,009 | 2 | 49 | 51 | 5.1 | | |
| Kirkland_Main-211 | Kirkland_Manholes-1195 | 162.64 | Kirkland_Manholes-1190 | 151.12 | 307.8 | 3.74 | 8 | | 0.012 | 1,137 | 2 | 58 | 60 | 5.3 | | |
| Kirkland_Main-212 | Kirkland_Manholes-1190 | 151.12 | Kirkland_Manholes-1405 | 132.7 | 345 | 5.34 | 8 | | 0.012 | 1,358 | 4 | 74 | 78 | 5.7 | | |
| Kirkland_Main-213 | Kirkland_Manholes-1191 | 345.24 | Kirkland_Manholes-1192 | 340.89 | 127.3 | 3.42 | 6 | Vitrified Clay | 0.013 | 465 | 14 | 4 | 18 | 3.8 | | |
| Kirkland_Main-214 | Kirkland_Manholes-1192 | 340.89 | Kirkland_Manholes-1193 | 318.62 | 250.8 | 8.88 | 6 | Vitrified Clay | 0.013 | 750 | 60 | 8 | 67 | 9 | | |
| Kirkland_Main-215 | Kirkland_Manholes-1193 | 318.62 | Kirkland_Manholes-1194 | 312.16 | 165.2 | 3.91 | 6 | Vitrified Clay | 0.013 | 498 | 60 | 12 | 71 | 14.3 | | |
| Kirkland_Main-216 | Kirkland_Manholes-1194 | 312.16 | Kirkland_Manholes-1212 | 307.51 | 140.5 | 3.31 | 6 | Concrete | 0.013 | 458 | 60 | 16 | 75 | 16.5 | | |
| Kirkland_Main-217 | Kirkland_Manholes-1146 | 215.3 | Kirkland_Manholes-500 | 209.24 | 317 | 1.91 | 6 | Concrete | 0.013 | 348 | 13 | 49 | 62 | 17.8 | SM4 | |
| Kirkland_Main-218 | Kirkland_Manholes-1225 | 212.63 | Kirkland_Manholes-1147 | 194.47 | 343.1 | 5.29 | 6 | Concrete | 0.013 | 579 | 2 | 8 | 10 | 1.7 | SM14-Ex-EX88 | |
| Kirkland_Main-219 | Kirkland_Manholes-500 | 209.24 | Kirkland_Manholes-1147 | 194.47 | 315.3 | 4.68 | 8 | Concrete | 0.013 | 1,174 | 18 | 66 | 84 | 7.1 | SM4 | |
| Kirkland_Main-220 | Kirkland_Manholes-1149 | 192.13 | Kirkland_Manholes-1148 | 179.25 | 269.3 | 4.78 | 8 | Concrete | 0.013 | 1,186 | 17 | 64 | 81 | 6.9 | SM14-Ex-EX89 | |
| Kirkland_Main-221 | Kirkland_Manholes-1147 | 194.47 | Kirkland_Manholes-1148 | 179.25 | 319 | 4.77 | 8 | Concrete | 0.013 | 1,185 | 22 | 82 | 104 | 8.8 | SM4 | |
| Kirkland_Main-222 | Kirkland_Manholes-1148 | 179.25 | Kirkland_Manholes-1796 | 160.8 | 313.7 | 5.88 | 8 | Concrete | 0.013 | 1,315 | 41 | 154 | 196 | 14.9 | SM4 | |
| Kirkland_Main-223 | Kirkland_Manholes-1171 | 160.49 | Kirkland_Manholes-1150 | 151.79 | 210.3 | 4.14 | 6 | Concrete | 0.013 | 512 | 7 | 41 | 48 | 9.5 | SM10 | |
| Kirkland_Main-224 | Kirkland_Manholes-1129 | 164.28 | Kirkland_Manholes-1128 | 162.57 | 73.5 | 2.33 | 8 | Concrete | 0.013 | 827 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX4 | |
| Kirkland_Main-225 | Kirkland_Manholes-1111 | 165.6 | O-8 | 165.51 | 22.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | |
| Kirkland_Main-227 | Kirkland_Manholes-197 | 50.1 | Kirkland_Manholes-196 | 49.03 | 107.3 | 1 | 8 | Concrete | 0.013 | 542 | 7 | 34 | 41 | 7.7 | SM14-Ex-EX43 | |
| Kirkland_Main-228 | Kirkland_Manholes-196 | 49.03 | Kirkland_Manholes-195 | 48.03 | 74.6 | 1.34 | 8 | Concrete | 0.013 | 628 | 8 | 38 | 46 | 7.4 | SM14-Ex-EX43 | |
| Kirkland_Main-229 | Kirkland_Manholes-740 | 221.28 | Kirkland_Manholes-711 | 219.85 | 98.7 | 1.45 | 8 | PVC | 0.01 | 849 | 9 | 4 | 13 | 1.5 | | |
| Kirkland_Main-230 | Kirkland_Manholes-1107 | 164.79 | O-9 | 160.2 | 26.3 | 17.47 | 8 | Concrete | 0.013 | 2,267 | 0 | 8 | 8 | 0.4 | SM14-Ex-EX21 | |
| Kirkland_Main-231 | Kirkland_Manholes-1106 | 168.9 | O-10 | 168.5 | 24.6 | 1.64 | 18 | PVC | 0.01 | 7,851 | 580 | 2,122 | 2,702 | 34.4 | | Drop Connection |
| Kirkland_Main-232 | Kirkland_Manholes-1118 | 200.71 | Kirkland_Manholes-1117 | 196.58 | 128.3 | 3.22 | 8 | PVC | 0.01 | 1,265 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-233 | Kirkland_Manholes-1115 | 186.39 | Kirkland_Manholes-1114 | 181.51 | 185.2 | 2.63 | 15 | PVC | 0.01 | 6,118 | 18 | 16 | 34 | 0.6 | | |
| Kirkland_Main-234 | Kirkland_Manholes-1114 | 181.51 | Kirkland_Manholes-1113 | 180.6 | 148.4 | 0.61 | 15 | PVC | 0.01 | 2,952 | 34 | 20 | 54 | 1.8 | | |
| Kirkland_Main-235 | Kirkland_Manholes-1143 | 203.09 | Kirkland_Manholes-1144 | 194 | 101.9 | 8.92 | 6 | Concrete | 0.013 | 752 | 1 | 8 | 9 | 1.2 | SM14-Ex-EX82 | |
| Kirkland_Main-236 | Kirkland_Manholes-1144 | 194 | Kirkland_Manholes-1145 | 190.6 | 30.2 | 11.26 | 8 | PVC | 0.01 | 2,366 | 1 | 16 | 18 | 0.7 | | |
| Kirkland_Main-237 | Kirkland_Manholes-1145 | 190.6 | Kirkland_Manholes-1211 | 186.99 | 174.5 | 2.07 | 8 | PVC | 0.01 | 1,014 | 1 | 25 | 26 | 2.6 | | |
| Kirkland_Main-238 | Kirkland_Manholes-1184 | 19.39 | Kirkland_Manholes-1185 | 19.29 | 139.1 | 0.07 | 12 | sbestos Ceme | 0.011 | 507 | 28 | 177 | 205 | 40.5 | SM14-Ex-EX37 | |
| Kirkland_Main-239 | Kirkland_Manholes-1183 | 19.89 | Kirkland_Manholes-1184 | 19.39 | 178.8 | 0.28 | 12 | sbestos Ceme | 0.011 | 999 | 27 | 168 | 195 | 19.5 | SM14-Ex-EX37 | |
| Kirkland_Main-242 | Kirkland_Manholes-1131 | 191.56 | Kirkland_Manholes-1200 | 169.25 | 277.8 | 8.03 | 8 | Concrete | 0.013 | 1,537 | 16 | 40 | 56 | 3.7 | SM14-Ex-EX63 | |
| Kirkland_Main-243 | Kirkland_Manholes-1200 | 169.25 | Kirkland_Manholes-1201 | 159.96 | 155.1 | 5.99 | 8 | Concrete | 0.013 | 1,327 | 19 | 45 | 63 | 4.8 | SM14-Ex-EX62 | |
| Kirkland_Main-244 | Kirkland_Manholes-1201 | 159.96 | Kirkland_Manholes-1182 | 159 | 65 | 1.48 | 8 | Concrete | 0.013 | 659 | 20 | 49 | 69 | 10.4 | SM14-Ex-EX62 | |
| Kirkland_Main-245 | Kirkland_Manholes-1182 | 159 | Kirkland_Manholes-529 | 155.16 | 83.2 | 4.62 | 8 | Concrete | 0.013 | 1,165 | 20 | 53 | 73 | 6.3 | SM14-Ex-EX62 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-246 | Kirkland_Manholes-529 | 155.16 | Kirkland_Manholes-527 | 146.55 | 210.2 | 4.1 | 8 | Concrete | 0.013 | 1,098 | 21 | 57 | 78 | 7.1 | SM10 | |
| Kirkland_Main-247 | Kirkland_Manholes-516 | 17.69 | Kirkland_Manholes-2958 | 17.19 | 310.2 | 0.16 | 12 | PVC | 0.01 | 835 | 8 | 62 | 70 | 8.4 | SM14-Ex-EX37 | |
| Kirkland_Main-248 | Kirkland_Manholes-318 | 146.51 | Kirkland_Manholes-2957 | 145.86 | 162.1 | 0.4 | 8 | PVC | 0.01 | 446 | 89 | 324 | 414 | 92.8 | SM14-Ex-EX30 | |
| Kirkland_Main-249 | Kirkland_Manholes-2957 | 145.86 | Kirkland_Manholes-426 | 144.6 | 315.5 | 0.4 | 8 | PVC | 0.01 | 446 | 93 | 329 | 422 | 94.5 | SM14-Ex-EX30 | |
| Kirkland_Main-251 | Kirkland_Manholes-524 | 157.52 | Kirkland_Manholes-525 | 156.27 | 278.3 | 0.45 | 8 | Concrete | 0.013 | 363 | 2 | 16 | 18 | 5 | SM10 | |
| Kirkland_Main-253 | Kirkland_Manholes-2932 | 327.56 | Kirkland_Manholes-2931 | 326.77 | 30 | 2.63 | 8 | PVC | 0.01 | 1,144 | 2 | 24 | 26 | 2.3 | | |
| Kirkland_Main-254 | Kirkland_Manholes-2931 | 326.77 | Kirkland_Manholes-2930 | 326.38 | 131.8 | 0.3 | 8 | PVC | 0.01 | 384 | 3 | 28 | 31 | 8.1 | | |
| Kirkland_Main-255 | Kirkland_Manholes-2930 | 326.38 | Kirkland_Manholes-878 | 325.66 | 147.9 | 0.49 | 8 | PVC | 0.01 | 492 | 3 | 32 | 35 | 7.1 | | |
| Kirkland_Main-257 | Kirkland_Manholes-2345 | 343.84 | Kirkland_Manholes-2343 | 315.2 | 169.5 | 16.9 | 8 | Concrete | 0.013 | 2,229 | 6 | 20 | 26 | 1.2 | SM14-Ex-EX255 | |
| Kirkland_Main-258 | Kirkland_Manholes-2344 | 315.75 | Kirkland_Manholes-2343 | 315.2 | 137.3 | 0.4 | 8 | Concrete | 0.013 | 343 | 6 | 12 | 18 | 5.2 | SM14-Ex-EX254 | |
| Kirkland_Main-259 | Kirkland_Manholes-2256 | 329.88 | Kirkland_Manholes-2344 | 315.75 | 334.7 | 4.22 | 8 | PVC | 0.01 | 1,449 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX254 | |
| Kirkland_Main-261 | Kirkland_Manholes-2346 | 349.24 | Kirkland_Manholes-2345 | 343.84 | 323.2 | 1.67 | 8 | Concrete | 0.013 | 701 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX255 | |
| Kirkland_Main-262 | Kirkland_Manholes-2347 | 359.76 | Kirkland_Manholes-2345 | 343.84 | 158.1 | 10.07 | 8 | Concrete | 0.013 | 1,721 | 2 | 12 | 14 | 0.8 | SM14-Ex-EX255 | |
| Kirkland_Main-263 | Kirkland_Manholes-2348 | 314.6 | Kirkland_Manholes-2334 | 313.34 | 224.3 | 0.56 | 8 | Concrete | 0.013 | 406 | 14 | 40 | 54 | 13.2 | SM14-Ex-EX254 | |
| Kirkland_Main-264 | Kirkland_Manholes-2350 | 364.04 | Kirkland_Manholes-2347 | 359.76 | 357 | 1.2 | 8 | Concrete | 0.013 | 594 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX255 | |
| Kirkland_Main-265 | Kirkland_Manholes-2351 | 360.37 | Kirkland_Manholes-2347 | 359.76 | 181.2 | 0.34 | 8 | Concrete | 0.013 | 315 | 1 | 4 | 5 | 1.6 | SM14-Ex-EX255 | |
| Kirkland_Main-266 | Kirkland_Manholes-2352 | 284.5 | Kirkland_Manholes-2259 | 272.05 | 240.1 | 5.18 | 8 | Concrete | 0.013 | 1,235 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX250 | |
| Kirkland_Main-267 | Kirkland_Manholes-2353 | 298.2 | Kirkland_Manholes-2332 | 296.43 | 253 | 0.7 | 8 | Concrete | 0.013 | 454 | 2 | 4 | 6 | 1.3 | SM14-Ex-EX253 | |
| Kirkland_Main-268 | Kirkland_Manholes-2355 | 240.55 | Kirkland_Manholes-2124 | 217.78 | 364.4 | 6.25 | 8 | Concrete | 0.013 | 1,356 | 249 | 882 | 1,131 | 83.4 | SM14-Ex-EX248 | |
| Kirkland_Main-269 | Kirkland_Manholes-2354 | 256.04 | Kirkland_Manholes-2355 | 240.55 | 281.2 | 5.51 | 8 | Concrete | 0.013 | 1,273 | 246 | 878 | 1,124 | 88.3 | SM14-Ex-EX248 | |
| Kirkland_Main-270 | Kirkland_Manholes-2357 | 271.18 | Kirkland_Manholes-2354 | 256.04 | 199.4 | 7.59 | 6 | Concrete | 0.013 | 694 | 2 | 8 | 10 | 1.5 | SM14-Ex-EX249 | |
| Kirkland_Main-271 | Kirkland_Manholes-2258 | 263.77 | Kirkland_Manholes-2354 | 256.04 | 150.5 | 5.14 | 8 | Concrete | 0.013 | 1,229 | 243 | 866 | 1,109 | 90.2 | SM14-Ex-EX248 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-272 | Kirkland_Manholes-2356 | 278.21 | Kirkland_Manholes-2357 | 271.18 | 149.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-273 | Kirkland_Manholes-2324 | 245.37 | Kirkland_Manholes-2420 | 230.11 | 227.1 | 6.72 | 8 | PVC | 0.01 | 1,828 | 40 | 147 | 187 | 10.2 | | |
| Kirkland_Main-274 | Kirkland_Manholes-2358 | 262.09 | Kirkland_Manholes-2412 | 260.78 | 357.3 | 0.37 | 8 | PVC | 0.01 | 427 | 4 | 8 | 12 | 2.7 | | |
| Kirkland_Main-275 | Kirkland_Manholes-2359 | 271.5 | Kirkland_Manholes-2358 | 262.09 | 128.6 | 7.32 | 8 | PVC | 0.01 | 1,907 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-276 | Kirkland_Manholes-2362 | 285.37 | Kirkland_Manholes-2360 | 266.1 | 385.1 | 5 | 8 | PVC | 0.01 | 1,577 | 19 | 60 | 78 | 5 | | |
| Kirkland_Main-277 | Kirkland_Manholes-2360 | 266.1 | Kirkland_Manholes-2411 | 259.15 | 259.9 | 2.67 | 8 | PVC | 0.01 | 1,153 | 20 | 64 | 84 | 7.3 | | |
| Kirkland_Main-278 | Kirkland_Manholes-2361 | 291.01 | Kirkland_Manholes-2362 | 285.37 | 28 | 20.16 | 8 | PVC | 0.01 | 3,166 | 3 | 8 | 11 | 0.3 | | |
| Kirkland_Main-279 | Kirkland_Manholes-2371 | 291.2 | Kirkland_Manholes-2362 | 285.37 | 123.7 | 4.71 | 8 | PVC | 0.01 | 1,530 | 15 | 48 | 62 | 4.1 | | |
| Kirkland_Main-280 | Kirkland_Manholes-2363 | 291.88 | Kirkland_Manholes-2361 | 291.01 | 353 | 0.25 | 8 | PVC | 0.01 | 350 | 2 | 4 | 6 | 1.6 | | |
| Kirkland_Main-281 | Kirkland_Manholes-2364 | 284.3 | Kirkland_Manholes-2429 | 273.52 | 255 | 4.23 | 8 | Concrete | 0.013 | 1,115 | 26 | 91 | 117 | 10.5 | SM14-Ex-EX260 | |
| Kirkland_Main-282 | Kirkland_Manholes-2382 | 327.1 | Kirkland_Manholes-2369 | 315.99 | 220.4 | 5.04 | 8 | PVC | 0.01 | 1,583 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-283 | Kirkland_Manholes-2369 | 315.99 | Kirkland_Manholes-2370 | 312.97 | 65.7 | 4.59 | 8 | Concrete | 0.013 | 1,162 | 22 | 68 | 90 | 7.7 | SM14-Ex-EX260 | |
| Kirkland_Main-284 | Kirkland_Manholes-2383 | 328.5 | Kirkland_Manholes-2369 | 315.99 | 277.1 | 4.51 | 8 | Concrete | 0.013 | 1,152 | 19 | 60 | 78 | 6.8 | SM14-Ex-EX260 | |
| Kirkland_Main-285 | Kirkland_Manholes-2370 | 312.97 | Kirkland_Manholes-2367 | 295.27 | 303.5 | 5.83 | 8 | Concrete | 0.013 | 1,310 | 23 | 72 | 94 | 7.2 | SM14-Ex-EX260 | |
| Kirkland_Main-286 | Kirkland_Manholes-2365 | 289.93 | Kirkland_Manholes-2364 | 284.3 | 103.6 | 5.44 | 8 | Concrete | 0.013 | 1,265 | 25 | 87 | 113 | 8.9 | SM14-Ex-EX260 | |
| Kirkland_Main-287 | Kirkland_Manholes-2367 | 295.27 | Kirkland_Manholes-2366 | 292.68 | 34.9 | 7.43 | 8 | Concrete | 0.013 | 1,478 | 24 | 75 | 99 | 6.7 | SM14-Ex-EX260 | |
| Kirkland_Main-288 | Kirkland_Manholes-181 | 38.4 | Kirkland_Manholes-180 | 38.25 | 24 | 0.62 | 8 | PVC | 0.01 | 555 | 2 | 13 | 14 | 2.6 | | |
| Kirkland_Main-289 | Kirkland_Manholes-184 | 40.15 | Kirkland_Manholes-181 | 38.4 | 362.3 | 0.48 | 8 | PVC | 0.01 | 490 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-290 | Kirkland_Manholes-180 | 38.25 | Kirkland_Manholes-179 | 37.91 | 155.1 | 0.22 | 12 | Ductile Iron | 0.012 | 812 | 270 | 947 | 1,218 | 149.9 | SM3 | |
| Kirkland_Main-291 | Kirkland_Manholes-179 | 37.91 | Kirkland_Manholes-177 | 35.5 | 248.2 | 0.97 | 12 | Ductile Iron | 0.012 | 1,707 | 275 | 960 | 1,235 | 72.3 | SM3 | |
| Kirkland_Main-292 | Kirkland_Manholes-177 | 35.5 | Kirkland_Manholes-176 | 34.72 | 401.5 | 0.19 | 12 | Ductile Iron | 0.012 | 764 | 277 | 986 | 1,263 | 165.3 | SM3 | |
| Kirkland_Main-293 | Kirkland_Manholes-176 | 34.72 | Kirkland_Manholes-175 | 34.4 | 144.6 | 0.22 | 12 | Ductile Iron | 0.012 | 813 | 278 | 990 | 1,268 | 156 | SM3 | |
| Kirkland_Main-294 | Kirkland_Manholes-175 | 34.4 | Kirkland_Manholes-171 | 25.99 | 328.5 | 2.56 | 12 | Concrete | 0.013 | 2,558 | 297 | 1,058 | 1,355 | 53 | SM3 | |
| Kirkland_Main-295 | Kirkland_Manholes-171 | 25.99 | Kirkland_Manholes-170 | 25.29 | 316.1 | 0.22 | 12 | Concrete | 0.013 | 750 | 299 | 1,080 | 1,379 | 183.9 | SM3 | Drop Connection |
| Kirkland_Main-296 | Kirkland_Manholes-172 | 31.43 | Kirkland_Manholes-171 | 31.34 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 17 | 20 | 4.4 | | Drop Connection |
| Kirkland_Main-297 | Kirkland_Manholes-190 | 38.49 | Kirkland_Manholes-180 | 38.25 | 107 | 0.22 | 12 | Ductile Iron | 0.012 | 810 | 269 | 930 | 1,199 | 148 | SM3 | |
| Kirkland_Main-298 | Kirkland_Manholes-183 | 41.05 | Kirkland_Manholes-190 | 38.49 | 284.2 | 0.9 | 12 | Ductile Iron | 0.012 | 1,646 | 268 | 926 | 1,194 | 72.6 | SM3 | |
| Kirkland_Main-299 | Kirkland_Manholes-167 | 19.46 | Kirkland_Manholes-241 | 14.7 | 339.1 | 1.4 | 12 | Concrete | 0.013 | 1,894 | 305 | 1,118 | 1,423 | 75.1 | SM3 | |
| Kirkland_Main-300 | Kirkland_Manholes-164 | 59.16 | Kirkland_Manholes-242 | 58.15 | 252.4 | 0.4 | 8 | PVC | 0.01 | 446 | 14 | 51 | 65 | 14.6 | | Drop Connection |
| Kirkland_Main-301 | Kirkland_Manholes-203 | 83.91 | Kirkland_Manholes-202 | 68.28 | 127.4 | 12.27 | 8 | PVC | 0.01 | 2,470 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-302 | Kirkland_Manholes-202 | 68.28 | Kirkland_Manholes-204 | 54.86 | 133.6 | 10.05 | 8 | PVC | 0.01 | 2,235 | 1 | 9 | 10 | 0.4 | | |
| Kirkland_Main-303 | Kirkland_Manholes-204 | 54.86 | Kirkland_Manholes-169 | 21.92 | 184.1 | 17.89 | 8 | PVC | 0.01 | 2,982 | 3 | 13 | 16 | 0.5 | | |
| Kirkland_Main-304 | Kirkland_Manholes-209 | 226.32 | Kirkland_Manholes-210 | 216.33 | 137.5 | 7.27 | 8 | Vitrified Clay | 0.013 | 1,462 | 2 | 4 | 7 | 0.4 | SM14-Ex-EX66 | |
| Kirkland_Main-306 | Kirkland_Manholes-214 | 228.3 | Kirkland_Manholes-213 | 213.69 | 210.7 | 6.93 | 8 | PVC | 0.01 | 1,856 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-307 | Kirkland_Manholes-213 | 213.69 | Kirkland_Manholes-212 | 184.62 | 186.4 | 15.59 | 8 | PVC | 0.01 | 2,784 | 6 | 9 | 14 | 0.5 | | |
| Kirkland_Main-308 | Kirkland_Manholes-212 | 184.62 | Kirkland_Manholes-216 | 184.01 | 222.7 | 0.27 | 8 | PVC | 0.01 | 369 | 33 | 98 | 131 | 35.6 | | |
| Kirkland_Main-309 | Kirkland_Manholes-211 | 186.37 | Kirkland_Manholes-212 | 184.62 | 362.4 | 0.48 | 8 | PVC | 0.01 | 490 | 25 | 85 | 111 | 22.6 | | |
| Kirkland_Main-310 | Kirkland_Manholes-210 | 216.33 | Kirkland_Manholes-211 | 186.37 | 372.2 | 8.05 | 8 | Vitrified Clay | 0.013 | 1,539 | 5 | 9 | 14 | 0.9 | SM14-Ex-EX66 | |
| Kirkland_Main-312 | Kirkland_Manholes-216 | 184.01 | Kirkland_Manholes-217 | 183.22 | 296 | 0.27 | 8 | PVC | 0.01 | 364 | 34 | 102 | 137 | 37.6 | | |
| Kirkland_Main-313 | Kirkland_Manholes-215 | 220.47 | Kirkland_Manholes-217 | 183.22 | 347.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 4 | 4 | 8 | 0.3 | | |
| Kirkland_Main-314 | Kirkland_Manholes-208 | 241.09 | Kirkland_Manholes-207 | 240.8 | 258.2 | 0.11 | 8 | Concrete | 0.013 | 182 | 4 | 13 | 16 | 9 | SM14-Ex-EX57 | |
| Kirkland_Main-315 | Kirkland_Manholes-207 | 240.8 | Kirkland_Manholes-206 | 239.08 | 251.3 | 0.68 | 8 | Concrete | 0.013 | 449 | 6 | 17 | 24 | 5.2 | SM14-Ex-EX57 | |
| Kirkland_Main-316 | Kirkland_Manholes-1236 | 256.67 | Kirkland_Manholes-206 | 239.08 | 279.5 | 6.29 | 8 | Concrete | 0.013 | 1,360 | 5 | 9 | 13 | 1 | SM14-Ex-EX60 | |
| Kirkland_Main-317 | Kirkland_Manholes-206 | 239.08 | Kirkland_Manholes-205 | 228.15 | 235.6 | 4.64 | 8 | Concrete | 0.013 | 1,168 | 12 | 30 | 42 | 3.6 | SM14-Ex-EX57 | |
| Kirkland_Main-318 | Kirkland_Manholes-227 | 223.31 | Kirkland_Manholes-226 | 219.39 | 138.6 | 2.83 | 8 | PVC | 0.01 | 1,186 | 6 | 30 | 36 | 3 | | |
| Kirkland_Main-319 | Kirkland_Manholes-229 | 178.29 | Kirkland_Manholes-230 | 172.81 | 192.8 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-321 | Kirkland_Manholes-2569 | 300.83 | Kirkland_Manholes-2570 | 299.81 | 42.2 | 2.42 | 8 | PVC | 0.01 | 1,096 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-323 | Kirkland_Manholes-2570 | 299.81 | Kirkland_Manholes-2573 | 298.95 | 117.6 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 12 | 14 | 2.3 | | |
| Kirkland_Main-325 | Kirkland_Manholes-2574 | 291.72 | Kirkland_Manholes-2578 | 278.46 | 194.2 | 6.83 | 8 | PVC | 0.01 | 1,842 | 5 | 32 | 37 | 2 | | |
| Kirkland_Main-326 | Kirkland_Manholes-2575 | 296.63 | Kirkland_Manholes-2574 | 291.72 | 277.7 | 1.77 | 8 | PVC | 0.01 | 938 | 4 | 28 | 32 | 3.4 | | |
| Kirkland_Main-327 | Kirkland_Manholes-2572 | 298.88 | Kirkland_Manholes-2575 | 296.63 | 102.9 | 2.19 | 8 | PVC | 0.01 | 1,042 | 3 | 24 | 27 | 2.6 | | |
| Kirkland_Main-330 | Kirkland_Manholes-2576 | 288.87 | Kirkland_Manholes-2577 | 284.91 | 171.7 | 2.31 | 8 | PVC | 0.01 | 1,071 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-331 | Kirkland_Manholes-2577 | 284.91 | Kirkland_Manholes-2580 | 279.25 | 137.4 | 4.12 | 8 | PVC | 0.01 | 1,431 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-332 | Kirkland_Manholes-2580 | 279.25 | Kirkland_Manholes-2579 | 271.58 | 247.7 | 3.1 | 8 | PVC | 0.01 | 1,241 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-333 | Kirkland_Manholes-2582 | 256.45 | Kirkland_Manholes-2583 | 255.68 | 58.5 | 1.32 | 8 | Concrete | 0.013 | 622 | 12 | 75 | 88 | 14.1 | SM14-Ex-EX313 | |
| Kirkland_Main-334 | Kirkland_Manholes-2583 | 255.68 | Kirkland_Manholes-2584 | 252.35 | 54.4 | 6.12 | 8 | PVC | 0.01 | 1,744 | 13 | 79 | 92 | 5.3 | SM14-Ex-EX313 | |
| Kirkland_Main-335 | Kirkland_Manholes-2584 | 252.35 | Kirkland_Manholes-2787 | 252.17 | 133.2 | 0.14 | 8 | Concrete | 0.013 | 199 | 13 | 83 | 97 | 48.4 | SM14-Ex-EX313 | |
| Kirkland_Main-336 | Kirkland_Manholes-2581 | 260.74 | Kirkland_Manholes-2582 | 256.45 | 63.8 | 6.72 | 8 | PVC | 0.01 | 1,828 | 4 | 20 | 24 | 1.3 | | |
| Kirkland_Main-337 | Kirkland_Manholes-2786 | 258.1 | Kirkland_Manholes-2582 | 256.45 | 266.6 | 0.62 | 8 | PVC | 0.01 | 555 | 8 | 52 | 60 | 10.7 | | |
| Kirkland_Main-338 | Kirkland_Manholes-2579 | 271.58 | Kirkland_Manholes-2581 | 260.74 | 232.4 | 4.66 | 8 | PVC | 0.01 | 1,523 | 3 | 16 | 19 | 1.3 | | |
| Kirkland_Main-339 | Kirkland_Manholes-2586 | 274.45 | Kirkland_Manholes-2585 | 272.57 | 43.2 | 4.35 | 8 | PVC | 0.01 | 1,471 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-340 | Kirkland_Manholes-2587 | 285.24 | Kirkland_Manholes-2586 | 274.45 | 298.8 | 3.61 | 8 | PVC | 0.01 | 1,340 | 1 | 4 | 5 | 0.4 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-342 | Kirkland_Manholes-2588 | 292.14 | Kirkland_Manholes-2589 | 286.31 | 102.9 | 5.66 | 8 | Concrete | 0.013 | 1,291 | 21 | 79 | 101 | 7.8 | SM14-Ex-EX303 | |
| Kirkland_Main-343 | Kirkland_Manholes-2591 | 288.43 | Kirkland_Manholes-2589 | 286.31 | 198.2 | 1.07 | 8 | Concrete | 0.013 | 561 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX305 | |
| Kirkland_Main-344 | Kirkland_Manholes-2590 | 303.32 | Kirkland_Manholes-2588 | 292.14 | 220.1 | 5.08 | 8 | Concrete | 0.013 | 1,222 | 8 | 44 | 51 | 4.2 | SM14-Ex-EX303 | |
| Kirkland_Main-345 | Kirkland_Manholes-2592 | 294.57 | Kirkland_Manholes-2588 | 292.14 | 159.1 | 1.53 | 8 | Concrete | 0.013 | 670 | 2 | 8 | 10 | 1.5 | SM14-Ex-EX306 | |
| Kirkland_Main-346 | Kirkland_Manholes-2589 | 286.31 | Kirkland_Manholes-2593 | 281.14 | 131.6 | 3.93 | 8 | Concrete | 0.013 | 1,075 | 23 | 87 | 111 | 10.3 | SM14-Ex-EX303 | |
| Kirkland_Main-347 | Kirkland_Manholes-2593 | 281.14 | Kirkland_Manholes-2585 | 272.57 | 372.5 | 2.3 | 8 | Concrete | 0.013 | 823 | 24 | 91 | 115 | 14 | SM14-Ex-EX299 | |
| Kirkland_Main-348 | Kirkland_Manholes-2585 | 272.57 | Kirkland_Manholes-2595 | 270.48 | 180.9 | 1.16 | 8 | Concrete | 0.013 | 583 | 25 | 103 | 129 | 22 | SM14-Ex-EX299 | |
| Kirkland_Main-349 | Kirkland_Manholes-2595 | 270.48 | Kirkland_Manholes-2594 | 263.61 | 407.7 | 1.68 | 8 | Concrete | 0.013 | 704 | 27 | 107 | 135 | 19.1 | SM14-Ex-EX299 | |
| Kirkland_Main-350 | Kirkland_Manholes-2594 | 263.61 | Kirkland_Manholes-2601 | 228.74 | 402.9 | 8.65 | 8 | Concrete | 0.013 | 1,596 | 30 | 111 | 141 | 8.9 | SM14-Ex-EX299 | |
| Kirkland_Main-352 | Kirkland_Manholes-2598 | 252.13 | Kirkland_Manholes-2599 | 217.5 | 325.5 | 10.64 | 8 | Concrete | 0.013 | 1,769 | 3 | 12 | 15 | 0.8 | SM14-Ex-EX301 | |
| Kirkland_Main-353 | Kirkland_Manholes-2597 | 256.37 | Kirkland_Manholes-2598 | 252.13 | 172.1 | 2.46 | 8 | Concrete | 0.013 | 851 | 1 | 8 | 9 | 1 | SM14-Ex-EX301 | |
| Kirkland_Main-354 | Kirkland_Manholes-2596 | 262.84 | Kirkland_Manholes-2597 | 256.37 | 380.5 | 1.7 | 8 | Concrete | 0.013 | 707 | 0 | 4 | 4 | 0.6 | SM14-Ex-EX301 | |
| Kirkland_Main-355 | Kirkland_Manholes-853 | 340.38 | Kirkland_Manholes-851 | 339.16 | 105.8 | 1.16 | 8 | PVC | 0.01 | 758 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-356 | Kirkland_Manholes-851 | 339.16 | Kirkland_Manholes-852 | 338.63 | 131.5 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 36 | 42 | 9.3 | | |
| Kirkland_Main-357 | Kirkland_Manholes-852 | 338.63 | Kirkland_Manholes-854 | 336.98 | 245.6 | 0.67 | 8 | PVC | 0.01 | 578 | 6 | 40 | 46 | 7.9 | | |
| Kirkland_Main-358 | Kirkland_Manholes-854 | 336.98 | Kirkland_Manholes-855 | 335.54 | 321 | 0.45 | 8 | PVC | 0.01 | 472 | 7 | 44 | 50 | 10.7 | | |
| Kirkland_Main-359 | Kirkland_Manholes-855 | 335.54 | Kirkland_Manholes-857 | 334.93 | 126.6 | 0.48 | 8 | PVC | 0.01 | 489 | 7 | 48 | 54 | 11.1 | | |
| Kirkland_Main-360 | Kirkland_Manholes-857 | 334.93 | Kirkland_Manholes-856 | 333.21 | 25.3 | 6.8 | 8 | PVC | 0.01 | 1,838 | 7 | 52 | 59 | 3.2 | | |
| Kirkland_Main-361 | Kirkland_Manholes-858 | 311.1 | Kirkland_Manholes-859 | 309.2 | 142 | 1.34 | 8 | Concrete | 0.013 | 627 | 2 | 4 | 6 | 1 | SM14-Ex-EX51 | |
| Kirkland_Main-362 | Kirkland_Manholes-198 | 52.1 | Kirkland_Manholes-197 | 50.1 | 250.9 | 0.8 | 8 | Concrete | 0.013 | 484 | 5 | 30 | 35 | 7.3 | SM14-Ex-EX43 | |
| Kirkland_Main-363 | Kirkland_Manholes-1648 | 152.03 | Kirkland_Manholes-1649 | 151.45 | 206.3 | 0.28 | 10 | Concrete | 0.013 | 520 | 4 | 33 | 37 | 7.1 | SM14-Ex-EX196 | |
| Kirkland_Main-364 | Kirkland_Manholes-1649 | 151.45 | Kirkland_Manholes-1650 | 145.43 | 128.4 | 4.69 | 10 | Concrete | 0.013 | 2,129 | 7 | 41 | 48 | 2.3 | SM14-Ex-EX196 | |
| Kirkland_Main-365 | Kirkland_Manholes-1651 | 160.29 | Kirkland_Manholes-1650 | 145.43 | 297.8 | 4.99 | 8 | PVC | 0.01 | 1,575 | 0 | 16 | 17 | 1.1 | | |
| Kirkland_Main-366 | Kirkland_Manholes-1652 | 161.6 | Kirkland_Manholes-1651 | 160.29 | 197.8 | 0.66 | 8 | PVC | 0.01 | 574 | 0 | 8 | 9 | 1.5 | | |
| Kirkland_Main-369 | Kirkland_Manholes-1654 | 136.96 | Kirkland_Manholes-1653 | 127.26 | 270 | 3.59 | 8 | Concrete | 0.013 | 1,028 | 2 | 8 | 10 | 1 | SM14-Ex-EX168 | |
| Kirkland_Main-370 | Kirkland_Manholes-1653 | 127.26 | Kirkland_Manholes-1767 | 122.16 | 112.6 | 4.53 | 8 | Concrete | 0.013 | 1,154 | 5 | 16 | 22 | 1.9 | SM14-Ex-EX168 | |
| Kirkland_Main-372 | Kirkland_Manholes-977 | 225.95 | Kirkland_Manholes-978 | 222.9 | 113.4 | 2.69 | 8 | PVC | 0.01 | 1,157 | 8 | 47 | 54 | 4.7 | | |
| Kirkland_Main-374 | Kirkland_Manholes-2858 | 23.78 | Kirkland_Manholes-2857 | 19.7 | 174.1 | 2.34 | 8 | Ductile Iron | 0.012 | 900 | 0 | 5 | 5 | 0.5 | SM14-Ex-EX315 | |
| Kirkland_Main-376 | Kirkland_Manholes-2865 | 30.12 | Kirkland_Manholes-2864 | 27 | 7.9 | 39.25 | 6 | PVC | 0.01 | 2,051 | 13 | 21 | 34 | 1.6 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-377 | Kirkland_Manholes-2866 | 31.02 | Kirkland_Manholes-2867 | 30.31 | 15.5 | 4.58 | 6 | PVC | 0.01 | 701 | 9 | 15 | 24 | 3.4 | SM14-Ex-EX314 | |
| Kirkland_Main-378 | Kirkland_Manholes-2867 | 30.31 | Kirkland_Manholes-2865 | 30.12 | 118.6 | 0.16 | 6 | PVC | 0.01 | 131 | 9 | 18 | 27 | 20.6 | SM14-Ex-EX314 | |
| Kirkland_Main-379 | Kirkland_Manholes-2863 | 49.4 | Kirkland_Manholes-2866 | 31.02 | 310.1 | 5.93 | 8 | PVC | 0.01 | 1,716 | 7 | 12 | 19 | 1.1 | | |
| Kirkland_Main-380 | Kirkland_Manholes-1905 | 395.5 | Kirkland_Manholes-1906 | 388.2 | 277.5 | 2.63 | 8 | PVC | 0.01 | 1,143 | 9 | 40 | 49 | 4.3 | | |
| Kirkland_Main-381 | Kirkland_Manholes-1906 | 388.2 | Kirkland_Manholes-1908 | 383.29 | 92.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 17 | 48 | 65 | 4 | | |
| Kirkland_Main-382 | Kirkland_Manholes-1908 | 383.29 | Kirkland_Manholes-1909 | 380 | 18.3 | 18.02 | 8 | PVC | 0.01 | 2,993 | 26 | 60 | 85 | 2.8 | | |
| Kirkland_Main-383 | Kirkland_Manholes-1910 | 392.49 | Kirkland_Manholes-1908 | 383.29 | 192.6 | 4.78 | 8 | PVC | 0.01 | 1,541 | 8 | 8 | 16 | 1.1 | | |
| Kirkland_Main-386 | Kirkland_Manholes-1911 | 394.49 | Kirkland_Manholes-1910 | 392.49 | 114.9 | 1.74 | 8 | PVC | 0.01 | 930 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-388 | Kirkland_Manholes-1912 | 380.62 | Kirkland_Manholes-1907 | 380.32 | 64.6 | 0.46 | 8 | PVC | 0.01 | 480 | 17 | 8 | 25 | 5.2 | | |
| Kirkland_Main-389 | Kirkland_Manholes-1913 | 381.47 | Kirkland_Manholes-1912 | 380.62 | 181.1 | 0.47 | 8 | PVC | 0.01 | 483 | 17 | 4 | 21 | 4.4 | | |
| Kirkland_Main-390 | Kirkland_Manholes-1915 | 403.84 | Kirkland_Manholes-1903 | 399.77 | 113 | 3.6 | 8 | PVC | 0.01 | 1,338 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-391 | Kirkland_Manholes-1914 | 376.04 | Kirkland_Manholes-1916 | 361.73 | 343.6 | 4.16 | 8 | PVC | 0.01 | 1,439 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-392 | Kirkland_Manholes-1916 | 361.73 | Kirkland_Manholes-1965 | 345.05 | 397.2 | 4.2 | 8 | PVC | 0.01 | 1,445 | 29 | 20 | 49 | 3.4 | | |
| Kirkland_Main-393 | Kirkland_Manholes-1917 | 413.2 | Kirkland_Manholes-1919 | 411.73 | 326.8 | 0.45 | 10 | Concrete | 0.013 | 660 | 57 | 191 | 248 | 37.6 | SM14-Ex-EX215 | |
| Kirkland_Main-394 | Kirkland_Manholes-1918 | 411.61 | Kirkland_Manholes-1920 | 409.24 | 389.6 | 0.61 | 10 | Concrete | 0.013 | 767 | 88 | 358 | 445 | 58.1 | SM14-Ex-EX215 | |
| Kirkland_Main-395 | Kirkland_Manholes-1919 | 411.73 | Kirkland_Manholes-1918 | 411.61 | 19.4 | 0.61 | 10 | Concrete | 0.013 | 767 | 58 | 195 | 253 | 33 | SM14-Ex-EX215 | |
| Kirkland_Main-396 | Kirkland_Manholes-1966 | 418.21 | Kirkland_Manholes-1918 | 411.61 | 309.4 | 2.13 | 8 | Concrete | 0.013 | 792 | 29 | 159 | 188 | 23.7 | SM14-Ex-EX216 | |
| Kirkland_Main-397 | Kirkland_Manholes-2018 | 417.59 | Kirkland_Manholes-1920 | 409.24 | 266.4 | 3.13 | 8 | PVC | 0.01 | 1,248 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-398 | Kirkland_Manholes-2017 | 412 | Kirkland_Manholes-1921 | 405.86 | 284.9 | 2.16 | 8 | PVC | 0.01 | 1,035 | 4 | 20 | 24 | 2.3 | | |
| Kirkland_Main-399 | Kirkland_Manholes-1921 | 405.86 | Kirkland_Manholes-1923 | 399.87 | 337.2 | 1.78 | 10 | Concrete | 0.013 | 1,311 | 95 | 393 | 489 | 37.3 | SM14-Ex-EX215 | Drop Connection |
| Kirkland_Main-400 | Kirkland_Manholes-2013 | 413.74 | Kirkland_Manholes-1922 | 401.71 | 397 | 3.03 | 8 | PVC | 0.01 | 1,227 | 20 | 95 | 116 | 9.4 | | |
| Kirkland_Main-401 | Kirkland_Manholes-1924 | 396.12 | Kirkland_Manholes-1925 | 391.68 | 40.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 4 | 16 | 20 | 0.8 | | |
| Kirkland_Main-402 | Kirkland_Manholes-2012 | 406.67 | Kirkland_Manholes-1924 | 396.12 | 354.7 | 2.97 | 8 | PVC | 0.01 | 1,216 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-403 | Kirkland_Manholes-1926 | 383.42 | Kirkland_Manholes-1927 | 378.37 | 328.1 | 1.54 | 10 | Concrete | 0.013 | 1,220 | 123 | 528 | 651 | 53.4 | SM14-Ex-EX205 | |
| Kirkland_Main-404 | Kirkland_Manholes-1927 | 378.37 | Kirkland_Manholes-1928 | 375.97 | 126.7 | 1.89 | 10 | Concrete | 0.013 | 1,354 | 123 | 532 | 655 | 48.4 | SM14-Ex-EX205 | |
| Kirkland_Main-405 | Kirkland_Manholes-1922 | 401.71 | Kirkland_Manholes-3030 | 397.75 | 20.7 | 19.14 | 8 | PVC | 0.01 | 3,085 | 22 | 99 | 122 | 3.9 | | |
| Kirkland_Main-406 | Kirkland_Manholes-1923 | 399.87 | Kirkland_Manholes-3030 | 397.75 | 24.4 | 8.7 | 12 | PVC | 0.01 | 6,130 | 96 | 397 | 493 | 8 | | |
| Kirkland_Main-407 | Kirkland_Manholes-3030 | 397.75 | Kirkland_Manholes-1925 | 391.68 | 339.3 | 1.79 | 12 | PVC | 0.01 | 2,781 | 118 | 501 | 619 | 22.2 | | |
| Kirkland_Main-408 | Kirkland_Manholes-1925 | 391.68 | Kirkland_Manholes-3031 | 384.74 | 433.2 | 1.6 | 12 | PVC | 0.01 | 2,631 | 123 | 521 | 643 | 24.5 | | |
| Kirkland_Main-409 | Kirkland_Manholes-2750 | 105.56 | Kirkland_Manholes-2749 | 94.38 | 64.8 | 17.26 | 8 | PVC | 0.01 | 2,929 | 24 | 6 | 30 | 1 | | |
| Kirkland_Main-410 | Kirkland_Manholes-2751 | 82.43 | Kirkland_Manholes-2879 | 68.04 | 243.9 | 5.9 | 8 | Concrete | 0.013 | 1,317 | 0 | 6 | 6 | 0.5 | SM14-Ex-EX280 | |
| Kirkland_Main-412 | Kirkland_Manholes-373 | 230.9 | Kirkland_Manholes-1080 | 229.14 | 244 | 0.72 | 8 | PVC | 0.01 | 599 | 62 | 250 | 312 | 52.1 | | |
| Kirkland_Main-413 | Kirkland_Manholes-195 | 48.03 | Kirkland_Manholes-193 | 45.46 | 195.3 | 1.32 | 8 | Concrete | 0.013 | 622 | 9 | 43 | 52 | 8.3 | SM14-Ex-EX43 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-414 | Kirkland_Manholes-193 | 45.46 | Kirkland_Manholes-192 | 42.9 | 32.1 | 7.96 | 8 | Concrete | 0.013 | 1,530 | 9 | 47 | 56 | 3.7 | SM14-Ex-EX43 | |
| Kirkland_Main-415 | Kirkland_Manholes-194 | 50.84 | Kirkland_Manholes-192 | 50.61 | 58.2 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | Drop Connection |
| Kirkland_Main-416 | Kirkland_Manholes-192 | 42.9 | Kirkland_Manholes-191 | 42.5 | 357.1 | 0.11 | 8 | Concrete | 0.013 | 182 | 9 | 68 | 77 | 42.6 | SM14-Ex-EX44 | |
| Kirkland_Main-417 | Kirkland_Manholes-191 | 42.5 | Kirkland_Manholes-183 | 41.05 | 287.2 | 0.5 | 8 | Concrete | 0.013 | 385 | 9 | 73 | 82 | 21.2 | SM14-Ex-EX44 | |
| Kirkland_Main-418 | Kirkland_Manholes-201 | 56.98 | Kirkland_Manholes-192 | 42.9 | 368.5 | 3.82 | 8 | Concrete | 0.013 | 1,060 | 0 | 13 | 13 | 1.2 | SM14-Ex-EX43 | |
| Kirkland_Main-419 | Kirkland_Manholes-199 | 54.68 | Kirkland_Manholes-198 | 52.1 | 112.6 | 2.29 | 8 | Concrete | 0.013 | 821 | 4 | 26 | 30 | 3.7 | SM14-Ex-EX43 | |
| Kirkland_Main-420 | Kirkland_Manholes-2310 | 256 | Kirkland_Manholes-2738 | 255.5 | 66.4 | 0.75 | 8 | PVC | 0.01 | 612 | 8 | 26 | 33 | 5.5 | | |
| Kirkland_Main-421 | Kirkland_Manholes-2738 | 255.5 | Kirkland_Manholes-2752 | 253.8 | 209.4 | 0.81 | 8 | PVC | 0.01 | 635 | 9 | 30 | 39 | 6.1 | | |
| Kirkland_Main-422 | Kirkland_Manholes-2754 | 9.95 | O-40 | 9.81 | 113.1 | 0.12 | 18 | Ductile Iron | 0.012 | 1,797 | 506 | 1,846 | 2,653 | 147.7 | SM14-Ex-EX10 | Drop Connection |
| Kirkland_Main-423 | Kirkland_Manholes-2761 | 12.79 | Kirkland_Manholes-2759 | 11.56 | 416.9 | 0.3 | 18 | PVC | 0.01 | 3,329 | 505 | 1,824 | 2,631 | 79 | SM14-Ex-EX10 | |
| Kirkland_Main-425 | Kirkland_Manholes-2759 | 11.56 | Kirkland_Manholes-2758 | 11.2 | 391.7 | 0.09 | 18 | PVC | 0.01 | 1,858 | 505 | 1,829 | 2,635 | 141.8 | SM14-Ex-EX10 | |
| Kirkland_Main-426 | Kirkland_Manholes-2758 | 11.2 | Kirkland_Manholes-2757 | 10.95 | 117.7 | 0.21 | 18 | PVC | 0.01 | 2,824 | 506 | 1,833 | 2,640 | 93.5 | SM14-Ex-EX10 | |
| Kirkland_Main-428 | Kirkland_Manholes-217 | 183.22 | Kirkland_Manholes-230 | 172.81 | 258.2 | 4.03 | 8 | PVC | 0.01 | 1,416 | 40 | 111 | 151 | 10.7 | | |
| Kirkland_Main-429 | Kirkland_Manholes-228 | 142.32 | Kirkland_Manholes-232 | 112.59 | 208.3 | 14.27 | 8 | PVC | 0.01 | 2,663 | 45 | 128 | 173 | 6.5 | | |
| Kirkland_Main-430 | Kirkland_Manholes-226 | 219.39 | Kirkland_Manholes-225 | 214.73 | 200.7 | 2.32 | 8 | PVC | 0.01 | 1,074 | 7 | 34 | 41 | 3.8 | | |
| Kirkland_Main-431 | Kirkland_Manholes-225 | 214.73 | Kirkland_Manholes-223 | 193.39 | 169.1 | 12.62 | 8 | PVC | 0.01 | 2,505 | 9 | 38 | 47 | 1.9 | | |
| Kirkland_Main-432 | Kirkland_Manholes-223 | 193.39 | Kirkland_Manholes-224 | 189.69 | 263.2 | 1.41 | 8 | PVC | 0.01 | 836 | 18 | 68 | 87 | 10.4 | | |
| Kirkland_Main-433 | Kirkland_Manholes-222 | 194.04 | Kirkland_Manholes-223 | 193.39 | 133.1 | 0.49 | 8 | PVC | 0.01 | 493 | 9 | 26 | 34 | 7 | | |
| Kirkland_Main-434 | Kirkland_Manholes-221 | 194.75 | Kirkland_Manholes-222 | 194.04 | 121.4 | 0.58 | 8 | PVC | 0.01 | 539 | 8 | 21 | 29 | 5.5 | | |
| Kirkland_Main-435 | Kirkland_Manholes-219 | 195.26 | Kirkland_Manholes-221 | 194.75 | 115.1 | 0.44 | 8 | PVC | 0.01 | 469 | 7 | 17 | 24 | 5.2 | | |
| Kirkland_Main-436 | Kirkland_Manholes-220 | 211.06 | Kirkland_Manholes-219 | 195.26 | 185.5 | 8.52 | 8 | PVC | 0.01 | 2,057 | 4 | 9 | 13 | 0.6 | | |
| Kirkland_Main-437 | Kirkland_Manholes-218 | 197.04 | Kirkland_Manholes-219 | 195.26 | 182.3 | 0.98 | 8 | PVC | 0.01 | 697 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-438 | Kirkland_Manholes-233 | 215.48 | Kirkland_Manholes-220 | 211.06 | 169.3 | 2.61 | 8 | PVC | 0.01 | 1,139 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-439 | Kirkland_Manholes-224 | 189.69 | Kirkland_Manholes-211 | 186.37 | 292.8 | 1.13 | 8 | PVC | 0.01 | 751 | 19 | 73 | 91 | 12.2 | | |
| Kirkland_Main-440 | Kirkland_Manholes-266 | 97.98 | Kirkland_Manholes-267 | 95.34 | 145 | 1.82 | 8 | PVC | 0.01 | 951 | 33 | 83 | 116 | 12.2 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-441 | Kirkland_Manholes-265 | 110.6 | Kirkland_Manholes-266 | 97.98 | 184.6 | 6.84 | 8 | Concrete | 0.013 | 1,418 | 31 | 79 | 110 | 7.8 | SM10 | |
| Kirkland_Main-442 | Kirkland_Manholes-262 | 118.9 | Kirkland_Manholes-265 | 110.6 | 150.8 | 5.51 | 8 | Concrete | 0.013 | 1,272 | 30 | 75 | 105 | 8.2 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-443 | Kirkland_Manholes-261 | 130.12 | Kirkland_Manholes-262 | 118.9 | 278.9 | 4.02 | 8 | Concrete | 0.013 | 1,088 | 27 | 70 | 98 | 9 | SM10 | |
| Kirkland_Main-444 | Kirkland_Manholes-258 | 141.4 | Kirkland_Manholes-261 | 130.12 | 280.6 | 4.02 | 8 | Concrete | 0.013 | 1,087 | 24 | 66 | 90 | 8.2 | SM10 | |
| Kirkland_Main-445 | Kirkland_Manholes-527 | 146.55 | Kirkland_Manholes-258 | 141.4 | 279.2 | 1.84 | 8 | Concrete | 0.013 | 737 | 23 | 62 | 84 | 11.4 | SM10 | |
| Kirkland_Main-446 | Kirkland_Manholes-259 | 136.12 | Kirkland_Manholes-260 | 130.49 | 137.7 | 4.09 | 8 | sbestos Ceme | 0.011 | 1,296 | 1 | 4 | 6 | 0.4 | SM10 | |
| Kirkland_Main-447 | Kirkland_Manholes-260 | 130.49 | Kirkland_Manholes-251 | 119.87 | 263.8 | 4.03 | 8 | sbestos Ceme | 0.011 | 1,286 | 3 | 9 | 11 | 0.9 | SM10 | |
| Kirkland_Main-448 | Kirkland_Manholes-251 | 119.87 | Kirkland_Manholes-250 | 115.74 | 110.4 | 3.74 | 8 | sbestos Ceme | 0.011 | 1,239 | 3 | 13 | 16 | 1.3 | SM14-Ex-EX55 | |
| Kirkland_Main-449 | Kirkland_Manholes-253 | 121.6 | Kirkland_Manholes-254 | 100.7 | 323.7 | 6.46 | 8 | Concrete | 0.013 | 1,378 | 31 | 77 | 108 | 7.8 | SM14-Ex-EX40 | |
| Kirkland_Main-450 | Kirkland_Manholes-252 | 142.57 | Kirkland_Manholes-253 | 121.6 | 327.2 | 6.41 | 8 | Concrete | 0.013 | 1,373 | 31 | 73 | 103 | 7.5 | SM14-Ex-EX40 | |
| Kirkland_Main-451 | Kirkland_Manholes-257 | 165.98 | Kirkland_Manholes-252 | 142.57 | 284 | 8.24 | 8 | Concrete | 0.013 | 1,557 | 30 | 64 | 94 | 6 | SM14-Ex-EX57 | |
| Kirkland_Main-452 | Kirkland_Manholes-234 | 184.45 | Kirkland_Manholes-257 | 165.98 | 280.4 | 6.59 | 8 | Concrete | 0.013 | 1,392 | 22 | 51 | 73 | 5.2 | SM14-Ex-EX57 | |
| Kirkland_Main-453 | Kirkland_Manholes-1133 | 181.56 | Kirkland_Manholes-257 | 165.98 | 274.2 | 5.68 | 8 | Concrete | 0.013 | 1,293 | 7 | 9 | 15 | 1.2 | SM14-Ex-EX58 | |
| Kirkland_Main-454 | Kirkland_Manholes-231 | 144.64 | Kirkland_Manholes-236 | 135.22 | 190.5 | 4.95 | 6 | Concrete | 0.013 | 560 | 1 | 4 | 5 | 1 | SM14-Ex-EX56 | |
| Kirkland_Main-455 | Kirkland_Manholes-235 | 144.29 | Kirkland_Manholes-236 | 135.22 | 77.1 | 11.76 | 6 | Concrete | 0.013 | 864 | 1 | 4 | 6 | 0.7 | SM14-Ex-EX56 | |
| Kirkland_Main-456 | Kirkland_Manholes-236 | 135.22 | Kirkland_Manholes-237 | 112.26 | 221.2 | 10.38 | 6 | Concrete | 0.013 | 811 | 3 | 13 | 16 | 2 | SM14-Ex-EX56 | |
| Kirkland_Main-457 | Kirkland_Manholes-232 | 112.59 | Kirkland_Manholes-237 | 112.26 | 229.8 | 0.14 | 8 | Concrete | 0.013 | 206 | 45 | 132 | 177 | 86.3 | SM14-Ex-EX41 | |
| Kirkland_Main-458 | Kirkland_Manholes-237 | 112.26 | Kirkland_Manholes-254 | 100.7 | 413.4 | 2.8 | 8 | Concrete | 0.013 | 907 | 49 | 149 | 199 | 21.9 | SM14-Ex-EX41 | |
| Kirkland_Main-459 | Kirkland_Manholes-254 | 100.7 | Kirkland_Manholes-255 | 81.45 | 344 | 5.6 | 8 | Concrete | 0.013 | 1,283 | 81 | 230 | 311 | 24.3 | SM14-Ex-EX40 | |
| Kirkland_Main-460 | Kirkland_Manholes-249 | 98.75 | Kirkland_Manholes-248 | 82.01 | 263.5 | 6.35 | 8 | Concrete | 0.013 | 1,367 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX39 | |
| Kirkland_Main-461 | Kirkland_Manholes-255 | 81.45 | Kirkland_Manholes-256 | 63.52 | 326.4 | 5.49 | 8 | Concrete | 0.013 | 1,271 | 83 | 235 | 317 | 25 | SM14-Ex-EX40 | |
| Kirkland_Main-462 | Kirkland_Manholes-256 | 63.52 | Kirkland_Manholes-245 | 59.23 | 36.4 | 11.78 | 8 | Concrete | 0.013 | 1,862 | 83 | 239 | 322 | 17.3 | SM14-Ex-EX40 | |
| Kirkland_Main-463 | Kirkland_Manholes-248 | 82.01 | Kirkland_Manholes-245 | 59.23 | 346.7 | 6.57 | 8 | Concrete | 0.013 | 1,390 | 2 | 9 | 10 | 0.7 | SM14-Ex-EX39 | |
| Kirkland_Main-464 | Kirkland_Manholes-245 | 59.23 | Kirkland_Manholes-246 | 59.12 | 26.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 86 | 252 | 338 | 98.4 | SM14-Ex-EX40 | Drop Connection |
| Kirkland_Main-465 | Kirkland_Manholes-247 | 65.14 | Kirkland_Manholes-246 | 64.57 | 142.8 | 0.4 | 8 | PVC | 0.01 | 446 | 51 | 143 | 194 | 43.4 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-466 | Kirkland_Manholes-291 | 21.49 | Kirkland_Manholes-290 | 19.2 | 13 | 17.62 | 12 | PVC | 0.01 | 8,726 | 44 | 64 | 107 | 1.2 | SM10 | |
| Kirkland_Main-467 | Kirkland_Manholes-290 | 19.2 | ROSEPT_WETWELL | 14.96 | 16.7 | 25.32 | 8 | Ductile Iron | 0.012 | 2,957 | 52 | 86 | 138 | 4.7 | SM10 | |
| Kirkland_Main-468 | Kirkland_Manholes-289 | 31.71 | Kirkland_Manholes-287 | 23.53 | 51 | 16.05 | 8 | Concrete | 0.013 | 2,173 | 9 | 22 | 32 | 1.5 | SM10 | |
| Kirkland_Main-469 | Kirkland_Manholes-288 | 19.33 | Kirkland_Manholes-290 | 19.2 | 135.3 | 0.1 | 8 | Concrete | 0.013 | 168 | 7 | 19 | 26 | 15.7 | SM10 | |
| Kirkland_Main-470 | Kirkland_Manholes-287 | 23.53 | Kirkland_Manholes-291 | 21.49 | 128.7 | 1.58 | 8 | Concrete | 0.013 | 683 | 44 | 61 | 104 | 15.3 | SM10 | |
| Kirkland_Main-471 | Kirkland_Manholes-286 | 24.15 | Kirkland_Manholes-287 | 23.53 | 96.6 | 0.64 | 10 | Concrete | 0.013 | 788 | 34 | 35 | 70 | 8.8 | SM10 | |
| Kirkland_Main-472 | Kirkland_Manholes-285 | 19.59 | Kirkland_Manholes-288 | 19.33 | 259.3 | 0.1 | 8 | Concrete | 0.013 | 172 | 7 | 16 | 23 | 13.5 | SM10 | |
| Kirkland_Main-473 | Kirkland_Manholes-292 | 22.37 | Kirkland_Manholes-293 | 22.09 | 126.6 | 0.22 | 12 | Concrete | 0.013 | 744 | 0 | 9 | 9 | 1.2 | SM14-Ex-EX37 | |
| Kirkland_Main-474 | Kirkland_Manholes-297 | 22.86 | Kirkland_Manholes-296 | 21.27 | 137.3 | 1.16 | 8 | sbestos Ceme | 0.011 | 690 | 2 | 3 | 5 | 0.8 | SM14-Ex-EX36 | |
| Kirkland_Main-475 | Kirkland_Manholes-296 | 21.27 | Kirkland_Manholes-295 | 20.59 | 313.5 | 0.22 | 8 | sbestos Ceme | 0.011 | 299 | 4 | 6 | 10 | 3.4 | SM10 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-476 | Kirkland_Manholes-295 | 20.59 | Kirkland_Manholes-294 | 20.11 | 95.2 | 0.5 | 8 | sbestos Ceme | 0.011 | 455 | 5 | 10 | 14 | 3.1 | SM10 | |
| Kirkland_Main-477 | Kirkland_Manholes-294 | 20.11 | Kirkland_Manholes-285 | 19.59 | 185.3 | 0.28 | 8 | Concrete | 0.013 | 287 | 6 | 13 | 19 | 6.5 | SM10 | |
| Kirkland_Main-478 | Kirkland_Manholes-311 | 21.29 | Kirkland_Manholes-312 | 20.99 | 124.6 | 0.24 | 12 | Concrete | 0.013 | 784 | 4 | 35 | 39 | 5 | SM14-Ex-EX37 | |
| Kirkland_Main-479 | Kirkland_Manholes-312 | 20.99 | Kirkland_Manholes-306 | 19.99 | 281.9 | 0.35 | 12 | Concrete | 0.013 | 952 | 5 | 44 | 49 | 5.2 | SM14-Ex-EX37 | |
| Kirkland_Main-480 | Kirkland_Manholes-362 | 216.81 | Kirkland_Manholes-361 | 216.74 | 35.2 | 0.2 | 21 | PVC | 0.01 | 4,142 | 528 | 1,935 | 2,463 | 59.5 | | |
| Kirkland_Main-481 | Kirkland_Manholes-367 | 213.02 | Kirkland_Manholes-368 | 212.3 | 160.3 | 0.45 | 18 | PVC | 0.01 | 4,107 | 539 | 1,999 | 2,538 | 61.8 | | |
| Kirkland_Main-482 | Kirkland_Manholes-368 | 212.3 | Kirkland_Manholes-369 | 208.86 | 249.4 | 1.38 | 18 | PVC | 0.01 | 7,198 | 539 | 2,003 | 2,542 | 35.3 | | |
| Kirkland_Main-483 | Kirkland_Manholes-369 | 208.86 | Kirkland_Manholes-370 | 206.64 | 246.4 | 0.9 | 18 | PVC | 0.01 | 5,817 | 548 | 2,034 | 2,583 | 44.4 | | |
| Kirkland_Main-484 | Kirkland_Manholes-371 | 213.58 | Kirkland_Manholes-2872 | 207.03 | 240.7 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-485 | Kirkland_Manholes-372 | 241.98 | Kirkland_Manholes-373 | 230.9 | 143.8 | 7.71 | 8 | PVC | 0.01 | 1,957 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-486 | Kirkland_Manholes-375 | 234.87 | Kirkland_Manholes-373 | 230.9 | 271 | 1.46 | 8 | PVC | 0.01 | 853 | 61 | 242 | 303 | 35.5 | | |
| Kirkland_Main-487 | Kirkland_Manholes-374 | 244.09 | Kirkland_Manholes-375 | 234.87 | 143.4 | 6.43 | 8 | PVC | 0.01 | 1,788 | 1 | 4 | 4 | 0.3 | | |
| Kirkland_Main-488 | Kirkland_Manholes-535 | 472.49 | Kirkland_Manholes-536 | 466.05 | 355.6 | 1.81 | 8 | PVC | 0.01 | 949 | 2 | 16 | 18 | 1.9 | | |
| Kirkland_Main-489 | Kirkland_Manholes-536 | 466.05 | Kirkland_Manholes-539 | 454.38 | 292.6 | 3.99 | 8 | PVC | 0.01 | 1,408 | 4 | 20 | 24 | 1.7 | | |
| Kirkland_Main-490 | Kirkland_Manholes-537 | 455.9 | Kirkland_Manholes-539 | 454.38 | 190.6 | 0.8 | 8 | PVC | 0.01 | 630 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-491 | Kirkland_Manholes-539 | 454.38 | Kirkland_Manholes-540 | 453.6 | 170.3 | 0.46 | 8 | PVC | 0.01 | 477 | 8 | 60 | 67 | 14.1 | | |
| Kirkland_Main-492 | Kirkland_Manholes-540 | 453.6 | Kirkland_Manholes-541 | 450.25 | 325.9 | 1.03 | 8 | PVC | 0.01 | 715 | 8 | 64 | 72 | 10.1 | | |
| Kirkland_Main-493 | Kirkland_Manholes-538 | 457.48 | Kirkland_Manholes-1977 | 454.61 | 403.8 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-494 | Kirkland_Manholes-596 | 110.91 | Kirkland_Manholes-600 | 91.95 | 293.8 | 6.45 | 8 | Concrete | 0.013 | 1,378 | 89 | 354 | 443 | 32.2 | SM14-Ex-EX117 | |
| Kirkland_Main-495 | Kirkland_Manholes-598 | 118.14 | Kirkland_Manholes-596 | 110.91 | 360.7 | 2 | 6 | Concrete | 0.013 | 357 | 3 | 8 | 11 | 3.2 | SM14-Ex-EX159 | |
| Kirkland_Main-496 | Kirkland_Manholes-606 | 111.69 | Kirkland_Manholes-614 | 87.89 | 289.9 | 8.21 | 8 | Concrete | 0.013 | 1,554 | 39 | 165 | 203 | 13.1 | SM14-Ex-EX96 | |
| Kirkland_Main-497 | Kirkland_Manholes-238 | 85.65 | Kirkland_Manholes-239 | 27.77 | 394.9 | 14.66 | 8 | PVC | 0.01 | 2,699 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-502 | Kirkland_Manholes-200 | 55.31 | Kirkland_Manholes-199 | 54.68 | 46 | 1.37 | 8 | PVC | 0.01 | 825 | 4 | 21 | 25 | 3 | | |
| Kirkland_Main-503 | Kirkland_Manholes-2330 | 295.18 | Kirkland_Manholes-263 | 292.03 | 86.5 | 3.64 | 8 | Concrete | 0.013 | 1,035 | 29 | 95 | 124 | 12 | SM14-Ex-EX252 | |
| Kirkland_Main-504 | Kirkland_Manholes-2768 | 263.56 | Kirkland_Manholes-2769 | 260.32 | 376.9 | 0.86 | 8 | PVC | 0.01 | 654 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-505 | Kirkland_Manholes-280 | 27.37 | Kirkland_Manholes-286 | 24.15 | 372.8 | 0.86 | 10 | Concrete | 0.013 | 914 | 32 | 29 | 61 | 6.7 | SM10 | |
| Kirkland_Main-509 | Kirkland_Manholes-313 | 62.05 | Kirkland_Manholes-286 | 24.15 | 229.1 | 16.54 | 8 | Concrete | 0.013 | 2,206 | 1 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-510 | Kirkland_Manholes-804 | 284.1 | Kirkland_Manholes-319 | 281.98 | 84.4 | 2.51 | 8 | PVC | 0.01 | 1,117 | 8 | 32 | 40 | 3.6 | | |
| Kirkland_Main-511 | Kirkland_Manholes-319 | 281.98 | Kirkland_Manholes-320 | 278.6 | 79.1 | 4.27 | 8 | PVC | 0.01 | 1,458 | 9 | 36 | 45 | 3.1 | | |
| Kirkland_Main-512 | Kirkland_Manholes-320 | 278.6 | Kirkland_Manholes-321 | 265.74 | 204.3 | 6.3 | 8 | PVC | 0.01 | 1,769 | 10 | 40 | 49 | 2.8 | | |
| Kirkland_Main-513 | Kirkland_Manholes-321 | 265.74 | Kirkland_Manholes-322 | 263.88 | 72.5 | 2.57 | 8 | PVC | 0.01 | 1,129 | 10 | 44 | 54 | 4.8 | | |
| Kirkland_Main-514 | Kirkland_Manholes-322 | 263.88 | Kirkland_Manholes-323 | 244.99 | 177.9 | 10.62 | 8 | PVC | 0.01 | 2,297 | 20 | 75 | 95 | 4.1 | | |
| Kirkland_Main-515 | Kirkland_Manholes-803 | 278.64 | Kirkland_Manholes-322 | 263.88 | 141.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 9 | 28 | 37 | 1.6 | | |
| Kirkland_Main-516 | Kirkland_Manholes-323 | 244.99 | Kirkland_Manholes-324 | 240.21 | 186.2 | 2.57 | 8 | PVC | 0.01 | 1,130 | 20 | 79 | 100 | 8.8 | | |
| Kirkland_Main-517 | Kirkland_Manholes-815 | 248.52 | Kirkland_Manholes-324 | 240.21 | 137.2 | 6.05 | 8 | PVC | 0.01 | 1,735 | 6 | 20 | 26 | 1.5 | | |
| Kirkland_Main-518 | Kirkland_Manholes-324 | 240.21 | Kirkland_Manholes-325 | 236.62 | 39.9 | 9.01 | 8 | PVC | 0.01 | 2,116 | 27 | 103 | 130 | 6.1 | | |
| Kirkland_Main-519 | Kirkland_Manholes-325 | 236.62 | Kirkland_Manholes-327 | 230.43 | 89 | 6.95 | 8 | PVC | 0.01 | 1,859 | 27 | 111 | 139 | 7.5 | | |
| Kirkland_Main-520 | Kirkland_Manholes-326 | 238.6 | Kirkland_Manholes-325 | 236.62 | 142.9 | 1.39 | 8 | PVC | 0.01 | 830 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-521 | Kirkland_Manholes-327 | 230.43 | Kirkland_Manholes-328 | 228.68 | 117.4 | 1.49 | 8 | PVC | 0.01 | 861 | 28 | 115 | 143 | 16.6 | | |
| Kirkland_Main-522 | Kirkland_Manholes-328 | 228.68 | Kirkland_Manholes-329 | 227.48 | 172.3 | 0.7 | 8 | PVC | 0.01 | 588 | 28 | 119 | 148 | 25.1 | | |
| Kirkland_Main-523 | Kirkland_Manholes-329 | 227.48 | Kirkland_Manholes-814 | 224.81 | 265.5 | 1.01 | 8 | PVC | 0.01 | 707 | 30 | 123 | 153 | 21.6 | | |
| Kirkland_Main-524 | Kirkland_Manholes-335 | 225.11 | Kirkland_Manholes-330 | 224.74 | 400.7 | 0.09 | 21 | PVC | 0.01 | 2,809 | 491 | 1,713 | 2,204 | 78.5 | SM14-2021-DF4 | |
| Kirkland_Main-525 | Kirkland_Manholes-330 | 224.74 | Kirkland_Manholes-331 | 223 | 199.5 | 0.87 | 21 | PVC | 0.01 | 8,635 | 492 | 1,716 | 2,208 | 25.6 | | |
| Kirkland_Main-526 | Kirkland_Manholes-331 | 223 | Kirkland_Manholes-332 | 219.57 | 217.5 | 1.58 | 21 | PVC | 0.01 | 11,610 | 492 | 1,720 | 2,212 | 19.1 | | |
| Kirkland_Main-527 | Kirkland_Manholes-332 | 219.57 | Kirkland_Manholes-334 | 218.68 | 182 | 0.49 | 21 | PVC | 0.01 | 6,464 | 493 | 1,724 | 2,217 | 34.3 | | |
| Kirkland_Main-528 | Kirkland_Manholes-333 | 225.59 | Kirkland_Manholes-334 | 218.68 | 199.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 32 | 183 | 215 | 16.4 | | |
| Kirkland_Main-529 | Kirkland_Manholes-352 | 234.2 | Kirkland_Manholes-333 | 225.59 | 382.7 | 2.25 | 8 | PVC | 0.01 | 1,058 | 31 | 179 | 210 | 19.9 | | |
| Kirkland_Main-530 | Kirkland_Manholes-334 | 218.68 | Kirkland_Manholes-356 | 218.57 | 161 | 0.07 | 21 | PVC | 0.01 | 2,416 | 527 | 1,915 | 2,442 | 101.1 | SM14-Ex-EX48 | |
| Kirkland_Main-531 | Kirkland_Manholes-337 | 291.09 | Kirkland_Manholes-338 | 268.5 | 343.3 | 6.58 | 8 | PVC | 0.01 | 1,809 | 10 | 64 | 73 | 4 | | |
| Kirkland_Main-532 | Kirkland_Manholes-343 | 274.46 | Kirkland_Manholes-338 | 268.5 | 356.6 | 1.67 | 8 | PVC | 0.01 | 912 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-533 | Kirkland_Manholes-338 | 268.5 | Kirkland_Manholes-339 | 249.19 | 361.1 | 5.35 | 8 | PVC | 0.01 | 1,631 | 13 | 72 | 84 | 5.2 | | |
| Kirkland_Main-534 | Kirkland_Manholes-1543 | 289 | Kirkland_Manholes-1544 | 284.46 | 416.8 | 1.09 | 8 | Concrete | 0.013 | 566 | 7 | 20 | 27 | 4.8 | SM14-Ex-EX123 | |
| Kirkland_Main-535 | Kirkland_Manholes-1545 | 272.4 | Kirkland_Manholes-765 | 257.59 | 249.5 | 5.94 | 8 | Concrete | 0.013 | 1,321 | 18 | 68 | 85 | 6.4 | SM14-Ex-EX121 | |
| Kirkland_Main-536 | Kirkland_Manholes-1571 | 242.76 | Kirkland_Manholes-1572 | 242.19 | 318.3 | 0.18 | 15 | PVC | 0.01 | 1,595 | 191 | 445 | 636 | 39.9 | | |
| Kirkland_Main-537 | Kirkland_Manholes-1573 | 242.13 | Kirkland_Manholes-1574 | 241.8 | 67.8 | 0.49 | 15 | PVC | 0.01 | 2,630 | 191 | 453 | 644 | 24.5 | SM14-Ex-EX133 | |
| Kirkland_Main-538 | Kirkland_Manholes-1572 | 242.19 | Kirkland_Manholes-1573 | 242.13 | 243.5 | 0.02 | 15 | PVC | 0.01 | 592 | 191 | 449 | 640 | 108.3 | SM14-Ex-EX133 | |
| Kirkland_Main-539 | Kirkland_Manholes-1576 | 330.99 | Kirkland_Manholes-1575 | 314.42 | 250.6 | 6.61 | 8 | PVC | 0.01 | 1,813 | 3 | 28 | 31 | 1.7 | | |
| Kirkland_Main-540 | Kirkland_Manholes-1577 | 341.43 | Kirkland_Manholes-1576 | 330.99 | 181.7 | 5.75 | 8 | PVC | 0.01 | 1,690 | 3 | 24 | 27 | 1.6 | | |
| Kirkland_Main-541 | Kirkland_Manholes-1578 | 344.66 | Kirkland_Manholes-1577 | 341.43 | 47.3 | 6.83 | 8 | PVC | 0.01 | 1,843 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-542 | Kirkland_Manholes-1579 | 359.44 | Kirkland_Manholes-1580 | 335.19 | 206.7 | 11.73 | 8 | Concrete | 0.013 | 1,858 | 155 | 604 | 759 | 40.9 | SM14-Ex-EX205 | |
| Kirkland_Main-543 | Kirkland_Manholes-1580 | 335.19 | Kirkland_Manholes-1581 | 324.95 | 171.4 | 5.98 | 12 | Concrete | 0.013 | 3,909 | 156 | 608 | 764 | 19.5 | SM14-Ex-EX205 | |
| Kirkland_Main-544 | Kirkland_Manholes-1582 | 332.21 | Kirkland_Manholes-1581 | 324.95 | 160.1 | 4.53 | 12 | Concrete | 0.013 | 3,405 | 41 | 191 | 232 | 6.8 | SM14-Ex-EX206 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-545 | Kirkland_Manholes-1581 | 324.95 | Kirkland_Manholes-1623 | 294.92 | 398.1 | 7.54 | 12 | Concrete | 0.013 | 4,392 | 197 | 803 | 999 | 22.8 | SM14-Ex-EX205 | |
| Kirkland_Main-546 | Kirkland_Manholes-2681 | 334.86 | Kirkland_Manholes-3028 | 332.75 | 289 | 0.73 | 12 | Concrete | 0.013 | 1,366 | 38 | 171 | 209 | 15.3 | SM14-Ex-EX206 | |
| Kirkland_Main-547 | Kirkland_Manholes-1583 | 333.82 | Kirkland_Manholes-1582 | 332.21 | 16.6 | 9.69 | 8 | PVC | 0.01 | 2,195 | 2 | 8 | 10 | 0.5 | | |
| Kirkland_Main-548 | Kirkland_Manholes-1584 | 346.72 | Kirkland_Manholes-1583 | 333.82 | 203.1 | 6.35 | 8 | PVC | 0.01 | 1,777 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-549 | Kirkland_Manholes-1575 | 314.42 | Kirkland_Manholes-1953 | 290.71 | 326.1 | 7.27 | 8 | PVC | 0.01 | 1,901 | 3 | 32 | 35 | 1.8 | | |
| Kirkland_Main-550 | Kirkland_Manholes-1150 | 151.79 | Kirkland_Manholes-1151 | 143.36 | 156.6 | 5.38 | 6 | Concrete | 0.013 | 584 | 9 | 58 | 67 | 11.4 | SM10 | |
| Kirkland_Main-551 | Kirkland_Manholes-1151 | 143.36 | Kirkland_Manholes-1152 | 135.47 | 158.3 | 4.98 | 6 | Concrete | 0.013 | 562 | 10 | 66 | 76 | 13.5 | SM10 | |
| Kirkland_Main-552 | Kirkland_Manholes-1170 | 153.9 | Kirkland_Manholes-1150 | 151.79 | 249.2 | 0.85 | 6 | Concrete | 0.013 | 232 | 2 | 8 | 10 | 4.2 | SM10 | |
| Kirkland_Main-553 | Kirkland_Manholes-306 | 19.99 | Kirkland_Manholes-1183 | 19.89 | 217.6 | 0.05 | 12 | sbestos Ceme | 0.011 | 405 | 27 | 159 | 186 | 45.9 | SM14-Ex-EX37 | |
| Kirkland_Main-554 | Kirkland_Manholes-304 | 75.98 | Kirkland_Manholes-303 | 75.38 | 34.2 | 1.76 | 8 | Concrete | 0.013 | 719 | 16 | 62 | 77 | 10.8 | SM10 | |
| Kirkland_Main-555 | Kirkland_Manholes-303 | 75.38 | Kirkland_Manholes-305 | 74.69 | 171.5 | 0.4 | 8 | Concrete | 0.013 | 344 | 16 | 71 | 86 | 25.1 | SM10 | |
| Kirkland_Main-556 | Kirkland_Manholes-302 | 78.72 | Kirkland_Manholes-304 | 75.98 | 177.4 | 1.54 | 8 | Concrete | 0.013 | 674 | 15 | 53 | 68 | 10.1 | SM10 | |
| Kirkland_Main-557 | Kirkland_Manholes-307 | 105.6 | Kirkland_Manholes-302 | 78.72 | 385.1 | 6.98 | 8 | Concrete | 0.013 | 1,433 | 14 | 44 | 58 | 4.1 | SM10 | |
| Kirkland_Main-558 | Kirkland_Manholes-301 | 74.29 | Kirkland_Manholes-300 | 70.39 | 326.3 | 1.2 | 8 | Concrete | 0.013 | 593 | 2 | 3 | 5 | 0.9 | SM10 | |
| Kirkland_Main-559 | Kirkland_Manholes-1316 | 272.4 | Kirkland_Manholes-1317 | 271.64 | 47 | 1.62 | 8 | PVC | 0.01 | 896 | 1 | 12 | 13 | 1.4 | | |
| Kirkland_Main-563 | Kirkland_Manholes-300 | 70.39 | Kirkland_Manholes-299 | 66.63 | 324 | 1.16 | 8 | Concrete | 0.013 | 584 | 6 | 6 | 12 | 2 | SM10 | |
| Kirkland_Main-564 | Kirkland_Manholes-388 | 297.69 | Kirkland_Manholes-389 | 295.78 | 310.4 | 0.62 | 8 | Concrete | 0.013 | 425 | 8 | 20 | 28 | 6.5 | SM14-Ex-EX33 | |
| Kirkland_Main-565 | Kirkland_Manholes-390 | 304.37 | Kirkland_Manholes-391 | 302.9 | 200.9 | 0.73 | 8 | Concrete | 0.013 | 464 | 1 | 4 | 5 | 1.2 | SM14-Ex-EX34 | |
| Kirkland_Main-566 | Kirkland_Manholes-392 | 305 | Kirkland_Manholes-391 | 302.9 | 116.9 | 1.8 | 8 | Concrete | 0.013 | 727 | 28 | 119 | 147 | 20.3 | SM14-Ex-EX50 | |
| Kirkland_Main-567 | Kirkland_Manholes-2568 | 299.24 | Kirkland_Manholes-2592 | 294.57 | 199 | 2.35 | 8 | Concrete | 0.013 | 831 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX306 | |
| Kirkland_Main-568 | Kirkland_Manholes-2571 | 325.07 | Kirkland_Manholes-2570 | 299.81 | 188.9 | 13.37 | 8 | PVC | 0.01 | 2,578 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-569 | Kirkland_Manholes-2602 | 234.19 | Kirkland_Manholes-2601 | 228.74 | 344.4 | 1.58 | 8 | Concrete | 0.013 | 682 | 3 | 12 | 14 | 2.1 | SM14-Ex-EX300 | |
| Kirkland_Main-570 | Kirkland_Manholes-2603 | 296.02 | Kirkland_Manholes-2588 | 292.14 | 272.1 | 1.43 | 8 | Concrete | 0.013 | 648 | 11 | 24 | 34 | 5.3 | SM14-Ex-EX304 | |
| Kirkland_Main-573 | Kirkland_Manholes-2610 | 205.21 | Kirkland_Manholes-2609 | 193.8 | 79.9 | 14.28 | 8 | PVC | 0.01 | 2,664 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-574 | Kirkland_Manholes-1380 | 448.63 | Kirkland_Manholes-1386 | 447.82 | 272.6 | 0.3 | 8 | Concrete | 0.013 | 296 | 6 | 8 | 14 | 4.7 | SM14-Ex-EX219 | |
| Kirkland_Main-575 | Kirkland_Manholes-1383 | 449.36 | Kirkland_Manholes-1380 | 448.63 | 231 | 0.32 | 8 | Concrete | 0.013 | 305 | 4 | 4 | 8 | 2.5 | SM14-Ex-EX219 | |
| Kirkland_Main-576 | Kirkland_Manholes-1381 | 441.1 | Kirkland_Manholes-1382 | 428.64 | 320.7 | 3.88 | 8 | PVC | 0.01 | 1,390 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-577 | Kirkland_Manholes-1384 | 452.11 | Kirkland_Manholes-1385 | 450.86 | 206.1 | 0.61 | 8 | PVC | 0.01 | 549 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-578 | Kirkland_Manholes-1385 | 450.86 | Kirkland_Manholes-1386 | 447.82 | 69.1 | 4.4 | 8 | PVC | 0.01 | 1,479 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-579 | Kirkland_Manholes-1386 | 447.82 | Kirkland_Manholes-1387 | 446.83 | 200.1 | 0.49 | 8 | sbestos Ceme | 0.013 | 382 | 8 | 20 | 28 | 7.4 | SM14-Ex-EX219 | |
| Kirkland_Main-580 | Kirkland_Manholes-1387 | 446.83 | Kirkland_Manholes-1388 | 445.49 | 260.4 | 0.51 | 8 | Ductile Iron | 0.012 | 421 | 28 | 95 | 124 | 29.3 | SM14-Ex-EX219 | |
| Kirkland_Main-581 | Kirkland_Manholes-1388 | 445.49 | Kirkland_Manholes-1389 | 444.08 | 265.9 | 0.53 | 8 | Ductile Iron | 0.012 | 428 | 30 | 99 | 129 | 30.2 | SM14-Ex-EX219 | |
| Kirkland_Main-582 | Kirkland_Manholes-1390 | 457.46 | Kirkland_Manholes-1389 | 444.08 | 260.4 | 5.14 | 8 | Concrete | 0.013 | 1,229 | 6 | 24 | 29 | 2.4 | SM14-Ex-EX218 | |
| Kirkland_Main-583 | Kirkland_Manholes-1389 | 444.08 | Kirkland_Manholes-532 | 443.04 | 161.2 | 0.65 | 8 | Concrete | 0.013 | 436 | 37 | 127 | 164 | 37.7 | SM14-Ex-EX218 | |
| Kirkland_Main-584 | Kirkland_Manholes-532 | 443.04 | Kirkland_Manholes-533 | 442.23 | 169.5 | 0.48 | 8 | Concrete | 0.013 | 375 | 41 | 131 | 172 | 45.8 | SM14-Ex-EX218 | |
| Kirkland_Main-585 | Kirkland_Manholes-533 | 442.23 | Kirkland_Manholes-534 | 432.55 | 269 | 3.6 | 8 | Concrete | 0.013 | 1,029 | 42 | 135 | 177 | 17.3 | SM14-Ex-EX218 | |
| Kirkland_Main-586 | Kirkland_Manholes-530 | 464.47 | Kirkland_Manholes-1390 | 457.46 | 207.2 | 3.38 | 8 | Concrete | 0.013 | 998 | 5 | 20 | 25 | 2.5 | SM14-Ex-EX218 | |
| Kirkland_Main-587 | Kirkland_Manholes-1391 | 471.35 | Kirkland_Manholes-530 | 464.47 | 201.7 | 3.41 | 8 | Concrete | 0.013 | 1,002 | 2 | 12 | 14 | 1.4 | SM14-Ex-EX218 | |
| Kirkland_Main-588 | Kirkland_Manholes-543 | 448.24 | Kirkland_Manholes-1387 | 446.83 | 163.4 | 0.86 | 8 | PVC | 0.01 | 655 | 19 | 72 | 91 | 13.9 | | |
| Kirkland_Main-589 | Kirkland_Manholes-531 | 468.8 | Kirkland_Manholes-530 | 464.47 | 218 | 1.99 | 8 | PVC | 0.01 | 994 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-590 | Kirkland_Manholes-339 | 249.19 | Kirkland_Manholes-340 | 235.81 | 214 | 6.25 | 8 | PVC | 0.01 | 1,763 | 13 | 75 | 89 | 5 | | |
| Kirkland_Main-592 | Kirkland_Manholes-2009 | 426.97 | Kirkland_Manholes-2010 | 424.43 | 206.3 | 1.23 | 8 | PVC | 0.01 | 782 | 11 | 52 | 63 | 8 | | |
| Kirkland_Main-593 | Kirkland_Manholes-2011 | 417.75 | Kirkland_Manholes-2012 | 406.67 | 363.8 | 3.05 | 8 | PVC | 0.01 | 1,230 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-594 | Kirkland_Manholes-1989 | 447.97 | Kirkland_Manholes-1990 | 439.8 | 245.1 | 3.33 | 8 | PVC | 0.01 | 1,287 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-595 | Kirkland_Manholes-1990 | 439.8 | Kirkland_Manholes-1991 | 431.18 | 131.7 | 6.55 | 8 | PVC | 0.01 | 1,804 | 5 | 28 | 33 | 1.8 | | |
| Kirkland_Main-596 | Kirkland_Manholes-556 | 457.9 | Kirkland_Manholes-3007 | 456.9 | 222.1 | 0.45 | 8 | PVC | 0.01 | 473 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-597 | Kirkland_Manholes-2495 | 184.35 | Kirkland_Manholes-2494 | 170.93 | 403.6 | 3.33 | 8 | Concrete | 0.013 | 989 | 12 | 20 | 32 | 3.2 | SM14-Ex-EX236 | |
| Kirkland_Main-598 | Kirkland_Manholes-2496 | 191.57 | Kirkland_Manholes-2495 | 184.35 | 278.9 | 2.59 | 8 | Concrete | 0.013 | 873 | 10 | 16 | 26 | 2.9 | SM14-Ex-EX236 | |
| Kirkland_Main-599 | Kirkland_Manholes-2497 | 194.88 | Kirkland_Manholes-2498 | 194.29 | 45.2 | 1.3 | 6 | PVC | 0.01 | 374 | 8 | 8 | 16 | 4.3 | SM14-Ex-EX236 | |
| Kirkland_Main-600 | Kirkland_Manholes-2498 | 194.29 | Kirkland_Manholes-2496 | 191.57 | 77.4 | 3.51 | 6 | Concrete | 0.013 | 472 | 9 | 12 | 21 | 4.5 | SM14-Ex-EX236 | |
| Kirkland_Main-601 | Kirkland_Manholes-2237 | 143.38 | Kirkland_Manholes-2499 | 140.38 | 322.1 | 0.93 | 8 | Concrete | 0.013 | 523 | 3 | 6 | 10 | 1.8 | SM14-Ex-EX225 | |
| Kirkland_Main-602 | Kirkland_Manholes-2499 | 140.38 | Kirkland_Manholes-2500 | 122.66 | 273.4 | 6.48 | 8 | Concrete | 0.013 | 1,381 | 5 | 12 | 17 | 1.3 | SM14-Ex-EX225 | |
| Kirkland_Main-603 | Kirkland_Manholes-2500 | 122.66 | Kirkland_Manholes-2501 | 104.86 | 254.1 | 7.01 | 8 | Concrete | 0.013 | 1,435 | 6 | 18 | 25 | 1.7 | SM14-Ex-EX225 | |
| Kirkland_Main-604 | Kirkland_Manholes-2501 | 104.86 | Kirkland_Manholes-2502 | 102.46 | 257.9 | 0.93 | 8 | Concrete | 0.013 | 523 | 9 | 24 | 33 | 6.3 | SM14-Ex-EX225 | |
| Kirkland_Main-605 | Kirkland_Manholes-2502 | 102.46 | Kirkland_Manholes-2503 | 101.49 | 223.5 | 0.43 | 8 | Concrete | 0.013 | 357 | 13 | 30 | 43 | 12 | SM14-Ex-EX225 | |
| Kirkland_Main-606 | Kirkland_Manholes-2504 | 121.59 | Kirkland_Manholes-2503 | 101.49 | 254 | 7.91 | 8 | Concrete | 0.013 | 1,526 | 5 | 12 | 17 | 1.1 | SM14-Ex-EX223 | |
| Kirkland_Main-607 | Kirkland_Manholes-2503 | 101.49 | Kirkland_Manholes-2507 | 88.29 | 256.5 | 5.15 | 8 | Concrete | 0.013 | 1,230 | 18 | 49 | 67 | 5.4 | SM14-Ex-EX223 | |
| Kirkland_Main-608 | Kirkland_Manholes-2505 | 125.11 | Kirkland_Manholes-2504 | 121.59 | 387.3 | 0.91 | 8 | Concrete | 0.013 | 517 | 2 | 6 | 9 | 1.7 | SM14-Ex-EX223 | |
| Kirkland_Main-609 | Kirkland_Manholes-2763 | 13.15 | Kirkland_Manholes-2762 | 13.1 | 227.4 | 0.02 | 18 | Ductile Iron | 0.012 | 757 | 446 | 1,551 | 2,298 | 303.4 | SM14-Ex-EX10 | |
| Kirkland_Main-610 | Kirkland_Manholes-2238 | 92.13 | Kirkland_Manholes-2118 | 82.91 | 342.6 | 2.69 | 8 | Concrete | 0.013 | 890 | 4 | 12 | 17 | 1.9 | SM14-Ex-EX224 | |
| Kirkland_Main-611 | Kirkland_Manholes-2118 | 82.91 | Kirkland_Manholes-2146 | 75.22 | 210 | 3.66 | 8 | Concrete | 0.013 | 1,038 | 27 | 79 | 106 | 10.2 | SM14-Ex-EX223 | |
| Kirkland_Main-612 | Kirkland_Manholes-2506 | 86.22 | Kirkland_Manholes-2118 | 82.91 | 249.1 | 1.33 | 8 | Concrete | 0.013 | 625 | 21 | 61 | 81 | 13 | SM14-Ex-EX223 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-613 | Kirkland_Manholes-2507 | 88.29 | Kirkland_Manholes-2506 | 86.22 | 236.4 | 0.88 | 8 | Concrete | 0.013 | 507 | 19 | 55 | 74 | 14.5 | SM14-Ex-EX223 | |
| Kirkland_Main-614 | Kirkland_Manholes-2508 | 120.01 | Kirkland_Manholes-2510 | 102.3 | 301.7 | 5.87 | 6 | Concrete | 0.013 | 610 | 4 | 18 | 22 | 3.7 | SM14-Ex-EX229 | |
| Kirkland_Main-615 | Kirkland_Manholes-2144 | 65.5 | Kirkland_Manholes-2143 | 61.9 | 34.5 | 10.44 | 8 | PVC | 0.01 | 2,279 | 65 | 82 | 148 | 6.5 | | |
| Kirkland_Main-616 | Kirkland_Manholes-2145 | 63.1 | Kirkland_Manholes-2143 | 61.9 | 31.4 | 3.82 | 8 | PVC | 0.01 | 1,377 | 4 | 49 | 54 | 3.9 | | |
| Kirkland_Main-618 | Kirkland_Manholes-2170 | 148.68 | Kirkland_Manholes-2169 | 142.85 | 119.8 | 4.87 | 6 | PVC | 0.01 | 722 | 1 | 8 | 9 | 1.2 | SM14-Ex-EX193 | |
| Kirkland_Main-622 | Kirkland_Manholes-2167 | 120.69 | Kirkland_Manholes-2166 | 108.92 | 118.4 | 9.94 | 6 | Concrete | 0.013 | 794 | 3 | 33 | 35 | 4.5 | SM14-Ex-EX193 | |
| Kirkland_Main-623 | Kirkland_Manholes-2166 | 108.92 | Kirkland_Manholes-2165 | 94.99 | 230.8 | 6.04 | 6 | Concrete | 0.013 | 619 | 6 | 41 | 47 | 7.6 | SM14-Ex-EX193 | |
| Kirkland_Main-626 | Kirkland_Manholes-2719 | 31.99 | Kirkland_Manholes-2715 | 29.78 | 252.5 | 0.88 | 8 | PVC | 0.01 | 660 | 74 | 12 | 86 | 13 | | |
| Kirkland_Main-627 | Kirkland_Manholes-2278 | 406.74 | Kirkland_Manholes-2271 | 405.49 | 96 | 1.3 | 8 | PVC | 0.01 | 805 | 2 | 16 | 18 | 2.2 | | |
| Kirkland_Main-630 | Kirkland_Manholes-2407 | 403.31 | Kirkland_Manholes-2268 | 401.9 | 163.6 | 0.86 | 8 | Concrete | 0.013 | 503 | 11 | 48 | 59 | 11.6 | SM14-Ex-EX261 | |
| Kirkland_Main-631 | Kirkland_Manholes-2266 | 392.8 | Kirkland_Manholes-2265 | 392 | 110.1 | 0.73 | 8 | Concrete | 0.013 | 462 | 21 | 123 | 144 | 31.2 | SM14-Ex-EX212 | |
| Kirkland_Main-632 | Kirkland_Manholes-2265 | 392 | Kirkland_Manholes-2263 | 374.13 | 447.5 | 3.99 | 8 | Concrete | 0.013 | 1,084 | 21 | 127 | 148 | 13.7 | SM14-Ex-EX212 | |
| Kirkland_Main-633 | Kirkland_Manholes-2245 | 234.09 | Kirkland_Manholes-2074 | 213.49 | 327.6 | 6.29 | 8 | Concrete | 0.013 | 1,360 | 43 | 48 | 91 | 6.7 | SM14-Ex-EX246 | |
| Kirkland_Main-634 | Kirkland_Manholes-2253 | 239.74 | Kirkland_Manholes-2252 | 236.86 | 193.1 | 1.49 | 8 | Concrete | 0.013 | 662 | 31 | 12 | 43 | 6.4 | SM14-Ex-EX247 | |
| Kirkland_Main-635 | Kirkland_Manholes-2252 | 236.86 | Kirkland_Manholes-2245 | 234.09 | 241.6 | 1.15 | 8 | Concrete | 0.013 | 581 | 35 | 16 | 51 | 8.8 | SM14-Ex-EX247 | |
| Kirkland_Main-636 | Kirkland_Manholes-2246 | 246.17 | Kirkland_Manholes-2245 | 234.09 | 185.5 | 6.51 | 8 | Concrete | 0.013 | 1,384 | 6 | 24 | 30 | 2.1 | SM14-Ex-EX246 | |
| Kirkland_Main-637 | Kirkland_Manholes-2247 | 249.9 | Kirkland_Manholes-2246 | 246.17 | 310.7 | 1.2 | 8 | Concrete | 0.013 | 594 | 4 | 20 | 24 | 4.1 | SM14-Ex-EX246 | |
| Kirkland_Main-638 | Kirkland_Manholes-2251 | 257.04 | Kirkland_Manholes-2247 | 249.9 | 237.7 | 3 | 8 | Concrete | 0.013 | 940 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX246 | |
| Kirkland_Main-639 | Kirkland_Manholes-2248 | 259.41 | Kirkland_Manholes-2247 | 249.9 | 197.8 | 4.81 | 8 | PVC | 0.01 | 1,546 | 3 | 12 | 15 | 1 | | |
| Kirkland_Main-640 | Kirkland_Manholes-2249 | 263.29 | Kirkland_Manholes-2248 | 259.41 | 137.3 | 2.82 | 8 | PVC | 0.01 | 1,185 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-641 | Kirkland_Manholes-2250 | 275.69 | Kirkland_Manholes-2249 | 263.29 | 113.4 | 10.94 | 8 | PVC | 0.01 | 2,332 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-642 | Kirkland_Manholes-2261 | 305.59 | Kirkland_Manholes-2260 | 285.07 | 409.2 | 5.01 | 8 | Concrete | 0.013 | 1,214 | 237 | 850 | 1,087 | 89.5 | SM14-Ex-EX248 | |
| Kirkland_Main-643 | Kirkland_Manholes-2262 | 311.78 | Kirkland_Manholes-2261 | 305.59 | 133.8 | 4.62 | 8 | Concrete | 0.013 | 1,166 | 234 | 846 | 1,081 | 92.6 | SM14-Ex-EX248 | |
| Kirkland_Main-644 | Kirkland_Manholes-21 | 62.08 | Kirkland_Manholes-101 | 61.95 | 7 | 1.85 | 8 | PVC | 0.01 | 960 | 7 | 30 | 37 | 3.8 | | |
| Kirkland_Main-645 | Kirkland_Manholes-3038 | 279.17 | Kirkland_Manholes-3039 | 278.83 | 84.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-646 | Kirkland_Manholes-3039 | 278.83 | Kirkland_Manholes-3035 | 266.43 | 233.8 | 5.3 | 8 | PVC | 0.01 | 1,624 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-647 | Kirkland_Manholes-3037 | 277.97 | Kirkland_Manholes-3036 | 268.75 | 180.1 | 5.12 | 8 | PVC | 0.01 | 1,595 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-648 | Kirkland_Manholes-3036 | 268.75 | Kirkland_Manholes-3035 | 266.43 | 62.1 | 3.74 | 8 | PVC | 0.01 | 1,363 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-649 | Kirkland_Manholes-1505 | 267 | Kirkland_Manholes-3035 | 266.43 | 67.6 | 0.84 | 8 | PVC | 0.01 | 647 | 22 | 87 | 110 | 16.9 | | |
| Kirkland_Main-650 | Kirkland_Manholes-3040 | 208.06 | Kirkland_Manholes-3041 | 198.95 | 98.1 | 9.29 | 8 | PVC | 0.01 | 2,148 | 6 | 4 | 10 | 0.4 | | |
| Kirkland_Main-651 | Kirkland_Manholes-3041 | 198.95 | Kirkland_Manholes-1602 | 196.74 | 179.4 | 1.23 | 8 | PVC | 0.01 | 782 | 7 | 8 | 15 | 2 | | |
| Kirkland_Main-652 | Kirkland_Manholes-3100 | 18.3 | Kirkland_Manholes-3044 | 18.06 | 60.9 | 0.39 | 18 | Concrete | 0.013 | 2,959 | 88 | 67 | 155 | 5.2 | SM14-Ex-EX289 | |
| Kirkland_Main-653 | Kirkland_Manholes-566 | 483.97 | Kirkland_Manholes-3045 | 483.35 | 154.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-655 | Kirkland_Manholes-3046 | 250.83 | Kirkland_Manholes-3047 | 250.39 | 298.9 | 0.15 | 8 | PVC | 0.01 | 271 | 1 | 4 | 5 | 1.9 | | |
| Kirkland_Main-656 | Kirkland_Manholes-3047 | 250.39 | Kirkland_Manholes-396 | 249.55 | 18.8 | 4.48 | 8 | PVC | 0.01 | 1,492 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-657 | Kirkland_Manholes-3048 | 215.92 | Kirkland_Manholes-364 | 215.51 | 48.9 | 0.84 | 21 | PVC | 0.01 | 8,463 | 535 | 1,967 | 2,502 | 29.6 | | |
| Kirkland_Main-658 | Kirkland_Manholes-3051 | 246.2 | Kirkland_Manholes-3050 | 235.83 | 120.9 | 8.58 | 8 | PVC | 0.01 | 2,065 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-659 | Kirkland_Manholes-3050 | 235.83 | Kirkland_Manholes-3049 | 221.64 | 223.5 | 6.35 | 8 | PVC | 0.01 | 1,776 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-660 | Kirkland_Manholes-3049 | 221.64 | Kirkland_Manholes-3048 | 215.92 | 33.6 | 17.02 | 8 | PVC | 0.01 | 2,909 | 2 | 12 | 13 | 0.5 | | |
| Kirkland_Main-661 | Kirkland_Manholes-3054 | 230.52 | Kirkland_Manholes-3053 | 227.56 | 179.1 | 1.65 | 8 | PVC | 0.01 | 906 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-662 | Kirkland_Manholes-3052 | 228.3 | Kirkland_Manholes-3053 | 227.56 | 79.8 | 0.93 | 8 | PVC | 0.01 | 679 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-663 | Kirkland_Manholes-3053 | 227.56 | Kirkland_Manholes-3055 | 218.26 | 198.6 | 4.68 | 8 | PVC | 0.01 | 1,526 | 3 | 12 | 14 | 0.9 | | |
| Kirkland_Main-664 | Kirkland_Manholes-3055 | 218.26 | Kirkland_Manholes-364 | 215.51 | 19.7 | 13.95 | 8 | PVC | 0.01 | 2,634 | 3 | 16 | 18 | 0.7 | | |
| Kirkland_Main-665 | Kirkland_Manholes-3058 | 393.03 | Kirkland_Manholes-3057 | 384.71 | 254 | 3.28 | 8 | PVC | 0.01 | 1,276 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-666 | Kirkland_Manholes-3057 | 384.71 | Kirkland_Manholes-3056 | 382.54 | 53.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 2 | 8 | 9 | 0.7 | | |
| Kirkland_Main-667 | Kirkland_Manholes-3056 | 382.54 | Kirkland_Manholes-3016 | 372.66 | 250.2 | 3.95 | 8 | PVC | 0.01 | 1,401 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-668 | Kirkland_Manholes-3062 | 383.23 | Kirkland_Manholes-3063 | 372.82 | 282.2 | 3.69 | 8 | PVC | 0.01 | 1,354 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-669 | Kirkland_Manholes-3063 | 372.82 | Kirkland_Manholes-3061 | 361.76 | 319.4 | 3.46 | 8 | PVC | 0.01 | 1,312 | 0 | 8 | 8 | 0.6 | | |
| Kirkland_Main-670 | Kirkland_Manholes-3061 | 361.76 | Kirkland_Manholes-3060 | 360.51 | 136.8 | 0.91 | 8 | PVC | 0.01 | 674 | 0 | 12 | 12 | 1.8 | | |
| Kirkland_Main-671 | Kirkland_Manholes-3059 | 374.97 | Kirkland_Manholes-3060 | 371.3 | 316.1 | 1.16 | 8 | PVC | 0.01 | 760 | 0 | 4 | 4 | 0.6 | | Drop Connection |
| Kirkland_Main-672 | Kirkland_Manholes-3060 | 360.51 | Kirkland_Manholes-3064 | 358.68 | 232.8 | 0.79 | 8 | PVC | 0.01 | 625 | 2 | 20 | 22 | 3.5 | | |
| Kirkland_Main-673 | Kirkland_Manholes-3064 | 358.68 | Kirkland_Manholes-3065 | 358.3 | 94.6 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 24 | 26 | 5.8 | | |
| Kirkland_Main-674 | Kirkland_Manholes-3065 | 358.3 | Kirkland_Manholes-3066 | 356.12 | 87.4 | 2.49 | 8 | PVC | 0.01 | 1,113 | 3 | 28 | 31 | 2.8 | | |
| Kirkland_Main-675 | Kirkland_Manholes-3066 | 356.12 | Kirkland_Manholes-3067 | 344.94 | 288.6 | 3.87 | 8 | PVC | 0.01 | 1,388 | 5 | 32 | 37 | 2.7 | | |
| Kirkland_Main-676 | Kirkland_Manholes-3067 | 344.94 | Kirkland_Manholes-3068 | 332.11 | 210.6 | 6.09 | 8 | PVC | 0.01 | 1,740 | 5 | 36 | 41 | 2.4 | | |
| Kirkland_Main-677 | Kirkland_Manholes-3068 | 332.11 | Kirkland_Manholes-3069 | 304.52 | 266.1 | 10.37 | 8 | PVC | 0.01 | 2,270 | 6 | 40 | 45 | 2 | | |
| Kirkland_Main-678 | Kirkland_Manholes-3069 | 304.52 | Kirkland_Manholes-926 | 302.74 | 43.6 | 4.09 | 8 | PVC | 0.01 | 1,425 | 6 | 44 | 50 | 3.5 | | |
| Kirkland_Main-679 | Kirkland_Manholes-299 | 66.63 | Kirkland_Manholes-298 | 56.65 | 96.2 | 10.37 | 8 | Concrete | 0.013 | 1,747 | 9 | 16 | 25 | 1.4 | SM10 | |
| Kirkland_Main-680 | Kirkland_Manholes-298 | 56.65 | Kirkland_Manholes-289 | 31.71 | 154.4 | 16.15 | 8 | Concrete | 0.013 | 2,180 | 9 | 19 | 28 | 1.3 | SM10 | |
| Kirkland_Main-681 | Kirkland_Manholes-281 | 36.84 | Kirkland_Manholes-280 | 27.37 | 236.3 | 4.01 | 8 | PVC | 0.01 | 1,411 | 1 | 13 | 14 | 1 | SM10 | |
| Kirkland_Main-682 | Kirkland_Manholes-752 | 265.45 | Kirkland_Manholes-1559 | 253.89 | 158.5 | 7.29 | 8 | Concrete | 0.013 | 1,465 | 20 | 60 | 80 | 5.5 | SM14-Ex-EX68 | |
| Kirkland_Main-683 | Kirkland_Manholes-1561 | 229.17 | Kirkland_Manholes-1562 | 206.57 | 130 | 17.39 | 8 | PVC | 0.01 | 2,940 | 1 | 4 | 5 | 0.2 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-684 | Kirkland_Manholes-1563 | 203.28 | Kirkland_Manholes-1564 | 164.37 | 189.8 | 20.5 | 8 | PVC | 0.01 | 3,192 | 1 | 12 | 13 | 0.4 | | |
| Kirkland_Main-685 | Kirkland_Manholes-1347 | 427.05 | Kirkland_Manholes-1349 | 426.8 | 216.3 | 0.12 | 8 | PVC | 0.01 | 240 | 2 | 16 | 18 | 7.6 | | |
| Kirkland_Main-686 | Kirkland_Manholes-1349 | 426.8 | Kirkland_Manholes-1348 | 423.36 | 47.3 | 7.28 | 8 | PVC | 0.01 | 1,902 | 3 | 20 | 23 | 1.2 | | |
| Kirkland_Main-687 | Kirkland_Manholes-1348 | 423.36 | Kirkland_Manholes-1354 | 421.4 | 318.8 | 0.61 | 8 | PVC | 0.01 | 553 | 3 | 24 | 27 | 4.9 | | |
| Kirkland_Main-688 | Kirkland_Manholes-1352 | 406.36 | Kirkland_Manholes-1903 | 399.77 | 227.2 | 2.9 | 8 | PVC | 0.01 | 1,201 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-689 | Kirkland_Manholes-1353 | 422.52 | Kirkland_Manholes-1354 | 421.4 | 133.4 | 0.84 | 8 | PVC | 0.01 | 646 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-690 | Kirkland_Manholes-1354 | 421.4 | Kirkland_Manholes-1355 | 420.81 | 87.2 | 0.68 | 8 | PVC | 0.01 | 580 | 5 | 32 | 37 | 6.4 | | |
| Kirkland_Main-691 | Kirkland_Manholes-832 | 339.26 | Kirkland_Manholes-794 | 336.64 | 92.4 | 2.84 | 8 | PVC | 0.01 | 1,188 | 2 | 12 | 14 | 1.2 | | |
| Kirkland_Main-692 | Kirkland_Manholes-794 | 336.64 | Kirkland_Manholes-795 | 330.76 | 102.1 | 5.76 | 8 | PVC | 0.01 | 1,692 | 3 | 16 | 19 | 1.1 | | |
| Kirkland_Main-693 | Kirkland_Manholes-795 | 330.76 | Kirkland_Manholes-796 | 329.52 | 188.4 | 0.66 | 8 | PVC | 0.01 | 572 | 4 | 20 | 23 | 4.1 | | |
| Kirkland_Main-694 | Kirkland_Manholes-833 | 205 | Kirkland_Manholes-830 | 198.45 | 115.6 | 5.67 | 8 | PVC | 0.01 | 1,678 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-695 | Kirkland_Manholes-1212 | 307.51 | Kirkland_Manholes-1213 | 300.54 | 162.4 | 4.29 | 6 | Concrete | 0.013 | 522 | 60 | 20 | 79 | 15.2 | | |
| Kirkland_Main-696 | Kirkland_Manholes-1213 | 300.54 | Kirkland_Manholes-2616 | 274.02 | 226.7 | 11.7 | 6 | Concrete | 0.013 | 861 | 60 | 24 | 83 | 9.7 | | |
| Kirkland_Main-697 | Kirkland_Manholes-515 | 18.45 | Kirkland_Manholes-514 | 18.19 | 122.3 | 0.21 | 12 | sbestos Ceme | 0.011 | 866 | 30 | 203 | 233 | 26.9 | SM14-Ex-EX37 | |
| Kirkland_Main-698 | Kirkland_Manholes-1186 | 18.89 | Kirkland_Manholes-515 | 18.45 | 232.7 | 0.19 | 12 | sbestos Ceme | 0.011 | 825 | 30 | 195 | 224 | 27.2 | SM14-Ex-EX37 | |
| Kirkland_Main-699 | Kirkland_Manholes-1185 | 19.29 | Kirkland_Manholes-1186 | 18.89 | 267.9 | 0.15 | 12 | sbestos Ceme | 0.011 | 730 | 29 | 186 | 214 | 29.4 | SM14-Ex-EX37 | |
| Kirkland_Main-700 | Kirkland_Manholes-2510 | 102.3 | Kirkland_Manholes-2511 | 85.9 | 155.2 | 10.57 | 6 | Concrete | 0.013 | 819 | 6 | 24 | 30 | 3.7 | SM14-Ex-EX229 | |
| Kirkland_Main-701 | Kirkland_Manholes-2512 | 90.74 | Kirkland_Manholes-2511 | 85.9 | 110.5 | 4.38 | 6 | Vitrified Clay | 0.013 | 527 | 2 | 12 | 14 | 2.7 | SM14-Ex-EX228 | |
| Kirkland_Main-703 | Kirkland_Manholes-2513 | 104.61 | Kirkland_Manholes-2512 | 90.74 | 161.7 | 8.58 | 6 | PVC | 0.01 | 959 | 2 | 6 | 8 | 0.8 | SM14-Ex-EX228 | |
| Kirkland_Main-704 | Kirkland_Manholes-1988 | 449.74 | Kirkland_Manholes-1989 | 447.97 | 257 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-705 | Kirkland_Manholes-2008 | 435.7 | Kirkland_Manholes-1993 | 435.41 | 162.8 | 0.18 | 8 | PVC | 0.01 | 298 | 5 | 16 | 21 | 7 | | |
| Kirkland_Main-706 | Kirkland_Manholes-2060 | 437.6 | Kirkland_Manholes-2008 | 435.7 | 259.6 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-707 | Kirkland_Manholes-1993 | 435.41 | Kirkland_Manholes-2061 | 434.9 | 121.2 | 0.42 | 8 | PVC | 0.01 | 457 | 5 | 20 | 25 | 5.5 | | |
| Kirkland_Main-708 | Kirkland_Manholes-2061 | 434.9 | Kirkland_Manholes-1994 | 434.42 | 35 | 1.37 | 8 | PVC | 0.01 | 826 | 6 | 24 | 29 | 3.6 | | |
| Kirkland_Main-709 | Kirkland_Manholes-1994 | 434.42 | Kirkland_Manholes-1995 | 433.71 | 121.9 | 0.58 | 8 | PVC | 0.01 | 538 | 6 | 28 | 34 | 6.2 | | |
| Kirkland_Main-710 | Kirkland_Manholes-1995 | 433.71 | Kirkland_Manholes-1996 | 432.86 | 110.9 | 0.77 | 8 | PVC | 0.01 | 617 | 7 | 36 | 43 | 7 | | |
| Kirkland_Main-711 | Kirkland_Manholes-1996 | 432.86 | Kirkland_Manholes-1997 | 432.14 | 299.5 | 0.24 | 8 | PVC | 0.01 | 346 | 8 | 40 | 47 | 13.7 | | |
| Kirkland_Main-712 | Kirkland_Manholes-1998 | 432.54 | Kirkland_Manholes-1997 | 432.14 | 196.8 | 0.2 | 8 | Vitrified Clay | 0.013 | 245 | 1 | 4 | 5 | 2.1 | SM14-Ex-EX211 | |
| Kirkland_Main-713 | Kirkland_Manholes-1997 | 432.14 | Kirkland_Manholes-1999 | 430.91 | 331.2 | 0.37 | 8 | Concrete | 0.013 | 331 | 11 | 48 | 58 | 17.6 | SM14-Ex-EX211 | |
| Kirkland_Main-714 | Kirkland_Manholes-2062 | 435.63 | Kirkland_Manholes-1995 | 433.71 | 265.8 | 0.72 | 8 | PVC | 0.01 | 599 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-717 | Kirkland_Manholes-2063 | 422.68 | Kirkland_Manholes-2671 | 399.75 | 265 | 8.65 | 8 | Concrete | 0.013 | 1,595 | 12 | 72 | 84 | 5.2 | SM14-Ex-EX209 | |
| Kirkland_Main-718 | Kirkland_Manholes-2066 | 434.49 | Kirkland_Manholes-2059 | 433 | 119.7 | 1.24 | 8 | Concrete | 0.013 | 605 | 0 | 4 | 4 | 0.7 | SM14-Ex-EX213 | |
| Kirkland_Main-719 | Kirkland_Manholes-2698 | 186.34 | Kirkland_Manholes-2068 | 163.08 | 368.4 | 6.31 | 8 | Concrete | 0.013 | 1,363 | 13 | 60 | 73 | 5.3 | SM14-Ex-EX198 | |
| Kirkland_Main-720 | Kirkland_Manholes-2073 | 208.76 | Kirkland_Manholes-2072 | 202.36 | 249.4 | 2.57 | 8 | Vitrified Clay | 0.013 | 869 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX200 | |
| Kirkland_Main-721 | Kirkland_Manholes-2072 | 202.36 | Kirkland_Manholes-2071 | 194.98 | 377.1 | 1.96 | 8 | Vitrified Clay | 0.013 | 759 | 5 | 8 | 13 | 1.7 | SM14-Ex-EX200 | |
| Kirkland_Main-722 | Kirkland_Manholes-2071 | 194.98 | Kirkland_Manholes-2070 | 185.96 | 391.2 | 2.31 | 8 | Vitrified Clay | 0.013 | 824 | 8 | 12 | 20 | 2.5 | SM14-Ex-EX200 | |
| Kirkland_Main-723 | Kirkland_Manholes-2070 | 185.96 | Kirkland_Manholes-2069 | 170.43 | 333.6 | 4.65 | 8 | Vitrified Clay | 0.013 | 1,170 | 11 | 20 | 31 | 2.6 | SM14-Ex-EX200 | |
| Kirkland_Main-724 | Kirkland_Manholes-2082 | 247.37 | Kirkland_Manholes-2083 | 246.89 | 120.8 | 0.4 | 8 | PVC | 0.01 | 447 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-725 | Kirkland_Manholes-2083 | 246.89 | Kirkland_Manholes-658 | 246.8 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 8 | 1.9 | | |
| Kirkland_Main-727 | Kirkland_Manholes-2077 | 125.7 | Kirkland_Manholes-2078 | 109.29 | 215.7 | 7.61 | 6 | Concrete | 0.013 | 695 | 3 | 25 | 28 | 4 | SM14-Ex-EX195 | |
| Kirkland_Main-728 | Kirkland_Manholes-2076 | 138.89 | Kirkland_Manholes-2077 | 125.7 | 187.9 | 7.02 | 6 | Concrete | 0.013 | 667 | 2 | 16 | 18 | 2.8 | SM14-Ex-EX195 | |
| Kirkland_Main-729 | Kirkland_Manholes-2075 | 153.92 | Kirkland_Manholes-2076 | 138.89 | 219.4 | 6.85 | 6 | Concrete | 0.013 | 659 | 1 | 8 | 9 | 1.4 | SM14-Ex-EX195 | |
| Kirkland_Main-731 | Kirkland_Manholes-574 | 110.98 | Kirkland_Manholes-595 | 103.44 | 159.1 | 4.74 | 6 | Concrete | 0.013 | 548 | 3 | 16 | 19 | 3.5 | SM14-Ex-EX116 | |
| Kirkland_Main-736 | Kirkland_Manholes-1656 | 125.68 | Kirkland_Manholes-1655 | 123.15 | 42 | 6.03 | 8 | PVC | 0.01 | 1,731 | 8 | 8 | 16 | 0.9 | | |
| Kirkland_Main-737 | Kirkland_Manholes-1655 | 123.15 | Kirkland_Manholes-1657 | 121.13 | 91.5 | 2.21 | 8 | PVC | 0.01 | 1,048 | 8 | 16 | 24 | 2.3 | | |
| Kirkland_Main-738 | Kirkland_Manholes-1658 | 125.68 | Kirkland_Manholes-1657 | 125.55 | 31.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 11 | 2.4 | | Drop Connection |
| Kirkland_Main-739 | Kirkland_Manholes-1657 | 121.13 | Kirkland_Manholes-1659 | 116.52 | 191.7 | 2.41 | 8 | PVC | 0.01 | 1,093 | 10 | 33 | 43 | 3.9 | | |
| Kirkland_Main-740 | Kirkland_Manholes-1659 | 116.52 | Kirkland_Manholes-1660 | 110.77 | 122.6 | 4.69 | 8 | PVC | 0.01 | 1,527 | 26 | 41 | 67 | 4.4 | | |
| Kirkland_Main-741 | Kirkland_Manholes-1660 | 110.77 | Kirkland_Manholes-1662 | 100.46 | 127.6 | 8.08 | 8 | PVC | 0.01 | 2,004 | 26 | 49 | 75 | 3.8 | | |
| Kirkland_Main-742 | Kirkland_Manholes-1663 | 103.65 | Kirkland_Manholes-1661 | 102.19 | 55.6 | 2.62 | 8 | PVC | 0.01 | 1,142 | 2 | 16 | 18 | 1.6 | | |
| Kirkland_Main-743 | Kirkland_Manholes-1661 | 102.19 | Kirkland_Manholes-1662 | 100.46 | 11.1 | 15.62 | 8 | PVC | 0.01 | 2,786 | 2 | 25 | 27 | 1 | | |
| Kirkland_Main-744 | Kirkland_Manholes-1662 | 100.46 | Kirkland_Manholes-1665 | 94.21 | 177.6 | 3.52 | 8 | PVC | 0.01 | 1,322 | 28 | 82 | 110 | 8.3 | | |
| Kirkland_Main-745 | Kirkland_Manholes-1664 | 108.5 | Kirkland_Manholes-1663 | 103.65 | 57.4 | 8.45 | 8 | Ductile Iron | 0.012 | 1,707 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX169 | |
| Kirkland_Main-746 | Kirkland_Manholes-1667 | 101.23 | Kirkland_Manholes-1666 | 89.71 | 215.8 | 5.34 | 8 | PVC | 0.01 | 1,629 | 13 | 41 | 54 | 3.3 | | |
| Kirkland_Main-747 | Kirkland_Manholes-1668 | 119.52 | Kirkland_Manholes-1667 | 101.23 | 220.6 | 8.29 | 8 | PVC | 0.01 | 2,030 | 8 | 25 | 33 | 1.6 | | |
| Kirkland_Main-748 | Kirkland_Manholes-1295 | 119.7 | Kirkland_Manholes-572 | 113.73 | 319.3 | 1.87 | 8 | Concrete | 0.013 | 742 | 79 | 321 | 400 | 54 | SM14-Ex-EX117 | |
| Kirkland_Main-749 | Kirkland_Manholes-1256 | 151.53 | Kirkland_Manholes-1284 | 145.84 | 256.4 | 2.22 | 6 | Concrete | 0.013 | 375 | 18 | 115 | 134 | 35.6 | SM14-Ex-EX108 | |
| Kirkland_Main-750 | Kirkland_Manholes-1283 | 147.65 | Kirkland_Manholes-1284 | 145.84 | 53.9 | 3.36 | 6 | Concrete | 0.013 | 461 | 4 | 16 | 20 | 4.4 | SM14-Ex-EX108 | |
| Kirkland_Main-751 | Kirkland_Manholes-1282 | 154.9 | Kirkland_Manholes-1283 | 147.65 | 295.8 | 2.45 | 6 | Concrete | 0.013 | 394 | 2 | 8 | 10 | 2.5 | SM14-Ex-EX108 | |
| Kirkland_Main-753 | Kirkland_Manholes-1284 | 145.84 | Kirkland_Manholes-1287 | 140.18 | 314.1 | 1.8 | 6 | Concrete | 0.013 | 338 | 24 | 140 | 164 | 48.5 | SM14-Ex-EX105 | |
| Kirkland_Main-755 | Kirkland_Manholes-1285 | 150.78 | Kirkland_Manholes-1286 | 147.03 | 125.8 | 2.98 | 6 | Concrete | 0.013 | 435 | 1 | 8 | 9 | 2.1 | SM14-Ex-EX109 | |
| Kirkland_Main-756 | Kirkland_Manholes-1286 | 147.03 | Kirkland_Manholes-1287 | 140.18 | 192.2 | 3.56 | 6 | Concrete | 0.013 | 475 | 3 | 16 | 20 | 4.1 | SM14-Ex-EX109 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-757 | Kirkland_Manholes-1289 | 131.61 | Kirkland_Manholes-1290 | 127.52 | 235.4 | 1.74 | 6 | Concrete | 0.013 | 332 | 35 | 181 | 216 | 65 | SM14-Ex-EX105 | |
| Kirkland_Main-758 | Kirkland_Manholes-1290 | 127.52 | Kirkland_Manholes-576 | 111.2 | 318.6 | 5.12 | 8 | Concrete | 0.013 | 1,227 | 46 | 255 | 301 | 24.6 | SM14-Ex-EX105 | |
| Kirkland_Main-759 | Kirkland_Manholes-1291 | 137.27 | Kirkland_Manholes-1290 | 127.52 | 280.9 | 3.47 | 8 | Concrete | 0.013 | 1,010 | 10 | 66 | 76 | 7.5 | SM14-Ex-EX111 | |
| Kirkland_Main-760 | Kirkland_Manholes-1261 | 144.57 | Kirkland_Manholes-1291 | 137.27 | 276 | 2.64 | 8 | Concrete | 0.013 | 882 | 8 | 58 | 65 | 7.4 | SM14-Ex-EX111 | |
| Kirkland_Main-761 | Kirkland_Manholes-1227 | 174.57 | Kirkland_Manholes-584 | 159.38 | 158.7 | 9.57 | 8 | Concrete | 0.013 | 1,678 | 25 | 91 | 116 | 6.9 | SM14-Ex-EX96 | |
| Kirkland_Main-762 | Kirkland_Manholes-1238 | 263.26 | Kirkland_Manholes-1298 | 253.38 | 261 | 3.78 | 8 | Concrete | 0.013 | 1,055 | 3 | 16 | 20 | 1.9 | SM14-Ex-EX64 | |
| Kirkland_Main-763 | Kirkland_Manholes-1298 | 253.38 | Kirkland_Manholes-1245 | 243.41 | 258.4 | 3.86 | 8 | Concrete | 0.013 | 1,065 | 6 | 25 | 31 | 2.9 | SM14-Ex-EX64 | |
| Kirkland_Main-765 | Kirkland_Manholes-1302 | 252.61 | Kirkland_Manholes-1301 | 241.1 | 158.8 | 7.25 | 8 | Concrete | 0.013 | 1,460 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX98 | |
| Kirkland_Main-766 | Kirkland_Manholes-1230 | 236.32 | Kirkland_Manholes-1229 | 218.73 | 349.5 | 5.03 | 6 | Concrete | 0.013 | 565 | 17 | 58 | 74 | 13.1 | SM14-Ex-EX96 | |
| Kirkland_Main-767 | Kirkland_Manholes-1229 | 218.73 | Kirkland_Manholes-1228 | 189.87 | 369 | 7.82 | 6 | Concrete | 0.013 | 704 | 20 | 66 | 86 | 12.2 | SM14-Ex-EX96 | |
| Kirkland_Main-768 | Kirkland_Manholes-727 | 84.25 | Kirkland_Manholes-728 | 70.86 | 152.9 | 8.76 | 8 | Concrete | 0.013 | 1,605 | 112 | 535 | 648 | 40.3 | SM14-Ex-EX117 | |
| Kirkland_Main-769 | Kirkland_Manholes-1407 | 474.89 | Kirkland_Manholes-1406 | 473.57 | 319.1 | 0.41 | 8 | PVC | 0.01 | 453 | 25 | 28 | 53 | 11.7 | | |
| Kirkland_Main-770 | Kirkland_Manholes-1415 | 475.19 | Kirkland_Manholes-1406 | 473.57 | 245.1 | 0.66 | 8 | PVC | 0.01 | 573 | 30 | 44 | 73 | 12.8 | | |
| Kirkland_Main-771 | Kirkland_Manholes-1408 | 476.13 | Kirkland_Manholes-1407 | 474.89 | 287.1 | 0.43 | 8 | PVC | 0.01 | 463 | 4 | 24 | 27 | 5.9 | | |
| Kirkland_Main-772 | Kirkland_Manholes-1409 | 479.33 | Kirkland_Manholes-1408 | 476.13 | 271.9 | 1.18 | 8 | PVC | 0.01 | 765 | 4 | 20 | 23 | 3.1 | | |
| Kirkland_Main-773 | Kirkland_Manholes-1410 | 479.58 | Kirkland_Manholes-1409 | 479.33 | 219 | 0.11 | 8 | PVC | 0.01 | 238 | 3 | 16 | 19 | 8.1 | | |
| Kirkland_Main-774 | Kirkland_Manholes-1411 | 480.36 | Kirkland_Manholes-1410 | 479.58 | 194.5 | 0.4 | 8 | PVC | 0.01 | 445 | 3 | 12 | 15 | 3.4 | | |
| Kirkland_Main-775 | Kirkland_Manholes-1412 | 483.98 | Kirkland_Manholes-1411 | 480.36 | 100.6 | 3.6 | 8 | PVC | 0.01 | 1,338 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-776 | Kirkland_Manholes-1853 | 276.11 | Kirkland_Manholes-1851 | 275 | 191.4 | 0.58 | 8 | PVC | 0.01 | 537 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-777 | Kirkland_Manholes-1772 | 68.31 | Kirkland_Manholes-2929 | 66.75 | 69.5 | 2.25 | 12 | Concrete | 0.013 | 2,396 | 118 | 478 | 596 | 24.9 | SM14-Ex-EX166 | |
| Kirkland_Main-778 | Kirkland_Manholes-2929 | 66.75 | Kirkland_Manholes-729 | 64.46 | 261.6 | 0.88 | 12 | Concrete | 0.013 | 1,497 | 118 | 486 | 604 | 40.4 | SM14-Ex-EX166 | |
| Kirkland_Main-780 | Kirkland_Manholes-1413 | 481 | Kirkland_Manholes-1411 | 480.36 | 161.4 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | |
| Kirkland_Main-781 | Kirkland_Manholes-1418 | 477.42 | Kirkland_Manholes-1414 | 476.69 | 182.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 16 | 3.7 | | |
| Kirkland_Main-782 | Kirkland_Manholes-2078 | 109.29 | Kirkland_Manholes-2079 | 101.7 | 225.4 | 3.37 | 6 | Concrete | 0.013 | 462 | 4 | 33 | 36 | 7.9 | SM14-Ex-EX195 | |
| Kirkland_Main-783 | Kirkland_Manholes-2079 | 101.7 | Kirkland_Manholes-2080 | 100.3 | 24.2 | 5.79 | 8 | PVC | 0.01 | 1,697 | 5 | 41 | 46 | 2.7 | | |
| Kirkland_Main-784 | Kirkland_Manholes-2129 | 162.62 | Kirkland_Manholes-2130 | 161.57 | 13 | 8.1 | 12 | Ductile Iron | 0.012 | 4,930 | 0 | 8 | 8 | 0.2 | SM14-Ex-EX235 | |
| Kirkland_Main-785 | Kirkland_Manholes-2128 | 162.8 | Kirkland_Manholes-2129 | 162.62 | 31 | 0.58 | 12 | PVC | 0.01 | 1,584 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-786 | Kirkland_Manholes-2127 | 166.38 | Kirkland_Manholes-2130 | 161.57 | 81 | 5.94 | 8 | Concrete | 0.013 | 1,322 | 20 | 8 | 28 | 2.1 | SM14-Ex-EX235 | |
| Kirkland_Main-787 | Kirkland_Manholes-2131 | 158.3 | O-32 | 156.08 | 22.1 | 10.06 | 12 | Ductile Iron | 0.012 | 5,494 | 571 | 1,514 | 2,085 | 37.9 | SM14-Ex-EX236 | |
| Kirkland_Main-788 | Kirkland_Manholes-2139 | 96.6 | Kirkland_Manholes-2138 | 94.8 | 32.5 | 5.54 | 8 | PVC | 0.01 | 1,659 | 5 | 25 | 29 | 1.8 | | |
| Kirkland_Main-789 | Kirkland_Manholes-2154 | 28.66 | Kirkland_Manholes-2153 | 28.2 | 11.2 | 4.1 | 8 | Concrete | 0.013 | 1,098 | 3 | 39 | 42 | 3.8 | SM14-Ex-EX220 | |
| Kirkland_Main-790 | Kirkland_Manholes-2153 | 28.2 | Kirkland_Manholes-2152 | 27.32 | 8.5 | 10.4 | 8 | Concrete | 0.013 | 1,749 | 3 | 45 | 49 | 2.8 | SM14-Ex-EX220 | |
| Kirkland_Main-791 | Kirkland_Manholes-2152 | 27.32 | Kirkland_Manholes-2320 | 18 | 38.7 | 24.05 | 8 | PVC | 0.01 | 3,458 | 3 | 52 | 55 | 1.6 | | |
| Kirkland_Main-792 | Kirkland_Manholes-2151 | 49.81 | Kirkland_Manholes-2154 | 28.66 | 303.9 | 6.96 | 8 | Concrete | 0.013 | 1,431 | 3 | 32 | 36 | 2.5 | SM14-Ex-EX220 | |
| Kirkland_Main-793 | Kirkland_Manholes-2150 | 50.98 | Kirkland_Manholes-2151 | 49.81 | 135.2 | 0.87 | 8 | Concrete | 0.013 | 505 | 2 | 26 | 28 | 5.5 | SM14-Ex-EX220 | |
| Kirkland_Main-794 | Kirkland_Manholes-2149 | 76.26 | Kirkland_Manholes-2150 | 50.98 | 227.7 | 11.1 | 8 | Concrete | 0.013 | 1,807 | 1 | 19 | 20 | 1.1 | SM14-Ex-EX220 | |
| Kirkland_Main-795 | Kirkland_Manholes-2148 | 77.03 | Kirkland_Manholes-2149 | 76.26 | 100.5 | 0.77 | 8 | Concrete | 0.013 | 475 | 0 | 13 | 13 | 2.7 | SM14-Ex-EX220 | |
| Kirkland_Main-796 | Kirkland_Manholes-2147 | 92.38 | Kirkland_Manholes-2148 | 77.03 | 204.1 | 7.52 | 8 | Concrete | 0.013 | 1,488 | 0 | 6 | 6 | 0.4 | SM14-Ex-EX220 | |
| Kirkland_Main-800 | Kirkland_Manholes-2158 | 102.11 | Kirkland_Manholes-2157 | 100.18 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 2 | 6 | 9 | 1.5 | | |
| Kirkland_Main-801 | Kirkland_Manholes-2160 | 86.23 | Kirkland_Manholes-2159 | 84.71 | 220.9 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 6 | 8 | 1.3 | | |
| Kirkland_Main-802 | Kirkland_Manholes-2157 | 100.18 | Kirkland_Manholes-2159 | 84.71 | 251.5 | 6.15 | 8 | PVC | 0.01 | 1,749 | 14 | 52 | 66 | 3.8 | | |
| Kirkland_Main-804 | Kirkland_Manholes-2134 | 124.65 | Kirkland_Manholes-2135 | 110 | 281.7 | 5.2 | 8 | Concrete | 0.013 | 1,237 | 5 | 26 | 31 | 2.5 | SM14-Ex-EX221 | |
| Kirkland_Main-805 | Kirkland_Manholes-2133 | 139 | Kirkland_Manholes-2134 | 124.65 | 362.7 | 3.96 | 8 | Concrete | 0.013 | 1,079 | 3 | 19 | 22 | 2 | SM14-Ex-EX221 | |
| Kirkland_Main-806 | Kirkland_Manholes-2132 | 159.52 | Kirkland_Manholes-2131 | 158.3 | 73.8 | 1.65 | 8 | Concrete | 0.013 | 697 | 567 | 1,510 | 2,077 | 297.8 | SM14-Ex-EX236 | |
| Kirkland_Main-807 | Kirkland_Manholes-2126 | 177.6 | Kirkland_Manholes-2127 | 166.38 | 202.1 | 5.55 | 8 | Concrete | 0.013 | 1,278 | 20 | 4 | 24 | 1.9 | SM14-Ex-EX235 | |
| Kirkland_Main-808 | Kirkland_Manholes-2125 | 177.39 | Kirkland_Manholes-2132 | 159.52 | 237.1 | 7.54 | 12 | PVC | 0.01 | 5,707 | 551 | 1,482 | 2,033 | 35.6 | | |
| Kirkland_Main-809 | Kirkland_Manholes-2304 | 192.91 | Kirkland_Manholes-2125 | 177.39 | 277.3 | 5.6 | 12 | PVC | 0.01 | 4,918 | 551 | 1,478 | 2,029 | 41.3 | | |
| Kirkland_Main-810 | Kirkland_Manholes-2136 | 110.1 | Kirkland_Manholes-2137 | 107.9 | 254.4 | 0.86 | 10 | PVC | 0.01 | 1,189 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-811 | Kirkland_Manholes-2137 | 107.9 | Kirkland_Manholes-2080 | 100.3 | 293.2 | 2.59 | 10 | PVC | 0.01 | 2,058 | 6 | 16 | 22 | 1.1 | | |
| Kirkland_Main-812 | Kirkland_Manholes-2080 | 100.3 | Kirkland_Manholes-2138 | 94.8 | 252.5 | 2.18 | 10 | PVC | 0.01 | 1,887 | 11 | 66 | 76 | 4 | | |
| Kirkland_Main-813 | Kirkland_Manholes-2138 | 94.8 | Kirkland_Manholes-2140 | 88.47 | 239.3 | 2.65 | 10 | PVC | 0.01 | 2,079 | 15 | 99 | 114 | 5.5 | | |
| Kirkland_Main-814 | Kirkland_Manholes-2140 | 88.47 | Kirkland_Manholes-2141 | 73.53 | 356.2 | 4.19 | 10 | PVC | 0.01 | 2,618 | 24 | 165 | 188 | 7.2 | | |
| Kirkland_Main-815 | Kirkland_Manholes-2141 | 73.53 | Kirkland_Manholes-2142 | 68.99 | 196.1 | 2.31 | 10 | PVC | 0.01 | 1,945 | 48 | 214 | 262 | 13.5 | | |
| Kirkland_Main-816 | Kirkland_Manholes-2142 | 68.99 | Kirkland_Manholes-2143 | 61.9 | 284.3 | 2.49 | 10 | PVC | 0.01 | 2,019 | 54 | 288 | 342 | 17 | | |
| Kirkland_Main-817 | Kirkland_Manholes-2876 | 267.92 | Kirkland_Manholes-2877 | 259.41 | 173 | 4.92 | 8 | PVC | 0.01 | 1,564 | 4 | 20 | 24 | 1.5 | | |
| Kirkland_Main-818 | Kirkland_Manholes-2877 | 259.41 | Kirkland_Manholes-625 | 258 | 37.7 | 3.74 | 8 | PVC | 0.01 | 1,364 | 5 | 24 | 28 | 2.1 | | |
| Kirkland_Main-819 | Kirkland_Manholes-2878 | 269.8 | Kirkland_Manholes-2876 | 267.92 | 58 | 3.24 | 8 | PVC | 0.01 | 1,269 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-820 | Kirkland_Manholes-2882 | 274.26 | Kirkland_Manholes-2878 | 269.8 | 141 | 3.16 | 8 | PVC | 0.01 | 1,254 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-821 | Kirkland_Manholes-1801 | 112.29 | Kirkland_Manholes-1802 | 95.68 | 270.4 | 6.14 | 8 | Concrete | 0.013 | 1,344 | 58 | 253 | 311 | 23.1 | SM4 | |
| Kirkland_Main-822 | Kirkland_Manholes-1803 | 87.57 | Kirkland_Manholes-1401 | 76.78 | 133.9 | 8.06 | 6 | Concrete | 0.013 | 715 | 1 | 8 | 9 | 1.3 | SM14-Ex-EX141 | |
| Kirkland_Main-823 | Kirkland_Manholes-1804 | 103.12 | Kirkland_Manholes-1403 | 89.74 | 129.7 | 10.32 | 6 | Concrete | 0.013 | 809 | 1 | 8 | 9 | 1.2 | SM14-Ex-EX140 | |
| Kirkland_Main-826 | Kirkland_Manholes-1807 | 44.26 | Kirkland_Manholes-1806 | 38.89 | 57.7 | 9.3 | 8 | PVC | 0.01 | 2,150 | 84 | 303 | 386 | 18 | SM4 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-827 | Kirkland_Manholes-589 | 126.06 | Kirkland_Manholes-590 | 118.3 | 332.1 | 2.34 | 6 | Concrete | 0.013 | 385 | 3 | 8 | 11 | 2.8 | SM14-Ex-EX158 | |
| Kirkland_Main-828 | Kirkland_Manholes-1802 | 95.68 | Kirkland_Manholes-1810 | 85.96 | 289.7 | 3.35 | 8 | Concrete | 0.013 | 993 | 64 | 278 | 342 | 34.4 | SM4 | |
| Kirkland_Main-829 | Kirkland_Manholes-1833 | 16.5 | Kirkland_Manholes-1793 | 15.37 | 141.1 | 0.8 | 8 | PVC | 0.01 | 631 | 2 | 13 | 15 | 2.4 | | |
| Kirkland_Main-830 | Kirkland_Manholes-1836 | 11 | Kirkland_Manholes-1791 | 8.2 | 291.3 | 0.96 | 15 | PVC | 0.01 | 3,695 | 390 | 890 | 1,279 | 34.6 | | |
| Kirkland_Main-832 | Kirkland_Manholes-1850 | 19.39 | Kirkland_Manholes-1849 | 16.69 | 373.2 | 0.72 | 8 | Concrete | 0.013 | 461 | 4 | 13 | 17 | 3.7 | SM10 | |
| Kirkland_Main-833 | Kirkland_Manholes-1849 | 16.69 | Kirkland_Manholes-1847 | 16.59 | 254.1 | 0.04 | 8 | Concrete | 0.013 | 108 | 5 | 19 | 24 | 22.7 | SM10 | |
| Kirkland_Main-834 | Kirkland_Manholes-1847 | 16.59 | Kirkland_Manholes-1846 | 15.1 | 93.2 | 1.6 | 12 | PVC | 0.01 | 2,628 | 5 | 26 | 31 | 1.2 | SM10 | |
| Kirkland_Main-835 | Kirkland_Manholes-2633 | 278.44 | Kirkland_Manholes-2632 | 276.84 | 129.7 | 1.23 | 8 | Concrete | 0.013 | 602 | 3 | 8 | 11 | 1.8 | SM14-Ex-EX295 | |
| Kirkland_Main-837 | Kirkland_Manholes-2605 | 280.73 | Kirkland_Manholes-2633 | 278.44 | 217.9 | 1.05 | 8 | Concrete | 0.013 | 556 | 2 | 4 | 6 | 1.1 | SM14-Ex-EX295 | |
| Kirkland_Main-838 | Kirkland_Manholes-2634 | 286.56 | Kirkland_Manholes-2635 | 275.48 | 268.8 | 4.12 | 8 | Concrete | 0.013 | 1,101 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX294 | |
| Kirkland_Main-839 | Kirkland_Manholes-2635 | 275.48 | Kirkland_Manholes-2636 | 245.46 | 401.2 | 7.48 | 8 | Concrete | 0.013 | 1,484 | 5 | 12 | 17 | 1.1 | SM14-Ex-EX294 | |
| Kirkland_Main-840 | Kirkland_Manholes-2636 | 245.46 | Kirkland_Manholes-2637 | 187.87 | 397.8 | 14.48 | 8 | Concrete | 0.013 | 2,064 | 6 | 16 | 22 | 1.1 | SM14-Ex-EX294 | |
| Kirkland_Main-841 | Kirkland_Manholes-2640 | 93.15 | Kirkland_Manholes-2641 | 88.89 | 86.7 | 4.91 | 8 | PVC | 0.01 | 1,563 | 5 | 18 | 23 | 1.5 | | |
| Kirkland_Main-842 | Kirkland_Manholes-2639 | 115.66 | Kirkland_Manholes-2640 | 93.15 | 98.6 | 22.84 | 8 | PVC | 0.01 | 3,369 | 4 | 12 | 16 | 0.5 | | |
| Kirkland_Main-843 | Kirkland_Manholes-2638 | 117.25 | Kirkland_Manholes-2639 | 115.66 | 47.5 | 3.35 | 8 | PVC | 0.01 | 1,290 | 2 | 6 | 8 | 0.6 | | |
| Kirkland_Main-844 | Kirkland_Manholes-2643 | 117.26 | Kirkland_Manholes-2642 | 102.55 | 182.7 | 8.05 | 8 | PVC | 0.01 | 2,001 | 1 | 6 | 7 | 0.4 | | |
| Kirkland_Main-848 | Kirkland_Manholes-2645 | 79.04 | Kirkland_Manholes-2644 | 74.88 | 115.7 | 3.59 | 8 | PVC | 0.01 | 1,337 | 7 | 36 | 44 | 3.3 | | |
| Kirkland_Main-850 | Kirkland_Manholes-1481 | 462.54 | Kirkland_Manholes-1482 | 457.77 | 84.3 | 5.66 | 8 | Concrete | 0.013 | 1,290 | 4 | 20 | 24 | 1.8 | SM14-Ex-EX268 | |
| Kirkland_Main-851 | Kirkland_Manholes-1495 | 496.81 | Kirkland_Manholes-1484 | 495.36 | 362.4 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-852 | Kirkland_Manholes-1484 | 495.36 | Kirkland_Manholes-1485 | 486.98 | 151.8 | 5.52 | 8 | PVC | 0.01 | 1,657 | 4 | 32 | 36 | 2.2 | | |
| Kirkland_Main-853 | Kirkland_Manholes-1485 | 486.98 | Kirkland_Manholes-1486 | 483.92 | 112.4 | 2.72 | 8 | PVC | 0.01 | 1,163 | 11 | 48 | 59 | 5.1 | | |
| Kirkland_Main-854 | Kirkland_Manholes-1486 | 483.92 | Kirkland_Manholes-1488 | 482.18 | 104.3 | 1.67 | 8 | PVC | 0.01 | 910 | 13 | 52 | 65 | 7.1 | | |
| Kirkland_Main-855 | Kirkland_Manholes-1488 | 482.18 | Kirkland_Manholes-1489 | 480.6 | 353.4 | 0.45 | 8 | PVC | 0.01 | 471 | 16 | 60 | 76 | 16.1 | | |
| Kirkland_Main-856 | Kirkland_Manholes-1487 | 483.25 | Kirkland_Manholes-1488 | 482.18 | 163.9 | 0.65 | 8 | PVC | 0.01 | 570 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-857 | Kirkland_Manholes-1489 | 480.6 | Kirkland_Manholes-2029 | 479.06 | 117.8 | 1.31 | 8 | PVC | 0.01 | 806 | 18 | 64 | 81 | 10.1 | | |
| Kirkland_Main-858 | Kirkland_Manholes-1490 | 499.13 | Kirkland_Manholes-1492 | 491.87 | 290.5 | 2.5 | 8 | PVC | 0.01 | 1,115 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-859 | Kirkland_Manholes-1492 | 491.87 | Kirkland_Manholes-1491 | 489.53 | 101 | 2.32 | 8 | PVC | 0.01 | 1,073 | 4 | 8 | 12 | 1.1 | | |
| Kirkland_Main-860 | Kirkland_Manholes-1491 | 489.53 | Kirkland_Manholes-1485 | 486.98 | 404.5 | 0.63 | 8 | PVC | 0.01 | 560 | 6 | 12 | 17 | 3.1 | | |
| Kirkland_Main-861 | Kirkland_Manholes-1493 | 479.91 | Kirkland_Manholes-2025 | 477 | 402.9 | 0.72 | 8 | PVC | 0.01 | 599 | 6 | 8 | 13 | 2.2 | | |
| Kirkland_Main-862 | Kirkland_Manholes-1494 | 496.1 | Kirkland_Manholes-1484 | 495.36 | 68.3 | 1.08 | 8 | PVC | 0.01 | 734 | 3 | 24 | 27 | 3.7 | | |
| Kirkland_Main-865 | Kirkland_Manholes-2234 | 145.49 | Kirkland_Manholes-2235 | 140.92 | 280.9 | 1.63 | 6 | PVC | 0.01 | 418 | 3 | 6 | 9 | 2.2 | SM14-Ex-EX221 | |
| Kirkland_Main-866 | Kirkland_Manholes-2235 | 140.92 | Kirkland_Manholes-2133 | 139 | 112.7 | 1.7 | 6 | PVC | 0.01 | 427 | 3 | 13 | 16 | 3.7 | SM14-Ex-EX221 | |
| Kirkland_Main-867 | Kirkland_Manholes-2236 | 23.9 | Kirkland_Manholes-2230 | 23.3 | 57.5 | 1.04 | 8 | PVC | 0.01 | 720 | 0 | 6 | 6 | 0.9 | | |
| Kirkland_Main-868 | Kirkland_Manholes-2702 | 256.62 | Kirkland_Manholes-1633 | 254.8 | 313.1 | 0.58 | 8 | Concrete | 0.013 | 414 | 6 | 12 | 17 | 4.2 | SM14-Ex-EX204 | |
| Kirkland_Main-869 | Kirkland_Manholes-1634 | 223.49 | Kirkland_Manholes-1635 | 192.35 | 312.2 | 9.97 | 8 | Concrete | 0.013 | 1,713 | 216 | 842 | 1,059 | 61.8 | SM7 | |
| Kirkland_Main-870 | Kirkland_Manholes-1635 | 192.35 | Kirkland_Manholes-1638 | 164.94 | 265.5 | 10.33 | 8 | Concrete | 0.013 | 1,743 | 218 | 846 | 1,065 | 61.1 | SM7 | |
| Kirkland_Main-871 | Kirkland_Manholes-1636 | 172.84 | Kirkland_Manholes-1637 | 170.82 | 135.8 | 1.49 | 8 | PVC | 0.01 | 860 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-872 | Kirkland_Manholes-1637 | 170.82 | Kirkland_Manholes-1639 | 169.94 | 172.1 | 0.51 | 8 | PVC | 0.01 | 504 | 2 | 8 | 10 | 1.9 | | |
| Kirkland_Main-873 | Kirkland_Manholes-1639 | 169.94 | Kirkland_Manholes-1638 | 164.94 | 235.7 | 2.12 | 8 | Concrete | 0.013 | 790 | 16 | 95 | 111 | 14.1 | SM14-Ex-EX202 | |
| Kirkland_Main-874 | Kirkland_Manholes-1638 | 164.94 | Kirkland_Manholes-1642 | 158.76 | 65.1 | 9.49 | 8 | Concrete | 0.013 | 1,671 | 234 | 946 | 1,180 | 70.6 | SM7 | |
| Kirkland_Main-875 | Kirkland_Manholes-1641 | 205.91 | Kirkland_Manholes-1640 | 188.59 | 221.5 | 7.82 | 6 | PVC | 0.01 | 915 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX203 | |
| Kirkland_Main-877 | Kirkland_Manholes-1643 | 156.25 | Kirkland_Manholes-1648 | 152.03 | 150 | 2.81 | 8 | Concrete | 0.013 | 910 | 1 | 8 | 9 | 1 | SM14-Ex-EX196 | |
| Kirkland_Main-878 | Kirkland_Manholes-1644 | 159.14 | O-25 | 154.59 | 17.5 | 26 | 8 | PVC | 0.01 | 3,595 | 17 | 56 | 72 | 2 | | |
| Kirkland_Main-879 | Kirkland_Manholes-1645 | 171.46 | Kirkland_Manholes-1644 | 159.14 | 257.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 16 | 52 | 68 | 4.4 | | |
| Kirkland_Main-880 | Kirkland_Manholes-1625 | 179.1 | Kirkland_Manholes-1645 | 171.46 | 179.3 | 4.26 | 8 | PVC | 0.01 | 1,455 | 10 | 48 | 58 | 4 | | |
| Kirkland_Main-881 | Kirkland_Manholes-1647 | 165.32 | O-24 | 163.59 | 78.9 | 2.18 | 8 | Concrete | 0.013 | 801 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX175 | |
| Kirkland_Main-882 | Kirkland_Manholes-1676 | 98.96 | Kirkland_Manholes-1677 | 88.12 | 84.8 | 12.79 | 8 | PVC | 0.01 | 2,521 | 21 | 33 | 54 | 2.1 | | |
| Kirkland_Main-883 | Kirkland_Manholes-1678 | 99.76 | Kirkland_Manholes-1676 | 98.96 | 128.1 | 0.62 | 8 | PVC | 0.01 | 557 | 18 | 16 | 34 | 6.1 | | |
| Kirkland_Main-884 | Kirkland_Manholes-1679 | 107.21 | Kirkland_Manholes-1678 | 99.76 | 181.8 | 4.1 | 8 | PVC | 0.01 | 1,427 | 18 | 8 | 26 | 1.8 | | |
| Kirkland_Main-885 | Kirkland_Manholes-1683 | 75.33 | Kirkland_Manholes-1682 | 74.03 | 148.9 | 0.87 | 8 | PVC | 0.01 | 659 | 3 | 16 | 19 | 2.9 | | |
| Kirkland_Main-886 | Kirkland_Manholes-1682 | 74.03 | Kirkland_Manholes-1681 | 72.36 | 31.7 | 5.27 | 8 | PVC | 0.01 | 1,619 | 3 | 25 | 27 | 1.7 | | |
| Kirkland_Main-887 | Kirkland_Manholes-602 | 90.22 | Kirkland_Manholes-1680 | 83.64 | 138.4 | 4.75 | 8 | Concrete | 0.013 | 1,182 | 84 | 399 | 483 | 40.9 | SM5 | |
| Kirkland_Main-888 | Kirkland_Manholes-1680 | 83.64 | Kirkland_Manholes-1681 | 72.36 | 151.4 | 7.45 | 8 | Concrete | 0.013 | 1,480 | 85 | 408 | 493 | 33.3 | SM5 | |
| Kirkland_Main-889 | Kirkland_Manholes-600 | 91.95 | Kirkland_Manholes-1687 | 86.12 | 197.8 | 2.95 | 8 | Concrete | 0.013 | 931 | 95 | 379 | 473 | 50.8 | SM14-Ex-EX117 | |
| Kirkland_Main-890 | Kirkland_Manholes-1788 | 86.3 | Kirkland_Manholes-727 | 84.25 | 363.6 | 0.56 | 8 | Concrete | 0.013 | 407 | 12 | 132 | 143 | 35.2 | SM14-Ex-EX167 | |
| Kirkland_Main-891 | Kirkland_Manholes-1686 | 60.42 | Kirkland_Manholes-1685 | 57.24 | 38.9 | 8.17 | 8 | PVC | 0.01 | 2,016 | 0 | 8 | 8 | 0.4 | | |
| Kirkland_Main-892 | Kirkland_Manholes-1681 | 72.36 | Kirkland_Manholes-1685 | 57.24 | 220.4 | 6.86 | 8 | Concrete | 0.013 | 1,420 | 88 | 440 | 528 | 37.2 | SM5 | |
| Kirkland_Main-893 | Kirkland_Manholes-1687 | 86.12 | Kirkland_Manholes-727 | 84.25 | 76.5 | 2.45 | 8 | Concrete | 0.013 | 848 | 101 | 395 | 496 | 58.5 | SM14-Ex-EX117 | |
| Kirkland_Main-894 | Kirkland_Manholes-1688 | 86.4 | Kirkland_Manholes-1687 | 86.26 | 34.9 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 8 | 14 | 3.2 | | Drop Connection |
| Kirkland_Main-895 | Kirkland_Manholes-621 | 70.36 | Kirkland_Manholes-618 | 51.3 | 271.9 | 7.01 | 8 | Concrete | 0.013 | 1,436 | 35 | 29 | 64 | 4.5 | SM14-Ex-EX161 | |
| Kirkland_Main-896 | Kirkland_Manholes-617 | 67.92 | Kirkland_Manholes-618 | 51.3 | 164.3 | 10.11 | 8 | Concrete | 0.013 | 1,725 | 6 | 16 | 22 | 1.3 | SM14-Ex-EX162 | |
| Kirkland_Main-897 | Kirkland_Manholes-1690 | 47.42 | Kirkland_Manholes-1689 | 43.75 | 38.1 | 9.62 | 6 | PVC | 0.01 | 1,015 | 3 | 16 | 19 | 1.9 | SM14-Ex-EX163 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-898 | Kirkland_Manholes-2864 | 27 | SOUTHBAY_WETWELL | 22 | 7.5 | 67.05 | 6 | PVC | 0.01 | 2,681 | 13 | 24 | 37 | 1.4 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-900 | Kirkland_Manholes-1691 | 49.07 | Kirkland_Manholes-1690 | 47.42 | 170.4 | 0.97 | 6 | PVC | 0.01 | 322 | 2 | 8 | 10 | 3.2 | SM14-Ex-EX163 | |
| Kirkland_Main-901 | Kirkland_Manholes-618 | 51.3 | Kirkland_Manholes-619 | 48.43 | 55.8 | 5.15 | 8 | Concrete | 0.013 | 1,231 | 41 | 54 | 95 | 7.7 | SM14-Ex-EX161 | |
| Kirkland_Main-902 | Kirkland_Manholes-619 | 48.43 | Kirkland_Manholes-1689 | 43.75 | 128.1 | 3.65 | 8 | Concrete | 0.013 | 1,036 | 42 | 78 | 120 | 11.6 | SM14-Ex-EX161 | |
| Kirkland_Main-903 | Kirkland_Manholes-1693 | 36.33 | Kirkland_Manholes-1692 | 35.9 | 53.8 | 0.8 | 8 | PVC | 0.01 | 630 | 3 | 8 | 12 | 1.9 | | |
| Kirkland_Main-905 | Kirkland_Manholes-1809 | 70.83 | Kirkland_Manholes-1703 | 58 | 295.2 | 4.35 | 6 | Concrete | 0.013 | 525 | 1 | 8 | 10 | 1.8 | SM14-Ex-EX153 | |
| Kirkland_Main-910 | Kirkland_Manholes-1707 | 126.28 | Kirkland_Manholes-1706 | 124.78 | 10 | 14.96 | 12 | Concrete | 0.013 | 6,185 | 15 | 115 | 130 | 2.1 | SM14-Ex-EX196 | |
| Kirkland_Main-911 | Kirkland_Manholes-1710 | 134.24 | Kirkland_Manholes-1709 | 133.97 | 34.7 | 0.78 | 10 | Concrete | 0.013 | 867 | 12 | 82 | 94 | 10.9 | SM14-Ex-EX196 | |
| Kirkland_Main-912 | Kirkland_Manholes-1708 | 148.34 | Kirkland_Manholes-1709 | 133.97 | 305.2 | 4.71 | 12 | Concrete | 0.013 | 3,470 | 2 | 16 | 18 | 0.5 | SM14-Ex-EX197 | |
| Kirkland_Main-913 | Kirkland_Manholes-1709 | 133.97 | Kirkland_Manholes-1707 | 126.28 | 136.1 | 5.65 | 12 | Concrete | 0.013 | 3,801 | 14 | 107 | 121 | 3.2 | SM14-Ex-EX196 | |
| Kirkland_Main-914 | Kirkland_Manholes-2281 | 374.95 | Kirkland_Manholes-2263 | 374.13 | 166.2 | 0.49 | 8 | Concrete | 0.013 | 381 | 0 | 4 | 4 | 1 | SM14-Ex-EX212 | |
| Kirkland_Main-915 | Kirkland_Manholes-2283 | 405.87 | Kirkland_Manholes-2282 | 401.71 | 113.4 | 3.67 | 8 | PVC | 0.01 | 1,350 | 5 | 20 | 25 | 1.8 | | |
| Kirkland_Main-916 | Kirkland_Manholes-2295 | 415.45 | Kirkland_Manholes-2294 | 370.88 | 306.7 | 14.53 | 8 | PVC | 0.01 | 2,688 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-917 | Kirkland_Manholes-2294 | 370.88 | Kirkland_Manholes-2293 | 362.58 | 254.1 | 3.27 | 8 | PVC | 0.01 | 1,274 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-918 | Kirkland_Manholes-2298 | 374.75 | Kirkland_Manholes-2297 | 358.91 | 231 | 6.86 | 8 | Concrete | 0.013 | 1,420 | 4 | 12 | 16 | 1.1 | SM14-Ex-EX210 | |
| Kirkland_Main-919 | Kirkland_Manholes-2297 | 358.91 | Kirkland_Manholes-2296 | 354.23 | 230.5 | 2.03 | 8 | Concrete | 0.013 | 773 | 5 | 16 | 21 | 2.8 | SM14-Ex-EX210 | |
| Kirkland_Main-920 | Kirkland_Manholes-2772 | 308.23 | O-3 | 307.9 | 81.9 | 0.4 | 8 | PVC | 0.01 | 446 | 29 | 91 | 119 | 26.8 | | Drop Connection |
| Kirkland_Main-921 | Kirkland_Manholes-2293 | 362.58 | Kirkland_Manholes-2296 | 354.23 | 294.7 | 2.83 | 8 | PVC | 0.01 | 1,187 | 9 | 32 | 41 | 3.4 | | |
| Kirkland_Main-922 | Kirkland_Manholes-2299 | 342.7 | Kirkland_Manholes-2300 | 337.19 | 153.2 | 3.6 | 8 | Concrete | 0.013 | 1,029 | 15 | 56 | 71 | 6.9 | SM14-Ex-EX206 | |
| Kirkland_Main-923 | Kirkland_Manholes-2296 | 354.23 | Kirkland_Manholes-2299 | 342.7 | 146.7 | 7.86 | 8 | Concrete | 0.013 | 1,520 | 15 | 52 | 66 | 4.4 | SM14-Ex-EX206 | |
| Kirkland_Main-924 | Kirkland_Manholes-2264 | 383.3 | Kirkland_Manholes-2263 | 374.13 | 85.7 | 10.7 | 8 | Concrete | 0.013 | 1,774 | 210 | 707 | 918 | 51.7 | SM14-Ex-EX248 | |
| Kirkland_Main-925 | Kirkland_Manholes-2432 | 257.14 | Kirkland_Manholes-2312 | 256.91 | 169.1 | 0.14 | 8 | PVC | 0.01 | 260 | 1 | 4 | 6 | 2.2 | | |
| Kirkland_Main-926 | Kirkland_Manholes-2312 | 256.91 | Kirkland_Manholes-2311 | 256.52 | 196.4 | 0.2 | 8 | PVC | 0.01 | 314 | 2 | 9 | 11 | 3.4 | | |
| Kirkland_Main-927 | Kirkland_Manholes-2282 | 401.71 | Kirkland_Manholes-2264 | 383.3 | 409.8 | 4.49 | 8 | Concrete | 0.013 | 1,150 | 210 | 703 | 914 | 79.5 | SM14-Ex-EX248 | |
| Kirkland_Main-928 | Kirkland_Manholes-2288 | 423.18 | Kirkland_Manholes-2286 | 420.26 | 97.3 | 3 | 8 | PVC | 0.01 | 1,221 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-929 | Kirkland_Manholes-2289 | 426.62 | Kirkland_Manholes-2288 | 423.18 | 150.1 | 2.29 | 8 | PVC | 0.01 | 1,067 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-930 | Kirkland_Manholes-2286 | 420.26 | Kirkland_Manholes-2287 | 418.83 | 164.5 | 0.87 | 8 | PVC | 0.01 | 657 | 4 | 12 | 15 | 2.3 | | |
| Kirkland_Main-931 | Kirkland_Manholes-2287 | 418.83 | Kirkland_Manholes-2283 | 405.87 | 87.5 | 14.81 | 8 | PVC | 0.01 | 2,714 | 5 | 16 | 21 | 0.8 | | |
| Kirkland_Main-932 | Kirkland_Manholes-1585 | 238.49 | Kirkland_Manholes-1586 | 212.55 | 318.9 | 8.13 | 8 | Concrete | 0.013 | 1,547 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX173 | |
| Kirkland_Main-933 | Kirkland_Manholes-1586 | 212.55 | Kirkland_Manholes-1587 | 210.95 | 268.2 | 0.6 | 8 | Concrete | 0.013 | 419 | 2 | 8 | 10 | 2.5 | SM14-Ex-EX173 | |
| Kirkland_Main-934 | Kirkland_Manholes-1589 | 233.01 | Kirkland_Manholes-1587 | 210.95 | 318.8 | 6.92 | 8 | sbestos Ceme | 0.011 | 1,686 | 59 | 207 | 266 | 15.8 | SM14-Ex-EX171 | |
| Kirkland_Main-935 | Kirkland_Manholes-1587 | 210.95 | Kirkland_Manholes-1603 | 202.22 | 137.6 | 6.34 | 8 | Concrete | 0.013 | 1,366 | 64 | 223 | 287 | 21 | SM14-Ex-EX172 | |
| Kirkland_Main-936 | Kirkland_Manholes-1588 | 231.21 | Kirkland_Manholes-1587 | 230.56 | 162.2 | 0.4 | 8 | Concrete | 0.013 | 343 | 2 | 4 | 6 | 1.7 | SM14-Ex-EX172 | Drop Connection |
| Kirkland_Main-938 | Kirkland_Manholes-1590 | 241.99 | Kirkland_Manholes-1589 | 233.01 | 173.6 | 5.17 | 8 | Concrete | 0.013 | 1,233 | 58 | 203 | 261 | 21.1 | SM14-Ex-EX171 | |
| Kirkland_Main-939 | Kirkland_Manholes-1591 | 253.12 | Kirkland_Manholes-1590 | 241.99 | 399.8 | 2.78 | 8 | Concrete | 0.013 | 905 | 56 | 199 | 255 | 28.2 | SM14-Ex-EX171 | |
| Kirkland_Main-940 | Kirkland_Manholes-1592 | 255.76 | Kirkland_Manholes-1591 | 253.12 | 306.5 | 0.86 | 8 | Concrete | 0.013 | 503 | 54 | 195 | 248 | 49.4 | SM14-Ex-EX124 | |
| Kirkland_Main-942 | Kirkland_Manholes-1593 | 256.67 | Kirkland_Manholes-1592 | 255.76 | 194.7 | 0.47 | 8 | Concrete | 0.013 | 371 | 39 | 155 | 194 | 52.4 | SM14-Ex-EX131 | |
| Kirkland_Main-943 | Kirkland_Manholes-1594 | 254.46 | Kirkland_Manholes-1595 | 245.33 | 353 | 2.59 | 8 | Concrete | 0.013 | 872 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX130 | |
| Kirkland_Main-944 | Kirkland_Manholes-1595 | 245.33 | Kirkland_Manholes-1596 | 228.98 | 200 | 8.17 | 8 | Concrete | 0.013 | 1,551 | 4 | 8 | 12 | 0.8 | SM14-Ex-EX130 | |
| Kirkland_Main-945 | Kirkland_Manholes-1596 | 228.98 | Kirkland_Manholes-1597 | 180.84 | 398.5 | 12.08 | 8 | Concrete | 0.013 | 1,885 | 6 | 12 | 18 | 0.9 | SM14-Ex-EX130 | |
| Kirkland_Main-946 | Kirkland_Manholes-1601 | 173.67 | Kirkland_Manholes-1598 | 169.75 | 176.3 | 2.22 | 8 | Concrete | 0.013 | 809 | 54 | 163 | 217 | 26.8 | SM14-Ex-EX121 | |
| Kirkland_Main-947 | Kirkland_Manholes-1599 | 200.11 | Kirkland_Manholes-1598 | 169.75 | 271.2 | 11.19 | 8 | Concrete | 0.013 | 1,814 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX170 | |
| Kirkland_Main-948 | Kirkland_Manholes-379 | 279.26 | Kirkland_Manholes-380 | 277.21 | 303.7 | 0.67 | 8 | PVC | 0.01 | 579 | 2 | 8 | 10 | 1.8 | | |
| Kirkland_Main-949 | Kirkland_Manholes-378 | 285.63 | Kirkland_Manholes-379 | 279.26 | 366.8 | 1.74 | 8 | PVC | 0.01 | 929 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-950 | Kirkland_Manholes-377 | 262.82 | Kirkland_Manholes-376 | 239.8 | 319.8 | 7.2 | 8 | PVC | 0.01 | 1,892 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-951 | Kirkland_Manholes-376 | 239.8 | Kirkland_Manholes-375 | 234.87 | 251.6 | 1.96 | 8 | PVC | 0.01 | 987 | 58 | 234 | 292 | 29.6 | | |
| Kirkland_Main-953 | Kirkland_Manholes-382 | 308.23 | Kirkland_Manholes-381 | 307.41 | 91.4 | 0.9 | 8 | PVC | 0.01 | 668 | 2 | 8 | 10 | 1.6 | | |
| Kirkland_Main-954 | Kirkland_Manholes-381 | 307.41 | Kirkland_Manholes-383 | 304.37 | 123.9 | 2.45 | 8 | PVC | 0.01 | 1,104 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-955 | Kirkland_Manholes-383 | 304.37 | Kirkland_Manholes-384 | 296.91 | 253.7 | 2.94 | 8 | PVC | 0.01 | 1,209 | 4 | 16 | 20 | 1.6 | | |
| Kirkland_Main-956 | Kirkland_Manholes-384 | 296.91 | Kirkland_Manholes-424 | 292.81 | 99.3 | 4.13 | 8 | PVC | 0.01 | 1,432 | 5 | 20 | 25 | 1.7 | | |
| Kirkland_Main-957 | Kirkland_Manholes-873 | 311.45 | Kirkland_Manholes-385 | 303.54 | 299 | 2.65 | 8 | Concrete | 0.013 | 882 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX33 | |
| Kirkland_Main-958 | Kirkland_Manholes-385 | 303.54 | Kirkland_Manholes-387 | 300.3 | 93.5 | 3.46 | 8 | Concrete | 0.013 | 1,009 | 3 | 8 | 11 | 1.1 | SM14-Ex-EX33 | |
| Kirkland_Main-959 | Kirkland_Manholes-386 | 300.85 | Kirkland_Manholes-387 | 300.3 | 138.6 | 0.4 | 8 | Concrete | 0.013 | 342 | 2 | 4 | 6 | 1.8 | SM14-Ex-EX33 | |
| Kirkland_Main-960 | Kirkland_Manholes-387 | 300.3 | Kirkland_Manholes-388 | 297.69 | 129.3 | 2.02 | 8 | Concrete | 0.013 | 771 | 6 | 16 | 22 | 2.9 | SM14-Ex-EX33 | |
| Kirkland_Main-962 | Kirkland_Manholes-2611 | 254.27 | Kirkland_Manholes-2612 | 250.12 | 152.9 | 2.71 | 6 | PVC | 0.01 | 539 | 3 | 4 | 7 | 1.2 | SM14-Ex-EX297 | |
| Kirkland_Main-963 | Kirkland_Manholes-1075 | 291.84 | Kirkland_Manholes-1121 | 289.91 | 99 | 1.95 | 8 | PVC | 0.01 | 984 | 43 | 131 | 350 | 35.5 | | |
| Kirkland_Main-964 | Kirkland_Manholes-1121 | 289.91 | Kirkland_Manholes-1068 | 279.38 | 106.4 | 9.89 | 8 | PVC | 0.01 | 2,218 | 44 | 135 | 355 | 16 | | |
| Kirkland_Main-966 | Kirkland_Manholes-1105 | 155.49 | Kirkland_Manholes-1052 | 151.4 | 310 | 1.32 | 8 | PVC | 0.01 | 810 | 83 | 299 | 382 | 47.2 | | |
| Kirkland_Main-967 | Kirkland_Manholes-1108 | 160.8 | Kirkland_Manholes-1105 | 155.49 | 333.3 | 1.59 | 8 | PVC | 0.01 | 890 | 9 | 13 | 22 | 2.4 | | |
| Kirkland_Main-968 | Kirkland_Manholes-1104 | 175.28 | Kirkland_Manholes-1106 | 168.9 | 388 | 1.64 | 18 | PVC | 0.01 | 7,859 | 580 | 2,118 | 2,698 | 34.3 | | |
| Kirkland_Main-969 | Kirkland_Manholes-1109 | 162.78 | Kirkland_Manholes-1108 | 160.8 | 303.1 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 9 | 10 | 1.7 | | |
| Kirkland_Main-970 | Kirkland_Manholes-1110 | 163.51 | Kirkland_Manholes-1109 | 162.78 | 317.4 | 0.23 | 8 | PVC | 0.01 | 338 | 1 | 4 | 5 | 1.5 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-972 | Kirkland_Manholes-1128 | 162.57 | O-7 | 162.29 | 71 | 0.4 | 20 | Concrete | 0.013 | 3,948 | 280 | 695 | 1,151 | 29.2 | SM14-Ex-EX4 | |
| Kirkland_Main-973 | Kirkland_Manholes-1127 | 163.92 | Kirkland_Manholes-1128 | 162.57 | 132.6 | 1.02 | 20 | Concrete | 0.013 | 6,300 | 280 | 687 | 1,143 | 18.1 | SM14-Ex-EX4 | |
| Kirkland_Main-974 | Kirkland_Manholes-1086 | 198.2 | Kirkland_Manholes-1122 | 184.29 | 391.8 | 3.55 | 8 | PVC | 0.01 | 1,328 | 10 | 48 | 58 | 4.3 | | |
| Kirkland_Main-975 | Kirkland_Manholes-1122 | 184.29 | Kirkland_Manholes-1123 | 182.63 | 257.7 | 0.64 | 20 | Concrete | 0.013 | 5,012 | 184 | 620 | 980 | 19.5 | SM14-Ex-EX4 | |
| Kirkland_Main-976 | Kirkland_Manholes-1130 | 185.43 | Kirkland_Manholes-1122 | 185.35 | 20.3 | 0.4 | 8 | PVC | 0.01 | 446 | 173 | 568 | 918 | 205.9 | SM14-Ex-EX320 | Drop Connection |
| Kirkland_Main-977 | Kirkland_Manholes-1123 | 182.63 | Kirkland_Manholes-1124 | 177.02 | 186.2 | 3.01 | 20 | Concrete | 0.013 | 10,839 | 190 | 624 | 989 | 9.1 | SM14-Ex-EX4 | |
| Kirkland_Main-978 | Kirkland_Manholes-1124 | 177.02 | Kirkland_Manholes-1125 | 167.88 | 251.4 | 3.64 | 20 | Concrete | 0.013 | 11,904 | 248 | 660 | 1,083 | 9.1 | SM14-Ex-EX4 | |
| Kirkland_Main-979 | Kirkland_Manholes-1125 | 167.88 | Kirkland_Manholes-1126 | 164.51 | 134.8 | 2.5 | 20 | Concrete | 0.013 | 9,873 | 280 | 679 | 1,135 | 11.5 | SM14-Ex-EX4 | |
| Kirkland_Main-980 | Kirkland_Manholes-2840 | 90.84 | Kirkland_Manholes-2841 | 31.53 | 332.1 | 17.86 | 8 | Concrete | 0.013 | 2,292 | 3 | 12 | 15 | 0.7 | SM14-Ex-EX310 | |
| Kirkland_Main-981 | Kirkland_Manholes-2851 | 10.8 | Kirkland_Manholes-2852 | 10.72 | 17.2 | 0.47 | 16 | Concrete | 0.013 | 2,350 | 254 | 784 | 1,037 | 44.2 | SM14-Ex-EX289 | |
| Kirkland_Main-982 | Kirkland_Manholes-2853 | 25.84 | Kirkland_Manholes-2852 | 10.72 | 47.1 | 32.11 | 8 | Concrete | 0.013 | 3,073 | 0 | 6 | 6 | 0.2 | SM14-Ex-EX289 | |
| Kirkland_Main-983 | Kirkland_Manholes-2852 | 10.72 | KC_Manholes-18 | 10.29 | 84.8 | 0.51 | 18 | Concrete | 0.013 | 3,357 | 254 | 796 | 1,050 | 31.3 | SM14-Ex-EX289 | |
| Kirkland_Main-984 | Kirkland_Manholes-2788 | 251.6 | Kirkland_Manholes-2789 | 247.4 | 283.4 | 1.48 | 8 | Concrete | 0.013 | 660 | 15 | 91 | 106 | 16.1 | SM14-Ex-EX313 | |
| Kirkland_Main-985 | Kirkland_Manholes-2789 | 247.4 | Kirkland_Manholes-2790 | 235.81 | 170.4 | 6.8 | 8 | Concrete | 0.013 | 1,415 | 17 | 95 | 112 | 7.9 | SM14-Ex-EX313 | |
| Kirkland_Main-987 | Kirkland_Manholes-2790 | 235.81 | Kirkland_Manholes-2791 | 226.53 | 127.8 | 7.26 | 8 | Concrete | 0.013 | 1,462 | 17 | 99 | 117 | 8 | SM14-Ex-EX313 | |
| Kirkland_Main-988 | Kirkland_Manholes-2791 | 226.53 | Kirkland_Manholes-2792 | 199.25 | 298.7 | 9.13 | 8 | Concrete | 0.013 | 1,639 | 19 | 103 | 122 | 7.5 | SM14-Ex-EX313 | |
| Kirkland_Main-989 | Kirkland_Manholes-2794 | 201.04 | Kirkland_Manholes-2792 | 199.25 | 290.5 | 0.62 | 8 | Concrete | 0.013 | 426 | 3 | 8 | 11 | 2.5 | SM14-Ex-EX312 | |
| Kirkland_Main-991 | Kirkland_Manholes-2795 | 201.42 | Kirkland_Manholes-2794 | 201.04 | 162 | 0.23 | 8 | Concrete | 0.013 | 263 | 1 | 4 | 5 | 2 | SM14-Ex-EX312 | |
| Kirkland_Main-992 | Kirkland_Manholes-2792 | 199.25 | Kirkland_Manholes-2793 | 190.95 | 116.2 | 7.14 | 8 | Concrete | 0.013 | 1,450 | 29 | 115 | 144 | 9.9 | SM14-Ex-EX313 | |
| Kirkland_Main-993 | Kirkland_Manholes-2793 | 190.95 | Kirkland_Manholes-2803 | 158.22 | 135.7 | 24.12 | 8 | Concrete | 0.013 | 2,663 | 29 | 119 | 149 | 5.6 | SM14-Ex-EX313 | |
| Kirkland_Main-994 | Kirkland_Manholes-2842 | 26.9 | Kirkland_Manholes-2850 | 13.3 | 475.2 | 2.86 | 15 | Concrete | 0.013 | 4,905 | 479 | 1,240 | 1,790 | 36.5 | SM14-Ex-EX309 | |
| Kirkland_Main-995 | Kirkland_Manholes-2850 | 13.3 | KC_Manholes-18 | 10.29 | 41.7 | 7.21 | 15 | Concrete | 0.013 | 7,787 | 480 | 1,246 | 1,798 | 23.1 | SM14-Ex-EX309 | |
| Kirkland_Main-996 | Kirkland_Manholes-2856 | 18.03 | Kirkland_Manholes-2845 | 16.72 | 134.6 | 0.98 | 8 | Ductile Iron | 0.012 | 580 | 11 | 14 | 25 | 4.4 | SM14-Ex-EX315 | |
| Kirkland_Main-997 | Kirkland_Manholes-2857 | 19.7 | Kirkland_Manholes-2856 | 18.03 | 135.5 | 1.23 | 8 | Ductile Iron | 0.012 | 652 | 11 | 9 | 21 | 3.2 | SM14-Ex-EX315 | |
| Kirkland_Main-998 | Kirkland_Manholes-1928 | 375.97 | Kirkland_Manholes-1929 | 374.67 | 53.7 | 2.42 | 10 | Concrete | 0.013 | 1,530 | 123 | 536 | 659 | 43.1 | SM14-Ex-EX205 | |
| Kirkland_Main-999 | Kirkland_Manholes-1929 | 374.67 | Kirkland_Manholes-1579 | 359.44 | 398.3 | 3.82 | 10 | Concrete | 0.013 | 1,923 | 155 | 600 | 755 | 39.3 | SM14-Ex-EX205 | |
| Kirkland_Main-1000 | Kirkland_Manholes-1930 | 369.31 | Kirkland_Manholes-1931 | 367.07 | 97.4 | 2.3 | 8 | PVC | 0.01 | 1,069 | 2 | 8 | 10 | 1 | | |
| Kirkland_Main-1001 | Kirkland_Manholes-1931 | 367.07 | Kirkland_Manholes-1932 | 360.4 | 233.1 | 2.86 | 8 | PVC | 0.01 | 1,193 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1003 | Kirkland_Manholes-1932 | 360.4 | Kirkland_Manholes-1954 | 357.36 | 158.2 | 1.92 | 8 | PVC | 0.01 | 977 | 4 | 16 | 19 | 2 | | |
| Kirkland_Main-1004 | Kirkland_Manholes-1935 | 274.07 | Kirkland_Manholes-1881 | 267.11 | 156.7 | 4.44 | 8 | PVC | 0.01 | 1,486 | 29 | 83 | 113 | 7.6 | | |
| Kirkland_Main-1005 | Kirkland_Manholes-1951 | 275.06 | Kirkland_Manholes-1935 | 274.07 | 209.5 | 0.47 | 8 | PVC | 0.01 | 485 | 16 | 44 | 60 | 12.4 | | |
| Kirkland_Main-1006 | Kirkland_Manholes-1936 | 301.29 | Kirkland_Manholes-1935 | 274.07 | 237.6 | 11.46 | 8 | PVC | 0.01 | 2,387 | 11 | 36 | 47 | 2 | | |
| Kirkland_Main-1007 | Kirkland_Manholes-1933 | 343.68 | Kirkland_Manholes-1934 | 342.88 | 296 | 0.27 | 8 | PVC | 0.01 | 367 | 6 | 32 | 38 | 10.4 | | |
| Kirkland_Main-1008 | Kirkland_Manholes-1954 | 357.36 | Kirkland_Manholes-1934 | 342.88 | 118.8 | 12.19 | 8 | PVC | 0.01 | 2,462 | 4 | 20 | 24 | 1 | | |
| Kirkland_Main-1009 | Kirkland_Manholes-1934 | 342.88 | Kirkland_Manholes-1961 | 341.24 | 125.1 | 1.31 | 8 | PVC | 0.01 | 807 | 10 | 56 | 66 | 8.2 | | |
| Kirkland_Main-1010 | Kirkland_Manholes-1938 | 323.43 | Kirkland_Manholes-1936 | 301.29 | 243 | 9.11 | 8 | PVC | 0.01 | 2,128 | 11 | 32 | 42 | 2 | | |
| Kirkland_Main-1011 | Kirkland_Manholes-1939 | 324.34 | Kirkland_Manholes-1938 | 323.43 | 100 | 0.91 | 8 | PVC | 0.01 | 673 | 9 | 24 | 33 | 4.9 | | |
| Kirkland_Main-1012 | Kirkland_Manholes-1937 | 332.23 | Kirkland_Manholes-1938 | 323.43 | 194.4 | 4.53 | 8 | PVC | 0.01 | 1,500 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1013 | Kirkland_Manholes-1940 | 363.18 | Kirkland_Manholes-1941 | 361.64 | 56.6 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1014 | Kirkland_Manholes-391 | 302.9 | Kirkland_Manholes-389 | 295.78 | 243.6 | 2.92 | 8 | Concrete | 0.013 | 927 | 31 | 127 | 158 | 17 | SM14-Ex-EX50 | |
| Kirkland_Main-1015 | Kirkland_Manholes-389 | 295.78 | Kirkland_Manholes-393 | 288.03 | 97.8 | 7.93 | 8 | Concrete | 0.013 | 1,527 | 40 | 151 | 191 | 12.5 | SM14-Ex-EX50 | |
| Kirkland_Main-1016 | Kirkland_Manholes-393 | 288.03 | Kirkland_Manholes-380 | 277.21 | 135.7 | 7.97 | 8 | Concrete | 0.013 | 1,531 | 42 | 159 | 201 | 13.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1017 | Kirkland_Manholes-395 | 253.88 | Kirkland_Manholes-396 | 249.55 | 242.3 | 1.79 | 8 | PVC | 0.01 | 942 | 51 | 207 | 258 | 27.4 | | |
| Kirkland_Main-1018 | Kirkland_Manholes-398 | 254.33 | Kirkland_Manholes-397 | 247.33 | 147.9 | 4.73 | 8 | PVC | 0.01 | 1,534 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1019 | Kirkland_Manholes-396 | 249.55 | Kirkland_Manholes-397 | 247.33 | 240.2 | 0.92 | 8 | PVC | 0.01 | 678 | 54 | 219 | 273 | 40.3 | | |
| Kirkland_Main-1020 | Kirkland_Manholes-394 | 266.89 | Kirkland_Manholes-395 | 253.88 | 150 | 8.67 | 8 | Concrete | 0.013 | 1,597 | 49 | 183 | 232 | 14.5 | SM14-Ex-EX50 | |
| Kirkland_Main-1021 | Kirkland_Manholes-380 | 277.21 | Kirkland_Manholes-394 | 266.89 | 136.7 | 7.55 | 8 | Concrete | 0.013 | 1,490 | 45 | 171 | 216 | 14.5 | SM14-Ex-EX50 | |
| Kirkland_Main-1022 | Kirkland_Manholes-898 | 306.89 | Kirkland_Manholes-899 | 305.17 | 102.3 | 1.68 | 8 | PVC | 0.01 | 914 | 1 | 8 | 9 | 1 | | |
| Kirkland_Main-1023 | Kirkland_Manholes-899 | 305.17 | Kirkland_Manholes-900 | 302.97 | 237.5 | 0.93 | 8 | PVC | 0.01 | 679 | 3 | 12 | 15 | 2.2 | | |
| Kirkland_Main-1024 | Kirkland_Manholes-444 | 92.89 | Kirkland_Manholes-443 | 91.49 | 172.9 | 0.81 | 8 | PVC | 0.01 | 634 | 4 | 43 | 46 | 7.3 | | |
| Kirkland_Main-1025 | Kirkland_Manholes-525 | 156.27 | Kirkland_Manholes-526 | 148.56 | 279.6 | 2.76 | 8 | Concrete | 0.013 | 901 | 4 | 25 | 29 | 3.2 | SM10 | |
| Kirkland_Main-1027 | Kirkland_Manholes-1198 | 189.72 | Kirkland_Manholes-497 | 188.11 | 129.7 | 1.24 | 8 | Concrete | 0.013 | 604 | 13 | 49 | 62 | 10.3 | SM14-Ex-EX80 | |
| Kirkland_Main-1030 | Kirkland_Manholes-520 | 182.65 | Kirkland_Manholes-519 | 157.09 | 301.6 | 8.48 | 6 | Concrete | 0.013 | 733 | 4 | 16 | 20 | 2.8 | SM10 | |
| Kirkland_Main-1031 | Kirkland_Manholes-499 | 185.94 | Kirkland_Manholes-523 | 180.21 | 279.4 | 2.05 | 8 | Concrete | 0.013 | 777 | 19 | 74 | 93 | 12 | SM10 | |
| Kirkland_Main-1032 | Kirkland_Manholes-523 | 180.21 | Kirkland_Manholes-522 | 152.47 | 278.9 | 9.95 | 8 | Concrete | 0.013 | 1,711 | 21 | 82 | 104 | 6.1 | SM10 | |
| Kirkland_Main-1033 | Kirkland_Manholes-522 | 152.47 | Kirkland_Manholes-521 | 145.96 | 154.4 | 4.22 | 8 | Concrete | 0.013 | 1,114 | 22 | 91 | 113 | 10.1 | SM10 | |
| Kirkland_Main-1034 | Kirkland_Manholes-521 | 145.96 | Kirkland_Manholes-518 | 138.7 | 160.6 | 4.52 | 8 | Concrete | 0.013 | 1,153 | 24 | 99 | 122 | 10.6 | SM10 | |
| Kirkland_Main-1036 | Kirkland_Manholes-518 | 138.7 | Kirkland_Manholes-1179 | 123.76 | 316.8 | 4.72 | 8 | Concrete | 0.013 | 1,178 | 31 | 132 | 163 | 13.8 | SM10 | |
| Kirkland_Main-1037 | Kirkland_Manholes-519 | 157.09 | Kirkland_Manholes-518 | 138.7 | 337.5 | 5.45 | 6 | Concrete | 0.013 | 588 | 7 | 25 | 32 | 5.4 | SM10 | |
| Kirkland_Main-1041 | Kirkland_Manholes-1235 | 275.6 | Kirkland_Manholes-1233 | 274.4 | 201.2 | 0.6 | 8 | PVC | 0.01 | 545 | 2 | 8 | 10 | 1.9 | | |
| Kirkland_Main-1042 | Kirkland_Manholes-1240 | 250.21 | Kirkland_Manholes-1230 | 236.32 | 226.8 | 6.13 | 6 | Concrete | 0.013 | 623 | 4 | 8 | 13 | 2 | SM14-Ex-EX92 | |
| Kirkland_Main-1043 | Kirkland_Manholes-1243 | 249.45 | Kirkland_Manholes-1242 | 244.28 | 74.2 | 6.97 | 8 | PVC | 0.01 | 1,862 | 1 | 4 | 5 | 0.3 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1044 | Kirkland_Manholes-1206 | 193.92 | Kirkland_Manholes-1149 | 192.13 | 296.5 | 0.6 | 8 | Concrete | 0.013 | 421 | 16 | 56 | 71 | 17 | SM14-Ex-EX89 | |
| Kirkland_Main-1049 | Kirkland_Manholes-1268 | 189.24 | Kirkland_Manholes-1269 | 174.05 | 110.9 | 13.69 | 6 | Concrete | 0.013 | 932 | 4 | 16 | 20 | 2.2 | SM14-Ex-EX107 | |
| Kirkland_Main-1050 | Kirkland_Manholes-1269 | 174.05 | Kirkland_Manholes-1259 | 154.8 | 228.2 | 8.43 | 6 | Concrete | 0.013 | 731 | 5 | 25 | 29 | 4 | SM14-Ex-EX107 | |
| Kirkland_Main-1051 | Kirkland_Manholes-1267 | 201.75 | Kirkland_Manholes-1268 | 189.24 | 323.1 | 3.87 | 6 | Concrete | 0.013 | 495 | 3 | 8 | 11 | 2.3 | SM14-Ex-EX107 | |
| Kirkland_Main-1052 | Kirkland_Manholes-1265 | 168.12 | Kirkland_Manholes-1262 | 156.59 | 138.9 | 8.3 | 8 | PVC | 0.01 | 2,031 | 4 | 25 | 28 | 1.4 | | |
| Kirkland_Main-1053 | Kirkland_Manholes-1497 | 270.45 | Kirkland_Manholes-1499 | 268.92 | 211.1 | 0.72 | 8 | PVC | 0.01 | 600 | 16 | 56 | 72 | 12 | | |
| Kirkland_Main-1054 | Kirkland_Manholes-1315 | 270.9 | Kirkland_Manholes-1497 | 270.45 | 108.5 | 0.41 | 8 | PVC | 0.01 | 454 | 15 | 52 | 66 | 14.6 | | |
| Kirkland_Main-1055 | Kirkland_Manholes-704 | 272.37 | Kirkland_Manholes-145 | 271.65 | 145.7 | 0.49 | 8 | PVC | 0.01 | 496 | 12 | 36 | 48 | 9.6 | | |
| Kirkland_Main-1057 | Kirkland_Manholes-1220 | 255.3 | Kirkland_Manholes-1140 | 220.91 | 332.7 | 10.34 | 6 | Concrete | 0.013 | 810 | 2 | 8 | 10 | 1.3 | SM14-Ex-EX84 | |
| Kirkland_Main-1058 | Kirkland_Manholes-1222 | 248.84 | Kirkland_Manholes-1142 | 218.06 | 350.4 | 8.79 | 6 | Concrete | 0.013 | 746 | 3 | 8 | 12 | 1.6 | SM14-Ex-EX85 | |
| Kirkland_Main-1059 | Kirkland_Manholes-1140 | 220.91 | Kirkland_Manholes-1142 | 218.06 | 314 | 0.91 | 6 | Concrete | 0.013 | 240 | 4 | 16 | 21 | 8.7 | SM4 | |
| Kirkland_Main-1061 | Kirkland_Manholes-1224 | 232.76 | Kirkland_Manholes-500 | 209.24 | 344.5 | 6.83 | 6 | Concrete | 0.013 | 658 | 2 | 8 | 11 | 1.6 | SM14-Ex-EX87 | |
| Kirkland_Main-1062 | Kirkland_Manholes-1085 | 204.43 | Kirkland_Manholes-1130 | 185.43 | 381.7 | 4.98 | 8 | PVC | 0.01 | 1,573 | 152 | 564 | 892 | 56.7 | | |
| Kirkland_Main-1063 | Kirkland_Manholes-1120 | 158.13 | Kirkland_Manholes-712 | 157.06 | 229.6 | 0.47 | 8 | Concrete | 0.013 | 370 | 27 | 11 | 38 | 10.4 | SM14-Ex-EX1 | |
| Kirkland_Main-1066 | Kirkland_Manholes-1512 | 281.18 | Kirkland_Manholes-1513 | 263.11 | 227.7 | 7.94 | 8 | Concrete | 0.013 | 1,528 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX132 | |
| Kirkland_Main-1067 | Kirkland_Manholes-1161 | 78.67 | Kirkland_Manholes-1162 | 78.51 | 20.6 | 0.78 | 15 | PVC | 0.01 | 3,326 | 67 | 403 | 470 | 14.1 | SM14-Ex-EX77 | |
| Kirkland_Main-1068 | Kirkland_Manholes-1132 | 188.66 | Kirkland_Manholes-1133 | 181.56 | 258.9 | 2.74 | 8 | Concrete | 0.013 | 898 | 3 | 4 | 7 | 0.8 | SM14-Ex-EX58 | |
| Kirkland_Main-1069 | Kirkland_Manholes-616 | 72.16 | Kirkland_Manholes-617 | 67.92 | 242.5 | 1.75 | 6 | Concrete | 0.013 | 333 | 3 | 8 | 12 | 3.5 | SM14-Ex-EX162 | |
| Kirkland_Main-1070 | Kirkland_Manholes-1699 | 108.13 | Kirkland_Manholes-1700 | 106.17 | 216.2 | 0.91 | 6 | Concrete | 0.013 | 240 | 0 | 8 | 8 | 3.5 | SM14-Ex-EX150 | |
| Kirkland_Main-1071 | Kirkland_Manholes-1700 | 106.17 | Kirkland_Manholes-1802 | 95.68 | 325.3 | 3.22 | 6 | Concrete | 0.013 | 452 | 4 | 16 | 20 | 4.4 | SM14-Ex-EX150 | |
| Kirkland_Main-1074 | Kirkland_Manholes-1613 | 87.49 | Kirkland_Manholes-1788 | 86.3 | 197.1 | 0.6 | 8 | Concrete | 0.013 | 421 | 12 | 123 | 135 | 32.1 | SM14-Ex-EX167 | |
| Kirkland_Main-1075 | Kirkland_Manholes-1793 | 15.37 | Kirkland_Manholes-1794 | 12.63 | 22.1 | 12.39 | 8 | PVC | 0.01 | 2,482 | 26 | 19 | 46 | 1.8 | | |
| Kirkland_Main-1076 | Kirkland_Manholes-1795 | 13.3 | Kirkland_Manholes-1794 | 12.63 | 41.9 | 1.6 | 15 | PVC | 0.01 | 4,763 | 345 | 753 | 1,098 | 23.1 | | |
| Kirkland_Main-1077 | Kirkland_Manholes-1789 | 14.67 | Kirkland_Manholes-1790 | 14.6 | 18.2 | 0.38 | 21 | PVC | 0.01 | 5,726 | 339 | 734 | 1,073 | 18.7 | | |
| Kirkland_Main-1078 | Kirkland_Manholes-1790 | 14.6 | Kirkland_Manholes-1792 | 14.49 | 82.9 | 0.13 | 21 | PVC | 0.01 | 3,367 | 339 | 740 | 1,080 | 32.1 | | |
| Kirkland_Main-1079 | Kirkland_Manholes-1791 | 8.2 | PLAZA_WW | 6 | 10.6 | 20.76 | 16 | Ductile Iron | 0.012 | 16,998 | 390 | 896 | 1,286 | 7.6 | SM14-Ex-EX182 | |
| Kirkland_Main-1080 | Kirkland_Manholes-1792 | 14.49 | Kirkland_Manholes-1795 | 13.3 | 199 | 0.6 | 21 | PVC | 0.01 | 7,159 | 340 | 747 | 1,087 | 15.2 | | |
| Kirkland_Main-1081 | Kirkland_Manholes-1800 | 147.89 | Kirkland_Manholes-1799 | 133.76 | 154.6 | 9.14 | 6 | Concrete | 0.013 | 761 | 2 | 8 | 10 | 1.4 | SM14-Ex-EX146 | |
| Kirkland_Main-1082 | Kirkland_Manholes-1799 | 133.76 | Kirkland_Manholes-1798 | 126.65 | 165.5 | 4.3 | 6 | Concrete | 0.013 | 522 | 5 | 25 | 30 | 5.7 | SM14-Ex-EX146 | |
| Kirkland_Main-1083 | Kirkland_Manholes-1797 | 142.57 | Kirkland_Manholes-1798 | 126.65 | 291.9 | 5.45 | 8 | Concrete | 0.013 | 1,267 | 49 | 196 | 245 | 19.3 | SM4 | |
| Kirkland_Main-1084 | Kirkland_Manholes-1796 | 160.8 | Kirkland_Manholes-1797 | 142.57 | 315.3 | 5.78 | 8 | Concrete | 0.013 | 1,304 | 46 | 179 | 225 | 17.3 | SM4 | |
| Kirkland_Main-1085 | Kirkland_Manholes-1798 | 126.65 | Kirkland_Manholes-1801 | 112.29 | 288.6 | 4.97 | 8 | Concrete | 0.013 | 1,210 | 55 | 229 | 283 | 23.4 | SM4 | |
| Kirkland_Main-1086 | Kirkland_Manholes-2191 | 134.63 | Kirkland_Manholes-2190 | 132.39 | 117.1 | 1.91 | 8 | PVC | 0.01 | 975 | 3 | 16 | 20 | 2 | | |
| Kirkland_Main-1088 | Kirkland_Manholes-2194 | 68 | Kirkland_Manholes-2193 | 64.5 | 142 | 2.47 | 6 | Concrete | 0.013 | 395 | 1 | 8 | 9 | 2.2 | SM14-Ex-EX187 | |
| Kirkland_Main-1089 | Kirkland_Manholes-2193 | 64.5 | Kirkland_Manholes-2145 | 63.1 | 194.7 | 0.72 | 8 | Concrete | 0.013 | 460 | 4 | 41 | 46 | 9.9 | SM14-Ex-EX187 | |
| Kirkland_Main-1091 | Kirkland_Manholes-2187 | 114.37 | Kirkland_Manholes-2185 | 103.23 | 164.5 | 6.77 | 6 | Concrete | 0.013 | 655 | 6 | 16 | 22 | 3.4 | SM14-Ex-EX188 | |
| Kirkland_Main-1092 | Kirkland_Manholes-2185 | 103.23 | Kirkland_Manholes-2184 | 75.09 | 227 | 12.4 | 6 | Concrete | 0.013 | 887 | 31 | 66 | 97 | 10.9 | SM14-Ex-EX188 | |
| Kirkland_Main-1093 | Kirkland_Manholes-2184 | 75.09 | Kirkland_Manholes-2144 | 65.5 | 214.4 | 4.47 | 6 | Concrete | 0.013 | 533 | 31 | 74 | 105 | 19.7 | SM14-Ex-EX188 | |
| Kirkland_Main-1094 | Kirkland_Manholes-2199 | 42.12 | Kirkland_Manholes-2201 | 34.26 | 130.3 | 6.03 | 8 | PVC | 0.01 | 1,731 | 49 | 6 | 55 | 3.2 | | |
| Kirkland_Main-1095 | Kirkland_Manholes-2201 | 34.26 | Kirkland_Manholes-2200 | 29.87 | 27.9 | 15.75 | 8 | PVC | 0.01 | 2,798 | 49 | 13 | 62 | 2.2 | | |
| Kirkland_Main-1096 | Kirkland_Manholes-2098 | 53.6 | Kirkland_Manholes-2097 | 45.25 | 198.1 | 4.22 | 6 | Concrete | 0.013 | 517 | 2 | 6 | 8 | 1.6 | SM14-Ex-EX233 | |
| Kirkland_Main-1097 | Kirkland_Manholes-2195 | 483.44 | Kirkland_Manholes-2196 | 481.85 | 326.8 | 0.49 | 8 | PVC | 0.01 | 492 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-1098 | Kirkland_Manholes-2196 | 481.85 | Kirkland_Manholes-2197 | 480.89 | 188.7 | 0.51 | 8 | PVC | 0.01 | 503 | 1 | 8 | 9 | 1.8 | | |
| Kirkland_Main-1099 | Kirkland_Manholes-2111 | 59.56 | Kirkland_Manholes-2099 | 57.72 | 398 | 0.46 | 12 | Concrete | 0.013 | 1,087 | 69 | 194 | 263 | 24.2 | SM14-Ex-EX222 | |
| Kirkland_Main-1100 | Kirkland_Manholes-2100 | 58.67 | Kirkland_Manholes-2099 | 57.72 | 62.5 | 1.52 | 8 | Concrete | 0.013 | 669 | 8 | 18 | 27 | 4 | SM14-Ex-EX234 | |
| Kirkland_Main-1101 | Kirkland_Manholes-2101 | 73.68 | Kirkland_Manholes-2100 | 58.67 | 124.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 8 | 12 | 20 | 0.8 | | |
| Kirkland_Main-1102 | Kirkland_Manholes-2102 | 127.52 | Kirkland_Manholes-2101 | 73.68 | 250.6 | 21.48 | 8 | PVC | 0.01 | 3,268 | 4 | 6 | 10 | 0.3 | | |
| Kirkland_Main-1104 | Kirkland_Manholes-2103 | 51.49 | Kirkland_Manholes-2104 | 41.29 | 235.7 | 4.33 | 6 | Concrete | 0.013 | 524 | 0 | 6 | 7 | 1.3 | SM14-Ex-EX231 | |
| Kirkland_Main-1105 | Kirkland_Manholes-2447 | 28.08 | Kirkland_Manholes-2448 | 25.41 | 138 | 1.94 | 12 | PVC | 0.01 | 2,892 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-1106 | Kirkland_Manholes-2448 | 25.41 | Kirkland_Manholes-2451 | 24.29 | 346.6 | 0.32 | 12 | PVC | 0.01 | 1,182 | 12 | 19 | 32 | 2.7 | | |
| Kirkland_Main-1107 | Kirkland_Manholes-2449 | 27.6 | Kirkland_Manholes-2448 | 25.41 | 29.8 | 7.34 | 8 | PVC | 0.01 | 1,910 | 9 | 6 | 16 | 0.8 | | |
| Kirkland_Main-1108 | Kirkland_Manholes-2450 | 27.97 | Kirkland_Manholes-2451 | 24.29 | 50.3 | 7.31 | 8 | PVC | 0.01 | 1,906 | 2 | 13 | 15 | 0.8 | | |
| Kirkland_Main-1109 | Kirkland_Manholes-2491 | 35.69 | Kirkland_Manholes-2450 | 27.97 | 197.9 | 3.9 | 6 | Concrete | 0.013 | 497 | 1 | 6 | 7 | 1.5 | SM14-Ex-EX278 | |
| Kirkland_Main-1110 | Kirkland_Manholes-2451 | 24.29 | Kirkland_Manholes-2452 | 24.18 | 330.9 | 0.03 | 12 | PVC | 0.01 | 374 | 14 | 39 | 53 | 14.2 | | |
| Kirkland_Main-1111 | Kirkland_Manholes-2452 | 24.18 | Kirkland_Manholes-2454 | 23.57 | 255.1 | 0.24 | 12 | PVC | 0.01 | 1,016 | 22 | 58 | 81 | 8 | | |
| Kirkland_Main-1112 | Kirkland_Manholes-2453 | 27.74 | Kirkland_Manholes-2452 | 24.18 | 62.2 | 5.72 | 8 | PVC | 0.01 | 1,686 | 8 | 13 | 21 | 1.2 | | |
| Kirkland_Main-1113 | Kirkland_Manholes-2093 | 44.98 | Kirkland_Manholes-2453 | 27.74 | 236.1 | 7.3 | 6 | Concrete | 0.013 | 681 | 7 | 6 | 13 | 2 | SM14-Ex-EX276 | |
| Kirkland_Main-1114 | Kirkland_Manholes-2097 | 45.25 | Kirkland_Manholes-2455 | 44.41 | 209.1 | 0.4 | 6 | Concrete | 0.013 | 159 | 6 | 13 | 19 | 11.6 | SM14-Ex-EX233 | Drop Connection |
| Kirkland_Main-1115 | Kirkland_Manholes-2455 | 26.2 | Kirkland_Manholes-2454 | 23.57 | 36.4 | 7.21 | 6 | PVC | 0.01 | 879 | 7 | 19 | 27 | 3 | SM14-Ex-EX233 | |
| Kirkland_Main-1116 | Kirkland_Manholes-2454 | 23.57 | Kirkland_Manholes-2456 | 21.67 | 413.5 | 0.46 | 12 | PVC | 0.01 | 1,410 | 29 | 84 | 114 | 8.1 | | |
| Kirkland_Main-1117 | Kirkland_Manholes-2457 | 26.27 | Kirkland_Manholes-2456 | 21.67 | 49.5 | 9.28 | 8 | PVC | 0.01 | 2,148 | 7 | 19 | 27 | 1.2 | | |
| Kirkland_Main-1118 | Kirkland_Manholes-2202 | 26.91 | Kirkland_Manholes-2305 | 25.32 | 49.2 | 3.23 | 8 | PVC | 0.01 | 1,266 | 49 | 26 | 75 | 5.9 | | Drop Connection |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1119 | Kirkland_Manholes-2205 | 23.1 | Kirkland_Manholes-2306 | 15.63 | 44.6 | 16.73 | 8 | PVC | 0.01 | 2,884 | 6 | 32 | 39 | 1.3 | | Drop Connection |
| Kirkland_Main-1120 | Kirkland_Manholes-2306 | 15.63 | Kirkland_Manholes-2305 | 15.26 | 357 | 0.1 | 21 | PVC | 0.01 | 2,976 | 213 | 643 | 856 | 28.8 | | |
| Kirkland_Main-1121 | Kirkland_Manholes-2307 | 15.73 | Kirkland_Manholes-2306 | 15.63 | 136.3 | 0.07 | 21 | PVC | 0.01 | 2,504 | 207 | 604 | 811 | 32.4 | | |
| Kirkland_Main-1122 | Kirkland_Manholes-2217 | 22.48 | Kirkland_Manholes-2308 | 22.33 | 38 | 0.4 | 8 | PVC | 0.01 | 446 | 11 | 39 | 50 | 11.2 | | Drop Connection |
| Kirkland_Main-1123 | Kirkland_Manholes-2308 | 15.98 | Kirkland_Manholes-2307 | 15.73 | 271.4 | 0.09 | 21 | PVC | 0.01 | 2,806 | 199 | 597 | 796 | 28.4 | | |
| Kirkland_Main-1124 | Kirkland_Manholes-2309 | 16.24 | Kirkland_Manholes-2308 | 15.98 | 211.8 | 0.12 | 21 | PVC | 0.01 | 3,239 | 186 | 552 | 738 | 22.8 | | |
| Kirkland_Main-1125 | Kirkland_Manholes-2313 | 16.39 | Kirkland_Manholes-2309 | 16.24 | 162.2 | 0.09 | 21 | PVC | 0.01 | 2,811 | 181 | 545 | 727 | 25.9 | | |
| Kirkland_Main-1126 | Kirkland_Manholes-2314 | 16.65 | Kirkland_Manholes-2313 | 16.39 | 183.4 | 0.14 | 21 | PVC | 0.01 | 3,481 | 167 | 500 | 667 | 19.2 | | |
| Kirkland_Main-1127 | Kirkland_Manholes-2315 | 16.77 | Kirkland_Manholes-2314 | 16.65 | 235.7 | 0.05 | 21 | PVC | 0.01 | 2,086 | 148 | 416 | 564 | 27 | | |
| Kirkland_Main-1128 | Kirkland_Manholes-2316 | 17.03 | Kirkland_Manholes-2315 | 16.77 | 315.7 | 0.08 | 21 | PVC | 0.01 | 2,653 | 148 | 409 | 557 | 21 | | |
| Kirkland_Main-1129 | Kirkland_Manholes-2317 | 17.2 | Kirkland_Manholes-2316 | 17.03 | 183.4 | 0.09 | 21 | PVC | 0.01 | 2,815 | 138 | 403 | 541 | 19.2 | | |
| Kirkland_Main-1130 | Kirkland_Manholes-2155 | 23.66 | Kirkland_Manholes-2318 | 17.6 | 47.1 | 12.87 | 8 | PVC | 0.01 | 2,530 | 27 | 97 | 124 | 4.9 | | |
| Kirkland_Main-1131 | Kirkland_Manholes-2318 | 17.6 | Kirkland_Manholes-2317 | 17.2 | 364 | 0.11 | 21 | PVC | 0.01 | 3,053 | 131 | 390 | 521 | 17 | | |
| Kirkland_Main-1132 | Kirkland_Manholes-2319 | 17.7 | Kirkland_Manholes-2318 | 17.6 | 48.4 | 0.21 | 21 | PVC | 0.01 | 4,200 | 102 | 279 | 382 | 9.1 | | |
| Kirkland_Main-1136 | Kirkland_Manholes-2874 | 209.8 | Kirkland_Manholes-2873 | 208.01 | 164.9 | 1.09 | 8 | PVC | 0.01 | 735 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1137 | Kirkland_Manholes-2873 | 208.01 | Kirkland_Manholes-2872 | 207.03 | 88.7 | 1.1 | 8 | PVC | 0.01 | 741 | 0 | 8 | 8 | 1.1 | | |
| Kirkland_Main-1138 | Kirkland_Manholes-2872 | 207.03 | Kirkland_Manholes-2871 | 205.15 | 113.5 | 1.66 | 8 | PVC | 0.01 | 907 | 0 | 16 | 16 | 1.8 | | |
| Kirkland_Main-1139 | Kirkland_Manholes-2871 | 205.15 | Kirkland_Manholes-2869 | 204.84 | 44.2 | 0.7 | 8 | PVC | 0.01 | 591 | 0 | 20 | 20 | 3.4 | | |
| Kirkland_Main-1140 | Kirkland_Manholes-2869 | 204.84 | Kirkland_Manholes-2870 | 201.21 | 123.4 | 2.94 | 18 | PVC | 0.01 | 10,510 | 549 | 2,062 | 2,611 | 24.8 | | |
| Kirkland_Main-1141 | Kirkland_Manholes-2870 | 201.21 | Kirkland_Manholes-1103 | 198.97 | 205 | 1.09 | 18 | PVC | 0.01 | 6,407 | 549 | 2,066 | 2,615 | 40.8 | | |
| Kirkland_Main-1142 | Kirkland_Manholes-2875 | 310.11 | Kirkland_Manholes-898 | 306.89 | 269.8 | 1.19 | 8 | PVC | 0.01 | 770 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1143 | Kirkland_Manholes-2475 | 210.58 | Kirkland_Manholes-2477 | 189.6 | 360 | 5.83 | 8 | Concrete | 0.013 | 1,309 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX241 | |
| Kirkland_Main-1144 | Kirkland_Manholes-2478 | 190.32 | Kirkland_Manholes-2477 | 189.6 | 67.1 | 1.07 | 8 | Concrete | 0.013 | 562 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX241 | |
| Kirkland_Main-1145 | Kirkland_Manholes-2477 | 189.6 | Kirkland_Manholes-2479 | 186.26 | 224.2 | 1.49 | 8 | Concrete | 0.013 | 662 | 4 | 12 | 16 | 2.4 | SM14-Ex-EX241 | |
| Kirkland_Main-1146 | Kirkland_Manholes-2479 | 186.26 | Kirkland_Manholes-2482 | 184.91 | 81 | 1.67 | 8 | PVC | 0.01 | 910 | 6 | 24 | 30 | 3.3 | | |
| Kirkland_Main-1147 | Kirkland_Manholes-2480 | 187.23 | Kirkland_Manholes-2479 | 186.26 | 143.4 | 0.68 | 8 | Concrete | 0.013 | 446 | 2 | 8 | 10 | 2.3 | SM14-Ex-EX241 | |
| Kirkland_Main-1148 | Kirkland_Manholes-2489 | 190.15 | Kirkland_Manholes-2480 | 187.23 | 230.1 | 1.27 | 8 | Concrete | 0.013 | 611 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX241 | |
| Kirkland_Main-1149 | Kirkland_Manholes-2481 | 184.88 | Kirkland_Manholes-2490 | 173.27 | 348.4 | 3.33 | 8 | Concrete | 0.013 | 990 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX242 | |
| Kirkland_Main-1150 | Kirkland_Manholes-2482 | 184.91 | Kirkland_Manholes-2483 | 165.54 | 140.6 | 13.78 | 8 | PVC | 0.01 | 2,617 | 7 | 28 | 35 | 1.3 | | |
| Kirkland_Main-1152 | Kirkland_Manholes-2483 | 165.54 | Kirkland_Manholes-2488 | 154.5 | 273.8 | 4.03 | 8 | PVC | 0.01 | 1,416 | 9 | 32 | 40 | 2.9 | | |
| Kirkland_Main-1153 | Kirkland_Manholes-2488 | 154.5 | Kirkland_Manholes-2487 | 153.78 | 111.9 | 0.64 | 8 | PVC | 0.01 | 566 | 10 | 36 | 46 | 8.1 | | |
| Kirkland_Main-1154 | Kirkland_Manholes-2490 | 173.27 | Kirkland_Manholes-2485 | 153.26 | 284.1 | 7.04 | 8 | Concrete | 0.013 | 1,439 | 24 | 75 | 100 | 6.9 | SM14-Ex-EX242 | |
| Kirkland_Main-1156 | Kirkland_Manholes-2484 | 189.79 | Kirkland_Manholes-2485 | 153.26 | 364.5 | 10.02 | 8 | Concrete | 0.013 | 1,717 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX239 | |
| Kirkland_Main-1157 | Kirkland_Manholes-2487 | 153.78 | Kirkland_Manholes-2486 | 152.49 | 105 | 1.23 | 8 | PVC | 0.01 | 782 | 10 | 40 | 50 | 6.4 | | |
| Kirkland_Main-1158 | Kirkland_Manholes-2485 | 153.26 | Kirkland_Manholes-2486 | 152.49 | 113.6 | 0.68 | 8 | Concrete | 0.013 | 446 | 28 | 83 | 111 | 24.9 | SM14-Ex-EX239 | |
| Kirkland_Main-1159 | Kirkland_Manholes-1429 | 514.5 | Kirkland_Manholes-1427 | 513.21 | 125.2 | 1.03 | 8 | PVC | 0.01 | 715 | 3 | 16 | 19 | 2.6 | | |
| Kirkland_Main-1160 | Kirkland_Manholes-1427 | 513.21 | Kirkland_Manholes-1428 | 512.46 | 129.3 | 0.58 | 8 | PVC | 0.01 | 537 | 5 | 24 | 29 | 5.4 | | |
| Kirkland_Main-1161 | Kirkland_Manholes-1428 | 512.46 | Kirkland_Manholes-1434 | 511.6 | 190.6 | 0.45 | 8 | PVC | 0.01 | 474 | 5 | 28 | 33 | 7 | | |
| Kirkland_Main-1162 | Kirkland_Manholes-1430 | 516.64 | Kirkland_Manholes-1429 | 514.5 | 144.2 | 1.48 | 8 | PVC | 0.01 | 859 | 3 | 12 | 14 | 1.7 | | |
| Kirkland_Main-1164 | Kirkland_Manholes-2175 | 133.14 | Kirkland_Manholes-2174 | 132.67 | 117.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2.1 | | |
| Kirkland_Main-1165 | Kirkland_Manholes-2174 | 132.67 | Kirkland_Manholes-2173 | 131.99 | 11.1 | 6.13 | 8 | PVC | 0.01 | 1,745 | 2 | 16 | 18 | 1.1 | | |
| Kirkland_Main-1166 | Kirkland_Manholes-2173 | 131.99 | Kirkland_Manholes-2172 | 130.6 | 348.2 | 0.4 | 6 | Concrete | 0.013 | 159 | 23 | 25 | 47 | 29.6 | SM14-Ex-EX192 | Drop Connection |
| Kirkland_Main-1167 | Kirkland_Manholes-2172 | 107.91 | Kirkland_Manholes-2163 | 75.42 | 383.7 | 8.47 | 6 | Concrete | 0.013 | 733 | 24 | 33 | 57 | 7.8 | SM14-Ex-EX192 | |
| Kirkland_Main-1168 | Kirkland_Manholes-2163 | 75.42 | Kirkland_Manholes-2141 | 73.53 | 47.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 24 | 41 | 66 | 4.7 | | |
| Kirkland_Main-1169 | Kirkland_Manholes-2183 | 146.45 | Kirkland_Manholes-2182 | 136.23 | 145.7 | 7.02 | 8 | PVC | 0.01 | 1,868 | 0 | 8 | 9 | 0.5 | | |
| Kirkland_Main-1170 | Kirkland_Manholes-2182 | 136.23 | Kirkland_Manholes-2181 | 133.52 | 88.2 | 3.07 | 8 | PVC | 0.01 | 1,236 | 0 | 16 | 17 | 1.4 | | |
| Kirkland_Main-1171 | Kirkland_Manholes-2181 | 133.52 | Kirkland_Manholes-2180 | 125.44 | 163.5 | 4.94 | 8 | PVC | 0.01 | 1,567 | 1 | 25 | 26 | 1.6 | | |
| Kirkland_Main-1172 | Kirkland_Manholes-2180 | 125.44 | Kirkland_Manholes-2179 | 120.67 | 330.4 | 1.44 | 8 | PVC | 0.01 | 847 | 3 | 33 | 36 | 4.3 | | |
| Kirkland_Main-1173 | Kirkland_Manholes-2179 | 120.67 | Kirkland_Manholes-2178 | 102.28 | 199.5 | 9.22 | 8 | PVC | 0.01 | 2,140 | 5 | 41 | 47 | 2.2 | | |
| Kirkland_Main-1174 | Kirkland_Manholes-2178 | 102.28 | Kirkland_Manholes-2177 | 75.93 | 214.6 | 12.28 | 8 | PVC | 0.01 | 2,471 | 6 | 49 | 55 | 2.2 | | |
| Kirkland_Main-1175 | Kirkland_Manholes-2177 | 75.93 | Kirkland_Manholes-2176 | 70.83 | 149.4 | 3.41 | 8 | PVC | 0.01 | 1,303 | 6 | 58 | 64 | 4.9 | | |
| Kirkland_Main-1176 | Kirkland_Manholes-2176 | 70.83 | Kirkland_Manholes-2142 | 68.99 | 36.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 6 | 66 | 72 | 4.5 | | |
| Kirkland_Main-1177 | Kirkland_Manholes-2366 | 292.68 | Kirkland_Manholes-2365 | 289.93 | 42.5 | 6.47 | 8 | Concrete | 0.013 | 1,380 | 24 | 79 | 103 | 7.5 | SM14-Ex-EX260 | |
| Kirkland_Main-1178 | Kirkland_Manholes-2368 | 290.87 | Kirkland_Manholes-2365 | 289.93 | 48.6 | 1.94 | 8 | PVC | 0.01 | 981 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1179 | Kirkland_Manholes-2372 | 304.48 | Kirkland_Manholes-2371 | 291.2 | 253.9 | 5.23 | 8 | Concrete | 0.013 | 1,240 | 14 | 44 | 57 | 4.6 | SM14-Ex-EX257 | |
| Kirkland_Main-1180 | Kirkland_Manholes-2378 | 312.05 | Kirkland_Manholes-2372 | 304.48 | 224.1 | 3.38 | 8 | Concrete | 0.013 | 997 | 10 | 24 | 34 | 3.4 | SM14-Ex-EX257 | |
| Kirkland_Main-1181 | Kirkland_Manholes-2373 | 306.85 | Kirkland_Manholes-2372 | 304.48 | 403.1 | 0.59 | 8 | Concrete | 0.013 | 416 | 2 | 8 | 10 | 2.5 | SM14-Ex-EX258 | |
| Kirkland_Main-1182 | Kirkland_Manholes-2374 | 307.1 | Kirkland_Manholes-2373 | 306.85 | 109.8 | 0.23 | 8 | Concrete | 0.013 | 259 | 1 | 4 | 5 | 2 | SM14-Ex-EX258 | |
| Kirkland_Main-1183 | Kirkland_Manholes-2376 | 359.31 | Kirkland_Manholes-2375 | 323.76 | 368.2 | 9.66 | 8 | Concrete | 0.013 | 1,685 | 4 | 4 | 8 | 0.5 | SM14-Ex-EX259 | |
| Kirkland_Main-1184 | Kirkland_Manholes-2375 | 323.76 | Kirkland_Manholes-2377 | 320.51 | 173.5 | 1.87 | 8 | Concrete | 0.013 | 742 | 6 | 8 | 14 | 1.9 | SM14-Ex-EX259 | |
| Kirkland_Main-1185 | Kirkland_Manholes-2377 | 320.51 | Kirkland_Manholes-2378 | 312.05 | 352.3 | 2.4 | 8 | Concrete | 0.013 | 840 | 8 | 12 | 20 | 2.3 | SM14-Ex-EX259 | |
| Kirkland_Main-1186 | Kirkland_Manholes-2379 | 312.61 | Kirkland_Manholes-2378 | 312.05 | 23.8 | 2.35 | 8 | Concrete | 0.013 | 831 | 2 | 8 | 10 | 1.2 | SM14-Ex-EX257 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1187 | Kirkland_Manholes-2380 | 290.72 | Kirkland_Manholes-2430 | 273.69 | 397.1 | 4.29 | 8 | Concrete | 0.013 | 1,123 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX286 | |
| Kirkland_Main-1188 | Kirkland_Manholes-2381 | 293.12 | Kirkland_Manholes-2380 | 290.72 | 144.3 | 1.66 | 6 | Concrete | 0.013 | 325 | 1 | 4 | 5 | 1.6 | SM14-Ex-EX286 | |
| Kirkland_Main-1189 | Kirkland_Manholes-2385 | 343.75 | Kirkland_Manholes-2383 | 328.5 | 173.4 | 8.79 | 8 | Concrete | 0.013 | 1,608 | 8 | 24 | 32 | 2 | SM14-Ex-EX260 | |
| Kirkland_Main-1190 | Kirkland_Manholes-2384 | 330.79 | Kirkland_Manholes-2383 | 328.5 | 64.4 | 3.56 | 8 | Concrete | 0.013 | 1,023 | 10 | 32 | 42 | 4.1 | SM14-Ex-EX287 | |
| Kirkland_Main-1191 | Kirkland_Manholes-2395 | 331.59 | Kirkland_Manholes-2384 | 330.79 | 136.8 | 0.58 | 8 | Concrete | 0.013 | 415 | 9 | 28 | 37 | 8.9 | SM14-Ex-EX287 | |
| Kirkland_Main-1192 | Kirkland_Manholes-2386 | 373.02 | Kirkland_Manholes-2385 | 343.75 | 310.7 | 9.42 | 8 | Concrete | 0.013 | 1,665 | 7 | 20 | 27 | 1.6 | SM14-Ex-EX260 | |
| Kirkland_Main-1193 | Kirkland_Manholes-2387 | 380.46 | Kirkland_Manholes-2386 | 373.02 | 399.9 | 1.86 | 8 | Concrete | 0.013 | 740 | 6 | 16 | 21 | 2.9 | SM14-Ex-EX260 | |
| Kirkland_Main-1194 | Kirkland_Manholes-2388 | 388.18 | Kirkland_Manholes-2387 | 380.46 | 279.2 | 2.76 | 8 | Concrete | 0.013 | 902 | 4 | 12 | 16 | 1.7 | SM14-Ex-EX260 | |
| Kirkland_Main-1195 | Kirkland_Manholes-2533 | 389.33 | Kirkland_Manholes-2388 | 388.18 | 396.1 | 0.29 | 8 | Concrete | 0.013 | 292 | 2 | 8 | 10 | 3.4 | SM14-Ex-EX260 | |
| Kirkland_Main-1196 | Kirkland_Manholes-2389 | 365.8 | Kirkland_Manholes-2390 | 359.58 | 183.8 | 3.38 | 8 | Concrete | 0.013 | 998 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX287 | |
| Kirkland_Main-1197 | Kirkland_Manholes-2390 | 359.58 | Kirkland_Manholes-2391 | 347.6 | 291 | 4.12 | 8 | Concrete | 0.013 | 1,100 | 4 | 8 | 12 | 1.1 | SM14-Ex-EX287 | |
| Kirkland_Main-1198 | Kirkland_Manholes-2391 | 347.6 | Kirkland_Manholes-2392 | 345.7 | 123.7 | 1.54 | 8 | Concrete | 0.013 | 672 | 6 | 12 | 18 | 2.7 | SM14-Ex-EX287 | |
| Kirkland_Main-1199 | Kirkland_Manholes-2392 | 345.7 | Kirkland_Manholes-2393 | 339.78 | 135.6 | 4.36 | 8 | Concrete | 0.013 | 1,133 | 7 | 16 | 23 | 2 | SM14-Ex-EX287 | |
| Kirkland_Main-1200 | Kirkland_Manholes-2411 | 259.15 | Kirkland_Manholes-2413 | 251.1 | 165.8 | 4.86 | 8 | PVC | 0.01 | 1,554 | 26 | 79 | 106 | 6.8 | | |
| Kirkland_Main-1201 | Kirkland_Manholes-2419 | 203.52 | Kirkland_Manholes-2303 | 195.57 | 329.3 | 2.41 | 8 | Concrete | 0.013 | 843 | 295 | 580 | 876 | 103.9 | SM2 | |
| Kirkland_Main-1202 | Kirkland_Manholes-2418 | 218.73 | Kirkland_Manholes-2419 | 203.52 | 222.4 | 6.84 | 8 | Concrete | 0.013 | 1,418 | 287 | 576 | 863 | 60.8 | SM2 | |
| Kirkland_Main-1203 | Kirkland_Manholes-2417 | 230.48 | Kirkland_Manholes-2418 | 218.73 | 175.2 | 6.71 | 8 | Concrete | 0.013 | 1,405 | 246 | 421 | 667 | 47.5 | SM2 | |
| Kirkland_Main-1204 | Kirkland_Manholes-2416 | 242.81 | Kirkland_Manholes-2417 | 230.48 | 262.7 | 4.69 | 8 | Concrete | 0.013 | 1,175 | 244 | 417 | 661 | 56.2 | SM2 | |
| Kirkland_Main-1205 | Kirkland_Manholes-2420 | 230.11 | Kirkland_Manholes-2418 | 218.73 | 227.2 | 5.01 | 8 | Concrete | 0.013 | 1,214 | 41 | 151 | 192 | 15.8 | SM14-Ex-EX251 | |
| Kirkland_Main-1206 | Kirkland_Manholes-2415 | 247.52 | Kirkland_Manholes-2416 | 242.81 | 265.9 | 1.77 | 8 | Concrete | 0.013 | 722 | 241 | 413 | 655 | 90.7 | SM2 | |
| Kirkland_Main-1207 | Kirkland_Manholes-2720 | 32.22 | Kirkland_Manholes-2719 | 31.99 | 57.5 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 6 | 80 | 17.9 | | |
| Kirkland_Main-1208 | Kirkland_Manholes-2414 | 248.96 | Kirkland_Manholes-2415 | 247.52 | 131.3 | 1.1 | 8 | Concrete | 0.013 | 568 | 240 | 409 | 650 | 114.4 | SM2 | |
| Kirkland_Main-1209 | Kirkland_Manholes-2413 | 251.1 | Kirkland_Manholes-2414 | 248.96 | 118.1 | 1.81 | 8 | Concrete | 0.013 | 730 | 240 | 405 | 645 | 88.4 | SM2 | |
| Kirkland_Main-1210 | Kirkland_Manholes-2421 | 253.02 | Kirkland_Manholes-2413 | 251.1 | 118.9 | 1.61 | 8 | Concrete | 0.013 | 689 | 213 | 322 | 535 | 77.6 | SM2 | |
| Kirkland_Main-1211 | Kirkland_Manholes-2422 | 254.09 | Kirkland_Manholes-2421 | 253.02 | 92.9 | 1.15 | 8 | Concrete | 0.013 | 582 | 210 | 314 | 524 | 90 | SM2 | |
| Kirkland_Main-1212 | Kirkland_Manholes-2424 | 257.66 | Kirkland_Manholes-2422 | 254.09 | 323.2 | 1.1 | 8 | Concrete | 0.013 | 570 | 209 | 310 | 519 | 91.1 | SM2 | |
| Kirkland_Main-1213 | Kirkland_Manholes-2879 | 68.04 | Kirkland_Manholes-2492 | 55.46 | 56.8 | 22.14 | 8 | PVC | 0.01 | 3,317 | 24 | 43 | 67 | 2 | | |
| Kirkland_Main-1214 | Kirkland_Manholes-2091 | 57.76 | Kirkland_Manholes-2090 | 57.52 | 58.9 | 0.4 | 8 | Concrete | 0.013 | 343 | 2 | 12 | 14 | 4.2 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1215 | Kirkland_Manholes-2094 | 57.58 | Kirkland_Manholes-2090 | 57.44 | 314.4 | 0.04 | 12 | Concrete | 0.013 | 337 | 80 | 237 | 317 | 94.1 | SM14-Ex-EX222 | |
| Kirkland_Main-1216 | Kirkland_Manholes-2092 | 79.95 | Kirkland_Manholes-2091 | 79.51 | 110.7 | 0.4 | 6 | Concrete | 0.013 | 159 | 2 | 6 | 8 | 5 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1218 | Kirkland_Manholes-2095 | 60.47 | Kirkland_Manholes-2094 | 57.58 | 55.7 | 5.18 | 8 | Concrete | 0.013 | 1,235 | 2 | 12 | 14 | 1.2 | SM14-Ex-EX277 | |
| Kirkland_Main-1219 | Kirkland_Manholes-2096 | 71.29 | Kirkland_Manholes-2095 | 60.47 | 119 | 9.09 | 6 | Concrete | 0.013 | 759 | 2 | 6 | 8 | 1.1 | SM14-Ex-EX277 | |
| Kirkland_Main-1220 | Kirkland_Manholes-2099 | 57.72 | Kirkland_Manholes-2094 | 57.58 | 259 | 0.05 | 12 | Concrete | 0.013 | 372 | 78 | 219 | 296 | 79.7 | SM14-Ex-EX222 | |
| Kirkland_Main-1223 | Kirkland_Manholes-2614 | 304.78 | Kirkland_Manholes-2615 | 302.07 | 237.1 | 1.14 | 8 | Concrete | 0.013 | 580 | 37 | 103 | 141 | 24.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1224 | Kirkland_Manholes-2615 | 302.07 | Kirkland_Manholes-2618 | 301.8 | 67.7 | 0.4 | 8 | Concrete | 0.013 | 343 | 37 | 107 | 145 | 42.1 | SM14-Ex-EX299 | Drop Connection |
| Kirkland_Main-1225 | Kirkland_Manholes-2618 | 278.4 | Kirkland_Manholes-2617 | 276.43 | 274.1 | 0.72 | 8 | Concrete | 0.013 | 460 | 42 | 119 | 161 | 35.1 | SM2 | |
| Kirkland_Main-1226 | Kirkland_Manholes-2617 | 276.43 | Kirkland_Manholes-2616 | 275.44 | 246.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 58 | 123 | 181 | 52.9 | SM2 | Drop Connection |
| Kirkland_Main-1227 | Kirkland_Manholes-2616 | 274.02 | Kirkland_Manholes-2619 | 272.54 | 173.9 | 0.85 | 8 | Concrete | 0.013 | 500 | 119 | 151 | 270 | 54 | SM2 | |
| Kirkland_Main-1228 | Kirkland_Manholes-2619 | 272.54 | Kirkland_Manholes-2428 | 270.37 | 122.7 | 1.77 | 8 | Concrete | 0.013 | 721 | 119 | 155 | 274 | 38 | SM2 | |
| Kirkland_Main-1229 | Kirkland_Manholes-407 | 266.31 | Kirkland_Manholes-409 | 264.84 | 123.1 | 1.19 | 8 | PVC | 0.01 | 771 | 2 | 8 | 10 | 1.3 | | |
| Kirkland_Main-1230 | Kirkland_Manholes-409 | 264.84 | Kirkland_Manholes-419 | 263.82 | 78.4 | 1.3 | 8 | PVC | 0.01 | 804 | 3 | 16 | 19 | 2.4 | | |
| Kirkland_Main-1231 | Kirkland_Manholes-411 | 265.96 | Kirkland_Manholes-412 | 253.7 | 218.8 | 5.6 | 8 | PVC | 0.01 | 1,669 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1232 | Kirkland_Manholes-412 | 253.7 | Kirkland_Manholes-413 | 252.76 | 178.3 | 0.53 | 8 | PVC | 0.01 | 512 | 2 | 8 | 10 | 1.9 | | |
| Kirkland_Main-1233 | Kirkland_Manholes-413 | 252.76 | Kirkland_Manholes-414 | 251.5 | 46.6 | 2.7 | 8 | PVC | 0.01 | 1,159 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1234 | Kirkland_Manholes-414 | 251.5 | Kirkland_Manholes-415 | 250.52 | 65.4 | 1.5 | 8 | PVC | 0.01 | 863 | 3 | 16 | 19 | 2.1 | | |
| Kirkland_Main-1235 | Kirkland_Manholes-415 | 250.52 | Kirkland_Manholes-416 | 248.58 | 58.4 | 3.32 | 8 | PVC | 0.01 | 1,285 | 3 | 20 | 23 | 1.8 | | |
| Kirkland_Main-1236 | Kirkland_Manholes-416 | 248.58 | Kirkland_Manholes-417 | 237.12 | 157.3 | 7.28 | 8 | PVC | 0.01 | 1,903 | 4 | 24 | 28 | 1.5 | | |
| Kirkland_Main-1237 | Kirkland_Manholes-417 | 237.12 | Kirkland_Manholes-2767 | 236.02 | 47.6 | 2.31 | 8 | PVC | 0.01 | 1,071 | 5 | 28 | 32 | 3 | | |
| Kirkland_Main-1238 | Kirkland_Manholes-2767 | 236.02 | Kirkland_Manholes-418 | 235.93 | 86.7 | 0.1 | 8 | PVC | 0.01 | 227 | 5 | 32 | 36 | 16 | | |
| Kirkland_Main-1239 | Kirkland_Manholes-408 | 267.9 | Kirkland_Manholes-407 | 266.31 | 113.3 | 1.4 | 8 | PVC | 0.01 | 835 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1240 | Kirkland_Manholes-419 | 263.82 | Kirkland_Manholes-625 | 258 | 200 | 2.91 | 8 | PVC | 0.01 | 1,203 | 4 | 20 | 24 | 2 | | |
| Kirkland_Main-1241 | Kirkland_Manholes-420 | 281.46 | Kirkland_Manholes-1071 | 277.81 | 358.8 | 1.02 | 8 | PVC | 0.01 | 711 | 7 | 36 | 43 | 6.1 | | |
| Kirkland_Main-1242 | Kirkland_Manholes-418 | 235.93 | Kirkland_Manholes-421 | 235.77 | 9.8 | 1.63 | 8 | PVC | 0.01 | 901 | 5 | 36 | 40 | 4.5 | | |
| Kirkland_Main-1243 | Kirkland_Manholes-422 | 235.64 | Kirkland_Manholes-341 | 235.59 | 30.3 | 0.17 | 8 | Ductile Iron | 0.012 | 239 | 5 | 44 | 49 | 20.4 | SM14-Ex-EX49 | |
| Kirkland_Main-1244 | Kirkland_Manholes-421 | 235.77 | Kirkland_Manholes-422 | 235.64 | 135.2 | 0.1 | 8 | Ductile Iron | 0.012 | 182 | 5 | 40 | 45 | 24.6 | SM14-Ex-EX49 | |
| Kirkland_Main-1245 | Kirkland_Manholes-423 | 284.5 | Kirkland_Manholes-420 | 281.46 | 237.1 | 1.28 | 8 | PVC | 0.01 | 798 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1246 | Kirkland_Manholes-424 | 292.81 | Kirkland_Manholes-425 | 290.3 | 45.2 | 5.56 | 8 | PVC | 0.01 | 1,662 | 5 | 24 | 29 | 1.8 | | |
| Kirkland_Main-1247 | Kirkland_Manholes-1846 | 15.1 | Kirkland_Manholes-1845 | 14.95 | 208.8 | 0.07 | 12 | PVC | 0.01 | 557 | 5 | 32 | 38 | 6.8 | SM10 | |
| Kirkland_Main-1248 | Kirkland_Manholes-1845 | 14.95 | Kirkland_Manholes-1844 | 14.08 | 225.8 | 0.39 | 12 | PVC | 0.01 | 1,290 | 6 | 39 | 45 | 3.5 | SM10 | |
| Kirkland_Main-1249 | Kirkland_Manholes-1844 | 14.08 | Kirkland_Manholes-1843 | 13.9 | 253.8 | 0.07 | 12 | PVC | 0.01 | 554 | 8 | 45 | 53 | 9.6 | SM10 | |
| Kirkland_Main-1250 | Kirkland_Manholes-1843 | 13.9 | Kirkland_Manholes-1842 | 13.84 | 237.6 | 0.03 | 12 | PVC | 0.01 | 330 | 8 | 52 | 60 | 18.1 | SM10 | |
| Kirkland_Main-1251 | Kirkland_Manholes-1842 | 13.84 | Kirkland_Manholes-1841 | 13.3 | 228.3 | 0.24 | 12 | PVC | 0.01 | 1,011 | 9 | 58 | 67 | 6.7 | SM10 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1252 | Kirkland_Manholes-1840 | 12.98 | Kirkland_Manholes-1839 | 12.1 | 208.1 | 0.42 | 12 | PVC | 0.01 | 1,352 | 14 | 71 | 86 | 6.4 | SM10 | |
| Kirkland_Main-1253 | Kirkland_Manholes-1839 | 12.1 | Kirkland_Manholes-1838 | 12 | 159.4 | 0.06 | 12 | PVC | 0.01 | 521 | 14 | 78 | 92 | 17.7 | | |
| Kirkland_Main-1254 | Kirkland_Manholes-1838 | 12 | Kirkland_Manholes-1834 | 11.35 | 218.3 | 0.3 | 12 | PVC | 0.01 | 1,134 | 16 | 84 | 100 | 8.8 | | |
| Kirkland_Main-1255 | Kirkland_Manholes-1841 | 13.3 | Kirkland_Manholes-1840 | 12.98 | 311 | 0.1 | 12 | PVC | 0.01 | 667 | 10 | 65 | 75 | 11.2 | SM10 | |
| Kirkland_Main-1256 | Kirkland_Manholes-1854 | 359.04 | Kirkland_Manholes-1855 | 357.41 | 200.3 | 0.81 | 8 | PVC | 0.01 | 636 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-1257 | Kirkland_Manholes-1855 | 357.41 | Kirkland_Manholes-1856 | 346.8 | 232 | 4.57 | 8 | PVC | 0.01 | 1,508 | 0 | 8 | 8 | 0.5 | | |
| Kirkland_Main-1258 | Kirkland_Manholes-1856 | 346.8 | Kirkland_Manholes-1857 | 344.14 | 121.8 | 2.18 | 8 | PVC | 0.01 | 1,042 | 6 | 12 | 18 | 1.7 | | |
| Kirkland_Main-1259 | Kirkland_Manholes-1857 | 344.14 | Kirkland_Manholes-1858 | 335.71 | 162.8 | 5.18 | 8 | PVC | 0.01 | 1,605 | 6 | 16 | 22 | 1.4 | | |
| Kirkland_Main-1260 | Kirkland_Manholes-1858 | 335.71 | Kirkland_Manholes-1859 | 326.96 | 255.9 | 3.42 | 8 | PVC | 0.01 | 1,304 | 62 | 115 | 178 | 13.6 | | |
| Kirkland_Main-1261 | Kirkland_Manholes-1963 | 340.77 | Kirkland_Manholes-1858 | 335.71 | 100.1 | 5.06 | 8 | PVC | 0.01 | 1,585 | 53 | 95 | 149 | 9.4 | | |
| Kirkland_Main-1262 | Kirkland_Manholes-1859 | 326.96 | Kirkland_Manholes-1860 | 317.11 | 345 | 2.85 | 8 | PVC | 0.01 | 1,191 | 62 | 119 | 182 | 15.2 | | |
| Kirkland_Main-1263 | Kirkland_Manholes-1860 | 317.11 | Kirkland_Manholes-1861 | 303.96 | 398.6 | 3.3 | 8 | PVC | 0.01 | 1,281 | 63 | 123 | 186 | 14.5 | | |
| Kirkland_Main-1264 | Kirkland_Manholes-1861 | 303.96 | Kirkland_Manholes-1862 | 294.2 | 372.7 | 2.62 | 8 | PVC | 0.01 | 1,141 | 63 | 127 | 190 | 16.6 | | Drop Connection |
| Kirkland_Main-1265 | Kirkland_Manholes-2394 | 354.21 | Kirkland_Manholes-2393 | 339.78 | 142.1 | 10.15 | 8 | Concrete | 0.013 | 1,728 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX287 | |
| Kirkland_Main-1266 | Kirkland_Manholes-2393 | 339.78 | Kirkland_Manholes-2395 | 331.59 | 110.8 | 7.39 | 8 | Concrete | 0.013 | 1,475 | 9 | 24 | 32 | 2.2 | SM14-Ex-EX287 | |
| Kirkland_Main-1267 | Kirkland_Manholes-2405 | 418 | Kirkland_Manholes-2397 | 417.95 | 35.5 | 0.14 | 8 | PVC | 0.01 | 265 | 5 | 28 | 33 | 12.5 | | |
| Kirkland_Main-1268 | Kirkland_Manholes-2397 | 417.95 | Kirkland_Manholes-2398 | 416.84 | 162.8 | 0.68 | 8 | Concrete | 0.013 | 448 | 6 | 32 | 38 | 8.4 | SM14-Ex-EX261 | |
| Kirkland_Main-1269 | Kirkland_Manholes-2404 | 419.23 | Kirkland_Manholes-2405 | 418 | 199.9 | 0.62 | 8 | PVC | 0.01 | 553 | 4 | 24 | 28 | 5 | | |
| Kirkland_Main-1270 | Kirkland_Manholes-2399 | 419.47 | Kirkland_Manholes-2404 | 419.23 | 32.8 | 0.73 | 8 | PVC | 0.01 | 603 | 1 | 8 | 9 | 1.4 | | |
| Kirkland_Main-1271 | Kirkland_Manholes-2403 | 420.2 | Kirkland_Manholes-2404 | 419.23 | 274.8 | 0.35 | 8 | PVC | 0.01 | 419 | 3 | 12 | 15 | 3.5 | | |
| Kirkland_Main-1272 | Kirkland_Manholes-2400 | 420.6 | Kirkland_Manholes-2399 | 419.47 | 159 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-1273 | Kirkland_Manholes-2402 | 421.38 | Kirkland_Manholes-2403 | 420.2 | 252.3 | 0.47 | 8 | PVC | 0.01 | 482 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-1274 | Kirkland_Manholes-2401 | 422.6 | Kirkland_Manholes-2402 | 421.38 | 262.8 | 0.46 | 8 | PVC | 0.01 | 480 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-1276 | Kirkland_Manholes-2398 | 416.84 | Kirkland_Manholes-2406 | 412.88 | 316.7 | 1.25 | 8 | Concrete | 0.013 | 606 | 7 | 36 | 43 | 7.1 | SM14-Ex-EX261 | |
| Kirkland_Main-1277 | Kirkland_Manholes-2406 | 412.88 | Kirkland_Manholes-2396 | 406.38 | 222.1 | 2.93 | 8 | Concrete | 0.013 | 928 | 9 | 40 | 49 | 5.3 | SM14-Ex-EX261 | |
| Kirkland_Main-1278 | Kirkland_Manholes-2396 | 406.38 | Kirkland_Manholes-2407 | 403.31 | 84.2 | 3.65 | 8 | Concrete | 0.013 | 1,036 | 10 | 44 | 54 | 5.2 | SM14-Ex-EX261 | |
| Kirkland_Main-1279 | Kirkland_Manholes-2408 | 405.44 | Kirkland_Manholes-2409 | 401.93 | 26.6 | 13.2 | 8 | PVC | 0.01 | 2,561 | 0 | 8 | 8 | 0.3 | | |
| Kirkland_Main-1281 | Kirkland_Manholes-2409 | 401.93 | Kirkland_Manholes-2267 | 393.07 | 194.4 | 4.56 | 8 | PVC | 0.01 | 1,505 | 0 | 12 | 12 | 0.8 | | |
| Kirkland_Main-1282 | Kirkland_Manholes-2412 | 260.78 | Kirkland_Manholes-2411 | 259.15 | 122.6 | 1.33 | 8 | PVC | 0.01 | 813 | 6 | 12 | 18 | 2.2 | | |
| Kirkland_Main-1283 | Kirkland_Manholes-282 | 50.07 | Kirkland_Manholes-281 | 36.84 | 240.3 | 5.51 | 8 | PVC | 0.01 | 1,654 | 1 | 10 | 11 | 0.7 | SM10 | |
| Kirkland_Main-1284 | Kirkland_Manholes-284 | 50.6 | Kirkland_Manholes-282 | 50.07 | 132.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 3 | 3 | 0.7 | | |
| Kirkland_Main-1285 | Kirkland_Manholes-283 | 64.31 | Kirkland_Manholes-282 | 50.07 | 115.4 | 12.34 | 8 | PVC | 0.01 | 2,477 | 1 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-1286 | Kirkland_Manholes-273 | 69.52 | Kirkland_Manholes-247 | 65.14 | 92.5 | 4.74 | 8 | Concrete | 0.013 | 1,180 | 50 | 139 | 188 | 16 | SM10 | |
| Kirkland_Main-1290 | Kirkland_Manholes-274 | 93.7 | Kirkland_Manholes-271 | 91.78 | 250.2 | 0.77 | 8 | Concrete | 0.013 | 475 | 36 | 96 | 132 | 27.7 | SM10 | |
| Kirkland_Main-1292 | Kirkland_Manholes-277 | 72.24 | Kirkland_Manholes-278 | 56.62 | 141.8 | 11.02 | 8 | Concrete | 0.013 | 1,800 | 2 | 3 | 6 | 0.3 | SM10 | |
| Kirkland_Main-1293 | Kirkland_Manholes-278 | 56.62 | Kirkland_Manholes-280 | 27.37 | 245.1 | 11.93 | 8 | Concrete | 0.013 | 1,874 | 31 | 13 | 44 | 2.3 | SM10 | |
| Kirkland_Main-1294 | Kirkland_Manholes-276 | 92.16 | Kirkland_Manholes-299 | 66.63 | 263.6 | 9.68 | 8 | Concrete | 0.013 | 1,688 | 2 | 6 | 9 | 0.5 | SM10 | |
| Kirkland_Main-1295 | Kirkland_Manholes-267 | 95.34 | Kirkland_Manholes-275 | 94.08 | 184.4 | 0.68 | 8 | Concrete | 0.013 | 448 | 34 | 87 | 121 | 27 | SM10 | |
| Kirkland_Main-1296 | Kirkland_Manholes-275 | 94.08 | Kirkland_Manholes-274 | 93.7 | 61.9 | 0.61 | 8 | Concrete | 0.013 | 425 | 34 | 92 | 126 | 29.7 | SM10 | |
| Kirkland_Main-1297 | Kirkland_Manholes-270 | 94.47 | Kirkland_Manholes-271 | 91.78 | 344.2 | 0.78 | 8 | Concrete | 0.013 | 479 | 10 | 30 | 40 | 8.3 | SM10 | |
| Kirkland_Main-1298 | Kirkland_Manholes-269 | 103.08 | Kirkland_Manholes-270 | 94.47 | 190.8 | 4.51 | 8 | Concrete | 0.013 | 1,152 | 7 | 26 | 32 | 2.8 | SM10 | |
| Kirkland_Main-1299 | Kirkland_Manholes-268 | 108.82 | Kirkland_Manholes-269 | 103.08 | 133.1 | 4.31 | 8 | Concrete | 0.013 | 1,126 | 5 | 21 | 26 | 2.3 | SM10 | |
| Kirkland_Main-1300 | Kirkland_Manholes-2521 | 363.83 | Kirkland_Manholes-2525 | 348.63 | 167.1 | 9.09 | 8 | PVC | 0.01 | 2,126 | 2 | 5 | 7 | 0.3 | | |
| Kirkland_Main-1301 | Kirkland_Manholes-2519 | 384.75 | Kirkland_Manholes-2522 | 362.4 | 159.7 | 13.99 | 8 | PVC | 0.01 | 2,637 | 2 | 2 | 4 | 0.1 | | |
| Kirkland_Main-1302 | Kirkland_Manholes-2522 | 362.4 | Kirkland_Manholes-2523 | 357.31 | 64.3 | 7.92 | 8 | PVC | 0.01 | 1,984 | 2 | 5 | 7 | 0.3 | | |
| Kirkland_Main-1303 | Kirkland_Manholes-2523 | 357.31 | Kirkland_Manholes-2524 | 346.56 | 113.2 | 9.5 | 8 | PVC | 0.01 | 2,173 | 3 | 7 | 10 | 0.5 | | |
| Kirkland_Main-1304 | Kirkland_Manholes-2524 | 346.56 | Kirkland_Manholes-2527 | 340.94 | 187 | 3.01 | 8 | PVC | 0.01 | 1,222 | 22 | 30 | 52 | 4.3 | | |
| Kirkland_Main-1305 | Kirkland_Manholes-2526 | 336.85 | Kirkland_Manholes-2776 | 334.45 | 375.1 | 0.64 | 8 | PVC | 0.01 | 564 | 29 | 79 | 108 | 19.1 | | |
| Kirkland_Main-1306 | Kirkland_Manholes-2527 | 340.94 | Kirkland_Manholes-2526 | 336.85 | 509.8 | 0.8 | 8 | PVC | 0.01 | 631 | 29 | 77 | 105 | 16.7 | | |
| Kirkland_Main-1307 | Kirkland_Manholes-2525 | 348.63 | Kirkland_Manholes-2527 | 340.94 | 406 | 1.89 | 8 | PVC | 0.01 | 970 | 7 | 44 | 51 | 5.3 | | |
| Kirkland_Main-1308 | Kirkland_Manholes-2528 | 359.11 | Kirkland_Manholes-2525 | 348.63 | 235.4 | 4.45 | 8 | PVC | 0.01 | 1,488 | 4 | 37 | 41 | 2.8 | | |
| Kirkland_Main-1309 | Kirkland_Manholes-2529 | 365.07 | Kirkland_Manholes-2528 | 362.98 | 40.4 | 5.17 | 8 | PVC | 0.01 | 1,604 | 3 | 35 | 38 | 2.4 | | Drop Connection |
| Kirkland_Main-1310 | Kirkland_Manholes-2531 | 381.45 | Kirkland_Manholes-2529 | 365.07 | 303.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 3 | 33 | 36 | 2.2 | | |
| Kirkland_Main-1311 | Kirkland_Manholes-2530 | 382.12 | Kirkland_Manholes-2531 | 381.45 | 45.8 | 1.46 | 8 | PVC | 0.01 | 853 | 3 | 30 | 34 | 3.9 | | |
| Kirkland_Main-1312 | Kirkland_Manholes-2532 | 395.91 | Kirkland_Manholes-2530 | 382.12 | 311 | 4.43 | 8 | PVC | 0.01 | 1,485 | 2 | 28 | 30 | 2 | | |
| Kirkland_Main-1313 | Kirkland_Manholes-2534 | 391.7 | Kirkland_Manholes-2533 | 389.33 | 214.8 | 1.1 | 8 | Concrete | 0.013 | 570 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX260 | |
| Kirkland_Main-1315 | Kirkland_Manholes-2535 | 407.5 | Kirkland_Manholes-2536 | 406.16 | 143.7 | 0.93 | 8 | PVC | 0.01 | 681 | 13 | 4 | 17 | 2.4 | | |
| Kirkland_Main-1316 | Kirkland_Manholes-2536 | 406.16 | Kirkland_Manholes-2537 | 404.02 | 173.1 | 1.24 | 8 | PVC | 0.01 | 784 | 17 | 8 | 25 | 3.2 | | |
| Kirkland_Main-1317 | Kirkland_Manholes-2537 | 404.02 | Kirkland_Manholes-2538 | 403.64 | 31.1 | 1.22 | 8 | PVC | 0.01 | 780 | 17 | 12 | 29 | 3.7 | | |
| Kirkland_Main-1318 | Kirkland_Manholes-2541 | 412.62 | Kirkland_Manholes-2538 | 403.64 | 249.5 | 3.6 | 8 | Concrete | 0.013 | 1,029 | 5 | 12 | 16 | 1.6 | SM14-Ex-EX299 | |
| Kirkland_Main-1320 | Kirkland_Manholes-2538 | 403.64 | Kirkland_Manholes-2542 | 402.84 | 199.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 22 | 28 | 50 | 14.6 | SM14-Ex-EX299 | |
| Kirkland_Main-1321 | Kirkland_Manholes-2539 | 420.17 | Kirkland_Manholes-2540 | 419.4 | 116.4 | 0.66 | 8 | Concrete | 0.013 | 441 | 2 | 4 | 6 | 1.3 | SM14-Ex-EX299 | |

E-Page 723

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1322 | Kirkland_Manholes-2540 | 419.4 | Kirkland_Manholes-2541 | 412.62 | 255.5 | 2.65 | 8 | Concrete | 0.013 | 884 | 3 | 8 | 11 | 1.3 | SM14-Ex-EX299 | |
| Kirkland_Main-1324 | Kirkland_Manholes-2542 | 402.84 | Kirkland_Manholes-2547 | 388.67 | 366.3 | 3.87 | 8 | Concrete | 0.013 | 1,067 | 24 | 32 | 55 | 5.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1325 | Kirkland_Manholes-2547 | 388.67 | Kirkland_Manholes-2549 | 373.53 | 148.8 | 10.17 | 8 | Concrete | 0.013 | 1,730 | 25 | 36 | 60 | 3.5 | SM14-Ex-EX299 | |
| Kirkland_Main-1327 | Kirkland_Manholes-2543 | 398.38 | Kirkland_Manholes-2545 | 394.25 | 263.6 | 1.57 | 8 | PVC | 0.01 | 883 | 3 | 8 | 10 | 1.2 | | |
| Kirkland_Main-1328 | Kirkland_Manholes-2544 | 407.5 | Kirkland_Manholes-2543 | 398.38 | 295.7 | 3.08 | 8 | Concrete | 0.013 | 952 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX308 | |
| Kirkland_Main-1329 | Kirkland_Manholes-2546 | 394.6 | Kirkland_Manholes-2545 | 394.25 | 207.1 | 0.17 | 8 | PVC | 0.01 | 290 | 0 | 4 | 4 | 1.5 | | |
| Kirkland_Main-1330 | Kirkland_Manholes-2545 | 394.25 | Kirkland_Manholes-2548 | 359.75 | 323.6 | 10.66 | 8 | PVC | 0.01 | 2,302 | 6 | 16 | 22 | 1 | | |
| Kirkland_Main-1331 | Kirkland_Manholes-2549 | 373.53 | Kirkland_Manholes-2550 | 363.01 | 106.8 | 9.85 | 8 | Concrete | 0.013 | 1,702 | 25 | 40 | 64 | 3.8 | SM14-Ex-EX299 | |
| Kirkland_Main-1332 | Kirkland_Manholes-2550 | 363.01 | Kirkland_Manholes-2551 | 350.96 | 184.1 | 6.54 | 8 | Concrete | 0.013 | 1,387 | 25 | 44 | 69 | 4.9 | SM14-Ex-EX299 | |
| Kirkland_Main-1333 | Kirkland_Manholes-2551 | 350.96 | Kirkland_Manholes-2552 | 332.83 | 142.8 | 12.69 | 8 | Concrete | 0.013 | 1,932 | 36 | 83 | 120 | 6.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1334 | Kirkland_Manholes-2552 | 332.83 | Kirkland_Manholes-2559 | 326.46 | 239.1 | 2.66 | 8 | Concrete | 0.013 | 885 | 37 | 95 | 133 | 15 | SM14-Ex-EX299 | |
| Kirkland_Main-1335 | Kirkland_Manholes-2555 | 336.08 | Kirkland_Manholes-2552 | 332.83 | 311.9 | 1.04 | 8 | Concrete | 0.013 | 554 | 1 | 8 | 9 | 1.6 | SM14-Ex-EX322 | |
| Kirkland_Main-1336 | Kirkland_Manholes-2553 | 338.58 | Kirkland_Manholes-2554 | 334.68 | 146 | 2.67 | 6 | Concrete | 0.013 | 412 | 1 | 4 | 5 | 1.1 | SM14-Ex-EX304 | |
| Kirkland_Main-1337 | Kirkland_Manholes-2892 | 130.3 | Kirkland_Manholes-7 | 127.07 | 138.9 | 2.32 | 8 | PVC | 0.01 | 1,075 | 1 | 1 | 3 | 0.2 | | |
| Kirkland_Main-1338 | Kirkland_Manholes-2554 | 334.68 | Kirkland_Manholes-2558 | 329.23 | 295.9 | 1.84 | 6 | Concrete | 0.013 | 342 | 6 | 8 | 14 | 4 | SM14-Ex-EX304 | |
| Kirkland_Main-1339 | Kirkland_Manholes-2556 | 339.44 | Kirkland_Manholes-2555 | 336.08 | 338.5 | 0.99 | 6 | Concrete | 0.013 | 251 | 1 | 4 | 5 | 1.9 | SM14-Ex-EX322 | |
| Kirkland_Main-1340 | Kirkland_Manholes-2557 | 338.97 | Kirkland_Manholes-2564 | 326.24 | 273.9 | 4.65 | 8 | Concrete | 0.013 | 1,169 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX303 | |
| Kirkland_Main-1341 | Kirkland_Manholes-2558 | 329.23 | Kirkland_Manholes-2562 | 315.88 | 275 | 4.86 | 8 | Concrete | 0.013 | 1,195 | 6 | 12 | 18 | 1.5 | SM14-Ex-EX304 | |
| Kirkland_Main-1342 | Kirkland_Manholes-2559 | 326.46 | Kirkland_Manholes-2614 | 304.78 | 296.2 | 7.32 | 8 | Concrete | 0.013 | 1,467 | 37 | 99 | 137 | 9.3 | SM14-Ex-EX299 | |
| Kirkland_Main-1343 | Kirkland_Manholes-2561 | 358.82 | Kirkland_Manholes-2551 | 350.96 | 208.8 | 3.76 | 8 | PVC | 0.01 | 1,368 | 11 | 36 | 47 | 3.4 | | |
| Kirkland_Main-1344 | Kirkland_Manholes-2560 | 366.92 | Kirkland_Manholes-2561 | 358.82 | 174.3 | 4.65 | 8 | PVC | 0.01 | 1,520 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1345 | Kirkland_Manholes-2562 | 315.88 | Kirkland_Manholes-2563 | 304.66 | 203.7 | 5.51 | 8 | Concrete | 0.013 | 1,273 | 7 | 16 | 23 | 1.8 | SM14-Ex-EX304 | |
| Kirkland_Main-1346 | Kirkland_Manholes-2563 | 304.66 | Kirkland_Manholes-2603 | 296.02 | 227.1 | 3.81 | 8 | Concrete | 0.013 | 1,058 | 9 | 20 | 29 | 2.7 | SM14-Ex-EX304 | |
| Kirkland_Main-1347 | Kirkland_Manholes-2564 | 326.24 | Kirkland_Manholes-2565 | 315.02 | 180.1 | 6.23 | 8 | Concrete | 0.013 | 1,354 | 1 | 8 | 9 | 0.7 | SM14-Ex-EX303 | |
| Kirkland_Main-1349 | Kirkland_Manholes-2565 | 315.02 | Kirkland_Manholes-2590 | 303.32 | 215.8 | 5.42 | 8 | Concrete | 0.013 | 1,263 | 7 | 40 | 47 | 3.7 | SM14-Ex-EX303 | |
| Kirkland_Main-1350 | Kirkland_Manholes-2567 | 316.05 | Kirkland_Manholes-2565 | 315.02 | 200.2 | 0.51 | 8 | Concrete | 0.013 | 389 | 5 | 28 | 33 | 8.4 | SM14-Ex-EX307 | |
| Kirkland_Main-1353 | Kirkland_Manholes-2456 | 21.67 | Kirkland_Manholes-2458 | 21.12 | 286.3 | 0.19 | 12 | PVC | 0.01 | 911 | 46 | 110 | 156 | 17.1 | | |
| Kirkland_Main-1354 | Kirkland_Manholes-2104 | 41.29 | Kirkland_Manholes-2457 | 40.34 | 237.1 | 0.4 | 6 | Concrete | 0.013 | 159 | 6 | 13 | 19 | 12.2 | SM14-Ex-EX231 | Drop Connection |
| Kirkland_Main-1355 | Kirkland_Manholes-2459 | 25.23 | Kirkland_Manholes-2458 | 21.12 | 57.9 | 7.1 | 8 | PVC | 0.01 | 1,879 | 0 | 13 | 13 | 0.7 | | |
| Kirkland_Main-1356 | Kirkland_Manholes-2458 | 21.12 | Kirkland_Manholes-2460 | 20.42 | 280.8 | 0.25 | 12 | PVC | 0.01 | 1,038 | 56 | 130 | 186 | 17.9 | | |
| Kirkland_Main-1357 | Kirkland_Manholes-2105 | 41.32 | Kirkland_Manholes-2459 | 40.36 | 240.6 | 0.4 | 6 | Concrete | 0.013 | 159 | 0 | 6 | 7 | 4.3 | SM14-Ex-EX230 | Drop Connection |
| Kirkland_Main-1358 | Kirkland_Manholes-2460 | 20.42 | Kirkland_Manholes-2463 | 19.08 | 286.9 | 0.47 | 12 | PVC | 0.01 | 1,421 | 72 | 162 | 234 | 16.5 | | |
| Kirkland_Main-1359 | Kirkland_Manholes-2461 | 23.27 | Kirkland_Manholes-2460 | 20.42 | 36.9 | 7.72 | 8 | PVC | 0.01 | 1,959 | 8 | 19 | 27 | 1.4 | | |
| Kirkland_Main-1360 | Kirkland_Manholes-2106 | 63.43 | Kirkland_Manholes-2461 | 62.02 | 352 | 0.4 | 6 | Concrete | 0.013 | 159 | 6 | 13 | 19 | 11.9 | SM14-Ex-EX227 | Drop Connection |
| Kirkland_Main-1361 | Kirkland_Manholes-2462 | 20.98 | Kirkland_Manholes-2460 | 20.42 | 12.7 | 4.42 | 8 | PVC | 0.01 | 1,483 | 8 | 6 | 15 | 1 | | |
| Kirkland_Main-1362 | Kirkland_Manholes-2463 | 19.08 | Kirkland_Manholes-2465 | 18.4 | 238.2 | 0.29 | 15 | PVC | 0.01 | 2,014 | 82 | 169 | 251 | 12.5 | | |
| Kirkland_Main-1363 | Kirkland_Manholes-2464 | 24.34 | Kirkland_Manholes-2465 | 24.15 | 46.3 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 32 | 45 | 10.1 | | Drop Connection |
| Kirkland_Main-1364 | Kirkland_Manholes-2465 | 18.4 | Kirkland_Manholes-2321 | 18.2 | 405.1 | 0.05 | 15 | PVC | 0.01 | 837 | 95 | 208 | 303 | 36.2 | | |
| Kirkland_Main-1365 | Kirkland_Manholes-2466 | 40.06 | Kirkland_Manholes-2464 | 24.34 | 133.9 | 11.74 | 8 | PVC | 0.01 | 2,416 | 12 | 26 | 38 | 1.6 | | |
| Kirkland_Main-1366 | Kirkland_Manholes-754 | 246.56 | Kirkland_Manholes-756 | 236.14 | 59.1 | 17.63 | 8 | PVC | 0.01 | 2,961 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1367 | Kirkland_Manholes-756 | 236.14 | Kirkland_Manholes-759 | 235.08 | 17.7 | 6 | 8 | PVC | 0.01 | 1,727 | 3 | 12 | 15 | 0.9 | | |
| Kirkland_Main-1368 | Kirkland_Manholes-759 | 235.08 | Kirkland_Manholes-755 | 223.34 | 72.1 | 16.27 | 8 | PVC | 0.01 | 2,844 | 4 | 16 | 20 | 0.7 | | |
| Kirkland_Main-1369 | Kirkland_Manholes-749 | 322.83 | Kirkland_Manholes-748 | 311.92 | 207.7 | 5.25 | 8 | Concrete | 0.013 | 1,243 | 15 | 36 | 51 | 4.1 | SM14-Ex-EX71 | |
| Kirkland_Main-1370 | Kirkland_Manholes-743 | 333.02 | Kirkland_Manholes-749 | 322.83 | 238.3 | 4.28 | 8 | Concrete | 0.013 | 1,121 | 14 | 32 | 45 | 4.1 | SM14-Ex-EX71 | |
| Kirkland_Main-1371 | Kirkland_Manholes-742 | 334.85 | Kirkland_Manholes-743 | 333.02 | 278.1 | 0.66 | 8 | Concrete | 0.013 | 440 | 9 | 20 | 29 | 6.5 | SM14-Ex-EX71 | |
| Kirkland_Main-1372 | Kirkland_Manholes-744 | 343.43 | Kirkland_Manholes-743 | 333.02 | 155.4 | 6.7 | 8 | Concrete | 0.013 | 1,404 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX73 | |
| Kirkland_Main-1373 | Kirkland_Manholes-1551 | 340.04 | Kirkland_Manholes-1548 | 334.13 | 358.9 | 1.65 | 8 | Concrete | 0.013 | 696 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX122 | |
| Kirkland_Main-1374 | Kirkland_Manholes-1548 | 334.13 | Kirkland_Manholes-1547 | 314.76 | 165.7 | 11.69 | 8 | Concrete | 0.013 | 1,854 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX122 | |
| Kirkland_Main-1375 | Kirkland_Manholes-1554 | 318.87 | Kirkland_Manholes-1547 | 314.76 | 166.1 | 2.48 | 8 | Concrete | 0.013 | 853 | 3 | 12 | 15 | 1.7 | SM14-Ex-EX122 | |
| Kirkland_Main-1376 | Kirkland_Manholes-1547 | 314.76 | Kirkland_Manholes-1553 | 308.15 | 101.4 | 6.52 | 8 | Concrete | 0.013 | 1,385 | 5 | 24 | 29 | 2.1 | SM14-Ex-EX122 | |
| Kirkland_Main-1377 | Kirkland_Manholes-1549 | 335.84 | Kirkland_Manholes-1550 | 330.23 | 147.4 | 3.81 | 8 | Concrete | 0.013 | 1,058 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX122 | |
| Kirkland_Main-1378 | Kirkland_Manholes-1550 | 330.23 | Kirkland_Manholes-1554 | 318.87 | 207.3 | 5.48 | 8 | Concrete | 0.013 | 1,270 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX122 | |
| Kirkland_Main-1379 | Kirkland_Manholes-741 | 345.43 | Kirkland_Manholes-696 | 340.09 | 318.5 | 1.68 | 8 | Concrete | 0.013 | 702 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX74 | |
| Kirkland_Main-1380 | Kirkland_Manholes-696 | 340.09 | Kirkland_Manholes-742 | 334.85 | 242.4 | 2.16 | 8 | Concrete | 0.013 | 797 | 8 | 16 | 23 | 2.9 | SM14-Ex-EX71 | |
| Kirkland_Main-1381 | Kirkland_Manholes-820 | 351.15 | Kirkland_Manholes-821 | 328.81 | 334.9 | 6.67 | 8 | Concrete | 0.013 | 1,401 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX72 | |
| Kirkland_Main-1382 | Kirkland_Manholes-745 | 351.42 | Kirkland_Manholes-744 | 343.43 | 306.7 | 2.6 | 8 | Concrete | 0.013 | 875 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX73 | |
| Kirkland_Main-1383 | Kirkland_Manholes-821 | 328.81 | Kirkland_Manholes-746 | 326.06 | 200.6 | 1.37 | 8 | Concrete | 0.013 | 635 | 2 | 8 | 10 | 1.5 | SM14-Ex-EX72 | |
| Kirkland_Main-1384 | Kirkland_Manholes-746 | 326.06 | Kirkland_Manholes-747 | 319.23 | 281 | 2.43 | 8 | Concrete | 0.013 | 846 | 2 | 12 | 14 | 1.7 | SM14-Ex-EX72 | |
| Kirkland_Main-1385 | Kirkland_Manholes-747 | 319.23 | Kirkland_Manholes-748 | 311.92 | 331.6 | 2.2 | 8 | Concrete | 0.013 | 805 | 3 | 16 | 19 | 2.4 | SM14-Ex-EX72 | |
| Kirkland_Main-1386 | Kirkland_Manholes-1562 | 206.57 | Kirkland_Manholes-1563 | 203.28 | 21.7 | 15.13 | 8 | PVC | 0.01 | 2,743 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-1387 | Kirkland_Manholes-1560 | 251.28 | Kirkland_Manholes-455 | 250.45 | 217.9 | 0.38 | 8 | Concrete | 0.013 | 335 | 23 | 68 | 91 | 27 | SM14-Ex-EX68 | |
| Kirkland_Main-1388 | Kirkland_Manholes-1559 | 253.89 | Kirkland_Manholes-1560 | 251.28 | 258.2 | 1.01 | 8 | Concrete | 0.013 | 545 | 22 | 64 | 86 | 15.7 | SM14-Ex-EX68 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1389 | Kirkland_Manholes-317 | 146.79 | Kirkland_Manholes-318 | 146.51 | 72.2 | 0.39 | 8 | PVC | 0.01 | 440 | 89 | 320 | 409 | 93 | SM14-Ex-EX30 | |
| Kirkland_Main-1390 | Kirkland_Manholes-1052 | 151.4 | Kirkland_Manholes-316 | 147.8 | 353.6 | 1.02 | 8 | PVC | 0.01 | 711 | 89 | 303 | 392 | 55.1 | | |
| Kirkland_Main-1392 | Kirkland_Manholes-264 | 215.3 | Kirkland_Manholes-1099 | 211.44 | 157 | 2.46 | 8 | PVC | 0.01 | 1,105 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1398 | Kirkland_Manholes-836 | 335.7 | Kirkland_Manholes-835 | 335.4 | 62.1 | 0.48 | 8 | PVC | 0.01 | 490 | 11 | 28 | 39 | 7.9 | | |
| Kirkland_Main-1399 | Kirkland_Manholes-835 | 335.4 | Kirkland_Manholes-839 | 334.68 | 84.6 | 0.85 | 8 | PVC | 0.01 | 650 | 13 | 36 | 48 | 7.4 | | |
| Kirkland_Main-1400 | Kirkland_Manholes-837 | 336.53 | Kirkland_Manholes-836 | 335.7 | 248.7 | 0.33 | 8 | PVC | 0.01 | 407 | 10 | 24 | 34 | 8.3 | | |
| Kirkland_Main-1401 | Kirkland_Manholes-838 | 337.31 | Kirkland_Manholes-837 | 336.53 | 120.5 | 0.65 | 8 | PVC | 0.01 | 567 | 7 | 20 | 27 | 4.8 | | |
| Kirkland_Main-1402 | Kirkland_Manholes-840 | 326.85 | Kirkland_Manholes-841 | 325.94 | 71 | 1.28 | 8 | PVC | 0.01 | 798 | 19 | 56 | 74 | 9.3 | | |
| Kirkland_Main-1403 | Kirkland_Manholes-841 | 325.94 | Kirkland_Manholes-842 | 324.88 | 230.1 | 0.46 | 8 | PVC | 0.01 | 479 | 20 | 60 | 80 | 16.6 | | |
| Kirkland_Main-1404 | Kirkland_Manholes-843 | 340.26 | Kirkland_Manholes-842 | 324.88 | 172 | 8.94 | 8 | PVC | 0.01 | 2,108 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1405 | Kirkland_Manholes-844 | 342.5 | Kirkland_Manholes-845 | 341.21 | 161.2 | 0.8 | 8 | PVC | 0.01 | 631 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1406 | Kirkland_Manholes-846 | 342.07 | Kirkland_Manholes-845 | 341.21 | 84.3 | 1.02 | 8 | PVC | 0.01 | 712 | 3 | 16 | 19 | 2.7 | | |
| Kirkland_Main-1407 | Kirkland_Manholes-845 | 341.21 | Kirkland_Manholes-850 | 340.39 | 138.4 | 0.59 | 8 | PVC | 0.01 | 543 | 5 | 24 | 29 | 5.4 | | |
| Kirkland_Main-1408 | Kirkland_Manholes-849 | 342.42 | Kirkland_Manholes-846 | 342.07 | 117.3 | 0.3 | 8 | PVC | 0.01 | 385 | 2 | 12 | 14 | 3.7 | | |
| Kirkland_Main-1409 | Kirkland_Manholes-847 | 343.01 | Kirkland_Manholes-849 | 342.42 | 70.3 | 0.84 | 8 | PVC | 0.01 | 646 | 2 | 8 | 10 | 1.6 | | |
| Kirkland_Main-1410 | Kirkland_Manholes-848 | 344.32 | Kirkland_Manholes-847 | 343.01 | 145.5 | 0.9 | 8 | PVC | 0.01 | 669 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1411 | Kirkland_Manholes-850 | 340.39 | Kirkland_Manholes-851 | 339.16 | 69.3 | 1.78 | 8 | PVC | 0.01 | 941 | 6 | 28 | 34 | 3.6 | | |
| Kirkland_Main-1412 | Kirkland_Manholes-1538 | 302.73 | Kirkland_Manholes-1537 | 302.03 | 362.6 | 0.19 | 8 | Concrete | 0.013 | 238 | 6 | 16 | 22 | 9.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1413 | Kirkland_Manholes-1511 | 290.62 | Kirkland_Manholes-1509 | 286.35 | 84.7 | 5.04 | 8 | PVC | 0.01 | 1,583 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1414 | Kirkland_Manholes-1510 | 287.19 | Kirkland_Manholes-1509 | 286.35 | 79 | 1.06 | 8 | PVC | 0.01 | 727 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1415 | Kirkland_Manholes-1509 | 286.35 | Kirkland_Manholes-1508 | 277.83 | 283.5 | 3.01 | 8 | PVC | 0.01 | 1,222 | 3 | 12 | 15 | 1.2 | | Drop Connection |
| Kirkland_Main-1416 | Kirkland_Manholes-1537 | 302.03 | Kirkland_Manholes-1536 | 298.86 | 351.3 | 0.9 | 8 | Concrete | 0.013 | 515 | 9 | 20 | 29 | 5.6 | SM14-Ex-EX124 | |
| Kirkland_Main-1417 | Kirkland_Manholes-762 | 287.2 | Kirkland_Manholes-763 | 274.33 | 165.6 | 7.77 | 8 | Concrete | 0.013 | 1,512 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX125 | |
| Kirkland_Main-1418 | Kirkland_Manholes-763 | 274.33 | Kirkland_Manholes-1531 | 265.03 | 234.1 | 3.97 | 8 | Concrete | 0.013 | 1,081 | 4 | 8 | 12 | 1.1 | SM14-Ex-EX125 | |
| Kirkland_Main-1419 | Kirkland_Manholes-1541 | 294.69 | Kirkland_Manholes-1543 | 289 | 216.2 | 2.63 | 8 | Concrete | 0.013 | 880 | 6 | 16 | 22 | 2.4 | SM14-Ex-EX123 | |
| Kirkland_Main-1420 | Kirkland_Manholes-1536 | 298.86 | Kirkland_Manholes-1518 | 277.88 | 393.1 | 5.34 | 8 | Concrete | 0.013 | 1,253 | 10 | 24 | 34 | 2.7 | SM14-Ex-EX124 | |
| Kirkland_Main-1421 | Kirkland_Manholes-1544 | 284.46 | Kirkland_Manholes-1545 | 272.4 | 63.3 | 19.06 | 8 | Concrete | 0.013 | 2,367 | 9 | 24 | 32 | 1.4 | SM14-Ex-EX123 | |
| Kirkland_Main-1422 | Kirkland_Manholes-1558 | 160.79 | O-20 | 159.86 | 16.6 | 5.62 | 8 | PVC | 0.01 | 1,671 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1424 | Kirkland_Manholes-1557 | 161.32 | O-21 | 159.86 | 64.6 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-1425 | Kirkland_Manholes-1556 | 178.05 | Kirkland_Manholes-1557 | 161.32 | 76.6 | 21.85 | 8 | PVC | 0.01 | 3,296 | 1 | 4 | 5 | 0.1 | | |
| Kirkland_Main-1427 | Kirkland_Manholes-541 | 450.25 | Kirkland_Manholes-542 | 440.69 | 230.2 | 4.15 | 8 | PVC | 0.01 | 1,437 | 8 | 68 | 76 | 5.3 | | |
| Kirkland_Main-1428 | Kirkland_Manholes-542 | 440.69 | Kirkland_Manholes-1978 | 440.32 | 89.3 | 0.41 | 8 | PVC | 0.01 | 454 | 9 | 72 | 80 | 17.7 | | |
| Kirkland_Main-1429 | Kirkland_Manholes-544 | 449.4 | Kirkland_Manholes-543 | 448.24 | 235 | 0.49 | 8 | PVC | 0.01 | 495 | 19 | 68 | 86 | 17.5 | | |
| Kirkland_Main-1430 | Kirkland_Manholes-546 | 452.43 | Kirkland_Manholes-545 | 450.22 | 300.2 | 0.74 | 8 | PVC | 0.01 | 605 | 15 | 60 | 75 | 12.4 | | |
| Kirkland_Main-1431 | Kirkland_Manholes-545 | 450.22 | Kirkland_Manholes-544 | 449.4 | 161.7 | 0.51 | 8 | PVC | 0.01 | 502 | 18 | 64 | 81 | 16.2 | | |
| Kirkland_Main-1432 | Kirkland_Manholes-547 | 452.62 | Kirkland_Manholes-546 | 452.43 | 162.6 | 0.12 | 8 | PVC | 0.01 | 243 | 13 | 56 | 69 | 28.4 | | |
| Kirkland_Main-1433 | Kirkland_Manholes-548 | 453.36 | Kirkland_Manholes-547 | 452.62 | 135.2 | 0.55 | 8 | PVC | 0.01 | 522 | 12 | 52 | 64 | 12.3 | | |
| Kirkland_Main-1434 | Kirkland_Manholes-549 | 453.9 | Kirkland_Manholes-548 | 453.36 | 128.1 | 0.42 | 8 | PVC | 0.01 | 456 | 11 | 40 | 50 | 11 | | |
| Kirkland_Main-1435 | Kirkland_Manholes-552 | 455.6 | Kirkland_Manholes-549 | 453.9 | 177.5 | 0.96 | 8 | PVC | 0.01 | 690 | 11 | 36 | 46 | 6.7 | | |
| Kirkland_Main-1436 | Kirkland_Manholes-550 | 455.89 | Kirkland_Manholes-552 | 455.6 | 183.6 | 0.16 | 8 | PVC | 0.01 | 280 | 1 | 4 | 5 | 1.7 | | |
| Kirkland_Main-1437 | Kirkland_Manholes-551 | 462.06 | Kirkland_Manholes-563 | 461.52 | 194.4 | 0.28 | 8 | PVC | 0.01 | 372 | 4 | 4 | 8 | 2.3 | | |
| Kirkland_Main-1438 | Kirkland_Manholes-553 | 455.61 | Kirkland_Manholes-552 | 455.6 | 92.3 | 0.01 | 8 | PVC | 0.01 | 73 | 10 | 28 | 37 | 50.9 | | |
| Kirkland_Main-1439 | Kirkland_Manholes-554 | 456.45 | Kirkland_Manholes-553 | 455.61 | 88.9 | 0.94 | 8 | PVC | 0.01 | 685 | 9 | 24 | 33 | 4.8 | | |
| Kirkland_Main-1440 | Kirkland_Manholes-558 | 457.55 | Kirkland_Manholes-554 | 456.45 | 287.7 | 0.38 | 8 | PVC | 0.01 | 436 | 7 | 16 | 23 | 5.2 | | |
| Kirkland_Main-1441 | Kirkland_Manholes-557 | 460.23 | Kirkland_Manholes-554 | 456.45 | 194.6 | 1.94 | 8 | PVC | 0.01 | 983 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1442 | Kirkland_Manholes-559 | 467.58 | Kirkland_Manholes-558 | 457.55 | 209.6 | 4.79 | 8 | PVC | 0.01 | 1,542 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1443 | Kirkland_Manholes-563 | 461.52 | Kirkland_Manholes-558 | 457.55 | 324.2 | 1.22 | 8 | PVC | 0.01 | 780 | 4 | 8 | 12 | 1.6 | | |
| Kirkland_Main-1444 | Kirkland_Manholes-562 | 483.8 | Kirkland_Manholes-560 | 483.4 | 99.9 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-1445 | Kirkland_Manholes-565 | 468.54 | Kirkland_Manholes-2020 | 468.34 | 312.4 | 0.06 | 10 | PVC | 0.01 | 326 | 74 | 143 | 217 | 66.5 | SM14-2035-DF12 | |
| Kirkland_Main-1446 | Kirkland_Manholes-564 | 469.28 | Kirkland_Manholes-565 | 468.54 | 228 | 0.32 | 10 | PVC | 0.01 | 728 | 73 | 139 | 213 | 29.2 | | |
| Kirkland_Main-1447 | Kirkland_Manholes-567 | 470.28 | Kirkland_Manholes-564 | 469.28 | 324.2 | 0.31 | 10 | PVC | 0.01 | 710 | 61 | 95 | 156 | 22 | | |
| Kirkland_Main-1448 | Kirkland_Manholes-3045 | 483.35 | Kirkland_Manholes-2029 | 479.06 | 297.6 | 1.44 | 8 | PVC | 0.01 | 846 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-1449 | Kirkland_Manholes-568 | 471.29 | Kirkland_Manholes-567 | 470.28 | 325 | 0.31 | 10 | PVC | 0.01 | 713 | 60 | 87 | 148 | 20.7 | | |
| Kirkland_Main-1450 | Kirkland_Manholes-569 | 473.29 | Kirkland_Manholes-568 | 471.29 | 178.4 | 1.12 | 10 | PVC | 0.01 | 1,354 | 60 | 83 | 143 | 10.6 | | |
| Kirkland_Main-1451 | Kirkland_Manholes-570 | 473.5 | Kirkland_Manholes-569 | 473.29 | 54.9 | 0.38 | 8 | PVC | 0.01 | 433 | 60 | 79 | 139 | 32.2 | | |
| Kirkland_Main-1452 | Kirkland_Manholes-1406 | 473.57 | Kirkland_Manholes-570 | 473.5 | 288.8 | 0.03 | 8 | PVC | 0.01 | 112 | 55 | 75 | 130 | 116.2 | SM14-Ex-EX275 | |
| Kirkland_Main-1453 | Kirkland_Manholes-571 | 472.91 | Kirkland_Manholes-567 | 470.28 | 172.6 | 1.52 | 8 | PVC | 0.01 | 870 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1454 | Kirkland_Manholes-575 | 113.73 | Kirkland_Manholes-574 | 110.98 | 152.2 | 1.81 | 6 | Concrete | 0.013 | 338 | 2 | 8 | 10 | 2.9 | SM14-Ex-EX116 | |
| Kirkland_Main-1455 | Kirkland_Manholes-1665 | 94.21 | Kirkland_Manholes-1666 | 89.71 | 26.9 | 16.73 | 8 | PVC | 0.01 | 2,883 | 28 | 91 | 119 | 4.1 | | |
| Kirkland_Main-1456 | Kirkland_Manholes-957 | 315.92 | Kirkland_Manholes-958 | 300.6 | 184.6 | 8.3 | 8 | PVC | 0.01 | 2,031 | 3 | 20 | 23 | 1.1 | | |
| Kirkland_Main-1457 | Kirkland_Manholes-958 | 300.6 | Kirkland_Manholes-942 | 300.01 | 173 | 0.34 | 8 | PVC | 0.01 | 412 | 4 | 24 | 28 | 6.8 | | |
| Kirkland_Main-1458 | Kirkland_Manholes-960 | 258.67 | Kirkland_Manholes-959 | 252.05 | 190.9 | 3.47 | 8 | PVC | 0.01 | 1,313 | 2 | 4 | 6 | 0.5 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1459 | Kirkland_Manholes-2752 | 253.8 | Kirkland_Manholes-959 | 252.05 | 339.9 | 0.51 | 8 | PVC | 0.01 | 506 | 9 | 34 | 44 | 8.6 | | |
| Kirkland_Main-1460 | Kirkland_Manholes-959 | 252.05 | Kirkland_Manholes-963 | 250.7 | 229 | 0.59 | 8 | PVC | 0.01 | 541 | 14 | 43 | 56 | 10.4 | | |
| Kirkland_Main-1461 | Kirkland_Manholes-961 | 263.75 | Kirkland_Manholes-962 | 249.53 | 185.7 | 7.66 | 8 | PVC | 0.01 | 1,951 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1462 | Kirkland_Manholes-964 | 266.7 | Kirkland_Manholes-963 | 250.7 | 315.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1463 | Kirkland_Manholes-963 | 250.7 | Kirkland_Manholes-962 | 249.53 | 229.2 | 0.51 | 8 | PVC | 0.01 | 504 | 17 | 51 | 68 | 13.5 | | |
| Kirkland_Main-1464 | Kirkland_Manholes-962 | 249.53 | Kirkland_Manholes-966 | 247.26 | 381 | 0.59 | 8 | PVC | 0.01 | 544 | 20 | 60 | 79 | 14.6 | | |
| Kirkland_Main-1465 | Kirkland_Manholes-965 | 252.45 | Kirkland_Manholes-966 | 247.26 | 188.4 | 2.75 | 8 | PVC | 0.01 | 1,170 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1466 | Kirkland_Manholes-966 | 247.26 | Kirkland_Manholes-967 | 246.35 | 132.7 | 0.69 | 8 | PVC | 0.01 | 584 | 24 | 68 | 92 | 15.7 | | |
| Kirkland_Main-1467 | Kirkland_Manholes-968 | 245.61 | Kirkland_Manholes-969 | 239.3 | 150 | 4.21 | 8 | PVC | 0.01 | 1,446 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1468 | Kirkland_Manholes-969 | 239.3 | Kirkland_Manholes-970 | 236.6 | 291.2 | 0.93 | 8 | PVC | 0.01 | 679 | 1 | 9 | 9 | 1.4 | | |
| Kirkland_Main-1469 | Kirkland_Manholes-970 | 236.6 | Kirkland_Manholes-971 | 236.2 | 92.8 | 0.43 | 8 | PVC | 0.01 | 463 | 2 | 13 | 15 | 3.2 | | |
| Kirkland_Main-1470 | Kirkland_Manholes-967 | 246.35 | Kirkland_Manholes-972 | 246.27 | 41.8 | 0.2 | 8 | PVC | 0.01 | 314 | 24 | 73 | 96 | 30.6 | | |
| Kirkland_Main-1471 | Kirkland_Manholes-971 | 236.2 | Kirkland_Manholes-973 | 233.19 | 134.5 | 2.24 | 8 | Concrete | 0.013 | 811 | 3 | 17 | 20 | 2.4 | SM14-Ex-EX2 | |
| Kirkland_Main-1472 | Kirkland_Manholes-974 | 234.1 | Kirkland_Manholes-973 | 233.19 | 211 | 0.43 | 8 | PVC | 0.01 | 463 | 2 | 9 | 10 | 2.2 | | |
| Kirkland_Main-1473 | Kirkland_Manholes-987 | 239.5 | Kirkland_Manholes-976 | 229.3 | 219.2 | 4.65 | 8 | PVC | 0.01 | 1,521 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1474 | Kirkland_Manholes-975 | 230.2 | Kirkland_Manholes-976 | 229.3 | 22.7 | 3.96 | 8 | PVC | 0.01 | 1,404 | 5 | 34 | 39 | 2.8 | | |
| Kirkland_Main-1475 | Kirkland_Manholes-973 | 233.19 | Kirkland_Manholes-975 | 230.2 | 123.5 | 2.42 | 8 | PVC | 0.01 | 1,097 | 5 | 30 | 35 | 3.2 | | |
| Kirkland_Main-1476 | Kirkland_Manholes-976 | 229.3 | Kirkland_Manholes-977 | 225.95 | 181.2 | 1.85 | 8 | PVC | 0.01 | 959 | 7 | 43 | 49 | 5.1 | | |
| Kirkland_Main-1478 | Kirkland_Manholes-1564 | 164.37 | O-15 | 160 | 18.2 | 24.07 | 8 | PVC | 0.01 | 3,459 | 2 | 16 | 18 | 0.5 | | |
| Kirkland_Main-1479 | Kirkland_Manholes-755 | 223.34 | Kirkland_Manholes-1565 | 218.86 | 20.1 | 22.24 | 8 | PVC | 0.01 | 3,325 | 4 | 20 | 24 | 0.7 | | |
| Kirkland_Main-1480 | Kirkland_Manholes-1567 | 133.87 | Kirkland_Manholes-1566 | 130.52 | 314.6 | 1.06 | 8 | Concrete | 0.013 | 560 | 3 | 8 | 12 | 2.1 | SM14-Ex-EX119 | |
| Kirkland_Main-1481 | Kirkland_Manholes-1566 | 130.52 | Kirkland_Manholes-1604 | 117.22 | 313.5 | 4.24 | 8 | Concrete | 0.013 | 1,117 | 4 | 16 | 20 | 1.8 | SM14-Ex-EX119 | |
| Kirkland_Main-1482 | Kirkland_Manholes-776 | 207.48 | Kirkland_Manholes-775 | 172.73 | 191.1 | 18.19 | 8 | PVC | 0.01 | 3,007 | 5 | 28 | 33 | 1.1 | | |
| Kirkland_Main-1483 | Kirkland_Manholes-1565 | 218.86 | Kirkland_Manholes-776 | 207.48 | 52.1 | 21.84 | 8 | PVC | 0.01 | 3,295 | 4 | 24 | 28 | 0.8 | | |
| Kirkland_Main-1484 | Kirkland_Manholes-1263 | 156.98 | Kirkland_Manholes-1262 | 156.59 | 13.2 | 2.96 | 6 | Concrete | 0.013 | 433 | 0 | 8 | 8 | 1.9 | SM14-Ex-EX111 | |
| Kirkland_Main-1485 | Kirkland_Manholes-1262 | 156.59 | Kirkland_Manholes-1261 | 144.57 | 314.4 | 3.82 | 6 | Concrete | 0.013 | 492 | 4 | 41 | 46 | 9.3 | SM14-Ex-EX111 | |
| Kirkland_Main-1486 | Kirkland_Manholes-1260 | 164.33 | Kirkland_Manholes-1261 | 144.57 | 293.7 | 6.73 | 6 | Concrete | 0.013 | 653 | 2 | 8 | 10 | 1.5 | SM14-Ex-EX110 | |
| Kirkland_Main-1488 | Kirkland_Manholes-1259 | 154.8 | Kirkland_Manholes-1258 | 154.28 | 130.3 | 0.4 | 8 | Concrete | 0.013 | 343 | 6 | 33 | 39 | 11.5 | SM14-Ex-EX108 | |
| Kirkland_Main-1489 | Kirkland_Manholes-1258 | 154.28 | Kirkland_Manholes-1257 | 152.6 | 347 | 0.48 | 8 | Concrete | 0.013 | 377 | 13 | 66 | 79 | 20.9 | SM14-Ex-EX108 | |
| Kirkland_Main-1490 | Kirkland_Manholes-1257 | 152.6 | Kirkland_Manholes-1256 | 151.53 | 24 | 4.46 | 8 | Concrete | 0.013 | 1,146 | 14 | 74 | 88 | 7.7 | SM14-Ex-EX108 | |
| Kirkland_Main-1494 | Kirkland_Manholes-2467 | 42.59 | Kirkland_Manholes-2466 | 40.06 | 76.4 | 3.31 | 8 | PVC | 0.01 | 1,283 | 9 | 19 | 29 | 2.2 | | |
| Kirkland_Main-1495 | Kirkland_Manholes-2469 | 49.1 | Kirkland_Manholes-2467 | 42.59 | 138.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 8 | 13 | 21 | 1.3 | | |
| Kirkland_Main-1496 | Kirkland_Manholes-2468 | 49.98 | Kirkland_Manholes-2469 | 49.48 | 124.2 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 6 | 13 | 3 | | Drop Connection |
| Kirkland_Main-1498 | Kirkland_Manholes-2470 | 236.6 | Kirkland_Manholes-2472 | 223.64 | 225 | 5.76 | 8 | Concrete | 0.013 | 1,302 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX282 | |
| Kirkland_Main-1499 | Kirkland_Manholes-2472 | 223.64 | Kirkland_Manholes-2473 | 222.78 | 215.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 3 | 12 | 15 | 4.4 | SM14-Ex-EX282 | Drop Connection |
| Kirkland_Main-1500 | Kirkland_Manholes-2473 | 207.49 | Kirkland_Manholes-2474 | 188.45 | 212.3 | 8.97 | 8 | Concrete | 0.013 | 1,624 | 5 | 16 | 21 | 1.3 | SM14-Ex-EX282 | |
| Kirkland_Main-1501 | Kirkland_Manholes-2471 | 234.47 | Kirkland_Manholes-2472 | 223.64 | 364.1 | 2.97 | 8 | Concrete | 0.013 | 935 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX283 | |
| Kirkland_Main-1502 | Kirkland_Manholes-2474 | 188.45 | Kirkland_Manholes-2476 | 187.5 | 225.3 | 0.42 | 8 | Concrete | 0.013 | 352 | 7 | 24 | 31 | 8.7 | SM14-Ex-EX282 | |
| Kirkland_Main-1505 | Kirkland_Manholes-2492 | 55.46 | Kirkland_Manholes-2666 | 55.28 | 147.8 | 0.12 | 12 | Concrete | 0.013 | 558 | 109 | 316 | 425 | 76.1 | SM14-Ex-EX222 | |
| Kirkland_Main-1506 | Kirkland_Manholes-2088 | 57.39 | Kirkland_Manholes-2492 | 55.46 | 144 | 1.34 | 12 | Concrete | 0.013 | 1,851 | 83 | 267 | 351 | 18.9 | SM14-Ex-EX222 | |
| Kirkland_Main-1507 | Kirkland_Manholes-2090 | 57.44 | Kirkland_Manholes-2088 | 57.39 | 370.9 | 0.01 | 12 | Concrete | 0.013 | 186 | 83 | 255 | 338 | 182.3 | SM14-Ex-EX222 | |
| Kirkland_Main-1508 | Kirkland_Manholes-2089 | 58.23 | Kirkland_Manholes-2088 | 57.39 | 14.1 | 5.97 | 8 | PVC | 0.01 | 1,723 | 0 | 6 | 6 | 0.4 | | |
| Kirkland_Main-1509 | Kirkland_Manholes-2620 | 281.06 | Kirkland_Manholes-2618 | 278.4 | 382.5 | 0.7 | 8 | Concrete | 0.013 | 452 | 2 | 8 | 10 | 2.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1510 | Kirkland_Manholes-2604 | 283.17 | Kirkland_Manholes-2620 | 281.06 | 375.6 | 0.56 | 8 | Concrete | 0.013 | 406 | 1 | 4 | 5 | 1.1 | SM14-Ex-EX299 | |
| Kirkland_Main-1512 | Kirkland_Manholes-2621 | 277.53 | Kirkland_Manholes-2433 | 276.88 | 161.5 | 0.4 | 8 | Concrete | 0.013 | 343 | 1 | 4 | 5 | 1.5 | SM14-Ex-EX244 | Drop Connection |
| Kirkland_Main-1513 | Kirkland_Manholes-2623 | 277.98 | Kirkland_Manholes-2622 | 271.8 | 433.3 | 1.43 | 8 | Concrete | 0.013 | 648 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1514 | Kirkland_Manholes-2622 | 271.8 | Kirkland_Manholes-2625 | 260.54 | 221.9 | 5.07 | 8 | Concrete | 0.013 | 1,222 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX281 | |
| Kirkland_Main-1515 | Kirkland_Manholes-2624 | 276.22 | Kirkland_Manholes-2635 | 275.48 | 185.1 | 0.4 | 8 | Concrete | 0.013 | 343 | 1 | 4 | 5 | 1.3 | SM14-Ex-EX294 | |
| Kirkland_Main-1516 | Kirkland_Manholes-2625 | 260.54 | Kirkland_Manholes-2626 | 246.92 | 188.3 | 7.23 | 8 | Concrete | 0.013 | 1,458 | 2 | 12 | 14 | 0.9 | SM14-Ex-EX281 | |
| Kirkland_Main-1517 | Kirkland_Manholes-2626 | 246.92 | Kirkland_Manholes-2627 | 215.5 | 237.8 | 13.21 | 8 | Concrete | 0.013 | 1,971 | 2 | 16 | 18 | 0.9 | SM14-Ex-EX281 | |
| Kirkland_Main-1518 | Kirkland_Manholes-2627 | 215.5 | Kirkland_Manholes-2628 | 186 | 220.8 | 13.36 | 8 | Concrete | 0.013 | 1,983 | 4 | 20 | 24 | 1.2 | SM14-Ex-EX281 | |
| Kirkland_Main-1519 | Kirkland_Manholes-2476 | 187.5 | Kirkland_Manholes-2628 | 186 | 397.3 | 0.38 | 8 | Concrete | 0.013 | 333 | 9 | 28 | 37 | 11.1 | SM14-Ex-EX282 | |
| Kirkland_Main-1520 | Kirkland_Manholes-2606 | 272.98 | Kirkland_Manholes-2607 | 264.34 | 256.6 | 3.37 | 8 | Concrete | 0.013 | 995 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX298 | |
| Kirkland_Main-1521 | Kirkland_Manholes-2607 | 264.34 | Kirkland_Manholes-2608 | 229.39 | 401.2 | 8.71 | 8 | Concrete | 0.013 | 1,601 | 5 | 8 | 13 | 0.8 | SM14-Ex-EX298 | Drop Connection |
| Kirkland_Main-1522 | Kirkland_Manholes-2608 | 227.04 | Kirkland_Manholes-2600 | 217.97 | 170.3 | 5.33 | 8 | Concrete | 0.013 | 1,252 | 6 | 12 | 18 | 1.4 | SM14-Ex-EX298 | |
| Kirkland_Main-1523 | Kirkland_Manholes-2630 | 232.51 | Kirkland_Manholes-2629 | 172.55 | 421 | 14.24 | 8 | Concrete | 0.013 | 2,047 | 9 | 20 | 29 | 1.4 | SM14-Ex-EX295 | |
| Kirkland_Main-1524 | Kirkland_Manholes-1219 | 264.33 | Kirkland_Manholes-1139 | 247.37 | 248 | 6.84 | 6 | Concrete | 0.013 | 659 | 1 | 8 | 9 | 1.4 | SM14-Ex-EX80 | |
| Kirkland_Main-1525 | Kirkland_Manholes-1139 | 247.37 | Kirkland_Manholes-1138 | 221.13 | 248.6 | 10.56 | 6 | Concrete | 0.013 | 818 | 2 | 16 | 19 | 2.3 | SM14-Ex-EX80 | |
| Kirkland_Main-1526 | Kirkland_Manholes-1138 | 221.13 | Kirkland_Manholes-1141 | 204.1 | 177.9 | 9.57 | 6 | Concrete | 0.013 | 779 | 3 | 25 | 28 | 3.6 | SM14-Ex-EX80 | |
| Kirkland_Main-1527 | Kirkland_Manholes-1152 | 135.47 | Kirkland_Manholes-1811 | 129.72 | 351.2 | 1.64 | 6 | Concrete | 0.013 | 322 | 10 | 74 | 84 | 26.1 | SM10 | |
| Kirkland_Main-1528 | Kirkland_Manholes-1153 | 137.55 | Kirkland_Manholes-1154 | 131.73 | 270.2 | 2.15 | 6 | Concrete | 0.013 | 370 | 2 | 8 | 10 | 2.7 | SM10 | |
| Kirkland_Main-1529 | Kirkland_Manholes-1154 | 131.73 | Kirkland_Manholes-1155 | 122.09 | 288.9 | 3.34 | 6 | Concrete | 0.013 | 460 | 2 | 16 | 19 | 4.1 | SM10 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1530 | Kirkland_Manholes-1155 | 122.09 | Kirkland_Manholes-1156 | 108.19 | 328.7 | 4.23 | 6 | Concrete | 0.013 | 518 | 3 | 25 | 28 | 5.4 | SM10 | |
| Kirkland_Main-1531 | Kirkland_Manholes-1156 | 108.19 | Kirkland_Manholes-1157 | 99.29 | 118.4 | 7.51 | 6 | Concrete | 0.013 | 690 | 4 | 33 | 37 | 5.4 | SM10 | |
| Kirkland_Main-1532 | Kirkland_Manholes-1157 | 99.29 | Kirkland_Manholes-1159 | 82.66 | 203.9 | 8.16 | 6 | Concrete | 0.013 | 719 | 9 | 66 | 74 | 10.4 | SM10 | |
| Kirkland_Main-1533 | Kirkland_Manholes-1159 | 82.66 | Kirkland_Manholes-1160 | 77.11 | 29.4 | 18.89 | 8 | PVC | 0.01 | 3,064 | 10 | 74 | 84 | 2.7 | | |
| Kirkland_Main-1534 | Kirkland_Manholes-1158 | 124.93 | Kirkland_Manholes-1157 | 99.29 | 160.8 | 15.95 | 6 | Concrete | 0.013 | 1,006 | 4 | 25 | 28 | 2.8 | SM10 | |
| Kirkland_Main-1535 | Kirkland_Manholes-1162 | 78.51 | Kirkland_Manholes-1160 | 77.11 | 390.4 | 0.36 | 15 | PVC | 0.01 | 2,257 | 67 | 420 | 770 | 34.1 | | |
| Kirkland_Main-1536 | Kirkland_Manholes-1179 | 123.76 | Kirkland_Manholes-1163 | 96.51 | 315 | 8.65 | 8 | Concrete | 0.013 | 1,595 | 38 | 165 | 203 | 12.7 | SM10 | |
| Kirkland_Main-1537 | Kirkland_Manholes-1163 | 96.51 | Kirkland_Manholes-1161 | 78.67 | 122.8 | 14.53 | 8 | Concrete | 0.013 | 2,067 | 45 | 222 | 267 | 12.9 | SM14-Ex-EX77 | |
| Kirkland_Main-1538 | Kirkland_Manholes-1164 | 119.66 | Kirkland_Manholes-1163 | 96.51 | 338.6 | 6.84 | 6 | Concrete | 0.013 | 658 | 6 | 49 | 56 | 8.4 | SM10 | |
| Kirkland_Main-1539 | Kirkland_Manholes-1165 | 133.24 | Kirkland_Manholes-1164 | 119.66 | 224 | 6.06 | 6 | Concrete | 0.013 | 620 | 5 | 41 | 47 | 7.5 | SM10 | |
| Kirkland_Main-1540 | Kirkland_Manholes-1166 | 151.97 | Kirkland_Manholes-1165 | 133.24 | 158.7 | 11.8 | 6 | Concrete | 0.013 | 865 | 1 | 8 | 9 | 1.1 | SM10 | |
| Kirkland_Main-1541 | Kirkland_Manholes-1167 | 140.51 | Kirkland_Manholes-1165 | 133.24 | 127.8 | 5.69 | 6 | Concrete | 0.013 | 601 | 4 | 25 | 29 | 4.8 | SM10 | |
| Kirkland_Main-1542 | Kirkland_Manholes-1168 | 149.52 | Kirkland_Manholes-1167 | 140.51 | 328.4 | 2.74 | 6 | Concrete | 0.013 | 417 | 3 | 16 | 20 | 4.7 | SM10 | |
| Kirkland_Main-1543 | Kirkland_Manholes-1169 | 156.83 | Kirkland_Manholes-1168 | 149.52 | 316.3 | 2.31 | 6 | Concrete | 0.013 | 383 | 1 | 8 | 10 | 2.5 | SM10 | |
| Kirkland_Main-1544 | Kirkland_Manholes-662 | 248.07 | Kirkland_Manholes-651 | 247.63 | 225.4 | 0.2 | 15 | PVC | 0.01 | 1,665 | 231 | 1,013 | 1,244 | 74.7 | SM14-2035-DF9 | |
| Kirkland_Main-1545 | Kirkland_Manholes-653 | 238.2 | Kirkland_Manholes-639 | 237.89 | 305.4 | 0.1 | 21 | PVC | 0.01 | 2,946 | 207 | 477 | 683 | 23.2 | | |
| Kirkland_Main-1546 | Kirkland_Manholes-654 | 239.59 | Kirkland_Manholes-653 | 238.2 | 298.1 | 0.47 | 21 | PVC | 0.01 | 6,313 | 206 | 473 | 679 | 10.8 | | |
| Kirkland_Main-1547 | Kirkland_Manholes-655 | 240 | Kirkland_Manholes-654 | 239.59 | 255.9 | 0.16 | 21 | PVC | 0.01 | 3,700 | 205 | 469 | 674 | 18.2 | | Drop Connection |
| Kirkland_Main-1548 | Kirkland_Manholes-1574 | 241.8 | Kirkland_Manholes-657 | 241.69 | 265.5 | 0.04 | 21 | PVC | 0.01 | 1,882 | 204 | 457 | 661 | 35.1 | | |
| Kirkland_Main-1549 | Kirkland_Manholes-657 | 241.69 | Kirkland_Manholes-656 | 240.1 | 132.5 | 1.2 | 21 | PVC | 0.01 | 10,129 | 204 | 461 | 665 | 6.6 | | |
| Kirkland_Main-1550 | Kirkland_Manholes-656 | 240.1 | Kirkland_Manholes-655 | 240 | 131.8 | 0.08 | 21 | PVC | 0.01 | 2,546 | 204 | 465 | 669 | 26.3 | | Drop Connection |
| Kirkland_Main-1551 | Kirkland_Manholes-658 | 246.8 | Kirkland_Manholes-659 | 246.11 | 66.6 | 1.04 | 8 | PVC | 0.01 | 718 | 1 | 12 | 12 | 1.7 | | |
| Kirkland_Main-1552 | Kirkland_Manholes-660 | 246.84 | Kirkland_Manholes-659 | 246.11 | 57.6 | 1.27 | 8 | PVC | 0.01 | 793 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1553 | Kirkland_Manholes-659 | 246.11 | Kirkland_Manholes-661 | 245.17 | 89.4 | 1.05 | 8 | PVC | 0.01 | 723 | 3 | 20 | 23 | 3.1 | | |
| Kirkland_Main-1554 | Kirkland_Manholes-651 | 247.63 | Kirkland_Manholes-645 | 243.42 | 262.6 | 1.6 | 15 | PVC | 0.01 | 4,772 | 232 | 1,017 | 1,249 | 26.2 | SM14-2035-DF9 | |
| Kirkland_Main-1555 | Kirkland_Manholes-652 | 251.94 | Kirkland_Manholes-662 | 248.07 | 324.4 | 1.19 | 15 | PVC | 0.01 | 4,116 | 231 | 1,009 | 1,240 | 30.1 | SM14-2035-DF9 | |
| Kirkland_Main-1556 | Kirkland_Manholes-664 | 268.55 | Kirkland_Manholes-663 | 252.67 | 383.8 | 4.14 | 8 | PVC | 0.01 | 1,434 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1557 | Kirkland_Manholes-663 | 252.67 | Kirkland_Manholes-652 | 251.94 | 362.7 | 0.2 | 15 | PVC | 0.01 | 1,691 | 230 | 1,005 | 1,236 | 73.1 | SM14-2035-DF9 | |
| Kirkland_Main-1558 | Kirkland_Manholes-666 | 254.95 | Kirkland_Manholes-665 | 253.2 | 321.8 | 0.54 | 15 | PVC | 0.01 | 2,780 | 207 | 898 | 1,105 | 39.8 | | |
| Kirkland_Main-1559 | Kirkland_Manholes-665 | 253.2 | Kirkland_Manholes-663 | 252.67 | 360.1 | 0.15 | 15 | PVC | 0.01 | 1,446 | 228 | 997 | 1,225 | 84.7 | SM14-Ex-EX135 | |
| Kirkland_Main-1560 | Kirkland_Manholes-668 | 260.28 | Kirkland_Manholes-667 | 256.8 | 251.1 | 1.39 | 8 | PVC | 0.01 | 830 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-1561 | Kirkland_Manholes-667 | 256.8 | Kirkland_Manholes-665 | 253.2 | 386.9 | 0.93 | 8 | PVC | 0.01 | 680 | 18 | 95 | 114 | 16.7 | | |
| Kirkland_Main-1562 | Kirkland_Manholes-669 | 262.97 | Kirkland_Manholes-667 | 256.8 | 300.6 | 2.05 | 8 | PVC | 0.01 | 1,010 | 13 | 87 | 101 | 10 | | |
| Kirkland_Main-1563 | Kirkland_Manholes-671 | 267.47 | Kirkland_Manholes-670 | 264.24 | 114.1 | 2.83 | 8 | PVC | 0.01 | 1,186 | 7 | 24 | 31 | 2.6 | | |
| Kirkland_Main-1564 | Kirkland_Manholes-672 | 266.2 | Kirkland_Manholes-670 | 264.24 | 209.3 | 0.94 | 8 | PVC | 0.01 | 682 | 6 | 56 | 61 | 9 | | |
| Kirkland_Main-1565 | Kirkland_Manholes-670 | 264.24 | Kirkland_Manholes-669 | 262.97 | 88.5 | 1.43 | 8 | PVC | 0.01 | 844 | 13 | 83 | 96 | 11.4 | | |
| Kirkland_Main-1567 | Kirkland_Manholes-676 | 280.09 | Kirkland_Manholes-674 | 276.15 | 217.6 | 1.81 | 8 | PVC | 0.01 | 949 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-1568 | Kirkland_Manholes-674 | 276.15 | Kirkland_Manholes-675 | 275.52 | 20.5 | 3.07 | 8 | PVC | 0.01 | 1,235 | 5 | 16 | 21 | 1.7 | | |
| Kirkland_Main-1569 | Kirkland_Manholes-673 | 281.46 | Kirkland_Manholes-674 | 276.15 | 196.8 | 2.7 | 8 | PVC | 0.01 | 1,158 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-1570 | Kirkland_Manholes-675 | 275.52 | Kirkland_Manholes-671 | 267.47 | 256.7 | 3.14 | 8 | PVC | 0.01 | 1,249 | 6 | 20 | 25 | 2 | | |
| Kirkland_Main-1571 | Kirkland_Manholes-677 | 287.02 | Kirkland_Manholes-673 | 281.46 | 185.8 | 2.99 | 8 | PVC | 0.01 | 1,220 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1572 | Kirkland_Manholes-1728 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 120.1 | 0.95 | 12 | PVC | 0.01 | 2,026 | 69 | 58 | 127 | 6.3 | | |
| Kirkland_Main-1573 | Kirkland_Manholes-1727 | 26.48 | Kirkland_Manholes-1728 | 26.2 | 59.2 | 0.47 | 8 | PVC | 0.01 | 485 | 39 | 33 | 72 | 14.8 | | |
| Kirkland_Main-1574 | Kirkland_Manholes-1724 | 26.68 | Kirkland_Manholes-1727 | 26.48 | 122.2 | 0.16 | 8 | PVC | 0.01 | 285 | 39 | 25 | 63 | 22.3 | | |
| Kirkland_Main-1575 | Kirkland_Manholes-1725 | 28.56 | Kirkland_Manholes-1724 | 26.68 | 150.5 | 1.25 | 8 | PVC | 0.01 | 788 | 21 | 16 | 38 | 4.8 | | |
| Kirkland_Main-1576 | Kirkland_Manholes-1726 | 29.93 | Kirkland_Manholes-1725 | 28.56 | 57.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 7 | 8 | 16 | 1.4 | | |
| Kirkland_Main-1577 | Kirkland_Manholes-1650 | 145.43 | Kirkland_Manholes-1711 | 136.47 | 206.1 | 4.35 | 10 | Concrete | 0.013 | 2,050 | 9 | 66 | 75 | 3.6 | SM14-Ex-EX196 | |
| Kirkland_Main-1578 | Kirkland_Manholes-1751 | 37.07 | Kirkland_Manholes-1750 | 33.34 | 26 | 14.35 | 6 | PVC | 0.01 | 1,240 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX164 | |
| Kirkland_Main-1580 | Kirkland_Manholes-2722 | 21 | Kirkland_Manholes-3100 | 18.3 | 194.6 | 1.39 | 12 | Concrete | 0.013 | 1,884 | 88 | 61 | 149 | 7.9 | SM14-Ex-EX289 | |
| Kirkland_Main-1585 | Kirkland_Manholes-1750 | 33.34 | Kirkland_Manholes-1749 | 32.74 | 150.9 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 18 | 4 | | Drop Connection |
| Kirkland_Main-1586 | Kirkland_Manholes-1749 | 30.51 | Kirkland_Manholes-1745 | 27.57 | 191.8 | 1.53 | 8 | PVC | 0.01 | 873 | 1 | 25 | 26 | 3 | | |
| Kirkland_Main-1587 | Kirkland_Manholes-1744 | 27.68 | Kirkland_Manholes-1745 | 27.57 | 23.9 | 0.46 | 8 | PVC | 0.01 | 479 | 0 | 8 | 8 | 1.7 | | |
| Kirkland_Main-1588 | Kirkland_Manholes-1955 | 335.45 | Kirkland_Manholes-1958 | 324.88 | 118.1 | 8.95 | 8 | PVC | 0.01 | 2,109 | 8 | 12 | 20 | 1 | | |
| Kirkland_Main-1589 | Kirkland_Manholes-1958 | 324.88 | Kirkland_Manholes-1939 | 324.34 | 135.7 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 20 | 28 | 6.4 | | |
| Kirkland_Main-1590 | Kirkland_Manholes-1959 | 325.55 | Kirkland_Manholes-1958 | 324.88 | 167.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-1591 | Kirkland_Manholes-1960 | 312.18 | Kirkland_Manholes-1892 | 301.26 | 279 | 3.91 | 8 | PVC | 0.01 | 1,395 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1592 | Kirkland_Manholes-1962 | 345.61 | Kirkland_Manholes-1961 | 341.24 | 157.8 | 2.77 | 8 | PVC | 0.01 | 1,173 | 13 | 4 | 17 | 1.5 | | |
| Kirkland_Main-1593 | Kirkland_Manholes-1961 | 341.24 | Kirkland_Manholes-1964 | 341.08 | 188.7 | 0.08 | 8 | PVC | 0.01 | 205 | 24 | 64 | 88 | 42.8 | | |
| Kirkland_Main-1594 | Kirkland_Manholes-1964 | 341.08 | Kirkland_Manholes-1963 | 340.77 | 13.1 | 2.37 | 8 | PVC | 0.01 | 1,085 | 53 | 91 | 145 | 13.3 | | |
| Kirkland_Main-1595 | Kirkland_Manholes-1965 | 345.05 | Kirkland_Manholes-1964 | 341.08 | 103.3 | 3.84 | 8 | PVC | 0.01 | 1,382 | 29 | 24 | 53 | 3.8 | | |
| Kirkland_Main-1596 | Kirkland_Manholes-1967 | 421.47 | Kirkland_Manholes-1966 | 418.21 | 134.2 | 2.43 | 8 | Concrete | 0.013 | 845 | 28 | 155 | 183 | 21.7 | SM14-Ex-EX216 | |
| Kirkland_Main-1597 | Kirkland_Manholes-1968 | 421.67 | Kirkland_Manholes-1967 | 421.47 | 23.9 | 0.84 | 8 | PVC | 0.01 | 646 | 28 | 151 | 179 | 27.7 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1598 | Kirkland_Manholes-1969 | 423.5 | Kirkland_Manholes-1968 | 421.67 | 353.5 | 0.52 | 8 | PVC | 0.01 | 507 | 26 | 147 | 173 | 34.1 | | |
| Kirkland_Main-1599 | Kirkland_Manholes-1970 | 425.5 | Kirkland_Manholes-1969 | 423.5 | 200.6 | 1 | 8 | PVC | 0.01 | 704 | 3 | 16 | 19 | 2.7 | | |
| Kirkland_Main-1600 | Kirkland_Manholes-1974 | 432 | Kirkland_Manholes-1969 | 423.5 | 272.7 | 3.12 | 8 | PVC | 0.01 | 1,245 | 22 | 127 | 149 | 12 | | |
| Kirkland_Main-1601 | Kirkland_Manholes-1971 | 425.8 | Kirkland_Manholes-1970 | 425.5 | 74.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3.2 | | |
| Kirkland_Main-1602 | Kirkland_Manholes-1972 | 426.31 | Kirkland_Manholes-1971 | 425.8 | 127.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-1603 | Kirkland_Manholes-1973 | 430.86 | Kirkland_Manholes-1972 | 426.31 | 87.6 | 5.19 | 8 | PVC | 0.01 | 1,607 | 1 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1604 | Kirkland_Manholes-2631 | 265.77 | Kirkland_Manholes-2630 | 232.51 | 349 | 9.53 | 8 | Concrete | 0.013 | 1,674 | 6 | 16 | 22 | 1.3 | SM14-Ex-EX295 | |
| Kirkland_Main-1605 | Kirkland_Manholes-2632 | 276.84 | Kirkland_Manholes-2631 | 265.77 | 241.2 | 4.59 | 8 | Concrete | 0.013 | 1,162 | 4 | 12 | 15 | 1.3 | SM14-Ex-EX295 | |
| Kirkland_Main-1606 | Kirkland_Manholes-2649 | 147.51 | Kirkland_Manholes-2648 | 144.73 | 165.5 | 1.68 | 8 | PVC | 0.01 | 914 | 2 | 12 | 14 | 1.6 | | |
| Kirkland_Main-1607 | Kirkland_Manholes-2648 | 144.73 | Kirkland_Manholes-2647 | 132.46 | 109.5 | 11.21 | 8 | PVC | 0.01 | 2,360 | 3 | 18 | 21 | 0.9 | | |
| Kirkland_Main-1608 | Kirkland_Manholes-2647 | 132.46 | Kirkland_Manholes-2646 | 96.97 | 134.3 | 26.42 | 8 | PVC | 0.01 | 3,624 | 4 | 24 | 28 | 0.8 | | |
| Kirkland_Main-1609 | Kirkland_Manholes-2646 | 96.97 | Kirkland_Manholes-2645 | 79.04 | 111.3 | 16.11 | 8 | PVC | 0.01 | 2,830 | 6 | 30 | 36 | 1.3 | | |
| Kirkland_Main-1610 | Kirkland_Manholes-2650 | 148.19 | Kirkland_Manholes-2649 | 147.51 | 170.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 6 | 7 | 1.6 | | |
| Kirkland_Main-1611 | Kirkland_Manholes-2651 | 121.43 | Kirkland_Manholes-2652 | 57.18 | 251.5 | 25.55 | 6 | PVC | 0.01 | 1,655 | 2 | 6 | 8 | 0.5 | SM14-Ex-EX292 | |
| Kirkland_Main-1612 | Kirkland_Manholes-2654 | 54.76 | Kirkland_Manholes-2657 | 43.64 | 394.5 | 2.82 | 8 | Concrete | 0.013 | 911 | 3 | 24 | 27 | 3 | SM14-Ex-EX291 | |
| Kirkland_Main-1613 | Kirkland_Manholes-2653 | 56.99 | Kirkland_Manholes-2654 | 54.76 | 13.8 | 16.21 | 6 | Concrete | 0.013 | 1,014 | 3 | 18 | 21 | 2.1 | SM14-Ex-EX292 | |
| Kirkland_Main-1614 | Kirkland_Manholes-2652 | 57.18 | Kirkland_Manholes-2653 | 56.99 | 47.7 | 0.4 | 6 | PVC | 0.01 | 207 | 3 | 12 | 15 | 7.4 | SM14-Ex-EX292 | |
| Kirkland_Main-1615 | Kirkland_Manholes-2657 | 43.64 | Kirkland_Manholes-2656 | 33.93 | 250 | 3.88 | 8 | Concrete | 0.013 | 1,069 | 4 | 30 | 35 | 3.2 | SM14-Ex-EX291 | |
| Kirkland_Main-1616 | Kirkland_Manholes-2655 | 44.22 | Kirkland_Manholes-2656 | 33.93 | 73.2 | 14.06 | 6 | Concrete | 0.013 | 944 | 13 | 79 | 92 | 9.7 | SM14-Ex-EX293 | |
| Kirkland_Main-1617 | Kirkland_Manholes-2656 | 33.93 | Kirkland_Manholes-2658 | 29.62 | 118.6 | 3.63 | 8 | Concrete | 0.013 | 1,034 | 17 | 115 | 132 | 12.8 | SM14-Ex-EX291 | |
| Kirkland_Main-1618 | Kirkland_Manholes-2658 | 29.62 | Kirkland_Manholes-2659 | 28.05 | 312.8 | 0.5 | 8 | Concrete | 0.013 | 384 | 17 | 121 | 139 | 36.1 | SM14-Ex-EX291 | |
| Kirkland_Main-1619 | Kirkland_Manholes-2659 | 28.05 | Kirkland_Manholes-2660 | 26.87 | 281 | 0.42 | 8 | Concrete | 0.013 | 351 | 19 | 128 | 146 | 41.6 | SM14-Ex-EX291 | |
| Kirkland_Main-1624 | Kirkland_Manholes-2726 | 12.39 | Kirkland_Manholes-2662 | 11.52 | 172.8 | 0.5 | 18 | Concrete | 0.013 | 3,345 | 229 | 595 | 824 | 24.6 | SM14-Ex-EX289 | |
| Kirkland_Main-1625 | Kirkland_Manholes-2666 | 55.28 | Kirkland_Manholes-2667 | 55.1 | 203.4 | 0.09 | 12 | Concrete | 0.013 | 476 | 109 | 322 | 431 | 90.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1626 | Kirkland_Manholes-2667 | 55.1 | Kirkland_Manholes-2665 | 53.92 | 196.9 | 0.6 | 12 | Concrete | 0.013 | 1,238 | 109 | 328 | 437 | 35.3 | SM14-Ex-EX222 | |
| Kirkland_Main-1627 | Kirkland_Manholes-2665 | 53.92 | Kirkland_Manholes-3102 | 53.77 | 398.5 | 0.04 | 12 | Concrete | 0.013 | 310 | 109 | 334 | 443 | 142.8 | SM14-Ex-EX222 | |
| Kirkland_Main-1629 | Kirkland_Manholes-2203 | 62.94 | Kirkland_Manholes-3102 | 53.77 | 55.2 | 16.62 | 8 | Ductile Iron | 0.012 | 2,395 | 12 | 61 | 73 | 3 | SM14-Ex-EX290 | |
| Kirkland_Main-1633 | Kirkland_Manholes-3101 | 52.44 | Kirkland_Manholes-2663 | 50.64 | 51.5 | 3.5 | 12 | Concrete | 0.013 | 2,991 | 124 | 431 | 555 | 18.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1634 | Kirkland_Manholes-250 | 115.74 | Kirkland_Manholes-268 | 108.82 | 144.1 | 4.8 | 8 | sbestos Ceme | 0.011 | 1,405 | 4 | 17 | 21 | 1.5 | SM10 | |
| Kirkland_Main-1635 | Kirkland_Manholes-309 | 140.9 | Kirkland_Manholes-308 | 114.39 | 431.7 | 6.14 | 8 | Concrete | 0.013 | 1,344 | 3 | 9 | 12 | 0.9 | SM10 | |
| Kirkland_Main-1636 | Kirkland_Manholes-308 | 114.39 | Kirkland_Manholes-307 | 105.6 | 319 | 2.76 | 8 | Concrete | 0.013 | 900 | 6 | 27 | 33 | 3.6 | SM10 | |
| Kirkland_Main-1637 | Kirkland_Manholes-494 | 135.66 | Kirkland_Manholes-307 | 105.6 | 436.1 | 6.89 | 8 | Concrete | 0.013 | 1,424 | 3 | 9 | 12 | 0.8 | SM10 | |
| Kirkland_Main-1638 | Kirkland_Manholes-241 | 14.7 | Kirkland_Manholes-2765 | 13.19 | 59.4 | 2.54 | 8 | Ductile Iron | 0.012 | 936 | 305 | 1,122 | 1,428 | 152.5 | SM3 | |
| Kirkland_Main-1639 | Kirkland_Manholes-240 | 17.1 | Kirkland_Manholes-2765 | 13.19 | 342.3 | 1.14 | 8 | Ductile Iron | 0.012 | 628 | 140 | 420 | 861 | 137.1 | SM14-Ex-EX42 | |
| Kirkland_Main-1640 | Kirkland_Manholes-239 | 27.77 | Kirkland_Manholes-240 | 17.1 | 321.9 | 3.31 | 8 | Ductile Iron | 0.012 | 1,070 | 140 | 416 | 857 | 80.1 | SM14-Ex-EX42 | |
| Kirkland_Main-1641 | Kirkland_Manholes-243 | 37.12 | Kirkland_Manholes-239 | 27.77 | 158.7 | 5.89 | 8 | Concrete | 0.013 | 1,317 | 139 | 407 | 847 | 64.3 | SM14-Ex-EX38 | |
| Kirkland_Main-1642 | Kirkland_Manholes-244 | 47.57 | Kirkland_Manholes-243 | 46.95 | 154.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 137 | 403 | 841 | 245.2 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-1643 | Kirkland_Manholes-246 | 58 | Kirkland_Manholes-244 | 47.57 | 272.3 | 3.83 | 8 | Concrete | 0.013 | 1,061 | 137 | 399 | 837 | 78.8 | SM14-Ex-EX38 | |
| Kirkland_Main-1645 | Kirkland_Manholes-901 | 304.32 | Kirkland_Manholes-900 | 302.97 | 52 | 2.59 | 8 | PVC | 0.01 | 1,135 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1646 | Kirkland_Manholes-902 | 304.94 | Kirkland_Manholes-900 | 302.97 | 236.8 | 0.83 | 8 | PVC | 0.01 | 643 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1647 | Kirkland_Manholes-900 | 302.97 | Kirkland_Manholes-904 | 289.03 | 425.5 | 3.28 | 8 | PVC | 0.01 | 1,276 | 5 | 24 | 29 | 2.3 | | |
| Kirkland_Main-1648 | Kirkland_Manholes-903 | 290.15 | Kirkland_Manholes-904 | 289.03 | 62.2 | 1.8 | 8 | PVC | 0.01 | 946 | 11 | 60 | 71 | 7.5 | | |
| Kirkland_Main-1649 | Kirkland_Manholes-904 | 289.03 | Kirkland_Manholes-905 | 283.61 | 138.2 | 3.92 | 8 | PVC | 0.01 | 1,396 | 16 | 87 | 104 | 7.4 | | |
| Kirkland_Main-1650 | Kirkland_Manholes-905 | 283.61 | Kirkland_Manholes-912 | 277.93 | 121.5 | 4.68 | 8 | PVC | 0.01 | 1,525 | 16 | 91 | 108 | 7.1 | | |
| Kirkland_Main-1651 | Kirkland_Manholes-906 | 293.01 | Kirkland_Manholes-907 | 291.52 | 150.3 | 0.99 | 8 | PVC | 0.01 | 702 | 4 | 40 | 44 | 6.3 | | |
| Kirkland_Main-1652 | Kirkland_Manholes-907 | 291.52 | Kirkland_Manholes-908 | 290.53 | 109.9 | 0.9 | 8 | PVC | 0.01 | 669 | 5 | 44 | 49 | 7.3 | | |
| Kirkland_Main-1653 | Kirkland_Manholes-908 | 290.53 | Kirkland_Manholes-903 | 290.15 | 324 | 0.12 | 8 | PVC | 0.01 | 241 | 10 | 56 | 65 | 27.1 | | |
| Kirkland_Main-1654 | Kirkland_Manholes-910 | 293.95 | Kirkland_Manholes-908 | 290.53 | 193.3 | 1.77 | 8 | PVC | 0.01 | 938 | 4 | 8 | 12 | 1.3 | | |
| Kirkland_Main-1655 | Kirkland_Manholes-909 | 297.88 | Kirkland_Manholes-910 | 293.95 | 188.4 | 2.09 | 8 | PVC | 0.01 | 1,018 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-1656 | Kirkland_Manholes-911 | 279.8 | Kirkland_Manholes-912 | 277.93 | 207.2 | 0.9 | 8 | PVC | 0.01 | 670 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1657 | Kirkland_Manholes-912 | 277.93 | Kirkland_Manholes-913 | 274.64 | 100.2 | 3.28 | 8 | PVC | 0.01 | 1,277 | 20 | 99 | 119 | 9.3 | | |
| Kirkland_Main-1658 | Kirkland_Manholes-913 | 274.64 | Kirkland_Manholes-917 | 265.16 | 288.9 | 3.28 | 8 | PVC | 0.01 | 1,277 | 21 | 103 | 124 | 9.7 | | |
| Kirkland_Main-1659 | Kirkland_Manholes-890 | 280.21 | Kirkland_Manholes-914 | 274.6 | 210.2 | 2.67 | 8 | PVC | 0.01 | 1,152 | 27 | 115 | 142 | 12.3 | | |
| Kirkland_Main-1660 | Kirkland_Manholes-914 | 274.6 | Kirkland_Manholes-915 | 272.06 | 86.6 | 2.93 | 8 | PVC | 0.01 | 1,207 | 30 | 127 | 157 | 13 | | |
| Kirkland_Main-1661 | Kirkland_Manholes-915 | 272.06 | Kirkland_Manholes-916 | 270.65 | 45.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 30 | 131 | 161 | 13 | | |
| Kirkland_Main-1662 | Kirkland_Manholes-627 | 275.98 | Kirkland_Manholes-914 | 274.6 | 212.1 | 0.65 | 8 | PVC | 0.01 | 569 | 2 | 8 | 10 | 1.8 | | |
| Kirkland_Main-1663 | Kirkland_Manholes-916 | 270.65 | Kirkland_Manholes-917 | 265.16 | 154.3 | 3.56 | 8 | PVC | 0.01 | 1,330 | 30 | 135 | 166 | 12.4 | | |
| Kirkland_Main-1664 | Kirkland_Manholes-917 | 265.16 | Kirkland_Manholes-918 | 264.4 | 332.4 | 0.23 | 8 | PVC | 0.01 | 337 | 52 | 246 | 299 | 88.6 | SM14-Ex-EX136 | |
| Kirkland_Main-1665 | Kirkland_Manholes-918 | 264.4 | Kirkland_Manholes-919 | 263.89 | 50.1 | 1.02 | 8 | PVC | 0.01 | 711 | 53 | 250 | 303 | 42.6 | SM14-Ex-EX136 | |
| Kirkland_Main-1666 | Kirkland_Manholes-919 | 263.89 | Kirkland_Manholes-920 | 263.16 | 175.4 | 0.42 | 8 | PVC | 0.01 | 455 | 53 | 254 | 307 | 67.6 | SM14-Ex-EX136 | |
| Kirkland_Main-1667 | Kirkland_Manholes-687 | 264 | Kirkland_Manholes-921 | 262.87 | 223.9 | 0.5 | 8 | PVC | 0.01 | 501 | 4 | 12 | 16 | 3.1 | | |
| Kirkland_Main-1668 | Kirkland_Manholes-920 | 263.16 | Kirkland_Manholes-921 | 262.87 | 116.1 | 0.25 | 8 | PVC | 0.01 | 352 | 54 | 258 | 312 | 88.5 | SM14-Ex-EX136 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1669 | Kirkland_Manholes-2064 | 426.84 | Kirkland_Manholes-2670 | 399.73 | 295.3 | 9.18 | 8 | PVC | 0.01 | 2,136 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1670 | Kirkland_Manholes-921 | 262.87 | Kirkland_Manholes-940 | 262.57 | 126.3 | 0.24 | 8 | PVC | 0.01 | 344 | 58 | 274 | 332 | 96.6 | SM14-Ex-EX136 | |
| Kirkland_Main-1671 | Kirkland_Manholes-940 | 262.57 | Kirkland_Manholes-939 | 261.56 | 302.2 | 0.33 | 8 | PVC | 0.01 | 407 | 61 | 278 | 339 | 83.4 | SM14-Ex-EX136 | |
| Kirkland_Main-1672 | Kirkland_Manholes-939 | 261.56 | Kirkland_Manholes-938 | 261.15 | 139.9 | 0.29 | 8 | PVC | 0.01 | 382 | 62 | 282 | 344 | 90.1 | SM14-Ex-EX136 | Drop Connection |
| Kirkland_Main-1673 | Kirkland_Manholes-925 | 289.69 | Kirkland_Manholes-924 | 268.15 | 361.6 | 5.96 | 8 | PVC | 0.01 | 1,721 | 13 | 60 | 73 | 4.2 | | |
| Kirkland_Main-1674 | Kirkland_Manholes-924 | 268.15 | Kirkland_Manholes-923 | 268.09 | 97.9 | 0.06 | 12 | PVC | 0.01 | 515 | 122 | 489 | 610 | 118.6 | SM14-Ex-EX138 | |
| Kirkland_Main-1675 | Kirkland_Manholes-922 | 269.99 | Kirkland_Manholes-923 | 268.09 | 235 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1676 | Kirkland_Manholes-923 | 268.09 | Kirkland_Manholes-929 | 267.98 | 60 | 0.18 | 12 | PVC | 0.01 | 890 | 123 | 497 | 619 | 69.6 | SM14-2035-DF10 | |
| Kirkland_Main-1678 | Kirkland_Manholes-927 | 307.71 | Kirkland_Manholes-926 | 302.74 | 56.6 | 8.77 | 8 | PVC | 0.01 | 2,089 | 6 | 8 | 14 | 0.7 | | |
| Kirkland_Main-1679 | Kirkland_Manholes-926 | 302.74 | Kirkland_Manholes-925 | 289.69 | 296 | 4.41 | 8 | PVC | 0.01 | 1,481 | 12 | 56 | 68 | 4.6 | | |
| Kirkland_Main-1680 | Kirkland_Manholes-928 | 294.43 | Kirkland_Manholes-930 | 277.33 | 346.1 | 4.94 | 8 | PVC | 0.01 | 1,567 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1681 | Kirkland_Manholes-930 | 277.33 | Kirkland_Manholes-929 | 267.98 | 33.8 | 27.65 | 8 | PVC | 0.01 | 3,707 | 3 | 8 | 11 | 0.3 | | |
| Kirkland_Main-1682 | Kirkland_Manholes-933 | 269.3 | Kirkland_Manholes-932 | 267 | 200 | 1.15 | 8 | PVC | 0.01 | 756 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1683 | Kirkland_Manholes-929 | 267.98 | Kirkland_Manholes-931 | 267.3 | 153.6 | 0.44 | 12 | PVC | 0.01 | 1,383 | 126 | 509 | 635 | 45.9 | | |
| Kirkland_Main-1684 | Kirkland_Manholes-931 | 267.3 | Kirkland_Manholes-932 | 267 | 103.9 | 0.29 | 12 | PVC | 0.01 | 1,117 | 126 | 513 | 639 | 57.2 | | |
| Kirkland_Main-1685 | Kirkland_Manholes-932 | 267 | Kirkland_Manholes-934 | 266.31 | 201.7 | 0.34 | 12 | PVC | 0.01 | 1,216 | 129 | 521 | 649 | 53.4 | | |
| Kirkland_Main-1686 | Kirkland_Manholes-950 | 293.99 | Kirkland_Manholes-934 | 266.31 | 270.7 | 10.22 | 8 | PVC | 0.01 | 2,254 | 5 | 32 | 37 | 1.6 | | |
| Kirkland_Main-1688 | Kirkland_Manholes-934 | 266.31 | Kirkland_Manholes-935 | 265.1 | 223.8 | 0.54 | 12 | PVC | 0.01 | 1,529 | 136 | 556 | 692 | 45.3 | | |
| Kirkland_Main-1689 | Kirkland_Manholes-937 | 264.43 | Kirkland_Manholes-938 | 264.12 | 49.3 | 0.62 | 12 | PVC | 0.01 | 1,641 | 143 | 608 | 751 | 45.8 | | Drop Connection |
| Kirkland_Main-1690 | Kirkland_Manholes-936 | 264.57 | Kirkland_Manholes-937 | 264.43 | 21.7 | 0.66 | 12 | PVC | 0.01 | 1,686 | 137 | 564 | 701 | 41.6 | | |
| Kirkland_Main-1691 | Kirkland_Manholes-935 | 265.1 | Kirkland_Manholes-936 | 264.57 | 71.3 | 0.74 | 12 | PVC | 0.01 | 1,788 | 137 | 560 | 697 | 39 | | |
| Kirkland_Main-1692 | Kirkland_Manholes-938 | 257.09 | Kirkland_Manholes-666 | 254.95 | 392.8 | 0.55 | 15 | PVC | 0.01 | 2,784 | 206 | 894 | 1,100 | 39.5 | | |
| Kirkland_Main-1693 | Kirkland_Manholes-941 | 287.52 | Kirkland_Manholes-937 | 264.43 | 281.4 | 8.21 | 8 | PVC | 0.01 | 2,020 | 6 | 40 | 46 | 2.3 | | |
| Kirkland_Main-1694 | Kirkland_Manholes-942 | 300.01 | Kirkland_Manholes-941 | 287.52 | 399.1 | 3.13 | 8 | PVC | 0.01 | 1,247 | 5 | 36 | 41 | 3.3 | | |
| Kirkland_Main-1695 | Kirkland_Manholes-943 | 306.11 | Kirkland_Manholes-944 | 304.9 | 190.1 | 0.64 | 8 | Concrete | 0.013 | 433 | 1 | 4 | 5 | 1.1 | SM14-Ex-EX137 | |
| Kirkland_Main-1696 | Kirkland_Manholes-946 | 335.98 | Kirkland_Manholes-945 | 330.63 | 152.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1697 | Kirkland_Manholes-945 | 330.63 | Kirkland_Manholes-944 | 304.9 | 238 | 10.81 | 8 | PVC | 0.01 | 2,318 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1698 | Kirkland_Manholes-947 | 299.2 | Kirkland_Manholes-948 | 296.38 | 132 | 2.14 | 8 | Concrete | 0.013 | 793 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX137 | |
| Kirkland_Main-1699 | Kirkland_Manholes-944 | 304.9 | Kirkland_Manholes-948 | 296.38 | 218.3 | 3.9 | 8 | Concrete | 0.013 | 1,071 | 3 | 16 | 19 | 1.7 | SM14-Ex-EX137 | |
| Kirkland_Main-1701 | Kirkland_Manholes-949 | 295.21 | Kirkland_Manholes-950 | 293.99 | 49 | 2.49 | 8 | PVC | 0.01 | 1,112 | 4 | 28 | 32 | 2.9 | | |
| Kirkland_Main-1702 | Kirkland_Manholes-948 | 296.38 | Kirkland_Manholes-949 | 295.21 | 143.9 | 0.81 | 8 | Concrete | 0.013 | 489 | 4 | 24 | 28 | 5.7 | SM14-Ex-EX137 | |
| Kirkland_Main-1703 | Kirkland_Manholes-951 | 321.2 | Kirkland_Manholes-942 | 300.01 | 232.8 | 9.1 | 8 | PVC | 0.01 | 2,127 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-1704 | Kirkland_Manholes-952 | 325.62 | Kirkland_Manholes-951 | 321.2 | 323.7 | 1.37 | 8 | PVC | 0.01 | 824 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1705 | Kirkland_Manholes-953 | 318.51 | Kirkland_Manholes-954 | 318.45 | 75.8 | 0.08 | 8 | PVC | 0.01 | 198 | 1 | 4 | 5 | 2.3 | | |
| Kirkland_Main-1706 | Kirkland_Manholes-954 | 318.45 | Kirkland_Manholes-955 | 318.15 | 133.7 | 0.22 | 8 | PVC | 0.01 | 334 | 1 | 8 | 9 | 2.7 | | |
| Kirkland_Main-1707 | Kirkland_Manholes-1546 | 284.43 | Kirkland_Manholes-1545 | 272.4 | 160.7 | 7.49 | 8 | Concrete | 0.013 | 1,484 | 8 | 40 | 48 | 3.2 | SM14-Ex-EX121 | |
| Kirkland_Main-1708 | Kirkland_Manholes-750 | 289.43 | Kirkland_Manholes-1546 | 284.43 | 152.8 | 3.27 | 8 | Concrete | 0.013 | 981 | 2 | 8 | 10 | 1 | SM14-Ex-EX121 | |
| Kirkland_Main-1709 | Kirkland_Manholes-1553 | 308.15 | Kirkland_Manholes-1546 | 284.43 | 340 | 6.98 | 8 | Concrete | 0.013 | 1,432 | 6 | 28 | 33 | 2.3 | SM14-Ex-EX122 | |
| Kirkland_Main-1710 | Kirkland_Manholes-751 | 298.52 | Kirkland_Manholes-750 | 289.43 | 402.2 | 2.26 | 8 | Concrete | 0.013 | 815 | 2 | 4 | 5 | 0.7 | SM14-Ex-EX121 | |
| Kirkland_Main-1711 | Kirkland_Manholes-748 | 311.92 | Kirkland_Manholes-752 | 265.45 | 362.2 | 12.83 | 8 | Concrete | 0.013 | 1,943 | 19 | 56 | 75 | 3.8 | SM14-Ex-EX71 | |
| Kirkland_Main-1712 | Kirkland_Manholes-753 | 247.15 | Kirkland_Manholes-754 | 246.56 | 209.3 | 0.28 | 8 | PVC | 0.01 | 374 | 2 | 4 | 6 | 1.6 | | |
| Kirkland_Main-1713 | Kirkland_Manholes-1355 | 420.81 | Kirkland_Manholes-1357 | 417.32 | 183.1 | 1.91 | 8 | PVC | 0.01 | 973 | 7 | 36 | 43 | 4.4 | | |
| Kirkland_Main-1714 | Kirkland_Manholes-1356 | 418.13 | Kirkland_Manholes-1357 | 417.32 | 41.8 | 1.94 | 8 | Concrete | 0.013 | 755 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX180 | |
| Kirkland_Main-1715 | Kirkland_Manholes-1357 | 417.32 | Kirkland_Manholes-1358 | 410.38 | 295.5 | 2.35 | 8 | Concrete | 0.013 | 831 | 10 | 44 | 53 | 6.4 | SM14-Ex-EX180 | |
| Kirkland_Main-1716 | Kirkland_Manholes-1358 | 410.38 | Kirkland_Manholes-1359 | 407.6 | 322.3 | 0.86 | 8 | Concrete | 0.013 | 504 | 11 | 48 | 58 | 11.6 | SM14-Ex-EX180 | |
| Kirkland_Main-1717 | Kirkland_Manholes-1359 | 407.6 | Kirkland_Manholes-1364 | 404.91 | 317.2 | 0.85 | 8 | Concrete | 0.013 | 499 | 13 | 52 | 64 | 12.9 | SM14-Ex-EX180 | |
| Kirkland_Main-1718 | Kirkland_Manholes-1360 | 392.45 | Kirkland_Manholes-1361 | 390.34 | 26.4 | 7.99 | 8 | Concrete | 0.013 | 1,533 | 5 | 20 | 25 | 1.6 | SM14-Ex-EX179 | |
| Kirkland_Main-1719 | Kirkland_Manholes-1361 | 390.34 | Kirkland_Manholes-1371 | 389.7 | 160.2 | 0.4 | 8 | PVC | 0.01 | 446 | 19 | 79 | 98 | 22 | | Drop Connection |
| Kirkland_Main-1720 | Kirkland_Manholes-1365 | 376.9 | Kirkland_Manholes-1371 | 376.15 | 121.9 | 0.62 | 8 | PVC | 0.01 | 553 | 43 | 83 | 126 | 22.8 | | |
| Kirkland_Main-1721 | Kirkland_Manholes-1366 | 377.95 | Kirkland_Manholes-1365 | 376.9 | 166.8 | 0.63 | 8 | PVC | 0.01 | 559 | 43 | 79 | 122 | 21.9 | | |
| Kirkland_Main-1722 | Kirkland_Manholes-1364 | 404.91 | Kirkland_Manholes-1361 | 390.34 | 354.3 | 4.11 | 8 | Concrete | 0.013 | 1,100 | 14 | 56 | 69 | 6.3 | SM14-Ex-EX180 | |
| Kirkland_Main-1723 | Kirkland_Manholes-1362 | 399.37 | Kirkland_Manholes-1360 | 392.45 | 312.9 | 2.21 | 8 | Concrete | 0.013 | 807 | 5 | 16 | 21 | 2.6 | SM14-Ex-EX179 | |
| Kirkland_Main-1724 | Kirkland_Manholes-1363 | 403.55 | Kirkland_Manholes-1362 | 399.37 | 238 | 1.76 | 8 | Concrete | 0.013 | 719 | 3 | 12 | 15 | 2.1 | SM14-Ex-EX179 | |
| Kirkland_Main-1726 | Kirkland_Manholes-1367 | 392.51 | Kirkland_Manholes-1906 | 388.2 | 267.7 | 1.61 | 8 | PVC | 0.01 | 895 | 7 | 4 | 11 | 1.2 | | |
| Kirkland_Main-1727 | Kirkland_Manholes-1368 | 393.26 | Kirkland_Manholes-1369 | 387.01 | 105.4 | 5.93 | 8 | Concrete | 0.013 | 1,321 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX178 | |
| Kirkland_Main-1728 | Kirkland_Manholes-1369 | 387.01 | Kirkland_Manholes-1370 | 385.7 | 133.5 | 0.98 | 8 | Concrete | 0.013 | 537 | 1 | 8 | 9 | 1.6 | SM14-Ex-EX178 | |
| Kirkland_Main-1729 | Kirkland_Manholes-1370 | 385.7 | Kirkland_Manholes-1371 | 376.15 | 179.2 | 5.33 | 8 | Concrete | 0.013 | 1,252 | 1 | 12 | 13 | 1 | SM14-Ex-EX178 | |
| Kirkland_Main-1730 | Kirkland_Manholes-534 | 432.55 | Kirkland_Manholes-1372 | 427.9 | 355.1 | 1.31 | 8 | Concrete | 0.013 | 621 | 44 | 139 | 183 | 29.5 | SM14-Ex-EX218 | |
| Kirkland_Main-1731 | Kirkland_Manholes-560 | 483.4 | Kirkland_Manholes-561 | 481.3 | 94.5 | 2.22 | 8 | PVC | 0.01 | 1,051 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-1733 | Kirkland_Manholes-561 | 481.3 | Kirkland_Manholes-1374 | 479.93 | 141.7 | 0.97 | 8 | PVC | 0.01 | 693 | 4 | 12 | 16 | 2.3 | | |
| Kirkland_Main-1734 | Kirkland_Manholes-1376 | 483.23 | Kirkland_Manholes-1375 | 479.6 | 272.8 | 1.33 | 8 | PVC | 0.01 | 813 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1735 | Kirkland_Manholes-1375 | 479.6 | Kirkland_Manholes-1377 | 478.89 | 93.1 | 0.76 | 8 | PVC | 0.01 | 616 | 6 | 24 | 30 | 4.9 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1736 | Kirkland_Manholes-1377 | 478.89 | Kirkland_Manholes-1378 | 472.9 | 259 | 2.31 | 8 | PVC | 0.01 | 1,072 | 7 | 28 | 35 | 3.3 | | |
| Kirkland_Main-1737 | Kirkland_Manholes-1378 | 472.9 | Kirkland_Manholes-1379 | 471.21 | 302 | 0.56 | 8 | PVC | 0.01 | 527 | 11 | 32 | 42 | 8 | | |
| Kirkland_Main-1738 | Kirkland_Manholes-1374 | 479.93 | Kirkland_Manholes-1375 | 479.6 | 219.3 | 0.15 | 8 | PVC | 0.01 | 274 | 4 | 16 | 20 | 7.2 | | |
| Kirkland_Main-1739 | Kirkland_Manholes-1379 | 471.21 | Kirkland_Manholes-564 | 469.28 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 11 | 36 | 47 | 7.9 | | |
| Kirkland_Main-1740 | Kirkland_Manholes-340 | 235.81 | Kirkland_Manholes-341 | 235.59 | 47.2 | 0.47 | 8 | PVC | 0.01 | 482 | 13 | 79 | 93 | 19.3 | | |
| Kirkland_Main-1741 | Kirkland_Manholes-341 | 235.59 | Kirkland_Manholes-342 | 234.97 | 31.7 | 1.95 | 8 | Ductile Iron | 0.012 | 821 | 18 | 127 | 146 | 17.7 | SM14-Ex-EX49 | |
| Kirkland_Main-1742 | Kirkland_Manholes-342 | 234.97 | Kirkland_Manholes-351 | 234.93 | 111.2 | 0.04 | 8 | PVC | 0.01 | 134 | 18 | 131 | 150 | 111.9 | SM14-Ex-EX49 | |
| Kirkland_Main-1743 | Kirkland_Manholes-345 | 279.43 | Kirkland_Manholes-344 | 279.2 | 57.3 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 8 | 12 | 2.7 | | |
| Kirkland_Main-1744 | Kirkland_Manholes-344 | 279.2 | Kirkland_Manholes-346 | 254.2 | 328.7 | 7.61 | 8 | PVC | 0.01 | 1,944 | 5 | 12 | 17 | 0.9 | | |
| Kirkland_Main-1745 | Kirkland_Manholes-346 | 254.2 | Kirkland_Manholes-347 | 250.02 | 240.3 | 1.74 | 8 | PVC | 0.01 | 930 | 6 | 16 | 22 | 2.4 | | |
| Kirkland_Main-1746 | Kirkland_Manholes-348 | 251.65 | Kirkland_Manholes-347 | 250.02 | 50.6 | 3.22 | 8 | PVC | 0.01 | 1,266 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1747 | Kirkland_Manholes-347 | 250.02 | Kirkland_Manholes-349 | 238.18 | 204.7 | 5.78 | 8 | PVC | 0.01 | 1,695 | 9 | 24 | 33 | 2 | | |
| Kirkland_Main-1748 | Kirkland_Manholes-349 | 238.18 | Kirkland_Manholes-350 | 235.63 | 111.7 | 2.28 | 8 | PVC | 0.01 | 1,065 | 10 | 28 | 38 | 3.6 | | |
| Kirkland_Main-1749 | Kirkland_Manholes-1666 | 89.71 | Kirkland_Manholes-1673 | 84.18 | 111.9 | 4.94 | 8 | PVC | 0.01 | 1,568 | 42 | 148 | 190 | 12.2 | | |
| Kirkland_Main-1750 | Kirkland_Manholes-1672 | 91.63 | Kirkland_Manholes-1666 | 89.71 | 163.9 | 1.17 | 8 | PVC | 0.01 | 763 | 1 | 8 | 9 | 1.2 | | |
| Kirkland_Main-1751 | Kirkland_Manholes-1671 | 101.9 | Kirkland_Manholes-1667 | 101.23 | 167.6 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 8 | 13 | 3 | | |
| Kirkland_Main-1752 | Kirkland_Manholes-1669 | 132.92 | Kirkland_Manholes-1668 | 119.52 | 315.3 | 4.25 | 8 | PVC | 0.01 | 1,454 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1753 | Kirkland_Manholes-1670 | 121.1 | Kirkland_Manholes-1668 | 119.52 | 161.1 | 0.98 | 8 | PVC | 0.01 | 698 | 3 | 8 | 11 | 1.6 | | |
| Kirkland_Main-1754 | Kirkland_Manholes-1673 | 84.18 | Kirkland_Manholes-1674 | 78.95 | 158.5 | 3.3 | 8 | PVC | 0.01 | 1,281 | 42 | 156 | 199 | 15.5 | | |
| Kirkland_Main-1755 | Kirkland_Manholes-1677 | 88.12 | Kirkland_Manholes-1674 | 87.91 | 51.7 | 0.4 | 8 | PVC | 0.01 | 446 | 21 | 41 | 62 | 14 | | Drop Connection |
| Kirkland_Main-1756 | Kirkland_Manholes-1675 | 105.24 | Kirkland_Manholes-1676 | 98.96 | 116.6 | 5.39 | 8 | PVC | 0.01 | 1,636 | 3 | 8 | 12 | 0.7 | | |
| Kirkland_Main-1757 | Kirkland_Manholes-859 | 309.2 | Kirkland_Manholes-865 | 308.29 | 290.7 | 0.31 | 8 | Concrete | 0.013 | 303 | 15 | 75 | 91 | 30 | SM14-Ex-EX51 | |
| Kirkland_Main-1758 | Kirkland_Manholes-860 | 317.71 | Kirkland_Manholes-859 | 309.2 | 202.9 | 4.19 | 8 | Concrete | 0.013 | 1,111 | 12 | 68 | 80 | 7.2 | SM14-Ex-EX52 | |
| Kirkland_Main-1759 | Kirkland_Manholes-861 | 327.02 | Kirkland_Manholes-860 | 317.71 | 236.9 | 3.93 | 8 | Concrete | 0.013 | 1,075 | 10 | 64 | 74 | 6.9 | SM14-Ex-EX52 | |
| Kirkland_Main-1760 | Kirkland_Manholes-856 | 333.21 | Kirkland_Manholes-861 | 327.02 | 162.2 | 3.82 | 8 | Concrete | 0.013 | 1,059 | 9 | 60 | 69 | 6.5 | SM14-Ex-EX52 | |
| Kirkland_Main-1761 | Kirkland_Manholes-862 | 335.56 | Kirkland_Manholes-856 | 333.21 | 185.2 | 1.27 | 8 | Concrete | 0.013 | 611 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX53 | |
| Kirkland_Main-1762 | Kirkland_Manholes-2254 | 240.28 | Kirkland_Manholes-2253 | 239.74 | 205.7 | 0.26 | 8 | Concrete | 0.013 | 278 | 0 | 4 | 4 | 1.4 | SM14-Ex-EX247 | |
| Kirkland_Main-1763 | Kirkland_Manholes-863 | 341.24 | Kirkland_Manholes-864 | 334.74 | 171.5 | 3.79 | 8 | Concrete | 0.013 | 1,056 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX50 | |
| Kirkland_Main-1764 | Kirkland_Manholes-864 | 334.74 | Kirkland_Manholes-865 | 308.29 | 391.4 | 6.76 | 8 | Concrete | 0.013 | 1,410 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX50 | |
| Kirkland_Main-1765 | Kirkland_Manholes-866 | 314.35 | Kirkland_Manholes-865 | 308.29 | 226.5 | 2.68 | 8 | Concrete | 0.013 | 887 | 7 | 28 | 35 | 3.9 | SM14-Ex-EX35 | |
| Kirkland_Main-1766 | Kirkland_Manholes-865 | 308.29 | Kirkland_Manholes-392 | 305 | 233.2 | 1.41 | 8 | Concrete | 0.013 | 644 | 27 | 115 | 143 | 22.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1767 | Kirkland_Manholes-867 | 319 | Kirkland_Manholes-866 | 314.35 | 119.3 | 3.9 | 8 | Concrete | 0.013 | 1,071 | 6 | 24 | 29 | 2.7 | SM14-Ex-EX35 | |
| Kirkland_Main-1768 | Kirkland_Manholes-868 | 321.84 | Kirkland_Manholes-867 | 319 | 90.7 | 3.13 | 8 | Concrete | 0.013 | 960 | 5 | 20 | 25 | 2.6 | SM14-Ex-EX35 | |
| Kirkland_Main-1769 | Kirkland_Manholes-869 | 325.94 | Kirkland_Manholes-868 | 321.84 | 101.3 | 4.05 | 8 | Concrete | 0.013 | 1,091 | 4 | 16 | 20 | 1.9 | SM14-Ex-EX35 | |
| Kirkland_Main-1770 | Kirkland_Manholes-870 | 327.4 | Kirkland_Manholes-869 | 325.94 | 99.3 | 1.47 | 8 | Concrete | 0.013 | 658 | 2 | 4 | 5 | 0.8 | SM14-Ex-EX35 | |
| Kirkland_Main-1771 | Kirkland_Manholes-871 | 340.54 | Kirkland_Manholes-872 | 339.98 | 74.2 | 0.75 | 8 | Concrete | 0.013 | 471 | 1 | 4 | 5 | 1 | SM14-Ex-EX35 | |
| Kirkland_Main-1772 | Kirkland_Manholes-872 | 339.98 | Kirkland_Manholes-869 | 325.94 | 265.2 | 5.29 | 8 | Concrete | 0.013 | 1,248 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX35 | |
| Kirkland_Main-1773 | Kirkland_Manholes-874 | 310.68 | Kirkland_Manholes-382 | 308.23 | 108.1 | 2.27 | 8 | PVC | 0.01 | 1,062 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1774 | Kirkland_Manholes-875 | 310.4 | Kirkland_Manholes-1073 | 302.05 | 254.5 | 3.28 | 8 | PVC | 0.01 | 1,277 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-1775 | Kirkland_Manholes-2900 | 302.3 | Kirkland_Manholes-876 | 301.25 | 160.8 | 0.65 | 8 | PVC | 0.01 | 570 | 6 | 40 | 46 | 8 | | |
| Kirkland_Main-1776 | Kirkland_Manholes-876 | 301.25 | Kirkland_Manholes-337 | 291.09 | 336.8 | 3.02 | 8 | PVC | 0.01 | 1,225 | 7 | 60 | 67 | 5.4 | | |
| Kirkland_Main-1777 | Kirkland_Manholes-877 | 295.2 | Kirkland_Manholes-884 | 291.06 | 114.3 | 3.62 | 8 | PVC | 0.01 | 1,342 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1778 | Kirkland_Manholes-884 | 291.06 | Kirkland_Manholes-881 | 290.87 | 47 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.3 | | |
| Kirkland_Main-1779 | Kirkland_Manholes-705 | 293.8 | Kirkland_Manholes-884 | 291.06 | 213.2 | 1.29 | 8 | PVC | 0.01 | 800 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-1780 | Kirkland_Manholes-881 | 290.87 | Kirkland_Manholes-885 | 286.75 | 194.6 | 2.12 | 8 | PVC | 0.01 | 1,026 | 11 | 60 | 71 | 6.9 | | |
| Kirkland_Main-1781 | Kirkland_Manholes-880 | 294.11 | Kirkland_Manholes-881 | 290.87 | 199.3 | 1.63 | 8 | PVC | 0.01 | 899 | 8 | 44 | 52 | 5.8 | | |
| Kirkland_Main-1782 | Kirkland_Manholes-879 | 310.92 | Kirkland_Manholes-880 | 294.11 | 360 | 4.67 | 8 | PVC | 0.01 | 1,524 | 7 | 40 | 46 | 3 | | |
| Kirkland_Main-1783 | Kirkland_Manholes-878 | 325.66 | Kirkland_Manholes-879 | 310.92 | 320.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 5 | 36 | 40 | 2.7 | | |
| Kirkland_Main-1784 | Kirkland_Manholes-886 | 291.6 | Kirkland_Manholes-885 | 286.75 | 178.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1785 | Kirkland_Manholes-887 | 294.74 | Kirkland_Manholes-886 | 291.6 | 177.9 | 1.77 | 8 | PVC | 0.01 | 937 | 2 | 8 | 10 | 1 | | |
| Kirkland_Main-1786 | Kirkland_Manholes-888 | 307.6 | Kirkland_Manholes-887 | 294.74 | 260 | 4.95 | 8 | PVC | 0.01 | 1,568 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1788 | Kirkland_Manholes-885 | 286.75 | Kirkland_Manholes-889 | 285.3 | 34.9 | 4.16 | 8 | PVC | 0.01 | 1,437 | 14 | 75 | 90 | 6.2 | | |
| Kirkland_Main-1789 | Kirkland_Manholes-336 | 286.9 | Kirkland_Manholes-889 | 285.3 | 212.5 | 0.75 | 8 | PVC | 0.01 | 612 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1790 | Kirkland_Manholes-889 | 285.3 | Kirkland_Manholes-890 | 280.21 | 299.8 | 1.7 | 8 | PVC | 0.01 | 919 | 17 | 83 | 100 | 10.9 | | |
| Kirkland_Main-1791 | Kirkland_Manholes-891 | 282.85 | Kirkland_Manholes-890 | 280.21 | 269.2 | 0.98 | 8 | PVC | 0.01 | 698 | 9 | 28 | 37 | 5.2 | | |
| Kirkland_Main-1792 | Kirkland_Manholes-892 | 286 | Kirkland_Manholes-891 | 282.85 | 80.7 | 3.9 | 8 | PVC | 0.01 | 1,393 | 7 | 24 | 31 | 2.2 | | |
| Kirkland_Main-1793 | Kirkland_Manholes-895 | 303.91 | Kirkland_Manholes-896 | 303.5 | 71 | 0.58 | 8 | PVC | 0.01 | 536 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1794 | Kirkland_Manholes-896 | 303.5 | Kirkland_Manholes-893 | 293.25 | 259.5 | 3.95 | 8 | PVC | 0.01 | 1,401 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-1795 | Kirkland_Manholes-894 | 293.53 | Kirkland_Manholes-893 | 293.25 | 69.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-1796 | Kirkland_Manholes-893 | 293.25 | Kirkland_Manholes-892 | 286 | 208.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 5 | 20 | 25 | 1.9 | | |
| Kirkland_Main-1797 | Kirkland_Manholes-897 | 317.07 | Kirkland_Manholes-896 | 303.5 | 263.1 | 5.16 | 8 | PVC | 0.01 | 1,601 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1798 | Kirkland_Manholes-955 | 318.15 | Kirkland_Manholes-956 | 317.42 | 90.2 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 12 | 13 | 2.1 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1799 | Kirkland_Manholes-956 | 317.42 | Kirkland_Manholes-957 | 315.92 | 143.6 | 1.04 | 8 | PVC | 0.01 | 720 | 2 | 16 | 18 | 2.5 | | |
| Kirkland_Main-1800 | Kirkland_Manholes-1294 | 129.1 | Kirkland_Manholes-1295 | 119.7 | 303.2 | 3.1 | 6 | Concrete | 0.013 | 443 | 3 | 8 | 11 | 2.6 | SM14-Ex-EX115 | |
| Kirkland_Main-1801 | Kirkland_Manholes-1296 | 129.32 | Kirkland_Manholes-1295 | 119.7 | 314.4 | 3.06 | 6 | Concrete | 0.013 | 440 | 61 | 296 | 358 | 81.2 | SM6 | |
| Kirkland_Main-1802 | Kirkland_Manholes-1301 | 241.1 | Kirkland_Manholes-1300 | 221.25 | 201.1 | 9.87 | 8 | Concrete | 0.013 | 1,704 | 3 | 16 | 20 | 1.2 | SM14-Ex-EX98 | |
| Kirkland_Main-1803 | Kirkland_Manholes-1299 | 227.62 | Kirkland_Manholes-1300 | 221.25 | 159.1 | 4 | 8 | Concrete | 0.013 | 1,085 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX101 | |
| Kirkland_Main-1804 | Kirkland_Manholes-1300 | 221.25 | Kirkland_Manholes-1250 | 210.15 | 248.6 | 4.47 | 8 | Concrete | 0.013 | 1,146 | 6 | 33 | 38 | 3.4 | SM14-Ex-EX101 | |
| Kirkland_Main-1805 | Kirkland_Manholes-1303 | 126.2 | Kirkland_Manholes-1295 | 119.7 | 386.9 | 1.68 | 6 | Concrete | 0.013 | 326 | 3 | 8 | 11 | 3.4 | SM14-Ex-EX115 | |
| Kirkland_Main-1806 | Kirkland_Manholes-1304 | 180.12 | Kirkland_Manholes-1258 | 154.28 | 295.6 | 8.74 | 6 | Concrete | 0.013 | 745 | 5 | 25 | 30 | 4 | SM14-Ex-EX106 | |
| Kirkland_Main-1807 | Kirkland_Manholes-1306 | 225.07 | Kirkland_Manholes-227 | 223.31 | 140.1 | 1.26 | 8 | PVC | 0.01 | 790 | 6 | 26 | 32 | 4 | | |
| Kirkland_Main-1808 | Kirkland_Manholes-1309 | 233.16 | Kirkland_Manholes-1308 | 229.72 | 344.3 | 1 | 8 | PVC | 0.01 | 705 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-1809 | Kirkland_Manholes-1308 | 229.72 | Kirkland_Manholes-1307 | 211.15 | 175.8 | 10.56 | 8 | PVC | 0.01 | 2,292 | 4 | 16 | 20 | 0.9 | | |
| Kirkland_Main-1810 | Kirkland_Manholes-1307 | 211.15 | Kirkland_Manholes-1252 | 181.71 | 226.9 | 12.97 | 8 | Concrete | 0.013 | 1,954 | 7 | 25 | 31 | 1.6 | SM14-Ex-EX100 | |
| Kirkland_Main-1812 | Kirkland_Manholes-1275 | 185.58 | Kirkland_Manholes-1276 | 172.95 | 322.8 | 3.91 | 8 | PVC | 0.01 | 1,395 | 2 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1813 | Kirkland_Manholes-1279 | 163.99 | Kirkland_Manholes-1278 | 160.09 | 249.2 | 1.56 | 6 | Concrete | 0.013 | 315 | 5 | 25 | 29 | 9.3 | SM14-Ex-EX103 | |
| Kirkland_Main-1814 | Kirkland_Manholes-1597 | 180.84 | Kirkland_Manholes-1601 | 173.67 | 138.4 | 5.18 | 8 | Concrete | 0.013 | 1,235 | 53 | 159 | 212 | 17.2 | SM14-Ex-EX121 | |
| Kirkland_Main-1815 | Kirkland_Manholes-1603 | 202.22 | Kirkland_Manholes-1602 | 196.74 | 63.2 | 8.68 | 8 | Concrete | 0.013 | 1,598 | 65 | 226 | 291 | 18.2 | SM14-Ex-EX172 | |
| Kirkland_Main-1817 | Kirkland_Manholes-1570 | 121.83 | Kirkland_Manholes-1604 | 117.22 | 301 | 1.53 | 8 | Concrete | 0.013 | 671 | 3 | 8 | 12 | 1.7 | SM14-Ex-EX120 | |
| Kirkland_Main-1818 | Kirkland_Manholes-1604 | 117.22 | Kirkland_Manholes-1608 | 108.38 | 320.2 | 2.76 | 8 | Concrete | 0.013 | 901 | 7 | 49 | 56 | 6.3 | SM14-Ex-EX119 | |
| Kirkland_Main-1823 | Kirkland_Manholes-1607 | 115.82 | Kirkland_Manholes-1608 | 108.38 | 281.1 | 2.65 | 8 | PVC | 0.01 | 1,147 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-1824 | Kirkland_Manholes-1608 | 108.38 | Kirkland_Manholes-1609 | 99.56 | 224.5 | 3.93 | 8 | Concrete | 0.013 | 1,075 | 8 | 66 | 74 | 6.9 | SM14-Ex-EX119 | |
| Kirkland_Main-1825 | Kirkland_Manholes-1609 | 99.56 | Kirkland_Manholes-1610 | 98.61 | 103.1 | 0.92 | 8 | Concrete | 0.013 | 521 | 8 | 74 | 82 | 15.8 | SM14-Ex-EX119 | |
| Kirkland_Main-1826 | Kirkland_Manholes-1615 | 109.23 | Kirkland_Manholes-1610 | 98.61 | 252.9 | 4.2 | 8 | PVC | 0.01 | 1,445 | 3 | 16 | 20 | 1.4 | | |
| Kirkland_Main-1827 | Kirkland_Manholes-1610 | 98.61 | Kirkland_Manholes-1611 | 98.01 | 137.6 | 0.44 | 8 | Concrete | 0.013 | 358 | 11 | 99 | 110 | 30.8 | SM14-Ex-EX160 | |
| Kirkland_Main-1828 | Kirkland_Manholes-1611 | 98.01 | Kirkland_Manholes-1614 | 91.09 | 116.4 | 5.94 | 8 | Concrete | 0.013 | 1,322 | 11 | 107 | 118 | 9 | SM14-Ex-EX167 | |
| Kirkland_Main-1830 | Kirkland_Manholes-350 | 235.63 | Kirkland_Manholes-351 | 234.93 | 99 | 0.71 | 8 | PVC | 0.01 | 593 | 12 | 32 | 43 | 7.3 | | |
| Kirkland_Main-1831 | Kirkland_Manholes-351 | 234.93 | Kirkland_Manholes-352 | 234.2 | 197.8 | 0.37 | 8 | PVC | 0.01 | 428 | 30 | 167 | 197 | 46 | | |
| Kirkland_Main-1832 | Kirkland_Manholes-353 | 237.24 | Kirkland_Manholes-352 | 234.2 | 58.3 | 5.21 | 8 | PVC | 0.01 | 1,609 | 0 | 8 | 8 | 0.5 | | |
| Kirkland_Main-1833 | Kirkland_Manholes-354 | 240.05 | Kirkland_Manholes-353 | 237.24 | 111.3 | 2.52 | 8 | PVC | 0.01 | 1,120 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1834 | Kirkland_Manholes-355 | 245.23 | Kirkland_Manholes-357 | 224.18 | 289.7 | 7.27 | 8 | PVC | 0.01 | 1,901 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1835 | Kirkland_Manholes-357 | 224.18 | Kirkland_Manholes-356 | 218.57 | 38.2 | 14.7 | 8 | PVC | 0.01 | 2,703 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-1836 | Kirkland_Manholes-356 | 218.57 | Kirkland_Manholes-358 | 217.4 | 168.8 | 0.69 | 21 | PVC | 0.01 | 7,697 | 528 | 1,927 | 2,455 | 31.9 | | |
| Kirkland_Main-1837 | Kirkland_Manholes-358 | 217.4 | Kirkland_Manholes-362 | 216.81 | 209.2 | 0.28 | 21 | PVC | 0.01 | 4,910 | 528 | 1,931 | 2,459 | 50.1 | | |
| Kirkland_Main-1838 | Kirkland_Manholes-365 | 215.67 | Kirkland_Manholes-366 | 214.9 | 145.3 | 0.53 | 8 | PVC | 0.01 | 513 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-1839 | Kirkland_Manholes-366 | 214.9 | Kirkland_Manholes-367 | 213.02 | 57.5 | 3.27 | 8 | PVC | 0.01 | 1,275 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-1840 | Kirkland_Manholes-364 | 215.51 | Kirkland_Manholes-367 | 213.02 | 231.6 | 1.07 | 18 | PVC | 0.01 | 6,354 | 538 | 1,987 | 2,525 | 39.7 | | |
| Kirkland_Main-1841 | Kirkland_Manholes-363 | 216.4 | Kirkland_Manholes-3048 | 215.92 | 195.5 | 0.25 | 21 | PVC | 0.01 | 4,581 | 533 | 1,951 | 2,484 | 54.2 | | |
| Kirkland_Main-1842 | Kirkland_Manholes-361 | 216.74 | Kirkland_Manholes-363 | 216.4 | 169.2 | 0.2 | 21 | PVC | 0.01 | 4,140 | 533 | 1,947 | 2,480 | 59.9 | | |
| Kirkland_Main-1843 | Kirkland_Manholes-359 | 233.48 | Kirkland_Manholes-360 | 230.84 | 309.4 | 0.85 | 8 | PVC | 0.01 | 651 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-1844 | Kirkland_Manholes-360 | 230.84 | Kirkland_Manholes-361 | 216.74 | 103.8 | 13.58 | 8 | PVC | 0.01 | 2,599 | 4 | 8 | 12 | 0.5 | | |
| Kirkland_Main-1845 | Kirkland_Manholes-400 | 274.94 | Kirkland_Manholes-399 | 268.35 | 106.2 | 6.21 | 8 | PVC | 0.01 | 1,757 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1846 | Kirkland_Manholes-399 | 268.35 | Kirkland_Manholes-394 | 266.89 | 274.5 | 0.53 | 8 | PVC | 0.01 | 514 | 3 | 8 | 11 | 2.1 | | |
| Kirkland_Main-1847 | Kirkland_Manholes-405 | 259.21 | Kirkland_Manholes-404 | 259.2 | 31.6 | 0.03 | 8 | PVC | 0.01 | 125 | 0 | 4 | 4 | 3.2 | | |
| Kirkland_Main-1848 | Kirkland_Manholes-404 | 259.2 | Kirkland_Manholes-403 | 257.79 | 99.7 | 1.41 | 8 | PVC | 0.01 | 839 | 0 | 8 | 8 | 1 | | |
| Kirkland_Main-1849 | Kirkland_Manholes-403 | 257.79 | Kirkland_Manholes-402 | 257.52 | 55.3 | 0.49 | 8 | PVC | 0.01 | 493 | 1 | 12 | 12 | 2.5 | | |
| Kirkland_Main-1850 | Kirkland_Manholes-402 | 257.52 | Kirkland_Manholes-401 | 256.8 | 97.3 | 0.74 | 8 | PVC | 0.01 | 607 | 1 | 16 | 17 | 2.8 | | |
| Kirkland_Main-1851 | Kirkland_Manholes-401 | 256.8 | Kirkland_Manholes-395 | 253.88 | 284.1 | 1.03 | 8 | PVC | 0.01 | 715 | 2 | 20 | 22 | 3.1 | | |
| Kirkland_Main-1852 | Kirkland_Manholes-406 | 288.66 | Kirkland_Manholes-393 | 288.03 | 160.6 | 0.39 | 8 | PVC | 0.01 | 442 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-1853 | Kirkland_Manholes-410 | 278.41 | Kirkland_Manholes-409 | 264.84 | 185.6 | 7.31 | 8 | PVC | 0.01 | 1,906 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1854 | Kirkland_Manholes-425 | 290.3 | Kirkland_Manholes-420 | 281.46 | 112.7 | 7.84 | 8 | PVC | 0.01 | 1,974 | 6 | 28 | 34 | 1.7 | | |
| Kirkland_Main-1855 | Kirkland_Manholes-370 | 206.64 | Kirkland_Manholes-2869 | 204.84 | 75.1 | 2.4 | 18 | PVC | 0.01 | 9,487 | 548 | 2,038 | 2,587 | 27.3 | | |
| Kirkland_Main-1856 | Kirkland_Manholes-436 | 58.61 | Kirkland_Manholes-437 | 58.56 | 24.6 | 0.22 | 12 | Concrete | 0.013 | 750 | 197 | 644 | 842 | 112.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1857 | Kirkland_Manholes-437 | 58.56 | Kirkland_Manholes-188 | 58.06 | 273 | 0.18 | 12 | Concrete | 0.013 | 684 | 202 | 657 | 859 | 125.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1858 | Kirkland_Manholes-450 | 130.07 | Kirkland_Manholes-448 | 127.19 | 147.1 | 1.96 | 8 | PVC | 0.01 | 987 | 4 | 17 | 21 | 2.1 | | |
| Kirkland_Main-1859 | Kirkland_Manholes-448 | 127.19 | Kirkland_Manholes-449 | 124.43 | 143 | 1.93 | 8 | PVC | 0.01 | 979 | 4 | 21 | 25 | 2.5 | | |
| Kirkland_Main-1860 | Kirkland_Manholes-449 | 124.43 | Kirkland_Manholes-446 | 123.86 | 143.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 26 | 29 | 6.5 | | Drop Connection |
| Kirkland_Main-1861 | Kirkland_Manholes-447 | 95.3 | Kirkland_Manholes-446 | 94.25 | 125.1 | 0.84 | 8 | PVC | 0.01 | 646 | 0 | 4 | 4 | 0.7 | | |
| Kirkland_Main-1862 | Kirkland_Manholes-445 | 128.4 | Kirkland_Manholes-444 | 92.89 | 173.2 | 20.5 | 8 | PVC | 0.01 | 3,192 | 0 | 4 | 4 | 0.1 | | |
| Kirkland_Main-1863 | Kirkland_Manholes-446 | 94.25 | Kirkland_Manholes-444 | 92.89 | 143.2 | 0.95 | 8 | PVC | 0.01 | 687 | 4 | 34 | 38 | 5.5 | | |
| Kirkland_Main-1864 | Kirkland_Manholes-1522 | 291.35 | Kirkland_Manholes-145 | 271.65 | 161.3 | 12.21 | 8 | PVC | 0.01 | 2,464 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1865 | Kirkland_Manholes-145 | 271.65 | Kirkland_Manholes-1315 | 270.9 | 108.1 | 0.69 | 8 | PVC | 0.01 | 587 | 14 | 48 | 62 | 10.5 | | |
| Kirkland_Main-1866 | Kirkland_Manholes-1314 | 312.02 | Kirkland_Manholes-1522 | 291.35 | 177.8 | 11.62 | 8 | PVC | 0.01 | 2,404 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1867 | Kirkland_Manholes-1515 | 261.7 | Kirkland_Manholes-1516 | 259.7 | 167.2 | 1.2 | 8 | Concrete | 0.013 | 593 | 33 | 147 | 180 | 30.4 | SM14-Ex-EX131 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1868 | Kirkland_Manholes-1516 | 259.7 | Kirkland_Manholes-1593 | 256.67 | 397.6 | 0.76 | 8 | Concrete | 0.013 | 473 | 37 | 151 | 188 | 39.7 | SM14-Ex-EX131 | |
| Kirkland_Main-1869 | Kirkland_Manholes-1520 | 262.79 | Kirkland_Manholes-1517 | 262.15 | 299 | 0.21 | 8 | Concrete | 0.013 | 251 | 2 | 4 | 6 | 2.2 | SM14-Ex-EX129 | |
| Kirkland_Main-1870 | Kirkland_Manholes-1518 | 277.88 | Kirkland_Manholes-1517 | 262.15 | 157.4 | 10 | 8 | Concrete | 0.013 | 1,715 | 12 | 28 | 40 | 2.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1871 | Kirkland_Manholes-1517 | 262.15 | Kirkland_Manholes-1592 | 255.76 | 316.1 | 2.02 | 8 | Concrete | 0.013 | 771 | 14 | 36 | 50 | 6.5 | SM14-Ex-EX124 | |
| Kirkland_Main-1872 | Kirkland_Manholes-1519 | 265 | Kirkland_Manholes-1521 | 258.62 | 235.2 | 2.71 | 8 | Concrete | 0.013 | 893 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX128 | |
| Kirkland_Main-1873 | Kirkland_Manholes-1521 | 258.62 | Kirkland_Manholes-1524 | 207.32 | 404.3 | 12.69 | 8 | Concrete | 0.013 | 1,932 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX128 | |
| Kirkland_Main-1874 | Kirkland_Manholes-1552 | 337.73 | Kirkland_Manholes-761 | 326.09 | 158.4 | 7.35 | 8 | Concrete | 0.013 | 1,470 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1875 | Kirkland_Manholes-761 | 326.09 | Kirkland_Manholes-760 | 311.91 | 217.3 | 6.53 | 8 | Concrete | 0.013 | 1,385 | 4 | 8 | 12 | 0.9 | SM14-Ex-EX124 | |
| Kirkland_Main-1876 | Kirkland_Manholes-760 | 311.91 | Kirkland_Manholes-1538 | 302.73 | 273.6 | 3.36 | 8 | Concrete | 0.013 | 993 | 6 | 12 | 18 | 1.8 | SM14-Ex-EX124 | |
| Kirkland_Main-1877 | Kirkland_Manholes-1542 | 314.5 | Kirkland_Manholes-1541 | 294.69 | 208.5 | 9.5 | 8 | Concrete | 0.013 | 1,672 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX123 | |
| Kirkland_Main-1878 | Kirkland_Manholes-1540 | 296.8 | Kirkland_Manholes-1541 | 294.69 | 76 | 2.78 | 8 | Concrete | 0.013 | 904 | 4 | 8 | 12 | 1.3 | SM14-Ex-EX123 | |
| Kirkland_Main-1879 | Kirkland_Manholes-1539 | 301.51 | Kirkland_Manholes-1540 | 296.8 | 362.1 | 1.3 | 8 | Concrete | 0.013 | 619 | 3 | 4 | 7 | 1.1 | SM14-Ex-EX123 | |
| Kirkland_Main-1880 | Kirkland_Manholes-1523 | 194.94 | Kirkland_Manholes-1597 | 180.84 | 315.7 | 4.47 | 8 | Concrete | 0.013 | 1,146 | 45 | 143 | 188 | 16.4 | SM14-Ex-EX121 | |
| Kirkland_Main-1881 | Kirkland_Manholes-1524 | 207.32 | Kirkland_Manholes-1523 | 194.94 | 95.1 | 13.01 | 8 | Concrete | 0.013 | 1,956 | 4 | 12 | 16 | 0.8 | SM14-Ex-EX128 | |
| Kirkland_Main-1882 | Kirkland_Manholes-1528 | 217.87 | Kirkland_Manholes-1523 | 194.94 | 317.2 | 7.23 | 8 | Concrete | 0.013 | 1,458 | 41 | 127 | 168 | 11.5 | SM14-Ex-EX121 | |
| Kirkland_Main-1883 | Kirkland_Manholes-1525 | 281.6 | Kirkland_Manholes-1526 | 273.99 | 396.4 | 1.92 | 8 | Concrete | 0.013 | 751 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX127 | |
| Kirkland_Main-1884 | Kirkland_Manholes-1526 | 273.99 | Kirkland_Manholes-1527 | 258.94 | 183.5 | 8.2 | 8 | Concrete | 0.013 | 1,553 | 3 | 8 | 11 | 0.7 | SM14-Ex-EX127 | |
| Kirkland_Main-1885 | Kirkland_Manholes-1527 | 258.94 | Kirkland_Manholes-1528 | 217.87 | 397.7 | 10.33 | 8 | Concrete | 0.013 | 1,743 | 4 | 12 | 16 | 0.9 | SM14-Ex-EX127 | |
| Kirkland_Main-1886 | Kirkland_Manholes-1535 | 304.79 | Kirkland_Manholes-1534 | 301.8 | 155.7 | 1.92 | 8 | Concrete | 0.013 | 752 | 0 | 4 | 4 | 0.6 | SM14-Ex-EX126 | |
| Kirkland_Main-1887 | Kirkland_Manholes-1534 | 301.8 | Kirkland_Manholes-1533 | 294.07 | 244.9 | 3.16 | 8 | Concrete | 0.013 | 963 | 1 | 8 | 9 | 1 | SM14-Ex-EX126 | |
| Kirkland_Main-1888 | Kirkland_Manholes-775 | 172.73 | KC_Manholes-5 | 169.15 | 345.4 | 1.04 | 8 | PVC | 0.01 | 718 | 5 | 32 | 37 | 5.2 | | |
| Kirkland_Main-1889 | Kirkland_Manholes-774 | 192.94 | KC_Manholes-5 | 169.15 | 221.2 | 10.75 | 8 | PVC | 0.01 | 2,312 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1890 | Kirkland_Manholes-773 | 227.51 | Kirkland_Manholes-774 | 192.94 | 170.2 | 20.31 | 8 | PVC | 0.01 | 3,177 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1891 | Kirkland_Manholes-772 | 214.68 | Kirkland_Manholes-771 | 213.99 | 63.9 | 1.08 | 8 | PVC | 0.01 | 733 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1892 | Kirkland_Manholes-443 | 91.49 | Kirkland_Manholes-442 | 83.66 | 233.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 40 | 47 | 87 | 6.8 | | |
| Kirkland_Main-1893 | Kirkland_Manholes-442 | 83.66 | Kirkland_Manholes-441 | 83.38 | 212.8 | 0.13 | 8 | PVC | 0.01 | 256 | 40 | 51 | 92 | 35.8 | | |
| Kirkland_Main-1894 | Kirkland_Manholes-441 | 83.38 | Kirkland_Manholes-433 | 80.24 | 108 | 2.91 | 8 | PVC | 0.01 | 1,202 | 40 | 55 | 96 | 8 | | |
| Kirkland_Main-1895 | Kirkland_Manholes-432 | 97.11 | Kirkland_Manholes-433 | 80.24 | 205.7 | 8.2 | 8 | PVC | 0.01 | 2,019 | 99 | 358 | 457 | 22.6 | SM14-Ex-EX30 | |
| Kirkland_Main-1896 | Kirkland_Manholes-426 | 144.6 | Kirkland_Manholes-427 | 143.58 | 254.5 | 0.4 | 8 | Concrete | 0.013 | 343 | 93 | 333 | 426 | 124.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1897 | Kirkland_Manholes-427 | 143.58 | Kirkland_Manholes-428 | 141.37 | 251.3 | 0.88 | 8 | Concrete | 0.013 | 509 | 99 | 337 | 436 | 85.7 | SM14-Ex-EX30 | |
| Kirkland_Main-1898 | Kirkland_Manholes-428 | 141.37 | Kirkland_Manholes-429 | 138.12 | 320.6 | 1.01 | 8 | Concrete | 0.013 | 546 | 99 | 341 | 440 | 80.6 | SM14-Ex-EX30 | |
| Kirkland_Main-1899 | Kirkland_Manholes-429 | 138.12 | Kirkland_Manholes-430 | 132.21 | 248.9 | 2.37 | 8 | Concrete | 0.013 | 836 | 99 | 346 | 444 | 53.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1900 | Kirkland_Manholes-430 | 132.21 | Kirkland_Manholes-431 | 114.37 | 310.4 | 5.75 | 8 | Concrete | 0.013 | 1,300 | 99 | 350 | 449 | 34.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1901 | Kirkland_Manholes-431 | 114.37 | Kirkland_Manholes-432 | 97.11 | 290.4 | 5.94 | 8 | Concrete | 0.013 | 1,322 | 99 | 354 | 453 | 34.3 | SM14-Ex-EX30 | |
| Kirkland_Main-1902 | Kirkland_Manholes-433 | 80.24 | Kirkland_Manholes-434 | 74.08 | 187.9 | 3.28 | 8 | Concrete | 0.013 | 982 | 139 | 418 | 557 | 56.7 | SM14-Ex-EX30 | |
| Kirkland_Main-1903 | Kirkland_Manholes-434 | 74.08 | Kirkland_Manholes-435 | 64.4 | 325.2 | 2.98 | 8 | Concrete | 0.013 | 936 | 139 | 422 | 562 | 60 | SM14-Ex-EX30 | |
| Kirkland_Main-1904 | Kirkland_Manholes-439 | 82.56 | Kirkland_Manholes-438 | 74.46 | 270.1 | 3 | 8 | PVC | 0.01 | 1,221 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1905 | Kirkland_Manholes-438 | 74.46 | Kirkland_Manholes-435 | 64.4 | 260.6 | 3.86 | 8 | Concrete | 0.013 | 1,065 | 58 | 213 | 271 | 25.5 | SM14-Ex-EX31 | |
| Kirkland_Main-1906 | Kirkland_Manholes-435 | 64.4 | Kirkland_Manholes-436 | 58.61 | 312.5 | 1.85 | 12 | Concrete | 0.013 | 2,176 | 197 | 640 | 837 | 38.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1907 | Kirkland_Manholes-1018 | 179.75 | Kirkland_Manholes-451 | 173.02 | 146.6 | 4.59 | 8 | Concrete | 0.013 | 1,162 | 50 | 171 | 221 | 19 | SM14-Ex-EX31 | |
| Kirkland_Main-1908 | Kirkland_Manholes-453 | 159.42 | Kirkland_Manholes-454 | 126.39 | 122.9 | 26.88 | 8 | Concrete | 0.013 | 2,812 | 52 | 184 | 236 | 8.4 | SM14-Ex-EX31 | |
| Kirkland_Main-1909 | Kirkland_Manholes-440 | 131.78 | Kirkland_Manholes-454 | 126.39 | 361.7 | 1.49 | 8 | Ductile Iron | 0.012 | 717 | 5 | 17 | 22 | 3.1 | SM14-Ex-EX31 | |
| Kirkland_Main-1910 | Kirkland_Manholes-1026 | 149.27 | Kirkland_Manholes-440 | 131.78 | 156.8 | 11.16 | 8 | PVC | 0.01 | 2,355 | 5 | 13 | 17 | 0.7 | | |
| Kirkland_Main-1911 | Kirkland_Manholes-451 | 173.02 | Kirkland_Manholes-452 | 170.49 | 70.2 | 3.6 | 8 | Concrete | 0.013 | 1,030 | 50 | 175 | 225 | 21.9 | SM14-Ex-EX31 | |
| Kirkland_Main-1912 | Kirkland_Manholes-452 | 170.49 | Kirkland_Manholes-453 | 159.42 | 88.9 | 12.45 | 8 | Concrete | 0.013 | 1,914 | 51 | 179 | 230 | 12 | SM14-Ex-EX31 | |
| Kirkland_Main-1913 | Kirkland_Manholes-454 | 126.39 | Kirkland_Manholes-438 | 74.46 | 305.4 | 17.01 | 8 | Concrete | 0.013 | 2,237 | 58 | 205 | 263 | 11.7 | SM14-Ex-EX31 | |
| Kirkland_Main-1914 | Kirkland_Manholes-484 | 295.92 | Kirkland_Manholes-483 | 294.22 | 69.9 | 2.43 | 8 | PVC | 0.01 | 1,098 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1915 | Kirkland_Manholes-483 | 294.22 | Kirkland_Manholes-482 | 293.97 | 63.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-1916 | Kirkland_Manholes-481 | 300.21 | Kirkland_Manholes-482 | 293.97 | 44.6 | 13.98 | 8 | PVC | 0.01 | 2,636 | 7 | 40 | 47 | 1.8 | | |
| Kirkland_Main-1917 | Kirkland_Manholes-477 | 317.64 | Kirkland_Manholes-481 | 300.21 | 198.9 | 8.76 | 8 | PVC | 0.01 | 2,087 | 6 | 36 | 42 | 2 | | |
| Kirkland_Main-1918 | Kirkland_Manholes-478 | 318.91 | Kirkland_Manholes-477 | 317.64 | 130.7 | 0.97 | 8 | PVC | 0.01 | 695 | 5 | 32 | 37 | 5.3 | | |
| Kirkland_Main-1919 | Kirkland_Manholes-479 | 328.09 | Kirkland_Manholes-478 | 318.91 | 81.5 | 11.27 | 8 | PVC | 0.01 | 2,367 | 5 | 28 | 33 | 1.4 | | |
| Kirkland_Main-1920 | Kirkland_Manholes-476 | 330.32 | Kirkland_Manholes-475 | 322.42 | 166.4 | 4.75 | 8 | PVC | 0.01 | 1,536 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1921 | Kirkland_Manholes-475 | 322.42 | Kirkland_Manholes-473 | 288.65 | 238.6 | 14.15 | 8 | PVC | 0.01 | 2,653 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1922 | Kirkland_Manholes-474 | 290.07 | Kirkland_Manholes-473 | 288.65 | 187.1 | 0.76 | 8 | PVC | 0.01 | 614 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1923 | Kirkland_Manholes-473 | 288.65 | Kirkland_Manholes-468 | 238.51 | 297.1 | 16.88 | 8 | PVC | 0.01 | 2,896 | 5 | 16 | 21 | 0.7 | | |
| Kirkland_Main-1924 | Kirkland_Manholes-468 | 238.51 | Kirkland_Manholes-462 | 219.91 | 120.9 | 15.39 | 8 | PVC | 0.01 | 2,766 | 6 | 20 | 26 | 0.9 | | |
| Kirkland_Main-1925 | Kirkland_Manholes-463 | 227.23 | Kirkland_Manholes-462 | 219.91 | 71.2 | 10.28 | 8 | PVC | 0.01 | 2,261 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1926 | Kirkland_Manholes-464 | 254.44 | Kirkland_Manholes-463 | 227.23 | 171 | 15.91 | 8 | PVC | 0.01 | 2,812 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1927 | Kirkland_Manholes-462 | 219.91 | Kirkland_Manholes-465 | 166.54 | 349.5 | 15.27 | 8 | PVC | 0.01 | 2,755 | 8 | 32 | 40 | 1.4 | | |
| Kirkland_Main-1928 | Kirkland_Manholes-465 | 166.54 | Kirkland_Manholes-466 | 159.47 | 196.4 | 3.6 | 8 | PVC | 0.01 | 1,338 | 8 | 36 | 44 | 3.3 | | |
| Kirkland_Main-1929 | Kirkland_Manholes-467 | 166.95 | Kirkland_Manholes-466 | 159.47 | 59.4 | 12.59 | 8 | PVC | 0.01 | 2,502 | 5 | 16 | 21 | 0.8 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1930 | Kirkland_Manholes-469 | 217.48 | Kirkland_Manholes-470 | 207.2 | 162.3 | 6.34 | 8 | PVC | 0.01 | 1,775 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1931 | Kirkland_Manholes-471 | 208.89 | Kirkland_Manholes-470 | 207.2 | 106.2 | 1.59 | 8 | PVC | 0.01 | 889 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1932 | Kirkland_Manholes-470 | 207.2 | Kirkland_Manholes-472 | 192.62 | 137.7 | 10.59 | 8 | PVC | 0.01 | 2,294 | 2 | 12 | 13 | 0.6 | | |
| Kirkland_Main-1934 | Kirkland_Manholes-489 | 206.41 | Kirkland_Manholes-467 | 166.95 | 178.4 | 22.12 | 8 | PVC | 0.01 | 3,316 | 5 | 12 | 16 | 0.5 | | |
| Kirkland_Main-1935 | Kirkland_Manholes-491 | 317.17 | Kirkland_Manholes-492 | 300.1 | 240.7 | 7.09 | 8 | PVC | 0.01 | 1,878 | 3 | 8 | 11 | 0.6 | | |
| Kirkland_Main-1936 | Kirkland_Manholes-492 | 300.1 | Kirkland_Manholes-778 | 273.49 | 272.5 | 9.76 | 8 | PVC | 0.01 | 2,203 | 3 | 12 | 15 | 0.7 | | |
| Kirkland_Main-1937 | Kirkland_Manholes-778 | 273.49 | Kirkland_Manholes-783 | 251.91 | 166.5 | 12.96 | 8 | PVC | 0.01 | 2,539 | 4 | 16 | 20 | 0.8 | | |
| Kirkland_Main-1938 | Kirkland_Manholes-783 | 251.91 | Kirkland_Manholes-782 | 245.67 | 36.9 | 16.9 | 8 | PVC | 0.01 | 2,898 | 16 | 91 | 108 | 3.7 | | |
| Kirkland_Main-1939 | Kirkland_Manholes-779 | 276.61 | Kirkland_Manholes-486 | 260.65 | 97.8 | 16.33 | 8 | PVC | 0.01 | 2,849 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1940 | Kirkland_Manholes-486 | 260.65 | Kirkland_Manholes-487 | 257.38 | 130.2 | 2.51 | 8 | PVC | 0.01 | 1,117 | 12 | 68 | 79 | 7.1 | | |
| Kirkland_Main-1942 | Kirkland_Manholes-487 | 257.38 | Kirkland_Manholes-783 | 251.91 | 251.1 | 2.18 | 8 | PVC | 0.01 | 1,041 | 12 | 72 | 84 | 8 | | |
| Kirkland_Main-1943 | Kirkland_Manholes-781 | 270.16 | Kirkland_Manholes-782 | 245.67 | 162 | 15.11 | 8 | PVC | 0.01 | 2,741 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1944 | Kirkland_Manholes-780 | 304.33 | Kirkland_Manholes-781 | 270.16 | 338 | 10.11 | 8 | PVC | 0.01 | 2,242 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1945 | Kirkland_Manholes-782 | 245.67 | Kirkland_Manholes-785 | 203.06 | 217.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 19 | 103 | 122 | 3.9 | | |
| Kirkland_Main-1946 | Kirkland_Manholes-785 | 203.06 | Kirkland_Manholes-784 | 186.93 | 82.2 | 19.62 | 8 | PVC | 0.01 | 3,123 | 19 | 107 | 127 | 4.1 | | |
| Kirkland_Main-1947 | Kirkland_Manholes-784 | 186.93 | Kirkland_Manholes-786 | 173.41 | 68.9 | 19.64 | 8 | PVC | 0.01 | 3,124 | 58 | 262 | 321 | 10.3 | | |
| Kirkland_Main-1948 | Kirkland_Manholes-789 | 234.78 | Kirkland_Manholes-788 | 234.04 | 150 | 0.49 | 8 | PVC | 0.01 | 495 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1949 | Kirkland_Manholes-788 | 234.04 | Kirkland_Manholes-787 | 233.49 | 110.1 | 0.5 | 8 | PVC | 0.01 | 498 | 1 | 8 | 9 | 1.8 | | |
| Kirkland_Main-1950 | Kirkland_Manholes-787 | 233.49 | Kirkland_Manholes-790 | 227.7 | 106.2 | 5.45 | 8 | PVC | 0.01 | 1,646 | 2 | 12 | 14 | 0.8 | | |
| Kirkland_Main-1951 | Kirkland_Manholes-485 | 265.21 | Kirkland_Manholes-486 | 260.65 | 233.3 | 1.95 | 8 | PVC | 0.01 | 986 | 10 | 60 | 70 | 7.1 | | |
| Kirkland_Main-1952 | Kirkland_Manholes-490 | 279.75 | Kirkland_Manholes-485 | 265.21 | 234 | 6.21 | 8 | PVC | 0.01 | 1,758 | 9 | 56 | 65 | 3.7 | | |
| Kirkland_Main-1953 | Kirkland_Manholes-482 | 293.97 | Kirkland_Manholes-490 | 279.75 | 98.3 | 14.47 | 8 | PVC | 0.01 | 2,682 | 9 | 52 | 60 | 2.3 | | |
| Kirkland_Main-1954 | Kirkland_Manholes-791 | 327.42 | Kirkland_Manholes-491 | 317.17 | 287.1 | 3.57 | 6 | PVC | 0.01 | 619 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX47 | |
| Kirkland_Main-1955 | Kirkland_Manholes-796 | 329.52 | Kirkland_Manholes-479 | 328.09 | 60.4 | 2.37 | 8 | PVC | 0.01 | 1,085 | 4 | 24 | 28 | 2.6 | | |
| Kirkland_Main-1956 | Kirkland_Manholes-802 | 309.62 | Kirkland_Manholes-801 | 301.38 | 220.6 | 3.74 | 8 | PVC | 0.01 | 1,363 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1957 | Kirkland_Manholes-801 | 301.38 | Kirkland_Manholes-800 | 299.84 | 122.4 | 1.26 | 8 | PVC | 0.01 | 791 | 3 | 8 | 11 | 1.4 | | |
| Kirkland_Main-1958 | Kirkland_Manholes-800 | 299.84 | Kirkland_Manholes-799 | 299.17 | 200.4 | 0.33 | 8 | PVC | 0.01 | 408 | 4 | 12 | 16 | 3.9 | | |
| Kirkland_Main-1960 | Kirkland_Manholes-797 | 330.09 | Kirkland_Manholes-798 | 328.4 | 134 | 1.26 | 8 | PVC | 0.01 | 792 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1961 | Kirkland_Manholes-798 | 328.4 | Kirkland_Manholes-799 | 299.17 | 250.4 | 11.67 | 8 | PVC | 0.01 | 2,409 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1962 | Kirkland_Manholes-799 | 299.17 | Kirkland_Manholes-803 | 278.64 | 308 | 6.67 | 8 | PVC | 0.01 | 1,820 | 7 | 24 | 31 | 1.7 | | |
| Kirkland_Main-1963 | Kirkland_Manholes-805 | 300.26 | Kirkland_Manholes-806 | 295.73 | 104.4 | 4.34 | 8 | PVC | 0.01 | 1,468 | 6 | 24 | 30 | 2 | | |
| Kirkland_Main-1964 | Kirkland_Manholes-806 | 295.73 | Kirkland_Manholes-804 | 284.1 | 194.3 | 5.99 | 8 | PVC | 0.01 | 1,725 | 7 | 28 | 35 | 2 | | |
| Kirkland_Main-1965 | Kirkland_Manholes-807 | 300.8 | Kirkland_Manholes-805 | 300.26 | 78.9 | 0.68 | 8 | PVC | 0.01 | 583 | 6 | 20 | 26 | 4.4 | | |
| Kirkland_Main-1966 | Kirkland_Manholes-819 | 270.84 | Kirkland_Manholes-818 | 259.9 | 158.1 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1967 | Kirkland_Manholes-818 | 259.9 | Kirkland_Manholes-816 | 252.1 | 223.2 | 3.49 | 8 | PVC | 0.01 | 1,318 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1968 | Kirkland_Manholes-816 | 252.1 | Kirkland_Manholes-815 | 248.52 | 125.8 | 2.85 | 8 | PVC | 0.01 | 1,190 | 4 | 12 | 16 | 1.3 | | |
| Kirkland_Main-1969 | Kirkland_Manholes-817 | 249.75 | Kirkland_Manholes-815 | 248.52 | 170.1 | 0.72 | 8 | PVC | 0.01 | 600 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1970 | Kirkland_Manholes-814 | 224.81 | Kirkland_Manholes-813 | 224.1 | 119.5 | 0.59 | 8 | PVC | 0.01 | 543 | 31 | 127 | 158 | 29.1 | | |
| Kirkland_Main-1971 | Kirkland_Manholes-813 | 224.1 | Kirkland_Manholes-811 | 220.71 | 283.2 | 1.2 | 8 | PVC | 0.01 | 771 | 33 | 131 | 164 | 21.3 | | |
| Kirkland_Main-1972 | Kirkland_Manholes-810 | 231.27 | Kirkland_Manholes-811 | 220.71 | 86.4 | 12.23 | 8 | PVC | 0.01 | 2,465 | 4 | 12 | 16 | 0.6 | | |
| Kirkland_Main-1973 | Kirkland_Manholes-811 | 220.71 | Kirkland_Manholes-812 | 219.12 | 123.9 | 1.28 | 8 | PVC | 0.01 | 799 | 38 | 147 | 185 | 23.1 | | |
| Kirkland_Main-1974 | Kirkland_Manholes-809 | 238.49 | Kirkland_Manholes-810 | 231.27 | 197.7 | 3.65 | 8 | PVC | 0.01 | 1,347 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1975 | Kirkland_Manholes-808 | 239.21 | Kirkland_Manholes-809 | 238.5 | 177.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | Drop Connection |
| Kirkland_Main-1976 | Kirkland_Manholes-812 | 219.12 | Kirkland_Manholes-784 | 186.93 | 281.2 | 11.45 | 8 | PVC | 0.01 | 2,385 | 39 | 151 | 190 | 7.9 | | |
| Kirkland_Main-1977 | Kirkland_Manholes-822 | 337.49 | Kirkland_Manholes-823 | 321.62 | 170.9 | 9.29 | 8 | Concrete | 0.013 | 1,653 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX69 | |
| Kirkland_Main-1978 | Kirkland_Manholes-823 | 321.62 | Kirkland_Manholes-824 | 311.58 | 159.2 | 6.3 | 8 | Concrete | 0.013 | 1,362 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX69 | |
| Kirkland_Main-1979 | Kirkland_Manholes-824 | 311.58 | Kirkland_Manholes-825 | 285.55 | 131.7 | 19.76 | 8 | Concrete | 0.013 | 2,411 | 2 | 12 | 14 | 0.6 | SM14-Ex-EX69 | |
| Kirkland_Main-1980 | Kirkland_Manholes-825 | 285.55 | Kirkland_Manholes-826 | 282.55 | 56.8 | 5.29 | 8 | Concrete | 0.013 | 1,247 | 3 | 24 | 27 | 2.2 | SM14-Ex-EX69 | |
| Kirkland_Main-1981 | Kirkland_Manholes-827 | 295.62 | Kirkland_Manholes-828 | 285.89 | 94.5 | 10.29 | 8 | Concrete | 0.013 | 1,740 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX69 | |
| Kirkland_Main-1982 | Kirkland_Manholes-826 | 282.55 | Kirkland_Manholes-456 | 263.04 | 178.8 | 10.91 | 8 | Concrete | 0.013 | 1,791 | 3 | 28 | 31 | 1.7 | SM14-Ex-EX69 | |
| Kirkland_Main-1983 | Kirkland_Manholes-828 | 285.89 | Kirkland_Manholes-825 | 285.55 | 69 | 0.49 | 8 | Concrete | 0.013 | 381 | 1 | 8 | 9 | 2.3 | SM14-Ex-EX69 | |
| Kirkland_Main-1984 | Kirkland_Manholes-790 | 227.7 | Kirkland_Manholes-830 | 198.45 | 91.3 | 32.05 | 8 | PVC | 0.01 | 3,991 | 2 | 16 | 18 | 0.5 | | Slope verified in as-builts |
| Kirkland_Main-1985 | Kirkland_Manholes-830 | 198.45 | Kirkland_Manholes-831 | 192.6 | 15.9 | 36.68 | 8 | PVC | 0.01 | 4,270 | 4 | 24 | 28 | 0.6 | | Slope verified in as-builts |
| Kirkland_Main-1986 | Kirkland_Manholes-831 | 192.6 | Kirkland_Manholes-786 | 173.41 | 171.2 | 11.21 | 8 | Concrete | 0.013 | 1,816 | 4 | 28 | 32 | 1.7 | SM14-Ex-EX46 | |
| Kirkland_Main-1987 | Kirkland_Manholes-461 | 269.91 | Kirkland_Manholes-460 | 268.13 | 121.9 | 1.46 | 8 | Concrete | 0.013 | 655 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX68 | |
| Kirkland_Main-1988 | Kirkland_Manholes-460 | 268.13 | Kirkland_Manholes-456 | 263.04 | 170.9 | 2.98 | 8 | Concrete | 0.013 | 936 | 2 | 8 | 10 | 1 | SM14-Ex-EX68 | |
| Kirkland_Main-1989 | Kirkland_Manholes-455 | 250.45 | Kirkland_Manholes-457 | 235.02 | 148.1 | 10.42 | 8 | Concrete | 0.013 | 1,751 | 29 | 111 | 140 | 8 | SM14-Ex-EX67 | |
| Kirkland_Main-1990 | Kirkland_Manholes-457 | 235.02 | Kirkland_Manholes-458 | 212.1 | 153.1 | 14.97 | 8 | Concrete | 0.013 | 2,098 | 29 | 119 | 148 | 7.1 | SM14-Ex-EX67 | |
| Kirkland_Main-1991 | Kirkland_Manholes-459 | 247.75 | Kirkland_Manholes-457 | 235.02 | 263.1 | 4.84 | 8 | Concrete | 0.013 | 1,193 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX67 | |
| Kirkland_Main-1992 | Kirkland_Manholes-456 | 263.04 | Kirkland_Manholes-455 | 262.36 | 18.8 | 3.61 | 8 | Concrete | 0.013 | 1,030 | 5 | 40 | 45 | 4.3 | SM14-Ex-EX68 | Drop Connection |
| Kirkland_Main-1993 | Kirkland_Manholes-792 | 342.6 | Kirkland_Manholes-832 | 339.26 | 96.2 | 3.47 | 8 | Concrete | 0.013 | 1,011 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX70 | |
| Kirkland_Main-1994 | Kirkland_Manholes-793 | 339.56 | Kirkland_Manholes-832 | 339.26 | 76 | 0.4 | 8 | Concrete | 0.013 | 343 | 2 | 4 | 6 | 1.7 | SM14-Ex-EX70 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1997 | Kirkland_Manholes-988 | 238.57 | Kirkland_Manholes-989 | 235.68 | 166.4 | 1.74 | 8 | PVC | 0.01 | 929 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1998 | Kirkland_Manholes-989 | 235.68 | Kirkland_Manholes-990 | 231.8 | 65.1 | 5.96 | 8 | PVC | 0.01 | 1,721 | 2 | 9 | 11 | 0.6 | | |
| Kirkland_Main-1999 | Kirkland_Manholes-990 | 231.8 | Kirkland_Manholes-991 | 230.6 | 208.7 | 0.57 | 8 | PVC | 0.01 | 535 | 4 | 13 | 16 | 3.1 | | |
| Kirkland_Main-2000 | Kirkland_Manholes-992 | 230.9 | Kirkland_Manholes-991 | 230.6 | 22.8 | 1.32 | 8 | PVC | 0.01 | 809 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-2001 | Kirkland_Manholes-991 | 230.6 | Kirkland_Manholes-993 | 229.29 | 112.3 | 1.17 | 8 | PVC | 0.01 | 762 | 4 | 21 | 26 | 3.4 | | |
| Kirkland_Main-2002 | Kirkland_Manholes-993 | 229.29 | Kirkland_Manholes-994 | 224.8 | 89 | 5.04 | 8 | PVC | 0.01 | 1,583 | 5 | 26 | 31 | 1.9 | | |
| Kirkland_Main-2003 | Kirkland_Manholes-996 | 225.97 | Kirkland_Manholes-994 | 224.8 | 53 | 2.21 | 8 | PVC | 0.01 | 1,047 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2004 | Kirkland_Manholes-994 | 224.8 | Kirkland_Manholes-995 | 224.6 | 50 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 34 | 39 | 8.8 | | |
| Kirkland_Main-2005 | Kirkland_Manholes-995 | 224.6 | Kirkland_Manholes-997 | 222.3 | 221.9 | 1.04 | 8 | PVC | 0.01 | 718 | 6 | 38 | 45 | 6.3 | | |
| Kirkland_Main-2006 | Kirkland_Manholes-997 | 222.3 | Kirkland_Manholes-998 | 220.4 | 187.6 | 1.01 | 8 | PVC | 0.01 | 710 | 6 | 43 | 49 | 6.9 | | |
| Kirkland_Main-2007 | Kirkland_Manholes-998 | 220.4 | Kirkland_Manholes-980 | 219.4 | 152.8 | 0.65 | 8 | PVC | 0.01 | 570 | 6 | 47 | 53 | 9.4 | | |
| Kirkland_Main-2008 | Kirkland_Manholes-980 | 219.4 | Kirkland_Manholes-981 | 218.7 | 155.5 | 0.45 | 8 | PVC | 0.01 | 473 | 18 | 115 | 133 | 28.2 | | |
| Kirkland_Main-2009 | Kirkland_Manholes-981 | 218.7 | Kirkland_Manholes-982 | 217.59 | 190.8 | 0.58 | 8 | PVC | 0.01 | 538 | 20 | 119 | 139 | 25.9 | | |
| Kirkland_Main-2010 | Kirkland_Manholes-982 | 217.59 | Kirkland_Manholes-983 | 215.91 | 138.4 | 1.21 | 8 | PVC | 0.01 | 777 | 25 | 124 | 149 | 19.2 | | |
| Kirkland_Main-2011 | Kirkland_Manholes-983 | 215.91 | Kirkland_Manholes-984 | 210.71 | 282.7 | 1.84 | 8 | PVC | 0.01 | 956 | 26 | 128 | 154 | 16.1 | | |
| Kirkland_Main-2012 | Kirkland_Manholes-984 | 210.71 | Kirkland_Manholes-985 | 205.92 | 47.8 | 10.03 | 8 | PVC | 0.01 | 2,232 | 29 | 132 | 161 | 7.2 | | |
| Kirkland_Main-2013 | Kirkland_Manholes-1001 | 230.61 | Kirkland_Manholes-1020 | 226.4 | 192.3 | 2.19 | 8 | PVC | 0.01 | 1,043 | 28 | 90 | 117 | 11.2 | | |
| Kirkland_Main-2014 | Kirkland_Manholes-1000 | 240.25 | Kirkland_Manholes-1001 | 230.61 | 249.9 | 3.86 | 8 | PVC | 0.01 | 1,385 | 26 | 85 | 112 | 8.1 | | |
| Kirkland_Main-2015 | Kirkland_Manholes-999 | 246.1 | Kirkland_Manholes-1000 | 240.25 | 246.4 | 2.37 | 8 | PVC | 0.01 | 1,086 | 25 | 81 | 106 | 9.7 | | |
| Kirkland_Main-2016 | Kirkland_Manholes-972 | 246.27 | Kirkland_Manholes-999 | 246.1 | 109.4 | 0.16 | 8 | PVC | 0.01 | 278 | 24 | 77 | 101 | 36.3 | | |
| Kirkland_Main-2017 | Kirkland_Manholes-1002 | 227.29 | Kirkland_Manholes-1003 | 219.05 | 401.3 | 2.05 | 8 | PVC | 0.01 | 1,010 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2018 | Kirkland_Manholes-1003 | 219.05 | Kirkland_Manholes-1004 | 214.11 | 181.5 | 2.72 | 8 | PVC | 0.01 | 1,163 | 4 | 9 | 12 | 1.1 | | |
| Kirkland_Main-2019 | Kirkland_Manholes-1006 | 216.58 | Kirkland_Manholes-1007 | 215.09 | 213.6 | 0.7 | 8 | PVC | 0.01 | 589 | 4 | 9 | 12 | 2.1 | | |
| Kirkland_Main-2020 | Kirkland_Manholes-1005 | 223.06 | Kirkland_Manholes-1006 | 216.58 | 398.8 | 1.63 | 8 | PVC | 0.01 | 899 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2023 | Kirkland_Manholes-1007 | 215.09 | Kirkland_Manholes-1004 | 214.11 | 335.8 | 0.29 | 8 | PVC | 0.01 | 381 | 5 | 13 | 18 | 4.8 | | |
| Kirkland_Main-2024 | Kirkland_Manholes-1012 | 211.42 | Kirkland_Manholes-1013 | 197.72 | 100.9 | 13.58 | 8 | PVC | 0.01 | 2,598 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2025 | Kirkland_Manholes-1013 | 197.72 | Kirkland_Manholes-1014 | 187.16 | 124 | 8.52 | 8 | PVC | 0.01 | 2,057 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2026 | Kirkland_Manholes-1014 | 187.16 | Kirkland_Manholes-1015 | 186.96 | 99 | 0.2 | 8 | PVC | 0.01 | 317 | 3 | 13 | 16 | 4.9 | | |
| Kirkland_Main-2027 | Kirkland_Manholes-1015 | 186.96 | Kirkland_Manholes-1016 | 185.35 | 120.5 | 1.34 | 8 | PVC | 0.01 | 815 | 5 | 17 | 22 | 2.7 | | |
| Kirkland_Main-2028 | Kirkland_Manholes-1016 | 185.35 | Kirkland_Manholes-1036 | 185.26 | 143 | 0.06 | 8 | PVC | 0.01 | 174 | 7 | 21 | 28 | 16.1 | | |
| Kirkland_Main-2029 | Kirkland_Manholes-1036 | 185.26 | Kirkland_Manholes-1030 | 184.08 | 404.9 | 0.29 | 10 | PVC | 0.01 | 690 | 7 | 26 | 32 | 4.7 | | |
| Kirkland_Main-2030 | Kirkland_Manholes-1030 | 184.08 | Kirkland_Manholes-1031 | 183.18 | 286.1 | 0.31 | 10 | PVC | 0.01 | 717 | 10 | 30 | 40 | 5.5 | | |
| Kirkland_Main-2031 | Kirkland_Manholes-1034 | 183.86 | Kirkland_Manholes-1031 | 183.18 | 169 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-2032 | Kirkland_Manholes-1031 | 183.18 | Kirkland_Manholes-1035 | 182.7 | 151.6 | 0.32 | 8 | PVC | 0.01 | 397 | 11 | 38 | 49 | 12.5 | | |
| Kirkland_Main-2033 | Kirkland_Manholes-1032 | 177.81 | Kirkland_Manholes-1033 | 173.21 | 285.6 | 1.61 | 8 | PVC | 0.01 | 895 | 3 | 9 | 12 | 1.3 | | |
| Kirkland_Main-2034 | Kirkland_Manholes-1004 | 214.11 | Kirkland_Manholes-1028 | 212.78 | 233.9 | 0.57 | 8 | PVC | 0.01 | 532 | 9 | 26 | 35 | 6.5 | | |
| Kirkland_Main-2035 | Kirkland_Manholes-1009 | 214.27 | Kirkland_Manholes-1008 | 211.28 | 293.5 | 1.02 | 8 | Concrete | 0.013 | 547 | 2 | 4 | 6 | 1.1 | SM14-Ex-EX19 | |
| Kirkland_Main-2036 | Kirkland_Manholes-1028 | 212.78 | Kirkland_Manholes-1008 | 211.28 | 261 | 0.57 | 8 | Concrete | 0.013 | 411 | 9 | 30 | 39 | 9.5 | SM14-Ex-EX19 | |
| Kirkland_Main-2037 | Kirkland_Manholes-1008 | 211.28 | Kirkland_Manholes-1029 | 210.29 | 108.6 | 0.91 | 8 | Concrete | 0.013 | 518 | 11 | 38 | 49 | 9.6 | SM14-Ex-EX19 | |
| Kirkland_Main-2038 | Kirkland_Manholes-1029 | 210.29 | Kirkland_Manholes-1010 | 207.69 | 265.5 | 0.98 | 8 | Concrete | 0.013 | 537 | 11 | 43 | 54 | 10 | SM14-Ex-EX19 | |
| Kirkland_Main-2039 | Kirkland_Manholes-1010 | 207.69 | Kirkland_Manholes-1017 | 205.5 | 77.5 | 2.83 | 8 | Concrete | 0.013 | 912 | 11 | 47 | 58 | 6.4 | SM14-Ex-EX19 | |
| Kirkland_Main-2040 | Kirkland_Manholes-1022 | 213.66 | Kirkland_Manholes-1023 | 207.88 | 245.2 | 2.36 | 8 | Concrete | 0.013 | 833 | 35 | 111 | 145 | 17.5 | SM14-Ex-EX18 | |
| Kirkland_Main-2041 | Kirkland_Manholes-1023 | 207.88 | Kirkland_Manholes-1017 | 205.5 | 153 | 1.56 | 8 | Concrete | 0.013 | 676 | 36 | 115 | 152 | 22.4 | SM14-Ex-EX18 | |
| Kirkland_Main-2042 | Kirkland_Manholes-1017 | 205.5 | Kirkland_Manholes-1018 | 179.75 | 288.9 | 8.91 | 8 | Concrete | 0.013 | 1,619 | 48 | 166 | 215 | 13.3 | SM14-Ex-EX31 | |
| Kirkland_Main-2043 | Kirkland_Manholes-1025 | 183.2 | Kirkland_Manholes-1026 | 149.27 | 241.9 | 14.02 | 8 | PVC | 0.01 | 2,640 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-2044 | Kirkland_Manholes-1027 | 150.87 | Kirkland_Manholes-1026 | 149.27 | 180 | 0.89 | 8 | PVC | 0.01 | 665 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2045 | Kirkland_Manholes-1021 | 230.72 | Kirkland_Manholes-1020 | 230.54 | 45.4 | 0.4 | 6 | Concrete | 0.013 | 159 | 3 | 9 | 11 | 7 | SM14-Ex-EX18 | Drop Connection |
| Kirkland_Main-2046 | Kirkland_Manholes-1020 | 226.4 | Kirkland_Manholes-1019 | 216.75 | 175.1 | 5.51 | 8 | Concrete | 0.013 | 1,273 | 32 | 102 | 134 | 10.5 | SM14-Ex-EX18 | |
| Kirkland_Main-2047 | Kirkland_Manholes-1019 | 216.75 | Kirkland_Manholes-1022 | 213.66 | 284.9 | 1.08 | 8 | Concrete | 0.013 | 565 | 33 | 107 | 140 | 24.8 | SM14-Ex-EX18 | |
| Kirkland_Main-2050 | Kirkland_Manholes-1037 | 180.8 | Kirkland_Manholes-1032 | 177.81 | 192.3 | 1.56 | 8 | PVC | 0.01 | 879 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2051 | Kirkland_Manholes-1041 | 211.62 | Kirkland_Manholes-1040 | 211.16 | 115.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2052 | Kirkland_Manholes-1040 | 211.16 | Kirkland_Manholes-1039 | 191.93 | 181.5 | 10.59 | 8 | PVC | 0.01 | 2,295 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2053 | Kirkland_Manholes-1039 | 191.93 | Kirkland_Manholes-1038 | 180.54 | 235.3 | 4.84 | 8 | PVC | 0.01 | 1,551 | 4 | 13 | 17 | 1.1 | | |
| Kirkland_Main-2054 | Kirkland_Manholes-1038 | 180.54 | Kirkland_Manholes-1042 | 180.42 | 296.4 | 0.04 | 8 | PVC | 0.01 | 140 | 21 | 81 | 102 | 73 | SM14-2035-DF6 | |
| Kirkland_Main-2055 | Kirkland_Manholes-1045 | 212.56 | Kirkland_Manholes-1044 | 190.19 | 362.7 | 6.17 | 8 | PVC | 0.01 | 1,751 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-2056 | Kirkland_Manholes-1044 | 190.19 | Kirkland_Manholes-1043 | 180.32 | 106.1 | 9.3 | 8 | PVC | 0.01 | 2,151 | 4 | 9 | 13 | 0.6 | | |
| Kirkland_Main-2057 | Kirkland_Manholes-1042 | 180.42 | Kirkland_Manholes-1043 | 180.32 | 14.1 | 0.71 | 8 | PVC | 0.01 | 594 | 22 | 85 | 107 | 18 | | |
| Kirkland_Main-2058 | Kirkland_Manholes-1051 | 183.74 | Kirkland_Manholes-1050 | 181.82 | 166.3 | 1.15 | 8 | PVC | 0.01 | 758 | 33 | 145 | 178 | 23.5 | | |
| Kirkland_Main-2059 | Kirkland_Manholes-1050 | 181.82 | Kirkland_Manholes-1049 | 169.63 | 230.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 40 | 149 | 189 | 11.7 | | |
| Kirkland_Main-2060 | Kirkland_Manholes-1049 | 169.63 | Kirkland_Manholes-1048 | 168.86 | 245.7 | 0.31 | 8 | PVC | 0.01 | 395 | 40 | 154 | 194 | 49.1 | | |
| Kirkland_Main-2061 | Kirkland_Manholes-986 | 204.38 | Kirkland_Manholes-1051 | 183.74 | 288.7 | 7.15 | 8 | PVC | 0.01 | 1,885 | 31 | 141 | 172 | 9.1 | | |
| Kirkland_Main-2062 | Kirkland_Manholes-1048 | 168.86 | Kirkland_Manholes-1047 | 166.5 | 308.6 | 0.76 | 8 | PVC | 0.01 | 617 | 46 | 158 | 204 | 33.1 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2063 | Kirkland_Manholes-1047 | 166.5 | Kirkland_Manholes-1046 | 162.86 | 368.8 | 0.99 | 8 | PVC | 0.01 | 700 | 46 | 162 | 208 | 29.7 | | |
| Kirkland_Main-2064 | Kirkland_Manholes-1053 | 228.57 | Kirkland_Manholes-1089 | 214.64 | 105.1 | 13.25 | 8 | PVC | 0.01 | 2,566 | 1 | 32 | 33 | 1.3 | | |
| Kirkland_Main-2065 | Kirkland_Manholes-1054 | 235.88 | Kirkland_Manholes-1053 | 228.57 | 61.2 | 11.95 | 8 | PVC | 0.01 | 2,437 | 1 | 28 | 29 | 1.2 | | |
| Kirkland_Main-2066 | Kirkland_Manholes-1062 | 265.12 | Kirkland_Manholes-1055 | 254.27 | 156.2 | 6.95 | 8 | PVC | 0.01 | 1,858 | 6 | 20 | 26 | 1.4 | | |
| Kirkland_Main-2067 | Kirkland_Manholes-1063 | 275.15 | Kirkland_Manholes-1062 | 265.12 | 144.2 | 6.96 | 8 | PVC | 0.01 | 1,860 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2068 | Kirkland_Manholes-1064 | 278.57 | Kirkland_Manholes-1062 | 265.12 | 154.9 | 8.68 | 8 | PVC | 0.01 | 2,078 | 4 | 12 | 16 | 0.8 | | |
| Kirkland_Main-2069 | Kirkland_Manholes-1055 | 254.27 | Kirkland_Manholes-1056 | 242.38 | 224 | 5.31 | 8 | PVC | 0.01 | 1,625 | 7 | 24 | 30 | 1.9 | | |
| Kirkland_Main-2070 | Kirkland_Manholes-1056 | 242.38 | Kirkland_Manholes-1057 | 237.15 | 108.2 | 4.83 | 8 | PVC | 0.01 | 1,550 | 8 | 28 | 36 | 2.3 | | |
| Kirkland_Main-2071 | Kirkland_Manholes-1057 | 237.15 | Kirkland_Manholes-1058 | 224.96 | 136.1 | 8.96 | 8 | PVC | 0.01 | 2,110 | 11 | 44 | 55 | 2.6 | | |
| Kirkland_Main-2072 | Kirkland_Manholes-1059 | 243.26 | Kirkland_Manholes-1057 | 237.15 | 201.9 | 3.03 | 8 | PVC | 0.01 | 1,227 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-2073 | Kirkland_Manholes-1061 | 271.51 | Kirkland_Manholes-1060 | 252.96 | 148.5 | 12.49 | 8 | PVC | 0.01 | 2,492 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2074 | Kirkland_Manholes-1060 | 252.96 | Kirkland_Manholes-1059 | 243.26 | 83.7 | 11.58 | 8 | PVC | 0.01 | 2,400 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2075 | Kirkland_Manholes-1103 | 198.97 | Kirkland_Manholes-1101 | 197.04 | 31 | 6.23 | 18 | PVC | 0.01 | 15,303 | 549 | 2,070 | 2,619 | 17.1 | | |
| Kirkland_Main-2076 | Kirkland_Manholes-1102 | 199.75 | Kirkland_Manholes-1101 | 197.04 | 30.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 3 | 40 | 42 | 2 | | |
| Kirkland_Main-2077 | Kirkland_Manholes-1100 | 201.72 | Kirkland_Manholes-1102 | 199.75 | 337.5 | 0.58 | 8 | PVC | 0.01 | 539 | 2 | 36 | 37 | 6.9 | | |
| Kirkland_Main-2078 | Kirkland_Manholes-1093 | 203.29 | Kirkland_Manholes-1100 | 201.72 | 272.4 | 0.58 | 8 | PVC | 0.01 | 535 | 0 | 32 | 32 | 6 | | |
| Kirkland_Main-2079 | Kirkland_Manholes-1095 | 206.07 | Kirkland_Manholes-1094 | 204.22 | 102 | 1.81 | 8 | PVC | 0.01 | 950 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2080 | Kirkland_Manholes-1094 | 204.22 | Kirkland_Manholes-1093 | 203.29 | 43.7 | 2.13 | 8 | PVC | 0.01 | 1,028 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-2081 | Kirkland_Manholes-1096 | 204.27 | Kirkland_Manholes-1093 | 203.29 | 162.1 | 0.6 | 8 | PVC | 0.01 | 548 | 0 | 20 | 20 | 3.6 | | |
| Kirkland_Main-2082 | Kirkland_Manholes-1098 | 205.6 | Kirkland_Manholes-1097 | 204.86 | 78.1 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2083 | Kirkland_Manholes-1097 | 204.86 | Kirkland_Manholes-1096 | 204.27 | 167.5 | 0.35 | 8 | PVC | 0.01 | 418 | 0 | 16 | 16 | 3.8 | | |
| Kirkland_Main-2084 | Kirkland_Manholes-1099 | 211.44 | Kirkland_Manholes-1097 | 204.86 | 308.5 | 2.13 | 8 | PVC | 0.01 | 1,030 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-2085 | Kirkland_Manholes-1079 | 238.18 | Kirkland_Manholes-1080 | 229.14 | 134.4 | 6.73 | 8 | PVC | 0.01 | 1,829 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2086 | Kirkland_Manholes-1080 | 229.14 | Kirkland_Manholes-1081 | 226.1 | 255.6 | 1.19 | 8 | PVC | 0.01 | 769 | 63 | 258 | 321 | 41.7 | | |
| Kirkland_Main-2087 | Kirkland_Manholes-1082 | 233.35 | Kirkland_Manholes-1081 | 226.1 | 142.6 | 5.08 | 8 | PVC | 0.01 | 1,590 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2088 | Kirkland_Manholes-1081 | 226.1 | Kirkland_Manholes-1070 | 224.89 | 260.5 | 0.46 | 8 | PVC | 0.01 | 481 | 64 | 266 | 331 | 68.8 | SM14-2035-DF7 | |
| Kirkland_Main-2089 | Kirkland_Manholes-1069 | 247.48 | Kirkland_Manholes-1070 | 224.89 | 321.6 | 7.02 | 8 | PVC | 0.01 | 1,869 | 64 | 226 | 467 | 25 | | |
| Kirkland_Main-2090 | Kirkland_Manholes-1067 | 259.57 | Kirkland_Manholes-1069 | 247.48 | 126 | 9.6 | 8 | PVC | 0.01 | 2,184 | 60 | 211 | 447 | 20.5 | | |
| Kirkland_Main-2091 | Kirkland_Manholes-1071 | 277.81 | Kirkland_Manholes-1067 | 259.57 | 242.2 | 7.53 | 8 | PVC | 0.01 | 1,935 | 15 | 60 | 74 | 3.8 | | |
| Kirkland_Main-2092 | Kirkland_Manholes-1072 | 288.83 | Kirkland_Manholes-1071 | 277.81 | 139.9 | 7.88 | 8 | PVC | 0.01 | 1,979 | 7 | 20 | 27 | 1.4 | | |
| Kirkland_Main-2093 | Kirkland_Manholes-1077 | 252.59 | Kirkland_Manholes-1069 | 247.48 | 346.5 | 1.47 | 8 | PVC | 0.01 | 856 | 4 | 12 | 16 | 1.8 | | |
| Kirkland_Main-2094 | Kirkland_Manholes-1078 | 305.14 | Kirkland_Manholes-1073 | 302.05 | 162.4 | 1.9 | 8 | PVC | 0.01 | 973 | 3 | 8 | 11 | 1.1 | | |
| Kirkland_Main-2095 | Kirkland_Manholes-1073 | 302.05 | Kirkland_Manholes-1072 | 288.83 | 375.1 | 3.52 | 8 | PVC | 0.01 | 1,324 | 6 | 16 | 22 | 1.6 | | |
| Kirkland_Main-2096 | Kirkland_Manholes-1074 | 295.05 | Kirkland_Manholes-1075 | 291.84 | 155.4 | 2.07 | 8 | PVC | 0.01 | 1,013 | 41 | 127 | 345 | 34 | | |
| Kirkland_Main-2097 | Kirkland_Manholes-1076 | 298.68 | Kirkland_Manholes-1074 | 295.05 | 108.2 | 3.36 | 8 | PVC | 0.01 | 1,291 | 41 | 123 | 340 | 26.3 | | |
| Kirkland_Main-2098 | Kirkland_Manholes-1068 | 279.38 | Kirkland_Manholes-1066 | 278.91 | 39.6 | 1.19 | 8 | PVC | 0.01 | 768 | 44 | 139 | 359 | 46.7 | | |
| Kirkland_Main-2099 | Kirkland_Manholes-1066 | 278.91 | Kirkland_Manholes-1065 | 260.88 | 143.1 | 12.6 | 8 | PVC | 0.01 | 2,502 | 44 | 143 | 363 | 14.5 | | |
| Kirkland_Main-2100 | Kirkland_Manholes-1065 | 260.88 | Kirkland_Manholes-1067 | 259.57 | 130 | 1.01 | 8 | PVC | 0.01 | 708 | 44 | 147 | 367 | 51.9 | | |
| Kirkland_Main-2101 | Kirkland_Manholes-1090 | 254.86 | Kirkland_Manholes-1091 | 251.69 | 82.2 | 3.86 | 8 | PVC | 0.01 | 1,385 | 1 | 16 | 17 | 1.2 | | |
| Kirkland_Main-2102 | Kirkland_Manholes-1091 | 251.69 | Kirkland_Manholes-1092 | 246.51 | 140.9 | 3.68 | 8 | PVC | 0.01 | 1,352 | 1 | 20 | 21 | 1.5 | | |
| Kirkland_Main-2103 | Kirkland_Manholes-1092 | 246.51 | Kirkland_Manholes-1054 | 235.88 | 141.8 | 7.5 | 8 | PVC | 0.01 | 1,931 | 1 | 24 | 25 | 1.3 | | |
| Kirkland_Main-2104 | Kirkland_Manholes-1089 | 214.64 | Kirkland_Manholes-1086 | 198.2 | 276 | 5.96 | 8 | PVC | 0.01 | 1,721 | 1 | 36 | 37 | 2.1 | | |
| Kirkland_Main-2105 | Kirkland_Manholes-1088 | 203.98 | Kirkland_Manholes-1087 | 203.79 | 103.7 | 0.19 | 8 | PVC | 0.01 | 306 | 5 | 4 | 8 | 2.8 | | |
| Kirkland_Main-2106 | Kirkland_Manholes-1087 | 203.79 | Kirkland_Manholes-1086 | 198.2 | 55.1 | 10.14 | 8 | PVC | 0.01 | 2,245 | 5 | 8 | 12 | 0.6 | | |
| Kirkland_Main-2107 | Kirkland_Manholes-1070 | 224.89 | Kirkland_Manholes-1083 | 220.88 | 227.5 | 1.76 | 8 | PVC | 0.01 | 936 | 130 | 497 | 802 | 85.7 | SM14-Ex-EX321 | |
| Kirkland_Main-2108 | Kirkland_Manholes-2996 | 220.63 | Kirkland_Manholes-1084 | 206.2 | 323.5 | 4.46 | 8 | PVC | 0.01 | 1,489 | 139 | 509 | 824 | 55.3 | | |
| Kirkland_Main-2109 | Kirkland_Manholes-1058 | 224.96 | Kirkland_Manholes-1084 | 206.2 | 342.8 | 5.47 | 8 | PVC | 0.01 | 1,649 | 12 | 48 | 59 | 3.6 | | |
| Kirkland_Main-2110 | Kirkland_Manholes-1084 | 206.2 | Kirkland_Manholes-1085 | 204.43 | 46.9 | 3.78 | 8 | PVC | 0.01 | 1,370 | 151 | 560 | 888 | 64.8 | | |
| Kirkland_Main-2111 | Kirkland_Manholes-1101 | 197.04 | Kirkland_Manholes-1104 | 196.79 | 207.5 | 0.12 | 18 | PVC | 0.01 | 2,123 | 552 | 2,114 | 2,666 | 125.6 | SM14-Ex-EX22 | |
| Kirkland_Main-2112 | Kirkland_Manholes-1112 | 179.44 | Kirkland_Manholes-1124 | 177.02 | 214.1 | 1.13 | 15 | PVC | 0.01 | 4,007 | 58 | 32 | 90 | 2.2 | | |
| Kirkland_Main-2113 | Kirkland_Manholes-1113 | 180.6 | Kirkland_Manholes-1112 | 179.44 | 131.8 | 0.88 | 15 | PVC | 0.01 | 3,535 | 50 | 24 | 74 | 2.1 | | |
| Kirkland_Main-2114 | Kirkland_Manholes-1117 | 196.58 | Kirkland_Manholes-1115 | 186.39 | 163.3 | 6.24 | 15 | PVC | 0.01 | 9,416 | 18 | 12 | 30 | 0.3 | | |
| Kirkland_Main-2115 | Kirkland_Manholes-1116 | 180.36 | Kirkland_Manholes-1112 | 179.44 | 120 | 0.77 | 8 | PVC | 0.01 | 617 | 3 | 4 | 7 | 1.2 | | |
| Kirkland_Main-2116 | Kirkland_Manholes-1119 | 159.49 | Kirkland_Manholes-1120 | 158.13 | 217.8 | 0.62 | 8 | PVC | 0.01 | 557 | 25 | 6 | 31 | 5.5 | | |
| Kirkland_Main-2117 | Kirkland_Manholes-1126 | 164.51 | Kirkland_Manholes-1127 | 163.92 | 310.2 | 0.19 | 20 | Concrete | 0.013 | 2,723 | 280 | 683 | 1,139 | 41.8 | SM14-Ex-EX4 | |
| Kirkland_Main-2118 | Kirkland_Manholes-1134 | 223.76 | Kirkland_Manholes-1131 | 191.56 | 280.1 | 11.49 | 8 | Concrete | 0.013 | 1,839 | 12 | 23 | 35 | 1.9 | SM14-Ex-EX63 | |
| Kirkland_Main-2119 | Kirkland_Manholes-1137 | 231.81 | Kirkland_Manholes-1135 | 210.01 | 166.8 | 13.07 | 6 | Concrete | 0.013 | 910 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX81 | |
| Kirkland_Main-2120 | Kirkland_Manholes-1135 | 210.01 | Kirkland_Manholes-1131 | 191.56 | 334.9 | 5.51 | 8 | Concrete | 0.013 | 1,273 | 2 | 13 | 15 | 1.2 | SM14-Ex-EX81 | |
| Kirkland_Main-2121 | Kirkland_Manholes-1136 | 213.62 | Kirkland_Manholes-1135 | 210.01 | 85.6 | 4.22 | 8 | Concrete | 0.013 | 1,114 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX81 | |
| Kirkland_Main-2122 | Kirkland_Manholes-680 | 257.67 | Kirkland_Manholes-679 | 257.45 | 31.1 | 0.71 | 8 | PVC | 0.01 | 593 | 19 | 24 | 43 | 7.3 | | |
| Kirkland_Main-2123 | Kirkland_Manholes-679 | 257.45 | Kirkland_Manholes-681 | 256.89 | 146.9 | 0.38 | 8 | PVC | 0.01 | 435 | 19 | 32 | 51 | 11.7 | | |
| Kirkland_Main-2124 | Kirkland_Manholes-678 | 266.88 | Kirkland_Manholes-679 | 257.45 | 86.2 | 10.93 | 8 | PVC | 0.01 | 2,331 | 0 | 4 | 4 | 0.2 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2125 | Kirkland_Manholes-682 | 258.64 | Kirkland_Manholes-680 | 257.67 | 223 | 0.44 | 8 | PVC | 0.01 | 465 | 1 | 20 | 20 | 4.4 | | |
| Kirkland_Main-2126 | Kirkland_Manholes-685 | 255.36 | Kirkland_Manholes-1888 | 254.12 | 288.3 | 0.43 | 8 | PVC | 0.01 | 462 | 21 | 44 | 65 | 14 | | |
| Kirkland_Main-2127 | Kirkland_Manholes-684 | 256.25 | Kirkland_Manholes-685 | 255.36 | 200.3 | 0.44 | 8 | PVC | 0.01 | 469 | 19 | 40 | 59 | 12.6 | | |
| Kirkland_Main-2128 | Kirkland_Manholes-1740 | 35.99 | Kirkland_Manholes-1743 | 28.04 | 156.8 | 5.07 | 10 | PVC | 0.01 | 2,878 | 247 | 560 | 807 | 28 | | |
| Kirkland_Main-2129 | Kirkland_Manholes-1757 | 18.99 | Kirkland_Manholes-1756 | 15.01 | 53.7 | 7.42 | 8 | Concrete | 0.013 | 1,477 | 5 | 6 | 12 | 0.8 | SM14-Ex-EX183 | |
| Kirkland_Main-2130 | Kirkland_Manholes-1756 | 15.01 | Kirkland_Manholes-1758 | 14.89 | 54.1 | 0.21 | 12 | Concrete | 0.013 | 738 | 57 | 19 | 77 | 10.4 | SM14-Ex-EX183 | |
| Kirkland_Main-2131 | Kirkland_Manholes-1758 | 14.89 | Kirkland_Manholes-1759 | 14.76 | 60.8 | 0.23 | 12 | Concrete | 0.013 | 762 | 60 | 26 | 86 | 11.3 | SM14-Ex-EX183 | |
| Kirkland_Main-2132 | Kirkland_Manholes-1759 | 14.76 | Kirkland_Manholes-1789 | 14.67 | 38.9 | 0.21 | 12 | Concrete | 0.013 | 736 | 60 | 32 | 93 | 12.6 | SM14-Ex-EX183 | |
| Kirkland_Main-2133 | Kirkland_Manholes-2067 | 19 | Kirkland_Manholes-1756 | 15.01 | 217.5 | 1.84 | 12 | Concrete | 0.013 | 2,166 | 46 | 6 | 52 | 2.4 | SM14-Ex-EX183 | |
| Kirkland_Main-2134 | Kirkland_Manholes-2305 | 15.26 | Kirkland_Manholes-1755 | 15.12 | 124.7 | 0.11 | 21 | PVC | 0.01 | 3,097 | 267 | 675 | 942 | 30.4 | | |
| Kirkland_Main-2135 | Kirkland_Manholes-1755 | 15.12 | Kirkland_Manholes-1753 | 14.83 | 381.1 | 0.08 | 21 | PVC | 0.01 | 2,550 | 267 | 682 | 949 | 37.2 | | |
| Kirkland_Main-2136 | Kirkland_Manholes-1753 | 14.83 | Kirkland_Manholes-1754 | 14.75 | 34.9 | 0.23 | 21 | PVC | 0.01 | 4,426 | 272 | 688 | 961 | 21.7 | | |
| Kirkland_Main-2137 | Kirkland_Manholes-1754 | 14.75 | Kirkland_Manholes-1789 | 14.67 | 165.1 | 0.05 | 21 | PVC | 0.01 | 2,035 | 279 | 695 | 974 | 47.8 | | |
| Kirkland_Main-2138 | Kirkland_Manholes-1692 | 35.9 | Kirkland_Manholes-736 | 28.45 | 107.1 | 6.96 | 8 | Concrete | 0.013 | 1,431 | 60 | 272 | 332 | 23.2 | SM14-Ex-EX96 | |
| Kirkland_Main-2139 | Kirkland_Manholes-1694 | 44.12 | Kirkland_Manholes-1692 | 35.9 | 116.3 | 7.07 | 8 | Concrete | 0.013 | 1,442 | 56 | 255 | 312 | 21.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2140 | Kirkland_Manholes-1701 | 49.81 | Kirkland_Manholes-1694 | 44.12 | 274.3 | 2.07 | 8 | Concrete | 0.013 | 781 | 4 | 16 | 20 | 2.6 | SM14-Ex-EX152 | |
| Kirkland_Main-2141 | Kirkland_Manholes-1702 | 82.31 | Kirkland_Manholes-1701 | 49.81 | 296.4 | 10.96 | 8 | Concrete | 0.013 | 1,796 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX152 | |
| Kirkland_Main-2142 | Kirkland_Manholes-1698 | 89.68 | Kirkland_Manholes-1697 | 68.77 | 247.3 | 8.45 | 6 | Concrete | 0.013 | 732 | 1 | 8 | 10 | 1.3 | SM14-Ex-EX151 | |
| Kirkland_Main-2143 | Kirkland_Manholes-1697 | 68.77 | Kirkland_Manholes-1696 | 58.41 | 181 | 5.72 | 6 | Concrete | 0.013 | 603 | 5 | 16 | 21 | 3.5 | SM14-Ex-EX151 | |
| Kirkland_Main-2144 | Kirkland_Manholes-614 | 87.89 | Kirkland_Manholes-1696 | 58.41 | 277.2 | 10.64 | 8 | Concrete | 0.013 | 1,769 | 45 | 198 | 242 | 13.7 | SM14-Ex-EX96 | |
| Kirkland_Main-2145 | Kirkland_Manholes-2025 | 477 | Kirkland_Manholes-2024 | 470.6 | 42.9 | 14.92 | 8 | PVC | 0.01 | 2,724 | 6 | 12 | 18 | 0.7 | | |
| Kirkland_Main-2146 | Kirkland_Manholes-2024 | 470.6 | Kirkland_Manholes-2023 | 466.76 | 120.1 | 3.2 | 8 | PVC | 0.01 | 1,261 | 7 | 16 | 23 | 1.8 | | |
| Kirkland_Main-2147 | Kirkland_Manholes-2019 | 467.83 | Kirkland_Manholes-2022 | 466 | 273.9 | 0.67 | 10 | PVC | 0.01 | 1,045 | 99 | 246 | 345 | 33.1 | | |
| Kirkland_Main-2148 | Kirkland_Manholes-2028 | 481.27 | Kirkland_Manholes-2026 | 474.59 | 90.6 | 7.37 | 8 | PVC | 0.01 | 1,914 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2149 | Kirkland_Manholes-2029 | 479.06 | Kirkland_Manholes-2027 | 477.1 | 283.3 | 0.69 | 8 | PVC | 0.01 | 586 | 21 | 75 | 97 | 16.5 | | |
| Kirkland_Main-2150 | Kirkland_Manholes-2027 | 477.1 | Kirkland_Manholes-2026 | 474.59 | 76.4 | 3.29 | 8 | PVC | 0.01 | 1,278 | 22 | 79 | 102 | 8 | | |
| Kirkland_Main-2151 | Kirkland_Manholes-2026 | 474.59 | Kirkland_Manholes-2021 | 473.17 | 135.7 | 1.05 | 8 | PVC | 0.01 | 721 | 24 | 87 | 111 | 15.4 | | |
| Kirkland_Main-2152 | Kirkland_Manholes-2033 | 462.47 | Kirkland_Manholes-2034 | 462.21 | 16.1 | 1.61 | 8 | PVC | 0.01 | 896 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2153 | Kirkland_Manholes-2034 | 462.21 | Kirkland_Manholes-2032 | 461.07 | 176.2 | 0.65 | 8 | PVC | 0.01 | 567 | 1 | 8 | 9 | 1.6 | | Drop Connection |
| Kirkland_Main-2154 | Kirkland_Manholes-2031 | 464.09 | Kirkland_Manholes-2032 | 458.97 | 79 | 6.48 | 8 | Concrete | 0.013 | 1,381 | 109 | 282 | 392 | 28.4 | SM14-Ex-EX264 | |
| Kirkland_Main-2155 | Kirkland_Manholes-2030 | 465.11 | Kirkland_Manholes-2031 | 464.09 | 197.9 | 0.52 | 10 | PVC | 0.01 | 918 | 109 | 278 | 387 | 42.2 | | |
| Kirkland_Main-2156 | Kirkland_Manholes-2022 | 466 | Kirkland_Manholes-2030 | 465.11 | 389.3 | 0.23 | 10 | PVC | 0.01 | 611 | 107 | 270 | 377 | 61.7 | | |
| Kirkland_Main-2157 | Kirkland_Manholes-2035 | 454.4 | Kirkland_Manholes-2036 | 452.58 | 173.2 | 1.05 | 8 | Concrete | 0.013 | 556 | 113 | 298 | 411 | 73.8 | SM14-Ex-EX264 | |
| Kirkland_Main-2158 | Kirkland_Manholes-2032 | 458.97 | Kirkland_Manholes-2035 | 454.4 | 196.5 | 2.33 | 8 | Concrete | 0.013 | 827 | 112 | 294 | 406 | 49.1 | SM14-Ex-EX264 | |
| Kirkland_Main-2159 | Kirkland_Manholes-2039 | 480.14 | Kirkland_Manholes-2040 | 475.69 | 137 | 3.25 | 8 | Concrete | 0.013 | 977 | 5 | 8 | 13 | 1.3 | SM14-Ex-EX266 | |
| Kirkland_Main-2160 | Kirkland_Manholes-2038 | 484.4 | Kirkland_Manholes-2039 | 480.14 | 188.8 | 2.26 | 8 | Concrete | 0.013 | 815 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX266 | |
| Kirkland_Main-2161 | Kirkland_Manholes-2040 | 475.69 | Kirkland_Manholes-2037 | 465.67 | 362.6 | 2.76 | 8 | Concrete | 0.013 | 902 | 7 | 12 | 19 | 2.1 | SM14-Ex-EX266 | |
| Kirkland_Main-2162 | Kirkland_Manholes-2672 | 373.35 | Kirkland_Manholes-2674 | 354.77 | 247.9 | 7.5 | 8 | Concrete | 0.013 | 1,485 | 14 | 79 | 93 | 6.3 | SM14-Ex-EX209 | |
| Kirkland_Main-2163 | Kirkland_Manholes-2671 | 399.75 | Kirkland_Manholes-2672 | 373.35 | 240.8 | 10.97 | 8 | Concrete | 0.013 | 1,796 | 13 | 75 | 88 | 4.9 | SM14-Ex-EX209 | |
| Kirkland_Main-2164 | Kirkland_Manholes-2674 | 354.77 | Kirkland_Manholes-2300 | 337.19 | 208.1 | 8.45 | 8 | Concrete | 0.013 | 1,576 | 15 | 83 | 98 | 6.2 | SM14-Ex-EX209 | |
| Kirkland_Main-2165 | Kirkland_Manholes-2678 | 335.2 | Kirkland_Manholes-2681 | 334.86 | 198.8 | 0.17 | 12 | Concrete | 0.013 | 661 | 37 | 167 | 204 | 30.8 | SM14-Ex-EX206 | |
| Kirkland_Main-2166 | Kirkland_Manholes-2680 | 361.93 | Kirkland_Manholes-2678 | 335.2 | 358.9 | 7.45 | 8 | PVC | 0.01 | 1,924 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-2167 | Kirkland_Manholes-2677 | 336.2 | Kirkland_Manholes-2678 | 335.2 | 208.7 | 0.48 | 12 | Concrete | 0.013 | 1,107 | 34 | 159 | 193 | 17.4 | SM14-Ex-EX206 | |
| Kirkland_Main-2168 | Kirkland_Manholes-2676 | 336.73 | Kirkland_Manholes-2677 | 336.2 | 133.1 | 0.4 | 12 | Concrete | 0.013 | 1,013 | 34 | 155 | 188 | 18.6 | SM14-Ex-EX206 | |
| Kirkland_Main-2169 | Kirkland_Manholes-2675 | 350.82 | Kirkland_Manholes-2676 | 336.73 | 223.6 | 6.3 | 8 | Concrete | 0.013 | 1,361 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX208 | |
| Kirkland_Main-2170 | Kirkland_Manholes-2300 | 337.19 | Kirkland_Manholes-2676 | 336.73 | 113.6 | 0.4 | 12 | Concrete | 0.013 | 1,013 | 30 | 143 | 173 | 17 | SM14-Ex-EX206 | |
| Kirkland_Main-2171 | Kirkland_Manholes-2697 | 234.26 | Kirkland_Manholes-2245 | 234.09 | 42.8 | 0.4 | 8 | PVC | 0.01 | 444 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2173 | Kirkland_Manholes-2682 | 228.77 | Kirkland_Manholes-2685 | 228.01 | 128.4 | 0.59 | 8 | Concrete | 0.013 | 417 | 4 | 12 | 16 | 3.9 | SM14-Ex-EX201 | |
| Kirkland_Main-2174 | Kirkland_Manholes-2683 | 239.58 | Kirkland_Manholes-2682 | 228.77 | 368.9 | 2.93 | 8 | PVC | 0.01 | 1,207 | 3 | 8 | 11 | 0.9 | | |
| Kirkland_Main-2175 | Kirkland_Manholes-2684 | 244.68 | Kirkland_Manholes-2683 | 239.58 | 150.1 | 3.4 | 8 | PVC | 0.01 | 1,300 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2176 | Kirkland_Manholes-2685 | 228.01 | Kirkland_Manholes-2686 | 221.84 | 249.2 | 2.48 | 8 | Concrete | 0.013 | 853 | 5 | 16 | 21 | 2.5 | SM14-Ex-EX201 | |
| Kirkland_Main-2177 | Kirkland_Manholes-2311 | 256.52 | Kirkland_Manholes-2310 | 256 | 129.9 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 13 | 17 | 3.7 | | |
| Kirkland_Main-2178 | Kirkland_Manholes-2688 | 231.59 | Kirkland_Manholes-2687 | 227.79 | 162.1 | 2.34 | 8 | PVC | 0.01 | 1,080 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-2179 | Kirkland_Manholes-2687 | 227.79 | Kirkland_Manholes-2686 | 221.84 | 261.7 | 2.27 | 8 | PVC | 0.01 | 1,063 | 4 | 12 | 16 | 1.5 | | |
| Kirkland_Main-2180 | Kirkland_Manholes-2689 | 235.04 | Kirkland_Manholes-2688 | 231.59 | 174.6 | 1.98 | 8 | PVC | 0.01 | 991 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2184 | Kirkland_Manholes-2691 | 211.09 | Kirkland_Manholes-2692 | 205.03 | 238.4 | 2.54 | 8 | Concrete | 0.013 | 865 | 12 | 40 | 51 | 6 | SM14-Ex-EX201 | |
| Kirkland_Main-2185 | Kirkland_Manholes-2692 | 205.03 | Kirkland_Manholes-2693 | 198.67 | 215 | 2.96 | 8 | Concrete | 0.013 | 933 | 12 | 44 | 56 | 6 | SM14-Ex-EX201 | |
| Kirkland_Main-2186 | Kirkland_Manholes-2693 | 198.67 | Kirkland_Manholes-2694 | 189.1 | 61.3 | 15.61 | 8 | Concrete | 0.013 | 2,142 | 13 | 48 | 60 | 2.8 | SM14-Ex-EX201 | |
| Kirkland_Main-2187 | Kirkland_Manholes-2695 | 190.38 | Kirkland_Manholes-2694 | 189.1 | 280.3 | 0.46 | 8 | Concrete | 0.013 | 366 | 0 | 4 | 4 | 1.1 | SM14-Ex-EX201 | |
| Kirkland_Main-2188 | Kirkland_Manholes-2694 | 189.1 | Kirkland_Manholes-2698 | 186.34 | 272.4 | 1.01 | 8 | Concrete | 0.013 | 546 | 13 | 56 | 69 | 12.6 | SM14-Ex-EX198 | |
| Kirkland_Main-2189 | Kirkland_Manholes-2701 | 219.11 | Kirkland_Manholes-2700 | 212.52 | 304.2 | 2.17 | 8 | PVC | 0.01 | 1,038 | 8 | 56 | 64 | 6.1 | | |
| Kirkland_Main-2190 | Kirkland_Manholes-2700 | 212.52 | Kirkland_Manholes-2699 | 190.07 | 286.1 | 7.85 | 8 | Concrete | 0.013 | 1,519 | 10 | 60 | 69 | 4.6 | SM14-Ex-EX202 | |

E-Page 736

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2191 | Kirkland_Manholes-2699 | 190.07 | Kirkland_Manholes-2696 | 172.94 | 342.2 | 5.01 | 8 | Concrete | 0.013 | 1,213 | 10 | 64 | 74 | 6.1 | SM14-Ex-EX202 | |
| Kirkland_Main-2192 | Kirkland_Manholes-2706 | 252.55 | Kirkland_Manholes-2704 | 250.11 | 196.5 | 1.24 | 8 | PVC | 0.01 | 786 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2193 | Kirkland_Manholes-2704 | 250.11 | Kirkland_Manholes-2705 | 234.07 | 107.2 | 14.96 | 8 | PVC | 0.01 | 2,727 | 6 | 48 | 54 | 2 | | |
| Kirkland_Main-2194 | Kirkland_Manholes-2705 | 234.07 | Kirkland_Manholes-2701 | 219.11 | 291.8 | 5.13 | 8 | PVC | 0.01 | 1,596 | 8 | 52 | 60 | 3.7 | | |
| Kirkland_Main-2195 | Kirkland_Manholes-2710 | 293.33 | Kirkland_Manholes-2709 | 292.14 | 31.4 | 3.79 | 8 | PVC | 0.01 | 1,373 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2197 | Kirkland_Manholes-501 | 145.5 | Kirkland_Manholes-502 | 134.98 | 294 | 3.58 | 6 | Concrete | 0.013 | 476 | 1 | 8 | 9 | 2 | SM10 | |
| Kirkland_Main-2198 | Kirkland_Manholes-502 | 134.98 | Kirkland_Manholes-1158 | 124.93 | 261.4 | 3.85 | 6 | Concrete | 0.013 | 494 | 3 | 16 | 19 | 3.9 | SM10 | |
| Kirkland_Main-2199 | Kirkland_Manholes-1178 | 142.08 | Kirkland_Manholes-1179 | 123.76 | 339.2 | 5.4 | 6 | Concrete | 0.013 | 585 | 5 | 25 | 30 | 5.1 | SM10 | |
| Kirkland_Main-2200 | Kirkland_Manholes-1177 | 164.29 | Kirkland_Manholes-1178 | 142.08 | 352.7 | 6.3 | 6 | Concrete | 0.013 | 632 | 3 | 16 | 19 | 3.1 | SM10 | |
| Kirkland_Main-2201 | Kirkland_Manholes-1176 | 174.14 | Kirkland_Manholes-1177 | 164.29 | 198.1 | 4.97 | 6 | Concrete | 0.013 | 562 | 1 | 8 | 9 | 1.7 | SM10 | |
| Kirkland_Main-2202 | Kirkland_Manholes-1174 | 178.7 | Kirkland_Manholes-1173 | 177.85 | 211.5 | 0.4 | 6 | Concrete | 0.013 | 159 | 2 | 8 | 10 | 6.2 | SM10 | Drop Connection |
| Kirkland_Main-2203 | Kirkland_Manholes-1175 | 174.04 | Kirkland_Manholes-1173 | 166.52 | 399.1 | 1.88 | 6 | Concrete | 0.013 | 346 | 2 | 8 | 10 | 2.9 | SM10 | |
| Kirkland_Main-2204 | Kirkland_Manholes-1173 | 166.52 | Kirkland_Manholes-1172 | 164.12 | 183.3 | 1.31 | 6 | Concrete | 0.013 | 288 | 6 | 25 | 31 | 10.7 | SM10 | |
| Kirkland_Main-2205 | Kirkland_Manholes-1172 | 164.12 | Kirkland_Manholes-1171 | 160.49 | 157.6 | 2.3 | 6 | Concrete | 0.013 | 382 | 7 | 33 | 40 | 10.5 | SM14-Ex-EX79 | |
| Kirkland_Main-2206 | Kirkland_Manholes-2890 | 82 | Kirkland_Manholes-1162 | 78.51 | 88.5 | 3.95 | 8 | Ductile Iron | 0.012 | 1,167 | 0 | 8 | 291 | 24.9 | SM14-Ex-EX77 | |
| Kirkland_Main-2207 | Kirkland_Manholes-514 | 18.19 | Kirkland_Manholes-2958 | 17.19 | 133.7 | 0.75 | 8 | sbestos Ceme | 0.011 | 554 | 30 | 212 | 242 | 43.6 | SM14-Ex-EX37 | |
| Kirkland_Main-2208 | Kirkland_Manholes-493 | 145.66 | Kirkland_Manholes-3107 | 127.14 | 403.7 | 4.59 | 8 | Concrete | 0.013 | 1,162 | 2 | 8 | 10 | 0.9 | SM10 | |
| Kirkland_Main-2209 | Kirkland_Manholes-496 | 188.94 | Kirkland_Manholes-495 | 169.48 | 399.8 | 4.87 | 8 | Concrete | 0.013 | 1,196 | 2 | 8 | 10 | 0.8 | SM10 | |
| Kirkland_Main-2210 | Kirkland_Manholes-497 | 188.11 | Kirkland_Manholes-499 | 185.94 | 314.9 | 0.69 | 8 | Concrete | 0.013 | 450 | 14 | 58 | 71 | 15.8 | SM10 | |
| Kirkland_Main-2211 | Kirkland_Manholes-498 | 190.16 | Kirkland_Manholes-499 | 185.94 | 340.1 | 1.24 | 6 | Concrete | 0.013 | 281 | 3 | 8 | 11 | 4 | SM10 | |
| Kirkland_Main-2213 | Kirkland_Manholes-510 | 78.8 | Kirkland_Manholes-509 | 76.43 | 10.6 | 22.33 | 15 | PVC | 0.01 | 17,810 | 5 | 41 | 46 | 0.3 | | |
| Kirkland_Main-2214 | Kirkland_Manholes-513 | 81.7 | Kirkland_Manholes-512 | 79.85 | 46 | 4.02 | 12 | Ductile Iron | 0.012 | 3,473 | 21 | 156 | 177 | 5.1 | SM14-Ex-EX76 | |
| Kirkland_Main-2215 | Kirkland_Manholes-1825 | 112.27 | Kirkland_Manholes-508 | 102 | 349.6 | 2.94 | 6 | Concrete | 0.013 | 432 | 4 | 16 | 20 | 4.7 | SM10 | |
| Kirkland_Main-2216 | Kirkland_Manholes-508 | 102 | Kirkland_Manholes-507 | 100.47 | 381.8 | 0.4 | 6 | Concrete | 0.013 | 159 | 5 | 25 | 30 | 18.8 | SM10 | Drop Connection |
| Kirkland_Main-2217 | Kirkland_Manholes-507 | 85.74 | Kirkland_Manholes-506 | 75.41 | 39.4 | 26.19 | 8 | PVC | 0.01 | 3,608 | 5 | 33 | 38 | 1.1 | | |
| Kirkland_Main-2218 | Kirkland_Manholes-506 | 75.41 | Kirkland_Manholes-505 | 74.06 | 314 | 0.43 | 15 | PVC | 0.01 | 2,471 | 88 | 593 | 963 | 39 | | |
| Kirkland_Main-2221 | Kirkland_Manholes-505 | 74.06 | Kirkland_Manholes-1824 | 72.16 | 261.9 | 0.73 | 15 | PVC | 0.01 | 3,210 | 88 | 601 | 971 | 30.3 | | |
| Kirkland_Main-2222 | Kirkland_Manholes-509 | 76.43 | Kirkland_Manholes-506 | 75.41 | 337.6 | 0.3 | 15 | PVC | 0.01 | 2,072 | 82 | 552 | 916 | 44.2 | | |
| Kirkland_Main-2224 | Kirkland_Manholes-1160 | 77.11 | Kirkland_Manholes-509 | 76.43 | 266.4 | 0.26 | 15 | PVC | 0.01 | 1,904 | 77 | 502 | 862 | 45.3 | | |
| Kirkland_Main-2225 | Kirkland_Manholes-511 | 79.24 | Kirkland_Manholes-1161 | 78.67 | 198.1 | 0.29 | 15 | PVC | 0.01 | 2,022 | 21 | 173 | 194 | 9.6 | | |
| Kirkland_Main-2226 | Kirkland_Manholes-512 | 79.85 | Kirkland_Manholes-511 | 79.24 | 306.1 | 0.2 | 15 | PVC | 0.01 | 1,683 | 21 | 165 | 186 | 11 | | |
| Kirkland_Main-2228 | Kirkland_Manholes-1533 | 294.07 | Kirkland_Manholes-1532 | 269.21 | 121 | 20.55 | 8 | Concrete | 0.013 | 2,459 | 2 | 12 | 14 | 0.6 | SM14-Ex-EX126 | |
| Kirkland_Main-2229 | Kirkland_Manholes-1532 | 269.21 | Kirkland_Manholes-1531 | 265.03 | 88.5 | 4.72 | 8 | Concrete | 0.013 | 1,179 | 2 | 16 | 18 | 1.5 | SM14-Ex-EX126 | |
| Kirkland_Main-2230 | Kirkland_Manholes-1211 | 186.99 | Kirkland_Manholes-1197 | 181.82 | 133.6 | 3.87 | 8 | | 0.012 | 1,156 | 1 | 33 | 34 | 3 | | |
| Kirkland_Main-2231 | Kirkland_Manholes-1531 | 265.03 | Kirkland_Manholes-1530 | 229.92 | 439.6 | 7.99 | 8 | Concrete | 0.013 | 1,533 | 10 | 28 | 38 | 2.5 | SM14-Ex-EX125 | |
| Kirkland_Main-2232 | Kirkland_Manholes-1530 | 229.92 | Kirkland_Manholes-1529 | 223.45 | 269.7 | 2.4 | 8 | Concrete | 0.013 | 840 | 33 | 107 | 141 | 16.7 | SM14-Ex-EX121 | |
| Kirkland_Main-2233 | Kirkland_Manholes-1529 | 223.45 | Kirkland_Manholes-1528 | 217.87 | 160.3 | 3.48 | 8 | Concrete | 0.013 | 1,012 | 35 | 111 | 146 | 14.5 | SM14-Ex-EX121 | |
| Kirkland_Main-2235 | Kirkland_Manholes-1249 | 223.25 | Kirkland_Manholes-1250 | 210.15 | 250.9 | 5.22 | 8 | Concrete | 0.013 | 1,239 | 15 | 99 | 114 | 9.2 | SM14-Ex-EX65 | |
| Kirkland_Main-2236 | Kirkland_Manholes-1246 | 238.47 | Kirkland_Manholes-1247 | 236.99 | 105.6 | 1.4 | 8 | Concrete | 0.013 | 642 | 11 | 58 | 69 | 10.7 | SM14-Ex-EX65 | |
| Kirkland_Main-2237 | Kirkland_Manholes-1248 | 254.12 | Kirkland_Manholes-1247 | 236.99 | 222.2 | 7.71 | 8 | Concrete | 0.013 | 1,506 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX97 | |
| Kirkland_Main-2238 | Kirkland_Manholes-1245 | 243.41 | Kirkland_Manholes-1246 | 238.47 | 272.7 | 1.81 | 8 | Concrete | 0.013 | 730 | 9 | 49 | 59 | 8 | SM14-Ex-EX65 | |
| Kirkland_Main-2239 | Kirkland_Manholes-1244 | 254.14 | Kirkland_Manholes-1245 | 243.41 | 231.8 | 4.63 | 8 | Concrete | 0.013 | 1,167 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX65 | |
| Kirkland_Main-2240 | Kirkland_Manholes-1242 | 244.28 | Kirkland_Manholes-208 | 241.09 | 154 | 2.07 | 8 | Concrete | 0.013 | 781 | 2 | 9 | 11 | 1.4 | SM14-Ex-EX61 | |
| Kirkland_Main-2241 | Kirkland_Manholes-1237 | 263.8 | Kirkland_Manholes-1236 | 256.67 | 250.6 | 2.84 | 8 | Concrete | 0.013 | 915 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX60 | |
| Kirkland_Main-2242 | Kirkland_Manholes-1239 | 270.66 | Kirkland_Manholes-1238 | 263.26 | 225.6 | 3.28 | 8 | Concrete | 0.013 | 982 | 3 | 8 | 11 | 1.1 | SM14-Ex-EX95 | |
| Kirkland_Main-2244 | Kirkland_Manholes-1234 | 275.2 | Kirkland_Manholes-1233 | 274.4 | 31.3 | 2.55 | 6 | Concrete | 0.013 | 402 | 1 | 8 | 9 | 2.4 | SM14-Ex-EX96 | |
| Kirkland_Main-2245 | Kirkland_Manholes-1233 | 274.4 | Kirkland_Manholes-1232 | 271.55 | 317 | 0.9 | 6 | Concrete | 0.013 | 239 | 5 | 25 | 30 | 12.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2246 | Kirkland_Manholes-1232 | 271.55 | Kirkland_Manholes-1231 | 254.08 | 347.6 | 5.03 | 6 | Concrete | 0.013 | 565 | 8 | 33 | 41 | 7.2 | SM14-Ex-EX96 | |
| Kirkland_Main-2247 | Kirkland_Manholes-1231 | 254.08 | Kirkland_Manholes-1230 | 236.32 | 352.2 | 5.04 | 6 | Concrete | 0.013 | 566 | 12 | 41 | 53 | 9.3 | SM14-Ex-EX96 | |
| Kirkland_Main-2248 | Kirkland_Manholes-1414 | 476.69 | Kirkland_Manholes-1415 | 475.19 | 382.9 | 0.39 | 8 | PVC | 0.01 | 441 | 1 | 20 | 20 | 4.6 | | |
| Kirkland_Main-2249 | Kirkland_Manholes-1416 | 475.58 | Kirkland_Manholes-1415 | 475.19 | 141 | 0.28 | 8 | PVC | 0.01 | 371 | 3 | 20 | 23 | 6.1 | | |
| Kirkland_Main-2250 | Kirkland_Manholes-1417 | 477.64 | Kirkland_Manholes-1416 | 475.58 | 44.3 | 4.65 | 8 | PVC | 0.01 | 1,521 | 2 | 16 | 18 | 1.2 | | |
| Kirkland_Main-2251 | Kirkland_Manholes-1419 | 480.31 | Kirkland_Manholes-1418 | 477.42 | 188.2 | 1.54 | 8 | PVC | 0.01 | 874 | 1 | 12 | 12 | 1.4 | | |
| Kirkland_Main-2252 | Kirkland_Manholes-1420 | 487.42 | Kirkland_Manholes-1419 | 480.31 | 251.4 | 2.83 | 8 | PVC | 0.01 | 1,186 | 0 | 8 | 8 | 0.7 | | |
| Kirkland_Main-2253 | Kirkland_Manholes-1421 | 490.08 | Kirkland_Manholes-1420 | 487.42 | 280.7 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2255 | Kirkland_Manholes-1422 | 436.01 | Kirkland_Manholes-1423 | 431.09 | 115.7 | 4.25 | 8 | PVC | 0.01 | 1,454 | 4 | 2 | 6 | 0.4 | | |
| Kirkland_Main-2256 | Kirkland_Manholes-1423 | 431.09 | Kirkland_Manholes-1424 | 424.73 | 75.1 | 8.47 | 8 | PVC | 0.01 | 2,052 | 5 | 5 | 10 | 0.5 | | |
| Kirkland_Main-2257 | Kirkland_Manholes-1424 | 424.73 | Kirkland_Manholes-1425 | 416.33 | 120.8 | 6.95 | 8 | PVC | 0.01 | 1,859 | 6 | 7 | 13 | 0.7 | | |
| Kirkland_Main-2258 | Kirkland_Manholes-1425 | 416.33 | Kirkland_Manholes-2514 | 400.04 | 156.3 | 10.42 | 8 | PVC | 0.01 | 2,276 | 8 | 9 | 17 | 0.8 | | |
| Kirkland_Main-2260 | Kirkland_Manholes-1426 | 513.73 | Kirkland_Manholes-1427 | 513.21 | 150.6 | 0.34 | 8 | PVC | 0.01 | 413 | 2 | 4 | 6 | 1.5 | | |
| Kirkland_Main-2261 | Kirkland_Manholes-2186 | 104.5 | Kirkland_Manholes-2185 | 103.23 | 40.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 21 | 41 | 62 | 4.9 | | |
| Kirkland_Main-2262 | Kirkland_Manholes-2188 | 116.01 | Kirkland_Manholes-2187 | 114.37 | 29.7 | 5.52 | 8 | PVC | 0.01 | 1,657 | 0 | 8 | 9 | 0.5 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2263 | Kirkland_Manholes-2192 | 135.5 | Kirkland_Manholes-2191 | 134.63 | 54 | 1.61 | 8 | PVC | 0.01 | 895 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-2265 | Kirkland_Manholes-2120 | 156.16 | O-33 | 155.88 | 68.2 | 0.41 | 8 | PVC | 0.01 | 452 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2266 | Kirkland_Manholes-2121 | 179.17 | Kirkland_Manholes-2122 | 169.1 | 148.2 | 6.79 | 8 | Concrete | 0.013 | 1,414 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX238 | |
| Kirkland_Main-2267 | Kirkland_Manholes-2122 | 169.1 | Kirkland_Manholes-2123 | 164.83 | 234.6 | 1.82 | 8 | Concrete | 0.013 | 732 | 2 | 8 | 10 | 1.4 | SM14-Ex-EX238 | |
| Kirkland_Main-2268 | Kirkland_Manholes-2200 | 29.87 | Kirkland_Manholes-2202 | 26.91 | 11.2 | 26.5 | 8 | PVC | 0.01 | 3,629 | 49 | 19 | 68 | 1.9 | | Slope confirmed by as-builts |
| Kirkland_Main-2270 | Kirkland_Manholes-2209 | 69.6 | Kirkland_Manholes-2206 | 66.42 | 347.3 | 0.92 | 6 | Concrete | 0.013 | 241 | 1 | 8 | 9 | 3.8 | SM8 | |
| Kirkland_Main-2271 | Kirkland_Manholes-2208 | 66.31 | Kirkland_Manholes-2207 | 65.6 | 145.2 | 0.49 | 6 | Concrete | 0.013 | 176 | 0 | 6 | 7 | 3.9 | SM14-Ex-EX189 | Drop Connection |
| Kirkland_Main-2272 | Kirkland_Manholes-2216 | 56.6 | Kirkland_Manholes-2217 | 22.48 | 221.2 | 15.42 | 8 | PVC | 0.01 | 2,769 | 4 | 32 | 37 | 1.3 | | |
| Kirkland_Main-2273 | Kirkland_Manholes-2215 | 67.8 | Kirkland_Manholes-2214 | 67.15 | 122.4 | 0.53 | 8 | PVC | 0.01 | 514 | 2 | 6 | 8 | 1.6 | | |
| Kirkland_Main-2274 | Kirkland_Manholes-2214 | 67.15 | Kirkland_Manholes-2213 | 66.3 | 36.8 | 2.31 | 8 | PVC | 0.01 | 1,071 | 2 | 13 | 15 | 1.4 | | |
| Kirkland_Main-2275 | Kirkland_Manholes-2213 | 66.3 | Kirkland_Manholes-2216 | 56.6 | 199.9 | 4.85 | 8 | PVC | 0.01 | 1,553 | 3 | 26 | 29 | 1.9 | | |
| Kirkland_Main-2276 | Kirkland_Manholes-2212 | 72.13 | Kirkland_Manholes-2213 | 66.3 | 100 | 5.83 | 6 | Concrete | 0.013 | 608 | 1 | 6 | 8 | 1.3 | SM14-Ex-EX190 | |
| Kirkland_Main-2278 | Kirkland_Manholes-2124 | 217.78 | Kirkland_Manholes-2303 | 195.57 | 353.2 | 6.29 | 8 | Concrete | 0.013 | 1,360 | 253 | 886 | 1,139 | 83.8 | SM14-Ex-EX248 | |
| Kirkland_Main-2280 | Kirkland_Manholes-1463 | 498.43 | Kirkland_Manholes-1464 | 490.77 | 337.1 | 2.27 | 8 | Concrete | 0.013 | 817 | 6 | 16 | 22 | 2.6 | SM14-Ex-EX271 | |
| Kirkland_Main-2281 | Kirkland_Manholes-1465 | 496.7 | Kirkland_Manholes-1464 | 490.77 | 350 | 1.69 | 8 | Concrete | 0.013 | 706 | 5 | 12 | 17 | 2.4 | SM14-Ex-EX272 | |
| Kirkland_Main-2282 | Kirkland_Manholes-1464 | 490.77 | Kirkland_Manholes-1469 | 490.09 | 171.1 | 0.4 | 8 | Concrete | 0.013 | 343 | 12 | 32 | 44 | 12.9 | SM14-Ex-EX271 | |
| Kirkland_Main-2283 | Kirkland_Manholes-1466 | 501.75 | Kirkland_Manholes-1465 | 496.7 | 399.1 | 1.27 | 8 | Concrete | 0.013 | 610 | 3 | 8 | 11 | 1.7 | SM14-Ex-EX272 | |
| Kirkland_Main-2284 | Kirkland_Manholes-1467 | 507 | Kirkland_Manholes-1466 | 501.75 | 336.1 | 1.56 | 8 | Concrete | 0.013 | 678 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX272 | |
| Kirkland_Main-2285 | Kirkland_Manholes-1470 | 502.07 | Kirkland_Manholes-1475 | 484.92 | 351.8 | 4.88 | 8 | Concrete | 0.013 | 1,198 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX268 | |
| Kirkland_Main-2286 | Kirkland_Manholes-1471 | 502.1 | Kirkland_Manholes-1472 | 489.92 | 152.5 | 7.99 | 8 | Concrete | 0.013 | 1,533 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX267 | |
| Kirkland_Main-2287 | Kirkland_Manholes-1472 | 489.92 | Kirkland_Manholes-1473 | 489.3 | 149.9 | 0.41 | 8 | Concrete | 0.013 | 349 | 3 | 8 | 11 | 3 | SM14-Ex-EX267 | |
| Kirkland_Main-2288 | Kirkland_Manholes-1473 | 489.3 | Kirkland_Manholes-1474 | 483.04 | 397.5 | 1.57 | 8 | Concrete | 0.013 | 681 | 4 | 12 | 16 | 2.3 | SM14-Ex-EX267 | |
| Kirkland_Main-2289 | Kirkland_Manholes-1474 | 483.04 | Kirkland_Manholes-1478 | 480.02 | 383.8 | 0.79 | 8 | Concrete | 0.013 | 481 | 6 | 16 | 22 | 4.5 | SM14-Ex-EX267 | |
| Kirkland_Main-2290 | Kirkland_Manholes-1475 | 484.92 | Kirkland_Manholes-1476 | 483.18 | 394.8 | 0.44 | 8 | Concrete | 0.013 | 360 | 2 | 8 | 10 | 2.7 | SM14-Ex-EX268 | |
| Kirkland_Main-2291 | Kirkland_Manholes-1476 | 483.18 | Kirkland_Manholes-1477 | 477.36 | 143.4 | 4.06 | 8 | Concrete | 0.013 | 1,093 | 3 | 12 | 15 | 1.4 | SM14-Ex-EX268 | |
| Kirkland_Main-2292 | Kirkland_Manholes-1477 | 477.36 | Kirkland_Manholes-1481 | 462.54 | 116.7 | 12.7 | 8 | Concrete | 0.013 | 1,933 | 3 | 16 | 19 | 1 | SM14-Ex-EX268 | |
| Kirkland_Main-2293 | Kirkland_Manholes-1478 | 480.02 | Kirkland_Manholes-1479 | 473.98 | 182.8 | 3.3 | 8 | Concrete | 0.013 | 986 | 7 | 20 | 27 | 2.7 | SM14-Ex-EX267 | |
| Kirkland_Main-2294 | Kirkland_Manholes-1479 | 473.98 | Kirkland_Manholes-1483 | 455.88 | 188.4 | 9.61 | 8 | Concrete | 0.013 | 1,681 | 8 | 24 | 32 | 1.9 | SM14-Ex-EX267 | |
| Kirkland_Main-2295 | Kirkland_Manholes-1482 | 457.77 | Kirkland_Manholes-1483 | 455.88 | 220.6 | 0.86 | 8 | Concrete | 0.013 | 502 | 55 | 242 | 298 | 59.3 | SM14-Ex-EX214 | |
| Kirkland_Main-2296 | Kirkland_Manholes-1483 | 455.88 | Kirkland_Manholes-2042 | 455.6 | 242 | 0.12 | 8 | Concrete | 0.013 | 184 | 64 | 270 | 334 | 181.1 | SM14-Ex-EX214 | |
| Kirkland_Main-2297 | Kirkland_Manholes-1480 | 465.84 | Kirkland_Manholes-1482 | 457.77 | 216.4 | 3.73 | 8 | Concrete | 0.013 | 1,047 | 51 | 219 | 270 | 25.8 | SM14-Ex-EX214 | |
| Kirkland_Main-2298 | Kirkland_Manholes-2162 | 123.07 | Kirkland_Manholes-2139 | 96.6 | 399.7 | 6.62 | 8 | Concrete | 0.013 | 1,396 | 4 | 16 | 21 | 1.5 | SM14-Ex-EX194 | |
| Kirkland_Main-2299 | Kirkland_Manholes-2161 | 148.95 | Kirkland_Manholes-2162 | 123.07 | 410.6 | 6.3 | 6 | Concrete | 0.013 | 632 | 1 | 8 | 9 | 1.5 | SM14-Ex-EX194 | |
| Kirkland_Main-2300 | Kirkland_Manholes-2239 | 125.2 | Kirkland_Manholes-2238 | 92.13 | 326.8 | 10.12 | 8 | Concrete | 0.013 | 1,725 | 2 | 6 | 8 | 0.5 | SM14-Ex-EX224 | |
| Kirkland_Main-2301 | Kirkland_Manholes-2241 | 73.4 | Kirkland_Manholes-2240 | 69.07 | 226.1 | 1.92 | 8 | PVC | 0.01 | 976 | 2 | 6 | 8 | 0.8 | | |
| Kirkland_Main-2302 | Kirkland_Manholes-2159 | 84.71 | Kirkland_Manholes-2240 | 69.07 | 248.4 | 6.3 | 8 | PVC | 0.01 | 1,769 | 18 | 65 | 83 | 4.7 | | |
| Kirkland_Main-2303 | Kirkland_Manholes-2243 | 51.95 | Kirkland_Manholes-2244 | 43.69 | 203.1 | 4.07 | 8 | PVC | 0.01 | 1,422 | 2 | 6 | 8 | 0.6 | | |
| Kirkland_Main-2304 | Kirkland_Manholes-2240 | 69.07 | Kirkland_Manholes-2244 | 43.69 | 271.1 | 9.36 | 8 | PVC | 0.01 | 2,157 | 21 | 78 | 99 | 4.6 | | |
| Kirkland_Main-2305 | Kirkland_Manholes-2244 | 43.69 | Kirkland_Manholes-2155 | 42.84 | 213.7 | 0.4 | 8 | PVC | 0.01 | 446 | 26 | 91 | 117 | 26.3 | | Drop Connection |
| Kirkland_Main-2306 | Kirkland_Manholes-2494 | 170.93 | Kirkland_Manholes-2132 | 159.52 | 411.9 | 2.77 | 8 | Concrete | 0.013 | 903 | 16 | 24 | 40 | 4.4 | SM14-Ex-EX236 | |
| Kirkland_Main-2307 | Kirkland_Manholes-2242 | 36.17 | Kirkland_Manholes-2317 | 17.2 | 251 | 7.56 | 8 | Concrete | 0.013 | 1,491 | 2 | 6 | 8 | 0.5 | SM14-Ex-EX191 | |
| Kirkland_Main-2308 | Kirkland_Manholes-2229 | 22.53 | Kirkland_Manholes-2313 | 22.37 | 40.9 | 0.4 | 8 | PVC | 0.01 | 446 | 15 | 39 | 54 | 12.1 | | Drop Connection |
| Kirkland_Main-2309 | Kirkland_Manholes-2228 | 23.08 | Kirkland_Manholes-2314 | 22.81 | 66.4 | 0.4 | 8 | PVC | 0.01 | 446 | 18 | 78 | 96 | 21.5 | | Drop Connection |
| Kirkland_Main-2311 | Kirkland_Manholes-2257 | 348.17 | Kirkland_Manholes-2256 | 329.88 | 184.1 | 9.94 | 8 | Concrete | 0.013 | 1,709 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX254 | |
| Kirkland_Main-2312 | Kirkland_Manholes-2267 | 393.07 | Kirkland_Manholes-2266 | 392.8 | 100.8 | 0.27 | 8 | PVC | 0.01 | 365 | 2 | 16 | 18 | 4.9 | | |
| Kirkland_Main-2313 | Kirkland_Manholes-2715 | 29.78 | Kirkland_Manholes-2716 | 29.3 | 129 | 0.37 | 12 | PVC | 0.01 | 1,268 | 74 | 18 | 92 | 7.3 | | |
| Kirkland_Main-2314 | Kirkland_Manholes-2716 | 29.3 | Kirkland_Manholes-2717 | 21.61 | 141.2 | 5.45 | 12 | PVC | 0.01 | 4,851 | 74 | 24 | 98 | 2 | | |
| Kirkland_Main-2315 | Kirkland_Manholes-2717 | 21.61 | Kirkland_Manholes-2718 | 21.4 | 363.5 | 0.06 | 12 | PVC | 0.01 | 500 | 74 | 30 | 104 | 20.8 | | |
| Kirkland_Main-2316 | Kirkland_Manholes-2052 | 419.8 | Kirkland_Manholes-2280 | 418.85 | 171.1 | 0.56 | 8 | Concrete | 0.013 | 404 | 1 | 4 | 5 | 1.2 | SM14-Ex-EX262 | |
| Kirkland_Main-2317 | Kirkland_Manholes-2280 | 418.85 | Kirkland_Manholes-2279 | 418 | 153.8 | 0.55 | 8 | Concrete | 0.013 | 403 | 2 | 8 | 10 | 2.4 | SM14-Ex-EX262 | |
| Kirkland_Main-2318 | Kirkland_Manholes-2274 | 417.36 | Kirkland_Manholes-2273 | 414.69 | 101.2 | 2.64 | 8 | PVC | 0.01 | 1,145 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2319 | Kirkland_Manholes-2279 | 418 | Kirkland_Manholes-2268 | 401.9 | 291.9 | 5.52 | 8 | Concrete | 0.013 | 1,274 | 3 | 12 | 15 | 1.2 | SM14-Ex-EX262 | |
| Kirkland_Main-2320 | Kirkland_Manholes-2268 | 401.9 | Kirkland_Manholes-2269 | 398.2 | 115.6 | 3.2 | 8 | Concrete | 0.013 | 970 | 14 | 64 | 78 | 8 | SM14-Ex-EX261 | |
| Kirkland_Main-2321 | Kirkland_Manholes-2270 | 403.21 | Kirkland_Manholes-2269 | 398.2 | 107.6 | 4.66 | 8 | PVC | 0.01 | 1,521 | 4 | 36 | 40 | 2.6 | | |
| Kirkland_Main-2322 | Kirkland_Manholes-2273 | 414.69 | Kirkland_Manholes-2272 | 410.23 | 107.4 | 4.15 | 8 | PVC | 0.01 | 1,437 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-2323 | Kirkland_Manholes-2272 | 410.23 | Kirkland_Manholes-2271 | 405.49 | 51.3 | 9.24 | 8 | PVC | 0.01 | 2,143 | 2 | 12 | 14 | 0.6 | | |
| Kirkland_Main-2324 | Kirkland_Manholes-2271 | 405.49 | Kirkland_Manholes-2270 | 403.21 | 91.2 | 2.5 | 8 | PVC | 0.01 | 1,115 | 4 | 32 | 36 | 3.2 | | |
| Kirkland_Main-2325 | Kirkland_Manholes-2276 | 410.45 | Kirkland_Manholes-2277 | 408.15 | 110.4 | 2.08 | 8 | PVC | 0.01 | 1,017 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-2326 | Kirkland_Manholes-2277 | 408.15 | Kirkland_Manholes-2278 | 406.74 | 80.9 | 1.74 | 8 | PVC | 0.01 | 931 | 2 | 12 | 14 | 1.5 | | |
| Kirkland_Main-2327 | Kirkland_Manholes-1228 | 189.87 | Kirkland_Manholes-1227 | 174.57 | 207.5 | 7.37 | 8 | Concrete | 0.013 | 1,473 | 22 | 74 | 96 | 6.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2329 | Kirkland_Manholes-1226 | 185.47 | Kirkland_Manholes-1227 | 174.57 | 349.3 | 3.12 | 6 | Concrete | 0.013 | 445 | 2 | 8 | 11 | 2.4 | SM14-Ex-EX93 | |
| Kirkland_Main-2333 | Kirkland_Manholes-1209 | 251.94 | Kirkland_Manholes-1208 | 237.71 | 314.7 | 4.52 | 6 | Concrete | 0.013 | 535 | 10 | 31 | 41 | 7.6 | SM14-Ex-EX90 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2335 | Kirkland_Manholes-1210 | 257.02 | Kirkland_Manholes-1209 | 251.94 | 317.5 | 1.6 | 6 | Concrete | 0.013 | 319 | 7 | 23 | 30 | 9.4 | SM14-Ex-EX90 | |
| Kirkland_Main-2341 | Kirkland_Manholes-1214 | 261.31 | Kirkland_Manholes-1215 | 243.02 | 404.6 | 4.52 | 8 | Concrete | 0.013 | 1,153 | 5 | 11 | 16 | 1.4 | SM14-Ex-EX90 | |
| Kirkland_Main-2342 | Kirkland_Manholes-1241 | 267.65 | Kirkland_Manholes-1215 | 243.02 | 241.5 | 10.2 | 8 | Concrete | 0.013 | 1,732 | 3 | 4 | 7 | 0.4 | SM14-Ex-EX63 | |
| Kirkland_Main-2343 | Kirkland_Manholes-1215 | 243.02 | Kirkland_Manholes-1134 | 223.76 | 275.3 | 7 | 8 | Concrete | 0.013 | 1,435 | 10 | 19 | 29 | 2 | SM14-Ex-EX63 | |
| Kirkland_Main-2344 | Kirkland_Manholes-1217 | 232.97 | Kirkland_Manholes-1218 | 220.85 | 252.7 | 4.8 | 8 | Concrete | 0.013 | 1,188 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX59 | |
| Kirkland_Main-2345 | Kirkland_Manholes-1270 | 246.8 | Kirkland_Manholes-1245 | 243.41 | 285.9 | 1.19 | 8 | Concrete | 0.013 | 591 | 1 | 8 | 9 | 1.5 | SM14-Ex-EX64 | |
| Kirkland_Main-2348 | Kirkland_Manholes-1276 | 172.95 | Kirkland_Manholes-1279 | 163.99 | 169.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 4 | 16 | 20 | 1.2 | | |
| Kirkland_Main-2349 | Kirkland_Manholes-1569 | 157.57 | Kirkland_Manholes-1293 | 152.35 | 333.3 | 1.57 | 6 | Concrete | 0.013 | 315 | 4 | 8 | 12 | 3.9 | SM14-Ex-EX113 | |
| Kirkland_Main-2350 | Kirkland_Manholes-1293 | 152.35 | Kirkland_Manholes-1292 | 148.28 | 368.4 | 1.1 | 6 | Concrete | 0.013 | 265 | 8 | 16 | 24 | 9.1 | SM14-Ex-EX113 | |
| Kirkland_Main-2351 | Kirkland_Manholes-1568 | 145.18 | Kirkland_Manholes-1297 | 132.74 | 335 | 3.71 | 6 | Concrete | 0.013 | 485 | 2 | 8 | 11 | 2.2 | SM14-Ex-EX114 | |
| Kirkland_Main-2352 | Kirkland_Manholes-1297 | 132.74 | Kirkland_Manholes-1296 | 129.32 | 308.3 | 1.11 | 6 | Concrete | 0.013 | 265 | 4 | 16 | 20 | 7.7 | SM14-Ex-EX114 | |
| Kirkland_Main-2353 | Kirkland_Manholes-1281 | 154.69 | Kirkland_Manholes-1292 | 148.28 | 310.6 | 2.06 | 8 | Concrete | 0.013 | 779 | 46 | 247 | 293 | 37.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2354 | Kirkland_Manholes-1292 | 148.28 | Kirkland_Manholes-1296 | 129.32 | 322 | 5.89 | 8 | Concrete | 0.013 | 1,316 | 56 | 272 | 327 | 24.9 | SM14-Ex-EX102 | |
| Kirkland_Main-2357 | Kirkland_Manholes-1266 | 188.85 | Kirkland_Manholes-1264 | 172.1 | 141.2 | 11.87 | 8 | PVC | 0.01 | 2,429 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2358 | Kirkland_Manholes-1264 | 172.1 | Kirkland_Manholes-1265 | 168.12 | 70.1 | 5.67 | 8 | PVC | 0.01 | 1,679 | 1 | 16 | 18 | 1.1 | | |
| Kirkland_Main-2363 | Kirkland_Manholes-1273 | 182.86 | Kirkland_Manholes-1274 | 175.64 | 151.8 | 4.76 | 8 | PVC | 0.01 | 1,538 | 5 | 25 | 30 | 1.9 | | |
| Kirkland_Main-2364 | Kirkland_Manholes-1252 | 181.71 | Kirkland_Manholes-1277 | 163.83 | 245.6 | 7.28 | 8 | Concrete | 0.013 | 1,463 | 37 | 189 | 226 | 15.5 | SM14-Ex-EX101 | |
| Kirkland_Main-2365 | Kirkland_Manholes-1277 | 163.83 | Kirkland_Manholes-1278 | 160.09 | 110.9 | 3.37 | 8 | Concrete | 0.013 | 996 | 38 | 198 | 235 | 23.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2366 | Kirkland_Manholes-1278 | 160.09 | Kirkland_Manholes-1280 | 156.25 | 144.5 | 2.66 | 8 | Concrete | 0.013 | 884 | 43 | 231 | 273 | 30.9 | SM14-Ex-EX102 | |
| Kirkland_Main-2367 | Kirkland_Manholes-1280 | 156.25 | Kirkland_Manholes-1281 | 154.69 | 317.7 | 0.49 | 8 | Concrete | 0.013 | 380 | 45 | 239 | 284 | 74.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2369 | Kirkland_Manholes-1311 | 230.66 | Kirkland_Manholes-1312 | 230.27 | 96.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | |
| Kirkland_Main-2370 | Kirkland_Manholes-1313 | 230.7 | Kirkland_Manholes-1312 | 230.27 | 76.5 | 0.56 | 8 | PVC | 0.01 | 528 | 3 | 13 | 16 | 3.1 | | |
| Kirkland_Main-2371 | Kirkland_Manholes-1312 | 230.27 | Kirkland_Manholes-1306 | 225.07 | 369.5 | 1.41 | 8 | PVC | 0.01 | 836 | 4 | 21 | 25 | 3 | | |
| Kirkland_Main-2372 | Kirkland_Manholes-1513 | 263.11 | Kirkland_Manholes-1515 | 261.7 | 138 | 1.02 | 8 | Concrete | 0.013 | 548 | 33 | 143 | 176 | 32.2 | SM14-Ex-EX131 | |
| Kirkland_Main-2373 | Kirkland_Manholes-1508 | 264.2 | Kirkland_Manholes-1514 | 263.47 | 179.7 | 0.41 | 8 | Ductile Iron | 0.012 | 375 | 31 | 131 | 162 | 43.2 | SM14-Ex-EX131 | |
| Kirkland_Main-2374 | Kirkland_Manholes-1684 | 76.22 | Kirkland_Manholes-1683 | 75.33 | 41.4 | 2.15 | 8 | PVC | 0.01 | 1,034 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-2375 | Kirkland_Manholes-1851 | 275 | Kirkland_Manholes-1316 | 272.4 | 254.5 | 1.02 | 8 | PVC | 0.01 | 713 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-2376 | Kirkland_Manholes-1317 | 271.64 | Kirkland_Manholes-924 | 268.15 | 334 | 1.04 | 12 | PVC | 0.01 | 2,125 | 108 | 425 | 533 | 25.1 | | |
| Kirkland_Main-2377 | Kirkland_Manholes-2984 | 277.63 | Kirkland_Manholes-1317 | 271.64 | 132.6 | 4.52 | 10 | PVC | 0.01 | 2,717 | 106 | 373 | 479 | 17.6 | | |
| Kirkland_Main-2378 | Kirkland_Manholes-1371 | 376.15 | Kirkland_Manholes-3081 | 373.55 | 185 | 1.41 | 8 | PVC | 0.01 | 836 | 65 | 179 | 244 | 29.2 | | |
| Kirkland_Main-2379 | Kirkland_Manholes-1319 | 372.4 | Kirkland_Manholes-1318 | 358.26 | 123 | 11.5 | 8 | PVC | 0.01 | 2,391 | 67 | 191 | 258 | 10.8 | | |
| Kirkland_Main-2380 | Kirkland_Manholes-1318 | 358.26 | Kirkland_Manholes-1320 | 342.61 | 140.9 | 11.1 | 10 | PVC | 0.01 | 4,260 | 67 | 195 | 262 | 6.2 | | |
| Kirkland_Main-2381 | Kirkland_Manholes-1320 | 342.61 | Kirkland_Manholes-1326 | 321.42 | 151.5 | 13.98 | 10 | PVC | 0.01 | 4,780 | 92 | 262 | 354 | 7.4 | | |
| Kirkland_Main-2382 | Kirkland_Manholes-1514 | 263.47 | Kirkland_Manholes-1513 | 263.11 | 127.9 | 0.28 | 8 | Ductile Iron | 0.012 | 312 | 32 | 135 | 167 | 53.6 | SM14-Ex-EX131 | |
| Kirkland_Main-2383 | Kirkland_Manholes-1507 | 265.94 | Kirkland_Manholes-1508 | 264.2 | 288.2 | 0.6 | 8 | Ductile Iron | 0.012 | 456 | 27 | 115 | 143 | 31.2 | SM14-Ex-EX131 | |
| Kirkland_Main-2384 | Kirkland_Manholes-1322 | 342.78 | Kirkland_Manholes-1320 | 342.61 | 36.2 | 0.47 | 8 | PVC | 0.01 | 483 | 24 | 64 | 88 | 18.1 | | |
| Kirkland_Main-2385 | Kirkland_Manholes-1321 | 355.4 | Kirkland_Manholes-1322 | 342.78 | 269.6 | 4.68 | 8 | PVC | 0.01 | 1,525 | 23 | 60 | 83 | 5.4 | | |
| Kirkland_Main-2386 | Kirkland_Manholes-1335 | 367.98 | Kirkland_Manholes-1321 | 355.4 | 137.9 | 9.12 | 8 | PVC | 0.01 | 2,129 | 22 | 56 | 78 | 3.6 | | |
| Kirkland_Main-2387 | Kirkland_Manholes-1323 | 332.91 | Kirkland_Manholes-1324 | 332.34 | 49.4 | 1.15 | 8 | PVC | 0.01 | 757 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2388 | Kirkland_Manholes-1324 | 332.34 | Kirkland_Manholes-1325 | 323.2 | 121 | 7.55 | 8 | PVC | 0.01 | 1,938 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-2389 | Kirkland_Manholes-1325 | 323.2 | Kirkland_Manholes-1326 | 321.42 | 174.1 | 1.02 | 8 | PVC | 0.01 | 713 | 2 | 12 | 14 | 2 | | |
| Kirkland_Main-2390 | Kirkland_Manholes-1326 | 321.42 | Kirkland_Manholes-1339 | 314.87 | 128.9 | 5.08 | 10 | PVC | 0.01 | 2,880 | 96 | 290 | 386 | 13.4 | | |
| Kirkland_Main-2391 | Kirkland_Manholes-1337 | 323.9 | Kirkland_Manholes-1326 | 321.42 | 30.5 | 8.12 | 8 | PVC | 0.01 | 2,009 | 1 | 12 | 13 | 0.7 | | |
| Kirkland_Main-2392 | Kirkland_Manholes-1327 | 326.71 | Kirkland_Manholes-1337 | 323.9 | 27.1 | 10.37 | 8 | PVC | 0.01 | 2,271 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2393 | Kirkland_Manholes-1328 | 394.1 | Kirkland_Manholes-1329 | 393.5 | 241.8 | 0.25 | 8 | PVC | 0.01 | 351 | 2 | 28 | 30 | 8.6 | | |
| Kirkland_Main-2394 | Kirkland_Manholes-1329 | 393.5 | Kirkland_Manholes-1330 | 392.47 | 187.9 | 0.55 | 8 | PVC | 0.01 | 522 | 4 | 32 | 35 | 6.8 | | |
| Kirkland_Main-2395 | Kirkland_Manholes-1330 | 392.47 | Kirkland_Manholes-1332 | 391.73 | 102.7 | 0.72 | 8 | PVC | 0.01 | 597 | 4 | 36 | 40 | 6.6 | | |
| Kirkland_Main-2396 | Kirkland_Manholes-1332 | 391.73 | Kirkland_Manholes-1333 | 390.44 | 145.6 | 0.89 | 8 | Ductile Iron | 0.012 | 553 | 20 | 44 | 64 | 11.5 | SM14-Ex-EX177 | Drop Connection |
| Kirkland_Main-2397 | Kirkland_Manholes-1331 | 393.51 | Kirkland_Manholes-1332 | 391.73 | 79.5 | 2.24 | 8 | Ductile Iron | 0.012 | 879 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX177 | |
| Kirkland_Main-2398 | Kirkland_Manholes-1333 | 387.1 | Kirkland_Manholes-1334 | 373.64 | 147.7 | 9.12 | 8 | PVC | 0.01 | 2,129 | 21 | 48 | 68 | 3.2 | | |
| Kirkland_Main-2399 | Kirkland_Manholes-1334 | 373.64 | Kirkland_Manholes-1335 | 367.98 | 202.7 | 2.79 | 8 | PVC | 0.01 | 1,178 | 21 | 52 | 73 | 6.2 | | |
| Kirkland_Main-2400 | Kirkland_Manholes-1336 | 341.09 | Kirkland_Manholes-1327 | 326.71 | 166.6 | 8.63 | 8 | PVC | 0.01 | 2,071 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2401 | Kirkland_Manholes-1338 | 316.17 | Kirkland_Manholes-1339 | 314.87 | 207.4 | 0.63 | 8 | PVC | 0.01 | 557 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-2402 | Kirkland_Manholes-1339 | 314.87 | Kirkland_Manholes-1342 | 287.41 | 238.7 | 11.5 | 10 | PVC | 0.01 | 4,335 | 98 | 298 | 396 | 9.1 | | Drop Connection |
| Kirkland_Main-2403 | Kirkland_Manholes-1345 | 289.73 | Kirkland_Manholes-1344 | 287.44 | 243.6 | 0.94 | 8 | PVC | 0.01 | 684 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2404 | Kirkland_Manholes-1344 | 287.44 | Kirkland_Manholes-1343 | 283.8 | 35.3 | 10.32 | 8 | PVC | 0.01 | 2,265 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2405 | Kirkland_Manholes-1343 | 283.8 | Kirkland_Manholes-1342 | 283.15 | 24.6 | 2.63 | 8 | PVC | 0.01 | 1,144 | 2 | 12 | 13 | 1.2 | | |
| Kirkland_Main-2406 | Kirkland_Manholes-1340 | 293.32 | Kirkland_Manholes-1342 | 293.12 | 51.1 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 56 | 62 | 14 | | Drop Connection |
| Kirkland_Main-2407 | Kirkland_Manholes-1341 | 299.38 | Kirkland_Manholes-1340 | 293.32 | 143.1 | 4.24 | 8 | PVC | 0.01 | 1,451 | 6 | 52 | 57 | 4 | | |
| Kirkland_Main-2408 | Kirkland_Manholes-1346 | 416.9 | Kirkland_Manholes-1351 | 414.82 | 383.4 | 0.54 | 8 | Concrete | 0.013 | 399 | 0 | 4 | 4 | 1 | SM14-Ex-EX181 | |
| Kirkland_Main-2409 | Kirkland_Manholes-1351 | 414.82 | Kirkland_Manholes-1350 | 414.2 | 207.6 | 0.3 | 10 | Concrete | 0.013 | 537 | 52 | 179 | 231 | 43 | SM14-Ex-EX215 | |
| Kirkland_Main-2410 | Kirkland_Manholes-1350 | 414.2 | Kirkland_Manholes-1917 | 413.2 | 125.7 | 0.8 | 10 | Concrete | 0.013 | 877 | 55 | 187 | 242 | 27.6 | SM14-Ex-EX215 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2411 | Kirkland_Manholes-1373 | 425.99 | Kirkland_Manholes-1350 | 414.2 | 373.4 | 3.16 | 8 | Concrete | 0.013 | 964 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX217 | |
| Kirkland_Main-2412 | Kirkland_Manholes-612 | 119.17 | Kirkland_Manholes-613 | 104.8 | 247.7 | 5.8 | 6 | Concrete | 0.013 | 607 | 1 | 8 | 9 | 1.5 | SM14-Ex-EX149 | |
| Kirkland_Main-2413 | Kirkland_Manholes-613 | 104.8 | Kirkland_Manholes-614 | 87.89 | 231.1 | 7.32 | 6 | Concrete | 0.013 | 681 | 3 | 16 | 20 | 2.9 | SM14-Ex-EX149 | |
| Kirkland_Main-2414 | Kirkland_Manholes-609 | 139.22 | Kirkland_Manholes-1799 | 133.76 | 308.5 | 1.77 | 6 | Concrete | 0.013 | 335 | 2 | 8 | 10 | 3.1 | SM14-Ex-EX146 | |
| Kirkland_Main-2417 | Kirkland_Manholes-611 | 126.2 | Kirkland_Manholes-610 | 123.3 | 146.2 | 1.98 | 6 | Concrete | 0.013 | 355 | 1 | 8 | 9 | 2.5 | SM14-Ex-EX148 | |
| Kirkland_Main-2418 | Kirkland_Manholes-610 | 123.3 | Kirkland_Manholes-1801 | 112.29 | 320.9 | 3.43 | 6 | Concrete | 0.013 | 466 | 2 | 16 | 19 | 4.1 | SM14-Ex-EX148 | |
| Kirkland_Main-2420 | Kirkland_Manholes-585 | 162.05 | Kirkland_Manholes-1797 | 142.57 | 517.3 | 3.77 | 6 | Concrete | 0.013 | 489 | 1 | 8 | 10 | 2 | SM14-Ex-EX144 | |
| Kirkland_Main-2424 | Kirkland_Manholes-582 | 179.11 | Kirkland_Manholes-583 | 174.24 | 247.1 | 1.97 | 6 | Concrete | 0.013 | 354 | 2 | 8 | 10 | 2.8 | SM14-Ex-EX91 | |
| Kirkland_Main-2425 | Kirkland_Manholes-583 | 174.24 | Kirkland_Manholes-1796 | 160.8 | 295.1 | 4.55 | 6 | Concrete | 0.013 | 537 | 3 | 16 | 20 | 3.6 | SM14-Ex-EX91 | |
| Kirkland_Main-2426 | Kirkland_Manholes-586 | 156.07 | Kirkland_Manholes-587 | 133.23 | 320.6 | 7.12 | 6 | Concrete | 0.013 | 672 | 1 | 8 | 9 | 1.4 | SM14-Ex-EX145 | |
| Kirkland_Main-2427 | Kirkland_Manholes-587 | 133.23 | Kirkland_Manholes-588 | 128.35 | 150.1 | 3.25 | 6 | Concrete | 0.013 | 454 | 3 | 16 | 20 | 4.4 | SM14-Ex-EX145 | |
| Kirkland_Main-2428 | Kirkland_Manholes-580 | 147.12 | Kirkland_Manholes-588 | 128.35 | 316.6 | 5.93 | 8 | Concrete | 0.013 | 1,321 | 29 | 115 | 144 | 10.9 | SM14-Ex-EX96 | |
| Kirkland_Main-2430 | Kirkland_Manholes-581 | 170.5 | Kirkland_Manholes-580 | 147.12 | 349.2 | 6.7 | 6 | Concrete | 0.013 | 652 | 2 | 8 | 10 | 1.6 | SM14-Ex-EX94 | |
| Kirkland_Main-2431 | Kirkland_Manholes-588 | 128.35 | Kirkland_Manholes-606 | 111.69 | 288.6 | 5.77 | 8 | Concrete | 0.013 | 1,303 | 33 | 140 | 173 | 13.3 | SM14-Ex-EX96 | |
| Kirkland_Main-2432 | Kirkland_Manholes-1506 | 266.15 | Kirkland_Manholes-1507 | 265.94 | 137.9 | 0.15 | 8 | PVC | 0.01 | 275 | 27 | 111 | 138 | 50.2 | | |
| Kirkland_Main-2433 | Kirkland_Manholes-605 | 109.94 | Kirkland_Manholes-604 | 92.41 | 437.3 | 4.01 | 6 | Concrete | 0.013 | 504 | 7 | 8 | 15 | 2.9 | SM14-Ex-EX160 | |
| Kirkland_Main-2434 | Kirkland_Manholes-590 | 118.3 | Kirkland_Manholes-591 | 102.05 | 327.5 | 4.96 | 6 | Concrete | 0.013 | 561 | 5 | 16 | 21 | 3.8 | SM14-Ex-EX158 | |
| Kirkland_Main-2435 | Kirkland_Manholes-591 | 102.05 | Kirkland_Manholes-592 | 96.93 | 331.1 | 1.55 | 6 | Concrete | 0.013 | 313 | 8 | 25 | 33 | 10.5 | SM14-Ex-EX158 | |
| Kirkland_Main-2436 | Kirkland_Manholes-592 | 96.93 | Kirkland_Manholes-602 | 90.22 | 292.3 | 2.3 | 8 | Concrete | 0.013 | 822 | 71 | 370 | 442 | 53.8 | SM5 | |
| Kirkland_Main-2437 | Kirkland_Manholes-597 | 99.4 | Kirkland_Manholes-592 | 96.93 | 306.8 | 0.8 | 6 | Concrete | 0.013 | 226 | 7 | 41 | 49 | 21.5 | SM14-Ex-EX158 | |
| Kirkland_Main-2438 | Kirkland_Manholes-1612 | 97.3 | Kirkland_Manholes-599 | 92.8 | 301.8 | 1.49 | 6 | Concrete | 0.013 | 308 | 0 | 8 | 9 | 2.8 | SM14-Ex-EX160 | |
| Kirkland_Main-2440 | Kirkland_Manholes-573 | 132.21 | Kirkland_Manholes-572 | 113.73 | 388 | 4.76 | 6 | Concrete | 0.013 | 550 | 3 | 8 | 12 | 2.1 | SM14-Ex-EX118 | |
| Kirkland_Main-2441 | Kirkland_Manholes-572 | 113.73 | Kirkland_Manholes-596 | 110.91 | 307.7 | 0.92 | 8 | Concrete | 0.013 | 519 | 85 | 338 | 422 | 81.3 | SM14-Ex-EX117 | |
| Kirkland_Main-2442 | Kirkland_Manholes-595 | 103.44 | Kirkland_Manholes-597 | 99.4 | 155.7 | 2.6 | 8 | Concrete | 0.013 | 874 | 6 | 33 | 39 | 4.5 | SM14-Ex-EX116 | |
| Kirkland_Main-2443 | Kirkland_Manholes-576 | 111.2 | Kirkland_Manholes-593 | 103.61 | 155.5 | 4.88 | 8 | Concrete | 0.013 | 1,198 | 54 | 288 | 342 | 28.5 | SM5 | |
| Kirkland_Main-2444 | Kirkland_Manholes-593 | 103.61 | Kirkland_Manholes-592 | 96.93 | 157.1 | 4.25 | 8 | Concrete | 0.013 | 1,118 | 55 | 296 | 351 | 31.4 | SM5 | |
| Kirkland_Main-2445 | Kirkland_Manholes-577 | 113.69 | Kirkland_Manholes-576 | 111.2 | 334.4 | 0.74 | 6 | Concrete | 0.013 | 217 | 7 | 25 | 32 | 14.5 | SM14-Ex-EX112 | |
| Kirkland_Main-2446 | Kirkland_Manholes-578 | 130.09 | Kirkland_Manholes-577 | 113.69 | 328.9 | 4.99 | 6 | Concrete | 0.013 | 562 | 4 | 16 | 20 | 3.6 | SM14-Ex-EX112 | |
| Kirkland_Main-2447 | Kirkland_Manholes-2065 | 431.1 | Kirkland_Manholes-2295 | 415.45 | 308.4 | 5.07 | 8 | PVC | 0.01 | 1,588 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2448 | Kirkland_Manholes-579 | 148.3 | Kirkland_Manholes-578 | 130.09 | 329.4 | 5.53 | 6 | Concrete | 0.013 | 592 | 2 | 8 | 10 | 1.7 | SM14-Ex-EX112 | |
| Kirkland_Main-2449 | Kirkland_Manholes-584 | 159.38 | Kirkland_Manholes-580 | 147.12 | 165.2 | 7.42 | 8 | Concrete | 0.013 | 1,478 | 26 | 99 | 125 | 8.4 | SM14-Ex-EX96 | |
| Kirkland_Main-2450 | Kirkland_Manholes-615 | 97.62 | Kirkland_Manholes-614 | 87.89 | 329.8 | 2.95 | 6 | Concrete | 0.013 | 433 | 1 | 8 | 9 | 2.1 | SM14-Ex-EX149 | |
| Kirkland_Main-2451 | Kirkland_Manholes-604 | 92.41 | Kirkland_Manholes-621 | 70.36 | 291.4 | 7.57 | 8 | Concrete | 0.013 | 1,492 | 10 | 21 | 31 | 2.1 | SM14-Ex-EX161 | |
| Kirkland_Main-2452 | Kirkland_Manholes-626 | 276.72 | Kirkland_Manholes-627 | 275.98 | 244.8 | 0.3 | 8 | PVC | 0.01 | 388 | 1 | 4 | 5 | 1.3 | | |
| Kirkland_Main-2453 | Kirkland_Manholes-628 | 242.79 | Kirkland_Manholes-629 | 242.12 | 61.5 | 1.09 | 8 | PVC | 0.01 | 736 | 29 | 139 | 168 | 22.8 | | |
| Kirkland_Main-2454 | Kirkland_Manholes-629 | 242.12 | Kirkland_Manholes-630 | 239.43 | 331.8 | 0.81 | 8 | PVC | 0.01 | 635 | 30 | 143 | 173 | 27.2 | | |
| Kirkland_Main-2455 | Kirkland_Manholes-648 | 244.79 | Kirkland_Manholes-628 | 242.79 | 365.8 | 0.55 | 8 | PVC | 0.01 | 521 | 28 | 135 | 163 | 31.2 | | |
| Kirkland_Main-2456 | Kirkland_Manholes-631 | 237.5 | Kirkland_Manholes-632 | 237.32 | 36.6 | 0.5 | 8 | PVC | 0.01 | 498 | 30 | 151 | 181 | 36.3 | | Updated Per As-Builts (Drop Connection) |
| Kirkland_Main-2457 | Kirkland_Manholes-630 | 239.43 | Kirkland_Manholes-631 | 237.5 | 158.9 | 1.21 | 8 | PVC | 0.01 | 777 | 30 | 147 | 177 | 22.7 | | |
| Kirkland_Main-2458 | Kirkland_Manholes-633 | 234.78 | Kirkland_Manholes-634 | 228.12 | 123.4 | 5.4 | 21 | PVC | 0.01 | 21,481 | 458 | 1,542 | 2,000 | 9.3 | | |
| Kirkland_Main-2459 | Kirkland_Manholes-635 | 248.49 | Kirkland_Manholes-634 | 228.12 | 181.8 | 11.21 | 8 | PVC | 0.01 | 2,360 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2460 | Kirkland_Manholes-634 | 228.12 | Kirkland_Manholes-632 | 228 | 216.6 | 0.06 | 21 | PVC | 0.01 | 2,176 | 460 | 1,550 | 2,009 | 92.3 | SM14-Ex-EX75 | |
| Kirkland_Main-2461 | Kirkland_Manholes-632 | 228 | Kirkland_Manholes-636 | 227 | 153.6 | 0.65 | 21 | PVC | 0.01 | 7,460 | 490 | 1,705 | 2,194 | 29.4 | | |
| Kirkland_Main-2462 | Kirkland_Manholes-636 | 227 | Kirkland_Manholes-335 | 225.11 | 273.2 | 0.69 | 21 | PVC | 0.01 | 7,690 | 490 | 1,709 | 2,198 | 28.6 | | |
| Kirkland_Main-2466 | Kirkland_Manholes-640 | 237.92 | Kirkland_Manholes-639 | 237.89 | 31.5 | 0.1 | 18 | PVC | 0.01 | 1,891 | 244 | 1,049 | 1,293 | 68.4 | SM14-2035-DF8 | |
| Kirkland_Main-2467 | Kirkland_Manholes-639 | 237.89 | Kirkland_Manholes-638 | 236.51 | 242.7 | 0.57 | 21 | PVC | 0.01 | 6,971 | 451 | 1,530 | 1,981 | 28.4 | | |
| Kirkland_Main-2468 | Kirkland_Manholes-647 | 246.6 | Kirkland_Manholes-646 | 244.32 | 287.5 | 0.79 | 8 | PVC | 0.01 | 628 | 5 | 4 | 9 | 1.5 | | |
| Kirkland_Main-2469 | Kirkland_Manholes-646 | 244.32 | Kirkland_Manholes-645 | 243.42 | 85.6 | 1.05 | 8 | PVC | 0.01 | 723 | 6 | 8 | 14 | 1.9 | | |
| Kirkland_Main-2470 | Kirkland_Manholes-644 | 249.23 | Kirkland_Manholes-643 | 242.32 | 131.1 | 5.27 | 8 | PVC | 0.01 | 1,619 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2471 | Kirkland_Manholes-645 | 243.42 | Kirkland_Manholes-643 | 242.32 | 253.7 | 0.43 | 18 | PVC | 0.01 | 4,035 | 239 | 1,029 | 1,268 | 31.4 | | |
| Kirkland_Main-2472 | Kirkland_Manholes-643 | 242.32 | Kirkland_Manholes-642 | 242.1 | 113.5 | 0.19 | 18 | PVC | 0.01 | 2,698 | 241 | 1,037 | 1,278 | 47.4 | | |
| Kirkland_Main-2473 | Kirkland_Manholes-642 | 242.1 | Kirkland_Manholes-641 | 241.26 | 301.1 | 0.28 | 18 | PVC | 0.01 | 3,237 | 243 | 1,041 | 1,284 | 39.7 | | |
| Kirkland_Main-2474 | Kirkland_Manholes-641 | 241.26 | Kirkland_Manholes-640 | 237.92 | 280 | 1.19 | 18 | PVC | 0.01 | 6,693 | 244 | 1,045 | 1,289 | 19.3 | | |
| Kirkland_Main-2475 | Kirkland_Manholes-650 | 246.28 | Kirkland_Manholes-649 | 244.91 | 253.4 | 0.54 | 8 | PVC | 0.01 | 518 | 22 | 103 | 125 | 24.2 | | |
| Kirkland_Main-2476 | Kirkland_Manholes-661 | 245.17 | Kirkland_Manholes-648 | 244.79 | 204.2 | 0.19 | 8 | PVC | 0.01 | 304 | 4 | 24 | 27 | 9 | | |
| Kirkland_Main-2477 | Kirkland_Manholes-649 | 244.91 | Kirkland_Manholes-648 | 244.79 | 14.5 | 0.83 | 8 | PVC | 0.01 | 641 | 24 | 107 | 131 | 20.4 | | |
| Kirkland_Main-2478 | Kirkland_Manholes-681 | 256.89 | Kirkland_Manholes-684 | 256.25 | 143.5 | 0.45 | 8 | PVC | 0.01 | 473 | 19 | 36 | 55 | 11.6 | | |
| Kirkland_Main-2479 | Kirkland_Manholes-683 | 268.99 | Kirkland_Manholes-682 | 258.64 | 128.7 | 8.04 | 8 | PVC | 0.01 | 1,999 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2480 | Kirkland_Manholes-689 | 265.38 | Kirkland_Manholes-688 | 264.8 | 145.1 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-2481 | Kirkland_Manholes-688 | 264.8 | Kirkland_Manholes-687 | 264 | 200.3 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-2482 | Kirkland_Manholes-695 | 344.34 | Kirkland_Manholes-696 | 340.09 | 297.3 | 1.43 | 8 | Concrete | 0.013 | 648 | 4 | 8 | 12 | 1.9 | SM14-Ex-EX74 | |
| Kirkland_Main-2483 | Kirkland_Manholes-829 | 344.99 | Kirkland_Manholes-695 | 344.34 | 301.8 | 0.22 | 8 | Concrete | 0.013 | 252 | 2 | 4 | 5 | 2.2 | SM14-Ex-EX74 | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2484 | Kirkland_Manholes-694 | 328.94 | Kirkland_Manholes-693 | 302.3 | 232.9 | 11.44 | 8 | PVC | 0.01 | 2,384 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2485 | Kirkland_Manholes-691 | 306.23 | Kirkland_Manholes-693 | 302.3 | 272.1 | 1.44 | 8 | PVC | 0.01 | 847 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-2486 | Kirkland_Manholes-692 | 325.47 | Kirkland_Manholes-691 | 306.23 | 258.4 | 7.45 | 8 | PVC | 0.01 | 1,924 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2487 | Kirkland_Manholes-693 | 302.3 | Kirkland_Manholes-807 | 300.8 | 136 | 1.1 | 8 | PVC | 0.01 | 741 | 6 | 16 | 22 | 2.9 | | |
| Kirkland_Main-2488 | Kirkland_Manholes-690 | 274.25 | Kirkland_Manholes-701 | 273.2 | 290.3 | 0.36 | 8 | PVC | 0.01 | 424 | 4 | 12 | 16 | 3.7 | | |
| Kirkland_Main-2489 | Kirkland_Manholes-699 | 288.54 | Kirkland_Manholes-701 | 273.2 | 288.8 | 5.31 | 8 | PVC | 0.01 | 1,625 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-2490 | Kirkland_Manholes-698 | 313.56 | Kirkland_Manholes-699 | 288.54 | 182.5 | 13.71 | 8 | PVC | 0.01 | 2,611 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2492 | Kirkland_Manholes-697 | 318.15 | Kirkland_Manholes-700 | 302.48 | 274.3 | 5.71 | 8 | PVC | 0.01 | 1,685 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2493 | Kirkland_Manholes-700 | 302.48 | Kirkland_Manholes-690 | 274.25 | 242.5 | 11.64 | 8 | PVC | 0.01 | 2,405 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-2494 | Kirkland_Manholes-703 | 275.12 | Kirkland_Manholes-704 | 272.37 | 210.2 | 1.31 | 8 | PVC | 0.01 | 806 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2495 | Kirkland_Manholes-702 | 273 | Kirkland_Manholes-704 | 272.37 | 144.8 | 0.44 | 8 | PVC | 0.01 | 465 | 9 | 28 | 37 | 8 | | |
| Kirkland_Main-2496 | Kirkland_Manholes-701 | 273.2 | Kirkland_Manholes-702 | 273 | 143.3 | 0.14 | 8 | PVC | 0.01 | 263 | 8 | 24 | 32 | 12.1 | | |
| Kirkland_Main-2497 | Kirkland_Manholes-723 | 131.03 | O-42 | 125.22 | 186.8 | 3.11 | 8 | PVC | 0.01 | 1,244 | 55 | 118 | 173 | 13.9 | SM14-2021-DF2 | |
| Kirkland_Main-2498 | Kirkland_Manholes-722 | 137.76 | Kirkland_Manholes-723 | 131.03 | 91.1 | 7.39 | 8 | PVC | 0.01 | 1,917 | 54 | 112 | 167 | 8.7 | SM14-2021-DF2 | |
| Kirkland_Main-2499 | Kirkland_Manholes-721 | 142.27 | Kirkland_Manholes-722 | 137.76 | 93.1 | 4.84 | 8 | PVC | 0.01 | 1,551 | 52 | 107 | 159 | 10.2 | SM14-2021-DF2 | |
| Kirkland_Main-2500 | Kirkland_Manholes-720 | 147.09 | Kirkland_Manholes-721 | 142.27 | 318.3 | 1.51 | 8 | PVC | 0.01 | 868 | 52 | 101 | 153 | 17.7 | SM14-2021-DF2 | |
| Kirkland_Main-2501 | Kirkland_Manholes-719 | 148.45 | Kirkland_Manholes-720 | 147.09 | 142.4 | 0.95 | 8 | PVC | 0.01 | 689 | 52 | 95 | 148 | 21.4 | SM14-2021-DF2 | |
| Kirkland_Main-2502 | Kirkland_Manholes-717 | 151.36 | Kirkland_Manholes-718 | 150.12 | 225.4 | 0.55 | 8 | PVC | 0.01 | 523 | 50 | 73 | 123 | 23.4 | SM14-2035-DF5 | |
| Kirkland_Main-2503 | Kirkland_Manholes-716 | 152.58 | Kirkland_Manholes-717 | 151.36 | 272.7 | 0.45 | 8 | PVC | 0.01 | 472 | 50 | 67 | 117 | 24.8 | SM14-2035-DF5 | |
| Kirkland_Main-2504 | Kirkland_Manholes-725 | 154.45 | Kirkland_Manholes-716 | 152.58 | 174.3 | 1.07 | 8 | PVC | 0.01 | 730 | 42 | 45 | 87 | 11.9 | | |
| Kirkland_Main-2505 | Kirkland_Manholes-726 | 155.56 | Kirkland_Manholes-725 | 154.45 | 157.9 | 0.7 | 8 | PVC | 0.01 | 591 | 42 | 39 | 81 | 13.8 | | |
| Kirkland_Main-2506 | Kirkland_Manholes-713 | 156.49 | Kirkland_Manholes-726 | 155.56 | 219 | 0.43 | 8 | PVC | 0.01 | 460 | 27 | 34 | 61 | 13.2 | | |
| Kirkland_Main-2507 | Kirkland_Manholes-712 | 157.06 | Kirkland_Manholes-713 | 156.49 | 30.1 | 1.89 | 8 | PVC | 0.01 | 971 | 27 | 28 | 55 | 5.7 | | |
| Kirkland_Main-2508 | Kirkland_Manholes-714 | 170.75 | Kirkland_Manholes-712 | 157.06 | 209.3 | 6.54 | 8 | PVC | 0.01 | 1,803 | 0 | 11 | 11 | 0.6 | | |
| Kirkland_Main-2509 | Kirkland_Manholes-715 | 181.7 | Kirkland_Manholes-714 | 170.75 | 155 | 7.07 | 8 | PVC | 0.01 | 1,874 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-2510 | Kirkland_Manholes-1398 | 27.8 | Kirkland_Manholes-1397 | 27.53 | 119.5 | 0.23 | 24 | PVC | 0.01 | 6,274 | 138 | 1,013 | 2,736 | 43.6 | SM14-Ex-EX154 | |
| Kirkland_Main-2511 | Kirkland_Manholes-1397 | 27.53 | Kirkland_Manholes-1396 | 27.46 | 145.3 | 0.05 | 24 | PVC | 0.01 | 2,835 | 138 | 1,021 | 2,744 | 96.8 | SM14-Ex-EX154 | |
| Kirkland_Main-2512 | Kirkland_Manholes-1399 | 44.47 | Kirkland_Manholes-1398 | 27.8 | 324.1 | 5.14 | 8 | | 0.012 | 1,333 | 135 | 1,004 | 1,422 | 106.7 | SM14-Ex-EX143 | |
| Kirkland_Main-2513 | Kirkland_Manholes-1400 | 61.37 | Kirkland_Manholes-1399 | 44.47 | 267.9 | 6.31 | 8 | | 0.012 | 1,476 | 133 | 996 | 1,412 | 95.7 | SM14-Ex-EX143 | |
| Kirkland_Main-2514 | Kirkland_Manholes-1401 | 76.78 | Kirkland_Manholes-1400 | 61.37 | 289.6 | 5.32 | 8 | | 0.012 | 1,355 | 30 | 280 | 310 | 22.9 | | |
| Kirkland_Main-2515 | Kirkland_Manholes-1402 | 82.36 | Kirkland_Manholes-1401 | 76.78 | 122 | 4.57 | 8 | | 0.012 | 1,257 | 29 | 263 | 292 | 23.3 | | |
| Kirkland_Main-2516 | Kirkland_Manholes-711 | 219.85 | Kirkland_Manholes-710 | 219.11 | 65.7 | 1.13 | 8 | PVC | 0.01 | 748 | 9 | 8 | 17 | 2.3 | | |
| Kirkland_Main-2517 | Kirkland_Manholes-710 | 219.11 | Kirkland_Manholes-709 | 218.2 | 118.5 | 0.77 | 8 | PVC | 0.01 | 618 | 9 | 12 | 21 | 3.4 | | |
| Kirkland_Main-2518 | Kirkland_Manholes-709 | 218.2 | Kirkland_Manholes-707 | 216.1 | 262.1 | 0.8 | 8 | PVC | 0.01 | 631 | 9 | 16 | 25 | 3.9 | | |
| Kirkland_Main-2519 | Kirkland_Manholes-708 | 217.66 | Kirkland_Manholes-707 | 216.1 | 74 | 2.11 | 8 | PVC | 0.01 | 1,024 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2520 | Kirkland_Manholes-707 | 216.1 | Kirkland_Manholes-706 | 215.57 | 102.1 | 0.52 | 8 | PVC | 0.01 | 508 | 9 | 24 | 33 | 6.4 | | |
| Kirkland_Main-2521 | Kirkland_Manholes-706 | 215.57 | Kirkland_Manholes-369 | 208.86 | 103.2 | 6.5 | 8 | PVC | 0.01 | 1,798 | 9 | 28 | 37 | 2 | | |
| Kirkland_Main-2522 | Kirkland_Manholes-1403 | 89.74 | Kirkland_Manholes-1402 | 82.36 | 156.6 | 4.71 | 8 | | 0.012 | 1,276 | 22 | 239 | 261 | 20.5 | | |
| Kirkland_Main-2523 | Kirkland_Manholes-1805 | 101.51 | Kirkland_Manholes-1403 | 89.74 | 269.7 | 4.36 | 8 | | 0.012 | 1,227 | 21 | 222 | 243 | 19.8 | | |
| Kirkland_Main-2524 | Kirkland_Manholes-1404 | 117.83 | Kirkland_Manholes-1805 | 101.51 | 279.3 | 5.84 | 8 | | 0.012 | 1,420 | 5 | 91 | 95 | 6.7 | | |
| Kirkland_Main-2525 | Kirkland_Manholes-1405 | 132.7 | Kirkland_Manholes-1404 | 117.83 | 317.4 | 4.68 | 8 | | 0.012 | 1,272 | 5 | 82 | 87 | 6.8 | | |
| Kirkland_Main-2526 | Kirkland_Manholes-1396 | 27.46 | Kirkland_Manholes-1395 | 27.24 | 179.5 | 0.12 | 24 | PVC | 0.01 | 4,652 | 225 | 1,348 | 3,158 | 67.9 | SM14-Ex-EX154 | |
| Kirkland_Main-2527 | Kirkland_Manholes-1395 | 27.24 | Kirkland_Manholes-739 | 26.87 | 399 | 0.09 | 24 | PVC | 0.01 | 4,019 | 226 | 1,356 | 3,168 | 78.8 | SM14-Ex-EX154 | |
| Kirkland_Main-2528 | Kirkland_Manholes-739 | 26.87 | Kirkland_Manholes-738 | 25.89 | 300.8 | 0.33 | 24 | PVC | 0.01 | 7,534 | 226 | 1,365 | 3,176 | 42.2 | | |
| Kirkland_Main-2532 | Kirkland_Manholes-738 | 25.89 | MH 05-714 | 25.01 | 257 | 0.34 | 24 | PVC | 0.01 | 7,724 | 246 | 1,414 | 3,245 | 42 | | Updated per as-built drawings |
| Kirkland_Main-2533 | Kirkland_Manholes-736 | 28.45 | Kirkland_Manholes-735 | 25.17 | 30.7 | 10.68 | 8 | PVC | 0.01 | 2,304 | 60 | 280 | 340 | 14.8 | | |
| Kirkland_Main-2534 | Kirkland_Manholes-735 | 25.17 | MH 05-714 | 25.01 | 98.1 | 0.16 | 24 | PVC | 0.01 | 5,330 | 550 | 2,050 | 2,600 | 48.8 | | Updated per as-built drawings |
| Kirkland_Main-2535 | Kirkland_Manholes-1705 | 33.28 | Kirkland_Manholes-757 | 27.8 | 142.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 15 | 33 | 48 | 3.5 | | |
| Kirkland_Main-2536 | Kirkland_Manholes-757 | 27.8 | Kirkland_Manholes-738 | 25.89 | 24.1 | 7.91 | 8 | PVC | 0.01 | 1,983 | 20 | 41 | 61 | 3.1 | | |
| Kirkland_Main-2537 | Kirkland_Manholes-734 | 25.7 | Kirkland_Manholes-735 | 25.17 | 249.9 | 0.21 | 24 | PVC | 0.01 | 6,079 | 490 | 1,762 | 2,252 | 37 | | |
| Kirkland_Main-2538 | Kirkland_Manholes-732 | 47.45 | Kirkland_Manholes-733 | 35.72 | 350.8 | 3.34 | 18 | PVC | 0.01 | 11,207 | 375 | 1,527 | 1,902 | 17 | | |
| Kirkland_Main-2539 | Kirkland_Manholes-731 | 53.54 | Kirkland_Manholes-732 | 47.45 | 265.7 | 2.29 | 18 | PVC | 0.01 | 9,278 | 375 | 1,519 | 1,894 | 20.4 | | |
| Kirkland_Main-2540 | Kirkland_Manholes-729 | 64.46 | Kirkland_Manholes-730 | 57.26 | 336.6 | 2.14 | 12 | PVC | 0.01 | 3,040 | 118 | 494 | 612 | 20.1 | | |
| Kirkland_Main-2541 | Kirkland_Manholes-730 | 57.26 | Kirkland_Manholes-731 | 53.54 | 101.9 | 3.65 | 18 | PVC | 0.01 | 11,709 | 287 | 1,054 | 1,341 | 11.4 | | |
| Kirkland_Main-2542 | Kirkland_Manholes-1436 | 518.03 | Kirkland_Manholes-1430 | 516.64 | 170 | 0.82 | 8 | PVC | 0.01 | 638 | 2 | 8 | 10 | 1.5 | | |
| Kirkland_Main-2543 | Kirkland_Manholes-1434 | 511.6 | Kirkland_Manholes-1431 | 510.8 | 175 | 0.46 | 8 | PVC | 0.01 | 477 | 8 | 32 | 40 | 8.4 | | |
| Kirkland_Main-2544 | Kirkland_Manholes-1431 | 510.8 | Kirkland_Manholes-1432 | 510.04 | 163.2 | 0.47 | 8 | PVC | 0.01 | 481 | 8 | 36 | 44 | 9.1 | | |
| Kirkland_Main-2545 | Kirkland_Manholes-1432 | 510.04 | Kirkland_Manholes-1433 | 509.55 | 97.9 | 0.5 | 8 | PVC | 0.01 | 499 | 9 | 40 | 49 | 9.8 | | |
| Kirkland_Main-2546 | Kirkland_Manholes-1433 | 509.55 | Kirkland_Manholes-1437 | 508.69 | 186 | 0.46 | 8 | PVC | 0.01 | 480 | 10 | 44 | 54 | 11.2 | | |
| Kirkland_Main-2547 | Kirkland_Manholes-1435 | 519.8 | Kirkland_Manholes-1436 | 518.03 | 159.8 | 1.11 | 8 | PVC | 0.01 | 742 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2548 | Kirkland_Manholes-1437 | 508.69 | Kirkland_Manholes-1438 | 507.49 | 258.4 | 0.46 | 8 | PVC | 0.01 | 480 | 11 | 48 | 58 | 12.2 | | |
| Kirkland_Main-2549 | Kirkland_Manholes-1438 | 507.49 | Kirkland_Manholes-1444 | 505.53 | 236.5 | 0.83 | 8 | Concrete | 0.013 | 494 | 15 | 72 | 87 | 17.6 | SM14-Ex-EX269 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2550 | Kirkland_Manholes-1439 | 508.99 | Kirkland_Manholes-1438 | 507.49 | 261.3 | 0.57 | 8 | PVC | 0.01 | 534 | 5 | 20 | 25 | 4.6 | SM14-Ex-EX269 | |
| Kirkland_Main-2551 | Kirkland_Manholes-1441 | 509.69 | Kirkland_Manholes-1440 | 509.16 | 212.6 | 0.25 | 8 | Concrete | 0.013 | 271 | 4 | 12 | 16 | 6.1 | SM14-Ex-EX269 | |
| Kirkland_Main-2552 | Kirkland_Manholes-1440 | 509.16 | Kirkland_Manholes-1439 | 508.99 | 378 | 0.04 | 8 | Concrete | 0.013 | 115 | 4 | 16 | 20 | 17.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2554 | Kirkland_Manholes-1449 | 498.19 | Kirkland_Manholes-1450 | 496.32 | 291.2 | 0.64 | 8 | Concrete | 0.013 | 435 | 22 | 127 | 149 | 34.3 | SM14-Ex-EX269 | |
| Kirkland_Main-2555 | Kirkland_Manholes-1450 | 496.32 | Kirkland_Manholes-1451 | 492.05 | 400.8 | 1.07 | 8 | Concrete | 0.013 | 560 | 25 | 131 | 156 | 27.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2556 | Kirkland_Manholes-1448 | 502.55 | Kirkland_Manholes-1449 | 498.19 | 186.7 | 2.34 | 8 | Concrete | 0.013 | 829 | 21 | 123 | 144 | 17.4 | SM14-Ex-EX269 | |
| Kirkland_Main-2557 | Kirkland_Manholes-1447 | 503.26 | Kirkland_Manholes-1448 | 502.55 | 401.7 | 0.18 | 8 | Concrete | 0.013 | 228 | 19 | 119 | 138 | 60.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2558 | Kirkland_Manholes-2976 | 503.85 | Kirkland_Manholes-1447 | 503.26 | 210.4 | 0.28 | 8 | Concrete | 0.013 | 287 | 18 | 115 | 134 | 46.5 | SM14-Ex-EX269 | |
| Kirkland_Main-2559 | Kirkland_Manholes-1444 | 505.53 | Kirkland_Manholes-1446 | 505.51 | 95.2 | 0.02 | 8 | Concrete | 0.013 | 79 | 16 | 83 | 99 | 126.1 | SM14-Ex-EX269 | |
| Kirkland_Main-2560 | Kirkland_Manholes-1446 | 505.51 | Kirkland_Manholes-1445 | 504.92 | 12.7 | 4.66 | 8 | Concrete | 0.013 | 1,171 | 16 | 87 | 103 | 8.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2561 | Kirkland_Manholes-1442 | 510.02 | Kirkland_Manholes-1443 | 506.8 | 138.1 | 2.33 | 8 | Concrete | 0.013 | 828 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX274 | |
| Kirkland_Main-2562 | Kirkland_Manholes-1443 | 506.8 | Kirkland_Manholes-1444 | 505.53 | 203.3 | 0.62 | 8 | Concrete | 0.013 | 429 | 0 | 8 | 8 | 1.9 | SM14-Ex-EX274 | |
| Kirkland_Main-2563 | Kirkland_Manholes-1451 | 492.05 | Kirkland_Manholes-1452 | 486.6 | 321.3 | 1.7 | 8 | Concrete | 0.013 | 706 | 27 | 135 | 162 | 22.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2564 | Kirkland_Manholes-1452 | 486.6 | Kirkland_Manholes-1459 | 479.42 | 322.1 | 2.23 | 8 | Concrete | 0.013 | 810 | 28 | 139 | 167 | 20.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2565 | Kirkland_Manholes-1453 | 500.71 | Kirkland_Manholes-1454 | 499.21 | 284.8 | 0.53 | 8 | Concrete | 0.013 | 394 | 1 | 4 | 5 | 1.3 | SM14-Ex-EX270 | |
| Kirkland_Main-2566 | Kirkland_Manholes-1454 | 499.21 | Kirkland_Manholes-1455 | 496 | 348.8 | 0.92 | 8 | Concrete | 0.013 | 520 | 3 | 8 | 11 | 2.1 | SM14-Ex-EX270 | |
| Kirkland_Main-2567 | Kirkland_Manholes-1455 | 496 | Kirkland_Manholes-1456 | 494.83 | 99.7 | 1.17 | 8 | Concrete | 0.013 | 587 | 5 | 12 | 17 | 2.8 | SM14-Ex-EX270 | |
| Kirkland_Main-2568 | Kirkland_Manholes-1456 | 494.83 | Kirkland_Manholes-1457 | 481.56 | 320 | 4.15 | 8 | Concrete | 0.013 | 1,104 | 6 | 16 | 22 | 2 | SM14-Ex-EX270 | |
| Kirkland_Main-2569 | Kirkland_Manholes-1461 | 483.24 | Kirkland_Manholes-1457 | 482.02 | 293.4 | 0.42 | 8 | Concrete | 0.013 | 350 | 17 | 48 | 64 | 18.4 | SM14-Ex-EX214 | Drop Connection |
| Kirkland_Main-2570 | Kirkland_Manholes-1457 | 481.56 | Kirkland_Manholes-1458 | 481.15 | 103.4 | 0.4 | 8 | Concrete | 0.013 | 342 | 23 | 68 | 91 | 26.6 | SM14-Ex-EX214 | |
| Kirkland_Main-2571 | Kirkland_Manholes-1458 | 481.15 | Kirkland_Manholes-1459 | 479.42 | 259.2 | 0.67 | 8 | Concrete | 0.013 | 443 | 23 | 72 | 95 | 21.4 | SM14-Ex-EX214 | |
| Kirkland_Main-2572 | Kirkland_Manholes-1459 | 479.42 | Kirkland_Manholes-1480 | 465.84 | 411.8 | 3.3 | 8 | Concrete | 0.013 | 985 | 51 | 215 | 266 | 27 | SM14-Ex-EX214 | |
| Kirkland_Main-2573 | Kirkland_Manholes-1460 | 490.4 | Kirkland_Manholes-1461 | 483.24 | 392 | 1.83 | 8 | Concrete | 0.013 | 733 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX214 | |
| Kirkland_Main-2574 | Kirkland_Manholes-1469 | 490.09 | Kirkland_Manholes-1461 | 483.24 | 144.8 | 4.73 | 8 | Concrete | 0.013 | 1,180 | 14 | 36 | 50 | 4.2 | SM14-Ex-EX271 | |
| Kirkland_Main-2575 | Kirkland_Manholes-608 | 134.68 | Kirkland_Manholes-607 | 127.97 | 148.5 | 4.52 | 6 | Concrete | 0.013 | 535 | 1 | 8 | 9 | 1.7 | SM14-Ex-EX147 | |
| Kirkland_Main-2576 | Kirkland_Manholes-607 | 127.97 | Kirkland_Manholes-606 | 111.69 | 332.5 | 4.9 | 6 | Concrete | 0.013 | 557 | 4 | 16 | 20 | 3.6 | SM14-Ex-EX147 | |
| Kirkland_Main-2578 | Kirkland_Manholes-3035 | 266.43 | Kirkland_Manholes-1506 | 266.15 | 125.7 | 0.22 | 8 | PVC | 0.01 | 333 | 27 | 107 | 134 | 40.3 | | |
| Kirkland_Main-2579 | Kirkland_Manholes-1504 | 267.51 | Kirkland_Manholes-1505 | 267 | 104.1 | 0.49 | 8 | PVC | 0.01 | 493 | 22 | 83 | 105 | 21.3 | | |
| Kirkland_Main-2580 | Kirkland_Manholes-1503 | 273.94 | Kirkland_Manholes-1504 | 267.51 | 44 | 14.62 | 8 | PVC | 0.01 | 2,696 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-2581 | Kirkland_Manholes-1502 | 279.47 | Kirkland_Manholes-1503 | 273.94 | 90.7 | 6.09 | 8 | PVC | 0.01 | 1,741 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2582 | Kirkland_Manholes-1501 | 267.93 | Kirkland_Manholes-1504 | 267.51 | 165.4 | 0.25 | 8 | PVC | 0.01 | 355 | 20 | 72 | 92 | 25.8 | | |
| Kirkland_Main-2583 | Kirkland_Manholes-2255 | 245.88 | Kirkland_Manholes-2253 | 239.74 | 232.2 | 2.64 | 8 | Concrete | 0.013 | 882 | 29 | 4 | 33 | 3.8 | SM14-Ex-EX247 | |
| Kirkland_Main-2584 | Kirkland_Manholes-1499 | 268.92 | Kirkland_Manholes-1501 | 267.93 | 240 | 0.41 | 8 | PVC | 0.01 | 453 | 19 | 68 | 87 | 19.1 | | |
| Kirkland_Main-2585 | Kirkland_Manholes-1500 | 287.29 | Kirkland_Manholes-1498 | 284.32 | 146.8 | 2.02 | 8 | PVC | 0.01 | 1,003 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2587 | Kirkland_Manholes-1498 | 284.32 | Kirkland_Manholes-1499 | 268.92 | 127.3 | 12.1 | 8 | PVC | 0.01 | 2,452 | 2 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2588 | Kirkland_Manholes-771 | 213.99 | Kirkland_Manholes-777 | 184.25 | 152.4 | 19.51 | 8 | PVC | 0.01 | 3,115 | 2 | 8 | 10 | 0.3 | | |
| Kirkland_Main-2589 | Kirkland_Manholes-777 | 184.25 | KC_Manholes-6 | 163.9 | 254 | 8.01 | 8 | PVC | 0.01 | 1,995 | 5 | 12 | 17 | 0.8 | | |
| Kirkland_Main-2590 | KC_Manholes-5 | 169.15 | KC_Manholes-6 | 163.9 | 285.7 | 1.84 | 8 | PVC | 0.01 | 956 | 9 | 44 | 53 | 5.5 | | |
| Kirkland_Main-2591 | KC_Manholes-6 | 163.9 | O-17 | 159.86 | 90.8 | 4.45 | 8 | PVC | 0.01 | 1,487 | 15 | 60 | 74 | 5 | | |
| Kirkland_Main-2592 | Kirkland_Manholes-766 | 182.72 | Kirkland_Manholes-1555 | 164.48 | 325.6 | 5.6 | 8 | PVC | 0.01 | 1,669 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-2593 | Kirkland_Manholes-1555 | 164.48 | O-18 | 159.86 | 33.3 | 13.89 | 8 | PVC | 0.01 | 2,628 | 4 | 12 | 15 | 0.6 | | |
| Kirkland_Main-2594 | Kirkland_Manholes-767 | 210.01 | Kirkland_Manholes-766 | 182.72 | 125.5 | 21.75 | 8 | PVC | 0.01 | 3,288 | 1 | 4 | 4 | 0.1 | | |
| Kirkland_Main-2595 | Kirkland_Manholes-765 | 257.59 | Kirkland_Manholes-764 | 244.77 | 266.3 | 4.81 | 8 | Concrete | 0.013 | 1,190 | 20 | 72 | 91 | 7.7 | SM14-Ex-EX121 | |
| Kirkland_Main-2596 | Kirkland_Manholes-764 | 244.77 | Kirkland_Manholes-1530 | 229.92 | 292.5 | 5.08 | 8 | Concrete | 0.013 | 1,222 | 21 | 75 | 97 | 7.9 | SM14-Ex-EX121 | |
| Kirkland_Main-2597 | Kirkland_Manholes-770 | 166.93 | Kirkland_Manholes-769 | 165.1 | 146.5 | 1.25 | 8 | PVC | 0.01 | 788 | 1 | 8 | 9 | 1.1 | | |
| Kirkland_Main-2598 | Kirkland_Manholes-769 | 165.1 | Kirkland_Manholes-768 | 159.83 | 42.8 | 12.31 | 8 | PVC | 0.01 | 2,474 | 3 | 16 | 19 | 0.8 | | |
| Kirkland_Main-2599 | Kirkland_Manholes-768 | 159.83 | O-19 | 156.57 | 65.3 | 5 | 8 | PVC | 0.01 | 1,577 | 3 | 20 | 23 | 1.5 | | |
| Kirkland_Main-2600 | Kirkland_Manholes-1600 | 216.22 | Kirkland_Manholes-1599 | 200.11 | 155.5 | 10.36 | 8 | Concrete | 0.013 | 1,746 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX170 | |
| Kirkland_Main-2601 | Kirkland_Manholes-1614 | 91.09 | Kirkland_Manholes-1613 | 87.49 | 157.9 | 2.28 | 8 | Concrete | 0.013 | 819 | 12 | 115 | 127 | 15.5 | SM14-Ex-EX167 | |
| Kirkland_Main-2602 | Kirkland_Manholes-1616 | 135.79 | Kirkland_Manholes-1615 | 109.23 | 291.4 | 9.11 | 8 | PVC | 0.01 | 2,128 | 2 | 8 | 11 | 0.5 | | |
| Kirkland_Main-2603 | Kirkland_Manholes-1617 | 246.15 | Kirkland_Manholes-1630 | 217.96 | 377.4 | 7.47 | 8 | PVC | 0.01 | 1,927 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2604 | Kirkland_Manholes-1618 | 259.44 | Kirkland_Manholes-1619 | 255.5 | 286.6 | 1.37 | 6 | Concrete | 0.013 | 295 | 1 | 4 | 5 | 1.7 | SM14-Ex-EX176 | |
| Kirkland_Main-2605 | Kirkland_Manholes-1619 | 255.5 | Kirkland_Manholes-1622 | 253.11 | 371.5 | 0.64 | 6 | Concrete | 0.013 | 202 | 3 | 8 | 11 | 5.6 | SM14-Ex-EX176 | |
| Kirkland_Main-2607 | Kirkland_Manholes-1620 | 234.07 | Kirkland_Manholes-1621 | 227.94 | 53.2 | 11.53 | 8 | PVC | 0.01 | 2,394 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2608 | Kirkland_Manholes-1621 | 227.94 | Kirkland_Manholes-1631 | 193.59 | 278.6 | 12.33 | 8 | PVC | 0.01 | 2,476 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-2609 | Kirkland_Manholes-1623 | 294.92 | Kirkland_Manholes-1622 | 253.11 | 447.9 | 9.33 | 8 | Concrete | 0.013 | 1,657 | 200 | 807 | 1,006 | 60.7 | SM7 | |
| Kirkland_Main-2610 | Kirkland_Manholes-1633 | 254.8 | Kirkland_Manholes-1622 | 253.11 | 303.2 | 0.56 | 8 | Concrete | 0.013 | 405 | 8 | 16 | 24 | 5.9 | SM14-Ex-EX204 | |
| Kirkland_Main-2611 | Kirkland_Manholes-1626 | 191.61 | Kirkland_Manholes-1624 | 183.67 | 177.3 | 4.48 | 8 | PVC | 0.01 | 1,492 | 7 | 24 | 31 | 2.1 | | |
| Kirkland_Main-2615 | Kirkland_Manholes-1829 | 64.39 | Kirkland_Manholes-1830 | 64.02 | 316.5 | 0.12 | 15 | PVC | 0.01 | 1,289 | 102 | 700 | 1,084 | 84.1 | SM14-Ex-EX142 | |
| Kirkland_Main-2616 | Kirkland_Manholes-1830 | 64.02 | Kirkland_Manholes-1400 | 61.37 | 81.5 | 3.25 | 15 | PVC | 0.01 | 6,795 | 102 | 708 | 1,092 | 16.1 | SM14-Ex-EX142 | |
| Kirkland_Main-2617 | Kirkland_Manholes-1828 | 65.79 | Kirkland_Manholes-1829 | 64.39 | 312.6 | 0.45 | 15 | PVC | 0.01 | 2,522 | 101 | 692 | 1,075 | 42.6 | SM14-2035-DF11 | |
| Kirkland_Main-2618 | Kirkland_Manholes-1827 | 69.3 | Kirkland_Manholes-2994 | 67.86 | 357.5 | 0.4 | 15 | PVC | 0.01 | 2,392 | 98 | 659 | 1,039 | 43.4 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2619 | Kirkland_Manholes-1826 | 70.81 | Kirkland_Manholes-1827 | 69.3 | 214.2 | 0.71 | 15 | PVC | 0.01 | 3,165 | 96 | 650 | 1,029 | 32.5 | | |
| Kirkland_Main-2620 | Kirkland_Manholes-1824 | 72.16 | Kirkland_Manholes-1826 | 70.81 | 200.6 | 0.67 | 15 | PVC | 0.01 | 3,092 | 96 | 642 | 1,020 | 33 | | |
| Kirkland_Main-2621 | Kirkland_Manholes-1823 | 74.67 | Kirkland_Manholes-1824 | 72.16 | 26.9 | 9.32 | 8 | PVC | 0.01 | 2,153 | 7 | 33 | 40 | 1.9 | SM10 | |
| Kirkland_Main-2622 | Kirkland_Manholes-1822 | 87.17 | Kirkland_Manholes-1823 | 74.67 | 362.6 | 3.45 | 6 | Concrete | 0.013 | 468 | 5 | 25 | 30 | 6.4 | SM10 | |
| Kirkland_Main-2623 | Kirkland_Manholes-1821 | 94.43 | Kirkland_Manholes-1822 | 87.17 | 350 | 2.07 | 6 | Concrete | 0.013 | 363 | 4 | 16 | 20 | 5.6 | SM10 | |
| Kirkland_Main-2624 | Kirkland_Manholes-1820 | 95.81 | Kirkland_Manholes-1821 | 94.43 | 359.9 | 0.38 | 6 | Concrete | 0.013 | 156 | 2 | 8 | 10 | 6.4 | SM10 | |
| Kirkland_Main-2625 | Kirkland_Manholes-1819 | 89.53 | Kirkland_Manholes-1402 | 82.36 | 241.2 | 2.97 | 6 | Concrete | 0.013 | 434 | 6 | 16 | 23 | 5.3 | SM10 | |
| Kirkland_Main-2626 | Kirkland_Manholes-1818 | 98.86 | Kirkland_Manholes-1819 | 89.53 | 204 | 4.57 | 6 | Concrete | 0.013 | 539 | 5 | 8 | 13 | 2.5 | SM10 | |
| Kirkland_Main-2628 | Kirkland_Manholes-1811 | 129.72 | Kirkland_Manholes-1812 | 126.33 | 178.5 | 1.9 | 6 | Concrete | 0.013 | 347 | 12 | 82 | 94 | 27.2 | SM10 | |
| Kirkland_Main-2629 | Kirkland_Manholes-1812 | 126.33 | Kirkland_Manholes-1813 | 123.92 | 54.8 | 4.4 | 6 | Concrete | 0.013 | 528 | 12 | 91 | 103 | 19.4 | SM14-Ex-EX139 | |
| Kirkland_Main-2630 | Kirkland_Manholes-1813 | 123.92 | Kirkland_Manholes-1814 | 117.44 | 111.3 | 5.82 | 6 | Concrete | 0.013 | 608 | 13 | 99 | 112 | 18.4 | SM14-Ex-EX139 | |
| Kirkland_Main-2631 | Kirkland_Manholes-1814 | 117.44 | Kirkland_Manholes-1817 | 109.22 | 155.5 | 5.28 | 6 | Concrete | 0.013 | 579 | 15 | 115 | 130 | 22.5 | SM10 | |
| Kirkland_Main-2632 | Kirkland_Manholes-1815 | 130.16 | Kirkland_Manholes-1814 | 117.44 | 475.8 | 2.67 | 6 | PVC | 0.01 | 535 | 2 | 8 | 10 | 1.8 | SM10 | |
| Kirkland_Main-2633 | Kirkland_Manholes-1816 | 115.31 | Kirkland_Manholes-1825 | 112.27 | 360.1 | 0.84 | 6 | Concrete | 0.013 | 231 | 3 | 8 | 11 | 4.8 | SM10 | |
| Kirkland_Main-2634 | Kirkland_Manholes-1817 | 109.22 | Kirkland_Manholes-1805 | 101.51 | 328.6 | 2.35 | 8 | Concrete | 0.013 | 831 | 15 | 123 | 139 | 16.7 | SM10 | |
| Kirkland_Main-2635 | Kirkland_Manholes-1831 | 166.9 | Kirkland_Manholes-1190 | 151.12 | 137.2 | 11.5 | 6 | PVC | 0.01 | 1,110 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX83 | |
| Kirkland_Main-2636 | Kirkland_Manholes-1837 | 12.2 | Kirkland_Manholes-1836 | 11 | 9.3 | 12.92 | 12 | PVC | 0.01 | 7,473 | 372 | 786 | 1,157 | 15.5 | | |
| Kirkland_Main-2637 | Kirkland_Manholes-1834 | 11.35 | Kirkland_Manholes-1835 | 11.1 | 27.9 | 0.9 | 12 | PVC | 0.01 | 1,967 | 16 | 91 | 106 | 5.4 | | |
| Kirkland_Main-2638 | Kirkland_Manholes-1835 | 11.1 | Kirkland_Manholes-1836 | 11 | 9.8 | 1.02 | 12 | PVC | 0.01 | 2,099 | 16 | 97 | 113 | 5.4 | | |
| Kirkland_Main-2639 | Kirkland_Manholes-1832 | 17.68 | Kirkland_Manholes-1833 | 16.5 | 43.9 | 2.69 | 8 | PVC | 0.01 | 1,155 | 2 | 6 | 9 | 0.7 | | |
| Kirkland_Main-2640 | Kirkland_Manholes-1794 | 12.63 | Kirkland_Manholes-1837 | 12.2 | 128.1 | 0.34 | 15 | PVC | 0.01 | 2,183 | 372 | 779 | 1,151 | 52.7 | | |
| Kirkland_Main-2641 | Kirkland_Manholes-2679 | 83.65 | Kirkland_Manholes-2880 | 81.72 | 80.2 | 2.41 | 8 | PVC | 0.01 | 1,094 | 0 | 6 | 6 | 0.6 | | |
| Kirkland_Main-2642 | Kirkland_Manholes-2880 | 81.72 | Kirkland_Manholes-2879 | 68.04 | 76.6 | 17.86 | 8 | PVC | 0.01 | 2,979 | 24 | 30 | 55 | 1.8 | | |
| Kirkland_Main-2644 | Kirkland_Manholes-2885 | 165.69 | Kirkland_Manholes-1111 | 165.6 | 145.4 | 0.06 | 8 | Concrete | 0.013 | 135 | 0 | 4 | 4 | 2.9 | SM14-Ex-EX9 | |
| Kirkland_Main-2658 | Kirkland_Manholes-480 | 484.34 | Kirkland_Manholes-1493 | 479.91 | 224.4 | 1.97 | 8 | PVC | 0.01 | 991 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2659 | Kirkland_Manholes-3042 | 194.23 | Kirkland_Manholes-2474 | 188.45 | 173.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2663 | Kirkland_Manholes-2886 | 151 | Kirkland_Manholes-252 | 142.57 | 290.9 | 2.9 | 8 | Concrete | 0.013 | 923 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX40 | |
| Kirkland_Main-2666 | Kirkland_Manholes-2887 | 302.33 | Kirkland_Manholes-2888 | 290.53 | 197 | 5.99 | 8 | PVC | 0.01 | 1,725 | 3 | 16 | 19 | 1.1 | | |
| Kirkland_Main-2667 | Kirkland_Manholes-1181 | 120.04 | Kirkland_Manholes-2889 | 83.33 | 400.3 | 9.17 | 8 | Concrete | 0.013 | 1,642 | 3 | 9 | 12 | 0.7 | SM10 | |
| Kirkland_Main-2668 | Kirkland_Manholes-2889 | 83.33 | Kirkland_Manholes-305 | 74.69 | 164.1 | 5.26 | 8 | Concrete | 0.013 | 1,244 | 5 | 18 | 23 | 1.9 | SM10 | |
| Kirkland_Main-2670 | Kirkland_Manholes-1624 | 183.67 | Kirkland_Manholes-1625 | 179.1 | 84.9 | 5.38 | 8 | PVC | 0.01 | 1,636 | 7 | 28 | 35 | 2.1 | | |
| Kirkland_Main-2671 | Kirkland_Manholes-1632 | 181.73 | Kirkland_Manholes-1625 | 179.1 | 96.8 | 2.72 | 8 | PVC | 0.01 | 1,162 | 3 | 16 | 19 | 1.6 | | |
| Kirkland_Main-2672 | Kirkland_Manholes-1627 | 199.21 | Kirkland_Manholes-1626 | 191.61 | 142.7 | 5.33 | 8 | PVC | 0.01 | 1,627 | 7 | 20 | 27 | 1.7 | | |
| Kirkland_Main-2673 | Kirkland_Manholes-1628 | 203.71 | Kirkland_Manholes-1627 | 199.21 | 47.7 | 9.43 | 8 | PVC | 0.01 | 2,165 | 7 | 16 | 22 | 1 | | |
| Kirkland_Main-2674 | Kirkland_Manholes-1629 | 216.45 | Kirkland_Manholes-1628 | 203.71 | 87.7 | 14.52 | 8 | PVC | 0.01 | 2,687 | 7 | 12 | 18 | 0.7 | | |
| Kirkland_Main-2675 | Kirkland_Manholes-1630 | 217.96 | Kirkland_Manholes-1629 | 216.45 | 15.3 | 9.86 | 8 | PVC | 0.01 | 2,214 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2676 | Kirkland_Manholes-1631 | 193.59 | Kirkland_Manholes-1632 | 181.73 | 96.1 | 12.34 | 8 | PVC | 0.01 | 2,477 | 3 | 12 | 15 | 0.6 | | |
| Kirkland_Main-2677 | Kirkland_Manholes-1712 | 141.37 | Kirkland_Manholes-1706 | 124.78 | 325.1 | 5.1 | 6 | Concrete | 0.013 | 569 | 1 | 8 | 10 | 1.7 | SM14-Ex-EX166 | |
| Kirkland_Main-2678 | Kirkland_Manholes-1716 | 100.64 | Kirkland_Manholes-1715 | 96.61 | 119 | 3.39 | 8 | PVC | 0.01 | 1,298 | 15 | 8 | 23 | 1.8 | | |
| Kirkland_Main-2679 | Kirkland_Manholes-1715 | 96.61 | Kirkland_Manholes-1714 | 94.78 | 31.8 | 5.76 | 8 | PVC | 0.01 | 1,692 | 15 | 16 | 31 | 1.9 | | |
| Kirkland_Main-2680 | Kirkland_Manholes-1713 | 108.19 | Kirkland_Manholes-1714 | 94.78 | 126.8 | 10.57 | 6 | Concrete | 0.013 | 819 | 9 | 8 | 17 | 2 | SM14-Ex-EX186 | |
| Kirkland_Main-2681 | Kirkland_Manholes-1714 | 94.78 | Kirkland_Manholes-1717 | 58.55 | 387.3 | 9.35 | 6 | Concrete | 0.013 | 770 | 24 | 33 | 56 | 7.3 | SM14-Ex-EX186 | |
| Kirkland_Main-2685 | Kirkland_Manholes-1720 | 51.16 | Kirkland_Manholes-1722 | 47.26 | 30.1 | 12.97 | 8 | PVC | 0.01 | 2,539 | 39 | 25 | 63 | 2.5 | | |
| Kirkland_Main-2686 | Kirkland_Manholes-1721 | 54.75 | Kirkland_Manholes-1720 | 51.16 | 58.7 | 6.12 | 6 | PVC | 0.01 | 810 | 39 | 16 | 55 | 6.8 | SM14-Ex-EX185 | |
| Kirkland_Main-2687 | Kirkland_Manholes-1723 | 62.26 | Kirkland_Manholes-1721 | 54.75 | 207.5 | 3.62 | 6 | PVC | 0.01 | 623 | 36 | 8 | 45 | 7.2 | SM14-Ex-EX185 | |
| Kirkland_Main-2688 | Kirkland_Manholes-1711 | 136.47 | Kirkland_Manholes-1710 | 134.24 | 160.1 | 1.39 | 10 | Concrete | 0.013 | 1,161 | 11 | 74 | 85 | 7.3 | SM14-Ex-EX196 | |
| Kirkland_Main-2689 | Kirkland_Manholes-1734 | 24.57 | Kirkland_Manholes-1737 | 24.2 | 117 | 0.32 | 12 | PVC | 0.01 | 1,169 | 92 | 132 | 224 | 19.1 | | |
| Kirkland_Main-2690 | Kirkland_Manholes-1735 | 26.22 | Kirkland_Manholes-1734 | 24.57 | 115.4 | 1.43 | 12 | PVC | 0.01 | 2,488 | 5 | 25 | 30 | 1.2 | | |
| Kirkland_Main-2691 | Kirkland_Manholes-1729 | 25.06 | Kirkland_Manholes-1734 | 24.57 | 158.2 | 0.31 | 12 | PVC | 0.01 | 1,157 | 87 | 99 | 185 | 16 | | |
| Kirkland_Main-2692 | Kirkland_Manholes-1730 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 35.3 | 3.23 | 8 | PVC | 0.01 | 1,268 | 17 | 33 | 50 | 4 | | |
| Kirkland_Main-2693 | Kirkland_Manholes-1731 | 27.35 | Kirkland_Manholes-1730 | 26.2 | 207.2 | 0.55 | 8 | PVC | 0.01 | 525 | 13 | 25 | 38 | 7.3 | | |
| Kirkland_Main-2694 | Kirkland_Manholes-1732 | 28.2 | Kirkland_Manholes-1731 | 27.35 | 54.4 | 1.56 | 6 | PVC | 0.01 | 409 | 6 | 16 | 23 | 5.5 | SM14-Ex-EX156 | |
| Kirkland_Main-2695 | Kirkland_Manholes-1733 | 28.74 | Kirkland_Manholes-1732 | 28.2 | 66.1 | 0.82 | 6 | PVC | 0.01 | 296 | 6 | 8 | 14 | 4.9 | SM14-Ex-EX156 | |
| Kirkland_Main-2696 | Kirkland_Manholes-1743 | 28.04 | Kirkland_Manholes-1746 | 27.54 | 238.6 | 0.21 | 10 | PVC | 0.01 | 585 | 247 | 568 | 816 | 139.3 | SM14-Ex-EX157 | |
| Kirkland_Main-2697 | Kirkland_Manholes-1746 | 27.54 | MH_Selection_06-13-2016-4 | 25.37 | 27.6 | 7.87 | 10 | PVC | 0.01 | 3,585 | 249 | 617 | 866 | 24.2 | SM14-Ex-EX157 | Updated per as-built drawings |
| Kirkland_Main-2700 | Kirkland_Manholes-1745 | 27.57 | Kirkland_Manholes-1746 | 27.54 | 73.9 | 0.04 | 8 | PVC | 0.01 | 142 | 1 | 41 | 43 | 29.9 | | |
| Kirkland_Main-2702 | Kirkland_Manholes-1737 | 24.2 | MH_Selection_06-13-2016-5 | 24.55 | 145.6 | -0.24 | 12 | PVC | 0.01 | 1,019 | 101 | 140 | 241 | 23.7 | | Updated per as-built drawings |
| Kirkland_Main-2703 | Kirkland_Manholes-1736 | 26.69 | Kirkland_Manholes-1735 | 26.22 | 88.6 | 0.53 | 8 | PVC | 0.01 | 513 | 5 | 16 | 22 | 4.2 | | |
| Kirkland_Main-2704 | Kirkland_Manholes-1752 | 27.81 | Kirkland_Manholes-1736 | 26.69 | 254.8 | 0.44 | 8 | PVC | 0.01 | 467 | 4 | 8 | 12 | 2.6 | | |
| Kirkland_Main-2705 | Kirkland_Manholes-1765 | 114.35 | Kirkland_Manholes-1764 | 112.57 | 108.8 | 1.64 | 8 | PVC | 0.01 | 902 | 2 | 8 | 10 | 1.1 | | |
| Kirkland_Main-2706 | Kirkland_Manholes-1764 | 112.57 | Kirkland_Manholes-1763 | 111.41 | 74.1 | 1.57 | 8 | PVC | 0.01 | 882 | 7 | 16 | 23 | 2.6 | | |
| Kirkland_Main-2707 | Kirkland_Manholes-1763 | 111.41 | Kirkland_Manholes-1761 | 99.41 | 212.2 | 5.65 | 10 | PVC | 0.01 | 3,040 | 12 | 58 | 70 | 2.3 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2708 | Kirkland_Manholes-1761 | 99.41 | Kirkland_Manholes-1762 | 98.88 | 52.5 | 1.01 | 12 | Concrete | 0.013 | 1,607 | 29 | 198 | 227 | 14.1 | SM14-Ex-EX166 | |
| Kirkland_Main-2709 | Kirkland_Manholes-1706 | 124.78 | Kirkland_Manholes-1761 | 99.41 | 406.8 | 6.24 | 12 | Concrete | 0.013 | 3,993 | 17 | 132 | 149 | 3.7 | SM14-Ex-EX166 | |
| Kirkland_Main-2710 | Kirkland_Manholes-1766 | 113.7 | Kirkland_Manholes-1763 | 111.41 | 43.4 | 5.28 | 8 | Concrete | 0.013 | 1,246 | 5 | 33 | 38 | 3.1 | SM14-Ex-EX168 | |
| Kirkland_Main-2711 | Kirkland_Manholes-1767 | 122.16 | Kirkland_Manholes-1766 | 113.7 | 181 | 4.67 | 8 | Concrete | 0.013 | 1,173 | 5 | 25 | 30 | 2.5 | SM14-Ex-EX168 | |
| Kirkland_Main-2712 | Kirkland_Manholes-1674 | 78.95 | Kirkland_Manholes-1774 | 71.66 | 398 | 1.83 | 8 | PVC | 0.01 | 954 | 65 | 206 | 270 | 28.3 | | |
| Kirkland_Main-2713 | Kirkland_Manholes-1774 | 71.66 | Kirkland_Manholes-1773 | 69.68 | 129.9 | 1.52 | 8 | PVC | 0.01 | 871 | 66 | 214 | 280 | 32.2 | | |
| Kirkland_Main-2714 | Kirkland_Manholes-1773 | 69.68 | Kirkland_Manholes-1772 | 68.31 | 220 | 0.62 | 8 | PVC | 0.01 | 556 | 73 | 222 | 296 | 53.2 | | |
| Kirkland_Main-2715 | Kirkland_Manholes-1768 | 72.13 | Kirkland_Manholes-1772 | 68.31 | 229.6 | 1.66 | 12 | Concrete | 0.013 | 2,062 | 45 | 247 | 292 | 14.2 | SM14-Ex-EX166 | |
| Kirkland_Main-2716 | Kirkland_Manholes-1775 | 102.05 | Kirkland_Manholes-1771 | 101.91 | 35.5 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 8 | 13 | 2.9 | | Drop Connection |
| Kirkland_Main-2717 | Kirkland_Manholes-1771 | 99.82 | Kirkland_Manholes-1770 | 99.51 | 78 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 16 | 22 | 5 | | Drop Connection |
| Kirkland_Main-2718 | Kirkland_Manholes-1770 | 92.14 | Kirkland_Manholes-1769 | 80.52 | 165 | 7.04 | 8 | PVC | 0.01 | 1,871 | 7 | 25 | 31 | 1.7 | | |
| Kirkland_Main-2719 | Kirkland_Manholes-1769 | 80.52 | Kirkland_Manholes-1768 | 72.13 | 44.6 | 18.83 | 8 | PVC | 0.01 | 3,059 | 7 | 33 | 40 | 1.3 | | |
| Kirkland_Main-2720 | Kirkland_Manholes-1762 | 98.88 | Kirkland_Manholes-1768 | 72.13 | 281.2 | 9.51 | 12 | Concrete | 0.013 | 4,932 | 30 | 206 | 235 | 4.8 | SM14-Ex-EX166 | |
| Kirkland_Main-2721 | Kirkland_Manholes-1742 | 45.09 | Kirkland_Manholes-1740 | 35.99 | 141.8 | 6.42 | 10 | PVC | 0.01 | 3,238 | 177 | 478 | 654 | 20.2 | | |
| Kirkland_Main-2722 | Kirkland_Manholes-1741 | 41.4 | Kirkland_Manholes-1740 | 35.99 | 19.3 | 27.98 | 8 | PVC | 0.01 | 3,729 | 71 | 74 | 145 | 3.9 | | |
| Kirkland_Main-2723 | Kirkland_Manholes-1722 | 47.26 | Kirkland_Manholes-1742 | 45.09 | 91 | 2.38 | 12 | PVC | 0.01 | 3,210 | 177 | 469 | 646 | 20.1 | | |
| Kirkland_Main-2724 | Kirkland_Manholes-1760 | 56.49 | Kirkland_Manholes-1722 | 47.26 | 220.7 | 4.18 | 10 | PVC | 0.01 | 2,614 | 138 | 436 | 574 | 22 | | |
| Kirkland_Main-2725 | Kirkland_Manholes-2143 | 61.9 | Kirkland_Manholes-1760 | 56.49 | 198.1 | 2.73 | 10 | PVC | 0.01 | 2,112 | 124 | 428 | 552 | 26.1 | | |
| Kirkland_Main-2726 | Kirkland_Manholes-1738 | 34.54 | Kirkland_Manholes-1728 | 26.2 | 233.5 | 3.57 | 8 | Concrete | 0.013 | 1,025 | 30 | 16 | 47 | 4.6 | SM14-Ex-EX184 | |
| Kirkland_Main-2727 | Kirkland_Manholes-1739 | 35.68 | Kirkland_Manholes-1738 | 34.54 | 39.2 | 2.91 | 8 | Concrete | 0.013 | 925 | 0 | 8 | 8 | 0.9 | SM14-Ex-EX184 | |
| Kirkland_Main-2730 | Kirkland_Manholes-1783 | 44.54 | Kirkland_Manholes-1784 | 44.07 | 47.4 | 1 | 8 | PVC | 0.01 | 705 | 65 | 66 | 131 | 18.6 | | |
| Kirkland_Main-2731 | Kirkland_Manholes-1786 | 41.21 | Kirkland_Manholes-733 | 35.72 | 39.3 | 13.98 | 10 | PVC | 0.01 | 4,780 | 66 | 99 | 165 | 3.4 | | |
| Kirkland_Main-2732 | Kirkland_Manholes-1787 | 42.06 | Kirkland_Manholes-1786 | 41.21 | 134.7 | 0.63 | 10 | PVC | 0.01 | 1,016 | 66 | 91 | 157 | 15.4 | | |
| Kirkland_Main-2733 | Kirkland_Manholes-1785 | 42.96 | Kirkland_Manholes-1787 | 42.06 | 131.8 | 0.68 | 10 | PVC | 0.01 | 1,056 | 65 | 82 | 147 | 13.9 | | |
| Kirkland_Main-2734 | Kirkland_Manholes-1920 | 409.24 | Kirkland_Manholes-2925 | 409 | 89.7 | 0.27 | 8 | Concrete | 0.013 | 281 | 90 | 366 | 455 | 162.3 | SM14-Ex-EX215 | |
| Kirkland_Main-2735 | Kirkland_Manholes-2925 | 409 | Kirkland_Manholes-1921 | 405.86 | 161.9 | 1.94 | 8 | Concrete | 0.013 | 755 | 91 | 370 | 460 | 60.9 | SM14-Ex-EX215 | |
| Kirkland_Main-2736 | Kirkland_Manholes-1784 | 44.07 | Kirkland_Manholes-1785 | 42.96 | 150 | 0.74 | 10 | PVC | 0.01 | 1,100 | 65 | 74 | 139 | 12.7 | | |
| Kirkland_Main-2737 | Kirkland_Manholes-1782 | 44.9 | Kirkland_Manholes-1783 | 44.54 | 88.3 | 0.4 | 8 | PVC | 0.01 | 446 | 65 | 58 | 123 | 27.5 | | |
| Kirkland_Main-2738 | Kirkland_Manholes-1781 | 45.04 | Kirkland_Manholes-1782 | 44.9 | 34.7 | 0.4 | 8 | PVC | 0.01 | 446 | 65 | 49 | 114 | 25.7 | | |
| Kirkland_Main-2739 | Kirkland_Manholes-1777 | 45.35 | Kirkland_Manholes-1781 | 45.04 | 78.1 | 0.4 | 8 | PVC | 0.01 | 446 | 65 | 41 | 106 | 23.8 | | |
| Kirkland_Main-2740 | Kirkland_Manholes-1779 | 45.97 | Kirkland_Manholes-1778 | 45.85 | 28.6 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 16 | 21 | 4.8 | | |
| Kirkland_Main-2741 | Kirkland_Manholes-1778 | 45.85 | Kirkland_Manholes-1777 | 45.35 | 126.1 | 0.4 | 8 | PVC | 0.01 | 446 | 62 | 25 | 87 | 19.5 | | |
| Kirkland_Main-2742 | Kirkland_Manholes-1780 | 57.25 | Kirkland_Manholes-1779 | 45.97 | 252.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 5 | 8 | 13 | 0.9 | | |
| Kirkland_Main-2743 | Kirkland_Manholes-1776 | 46.25 | Kirkland_Manholes-1777 | 45.35 | 244.9 | 0.37 | 8 | PVC | 0.01 | 428 | 3 | 8 | 11 | 2.6 | | |
| Kirkland_Main-2745 | Kirkland_Manholes-1696 | 58.41 | Kirkland_Manholes-1695 | 51.29 | 146.7 | 4.85 | 8 | Concrete | 0.013 | 1,195 | 50 | 222 | 273 | 22.8 | SM14-Ex-EX96 | |
| Kirkland_Main-2746 | Kirkland_Manholes-1695 | 51.29 | Kirkland_Manholes-1694 | 44.12 | 135.5 | 5.29 | 8 | Concrete | 0.013 | 1,248 | 52 | 231 | 283 | 22.7 | SM14-Ex-EX96 | |
| Kirkland_Main-2748 | Kirkland_Manholes-2107 | 69.19 | Kirkland_Manholes-2106 | 63.43 | 225 | 2.56 | 6 | Concrete | 0.013 | 403 | 1 | 6 | 8 | 1.9 | SM14-Ex-EX227 | |
| Kirkland_Main-2749 | Kirkland_Manholes-2108 | 68.46 | Kirkland_Manholes-2109 | 59.77 | 298.6 | 2.91 | 8 | Concrete | 0.013 | 925 | 52 | 146 | 198 | 21.4 | SM14-Ex-EX222 | |
| Kirkland_Main-2750 | Kirkland_Manholes-2119 | 72.3 | Kirkland_Manholes-2108 | 68.46 | 400.8 | 0.96 | 8 | Concrete | 0.013 | 531 | 42 | 97 | 139 | 26.3 | SM14-Ex-EX222 | |
| Kirkland_Main-2751 | Kirkland_Manholes-2511 | 85.9 | Kirkland_Manholes-2108 | 85.31 | 148.4 | 0.4 | 6 | Concrete | 0.013 | 159 | 10 | 43 | 52 | 32.9 | SM14-Ex-EX229 | Drop Connection |
| Kirkland_Main-2752 | Kirkland_Manholes-2109 | 59.77 | Kirkland_Manholes-2111 | 59.56 | 305.5 | 0.07 | 12 | Concrete | 0.013 | 419 | 55 | 152 | 207 | 49.3 | SM14-Ex-EX222 | |
| Kirkland_Main-2753 | Kirkland_Manholes-2110 | 60.2 | Kirkland_Manholes-2111 | 59.56 | 55.5 | 1.15 | 8 | Concrete | 0.013 | 583 | 13 | 36 | 49 | 8.4 | SM14-Ex-EX232 | |
| Kirkland_Main-2754 | Kirkland_Manholes-2112 | 88.66 | Kirkland_Manholes-2110 | 60.2 | 228.7 | 12.44 | 6 | Concrete | 0.013 | 888 | 12 | 30 | 43 | 4.8 | SM14-Ex-EX232 | |
| Kirkland_Main-2755 | Kirkland_Manholes-2115 | 91.85 | Kirkland_Manholes-2112 | 88.66 | 62.8 | 5.08 | 6 | PVC | 0.01 | 738 | 8 | 24 | 32 | 4.4 | SM14-Ex-EX232 | |
| Kirkland_Main-2756 | Kirkland_Manholes-2113 | 121.3 | Kirkland_Manholes-2115 | 91.85 | 150.4 | 19.59 | 6 | PVC | 0.01 | 1,449 | 4 | 12 | 17 | 1.1 | SM14-Ex-EX232 | |
| Kirkland_Main-2757 | Kirkland_Manholes-2114 | 121.77 | Kirkland_Manholes-2113 | 121.3 | 207.4 | 0.23 | 8 | PVC | 0.01 | 336 | 3 | 6 | 9 | 2.7 | | |
| Kirkland_Main-2758 | Kirkland_Manholes-2116 | 91.9 | Kirkland_Manholes-2115 | 91.85 | 279.7 | 0.02 | 8 | Concrete | 0.013 | 73 | 3 | 6 | 9 | 12.6 | SM14-Ex-EX232 | |
| Kirkland_Main-2759 | Kirkland_Manholes-2146 | 75.22 | Kirkland_Manholes-2117 | 74.65 | 143.2 | 0.4 | 8 | Concrete | 0.013 | 343 | 28 | 85 | 113 | 33 | SM14-Ex-EX222 | Drop Connection |
| Kirkland_Main-2760 | Kirkland_Manholes-2117 | 73.78 | Kirkland_Manholes-2119 | 72.3 | 427.2 | 0.35 | 8 | Concrete | 0.013 | 319 | 28 | 91 | 120 | 37.5 | SM14-Ex-EX222 | |
| Kirkland_Main-2761 | Kirkland_Manholes-2445 | 191.11 | Kirkland_Manholes-2490 | 173.27 | 210.3 | 8.48 | 8 | Concrete | 0.013 | 1,580 | 20 | 68 | 87 | 5.5 | SM14-Ex-EX243 | |
| Kirkland_Main-2763 | Kirkland_Manholes-2446 | 217.36 | Kirkland_Manholes-2444 | 199.73 | 226.7 | 7.78 | 8 | Concrete | 0.013 | 1,512 | 3 | 12 | 15 | 1 | SM14-Ex-EX245 | |
| Kirkland_Main-2765 | Kirkland_Manholes-1862 | 286.87 | Kirkland_Manholes-1863 | 286.75 | 31.1 | 0.4 | 8 | PVC | 0.01 | 446 | 63 | 131 | 194 | 43.5 | | Drop Connection |
| Kirkland_Main-2766 | Kirkland_Manholes-1863 | 286.33 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 3.06 | 8 | PVC | 0.01 | 1,233 | 63 | 135 | 198 | 16.1 | | |
| Kirkland_Main-2767 | Kirkland_Manholes-1864 | 285.22 | Kirkland_Manholes-1866 | 277.54 | 215.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 67 | 147 | 214 | 16.1 | | |
| Kirkland_Main-2768 | Kirkland_Manholes-1865 | 285.61 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 1.07 | 8 | PVC | 0.01 | 731 | 4 | 8 | 12 | 1.7 | | |
| Kirkland_Main-2769 | Kirkland_Manholes-2770 | 287.2 | Kirkland_Manholes-1865 | 285.61 | 339.1 | 0.47 | 8 | PVC | 0.01 | 483 | 4 | 4 | 8 | 1.7 | | |
| Kirkland_Main-2770 | Kirkland_Manholes-1871 | 279.1 | Kirkland_Manholes-1866 | 277.54 | 120.2 | 1.3 | 8 | PVC | 0.01 | 803 | 3 | 28 | 31 | 3.8 | | |
| Kirkland_Main-2771 | Kirkland_Manholes-1866 | 277.54 | Kirkland_Manholes-1867 | 276.54 | 31.1 | 3.22 | 8 | PVC | 0.01 | 1,264 | 70 | 179 | 249 | 19.7 | | |
| Kirkland_Main-2772 | Kirkland_Manholes-1867 | 276.54 | Kirkland_Manholes-1868 | 257.42 | 267.6 | 7.15 | 8 | PVC | 0.01 | 1,885 | 70 | 183 | 253 | 13.4 | | |
| Kirkland_Main-2773 | Kirkland_Manholes-1868 | 257.42 | Kirkland_Manholes-1888 | 254.12 | 73.1 | 4.51 | 10 | PVC | 0.01 | 2,715 | 116 | 262 | 378 | 13.9 | | |
| Kirkland_Main-2774 | Kirkland_Manholes-1887 | 260.26 | Kirkland_Manholes-1868 | 257.42 | 270 | 1.05 | 8 | PVC | 0.01 | 723 | 45 | 75 | 120 | 16.6 | | |
| Kirkland_Main-2775 | Kirkland_Manholes-1869 | 292.56 | Kirkland_Manholes-1870 | 286.99 | 206.4 | 2.7 | 8 | PVC | 0.01 | 1,158 | 3 | 4 | 7 | 0.6 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2776 | Kirkland_Manholes-1870 | 286.99 | Kirkland_Manholes-1871 | 279.1 | 130.7 | 6.04 | 8 | PVC | 0.01 | 1,732 | 3 | 8 | 11 | 0.6 | | |
| Kirkland_Main-2777 | Kirkland_Manholes-1872 | 282.33 | Kirkland_Manholes-1871 | 279.1 | 27.4 | 11.77 | 8 | PVC | 0.01 | 2,419 | 0 | 16 | 16 | 0.7 | | |
| Kirkland_Main-2778 | Kirkland_Manholes-1896 | 286.15 | Kirkland_Manholes-1872 | 282.33 | 252.6 | 1.51 | 8 | PVC | 0.01 | 867 | 0 | 12 | 12 | 1.4 | | |
| Kirkland_Main-2779 | Kirkland_Manholes-1895 | 288.31 | Kirkland_Manholes-1896 | 286.15 | 156.7 | 1.38 | 8 | PVC | 0.01 | 828 | 0 | 8 | 8 | 1 | | |
| Kirkland_Main-2781 | Kirkland_Manholes-1894 | 292.07 | Kirkland_Manholes-1895 | 288.31 | 37.7 | 9.98 | 8 | PVC | 0.01 | 2,227 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2785 | Kirkland_Manholes-1893 | 314.62 | Kirkland_Manholes-1892 | 301.26 | 174.3 | 7.66 | 8 | PVC | 0.01 | 1,952 | 21 | 32 | 53 | 2.7 | | |
| Kirkland_Main-2786 | Kirkland_Manholes-1892 | 301.26 | Kirkland_Manholes-1882 | 297.55 | 110.1 | 3.37 | 8 | PVC | 0.01 | 1,294 | 24 | 40 | 63 | 4.9 | | |
| Kirkland_Main-2787 | Kirkland_Manholes-1882 | 297.55 | Kirkland_Manholes-1885 | 271.65 | 301.6 | 8.59 | 8 | PVC | 0.01 | 2,066 | 29 | 44 | 73 | 3.5 | | |
| Kirkland_Main-2788 | Kirkland_Manholes-1883 | 295.15 | Kirkland_Manholes-1885 | 271.65 | 83.7 | 28.09 | 8 | PVC | 0.01 | 3,737 | 8 | 20 | 28 | 0.7 | | |
| Kirkland_Main-2789 | Kirkland_Manholes-1889 | 296.4 | Kirkland_Manholes-1883 | 295.15 | 155.2 | 0.81 | 8 | PVC | 0.01 | 633 | 8 | 16 | 24 | 3.8 | | |
| Kirkland_Main-2790 | Kirkland_Manholes-1884 | 299.38 | Kirkland_Manholes-1889 | 296.4 | 51.3 | 5.81 | 8 | PVC | 0.01 | 1,699 | 4 | 12 | 16 | 0.9 | | |
| Kirkland_Main-2791 | Kirkland_Manholes-1891 | 305.89 | Kirkland_Manholes-1890 | 303.36 | 105.7 | 2.39 | 8 | PVC | 0.01 | 1,091 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2792 | Kirkland_Manholes-1890 | 303.36 | Kirkland_Manholes-1884 | 299.38 | 71.4 | 5.58 | 8 | PVC | 0.01 | 1,665 | 4 | 8 | 12 | 0.7 | | |
| Kirkland_Main-2793 | Kirkland_Manholes-1885 | 271.65 | Kirkland_Manholes-1886 | 262.12 | 238.5 | 4 | 8 | PVC | 0.01 | 1,409 | 44 | 68 | 111 | 7.9 | | |
| Kirkland_Main-2794 | Kirkland_Manholes-1886 | 262.12 | Kirkland_Manholes-1887 | 260.26 | 298.4 | 0.62 | 8 | PVC | 0.01 | 557 | 44 | 72 | 115 | 20.7 | | |
| Kirkland_Main-2795 | Kirkland_Manholes-1888 | 254.12 | Kirkland_Manholes-1897 | 245.38 | 209.5 | 4.17 | 8 | PVC | 0.01 | 1,440 | 136 | 310 | 446 | 31 | | |
| Kirkland_Main-2796 | Kirkland_Manholes-1877 | 246.77 | Kirkland_Manholes-1873 | 243.35 | 391.2 | 0.87 | 8 | PVC | 0.01 | 659 | 55 | 119 | 174 | 26.4 | | |
| Kirkland_Main-2797 | Kirkland_Manholes-1873 | 243.35 | Kirkland_Manholes-1874 | 243.32 | 295.9 | 0.01 | 15 | PVC | 0.01 | 379 | 191 | 437 | 629 | 165.6 | SM14-Ex-EX134 | |
| Kirkland_Main-2798 | Kirkland_Manholes-1875 | 249.18 | Kirkland_Manholes-1876 | 247.77 | 111.8 | 1.26 | 8 | PVC | 0.01 | 792 | 22 | 4 | 26 | 3.3 | | |
| Kirkland_Main-2799 | Kirkland_Manholes-1876 | 247.77 | Kirkland_Manholes-1877 | 246.77 | 320.2 | 0.31 | 8 | PVC | 0.01 | 394 | 22 | 16 | 38 | 9.7 | | |
| Kirkland_Main-2800 | Kirkland_Manholes-1878 | 249.88 | Kirkland_Manholes-1877 | 246.77 | 242.5 | 1.28 | 8 | PVC | 0.01 | 798 | 32 | 99 | 132 | 16.5 | | |
| Kirkland_Main-2801 | Kirkland_Manholes-1874 | 243.32 | Kirkland_Manholes-1571 | 242.76 | 271.1 | 0.21 | 15 | PVC | 0.01 | 1,713 | 191 | 441 | 632 | 36.9 | | |
| Kirkland_Main-2802 | Kirkland_Manholes-1881 | 267.11 | Kirkland_Manholes-1879 | 258.08 | 239.4 | 3.77 | 8 | PVC | 0.01 | 1,369 | 30 | 87 | 117 | 8.6 | | |
| Kirkland_Main-2803 | Kirkland_Manholes-1880 | 260.03 | Kirkland_Manholes-1879 | 258.08 | 143.3 | 1.36 | 8 | PVC | 0.01 | 822 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2805 | Kirkland_Manholes-1879 | 258.08 | Kirkland_Manholes-1878 | 249.88 | 231.7 | 3.54 | 8 | PVC | 0.01 | 1,326 | 32 | 95 | 128 | 9.6 | | |
| Kirkland_Main-2806 | Kirkland_Manholes-1897 | 245.38 | Kirkland_Manholes-1873 | 243.35 | 282.6 | 0.72 | 10 | PVC | 0.01 | 1,084 | 136 | 314 | 450 | 41.6 | | |
| Kirkland_Main-2807 | Kirkland_Manholes-1902 | 406.33 | Kirkland_Manholes-1899 | 405.32 | 253.1 | 0.4 | 8 | PVC | 0.01 | 447 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-2808 | Kirkland_Manholes-1899 | 405.32 | Kirkland_Manholes-1898 | 404.75 | 141.4 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 9 | 2.1 | | |
| Kirkland_Main-2809 | Kirkland_Manholes-1898 | 404.75 | Kirkland_Manholes-1900 | 402.51 | 135.8 | 1.65 | 8 | PVC | 0.01 | 905 | 3 | 12 | 15 | 1.6 | | |
| Kirkland_Main-2810 | Kirkland_Manholes-1900 | 402.51 | Kirkland_Manholes-1901 | 396.95 | 219.6 | 2.53 | 8 | PVC | 0.01 | 1,122 | 4 | 16 | 20 | 1.8 | | |
| Kirkland_Main-2811 | Kirkland_Manholes-1901 | 396.95 | Kirkland_Manholes-1905 | 395.5 | 142.8 | 1.02 | 8 | PVC | 0.01 | 711 | 5 | 20 | 25 | 3.5 | | |
| Kirkland_Main-2812 | Kirkland_Manholes-1903 | 399.77 | Kirkland_Manholes-1904 | 399.67 | 107.5 | 0.09 | 8 | PVC | 0.01 | 215 | 3 | 12 | 15 | 7.1 | | |
| Kirkland_Main-2813 | Kirkland_Manholes-1904 | 399.67 | Kirkland_Manholes-1905 | 395.5 | 126.3 | 3.3 | 8 | PVC | 0.01 | 1,281 | 4 | 16 | 20 | 1.6 | | |
| Kirkland_Main-2814 | Kirkland_Manholes-2220 | 93.99 | Kirkland_Manholes-2219 | 92.24 | 194.8 | 0.9 | 8 | PVC | 0.01 | 668 | 1 | 6 | 7 | 1.1 | | |
| Kirkland_Main-2815 | Kirkland_Manholes-2219 | 92.24 | Kirkland_Manholes-2218 | 82.71 | 300.9 | 3.17 | 8 | PVC | 0.01 | 1,255 | 3 | 13 | 16 | 1.3 | | |
| Kirkland_Main-2824 | Kirkland_Manholes-2222 | 72.19 | Kirkland_Manholes-2221 | 60.29 | 232.5 | 5.12 | 8 | PVC | 0.01 | 1,595 | 3 | 19 | 23 | 1.4 | | |
| Kirkland_Main-2825 | Kirkland_Manholes-2223 | 75.05 | Kirkland_Manholes-2222 | 72.19 | 181.6 | 1.58 | 8 | PVC | 0.01 | 885 | 2 | 13 | 15 | 1.6 | | |
| Kirkland_Main-2826 | Kirkland_Manholes-2224 | 76.4 | Kirkland_Manholes-2223 | 75.05 | 210.4 | 0.64 | 8 | PVC | 0.01 | 565 | 1 | 6 | 7 | 1.3 | | |
| Kirkland_Main-2829 | Kirkland_Manholes-2233 | 60.15 | Kirkland_Manholes-2232 | 48.59 | 76.7 | 15.07 | 8 | PVC | 0.01 | 2,737 | 14 | 6 | 21 | 0.8 | | |
| Kirkland_Main-2830 | Kirkland_Manholes-2232 | 48.59 | Kirkland_Manholes-2231 | 25.71 | 219.7 | 10.42 | 8 | PVC | 0.01 | 2,275 | 15 | 13 | 28 | 1.2 | | |
| Kirkland_Main-2831 | Kirkland_Manholes-2231 | 25.71 | Kirkland_Manholes-2230 | 23.3 | 56.5 | 4.26 | 8 | PVC | 0.01 | 1,456 | 15 | 19 | 34 | 2.4 | | |
| Kirkland_Main-2832 | Kirkland_Manholes-2230 | 23.3 | Kirkland_Manholes-2229 | 22.53 | 34.1 | 2.26 | 8 | PVC | 0.01 | 1,060 | 15 | 32 | 47 | 4.5 | | |
| Kirkland_Main-2833 | Kirkland_Manholes-2210 | 47.75 | Kirkland_Manholes-2205 | 23.1 | 33.9 | 72.62 | 8 | Ductile Iron | 0.012 | 5,007 | 6 | 26 | 32 | 0.6 | SM14-Ex-EX189 | Slope verified in as-builts |
| Kirkland_Main-2834 | Kirkland_Manholes-2211 | 51.73 | Kirkland_Manholes-2210 | 47.75 | 86.6 | 4.6 | 8 | PVC | 0.01 | 1,512 | 6 | 19 | 26 | 1.7 | | |
| Kirkland_Main-2835 | Kirkland_Manholes-2207 | 54.13 | Kirkland_Manholes-2211 | 51.73 | 163.6 | 1.47 | 8 | PVC | 0.01 | 854 | 0 | 13 | 13 | 1.6 | | |
| Kirkland_Main-2836 | Kirkland_Manholes-2206 | 66.42 | Kirkland_Manholes-2198 | 65.46 | 282.2 | 0.34 | 6 | Concrete | 0.013 | 147 | 2 | 16 | 18 | 12.2 | SM8 | |
| Kirkland_Main-2837 | Kirkland_Manholes-2198 | 65.46 | Kirkland_Manholes-2193 | 64.5 | 239.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 3 | 25 | 28 | 8.1 | SM14-Ex-EX187 | |
| Kirkland_Main-2839 | Kirkland_Manholes-2084 | 179.07 | Kirkland_Manholes-2069 | 170.43 | 427.7 | 2.02 | 10 | Concrete | 0.013 | 1,398 | 62 | 72 | 134 | 9.6 | SM14-Ex-EX199 | |
| Kirkland_Main-2840 | Kirkland_Manholes-2085 | 183.55 | Kirkland_Manholes-2084 | 179.07 | 426.7 | 1.05 | 10 | Concrete | 0.013 | 1,008 | 62 | 68 | 129 | 12.8 | SM14-Ex-EX199 | |
| Kirkland_Main-2841 | Kirkland_Manholes-2086 | 187.61 | Kirkland_Manholes-2085 | 183.55 | 445.4 | 0.91 | 10 | Concrete | 0.013 | 939 | 60 | 64 | 123 | 13.2 | SM1 | |
| Kirkland_Main-2842 | Kirkland_Manholes-2074 | 213.49 | Kirkland_Manholes-2086 | 187.61 | 333.1 | 7.77 | 8 | Concrete | 0.013 | 1,512 | 45 | 52 | 97 | 6.4 | SM14-Ex-EX246 | |
| Kirkland_Main-2843 | Kirkland_Manholes-2087 | 189.64 | Kirkland_Manholes-2086 | 187.61 | 250.4 | 0.81 | 8 | Concrete | 0.013 | 488 | 8 | 8 | 16 | 3.2 | SM1 | |
| Kirkland_Main-2844 | Kirkland_Manholes-2301 | 194.13 | Kirkland_Manholes-2087 | 189.64 | 258.5 | 1.74 | 8 | Concrete | 0.013 | 715 | 0 | 4 | 4 | 0.6 | SM1 | |
| Kirkland_Main-2845 | Kirkland_Manholes-2838 | 108.96 | Kirkland_Manholes-2837 | 104.37 | 77.8 | 5.9 | 8 | PVC | 0.01 | 1,712 | 5 | 6 | 11 | 0.7 | | |
| Kirkland_Main-2846 | Kirkland_Manholes-2837 | 104.37 | Kirkland_Manholes-2836 | 60.97 | 275.8 | 15.74 | 8 | PVC | 0.01 | 2,797 | 5 | 12 | 17 | 0.6 | | |
| Kirkland_Main-2847 | Kirkland_Manholes-2834 | 37.62 | Kirkland_Manholes-2849 | 29.21 | 55.8 | 15.07 | 12 | Concrete | 0.013 | 6,208 | 32 | 128 | 159 | 2.6 | SM14-Ex-EX316 | |
| Kirkland_Main-2848 | Kirkland_Manholes-2833 | 29.99 | Kirkland_Manholes-2849 | 29.21 | 264.4 | 0.3 | 15 | Concrete | 0.013 | 1,575 | 439 | 1,076 | 1,587 | 100.8 | SM14-Ex-EX309 | |
| Kirkland_Main-2849 | Kirkland_Manholes-2849 | 29.21 | Kirkland_Manholes-2848 | 28.9 | 205.9 | 0.15 | 15 | Concrete | 0.013 | 1,123 | 471 | 1,210 | 1,752 | 156 | SM14-Ex-EX309 | Drop Connection |
| Kirkland_Main-2850 | Kirkland_Manholes-2848 | 27.55 | Kirkland_Manholes-2842 | 26.9 | 429.8 | 0.15 | 15 | Concrete | 0.013 | 1,127 | 474 | 1,216 | 1,762 | 156.3 | SM14-Ex-EX309 | |
| Kirkland_Main-2851 | Kirkland_Manholes-1941 | 361.64 | Kirkland_Manholes-1942 | 350.59 | 169 | 6.54 | 8 | PVC | 0.01 | 1,803 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-2852 | Kirkland_Manholes-1943 | 356.18 | Kirkland_Manholes-1942 | 350.59 | 121.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2853 | Kirkland_Manholes-1942 | 350.59 | Kirkland_Manholes-1577 | 341.43 | 212 | 4.32 | 8 | PVC | 0.01 | 1,465 | 3 | 16 | 19 | 1.3 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2854 | Kirkland_Manholes-1944 | 388.13 | Kirkland_Manholes-1945 | 370.88 | 207.3 | 8.32 | 8 | PVC | 0.01 | 2,034 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2855 | Kirkland_Manholes-1945 | 370.88 | Kirkland_Manholes-1946 | 363.75 | 185.3 | 3.85 | 8 | PVC | 0.01 | 1,383 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-2856 | Kirkland_Manholes-1946 | 363.75 | Kirkland_Manholes-1947 | 358.01 | 122.1 | 4.7 | 8 | PVC | 0.01 | 1,529 | 2 | 12 | 13 | 0.9 | | |
| Kirkland_Main-2857 | Kirkland_Manholes-1947 | 358.01 | Kirkland_Manholes-1948 | 350.2 | 125.9 | 6.2 | 8 | PVC | 0.01 | 1,756 | 2 | 16 | 18 | 1 | | |
| Kirkland_Main-2858 | Kirkland_Manholes-1949 | 352.67 | Kirkland_Manholes-1948 | 350.2 | 274.7 | 0.9 | 8 | PVC | 0.01 | 669 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2859 | Kirkland_Manholes-1948 | 350.2 | Kirkland_Manholes-1950 | 344.53 | 121.4 | 4.67 | 8 | PVC | 0.01 | 1,524 | 5 | 24 | 29 | 1.9 | | |
| Kirkland_Main-2860 | Kirkland_Manholes-1950 | 344.53 | Kirkland_Manholes-1893 | 314.62 | 313.2 | 9.55 | 8 | PVC | 0.01 | 2,179 | 6 | 28 | 34 | 1.5 | | |
| Kirkland_Main-2861 | Kirkland_Manholes-1952 | 275.36 | Kirkland_Manholes-1951 | 275.06 | 208.2 | 0.14 | 8 | PVC | 0.01 | 268 | 3 | 40 | 43 | 16.1 | | |
| Kirkland_Main-2862 | Kirkland_Manholes-1953 | 290.71 | Kirkland_Manholes-1952 | 275.36 | 336.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 3 | 36 | 39 | 2.6 | | |
| Kirkland_Main-2863 | Kirkland_Manholes-1957 | 343.4 | Kirkland_Manholes-1956 | 335.87 | 142.5 | 5.28 | 8 | PVC | 0.01 | 1,620 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2864 | Kirkland_Manholes-1956 | 335.87 | Kirkland_Manholes-1955 | 335.45 | 105.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 8 | 8 | 1.8 | | |
| Kirkland_Main-2865 | Kirkland_Manholes-1975 | 436.73 | Kirkland_Manholes-1974 | 432 | 247.5 | 1.91 | 8 | PVC | 0.01 | 975 | 21 | 123 | 144 | 14.7 | | |
| Kirkland_Main-2866 | Kirkland_Manholes-1976 | 440.77 | Kirkland_Manholes-1975 | 436.73 | 231.1 | 1.75 | 8 | PVC | 0.01 | 932 | 9 | 40 | 49 | 5.2 | | |
| Kirkland_Main-2867 | Kirkland_Manholes-1978 | 440.32 | Kirkland_Manholes-1975 | 436.73 | 342.8 | 1.05 | 8 | PVC | 0.01 | 721 | 11 | 79 | 90 | 12.5 | | |
| Kirkland_Main-2868 | Kirkland_Manholes-1977 | 454.61 | Kirkland_Manholes-1976 | 440.77 | 262.5 | 5.27 | 8 | PVC | 0.01 | 1,619 | 5 | 32 | 37 | 2.3 | | |
| Kirkland_Main-2869 | Kirkland_Manholes-1980 | 464.9 | Kirkland_Manholes-1977 | 454.61 | 328.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 4 | 24 | 28 | 2.2 | | |
| Kirkland_Main-2870 | Kirkland_Manholes-1979 | 446.84 | Kirkland_Manholes-1978 | 440.32 | 179.3 | 3.64 | 8 | PVC | 0.01 | 1,345 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2871 | Kirkland_Manholes-1984 | 465.6 | Kirkland_Manholes-1980 | 464.9 | 159.8 | 0.44 | 8 | PVC | 0.01 | 467 | 3 | 16 | 19 | 4 | | |
| Kirkland_Main-2872 | Kirkland_Manholes-1982 | 470.94 | Kirkland_Manholes-1980 | 464.9 | 329.7 | 1.83 | 8 | PVC | 0.01 | 954 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2873 | Kirkland_Manholes-1985 | 470.88 | Kirkland_Manholes-1981 | 467.1 | 204.6 | 1.85 | 8 | PVC | 0.01 | 958 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2874 | Kirkland_Manholes-1986 | 467.24 | Kirkland_Manholes-1981 | 467.1 | 144.7 | 0.1 | 8 | PVC | 0.01 | 219 | 0 | 4 | 4 | 1.9 | | |
| Kirkland_Main-2875 | Kirkland_Manholes-1983 | 469.93 | Kirkland_Manholes-2019 | 467.83 | 75.8 | 2.77 | 8 | PVC | 0.01 | 1,174 | 1 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2876 | Kirkland_Manholes-1981 | 467.1 | Kirkland_Manholes-1984 | 465.6 | 153 | 0.98 | 8 | PVC | 0.01 | 698 | 1 | 12 | 13 | 1.9 | | |
| Kirkland_Main-2877 | Kirkland_Manholes-1987 | 443.37 | Kirkland_Manholes-1976 | 440.77 | 252.9 | 1.03 | 8 | PVC | 0.01 | 715 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2878 | Kirkland_Manholes-2002 | 429.3 | Kirkland_Manholes-2000 | 426.18 | 243.7 | 1.28 | 8 | Concrete | 0.013 | 614 | 0 | 8 | 8 | 1.4 | SM14-Ex-EX209 | |
| Kirkland_Main-2879 | Kirkland_Manholes-2000 | 426.18 | Kirkland_Manholes-2001 | 424.5 | 24.1 | 6.98 | 8 | Concrete | 0.013 | 1,433 | 12 | 64 | 75 | 5.3 | SM14-Ex-EX209 | |
| Kirkland_Main-2880 | Kirkland_Manholes-1999 | 430.91 | Kirkland_Manholes-2000 | 426.18 | 304.8 | 1.55 | 8 | Concrete | 0.013 | 676 | 11 | 52 | 63 | 9.3 | SM14-Ex-EX211 | |
| Kirkland_Main-2881 | Kirkland_Manholes-2001 | 424.5 | Kirkland_Manholes-2063 | 422.68 | 357.6 | 0.51 | 8 | Concrete | 0.013 | 387 | 12 | 68 | 79 | 20.5 | SM14-Ex-EX209 | |
| Kirkland_Main-2882 | Kirkland_Manholes-2003 | 431.01 | Kirkland_Manholes-2002 | 429.3 | 155.3 | 1.1 | 8 | PVC | 0.01 | 740 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2883 | Kirkland_Manholes-2015 | 418.27 | Kirkland_Manholes-2014 | 416.63 | 83.6 | 1.96 | 8 | PVC | 0.01 | 988 | 19 | 87 | 106 | 10.8 | | |
| Kirkland_Main-2884 | Kirkland_Manholes-2014 | 416.63 | Kirkland_Manholes-2013 | 413.74 | 146.6 | 1.97 | 8 | PVC | 0.01 | 990 | 19 | 91 | 111 | 11.2 | | |
| Kirkland_Main-2886 | Kirkland_Manholes-2010 | 424.43 | Kirkland_Manholes-2016 | 421.46 | 333.6 | 0.89 | 8 | PVC | 0.01 | 665 | 16 | 79 | 96 | 14.4 | | |
| Kirkland_Main-2887 | Kirkland_Manholes-2016 | 421.46 | Kirkland_Manholes-2015 | 418.27 | 330.4 | 0.97 | 8 | PVC | 0.01 | 693 | 18 | 83 | 101 | 14.6 | | |
| Kirkland_Main-2889 | Kirkland_Manholes-2021 | 473.17 | Kirkland_Manholes-2020 | 468.34 | 27.5 | 17.56 | 8 | PVC | 0.01 | 2,954 | 24 | 91 | 116 | 3.9 | | |
| Kirkland_Main-2890 | Kirkland_Manholes-2020 | 468.34 | Kirkland_Manholes-2019 | 467.83 | 127.5 | 0.4 | 10 | PVC | 0.01 | 809 | 98 | 238 | 337 | 41.7 | | |
| Kirkland_Main-2891 | Kirkland_Manholes-2023 | 466.76 | Kirkland_Manholes-2022 | 466 | 41.6 | 1.83 | 8 | PVC | 0.01 | 953 | 7 | 20 | 27 | 2.8 | | |
| Kirkland_Main-2892 | Kirkland_Manholes-2037 | 465.67 | Kirkland_Manholes-2036 | 452.58 | 367.2 | 3.57 | 8 | Concrete | 0.013 | 1,024 | 9 | 16 | 25 | 2.5 | SM14-Ex-EX266 | |
| Kirkland_Main-2893 | Kirkland_Manholes-2041 | 465.42 | Kirkland_Manholes-2042 | 455.6 | 502.4 | 1.95 | 8 | Concrete | 0.013 | 758 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX265 | |
| Kirkland_Main-2894 | Kirkland_Manholes-2042 | 455.6 | Kirkland_Manholes-2043 | 454.68 | 150.3 | 0.61 | 8 | Concrete | 0.013 | 424 | 67 | 278 | 345 | 81.3 | SM14-Ex-EX214 | |
| Kirkland_Main-2895 | Kirkland_Manholes-2044 | 435.14 | Kirkland_Manholes-2045 | 432.5 | 20.8 | 12.67 | 8 | PVC | 0.01 | 2,510 | 69 | 286 | 355 | 14.1 | SM14-Ex-EX214 | |
| Kirkland_Main-2896 | Kirkland_Manholes-2043 | 454.68 | Kirkland_Manholes-2044 | 435.14 | 356.2 | 5.49 | 8 | Concrete | 0.013 | 1,270 | 68 | 282 | 350 | 27.5 | SM14-Ex-EX214 | |
| Kirkland_Main-2897 | Kirkland_Manholes-2046 | 437.24 | Kirkland_Manholes-2045 | 432.5 | 199.5 | 2.38 | 10 | PVC | 0.01 | 1,970 | 127 | 338 | 464 | 23.6 | | |
| Kirkland_Main-2898 | Kirkland_Manholes-2047 | 441.15 | Kirkland_Manholes-2046 | 437.24 | 49.2 | 7.95 | 10 | PVC | 0.01 | 3,605 | 126 | 334 | 460 | 12.7 | | |
| Kirkland_Main-2899 | Kirkland_Manholes-2048 | 442.51 | Kirkland_Manholes-2047 | 441.15 | 76.6 | 1.77 | 8 | Concrete | 0.013 | 723 | 125 | 330 | 455 | 63 | SM14-Ex-EX264 | |
| Kirkland_Main-2900 | Kirkland_Manholes-2049 | 454.48 | Kirkland_Manholes-2050 | 439.64 | 163.1 | 9.1 | 8 | Concrete | 0.013 | 1,636 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX263 | |
| Kirkland_Main-2901 | Kirkland_Manholes-2050 | 439.64 | Kirkland_Manholes-2051 | 434.18 | 313 | 1.74 | 8 | Concrete | 0.013 | 716 | 3 | 8 | 11 | 1.5 | SM14-Ex-EX263 | |
| Kirkland_Main-2902 | Kirkland_Manholes-2051 | 434.18 | Kirkland_Manholes-2054 | 429.73 | 307.2 | 1.45 | 8 | Concrete | 0.013 | 653 | 5 | 12 | 17 | 2.5 | SM14-Ex-EX263 | |
| Kirkland_Main-2903 | Kirkland_Manholes-2053 | 424.91 | Kirkland_Manholes-2285 | 419.89 | 165.8 | 3.03 | 8 | Concrete | 0.013 | 944 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX248 | |
| Kirkland_Main-2904 | Kirkland_Manholes-2054 | 429.73 | Kirkland_Manholes-2055 | 427.92 | 21.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 5 | 16 | 21 | 1 | | |
| Kirkland_Main-2905 | Kirkland_Manholes-3044 | 18.06 | Kirkland_Manholes-2736 | 17.76 | 69.7 | 0.43 | 18 | Concrete | 0.013 | 3,093 | 212 | 516 | 728 | 23.5 | SM14-Ex-EX289 | |
| Kirkland_Main-2906 | Kirkland_Manholes-2045 | 432.5 | Kirkland_Manholes-2055 | 427.92 | 351.4 | 1.3 | 10 | PVC | 0.01 | 1,460 | 196 | 628 | 824 | 56.5 | | |
| Kirkland_Main-2907 | Kirkland_Manholes-2057 | 422.6 | Kirkland_Manholes-2056 | 422.2 | 14.4 | 2.79 | 10 | PVC | 0.01 | 2,134 | 203 | 664 | 866 | 40.6 | | |
| Kirkland_Main-2908 | Kirkland_Manholes-1848 | 462 | Kirkland_Manholes-1216 | 443.89 | 186.3 | 9.72 | 8 | PVC | 0.01 | 2,198 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2909 | Kirkland_Manholes-2056 | 422.2 | Kirkland_Manholes-2285 | 419.89 | 62.2 | 3.71 | 8 | PVC | 0.01 | 1,359 | 203 | 668 | 870 | 64.1 | | |
| Kirkland_Main-2910 | Kirkland_Manholes-2058 | 427.27 | Kirkland_Manholes-2057 | 422.6 | 119.2 | 3.92 | 10 | PVC | 0.01 | 2,531 | 202 | 660 | 862 | 34.1 | | |
| Kirkland_Main-2911 | Kirkland_Manholes-2055 | 427.92 | Kirkland_Manholes-2058 | 427.27 | 53.1 | 1.22 | 10 | PVC | 0.01 | 1,414 | 202 | 648 | 849 | 60.1 | | |
| Kirkland_Main-2912 | Kirkland_Manholes-2059 | 433 | Kirkland_Manholes-2058 | 427.27 | 231.2 | 2.48 | 8 | Concrete | 0.013 | 854 | 0 | 8 | 8 | 1 | SM14-Ex-EX213 | |
| Kirkland_Main-2913 | Kirkland_Manholes-3082 | 428.49 | Kirkland_Manholes-1992 | 427.27 | 187.8 | 0.65 | 8 | PVC | 0.01 | 568 | 2 | 8 | 10 | 1.8 | | |
| Kirkland_Main-2914 | Kirkland_Manholes-1992 | 427.27 | Kirkland_Manholes-2009 | 426.97 | 143.6 | 0.21 | 8 | PVC | 0.01 | 322 | 10 | 48 | 57 | 17.8 | | |
| Kirkland_Main-2915 | Kirkland_Manholes-1991 | 431.18 | Kirkland_Manholes-1992 | 427.27 | 327 | 1.2 | 8 | PVC | 0.01 | 771 | 7 | 36 | 43 | 5.6 | | |
| Kirkland_Main-2916 | Kirkland_Manholes-2004 | 427.75 | Kirkland_Manholes-2010 | 424.43 | 322.6 | 1.03 | 8 | PVC | 0.01 | 715 | 4 | 24 | 27 | 3.8 | | |
| Kirkland_Main-2917 | Kirkland_Manholes-2007 | 429.08 | Kirkland_Manholes-2004 | 427.75 | 98.7 | 1.35 | 8 | PVC | 0.01 | 819 | 4 | 20 | 23 | 2.9 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2918 | Kirkland_Manholes-2260 | 285.07 | Kirkland_Manholes-2259 | 272.05 | 278.2 | 4.68 | 8 | Concrete | 0.013 | 1,173 | 238 | 854 | 1,092 | 93.1 | SM14-Ex-EX248 | |
| Kirkland_Main-2919 | Kirkland_Manholes-2259 | 272.05 | Kirkland_Manholes-2258 | 263.77 | 196.6 | 4.21 | 8 | Concrete | 0.013 | 1,113 | 243 | 862 | 1,105 | 99.3 | SM14-Ex-EX248 | |
| Kirkland_Main-2920 | Kirkland_Manholes-2323 | 247.45 | Kirkland_Manholes-2324 | 245.37 | 33.9 | 6.13 | 8 | PVC | 0.01 | 1,746 | 35 | 131 | 166 | 9.5 | | |
| Kirkland_Main-2921 | Kirkland_Manholes-2322 | 259.98 | Kirkland_Manholes-2323 | 247.45 | 184.9 | 6.78 | 8 | Concrete | 0.013 | 1,412 | 34 | 127 | 161 | 11.4 | SM14-Ex-EX252 | |
| Kirkland_Main-2922 | Kirkland_Manholes-2325 | 246.61 | Kirkland_Manholes-2324 | 245.37 | 131.1 | 0.95 | 8 | PVC | 0.01 | 686 | 5 | 12 | 17 | 2.4 | | |
| Kirkland_Main-2923 | Kirkland_Manholes-2329 | 258.36 | Kirkland_Manholes-2325 | 246.61 | 302.7 | 3.88 | 8 | PVC | 0.01 | 1,389 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-2924 | Kirkland_Manholes-2328 | 273.89 | Kirkland_Manholes-2329 | 258.36 | 228.5 | 6.8 | 8 | PVC | 0.01 | 1,838 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2925 | Kirkland_Manholes-2339 | 347.35 | Kirkland_Manholes-2337 | 345.83 | 131 | 1.16 | 8 | Concrete | 0.013 | 584 | 3 | 8 | 11 | 1.8 | SM14-Ex-EX256 | |
| Kirkland_Main-2926 | Kirkland_Manholes-2337 | 345.83 | Kirkland_Manholes-2338 | 328.54 | 114.6 | 15.08 | 8 | Concrete | 0.013 | 2,106 | 5 | 12 | 16 | 0.8 | SM14-Ex-EX256 | |
| Kirkland_Main-2927 | Kirkland_Manholes-2334 | 313.34 | Kirkland_Manholes-2333 | 308.81 | 129.8 | 3.49 | 8 | Concrete | 0.013 | 1,013 | 25 | 75 | 100 | 9.9 | SM14-Ex-EX252 | |
| Kirkland_Main-2928 | Kirkland_Manholes-2333 | 308.81 | Kirkland_Manholes-2332 | 296.43 | 179.4 | 6.9 | 8 | Concrete | 0.013 | 1,425 | 25 | 79 | 105 | 7.4 | SM14-Ex-EX252 | |
| Kirkland_Main-2929 | Kirkland_Manholes-2332 | 296.43 | Kirkland_Manholes-2331 | 295.51 | 98.1 | 0.94 | 8 | Concrete | 0.013 | 525 | 27 | 87 | 115 | 21.9 | SM14-Ex-EX252 | |
| Kirkland_Main-2930 | Kirkland_Manholes-2718 | 21.4 | Kirkland_Manholes-2721 | 21.2 | 187 | 0.11 | 12 | Ductile Iron | 0.012 | 566 | 74 | 36 | 110 | 19.4 | SM14-Ex-EX289 | |
| Kirkland_Main-2931 | Kirkland_Manholes-2331 | 295.51 | Kirkland_Manholes-2330 | 295.18 | 115.3 | 0.29 | 8 | Concrete | 0.013 | 290 | 28 | 91 | 119 | 41.1 | SM14-Ex-EX252 | |
| Kirkland_Main-2932 | Kirkland_Manholes-2327 | 280.44 | Kirkland_Manholes-2326 | 264.71 | 213.4 | 7.37 | 8 | Concrete | 0.013 | 1,472 | 31 | 119 | 151 | 10.2 | SM14-Ex-EX252 | |
| Kirkland_Main-2933 | Kirkland_Manholes-2326 | 264.71 | Kirkland_Manholes-2322 | 259.98 | 165.9 | 2.85 | 8 | Concrete | 0.013 | 916 | 33 | 123 | 156 | 17 | SM14-Ex-EX252 | |
| Kirkland_Main-2935 | Kirkland_Manholes-2342 | 370.03 | Kirkland_Manholes-2339 | 347.35 | 229.4 | 9.89 | 8 | Concrete | 0.013 | 1,705 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX256 | |
| Kirkland_Main-2936 | Kirkland_Manholes-2340 | 335.99 | Kirkland_Manholes-2379 | 312.61 | 331.3 | 7.06 | 8 | Concrete | 0.013 | 1,441 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX257 | |
| Kirkland_Main-2937 | Kirkland_Manholes-2338 | 328.54 | Kirkland_Manholes-2341 | 327.28 | 253.7 | 0.5 | 8 | Concrete | 0.013 | 382 | 6 | 16 | 22 | 5.8 | SM14-Ex-EX256 | |
| Kirkland_Main-2938 | Kirkland_Manholes-2341 | 327.28 | Kirkland_Manholes-2335 | 323.22 | 289.5 | 1.4 | 8 | Concrete | 0.013 | 642 | 9 | 24 | 33 | 5.1 | SM14-Ex-EX256 | |
| Kirkland_Main-2939 | Kirkland_Manholes-2336 | 342.09 | Kirkland_Manholes-2341 | 327.28 | 137.3 | 10.78 | 8 | Concrete | 0.013 | 1,781 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX256 | Drop Connection |
| Kirkland_Main-2940 | Kirkland_Manholes-2349 | 361.19 | Kirkland_Manholes-2335 | 323.22 | 315.1 | 12.05 | 8 | Concrete | 0.013 | 1,883 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX252 | |
| Kirkland_Main-2941 | Kirkland_Manholes-2335 | 323.22 | Kirkland_Manholes-2334 | 323.19 | 8.2 | 0.4 | 8 | Concrete | 0.013 | 343 | 11 | 32 | 43 | 12.4 | SM14-Ex-EX252 | Drop Connection |
| Kirkland_Main-2942 | Kirkland_Manholes-2343 | 315.2 | Kirkland_Manholes-2348 | 314.6 | 208.7 | 0.29 | 8 | Concrete | 0.013 | 291 | 13 | 36 | 49 | 16.7 | SM14-Ex-EX254 | |
| Kirkland_Main-2944 | Kirkland_Manholes-2915 | 422.99 | Kirkland_Manholes-2916 | 416.17 | 267.2 | 2.55 | 8 | PVC | 0.01 | 1,126 | 4 | 16 | 19 | 1.7 | | |
| Kirkland_Main-2945 | Kirkland_Manholes-2916 | 416.17 | Kirkland_Manholes-2936 | 415.17 | 403.5 | 0.25 | 8 | PVC | 0.01 | 351 | 5 | 24 | 29 | 8.3 | | |
| Kirkland_Main-2946 | Kirkland_Manholes-2917 | 449.84 | Kirkland_Manholes-2918 | 440.81 | 194.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2947 | Kirkland_Manholes-2918 | 440.81 | Kirkland_Manholes-2919 | 429.45 | 198.9 | 5.71 | 8 | PVC | 0.01 | 1,685 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-2948 | Kirkland_Manholes-2919 | 429.45 | Kirkland_Manholes-2915 | 422.99 | 217.1 | 2.98 | 8 | PVC | 0.01 | 1,216 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-2949 | Kirkland_Manholes-2922 | 91.28 | Kirkland_Manholes-2921 | 73.76 | 147.5 | 11.88 | 8 | PVC | 0.01 | 2,430 | 1 | 13 | 14 | 0.6 | | |
| Kirkland_Main-2951 | Kirkland_Manholes-2923 | 92.6 | Kirkland_Manholes-2922 | 91.28 | 84.5 | 1.56 | 8 | PVC | 0.01 | 881 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2952 | Kirkland_Manholes-2924 | 104.01 | Kirkland_Manholes-2922 | 91.28 | 265 | 4.8 | 8 | PVC | 0.01 | 1,545 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2953 | Kirkland_Manholes-2423 | 267.38 | Kirkland_Manholes-2421 | 253.02 | 328.6 | 4.37 | 8 | PVC | 0.01 | 1,474 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-2954 | Kirkland_Manholes-2429 | 273.52 | Kirkland_Manholes-2424 | 257.66 | 398.8 | 3.98 | 8 | Concrete | 0.013 | 1,082 | 29 | 95 | 124 | 11.5 | SM14-Ex-EX260 | |
| Kirkland_Main-2955 | Kirkland_Manholes-2425 | 261.07 | Kirkland_Manholes-2424 | 257.66 | 270.7 | 1.26 | 8 | Concrete | 0.013 | 609 | 179 | 211 | 389 | 64 | SM2 | |
| Kirkland_Main-2956 | Kirkland_Manholes-2426 | 264.11 | Kirkland_Manholes-2425 | 261.07 | 237.2 | 1.28 | 8 | Concrete | 0.013 | 614 | 173 | 191 | 364 | 59.2 | SM2 | |
| Kirkland_Main-2957 | Kirkland_Manholes-2430 | 273.69 | Kirkland_Manholes-2425 | 261.07 | 254.1 | 4.97 | 8 | Concrete | 0.013 | 1,209 | 5 | 16 | 21 | 1.7 | SM14-Ex-EX286 | |
| Kirkland_Main-2958 | Kirkland_Manholes-2427 | 267.5 | Kirkland_Manholes-2426 | 266.42 | 268.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 172 | 187 | 359 | 104.6 | SM2 | Drop Connection |
| Kirkland_Main-2959 | Kirkland_Manholes-2428 | 270.37 | Kirkland_Manholes-2427 | 267.5 | 310.1 | 0.93 | 8 | Concrete | 0.013 | 522 | 120 | 159 | 279 | 53.4 | SM2 | |
| Kirkland_Main-2960 | Kirkland_Manholes-2431 | 277.03 | Kirkland_Manholes-2430 | 273.69 | 201.8 | 1.66 | 8 | PVC | 0.01 | 907 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2961 | Kirkland_Manholes-2433 | 263.87 | Kirkland_Manholes-2434 | 245.33 | 172.7 | 10.73 | 8 | Concrete | 0.013 | 1,777 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX244 | |
| Kirkland_Main-2962 | Kirkland_Manholes-2434 | 245.33 | Kirkland_Manholes-2437 | 244.43 | 228.6 | 0.39 | 8 | Concrete | 0.013 | 340 | 5 | 12 | 16 | 4.8 | SM14-Ex-EX244 | |
| Kirkland_Main-2963 | Kirkland_Manholes-2437 | 244.43 | Kirkland_Manholes-2436 | 225.88 | 256.7 | 7.23 | 8 | Concrete | 0.013 | 1,458 | 6 | 16 | 22 | 1.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2964 | Kirkland_Manholes-2514 | 400.04 | Kirkland_Manholes-2517 | 387 | 217.1 | 6.01 | 8 | PVC | 0.01 | 1,728 | 9 | 12 | 21 | 1.2 | | |
| Kirkland_Main-2965 | Kirkland_Manholes-2515 | 393.7 | Kirkland_Manholes-2516 | 391.18 | 190.1 | 1.33 | 8 | PVC | 0.01 | 812 | 4 | 2 | 6 | 0.7 | | |
| Kirkland_Main-2966 | Kirkland_Manholes-2516 | 391.18 | Kirkland_Manholes-2517 | 387 | 163.7 | 2.55 | 8 | PVC | 0.01 | 1,127 | 5 | 5 | 10 | 0.9 | | |
| Kirkland_Main-2967 | Kirkland_Manholes-2517 | 387 | Kirkland_Manholes-2518 | 378.45 | 142.8 | 5.99 | 8 | PVC | 0.01 | 1,725 | 15 | 19 | 34 | 2 | | |
| Kirkland_Main-2968 | Kirkland_Manholes-2518 | 378.45 | Kirkland_Manholes-2524 | 346.56 | 373.5 | 8.54 | 8 | PVC | 0.01 | 2,060 | 18 | 21 | 39 | 1.9 | | |
| Kirkland_Main-2969 | Kirkland_Manholes-2520 | 374.03 | Kirkland_Manholes-2521 | 363.83 | 98.2 | 10.38 | 8 | PVC | 0.01 | 2,272 | 2 | 2 | 4 | 0.2 | | |
| Kirkland_Main-2970 | Kirkland_Manholes-2435 | 226.37 | Kirkland_Manholes-2436 | 225.88 | 121.8 | 0.4 | 8 | Concrete | 0.013 | 343 | 2 | 4 | 6 | 1.7 | SM14-Ex-EX285 | |
| Kirkland_Main-2971 | Kirkland_Manholes-2436 | 225.88 | Kirkland_Manholes-2438 | 209.72 | 279.9 | 5.77 | 8 | Concrete | 0.013 | 1,303 | 9 | 24 | 32 | 2.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2972 | Kirkland_Manholes-2438 | 209.72 | Kirkland_Manholes-2441 | 205.09 | 260.5 | 1.78 | 8 | Concrete | 0.013 | 723 | 13 | 36 | 49 | 6.8 | SM14-Ex-EX244 | |
| Kirkland_Main-2973 | Kirkland_Manholes-2439 | 217.92 | Kirkland_Manholes-2438 | 209.72 | 117.3 | 6.99 | 8 | Concrete | 0.013 | 1,434 | 3 | 8 | 11 | 0.7 | SM14-Ex-EX284 | |
| Kirkland_Main-2974 | Kirkland_Manholes-2440 | 242.45 | Kirkland_Manholes-2439 | 217.92 | 136.9 | 17.92 | 6 | Vitrified Clay | 0.013 | 1,066 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX284 | |
| Kirkland_Main-2975 | Kirkland_Manholes-2441 | 205.09 | Kirkland_Manholes-2442 | 204.35 | 67.9 | 1.09 | 8 | Concrete | 0.013 | 566 | 14 | 40 | 53 | 9.4 | SM14-Ex-EX244 | |
| Kirkland_Main-2977 | Kirkland_Manholes-2992 | 396.35 | Kirkland_Manholes-2991 | 395.79 | 171.2 | 0.33 | 8 | PVC | 0.01 | 403 | 2 | 20 | 22 | 5.4 | | |
| Kirkland_Main-2978 | Kirkland_Manholes-2991 | 395.79 | Kirkland_Manholes-1328 | 394.1 | 142.6 | 1.18 | 8 | PVC | 0.01 | 767 | 2 | 24 | 26 | 3.4 | | |
| Kirkland_Main-2979 | Kirkland_Manholes-2737 | 259.86 | Kirkland_Manholes-2310 | 256 | 91.2 | 4.23 | 8 | PVC | 0.01 | 1,451 | 3 | 9 | 12 | 0.8 | | |
| Kirkland_Main-2980 | Kirkland_Manholes-2442 | 204.35 | Kirkland_Manholes-2443 | 200 | 192.1 | 2.26 | 8 | Concrete | 0.013 | 816 | 14 | 44 | 58 | 7.1 | SM14-Ex-EX244 | |
| Kirkland_Main-2981 | Kirkland_Manholes-2444 | 199.73 | Kirkland_Manholes-2445 | 191.11 | 277 | 3.11 | 8 | Concrete | 0.013 | 957 | 18 | 64 | 82 | 8.6 | SM14-Ex-EX244 | |
| Kirkland_Main-2982 | Kirkland_Manholes-2443 | 200 | Kirkland_Manholes-2444 | 199.73 | 20.4 | 1.32 | 8 | Concrete | 0.013 | 623 | 15 | 48 | 63 | 10 | SM14-Ex-EX244 | |
| Kirkland_Main-2983 | Kirkland_Manholes-2668 | 18.29 | Kirkland_Manholes-2318 | 17.6 | 53.6 | 1.29 | 8 | PVC | 0.01 | 800 | 1 | 6 | 8 | 1 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2984 | Kirkland_Manholes-2320 | 18 | Kirkland_Manholes-2319 | 17.7 | 261.8 | 0.11 | 21 | PVC | 0.01 | 3,129 | 102 | 273 | 375 | 12 | | |
| Kirkland_Main-2985 | Kirkland_Manholes-2321 | 18.2 | Kirkland_Manholes-2320 | 18 | 193.7 | 0.1 | 21 | PVC | 0.01 | 2,971 | 97 | 214 | 312 | 10.5 | | |
| Kirkland_Main-2986 | Kirkland_Manholes-2303 | 195.57 | Kirkland_Manholes-2302 | 194.37 | 30.3 | 3.96 | 8 | Concrete | 0.013 | 1,079 | 549 | 1,470 | 2,019 | 187.1 | SM2 | |
| Kirkland_Main-2987 | Kirkland_Manholes-2302 | 194.37 | Kirkland_Manholes-2304 | 192.91 | 51.2 | 2.85 | 12 | PVC | 0.01 | 3,510 | 549 | 1,474 | 2,023 | 57.7 | | |
| Kirkland_Main-2988 | Kirkland_Manholes-2285 | 419.89 | Kirkland_Manholes-2284 | 417.52 | 64.2 | 3.69 | 8 | Concrete | 0.013 | 1,042 | 204 | 675 | 879 | 84.4 | SM14-Ex-EX248 | |
| Kirkland_Main-2989 | Kirkland_Manholes-2284 | 417.52 | Kirkland_Manholes-2282 | 401.71 | 231.8 | 6.82 | 8 | Concrete | 0.013 | 1,416 | 204 | 679 | 884 | 62.4 | SM14-Ex-EX248 | |
| Kirkland_Main-2990 | Kirkland_Manholes-2263 | 374.13 | Kirkland_Manholes-2262 | 311.78 | 761.4 | 8.19 | 8 | sbestos Ceme | 0.011 | 1,834 | 232 | 842 | 1,074 | 58.5 | SM14-Ex-EX248 | |
| Kirkland_Main-2991 | Kirkland_Manholes-2669 | 379.65 | Kirkland_Manholes-2290 | 372.36 | 83.4 | 8.74 | 8 | PVC | 0.01 | 2,084 | 4 | 4 | 8 | 0.4 | | |
| Kirkland_Main-2992 | Kirkland_Manholes-2290 | 372.36 | Kirkland_Manholes-2291 | 367.48 | 64.2 | 7.6 | 8 | PVC | 0.01 | 1,944 | 4 | 8 | 12 | 0.6 | | |
| Kirkland_Main-2993 | Kirkland_Manholes-2291 | 367.48 | Kirkland_Manholes-2292 | 366.54 | 71.9 | 1.31 | 8 | PVC | 0.01 | 806 | 5 | 12 | 17 | 2.1 | | |
| Kirkland_Main-2994 | Kirkland_Manholes-2292 | 366.54 | Kirkland_Manholes-2293 | 362.58 | 154 | 2.57 | 8 | PVC | 0.01 | 1,131 | 5 | 16 | 21 | 1.8 | | |
| Kirkland_Main-2995 | Kirkland_Manholes-2670 | 399.73 | Kirkland_Manholes-2298 | 382.52 | 120.1 | 14.33 | 8 | PVC | 0.01 | 2,669 | 3 | 8 | 11 | 0.4 | | Drop Connection |
| Kirkland_Main-2997 | Kirkland_Manholes-2673 | 372.3 | Kirkland_Manholes-2675 | 350.82 | 245.7 | 8.74 | 8 | Concrete | 0.013 | 1,603 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX208 | |
| Kirkland_Main-2998 | Kirkland_Manholes-2709 | 292.14 | Kirkland_Manholes-2708 | 281.32 | 58.6 | 18.46 | 8 | PVC | 0.01 | 3,029 | 1 | 16 | 17 | 0.6 | | |
| Kirkland_Main-2999 | Kirkland_Manholes-2708 | 281.32 | Kirkland_Manholes-2707 | 271.62 | 125.5 | 7.73 | 8 | PVC | 0.01 | 1,960 | 1 | 20 | 21 | 1.1 | | |
| Kirkland_Main-3000 | Kirkland_Manholes-2711 | 316.09 | Kirkland_Manholes-2709 | 292.14 | 170 | 14.09 | 8 | PVC | 0.01 | 2,647 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-3001 | Kirkland_Manholes-2707 | 271.62 | Kirkland_Manholes-2704 | 250.11 | 214 | 10.05 | 8 | PVC | 0.01 | 2,235 | 2 | 24 | 26 | 1.2 | | |
| Kirkland_Main-3002 | Kirkland_Manholes-2703 | 250.19 | Kirkland_Manholes-2704 | 250.11 | 401.9 | 0.02 | 8 | PVC | 0.01 | 99 | 4 | 16 | 20 | 20 | | |
| Kirkland_Main-3003 | Kirkland_Manholes-2712 | 326.54 | Kirkland_Manholes-2711 | 316.09 | 154.3 | 6.77 | 8 | PVC | 0.01 | 1,835 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3005 | Kirkland_Manholes-2714 | 316.79 | Kirkland_Manholes-2713 | 280.32 | 397.8 | 9.17 | 8 | Concrete | 0.013 | 1,642 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX204 | |
| Kirkland_Main-3006 | Kirkland_Manholes-2713 | 280.32 | Kirkland_Manholes-2702 | 256.62 | 323.4 | 7.33 | 8 | Concrete | 0.013 | 1,468 | 4 | 8 | 12 | 0.8 | SM14-Ex-EX204 | |
| Kirkland_Main-3008 | Kirkland_Manholes-2721 | 21.2 | Kirkland_Manholes-2722 | 21 | 44.5 | 0.45 | 12 | Ductile Iron | 0.012 | 1,161 | 76 | 43 | 118 | 10.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3009 | Kirkland_Manholes-2724 | 25.33 | Kirkland_Manholes-2723 | 21.5 | 122.9 | 3.12 | 6 | Ductile Iron | 0.012 | 482 | 11 | 6 | 17 | 3.5 | SM14-Ex-EX288 | |
| Kirkland_Main-3010 | Kirkland_Manholes-2723 | 21.5 | Kirkland_Manholes-2722 | 21 | 70.9 | 0.7 | 6 | Ductile Iron | 0.012 | 229 | 12 | 12 | 24 | 10.6 | SM14-Ex-EX288 | |
| Kirkland_Main-3011 | Kirkland_Manholes-2727 | 13 | Kirkland_Manholes-2726 | 12.39 | 121.7 | 0.5 | 18 | Concrete | 0.013 | 3,338 | 227 | 589 | 816 | 24.5 | SM14-Ex-EX289 | |
| Kirkland_Main-3012 | Kirkland_Manholes-2729 | 13.77 | Kirkland_Manholes-2727 | 13 | 208.7 | 0.37 | 18 | Concrete | 0.013 | 2,864 | 226 | 583 | 809 | 28.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3013 | Kirkland_Manholes-2730 | 14.43 | Kirkland_Manholes-2728 | 13.83 | 161.6 | 0.37 | 18 | Concrete | 0.013 | 2,873 | 224 | 571 | 795 | 27.7 | SM14-Ex-EX289 | |
| Kirkland_Main-3014 | Kirkland_Manholes-2728 | 13.83 | Kirkland_Manholes-2729 | 13.77 | 16.5 | 0.36 | 18 | Concrete | 0.013 | 2,843 | 226 | 577 | 803 | 28.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3015 | Kirkland_Manholes-2731 | 15.6 | Kirkland_Manholes-2977 | 14.89 | 193.8 | 0.37 | 18 | Concrete | 0.013 | 2,853 | 223 | 553 | 776 | 27.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3016 | Kirkland_Manholes-2732 | 15.71 | Kirkland_Manholes-2731 | 15.6 | 29.6 | 0.37 | 18 | Ductile Iron | 0.012 | 3,115 | 221 | 547 | 768 | 24.6 | SM14-Ex-EX289 | |
| Kirkland_Main-3017 | Kirkland_Manholes-2733 | 16.02 | Kirkland_Manholes-2732 | 15.71 | 84.3 | 0.37 | 18 | PVC | 0.01 | 3,716 | 218 | 541 | 758 | 20.4 | SM14-Ex-EX289 | |
| Kirkland_Main-3018 | Kirkland_Manholes-2735 | 16.81 | Kirkland_Manholes-2733 | 16.02 | 214.5 | 0.37 | 18 | Concrete | 0.013 | 2,861 | 217 | 534 | 751 | 26.3 | SM14-Ex-EX289 | |
| Kirkland_Main-3019 | Kirkland_Manholes-2734 | 17.15 | Kirkland_Manholes-2735 | 16.81 | 92.8 | 0.37 | 18 | Concrete | 0.013 | 2,854 | 216 | 528 | 744 | 26.1 | SM14-Ex-EX289 | |
| Kirkland_Main-3020 | Kirkland_Manholes-2736 | 17.76 | Kirkland_Manholes-2734 | 17.15 | 164.5 | 0.37 | 18 | Concrete | 0.013 | 2,871 | 216 | 522 | 738 | 25.7 | SM14-Ex-EX289 | |
| Kirkland_Main-3021 | Kirkland_Manholes-2741 | 83.04 | Kirkland_Manholes-2739 | 73.09 | 180.1 | 5.53 | 8 | PVC | 0.01 | 1,657 | 5 | 18 | 24 | 1.4 | | |
| Kirkland_Main-3022 | Kirkland_Manholes-2740 | 73.45 | Kirkland_Manholes-2739 | 73.09 | 167.3 | 0.22 | 8 | PVC | 0.01 | 327 | 0 | 6 | 6 | 1.9 | | |
| Kirkland_Main-3023 | Kirkland_Manholes-2739 | 73.09 | Kirkland_Manholes-2203 | 62.94 | 47.2 | 21.5 | 8 | PVC | 0.01 | 3,269 | 12 | 55 | 67 | 2 | | |
| Kirkland_Main-3024 | Kirkland_Manholes-2744 | 119.06 | Kirkland_Manholes-2739 | 73.09 | 200.2 | 22.96 | 8 | PVC | 0.01 | 3,378 | 7 | 24 | 31 | 0.9 | | |
| Kirkland_Main-3025 | Kirkland_Manholes-2745 | 129.7 | Kirkland_Manholes-2744 | 119.06 | 80.2 | 13.27 | 8 | PVC | 0.01 | 2,569 | 0 | 6 | 6 | 0.2 | | |
| Kirkland_Main-3026 | Kirkland_Manholes-2746 | 121.99 | Kirkland_Manholes-2744 | 119.06 | 88.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 0 | 12 | 12 | 0.9 | | |
| Kirkland_Main-3027 | Kirkland_Manholes-2747 | 133.27 | Kirkland_Manholes-2746 | 121.99 | 59.4 | 19 | 8 | PVC | 0.01 | 3,073 | 0 | 6 | 6 | 0.2 | | |
| Kirkland_Main-3028 | Kirkland_Manholes-2742 | 91.54 | Kirkland_Manholes-2741 | 83.04 | 69.2 | 12.29 | 8 | PVC | 0.01 | 2,471 | 5 | 12 | 18 | 0.7 | | |
| Kirkland_Main-3029 | Kirkland_Manholes-2743 | 92.6 | Kirkland_Manholes-2742 | 91.54 | 64.4 | 1.65 | 8 | PVC | 0.01 | 904 | 5 | 6 | 12 | 1.3 | | |
| Kirkland_Main-3030 | Kirkland_Manholes-2748 | 105.07 | Kirkland_Manholes-2749 | 94.38 | 144.8 | 7.38 | 8 | PVC | 0.01 | 1,916 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-3031 | Kirkland_Manholes-2749 | 94.38 | Kirkland_Manholes-2880 | 81.72 | 189.8 | 6.67 | 8 | PVC | 0.01 | 1,821 | 24 | 18 | 43 | 2.3 | | |
| Kirkland_Main-3032 | Kirkland_Manholes-2756 | 10.03 | Kirkland_Manholes-2754 | 9.95 | 319.1 | 0.03 | 18 | Ductile Iron | 0.012 | 809 | 506 | 1,841 | 2,649 | 327.6 | SM14-Ex-EX10 | |
| Kirkland_Main-3033 | Kirkland_Manholes-2757 | 10.95 | Kirkland_Manholes-2756 | 10.03 | 146.2 | 0.63 | 18 | PVC | 0.01 | 4,861 | 506 | 1,837 | 2,645 | 54.4 | SM14-Ex-EX10 | |
| Kirkland_Main-3036 | Kirkland_Manholes-2765 | 13.19 | Kirkland_Manholes-2763 | 13.15 | 315.8 | 0.01 | 18 | Ductile Iron | 0.012 | 575 | 445 | 1,547 | 2,293 | 398.9 | SM14-Ex-EX10 | |
| Kirkland_Main-3037 | Kirkland_Manholes-2766 | 361.12 | Kirkland_Manholes-2548 | 359.75 | 342.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-3038 | Kirkland_Manholes-397 | 247.33 | Kirkland_Manholes-376 | 239.8 | 215.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 55 | 226 | 282 | 21.4 | | |
| Kirkland_Main-3039 | Kirkland_Manholes-2769 | 260.32 | Kirkland_Manholes-1077 | 252.59 | 364.2 | 2.12 | 8 | PVC | 0.01 | 1,027 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-3044 | Kirkland_Manholes-2275 | 411.72 | Kirkland_Manholes-2276 | 410.45 | 52.8 | 2.4 | 8 | PVC | 0.01 | 1,093 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3045 | Kirkland_Manholes-2771 | 320.53 | Kirkland_Manholes-2772 | 308.23 | 258.2 | 4.76 | 8 | PVC | 0.01 | 1,539 | 29 | 88 | 117 | 7.6 | | |
| Kirkland_Main-3046 | Kirkland_Manholes-2776 | 334.45 | Kirkland_Manholes-2775 | 332.7 | 391.2 | 0.45 | 8 | PVC | 0.01 | 472 | 29 | 81 | 110 | 23.3 | | |
| Kirkland_Main-3047 | Kirkland_Manholes-2775 | 332.7 | Kirkland_Manholes-2774 | 330.08 | 382.8 | 0.68 | 8 | PVC | 0.01 | 583 | 29 | 84 | 112 | 19.3 | | |
| Kirkland_Main-3048 | Kirkland_Manholes-2774 | 330.08 | Kirkland_Manholes-2771 | 320.53 | 310.5 | 3.08 | 8 | PVC | 0.01 | 1,237 | 29 | 86 | 115 | 9.3 | | |
| Kirkland_Main-3049 | Kirkland_Manholes-2782 | 326.16 | Kirkland_Manholes-2781 | 293.52 | 273.1 | 11.95 | 8 | PVC | 0.01 | 2,438 | 0 | 3 | 3 | 0.1 | | |
| Kirkland_Main-3050 | Kirkland_Manholes-2781 | 293.52 | Kirkland_Manholes-2780 | 291.73 | 199 | 0.9 | 8 | PVC | 0.01 | 669 | 19 | 5 | 24 | 3.6 | | |
| Kirkland_Main-3051 | Kirkland_Manholes-2780 | 291.73 | Kirkland_Manholes-2779 | 288.37 | 73 | 4.6 | 8 | PVC | 0.01 | 1,512 | 19 | 8 | 27 | 1.8 | | |
| Kirkland_Main-3052 | Kirkland_Manholes-2779 | 288.37 | Kirkland_Manholes-2778 | 255.64 | 255.5 | 12.81 | 8 | PVC | 0.01 | 2,524 | 19 | 11 | 30 | 1.2 | | |
| Kirkland_Main-3053 | Kirkland_Manholes-2777 | 256.44 | Kirkland_Manholes-2778 | 255.64 | 115.8 | 0.69 | 8 | PVC | 0.01 | 586 | 0 | 3 | 3 | 0.5 | | |
| Kirkland_Main-3054 | Kirkland_Manholes-2785 | 259.34 | Kirkland_Manholes-2786 | 258.1 | 92.6 | 1.34 | 8 | PVC | 0.01 | 816 | 7 | 48 | 55 | 6.8 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3055 | Kirkland_Manholes-2784 | 262.56 | Kirkland_Manholes-2785 | 259.34 | 108.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 7 | 44 | 50 | 4.1 | | |
| Kirkland_Main-3057 | Kirkland_Manholes-2787 | 252.17 | Kirkland_Manholes-2788 | 251.6 | 73 | 0.78 | 8 | Concrete | 0.013 | 479 | 14 | 87 | 102 | 21.2 | SM14-Ex-EX313 | |
| Kirkland_Main-3059 | Kirkland_Manholes-2798 | 192.18 | Kirkland_Manholes-2797 | 190.87 | 110.6 | 1.18 | 8 | Concrete | 0.013 | 590 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX296 | |
| Kirkland_Main-3060 | Kirkland_Manholes-2797 | 190.87 | Kirkland_Manholes-2796 | 185.45 | 211.8 | 2.56 | 8 | Concrete | 0.013 | 868 | 5 | 16 | 21 | 2.5 | SM14-Ex-EX296 | |
| Kirkland_Main-3061 | Kirkland_Manholes-2799 | 233.81 | Kirkland_Manholes-2800 | 221.07 | 125.6 | 10.15 | 8 | Concrete | 0.013 | 1,728 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX302 | |
| Kirkland_Main-3062 | Kirkland_Manholes-2800 | 221.07 | Kirkland_Manholes-2797 | 190.87 | 260 | 11.62 | 8 | Concrete | 0.013 | 1,848 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX302 | |
| Kirkland_Main-3063 | Kirkland_Manholes-2802 | 238.36 | O-39 | 228.33 | 111.4 | 9 | 8 | PVC | 0.01 | 2,116 | 19 | 22 | 41 | 1.9 | | |
| Kirkland_Main-3064 | Kirkland_Manholes-2810 | 44.75 | Kirkland_Manholes-2809 | 44.5 | 62.2 | 0.4 | 8 | Concrete | 0.013 | 343 | 22 | 91 | 114 | 33.1 | SM14-Ex-EX316 | Drop Connection |
| Kirkland_Main-3065 | Kirkland_Manholes-2808 | 55.6 | Kirkland_Manholes-2807 | 47.79 | 63.2 | 12.36 | 8 | Concrete | 0.013 | 1,907 | 0 | 12 | 12 | 0.6 | SM14-Ex-EX317 | |
| Kirkland_Main-3066 | Kirkland_Manholes-2807 | 47.79 | Kirkland_Manholes-2810 | 44.75 | 258.6 | 1.18 | 8 | Concrete | 0.013 | 588 | 1 | 79 | 80 | 13.6 | SM14-Ex-EX316 | |
| Kirkland_Main-3067 | Kirkland_Manholes-2806 | 53.14 | Kirkland_Manholes-2807 | 47.79 | 321.9 | 1.66 | 8 | Concrete | 0.013 | 699 | 0 | 61 | 61 | 8.7 | SM14-Ex-EX316 | |
| Kirkland_Main-3068 | Kirkland_Manholes-2805 | 68.41 | Kirkland_Manholes-2806 | 53.14 | 319.8 | 4.78 | 8 | Concrete | 0.013 | 1,185 | 0 | 55 | 55 | 4.6 | SM14-Ex-EX316 | |
| Kirkland_Main-3069 | Kirkland_Manholes-2811 | 70.36 | Kirkland_Manholes-2808 | 55.6 | 132.6 | 11.13 | 6 | Concrete | 0.013 | 840 | 0 | 6 | 6 | 0.7 | SM14-Ex-EX317 | |
| Kirkland_Main-3070 | Kirkland_Manholes-2814 | 79.68 | Kirkland_Manholes-2805 | 68.41 | 70.6 | 15.96 | 6 | Concrete | 0.013 | 1,006 | 0 | 6 | 6 | 0.6 | SM14-Ex-EX318 | |
| Kirkland_Main-3071 | Kirkland_Manholes-2815 | 71.41 | Kirkland_Manholes-2805 | 68.41 | 115.4 | 2.6 | 8 | Concrete | 0.013 | 874 | 0 | 18 | 18 | 2.1 | SM14-Ex-EX318 | |
| Kirkland_Main-3072 | Kirkland_Manholes-2812 | 81.42 | Kirkland_Manholes-2815 | 71.41 | 284.3 | 3.52 | 8 | Concrete | 0.013 | 1,018 | 0 | 12 | 12 | 1.2 | SM14-Ex-EX318 | |
| Kirkland_Main-3073 | Kirkland_Manholes-2813 | 84.17 | Kirkland_Manholes-2812 | 81.42 | 272.3 | 1.01 | 8 | Concrete | 0.013 | 545 | 0 | 6 | 6 | 1.1 | SM14-Ex-EX318 | |
| Kirkland_Main-3074 | Kirkland_Manholes-2816 | 45.4 | Kirkland_Manholes-2810 | 44.75 | 163.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 6 | 7 | 1.6 | | |
| Kirkland_Main-3075 | Kirkland_Manholes-2822 | 57.68 | Kirkland_Manholes-2821 | 56.89 | 105.9 | 0.75 | 8 | PVC | 0.01 | 609 | 29 | 6 | 35 | 5.7 | | |
| Kirkland_Main-3076 | Kirkland_Manholes-2821 | 56.89 | Kirkland_Manholes-2820 | 55.04 | 95.1 | 1.94 | 8 | PVC | 0.01 | 983 | 30 | 12 | 42 | 4.3 | | |
| Kirkland_Main-3077 | Kirkland_Manholes-2820 | 55.04 | Kirkland_Manholes-2819 | 48.42 | 258.4 | 2.56 | 8 | PVC | 0.01 | 1,128 | 32 | 18 | 50 | 4.4 | | |
| Kirkland_Main-3078 | Kirkland_Manholes-2819 | 48.42 | Kirkland_Manholes-2817 | 44.74 | 95 | 3.87 | 8 | PVC | 0.01 | 1,388 | 32 | 24 | 57 | 4.1 | | |
| Kirkland_Main-3079 | Kirkland_Manholes-2818 | 48.57 | Kirkland_Manholes-2817 | 44.74 | 127 | 3.01 | 8 | PVC | 0.01 | 1,224 | 3 | 6 | 9 | 0.7 | | |
| Kirkland_Main-3080 | Kirkland_Manholes-2817 | 44.74 | Kirkland_Manholes-2823 | 34.33 | 329.7 | 3.16 | 8 | PVC | 0.01 | 1,253 | 35 | 36 | 72 | 5.7 | | |
| Kirkland_Main-3081 | Kirkland_Manholes-2827 | 39.5 | Kirkland_Manholes-2826 | 38.6 | 407 | 0.22 | 12 | Concrete | 0.013 | 750 | 220 | 590 | 810 | 108 | SM14-Ex-EX319 | Drop Connection |
| Kirkland_Main-3082 | Kirkland_Manholes-2826 | 36.35 | Kirkland_Manholes-2823 | 34.33 | 324.1 | 0.62 | 12 | Concrete | 0.013 | 1,261 | 228 | 596 | 824 | 65.3 | SM14-Ex-EX319 | |
| Kirkland_Main-3083 | Kirkland_Manholes-2823 | 34.33 | Kirkland_Manholes-2824 | 33.64 | 78.4 | 0.88 | 12 | Concrete | 0.013 | 1,500 | 263 | 638 | 902 | 60.1 | SM14-Ex-EX319 | |
| Kirkland_Main-3084 | Kirkland_Manholes-2824 | 33.64 | Kirkland_Manholes-2825 | 33 | 93.6 | 0.69 | 12 | Concrete | 0.013 | 1,325 | 264 | 645 | 908 | 68.5 | SM14-Ex-EX319 | |
| Kirkland_Main-3085 | Kirkland_Manholes-2830 | 52.24 | Kirkland_Manholes-2831 | 43.6 | 77.9 | 11.1 | 8 | PVC | 0.01 | 2,349 | 6 | 6 | 83 | 3.5 | | |
| Kirkland_Main-3088 | Kirkland_Manholes-2831 | 43.6 | Kirkland_Manholes-2829 | 40.2 | 467.6 | 0.73 | 12 | Concrete | 0.013 | 1,363 | 152 | 401 | 625 | 45.9 | SM14-Ex-EX309 | |
| Kirkland_Main-3089 | Kirkland_Manholes-2825 | 33 | Kirkland_Manholes-2832 | 30.86 | 94.7 | 2.26 | 12 | Concrete | 0.013 | 2,403 | 264 | 651 | 914 | 38 | SM14-Ex-EX319 | |
| Kirkland_Main-3090 | Kirkland_Manholes-2829 | 40.2 | Kirkland_Manholes-2832 | 30.86 | 260.5 | 3.59 | 12 | Concrete | 0.013 | 3,028 | 152 | 407 | 631 | 20.9 | SM14-Ex-EX309 | |
| Kirkland_Main-3091 | Kirkland_Manholes-2828 | 34.38 | Kirkland_Manholes-2832 | 30.86 | 239.8 | 1.47 | 8 | PVC | 0.01 | 854 | 21 | 6 | 27 | 3.1 | | |
| Kirkland_Main-3092 | Kirkland_Manholes-2832 | 30.86 | Kirkland_Manholes-2833 | 29.99 | 303.3 | 0.29 | 15 | Concrete | 0.013 | 1,553 | 437 | 1,070 | 1,579 | 101.7 | SM14-Ex-EX309 | |
| Kirkland_Main-3093 | Kirkland_Manholes-2839 | 98.83 | Kirkland_Manholes-2840 | 90.84 | 75.4 | 10.6 | 8 | PVC | 0.01 | 2,295 | 2 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3094 | Kirkland_Manholes-2841 | 31.53 | Kirkland_Manholes-2842 | 26.9 | 41.3 | 11.2 | 8 | Concrete | 0.013 | 1,815 | 4 | 18 | 22 | 1.2 | SM14-Ex-EX310 | |
| Kirkland_Main-3095 | Kirkland_Manholes-2843 | 16.05 | YARROW POINT_WETWELL | 6 | 32.1 | 31.31 | 8 | Ductile Iron | 0.012 | 3,288 | 11 | 47 | 58 | 1.8 | SM14-Ex-EX315 | |
| Kirkland_Main-3096 | Kirkland_Manholes-2847 | 24.39 | Kirkland_Manholes-2854 | 20.28 | 103.2 | 3.98 | 8 | Ductile Iron | 0.012 | 1,172 | 0 | 5 | 5 | 0.4 | SM14-Ex-EX315 | |
| Kirkland_Main-3097 | Kirkland_Manholes-2854 | 20.28 | Kirkland_Manholes-2855 | 19.82 | 135 | 0.34 | 8 | Ductile Iron | 0.012 | 343 | 0 | 9 | 9 | 2.7 | SM14-Ex-EX315 | |
| Kirkland_Main-3098 | Kirkland_Manholes-2855 | 19.82 | Kirkland_Manholes-2846 | 17.72 | 172.2 | 1.22 | 8 | Ductile Iron | 0.012 | 649 | 0 | 14 | 14 | 2.2 | SM14-Ex-EX315 | |
| Kirkland_Main-3099 | Kirkland_Manholes-2846 | 17.72 | Kirkland_Manholes-2843 | 16.05 | 133.2 | 1.25 | 8 | Ductile Iron | 0.012 | 658 | 0 | 19 | 19 | 2.8 | SM14-Ex-EX315 | |
| Kirkland_Main-3100 | Kirkland_Manholes-2845 | 16.72 | Kirkland_Manholes-2843 | 16.05 | 68.4 | 0.97 | 8 | Ductile Iron | 0.012 | 580 | 11 | 19 | 30 | 5.2 | SM14-Ex-EX315 | |
| Kirkland_Main-3102 | Kirkland_Manholes-2844 | 27.14 | Kirkland_Manholes-2843 | 26.59 | 137.5 | 0.4 | 8 | Ductile Iron | 0.012 | 372 | 0 | 5 | 5 | 1.3 | SM14-Ex-EX315 | Drop Connection |
| Kirkland_Main-3104 | Kirkland_Manholes-2809 | 42.91 | Kirkland_Manholes-2834 | 37.62 | 317.9 | 1.66 | 8 | Concrete | 0.013 | 700 | 25 | 97 | 122 | 17.5 | SM14-Ex-EX316 | |
| Kirkland_Main-3105 | Kirkland_Manholes-2836 | 60.97 | Kirkland_Manholes-2835 | 50.93 | 162.4 | 6.18 | 8 | PVC | 0.01 | 1,753 | 6 | 18 | 24 | 1.4 | | |
| Kirkland_Main-3106 | Kirkland_Manholes-2835 | 50.93 | Kirkland_Manholes-2834 | 37.62 | 47.5 | 28.02 | 8 | PVC | 0.01 | 3,732 | 6 | 24 | 31 | 0.8 | | |
| Kirkland_Main-3108 | Kirkland_Manholes-2862 | 89.88 | Kirkland_Manholes-2863 | 49.4 | 272.9 | 14.83 | 8 | PVC | 0.01 | 2,716 | 7 | 9 | 16 | 0.6 | | |
| Kirkland_Main-3109 | Kirkland_Manholes-2861 | 109.7 | Kirkland_Manholes-2862 | 89.88 | 239.2 | 8.29 | 8 | PVC | 0.01 | 2,030 | 5 | 6 | 11 | 0.5 | | |
| Kirkland_Main-3110 | Kirkland_Manholes-2860 | 120.82 | Kirkland_Manholes-2861 | 109.7 | 223.4 | 4.98 | 8 | PVC | 0.01 | 1,573 | 2 | 3 | 5 | 0.3 | | |
| Kirkland_Main-3115 | Kirkland_Manholes-2883 | 268.55 | Kirkland_Manholes-2876 | 267.92 | 60.1 | 1.05 | 8 | PVC | 0.01 | 722 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-3116 | Kirkland_Manholes-2884 | 269.34 | Kirkland_Manholes-2883 | 268.55 | 63.9 | 1.24 | 8 | PVC | 0.01 | 784 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3118 | Kirkland_Manholes-2548 | 359.75 | Kirkland_Manholes-2891 | 359.09 | 165.1 | 0.4 | 8 | PVC | 0.01 | 448 | 8 | 24 | 32 | 7.2 | | |
| Kirkland_Main-3119 | Kirkland_Manholes-2891 | 359.09 | Kirkland_Manholes-2561 | 358.82 | 66.3 | 0.4 | 8 | PVC | 0.01 | 446 | 9 | 28 | 37 | 8.2 | | |
| Kirkland_Main-3121 | Kirkland_Manholes-2893 | 432.24 | Kirkland_Manholes-1991 | 431.18 | 280.1 | 0.38 | 8 | PVC | 0.01 | 434 | 2 | 4 | 6 | 1.5 | | |
| Kirkland_Main-3122 | Kirkland_Manholes-2894 | 306.1 | Kirkland_Manholes-2895 | 306 | 25.4 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 18 | 4 | | |
| Kirkland_Main-3123 | Kirkland_Manholes-2895 | 306 | Kirkland_Manholes-2896 | 304.88 | 150.3 | 0.75 | 8 | PVC | 0.01 | 609 | 2 | 20 | 22 | 3.6 | | |
| Kirkland_Main-3124 | Kirkland_Manholes-2896 | 304.88 | Kirkland_Manholes-2897 | 303.8 | 169.5 | 0.64 | 8 | PVC | 0.01 | 563 | 3 | 24 | 27 | 4.8 | | |
| Kirkland_Main-3125 | Kirkland_Manholes-2898 | 307.58 | Kirkland_Manholes-2897 | 303.8 | 40 | 9.44 | 8 | PVC | 0.01 | 2,166 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3126 | Kirkland_Manholes-2897 | 303.8 | Kirkland_Manholes-2899 | 303.26 | 125.6 | 0.43 | 8 | PVC | 0.01 | 462 | 4 | 32 | 36 | 7.8 | | |
| Kirkland_Main-3127 | Kirkland_Manholes-2899 | 303.26 | Kirkland_Manholes-2900 | 302.3 | 244.9 | 0.39 | 8 | PVC | 0.01 | 441 | 5 | 36 | 41 | 9.3 | | |
| Kirkland_Main-3128 | Kirkland_Manholes-882 | 297.25 | Kirkland_Manholes-345 | 279.43 | 305.8 | 5.83 | 8 | PVC | 0.01 | 1,702 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-3129 | Kirkland_Manholes-2901 | 294.77 | Kirkland_Manholes-883 | 294.42 | 87 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 17 | 3.8 | | |

E-Page 749

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3130 | Kirkland_Manholes-883 | 294.42 | Kirkland_Manholes-906 | 293.01 | 64.9 | 2.17 | 8 | PVC | 0.01 | 1,039 | 4 | 36 | 40 | 3.8 | | |
| Kirkland_Main-3131 | Kirkland_Manholes-2902 | 301.02 | Kirkland_Manholes-883 | 294.42 | 322.3 | 2.05 | 8 | PVC | 0.01 | 1,009 | 3 | 16 | 19 | 1.9 | | |
| Kirkland_Main-3132 | Kirkland_Manholes-2903 | 301.35 | Kirkland_Manholes-2902 | 301.02 | 151.1 | 0.22 | 8 | PVC | 0.01 | 329 | 2 | 12 | 14 | 4.4 | | |
| Kirkland_Main-3133 | Kirkland_Manholes-2905 | 302.8 | Kirkland_Manholes-2904 | 301.39 | 65.9 | 2.14 | 8 | PVC | 0.01 | 1,031 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3134 | Kirkland_Manholes-2904 | 301.39 | Kirkland_Manholes-2903 | 301.35 | 153.8 | 0.03 | 8 | PVC | 0.01 | 114 | 1 | 8 | 9 | 8.1 | | |
| Kirkland_Main-3135 | Kirkland_Manholes-2913 | 474.42 | Kirkland_Manholes-1391 | 471.35 | 128.8 | 2.38 | 8 | PVC | 0.01 | 1,088 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-3136 | Kirkland_Manholes-2906 | 405.37 | Kirkland_Manholes-2907 | 402.62 | 299.9 | 0.92 | 8 | PVC | 0.01 | 675 | 1 | 21 | 22 | 3.3 | | |
| Kirkland_Main-3137 | Kirkland_Manholes-2907 | 402.62 | Kirkland_Manholes-2908 | 397.79 | 295.5 | 1.63 | 8 | PVC | 0.01 | 901 | 2 | 23 | 25 | 2.8 | | |
| Kirkland_Main-3138 | Kirkland_Manholes-2908 | 397.79 | Kirkland_Manholes-2532 | 395.91 | 85.9 | 2.19 | 8 | PVC | 0.01 | 1,043 | 2 | 26 | 27 | 2.6 | | |
| Kirkland_Main-3139 | Kirkland_Manholes-2910 | 412.56 | Kirkland_Manholes-2017 | 412 | 24.7 | 2.27 | 8 | PVC | 0.01 | 1,062 | 4 | 16 | 19 | 1.8 | | |
| Kirkland_Main-3140 | Kirkland_Manholes-2911 | 414.42 | Kirkland_Manholes-2910 | 412.56 | 288.8 | 0.64 | 8 | PVC | 0.01 | 566 | 3 | 12 | 15 | 2.6 | | |
| Kirkland_Main-3141 | Kirkland_Manholes-2909 | 423.03 | Kirkland_Manholes-2912 | 418.07 | 296 | 1.68 | 8 | PVC | 0.01 | 913 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3142 | Kirkland_Manholes-2912 | 418.07 | Kirkland_Manholes-2911 | 414.42 | 285.6 | 1.28 | 8 | PVC | 0.01 | 797 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-3143 | Kirkland_Manholes-2914 | 478.18 | Kirkland_Manholes-2913 | 474.42 | 305.5 | 1.23 | 8 | PVC | 0.01 | 782 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3144 | Kirkland_Manholes-2036 | 452.58 | Kirkland_Manholes-1216 | 443.89 | 347.4 | 2.5 | 8 | Concrete | 0.013 | 858 | 123 | 318 | 441 | 51.4 | SM14-Ex-EX264 | |
| Kirkland_Main-3145 | Kirkland_Manholes-1216 | 443.89 | Kirkland_Manholes-2048 | 442.51 | 28.4 | 4.86 | 8 | Concrete | 0.013 | 1,195 | 125 | 326 | 451 | 37.7 | SM14-Ex-EX264 | |
| Kirkland_Main-3146 | Kirkland_Manholes-1719 | 46.02 | Kirkland_Manholes-2935 | 44.9 | 241.2 | 0.46 | 8 | PVC | 0.01 | 480 | 71 | 58 | 128 | 26.7 | SM14-Ex-EX165 | |
| Kirkland_Main-3147 | Kirkland_Manholes-2935 | 44.9 | Kirkland_Manholes-1741 | 41.4 | 292.3 | 1.2 | 8 | Concrete | 0.013 | 594 | 71 | 66 | 137 | 23 | SM14-Ex-EX165 | |
| Kirkland_Main-3150 | Kirkland_Manholes-733 | 35.72 | Kirkland_Manholes-758 | 27.19 | 290.4 | 2.94 | 18 | PVC | 0.01 | 10,503 | 486 | 1,745 | 2,232 | 21.3 | | |
| Kirkland_Main-3151 | Kirkland_Manholes-758 | 27.19 | Kirkland_Manholes-734 | 25.7 | 118.9 | 1.25 | 18 | PVC | 0.01 | 6,865 | 486 | 1,754 | 2,240 | 32.6 | | |
| Kirkland_Main-3152 | Kirkland_Manholes-1689 | 43.75 | Kirkland_Manholes-2927 | 38.62 | 107.6 | 4.77 | 8 | Concrete | 0.013 | 1,184 | 46 | 103 | 149 | 12.6 | SM14-Ex-EX161 | |
| Kirkland_Main-3153 | Kirkland_Manholes-2927 | 38.62 | Kirkland_Manholes-733 | 35.72 | 20.9 | 13.88 | 8 | PVC | 0.01 | 2,627 | 46 | 111 | 157 | 6 | | |
| Kirkland_Main-3154 | Kirkland_Manholes-2928 | 60.36 | Kirkland_Manholes-730 | 57.26 | 71.9 | 4.31 | 18 | PVC | 0.01 | 12,722 | 141 | 552 | 692 | 5.4 | | |
| Kirkland_Main-3155 | Kirkland_Manholes-1372 | 427.9 | Kirkland_Manholes-2936 | 415.17 | 236.6 | 5.38 | 8 | Concrete | 0.013 | 1,258 | 46 | 143 | 189 | 15 | SM14-Ex-EX218 | |
| Kirkland_Main-3156 | Kirkland_Manholes-2936 | 415.17 | Kirkland_Manholes-1351 | 415.08 | 21.5 | 0.4 | 8 | PVC | 0.01 | 446 | 52 | 171 | 223 | 50 | | Drop Connection |
| Kirkland_Main-3157 | Kirkland_Manholes-2937 | 243.36 | Kirkland_Manholes-2938 | 237.72 | 156 | 3.61 | 8 | PVC | 0.01 | 1,340 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-3158 | Kirkland_Manholes-2938 | 237.72 | Kirkland_Manholes-1313 | 237.26 | 115.6 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.7 | | Drop Connection |
| Kirkland_Main-3159 | Kirkland_Manholes-2939 | 317.33 | Kirkland_Manholes-2887 | 302.33 | 186.7 | 8.03 | 8 | PVC | 0.01 | 1,999 | 2 | 12 | 14 | 0.7 | | |
| Kirkland_Main-3161 | Kirkland_Manholes-2940 | 472.26 | Kirkland_Manholes-564 | 469.28 | 203.6 | 1.46 | 8 | PVC | 0.01 | 853 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3162 | Kirkland_Manholes-2943 | 249.65 | Kirkland_Manholes-1876 | 247.77 | 195.1 | 0.96 | 8 | PVC | 0.01 | 692 | 0 | 8 | 8 | 1.1 | | |
| Kirkland_Main-3163 | Kirkland_Manholes-2947 | 393.38 | Kirkland_Manholes-2946 | 380.26 | 237.2 | 5.53 | 8 | PVC | 0.01 | 1,658 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3164 | Kirkland_Manholes-2946 | 380.26 | Kirkland_Manholes-2945 | 367.86 | 240.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 6 | 20 | 26 | 1.6 | | |
| Kirkland_Main-3165 | Kirkland_Manholes-2945 | 367.86 | Kirkland_Manholes-2948 | 345.5 | 368 | 6.08 | 8 | PVC | 0.01 | 1,738 | 6 | 24 | 30 | 1.7 | | |
| Kirkland_Main-3166 | Kirkland_Manholes-2948 | 345.5 | Kirkland_Manholes-1933 | 343.68 | 135.8 | 1.34 | 8 | PVC | 0.01 | 816 | 6 | 28 | 34 | 4.2 | | |
| Kirkland_Main-3167 | Kirkland_Manholes-2171 | 166.42 | Kirkland_Manholes-1107 | 164.79 | 299.5 | 0.54 | 8 | Concrete | 0.013 | 400 | 0 | 4 | 4 | 1 | SM14-Ex-EX21 | |
| Kirkland_Main-3168 | Kirkland_Manholes-2942 | 127.29 | Kirkland_Manholes-2941 | 110.18 | 161.6 | 10.59 | 8 | PVC | 0.01 | 2,294 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3169 | Kirkland_Manholes-80 | 110.33 | Kirkland_Manholes-2941 | 110.18 | 10 | 1.51 | 8 | PVC | 0.01 | 866 | 3 | 4 | 7 | 0.8 | | |
| Kirkland_Main-3170 | Kirkland_Manholes-2941 | 110.18 | Kirkland_Manholes-144 | 88.96 | 389.8 | 5.44 | 8 | PVC | 0.01 | 1,645 | 4 | 13 | 17 | 1 | | |
| Kirkland_Main-3171 | Kirkland_Manholes-2949 | 387.42 | Kirkland_Manholes-2946 | 380.26 | 393.8 | 1.82 | 8 | PVC | 0.01 | 951 | 4 | 12 | 15 | 1.6 | | |
| Kirkland_Main-3172 | Kirkland_Manholes-2950 | 396.31 | Kirkland_Manholes-2949 | 387.42 | 98.6 | 9.02 | 8 | PVC | 0.01 | 2,117 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-3173 | Kirkland_Manholes-2951 | 398.98 | Kirkland_Manholes-2950 | 396.31 | 142 | 1.88 | 8 | PVC | 0.01 | 967 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3174 | Kirkland_Manholes-2952 | 137.34 | Kirkland_Manholes-2509 | 126.48 | 113.7 | 9.55 | 8 | PVC | 0.01 | 2,179 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3175 | Kirkland_Manholes-1035 | 182.7 | Kirkland_Manholes-2955 | 181.46 | 188.6 | 0.66 | 8 | PVC | 0.01 | 572 | 13 | 51 | 64 | 11.2 | | |
| Kirkland_Main-3176 | Kirkland_Manholes-2955 | 181.46 | Kirkland_Manholes-1038 | 180.54 | 146.6 | 0.63 | 8 | PVC | 0.01 | 559 | 17 | 64 | 81 | 14.5 | | |
| Kirkland_Main-3177 | Kirkland_Manholes-2954 | 183.8 | Kirkland_Manholes-2953 | 182.9 | 158.6 | 0.57 | 8 | PVC | 0.01 | 531 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-3178 | Kirkland_Manholes-2953 | 182.9 | Kirkland_Manholes-2955 | 181.46 | 297.7 | 0.48 | 8 | PVC | 0.01 | 490 | 3 | 9 | 12 | 2.4 | | |
| Kirkland_Main-3179 | Kirkland_Manholes-2956 | 306.62 | Kirkland_Manholes-876 | 301.25 | 262.2 | 2.05 | 8 | PVC | 0.01 | 1,009 | 1 | 16 | 17 | 1.7 | | |
| Kirkland_Main-3180 | Kirkland_Manholes-2958 | 17.19 | WAVERLY_WETWELL | 0 | 45.5 | 37.82 | 12 | PVC | 0.01 | 12,784 | 38 | 283 | 321 | 2.5 | | WW Influent Pipe |
| Kirkland_Main-3181 | Kirkland_Manholes-1622 | 253.11 | Kirkland_Manholes-528 | 238.38 | 149.4 | 9.86 | 8 | Concrete | 0.013 | 1,703 | 213 | 834 | 1,048 | 61.5 | SM7 | |
| Kirkland_Main-3182 | Kirkland_Manholes-528 | 238.38 | Kirkland_Manholes-1634 | 223.49 | 152.1 | 9.79 | 8 | Concrete | 0.013 | 1,697 | 216 | 838 | 1,054 | 62.1 | SM7 | |
| Kirkland_Main-3183 | Kirkland_Manholes-2971 | 508.46 | Kirkland_Manholes-2972 | 508.32 | 249.3 | 0.06 | 8 | PVC | 0.01 | 167 | 0 | 4 | 4 | 2.4 | | |
| Kirkland_Main-3185 | Kirkland_Manholes-2960 | 235.09 | Kirkland_Manholes-334 | 218.68 | 321.1 | 5.11 | 8 | PVC | 0.01 | 1,594 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3186 | Kirkland_Manholes-2961 | 466.63 | Kirkland_Manholes-2030 | 465.11 | 267.6 | 0.57 | 8 | PVC | 0.01 | 531 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-3187 | Kirkland_Manholes-2963 | 352.22 | Kirkland_Manholes-2962 | 351.81 | 165.5 | 0.25 | 8 | PVC | 0.01 | 351 | 1 | 4 | 5 | 1.4 | | |
| Kirkland_Main-3188 | Kirkland_Manholes-2962 | 351.81 | Kirkland_Manholes-2566 | 326.34 | 167.8 | 15.18 | 8 | PVC | 0.01 | 2,747 | 4 | 20 | 23 | 0.9 | | |
| Kirkland_Main-3189 | Kirkland_Manholes-2966 | 369.29 | Kirkland_Manholes-2965 | 368.34 | 79.6 | 1.19 | 8 | PVC | 0.01 | 770 | 10 | 4 | 14 | 1.8 | | |
| Kirkland_Main-3190 | Kirkland_Manholes-2965 | 368.34 | Kirkland_Manholes-2964 | 368.18 | 12 | 1.33 | 8 | PVC | 0.01 | 814 | 15 | 8 | 22 | 2.8 | | |
| Kirkland_Main-3191 | Kirkland_Manholes-2964 | 368.18 | Kirkland_Manholes-1916 | 361.73 | 249.5 | 2.59 | 8 | PVC | 0.01 | 1,134 | 15 | 12 | 27 | 2.4 | | |
| Kirkland_Main-3193 | Kirkland_Manholes-2967 | 87.15 | Kirkland_Manholes-2969 | 78.32 | 80.7 | 10.94 | 8 | PVC | 0.01 | 2,332 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3194 | Kirkland_Manholes-2968 | 78.98 | Kirkland_Manholes-2969 | 78.32 | 100.1 | 0.66 | 8 | PVC | 0.01 | 573 | 1 | 4 | 6 | 1 | | |
| Kirkland_Main-3195 | Kirkland_Manholes-2969 | 78.32 | Kirkland_Manholes-2970 | 61.2 | 152.9 | 11.2 | 8 | PVC | 0.01 | 2,359 | 3 | 13 | 16 | 0.7 | | |
| Kirkland_Main-3196 | Kirkland_Manholes-2970 | 61.2 | Kirkland_Manholes-200 | 55.31 | 178.6 | 3.3 | 8 | PVC | 0.01 | 1,280 | 4 | 17 | 21 | 1.6 | | |

## Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3197 | Kirkland_Manholes-1445 | 504.92 | Kirkland_Manholes-2976 | 503.85 | 186.4 | 0.57 | 8 | Concrete | 0.013 | 411 | 16 | 91 | 108 | 26.2 | SM14-Ex-EX269 | |
| Kirkland_Main-3198 | Kirkland_Manholes-2972 | 508.32 | Kirkland_Manholes-2973 | 507.01 | 144.1 | 0.91 | 8 | PVC | 0.01 | 672 | 0 | 8 | 8 | 1.2 | | |
| Kirkland_Main-3199 | Kirkland_Manholes-2974 | 507.07 | Kirkland_Manholes-2973 | 507.01 | 168.1 | 0.04 | 8 | PVC | 0.01 | 133 | 0 | 4 | 4 | 3 | | |
| Kirkland_Main-3200 | Kirkland_Manholes-2973 | 507.01 | Kirkland_Manholes-2975 | 506.8 | 151.1 | 0.14 | 8 | PVC | 0.01 | 263 | 1 | 16 | 17 | 6.6 | | |
| Kirkland_Main-3201 | Kirkland_Manholes-2975 | 506.8 | Kirkland_Manholes-2976 | 503.85 | 22 | 13.39 | 8 | PVC | 0.01 | 2,579 | 1 | 20 | 21 | 0.8 | | |
| Kirkland_Main-3202 | Kirkland_Manholes-2978 | 14.63 | Kirkland_Manholes-2730 | 14.43 | 56 | 0.36 | 18 | Concrete | 0.013 | 2,817 | 224 | 565 | 789 | 28 | SM14-Ex-EX289 | |
| Kirkland_Main-3203 | Kirkland_Manholes-2977 | 14.89 | Kirkland_Manholes-2978 | 14.63 | 69.2 | 0.38 | 18 | Concrete | 0.013 | 2,891 | 223 | 559 | 782 | 27.1 | SM14-Ex-EX289 | |
| Kirkland_Main-3204 | Kirkland_Manholes-2979 | 372.62 | Kirkland_Manholes-2980 | 359.59 | 69.3 | 18.82 | 8 | PVC | 0.01 | 3,058 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3205 | Kirkland_Manholes-2980 | 359.59 | Kirkland_Manholes-2981 | 355.43 | 97.4 | 4.27 | 8 | PVC | 0.01 | 1,457 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-3206 | Kirkland_Manholes-2981 | 355.43 | Kirkland_Manholes-2962 | 351.81 | 43.7 | 8.28 | 8 | PVC | 0.01 | 2,029 | 3 | 12 | 14 | 0.7 | | |
| Kirkland_Main-3207 | Kirkland_Manholes-2982 | 168 | Kirkland_Manholes-770 | 166.93 | 80.1 | 1.34 | 8 | PVC | 0.01 | 815 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3208 | Kirkland_Manholes-2983 | 235.2 | Kirkland_Manholes-974 | 234.1 | 148.8 | 0.74 | 8 | PVC | 0.01 | 606 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-3209 | Kirkland_Manholes-1342 | 283.15 | Kirkland_Manholes-2984 | 277.63 | 191.2 | 2.89 | 10 | PVC | 0.01 | 2,172 | 106 | 370 | 475 | 21.9 | | |
| Kirkland_Main-3210 | Kirkland_Manholes-2985 | 155.7 | Kirkland_Manholes-1648 | 152.03 | 36.5 | 10.07 | 8 | PVC | 0.01 | 2,237 | 3 | 16 | 19 | 0.9 | | |
| Kirkland_Main-3211 | Kirkland_Manholes-2986 | 155.86 | Kirkland_Manholes-2985 | 155.7 | 122.4 | 0.13 | 8 | PVC | 0.01 | 255 | 3 | 8 | 11 | 4.3 | | |
| Kirkland_Main-3213 | Kirkland_Manholes-2987 | 213 | Kirkland_Manholes-2988 | 212.12 | 123.5 | 0.71 | 8 | PVC | 0.01 | 595 | 3 | 4 | 8 | 1.3 | | |
| Kirkland_Main-3214 | Kirkland_Manholes-2988 | 212.12 | Kirkland_Manholes-2989 | 210.69 | 118.1 | 1.21 | 8 | PVC | 0.01 | 776 | 5 | 9 | 13 | 1.7 | | |
| Kirkland_Main-3215 | Kirkland_Manholes-2989 | 210.69 | Kirkland_Manholes-61 | 205.17 | 54.3 | 10.16 | 8 | PVC | 0.01 | 2,247 | 5 | 13 | 18 | 0.8 | | |
| Kirkland_Main-3216 | Kirkland_Manholes-2990 | 239.73 | Kirkland_Manholes-1021 | 230.72 | 366.4 | 2.46 | 8 | PVC | 0.01 | 1,106 | 2 | 4 | 7 | 0.6 | | |
| Kirkland_Main-3217 | Kirkland_Manholes-2993 | 335.98 | Kirkland_Manholes-2939 | 317.33 | 213.5 | 8.74 | 8 | PVC | 0.01 | 2,084 | 2 | 8 | 10 | 0.5 | | |
| Kirkland_Main-3218 | Kirkland_Manholes-1083 | 220.88 | Kirkland_Manholes-2996 | 220.63 | 31.5 | 0.79 | 8 | PVC | 0.01 | 628 | 130 | 501 | 806 | 128.4 | SM14-Ex-EX321 | |
| Kirkland_Main-3219 | Kirkland_Manholes-2995 | 224.98 | Kirkland_Manholes-2996 | 220.63 | 134.4 | 3.24 | 8 | PVC | 0.01 | 1,269 | 9 | 4 | 13 | 1 | | |
| Kirkland_Main-3220 | Kirkland_Manholes-2997 | 482.7 | Kirkland_Manholes-2998 | 482.02 | 242.2 | 0.28 | 8 | PVC | 0.01 | 374 | 0 | 4 | 4 | 1.2 | | |
| Kirkland_Main-3221 | Kirkland_Manholes-2998 | 482.02 | Kirkland_Manholes-555 | 477.96 | 81.6 | 4.97 | 8 | PVC | 0.01 | 1,572 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-3222 | Kirkland_Manholes-2999 | 479.74 | Kirkland_Manholes-3000 | 475.69 | 102.7 | 3.94 | 8 | PVC | 0.01 | 1,400 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3223 | Kirkland_Manholes-3000 | 475.69 | Kirkland_Manholes-3001 | 471.99 | 137.1 | 2.7 | 8 | PVC | 0.01 | 1,158 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-3224 | Kirkland_Manholes-3001 | 471.99 | Kirkland_Manholes-3002 | 466.73 | 134.5 | 3.91 | 8 | PVC | 0.01 | 1,394 | 1 | 12 | 13 | 0.9 | | |
| Kirkland_Main-3225 | Kirkland_Manholes-3002 | 466.73 | Kirkland_Manholes-3003 | 466.06 | 37 | 1.81 | 8 | PVC | 0.01 | 949 | 1 | 16 | 17 | 1.8 | | |
| Kirkland_Main-3226 | Kirkland_Manholes-3003 | 466.06 | Kirkland_Manholes-3004 | 465.24 | 79.1 | 1.04 | 8 | PVC | 0.01 | 718 | 1 | 20 | 21 | 2.9 | | |
| Kirkland_Main-3227 | Kirkland_Manholes-3004 | 465.24 | Kirkland_Manholes-3005 | 459.83 | 119.2 | 4.54 | 8 | PVC | 0.01 | 1,502 | 2 | 24 | 26 | 1.7 | | |
| Kirkland_Main-3228 | Kirkland_Manholes-3005 | 459.83 | Kirkland_Manholes-3006 | 456.1 | 91.8 | 4.07 | 8 | PVC | 0.01 | 1,422 | 2 | 28 | 30 | 2.1 | | |
| Kirkland_Main-3229 | Kirkland_Manholes-3007 | 456.9 | Kirkland_Manholes-3008 | 447.1 | 310.3 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-3230 | Kirkland_Manholes-3009 | 452.69 | Kirkland_Manholes-3008 | 447.1 | 238.1 | 2.35 | 8 | PVC | 0.01 | 1,080 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3231 | Kirkland_Manholes-3008 | 447.1 | Kirkland_Manholes-1990 | 439.8 | 282 | 2.59 | 8 | PVC | 0.01 | 1,134 | 2 | 16 | 18 | 1.6 | | |
| Kirkland_Main-3232 | Kirkland_Manholes-3010 | 442.64 | Kirkland_Manholes-3011 | 434.12 | 219.9 | 3.87 | 8 | PVC | 0.01 | 1,388 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3233 | Kirkland_Manholes-3011 | 434.12 | Kirkland_Manholes-2005 | 431.24 | 367.7 | 0.78 | 8 | PVC | 0.01 | 624 | 1 | 8 | 9 | 1.4 | | |
| Kirkland_Main-3234 | Kirkland_Manholes-2005 | 431.24 | Kirkland_Manholes-2006 | 430.4 | 270.9 | 0.31 | 8 | PVC | 0.01 | 393 | 1 | 12 | 13 | 3.4 | | |
| Kirkland_Main-3235 | Kirkland_Manholes-2006 | 430.4 | Kirkland_Manholes-2007 | 429.08 | 284.1 | 0.46 | 8 | PVC | 0.01 | 481 | 3 | 16 | 19 | 3.9 | | |
| Kirkland_Main-3236 | Kirkland_Manholes-3012 | 424.86 | Kirkland_Manholes-2011 | 417.75 | 388.4 | 1.83 | 8 | PVC | 0.01 | 954 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3237 | Kirkland_Manholes-3014 | 470 | Kirkland_Manholes-3013 | 459.93 | 193.2 | 5.21 | 8 | PVC | 0.01 | 1,610 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3238 | Kirkland_Manholes-3013 | 459.93 | Kirkland_Manholes-548 | 453.36 | 230.6 | 2.85 | 8 | PVC | 0.01 | 1,190 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-3239 | Kirkland_Manholes-3020 | 302.86 | Kirkland_Manholes-1341 | 299.38 | 98.7 | 3.52 | 8 | PVC | 0.01 | 1,324 | 5 | 48 | 53 | 4 | | |
| Kirkland_Main-3240 | Kirkland_Manholes-3019 | 303.35 | Kirkland_Manholes-3020 | 302.86 | 19.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 5 | 44 | 49 | 4.4 | | |
| Kirkland_Main-3241 | Kirkland_Manholes-3021 | 303.74 | Kirkland_Manholes-3019 | 303.35 | 54.4 | 0.72 | 8 | PVC | 0.01 | 597 | 5 | 40 | 45 | 7.5 | | |
| Kirkland_Main-3242 | Kirkland_Manholes-3022 | 311.69 | Kirkland_Manholes-3021 | 303.74 | 55.5 | 14.32 | 8 | PVC | 0.01 | 2,668 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-3243 | Kirkland_Manholes-3023 | 312.84 | Kirkland_Manholes-3021 | 303.74 | 71.1 | 12.8 | 8 | PVC | 0.01 | 2,523 | 5 | 32 | 37 | 1.5 | | |
| Kirkland_Main-3244 | Kirkland_Manholes-3018 | 329.19 | Kirkland_Manholes-3023 | 312.84 | 105.9 | 15.45 | 8 | PVC | 0.01 | 2,771 | 5 | 28 | 33 | 1.2 | | |
| Kirkland_Main-3245 | Kirkland_Manholes-3017 | 343.42 | Kirkland_Manholes-3018 | 329.19 | 180.7 | 7.87 | 8 | PVC | 0.01 | 1,978 | 4 | 24 | 28 | 1.4 | | |
| Kirkland_Main-3246 | Kirkland_Manholes-3015 | 371.23 | Kirkland_Manholes-3017 | 343.42 | 160.4 | 17.33 | 8 | PVC | 0.01 | 2,935 | 3 | 20 | 23 | 0.8 | | |
| Kirkland_Main-3247 | Kirkland_Manholes-3016 | 372.66 | Kirkland_Manholes-3015 | 371.23 | 122.5 | 1.17 | 8 | PVC | 0.01 | 762 | 3 | 16 | 19 | 2.4 | | |
| Kirkland_Main-3248 | Kirkland_Manholes-3024 | 372.77 | Kirkland_Manholes-1930 | 369.31 | 206.2 | 1.68 | 8 | PVC | 0.01 | 913 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3250 | Kirkland_Manholes-3025 | 189.5 | Kirkland_Manholes-3026 | 186.45 | 198.2 | 1.54 | 8 | PVC | 0.01 | 875 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3251 | Kirkland_Manholes-3026 | 186.45 | Kirkland_Manholes-1035 | 182.7 | 331 | 1.13 | 8 | PVC | 0.01 | 750 | 1 | 9 | 10 | 1.3 | | |
| Kirkland_Main-3252 | Kirkland_Manholes-3028 | 332.75 | Kirkland_Manholes-1582 | 332.21 | 111.6 | 0.48 | 12 | Concrete | 0.013 | 1,113 | 39 | 179 | 217 | 19.5 | SM14-Ex-EX206 | |
| Kirkland_Main-3253 | Kirkland_Manholes-3027 | 333.49 | Kirkland_Manholes-3028 | 332.75 | 24.2 | 3.06 | 8 | PVC | 0.01 | 1,233 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3257 | Kirkland_Manholes-3031 | 384.74 | Kirkland_Manholes-1926 | 383.42 | 23.1 | 5.72 | 12 | PVC | 0.01 | 4,970 | 123 | 524 | 647 | 13 | | |
| Kirkland_Main-3258 | Kirkland_Manholes-1 | 73.25 | Kirkland_Manholes-21 | 62.08 | 92.5 | 12.08 | 8 | PVC | 0.01 | 2,451 | 7 | 21 | 28 | 1.2 | | |
| Kirkland_Main-3259 | Kirkland_Manholes-20 | 65.72 | Kirkland_Manholes-21 | 62.08 | 153.9 | 2.36 | 8 | PVC | 0.01 | 1,084 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3260 | Kirkland_Manholes-3070 | 330.73 | Kirkland_Manholes-927 | 307.71 | 144.8 | 15.9 | 8 | PVC | 0.01 | 2,811 | 6 | 4 | 10 | 0.4 | | |
| Kirkland_Main-3261 | Kirkland_Manholes-3078 | 370.92 | Kirkland_Manholes-3077 | 366.14 | 136.6 | 3.5 | 8 | PVC | 0.01 | 1,319 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3262 | Kirkland_Manholes-3077 | 366.14 | Kirkland_Manholes-3076 | 363.7 | 26.9 | 9.07 | 8 | PVC | 0.01 | 2,124 | 0 | 8 | 8 | 0.4 | | |
| Kirkland_Main-3263 | Kirkland_Manholes-3076 | 363.7 | Kirkland_Manholes-3075 | 343.97 | 114.4 | 17.24 | 8 | PVC | 0.01 | 2,928 | 0 | 12 | 12 | 0.4 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3264 | Kirkland_Manholes-3075 | 343.97 | Kirkland_Manholes-3079 | 316.42 | 161.6 | 17.05 | 8 | PVC | 0.01 | 2,911 | 1 | 16 | 17 | 0.6 | | |
| Kirkland_Main-3265 | Kirkland_Manholes-3079 | 316.42 | Kirkland_Manholes-3074 | 303.68 | 195.1 | 6.53 | 8 | PVC | 0.01 | 1,802 | 1 | 20 | 21 | 1.2 | | |
| Kirkland_Main-3266 | Kirkland_Manholes-3074 | 303.68 | Kirkland_Manholes-3073 | 289.21 | 131.6 | 10.99 | 8 | PVC | 0.01 | 2,337 | 1 | 24 | 25 | 1.1 | | |
| Kirkland_Main-3267 | Kirkland_Manholes-3073 | 289.21 | Kirkland_Manholes-3072 | 273.11 | 354 | 4.55 | 8 | PVC | 0.01 | 1,504 | 1 | 28 | 29 | 1.9 | | |
| Kirkland_Main-3268 | Kirkland_Manholes-3072 | 273.11 | Kirkland_Manholes-3071 | 273.04 | 17.1 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 32 | 33 | 7.5 | | |
| Kirkland_Main-3269 | Kirkland_Manholes-3071 | 273.04 | Kirkland_Manholes-1317 | 271.64 | 20.2 | 6.94 | 8 | PVC | 0.01 | 1,858 | 1 | 36 | 37 | 2 | | |
| Kirkland_Main-3270 | Kirkland_Manholes-3081 | 373.55 | Kirkland_Manholes-1319 | 372.4 | 30.4 | 3.78 | 8 | PVC | 0.01 | 1,371 | 65 | 187 | 252 | 18.4 | | |
| Kirkland_Main-3271 | Kirkland_Manholes-3080 | 382.34 | Kirkland_Manholes-3081 | 377.27 | 187.3 | 2.71 | 8 | PVC | 0.01 | 1,160 | 0 | 4 | 4 | 0.3 | | Drop Connection |
| Kirkland_Main-3272 | Kirkland_Manholes-3083 | 435.32 | Kirkland_Manholes-3082 | 428.49 | 311.8 | 2.19 | 8 | PVC | 0.01 | 1,044 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3273 | Kirkland_Manholes-3084 | 333.87 | Kirkland_Manholes-3085 | 329.83 | 142 | 2.85 | 8 | PVC | 0.01 | 1,189 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3274 | Kirkland_Manholes-3085 | 329.83 | Kirkland_Manholes-3086 | 304.85 | 242 | 10.32 | 12 | PVC | 0.01 | 6,678 | 1 | 8 | 8 | 0.1 | | |
| Kirkland_Main-3275 | Kirkland_Manholes-3086 | 304.85 | Kirkland_Manholes-3087 | 296.66 | 149.5 | 5.48 | 12 | PVC | 0.01 | 4,865 | 3 | 12 | 15 | 0.3 | | |
| Kirkland_Main-3276 | Kirkland_Manholes-3087 | 296.66 | Kirkland_Manholes-3088 | 288.51 | 213.4 | 3.82 | 8 | Concrete | 0.013 | 1,060 | 3 | 16 | 19 | 1.8 | | |
| Kirkland_Main-3277 | Kirkland_Manholes-3088 | 288.51 | Kirkland_Manholes-3089 | 268.55 | 207 | 9.64 | 8 | Concrete | 0.013 | 1,684 | 3 | 20 | 23 | 1.4 | | |
| Kirkland_Main-3278 | Kirkland_Manholes-3089 | 268.55 | Kirkland_Manholes-2427 | 267.5 | 263 | 0.4 | 8 | Concrete | 0.013 | 343 | 51 | 24 | 74 | 21.7 | | |
| Kirkland_Main-3279 | Kirkland_Manholes-2197 | 480.89 | Kirkland_Manholes-1417 | 477.64 | 213.1 | 1.52 | 8 | PVC | 0.01 | 871 | 2 | 12 | 14 | 1.6 | | |
| Kirkland_Main-3280 | Kirkland_Manholes-3090 | 416.74 | Kirkland_Manholes-2916 | 416.17 | 246 | 0.23 | 8 | PVC | 0.01 | 339 | 1 | 4 | 5 | 1.6 | | |
| Kirkland_Main-3281 | Kirkland_Manholes-3092 | 96.93 | Kirkland_Manholes-173 | 34.1 | 219.6 | 28.61 | 8 | PVC | 0.01 | 3,771 | 2 | 9 | 10 | 0.3 | | |
| Kirkland_Main-3282 | Kirkland_Manholes-3091 | 115.12 | Kirkland_Manholes-3092 | 96.93 | 129.4 | 14.06 | 8 | PVC | 0.01 | 2,644 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3283 | Kirkland_Manholes-3093 | 117.97 | Kirkland_Manholes-3094 | 63.71 | 388.1 | 13.98 | 8 | PVC | 0.01 | 2,636 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3284 | Kirkland_Manholes-3094 | 63.71 | Kirkland_Manholes-437 | 58.56 | 159.5 | 3.23 | 8 | PVC | 0.01 | 1,267 | 4 | 9 | 13 | 1 | | |
| Kirkland_Main-3285 | Kirkland_Manholes-3095 | 195.85 | Kirkland_Manholes-2070 | 185.96 | 195.6 | 5.06 | 8 | PVC | 0.01 | 1,585 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3287 | Kirkland_Manholes-205 | 228.15 | Kirkland_Manholes-3096 | 204.91 | 232.4 | 10 | 8 | Concrete | 0.013 | 1,715 | 14 | 34 | 48 | 2.8 | SM14-Ex-EX57 | |
| Kirkland_Main-3288 | Kirkland_Manholes-3096 | 204.91 | Kirkland_Manholes-234 | 184.45 | 273.4 | 7.48 | 8 | Concrete | 0.013 | 1,484 | 19 | 47 | 66 | 4.5 | SM14-Ex-EX57 | |
| Kirkland_Main-3289 | Kirkland_Manholes-1218 | 220.85 | Kirkland_Manholes-3096 | 204.91 | 278.6 | 5.72 | 8 | Concrete | 0.013 | 1,297 | 4 | 9 | 13 | 1 | SM14-Ex-EX59 | |
| Kirkland_Main-3290 | Kirkland_Manholes-3097 | 172.14 | Kirkland_Manholes-1639 | 169.94 | 87.4 | 2.52 | 8 | Concrete | 0.013 | 861 | 14 | 83 | 97 | 11.3 | SM14-Ex-EX202 | |
| Kirkland_Main-3291 | Kirkland_Manholes-3098 | 172.34 | Kirkland_Manholes-3097 | 172.14 | 17.4 | 1.15 | 8 | Concrete | 0.013 | 582 | 13 | 79 | 93 | 16 | SM14-Ex-EX202 | |
| Kirkland_Main-3292 | Kirkland_Manholes-1640 | 188.59 | Kirkland_Manholes-3098 | 174.29 | 160.1 | 8.93 | 8 | PVC | 0.01 | 2,107 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX203 | Drop Connection |
| Kirkland_Main-3293 | Kirkland_Manholes-2696 | 172.94 | Kirkland_Manholes-3098 | 172.34 | 33 | 1.82 | 8 | Concrete | 0.013 | 731 | 10 | 68 | 78 | 10.6 | SM14-Ex-EX202 | |
| Kirkland_Main-3294 | Kirkland_Manholes-3099 | 77.83 | Kirkland_Manholes-2204 | 53 | 99.4 | 24.97 | 8 | PVC | 0.01 | 3,523 | 3 | 12 | 15 | 0.4 | | |
| Kirkland_Main-3295 | Kirkland_Manholes-2725 | 97.33 | Kirkland_Manholes-3099 | 77.83 | 158.8 | 12.28 | 8 | PVC | 0.01 | 2,470 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3296 | Kirkland_Manholes-2663 | 50.64 | Kirkland_Manholes-3043 | 37.72 | 98.7 | 13.08 | 12 | PVC | 0.01 | 7,519 | 124 | 437 | 561 | 7.5 | | |
| Kirkland_Main-3297 | Kirkland_Manholes-3043 | 37.72 | Kirkland_Manholes-3044 | 18.06 | 181 | 10.86 | 12 | PVC | 0.01 | 6,850 | 124 | 443 | 567 | 8.3 | | |
| Kirkland_Main-3298 | Kirkland_Manholes-3106 | 117 | Kirkland_Manholes-3105 | 116.05 | 61.3 | 1.55 | 8 | PVC | 0.01 | 877 | 14 | 91 | 105 | 12 | SM10 | |
| Kirkland_Main-3299 | Kirkland_Manholes-3107 | 127.14 | Kirkland_Manholes-3106 | 117 | 167.2 | 6.07 | 8 | | 0.012 | 1,447 | 14 | 82 | 96 | 6.6 | SM10 | |
| Kirkland_Main-3300 | Kirkland_Manholes-1180 | 118.31 | Kirkland_Manholes-3108 | 104.6 | 196.1 | 6.99 | 8 | Concrete | 0.013 | 1,434 | 1 | 8 | 9 | 0.6 | SM10 | |
| Kirkland_Main-3301 | Kirkland_Manholes-3103 | 113.84 | Kirkland_Manholes-3109 | 110.43 | 345.5 | 0.99 | 10 | Concrete | 0.013 | 977 | 17 | 123 | 141 | 14.4 | SM10 | |
| Kirkland_Main-3302 | Kirkland_Manholes-3109 | 110.43 | Kirkland_Manholes-3108 | 104.6 | 85.9 | 6.79 | 8 | Concrete | 0.013 | 1,413 | 18 | 132 | 150 | 10.6 | SM10 | |
| Kirkland_Main-3303 | Kirkland_Manholes-3108 | 104.6 | Kirkland_Manholes-513 | 81.7 | 198.3 | 11.55 | 8 | Concrete | 0.013 | 1,843 | 19 | 148 | 167 | 9.1 | SM10 | |
| Kirkland_Main-3305 | Kirkland_Manholes-3105 | 116.05 | Kirkland_Manholes-3104 | 114.41 | 128.6 | 1.28 | 8 | PVC | 0.01 | 796 | 15 | 99 | 114 | 14.4 | SM10 | |
| Kirkland_Main-3306 | Kirkland_Manholes-3110 | 73.01 | Kirkland_Manholes-306 | 19.99 | 234 | 22.66 | 8 | Concrete | 0.013 | 2,582 | 22 | 106 | 128 | 5 | SM10 | |
| Kirkland_Main-3307 | Kirkland_Manholes-305 | 74.69 | Kirkland_Manholes-3110 | 73.01 | 8.3 | 20.21 | 8 | Concrete | 0.013 | 2,438 | 21 | 97 | 118 | 4.8 | SM10 | |
| Kirkland_Main-3308 | Kirkland_Manholes-3114 | 174.9 | Kirkland_Manholes-3113 | 173.48 | 159.7 | 0.89 | 8 | PVC | 0.01 | 665 | 32 | 4 | 36 | 5.4 | | |
| Kirkland_Main-3309 | Kirkland_Manholes-3113 | 173.48 | Kirkland_Manholes-3112 | 173.15 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 32 | 8 | 40 | 8.9 | | |
| Kirkland_Main-3310 | Kirkland_Manholes-3112 | 173.15 | Kirkland_Manholes-3111 | 170.05 | 248.7 | 1.25 | 8 | PVC | 0.01 | 787 | 32 | 12 | 44 | 5.6 | | |
| Kirkland_Main-3311 | Kirkland_Manholes-3111 | 170.05 | Kirkland_Manholes-1125 | 167.88 | 64.7 | 3.36 | 8 | PVC | 0.01 | 1,292 | 32 | 16 | 48 | 3.7 | | |
| Kirkland_Main-3314 | Kirkland_Manholes-3116 | 330.46 | Kirkland_Manholes-2933 | 328.79 | 108.5 | 1.54 | 8 | PVC | 0.01 | 875 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3315 | Kirkland_Manholes-3117 | 134.38 | Kirkland_Manholes-161 | 132.09 | 173.7 | 1.32 | 8 | PVC | 0.01 | 809 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3316 | Kirkland_Manholes-3118 | 331.75 | Kirkland_Manholes-2934 | 330.48 | 196.7 | 0.65 | 8 | PVC | 0.01 | 567 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-3317 | Kirkland_Manholes-3119 | 327.7 | Kirkland_Manholes-2932 | 327.56 | 161.9 | 0.09 | 8 | PVC | 0.01 | 207 | 2 | 20 | 22 | 10.7 | | |
| Kirkland_Main-3318 | Kirkland_Manholes-2933 | 328.79 | Kirkland_Manholes-3119 | 327.7 | 135.5 | 0.8 | 8 | PVC | 0.01 | 632 | 1 | 8 | 9 | 1.5 | | |
| Kirkland_Main-3319 | Kirkland_Manholes-2934 | 330.48 | Kirkland_Manholes-3119 | 327.7 | 250.4 | 1.11 | 8 | PVC | 0.01 | 743 | 1 | 8 | 9 | 1.2 | | |
| Kirkland_Main-3320 | Kirkland_Manholes-839 | 334.68 | Kirkland_Manholes-3121 | 329.59 | 187.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 14 | 40 | 54 | 4.6 | | |
| Kirkland_Main-3321 | Kirkland_Manholes-3120 | 345 | Kirkland_Manholes-3121 | 344.79 | 53.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | Drop Connection |
| Kirkland_Main-3322 | Kirkland_Manholes-3121 | 329.59 | Kirkland_Manholes-3122 | 329.14 | 65.3 | 0.69 | 8 | PVC | 0.01 | 585 | 15 | 48 | 62 | 10.7 | | |
| Kirkland_Main-3323 | Kirkland_Manholes-3122 | 329.14 | Kirkland_Manholes-840 | 326.85 | 337.3 | 0.68 | 8 | PVC | 0.01 | 581 | 17 | 52 | 69 | 11.8 | | |
| Kirkland_Main-3326 | Kirkland_Manholes-3123 | 227.69 | Kirkland_Manholes-2497 | 194.88 | 329.5 | 9.96 | 6 | PVC | 0.01 | 1,033 | 7 | 4 | 11 | 1.1 | SM14-Ex-EX236 | |
| Kirkland_Main-3332 | Kirkland_Manholes-3125 | 215.03 | Kirkland_Manholes-3124 | 203.5 | 175.2 | 6.58 | 8 | Concrete | 0.013 | 1,391 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX20 | |
| Kirkland_Main-3333 | Kirkland_Manholes-3124 | 203.5 | Kirkland_Manholes-3126 | 177.5 | 261.8 | 9.93 | 8 | Concrete | 0.013 | 1,709 | 2 | 9 | 10 | 0.6 | SM14-Ex-EX20 | |
| Kirkland_Main-3336 | Kirkland_Manholes-3006 | 456.1 | Kirkland_Manholes-539 | 454.38 | 165.4 | 1.04 | 8 | PVC | 0.01 | 719 | 3 | 32 | 34 | 4.8 | | |
| Kirkland_Main-3337 | Kirkland_Manholes-555 | 477.96 | Kirkland_Manholes-535 | 472.49 | 159.7 | 3.43 | 8 | PVC | 0.01 | 1,305 | 2 | 12 | 14 | 1.1 | | |
| Kirkland_Main-3338 | Kirkland_Manholes-2509 | 126.48 | Kirkland_Manholes-2508 | 120.01 | 60.3 | 10.73 | 6 | Concrete | 0.013 | 825 | 2 | 12 | 15 | 1.8 | SM14-Ex-EX229 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3339 | Kirkland_Manholes-2566 | 326.34 | Kirkland_Manholes-2567 | 316.05 | 133.4 | 7.71 | 8 | Concrete | 0.013 | 1,506 | 4 | 24 | 28 | 1.8 | SM14-Ex-EX307 | |
| Kirkland_Main-3340 | Kirkland_Manholes-728 | 70.86 | Kirkland_Manholes-2928 | 60.36 | 293.8 | 3.57 | 18 | PVC | 0.01 | 11,586 | 112 | 543 | 656 | 5.7 | | |
| Kirkland_Main-3341 | Kirkland_Manholes-3127 | 324.33 | Kirkland_Manholes-3128 | 323.94 | 81.4 | 0.48 | 8 | Concrete | 0.013 | 375 | 0 | 4 | 4 | 1.1 | SM14-Ex-EX54 | |
| Kirkland_Main-3344 | Kirkland_Manholes-3129 | 308.71 | Kirkland_Manholes-2956 | 306.62 | 67.6 | 3.09 | 8 | PVC | 0.01 | 1,240 | 1 | 12 | 13 | 1 | | |
| Kirkland_Main-3345 | Kirkland_Manholes-3130 | 70.51 | Kirkland_Manholes-3131 | 61.63 | 403.3 | 2.2 | 8 | PVC | 0.01 | 1,046 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3346 | Kirkland_Manholes-3131 | 61.63 | Kirkland_Manholes-201 | 56.98 | 404.6 | 1.15 | 8 | PVC | 0.01 | 756 | 0 | 9 | 9 | 1.1 | | |
| Kirkland_Main-3347 | Kirkland_Manholes-3132 | 514.05 | Kirkland_Manholes-3133 | 512.61 | 110 | 1.31 | 8 | PVC | 0.01 | 807 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3348 | Kirkland_Manholes-3133 | 512.61 | Kirkland_Manholes-1441 | 509.69 | 156.4 | 1.87 | 8 | PVC | 0.01 | 963 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-3349 | Kirkland_Manholes-3134 | 66.29 | Kirkland_Manholes-1828 | 65.79 | 294 | 0.17 | 15 | PVC | 0.01 | 1,554 | 100 | 683 | 1,066 | 68.6 | SM14-2035-DF11 | |
| Kirkland_Main-3350 | Kirkland_Manholes-2994 | 67.86 | Kirkland_Manholes-3135 | 66.49 | 13.6 | 10.06 | 15 | PVC | 0.01 | 11,957 | 99 | 667 | 1,048 | 8.8 | | |
| Kirkland_Main-3351 | Kirkland_Manholes-3135 | 66.49 | Kirkland_Manholes-3134 | 66.29 | 136.2 | 0.15 | 15 | PVC | 0.01 | 1,460 | 99 | 675 | 1,057 | 72.4 | SM14-2035-DF11 | |
| Kirkland_Main-3353 | Kirkland_Manholes-3137 | 192.8 | Kirkland_Manholes-1304 | 180.12 | 128.3 | 9.88 | 6 | Concrete | 0.013 | 792 | 4 | 16 | 21 | 2.6 | SM14-Ex-EX106 | |
| Kirkland_Main-3354 | Kirkland_Manholes-1305 | 222.35 | Kirkland_Manholes-3137 | 192.8 | 245.9 | 12.02 | 6 | Concrete | 0.013 | 873 | 3 | 8 | 11 | 1.3 | SM14-Ex-EX106 | |
| Kirkland_Main-3356 | Kirkland_Manholes-3138 | 280.24 | Kirkland_Manholes-672 | 266.2 | 264 | 5.32 | 8 | PVC | 0.01 | 1,626 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-3357 | Kirkland_Manholes-3139 | 191.69 | Kirkland_Manholes-769 | 165.1 | 236 | 11.27 | 8 | PVC | 0.01 | 2,367 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3358 | Kirkland_Manholes-3140 | 184.54 | Kirkland_Manholes-520 | 182.65 | 320.9 | 0.59 | 6 | Concrete | 0.013 | 193 | 2 | 8 | 10 | 5.3 | SM10 | |
| Kirkland_Main-3359 | Kirkland_Manholes-526 | 148.56 | Kirkland_Manholes-3141 | 141.49 | 317.3 | 2.23 | 8 | Concrete | 0.013 | 810 | 4 | 33 | 37 | 4.6 | SM10 | |
| Kirkland_Main-3360 | Kirkland_Manholes-3141 | 141.49 | Kirkland_Manholes-3107 | 127.14 | 314.8 | 4.56 | 8 | Concrete | 0.013 | 1,158 | 11 | 66 | 77 | 6.6 | SM10 | |
| Kirkland_Main-3361 | Kirkland_Manholes-495 | 169.48 | Kirkland_Manholes-3142 | 153.62 | 319.4 | 4.97 | 8 | Concrete | 0.013 | 1,209 | 4 | 16 | 20 | 1.7 | SM10 | |
| Kirkland_Main-3362 | Kirkland_Manholes-3142 | 153.62 | Kirkland_Manholes-3141 | 141.49 | 269.1 | 4.51 | 8 | Concrete | 0.013 | 1,151 | 6 | 25 | 30 | 2.6 | SM10 | |
| Kirkland_Main-3366 | Kirkland_Manholes-3148 | 304.94 | Kirkland_Manholes-3147 | 292.59 | 197.5 | 6.25 | 8 | PVC | 0.01 | 1,763 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3367 | Kirkland_Manholes-3147 | 292.59 | Kirkland_Manholes-3146 | 290.48 | 68.4 | 3.08 | 8 | PVC | 0.01 | 1,238 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-3368 | Kirkland_Manholes-3146 | 290.48 | Kirkland_Manholes-3145 | 283.25 | 74.7 | 9.68 | 8 | PVC | 0.01 | 2,194 | 1 | 12 | 13 | 0.6 | | |
| Kirkland_Main-3369 | Kirkland_Manholes-3149 | 279.32 | Kirkland_Manholes-672 | 266.2 | 331.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 5 | 48 | 53 | 3.8 | | |
| Kirkland_Main-3370 | Kirkland_Manholes-2888 | 290.53 | Kirkland_Manholes-3149 | 279.32 | 39.9 | 28.13 | 8 | PVC | 0.01 | 3,739 | 3 | 20 | 23 | 0.6 | | |
| Kirkland_Main-3371 | Kirkland_Manholes-3145 | 283.25 | Kirkland_Manholes-3149 | 279.32 | 272.6 | 1.44 | 8 | PVC | 0.01 | 847 | 2 | 24 | 25 | 3 | | |
| Kirkland_Main-3372 | Kirkland_Manholes-1382 | 428.64 | Kirkland_Manholes-3150 | 427.16 | 302.5 | 0.49 | 8 | PVC | 0.01 | 493 | 1 | 8 | 9 | 1.9 | | |
| Kirkland_Main-3373 | Kirkland_Manholes-3150 | 427.16 | Kirkland_Manholes-1347 | 427.05 | 67.8 | 0.16 | 8 | PVC | 0.01 | 284 | 2 | 12 | 14 | 4.8 | | |
| Kirkland_Main-3375 | Kirkland_Manholes-2803 | 158.22 | Kirkland_Manholes-3151 | 154.6 | 93.3 | 3.88 | 8 | Concrete | 0.013 | 1,068 | 29 | 123 | 153 | 14.3 | SM14-Ex-EX313 | |
| Kirkland_Main-3376 | Kirkland_Manholes-2609 | 193.8 | Kirkland_Manholes-3152 | 172.55 | 189.8 | 11.2 | 8 | PVC | 0.01 | 2,359 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-3377 | Kirkland_Manholes-3154 | 166.6 | Kirkland_Manholes-3153 | 166.34 | 271.7 | 0.1 | 8 | Concrete | 0.013 | 168 | 20 | 56 | 76 | 45.3 | SM14-Ex-EX294 | |
| Kirkland_Main-3378 | Kirkland_Manholes-2629 | 172.55 | Kirkland_Manholes-3154 | 166.6 | 85 | 7 | 8 | Concrete | 0.013 | 1,435 | 11 | 24 | 35 | 2.4 | SM14-Ex-EX295 | |
| Kirkland_Main-3379 | Kirkland_Manholes-3155 | 166.88 | Kirkland_Manholes-3154 | 166.6 | 37.7 | 0.74 | 8 | Concrete | 0.013 | 467 | 8 | 28 | 36 | 7.8 | SM14-Ex-EX294 | |
| Kirkland_Main-3380 | Kirkland_Manholes-2637 | 187.87 | Kirkland_Manholes-3156 | 168.61 | 186.4 | 10.33 | 8 | Concrete | 0.013 | 1,743 | 8 | 20 | 28 | 1.6 | SM14-Ex-EX294 | |
| Kirkland_Main-3381 | Kirkland_Manholes-3156 | 168.61 | Kirkland_Manholes-3155 | 166.88 | 387 | 0.45 | 8 | Concrete | 0.013 | 363 | 8 | 24 | 32 | 8.9 | SM14-Ex-EX294 | |
| Kirkland_Main-3382 | Kirkland_Manholes-3153 | 166.34 | O-37 | 146.26 | 92.7 | 21.67 | 8 | Concrete | 0.013 | 2,525 | 85 | 282 | 367 | 14.5 | SM14-Ex-EX294 | |
| Kirkland_Main-3383 | Kirkland_Manholes-3157 | 158.55 | O-36 | 147.51 | 94.1 | 11.73 | 8 | Concrete | 0.013 | 1,858 | 16 | 64 | 80 | 4.3 | SM14-Ex-EX281 | |
| Kirkland_Main-3384 | Kirkland_Manholes-3158 | 172.29 | Kirkland_Manholes-3157 | 158.55 | 121.1 | 11.35 | 8 | Concrete | 0.013 | 1,827 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX281 | |
| Kirkland_Main-3385 | Kirkland_Manholes-2628 | 186 | Kirkland_Manholes-3159 | 168.84 | 190.6 | 9 | 8 | Concrete | 0.013 | 1,627 | 14 | 52 | 65 | 4 | SM14-Ex-EX281 | |
| Kirkland_Main-3386 | Kirkland_Manholes-3159 | 168.84 | Kirkland_Manholes-3157 | 158.55 | 57.7 | 17.84 | 8 | Concrete | 0.013 | 2,290 | 15 | 56 | 70 | 3.1 | SM14-Ex-EX281 | Drop Connection |
| Kirkland_Main-3387 | Kirkland_Manholes-2601 | 228.74 | Kirkland_Manholes-3160 | 174.95 | 323 | 16.65 | 8 | Concrete | 0.013 | 2,213 | 34 | 127 | 161 | 7.3 | SM14-Ex-EX299 | |
| Kirkland_Main-3388 | Kirkland_Manholes-2796 | 185.45 | Kirkland_Manholes-3161 | 177.36 | 230.8 | 3.5 | 8 | Concrete | 0.013 | 1,015 | 6 | 20 | 26 | 2.6 | SM14-Ex-EX296 | |
| Kirkland_Main-3389 | Kirkland_Manholes-2599 | 217.5 | Kirkland_Manholes-3161 | 177.36 | 310.3 | 12.94 | 8 | Concrete | 0.013 | 1,951 | 4 | 16 | 20 | 1 | SM14-Ex-EX301 | |
| Kirkland_Main-3390 | Kirkland_Manholes-3162 | 175.71 | Kirkland_Manholes-3160 | 174.95 | 166.9 | 0.46 | 8 | Concrete | 0.013 | 366 | 12 | 44 | 55 | 15.1 | SM14-Ex-EX296 | |
| Kirkland_Main-3391 | Kirkland_Manholes-3161 | 177.36 | Kirkland_Manholes-3162 | 175.71 | 336.3 | 0.49 | 8 | Concrete | 0.013 | 380 | 11 | 40 | 51 | 13.4 | SM14-Ex-EX296 | |
| Kirkland_Main-3392 | Kirkland_Manholes-3160 | 174.95 | Kirkland_Manholes-3163 | 173.85 | 309.7 | 0.36 | 8 | Concrete | 0.013 | 323 | 47 | 175 | 221 | 68.5 | SM14-Ex-EX296 | |
| Kirkland_Main-3393 | Kirkland_Manholes-3163 | 173.85 | Kirkland_Manholes-3152 | 172.55 | 286.2 | 0.45 | 8 | Concrete | 0.013 | 365 | 55 | 195 | 250 | 68.4 | SM14-Ex-EX296 | |
| Kirkland_Main-3394 | Kirkland_Manholes-2600 | 217.97 | Kirkland_Manholes-3163 | 173.85 | 279.5 | 15.78 | 8 | Concrete | 0.013 | 2,155 | 8 | 16 | 23 | 1.1 | SM14-Ex-EX298 | |
| Kirkland_Main-3395 | Kirkland_Manholes-3152 | 172.55 | Kirkland_Manholes-3164 | 171.21 | 150.7 | 0.89 | 8 | Concrete | 0.013 | 511 | 57 | 207 | 263 | 51.5 | SM14-Ex-EX296 | |
| Kirkland_Main-3397 | Kirkland_Manholes-3164 | 171.21 | Kirkland_Manholes-3153 | 166.34 | 136.7 | 3.56 | 8 | Concrete | 0.013 | 1,024 | 64 | 223 | 286 | 27.9 | SM14-Ex-EX296 | |
| Kirkland_Main-3398 | Kirkland_Manholes-2123 | 164.83 | Kirkland_Manholes-3165 | 156.79 | 188.1 | 4.27 | 8 | Concrete | 0.013 | 1,121 | 3 | 12 | 15 | 1.4 | SM14-Ex-EX238 | |
| Kirkland_Main-3399 | Kirkland_Manholes-2493 | 157.85 | Kirkland_Manholes-3165 | 156.79 | 186.1 | 0.57 | 6 | | 0.013 | 190 | 1 | 4 | 5 | 2.5 | SM14-Ex-EX237 | |
| Kirkland_Main-3400 | Kirkland_Manholes-3165 | 156.79 | O-34 | 148.75 | 44.4 | 18.12 | 8 | Concrete | 0.013 | 2,308 | 5 | 20 | 25 | 1.1 | SM14-Ex-EX238 | |
| Kirkland_Main-3401 | Kirkland_Manholes-3151 | 154.6 | O-38 | 150 | 83 | 5.54 | 12 | Concrete | 0.013 | 3,764 | 29 | 127 | 157 | 4.2 | SM14-Ex-EX313 | |
| Kirkland_Main-3402 | Kirkland_Manholes-3166 | 161.38 | Kirkland_Manholes-3167 | 157.21 | 249.9 | 1.67 | 6 | Concrete | 0.013 | 325 | 8 | 12 | 20 | 6.1 | | |
| Kirkland_Main-3403 | Kirkland_Manholes-3167 | 157.21 | O-30 | 156.87 | 20.3 | 1.67 | 6 | Concrete | 0.013 | 326 | 8 | 16 | 24 | 7.3 | | Drop Connection |
| Kirkland_Main-3404 | Kirkland_Manholes-2068 | 163.08 | O-43 | 162.02 | 20.5 | 5.16 | 8 | Concrete | 0.013 | 1,232 | 13 | 64 | 77 | 6.2 | SM14-Ex-EX198 | |
| Kirkland_Main-3405 | Kirkland_Manholes-2069 | 170.43 | Kirkland_Manholes-3168 | 162.8 | 388.5 | 1.96 | 8 | Concrete | 0.013 | 760 | 76 | 95 | 171 | 22.5 | SM14-Ex-EX199 | |
| Kirkland_Main-3406 | Kirkland_Manholes-3168 | 162.8 | O-29 | 162.02 | 22.8 | 3.42 | 8 | Concrete | 0.013 | 1,004 | 77 | 99 | 176 | 17.5 | SM14-Ex-EX199 | |
| Kirkland_Main-3407 | Kirkland_Manholes-3169 | 153.32 | Kirkland_Manholes-1708 | 148.34 | 451.5 | 1.1 | 12 | Concrete | 0.013 | 1,679 | 0 | 8 | 8 | 0.5 | SM14-Ex-EX197 | |
| Kirkland_Main-3408 | Kirkland_Manholes-3170 | 175.74 | O-28 | 173.9 | 72.2 | 2.55 | 8 | PVC | 0.01 | 1,125 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3409 | Kirkland_Manholes-1642 | 158.76 | O-27 | 153.59 | 147.5 | 3.5 | 8 | Concrete | 0.013 | 1,015 | 234 | 950 | 1,184 | 116.6 | SM7 | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3410 | Kirkland_Manholes-1646 | 177.66 | O-23 | 163.59 | 79.6 | 17.67 | 8 | Concrete | 0.013 | 2,279 | 0 | 4 | 4 | 0.2 | SM14-Ex-EX174 | |
| Kirkland_Main-3411 | Kirkland_Manholes-1602 | 196.74 | Kirkland_Manholes-3171 | 164.9 | 343.8 | 9.26 | 8 | Concrete | 0.013 | 1,651 | 74 | 238 | 312 | 18.9 | SM14-Ex-EX172 | |
| Kirkland_Main-3412 | Kirkland_Manholes-3171 | 164.9 | O-22 | 163.59 | 29 | 4.51 | 12 | Concrete | 0.013 | 3,397 | 132 | 421 | 553 | 16.3 | SM14-Ex-EX121 | |
| Kirkland_Main-3413 | Kirkland_Manholes-3172 | 165.73 | Kirkland_Manholes-3171 | 164.9 | 49.5 | 1.68 | 8 | Concrete | 0.013 | 702 | 58 | 179 | 237 | 33.8 | SM14-Ex-EX121 | |
| Kirkland_Main-3414 | Kirkland_Manholes-1598 | 169.75 | Kirkland_Manholes-3172 | 165.73 | 259.8 | 1.55 | 8 | Concrete | 0.013 | 675 | 58 | 175 | 233 | 34.6 | SM14-Ex-EX121 | |
| Kirkland_Main-3415 | Kirkland_Manholes-3173 | 155.95 | O-16 | 154.93 | 82 | 1.24 | 8 | PVC | 0.01 | 787 | 7 | 41 | 48 | 6.1 | | |
| Kirkland_Main-3416 | Kirkland_Manholes-1274 | 175.64 | Kirkland_Manholes-3173 | 155.95 | 196.1 | 10.04 | 8 | PVC | 0.01 | 2,234 | 6 | 33 | 39 | 1.7 | | |
| Kirkland_Main-3417 | Kirkland_Manholes-458 | 212.1 | O-14 | 173.22 | 270.2 | 14.39 | 8 | Concrete | 0.013 | 2,057 | 31 | 123 | 154 | 7.5 | SM14-Ex-EX67 | |
| Kirkland_Main-3418 | Kirkland_Manholes-3174 | 172.82 | O-13 | 166.72 | 27.1 | 22.51 | 8 | PVC | 0.01 | 3,345 | 2 | 20 | 22 | 0.7 | | |
| Kirkland_Main-3419 | Kirkland_Manholes-472 | 192.62 | Kirkland_Manholes-3174 | 172.82 | 71.3 | 27.75 | 8 | PVC | 0.01 | 3,714 | 2 | 16 | 18 | 0.5 | | |
| Kirkland_Main-3420 | Kirkland_Manholes-466 | 159.47 | O-12 | 159.29 | 18.7 | 0.96 | 8 | Concrete | 0.013 | 531 | 13 | 56 | 69 | 12.9 | SM14-Ex-EX45 | |
| Kirkland_Main-3421 | Kirkland_Manholes-786 | 173.41 | O-11 | 153.37 | 102.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 62 | 294 | 356 | 11.4 | | |
| Kirkland_Main-3422 | Kirkland_Manholes-3175 | 156.47 | Kirkland_Manholes-1105 | 155.49 | 245.4 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 282 | 356 | 79.8 | SM14-2021-DF3 | |
| Kirkland_Main-3424 | Kirkland_Manholes-3176 | 350.9 | Kirkland_Manholes-2993 | 335.98 | 232.3 | 6.42 | 8 | PVC | 0.01 | 1,787 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3425 | Kirkland_Manholes-3183 | 400.11 | Kirkland_Manholes-3182 | 398.7 | 286.4 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-3426 | Kirkland_Manholes-3182 | 398.7 | Kirkland_Manholes-3181 | 397.83 | 157.2 | 0.55 | 8 | PVC | 0.01 | 525 | 0 | 8 | 8 | 1.5 | | |
| Kirkland_Main-3427 | Kirkland_Manholes-3181 | 397.83 | Kirkland_Manholes-3180 | 396.32 | 304.9 | 0.5 | 8 | PVC | 0.01 | 496 | 0 | 12 | 12 | 2.5 | | |
| Kirkland_Main-3428 | Kirkland_Manholes-3177 | 399.25 | Kirkland_Manholes-3178 | 398.25 | 237 | 0.42 | 8 | PVC | 0.01 | 458 | 0 | 8 | 8 | 1.7 | | |
| Kirkland_Main-3429 | Kirkland_Manholes-3178 | 398.25 | Kirkland_Manholes-3179 | 397.18 | 174.5 | 0.61 | 8 | PVC | 0.01 | 552 | 0 | 12 | 12 | 2.2 | | |
| Kirkland_Main-3430 | Kirkland_Manholes-3179 | 397.18 | Kirkland_Manholes-3180 | 396.32 | 145.5 | 0.59 | 8 | PVC | 0.01 | 542 | 0 | 16 | 16 | 2.9 | | |
| Kirkland_Main-3431 | Kirkland_Manholes-3180 | 396.32 | Kirkland_Manholes-3186 | 394.01 | 374.3 | 0.62 | 8 | Ductile Iron | 0.012 | 462 | 1 | 32 | 32 | 7 | SM14-Ex-EX207 | |
| Kirkland_Main-3432 | Kirkland_Manholes-3186 | 394.01 | Kirkland_Manholes-3187 | 393.39 | 93.6 | 0.66 | 8 | Ductile Iron | 0.012 | 478 | 1 | 36 | 37 | 7.7 | SM14-Ex-EX207 | |
| Kirkland_Main-3433 | Kirkland_Manholes-3187 | 393.39 | Kirkland_Manholes-3188 | 392.16 | 246.3 | 0.5 | 8 | PVC | 0.01 | 498 | 1 | 40 | 41 | 8.2 | | |
| Kirkland_Main-3434 | Kirkland_Manholes-3185 | 403.06 | Kirkland_Manholes-3184 | 397.63 | 317.3 | 1.71 | 8 | PVC | 0.01 | 922 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3435 | Kirkland_Manholes-3184 | 397.63 | Kirkland_Manholes-3189 | 393.42 | 318.2 | 1.32 | 8 | PVC | 0.01 | 811 | 31 | 8 | 39 | 4.9 | | |
| Kirkland_Main-3436 | Kirkland_Manholes-3189 | 393.42 | Kirkland_Manholes-3188 | 392.16 | 76.3 | 1.65 | 8 | PVC | 0.01 | 906 | 31 | 16 | 47 | 5.2 | | |
| Kirkland_Main-3437 | Kirkland_Manholes-3188 | 392.16 | Kirkland_Manholes-1929 | 374.67 | 305.2 | 5.73 | 8 | PVC | 0.01 | 1,688 | 32 | 60 | 92 | 5.4 | | |
| Kirkland_Main-3438 | Kirkland_Manholes-3192 | 307.27 | Kirkland_Manholes-3191 | 306.22 | 126.1 | 0.84 | 8 | PVC | 0.01 | 644 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-3439 | Kirkland_Manholes-3191 | 306.22 | Kirkland_Manholes-2894 | 306.1 | 28.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3 | | |
| Kirkland_Main-3440 | Kirkland_Manholes-3190 | 323.62 | Kirkland_Manholes-3191 | 306.22 | 169.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3441 | Kirkland_Manholes-620 | 55.37 | Kirkland_Manholes-3193 | 49.78 | 279.6 | 2 | 8 | PVC | 0.01 | 997 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-3442 | Kirkland_Manholes-3193 | 49.78 | Kirkland_Manholes-619 | 48.43 | 193 | 0.7 | 8 | PVC | 0.01 | 590 | 0 | 16 | 17 | 2.8 | | |
| Kirkland_Main-3443 | Kirkland_Manholes-1685 | 57.24 | Kirkland_Manholes-731 | 53.54 | 120.6 | 3.07 | 12 | PVC | 0.01 | 3,640 | 88 | 457 | 545 | 15 | SM5 | |
| Kirkland_Main-3444 | Kirkland_Manholes-1852 | 284.97 | Kirkland_Manholes-3145 | 283.25 | 105.1 | 1.64 | 8 | PVC | 0.01 | 902 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-3445 | Kirkland_Manholes-2130 | 161.57 | O-31 | 156.67 | 31.5 | 15.55 | 8 | Concrete | 0.013 | 2,138 | 21 | 24 | 44 | 2.1 | SM14-Ex-EX235 | |
| Kirkland_Main-3446 | Kirkland_Manholes-3195 | 259.3 | Kirkland_Manholes-682 | 258.64 | 178.4 | 0.37 | 8 | PVC | 0.01 | 429 | 1 | 12 | 13 | 2.9 | | |
| Kirkland_Main-3447 | Kirkland_Manholes-686 | 272.79 | Kirkland_Manholes-3195 | 262.73 | 170.3 | 5.91 | 8 | PVC | 0.01 | 1,714 | 0 | 4 | 4 | 0.2 | | Drop Connection |
| Kirkland_Main-3448 | Kirkland_Manholes-3194 | 260.3 | Kirkland_Manholes-3195 | 259.3 | 92.2 | 1.08 | 8 | PVC | 0.01 | 733 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3450 | Kirkland_Manholes-3198 | 69.13 | Kirkland_Manholes-2805 | 68.41 | 178.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 24 | 24 | 5.4 | | |
| Kirkland_Main-3451 | Kirkland_Manholes-3197 | 131.57 | Kirkland_Manholes-3196 | 122.5 | 306.9 | 2.96 | 8 | PVC | 0.01 | 1,212 | 1 | 8 | 10 | 0.8 | SM10 | |
| Kirkland_Main-3453 | Kirkland_Manholes-2804 | 82.15 | Kirkland_Manholes-3198 | 69.13 | 175.8 | 7.41 | 8 | PVC | 0.01 | 1,919 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-3454 | Kirkland_Manholes-3200 | 88.54 | Kirkland_Manholes-3199 | 84.4 | 128.7 | 3.22 | 8 | PVC | 0.01 | 1,264 | 0 | 6 | 6 | 0.5 | | |
| Kirkland_Main-3455 | Kirkland_Manholes-3199 | 84.4 | Kirkland_Manholes-3198 | 69.13 | 210.2 | 7.27 | 8 | PVC | 0.01 | 1,900 | 0 | 12 | 12 | 0.6 | | |
| Kirkland_Main-3456 | Kirkland_Manholes-2778 | 255.64 | Kirkland_Manholes-3201 | 243.59 | 148 | 8.14 | 8 | PVC | 0.01 | 2,012 | 19 | 16 | 35 | 1.7 | | |
| Kirkland_Main-3457 | Kirkland_Manholes-3201 | 243.59 | Kirkland_Manholes-2802 | 238.36 | 22.3 | 23.44 | 8 | PVC | 0.01 | 3,414 | 19 | 19 | 38 | 1.1 | | |
| Kirkland_Main-3458 | Kirkland_Manholes-2641 | 88.89 | Kirkland_Manholes-3202 | 66.61 | 82.1 | 27.14 | 8 | PVC | 0.01 | 3,673 | 5 | 24 | 30 | 0.8 | | |
| Kirkland_Main-3459 | Kirkland_Manholes-3202 | 66.61 | Kirkland_Manholes-3203 | 49.55 | 127.5 | 13.38 | 8 | PVC | 0.01 | 2,579 | 5 | 30 | 36 | 1.4 | | |
| Kirkland_Main-3461 | Kirkland_Manholes-3204 | 163.55 | Kirkland_Manholes-2130 | 161.57 | 74.1 | 2.67 | 8 | PVC | 0.01 | 1,153 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3462 | Kirkland_Manholes-3205 | 293.32 | Kirkland_Manholes-1852 | 284.97 | 245.2 | 3.41 | 8 | PVC | 0.01 | 1,301 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3463 | Kirkland_Manholes-3206 | 505.9 | Kirkland_Manholes-3207 | 502.85 | 330.6 | 0.92 | 8 | PVC | 0.01 | 677 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-3464 | Kirkland_Manholes-3207 | 502.85 | Kirkland_Manholes-3208 | 497.69 | 398.8 | 1.29 | 8 | PVC | 0.01 | 802 | 2 | 8 | 10 | 1.3 | | |
| Kirkland_Main-3465 | Kirkland_Manholes-3208 | 497.69 | Kirkland_Manholes-3209 | 497.22 | 90.8 | 0.52 | 8 | PVC | 0.01 | 507 | 2 | 12 | 14 | 2.8 | | |
| Kirkland_Main-3466 | Kirkland_Manholes-3209 | 497.22 | Kirkland_Manholes-3210 | 496.11 | 223.1 | 0.5 | 8 | PVC | 0.01 | 497 | 2 | 16 | 18 | 3.6 | | |
| Kirkland_Main-3467 | Kirkland_Manholes-3210 | 496.11 | Kirkland_Manholes-1494 | 496.1 | 92 | 0.01 | 8 | PVC | 0.01 | 74 | 2 | 20 | 22 | 30 | | |
| Kirkland_Main-3468 | Kirkland_Manholes-3212 | 420.94 | Kirkland_Manholes-3213 | 419.82 | 168.4 | 0.66 | 8 | PVC | 0.01 | 575 | 0 | 2 | 2 | 0.4 | | |
| Kirkland_Main-3469 | Kirkland_Manholes-3213 | 419.82 | Kirkland_Manholes-3214 | 418.95 | 128.5 | 0.68 | 8 | PVC | 0.01 | 580 | 0 | 5 | 5 | 0.8 | | |
| Kirkland_Main-3470 | Kirkland_Manholes-3211 | 420.5 | Kirkland_Manholes-3214 | 418.95 | 223.1 | 0.69 | 8 | PVC | 0.01 | 588 | 0 | 2 | 2 | 0.4 | | |
| Kirkland_Main-3471 | Kirkland_Manholes-3214 | 418.95 | Kirkland_Manholes-3215 | 418.25 | 213.6 | 0.33 | 8 | PVC | 0.01 | 404 | 0 | 9 | 9 | 2.3 | | |
| Kirkland_Main-3472 | Kirkland_Manholes-3215 | 418.25 | Kirkland_Manholes-3216 | 416.2 | 334.1 | 0.61 | 8 | PVC | 0.01 | 552 | 0 | 12 | 12 | 2.1 | | |
| Kirkland_Main-3473 | Kirkland_Manholes-3216 | 416.2 | Kirkland_Manholes-3217 | 414.96 | 329.2 | 0.38 | 8 | PVC | 0.01 | 433 | 0 | 14 | 14 | 3.2 | | |
| Kirkland_Main-3474 | Kirkland_Manholes-3217 | 414.96 | Kirkland_Manholes-3218 | 412.9 | 114.1 | 1.81 | 8 | PVC | 0.01 | 947 | 1 | 16 | 17 | 1.8 | | |
| Kirkland_Main-3475 | Kirkland_Manholes-3218 | 412.9 | Kirkland_Manholes-2906 | 405.37 | 172.8 | 4.36 | 8 | PVC | 0.01 | 1,472 | 1 | 19 | 20 | 1.3 | | |

Existing - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3476 | Kirkland_Manholes-718 | 150.12 | Kirkland_Manholes-3219 | 149.17 | 95.4 | 1 | 8 | PVC | 0.01 | 703 | 50 | 79 | 128 | 18.2 | SM14-2035-DF5 | |
| Kirkland_Main-3477 | Kirkland_Manholes-3219 | 149.17 | Kirkland_Manholes-3220 | 148.71 | 120.2 | 0.38 | 8 | PVC | 0.01 | 436 | 50 | 84 | 134 | 30.7 | SM14-2021-DF2 | |
| Kirkland_Main-3478 | Kirkland_Manholes-3220 | 148.71 | Kirkland_Manholes-719 | 148.45 | 82.3 | 0.32 | 8 | PVC | 0.01 | 396 | 50 | 90 | 139 | 35.2 | SM14-2021-DF2 | |
| Kirkland_Main-3479 | Kirkland_Manholes-3221 | 407.29 | Kirkland_Manholes-3222 | 405.15 | 69.7 | 3.07 | 8 | PVC | 0.01 | 1,235 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3480 | Kirkland_Manholes-3222 | 405.15 | Kirkland_Manholes-1363 | 403.55 | 104.8 | 1.53 | 8 | PVC | 0.01 | 871 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-3481 | Kirkland_Manholes-3223 | 405.2 | Kirkland_Manholes-3224 | 400.94 | 146.9 | 2.9 | 8 | PVC | 0.01 | 1,201 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3482 | Kirkland_Manholes-3225 | 409.6 | Kirkland_Manholes-3224 | 400.94 | 369 | 2.35 | 8 | PVC | 0.01 | 1,080 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3483 | Kirkland_Manholes-3224 | 400.94 | Kirkland_Manholes-3226 | 396.71 | 176 | 2.4 | 8 | PVC | 0.01 | 1,093 | 2 | 12 | 14 | 1.3 | | |
| Kirkland_Main-3484 | Kirkland_Manholes-3226 | 396.71 | Kirkland_Manholes-2992 | 396.35 | 10.8 | 3.34 | 8 | PVC | 0.01 | 1,289 | 2 | 16 | 18 | 1.4 | | |
| Kirkland_Main-3485 | Kirkland_Manholes-3227 | 308.86 | Kirkland_Manholes-3228 | 299.55 | 189.6 | 4.91 | 8 | PVC | 0.01 | 1,562 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3486 | Kirkland_Manholes-3228 | 299.55 | Kirkland_Manholes-3229 | 296.76 | 44.7 | 6.24 | 8 | PVC | 0.01 | 1,761 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-3487 | Kirkland_Manholes-3229 | 296.76 | Kirkland_Manholes-2901 | 294.77 | 63.1 | 3.16 | 8 | PVC | 0.01 | 1,252 | 1 | 12 | 13 | 1 | | |
| Kirkland_Main-3488 | Kirkland_Manholes-3230 | 157.83 | Kirkland_Manholes-3231 | 156.85 | 192.6 | 0.51 | 8 | PVC | 0.01 | 503 | 0 | 6 | 6 | 1.1 | | |
| Kirkland_Main-3489 | Kirkland_Manholes-3231 | 156.85 | Kirkland_Manholes-3232 | 156.12 | 91 | 0.8 | 8 | PVC | 0.01 | 632 | 7 | 11 | 19 | 3 | | |
| Kirkland_Main-3490 | Kirkland_Manholes-3232 | 156.12 | Kirkland_Manholes-716 | 152.58 | 36.4 | 9.73 | 8 | PVC | 0.01 | 2,199 | 7 | 17 | 24 | 1.1 | | |
| Kirkland_Main-3492 | Kirkland_Manholes-3233 | 197.29 | Kirkland_Manholes-1117 | 196.58 | 41.1 | 1.73 | 15 | PVC | 0.01 | 4,957 | 16 | 4 | 20 | 0.4 | | |
| Kirkland_Main-3493 | Kirkland_Manholes-3235 | 436.7 | Kirkland_Manholes-2008 | 435.7 | 179.8 | 0.56 | 8 | PVC | 0.01 | 526 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-3494 | Kirkland_Manholes-3234 | 236.42 | Kirkland_Manholes-1249 | 223.25 | 243.5 | 5.41 | 8 | Concrete | 0.013 | 1,261 | 15 | 91 | 105 | 8.3 | SM14-Ex-EX65 | |
| Kirkland_Main-3495 | Kirkland_Manholes-1247 | 236.99 | Kirkland_Manholes-3234 | 236.42 | 76.3 | 0.75 | 8 | Concrete | 0.013 | 469 | 13 | 74 | 87 | 18.5 | SM14-Ex-EX65 | |
| Kirkland_Main-3496 | Kirkland_Manholes-3237 | 442.96 | Kirkland_Manholes-3235 | 436.7 | 126.7 | 4.94 | 8 | PVC | 0.01 | 1,567 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3497 | Kirkland_Manholes-3242 | 314.11 | Kirkland_Manholes-3243 | 305.45 | 217.3 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3498 | Kirkland_Manholes-3243 | 305.45 | Kirkland_Manholes-2372 | 304.48 | 24.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 0 | 8 | 8 | 0.6 | | |
| Kirkland_Main-3499 | Kirkland_Manholes-3241 | 300.47 | Kirkland_Manholes-3240 | 289.24 | 289.6 | 3.88 | 8 | PVC | 0.01 | 1,388 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3500 | Kirkland_Manholes-3240 | 289.24 | Kirkland_Manholes-3239 | 288.78 | 114.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.1 | | |
| Kirkland_Main-3501 | Kirkland_Manholes-3239 | 288.78 | Kirkland_Manholes-3238 | 285.43 | 95.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-3502 | Kirkland_Manholes-263 | 292.03 | Kirkland_Manholes-3238 | 285.43 | 114.2 | 5.78 | 8 | Concrete | 0.013 | 1,304 | 29 | 99 | 128 | 9.9 | SM14-Ex-EX252 | |
| Kirkland_Main-3503 | Kirkland_Manholes-3238 | 285.43 | Kirkland_Manholes-2327 | 280.44 | 83.6 | 5.97 | 8 | Concrete | 0.013 | 1,325 | 31 | 115 | 147 | 11.1 | SM14-Ex-EX252 | |
| Kirkland_Main-3505 | Kirkland_Manholes-3236 | 241.89 | Kirkland_Manholes-3234 | 236.42 | 154.2 | 3.55 | 8 | PVC | 0.01 | 1,328 | 1 | 8 | 10 | 0.7 | | |
| Kirkland_Main-3506 | Kirkland_Manholes-2486 | 152.49 | O-35 | 152.05 | 116.8 | 0.38 | 8 | Concrete | 0.013 | 333 | 39 | 127 | 166 | 49.8 | SM14-Ex-EX239 | |
| Other_System_Main-6 | MH-320 | 399.28 | Kirkland_Manholes-3177 | 399.25 | 69.1 | 0.04 | 6 | PVC | 0.01 | 64 | 0 | 4 | 4 | 6.2 | | |
| Other_System_Main-7 | MH-317 | 393.56 | Kirkland_Manholes-3189 | 393.42 | 34.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Other_System_Main-8 | MH-326 | 162.67 | MH-323 | 161.73 | 233.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Other_System_Main-9 | MH-323 | 161.73 | Kirkland_Manholes-3166 | 161.38 | 88.4 | 0.4 | 6 | PVC | 0.01 | 207 | 8 | 8 | 16 | 7.6 | | |
| SS_Main_Selection_06-13-2016-1 | MH 05-714 | 24.7 | MH_Selection_06-13-2016-2 | 24.58 | 51.6 | 0.23 | 24 | Ductile Iron | 0.012 | 5,304 | 796 | 3,464 | 5,845 | 110.2 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-11 | MH_Selection_06-13-2016-4 | 21.4 | MH_Selection_06-13-2016-10 | 20.85 | 62.6 | 0.88 | 48 | Concrete | 0.013 | 60,432 | 1,045 | 4,082 | 6,712 | 11.1 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-12 | MH_Selection_06-13-2016-10 | 20.85 | MH_Selection_06-13-2016-11 | 20.7 | 78.4 | 0.19 | 48 | Concrete | 0.013 | 28,192 | 1,045 | 4,082 | 6,712 | 23.8 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-2 | MH_Selection_06-13-2016-3 | 22.2 | MH_Selection_06-13-2016-4 | 21.4 | 166.2 | 0.48 | 48 | Concrete | 0.013 | 44,726 | 796 | 3,464 | 5,845 | 13.1 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-3 | MH_Selection_06-13-2016-2 | 24.22 | MH_Selection_06-13-2016-6 | 24.16 | 7.3 | 0.82 | 24 | PVC | 0.013 | 9,175 | 796 | 3,464 | 5,845 | 63.7 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-4 | MH_Selection_06-13-2016-6 | 24.16 | MH_Selection_06-13-2016-7 | 23.6 | 28.1 | 1.99 | 24 | PVC | 0.013 | 14,333 | 796 | 3,464 | 5,845 | 40.8 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-5 | MH_Selection_06-13-2016-7 | 23.5 | MH_Selection_06-13-2016-8 | 22.81 | 32.8 | 2.11 | 48 | Concrete | 0.013 | 93,567 | 796 | 3,464 | 5,845 | 6.2 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-6 | MH_Selection_06-13-2016-8 | 22.81 | MH_Selection_06-13-2016-9 | 22.44 | 14.9 | 2.49 | 48 | Concrete | 0.013 | 101,749 | 796 | 3,464 | 5,845 | 5.7 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-7 | MH_Selection_06-13-2016-9 | 22.44 | MH_Selection_06-13-2016-3 | 22.2 | 69.4 | 0.35 | 48 | Concrete | 0.013 | 37,907 | 796 | 3,464 | 5,845 | 15.4 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-9 | MH_Selection_06-13-2016-5 | 24.55 | MH_Selection_06-13-2016-11 | 23.6 | 12.8 | 7.44 | 12 | PVC | 0.013 | 4,360.77 | 101.33 | 139.964 | 241.293 | 5.5 | | Updated per as-built drawings |

## Existing - Peak Hour Flow - Pump Table

| Label | Status | Pump Definition | Pumped Flow (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|
| PLAZA_PUMP | On | LAKE PLAZA | 1,303 | 44.9 | |
| ROSEPT_PUMP | On | ROSE PT LANE | 301 | 65.8 | |
| SOUTHBAY_PUMP | On | SOUTH BAY | 180 | 190.0 | |
| TREND_PUMP | On | TREND | 176 | 25.0 | |
| WAVERLY_PUMP | On | WAVERLY PARK | 282 | 103.9 | |
| YARROWBAYII_PUMP | On | YARROW POINT | 72 | 45.8 | |

## Existing - Peak Hour Flow - Wet Well Table

| Label | Ground Elevation (ft) | Maximum Elevation (ft) | Initial Elevation (ft) | Minimum Elevation (ft) | Base Elevation (ft) | Flow In (gpm) | Flow Out (gpm) | Net Flow In (gpm) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| PLAZA_WW | 21.95 | 10 | 6.5 | 2 | 0 | 1,286 | 1,303 | -17 | |
| ROSEPT_WETWELL | 28.91 | 28 | 12 | 11 | 10 | 138 | 301 | -163 | |
| SOUTHBAY_WETWELL | 42.96 | 26.5 | 25 | 24 | 22 | 37 | 180 | -143 | |
| TREND_WETWELL | 340.3 | 330 | 330 | 321.5 | 317.75 | 102 | 176 | -75 | |
| WAVERLY_WETWELL | 27 | 10 | 2 | 1 | 0 | 321 | 282 | 38 | |
| YARROW POINT_WETWELL | 32.18 | 20 | 8 | 6 | 6 | 58 | 72 | -13 | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin 3 | Kirkland_Manholes-3128 | 323.94 | Kirkland_Manholes-3129 | 308.71 | 343.2 | 4.44 | 8 | PVC | 0.01 | 1,485 | 0 | 8 | 8 | 0.6 | | |
| CO-1 | Kirkland_Manholes-293 | 22.09 | Kirkland_Manholes-310 | 21.69 | 516.5 | 0.08 | 12 | PVC | 0.01 | 578 | 1 | 18 | 18 | 3.2 | SM14-Ex-EX37 | |
| CO-2 | Kirkland_Manholes-310 | 21.69 | Kirkland_Manholes-311 | 21.29 | 254.7 | 0.16 | 12 | PVC | 0.01 | 824 | 3 | 27 | 30 | 3.6 | SM14-Ex-EX37 | |
| CO-6 | Kirkland_Manholes-1496 | 491.57 | Kirkland_Manholes-1461 | 483.24 | 408.5 | 2.04 | 8 | PVC | 0.01 | 1,007 | 0 | 4 | 4 | 0.4 | | |
| CO-8 | Kirkland_Manholes-1271 | 222.62 | Kirkland_Manholes-1272 | 197.83 | 531.9 | 4.66 | 8 | PVC | 0.01 | 1,522 | 0 | 8 | 8 | 0.6 | | |
| CO-9 | Kirkland_Manholes-1272 | 197.83 | Kirkland_Manholes-1273 | 182.86 | 225.5 | 6.64 | 8 | PVC | 0.01 | 1,817 | 3 | 16 | 20 | 1.1 | | |
| CO-11 | Kirkland_Manholes-3102 | 53.77 | Kirkland_Manholes-2664 | 53.2 | 380.4 | 0.15 | 18 | PVC | 0.01 | 2,372 | 121 | 401 | 522 | 22 | SM14-Ex-EX222 | |
| CO-13 | Kirkland_Manholes-2664 | 53.2 | Kirkland_Manholes-2204 | 53 | 65.8 | 0.3 | 18 | PVC | 0.01 | 3,378 | 121 | 407 | 528 | 15.6 | SM14-Ex-EX222 | |
| CO-14 | Kirkland_Manholes-2204 | 53 | Kirkland_Manholes-3101 | 52.44 | 123.2 | 0.45 | 18 | PVC | 0.01 | 4,132 | 124 | 425 | 549 | 13.3 | SM14-Ex-EX222 | |
| CO-15 | Kirkland_Manholes-978 | 222.9 | Kirkland_Manholes-979 | 219.9 | 335.8 | 0.89 | 8 | PVC | 0.01 | 666 | 8 | 51 | 59 | 8.8 | | |
| CO-17 | Kirkland_Manholes-979 | 219.9 | MH-327 | 219.64 | 97.4 | 0.27 | 8 | PVC | 0.01 | 364 | 8 | 55 | 63 | 17.4 | | |
| CO-18 | MH-327 | 219.64 | Kirkland_Manholes-980 | 219.4 | 90.3 | 0.27 | 8 | PVC | 0.01 | 364 | 12 | 64 | 76 | 20.8 | | |
| CO-19 | Kirkland_Manholes-1011 | 226.35 | MH-327 | 219.64 | 167.6 | 4 | 8 | PVC | 0.01 | 1,411 | 4 | 4 | 8 | 0.6 | | |
| CO-20 | Kirkland_Manholes-1907 | 380.32 | Kirkland_Manholes-1909 | 380 | 67.5 | 0.47 | 8 | PVC | 0.01 | 485 | 17 | 12 | 29 | 6 | | |
| CO-21 | Kirkland_Manholes-1909 | 380 | Kirkland_Manholes-1366 | 377.95 | 352.1 | 0.58 | 8 | PVC | 0.01 | 538 | 43 | 75 | 118 | 22 | | |
| CO-22 | Kirkland_Manholes-638 | 236.51 | Kirkland_Manholes-637 | 235.38 | 223.4 | 0.51 | 21 | PVC | 0.01 | 6,576 | 454 | 1,534 | 1,987 | 30.2 | | |
| CO-23 | Kirkland_Manholes-637 | 235.38 | Kirkland_Manholes-633 | 234.78 | 246.2 | 0.24 | 21 | PVC | 0.01 | 4,564 | 458 | 1,538 | 1,995 | 43.7 | | |
| CO-25 | Kirkland_Manholes-2644 | 74.88 | Kirkland_Manholes-2655 | 44.22 | 203.4 | 15.07 | 8 | PVC | 0.01 | 2,737 | 12 | 73 | 85 | 3.1 | | |
| CO-26 | Kirkland_Manholes-2642 | 102.55 | MH-328 | 82.65 | 111.2 | 17.89 | 8 | PVC | 0.01 | 2,982 | 1 | 12 | 13 | 0.5 | | |
| CO-27 | MH-328 | 82.65 | Kirkland_Manholes-2644 | 74.88 | 76.8 | 10.12 | 8 | PVC | 0.01 | 2,242 | 4 | 30 | 35 | 1.5 | | |
| CO-28 | Kirkland_Manholes-3144 | 94.3 | Kirkland_Manholes-3143 | 93.65 | 162.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 9 | 1.9 | SM14-Ex-EX293 | |
| CO-29 | Kirkland_Manholes-3143 | 93.65 | MH-328 | 82.65 | 108.8 | 10.11 | 8 | PVC | 0.01 | 2,242 | 3 | 12 | 15 | 0.7 | SM14-Ex-EX293 | |
| CO-30 | Kirkland_Manholes-2662 | 11.52 | Kirkland_Manholes-2661 | 11.28 | 48.5 | 0.49 | 18 | PVC | 0.01 | 4,311 | 229 | 601 | 830 | 19.3 | SM14-Ex-EX289 | |
| CO-31 | Kirkland_Manholes-2661 | 11.28 | Kirkland_Manholes-2851 | 10.8 | 93.8 | 0.51 | 18 | PVC | 0.01 | 4,385 | 254 | 777 | 1,031 | 23.5 | SM14-Ex-EX289 | |
| CO-32 | Kirkland_Manholes-3203 | 49.55 | Kirkland_Manholes-2660 | 26.87 | 244.8 | 9.27 | 8 | PVC | 0.01 | 2,146 | 6 | 36 | 42 | 2 | | |
| CO-33 | Kirkland_Manholes-2660 | 26.87 | Kirkland_Manholes-2661 | 11.28 | 44 | 35.46 | 8 | PVC | 0.01 | 4,198 | 25 | 170 | 195 | 4.6 | | |
| CO-34 | Kirkland_Manholes-2221 | 60.29 | Kirkland_Manholes-2225 | 40.46 | 244.8 | 8.1 | 8 | PVC | 0.01 | 2,007 | 11 | 52 | 63 | 3.1 | | |
| CO-35 | Kirkland_Manholes-2225 | 40.46 | Kirkland_Manholes-2228 | 25 | 165.9 | 9.32 | 8 | PVC | 0.01 | 2,152 | 18 | 71 | 89 | 4.2 | | Drop Connection |
| CO-36 | Kirkland_Manholes-2081 | 95.66 | Kirkland_Manholes-2218 | 82.71 | 188.1 | 6.88 | 8 | PVC | 0.01 | 1,850 | 1 | 6 | 7 | 0.4 | | |
| CO-37 | Kirkland_Manholes-2218 | 82.71 | Kirkland_Manholes-2221 | 60.29 | 246.5 | 9.1 | 8 | PVC | 0.01 | 2,126 | 7 | 26 | 33 | 1.6 | | |
| CO-38 | Kirkland_Manholes-2227 | 45.3 | Kirkland_Manholes-2226 | 43.3 | 93.8 | 2.13 | 8 | PVC | 0.01 | 1,029 | 2 | 6 | 9 | 0.8 | | |
| CO-39 | Kirkland_Manholes-2226 | 43.3 | Kirkland_Manholes-2225 | 40.46 | 248.3 | 1.14 | 8 | PVC | 0.01 | 754 | 6 | 13 | 19 | 2.5 | | |
| CO-41 | Kirkland_Manholes-1046 | 162.86 | Kirkland_Manholes-3175 | 156.47 | 218.7 | 2.92 | 8 | PVC | 0.01 | 1,205 | 74 | 277 | 352 | 29.2 | | |
| CO-42 | Kirkland_Manholes-1043 | 180.32 | Kirkland_Manholes-3126 | 177.5 | 189.3 | 1.49 | 8 | PVC | 0.01 | 861 | 26 | 98 | 124 | 14.4 | | |
| CO-43 | Kirkland_Manholes-3126 | 177.5 | Kirkland_Manholes-1046 | 162.86 | 197.5 | 7.41 | 8 | PVC | 0.01 | 1,920 | 28 | 111 | 139 | 7.2 | | |
| CO-44 | Kirkland_Manholes-61 | 205.17 | Kirkland_Manholes-64 | 204.5 | 110.3 | 0.61 | 8 | PVC | 0.01 | 550 | 8 | 30 | 38 | 6.8 | SM14-Ex-EX6 | |
| CO-45 | Kirkland_Manholes-64 | 204.5 | Kirkland_Manholes-65 | 199.61 | 323.5 | 1.51 | 8 | PVC | 0.01 | 867 | 10 | 34 | 44 | 5.1 | SM14-Ex-EX6 | |
| CO-47 | Kirkland_Manholes-2410 | 409.57 | Kirkland_Manholes-2408 | 405.44 | 108.3 | 3.82 | 8 | PVC | 0.01 | 1,377 | 0 | 4 | 4 | 0.3 | | |
| CO-48 | Kirkland_Manholes-2135 | 110 | Kirkland_Manholes-2156 | 109.44 | 35 | 1.6 | 8 | PVC | 0.01 | 892 | 8 | 32 | 40 | 4.5 | | |
| CO-49 | Kirkland_Manholes-2156 | 109.44 | Kirkland_Manholes-2157 | 100.18 | 171 | 5.42 | 8 | PVC | 0.01 | 1,641 | 8 | 39 | 47 | 2.9 | | |
| CO-50 | Kirkland_Manholes-2190 | 132.39 | Kirkland_Manholes-2189 | 112.21 | 288.2 | 7 | 8 | PVC | 0.01 | 1,866 | 6 | 25 | 30 | 1.6 | | |
| CO-51 | Kirkland_Manholes-2189 | 112.21 | Kirkland_Manholes-2186 | 104.5 | 321.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 11 | 33 | 44 | 4 | | |
| CO-52 | Kirkland_Manholes-2169 | 142.85 | Kirkland_Manholes-2168 | 127.32 | 219.5 | 7.07 | 8 | PVC | 0.01 | 1,875 | 1 | 16 | 18 | 0.9 | SM14-Ex-EX193 | |
| CO-53 | Kirkland_Manholes-2168 | 127.32 | Kirkland_Manholes-2167 | 120.69 | 65.4 | 10.14 | 8 | PVC | 0.01 | 2,245 | 2 | 25 | 27 | 1.2 | SM14-Ex-EX193 | |
| CO-54 | Kirkland_Manholes-2165 | 94.99 | Kirkland_Manholes-2164 | 90.37 | 91.4 | 5.05 | 8 | PVC | 0.01 | 1,585 | 8 | 49 | 57 | 3.6 | | |
| CO-55 | Kirkland_Manholes-2164 | 90.37 | Kirkland_Manholes-2140 | 88.47 | 43.9 | 4.33 | 8 | PVC | 0.01 | 1,468 | 8 | 58 | 66 | 4.5 | | |
| CO-56 | Kirkland_Manholes-1703 | 58 | Kirkland_Manholes-1704 | 54.53 | 111.1 | 3.12 | 8 | PVC | 0.01 | 1,246 | 5 | 16 | 22 | 1.7 | SM14-Ex-EX153 | |
| CO-57 | Kirkland_Manholes-1704 | 54.53 | Kirkland_Manholes-1705 | 33.28 | 211.8 | 10.03 | 8 | PVC | 0.01 | 2,233 | 5 | 25 | 30 | 1.3 | SM14-Ex-EX153 | |
| CO-58 | Kirkland_Manholes-1810 | 85.96 | Kirkland_Manholes-1808 | 66.8 | 280.2 | 6.84 | 8 | PVC | 0.01 | 1,844 | 65 | 286 | 351 | 19.1 | SM4 | |
| CO-59 | Kirkland_Manholes-1808 | 66.8 | Kirkland_Manholes-1807 | 44.26 | 183.9 | 12.26 | 8 | PVC | 0.01 | 2,469 | 66 | 294 | 360 | 14.6 | SM4 | |
| CO-60 | Kirkland_Manholes-1718 | 72.96 | Kirkland_Manholes-1717 | 58.55 | 301.8 | 4.77 | 8 | PVC | 0.01 | 1,541 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX165 | |
| CO-61 | Kirkland_Manholes-1717 | 58.55 | Kirkland_Manholes-1719 | 46.02 | 243.6 | 5.14 | 8 | PVC | 0.01 | 1,599 | 26 | 49 | 75 | 4.7 | SM14-Ex-EX165 | |
| CO-62 | Kirkland_Manholes-1605 | 146.86 | Kirkland_Manholes-1606 | 138.24 | 64.3 | 13.41 | 8 | PVC | 0.01 | 2,582 | 0 | 8 | 8 | 0.3 | SM14-Ex-EX120 | |
| CO-63 | Kirkland_Manholes-1606 | 138.24 | Kirkland_Manholes-1604 | 117.22 | 209.3 | 10.04 | 8 | PVC | 0.01 | 2,234 | 0 | 16 | 16 | 0.7 | SM14-Ex-EX120 | |
| CO-64 | Kirkland_Manholes-3029 | 503.06 | Kirkland_Manholes-1462 | 498.98 | 186.9 | 2.18 | 8 | PVC | 0.01 | 1,042 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX273 | |
| CO-66 | Kirkland_Manholes-1468 | 502.5 | Kirkland_Manholes-1462 | 498.98 | 381.4 | 0.92 | 8 | PVC | 0.01 | 677 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX271 | |
| CO-67 | Kirkland_Manholes-1462 | 498.98 | Kirkland_Manholes-1463 | 498.43 | 46.4 | 1.18 | 8 | PVC | 0.01 | 767 | 4 | 12 | 16 | 2.1 | SM14-Ex-EX271 | |
| CO-69 | Kirkland_Manholes-1251 | 198.9 | Kirkland_Manholes-1252 | 181.71 | 334.6 | 5.14 | 8 | PVC | 0.01 | 1,598 | 29 | 156 | 185 | 11.6 | SM14-Ex-EX101 | |
| CO-70 | Kirkland_Manholes-1250 | 210.15 | Kirkland_Manholes-1251 | 198.9 | 400 | 2.81 | 8 | PVC | 0.01 | 1,182 | 22 | 140 | 162 | 13.7 | SM14-Ex-EX101 | |
| CO-71 | Kirkland_Manholes-1310 | 231.57 | Kirkland_Manholes-1251 | 198.9 | 267.1 | 12.23 | 8 | PVC | 0.01 | 2,466 | 3 | 8 | 11 | 0.4 | SM14-Ex-EX99 | |
| CO-72 | Kirkland_Manholes-230 | 172.81 | Kirkland_Manholes-228 | 142.32 | 167.5 | 18.2 | 8 | PVC | 0.01 | 3,008 | 42 | 119 | 161 | 5.4 | | |
| CO-73 | Kirkland_Manholes-3115 | 187.58 | Kirkland_Manholes-228 | 142.32 | 414 | 10.93 | 8 | PVC | 0.01 | 2,331 | 2 | 4 | 7 | 0.3 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-74 | Kirkland_Manholes-1287 | 140.18 | Kirkland_Manholes-1288 | 139.29 | 58.2 | 1.53 | 8 | PVC | 0.01 | 872 | 29 | 165 | 194 | 22.2 | SM14-Ex-EX105 | |
| CO-75 | Kirkland_Manholes-1288 | 139.29 | Kirkland_Manholes-1289 | 131.61 | 344.5 | 2.23 | 8 | PVC | 0.01 | 1,053 | 32 | 173 | 205 | 19.5 | SM14-Ex-EX105 | |
| CO-77 | Kirkland_Manholes-1255 | 163.1 | Kirkland_Manholes-1256 | 151.53 | 106.9 | 10.82 | 8 | PVC | 0.01 | 2,319 | 4 | 33 | 37 | 1.6 | SM14-Ex-EX104 | |
| CO-78 | Kirkland_Manholes-1253 | 189.17 | MH-329 | 183.73 | 57.5 | 9.46 | 8 | PVC | 0.01 | 2,169 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX104 | |
| CO-80 | Kirkland_Manholes-1254 | 186 | MH-329 | 183.73 | 30.2 | 7.52 | 8 | PVC | 0.01 | 1,934 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX104 | |
| CO-81 | MH-329 | 183.73 | Kirkland_Manholes-1255 | 163.1 | 274.1 | 7.53 | 8 | PVC | 0.01 | 1,934 | 3 | 25 | 28 | 1.4 | SM14-Ex-EX104 | |
| CO-83 | Kirkland_Manholes-279 | 76.14 | Kirkland_Manholes-278 | 56.62 | 239.7 | 8.14 | 8 | PVC | 0.01 | 2,012 | 28 | 6 | 35 | 1.7 | SM10 | |
| CO-84 | Kirkland_Manholes-271 | 91.78 | Kirkland_Manholes-272 | 84 | 313.5 | 2.48 | 8 | PVC | 0.01 | 1,111 | 48 | 130 | 178 | 16 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| CO-85 | Kirkland_Manholes-272 | 84 | Kirkland_Manholes-273 | 69.52 | 161.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 50 | 134 | 184 | 8.7 | SM10 | |
| CO-89 | Kirkland_Manholes-1221 | 265 | Kirkland_Manholes-1210 | 257.02 | 313.6 | 2.54 | 8 | PVC | 0.01 | 1,125 | 4 | 14 | 19 | 1.7 | SM14-Ex-EX90 | |
| CO-90 | Kirkland_Manholes-1208 | 237.71 | Kirkland_Manholes-1207 | 214.35 | 271 | 8.62 | 8 | PVC | 0.01 | 2,070 | 12 | 39 | 51 | 2.5 | SM14-Ex-EX90 | |
| CO-91 | Kirkland_Manholes-1207 | 214.35 | Kirkland_Manholes-1206 | 193.92 | 362.6 | 5.63 | 8 | PVC | 0.01 | 1,673 | 15 | 47 | 62 | 3.7 | SM14-Ex-EX90 | |
| CO-92 | Kirkland_Manholes-1142 | 218.06 | Kirkland_Manholes-1146 | 215.3 | 316.4 | 0.87 | 8 | PVC | 0.01 | 659 | 8 | 33 | 41 | 6.3 | SM4 | |
| CO-93 | Kirkland_Manholes-1223 | 241.1 | Kirkland_Manholes-1146 | 215.3 | 349.8 | 7.38 | 8 | PVC | 0.01 | 1,915 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX86 | |
| CO-94 | Kirkland_Manholes-1199 | 190.02 | Kirkland_Manholes-1198 | 189.72 | 153.8 | 0.19 | 8 | PVC | 0.01 | 311 | 8 | 8 | 17 | 5.4 | SM14-Ex-EX80 | |
| CO-95 | Kirkland_Manholes-1141 | 204.1 | Kirkland_Manholes-1198 | 189.72 | 107.3 | 13.4 | 8 | PVC | 0.01 | 2,581 | 5 | 33 | 37 | 1.5 | SM14-Ex-EX80 | |
| CO-96 | Kirkland_Manholes-3104 | 114.41 | Kirkland_Manholes-3103 | 113.84 | 31.2 | 1.83 | 8 | PVC | 0.01 | 953 | 15 | 107 | 122 | 12.9 | SM10 | |
| CO-97 | Kirkland_Manholes-517 | 138.64 | Kirkland_Manholes-3103 | 113.84 | 358.5 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 8 | 9 | 0.5 | SM10 | |
| CO-98 | Kirkland_Manholes-3196 | 122.5 | Kirkland_Manholes-503 | 118 | 198.4 | 2.27 | 8 | PVC | 0.01 | 1,062 | 3 | 16 | 19 | 1.8 | SM10 | |
| CO-100 | Kirkland_Manholes-503 | 118 | Kirkland_Manholes-504 | 108.24 | 276.3 | 3.53 | 8 | PVC | 0.01 | 1,325 | 4 | 25 | 28 | 2.1 | SM14-Ex-EX78 | |
| CO-101 | Kirkland_Manholes-504 | 108.24 | Kirkland_Manholes-510 | 78.8 | 269.3 | 10.93 | 8 | PVC | 0.01 | 2,331 | 5 | 33 | 38 | 1.6 | SM14-Ex-EX78 | |
| CO-102 | Kirkland_Manholes-2573 | 298.95 | Kirkland_Manholes-2572 | 298.88 | 17.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 18 | 4.1 | | |
| CO-103 | Kirkland_Manholes-2959 | 355.76 | Kirkland_Manholes-2572 | 298.88 | 327.6 | 17.36 | 8 | PVC | 0.01 | 2,938 | 1 | 4 | 5 | 0.2 | | |
| CO-104 | Kirkland_Manholes-2783 | 269.77 | Kirkland_Manholes-2784 | 262.56 | 166.7 | 4.32 | 8 | PVC | 0.01 | 1,466 | 6 | 40 | 45 | 3.1 | | |
| CO-105 | Kirkland_Manholes-2578 | 278.46 | Kirkland_Manholes-2783 | 269.77 | 170.6 | 5.09 | 8 | PVC | 0.01 | 1,591 | 5 | 36 | 41 | 2.6 | | |
| CO-106 | Kirkland_Manholes-2921 | 73.76 | Kirkland_Manholes-2920 | 63.77 | 70.3 | 14.2 | 8 | PVC | 0.01 | 2,657 | 2 | 17 | 19 | 0.7 | | |
| CO-107 | Kirkland_Manholes-2920 | 63.77 | Kirkland_Manholes-177 | 35.5 | 126.7 | 22.31 | 8 | | 0.012 | 2,775 | 3 | 21 | 24 | 0.9 | | |
| CO-109 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1221 | 265 | 237.1 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 8 | 1.8 | SM14-Ex-EX90 | |
| CO-110 | Kirkland_Manholes-2686 | 221.84 | Kirkland_Manholes-2690 | 217.58 | 240.3 | 1.77 | 8 | PVC | 0.01 | 939 | 10 | 32 | 42 | 4.5 | SM14-Ex-EX201 | |
| CO-111 | Kirkland_Manholes-2690 | 217.58 | Kirkland_Manholes-2691 | 211.09 | 233.1 | 2.78 | 8 | PVC | 0.01 | 1,176 | 11 | 36 | 47 | 4 | SM14-Ex-EX201 | |
| CO-112 | Kirkland_Manholes-2612 | 250.12 | Kirkland_Manholes-2613 | 203.91 | 357.8 | 12.91 | 8 | PVC | 0.01 | 2,534 | 4 | 8 | 12 | 0.5 | SM14-Ex-EX297 | |
| CO-113 | Kirkland_Manholes-2613 | 203.91 | Kirkland_Manholes-3164 | 171.21 | 256.4 | 12.76 | 8 | PVC | 0.01 | 2,518 | 6 | 12 | 18 | 0.7 | SM14-Ex-EX297 | |
| CO-114 | Kirkland_Manholes-488 | 256.69 | Kirkland_Manholes-489 | 206.41 | 218.5 | 23.01 | 8 | PVC | 0.01 | 3,382 | 1 | 4 | 5 | 0.2 | | |
| CO-115 | Kirkland_Manholes-834 | 245.56 | Kirkland_Manholes-489 | 206.41 | 278.5 | 14.06 | 8 | PVC | 0.01 | 2,644 | 2 | 4 | 6 | 0.2 | | |
| CO-116 | Kirkland_Manholes-599 | 92.8 | Kirkland_Manholes-600 | 91.95 | 330.6 | 0.26 | 8 | PVC | 0.01 | 357 | 1 | 16 | 18 | 4.9 | SM14-Ex-EX160 | |
| CO-120 | Kirkland_Manholes-601 | 92.05 | Kirkland_Manholes-602 | 90.22 | 280.5 | 0.65 | 8 | PVC | 0.01 | 569 | 10 | 16 | 27 | 4.7 | SM14-Ex-EX160 | |
| CO-123 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-604 | 92.41 | 322.7 | 0.77 | 8 | PVC | 0.01 | 618 | 2 | 4 | 6 | 1 | SM14-Ex-EX160 | |
| CO-124 | Kirkland_Manholes-594 | 105.16 | Kirkland_Manholes-595 | 103.44 | 177 | 0.97 | 12 | PVC | 0.01 | 2,049 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX116 | |
| CO-125 | MH-321 | 218.02 | MH-322 | 217.7 | 80.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| CO-126 | MH-322 | 217.7 | Kirkland_Manholes-2446 | 217.36 | 85 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.3 | | |
| CO-127 | MH-315 | 235.18 | MH-316 | 235.06 | 29.4 | 0.41 | 6 | Concrete | 0.013 | 161 | 1 | 4 | 5 | 2.9 | | |
| CO-128 | MH-316 | 235.06 | Kirkland_Manholes-2602 | 234.19 | 216.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2.1 | SM14-Ex-EX300 | |
| CO-130 | MH-330 | 93.13 | Kirkland_Manholes-601 | 92.05 | 270.2 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 8 | 9 | 1.9 | SM14-Ex-EX160 | |
| CO-133 | Kirkland_Manholes-2269 | 398.2 | Kirkland_Manholes-2266 | 392.8 | 346.8 | 1.56 | 8 | PVC | 0.01 | 880 | 19 | 103 | 122 | 13.9 | SM14-Ex-EX261 | |
| CO-139 | Kirkland_Manholes-2703 | 250.19 | MH-333 | 250.73 | 32.9 | 1.64 | 8 | PVC | 0.01 | 904 | 2 | 12 | 14 | 1.6 | | |
| CO-140 | MH-333 | 250.73 | MH-334 | 252.1 | 150.3 | 0.91 | 8 | PVC | 0.01 | 673 | 1 | 8 | 9 | 1.4 | | |
| CO-141 | MH-334 | 252.1 | MH-335 | 253.55 | 221.6 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 4 | 5 | 0.8 | | |
| CO-142 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1214 | 261.31 | 224.5 | 2.07 | 8 | PVC | 0.01 | 1,013 | 2 | 6 | 8 | 0.8 | SM14-Ex-EX90 | |
| CO-143 | Kirkland_Manholes-2593 | 284.96 | Kirkland_Manholes-2604 | 283.17 | 324.7 | 0.55 | 8 | PVC | 0.01 | 524 | 24 | 91 | 0 | 0 | SM14-Ex-EX299 | |
| CO-148 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-602 | 90.22 | 228.3 | 2.05 | 8 | PVC | 0.01 | 1,008 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX160 | |
| CO-149 | MH-336 | 98.65 | Kirkland_Manholes-276 | 92.16 | 227.3 | 2.86 | 8 | PVC | 0.01 | 1,191 | 0 | 3 | 3 | 0.3 | SM10 | |
| CO-150 | MH-337 | 92.45 | Kirkland_Manholes-279 | 76.14 | 213.9 | 7.63 | 8 | PVC | 0.01 | 1,947 | 0 | 3 | 3 | 0.2 | SM10 | |
| CO-151 | MH-338 | 119.57 | Kirkland_Manholes-308 | 114.39 | 316.2 | 1.64 | 8 | PVC | 0.01 | 902 | 0 | 9 | 9 | 1 | SM10 | |
| CO-152 | MH-339 | 159.67 | Kirkland_Manholes-524 | 157.52 | 274.1 | 0.78 | 8 | PVC | 0.01 | 624 | 0 | 8 | 8 | 1.3 | SM10 | |
| CO-154 | MH_Selection_06-13-2016-11 | 20.6 | O-26 | 20.25 | 45 | 0.78 | 48 | Concrete | 0.013 | 56,862 | 1,146 | 4,222 | 7,021 | 12.3 | | Updated per as-built drawings |
| KC_Main-2 | KC_Manholes-18 | 10.29 | KC_Manholes-19 | 10.24 | 10.1 | 0.5 | 24 | PVC | 0.01 | 9,299 | 734 | 2,048 | 2,854 | 30.7 | SM14-Ex-EX289 | |
| KC_Main-28 | KC_Manholes-19 | 10.24 | O-6 | 10 | 47.9 | 0.5 | 24 | PVC | 0.01 | 9,344 | 782 | 2,054 | 2,908 | 31.1 | SM14-Ex-EX289 | |
| Kirkland_Main-1 | Kirkland_Manholes-2 | 142.59 | Kirkland_Manholes-3 | 141.09 | 316.3 | 0.47 | 8 | PVC | 0.01 | 486 | 0 | 1 | 1 | 0.3 | | |
| Kirkland_Main-2 | Kirkland_Manholes-4 | 139.47 | Kirkland_Manholes-5 | 138.65 | 146.8 | 0.56 | 8 | PVC | 0.01 | 527 | 14 | 4 | 19 | 3.5 | | |
| Kirkland_Main-3 | Kirkland_Manholes-3 | 141.09 | Kirkland_Manholes-4 | 139.47 | 325.9 | 0.5 | 8 | PVC | 0.01 | 497 | 14 | 3 | 17 | 3.4 | | |
| Kirkland_Main-4 | Kirkland_Manholes-6 | 127.8 | Kirkland_Manholes-7 | 127.07 | 145 | 0.5 | 8 | PVC | 0.01 | 500 | 15 | 7 | 23 | 4.5 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-5 | Kirkland_Manholes-5 | 138.65 | Kirkland_Manholes-6 | 127.8 | 166.2 | 6.53 | 8 | PVC | 0.01 | 1,801 | 15 | 6 | 21 | 1.1 | | |
| Kirkland_Main-6 | Kirkland_Manholes-8 | 108.29 | Kirkland_Manholes-9 | 99.39 | 204.3 | 4.36 | 8 | PVC | 0.01 | 1,471 | 16 | 12 | 28 | 1.9 | | |
| Kirkland_Main-7 | Kirkland_Manholes-7 | 127.07 | Kirkland_Manholes-8 | 108.29 | 154 | 12.2 | 8 | PVC | 0.01 | 2,462 | 16 | 10 | 27 | 1.1 | | |
| Kirkland_Main-8 | Kirkland_Manholes-9 | 99.39 | Kirkland_Manholes-99 | 74.09 | 252.3 | 10.03 | 8 | PVC | 0.01 | 2,233 | 58 | 13 | 71 | 3.2 | | |
| Kirkland_Main-10 | Kirkland_Manholes-10 | 249.23 | Kirkland_Manholes-11 | 247.5 | 365.2 | 0.47 | 8 | PVC | 0.01 | 485 | 1 | 4 | 4 | 0.9 | | |
| Kirkland_Main-11 | Kirkland_Manholes-11 | 247.5 | Kirkland_Manholes-12 | 246.57 | 355.7 | 0.26 | 8 | PVC | 0.01 | 360 | 2 | 8 | 10 | 2.8 | | |
| Kirkland_Main-12 | Kirkland_Manholes-12 | 246.57 | Kirkland_Manholes-650 | 246.28 | 73.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3.1 | | |
| Kirkland_Main-13 | Kirkland_Manholes-13 | 266.08 | Kirkland_Manholes-917 | 265.16 | 206.5 | 0.45 | 8 | PVC | 0.01 | 471 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-14 | Kirkland_Manholes-14 | 260.99 | Kirkland_Manholes-15 | 248.41 | 274.7 | 4.58 | 8 | PVC | 0.01 | 1,509 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-15 | Kirkland_Manholes-16 | 249.63 | Kirkland_Manholes-15 | 248.41 | 56 | 2.18 | 8 | PVC | 0.01 | 1,041 | 16 | 75 | 91 | 8.8 | | |
| Kirkland_Main-16 | Kirkland_Manholes-17 | 247.29 | Kirkland_Manholes-650 | 246.28 | 284.1 | 0.36 | 8 | PVC | 0.01 | 420 | 19 | 87 | 107 | 25.3 | | |
| Kirkland_Main-17 | Kirkland_Manholes-3034 | 97.65 | Kirkland_Manholes-3033 | 93.75 | 20 | 19.51 | 8 | PVC | 0.01 | 3,114 | 0 | 4 | 5 | 0.1 | | |
| Kirkland_Main-18 | Kirkland_Manholes-3033 | 93.75 | Kirkland_Manholes-3032 | 86.58 | 55.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 0 | 9 | 9 | 0.3 | | |
| Kirkland_Main-19 | Kirkland_Manholes-3032 | 86.58 | Kirkland_Manholes-22 | 82.71 | 39.7 | 9.76 | 8 | PVC | 0.01 | 2,202 | 0 | 13 | 13 | 0.6 | | |
| Kirkland_Main-20 | Kirkland_Manholes-22 | 82.71 | Kirkland_Manholes-1 | 73.25 | 125.9 | 7.51 | 8 | PVC | 0.01 | 1,932 | 1 | 17 | 18 | 0.9 | | |
| Kirkland_Main-21 | Kirkland_Manholes-15 | 248.41 | Kirkland_Manholes-17 | 247.29 | 382.5 | 0.29 | 8 | PVC | 0.01 | 382 | 17 | 83 | 100 | 26.3 | | |
| Kirkland_Main-22 | Kirkland_Manholes-18 | 254.35 | Kirkland_Manholes-16 | 249.63 | 106.2 | 4.45 | 8 | PVC | 0.01 | 1,487 | 15 | 72 | 86 | 5.8 | | |
| Kirkland_Main-23 | Kirkland_Manholes-19 | 254.88 | Kirkland_Manholes-18 | 254.35 | 102.4 | 0.52 | 8 | PVC | 0.01 | 507 | 14 | 68 | 81 | 16 | | |
| Kirkland_Main-24 | Kirkland_Manholes-23 | 269.98 | Kirkland_Manholes-19 | 254.88 | 324.5 | 4.65 | 8 | PVC | 0.01 | 1,521 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-25 | Kirkland_Manholes-622 | 255 | Kirkland_Manholes-19 | 254.88 | 84.5 | 0.14 | 8 | PVC | 0.01 | 266 | 12 | 60 | 72 | 26.9 | | |
| Kirkland_Main-26 | Kirkland_Manholes-624 | 257.73 | Kirkland_Manholes-623 | 256.4 | 95.1 | 1.4 | 8 | PVC | 0.01 | 834 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-27 | Kirkland_Manholes-623 | 256.4 | Kirkland_Manholes-622 | 255 | 306.3 | 0.46 | 8 | PVC | 0.01 | 477 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-28 | Kirkland_Manholes-625 | 258 | Kirkland_Manholes-622 | 255 | 179.1 | 1.67 | 8 | PVC | 0.01 | 912 | 10 | 48 | 57 | 6.3 | | |
| Kirkland_Main-29 | Kirkland_Manholes-28 | 182.96 | Kirkland_Manholes-29 | 182.79 | 41.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 8 | 1.8 | | |
| Kirkland_Main-30 | Kirkland_Manholes-29 | 182.79 | Kirkland_Manholes-25 | 175.02 | 121.6 | 6.39 | 8 | PVC | 0.01 | 1,783 | 16 | 43 | 59 | 3.3 | | |
| Kirkland_Main-31 | Kirkland_Manholes-36 | 251.25 | Kirkland_Manholes-35 | 222.04 | 280.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-32 | Kirkland_Manholes-35 | 222.04 | Kirkland_Manholes-34 | 221.71 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.6 | | |
| Kirkland_Main-33 | Kirkland_Manholes-34 | 221.71 | Kirkland_Manholes-32 | 220.36 | 300.4 | 0.45 | 8 | PVC | 0.01 | 473 | 5 | 13 | 18 | 3.7 | | |
| Kirkland_Main-34 | Kirkland_Manholes-32 | 220.36 | Kirkland_Manholes-33 | 219.84 | 21.3 | 2.44 | 8 | PVC | 0.01 | 1,102 | 6 | 17 | 23 | 2.1 | | |
| Kirkland_Main-35 | Kirkland_Manholes-33 | 219.84 | Kirkland_Manholes-31 | 218.88 | 40.1 | 2.39 | 8 | PVC | 0.01 | 1,091 | 6 | 21 | 28 | 2.5 | | |
| Kirkland_Main-36 | Kirkland_Manholes-37 | 238.46 | Kirkland_Manholes-31 | 218.88 | 419.9 | 4.66 | 8 | PVC | 0.01 | 1,523 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-37 | Kirkland_Manholes-31 | 218.88 | Kirkland_Manholes-30 | 193.77 | 330.5 | 7.6 | 8 | PVC | 0.01 | 1,943 | 9 | 30 | 39 | 2 | | |
| Kirkland_Main-38 | Kirkland_Manholes-30 | 193.77 | Kirkland_Manholes-29 | 182.79 | 147.1 | 7.46 | 8 | PVC | 0.01 | 1,926 | 12 | 34 | 46 | 2.4 | | |
| Kirkland_Main-39 | Kirkland_Manholes-40 | 185.88 | Kirkland_Manholes-41 | 184.86 | 116.1 | 0.88 | 8 | PVC | 0.01 | 661 | 0 | 9 | 9 | 1.3 | | |
| Kirkland_Main-40 | Kirkland_Manholes-41 | 184.86 | Kirkland_Manholes-38 | 173.18 | 108.4 | 10.78 | 8 | PVC | 0.01 | 2,314 | 1 | 13 | 14 | 0.6 | | |
| Kirkland_Main-41 | Kirkland_Manholes-39 | 193.85 | Kirkland_Manholes-40 | 185.88 | 407 | 1.96 | 8 | PVC | 0.01 | 987 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-42 | Kirkland_Manholes-54 | 66.84 | Kirkland_Manholes-103 | 59.75 | 133.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 35 | 154 | 189 | 11.6 | SM14-Ex-EX13 | |
| Kirkland_Main-43 | Kirkland_Manholes-47 | 192.83 | Kirkland_Manholes-48 | 169.78 | 343.8 | 6.71 | 8 | PVC | 0.01 | 1,826 | 1 | 4 | 6 | 0.3 | SM14-Ex-EX13 | |
| Kirkland_Main-44 | Kirkland_Manholes-48 | 169.78 | Kirkland_Manholes-49 | 164.6 | 338.4 | 1.53 | 8 | PVC | 0.01 | 872 | 3 | 9 | 12 | 1.3 | SM14-Ex-EX13 | |
| Kirkland_Main-45 | Kirkland_Manholes-49 | 164.6 | Kirkland_Manholes-50 | 161.4 | 179.7 | 1.78 | 8 | PVC | 0.01 | 941 | 22 | 111 | 133 | 14.1 | SM14-Ex-EX13 | |
| Kirkland_Main-46 | Kirkland_Manholes-50 | 161.4 | Kirkland_Manholes-51 | 157.39 | 303.6 | 1.32 | 8 | PVC | 0.01 | 810 | 23 | 115 | 139 | 17.1 | SM14-Ex-EX13 | |
| Kirkland_Main-47 | Kirkland_Manholes-51 | 157.39 | Kirkland_Manholes-52 | 124.84 | 333.7 | 9.75 | 8 | PVC | 0.01 | 2,202 | 25 | 119 | 145 | 6.6 | SM14-Ex-EX13 | |
| Kirkland_Main-48 | Kirkland_Manholes-59 | 155.25 | Kirkland_Manholes-58 | 153.05 | 131 | 1.68 | 8 | PVC | 0.01 | 914 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX14 | |
| Kirkland_Main-49 | Kirkland_Manholes-58 | 153.05 | Kirkland_Manholes-57 | 140.82 | 263.2 | 4.65 | 8 | PVC | 0.01 | 1,520 | 2 | 9 | 10 | 0.7 | SM14-Ex-EX14 | |
| Kirkland_Main-50 | Kirkland_Manholes-57 | 140.82 | Kirkland_Manholes-56 | 112.82 | 272.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 4 | 13 | 17 | 0.7 | SM14-Ex-EX14 | |
| Kirkland_Main-51 | Kirkland_Manholes-56 | 112.82 | Kirkland_Manholes-55 | 79.92 | 269.4 | 12.21 | 8 | PVC | 0.01 | 2,464 | 6 | 17 | 23 | 0.9 | SM14-Ex-EX14 | |
| Kirkland_Main-52 | Kirkland_Manholes-55 | 79.92 | Kirkland_Manholes-54 | 66.84 | 152.2 | 8.59 | 8 | PVC | 0.01 | 2,067 | 8 | 21 | 29 | 1.4 | SM14-Ex-EX14 | |
| Kirkland_Main-53 | Kirkland_Manholes-52 | 124.84 | Kirkland_Manholes-53 | 83.26 | 336 | 12.38 | 8 | PVC | 0.01 | 2,480 | 27 | 124 | 151 | 6.1 | SM14-Ex-EX13 | |
| Kirkland_Main-54 | Kirkland_Manholes-53 | 83.26 | Kirkland_Manholes-54 | 66.84 | 148.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 27 | 128 | 155 | 6.6 | SM14-Ex-EX13 | |
| Kirkland_Main-55 | Kirkland_Manholes-62 | 222.28 | Kirkland_Manholes-63 | 216.98 | 205.6 | 2.58 | 8 | PVC | 0.01 | 1,132 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-56 | Kirkland_Manholes-63 | 216.98 | Kirkland_Manholes-60 | 215.88 | 80.7 | 1.36 | 8 | PVC | 0.01 | 823 | 2 | 9 | 10 | 1.3 | | |
| Kirkland_Main-57 | Kirkland_Manholes-60 | 215.88 | Kirkland_Manholes-61 | 215.72 | 40.6 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 13 | 16 | 3.5 | | Drop Connection |
| Kirkland_Main-58 | Kirkland_Manholes-65 | 199.61 | Kirkland_Manholes-66 | 186.65 | 326.2 | 3.97 | 8 | PVC | 0.01 | 1,405 | 11 | 38 | 49 | 3.5 | SM14-Ex-EX6 | |
| Kirkland_Main-59 | Kirkland_Manholes-66 | 186.65 | Kirkland_Manholes-67 | 185.01 | 47 | 3.49 | 8 | PVC | 0.01 | 1,317 | 37 | 102 | 140 | 10.6 | SM14-Ex-EX17 | |
| Kirkland_Main-61 | Kirkland_Manholes-72 | 160.29 | Kirkland_Manholes-70 | 152.59 | 265.8 | 2.9 | 8 | PVC | 0.01 | 1,200 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX15 | |
| Kirkland_Main-62 | Kirkland_Manholes-985 | 205.92 | Kirkland_Manholes-986 | 204.38 | 192.7 | 0.8 | 8 | PVC | 0.01 | 630 | 29 | 137 | 165 | 26.2 | SM14-Ex-EX3 | |
| Kirkland_Main-63 | Kirkland_Manholes-242 | 21.02 | Kirkland_Manholes-2761 | 12.79 | 68 | 12.1 | 8 | PVC | 0.01 | 2,453 | 60 | 265 | 325 | 13.2 | | |
| Kirkland_Main-64 | Kirkland_Manholes-1033 | 173.21 | Kirkland_Manholes-450 | 130.07 | 239 | 18.05 | 8 | PVC | 0.01 | 2,996 | 4 | 13 | 16 | 0.5 | | |
| Kirkland_Main-65 | Kirkland_Manholes-71 | 153 | Kirkland_Manholes-70 | 152.59 | 153.6 | 0.27 | 8 | PVC | 0.01 | 364 | 1 | 4 | 5 | 1.4 | SM14-Ex-EX16 | |
| Kirkland_Main-66 | Kirkland_Manholes-69 | 159.19 | Kirkland_Manholes-70 | 152.59 | 340.9 | 1.94 | 8 | PVC | 0.01 | 981 | 4 | 9 | 12 | 1.3 | SM14-Ex-EX16 | |
| Kirkland_Main-67 | Kirkland_Manholes-68 | 178.61 | Kirkland_Manholes-69 | 159.19 | 346.1 | 5.61 | 8 | PVC | 0.01 | 1,670 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX16 | |
| Kirkland_Main-68 | Kirkland_Manholes-73 | 249.05 | Kirkland_Manholes-74 | 244.74 | 143 | 3.01 | 8 | PVC | 0.01 | 1,224 | 0 | 4 | 4 | 0.4 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-69 | Kirkland_Manholes-77 | 217.04 | Kirkland_Manholes-78 | 207.46 | 342.9 | 2.79 | 8 | PVC | 0.01 | 1,178 | 9 | 21 | 30 | 2.5 | SM14-Ex-EX7 | |
| Kirkland_Main-70 | Kirkland_Manholes-76 | 225.56 | Kirkland_Manholes-77 | 217.04 | 294.1 | 2.9 | 8 | PVC | 0.01 | 1,200 | 5 | 17 | 22 | 1.8 | SM14-Ex-EX7 | |
| Kirkland_Main-71 | Kirkland_Manholes-75 | 235.08 | Kirkland_Manholes-76 | 225.56 | 281.9 | 3.38 | 8 | PVC | 0.01 | 1,296 | 3 | 13 | 16 | 1.2 | SM14-Ex-EX7 | |
| Kirkland_Main-72 | Kirkland_Manholes-74 | 244.74 | Kirkland_Manholes-75 | 235.08 | 281.2 | 3.44 | 8 | PVC | 0.01 | 1,307 | 2 | 9 | 10 | 0.8 | SM14-Ex-EX7 | |
| Kirkland_Main-75 | Kirkland_Manholes-79 | 197.48 | Kirkland_Manholes-66 | 186.65 | 235.2 | 4.6 | 8 | PVC | 0.01 | 1,513 | 24 | 60 | 84 | 5.5 | SM14-Ex-EX17 | |
| Kirkland_Main-76 | Kirkland_Manholes-78 | 207.46 | Kirkland_Manholes-79 | 197.48 | 229.3 | 4.35 | 8 | PVC | 0.01 | 1,471 | 23 | 55 | 78 | 5.3 | SM14-Ex-EX17 | |
| Kirkland_Main-78 | Kirkland_Manholes-46 | 167.44 | Kirkland_Manholes-43 | 166.66 | 144 | 0.54 | 8 | PVC | 0.01 | 519 | 0 | 9 | 9 | 1.6 | SM14-Ex-EX5 | |
| Kirkland_Main-79 | Kirkland_Manholes-43 | 166.66 | Kirkland_Manholes-44 | 166.02 | 96.1 | 0.67 | 8 | PVC | 0.01 | 575 | 18 | 90 | 108 | 18.7 | SM14-Ex-EX5 | |
| Kirkland_Main-80 | Kirkland_Manholes-45 | 166.8 | Kirkland_Manholes-44 | 166.02 | 115.5 | 0.68 | 8 | PVC | 0.01 | 579 | 0 | 4 | 4 | 0.7 | SM14-Ex-EX5 | |
| Kirkland_Main-81 | Kirkland_Manholes-27 | 172.24 | Kirkland_Manholes-26 | 167.35 | 165.4 | 2.96 | 8 | PVC | 0.01 | 1,212 | 2 | 21 | 23 | 1.9 | SM14-Ex-EX5 | |
| Kirkland_Main-82 | Kirkland_Manholes-26 | 167.35 | Kirkland_Manholes-43 | 166.66 | 133.3 | 0.52 | 8 | PVC | 0.01 | 507 | 18 | 77 | 95 | 18.7 | SM14-Ex-EX5 | |
| Kirkland_Main-84 | Kirkland_Manholes-38 | 173.18 | Kirkland_Manholes-27 | 172.24 | 235.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 17 | 19 | 4.2 | SM14-Ex-EX5 | |
| Kirkland_Main-85 | Kirkland_Manholes-24 | 172.7 | Kirkland_Manholes-26 | 167.35 | 274.1 | 1.95 | 8 | PVC | 0.01 | 985 | 16 | 51 | 67 | 6.8 | SM14-Ex-EX5 | |
| Kirkland_Main-86 | Kirkland_Manholes-42 | 173.4 | Kirkland_Manholes-46 | 167.44 | 195.7 | 3.04 | 8 | PVC | 0.01 | 1,230 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX5 | |
| Kirkland_Main-87 | Kirkland_Manholes-25 | 175.02 | Kirkland_Manholes-24 | 172.7 | 94.4 | 2.46 | 8 | PVC | 0.01 | 1,105 | 16 | 47 | 63 | 5.7 | SM14-Ex-EX5 | |
| Kirkland_Main-88 | Kirkland_Manholes-44 | 166.02 | Kirkland_Manholes-49 | 164.6 | 321.6 | 0.44 | 8 | PVC | 0.01 | 469 | 18 | 98 | 116 | 24.8 | SM14-Ex-EX5 | |
| Kirkland_Main-90 | Kirkland_Manholes-81 | 88.9 | Kirkland_Manholes-143 | 71.16 | 340.9 | 5.2 | 8 | PVC | 0.01 | 1,608 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-91 | Kirkland_Manholes-70 | 152.59 | Kirkland_Manholes-82 | 150.35 | 263.6 | 0.85 | 8 | PVC | 0.01 | 650 | 7 | 21 | 29 | 4.4 | SM14-Ex-EX15 | |
| Kirkland_Main-92 | Kirkland_Manholes-85 | 147.38 | Kirkland_Manholes-84 | 141.87 | 73.4 | 7.51 | 8 | PVC | 0.01 | 1,932 | 3 | 9 | 12 | 0.6 | SM14-Ex-EX24 | |
| Kirkland_Main-93 | Kirkland_Manholes-83 | 157.35 | Kirkland_Manholes-85 | 147.38 | 229.6 | 4.34 | 8 | PVC | 0.01 | 1,469 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX24 | |
| Kirkland_Main-95 | Kirkland_Manholes-82 | 150.35 | Kirkland_Manholes-86 | 148.26 | 180.8 | 1.16 | 8 | PVC | 0.01 | 758 | 8 | 26 | 34 | 4.5 | SM14-Ex-EX15 | |
| Kirkland_Main-96 | Kirkland_Manholes-87 | 163.95 | Kirkland_Manholes-147 | 139.14 | 319.7 | 7.76 | 8 | PVC | 0.01 | 1,964 | 40 | 111 | 151 | 7.7 | SM14-Ex-EX25 | |
| Kirkland_Main-97 | Kirkland_Manholes-67 | 185.01 | Kirkland_Manholes-87 | 163.95 | 332 | 6.34 | 8 | PVC | 0.01 | 1,776 | 38 | 107 | 144 | 8.1 | SM14-Ex-EX25 | |
| Kirkland_Main-98 | Kirkland_Manholes-88 | 192.85 | Kirkland_Manholes-89 | 177.59 | 273.6 | 5.58 | 8 | PVC | 0.01 | 1,665 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX26 | |
| Kirkland_Main-99 | Kirkland_Manholes-90 | 174.66 | Kirkland_Manholes-91 | 170.09 | 87.7 | 5.21 | 8 | PVC | 0.01 | 1,609 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX27 | |
| Kirkland_Main-100 | Kirkland_Manholes-92 | 172.99 | Kirkland_Manholes-91 | 170.09 | 82 | 3.53 | 8 | PVC | 0.01 | 1,325 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX27 | |
| Kirkland_Main-101 | Kirkland_Manholes-91 | 170.09 | Kirkland_Manholes-152 | 157.79 | 45.8 | 26.87 | 8 | PVC | 0.01 | 3,654 | 3 | 13 | 15 | 0.4 | SM14-Ex-EX27 | Slope verified in as-builts |
| Kirkland_Main-103 | Kirkland_Manholes-98 | 253.76 | Kirkland_Manholes-97 | 241.6 | 353.8 | 3.44 | 8 | PVC | 0.01 | 1,307 | 3 | 4 | 7 | 0.5 | SM14-Ex-EX8 | |
| Kirkland_Main-104 | Kirkland_Manholes-2944 | 250.07 | Kirkland_Manholes-2943 | 249.65 | 93.4 | 0.45 | 8 | PVC | 0.01 | 473 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-105 | Kirkland_Manholes-97 | 241.6 | Kirkland_Manholes-95 | 228.66 | 356.1 | 3.63 | 8 | PVC | 0.01 | 1,344 | 5 | 9 | 14 | 1 | SM14-Ex-EX8 | |
| Kirkland_Main-106 | Kirkland_Manholes-95 | 228.66 | Kirkland_Manholes-96 | 228 | 106.1 | 0.62 | 8 | PVC | 0.01 | 556 | 7 | 13 | 20 | 3.6 | SM14-Ex-EX8 | |
| Kirkland_Main-107 | Kirkland_Manholes-96 | 228 | Kirkland_Manholes-93 | 223.12 | 245.5 | 1.99 | 8 | PVC | 0.01 | 994 | 8 | 17 | 25 | 2.5 | SM14-Ex-EX8 | |
| Kirkland_Main-108 | Kirkland_Manholes-93 | 223.12 | Kirkland_Manholes-94 | 210.17 | 176.3 | 7.35 | 8 | PVC | 0.01 | 1,911 | 9 | 21 | 30 | 1.6 | SM14-Ex-EX8 | |
| Kirkland_Main-109 | Kirkland_Manholes-94 | 210.17 | Kirkland_Manholes-78 | 207.46 | 295.3 | 0.92 | 8 | PVC | 0.01 | 675 | 12 | 30 | 42 | 6.2 | SM14-Ex-EX17 | |
| Kirkland_Main-110 | Kirkland_Manholes-1024 | 212.11 | Kirkland_Manholes-94 | 210.17 | 143.5 | 1.35 | 8 | PVC | 0.01 | 820 | 1 | 4 | 6 | 0.7 | SM14-Ex-EX17 | |
| Kirkland_Main-111 | Kirkland_Manholes-106 | 44.49 | Kirkland_Manholes-242 | 21.02 | 301.2 | 7.79 | 8 | PVC | 0.01 | 1,968 | 46 | 209 | 255 | 12.9 | SM14-Ex-EX12 | |
| Kirkland_Main-112 | Kirkland_Manholes-105 | 48.51 | Kirkland_Manholes-106 | 44.49 | 358.2 | 1.12 | 8 | PVC | 0.01 | 747 | 44 | 205 | 249 | 33.3 | SM14-Ex-EX12 | |
| Kirkland_Main-113 | Kirkland_Manholes-103 | 59.75 | Kirkland_Manholes-105 | 48.51 | 350.5 | 3.21 | 8 | PVC | 0.01 | 1,263 | 43 | 201 | 244 | 19.3 | SM14-Ex-EX12 | |
| Kirkland_Main-114 | Kirkland_Manholes-104 | 60.14 | Kirkland_Manholes-103 | 59.75 | 61 | 0.64 | 8 | PVC | 0.01 | 564 | 8 | 43 | 51 | 9 | | |
| Kirkland_Main-115 | Kirkland_Manholes-102 | 61.04 | Kirkland_Manholes-104 | 60.14 | 158.9 | 0.57 | 8 | PVC | 0.01 | 531 | 7 | 38 | 46 | 8.6 | | |
| Kirkland_Main-116 | Kirkland_Manholes-101 | 61.95 | Kirkland_Manholes-102 | 61.04 | 98.7 | 0.92 | 8 | PVC | 0.01 | 676 | 7 | 34 | 41 | 6.1 | | |
| Kirkland_Main-117 | Kirkland_Manholes-99 | 74.09 | O-41 | 72.48 | 38.5 | 4.19 | 8 | PVC | 0.01 | 1,443 | 65 | 15 | 80 | 5.5 | | |
| Kirkland_Main-119 | Kirkland_Manholes-107 | 262.65 | Kirkland_Manholes-2737 | 259.86 | 239.4 | 1.17 | 8 | PVC | 0.01 | 761 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-120 | Kirkland_Manholes-109 | 325.4 | Kirkland_Manholes-110 | 324.77 | 37.7 | 1.67 | 8 | PVC | 0.01 | 912 | 11 | 53 | 64 | 7.1 | | |
| Kirkland_Main-121 | Kirkland_Manholes-110 | 324.77 | Kirkland_Manholes-111 | 324 | 11.2 | 6.85 | 8 | PVC | 0.01 | 1,846 | 18 | 76 | 93 | 5.1 | | |
| Kirkland_Main-122 | Kirkland_Manholes-108 | 326.5 | Kirkland_Manholes-109 | 325.4 | 336.7 | 0.33 | 8 | PVC | 0.01 | 403 | 9 | 30 | 40 | 9.8 | | |
| Kirkland_Main-123 | Kirkland_Manholes-112 | 326.56 | Kirkland_Manholes-110 | 324.77 | 134.2 | 1.33 | 8 | PVC | 0.01 | 814 | 6 | 15 | 21 | 2.6 | | |
| Kirkland_Main-124 | Kirkland_Manholes-113 | 357.54 | Kirkland_Manholes-112 | 326.56 | 558 | 5.55 | 8 | PVC | 0.01 | 1,661 | 4 | 8 | 12 | 0.7 | | |
| Kirkland_Main-125 | Kirkland_Manholes-134 | 351.46 | Kirkland_Manholes-835 | 347 | 314.9 | 1.42 | 8 | PVC | 0.01 | 839 | 2 | 4 | 6 | 0.7 | | Drop Connection |
| Kirkland_Main-126 | Kirkland_Manholes-128 | 355.4 | Kirkland_Manholes-127 | 354 | 128.2 | 1.09 | 8 | PVC | 0.01 | 737 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-127 | Kirkland_Manholes-127 | 354 | Kirkland_Manholes-126 | 343.91 | 279.9 | 3.6 | 8 | PVC | 0.01 | 1,339 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-128 | Kirkland_Manholes-126 | 343.91 | Kirkland_Manholes-125 | 337.71 | 240.8 | 2.58 | 8 | PVC | 0.01 | 1,131 | 5 | 12 | 17 | 1.5 | | |
| Kirkland_Main-129 | Kirkland_Manholes-125 | 337.71 | Kirkland_Manholes-838 | 337.31 | 98.6 | 0.41 | 8 | PVC | 0.01 | 449 | 6 | 16 | 22 | 4.9 | | |
| Kirkland_Main-130 | Kirkland_Manholes-129 | 356.73 | Kirkland_Manholes-130 | 350.77 | 205.5 | 2.9 | 8 | PVC | 0.01 | 1,201 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX32 | |
| Kirkland_Main-131 | Kirkland_Manholes-130 | 350.77 | Kirkland_Manholes-131 | 322.01 | 184.9 | 15.56 | 8 | PVC | 0.01 | 2,781 | 4 | 8 | 12 | 0.4 | | |
| Kirkland_Main-132 | Kirkland_Manholes-133 | 323.35 | Kirkland_Manholes-131 | 322.01 | 242.6 | 0.55 | 8 | PVC | 0.01 | 524 | 25 | 72 | 97 | 18.4 | | |
| Kirkland_Main-133 | Kirkland_Manholes-842 | 324.88 | Kirkland_Manholes-133 | 323.35 | 209.8 | 0.73 | 8 | PVC | 0.01 | 602 | 24 | 68 | 91 | 15.1 | | |
| Kirkland_Main-134 | Kirkland_Manholes-131 | 322.01 | Kirkland_Manholes-132 | 319.83 | 182.3 | 1.2 | 8 | PVC | 0.01 | 771 | 30 | 83 | 113 | 14.7 | | |
| Kirkland_Main-135 | Kirkland_Manholes-132 | 319.83 | Kirkland_Manholes-116 | 315.23 | 159 | 2.89 | 8 | PVC | 0.01 | 1,199 | 31 | 87 | 119 | 9.9 | | |
| Kirkland_Main-136 | Kirkland_Manholes-115 | 335.3 | Kirkland_Manholes-116 | 315.23 | 256.3 | 7.83 | 8 | PVC | 0.01 | 1,973 | 3 | 8 | 187 | 9.5 | | |
| Kirkland_Main-137 | Kirkland_Manholes-114 | 360.4 | Kirkland_Manholes-115 | 335.3 | 252.2 | 9.95 | 8 | PVC | 0.01 | 2,224 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-138 | Kirkland_Manholes-1806 | 38.89 | Kirkland_Manholes-2926 | 31.46 | 54.5 | 13.64 | 8 | PVC | 0.01 | 2,604 | 87 | 311 | 398 | 15.3 | SM4 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-139 | Kirkland_Manholes-2926 | 31.46 | Kirkland_Manholes-1396 | 27.46 | 24.1 | 16.61 | 8 | PVC | 0.01 | 2,873 | 87 | 319 | 406 | 14.1 | SM4 | |
| Kirkland_Main-140 | Kirkland_Manholes-123 | 328.2 | Kirkland_Manholes-124 | 326.1 | 151.9 | 1.38 | 8 | PVC | 0.01 | 829 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-141 | Kirkland_Manholes-124 | 326.1 | Kirkland_Manholes-109 | 325.4 | 313.3 | 0.22 | 8 | PVC | 0.01 | 333 | 2 | 15 | 17 | 5.2 | | |
| Kirkland_Main-142 | Kirkland_Manholes-122 | 345.33 | Kirkland_Manholes-108 | 326.5 | 238.6 | 7.89 | 8 | PVC | 0.01 | 1,981 | 9 | 23 | 32 | 1.6 | | |
| Kirkland_Main-143 | Kirkland_Manholes-120 | 360.7 | Kirkland_Manholes-121 | 358.16 | 294.2 | 0.86 | 8 | PVC | 0.01 | 655 | 3 | 8 | 11 | 1.7 | | |
| Kirkland_Main-144 | Kirkland_Manholes-121 | 358.16 | Kirkland_Manholes-122 | 345.33 | 387.6 | 3.31 | 8 | PVC | 0.01 | 1,283 | 6 | 15 | 21 | 1.6 | | |
| Kirkland_Main-145 | Kirkland_Manholes-119 | 359.58 | Kirkland_Manholes-118 | 354.26 | 105.6 | 5.04 | 8 | PVC | 0.01 | 1,583 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-146 | Kirkland_Manholes-118 | 354.26 | Kirkland_Manholes-117 | 315.69 | 251.8 | 15.32 | 8 | PVC | 0.01 | 2,760 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-147 | Kirkland_Manholes-117 | 315.69 | Kirkland_Manholes-116 | 315.23 | 331.8 | 0.14 | 8 | PVC | 0.01 | 263 | 3 | 12 | 15 | 5.6 | | |
| Kirkland_Main-148 | Kirkland_Manholes-116 | 315.23 | Kirkland_Manholes-137 | 298.8 | 246.4 | 6.67 | 8 | PVC | 0.01 | 1,821 | 38 | 111 | 325 | 17.8 | | |
| Kirkland_Main-149 | Kirkland_Manholes-137 | 298.8 | Kirkland_Manholes-1076 | 298.68 | 103.3 | 0.12 | 12 | PVC | 0.01 | 709 | 40 | 119 | 336 | 47.4 | SM14-Ex-EX23 | |
| Kirkland_Main-150 | Kirkland_Manholes-138 | 300.28 | Kirkland_Manholes-137 | 298.8 | 187.2 | 0.79 | 8 | PVC | 0.01 | 627 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-151 | Kirkland_Manholes-135 | 297.13 | Kirkland_Manholes-136 | 295.76 | 244.5 | 0.56 | 8 | PVC | 0.01 | 528 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-152 | Kirkland_Manholes-136 | 295.76 | Kirkland_Manholes-1064 | 278.57 | 324.4 | 5.3 | 8 | PVC | 0.01 | 1,623 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-154 | Kirkland_Manholes-139 | 305.82 | Kirkland_Manholes-1078 | 305.14 | 98 | 0.69 | 8 | PVC | 0.01 | 587 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-156 | Kirkland_Manholes-140 | 281.69 | Kirkland_Manholes-141 | 277.32 | 84.7 | 5.16 | 8 | PVC | 0.01 | 1,601 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-157 | Kirkland_Manholes-141 | 277.32 | Kirkland_Manholes-142 | 276.94 | 95.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | Drop Connection |
| Kirkland_Main-158 | Kirkland_Manholes-142 | 255.54 | Kirkland_Manholes-1090 | 254.86 | 50.7 | 1.34 | 8 | PVC | 0.01 | 817 | 1 | 12 | 13 | 1.6 | | |
| Kirkland_Main-160 | Kirkland_Manholes-111 | 324 | TREND_WETWELL | 317.75 | 16.6 | 37.69 | 8 | PVC | 0.01 | 4,328 | 18 | 83 | 102 | 2.3 | | |
| Kirkland_Main-161 | Kirkland_Manholes-144 | 88.96 | Kirkland_Manholes-146 | 84.42 | 39.5 | 11.5 | 8 | PVC | 0.01 | 2,391 | 6 | 17 | 23 | 1 | | |
| Kirkland_Main-162 | Kirkland_Manholes-86 | 148.26 | Kirkland_Manholes-157 | 123.36 | 221.1 | 11.26 | 8 | PVC | 0.01 | 2,366 | 9 | 30 | 39 | 1.7 | SM14-Ex-EX15 | |
| Kirkland_Main-163 | Kirkland_Manholes-84 | 141.87 | Kirkland_Manholes-155 | 126.86 | 190.9 | 7.86 | 8 | PVC | 0.01 | 1,977 | 4 | 13 | 17 | 0.9 | SM14-Ex-EX24 | |
| Kirkland_Main-164 | Kirkland_Manholes-156 | 125.08 | Kirkland_Manholes-157 | 123.36 | 264.1 | 0.65 | 8 | PVC | 0.01 | 569 | 6 | 21 | 28 | 4.9 | SM14-Ex-EX24 | |
| Kirkland_Main-165 | Kirkland_Manholes-157 | 123.36 | Kirkland_Manholes-158 | 121.97 | 144.6 | 0.96 | 8 | PVC | 0.01 | 691 | 17 | 55 | 72 | 10.4 | SM14-Ex-EX15 | |
| Kirkland_Main-166 | Kirkland_Manholes-147 | 139.14 | Kirkland_Manholes-148 | 138.62 | 289.8 | 0.18 | 8 | PVC | 0.01 | 299 | 42 | 115 | 157 | 52.6 | SM14-Ex-EX25 | |
| Kirkland_Main-167 | Kirkland_Manholes-148 | 138.62 | Kirkland_Manholes-149 | 122.95 | 57.1 | 27.47 | 8 | PVC | 0.01 | 3,695 | 42 | 119 | 162 | 4.4 | SM14-Ex-EX25 | |
| Kirkland_Main-168 | Kirkland_Manholes-149 | 122.95 | Kirkland_Manholes-150 | 116.05 | 168.5 | 4.1 | 8 | PVC | 0.01 | 1,427 | 42 | 124 | 166 | 11.6 | SM14-Ex-EX25 | |
| Kirkland_Main-169 | Kirkland_Manholes-153 | 130.01 | Kirkland_Manholes-150 | 116.05 | 56.4 | 24.77 | 8 | PVC | 0.01 | 3,509 | 5 | 17 | 22 | 0.6 | SM14-Ex-EX26 | |
| Kirkland_Main-170 | Kirkland_Manholes-150 | 116.05 | Kirkland_Manholes-159 | 80.68 | 226.3 | 15.63 | 8 | PVC | 0.01 | 2,788 | 52 | 166 | 218 | 7.8 | SM14-Ex-EX28 | |
| Kirkland_Main-171 | Kirkland_Manholes-151 | 132.11 | Kirkland_Manholes-150 | 116.05 | 132.2 | 12.15 | 8 | PVC | 0.01 | 2,458 | 3 | 21 | 25 | 1 | SM14-Ex-EX27 | |
| Kirkland_Main-172 | Kirkland_Manholes-152 | 157.79 | Kirkland_Manholes-151 | 132.11 | 148.9 | 17.25 | 8 | PVC | 0.01 | 2,928 | 3 | 17 | 20 | 0.7 | SM14-Ex-EX27 | |
| Kirkland_Main-173 | Kirkland_Manholes-174 | 143.33 | Kirkland_Manholes-153 | 130.01 | 57.7 | 23.09 | 8 | PVC | 0.01 | 3,388 | 4 | 13 | 17 | 0.5 | SM14-Ex-EX26 | |
| Kirkland_Main-174 | Kirkland_Manholes-89 | 177.59 | Kirkland_Manholes-174 | 143.33 | 179.4 | 19.1 | 8 | PVC | 0.01 | 3,081 | 3 | 9 | 12 | 0.4 | SM14-Ex-EX26 | |
| Kirkland_Main-175 | Kirkland_Manholes-155 | 126.86 | Kirkland_Manholes-156 | 125.08 | 248.1 | 0.72 | 8 | PVC | 0.01 | 597 | 5 | 17 | 22 | 3.6 | SM14-Ex-EX24 | |
| Kirkland_Main-176 | Kirkland_Manholes-158 | 121.97 | Kirkland_Manholes-160 | 41.73 | 324.9 | 24.69 | 8 | PVC | 0.01 | 3,504 | 18 | 60 | 78 | 2.2 | SM14-Ex-EX15 | |
| Kirkland_Main-177 | Kirkland_Manholes-160 | 41.73 | Kirkland_Manholes-175 | 34.4 | 159.3 | 4.6 | 8 | PVC | 0.01 | 1,512 | 19 | 64 | 83 | 5.5 | SM14-Ex-EX15 | |
| Kirkland_Main-178 | Kirkland_Manholes-168 | 22.33 | Kirkland_Manholes-166 | 21.44 | 221.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-179 | Kirkland_Manholes-165 | 60.59 | Kirkland_Manholes-166 | 21.44 | 398.8 | 9.82 | 8 | PVC | 0.01 | 2,209 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-180 | Kirkland_Manholes-166 | 21.44 | Kirkland_Manholes-167 | 21.4 | 9.5 | 0.4 | 8 | PVC | 0.01 | 445 | 2 | 13 | 15 | 3.4 | | Drop Connection |
| Kirkland_Main-181 | Kirkland_Manholes-143 | 71.16 | Kirkland_Manholes-164 | 59.16 | 83.9 | 14.3 | 8 | PVC | 0.01 | 2,666 | 13 | 47 | 60 | 2.2 | | |
| Kirkland_Main-182 | Kirkland_Manholes-146 | 84.42 | Kirkland_Manholes-143 | 71.16 | 154.2 | 8.6 | 8 | PVC | 0.01 | 2,067 | 10 | 38 | 49 | 2.4 | | |
| Kirkland_Main-183 | Kirkland_Manholes-163 | 106.36 | Kirkland_Manholes-146 | 84.42 | 161.9 | 13.55 | 8 | PVC | 0.01 | 2,596 | 4 | 17 | 21 | 0.8 | | |
| Kirkland_Main-184 | Kirkland_Manholes-161 | 132.09 | Kirkland_Manholes-162 | 124.37 | 152 | 5.08 | 8 | PVC | 0.01 | 1,589 | 3 | 9 | 11 | 0.7 | | |
| Kirkland_Main-185 | Kirkland_Manholes-162 | 124.37 | Kirkland_Manholes-163 | 106.36 | 185.8 | 9.69 | 8 | PVC | 0.01 | 2,195 | 4 | 13 | 16 | 0.7 | | |
| Kirkland_Main-186 | Kirkland_Manholes-169 | 21.92 | Kirkland_Manholes-167 | 19.46 | 234.8 | 1.05 | 18 | PVC | 0.01 | 6,274 | 303 | 1,101 | 1,404 | 22.4 | SM3 | |
| Kirkland_Main-187 | Kirkland_Manholes-170 | 23.23 | Kirkland_Manholes-169 | 21.92 | 100.1 | 1.31 | 18 | PVC | 0.01 | 7,012 | 300 | 1,084 | 1,384 | 19.7 | SM3 | |
| Kirkland_Main-188 | Kirkland_Manholes-2762 | 13.1 | Kirkland_Manholes-2761 | 12.79 | 196.5 | 0.16 | 36 | PVC | 0.01 | 15,458 | 446 | 1,555 | 2,302 | 14.9 | SM14-Ex-EX10 | |
| Kirkland_Main-189 | Kirkland_Manholes-173 | 34.1 | Kirkland_Manholes-172 | 31.43 | 44.6 | 5.99 | 8 | PVC | 0.01 | 1,725 | 3 | 13 | 15 | 0.9 | | |
| Kirkland_Main-190 | Kirkland_Manholes-178 | 67.04 | Kirkland_Manholes-179 | 37.91 | 174.4 | 16.71 | 8 | PVC | 0.01 | 2,882 | 4 | 9 | 13 | 0.4 | | |
| Kirkland_Main-191 | Kirkland_Manholes-154 | 101.95 | Kirkland_Manholes-178 | 67.04 | 253.3 | 13.78 | 8 | PVC | 0.01 | 2,617 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-192 | Kirkland_Manholes-188 | 58.06 | Kirkland_Manholes-187 | 54.23 | 46.2 | 8.28 | 15 | PVC | 0.01 | 10,848 | 202 | 661 | 864 | 8 | SM14-Ex-EX30 | |
| Kirkland_Main-193 | Kirkland_Manholes-187 | 54.23 | Kirkland_Manholes-185 | 53.13 | 306 | 0.36 | 36 | PVC | 0.01 | 23,331 | 203 | 666 | 869 | 3.7 | SM14-Ex-EX30 | |
| Kirkland_Main-194 | Kirkland_Manholes-159 | 80.68 | Kirkland_Manholes-186 | 56.15 | 205.5 | 11.94 | 8 | PVC | 0.01 | 2,436 | 52 | 171 | 223 | 9.2 | SM14-Ex-EX28 | |
| Kirkland_Main-195 | Kirkland_Manholes-189 | 57.91 | Kirkland_Manholes-186 | 56.15 | 258.6 | 0.68 | 8 | PVC | 0.01 | 582 | 2 | 4 | 6 | 1 | SM14-Ex-EX29 | |
| Kirkland_Main-196 | Kirkland_Manholes-186 | 56.15 | Kirkland_Manholes-185 | 53.13 | 48.4 | 6.24 | 12 | PVC | 0.01 | 5,193 | 55 | 179 | 234 | 4.5 | SM14-Ex-EX28 | |
| Kirkland_Main-197 | Kirkland_Manholes-185 | 53.13 | Kirkland_Manholes-183 | 41.05 | 170.7 | 7.08 | 15 | PVC | 0.01 | 10,026 | 258 | 849 | 1,108 | 11 | SM14-Ex-EX30 | |
| Kirkland_Main-198 | Kirkland_Manholes-182 | 53.5 | Kirkland_Manholes-181 | 38.4 | 151.6 | 9.96 | 8 | PVC | 0.01 | 2,225 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-199 | Kirkland_Manholes-314 | 150.22 | Kirkland_Manholes-315 | 148.46 | 139.8 | 1.26 | 8 | PVC | 0.01 | 791 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-200 | Kirkland_Manholes-315 | 148.46 | Kirkland_Manholes-316 | 147.8 | 125.4 | 0.53 | 8 | PVC | 0.01 | 512 | 0 | 9 | 9 | 1.7 | | |
| Kirkland_Main-201 | Kirkland_Manholes-316 | 147.8 | Kirkland_Manholes-317 | 146.79 | 246.9 | 0.41 | 12 | PVC | 0.01 | 1,330 | 89 | 316 | 405 | 30.5 | SM14-Ex-EX30 | |
| Kirkland_Main-202 | Kirkland_Manholes-1205 | 19.63 | Kirkland_Manholes-1850 | 19.39 | 404.6 | 0.06 | 8 | PVC | 0.01 | 172 | 1 | 6 | 7 | 4.1 | SM10 | |
| Kirkland_Main-203 | Kirkland_Manholes-1187 | 22.69 | Kirkland_Manholes-1188 | 22.09 | 184.7 | 0.32 | 12 | PVC | 0.01 | 1,185 | 1 | 9 | 9 | 0.8 | SM14-Ex-EX37 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-204 | Kirkland_Manholes-1188 | 22.09 | Kirkland_Manholes-1189 | 21.99 | 127.3 | 0.08 | 12 | PVC | 0.01 | 583 | 2 | 18 | 19 | 3.3 | SM14-Ex-EX37 | |
| Kirkland_Main-205 | Kirkland_Manholes-1189 | 21.99 | Kirkland_Manholes-1202 | 18.39 | 139.2 | 2.59 | 12 | PVC | 0.01 | 3,343 | 3 | 27 | 30 | 0.9 | SM14-Ex-EX37 | |
| Kirkland_Main-206 | Kirkland_Manholes-1202 | 18.39 | Kirkland_Manholes-1203 | 18.22 | 388.5 | 0.04 | 12 | PVC | 0.01 | 435 | 5 | 35 | 40 | 9.3 | SM14-Ex-EX37 | |
| Kirkland_Main-207 | Kirkland_Manholes-1203 | 18.22 | Kirkland_Manholes-1204 | 17.89 | 122.5 | 0.27 | 12 | PVC | 0.01 | 1,079 | 6 | 44 | 50 | 4.6 | SM14-Ex-EX37 | |
| Kirkland_Main-208 | Kirkland_Manholes-1204 | 17.89 | Kirkland_Manholes-516 | 17.69 | 304.6 | 0.07 | 12 | PVC | 0.01 | 533 | 7 | 53 | 60 | 11.3 | SM14-Ex-EX37 | |
| Kirkland_Main-209 | Kirkland_Manholes-1197 | 181.82 | Kirkland_Manholes-1196 | 172.3 | 310.3 | 3.07 | 8 | | 0.012 | 1,029 | 1 | 41 | 42 | 4.1 | | |
| Kirkland_Main-210 | Kirkland_Manholes-1196 | 172.3 | Kirkland_Manholes-1195 | 162.64 | 327.7 | 2.95 | 8 | | 0.012 | 1,009 | 2 | 49 | 51 | 5.1 | | |
| Kirkland_Main-211 | Kirkland_Manholes-1195 | 162.64 | Kirkland_Manholes-1190 | 151.12 | 307.8 | 3.74 | 8 | | 0.012 | 1,137 | 2 | 58 | 60 | 5.3 | | |
| Kirkland_Main-212 | Kirkland_Manholes-1190 | 151.12 | Kirkland_Manholes-1405 | 132.7 | 345 | 5.34 | 8 | | 0.012 | 1,358 | 4 | 74 | 78 | 5.7 | | |
| Kirkland_Main-213 | Kirkland_Manholes-1191 | 345.24 | Kirkland_Manholes-1192 | 340.89 | 127.3 | 3.42 | 6 | Vitrified Clay | 0.013 | 465 | 14 | 4 | 18 | 3.8 | | |
| Kirkland_Main-214 | Kirkland_Manholes-1192 | 340.89 | Kirkland_Manholes-1193 | 318.62 | 250.8 | 8.88 | 6 | Vitrified Clay | 0.013 | 750 | 60 | 8 | 67 | 9 | | |
| Kirkland_Main-215 | Kirkland_Manholes-1193 | 318.62 | Kirkland_Manholes-1194 | 312.16 | 165.2 | 3.91 | 6 | Vitrified Clay | 0.013 | 498 | 60 | 12 | 71 | 14.3 | | |
| Kirkland_Main-216 | Kirkland_Manholes-1194 | 312.16 | Kirkland_Manholes-1212 | 307.51 | 140.5 | 3.31 | 6 | Concrete | 0.013 | 458 | 60 | 16 | 75 | 16.5 | | |
| Kirkland_Main-217 | Kirkland_Manholes-1146 | 215.3 | Kirkland_Manholes-500 | 209.24 | 317 | 1.91 | 8 | PVC | 0.01 | 975 | 13 | 49 | 62 | 6.4 | SM4 | |
| Kirkland_Main-218 | Kirkland_Manholes-1225 | 212.63 | Kirkland_Manholes-1147 | 194.47 | 343.1 | 5.29 | 8 | PVC | 0.01 | 1,622 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX88 | |
| Kirkland_Main-219 | Kirkland_Manholes-500 | 209.24 | Kirkland_Manholes-1147 | 194.47 | 315.3 | 4.68 | 8 | PVC | 0.01 | 1,526 | 18 | 66 | 84 | 5.5 | SM4 | |
| Kirkland_Main-220 | Kirkland_Manholes-1149 | 192.13 | Kirkland_Manholes-1148 | 179.25 | 269.3 | 4.78 | 8 | PVC | 0.01 | 1,542 | 17 | 64 | 81 | 5.3 | SM14-Ex-EX89 | |
| Kirkland_Main-221 | Kirkland_Manholes-1147 | 194.47 | Kirkland_Manholes-1148 | 179.25 | 319 | 4.77 | 8 | PVC | 0.01 | 1,540 | 22 | 82 | 104 | 6.8 | SM4 | |
| Kirkland_Main-222 | Kirkland_Manholes-1148 | 179.25 | Kirkland_Manholes-1796 | 160.8 | 313.7 | 5.88 | 8 | PVC | 0.01 | 1,710 | 41 | 154 | 196 | 11.4 | SM4 | |
| Kirkland_Main-223 | Kirkland_Manholes-1171 | 160.49 | Kirkland_Manholes-1150 | 151.79 | 210.3 | 4.14 | 8 | PVC | 0.01 | 1,434 | 7 | 41 | 48 | 3.4 | SM10 | |
| Kirkland_Main-224 | Kirkland_Manholes-1129 | 164.28 | Kirkland_Manholes-1128 | 162.57 | 73.5 | 2.33 | 8 | PVC | 0.01 | 1,075 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX4 | |
| Kirkland_Main-225 | Kirkland_Manholes-1111 | 165.6 | O-8 | 165.51 | 22.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | |
| Kirkland_Main-227 | Kirkland_Manholes-197 | 50.1 | Kirkland_Manholes-196 | 49.03 | 107.3 | 1 | 8 | PVC | 0.01 | 704 | 7 | 34 | 41 | 5.9 | SM14-Ex-EX43 | |
| Kirkland_Main-228 | Kirkland_Manholes-196 | 49.03 | Kirkland_Manholes-195 | 48.03 | 74.6 | 1.34 | 8 | PVC | 0.01 | 816 | 8 | 38 | 46 | 5.7 | SM14-Ex-EX43 | |
| Kirkland_Main-229 | Kirkland_Manholes-740 | 221.28 | Kirkland_Manholes-711 | 219.85 | 98.7 | 1.45 | 8 | PVC | 0.01 | 849 | 9 | 4 | 13 | 1.5 | | |
| Kirkland_Main-230 | Kirkland_Manholes-1107 | 164.79 | O-9 | 160.2 | 26.3 | 17.47 | 8 | PVC | 0.01 | 2,947 | 0 | 8 | 8 | 0.3 | SM14-Ex-EX21 | |
| Kirkland_Main-231 | Kirkland_Manholes-1106 | 168.9 | O-10 | 168.5 | 24.6 | 1.64 | 18 | PVC | 0.01 | 7,851 | 580 | 2,122 | 2,702 | 34.4 | | Drop Connection |
| Kirkland_Main-232 | Kirkland_Manholes-1118 | 200.71 | Kirkland_Manholes-1117 | 196.58 | 128.3 | 3.22 | 8 | PVC | 0.01 | 1,265 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-233 | Kirkland_Manholes-1115 | 186.39 | Kirkland_Manholes-1114 | 181.51 | 185.2 | 2.63 | 15 | PVC | 0.01 | 6,118 | 18 | 16 | 34 | 0.6 | | |
| Kirkland_Main-234 | Kirkland_Manholes-1114 | 181.51 | Kirkland_Manholes-1113 | 180.6 | 148.4 | 0.61 | 15 | PVC | 0.01 | 2,952 | 34 | 20 | 54 | 1.8 | | |
| Kirkland_Main-235 | Kirkland_Manholes-1143 | 203.09 | Kirkland_Manholes-1144 | 194 | 101.9 | 8.92 | 8 | PVC | 0.01 | 2,105 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX82 | |
| Kirkland_Main-236 | Kirkland_Manholes-1144 | 194 | Kirkland_Manholes-1145 | 190.6 | 30.2 | 11.26 | 8 | PVC | 0.01 | 2,366 | 1 | 16 | 18 | 0.7 | | |
| Kirkland_Main-237 | Kirkland_Manholes-1145 | 190.6 | Kirkland_Manholes-1211 | 186.99 | 174.5 | 2.07 | 8 | PVC | 0.01 | 1,014 | 1 | 25 | 26 | 2.6 | | |
| Kirkland_Main-238 | Kirkland_Manholes-1184 | 19.39 | Kirkland_Manholes-1185 | 19.29 | 139.1 | 0.07 | 12 | PVC | 0.01 | 557 | 28 | 177 | 205 | 36.8 | SM14-Ex-EX37 | |
| Kirkland_Main-239 | Kirkland_Manholes-1183 | 19.89 | Kirkland_Manholes-1184 | 19.39 | 178.8 | 0.28 | 12 | PVC | 0.01 | 1,099 | 27 | 168 | 195 | 17.7 | SM14-Ex-EX37 | |
| Kirkland_Main-242 | Kirkland_Manholes-1131 | 191.56 | Kirkland_Manholes-1200 | 169.25 | 277.8 | 8.03 | 8 | PVC | 0.01 | 1,998 | 16 | 40 | 56 | 2.8 | SM14-Ex-EX63 | |
| Kirkland_Main-243 | Kirkland_Manholes-1200 | 169.25 | Kirkland_Manholes-1201 | 159.96 | 155.1 | 5.99 | 8 | PVC | 0.01 | 1,726 | 19 | 45 | 63 | 3.7 | SM14-Ex-EX62 | |
| Kirkland_Main-244 | Kirkland_Manholes-1201 | 159.96 | Kirkland_Manholes-1182 | 159 | 65 | 1.48 | 8 | PVC | 0.01 | 857 | 20 | 49 | 69 | 8 | SM14-Ex-EX62 | |
| Kirkland_Main-245 | Kirkland_Manholes-1182 | 159 | Kirkland_Manholes-529 | 155.16 | 83.2 | 4.62 | 8 | PVC | 0.01 | 1,515 | 20 | 53 | 73 | 4.8 | SM14-Ex-EX62 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-246 | Kirkland_Manholes-529 | 155.16 | Kirkland_Manholes-527 | 146.55 | 210.2 | 4.1 | 8 | PVC | 0.01 | 1,427 | 21 | 57 | 78 | 5.5 | SM10 | |
| Kirkland_Main-247 | Kirkland_Manholes-516 | 17.69 | Kirkland_Manholes-2958 | 17.19 | 310.2 | 0.16 | 12 | PVC | 0.01 | 835 | 8 | 62 | 70 | 8.4 | SM14-Ex-EX37 | |
| Kirkland_Main-248 | Kirkland_Manholes-318 | 146.51 | Kirkland_Manholes-2957 | 145.86 | 162.1 | 0.4 | 12 | PVC | 0.01 | 1,315 | 89 | 324 | 414 | 31.5 | SM14-Ex-EX30 | |
| Kirkland_Main-249 | Kirkland_Manholes-2957 | 145.86 | Kirkland_Manholes-426 | 144.6 | 315.5 | 0.4 | 12 | PVC | 0.01 | 1,315 | 93 | 329 | 422 | 32.1 | SM14-Ex-EX30 | |
| Kirkland_Main-251 | Kirkland_Manholes-524 | 157.52 | Kirkland_Manholes-525 | 156.27 | 278.3 | 0.45 | 8 | PVC | 0.01 | 473 | 2 | 16 | 18 | 3.8 | SM10 | |
| Kirkland_Main-253 | Kirkland_Manholes-2932 | 327.56 | Kirkland_Manholes-2931 | 326.77 | 30 | 2.63 | 8 | PVC | 0.01 | 1,144 | 2 | 24 | 26 | 2.3 | | |
| Kirkland_Main-254 | Kirkland_Manholes-2931 | 326.77 | Kirkland_Manholes-2930 | 326.38 | 131.8 | 0.3 | 8 | PVC | 0.01 | 384 | 3 | 28 | 31 | 8.1 | | |
| Kirkland_Main-255 | Kirkland_Manholes-2930 | 326.38 | Kirkland_Manholes-878 | 325.66 | 147.9 | 0.49 | 8 | PVC | 0.01 | 492 | 3 | 32 | 35 | 7.1 | | |
| Kirkland_Main-257 | Kirkland_Manholes-2345 | 343.84 | Kirkland_Manholes-2343 | 315.2 | 169.5 | 16.9 | 8 | PVC | 0.01 | 2,898 | 6 | 20 | 26 | 0.9 | SM14-Ex-EX255 | |
| Kirkland_Main-258 | Kirkland_Manholes-2344 | 315.75 | Kirkland_Manholes-2343 | 315.2 | 137.3 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 12 | 18 | 4 | SM14-Ex-EX254 | |
| Kirkland_Main-259 | Kirkland_Manholes-2256 | 329.88 | Kirkland_Manholes-2344 | 315.75 | 334.7 | 4.22 | 8 | PVC | 0.01 | 1,449 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX254 | |
| Kirkland_Main-261 | Kirkland_Manholes-2346 | 349.24 | Kirkland_Manholes-2345 | 343.84 | 323.2 | 1.67 | 8 | PVC | 0.01 | 911 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX255 | |
| Kirkland_Main-262 | Kirkland_Manholes-2347 | 359.76 | Kirkland_Manholes-2345 | 343.84 | 158.1 | 10.07 | 8 | PVC | 0.01 | 2,237 | 2 | 12 | 14 | 0.6 | SM14-Ex-EX255 | |
| Kirkland_Main-263 | Kirkland_Manholes-2348 | 314.6 | Kirkland_Manholes-2334 | 313.34 | 224.3 | 0.56 | 8 | PVC | 0.01 | 528 | 14 | 40 | 54 | 10.2 | SM14-Ex-EX254 | |
| Kirkland_Main-264 | Kirkland_Manholes-2350 | 364.04 | Kirkland_Manholes-2347 | 359.76 | 357 | 1.2 | 8 | PVC | 0.01 | 772 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX255 | |
| Kirkland_Main-265 | Kirkland_Manholes-2351 | 360.37 | Kirkland_Manholes-2347 | 359.76 | 181.2 | 0.34 | 8 | PVC | 0.01 | 409 | 1 | 4 | 5 | 1.2 | SM14-Ex-EX255 | |
| Kirkland_Main-266 | Kirkland_Manholes-2352 | 284.5 | Kirkland_Manholes-2259 | 272.05 | 240.1 | 5.18 | 8 | PVC | 0.01 | 1,605 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX250 | |
| Kirkland_Main-267 | Kirkland_Manholes-2353 | 298.2 | Kirkland_Manholes-2332 | 296.43 | 253 | 0.7 | 8 | PVC | 0.01 | 590 | 2 | 4 | 6 | 1 | SM14-Ex-EX253 | |
| Kirkland_Main-268 | Kirkland_Manholes-2355 | 240.55 | Kirkland_Manholes-2124 | 217.78 | 364.4 | 6.25 | 12 | PVC | 0.01 | 5,196 | 249 | 882 | 1,131 | 21.8 | SM14-Ex-EX248 | |
| Kirkland_Main-269 | Kirkland_Manholes-2354 | 256.04 | Kirkland_Manholes-2355 | 240.55 | 281.2 | 5.51 | 12 | PVC | 0.01 | 4,879 | 246 | 878 | 1,124 | 23 | SM14-Ex-EX248 | |
| Kirkland_Main-270 | Kirkland_Manholes-2357 | 271.18 | Kirkland_Manholes-2354 | 256.04 | 199.4 | 7.59 | 8 | PVC | 0.01 | 1,943 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX249 | |
| Kirkland_Main-271 | Kirkland_Manholes-2258 | 263.77 | Kirkland_Manholes-2354 | 256.04 | 150.5 | 5.14 | 12 | PVC | 0.01 | 4,711 | 243 | 866 | 1,109 | 23.5 | SM14-Ex-EX248 | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-272 | Kirkland_Manholes-2356 | 278.21 | Kirkland_Manholes-2357 | 271.18 | 149.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-273 | Kirkland_Manholes-2324 | 245.37 | Kirkland_Manholes-2420 | 230.11 | 227.1 | 6.72 | 8 | PVC | 0.01 | 1,828 | 40 | 147 | 187 | 10.2 | | |
| Kirkland_Main-274 | Kirkland_Manholes-2358 | 262.09 | Kirkland_Manholes-2412 | 260.78 | 357.3 | 0.37 | 8 | PVC | 0.01 | 427 | 4 | 8 | 12 | 2.7 | | |
| Kirkland_Main-275 | Kirkland_Manholes-2359 | 271.5 | Kirkland_Manholes-2358 | 262.09 | 128.6 | 7.32 | 8 | PVC | 0.01 | 1,907 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-276 | Kirkland_Manholes-2362 | 285.37 | Kirkland_Manholes-2360 | 266.1 | 385.1 | 5 | 8 | PVC | 0.01 | 1,577 | 19 | 60 | 78 | 5 | | |
| Kirkland_Main-277 | Kirkland_Manholes-2360 | 266.1 | Kirkland_Manholes-2411 | 259.15 | 259.9 | 2.67 | 8 | PVC | 0.01 | 1,153 | 20 | 64 | 84 | 7.3 | | |
| Kirkland_Main-278 | Kirkland_Manholes-2361 | 291.01 | Kirkland_Manholes-2362 | 285.37 | 28 | 20.16 | 8 | PVC | 0.01 | 3,166 | 3 | 8 | 11 | 0.3 | | |
| Kirkland_Main-279 | Kirkland_Manholes-2371 | 291.2 | Kirkland_Manholes-2362 | 285.37 | 123.7 | 4.71 | 8 | PVC | 0.01 | 1,530 | 15 | 48 | 62 | 4.1 | | |
| Kirkland_Main-280 | Kirkland_Manholes-2363 | 291.88 | Kirkland_Manholes-2361 | 291.01 | 353 | 0.25 | 8 | PVC | 0.01 | 350 | 2 | 4 | 6 | 1.6 | | |
| Kirkland_Main-281 | Kirkland_Manholes-2364 | 284.3 | Kirkland_Manholes-2429 | 273.52 | 255 | 4.23 | 8 | PVC | 0.01 | 1,450 | 26 | 91 | 117 | 8.1 | SM14-Ex-EX260 | |
| Kirkland_Main-282 | Kirkland_Manholes-2382 | 327.1 | Kirkland_Manholes-2369 | 315.99 | 220.4 | 5.04 | 8 | PVC | 0.01 | 1,583 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-283 | Kirkland_Manholes-2369 | 315.99 | Kirkland_Manholes-2370 | 312.97 | 65.7 | 4.59 | 8 | PVC | 0.01 | 1,511 | 22 | 68 | 90 | 5.9 | SM14-Ex-EX260 | |
| Kirkland_Main-284 | Kirkland_Manholes-2383 | 328.5 | Kirkland_Manholes-2369 | 315.99 | 277.1 | 4.51 | 8 | PVC | 0.01 | 1,498 | 19 | 60 | 78 | 5.2 | SM14-Ex-EX260 | |
| Kirkland_Main-285 | Kirkland_Manholes-2370 | 312.97 | Kirkland_Manholes-2367 | 295.27 | 303.5 | 5.83 | 8 | PVC | 0.01 | 1,703 | 23 | 72 | 94 | 5.5 | SM14-Ex-EX260 | |
| Kirkland_Main-286 | Kirkland_Manholes-2365 | 289.93 | Kirkland_Manholes-2364 | 284.3 | 103.6 | 5.44 | 8 | PVC | 0.01 | 1,644 | 25 | 87 | 113 | 6.9 | SM14-Ex-EX260 | |
| Kirkland_Main-287 | Kirkland_Manholes-2367 | 295.27 | Kirkland_Manholes-2366 | 292.68 | 34.9 | 7.43 | 8 | PVC | 0.01 | 1,921 | 24 | 75 | 99 | 5.2 | SM14-Ex-EX260 | |
| Kirkland_Main-288 | Kirkland_Manholes-181 | 38.4 | Kirkland_Manholes-180 | 38.25 | 24 | 0.62 | 8 | PVC | 0.01 | 555 | 2 | 13 | 14 | 2.6 | | |
| Kirkland_Main-289 | Kirkland_Manholes-184 | 40.15 | Kirkland_Manholes-181 | 38.4 | 362.3 | 0.48 | 8 | PVC | 0.01 | 490 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-290 | Kirkland_Manholes-180 | 38.25 | Kirkland_Manholes-179 | 37.91 | 155.1 | 0.22 | 18 | PVC | 0.01 | 2,874 | 270 | 947 | 1,218 | 42.4 | SM3 | |
| Kirkland_Main-291 | Kirkland_Manholes-179 | 37.91 | Kirkland_Manholes-177 | 35.5 | 248.2 | 0.97 | 18 | PVC | 0.01 | 6,039 | 275 | 960 | 1,235 | 20.4 | SM3 | |
| Kirkland_Main-292 | Kirkland_Manholes-177 | 35.5 | Kirkland_Manholes-176 | 34.72 | 401.5 | 0.19 | 18 | PVC | 0.01 | 2,705 | 277 | 986 | 1,263 | 46.7 | SM3 | |
| Kirkland_Main-293 | Kirkland_Manholes-176 | 34.72 | Kirkland_Manholes-175 | 34.4 | 144.6 | 0.22 | 18 | PVC | 0.01 | 2,875 | 278 | 990 | 1,268 | 44.1 | SM3 | |
| Kirkland_Main-294 | Kirkland_Manholes-175 | 34.4 | Kirkland_Manholes-171 | 25.99 | 328.5 | 2.56 | 18 | PVC | 0.01 | 9,806 | 297 | 1,058 | 1,355 | 13.8 | SM3 | |
| Kirkland_Main-295 | Kirkland_Manholes-171 | 25.99 | Kirkland_Manholes-170 | 25.29 | 316.1 | 0.22 | 18 | PVC | 0.01 | 2,875 | 299 | 1,080 | 1,379 | 48 | SM3 | Drop Connection |
| Kirkland_Main-296 | Kirkland_Manholes-172 | 31.43 | Kirkland_Manholes-171 | 31.34 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 17 | 20 | 4.4 | | Drop Connection |
| Kirkland_Main-297 | Kirkland_Manholes-190 | 38.49 | Kirkland_Manholes-180 | 38.25 | 107 | 0.22 | 15 | PVC | 0.01 | 1,763 | 269 | 930 | 1,199 | 68 | SM3 | |
| Kirkland_Main-298 | Kirkland_Manholes-183 | 41.05 | Kirkland_Manholes-190 | 38.49 | 284.2 | 0.9 | 15 | PVC | 0.01 | 3,580 | 268 | 926 | 1,194 | 33.4 | SM3 | |
| Kirkland_Main-299 | Kirkland_Manholes-167 | 19.46 | Kirkland_Manholes-241 | 14.7 | 339.1 | 1.4 | 18 | PVC | 0.01 | 7,261 | 305 | 1,118 | 1,423 | 19.6 | SM3 | |
| Kirkland_Main-300 | Kirkland_Manholes-164 | 59.16 | Kirkland_Manholes-242 | 58.15 | 252.4 | 0.4 | 8 | PVC | 0.01 | 446 | 14 | 51 | 65 | 14.6 | | Drop Connection |
| Kirkland_Main-301 | Kirkland_Manholes-203 | 83.91 | Kirkland_Manholes-202 | 68.28 | 127.4 | 12.27 | 8 | PVC | 0.01 | 2,470 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-302 | Kirkland_Manholes-202 | 68.28 | Kirkland_Manholes-204 | 54.86 | 133.6 | 10.05 | 8 | PVC | 0.01 | 2,235 | 1 | 9 | 10 | 0.4 | | |
| Kirkland_Main-303 | Kirkland_Manholes-204 | 54.86 | Kirkland_Manholes-169 | 21.92 | 184.1 | 17.89 | 8 | PVC | 0.01 | 2,982 | 3 | 13 | 16 | 0.5 | | |
| Kirkland_Main-304 | Kirkland_Manholes-209 | 226.32 | Kirkland_Manholes-210 | 216.33 | 137.5 | 7.27 | 8 | PVC | 0.01 | 1,901 | 2 | 4 | 7 | 0.3 | SM14-Ex-EX66 | |
| Kirkland_Main-306 | Kirkland_Manholes-214 | 228.3 | Kirkland_Manholes-213 | 213.69 | 210.7 | 6.93 | 8 | PVC | 0.01 | 1,856 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-307 | Kirkland_Manholes-213 | 213.69 | Kirkland_Manholes-212 | 184.62 | 186.4 | 15.59 | 8 | PVC | 0.01 | 2,784 | 6 | 9 | 14 | 0.5 | | |
| Kirkland_Main-308 | Kirkland_Manholes-212 | 184.62 | Kirkland_Manholes-216 | 184.01 | 222.7 | 0.27 | 8 | PVC | 0.01 | 369 | 33 | 98 | 131 | 35.6 | | |
| Kirkland_Main-309 | Kirkland_Manholes-211 | 186.37 | Kirkland_Manholes-212 | 184.62 | 362.4 | 0.48 | 8 | PVC | 0.01 | 490 | 25 | 85 | 111 | 22.6 | | |
| Kirkland_Main-310 | Kirkland_Manholes-210 | 216.33 | Kirkland_Manholes-211 | 186.37 | 372.2 | 8.05 | 8 | PVC | 0.01 | 2,000 | 5 | 9 | 14 | 0.7 | SM14-Ex-EX66 | |
| Kirkland_Main-312 | Kirkland_Manholes-216 | 184.01 | Kirkland_Manholes-217 | 183.22 | 296 | 0.27 | 8 | PVC | 0.01 | 364 | 34 | 102 | 137 | 37.6 | | |
| Kirkland_Main-313 | Kirkland_Manholes-215 | 220.47 | Kirkland_Manholes-217 | 183.22 | 347.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 4 | 4 | 8 | 0.3 | | |
| Kirkland_Main-314 | Kirkland_Manholes-208 | 241.09 | Kirkland_Manholes-207 | 240.8 | 258.2 | 0.11 | 8 | PVC | 0.01 | 236 | 4 | 13 | 16 | 6.9 | SM14-Ex-EX57 | |
| Kirkland_Main-315 | Kirkland_Manholes-207 | 240.8 | Kirkland_Manholes-206 | 239.08 | 251.3 | 0.68 | 8 | PVC | 0.01 | 583 | 6 | 17 | 24 | 4 | SM14-Ex-EX57 | |
| Kirkland_Main-316 | Kirkland_Manholes-1236 | 256.67 | Kirkland_Manholes-206 | 239.08 | 279.5 | 6.29 | 8 | PVC | 0.01 | 1,769 | 5 | 9 | 13 | 0.7 | SM14-Ex-EX60 | |
| Kirkland_Main-317 | Kirkland_Manholes-206 | 239.08 | Kirkland_Manholes-205 | 228.15 | 235.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 12 | 30 | 42 | 2.8 | SM14-Ex-EX57 | |
| Kirkland_Main-318 | Kirkland_Manholes-227 | 223.31 | Kirkland_Manholes-226 | 219.39 | 138.6 | 2.83 | 8 | PVC | 0.01 | 1,186 | 6 | 30 | 36 | 3 | | |
| Kirkland_Main-319 | Kirkland_Manholes-229 | 178.29 | Kirkland_Manholes-230 | 172.81 | 192.8 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-321 | Kirkland_Manholes-2569 | 300.83 | Kirkland_Manholes-2570 | 299.81 | 42.2 | 2.42 | 8 | PVC | 0.01 | 1,096 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-323 | Kirkland_Manholes-2570 | 299.81 | Kirkland_Manholes-2573 | 298.95 | 117.6 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 12 | 14 | 2.3 | | |
| Kirkland_Main-325 | Kirkland_Manholes-2574 | 291.72 | Kirkland_Manholes-2578 | 278.46 | 194.2 | 6.83 | 8 | PVC | 0.01 | 1,842 | 5 | 32 | 37 | 2 | | |
| Kirkland_Main-326 | Kirkland_Manholes-2575 | 296.63 | Kirkland_Manholes-2574 | 291.72 | 277.7 | 1.77 | 8 | PVC | 0.01 | 938 | 4 | 28 | 32 | 3.4 | | |
| Kirkland_Main-327 | Kirkland_Manholes-2572 | 298.88 | Kirkland_Manholes-2575 | 296.63 | 102.9 | 2.19 | 8 | PVC | 0.01 | 1,042 | 3 | 24 | 27 | 2.6 | | |
| Kirkland_Main-330 | Kirkland_Manholes-2576 | 288.87 | Kirkland_Manholes-2577 | 284.91 | 171.7 | 2.31 | 8 | PVC | 0.01 | 1,071 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-331 | Kirkland_Manholes-2577 | 284.91 | Kirkland_Manholes-2580 | 279.25 | 137.4 | 4.12 | 8 | PVC | 0.01 | 1,431 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-332 | Kirkland_Manholes-2580 | 279.25 | Kirkland_Manholes-2579 | 271.58 | 247.7 | 3.1 | 8 | PVC | 0.01 | 1,241 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-333 | Kirkland_Manholes-2582 | 256.45 | Kirkland_Manholes-2583 | 255.68 | 58.5 | 1.32 | 8 | PVC | 0.01 | 809 | 12 | 75 | 88 | 10.9 | SM14-Ex-EX313 | |
| Kirkland_Main-334 | Kirkland_Manholes-2583 | 255.68 | Kirkland_Manholes-2584 | 252.35 | 54.4 | 6.12 | 8 | PVC | 0.01 | 1,744 | 13 | 79 | 92 | 5.3 | SM14-Ex-EX313 | |
| Kirkland_Main-335 | Kirkland_Manholes-2584 | 252.35 | Kirkland_Manholes-2787 | 252.17 | 133.2 | 0.14 | 8 | PVC | 0.01 | 259 | 13 | 83 | 97 | 37.3 | SM14-Ex-EX313 | |
| Kirkland_Main-336 | Kirkland_Manholes-2581 | 260.74 | Kirkland_Manholes-2582 | 256.45 | 63.8 | 6.72 | 8 | PVC | 0.01 | 1,828 | 4 | 20 | 24 | 1.3 | | |
| Kirkland_Main-337 | Kirkland_Manholes-2786 | 258.1 | Kirkland_Manholes-2582 | 256.45 | 266.6 | 0.62 | 8 | PVC | 0.01 | 555 | 8 | 52 | 60 | 10.7 | | |
| Kirkland_Main-338 | Kirkland_Manholes-2579 | 271.58 | Kirkland_Manholes-2581 | 260.74 | 232.4 | 4.66 | 8 | PVC | 0.01 | 1,523 | 3 | 16 | 19 | 1.3 | | |
| Kirkland_Main-339 | Kirkland_Manholes-2586 | 274.45 | Kirkland_Manholes-2585 | 272.57 | 43.2 | 4.35 | 8 | PVC | 0.01 | 1,471 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-340 | Kirkland_Manholes-2587 | 285.24 | Kirkland_Manholes-2586 | 274.45 | 298.8 | 3.61 | 8 | PVC | 0.01 | 1,340 | 1 | 4 | 5 | 0.4 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-342 | Kirkland_Manholes-2588 | 292.14 | Kirkland_Manholes-2589 | 286.31 | 102.9 | 5.66 | 8 | PVC | 0.01 | 1,678 | 21 | 79 | 101 | 6 | SM14-Ex-EX303 | |
| Kirkland_Main-343 | Kirkland_Manholes-2591 | 288.43 | Kirkland_Manholes-2589 | 286.31 | 198.2 | 1.07 | 8 | PVC | 0.01 | 729 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX305 | |
| Kirkland_Main-344 | Kirkland_Manholes-2590 | 303.32 | Kirkland_Manholes-2588 | 292.14 | 220.1 | 5.08 | 8 | PVC | 0.01 | 1,589 | 8 | 44 | 51 | 3.2 | SM14-Ex-EX303 | |
| Kirkland_Main-345 | Kirkland_Manholes-2592 | 294.57 | Kirkland_Manholes-2588 | 292.14 | 159.1 | 1.53 | 8 | PVC | 0.01 | 871 | 2 | 8 | 10 | 1.2 | SM14-Ex-EX306 | |
| Kirkland_Main-346 | Kirkland_Manholes-2589 | 286.31 | Kirkland_Manholes-2593 | 281.14 | 131.6 | 3.93 | 8 | PVC | 0.01 | 1,398 | 23 | 87 | 111 | 7.9 | SM14-Ex-EX303 | |
| Kirkland_Main-347 | Kirkland_Manholes-2593 | 281.14 | Kirkland_Manholes-2585 | 272.57 | 372.5 | 2.3 | 8 | PVC | 0.01 | 1,069 | 24 | 91 | 115 | 10.8 | SM14-Ex-EX299 | |
| Kirkland_Main-348 | Kirkland_Manholes-2585 | 272.57 | Kirkland_Manholes-2595 | 270.48 | 180.9 | 1.16 | 8 | PVC | 0.01 | 758 | 25 | 103 | 129 | 17 | SM14-Ex-EX299 | |
| Kirkland_Main-349 | Kirkland_Manholes-2595 | 270.48 | Kirkland_Manholes-2594 | 263.61 | 407.7 | 1.68 | 8 | PVC | 0.01 | 915 | 27 | 107 | 135 | 14.7 | SM14-Ex-EX299 | |
| Kirkland_Main-350 | Kirkland_Manholes-2594 | 263.61 | Kirkland_Manholes-2601 | 228.74 | 402.9 | 8.65 | 8 | PVC | 0.01 | 2,074 | 30 | 111 | 141 | 6.8 | SM14-Ex-EX299 | |
| Kirkland_Main-352 | Kirkland_Manholes-2598 | 252.13 | Kirkland_Manholes-2599 | 217.5 | 325.5 | 10.64 | 8 | PVC | 0.01 | 2,300 | 3 | 12 | 15 | 0.6 | SM14-Ex-EX301 | |
| Kirkland_Main-353 | Kirkland_Manholes-2597 | 256.37 | Kirkland_Manholes-2598 | 252.13 | 172.1 | 2.46 | 8 | PVC | 0.01 | 1,107 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX301 | |
| Kirkland_Main-354 | Kirkland_Manholes-2596 | 262.84 | Kirkland_Manholes-2597 | 256.37 | 380.5 | 1.7 | 8 | PVC | 0.01 | 919 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX301 | |
| Kirkland_Main-355 | Kirkland_Manholes-853 | 340.38 | Kirkland_Manholes-851 | 339.16 | 105.8 | 1.16 | 8 | PVC | 0.01 | 758 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-356 | Kirkland_Manholes-851 | 339.16 | Kirkland_Manholes-852 | 338.63 | 131.5 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 36 | 42 | 9.3 | | |
| Kirkland_Main-357 | Kirkland_Manholes-852 | 338.63 | Kirkland_Manholes-854 | 336.98 | 245.6 | 0.67 | 8 | PVC | 0.01 | 578 | 6 | 40 | 46 | 7.9 | | |
| Kirkland_Main-358 | Kirkland_Manholes-854 | 336.98 | Kirkland_Manholes-855 | 335.54 | 321 | 0.45 | 8 | PVC | 0.01 | 472 | 7 | 44 | 50 | 10.7 | | |
| Kirkland_Main-359 | Kirkland_Manholes-855 | 335.54 | Kirkland_Manholes-857 | 334.93 | 126.6 | 0.48 | 8 | PVC | 0.01 | 489 | 7 | 48 | 54 | 11.1 | | |
| Kirkland_Main-360 | Kirkland_Manholes-857 | 334.93 | Kirkland_Manholes-856 | 333.21 | 25.3 | 6.8 | 8 | PVC | 0.01 | 1,838 | 7 | 52 | 59 | 3.2 | | |
| Kirkland_Main-361 | Kirkland_Manholes-858 | 311.1 | Kirkland_Manholes-859 | 309.2 | 142 | 1.34 | 8 | PVC | 0.01 | 816 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX51 | |
| Kirkland_Main-362 | Kirkland_Manholes-198 | 52.1 | Kirkland_Manholes-197 | 50.1 | 250.9 | 0.8 | 8 | PVC | 0.01 | 630 | 5 | 30 | 35 | 5.6 | SM14-Ex-EX43 | |
| Kirkland_Main-363 | Kirkland_Manholes-1648 | 152.03 | Kirkland_Manholes-1649 | 151.45 | 206.3 | 0.28 | 12 | PVC | 0.01 | 1,100 | 4 | 33 | 37 | 3.4 | SM14-Ex-EX196 | |
| Kirkland_Main-364 | Kirkland_Manholes-1649 | 151.45 | Kirkland_Manholes-1650 | 145.43 | 128.4 | 4.69 | 12 | PVC | 0.01 | 4,501 | 7 | 41 | 48 | 1.1 | SM14-Ex-EX196 | |
| Kirkland_Main-365 | Kirkland_Manholes-1651 | 160.29 | Kirkland_Manholes-1650 | 145.43 | 297.8 | 4.99 | 8 | PVC | 0.01 | 1,575 | 0 | 16 | 17 | 1.1 | | |
| Kirkland_Main-366 | Kirkland_Manholes-1652 | 161.6 | Kirkland_Manholes-1651 | 160.29 | 197.8 | 0.66 | 8 | PVC | 0.01 | 574 | 0 | 8 | 9 | 1.5 | | |
| Kirkland_Main-369 | Kirkland_Manholes-1654 | 136.96 | Kirkland_Manholes-1653 | 127.26 | 270 | 3.59 | 8 | PVC | 0.01 | 1,336 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX168 | |
| Kirkland_Main-370 | Kirkland_Manholes-1653 | 127.26 | Kirkland_Manholes-1767 | 122.16 | 112.6 | 4.53 | 8 | PVC | 0.01 | 1,501 | 5 | 16 | 22 | 1.4 | SM14-Ex-EX168 | |
| Kirkland_Main-372 | Kirkland_Manholes-977 | 225.95 | Kirkland_Manholes-978 | 222.9 | 113.4 | 2.69 | 8 | PVC | 0.01 | 1,157 | 8 | 47 | 54 | 4.7 | | |
| Kirkland_Main-374 | Kirkland_Manholes-2858 | 23.78 | Kirkland_Manholes-2857 | 19.7 | 174.1 | 2.34 | 8 | PVC | 0.01 | 1,079 | 0 | 5 | 5 | 0.4 | SM14-Ex-EX315 | |
| Kirkland_Main-376 | Kirkland_Manholes-2865 | 30.12 | Kirkland_Manholes-2864 | 27 | 7.9 | 39.25 | 8 | PVC | 0.01 | 4,417 | 13 | 21 | 34 | 0.8 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-377 | Kirkland_Manholes-2866 | 31.02 | Kirkland_Manholes-2867 | 30.31 | 15.5 | 4.58 | 8 | PVC | 0.01 | 1,509 | 9 | 15 | 24 | 1.6 | SM14-Ex-EX314 | |
| Kirkland_Main-378 | Kirkland_Manholes-2867 | 30.31 | Kirkland_Manholes-2865 | 30.12 | 118.6 | 0.16 | 8 | PVC | 0.01 | 282 | 9 | 18 | 27 | 9.6 | SM14-Ex-EX314 | |
| Kirkland_Main-379 | Kirkland_Manholes-2863 | 49.4 | Kirkland_Manholes-2866 | 31.02 | 310.1 | 5.93 | 8 | PVC | 0.01 | 1,716 | 7 | 12 | 19 | 1.1 | | |
| Kirkland_Main-380 | Kirkland_Manholes-1905 | 395.5 | Kirkland_Manholes-1906 | 388.2 | 277.5 | 2.63 | 8 | PVC | 0.01 | 1,143 | 9 | 40 | 49 | 4.3 | | |
| Kirkland_Main-381 | Kirkland_Manholes-1906 | 388.2 | Kirkland_Manholes-1908 | 383.29 | 92.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 17 | 48 | 65 | 4 | | |
| Kirkland_Main-382 | Kirkland_Manholes-1908 | 383.29 | Kirkland_Manholes-1909 | 380 | 18.3 | 18.02 | 8 | PVC | 0.01 | 2,993 | 26 | 60 | 85 | 2.8 | | |
| Kirkland_Main-383 | Kirkland_Manholes-1910 | 392.49 | Kirkland_Manholes-1908 | 383.29 | 192.6 | 4.78 | 8 | PVC | 0.01 | 1,541 | 8 | 8 | 16 | 1.1 | | |
| Kirkland_Main-386 | Kirkland_Manholes-1911 | 394.49 | Kirkland_Manholes-1910 | 392.49 | 114.9 | 1.74 | 8 | PVC | 0.01 | 930 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-388 | Kirkland_Manholes-1912 | 380.62 | Kirkland_Manholes-1907 | 380.32 | 64.6 | 0.46 | 8 | PVC | 0.01 | 480 | 17 | 8 | 25 | 5.2 | | |
| Kirkland_Main-389 | Kirkland_Manholes-1913 | 381.47 | Kirkland_Manholes-1912 | 380.62 | 181.1 | 0.47 | 8 | PVC | 0.01 | 483 | 17 | 4 | 21 | 4.4 | | |
| Kirkland_Main-390 | Kirkland_Manholes-1915 | 403.84 | Kirkland_Manholes-1903 | 399.77 | 113 | 3.6 | 8 | PVC | 0.01 | 1,338 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-391 | Kirkland_Manholes-1914 | 376.04 | Kirkland_Manholes-1916 | 361.73 | 343.6 | 4.16 | 8 | PVC | 0.01 | 1,439 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-392 | Kirkland_Manholes-1916 | 361.73 | Kirkland_Manholes-1965 | 345.05 | 397.2 | 4.2 | 8 | PVC | 0.01 | 1,445 | 29 | 20 | 49 | 3.4 | | |
| Kirkland_Main-393 | Kirkland_Manholes-1917 | 413.2 | Kirkland_Manholes-1919 | 411.73 | 326.8 | 0.45 | 12 | PVC | 0.01 | 1,394 | 57 | 191 | 248 | 17.8 | SM14-Ex-EX215 | |
| Kirkland_Main-394 | Kirkland_Manholes-1918 | 411.61 | Kirkland_Manholes-1920 | 409.24 | 389.6 | 0.61 | 12 | PVC | 0.01 | 1,622 | 88 | 358 | 445 | 27.5 | SM14-Ex-EX215 | |
| Kirkland_Main-395 | Kirkland_Manholes-1919 | 411.73 | Kirkland_Manholes-1918 | 411.61 | 19.4 | 0.61 | 12 | PVC | 0.01 | 1,622 | 58 | 195 | 253 | 15.6 | SM14-Ex-EX215 | |
| Kirkland_Main-396 | Kirkland_Manholes-1966 | 418.21 | Kirkland_Manholes-1918 | 411.61 | 309.4 | 2.13 | 8 | PVC | 0.01 | 1,030 | 29 | 159 | 188 | 18.2 | SM14-Ex-EX216 | |
| Kirkland_Main-397 | Kirkland_Manholes-2018 | 417.59 | Kirkland_Manholes-1920 | 409.24 | 266.4 | 3.13 | 8 | PVC | 0.01 | 1,248 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-398 | Kirkland_Manholes-2017 | 412 | Kirkland_Manholes-1921 | 405.86 | 284.9 | 2.16 | 8 | PVC | 0.01 | 1,035 | 4 | 20 | 24 | 2.3 | | |
| Kirkland_Main-399 | Kirkland_Manholes-1921 | 405.86 | Kirkland_Manholes-1923 | 399.87 | 337.2 | 1.78 | 12 | PVC | 0.01 | 2,771 | 95 | 393 | 489 | 17.6 | SM14-Ex-EX215 | Drop Connection |
| Kirkland_Main-400 | Kirkland_Manholes-2013 | 413.74 | Kirkland_Manholes-1922 | 401.71 | 397 | 3.03 | 8 | PVC | 0.01 | 1,227 | 20 | 95 | 116 | 9.4 | | |
| Kirkland_Main-401 | Kirkland_Manholes-1924 | 396.12 | Kirkland_Manholes-1925 | 391.68 | 40.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 4 | 16 | 20 | 0.8 | | |
| Kirkland_Main-402 | Kirkland_Manholes-2012 | 406.67 | Kirkland_Manholes-1924 | 396.12 | 354.7 | 2.97 | 8 | PVC | 0.01 | 1,216 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-403 | Kirkland_Manholes-1926 | 383.42 | Kirkland_Manholes-1927 | 378.37 | 328.1 | 1.54 | 12 | PVC | 0.01 | 2,579 | 123 | 528 | 651 | 25.3 | SM14-Ex-EX205 | |
| Kirkland_Main-404 | Kirkland_Manholes-1927 | 378.37 | Kirkland_Manholes-1928 | 375.97 | 126.7 | 1.89 | 12 | PVC | 0.01 | 2,862 | 123 | 532 | 655 | 22.9 | SM14-Ex-EX205 | |
| Kirkland_Main-405 | Kirkland_Manholes-1922 | 401.71 | Kirkland_Manholes-3030 | 397.75 | 20.7 | 19.14 | 8 | PVC | 0.01 | 3,085 | 22 | 99 | 122 | 3.9 | | |
| Kirkland_Main-406 | Kirkland_Manholes-1923 | 399.87 | Kirkland_Manholes-3030 | 397.75 | 24.4 | 8.7 | 12 | PVC | 0.01 | 6,130 | 96 | 397 | 493 | 8 | | |
| Kirkland_Main-407 | Kirkland_Manholes-3030 | 397.75 | Kirkland_Manholes-1925 | 391.68 | 339.3 | 1.79 | 12 | PVC | 0.01 | 2,781 | 118 | 501 | 619 | 22.2 | | |
| Kirkland_Main-408 | Kirkland_Manholes-1925 | 391.68 | Kirkland_Manholes-3031 | 384.74 | 433.2 | 1.6 | 12 | PVC | 0.01 | 2,631 | 123 | 521 | 643 | 24.5 | | |
| Kirkland_Main-409 | Kirkland_Manholes-2750 | 105.56 | Kirkland_Manholes-2749 | 94.38 | 64.8 | 17.26 | 8 | PVC | 0.01 | 2,929 | 24 | 6 | 30 | 1 | | |
| Kirkland_Main-410 | Kirkland_Manholes-2751 | 82.43 | Kirkland_Manholes-2879 | 68.04 | 243.9 | 5.9 | 8 | PVC | 0.01 | 1,713 | 0 | 6 | 6 | 0.4 | SM14-Ex-EX280 | |
| Kirkland_Main-412 | Kirkland_Manholes-373 | 230.9 | Kirkland_Manholes-1080 | 229.14 | 244 | 0.72 | 8 | PVC | 0.01 | 599 | 62 | 250 | 312 | 52.1 | | |
| Kirkland_Main-413 | Kirkland_Manholes-195 | 48.03 | Kirkland_Manholes-193 | 45.46 | 195.3 | 1.32 | 8 | PVC | 0.01 | 809 | 9 | 43 | 52 | 6.4 | SM14-Ex-EX43 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-414 | Kirkland_Manholes-193 | 45.46 | Kirkland_Manholes-192 | 42.9 | 32.1 | 7.96 | 8 | PVC | 0.01 | 1,990 | 9 | 47 | 56 | 2.8 | SM14-Ex-EX43 | |
| Kirkland_Main-415 | Kirkland_Manholes-194 | 50.84 | Kirkland_Manholes-192 | 50.61 | 58.2 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | Drop Connection |
| Kirkland_Main-416 | Kirkland_Manholes-192 | 42.9 | Kirkland_Manholes-191 | 42.5 | 357.1 | 0.11 | 8 | PVC | 0.01 | 236 | 9 | 68 | 77 | 32.7 | SM14-Ex-EX44 | |
| Kirkland_Main-417 | Kirkland_Manholes-191 | 42.5 | Kirkland_Manholes-183 | 41.05 | 287.2 | 0.5 | 8 | PVC | 0.01 | 501 | 9 | 73 | 82 | 16.3 | SM14-Ex-EX44 | |
| Kirkland_Main-418 | Kirkland_Manholes-201 | 56.98 | Kirkland_Manholes-192 | 42.9 | 368.5 | 3.82 | 8 | PVC | 0.01 | 1,378 | 0 | 13 | 13 | 0.9 | SM14-Ex-EX43 | |
| Kirkland_Main-419 | Kirkland_Manholes-199 | 54.68 | Kirkland_Manholes-198 | 52.1 | 112.6 | 2.29 | 8 | PVC | 0.01 | 1,067 | 4 | 26 | 30 | 2.8 | SM14-Ex-EX43 | |
| Kirkland_Main-420 | Kirkland_Manholes-2310 | 256 | Kirkland_Manholes-2738 | 255.5 | 66.4 | 0.75 | 8 | PVC | 0.01 | 612 | 8 | 26 | 33 | 5.5 | | |
| Kirkland_Main-421 | Kirkland_Manholes-2738 | 255.5 | Kirkland_Manholes-2752 | 253.8 | 209.4 | 0.81 | 8 | PVC | 0.01 | 635 | 9 | 30 | 39 | 6.1 | | |
| Kirkland_Main-422 | Kirkland_Manholes-2754 | 9.95 | O-40 | 9.81 | 113.1 | 0.12 | 36 | PVC | 0.01 | 13,690 | 506 | 1,846 | 2,653 | 19.4 | SM14-Ex-EX10 | Drop Connection |
| Kirkland_Main-423 | Kirkland_Manholes-2761 | 12.79 | Kirkland_Manholes-2759 | 11.56 | 416.9 | 0.3 | 36 | PVC | 0.01 | 21,139 | 505 | 1,824 | 2,631 | 12.4 | SM14-Ex-EX10 | |
| Kirkland_Main-425 | Kirkland_Manholes-2759 | 11.56 | Kirkland_Manholes-2758 | 11.2 | 391.7 | 0.09 | 36 | PVC | 0.01 | 11,798 | 505 | 1,829 | 2,635 | 22.3 | SM14-Ex-EX10 | |
| Kirkland_Main-426 | Kirkland_Manholes-2758 | 11.2 | Kirkland_Manholes-2757 | 10.95 | 117.7 | 0.21 | 36 | PVC | 0.01 | 17,933 | 506 | 1,833 | 2,640 | 14.7 | SM14-Ex-EX10 | |
| Kirkland_Main-428 | Kirkland_Manholes-217 | 183.22 | Kirkland_Manholes-230 | 172.81 | 258.2 | 4.03 | 8 | PVC | 0.01 | 1,416 | 40 | 111 | 151 | 10.7 | | |
| Kirkland_Main-429 | Kirkland_Manholes-228 | 142.32 | Kirkland_Manholes-232 | 112.59 | 208.3 | 14.27 | 8 | PVC | 0.01 | 2,663 | 45 | 128 | 173 | 6.5 | | |
| Kirkland_Main-430 | Kirkland_Manholes-226 | 219.39 | Kirkland_Manholes-225 | 214.73 | 200.7 | 2.32 | 8 | PVC | 0.01 | 1,074 | 7 | 34 | 41 | 3.8 | | |
| Kirkland_Main-431 | Kirkland_Manholes-225 | 214.73 | Kirkland_Manholes-223 | 193.39 | 169.1 | 12.62 | 8 | PVC | 0.01 | 2,505 | 9 | 38 | 47 | 1.9 | | |
| Kirkland_Main-432 | Kirkland_Manholes-223 | 193.39 | Kirkland_Manholes-224 | 189.69 | 263.2 | 1.41 | 8 | PVC | 0.01 | 836 | 18 | 68 | 87 | 10.4 | | |
| Kirkland_Main-433 | Kirkland_Manholes-222 | 194.04 | Kirkland_Manholes-223 | 193.39 | 133.1 | 0.49 | 8 | PVC | 0.01 | 493 | 9 | 26 | 34 | 7 | | |
| Kirkland_Main-434 | Kirkland_Manholes-221 | 194.75 | Kirkland_Manholes-222 | 194.04 | 121.4 | 0.58 | 8 | PVC | 0.01 | 539 | 8 | 21 | 29 | 5.5 | | |
| Kirkland_Main-435 | Kirkland_Manholes-219 | 195.26 | Kirkland_Manholes-221 | 194.75 | 115.1 | 0.44 | 8 | PVC | 0.01 | 469 | 7 | 17 | 24 | 5.2 | | |
| Kirkland_Main-436 | Kirkland_Manholes-220 | 211.06 | Kirkland_Manholes-219 | 195.26 | 185.5 | 8.52 | 8 | PVC | 0.01 | 2,057 | 4 | 9 | 13 | 0.6 | | |
| Kirkland_Main-437 | Kirkland_Manholes-218 | 197.04 | Kirkland_Manholes-219 | 195.26 | 182.3 | 0.98 | 8 | PVC | 0.01 | 697 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-438 | Kirkland_Manholes-233 | 215.48 | Kirkland_Manholes-220 | 211.06 | 169.3 | 2.61 | 8 | PVC | 0.01 | 1,139 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-439 | Kirkland_Manholes-224 | 189.69 | Kirkland_Manholes-211 | 186.37 | 292.8 | 1.13 | 8 | PVC | 0.01 | 751 | 19 | 73 | 91 | 12.2 | | |
| Kirkland_Main-440 | Kirkland_Manholes-266 | 97.98 | Kirkland_Manholes-267 | 95.34 | 145 | 1.82 | 8 | PVC | 0.01 | 951 | 33 | 83 | 116 | 12.2 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-441 | Kirkland_Manholes-265 | 110.6 | Kirkland_Manholes-266 | 97.98 | 184.6 | 6.84 | 8 | PVC | 0.01 | 1,844 | 31 | 79 | 110 | 6 | SM10 | |
| Kirkland_Main-442 | Kirkland_Manholes-262 | 118.9 | Kirkland_Manholes-265 | 110.6 | 150.8 | 5.51 | 8 | PVC | 0.01 | 1,654 | 30 | 75 | 105 | 6.3 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-443 | Kirkland_Manholes-261 | 130.12 | Kirkland_Manholes-262 | 118.9 | 278.9 | 4.02 | 8 | PVC | 0.01 | 1,414 | 27 | 70 | 98 | 6.9 | SM10 | |
| Kirkland_Main-444 | Kirkland_Manholes-258 | 141.4 | Kirkland_Manholes-261 | 130.12 | 280.6 | 4.02 | 8 | PVC | 0.01 | 1,414 | 24 | 66 | 90 | 6.3 | SM10 | |
| Kirkland_Main-445 | Kirkland_Manholes-527 | 146.55 | Kirkland_Manholes-258 | 141.4 | 279.2 | 1.84 | 8 | PVC | 0.01 | 958 | 23 | 62 | 84 | 8.8 | SM10 | |
| Kirkland_Main-446 | Kirkland_Manholes-259 | 136.12 | Kirkland_Manholes-260 | 130.49 | 137.7 | 4.09 | 8 | PVC | 0.01 | 1,426 | 1 | 4 | 6 | 0.4 | SM10 | |
| Kirkland_Main-447 | Kirkland_Manholes-260 | 130.49 | Kirkland_Manholes-251 | 119.87 | 263.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 3 | 9 | 11 | 0.8 | SM10 | |
| Kirkland_Main-448 | Kirkland_Manholes-251 | 119.87 | Kirkland_Manholes-250 | 115.74 | 110.4 | 3.74 | 8 | PVC | 0.01 | 1,363 | 3 | 13 | 16 | 1.2 | SM14-Ex-EX55 | |
| Kirkland_Main-449 | Kirkland_Manholes-253 | 121.6 | Kirkland_Manholes-254 | 100.7 | 323.7 | 6.46 | 8 | PVC | 0.01 | 1,791 | 31 | 77 | 108 | 6 | SM14-Ex-EX40 | |
| Kirkland_Main-450 | Kirkland_Manholes-252 | 142.57 | Kirkland_Manholes-253 | 121.6 | 327.2 | 6.41 | 8 | PVC | 0.01 | 1,785 | 31 | 73 | 103 | 5.8 | SM14-Ex-EX40 | |
| Kirkland_Main-451 | Kirkland_Manholes-257 | 165.98 | Kirkland_Manholes-252 | 142.57 | 284 | 8.24 | 8 | PVC | 0.01 | 2,024 | 30 | 64 | 94 | 4.6 | SM14-Ex-EX57 | |
| Kirkland_Main-452 | Kirkland_Manholes-234 | 184.45 | Kirkland_Manholes-257 | 165.98 | 280.4 | 6.59 | 8 | PVC | 0.01 | 1,810 | 22 | 51 | 73 | 4 | SM14-Ex-EX57 | |
| Kirkland_Main-453 | Kirkland_Manholes-1133 | 181.56 | Kirkland_Manholes-257 | 165.98 | 274.2 | 5.68 | 8 | PVC | 0.01 | 1,681 | 7 | 9 | 15 | 0.9 | SM14-Ex-EX58 | |
| Kirkland_Main-454 | Kirkland_Manholes-231 | 144.64 | Kirkland_Manholes-236 | 135.22 | 190.5 | 4.95 | 8 | PVC | 0.01 | 1,568 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX56 | |
| Kirkland_Main-455 | Kirkland_Manholes-235 | 144.29 | Kirkland_Manholes-236 | 135.22 | 77.1 | 11.76 | 8 | PVC | 0.01 | 2,418 | 1 | 4 | 6 | 0.2 | SM14-Ex-EX56 | |
| Kirkland_Main-456 | Kirkland_Manholes-236 | 135.22 | Kirkland_Manholes-237 | 112.26 | 221.2 | 10.38 | 8 | PVC | 0.01 | 2,271 | 3 | 13 | 16 | 0.7 | SM14-Ex-EX56 | |
| Kirkland_Main-457 | Kirkland_Manholes-232 | 112.59 | Kirkland_Manholes-237 | 112.26 | 229.8 | 0.14 | 8 | PVC | 0.01 | 267 | 45 | 132 | 177 | 66.4 | SM14-Ex-EX41 | |
| Kirkland_Main-458 | Kirkland_Manholes-237 | 112.26 | Kirkland_Manholes-254 | 100.7 | 413.4 | 2.8 | 8 | PVC | 0.01 | 1,179 | 49 | 149 | 199 | 16.9 | SM14-Ex-EX41 | |
| Kirkland_Main-459 | Kirkland_Manholes-254 | 100.7 | Kirkland_Manholes-255 | 81.45 | 344 | 5.6 | 8 | PVC | 0.01 | 1,668 | 81 | 230 | 311 | 18.7 | SM14-Ex-EX40 | |
| Kirkland_Main-460 | Kirkland_Manholes-249 | 98.75 | Kirkland_Manholes-248 | 82.01 | 263.5 | 6.35 | 8 | PVC | 0.01 | 1,777 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX39 | |
| Kirkland_Main-461 | Kirkland_Manholes-255 | 81.45 | Kirkland_Manholes-256 | 63.52 | 326.4 | 5.49 | 8 | PVC | 0.01 | 1,653 | 83 | 235 | 317 | 19.2 | SM14-Ex-EX40 | |
| Kirkland_Main-462 | Kirkland_Manholes-256 | 63.52 | Kirkland_Manholes-245 | 59.23 | 36.4 | 11.78 | 8 | PVC | 0.01 | 2,420 | 83 | 239 | 322 | 13.3 | SM14-Ex-EX40 | |
| Kirkland_Main-463 | Kirkland_Manholes-248 | 82.01 | Kirkland_Manholes-245 | 59.23 | 346.7 | 6.57 | 8 | PVC | 0.01 | 1,807 | 2 | 9 | 10 | 0.6 | SM14-Ex-EX39 | |
| Kirkland_Main-464 | Kirkland_Manholes-245 | 59.23 | Kirkland_Manholes-246 | 59.12 | 26.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 86 | 252 | 338 | 25.7 | SM14-Ex-EX40 | Drop Connection |
| Kirkland_Main-465 | Kirkland_Manholes-247 | 65.14 | Kirkland_Manholes-246 | 64.57 | 142.8 | 0.4 | 8 | PVC | 0.01 | 446 | 51 | 143 | 194 | 43.4 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-466 | Kirkland_Manholes-291 | 21.49 | Kirkland_Manholes-290 | 19.2 | 13 | 17.62 | 12 | PVC | 0.01 | 8,726 | 44 | 64 | 107 | 1.2 | SM10 | |
| Kirkland_Main-467 | Kirkland_Manholes-290 | 19.2 | ROSEPT_WETWELL | 14.96 | 16.7 | 25.32 | 8 | PVC | 0.01 | 3,548 | 52 | 86 | 138 | 3.9 | SM10 | |
| Kirkland_Main-468 | Kirkland_Manholes-289 | 31.71 | Kirkland_Manholes-287 | 23.53 | 51 | 16.05 | 8 | PVC | 0.01 | 2,825 | 9 | 22 | 32 | 1.1 | SM10 | |
| Kirkland_Main-469 | Kirkland_Manholes-288 | 19.33 | Kirkland_Manholes-290 | 19.2 | 135.3 | 0.1 | 8 | PVC | 0.01 | 219 | 7 | 19 | 26 | 12 | SM10 | |
| Kirkland_Main-470 | Kirkland_Manholes-287 | 23.53 | Kirkland_Manholes-291 | 21.49 | 128.7 | 1.58 | 8 | PVC | 0.01 | 887 | 44 | 61 | 104 | 11.7 | SM10 | |
| Kirkland_Main-471 | Kirkland_Manholes-286 | 24.15 | Kirkland_Manholes-287 | 23.53 | 96.6 | 0.64 | 12 | PVC | 0.01 | 1,665 | 34 | 35 | 70 | 4.2 | SM10 | |
| Kirkland_Main-472 | Kirkland_Manholes-285 | 19.59 | Kirkland_Manholes-288 | 19.33 | 259.3 | 0.1 | 8 | PVC | 0.01 | 223 | 7 | 16 | 23 | 10.4 | SM10 | |
| Kirkland_Main-473 | Kirkland_Manholes-292 | 22.37 | Kirkland_Manholes-293 | 22.09 | 126.6 | 0.22 | 12 | PVC | 0.01 | 967 | 0 | 9 | 9 | 0.9 | SM14-Ex-EX37 | |
| Kirkland_Main-474 | Kirkland_Manholes-297 | 22.86 | Kirkland_Manholes-296 | 21.27 | 137.3 | 1.16 | 8 | PVC | 0.01 | 759 | 2 | 3 | 5 | 0.7 | SM14-Ex-EX36 | |
| Kirkland_Main-475 | Kirkland_Manholes-296 | 21.27 | Kirkland_Manholes-295 | 20.59 | 313.5 | 0.22 | 8 | PVC | 0.01 | 328 | 4 | 6 | 10 | 3.1 | SM10 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-476 | Kirkland_Manholes-295 | 20.59 | Kirkland_Manholes-294 | 20.11 | 95.2 | 0.5 | 8 | PVC | 0.01 | 501 | 5 | 10 | 14 | 2.8 | SM10 | |
| Kirkland_Main-477 | Kirkland_Manholes-294 | 20.11 | Kirkland_Manholes-285 | 19.59 | 185.3 | 0.28 | 8 | PVC | 0.01 | 373 | 6 | 13 | 19 | 5 | SM10 | |
| Kirkland_Main-478 | Kirkland_Manholes-311 | 21.29 | Kirkland_Manholes-312 | 20.99 | 124.6 | 0.24 | 12 | PVC | 0.01 | 1,020 | 4 | 35 | 39 | 3.9 | SM14-Ex-EX37 | |
| Kirkland_Main-479 | Kirkland_Manholes-312 | 20.99 | Kirkland_Manholes-306 | 19.99 | 281.9 | 0.35 | 12 | PVC | 0.01 | 1,238 | 5 | 44 | 49 | 4 | SM14-Ex-EX37 | |
| Kirkland_Main-480 | Kirkland_Manholes-362 | 216.81 | Kirkland_Manholes-361 | 216.74 | 35.2 | 0.2 | 21 | PVC | 0.01 | 4,142 | 528 | 1,935 | 2,463 | 59.5 | | |
| Kirkland_Main-481 | Kirkland_Manholes-367 | 213.02 | Kirkland_Manholes-368 | 212.3 | 160.3 | 0.45 | 18 | PVC | 0.01 | 4,107 | 539 | 1,999 | 2,538 | 61.8 | | |
| Kirkland_Main-482 | Kirkland_Manholes-368 | 212.3 | Kirkland_Manholes-369 | 208.86 | 249.4 | 1.38 | 18 | PVC | 0.01 | 7,198 | 539 | 2,003 | 2,542 | 35.3 | | |
| Kirkland_Main-483 | Kirkland_Manholes-369 | 208.86 | Kirkland_Manholes-370 | 206.64 | 246.4 | 0.9 | 18 | PVC | 0.01 | 5,817 | 548 | 2,034 | 2,583 | 44.4 | | |
| Kirkland_Main-484 | Kirkland_Manholes-371 | 213.58 | Kirkland_Manholes-2872 | 207.03 | 240.7 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-485 | Kirkland_Manholes-372 | 241.98 | Kirkland_Manholes-373 | 230.9 | 143.8 | 7.71 | 8 | PVC | 0.01 | 1,957 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-486 | Kirkland_Manholes-375 | 234.87 | Kirkland_Manholes-373 | 230.9 | 271 | 1.46 | 8 | PVC | 0.01 | 853 | 61 | 242 | 303 | 35.5 | | |
| Kirkland_Main-487 | Kirkland_Manholes-374 | 244.09 | Kirkland_Manholes-375 | 234.87 | 143.4 | 6.43 | 8 | PVC | 0.01 | 1,788 | 1 | 4 | 4 | 0.3 | | |
| Kirkland_Main-488 | Kirkland_Manholes-535 | 472.49 | Kirkland_Manholes-536 | 466.05 | 355.6 | 1.81 | 8 | PVC | 0.01 | 949 | 2 | 16 | 18 | 1.9 | | |
| Kirkland_Main-489 | Kirkland_Manholes-536 | 466.05 | Kirkland_Manholes-539 | 454.38 | 292.6 | 3.99 | 8 | PVC | 0.01 | 1,408 | 4 | 20 | 24 | 1.7 | | |
| Kirkland_Main-490 | Kirkland_Manholes-537 | 455.9 | Kirkland_Manholes-539 | 454.38 | 190.6 | 0.8 | 8 | PVC | 0.01 | 630 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-491 | Kirkland_Manholes-539 | 454.38 | Kirkland_Manholes-540 | 453.6 | 170.3 | 0.46 | 8 | PVC | 0.01 | 477 | 8 | 60 | 67 | 14.1 | | |
| Kirkland_Main-492 | Kirkland_Manholes-540 | 453.6 | Kirkland_Manholes-541 | 450.25 | 325.9 | 1.03 | 8 | PVC | 0.01 | 715 | 8 | 64 | 72 | 10.1 | | |
| Kirkland_Main-493 | Kirkland_Manholes-538 | 457.48 | Kirkland_Manholes-1977 | 454.61 | 403.8 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-494 | Kirkland_Manholes-596 | 110.91 | Kirkland_Manholes-600 | 91.95 | 293.8 | 6.45 | 8 | PVC | 0.01 | 1,791 | 89 | 354 | 443 | 24.7 | SM14-Ex-EX117 | |
| Kirkland_Main-495 | Kirkland_Manholes-598 | 118.14 | Kirkland_Manholes-596 | 110.91 | 360.7 | 2 | 8 | PVC | 0.01 | 998 | 3 | 8 | 11 | 1.1 | SM14-Ex-EX159 | |
| Kirkland_Main-496 | Kirkland_Manholes-606 | 111.69 | Kirkland_Manholes-614 | 87.89 | 289.9 | 8.21 | 8 | PVC | 0.01 | 2,020 | 39 | 165 | 203 | 10.1 | SM14-Ex-EX96 | |
| Kirkland_Main-497 | Kirkland_Manholes-238 | 85.65 | Kirkland_Manholes-239 | 27.77 | 394.9 | 14.66 | 8 | PVC | 0.01 | 2,699 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-502 | Kirkland_Manholes-200 | 55.31 | Kirkland_Manholes-199 | 54.68 | 46 | 1.37 | 8 | PVC | 0.01 | 825 | 4 | 21 | 25 | 3 | | |
| Kirkland_Main-503 | Kirkland_Manholes-2330 | 295.18 | Kirkland_Manholes-263 | 292.03 | 86.5 | 3.64 | 8 | PVC | 0.01 | 1,346 | 29 | 95 | 124 | 9.2 | SM14-Ex-EX252 | |
| Kirkland_Main-504 | Kirkland_Manholes-2768 | 263.56 | Kirkland_Manholes-2769 | 260.32 | 376.9 | 0.86 | 8 | PVC | 0.01 | 654 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-505 | Kirkland_Manholes-280 | 27.37 | Kirkland_Manholes-286 | 24.15 | 372.8 | 0.86 | 12 | PVC | 0.01 | 1,932 | 32 | 29 | 61 | 3.2 | SM10 | |
| Kirkland_Main-509 | Kirkland_Manholes-313 | 62.05 | Kirkland_Manholes-286 | 24.15 | 229.1 | 16.54 | 8 | PVC | 0.01 | 2,868 | 1 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-510 | Kirkland_Manholes-804 | 284.1 | Kirkland_Manholes-319 | 281.98 | 84.4 | 2.51 | 8 | PVC | 0.01 | 1,117 | 8 | 32 | 40 | 3.6 | | |
| Kirkland_Main-511 | Kirkland_Manholes-319 | 281.98 | Kirkland_Manholes-320 | 278.6 | 79.1 | 4.27 | 8 | PVC | 0.01 | 1,458 | 9 | 36 | 45 | 3.1 | | |
| Kirkland_Main-512 | Kirkland_Manholes-320 | 278.6 | Kirkland_Manholes-321 | 265.74 | 204.3 | 6.3 | 8 | PVC | 0.01 | 1,769 | 10 | 40 | 49 | 2.8 | | |
| Kirkland_Main-513 | Kirkland_Manholes-321 | 265.74 | Kirkland_Manholes-322 | 263.88 | 72.5 | 2.57 | 8 | PVC | 0.01 | 1,129 | 10 | 44 | 54 | 4.8 | | |
| Kirkland_Main-514 | Kirkland_Manholes-322 | 263.88 | Kirkland_Manholes-323 | 244.99 | 177.9 | 10.62 | 8 | PVC | 0.01 | 2,297 | 20 | 75 | 95 | 4.1 | | |
| Kirkland_Main-515 | Kirkland_Manholes-803 | 278.64 | Kirkland_Manholes-322 | 263.88 | 141.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 9 | 28 | 37 | 1.6 | | |
| Kirkland_Main-516 | Kirkland_Manholes-323 | 244.99 | Kirkland_Manholes-324 | 240.21 | 186.2 | 2.57 | 8 | PVC | 0.01 | 1,130 | 20 | 79 | 100 | 8.8 | | |
| Kirkland_Main-517 | Kirkland_Manholes-815 | 248.52 | Kirkland_Manholes-324 | 240.21 | 137.2 | 6.05 | 8 | PVC | 0.01 | 1,735 | 6 | 20 | 26 | 1.5 | | |
| Kirkland_Main-518 | Kirkland_Manholes-324 | 240.21 | Kirkland_Manholes-325 | 236.62 | 39.9 | 9.01 | 8 | PVC | 0.01 | 2,116 | 27 | 103 | 130 | 6.1 | | |
| Kirkland_Main-519 | Kirkland_Manholes-325 | 236.62 | Kirkland_Manholes-327 | 230.43 | 89 | 6.95 | 8 | PVC | 0.01 | 1,859 | 27 | 111 | 139 | 7.5 | | |
| Kirkland_Main-520 | Kirkland_Manholes-326 | 238.6 | Kirkland_Manholes-325 | 236.62 | 142.9 | 1.39 | 8 | PVC | 0.01 | 830 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-521 | Kirkland_Manholes-327 | 230.43 | Kirkland_Manholes-328 | 228.68 | 117.4 | 1.49 | 8 | PVC | 0.01 | 861 | 28 | 115 | 143 | 16.6 | | |
| Kirkland_Main-522 | Kirkland_Manholes-328 | 228.68 | Kirkland_Manholes-329 | 227.48 | 172.3 | 0.7 | 8 | PVC | 0.01 | 588 | 28 | 119 | 148 | 25.1 | | |
| Kirkland_Main-523 | Kirkland_Manholes-329 | 227.48 | Kirkland_Manholes-814 | 224.81 | 265.5 | 1.01 | 8 | PVC | 0.01 | 707 | 30 | 123 | 153 | 21.6 | | |
| Kirkland_Main-524 | Kirkland_Manholes-335 | 225.11 | Kirkland_Manholes-330 | 224.74 | 400.7 | 0.09 | 21 | PVC | 0.01 | 2,809 | 491 | 1,713 | 2,204 | 78.5 | SM14-2021-DF4 | |
| Kirkland_Main-525 | Kirkland_Manholes-330 | 224.74 | Kirkland_Manholes-331 | 223 | 199.5 | 0.87 | 21 | PVC | 0.01 | 8,635 | 492 | 1,716 | 2,208 | 25.6 | | |
| Kirkland_Main-526 | Kirkland_Manholes-331 | 223 | Kirkland_Manholes-332 | 219.57 | 217.5 | 1.58 | 21 | PVC | 0.01 | 11,610 | 492 | 1,720 | 2,212 | 19.1 | | |
| Kirkland_Main-527 | Kirkland_Manholes-332 | 219.57 | Kirkland_Manholes-334 | 218.68 | 182 | 0.49 | 21 | PVC | 0.01 | 6,464 | 493 | 1,724 | 2,217 | 34.3 | | |
| Kirkland_Main-528 | Kirkland_Manholes-333 | 225.59 | Kirkland_Manholes-334 | 218.68 | 199.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 32 | 183 | 215 | 16.4 | | |
| Kirkland_Main-529 | Kirkland_Manholes-352 | 234.2 | Kirkland_Manholes-333 | 225.59 | 382.7 | 2.25 | 8 | PVC | 0.01 | 1,058 | 31 | 179 | 210 | 19.9 | | |
| Kirkland_Main-530 | Kirkland_Manholes-334 | 218.68 | Kirkland_Manholes-356 | 218.57 | 161 | 0.07 | 30 | PVC | 0.01 | 6,255 | 527 | 1,915 | 2,442 | 39 | SM14-Ex-EX48 | |
| Kirkland_Main-531 | Kirkland_Manholes-337 | 291.09 | Kirkland_Manholes-338 | 268.5 | 343.3 | 6.58 | 8 | PVC | 0.01 | 1,809 | 10 | 64 | 73 | 4 | | |
| Kirkland_Main-532 | Kirkland_Manholes-343 | 274.46 | Kirkland_Manholes-338 | 268.5 | 356.6 | 1.67 | 8 | PVC | 0.01 | 912 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-533 | Kirkland_Manholes-338 | 268.5 | Kirkland_Manholes-339 | 249.19 | 361.1 | 5.35 | 8 | PVC | 0.01 | 1,631 | 13 | 72 | 84 | 5.2 | | |
| Kirkland_Main-534 | Kirkland_Manholes-1543 | 289 | Kirkland_Manholes-1544 | 284.46 | 416.8 | 1.09 | 8 | PVC | 0.01 | 736 | 7 | 20 | 27 | 3.7 | SM14-Ex-EX123 | |
| Kirkland_Main-535 | Kirkland_Manholes-1545 | 272.4 | Kirkland_Manholes-765 | 257.59 | 249.5 | 5.94 | 8 | PVC | 0.01 | 1,718 | 18 | 68 | 85 | 5 | SM14-Ex-EX121 | |
| Kirkland_Main-536 | Kirkland_Manholes-1571 | 242.76 | Kirkland_Manholes-1572 | 242.19 | 318.3 | 0.18 | 15 | PVC | 0.01 | 1,595 | 191 | 445 | 636 | 39.9 | | |
| Kirkland_Main-537 | Kirkland_Manholes-1573 | 242.13 | Kirkland_Manholes-1574 | 241.8 | 67.8 | 0.49 | 18 | PVC | 0.01 | 4,277 | 191 | 453 | 644 | 15.1 | SM14-Ex-EX133 | |
| Kirkland_Main-538 | Kirkland_Manholes-1572 | 242.19 | Kirkland_Manholes-1573 | 242.13 | 243.5 | 0.02 | 18 | PVC | 0.01 | 962 | 191 | 449 | 640 | 66.6 | SM14-Ex-EX133 | |
| Kirkland_Main-539 | Kirkland_Manholes-1576 | 330.99 | Kirkland_Manholes-1575 | 314.42 | 250.6 | 6.61 | 8 | PVC | 0.01 | 1,813 | 3 | 28 | 31 | 1.7 | | |
| Kirkland_Main-540 | Kirkland_Manholes-1577 | 341.43 | Kirkland_Manholes-1576 | 330.99 | 181.7 | 5.75 | 8 | PVC | 0.01 | 1,690 | 3 | 24 | 27 | 1.6 | | |
| Kirkland_Main-541 | Kirkland_Manholes-1578 | 344.66 | Kirkland_Manholes-1577 | 341.43 | 47.3 | 6.83 | 8 | PVC | 0.01 | 1,843 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-542 | Kirkland_Manholes-1579 | 359.44 | Kirkland_Manholes-1580 | 335.19 | 206.7 | 11.73 | 12 | PVC | 0.01 | 7,121 | 155 | 604 | 759 | 10.7 | SM14-Ex-EX205 | |
| Kirkland_Main-543 | Kirkland_Manholes-1580 | 335.19 | Kirkland_Manholes-1581 | 324.95 | 171.4 | 5.98 | 12 | PVC | 0.01 | 5,081 | 156 | 608 | 764 | 15 | SM14-Ex-EX205 | |
| Kirkland_Main-544 | Kirkland_Manholes-1582 | 332.21 | Kirkland_Manholes-1581 | 324.95 | 160.1 | 4.53 | 12 | PVC | 0.01 | 4,426 | 41 | 191 | 232 | 5.2 | SM14-Ex-EX206 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-545 | Kirkland_Manholes-1581 | 324.95 | Kirkland_Manholes-1623 | 294.92 | 398.1 | 7.54 | 12 | PVC | 0.01 | 5,709 | 197 | 803 | 999 | 17.5 | SM14-Ex-EX205 | |
| Kirkland_Main-546 | Kirkland_Manholes-2681 | 334.86 | Kirkland_Manholes-3028 | 332.75 | 289 | 0.73 | 12 | PVC | 0.01 | 1,776 | 38 | 171 | 209 | 11.7 | SM14-Ex-EX206 | |
| Kirkland_Main-547 | Kirkland_Manholes-1583 | 333.82 | Kirkland_Manholes-1582 | 332.21 | 16.6 | 9.69 | 8 | PVC | 0.01 | 2,195 | 2 | 8 | 10 | 0.5 | | |
| Kirkland_Main-548 | Kirkland_Manholes-1584 | 346.72 | Kirkland_Manholes-1583 | 333.82 | 203.1 | 6.35 | 8 | PVC | 0.01 | 1,777 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-549 | Kirkland_Manholes-1575 | 314.42 | Kirkland_Manholes-1953 | 290.71 | 326.1 | 7.27 | 8 | PVC | 0.01 | 1,901 | 3 | 32 | 35 | 1.8 | | |
| Kirkland_Main-550 | Kirkland_Manholes-1150 | 151.79 | Kirkland_Manholes-1151 | 143.36 | 156.6 | 5.38 | 8 | PVC | 0.01 | 1,636 | 9 | 58 | 67 | 4.1 | SM10 | |
| Kirkland_Main-551 | Kirkland_Manholes-1151 | 143.36 | Kirkland_Manholes-1152 | 135.47 | 158.3 | 4.98 | 8 | PVC | 0.01 | 1,574 | 10 | 66 | 76 | 4.8 | SM10 | |
| Kirkland_Main-552 | Kirkland_Manholes-1170 | 153.9 | Kirkland_Manholes-1150 | 151.79 | 249.2 | 0.85 | 8 | PVC | 0.01 | 649 | 2 | 8 | 10 | 1.5 | SM10 | |
| Kirkland_Main-553 | Kirkland_Manholes-306 | 19.99 | Kirkland_Manholes-1183 | 19.89 | 217.6 | 0.05 | 12 | PVC | 0.01 | 446 | 27 | 159 | 186 | 41.8 | SM14-Ex-EX37 | |
| Kirkland_Main-554 | Kirkland_Manholes-304 | 75.98 | Kirkland_Manholes-303 | 75.38 | 34.2 | 1.76 | 8 | PVC | 0.01 | 934 | 16 | 62 | 77 | 8.3 | SM10 | |
| Kirkland_Main-555 | Kirkland_Manholes-303 | 75.38 | Kirkland_Manholes-305 | 74.69 | 171.5 | 0.4 | 8 | PVC | 0.01 | 447 | 16 | 71 | 86 | 19.3 | SM10 | |
| Kirkland_Main-556 | Kirkland_Manholes-302 | 78.72 | Kirkland_Manholes-304 | 75.98 | 177.4 | 1.54 | 8 | PVC | 0.01 | 876 | 15 | 53 | 68 | 7.8 | SM10 | |
| Kirkland_Main-557 | Kirkland_Manholes-307 | 105.6 | Kirkland_Manholes-302 | 78.72 | 385.1 | 6.98 | 8 | PVC | 0.01 | 1,863 | 14 | 44 | 58 | 3.1 | SM10 | |
| Kirkland_Main-558 | Kirkland_Manholes-301 | 74.29 | Kirkland_Manholes-300 | 70.39 | 326.3 | 1.2 | 8 | PVC | 0.01 | 771 | 2 | 3 | 5 | 0.7 | SM10 | |
| Kirkland_Main-559 | Kirkland_Manholes-1316 | 272.4 | Kirkland_Manholes-1317 | 271.64 | 47 | 1.62 | 8 | PVC | 0.01 | 896 | 1 | 12 | 13 | 1.4 | | |
| Kirkland_Main-563 | Kirkland_Manholes-300 | 70.39 | Kirkland_Manholes-299 | 66.63 | 324 | 1.16 | 8 | PVC | 0.01 | 760 | 6 | 6 | 12 | 1.6 | SM10 | |
| Kirkland_Main-564 | Kirkland_Manholes-388 | 297.69 | Kirkland_Manholes-389 | 295.78 | 310.4 | 0.62 | 8 | PVC | 0.01 | 553 | 8 | 20 | 28 | 5 | SM14-Ex-EX33 | |
| Kirkland_Main-565 | Kirkland_Manholes-390 | 304.37 | Kirkland_Manholes-391 | 302.9 | 200.9 | 0.73 | 8 | PVC | 0.01 | 603 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX34 | |
| Kirkland_Main-566 | Kirkland_Manholes-392 | 305 | Kirkland_Manholes-391 | 302.9 | 116.9 | 1.8 | 8 | PVC | 0.01 | 945 | 28 | 119 | 147 | 15.6 | SM14-Ex-EX50 | |
| Kirkland_Main-567 | Kirkland_Manholes-2568 | 299.24 | Kirkland_Manholes-2592 | 294.57 | 199 | 2.35 | 8 | PVC | 0.01 | 1,080 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX306 | |
| Kirkland_Main-568 | Kirkland_Manholes-2571 | 325.07 | Kirkland_Manholes-2570 | 299.81 | 188.9 | 13.37 | 8 | PVC | 0.01 | 2,578 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-569 | Kirkland_Manholes-2602 | 234.19 | Kirkland_Manholes-2601 | 228.74 | 344.4 | 1.58 | 8 | PVC | 0.01 | 887 | 3 | 12 | 14 | 1.6 | SM14-Ex-EX300 | |
| Kirkland_Main-570 | Kirkland_Manholes-2603 | 296.02 | Kirkland_Manholes-2588 | 292.14 | 272.1 | 1.43 | 8 | PVC | 0.01 | 842 | 11 | 24 | 34 | 4.1 | SM14-Ex-EX304 | |
| Kirkland_Main-573 | Kirkland_Manholes-2610 | 205.21 | Kirkland_Manholes-2609 | 193.8 | 79.9 | 14.28 | 8 | PVC | 0.01 | 2,664 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-574 | Kirkland_Manholes-1380 | 448.63 | Kirkland_Manholes-1386 | 447.82 | 272.6 | 0.3 | 8 | PVC | 0.01 | 384 | 6 | 8 | 14 | 3.6 | SM14-Ex-EX219 | |
| Kirkland_Main-575 | Kirkland_Manholes-1383 | 449.36 | Kirkland_Manholes-1380 | 448.63 | 231 | 0.32 | 8 | PVC | 0.01 | 396 | 4 | 4 | 8 | 2 | SM14-Ex-EX219 | |
| Kirkland_Main-576 | Kirkland_Manholes-1381 | 441.1 | Kirkland_Manholes-1382 | 428.64 | 320.7 | 3.88 | 8 | PVC | 0.01 | 1,390 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-577 | Kirkland_Manholes-1384 | 452.11 | Kirkland_Manholes-1385 | 450.86 | 206.1 | 0.61 | 8 | PVC | 0.01 | 549 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-578 | Kirkland_Manholes-1385 | 450.86 | Kirkland_Manholes-1386 | 447.82 | 69.1 | 4.4 | 8 | PVC | 0.01 | 1,479 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-579 | Kirkland_Manholes-1386 | 447.82 | Kirkland_Manholes-1387 | 446.83 | 200.1 | 0.49 | 8 | PVC | 0.01 | 496 | 8 | 20 | 28 | 5.7 | SM14-Ex-EX219 | |
| Kirkland_Main-580 | Kirkland_Manholes-1387 | 446.83 | Kirkland_Manholes-1388 | 445.49 | 260.4 | 0.51 | 8 | PVC | 0.01 | 506 | 28 | 95 | 124 | 24.4 | SM14-Ex-EX219 | |
| Kirkland_Main-581 | Kirkland_Manholes-1388 | 445.49 | Kirkland_Manholes-1389 | 444.08 | 265.9 | 0.53 | 8 | PVC | 0.01 | 513 | 30 | 99 | 129 | 25.2 | SM14-Ex-EX219 | |
| Kirkland_Main-582 | Kirkland_Manholes-1390 | 457.46 | Kirkland_Manholes-1389 | 444.08 | 260.4 | 5.14 | 8 | PVC | 0.01 | 1,598 | 6 | 24 | 29 | 1.8 | SM14-Ex-EX218 | |
| Kirkland_Main-583 | Kirkland_Manholes-1389 | 444.08 | Kirkland_Manholes-532 | 443.04 | 161.2 | 0.65 | 8 | PVC | 0.01 | 566 | 37 | 127 | 164 | 29 | SM14-Ex-EX218 | |
| Kirkland_Main-584 | Kirkland_Manholes-532 | 443.04 | Kirkland_Manholes-533 | 442.23 | 169.5 | 0.48 | 8 | PVC | 0.01 | 487 | 41 | 131 | 172 | 35.2 | SM14-Ex-EX218 | |
| Kirkland_Main-585 | Kirkland_Manholes-533 | 442.23 | Kirkland_Manholes-534 | 432.55 | 269 | 3.6 | 8 | PVC | 0.01 | 1,337 | 42 | 135 | 177 | 13.3 | SM14-Ex-EX218 | |
| Kirkland_Main-586 | Kirkland_Manholes-530 | 464.47 | Kirkland_Manholes-1390 | 457.46 | 207.2 | 3.38 | 8 | PVC | 0.01 | 1,297 | 5 | 20 | 25 | 1.9 | SM14-Ex-EX218 | |
| Kirkland_Main-587 | Kirkland_Manholes-1391 | 471.35 | Kirkland_Manholes-530 | 464.47 | 201.7 | 3.41 | 8 | PVC | 0.01 | 1,302 | 2 | 12 | 14 | 1.1 | SM14-Ex-EX218 | |
| Kirkland_Main-588 | Kirkland_Manholes-543 | 448.24 | Kirkland_Manholes-1387 | 446.83 | 163.4 | 0.86 | 8 | PVC | 0.01 | 655 | 19 | 72 | 91 | 13.9 | | |
| Kirkland_Main-589 | Kirkland_Manholes-531 | 468.8 | Kirkland_Manholes-530 | 464.47 | 218 | 1.99 | 8 | PVC | 0.01 | 994 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-590 | Kirkland_Manholes-339 | 249.19 | Kirkland_Manholes-340 | 235.81 | 214 | 6.25 | 8 | PVC | 0.01 | 1,763 | 13 | 75 | 89 | 5 | | |
| Kirkland_Main-592 | Kirkland_Manholes-2009 | 426.97 | Kirkland_Manholes-2010 | 424.43 | 206.3 | 1.23 | 8 | PVC | 0.01 | 782 | 11 | 52 | 63 | 8 | | |
| Kirkland_Main-593 | Kirkland_Manholes-2011 | 417.75 | Kirkland_Manholes-2012 | 406.67 | 363.8 | 3.05 | 8 | PVC | 0.01 | 1,230 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-594 | Kirkland_Manholes-1989 | 447.97 | Kirkland_Manholes-1990 | 439.8 | 245.1 | 3.33 | 8 | PVC | 0.01 | 1,287 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-595 | Kirkland_Manholes-1990 | 439.8 | Kirkland_Manholes-1991 | 431.18 | 131.7 | 6.55 | 8 | PVC | 0.01 | 1,804 | 5 | 28 | 33 | 1.8 | | |
| Kirkland_Main-596 | Kirkland_Manholes-556 | 457.9 | Kirkland_Manholes-3007 | 456.9 | 222.1 | 0.45 | 8 | PVC | 0.01 | 473 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-597 | Kirkland_Manholes-2495 | 184.35 | Kirkland_Manholes-2494 | 170.93 | 403.6 | 3.33 | 8 | PVC | 0.01 | 1,286 | 12 | 20 | 32 | 2.5 | SM14-Ex-EX236 | |
| Kirkland_Main-598 | Kirkland_Manholes-2496 | 191.57 | Kirkland_Manholes-2495 | 184.35 | 278.9 | 2.59 | 8 | PVC | 0.01 | 1,134 | 10 | 16 | 26 | 2.3 | SM14-Ex-EX236 | |
| Kirkland_Main-599 | Kirkland_Manholes-2497 | 194.88 | Kirkland_Manholes-2498 | 194.29 | 45.2 | 1.3 | 8 | PVC | 0.01 | 805 | 8 | 8 | 16 | 2 | SM14-Ex-EX236 | |
| Kirkland_Main-600 | Kirkland_Manholes-2498 | 194.29 | Kirkland_Manholes-2496 | 191.57 | 77.4 | 3.51 | 8 | PVC | 0.01 | 1,322 | 9 | 12 | 21 | 1.6 | SM14-Ex-EX236 | |
| Kirkland_Main-601 | Kirkland_Manholes-2237 | 143.38 | Kirkland_Manholes-2499 | 140.38 | 322.1 | 0.93 | 8 | PVC | 0.01 | 680 | 3 | 6 | 10 | 1.4 | SM14-Ex-EX225 | |
| Kirkland_Main-602 | Kirkland_Manholes-2499 | 140.38 | Kirkland_Manholes-2500 | 122.66 | 273.4 | 6.48 | 8 | PVC | 0.01 | 1,795 | 5 | 12 | 17 | 1 | SM14-Ex-EX225 | |
| Kirkland_Main-603 | Kirkland_Manholes-2500 | 122.66 | Kirkland_Manholes-2501 | 104.86 | 254.1 | 7.01 | 8 | PVC | 0.01 | 1,866 | 6 | 18 | 25 | 1.3 | SM14-Ex-EX225 | |
| Kirkland_Main-604 | Kirkland_Manholes-2501 | 104.86 | Kirkland_Manholes-2502 | 102.46 | 257.9 | 0.93 | 8 | PVC | 0.01 | 680 | 9 | 24 | 33 | 4.8 | SM14-Ex-EX225 | |
| Kirkland_Main-605 | Kirkland_Manholes-2502 | 102.46 | Kirkland_Manholes-2503 | 101.49 | 223.5 | 0.43 | 8 | PVC | 0.01 | 464 | 13 | 30 | 43 | 9.2 | SM14-Ex-EX225 | |
| Kirkland_Main-606 | Kirkland_Manholes-2504 | 121.59 | Kirkland_Manholes-2503 | 101.49 | 254 | 7.91 | 8 | PVC | 0.01 | 1,983 | 5 | 12 | 17 | 0.9 | SM14-Ex-EX223 | |
| Kirkland_Main-607 | Kirkland_Manholes-2503 | 101.49 | Kirkland_Manholes-2507 | 88.29 | 256.5 | 5.15 | 8 | PVC | 0.01 | 1,599 | 18 | 49 | 67 | 4.2 | SM14-Ex-EX223 | |
| Kirkland_Main-608 | Kirkland_Manholes-2505 | 125.11 | Kirkland_Manholes-2504 | 121.59 | 387.3 | 0.91 | 8 | PVC | 0.01 | 672 | 2 | 6 | 9 | 1.3 | SM14-Ex-EX223 | |
| Kirkland_Main-609 | Kirkland_Manholes-2763 | 13.15 | Kirkland_Manholes-2762 | 13.1 | 227.4 | 0.02 | 36 | PVC | 0.01 | 5,771 | 446 | 1,551 | 2,298 | 39.8 | SM14-Ex-EX10 | |
| Kirkland_Main-610 | Kirkland_Manholes-2238 | 92.13 | Kirkland_Manholes-2118 | 82.91 | 342.6 | 2.69 | 8 | PVC | 0.01 | 1,157 | 4 | 12 | 17 | 1.4 | SM14-Ex-EX224 | |
| Kirkland_Main-611 | Kirkland_Manholes-2118 | 82.91 | Kirkland_Manholes-2146 | 75.22 | 210 | 3.66 | 8 | PVC | 0.01 | 1,349 | 27 | 79 | 106 | 7.9 | SM14-Ex-EX223 | |
| Kirkland_Main-612 | Kirkland_Manholes-2506 | 86.22 | Kirkland_Manholes-2118 | 82.91 | 249.1 | 1.33 | 8 | PVC | 0.01 | 813 | 21 | 61 | 81 | 10 | SM14-Ex-EX223 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-613 | Kirkland_Manholes-2507 | 88.29 | Kirkland_Manholes-2506 | 86.22 | 236.4 | 0.88 | 8 | PVC | 0.01 | 660 | 19 | 55 | 74 | 11.2 | SM14-Ex-EX223 | |
| Kirkland_Main-614 | Kirkland_Manholes-2508 | 120.01 | Kirkland_Manholes-2510 | 102.3 | 301.7 | 5.87 | 8 | PVC | 0.01 | 1,708 | 4 | 18 | 22 | 1.3 | SM14-Ex-EX229 | |
| Kirkland_Main-615 | Kirkland_Manholes-2144 | 65.5 | Kirkland_Manholes-2143 | 61.9 | 34.5 | 10.44 | 8 | PVC | 0.01 | 2,279 | 65 | 82 | 148 | 6.5 | | |
| Kirkland_Main-616 | Kirkland_Manholes-2145 | 63.1 | Kirkland_Manholes-2143 | 61.9 | 31.4 | 3.82 | 8 | PVC | 0.01 | 1,377 | 4 | 49 | 54 | 3.9 | | |
| Kirkland_Main-618 | Kirkland_Manholes-2170 | 148.68 | Kirkland_Manholes-2169 | 142.85 | 119.8 | 4.87 | 8 | PVC | 0.01 | 1,555 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX193 | |
| Kirkland_Main-622 | Kirkland_Manholes-2167 | 120.69 | Kirkland_Manholes-2166 | 108.92 | 118.4 | 9.94 | 8 | PVC | 0.01 | 2,223 | 3 | 33 | 35 | 1.6 | SM14-Ex-EX193 | |
| Kirkland_Main-623 | Kirkland_Manholes-2166 | 108.92 | Kirkland_Manholes-2165 | 94.99 | 230.8 | 6.04 | 8 | PVC | 0.01 | 1,732 | 6 | 41 | 47 | 2.7 | SM14-Ex-EX193 | |
| Kirkland_Main-626 | Kirkland_Manholes-2719 | 31.99 | Kirkland_Manholes-2715 | 29.78 | 252.5 | 0.88 | 8 | PVC | 0.01 | 660 | 74 | 12 | 86 | 13 | | |
| Kirkland_Main-627 | Kirkland_Manholes-2278 | 406.74 | Kirkland_Manholes-2271 | 405.49 | 96 | 1.3 | 8 | PVC | 0.01 | 805 | 2 | 16 | 18 | 2.2 | | |
| Kirkland_Main-630 | Kirkland_Manholes-2407 | 403.31 | Kirkland_Manholes-2268 | 401.9 | 163.6 | 0.86 | 8 | PVC | 0.01 | 655 | 11 | 48 | 59 | 8.9 | SM14-Ex-EX261 | |
| Kirkland_Main-631 | Kirkland_Manholes-2266 | 392.8 | Kirkland_Manholes-2265 | 392 | 110.1 | 0.73 | 8 | PVC | 0.01 | 601 | 21 | 123 | 144 | 24 | SM14-Ex-EX212 | |
| Kirkland_Main-632 | Kirkland_Manholes-2265 | 392 | Kirkland_Manholes-2263 | 374.13 | 447.5 | 3.99 | 8 | PVC | 0.01 | 1,409 | 21 | 127 | 148 | 10.5 | SM14-Ex-EX212 | |
| Kirkland_Main-633 | Kirkland_Manholes-2245 | 234.09 | Kirkland_Manholes-2074 | 213.49 | 327.6 | 6.29 | 8 | PVC | 0.01 | 1,768 | 43 | 48 | 91 | 5.1 | SM14-Ex-EX246 | |
| Kirkland_Main-634 | Kirkland_Manholes-2253 | 239.74 | Kirkland_Manholes-2252 | 236.86 | 193.1 | 1.49 | 8 | PVC | 0.01 | 861 | 31 | 12 | 43 | 4.9 | SM14-Ex-EX247 | |
| Kirkland_Main-635 | Kirkland_Manholes-2252 | 236.86 | Kirkland_Manholes-2245 | 234.09 | 241.6 | 1.15 | 8 | PVC | 0.01 | 755 | 35 | 16 | 51 | 6.8 | SM14-Ex-EX247 | |
| Kirkland_Main-636 | Kirkland_Manholes-2246 | 246.17 | Kirkland_Manholes-2245 | 234.09 | 185.5 | 6.51 | 8 | PVC | 0.01 | 1,799 | 6 | 24 | 30 | 1.7 | SM14-Ex-EX246 | |
| Kirkland_Main-637 | Kirkland_Manholes-2247 | 249.9 | Kirkland_Manholes-2246 | 246.17 | 310.7 | 1.2 | 8 | PVC | 0.01 | 773 | 4 | 20 | 24 | 3.1 | SM14-Ex-EX246 | |
| Kirkland_Main-638 | Kirkland_Manholes-2251 | 257.04 | Kirkland_Manholes-2247 | 249.9 | 237.7 | 3 | 8 | PVC | 0.01 | 1,222 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX246 | |
| Kirkland_Main-639 | Kirkland_Manholes-2248 | 259.41 | Kirkland_Manholes-2247 | 249.9 | 197.8 | 4.81 | 8 | PVC | 0.01 | 1,546 | 3 | 12 | 15 | 1 | | |
| Kirkland_Main-640 | Kirkland_Manholes-2249 | 263.29 | Kirkland_Manholes-2248 | 259.41 | 137.3 | 2.82 | 8 | PVC | 0.01 | 1,185 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-641 | Kirkland_Manholes-2250 | 275.69 | Kirkland_Manholes-2249 | 263.29 | 113.4 | 10.94 | 8 | PVC | 0.01 | 2,332 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-642 | Kirkland_Manholes-2261 | 305.59 | Kirkland_Manholes-2260 | 285.07 | 409.2 | 5.01 | 12 | PVC | 0.01 | 4,655 | 237 | 850 | 1,087 | 23.4 | SM14-Ex-EX248 | |
| Kirkland_Main-643 | Kirkland_Manholes-2262 | 311.78 | Kirkland_Manholes-2261 | 305.59 | 133.8 | 4.62 | 12 | PVC | 0.01 | 4,470 | 234 | 846 | 1,081 | 24.2 | SM14-Ex-EX248 | |
| Kirkland_Main-644 | Kirkland_Manholes-21 | 62.08 | Kirkland_Manholes-101 | 61.95 | 7 | 1.85 | 8 | PVC | 0.01 | 960 | 7 | 30 | 37 | 3.8 | | |
| Kirkland_Main-645 | Kirkland_Manholes-3038 | 279.17 | Kirkland_Manholes-3039 | 278.83 | 84.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-646 | Kirkland_Manholes-3039 | 278.83 | Kirkland_Manholes-3035 | 266.43 | 233.8 | 5.3 | 8 | PVC | 0.01 | 1,624 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-647 | Kirkland_Manholes-3037 | 277.97 | Kirkland_Manholes-3036 | 268.75 | 180.1 | 5.12 | 8 | PVC | 0.01 | 1,595 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-648 | Kirkland_Manholes-3036 | 268.75 | Kirkland_Manholes-3035 | 266.43 | 62.1 | 3.74 | 8 | PVC | 0.01 | 1,363 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-649 | Kirkland_Manholes-1505 | 267 | Kirkland_Manholes-3035 | 266.43 | 67.6 | 0.84 | 8 | PVC | 0.01 | 647 | 22 | 87 | 110 | 16.9 | | |
| Kirkland_Main-650 | Kirkland_Manholes-3040 | 208.06 | Kirkland_Manholes-3041 | 198.95 | 98.1 | 9.29 | 8 | PVC | 0.01 | 2,148 | 6 | 4 | 10 | 0.4 | | |
| Kirkland_Main-651 | Kirkland_Manholes-3041 | 198.95 | Kirkland_Manholes-1602 | 196.74 | 179.4 | 1.23 | 8 | PVC | 0.01 | 782 | 7 | 8 | 15 | 2 | | |
| Kirkland_Main-652 | Kirkland_Manholes-3100 | 18.3 | Kirkland_Manholes-3044 | 18.06 | 60.9 | 0.39 | 18 | PVC | 0.01 | 3,847 | 88 | 67 | 155 | 4 | SM14-Ex-EX289 | |
| Kirkland_Main-653 | Kirkland_Manholes-566 | 483.97 | Kirkland_Manholes-3045 | 483.35 | 154.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-655 | Kirkland_Manholes-3046 | 250.83 | Kirkland_Manholes-3047 | 250.39 | 298.9 | 0.15 | 8 | PVC | 0.01 | 271 | 1 | 4 | 5 | 1.9 | | |
| Kirkland_Main-656 | Kirkland_Manholes-3047 | 250.39 | Kirkland_Manholes-396 | 249.55 | 18.8 | 4.48 | 8 | PVC | 0.01 | 1,492 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-657 | Kirkland_Manholes-3048 | 215.92 | Kirkland_Manholes-364 | 215.51 | 48.9 | 0.84 | 21 | PVC | 0.01 | 8,463 | 535 | 1,967 | 2,502 | 29.6 | | |
| Kirkland_Main-658 | Kirkland_Manholes-3051 | 246.2 | Kirkland_Manholes-3050 | 235.83 | 120.9 | 8.58 | 8 | PVC | 0.01 | 2,065 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-659 | Kirkland_Manholes-3050 | 235.83 | Kirkland_Manholes-3049 | 221.64 | 223.5 | 6.35 | 8 | PVC | 0.01 | 1,776 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-660 | Kirkland_Manholes-3049 | 221.64 | Kirkland_Manholes-3048 | 215.92 | 33.6 | 17.02 | 8 | PVC | 0.01 | 2,909 | 2 | 12 | 13 | 0.5 | | |
| Kirkland_Main-661 | Kirkland_Manholes-3054 | 230.52 | Kirkland_Manholes-3053 | 227.56 | 179.1 | 1.65 | 8 | PVC | 0.01 | 906 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-662 | Kirkland_Manholes-3052 | 228.3 | Kirkland_Manholes-3053 | 227.56 | 79.8 | 0.93 | 8 | PVC | 0.01 | 679 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-663 | Kirkland_Manholes-3053 | 227.56 | Kirkland_Manholes-3055 | 218.26 | 198.6 | 4.68 | 8 | PVC | 0.01 | 1,526 | 3 | 12 | 14 | 0.9 | | |
| Kirkland_Main-664 | Kirkland_Manholes-3055 | 218.26 | Kirkland_Manholes-364 | 215.51 | 19.7 | 13.95 | 8 | PVC | 0.01 | 2,634 | 3 | 16 | 18 | 0.7 | | |
| Kirkland_Main-665 | Kirkland_Manholes-3058 | 393.03 | Kirkland_Manholes-3057 | 384.71 | 254 | 3.28 | 8 | PVC | 0.01 | 1,276 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-666 | Kirkland_Manholes-3057 | 384.71 | Kirkland_Manholes-3056 | 382.54 | 53.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 2 | 8 | 9 | 0.7 | | |
| Kirkland_Main-667 | Kirkland_Manholes-3056 | 382.54 | Kirkland_Manholes-3016 | 372.66 | 250.2 | 3.95 | 8 | PVC | 0.01 | 1,401 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-668 | Kirkland_Manholes-3062 | 383.23 | Kirkland_Manholes-3063 | 372.82 | 282.2 | 3.69 | 8 | PVC | 0.01 | 1,354 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-669 | Kirkland_Manholes-3063 | 372.82 | Kirkland_Manholes-3061 | 361.76 | 319.4 | 3.46 | 8 | PVC | 0.01 | 1,312 | 0 | 8 | 8 | 0.6 | | |
| Kirkland_Main-670 | Kirkland_Manholes-3061 | 361.76 | Kirkland_Manholes-3060 | 360.51 | 136.8 | 0.91 | 8 | PVC | 0.01 | 674 | 0 | 12 | 12 | 1.8 | | |
| Kirkland_Main-671 | Kirkland_Manholes-3059 | 374.97 | Kirkland_Manholes-3060 | 371.3 | 316.1 | 1.16 | 8 | PVC | 0.01 | 760 | 0 | 4 | 4 | 0.6 | | Drop Connection |
| Kirkland_Main-672 | Kirkland_Manholes-3060 | 360.51 | Kirkland_Manholes-3064 | 358.68 | 232.8 | 0.79 | 8 | PVC | 0.01 | 625 | 2 | 20 | 22 | 3.5 | | |
| Kirkland_Main-673 | Kirkland_Manholes-3064 | 358.68 | Kirkland_Manholes-3065 | 358.3 | 94.6 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 24 | 26 | 5.8 | | |
| Kirkland_Main-674 | Kirkland_Manholes-3065 | 358.3 | Kirkland_Manholes-3066 | 356.12 | 87.4 | 2.49 | 8 | PVC | 0.01 | 1,113 | 3 | 28 | 31 | 2.8 | | |
| Kirkland_Main-675 | Kirkland_Manholes-3066 | 356.12 | Kirkland_Manholes-3067 | 344.94 | 288.6 | 3.87 | 8 | PVC | 0.01 | 1,388 | 5 | 32 | 37 | 2.7 | | |
| Kirkland_Main-676 | Kirkland_Manholes-3067 | 344.94 | Kirkland_Manholes-3068 | 332.11 | 210.6 | 6.09 | 8 | PVC | 0.01 | 1,740 | 5 | 36 | 41 | 2.4 | | |
| Kirkland_Main-677 | Kirkland_Manholes-3068 | 332.11 | Kirkland_Manholes-3069 | 304.52 | 266.1 | 10.37 | 8 | PVC | 0.01 | 2,270 | 6 | 40 | 45 | 2 | | |
| Kirkland_Main-678 | Kirkland_Manholes-3069 | 304.52 | Kirkland_Manholes-926 | 302.74 | 43.6 | 4.09 | 8 | PVC | 0.01 | 1,425 | 6 | 44 | 50 | 3.5 | | |
| Kirkland_Main-679 | Kirkland_Manholes-299 | 66.63 | Kirkland_Manholes-298 | 56.65 | 96.2 | 10.37 | 8 | PVC | 0.01 | 2,271 | 9 | 16 | 25 | 1.1 | SM10 | |
| Kirkland_Main-680 | Kirkland_Manholes-298 | 56.65 | Kirkland_Manholes-289 | 31.71 | 154.4 | 16.15 | 8 | PVC | 0.01 | 2,834 | 9 | 19 | 28 | 1 | SM10 | |
| Kirkland_Main-681 | Kirkland_Manholes-281 | 36.84 | Kirkland_Manholes-280 | 27.37 | 236.3 | 4.01 | 8 | PVC | 0.01 | 1,411 | 1 | 13 | 14 | 1 | SM10 | |
| Kirkland_Main-682 | Kirkland_Manholes-752 | 265.45 | Kirkland_Manholes-1559 | 253.89 | 158.5 | 7.29 | 8 | PVC | 0.01 | 1,904 | 20 | 60 | 80 | 4.2 | SM14-Ex-EX68 | |
| Kirkland_Main-683 | Kirkland_Manholes-1561 | 229.17 | Kirkland_Manholes-1562 | 206.57 | 130 | 17.39 | 8 | PVC | 0.01 | 2,940 | 1 | 4 | 5 | 0.2 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-684 | Kirkland_Manholes-1563 | 203.28 | Kirkland_Manholes-1564 | 164.37 | 189.8 | 20.5 | 8 | PVC | 0.01 | 3,192 | 1 | 12 | 13 | 0.4 | | |
| Kirkland_Main-685 | Kirkland_Manholes-1347 | 427.05 | Kirkland_Manholes-1349 | 426.8 | 216.3 | 0.12 | 8 | PVC | 0.01 | 240 | 2 | 16 | 18 | 7.6 | | |
| Kirkland_Main-686 | Kirkland_Manholes-1349 | 426.8 | Kirkland_Manholes-1348 | 423.36 | 47.3 | 7.28 | 8 | PVC | 0.01 | 1,902 | 3 | 20 | 23 | 1.2 | | |
| Kirkland_Main-687 | Kirkland_Manholes-1348 | 423.36 | Kirkland_Manholes-1354 | 421.4 | 318.8 | 0.61 | 8 | PVC | 0.01 | 553 | 3 | 24 | 27 | 4.9 | | |
| Kirkland_Main-688 | Kirkland_Manholes-1352 | 406.36 | Kirkland_Manholes-1903 | 399.77 | 227.2 | 2.9 | 8 | PVC | 0.01 | 1,201 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-689 | Kirkland_Manholes-1353 | 422.52 | Kirkland_Manholes-1354 | 421.4 | 133.4 | 0.84 | 8 | PVC | 0.01 | 646 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-690 | Kirkland_Manholes-1354 | 421.4 | Kirkland_Manholes-1355 | 420.81 | 87.2 | 0.68 | 8 | PVC | 0.01 | 580 | 5 | 32 | 37 | 6.4 | | |
| Kirkland_Main-691 | Kirkland_Manholes-832 | 339.26 | Kirkland_Manholes-794 | 336.64 | 92.4 | 2.84 | 8 | PVC | 0.01 | 1,188 | 2 | 12 | 14 | 1.2 | | |
| Kirkland_Main-692 | Kirkland_Manholes-794 | 336.64 | Kirkland_Manholes-795 | 330.76 | 102.1 | 5.76 | 8 | PVC | 0.01 | 1,692 | 3 | 16 | 19 | 1.1 | | |
| Kirkland_Main-693 | Kirkland_Manholes-795 | 330.76 | Kirkland_Manholes-796 | 329.52 | 188.4 | 0.66 | 8 | PVC | 0.01 | 572 | 4 | 20 | 23 | 4.1 | | |
| Kirkland_Main-694 | Kirkland_Manholes-833 | 205 | Kirkland_Manholes-830 | 198.45 | 115.6 | 5.67 | 8 | PVC | 0.01 | 1,678 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-695 | Kirkland_Manholes-1212 | 307.51 | Kirkland_Manholes-1213 | 300.54 | 162.4 | 4.29 | 6 | Concrete | 0.013 | 522 | 60 | 20 | 79 | 15.2 | | |
| Kirkland_Main-696 | Kirkland_Manholes-1213 | 300.54 | Kirkland_Manholes-2616 | 274.02 | 226.7 | 11.7 | 6 | Concrete | 0.013 | 861 | 60 | 24 | 83 | 9.7 | | |
| Kirkland_Main-697 | Kirkland_Manholes-515 | 18.45 | Kirkland_Manholes-514 | 18.19 | 122.3 | 0.21 | 12 | PVC | 0.01 | 953 | 30 | 203 | 233 | 24.5 | SM14-Ex-EX37 | |
| Kirkland_Main-698 | Kirkland_Manholes-1186 | 18.89 | Kirkland_Manholes-515 | 18.45 | 232.7 | 0.19 | 12 | PVC | 0.01 | 907 | 30 | 195 | 224 | 24.7 | SM14-Ex-EX37 | |
| Kirkland_Main-699 | Kirkland_Manholes-1185 | 19.29 | Kirkland_Manholes-1186 | 18.89 | 267.9 | 0.15 | 12 | PVC | 0.01 | 803 | 29 | 186 | 214 | 26.7 | SM14-Ex-EX37 | |
| Kirkland_Main-700 | Kirkland_Manholes-2510 | 102.3 | Kirkland_Manholes-2511 | 85.9 | 155.2 | 10.57 | 8 | PVC | 0.01 | 2,292 | 6 | 24 | 30 | 1.3 | SM14-Ex-EX229 | |
| Kirkland_Main-701 | Kirkland_Manholes-2512 | 90.74 | Kirkland_Manholes-2511 | 85.9 | 110.5 | 4.38 | 8 | PVC | 0.01 | 1,475 | 2 | 12 | 14 | 1 | SM14-Ex-EX228 | |
| Kirkland_Main-703 | Kirkland_Manholes-2513 | 104.61 | Kirkland_Manholes-2512 | 90.74 | 161.7 | 8.58 | 8 | PVC | 0.01 | 2,065 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX228 | |
| Kirkland_Main-704 | Kirkland_Manholes-1988 | 449.74 | Kirkland_Manholes-1989 | 447.97 | 257 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-705 | Kirkland_Manholes-2008 | 435.7 | Kirkland_Manholes-1993 | 435.41 | 162.8 | 0.18 | 8 | PVC | 0.01 | 298 | 5 | 16 | 21 | 7 | | |
| Kirkland_Main-706 | Kirkland_Manholes-2060 | 437.6 | Kirkland_Manholes-2008 | 435.7 | 259.6 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-707 | Kirkland_Manholes-1993 | 435.41 | Kirkland_Manholes-2061 | 434.9 | 121.2 | 0.42 | 8 | PVC | 0.01 | 457 | 5 | 20 | 25 | 5.5 | | |
| Kirkland_Main-708 | Kirkland_Manholes-2061 | 434.9 | Kirkland_Manholes-1994 | 434.42 | 35 | 1.37 | 8 | PVC | 0.01 | 826 | 6 | 24 | 29 | 3.6 | | |
| Kirkland_Main-709 | Kirkland_Manholes-1994 | 434.42 | Kirkland_Manholes-1995 | 433.71 | 121.9 | 0.58 | 8 | PVC | 0.01 | 538 | 6 | 28 | 34 | 6.2 | | |
| Kirkland_Main-710 | Kirkland_Manholes-1995 | 433.71 | Kirkland_Manholes-1996 | 432.86 | 110.9 | 0.77 | 8 | PVC | 0.01 | 617 | 7 | 36 | 43 | 7 | | |
| Kirkland_Main-711 | Kirkland_Manholes-1996 | 432.86 | Kirkland_Manholes-1997 | 432.14 | 299.5 | 0.24 | 8 | PVC | 0.01 | 346 | 8 | 40 | 47 | 13.7 | | |
| Kirkland_Main-712 | Kirkland_Manholes-1998 | 432.54 | Kirkland_Manholes-1997 | 432.14 | 196.8 | 0.2 | 8 | PVC | 0.01 | 318 | 1 | 4 | 5 | 1.6 | SM14-Ex-EX211 | |
| Kirkland_Main-713 | Kirkland_Manholes-1997 | 432.14 | Kirkland_Manholes-1999 | 430.91 | 331.2 | 0.37 | 8 | PVC | 0.01 | 430 | 11 | 48 | 58 | 13.6 | SM14-Ex-EX211 | |
| Kirkland_Main-714 | Kirkland_Manholes-2062 | 435.63 | Kirkland_Manholes-1995 | 433.71 | 265.8 | 0.72 | 8 | PVC | 0.01 | 599 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-717 | Kirkland_Manholes-2063 | 422.68 | Kirkland_Manholes-2671 | 399.75 | 265 | 8.65 | 8 | PVC | 0.01 | 2,074 | 12 | 72 | 84 | 4 | SM14-Ex-EX209 | |
| Kirkland_Main-718 | Kirkland_Manholes-2066 | 434.49 | Kirkland_Manholes-2059 | 433 | 119.7 | 1.24 | 8 | PVC | 0.01 | 787 | 0 | 4 | 4 | 0.6 | SM14-Ex-EX213 | |
| Kirkland_Main-719 | Kirkland_Manholes-2698 | 186.34 | Kirkland_Manholes-2068 | 163.08 | 368.4 | 6.31 | 8 | PVC | 0.01 | 1,772 | 13 | 60 | 73 | 4.1 | SM14-Ex-EX198 | |
| Kirkland_Main-720 | Kirkland_Manholes-2073 | 208.76 | Kirkland_Manholes-2072 | 202.36 | 249.4 | 2.57 | 8 | PVC | 0.01 | 1,129 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX200 | |
| Kirkland_Main-721 | Kirkland_Manholes-2072 | 202.36 | Kirkland_Manholes-2071 | 194.98 | 377.1 | 1.96 | 8 | PVC | 0.01 | 986 | 5 | 8 | 13 | 1.3 | SM14-Ex-EX200 | |
| Kirkland_Main-722 | Kirkland_Manholes-2071 | 194.98 | Kirkland_Manholes-2070 | 185.96 | 391.2 | 2.31 | 8 | PVC | 0.01 | 1,071 | 8 | 12 | 20 | 1.9 | SM14-Ex-EX200 | |
| Kirkland_Main-723 | Kirkland_Manholes-2070 | 185.96 | Kirkland_Manholes-2069 | 170.43 | 333.6 | 4.65 | 8 | PVC | 0.01 | 1,521 | 11 | 20 | 31 | 2 | SM14-Ex-EX200 | |
| Kirkland_Main-724 | Kirkland_Manholes-2082 | 247.37 | Kirkland_Manholes-2083 | 246.89 | 120.8 | 0.4 | 8 | PVC | 0.01 | 447 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-725 | Kirkland_Manholes-2083 | 246.89 | Kirkland_Manholes-658 | 246.8 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 8 | 1.9 | | |
| Kirkland_Main-727 | Kirkland_Manholes-2077 | 125.7 | Kirkland_Manholes-2078 | 109.29 | 215.7 | 7.61 | 8 | PVC | 0.01 | 1,945 | 3 | 25 | 28 | 1.4 | SM14-Ex-EX195 | |
| Kirkland_Main-728 | Kirkland_Manholes-2076 | 138.89 | Kirkland_Manholes-2077 | 125.7 | 187.9 | 7.02 | 8 | PVC | 0.01 | 1,868 | 2 | 16 | 18 | 1 | SM14-Ex-EX195 | |
| Kirkland_Main-729 | Kirkland_Manholes-2075 | 153.92 | Kirkland_Manholes-2076 | 138.89 | 219.4 | 6.85 | 8 | PVC | 0.01 | 1,845 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX195 | |
| Kirkland_Main-731 | Kirkland_Manholes-574 | 110.98 | Kirkland_Manholes-595 | 103.44 | 159.1 | 4.74 | 8 | PVC | 0.01 | 1,535 | 3 | 16 | 19 | 1.3 | SM14-Ex-EX116 | |
| Kirkland_Main-736 | Kirkland_Manholes-1656 | 125.68 | Kirkland_Manholes-1655 | 123.15 | 42 | 6.03 | 8 | PVC | 0.01 | 1,731 | 8 | 8 | 16 | 0.9 | | |
| Kirkland_Main-737 | Kirkland_Manholes-1655 | 123.15 | Kirkland_Manholes-1657 | 121.13 | 91.5 | 2.21 | 8 | PVC | 0.01 | 1,048 | 8 | 16 | 24 | 2.3 | | |
| Kirkland_Main-738 | Kirkland_Manholes-1658 | 125.68 | Kirkland_Manholes-1657 | 125.55 | 31.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 11 | 2.4 | | Drop Connection |
| Kirkland_Main-739 | Kirkland_Manholes-1657 | 121.13 | Kirkland_Manholes-1659 | 116.52 | 191.7 | 2.41 | 8 | PVC | 0.01 | 1,093 | 10 | 33 | 43 | 3.9 | | |
| Kirkland_Main-740 | Kirkland_Manholes-1659 | 116.52 | Kirkland_Manholes-1660 | 110.77 | 122.6 | 4.69 | 8 | PVC | 0.01 | 1,527 | 26 | 41 | 67 | 4.4 | | |
| Kirkland_Main-741 | Kirkland_Manholes-1660 | 110.77 | Kirkland_Manholes-1662 | 100.46 | 127.6 | 8.08 | 8 | PVC | 0.01 | 2,004 | 26 | 49 | 75 | 3.8 | | |
| Kirkland_Main-742 | Kirkland_Manholes-1663 | 103.65 | Kirkland_Manholes-1661 | 102.19 | 55.6 | 2.62 | 8 | PVC | 0.01 | 1,142 | 2 | 16 | 18 | 1.6 | | |
| Kirkland_Main-743 | Kirkland_Manholes-1661 | 102.19 | Kirkland_Manholes-1662 | 100.46 | 11.1 | 15.62 | 8 | PVC | 0.01 | 2,786 | 2 | 25 | 27 | 1 | | |
| Kirkland_Main-744 | Kirkland_Manholes-1662 | 100.46 | Kirkland_Manholes-1665 | 94.21 | 177.6 | 3.52 | 8 | PVC | 0.01 | 1,322 | 28 | 82 | 110 | 8.3 | | |
| Kirkland_Main-745 | Kirkland_Manholes-1664 | 108.5 | Kirkland_Manholes-1663 | 103.65 | 57.4 | 8.45 | 8 | PVC | 0.01 | 2,049 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX169 | |
| Kirkland_Main-746 | Kirkland_Manholes-1667 | 101.23 | Kirkland_Manholes-1666 | 89.71 | 215.8 | 5.34 | 8 | PVC | 0.01 | 1,629 | 13 | 41 | 54 | 3.3 | | |
| Kirkland_Main-747 | Kirkland_Manholes-1668 | 119.52 | Kirkland_Manholes-1667 | 101.23 | 220.6 | 8.29 | 8 | PVC | 0.01 | 2,030 | 8 | 25 | 33 | 1.6 | | |
| Kirkland_Main-748 | Kirkland_Manholes-1295 | 119.7 | Kirkland_Manholes-572 | 113.73 | 319.3 | 1.87 | 8 | PVC | 0.01 | 964 | 79 | 321 | 400 | 41.5 | SM14-Ex-EX117 | |
| Kirkland_Main-749 | Kirkland_Manholes-1256 | 151.53 | Kirkland_Manholes-1284 | 145.84 | 256.4 | 2.22 | 8 | PVC | 0.01 | 1,050 | 18 | 115 | 134 | 12.7 | SM14-Ex-EX108 | |
| Kirkland_Main-750 | Kirkland_Manholes-1283 | 147.65 | Kirkland_Manholes-1284 | 145.84 | 53.9 | 3.36 | 8 | PVC | 0.01 | 1,292 | 4 | 16 | 20 | 1.6 | SM14-Ex-EX108 | |
| Kirkland_Main-751 | Kirkland_Manholes-1282 | 154.9 | Kirkland_Manholes-1283 | 147.65 | 295.8 | 2.45 | 8 | PVC | 0.01 | 1,104 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX108 | |
| Kirkland_Main-753 | Kirkland_Manholes-1284 | 145.84 | Kirkland_Manholes-1287 | 140.18 | 314.1 | 1.8 | 8 | PVC | 0.01 | 946 | 24 | 140 | 164 | 17.3 | SM14-Ex-EX105 | |
| Kirkland_Main-755 | Kirkland_Manholes-1285 | 150.78 | Kirkland_Manholes-1286 | 147.03 | 125.8 | 2.98 | 8 | PVC | 0.01 | 1,217 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX109 | |
| Kirkland_Main-756 | Kirkland_Manholes-1286 | 147.03 | Kirkland_Manholes-1287 | 140.18 | 192.2 | 3.56 | 8 | PVC | 0.01 | 1,331 | 3 | 16 | 20 | 1.5 | SM14-Ex-EX109 | |

E-Page 769

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-757 | Kirkland_Manholes-1289 | 131.61 | Kirkland_Manholes-1290 | 127.52 | 235.4 | 1.74 | 8 | PVC | 0.01 | 929 | 35 | 181 | 216 | 23.2 | SM14-Ex-EX105 | |
| Kirkland_Main-758 | Kirkland_Manholes-1290 | 127.52 | Kirkland_Manholes-576 | 111.2 | 318.6 | 5.12 | 8 | PVC | 0.01 | 1,596 | 46 | 255 | 301 | 18.9 | SM14-Ex-EX105 | |
| Kirkland_Main-759 | Kirkland_Manholes-1291 | 137.27 | Kirkland_Manholes-1290 | 127.52 | 280.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 10 | 66 | 76 | 5.8 | SM14-Ex-EX111 | |
| Kirkland_Main-760 | Kirkland_Manholes-1261 | 144.57 | Kirkland_Manholes-1291 | 137.27 | 276 | 2.64 | 8 | PVC | 0.01 | 1,147 | 8 | 58 | 65 | 5.7 | SM14-Ex-EX111 | |
| Kirkland_Main-761 | Kirkland_Manholes-1227 | 174.57 | Kirkland_Manholes-584 | 159.38 | 158.7 | 9.57 | 8 | PVC | 0.01 | 2,181 | 25 | 91 | 116 | 5.3 | SM14-Ex-EX96 | |
| Kirkland_Main-762 | Kirkland_Manholes-1238 | 263.26 | Kirkland_Manholes-1298 | 253.38 | 261 | 3.78 | 8 | PVC | 0.01 | 1,372 | 3 | 16 | 20 | 1.4 | SM14-Ex-EX64 | |
| Kirkland_Main-763 | Kirkland_Manholes-1298 | 253.38 | Kirkland_Manholes-1245 | 243.41 | 258.4 | 3.86 | 8 | PVC | 0.01 | 1,385 | 6 | 25 | 31 | 2.2 | SM14-Ex-EX64 | |
| Kirkland_Main-765 | Kirkland_Manholes-1302 | 252.61 | Kirkland_Manholes-1301 | 241.1 | 158.8 | 7.25 | 8 | PVC | 0.01 | 1,898 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX98 | |
| Kirkland_Main-766 | Kirkland_Manholes-1230 | 236.32 | Kirkland_Manholes-1229 | 218.73 | 349.5 | 5.03 | 8 | PVC | 0.01 | 1,582 | 17 | 58 | 74 | 4.7 | SM14-Ex-EX96 | |
| Kirkland_Main-767 | Kirkland_Manholes-1229 | 218.73 | Kirkland_Manholes-1228 | 189.87 | 369 | 7.82 | 8 | PVC | 0.01 | 1,972 | 20 | 66 | 86 | 4.4 | SM14-Ex-EX96 | |
| Kirkland_Main-768 | Kirkland_Manholes-727 | 84.25 | Kirkland_Manholes-728 | 70.86 | 152.9 | 8.76 | 8 | PVC | 0.01 | 2,086 | 112 | 535 | 648 | 31 | SM14-Ex-EX117 | |
| Kirkland_Main-769 | Kirkland_Manholes-1407 | 474.89 | Kirkland_Manholes-1406 | 473.57 | 319.1 | 0.41 | 8 | PVC | 0.01 | 453 | 25 | 28 | 53 | 11.7 | | |
| Kirkland_Main-770 | Kirkland_Manholes-1415 | 475.19 | Kirkland_Manholes-1406 | 473.57 | 245.1 | 0.66 | 8 | PVC | 0.01 | 573 | 30 | 44 | 73 | 12.8 | | |
| Kirkland_Main-771 | Kirkland_Manholes-1408 | 476.13 | Kirkland_Manholes-1407 | 474.89 | 287.1 | 0.43 | 8 | PVC | 0.01 | 463 | 4 | 24 | 27 | 5.9 | | |
| Kirkland_Main-772 | Kirkland_Manholes-1409 | 479.33 | Kirkland_Manholes-1408 | 476.13 | 271.9 | 1.18 | 8 | PVC | 0.01 | 765 | 4 | 20 | 23 | 3.1 | | |
| Kirkland_Main-773 | Kirkland_Manholes-1410 | 479.58 | Kirkland_Manholes-1409 | 479.33 | 219 | 0.11 | 8 | PVC | 0.01 | 238 | 3 | 16 | 19 | 8.1 | | |
| Kirkland_Main-774 | Kirkland_Manholes-1411 | 480.36 | Kirkland_Manholes-1410 | 479.58 | 194.5 | 0.4 | 8 | PVC | 0.01 | 445 | 3 | 12 | 15 | 3.4 | | |
| Kirkland_Main-775 | Kirkland_Manholes-1412 | 483.98 | Kirkland_Manholes-1411 | 480.36 | 100.6 | 3.6 | 8 | PVC | 0.01 | 1,338 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-776 | Kirkland_Manholes-1853 | 276.11 | Kirkland_Manholes-1851 | 275 | 191.4 | 0.58 | 8 | PVC | 0.01 | 537 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-777 | Kirkland_Manholes-1772 | 68.31 | Kirkland_Manholes-2929 | 66.75 | 69.5 | 2.25 | 12 | PVC | 0.01 | 3,115 | 118 | 478 | 596 | 19.1 | SM14-Ex-EX166 | |
| Kirkland_Main-778 | Kirkland_Manholes-2929 | 66.75 | Kirkland_Manholes-729 | 64.46 | 261.6 | 0.88 | 12 | PVC | 0.01 | 1,946 | 118 | 486 | 604 | 31 | SM14-Ex-EX166 | |
| Kirkland_Main-780 | Kirkland_Manholes-1413 | 481 | Kirkland_Manholes-1411 | 480.36 | 161.4 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | |
| Kirkland_Main-781 | Kirkland_Manholes-1418 | 477.42 | Kirkland_Manholes-1414 | 476.69 | 182.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 16 | 3.7 | | |
| Kirkland_Main-782 | Kirkland_Manholes-2078 | 109.29 | Kirkland_Manholes-2079 | 101.7 | 225.4 | 3.37 | 8 | PVC | 0.01 | 1,294 | 4 | 33 | 36 | 2.8 | SM14-Ex-EX195 | |
| Kirkland_Main-783 | Kirkland_Manholes-2079 | 101.7 | Kirkland_Manholes-2080 | 100.3 | 24.2 | 5.79 | 8 | PVC | 0.01 | 1,697 | 5 | 41 | 46 | 2.7 | | |
| Kirkland_Main-784 | Kirkland_Manholes-2129 | 162.62 | Kirkland_Manholes-2130 | 161.57 | 13 | 8.1 | 12 | PVC | 0.01 | 5,916 | 0 | 8 | 8 | 0.1 | SM14-Ex-EX235 | |
| Kirkland_Main-785 | Kirkland_Manholes-2128 | 162.8 | Kirkland_Manholes-2129 | 162.62 | 31 | 0.58 | 12 | PVC | 0.01 | 1,584 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-786 | Kirkland_Manholes-2127 | 166.38 | Kirkland_Manholes-2130 | 161.57 | 81 | 5.94 | 8 | PVC | 0.01 | 1,718 | 20 | 8 | 28 | 1.6 | SM14-Ex-EX235 | |
| Kirkland_Main-787 | Kirkland_Manholes-2131 | 158.3 | O-32 | 156.08 | 22.1 | 10.06 | 15 | PVC | 0.01 | 11,953 | 571 | 1,514 | 2,085 | 17.4 | SM14-Ex-EX236 | |
| Kirkland_Main-788 | Kirkland_Manholes-2139 | 96.6 | Kirkland_Manholes-2138 | 94.8 | 32.5 | 5.54 | 8 | PVC | 0.01 | 1,659 | 5 | 25 | 29 | 1.8 | | |
| Kirkland_Main-789 | Kirkland_Manholes-2154 | 28.66 | Kirkland_Manholes-2153 | 28.2 | 11.2 | 4.1 | 8 | PVC | 0.01 | 1,428 | 3 | 39 | 42 | 2.9 | SM14-Ex-EX220 | |
| Kirkland_Main-790 | Kirkland_Manholes-2153 | 28.2 | Kirkland_Manholes-2152 | 27.32 | 8.5 | 10.4 | 8 | PVC | 0.01 | 2,274 | 3 | 45 | 49 | 2.1 | SM14-Ex-EX220 | |
| Kirkland_Main-791 | Kirkland_Manholes-2152 | 27.32 | Kirkland_Manholes-2320 | 18 | 38.7 | 24.05 | 8 | PVC | 0.01 | 3,458 | 3 | 52 | 55 | 1.6 | | |
| Kirkland_Main-792 | Kirkland_Manholes-2151 | 49.81 | Kirkland_Manholes-2154 | 28.66 | 303.9 | 6.96 | 8 | PVC | 0.01 | 1,860 | 3 | 32 | 36 | 1.9 | SM14-Ex-EX220 | |
| Kirkland_Main-793 | Kirkland_Manholes-2150 | 50.98 | Kirkland_Manholes-2151 | 49.81 | 135.2 | 0.87 | 8 | PVC | 0.01 | 656 | 2 | 26 | 28 | 4.2 | SM14-Ex-EX220 | |
| Kirkland_Main-794 | Kirkland_Manholes-2149 | 76.26 | Kirkland_Manholes-2150 | 50.98 | 227.7 | 11.1 | 8 | PVC | 0.01 | 2,349 | 1 | 19 | 20 | 0.9 | SM14-Ex-EX220 | |
| Kirkland_Main-795 | Kirkland_Manholes-2148 | 77.03 | Kirkland_Manholes-2149 | 76.26 | 100.5 | 0.77 | 8 | PVC | 0.01 | 617 | 0 | 13 | 13 | 2.1 | SM14-Ex-EX220 | |
| Kirkland_Main-796 | Kirkland_Manholes-2147 | 92.38 | Kirkland_Manholes-2148 | 77.03 | 204.1 | 7.52 | 8 | PVC | 0.01 | 1,934 | 0 | 6 | 6 | 0.3 | SM14-Ex-EX220 | |
| Kirkland_Main-800 | Kirkland_Manholes-2158 | 102.11 | Kirkland_Manholes-2157 | 100.18 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 2 | 6 | 9 | 1.5 | | |
| Kirkland_Main-801 | Kirkland_Manholes-2160 | 86.23 | Kirkland_Manholes-2159 | 84.71 | 220.9 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 6 | 8 | 1.3 | | |
| Kirkland_Main-802 | Kirkland_Manholes-2157 | 100.18 | Kirkland_Manholes-2159 | 84.71 | 251.5 | 6.15 | 8 | PVC | 0.01 | 1,749 | 14 | 52 | 66 | 3.8 | | |
| Kirkland_Main-804 | Kirkland_Manholes-2134 | 124.65 | Kirkland_Manholes-2135 | 110 | 281.7 | 5.2 | 8 | PVC | 0.01 | 1,608 | 5 | 26 | 31 | 1.9 | SM14-Ex-EX221 | |
| Kirkland_Main-805 | Kirkland_Manholes-2133 | 139 | Kirkland_Manholes-2134 | 124.65 | 362.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 3 | 19 | 22 | 1.6 | SM14-Ex-EX221 | |
| Kirkland_Main-806 | Kirkland_Manholes-2132 | 159.52 | Kirkland_Manholes-2131 | 158.3 | 73.8 | 1.65 | 15 | PVC | 0.01 | 4,846 | 567 | 1,510 | 2,077 | 42.8 | SM14-Ex-EX236 | |
| Kirkland_Main-807 | Kirkland_Manholes-2126 | 177.6 | Kirkland_Manholes-2127 | 166.38 | 202.1 | 5.55 | 8 | PVC | 0.01 | 1,661 | 20 | 4 | 24 | 1.4 | SM14-Ex-EX235 | |
| Kirkland_Main-808 | Kirkland_Manholes-2125 | 177.39 | Kirkland_Manholes-2132 | 159.52 | 237.1 | 7.54 | 12 | PVC | 0.01 | 5,707 | 551 | 1,482 | 2,033 | 35.6 | | |
| Kirkland_Main-809 | Kirkland_Manholes-2304 | 192.91 | Kirkland_Manholes-2125 | 177.39 | 277.3 | 5.6 | 12 | PVC | 0.01 | 4,918 | 551 | 1,478 | 2,029 | 41.3 | | |
| Kirkland_Main-810 | Kirkland_Manholes-2136 | 110.1 | Kirkland_Manholes-2137 | 107.9 | 254.4 | 0.86 | 10 | PVC | 0.01 | 1,189 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-811 | Kirkland_Manholes-2137 | 107.9 | Kirkland_Manholes-2080 | 100.3 | 293.2 | 2.59 | 10 | PVC | 0.01 | 2,058 | 6 | 16 | 22 | 1.1 | | |
| Kirkland_Main-812 | Kirkland_Manholes-2080 | 100.3 | Kirkland_Manholes-2138 | 94.8 | 252.5 | 2.18 | 10 | PVC | 0.01 | 1,887 | 11 | 66 | 76 | 4 | | |
| Kirkland_Main-813 | Kirkland_Manholes-2138 | 94.8 | Kirkland_Manholes-2140 | 88.47 | 239.3 | 2.65 | 10 | PVC | 0.01 | 2,079 | 15 | 99 | 114 | 5.5 | | |
| Kirkland_Main-814 | Kirkland_Manholes-2140 | 88.47 | Kirkland_Manholes-2141 | 73.53 | 356.2 | 4.19 | 10 | PVC | 0.01 | 2,618 | 24 | 165 | 188 | 7.2 | | |
| Kirkland_Main-815 | Kirkland_Manholes-2141 | 73.53 | Kirkland_Manholes-2142 | 68.99 | 196.1 | 2.31 | 10 | PVC | 0.01 | 1,945 | 48 | 214 | 262 | 13.5 | | |
| Kirkland_Main-816 | Kirkland_Manholes-2142 | 68.99 | Kirkland_Manholes-2143 | 61.9 | 284.3 | 2.49 | 10 | PVC | 0.01 | 2,019 | 54 | 288 | 342 | 17 | | |
| Kirkland_Main-817 | Kirkland_Manholes-2876 | 267.92 | Kirkland_Manholes-2877 | 259.41 | 173 | 4.92 | 8 | PVC | 0.01 | 1,564 | 4 | 20 | 24 | 1.5 | | |
| Kirkland_Main-818 | Kirkland_Manholes-2877 | 259.41 | Kirkland_Manholes-625 | 258 | 37.7 | 3.74 | 8 | PVC | 0.01 | 1,364 | 5 | 24 | 28 | 2.1 | | |
| Kirkland_Main-819 | Kirkland_Manholes-2878 | 269.8 | Kirkland_Manholes-2876 | 267.92 | 58 | 3.24 | 8 | PVC | 0.01 | 1,269 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-820 | Kirkland_Manholes-2882 | 274.26 | Kirkland_Manholes-2878 | 269.8 | 141 | 3.16 | 8 | PVC | 0.01 | 1,254 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-821 | Kirkland_Manholes-1801 | 112.29 | Kirkland_Manholes-1802 | 95.68 | 270.4 | 6.14 | 8 | PVC | 0.01 | 1,747 | 58 | 253 | 311 | 17.8 | SM4 | |
| Kirkland_Main-822 | Kirkland_Manholes-1803 | 87.57 | Kirkland_Manholes-1401 | 76.78 | 133.9 | 8.06 | 8 | PVC | 0.01 | 2,002 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX141 | |
| Kirkland_Main-823 | Kirkland_Manholes-1804 | 103.12 | Kirkland_Manholes-1403 | 89.74 | 129.7 | 10.32 | 8 | PVC | 0.01 | 2,265 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX140 | |
| Kirkland_Main-826 | Kirkland_Manholes-1807 | 44.26 | Kirkland_Manholes-1806 | 38.89 | 57.7 | 9.3 | 8 | PVC | 0.01 | 2,150 | 84 | 303 | 386 | 18 | SM4 | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-827 | Kirkland_Manholes-589 | 126.06 | Kirkland_Manholes-590 | 118.3 | 332.1 | 2.34 | 8 | PVC | 0.01 | 1,078 | 3 | 8 | 11 | 1 | SM14-Ex-EX158 | |
| Kirkland_Main-828 | Kirkland_Manholes-1802 | 95.68 | Kirkland_Manholes-1810 | 85.96 | 289.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 64 | 278 | 342 | 26.5 | SM4 | |
| Kirkland_Main-829 | Kirkland_Manholes-1833 | 16.5 | Kirkland_Manholes-1793 | 15.37 | 141.1 | 0.8 | 8 | PVC | 0.01 | 631 | 2 | 13 | 15 | 2.4 | | |
| Kirkland_Main-830 | Kirkland_Manholes-1836 | 11 | Kirkland_Manholes-1791 | 8.2 | 291.3 | 0.96 | 15 | PVC | 0.01 | 3,695 | 390 | 890 | 1,279 | 34.6 | | |
| Kirkland_Main-832 | Kirkland_Manholes-1850 | 19.39 | Kirkland_Manholes-1849 | 16.69 | 373.2 | 0.72 | 8 | PVC | 0.01 | 600 | 4 | 13 | 17 | 2.9 | SM10 | |
| Kirkland_Main-833 | Kirkland_Manholes-1849 | 16.69 | Kirkland_Manholes-1847 | 16.59 | 254.1 | 0.04 | 8 | PVC | 0.01 | 140 | 5 | 19 | 24 | 17.5 | SM10 | |
| Kirkland_Main-834 | Kirkland_Manholes-1847 | 16.59 | Kirkland_Manholes-1846 | 15.1 | 93.2 | 1.6 | 12 | PVC | 0.01 | 2,628 | 5 | 26 | 31 | 1.2 | SM10 | |
| Kirkland_Main-835 | Kirkland_Manholes-2633 | 278.44 | Kirkland_Manholes-2632 | 276.84 | 129.7 | 1.23 | 8 | PVC | 0.01 | 783 | 3 | 8 | 11 | 1.4 | SM14-Ex-EX295 | |
| Kirkland_Main-837 | Kirkland_Manholes-2605 | 280.73 | Kirkland_Manholes-2633 | 278.44 | 217.9 | 1.05 | 8 | PVC | 0.01 | 723 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX295 | |
| Kirkland_Main-838 | Kirkland_Manholes-2634 | 286.56 | Kirkland_Manholes-2635 | 275.48 | 268.8 | 4.12 | 8 | PVC | 0.01 | 1,431 | 3 | 4 | 7 | 0.5 | SM14-Ex-EX294 | |
| Kirkland_Main-839 | Kirkland_Manholes-2635 | 275.48 | Kirkland_Manholes-2636 | 245.46 | 401.2 | 7.48 | 8 | PVC | 0.01 | 1,929 | 5 | 12 | 17 | 0.9 | SM14-Ex-EX294 | |
| Kirkland_Main-840 | Kirkland_Manholes-2636 | 245.46 | Kirkland_Manholes-2637 | 187.87 | 397.8 | 14.48 | 8 | PVC | 0.01 | 2,683 | 6 | 16 | 22 | 0.8 | SM14-Ex-EX294 | |
| Kirkland_Main-841 | Kirkland_Manholes-2640 | 93.15 | Kirkland_Manholes-2641 | 88.89 | 86.7 | 4.91 | 8 | PVC | 0.01 | 1,563 | 5 | 18 | 23 | 1.5 | | |
| Kirkland_Main-842 | Kirkland_Manholes-2639 | 115.66 | Kirkland_Manholes-2640 | 93.15 | 98.6 | 22.84 | 8 | PVC | 0.01 | 3,369 | 4 | 12 | 16 | 0.5 | | |
| Kirkland_Main-843 | Kirkland_Manholes-2638 | 117.25 | Kirkland_Manholes-2639 | 115.66 | 47.5 | 3.35 | 8 | PVC | 0.01 | 1,290 | 2 | 6 | 8 | 0.6 | | |
| Kirkland_Main-844 | Kirkland_Manholes-2643 | 117.26 | Kirkland_Manholes-2642 | 102.55 | 182.7 | 8.05 | 8 | PVC | 0.01 | 2,001 | 1 | 6 | 7 | 0.4 | | |
| Kirkland_Main-848 | Kirkland_Manholes-2645 | 79.04 | Kirkland_Manholes-2644 | 74.88 | 115.7 | 3.59 | 8 | PVC | 0.01 | 1,337 | 7 | 36 | 44 | 3.3 | | |
| Kirkland_Main-850 | Kirkland_Manholes-1481 | 462.54 | Kirkland_Manholes-1482 | 457.77 | 84.3 | 5.66 | 8 | PVC | 0.01 | 1,677 | 4 | 20 | 24 | 1.4 | SM14-Ex-EX268 | |
| Kirkland_Main-851 | Kirkland_Manholes-1495 | 496.81 | Kirkland_Manholes-1484 | 495.36 | 362.4 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-852 | Kirkland_Manholes-1484 | 495.36 | Kirkland_Manholes-1485 | 486.98 | 151.8 | 5.52 | 8 | PVC | 0.01 | 1,657 | 4 | 32 | 36 | 2.2 | | |
| Kirkland_Main-853 | Kirkland_Manholes-1485 | 486.98 | Kirkland_Manholes-1486 | 483.92 | 112.4 | 2.72 | 8 | PVC | 0.01 | 1,163 | 11 | 48 | 59 | 5.1 | | |
| Kirkland_Main-854 | Kirkland_Manholes-1486 | 483.92 | Kirkland_Manholes-1488 | 482.18 | 104.3 | 1.67 | 8 | PVC | 0.01 | 910 | 13 | 52 | 65 | 7.1 | | |
| Kirkland_Main-855 | Kirkland_Manholes-1488 | 482.18 | Kirkland_Manholes-1489 | 480.6 | 353.4 | 0.45 | 8 | PVC | 0.01 | 471 | 16 | 60 | 76 | 16.1 | | |
| Kirkland_Main-856 | Kirkland_Manholes-1487 | 483.25 | Kirkland_Manholes-1488 | 482.18 | 163.9 | 0.65 | 8 | PVC | 0.01 | 570 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-857 | Kirkland_Manholes-1489 | 480.6 | Kirkland_Manholes-2029 | 479.06 | 117.8 | 1.31 | 8 | PVC | 0.01 | 806 | 18 | 64 | 81 | 10.1 | | |
| Kirkland_Main-858 | Kirkland_Manholes-1490 | 499.13 | Kirkland_Manholes-1492 | 491.87 | 290.5 | 2.5 | 8 | PVC | 0.01 | 1,115 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-859 | Kirkland_Manholes-1492 | 491.87 | Kirkland_Manholes-1491 | 489.53 | 101 | 2.32 | 8 | PVC | 0.01 | 1,073 | 4 | 8 | 12 | 1.1 | | |
| Kirkland_Main-860 | Kirkland_Manholes-1491 | 489.53 | Kirkland_Manholes-1485 | 486.98 | 404.5 | 0.63 | 8 | PVC | 0.01 | 560 | 6 | 12 | 17 | 3.1 | | |
| Kirkland_Main-861 | Kirkland_Manholes-1493 | 479.91 | Kirkland_Manholes-2025 | 477 | 402.9 | 0.72 | 8 | PVC | 0.01 | 599 | 6 | 8 | 13 | 2.2 | | |
| Kirkland_Main-862 | Kirkland_Manholes-1494 | 496.1 | Kirkland_Manholes-1484 | 495.36 | 68.3 | 1.08 | 8 | PVC | 0.01 | 734 | 3 | 24 | 27 | 3.7 | | |
| Kirkland_Main-865 | Kirkland_Manholes-2234 | 145.49 | Kirkland_Manholes-2235 | 140.92 | 280.9 | 1.63 | 8 | PVC | 0.01 | 899 | 3 | 6 | 9 | 1 | SM14-Ex-EX221 | |
| Kirkland_Main-866 | Kirkland_Manholes-2235 | 140.92 | Kirkland_Manholes-2133 | 139 | 112.7 | 1.7 | 8 | PVC | 0.01 | 920 | 3 | 13 | 16 | 1.7 | SM14-Ex-EX221 | |
| Kirkland_Main-867 | Kirkland_Manholes-2236 | 23.9 | Kirkland_Manholes-2230 | 23.3 | 57.5 | 1.04 | 8 | PVC | 0.01 | 720 | 0 | 6 | 6 | 0.9 | | |
| Kirkland_Main-868 | Kirkland_Manholes-2702 | 256.62 | Kirkland_Manholes-1633 | 254.8 | 313.1 | 0.58 | 8 | PVC | 0.01 | 538 | 6 | 12 | 17 | 3.2 | SM14-Ex-EX204 | |
| Kirkland_Main-869 | Kirkland_Manholes-1634 | 223.49 | Kirkland_Manholes-1635 | 192.35 | 312.2 | 9.97 | 8 | PVC | 0.01 | 2,227 | 216 | 842 | 1,059 | 47.5 | SM7 | |
| Kirkland_Main-870 | Kirkland_Manholes-1635 | 192.35 | Kirkland_Manholes-1638 | 164.94 | 265.5 | 10.33 | 8 | PVC | 0.01 | 2,266 | 218 | 846 | 1,065 | 47 | SM7 | |
| Kirkland_Main-871 | Kirkland_Manholes-1636 | 172.84 | Kirkland_Manholes-1637 | 170.82 | 135.8 | 1.49 | 8 | PVC | 0.01 | 860 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-872 | Kirkland_Manholes-1637 | 170.82 | Kirkland_Manholes-1639 | 169.94 | 172.1 | 0.51 | 8 | PVC | 0.01 | 504 | 2 | 8 | 10 | 1.9 | | |
| Kirkland_Main-873 | Kirkland_Manholes-1639 | 169.94 | Kirkland_Manholes-1638 | 164.94 | 235.7 | 2.12 | 8 | PVC | 0.01 | 1,027 | 16 | 95 | 111 | 10.8 | SM14-Ex-EX202 | |
| Kirkland_Main-874 | Kirkland_Manholes-1638 | 164.94 | Kirkland_Manholes-1642 | 158.76 | 65.1 | 9.49 | 8 | PVC | 0.01 | 2,172 | 234 | 946 | 1,180 | 54.3 | SM7 | |
| Kirkland_Main-875 | Kirkland_Manholes-1641 | 205.91 | Kirkland_Manholes-1640 | 188.59 | 221.5 | 7.82 | 8 | PVC | 0.01 | 1,971 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX203 | |
| Kirkland_Main-877 | Kirkland_Manholes-1643 | 156.25 | Kirkland_Manholes-1648 | 152.03 | 150 | 2.81 | 8 | PVC | 0.01 | 1,183 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX196 | |
| Kirkland_Main-878 | Kirkland_Manholes-1644 | 159.14 | O-25 | 154.59 | 17.5 | 26 | 8 | PVC | 0.01 | 3,595 | 17 | 56 | 72 | 2 | | |
| Kirkland_Main-879 | Kirkland_Manholes-1645 | 171.46 | Kirkland_Manholes-1644 | 159.14 | 257.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 16 | 52 | 68 | 4.4 | | |
| Kirkland_Main-880 | Kirkland_Manholes-1625 | 179.1 | Kirkland_Manholes-1645 | 171.46 | 179.3 | 4.26 | 8 | PVC | 0.01 | 1,455 | 10 | 48 | 58 | 4 | | |
| Kirkland_Main-881 | Kirkland_Manholes-1647 | 165.32 | O-24 | 163.59 | 78.9 | 2.18 | 8 | PVC | 0.01 | 1,042 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX175 | |
| Kirkland_Main-882 | Kirkland_Manholes-1676 | 98.96 | Kirkland_Manholes-1677 | 88.12 | 84.8 | 12.79 | 8 | PVC | 0.01 | 2,521 | 21 | 33 | 54 | 2.1 | | |
| Kirkland_Main-883 | Kirkland_Manholes-1678 | 99.76 | Kirkland_Manholes-1676 | 98.96 | 128.1 | 0.62 | 8 | PVC | 0.01 | 557 | 18 | 16 | 34 | 6.1 | | |
| Kirkland_Main-884 | Kirkland_Manholes-1679 | 107.21 | Kirkland_Manholes-1678 | 99.76 | 181.8 | 4.1 | 8 | PVC | 0.01 | 1,427 | 18 | 8 | 26 | 1.8 | | |
| Kirkland_Main-885 | Kirkland_Manholes-1683 | 75.33 | Kirkland_Manholes-1682 | 74.03 | 148.9 | 0.87 | 8 | PVC | 0.01 | 659 | 3 | 16 | 19 | 2.9 | | |
| Kirkland_Main-886 | Kirkland_Manholes-1682 | 74.03 | Kirkland_Manholes-1681 | 72.36 | 31.7 | 5.27 | 8 | PVC | 0.01 | 1,619 | 3 | 25 | 27 | 1.7 | | |
| Kirkland_Main-887 | Kirkland_Manholes-602 | 90.22 | Kirkland_Manholes-1680 | 83.64 | 138.4 | 4.75 | 8 | PVC | 0.01 | 1,537 | 84 | 399 | 483 | 31.4 | SM5 | |
| Kirkland_Main-888 | Kirkland_Manholes-1680 | 83.64 | Kirkland_Manholes-1681 | 72.36 | 151.4 | 7.45 | 8 | PVC | 0.01 | 1,925 | 85 | 408 | 493 | 25.6 | SM5 | |
| Kirkland_Main-889 | Kirkland_Manholes-600 | 91.95 | Kirkland_Manholes-1687 | 86.12 | 197.8 | 2.95 | 8 | PVC | 0.01 | 1,210 | 95 | 379 | 473 | 39.1 | SM14-Ex-EX117 | |
| Kirkland_Main-890 | Kirkland_Manholes-1788 | 86.3 | Kirkland_Manholes-727 | 84.25 | 363.6 | 0.56 | 8 | PVC | 0.01 | 529 | 12 | 132 | 143 | 27.1 | SM14-Ex-EX167 | |
| Kirkland_Main-891 | Kirkland_Manholes-1686 | 60.42 | Kirkland_Manholes-1685 | 57.24 | 38.9 | 8.17 | 8 | PVC | 0.01 | 2,016 | 0 | 8 | 8 | 0.4 | | |
| Kirkland_Main-892 | Kirkland_Manholes-1681 | 72.36 | Kirkland_Manholes-1685 | 57.24 | 220.4 | 6.86 | 8 | PVC | 0.01 | 1,846 | 88 | 440 | 528 | 28.6 | SM5 | |
| Kirkland_Main-893 | Kirkland_Manholes-1687 | 86.12 | Kirkland_Manholes-727 | 84.25 | 76.5 | 2.45 | 8 | PVC | 0.01 | 1,103 | 101 | 395 | 496 | 45 | SM14-Ex-EX117 | |
| Kirkland_Main-894 | Kirkland_Manholes-1688 | 86.4 | Kirkland_Manholes-1687 | 86.26 | 34.9 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 8 | 14 | 3.2 | | Drop Connection |
| Kirkland_Main-895 | Kirkland_Manholes-621 | 70.36 | Kirkland_Manholes-618 | 51.3 | 271.9 | 7.01 | 8 | PVC | 0.01 | 1,867 | 35 | 29 | 64 | 3.4 | SM14-Ex-EX161 | |
| Kirkland_Main-896 | Kirkland_Manholes-617 | 67.92 | Kirkland_Manholes-618 | 51.3 | 164.3 | 10.11 | 8 | PVC | 0.01 | 2,242 | 6 | 16 | 22 | 1 | SM14-Ex-EX162 | |
| Kirkland_Main-897 | Kirkland_Manholes-1690 | 47.42 | Kirkland_Manholes-1689 | 43.75 | 38.1 | 9.62 | 8 | PVC | 0.01 | 2,187 | 3 | 16 | 19 | 0.9 | SM14-Ex-EX163 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-898 | Kirkland_Manholes-2864 | 27 | SOUTHBAY_WETWELL | 22 | 7.5 | 67.05 | 8 | PVC | 0.01 | 5,773 | 13 | 24 | 37 | 0.6 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-900 | Kirkland_Manholes-1691 | 49.07 | Kirkland_Manholes-1690 | 47.42 | 170.4 | 0.97 | 8 | PVC | 0.01 | 694 | 2 | 8 | 10 | 1.5 | SM14-Ex-EX163 | |
| Kirkland_Main-901 | Kirkland_Manholes-618 | 51.3 | Kirkland_Manholes-619 | 48.43 | 55.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 41 | 54 | 95 | 5.9 | SM14-Ex-EX161 | |
| Kirkland_Main-902 | Kirkland_Manholes-619 | 48.43 | Kirkland_Manholes-1689 | 43.75 | 128.1 | 3.65 | 8 | PVC | 0.01 | 1,347 | 42 | 78 | 120 | 8.9 | SM14-Ex-EX161 | |
| Kirkland_Main-903 | Kirkland_Manholes-1693 | 36.33 | Kirkland_Manholes-1692 | 35.9 | 53.8 | 0.8 | 8 | PVC | 0.01 | 630 | 3 | 8 | 12 | 1.9 | | |
| Kirkland_Main-905 | Kirkland_Manholes-1809 | 70.83 | Kirkland_Manholes-1703 | 58 | 295.2 | 4.35 | 8 | PVC | 0.01 | 1,470 | 1 | 8 | 10 | 0.7 | SM14-Ex-EX153 | |
| Kirkland_Main-910 | Kirkland_Manholes-1707 | 126.28 | Kirkland_Manholes-1706 | 124.78 | 10 | 14.96 | 12 | PVC | 0.01 | 8,041 | 15 | 115 | 130 | 1.6 | SM14-Ex-EX196 | |
| Kirkland_Main-911 | Kirkland_Manholes-1710 | 134.24 | Kirkland_Manholes-1709 | 133.97 | 34.7 | 0.78 | 12 | PVC | 0.01 | 1,833 | 12 | 82 | 94 | 5.2 | SM14-Ex-EX196 | |
| Kirkland_Main-912 | Kirkland_Manholes-1708 | 148.34 | Kirkland_Manholes-1709 | 133.97 | 305.2 | 4.71 | 12 | PVC | 0.01 | 4,511 | 2 | 16 | 18 | 0.4 | SM14-Ex-EX197 | |
| Kirkland_Main-913 | Kirkland_Manholes-1709 | 133.97 | Kirkland_Manholes-1707 | 126.28 | 136.1 | 5.65 | 12 | PVC | 0.01 | 4,942 | 14 | 107 | 121 | 2.5 | SM14-Ex-EX196 | |
| Kirkland_Main-914 | Kirkland_Manholes-2281 | 374.95 | Kirkland_Manholes-2263 | 374.13 | 166.2 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX212 | |
| Kirkland_Main-915 | Kirkland_Manholes-2283 | 405.87 | Kirkland_Manholes-2282 | 401.71 | 113.4 | 3.67 | 8 | PVC | 0.01 | 1,350 | 5 | 20 | 25 | 1.8 | | |
| Kirkland_Main-916 | Kirkland_Manholes-2295 | 415.45 | Kirkland_Manholes-2294 | 370.88 | 306.7 | 14.53 | 8 | PVC | 0.01 | 2,688 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-917 | Kirkland_Manholes-2294 | 370.88 | Kirkland_Manholes-2293 | 362.58 | 254.1 | 3.27 | 8 | PVC | 0.01 | 1,274 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-918 | Kirkland_Manholes-2298 | 374.75 | Kirkland_Manholes-2297 | 358.91 | 231 | 6.86 | 8 | PVC | 0.01 | 1,846 | 4 | 12 | 16 | 0.9 | SM14-Ex-EX210 | |
| Kirkland_Main-919 | Kirkland_Manholes-2297 | 358.91 | Kirkland_Manholes-2296 | 354.23 | 230.5 | 2.03 | 8 | PVC | 0.01 | 1,005 | 5 | 16 | 21 | 2.1 | SM14-Ex-EX210 | |
| Kirkland_Main-920 | Kirkland_Manholes-2772 | 308.23 | O-3 | 307.9 | 81.9 | 0.4 | 8 | PVC | 0.01 | 446 | 29 | 91 | 119 | 26.8 | | Drop Connection |
| Kirkland_Main-921 | Kirkland_Manholes-2293 | 362.58 | Kirkland_Manholes-2296 | 354.23 | 294.7 | 2.83 | 8 | PVC | 0.01 | 1,187 | 9 | 32 | 41 | 3.4 | | |
| Kirkland_Main-922 | Kirkland_Manholes-2299 | 342.7 | Kirkland_Manholes-2300 | 337.19 | 153.2 | 3.6 | 8 | PVC | 0.01 | 1,337 | 15 | 56 | 71 | 5.3 | SM14-Ex-EX206 | |
| Kirkland_Main-923 | Kirkland_Manholes-2296 | 354.23 | Kirkland_Manholes-2299 | 342.7 | 146.7 | 7.86 | 8 | PVC | 0.01 | 1,976 | 15 | 52 | 66 | 3.4 | SM14-Ex-EX206 | |
| Kirkland_Main-924 | Kirkland_Manholes-2264 | 383.3 | Kirkland_Manholes-2263 | 374.13 | 85.7 | 10.7 | 8 | PVC | 0.01 | 2,307 | 210 | 707 | 918 | 39.8 | SM14-Ex-EX248 | |
| Kirkland_Main-925 | Kirkland_Manholes-2432 | 257.14 | Kirkland_Manholes-2312 | 256.91 | 169.1 | 0.14 | 8 | PVC | 0.01 | 260 | 1 | 4 | 6 | 2.2 | | |
| Kirkland_Main-926 | Kirkland_Manholes-2312 | 256.91 | Kirkland_Manholes-2311 | 256.52 | 196.4 | 0.2 | 8 | PVC | 0.01 | 314 | 2 | 9 | 11 | 3.4 | | |
| Kirkland_Main-927 | Kirkland_Manholes-2282 | 401.71 | Kirkland_Manholes-2264 | 383.3 | 409.8 | 4.49 | 8 | PVC | 0.01 | 1,494 | 210 | 703 | 914 | 61.1 | SM14-Ex-EX248 | |
| Kirkland_Main-928 | Kirkland_Manholes-2288 | 423.18 | Kirkland_Manholes-2286 | 420.26 | 97.3 | 3 | 8 | PVC | 0.01 | 1,221 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-929 | Kirkland_Manholes-2289 | 426.62 | Kirkland_Manholes-2288 | 423.18 | 150.1 | 2.29 | 8 | PVC | 0.01 | 1,067 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-930 | Kirkland_Manholes-2286 | 420.26 | Kirkland_Manholes-2287 | 418.83 | 164.5 | 0.87 | 8 | PVC | 0.01 | 657 | 4 | 12 | 15 | 2.3 | | |
| Kirkland_Main-931 | Kirkland_Manholes-2287 | 418.83 | Kirkland_Manholes-2283 | 405.87 | 87.5 | 14.81 | 8 | PVC | 0.01 | 2,714 | 5 | 16 | 21 | 0.8 | | |
| Kirkland_Main-932 | Kirkland_Manholes-1585 | 238.49 | Kirkland_Manholes-1586 | 212.55 | 318.9 | 8.13 | 8 | PVC | 0.01 | 2,011 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX173 | |
| Kirkland_Main-933 | Kirkland_Manholes-1586 | 212.55 | Kirkland_Manholes-1587 | 210.95 | 268.2 | 0.6 | 8 | PVC | 0.01 | 545 | 2 | 8 | 10 | 1.9 | SM14-Ex-EX173 | |
| Kirkland_Main-934 | Kirkland_Manholes-1589 | 233.01 | Kirkland_Manholes-1587 | 210.95 | 318.8 | 6.92 | 8 | PVC | 0.01 | 1,855 | 59 | 207 | 266 | 14.3 | SM14-Ex-EX171 | |
| Kirkland_Main-935 | Kirkland_Manholes-1587 | 210.95 | Kirkland_Manholes-1603 | 202.22 | 137.6 | 6.34 | 8 | PVC | 0.01 | 1,776 | 64 | 223 | 287 | 16.2 | SM14-Ex-EX172 | |
| Kirkland_Main-936 | Kirkland_Manholes-1588 | 231.21 | Kirkland_Manholes-1587 | 230.56 | 162.2 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | SM14-Ex-EX172 | Drop Connection |
| Kirkland_Main-938 | Kirkland_Manholes-1590 | 241.99 | Kirkland_Manholes-1589 | 233.01 | 173.6 | 5.17 | 8 | PVC | 0.01 | 1,603 | 58 | 203 | 261 | 16.3 | SM14-Ex-EX171 | |
| Kirkland_Main-939 | Kirkland_Manholes-1591 | 253.12 | Kirkland_Manholes-1590 | 241.99 | 399.8 | 2.78 | 8 | PVC | 0.01 | 1,176 | 56 | 199 | 255 | 21.7 | SM14-Ex-EX171 | |
| Kirkland_Main-940 | Kirkland_Manholes-1592 | 255.76 | Kirkland_Manholes-1591 | 253.12 | 306.5 | 0.86 | 8 | PVC | 0.01 | 654 | 54 | 195 | 248 | 38 | SM14-Ex-EX124 | |
| Kirkland_Main-942 | Kirkland_Manholes-1593 | 256.67 | Kirkland_Manholes-1592 | 255.76 | 194.7 | 0.47 | 8 | PVC | 0.01 | 482 | 39 | 155 | 194 | 40.3 | SM14-Ex-EX131 | |
| Kirkland_Main-943 | Kirkland_Manholes-1594 | 254.46 | Kirkland_Manholes-1595 | 245.33 | 353 | 2.59 | 8 | PVC | 0.01 | 1,134 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX130 | |
| Kirkland_Main-944 | Kirkland_Manholes-1595 | 245.33 | Kirkland_Manholes-1596 | 228.98 | 200 | 8.17 | 8 | PVC | 0.01 | 2,016 | 4 | 8 | 12 | 0.6 | SM14-Ex-EX130 | |
| Kirkland_Main-945 | Kirkland_Manholes-1596 | 228.98 | Kirkland_Manholes-1597 | 180.84 | 398.5 | 12.08 | 8 | PVC | 0.01 | 2,450 | 6 | 12 | 18 | 0.7 | SM14-Ex-EX130 | |
| Kirkland_Main-946 | Kirkland_Manholes-1601 | 173.67 | Kirkland_Manholes-1598 | 169.75 | 176.3 | 2.22 | 8 | PVC | 0.01 | 1,051 | 54 | 163 | 217 | 20.6 | SM14-Ex-EX121 | |
| Kirkland_Main-947 | Kirkland_Manholes-1599 | 200.11 | Kirkland_Manholes-1598 | 169.75 | 271.2 | 11.19 | 8 | PVC | 0.01 | 2,359 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX170 | |
| Kirkland_Main-948 | Kirkland_Manholes-379 | 279.26 | Kirkland_Manholes-380 | 277.21 | 303.7 | 0.67 | 8 | PVC | 0.01 | 579 | 2 | 8 | 10 | 1.8 | | |
| Kirkland_Main-949 | Kirkland_Manholes-378 | 285.63 | Kirkland_Manholes-379 | 279.26 | 366.8 | 1.74 | 8 | PVC | 0.01 | 929 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-950 | Kirkland_Manholes-377 | 262.82 | Kirkland_Manholes-376 | 239.8 | 319.8 | 7.2 | 8 | PVC | 0.01 | 1,892 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-951 | Kirkland_Manholes-376 | 239.8 | Kirkland_Manholes-375 | 234.87 | 251.6 | 1.96 | 8 | PVC | 0.01 | 987 | 58 | 234 | 292 | 29.6 | | |
| Kirkland_Main-953 | Kirkland_Manholes-382 | 308.23 | Kirkland_Manholes-381 | 307.41 | 91.4 | 0.9 | 8 | PVC | 0.01 | 668 | 2 | 8 | 10 | 1.6 | | |
| Kirkland_Main-954 | Kirkland_Manholes-381 | 307.41 | Kirkland_Manholes-383 | 304.37 | 123.9 | 2.45 | 8 | PVC | 0.01 | 1,104 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-955 | Kirkland_Manholes-383 | 304.37 | Kirkland_Manholes-384 | 296.91 | 253.7 | 2.94 | 8 | PVC | 0.01 | 1,209 | 4 | 16 | 20 | 1.6 | | |
| Kirkland_Main-956 | Kirkland_Manholes-384 | 296.91 | Kirkland_Manholes-424 | 292.81 | 99.3 | 4.13 | 8 | PVC | 0.01 | 1,432 | 5 | 20 | 25 | 1.7 | | |
| Kirkland_Main-957 | Kirkland_Manholes-873 | 311.45 | Kirkland_Manholes-385 | 303.54 | 299 | 2.65 | 8 | PVC | 0.01 | 1,147 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX33 | |
| Kirkland_Main-958 | Kirkland_Manholes-385 | 303.54 | Kirkland_Manholes-387 | 300.3 | 93.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX33 | |
| Kirkland_Main-959 | Kirkland_Manholes-386 | 300.85 | Kirkland_Manholes-387 | 300.3 | 138.6 | 0.4 | 8 | PVC | 0.01 | 444 | 2 | 4 | 6 | 1.4 | SM14-Ex-EX33 | |
| Kirkland_Main-960 | Kirkland_Manholes-387 | 300.3 | Kirkland_Manholes-388 | 297.69 | 129.3 | 2.02 | 8 | PVC | 0.01 | 1,002 | 6 | 16 | 22 | 2.2 | SM14-Ex-EX33 | |
| Kirkland_Main-962 | Kirkland_Manholes-2611 | 254.27 | Kirkland_Manholes-2612 | 250.12 | 152.9 | 2.71 | 8 | PVC | 0.01 | 1,162 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX297 | |
| Kirkland_Main-963 | Kirkland_Manholes-1075 | 291.84 | Kirkland_Manholes-1121 | 289.91 | 99 | 1.95 | 8 | PVC | 0.01 | 984 | 43 | 131 | 350 | 35.5 | | |
| Kirkland_Main-964 | Kirkland_Manholes-1121 | 289.91 | Kirkland_Manholes-1068 | 279.38 | 106.4 | 9.89 | 8 | PVC | 0.01 | 2,218 | 44 | 135 | 355 | 16 | | |
| Kirkland_Main-966 | Kirkland_Manholes-1105 | 155.49 | Kirkland_Manholes-1052 | 151.4 | 310 | 1.32 | 8 | PVC | 0.01 | 810 | 83 | 299 | 382 | 47.2 | | |
| Kirkland_Main-967 | Kirkland_Manholes-1108 | 160.8 | Kirkland_Manholes-1105 | 155.49 | 333.3 | 1.59 | 8 | PVC | 0.01 | 890 | 9 | 13 | 22 | 2.4 | | |
| Kirkland_Main-968 | Kirkland_Manholes-1104 | 175.28 | Kirkland_Manholes-1106 | 168.9 | 388 | 1.64 | 18 | PVC | 0.01 | 7,859 | 580 | 2,118 | 2,698 | 34.3 | | |
| Kirkland_Main-969 | Kirkland_Manholes-1109 | 162.78 | Kirkland_Manholes-1108 | 160.8 | 303.1 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 9 | 10 | 1.7 | | |
| Kirkland_Main-970 | Kirkland_Manholes-1110 | 163.51 | Kirkland_Manholes-1109 | 162.78 | 317.4 | 0.23 | 8 | PVC | 0.01 | 338 | 1 | 4 | 5 | 1.5 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-972 | Kirkland_Manholes-1128 | 162.57 | O-7 | 162.29 | 71 | 0.4 | 24 | PVC | 0.01 | 8,346 | 280 | 695 | 1,151 | 13.8 | SM14-Ex-EX4 | |
| Kirkland_Main-973 | Kirkland_Manholes-1127 | 163.92 | Kirkland_Manholes-1128 | 162.57 | 132.6 | 1.02 | 24 | PVC | 0.01 | 13,318 | 280 | 687 | 1,143 | 8.6 | SM14-Ex-EX4 | |
| Kirkland_Main-974 | Kirkland_Manholes-1086 | 198.2 | Kirkland_Manholes-1122 | 184.29 | 391.8 | 3.55 | 8 | PVC | 0.01 | 1,328 | 10 | 48 | 58 | 4.3 | | |
| Kirkland_Main-975 | Kirkland_Manholes-1122 | 184.29 | Kirkland_Manholes-1123 | 182.63 | 257.7 | 0.64 | 24 | PVC | 0.01 | 10,594 | 184 | 620 | 980 | 9.2 | SM14-Ex-EX4 | |
| Kirkland_Main-976 | Kirkland_Manholes-1130 | 185.43 | Kirkland_Manholes-1122 | 185.35 | 20.3 | 0.4 | 12 | PVC | 0.01 | 1,314 | 173 | 568 | 918 | 69.8 | SM14-Ex-EX320 | Drop Connection |
| Kirkland_Main-977 | Kirkland_Manholes-1123 | 182.63 | Kirkland_Manholes-1124 | 177.02 | 186.2 | 3.01 | 24 | PVC | 0.01 | 22,913 | 190 | 624 | 989 | 4.3 | SM14-Ex-EX4 | |
| Kirkland_Main-978 | Kirkland_Manholes-1124 | 177.02 | Kirkland_Manholes-1125 | 167.88 | 251.4 | 3.64 | 24 | PVC | 0.01 | 25,165 | 248 | 660 | 1,083 | 4.3 | SM14-Ex-EX4 | |
| Kirkland_Main-979 | Kirkland_Manholes-1125 | 167.88 | Kirkland_Manholes-1126 | 164.51 | 134.8 | 2.5 | 24 | PVC | 0.01 | 20,870 | 280 | 679 | 1,135 | 5.4 | SM14-Ex-EX4 | |
| Kirkland_Main-980 | Kirkland_Manholes-2840 | 90.84 | Kirkland_Manholes-2841 | 31.53 | 332.1 | 17.86 | 8 | PVC | 0.01 | 2,980 | 3 | 12 | 15 | 0.5 | SM14-Ex-EX310 | |
| Kirkland_Main-981 | Kirkland_Manholes-2851 | 10.8 | Kirkland_Manholes-2852 | 10.72 | 17.2 | 0.47 | 18 | PVC | 0.01 | 4,181 | 254 | 784 | 1,037 | 24.8 | SM14-Ex-EX289 | |
| Kirkland_Main-982 | Kirkland_Manholes-2853 | 25.84 | Kirkland_Manholes-2852 | 10.72 | 47.1 | 32.11 | 8 | PVC | 0.01 | 3,995 | 0 | 6 | 6 | 0.2 | SM14-Ex-EX289 | |
| Kirkland_Main-983 | Kirkland_Manholes-2852 | 10.72 | KC_Manholes-18 | 10.29 | 84.8 | 0.51 | 18 | PVC | 0.01 | 4,364 | 254 | 796 | 1,050 | 24 | SM14-Ex-EX289 | |
| Kirkland_Main-984 | Kirkland_Manholes-2788 | 251.6 | Kirkland_Manholes-2789 | 247.4 | 283.4 | 1.48 | 8 | PVC | 0.01 | 858 | 15 | 91 | 106 | 12.4 | SM14-Ex-EX313 | |
| Kirkland_Main-985 | Kirkland_Manholes-2789 | 247.4 | Kirkland_Manholes-2790 | 235.81 | 170.4 | 6.8 | 8 | PVC | 0.01 | 1,839 | 17 | 95 | 112 | 6.1 | SM14-Ex-EX313 | |
| Kirkland_Main-987 | Kirkland_Manholes-2790 | 235.81 | Kirkland_Manholes-2791 | 226.53 | 127.8 | 7.26 | 8 | PVC | 0.01 | 1,900 | 17 | 99 | 117 | 6.1 | SM14-Ex-EX313 | |
| Kirkland_Main-988 | Kirkland_Manholes-2791 | 226.53 | Kirkland_Manholes-2792 | 199.25 | 298.7 | 9.13 | 8 | PVC | 0.01 | 2,131 | 19 | 103 | 122 | 5.7 | SM14-Ex-EX313 | |
| Kirkland_Main-989 | Kirkland_Manholes-2794 | 201.04 | Kirkland_Manholes-2792 | 199.25 | 290.5 | 0.62 | 8 | PVC | 0.01 | 553 | 3 | 8 | 11 | 1.9 | SM14-Ex-EX312 | |
| Kirkland_Main-991 | Kirkland_Manholes-2795 | 201.42 | Kirkland_Manholes-2794 | 201.04 | 162 | 0.23 | 8 | PVC | 0.01 | 341 | 1 | 4 | 5 | 1.5 | SM14-Ex-EX312 | |
| Kirkland_Main-992 | Kirkland_Manholes-2792 | 199.25 | Kirkland_Manholes-2793 | 190.95 | 116.2 | 7.14 | 8 | PVC | 0.01 | 1,885 | 29 | 115 | 144 | 7.6 | SM14-Ex-EX313 | |
| Kirkland_Main-993 | Kirkland_Manholes-2793 | 190.95 | Kirkland_Manholes-2803 | 158.22 | 135.7 | 24.12 | 8 | PVC | 0.01 | 3,462 | 29 | 119 | 149 | 4.3 | SM14-Ex-EX313 | |
| Kirkland_Main-994 | Kirkland_Manholes-2842 | 26.9 | Kirkland_Manholes-2850 | 13.3 | 475.2 | 2.86 | 24 | PVC | 0.01 | 22,330 | 479 | 1,240 | 1,790 | 8 | SM14-Ex-EX309 | |
| Kirkland_Main-995 | Kirkland_Manholes-2850 | 13.3 | KC_Manholes-18 | 10.29 | 41.7 | 7.21 | 24 | PVC | 0.01 | 35,453 | 480 | 1,246 | 1,798 | 5.1 | SM14-Ex-EX309 | |
| Kirkland_Main-996 | Kirkland_Manholes-2856 | 18.03 | Kirkland_Manholes-2845 | 16.72 | 134.6 | 0.98 | 8 | PVC | 0.01 | 696 | 11 | 14 | 25 | 3.7 | SM14-Ex-EX315 | |
| Kirkland_Main-997 | Kirkland_Manholes-2857 | 19.7 | Kirkland_Manholes-2856 | 18.03 | 135.5 | 1.23 | 8 | PVC | 0.01 | 783 | 11 | 9 | 21 | 2.7 | SM14-Ex-EX315 | |
| Kirkland_Main-998 | Kirkland_Manholes-1928 | 375.97 | Kirkland_Manholes-1929 | 374.67 | 53.7 | 2.42 | 12 | PVC | 0.01 | 3,235 | 123 | 536 | 659 | 20.4 | SM14-Ex-EX205 | |
| Kirkland_Main-999 | Kirkland_Manholes-1929 | 374.67 | Kirkland_Manholes-1579 | 359.44 | 398.3 | 3.82 | 12 | PVC | 0.01 | 4,065 | 155 | 600 | 755 | 18.6 | SM14-Ex-EX205 | |
| Kirkland_Main-1000 | Kirkland_Manholes-1930 | 369.31 | Kirkland_Manholes-1931 | 367.07 | 97.4 | 2.3 | 8 | PVC | 0.01 | 1,069 | 2 | 8 | 10 | 1 | | |
| Kirkland_Main-1001 | Kirkland_Manholes-1931 | 367.07 | Kirkland_Manholes-1932 | 360.4 | 233.1 | 2.86 | 8 | PVC | 0.01 | 1,193 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1003 | Kirkland_Manholes-1932 | 360.4 | Kirkland_Manholes-1954 | 357.36 | 158.2 | 1.92 | 8 | PVC | 0.01 | 977 | 4 | 16 | 19 | 2 | | |
| Kirkland_Main-1004 | Kirkland_Manholes-1935 | 274.07 | Kirkland_Manholes-1881 | 267.11 | 156.7 | 4.44 | 8 | PVC | 0.01 | 1,486 | 29 | 83 | 113 | 7.6 | | |
| Kirkland_Main-1005 | Kirkland_Manholes-1951 | 275.06 | Kirkland_Manholes-1935 | 274.07 | 209.5 | 0.47 | 8 | PVC | 0.01 | 485 | 16 | 44 | 60 | 12.4 | | |
| Kirkland_Main-1006 | Kirkland_Manholes-1936 | 301.29 | Kirkland_Manholes-1935 | 274.07 | 237.6 | 11.46 | 8 | PVC | 0.01 | 2,387 | 11 | 36 | 47 | 2 | | |
| Kirkland_Main-1007 | Kirkland_Manholes-1933 | 343.68 | Kirkland_Manholes-1934 | 342.88 | 296 | 0.27 | 8 | PVC | 0.01 | 367 | 6 | 32 | 38 | 10.4 | | |
| Kirkland_Main-1008 | Kirkland_Manholes-1954 | 357.36 | Kirkland_Manholes-1934 | 342.88 | 118.8 | 12.19 | 8 | PVC | 0.01 | 2,462 | 4 | 20 | 24 | 1 | | |
| Kirkland_Main-1009 | Kirkland_Manholes-1934 | 342.88 | Kirkland_Manholes-1961 | 341.24 | 125.1 | 1.31 | 8 | PVC | 0.01 | 807 | 10 | 56 | 66 | 8.2 | | |
| Kirkland_Main-1010 | Kirkland_Manholes-1938 | 323.43 | Kirkland_Manholes-1936 | 301.29 | 243 | 9.11 | 8 | PVC | 0.01 | 2,128 | 11 | 32 | 42 | 2 | | |
| Kirkland_Main-1011 | Kirkland_Manholes-1939 | 324.34 | Kirkland_Manholes-1938 | 323.43 | 100 | 0.91 | 8 | PVC | 0.01 | 673 | 9 | 24 | 33 | 4.9 | | |
| Kirkland_Main-1012 | Kirkland_Manholes-1937 | 332.23 | Kirkland_Manholes-1938 | 323.43 | 194.4 | 4.53 | 8 | PVC | 0.01 | 1,500 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1013 | Kirkland_Manholes-1940 | 363.18 | Kirkland_Manholes-1941 | 361.64 | 56.6 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1014 | Kirkland_Manholes-391 | 302.9 | Kirkland_Manholes-389 | 295.78 | 243.6 | 2.92 | 8 | PVC | 0.01 | 1,205 | 31 | 127 | 158 | 13.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1015 | Kirkland_Manholes-389 | 295.78 | Kirkland_Manholes-393 | 288.03 | 97.8 | 7.93 | 8 | PVC | 0.01 | 1,985 | 40 | 151 | 191 | 9.6 | SM14-Ex-EX50 | |
| Kirkland_Main-1016 | Kirkland_Manholes-393 | 288.03 | Kirkland_Manholes-380 | 277.21 | 135.7 | 7.97 | 8 | PVC | 0.01 | 1,991 | 42 | 159 | 201 | 10.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1017 | Kirkland_Manholes-395 | 253.88 | Kirkland_Manholes-396 | 249.55 | 242.3 | 1.79 | 8 | PVC | 0.01 | 942 | 51 | 207 | 258 | 27.4 | | |
| Kirkland_Main-1018 | Kirkland_Manholes-398 | 254.33 | Kirkland_Manholes-397 | 247.33 | 147.9 | 4.73 | 8 | PVC | 0.01 | 1,534 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1019 | Kirkland_Manholes-396 | 249.55 | Kirkland_Manholes-397 | 247.33 | 240.2 | 0.92 | 8 | PVC | 0.01 | 678 | 54 | 219 | 273 | 40.3 | | |
| Kirkland_Main-1020 | Kirkland_Manholes-394 | 266.89 | Kirkland_Manholes-395 | 253.88 | 150 | 8.67 | 8 | PVC | 0.01 | 2,076 | 49 | 183 | 232 | 11.2 | SM14-Ex-EX50 | |
| Kirkland_Main-1021 | Kirkland_Manholes-380 | 277.21 | Kirkland_Manholes-394 | 266.89 | 136.7 | 7.55 | 8 | PVC | 0.01 | 1,937 | 45 | 171 | 216 | 11.2 | SM14-Ex-EX50 | |
| Kirkland_Main-1022 | Kirkland_Manholes-898 | 306.89 | Kirkland_Manholes-899 | 305.17 | 102.3 | 1.68 | 8 | PVC | 0.01 | 914 | 1 | 8 | 9 | 1 | | |
| Kirkland_Main-1023 | Kirkland_Manholes-899 | 305.17 | Kirkland_Manholes-900 | 302.97 | 237.5 | 0.93 | 8 | PVC | 0.01 | 679 | 3 | 12 | 15 | 2.2 | | |
| Kirkland_Main-1024 | Kirkland_Manholes-444 | 92.89 | Kirkland_Manholes-443 | 91.49 | 172.9 | 0.81 | 8 | PVC | 0.01 | 634 | 4 | 43 | 46 | 7.3 | | |
| Kirkland_Main-1025 | Kirkland_Manholes-525 | 156.27 | Kirkland_Manholes-526 | 148.56 | 279.6 | 2.76 | 8 | PVC | 0.01 | 1,171 | 4 | 25 | 29 | 2.4 | SM10 | |
| Kirkland_Main-1027 | Kirkland_Manholes-1198 | 189.72 | Kirkland_Manholes-497 | 188.11 | 129.7 | 1.24 | 8 | PVC | 0.01 | 786 | 13 | 49 | 62 | 7.9 | SM14-Ex-EX80 | |
| Kirkland_Main-1030 | Kirkland_Manholes-520 | 182.65 | Kirkland_Manholes-519 | 157.09 | 301.6 | 8.48 | 8 | PVC | 0.01 | 2,053 | 4 | 16 | 20 | 1 | SM10 | |
| Kirkland_Main-1031 | Kirkland_Manholes-499 | 185.94 | Kirkland_Manholes-523 | 180.21 | 279.4 | 2.05 | 8 | PVC | 0.01 | 1,010 | 19 | 74 | 93 | 9.2 | SM10 | |
| Kirkland_Main-1032 | Kirkland_Manholes-523 | 180.21 | Kirkland_Manholes-522 | 152.47 | 278.9 | 9.95 | 8 | PVC | 0.01 | 2,224 | 21 | 82 | 104 | 4.7 | SM10 | |
| Kirkland_Main-1033 | Kirkland_Manholes-522 | 152.47 | Kirkland_Manholes-521 | 145.96 | 154.4 | 4.22 | 8 | PVC | 0.01 | 1,448 | 22 | 91 | 113 | 7.8 | SM10 | |
| Kirkland_Main-1034 | Kirkland_Manholes-521 | 145.96 | Kirkland_Manholes-518 | 138.7 | 160.6 | 4.52 | 8 | PVC | 0.01 | 1,499 | 24 | 99 | 122 | 8.2 | SM10 | |
| Kirkland_Main-1036 | Kirkland_Manholes-518 | 138.7 | Kirkland_Manholes-1179 | 123.76 | 316.8 | 4.72 | 8 | PVC | 0.01 | 1,531 | 31 | 132 | 163 | 10.6 | SM10 | |
| Kirkland_Main-1037 | Kirkland_Manholes-519 | 157.09 | Kirkland_Manholes-518 | 138.7 | 337.5 | 5.45 | 8 | PVC | 0.01 | 1,646 | 7 | 25 | 32 | 1.9 | SM10 | |
| Kirkland_Main-1041 | Kirkland_Manholes-1235 | 275.6 | Kirkland_Manholes-1233 | 274.4 | 201.2 | 0.6 | 8 | PVC | 0.01 | 545 | 2 | 8 | 10 | 1.9 | | |
| Kirkland_Main-1042 | Kirkland_Manholes-1240 | 250.21 | Kirkland_Manholes-1230 | 236.32 | 226.8 | 6.13 | 8 | PVC | 0.01 | 1,745 | 4 | 8 | 13 | 0.7 | SM14-Ex-EX92 | |
| Kirkland_Main-1043 | Kirkland_Manholes-1243 | 249.45 | Kirkland_Manholes-1242 | 244.28 | 74.2 | 6.97 | 8 | PVC | 0.01 | 1,862 | 1 | 4 | 5 | 0.3 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1044 | Kirkland_Manholes-1206 | 193.92 | Kirkland_Manholes-1149 | 192.13 | 296.5 | 0.6 | 8 | PVC | 0.01 | 548 | 16 | 56 | 71 | 13 | SM14-Ex-EX89 | |
| Kirkland_Main-1049 | Kirkland_Manholes-1268 | 189.24 | Kirkland_Manholes-1269 | 174.05 | 110.9 | 13.69 | 8 | PVC | 0.01 | 2,609 | 4 | 16 | 20 | 0.8 | SM14-Ex-EX107 | |
| Kirkland_Main-1050 | Kirkland_Manholes-1269 | 174.05 | Kirkland_Manholes-1259 | 154.8 | 228.2 | 8.43 | 8 | PVC | 0.01 | 2,048 | 5 | 25 | 29 | 1.4 | SM14-Ex-EX107 | |
| Kirkland_Main-1051 | Kirkland_Manholes-1267 | 201.75 | Kirkland_Manholes-1268 | 189.24 | 323.1 | 3.87 | 8 | PVC | 0.01 | 1,387 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX107 | |
| Kirkland_Main-1052 | Kirkland_Manholes-1265 | 168.12 | Kirkland_Manholes-1262 | 156.59 | 138.9 | 8.3 | 8 | PVC | 0.01 | 2,031 | 4 | 25 | 28 | 1.4 | | |
| Kirkland_Main-1053 | Kirkland_Manholes-1497 | 270.45 | Kirkland_Manholes-1499 | 268.92 | 211.1 | 0.72 | 8 | PVC | 0.01 | 600 | 16 | 56 | 72 | 12 | | |
| Kirkland_Main-1054 | Kirkland_Manholes-1315 | 270.9 | Kirkland_Manholes-1497 | 270.45 | 108.5 | 0.41 | 8 | PVC | 0.01 | 454 | 15 | 52 | 66 | 14.6 | | |
| Kirkland_Main-1055 | Kirkland_Manholes-704 | 272.37 | Kirkland_Manholes-145 | 271.65 | 145.7 | 0.49 | 8 | PVC | 0.01 | 496 | 12 | 36 | 48 | 9.6 | | |
| Kirkland_Main-1057 | Kirkland_Manholes-1220 | 255.3 | Kirkland_Manholes-1140 | 220.91 | 332.7 | 10.34 | 8 | PVC | 0.01 | 2,267 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX84 | |
| Kirkland_Main-1058 | Kirkland_Manholes-1222 | 248.84 | Kirkland_Manholes-1142 | 218.06 | 350.4 | 8.79 | 8 | PVC | 0.01 | 2,090 | 3 | 8 | 12 | 0.6 | SM14-Ex-EX85 | |
| Kirkland_Main-1059 | Kirkland_Manholes-1140 | 220.91 | Kirkland_Manholes-1142 | 218.06 | 314 | 0.91 | 8 | PVC | 0.01 | 672 | 4 | 16 | 21 | 3.1 | SM4 | |
| Kirkland_Main-1061 | Kirkland_Manholes-1224 | 232.76 | Kirkland_Manholes-500 | 209.24 | 344.5 | 6.83 | 8 | PVC | 0.01 | 1,842 | 2 | 8 | 11 | 0.6 | SM14-Ex-EX87 | |
| Kirkland_Main-1062 | Kirkland_Manholes-1085 | 204.43 | Kirkland_Manholes-1130 | 185.43 | 381.7 | 4.98 | 8 | PVC | 0.01 | 1,573 | 152 | 564 | 892 | 56.7 | | |
| Kirkland_Main-1063 | Kirkland_Manholes-1120 | 158.13 | Kirkland_Manholes-712 | 157.06 | 229.6 | 0.47 | 8 | PVC | 0.01 | 481 | 27 | 11 | 38 | 8 | SM14-Ex-EX1 | |
| Kirkland_Main-1066 | Kirkland_Manholes-1512 | 281.18 | Kirkland_Manholes-1513 | 263.11 | 227.7 | 7.94 | 8 | PVC | 0.01 | 1,986 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX132 | |
| Kirkland_Main-1067 | Kirkland_Manholes-1161 | 78.67 | Kirkland_Manholes-1162 | 78.51 | 20.6 | 0.78 | 15 | PVC | 0.01 | 3,326 | 67 | 403 | 470 | 14.1 | SM14-Ex-EX77 | |
| Kirkland_Main-1068 | Kirkland_Manholes-1132 | 188.66 | Kirkland_Manholes-1133 | 181.56 | 258.9 | 2.74 | 8 | PVC | 0.01 | 1,168 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX58 | |
| Kirkland_Main-1069 | Kirkland_Manholes-616 | 72.16 | Kirkland_Manholes-617 | 67.92 | 242.5 | 1.75 | 8 | PVC | 0.01 | 932 | 3 | 8 | 12 | 1.2 | SM14-Ex-EX162 | |
| Kirkland_Main-1070 | Kirkland_Manholes-1699 | 108.13 | Kirkland_Manholes-1700 | 106.17 | 216.2 | 0.91 | 8 | PVC | 0.01 | 671 | 0 | 8 | 8 | 1.2 | SM14-Ex-EX150 | |
| Kirkland_Main-1071 | Kirkland_Manholes-1700 | 106.17 | Kirkland_Manholes-1802 | 95.68 | 325.3 | 3.22 | 8 | PVC | 0.01 | 1,266 | 4 | 16 | 20 | 1.6 | SM14-Ex-EX150 | |
| Kirkland_Main-1074 | Kirkland_Manholes-1613 | 87.49 | Kirkland_Manholes-1788 | 86.3 | 197.1 | 0.6 | 8 | PVC | 0.01 | 548 | 12 | 123 | 135 | 24.7 | SM14-Ex-EX167 | |
| Kirkland_Main-1075 | Kirkland_Manholes-1793 | 15.37 | Kirkland_Manholes-1794 | 12.63 | 22.1 | 12.39 | 8 | PVC | 0.01 | 2,482 | 26 | 19 | 46 | 1.8 | | |
| Kirkland_Main-1076 | Kirkland_Manholes-1795 | 13.3 | Kirkland_Manholes-1794 | 12.63 | 41.9 | 1.6 | 15 | PVC | 0.01 | 4,763 | 345 | 753 | 1,098 | 23.1 | | |
| Kirkland_Main-1077 | Kirkland_Manholes-1789 | 14.67 | Kirkland_Manholes-1790 | 14.6 | 18.2 | 0.38 | 21 | PVC | 0.01 | 5,726 | 339 | 734 | 1,073 | 18.7 | | |
| Kirkland_Main-1078 | Kirkland_Manholes-1790 | 14.6 | Kirkland_Manholes-1792 | 14.49 | 82.9 | 0.13 | 21 | PVC | 0.01 | 3,367 | 339 | 740 | 1,080 | 32.1 | | |
| Kirkland_Main-1079 | Kirkland_Manholes-1791 | 8.2 | PLAZA_WW | 6 | 10.6 | 20.76 | 18 | PVC | 0.01 | 27,925 | 390 | 896 | 1,286 | 4.6 | SM14-Ex-EX182 | |
| Kirkland_Main-1080 | Kirkland_Manholes-1792 | 14.49 | Kirkland_Manholes-1795 | 13.3 | 199 | 0.6 | 21 | PVC | 0.01 | 7,159 | 340 | 747 | 1,087 | 15.2 | | |
| Kirkland_Main-1081 | Kirkland_Manholes-1800 | 147.89 | Kirkland_Manholes-1799 | 133.76 | 154.6 | 9.14 | 8 | PVC | 0.01 | 2,131 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX146 | |
| Kirkland_Main-1082 | Kirkland_Manholes-1799 | 133.76 | Kirkland_Manholes-1798 | 126.65 | 165.5 | 4.3 | 8 | PVC | 0.01 | 1,461 | 5 | 25 | 30 | 2.1 | SM14-Ex-EX146 | |
| Kirkland_Main-1083 | Kirkland_Manholes-1797 | 142.57 | Kirkland_Manholes-1798 | 126.65 | 291.9 | 5.45 | 8 | PVC | 0.01 | 1,647 | 49 | 196 | 245 | 14.9 | SM4 | |
| Kirkland_Main-1084 | Kirkland_Manholes-1796 | 160.8 | Kirkland_Manholes-1797 | 142.57 | 315.3 | 5.78 | 8 | PVC | 0.01 | 1,695 | 46 | 179 | 225 | 13.3 | SM4 | |
| Kirkland_Main-1085 | Kirkland_Manholes-1798 | 126.65 | Kirkland_Manholes-1801 | 112.29 | 288.6 | 4.97 | 8 | PVC | 0.01 | 1,573 | 55 | 229 | 283 | 18 | SM4 | |
| Kirkland_Main-1086 | Kirkland_Manholes-2191 | 134.63 | Kirkland_Manholes-2190 | 132.39 | 117.1 | 1.91 | 8 | PVC | 0.01 | 975 | 3 | 16 | 20 | 2 | | |
| Kirkland_Main-1088 | Kirkland_Manholes-2194 | 68 | Kirkland_Manholes-2193 | 64.5 | 142 | 2.47 | 8 | PVC | 0.01 | 1,107 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX187 | |
| Kirkland_Main-1089 | Kirkland_Manholes-2193 | 64.5 | Kirkland_Manholes-2145 | 63.1 | 194.7 | 0.72 | 8 | PVC | 0.01 | 598 | 4 | 41 | 46 | 7.6 | SM14-Ex-EX187 | |
| Kirkland_Main-1091 | Kirkland_Manholes-2187 | 114.37 | Kirkland_Manholes-2185 | 103.23 | 164.5 | 6.77 | 8 | PVC | 0.01 | 1,835 | 6 | 16 | 22 | 1.2 | SM14-Ex-EX188 | |
| Kirkland_Main-1092 | Kirkland_Manholes-2185 | 103.23 | Kirkland_Manholes-2184 | 75.09 | 227 | 12.4 | 8 | PVC | 0.01 | 2,482 | 31 | 66 | 97 | 3.9 | SM14-Ex-EX188 | |
| Kirkland_Main-1093 | Kirkland_Manholes-2184 | 75.09 | Kirkland_Manholes-2144 | 65.5 | 214.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 31 | 74 | 105 | 7 | SM14-Ex-EX188 | |
| Kirkland_Main-1094 | Kirkland_Manholes-2199 | 42.12 | Kirkland_Manholes-2201 | 34.26 | 130.3 | 6.03 | 8 | PVC | 0.01 | 1,731 | 49 | 6 | 55 | 3.2 | | |
| Kirkland_Main-1095 | Kirkland_Manholes-2201 | 34.26 | Kirkland_Manholes-2200 | 29.87 | 27.9 | 15.75 | 8 | PVC | 0.01 | 2,798 | 49 | 13 | 62 | 2.2 | | |
| Kirkland_Main-1096 | Kirkland_Manholes-2098 | 53.6 | Kirkland_Manholes-2097 | 45.25 | 198.1 | 4.22 | 8 | PVC | 0.01 | 1,448 | 2 | 6 | 8 | 0.6 | SM14-Ex-EX233 | |
| Kirkland_Main-1097 | Kirkland_Manholes-2195 | 483.44 | Kirkland_Manholes-2196 | 481.85 | 326.8 | 0.49 | 8 | PVC | 0.01 | 492 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-1098 | Kirkland_Manholes-2196 | 481.85 | Kirkland_Manholes-2197 | 480.89 | 188.7 | 0.51 | 8 | PVC | 0.01 | 503 | 1 | 8 | 9 | 1.8 | | |
| Kirkland_Main-1099 | Kirkland_Manholes-2111 | 59.56 | Kirkland_Manholes-2099 | 57.72 | 398 | 0.46 | 12 | PVC | 0.01 | 1,413 | 69 | 194 | 263 | 18.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1100 | Kirkland_Manholes-2100 | 58.67 | Kirkland_Manholes-2099 | 57.72 | 62.5 | 1.52 | 8 | PVC | 0.01 | 869 | 8 | 18 | 27 | 3.1 | SM14-Ex-EX234 | |
| Kirkland_Main-1101 | Kirkland_Manholes-2101 | 73.68 | Kirkland_Manholes-2100 | 58.67 | 124.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 8 | 12 | 20 | 0.8 | | |
| Kirkland_Main-1102 | Kirkland_Manholes-2102 | 127.52 | Kirkland_Manholes-2101 | 73.68 | 250.6 | 21.48 | 8 | PVC | 0.01 | 3,268 | 4 | 6 | 10 | 0.3 | | |
| Kirkland_Main-1104 | Kirkland_Manholes-2103 | 51.49 | Kirkland_Manholes-2104 | 41.29 | 235.7 | 4.33 | 8 | PVC | 0.01 | 1,467 | 0 | 6 | 7 | 0.5 | SM14-Ex-EX231 | |
| Kirkland_Main-1105 | Kirkland_Manholes-2447 | 28.08 | Kirkland_Manholes-2448 | 25.41 | 138 | 1.94 | 12 | PVC | 0.01 | 2,892 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-1106 | Kirkland_Manholes-2448 | 25.41 | Kirkland_Manholes-2451 | 24.29 | 346.6 | 0.32 | 12 | PVC | 0.01 | 1,182 | 12 | 19 | 32 | 2.7 | | |
| Kirkland_Main-1107 | Kirkland_Manholes-2449 | 27.6 | Kirkland_Manholes-2448 | 25.41 | 29.8 | 7.34 | 8 | PVC | 0.01 | 1,910 | 9 | 6 | 16 | 0.8 | | |
| Kirkland_Main-1108 | Kirkland_Manholes-2450 | 27.97 | Kirkland_Manholes-2451 | 24.29 | 50.3 | 7.31 | 8 | PVC | 0.01 | 1,906 | 2 | 13 | 15 | 0.8 | | |
| Kirkland_Main-1109 | Kirkland_Manholes-2491 | 35.69 | Kirkland_Manholes-2450 | 27.97 | 197.9 | 3.9 | 8 | PVC | 0.01 | 1,393 | 1 | 6 | 7 | 0.5 | SM14-Ex-EX278 | |
| Kirkland_Main-1110 | Kirkland_Manholes-2451 | 24.29 | Kirkland_Manholes-2452 | 24.18 | 330.9 | 0.03 | 12 | PVC | 0.01 | 374 | 14 | 39 | 53 | 14.2 | | |
| Kirkland_Main-1111 | Kirkland_Manholes-2452 | 24.18 | Kirkland_Manholes-2454 | 23.57 | 255.1 | 0.24 | 12 | PVC | 0.01 | 1,016 | 22 | 58 | 81 | 8 | | |
| Kirkland_Main-1112 | Kirkland_Manholes-2453 | 27.74 | Kirkland_Manholes-2452 | 24.18 | 62.2 | 5.72 | 8 | PVC | 0.01 | 1,686 | 8 | 13 | 21 | 1.2 | | |
| Kirkland_Main-1113 | Kirkland_Manholes-2093 | 44.98 | Kirkland_Manholes-2453 | 27.74 | 236.1 | 7.3 | 8 | PVC | 0.01 | 1,905 | 7 | 6 | 13 | 0.7 | SM14-Ex-EX276 | |
| Kirkland_Main-1114 | Kirkland_Manholes-2097 | 45.25 | Kirkland_Manholes-2455 | 44.41 | 209.1 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 13 | 19 | 4.2 | SM14-Ex-EX233 | Drop Connection |
| Kirkland_Main-1115 | Kirkland_Manholes-2455 | 26.2 | Kirkland_Manholes-2454 | 23.57 | 36.4 | 7.21 | 8 | PVC | 0.01 | 1,893 | 7 | 19 | 27 | 1.4 | SM14-Ex-EX233 | |
| Kirkland_Main-1116 | Kirkland_Manholes-2454 | 23.57 | Kirkland_Manholes-2456 | 21.67 | 413.5 | 0.46 | 12 | PVC | 0.01 | 1,410 | 29 | 84 | 114 | 8.1 | | |
| Kirkland_Main-1117 | Kirkland_Manholes-2457 | 26.27 | Kirkland_Manholes-2456 | 21.67 | 49.5 | 9.28 | 8 | PVC | 0.01 | 2,148 | 7 | 19 | 27 | 1.2 | | |
| Kirkland_Main-1118 | Kirkland_Manholes-2202 | 26.91 | Kirkland_Manholes-2305 | 25.32 | 49.2 | 3.23 | 8 | PVC | 0.01 | 1,266 | 49 | 26 | 75 | 5.9 | | Drop Connection |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1119 | Kirkland_Manholes-2205 | 23.1 | Kirkland_Manholes-2306 | 15.63 | 44.6 | 16.73 | 8 | PVC | 0.01 | 2,884 | 6 | 32 | 39 | 1.3 | | Drop Connection |
| Kirkland_Main-1120 | Kirkland_Manholes-2306 | 15.63 | Kirkland_Manholes-2305 | 15.26 | 357 | 0.1 | 21 | PVC | 0.01 | 2,976 | 213 | 643 | 856 | 28.8 | | |
| Kirkland_Main-1121 | Kirkland_Manholes-2307 | 15.73 | Kirkland_Manholes-2306 | 15.63 | 136.3 | 0.07 | 21 | PVC | 0.01 | 2,504 | 207 | 604 | 811 | 32.4 | | |
| Kirkland_Main-1122 | Kirkland_Manholes-2217 | 22.48 | Kirkland_Manholes-2308 | 22.33 | 38 | 0.4 | 8 | PVC | 0.01 | 446 | 11 | 39 | 50 | 11.2 | | Drop Connection |
| Kirkland_Main-1123 | Kirkland_Manholes-2308 | 15.98 | Kirkland_Manholes-2307 | 15.73 | 271.4 | 0.09 | 21 | PVC | 0.01 | 2,806 | 199 | 597 | 796 | 28.4 | | |
| Kirkland_Main-1124 | Kirkland_Manholes-2309 | 16.24 | Kirkland_Manholes-2308 | 15.98 | 211.8 | 0.12 | 21 | PVC | 0.01 | 3,239 | 186 | 552 | 738 | 22.8 | | |
| Kirkland_Main-1125 | Kirkland_Manholes-2313 | 16.39 | Kirkland_Manholes-2309 | 16.24 | 162.2 | 0.09 | 21 | PVC | 0.01 | 2,811 | 181 | 545 | 727 | 25.9 | | |
| Kirkland_Main-1126 | Kirkland_Manholes-2314 | 16.65 | Kirkland_Manholes-2313 | 16.39 | 183.4 | 0.14 | 21 | PVC | 0.01 | 3,481 | 167 | 500 | 667 | 19.2 | | |
| Kirkland_Main-1127 | Kirkland_Manholes-2315 | 16.77 | Kirkland_Manholes-2314 | 16.65 | 235.7 | 0.05 | 21 | PVC | 0.01 | 2,086 | 148 | 416 | 564 | 27 | | |
| Kirkland_Main-1128 | Kirkland_Manholes-2316 | 17.03 | Kirkland_Manholes-2315 | 16.77 | 315.7 | 0.08 | 21 | PVC | 0.01 | 2,653 | 148 | 409 | 557 | 21 | | |
| Kirkland_Main-1129 | Kirkland_Manholes-2317 | 17.2 | Kirkland_Manholes-2316 | 17.03 | 183.4 | 0.09 | 21 | PVC | 0.01 | 2,815 | 138 | 403 | 541 | 19.2 | | |
| Kirkland_Main-1130 | Kirkland_Manholes-2155 | 23.66 | Kirkland_Manholes-2318 | 17.6 | 47.1 | 12.87 | 8 | PVC | 0.01 | 2,530 | 27 | 97 | 124 | 4.9 | | |
| Kirkland_Main-1131 | Kirkland_Manholes-2318 | 17.6 | Kirkland_Manholes-2317 | 17.2 | 364 | 0.11 | 21 | PVC | 0.01 | 3,053 | 131 | 390 | 521 | 17 | | |
| Kirkland_Main-1132 | Kirkland_Manholes-2319 | 17.7 | Kirkland_Manholes-2318 | 17.6 | 48.4 | 0.21 | 21 | PVC | 0.01 | 4,200 | 102 | 279 | 382 | 9.1 | | |
| Kirkland_Main-1136 | Kirkland_Manholes-2874 | 209.8 | Kirkland_Manholes-2873 | 208.01 | 164.9 | 1.09 | 8 | PVC | 0.01 | 735 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1137 | Kirkland_Manholes-2873 | 208.01 | Kirkland_Manholes-2872 | 207.03 | 88.7 | 1.1 | 8 | PVC | 0.01 | 741 | 0 | 8 | 8 | 1.1 | | |
| Kirkland_Main-1138 | Kirkland_Manholes-2872 | 207.03 | Kirkland_Manholes-2871 | 205.15 | 113.5 | 1.66 | 8 | PVC | 0.01 | 907 | 0 | 16 | 16 | 1.8 | | |
| Kirkland_Main-1139 | Kirkland_Manholes-2871 | 205.15 | Kirkland_Manholes-2869 | 204.84 | 44.2 | 0.7 | 8 | PVC | 0.01 | 591 | 0 | 20 | 20 | 3.4 | | |
| Kirkland_Main-1140 | Kirkland_Manholes-2869 | 204.84 | Kirkland_Manholes-2870 | 201.21 | 123.4 | 2.94 | 18 | PVC | 0.01 | 10,510 | 549 | 2,062 | 2,611 | 24.8 | | |
| Kirkland_Main-1141 | Kirkland_Manholes-2870 | 201.21 | Kirkland_Manholes-1103 | 198.97 | 205 | 1.09 | 18 | PVC | 0.01 | 6,407 | 549 | 2,066 | 2,615 | 40.8 | | |
| Kirkland_Main-1142 | Kirkland_Manholes-2875 | 310.11 | Kirkland_Manholes-898 | 306.89 | 269.8 | 1.19 | 8 | PVC | 0.01 | 770 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1143 | Kirkland_Manholes-2475 | 210.58 | Kirkland_Manholes-2477 | 189.6 | 360 | 5.83 | 8 | PVC | 0.01 | 1,702 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX241 | |
| Kirkland_Main-1144 | Kirkland_Manholes-2478 | 190.32 | Kirkland_Manholes-2477 | 189.6 | 67.1 | 1.07 | 8 | PVC | 0.01 | 730 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX241 | |
| Kirkland_Main-1145 | Kirkland_Manholes-2477 | 189.6 | Kirkland_Manholes-2479 | 186.26 | 224.2 | 1.49 | 8 | PVC | 0.01 | 861 | 4 | 12 | 16 | 1.8 | SM14-Ex-EX241 | |
| Kirkland_Main-1146 | Kirkland_Manholes-2479 | 186.26 | Kirkland_Manholes-2482 | 184.91 | 81 | 1.67 | 8 | PVC | 0.01 | 910 | 6 | 24 | 30 | 3.3 | | |
| Kirkland_Main-1147 | Kirkland_Manholes-2480 | 187.23 | Kirkland_Manholes-2479 | 186.26 | 143.4 | 0.68 | 8 | PVC | 0.01 | 580 | 2 | 8 | 10 | 1.8 | SM14-Ex-EX241 | |
| Kirkland_Main-1148 | Kirkland_Manholes-2489 | 190.15 | Kirkland_Manholes-2480 | 187.23 | 230.1 | 1.27 | 8 | PVC | 0.01 | 794 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX241 | |
| Kirkland_Main-1149 | Kirkland_Manholes-2481 | 184.88 | Kirkland_Manholes-2490 | 173.27 | 348.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX242 | |
| Kirkland_Main-1150 | Kirkland_Manholes-2482 | 184.91 | Kirkland_Manholes-2483 | 165.54 | 140.6 | 13.78 | 8 | PVC | 0.01 | 2,617 | 7 | 28 | 35 | 1.3 | | |
| Kirkland_Main-1152 | Kirkland_Manholes-2483 | 165.54 | Kirkland_Manholes-2488 | 154.5 | 273.8 | 4.03 | 8 | PVC | 0.01 | 1,416 | 9 | 32 | 40 | 2.9 | | |
| Kirkland_Main-1153 | Kirkland_Manholes-2488 | 154.5 | Kirkland_Manholes-2487 | 153.78 | 111.9 | 0.64 | 8 | PVC | 0.01 | 566 | 10 | 36 | 46 | 8.1 | | |
| Kirkland_Main-1154 | Kirkland_Manholes-2490 | 173.27 | Kirkland_Manholes-2485 | 153.26 | 284.1 | 7.04 | 8 | PVC | 0.01 | 1,871 | 24 | 75 | 100 | 5.3 | SM14-Ex-EX242 | |
| Kirkland_Main-1156 | Kirkland_Manholes-2484 | 189.79 | Kirkland_Manholes-2485 | 153.26 | 364.5 | 10.02 | 8 | PVC | 0.01 | 2,232 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX239 | |
| Kirkland_Main-1157 | Kirkland_Manholes-2487 | 153.78 | Kirkland_Manholes-2486 | 152.49 | 105 | 1.23 | 8 | PVC | 0.01 | 782 | 10 | 40 | 50 | 6.4 | | |
| Kirkland_Main-1158 | Kirkland_Manholes-2485 | 153.26 | Kirkland_Manholes-2486 | 152.49 | 113.6 | 0.68 | 8 | PVC | 0.01 | 580 | 28 | 83 | 111 | 19.1 | SM14-Ex-EX239 | |
| Kirkland_Main-1159 | Kirkland_Manholes-1429 | 514.5 | Kirkland_Manholes-1427 | 513.21 | 125.2 | 1.03 | 8 | PVC | 0.01 | 715 | 3 | 16 | 19 | 2.6 | | |
| Kirkland_Main-1160 | Kirkland_Manholes-1427 | 513.21 | Kirkland_Manholes-1428 | 512.46 | 129.3 | 0.58 | 8 | PVC | 0.01 | 537 | 5 | 24 | 29 | 5.4 | | |
| Kirkland_Main-1161 | Kirkland_Manholes-1428 | 512.46 | Kirkland_Manholes-1434 | 511.6 | 190.6 | 0.45 | 8 | PVC | 0.01 | 474 | 5 | 28 | 33 | 7 | | |
| Kirkland_Main-1162 | Kirkland_Manholes-1430 | 516.64 | Kirkland_Manholes-1429 | 514.5 | 144.2 | 1.48 | 8 | PVC | 0.01 | 859 | 3 | 12 | 14 | 1.7 | | |
| Kirkland_Main-1164 | Kirkland_Manholes-2175 | 133.14 | Kirkland_Manholes-2174 | 132.67 | 117.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2.1 | | |
| Kirkland_Main-1165 | Kirkland_Manholes-2174 | 132.67 | Kirkland_Manholes-2173 | 131.99 | 11.1 | 6.13 | 8 | PVC | 0.01 | 1,745 | 2 | 16 | 18 | 1.1 | | |
| Kirkland_Main-1166 | Kirkland_Manholes-2173 | 131.99 | Kirkland_Manholes-2172 | 130.6 | 348.2 | 0.4 | 8 | PVC | 0.01 | 446 | 23 | 25 | 47 | 10.6 | SM14-Ex-EX192 | Drop Connection |
| Kirkland_Main-1167 | Kirkland_Manholes-2172 | 107.91 | Kirkland_Manholes-2163 | 75.42 | 383.7 | 8.47 | 8 | PVC | 0.01 | 2,052 | 24 | 33 | 57 | 2.8 | SM14-Ex-EX192 | |
| Kirkland_Main-1168 | Kirkland_Manholes-2163 | 75.42 | Kirkland_Manholes-2141 | 73.53 | 47.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 24 | 41 | 66 | 4.7 | | |
| Kirkland_Main-1169 | Kirkland_Manholes-2183 | 146.45 | Kirkland_Manholes-2182 | 136.23 | 145.7 | 7.02 | 8 | PVC | 0.01 | 1,868 | 0 | 8 | 9 | 0.5 | | |
| Kirkland_Main-1170 | Kirkland_Manholes-2182 | 136.23 | Kirkland_Manholes-2181 | 133.52 | 88.2 | 3.07 | 8 | PVC | 0.01 | 1,236 | 0 | 16 | 17 | 1.4 | | |
| Kirkland_Main-1171 | Kirkland_Manholes-2181 | 133.52 | Kirkland_Manholes-2180 | 125.44 | 163.5 | 4.94 | 8 | PVC | 0.01 | 1,567 | 1 | 25 | 26 | 1.6 | | |
| Kirkland_Main-1172 | Kirkland_Manholes-2180 | 125.44 | Kirkland_Manholes-2179 | 120.67 | 330.4 | 1.44 | 8 | PVC | 0.01 | 847 | 3 | 33 | 36 | 4.3 | | |
| Kirkland_Main-1173 | Kirkland_Manholes-2179 | 120.67 | Kirkland_Manholes-2178 | 102.28 | 199.5 | 9.22 | 8 | PVC | 0.01 | 2,140 | 5 | 41 | 47 | 2.2 | | |
| Kirkland_Main-1174 | Kirkland_Manholes-2178 | 102.28 | Kirkland_Manholes-2177 | 75.93 | 214.6 | 12.28 | 8 | PVC | 0.01 | 2,471 | 6 | 49 | 55 | 2.2 | | |
| Kirkland_Main-1175 | Kirkland_Manholes-2177 | 75.93 | Kirkland_Manholes-2176 | 70.83 | 149.4 | 3.41 | 8 | PVC | 0.01 | 1,303 | 6 | 58 | 64 | 4.9 | | |
| Kirkland_Main-1176 | Kirkland_Manholes-2176 | 70.83 | Kirkland_Manholes-2142 | 68.99 | 36.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 6 | 66 | 72 | 4.5 | | |
| Kirkland_Main-1177 | Kirkland_Manholes-2366 | 292.68 | Kirkland_Manholes-2365 | 289.93 | 42.5 | 6.47 | 8 | PVC | 0.01 | 1,794 | 24 | 79 | 103 | 5.8 | SM14-Ex-EX260 | |
| Kirkland_Main-1178 | Kirkland_Manholes-2368 | 290.87 | Kirkland_Manholes-2365 | 289.93 | 48.6 | 1.94 | 8 | PVC | 0.01 | 981 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1179 | Kirkland_Manholes-2372 | 304.48 | Kirkland_Manholes-2371 | 291.2 | 253.9 | 5.23 | 8 | PVC | 0.01 | 1,613 | 14 | 44 | 57 | 3.6 | SM14-Ex-EX257 | |
| Kirkland_Main-1180 | Kirkland_Manholes-2378 | 312.05 | Kirkland_Manholes-2372 | 304.48 | 224.1 | 3.38 | 8 | PVC | 0.01 | 1,296 | 10 | 24 | 34 | 2.6 | SM14-Ex-EX257 | |
| Kirkland_Main-1181 | Kirkland_Manholes-2373 | 306.85 | Kirkland_Manholes-2372 | 304.48 | 403.1 | 0.59 | 8 | PVC | 0.01 | 541 | 2 | 8 | 10 | 1.9 | SM14-Ex-EX258 | |
| Kirkland_Main-1182 | Kirkland_Manholes-2374 | 307.1 | Kirkland_Manholes-2373 | 306.85 | 109.8 | 0.23 | 8 | PVC | 0.01 | 336 | 1 | 4 | 5 | 1.5 | SM14-Ex-EX258 | |
| Kirkland_Main-1183 | Kirkland_Manholes-2376 | 359.31 | Kirkland_Manholes-2375 | 323.76 | 368.2 | 9.66 | 8 | PVC | 0.01 | 2,191 | 4 | 4 | 8 | 0.4 | SM14-Ex-EX259 | |
| Kirkland_Main-1184 | Kirkland_Manholes-2375 | 323.76 | Kirkland_Manholes-2377 | 320.51 | 173.5 | 1.87 | 8 | PVC | 0.01 | 965 | 6 | 8 | 14 | 1.4 | SM14-Ex-EX259 | |
| Kirkland_Main-1185 | Kirkland_Manholes-2377 | 320.51 | Kirkland_Manholes-2378 | 312.05 | 352.3 | 2.4 | 8 | PVC | 0.01 | 1,093 | 8 | 12 | 20 | 1.8 | SM14-Ex-EX259 | |
| Kirkland_Main-1186 | Kirkland_Manholes-2379 | 312.61 | Kirkland_Manholes-2378 | 312.05 | 23.8 | 2.35 | 8 | PVC | 0.01 | 1,081 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX257 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1187 | Kirkland_Manholes-2380 | 290.72 | Kirkland_Manholes-2430 | 273.69 | 397.1 | 4.29 | 8 | PVC | 0.01 | 1,460 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX286 | |
| Kirkland_Main-1188 | Kirkland_Manholes-2381 | 293.12 | Kirkland_Manholes-2380 | 290.72 | 144.3 | 1.66 | 8 | PVC | 0.01 | 909 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX286 | |
| Kirkland_Main-1189 | Kirkland_Manholes-2385 | 343.75 | Kirkland_Manholes-2383 | 328.5 | 173.4 | 8.79 | 8 | PVC | 0.01 | 2,091 | 8 | 24 | 32 | 1.5 | SM14-Ex-EX260 | |
| Kirkland_Main-1190 | Kirkland_Manholes-2384 | 330.79 | Kirkland_Manholes-2383 | 328.5 | 64.4 | 3.56 | 8 | PVC | 0.01 | 1,330 | 10 | 32 | 42 | 3.1 | SM14-Ex-EX287 | |
| Kirkland_Main-1191 | Kirkland_Manholes-2395 | 331.59 | Kirkland_Manholes-2384 | 330.79 | 136.8 | 0.58 | 8 | PVC | 0.01 | 539 | 9 | 28 | 37 | 6.9 | SM14-Ex-EX287 | |
| Kirkland_Main-1192 | Kirkland_Manholes-2386 | 373.02 | Kirkland_Manholes-2385 | 343.75 | 310.7 | 9.42 | 8 | PVC | 0.01 | 2,164 | 7 | 20 | 27 | 1.2 | SM14-Ex-EX260 | |
| Kirkland_Main-1193 | Kirkland_Manholes-2387 | 380.46 | Kirkland_Manholes-2386 | 373.02 | 399.9 | 1.86 | 8 | PVC | 0.01 | 962 | 6 | 16 | 21 | 2.2 | SM14-Ex-EX260 | |
| Kirkland_Main-1194 | Kirkland_Manholes-2388 | 388.18 | Kirkland_Manholes-2387 | 380.46 | 279.2 | 2.76 | 8 | PVC | 0.01 | 1,172 | 4 | 12 | 16 | 1.3 | SM14-Ex-EX260 | |
| Kirkland_Main-1195 | Kirkland_Manholes-2533 | 389.33 | Kirkland_Manholes-2388 | 388.18 | 396.1 | 0.29 | 8 | PVC | 0.01 | 380 | 2 | 8 | 10 | 2.6 | SM14-Ex-EX260 | |
| Kirkland_Main-1196 | Kirkland_Manholes-2389 | 365.8 | Kirkland_Manholes-2390 | 359.58 | 183.8 | 3.38 | 8 | PVC | 0.01 | 1,297 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX287 | |
| Kirkland_Main-1197 | Kirkland_Manholes-2390 | 359.58 | Kirkland_Manholes-2391 | 347.6 | 291 | 4.12 | 8 | PVC | 0.01 | 1,430 | 4 | 8 | 12 | 0.9 | SM14-Ex-EX287 | |
| Kirkland_Main-1198 | Kirkland_Manholes-2391 | 347.6 | Kirkland_Manholes-2392 | 345.7 | 123.7 | 1.54 | 8 | PVC | 0.01 | 874 | 6 | 12 | 18 | 2.1 | SM14-Ex-EX287 | |
| Kirkland_Main-1199 | Kirkland_Manholes-2392 | 345.7 | Kirkland_Manholes-2393 | 339.78 | 135.6 | 4.36 | 8 | PVC | 0.01 | 1,473 | 7 | 16 | 23 | 1.5 | SM14-Ex-EX287 | |
| Kirkland_Main-1200 | Kirkland_Manholes-2411 | 259.15 | Kirkland_Manholes-2413 | 251.1 | 165.8 | 4.86 | 8 | PVC | 0.01 | 1,554 | 26 | 79 | 106 | 6.8 | | |
| Kirkland_Main-1201 | Kirkland_Manholes-2419 | 203.52 | Kirkland_Manholes-2303 | 195.57 | 329.3 | 2.41 | 12 | PVC | 0.01 | 3,230 | 295 | 580 | 876 | 27.1 | SM2 | |
| Kirkland_Main-1202 | Kirkland_Manholes-2418 | 218.73 | Kirkland_Manholes-2419 | 203.52 | 222.4 | 6.84 | 12 | PVC | 0.01 | 5,436 | 287 | 576 | 863 | 15.9 | SM2 | |
| Kirkland_Main-1203 | Kirkland_Manholes-2417 | 230.48 | Kirkland_Manholes-2418 | 218.73 | 175.2 | 6.71 | 12 | PVC | 0.01 | 5,384 | 246 | 421 | 667 | 12.4 | SM2 | |
| Kirkland_Main-1204 | Kirkland_Manholes-2416 | 242.81 | Kirkland_Manholes-2417 | 230.48 | 262.7 | 4.69 | 12 | PVC | 0.01 | 4,503 | 244 | 417 | 661 | 14.7 | SM2 | |
| Kirkland_Main-1205 | Kirkland_Manholes-2420 | 230.11 | Kirkland_Manholes-2418 | 218.73 | 227.2 | 5.01 | 8 | PVC | 0.01 | 1,578 | 41 | 151 | 192 | 12.1 | SM14-Ex-EX251 | |
| Kirkland_Main-1206 | Kirkland_Manholes-2415 | 247.52 | Kirkland_Manholes-2416 | 242.81 | 265.9 | 1.77 | 12 | PVC | 0.01 | 2,766 | 241 | 413 | 655 | 23.7 | SM2 | |
| Kirkland_Main-1207 | Kirkland_Manholes-2720 | 32.22 | Kirkland_Manholes-2719 | 31.99 | 57.5 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 6 | 80 | 17.9 | | |
| Kirkland_Main-1208 | Kirkland_Manholes-2414 | 248.96 | Kirkland_Manholes-2415 | 247.52 | 131.3 | 1.1 | 12 | PVC | 0.01 | 2,177 | 240 | 409 | 650 | 29.8 | SM2 | |
| Kirkland_Main-1209 | Kirkland_Manholes-2413 | 251.1 | Kirkland_Manholes-2414 | 248.96 | 118.1 | 1.81 | 12 | PVC | 0.01 | 2,798 | 240 | 405 | 645 | 23.1 | SM2 | |
| Kirkland_Main-1210 | Kirkland_Manholes-2421 | 253.02 | Kirkland_Manholes-2413 | 251.1 | 118.9 | 1.61 | 12 | PVC | 0.01 | 2,641 | 213 | 322 | 535 | 20.3 | SM2 | |
| Kirkland_Main-1211 | Kirkland_Manholes-2422 | 254.09 | Kirkland_Manholes-2421 | 253.02 | 92.9 | 1.15 | 12 | PVC | 0.01 | 2,230 | 210 | 314 | 524 | 23.5 | SM2 | |
| Kirkland_Main-1212 | Kirkland_Manholes-2424 | 257.66 | Kirkland_Manholes-2422 | 254.09 | 323.2 | 1.1 | 12 | PVC | 0.01 | 2,185 | 209 | 310 | 519 | 23.8 | SM2 | |
| Kirkland_Main-1213 | Kirkland_Manholes-2879 | 68.04 | Kirkland_Manholes-2492 | 55.46 | 56.8 | 22.14 | 8 | PVC | 0.01 | 3,317 | 24 | 43 | 67 | 2 | | |
| Kirkland_Main-1214 | Kirkland_Manholes-2091 | 57.76 | Kirkland_Manholes-2090 | 57.52 | 58.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3.2 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1215 | Kirkland_Manholes-2094 | 57.58 | Kirkland_Manholes-2090 | 57.44 | 314.4 | 0.04 | 15 | PVC | 0.01 | 795 | 80 | 237 | 317 | 39.9 | SM14-Ex-EX222 | |
| Kirkland_Main-1216 | Kirkland_Manholes-2092 | 79.95 | Kirkland_Manholes-2091 | 79.51 | 110.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 8 | 1.8 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1218 | Kirkland_Manholes-2095 | 60.47 | Kirkland_Manholes-2094 | 57.58 | 55.7 | 5.18 | 8 | PVC | 0.01 | 1,605 | 2 | 12 | 14 | 0.9 | SM14-Ex-EX277 | |
| Kirkland_Main-1219 | Kirkland_Manholes-2096 | 71.29 | Kirkland_Manholes-2095 | 60.47 | 119 | 9.09 | 8 | PVC | 0.01 | 2,126 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX277 | |
| Kirkland_Main-1220 | Kirkland_Manholes-2099 | 57.72 | Kirkland_Manholes-2094 | 57.58 | 259 | 0.05 | 12 | PVC | 0.01 | 483 | 78 | 219 | 296 | 61.3 | SM14-Ex-EX222 | |
| Kirkland_Main-1223 | Kirkland_Manholes-2614 | 304.78 | Kirkland_Manholes-2615 | 302.07 | 237.1 | 1.14 | 8 | PVC | 0.01 | 754 | 37 | 103 | 141 | 18.6 | SM14-Ex-EX299 | |
| Kirkland_Main-1224 | Kirkland_Manholes-2615 | 302.07 | Kirkland_Manholes-2618 | 301.8 | 67.7 | 0.4 | 8 | PVC | 0.01 | 446 | 37 | 107 | 145 | 32.4 | SM14-Ex-EX299 | Drop Connection |
| Kirkland_Main-1225 | Kirkland_Manholes-2618 | 278.4 | Kirkland_Manholes-2617 | 276.43 | 274.1 | 0.72 | 8 | PVC | 0.01 | 598 | 42 | 119 | 161 | 27 | SM2 | |
| Kirkland_Main-1226 | Kirkland_Manholes-2617 | 276.43 | Kirkland_Manholes-2616 | 275.44 | 246.8 | 0.4 | 8 | PVC | 0.01 | 446 | 58 | 123 | 181 | 40.7 | SM2 | Drop Connection |
| Kirkland_Main-1227 | Kirkland_Manholes-2616 | 274.02 | Kirkland_Manholes-2619 | 272.54 | 173.9 | 0.85 | 8 | PVC | 0.01 | 650 | 119 | 151 | 270 | 41.5 | SM2 | |
| Kirkland_Main-1228 | Kirkland_Manholes-2619 | 272.54 | Kirkland_Manholes-2428 | 270.37 | 122.7 | 1.77 | 8 | PVC | 0.01 | 937 | 119 | 155 | 274 | 29.2 | SM2 | |
| Kirkland_Main-1229 | Kirkland_Manholes-407 | 266.31 | Kirkland_Manholes-409 | 264.84 | 123.1 | 1.19 | 8 | PVC | 0.01 | 771 | 2 | 8 | 10 | 1.3 | | |
| Kirkland_Main-1230 | Kirkland_Manholes-409 | 264.84 | Kirkland_Manholes-419 | 263.82 | 78.4 | 1.3 | 8 | PVC | 0.01 | 804 | 3 | 16 | 19 | 2.4 | | |
| Kirkland_Main-1231 | Kirkland_Manholes-411 | 265.96 | Kirkland_Manholes-412 | 253.7 | 218.8 | 5.6 | 8 | PVC | 0.01 | 1,669 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1232 | Kirkland_Manholes-412 | 253.7 | Kirkland_Manholes-413 | 252.76 | 178.3 | 0.53 | 8 | PVC | 0.01 | 512 | 2 | 8 | 10 | 1.9 | | |
| Kirkland_Main-1233 | Kirkland_Manholes-413 | 252.76 | Kirkland_Manholes-414 | 251.5 | 46.6 | 2.7 | 8 | PVC | 0.01 | 1,159 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1234 | Kirkland_Manholes-414 | 251.5 | Kirkland_Manholes-415 | 250.52 | 65.4 | 1.5 | 8 | PVC | 0.01 | 863 | 3 | 16 | 19 | 2.1 | | |
| Kirkland_Main-1235 | Kirkland_Manholes-415 | 250.52 | Kirkland_Manholes-416 | 248.58 | 58.4 | 3.32 | 8 | PVC | 0.01 | 1,285 | 3 | 20 | 23 | 1.8 | | |
| Kirkland_Main-1236 | Kirkland_Manholes-416 | 248.58 | Kirkland_Manholes-417 | 237.12 | 157.3 | 7.28 | 8 | PVC | 0.01 | 1,903 | 4 | 24 | 28 | 1.5 | | |
| Kirkland_Main-1237 | Kirkland_Manholes-417 | 237.12 | Kirkland_Manholes-2767 | 236.02 | 47.6 | 2.31 | 8 | PVC | 0.01 | 1,071 | 5 | 28 | 32 | 3 | | |
| Kirkland_Main-1238 | Kirkland_Manholes-2767 | 236.02 | Kirkland_Manholes-418 | 235.93 | 86.7 | 0.1 | 8 | PVC | 0.01 | 227 | 5 | 32 | 36 | 16 | | |
| Kirkland_Main-1239 | Kirkland_Manholes-408 | 267.9 | Kirkland_Manholes-407 | 266.31 | 113.3 | 1.4 | 8 | PVC | 0.01 | 835 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1240 | Kirkland_Manholes-419 | 263.82 | Kirkland_Manholes-625 | 258 | 200 | 2.91 | 8 | PVC | 0.01 | 1,203 | 4 | 20 | 24 | 2 | | |
| Kirkland_Main-1241 | Kirkland_Manholes-420 | 281.46 | Kirkland_Manholes-1071 | 277.81 | 358.8 | 1.02 | 8 | PVC | 0.01 | 711 | 7 | 36 | 43 | 6.1 | | |
| Kirkland_Main-1242 | Kirkland_Manholes-418 | 235.93 | Kirkland_Manholes-421 | 235.77 | 9.8 | 1.63 | 8 | PVC | 0.01 | 901 | 5 | 36 | 40 | 4.5 | | |
| Kirkland_Main-1243 | Kirkland_Manholes-422 | 235.64 | Kirkland_Manholes-341 | 235.59 | 30.3 | 0.17 | 8 | PVC | 0.01 | 287 | 5 | 44 | 49 | 17 | SM14-Ex-EX49 | |
| Kirkland_Main-1244 | Kirkland_Manholes-421 | 235.77 | Kirkland_Manholes-422 | 235.64 | 135.2 | 0.1 | 8 | PVC | 0.01 | 219 | 5 | 40 | 45 | 20.5 | SM14-Ex-EX49 | |
| Kirkland_Main-1245 | Kirkland_Manholes-423 | 284.5 | Kirkland_Manholes-420 | 281.46 | 237.1 | 1.28 | 8 | PVC | 0.01 | 798 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1246 | Kirkland_Manholes-424 | 292.81 | Kirkland_Manholes-425 | 290.3 | 45.2 | 5.56 | 8 | PVC | 0.01 | 1,662 | 5 | 24 | 29 | 1.8 | | |
| Kirkland_Main-1247 | Kirkland_Manholes-1846 | 15.1 | Kirkland_Manholes-1845 | 14.95 | 208.8 | 0.07 | 12 | PVC | 0.01 | 557 | 5 | 32 | 38 | 6.8 | SM10 | |
| Kirkland_Main-1248 | Kirkland_Manholes-1845 | 14.95 | Kirkland_Manholes-1844 | 14.08 | 225.8 | 0.39 | 12 | PVC | 0.01 | 1,290 | 6 | 39 | 45 | 3.5 | SM10 | |
| Kirkland_Main-1249 | Kirkland_Manholes-1844 | 14.08 | Kirkland_Manholes-1843 | 13.9 | 253.8 | 0.07 | 12 | PVC | 0.01 | 554 | 8 | 45 | 53 | 9.6 | SM10 | |
| Kirkland_Main-1250 | Kirkland_Manholes-1843 | 13.9 | Kirkland_Manholes-1842 | 13.84 | 237.6 | 0.03 | 12 | PVC | 0.01 | 330 | 8 | 52 | 60 | 18.1 | SM10 | |
| Kirkland_Main-1251 | Kirkland_Manholes-1842 | 13.84 | Kirkland_Manholes-1841 | 13.3 | 228.3 | 0.24 | 12 | PVC | 0.01 | 1,011 | 9 | 58 | 67 | 6.7 | SM10 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1252 | Kirkland_Manholes-1840 | 12.98 | Kirkland_Manholes-1839 | 12.1 | 208.1 | 0.42 | 12 | PVC | 0.01 | 1,352 | 14 | 71 | 86 | 6.4 | SM10 | |
| Kirkland_Main-1253 | Kirkland_Manholes-1839 | 12.1 | Kirkland_Manholes-1838 | 12 | 159.4 | 0.06 | 12 | PVC | 0.01 | 521 | 14 | 78 | 92 | 17.7 | | |
| Kirkland_Main-1254 | Kirkland_Manholes-1838 | 12 | Kirkland_Manholes-1834 | 11.35 | 218.3 | 0.3 | 12 | PVC | 0.01 | 1,134 | 16 | 84 | 100 | 8.8 | | |
| Kirkland_Main-1255 | Kirkland_Manholes-1841 | 13.3 | Kirkland_Manholes-1840 | 12.98 | 311 | 0.1 | 12 | PVC | 0.01 | 667 | 10 | 65 | 75 | 11.2 | SM10 | |
| Kirkland_Main-1256 | Kirkland_Manholes-1854 | 359.04 | Kirkland_Manholes-1855 | 357.41 | 200.3 | 0.81 | 8 | PVC | 0.01 | 636 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-1257 | Kirkland_Manholes-1855 | 357.41 | Kirkland_Manholes-1856 | 346.8 | 232 | 4.57 | 8 | PVC | 0.01 | 1,508 | 0 | 8 | 8 | 0.5 | | |
| Kirkland_Main-1258 | Kirkland_Manholes-1856 | 346.8 | Kirkland_Manholes-1857 | 344.14 | 121.8 | 2.18 | 8 | PVC | 0.01 | 1,042 | 6 | 12 | 18 | 1.7 | | |
| Kirkland_Main-1259 | Kirkland_Manholes-1857 | 344.14 | Kirkland_Manholes-1858 | 335.71 | 162.8 | 5.18 | 8 | PVC | 0.01 | 1,605 | 6 | 16 | 22 | 1.4 | | |
| Kirkland_Main-1260 | Kirkland_Manholes-1858 | 335.71 | Kirkland_Manholes-1859 | 326.96 | 255.9 | 3.42 | 8 | PVC | 0.01 | 1,304 | 62 | 115 | 178 | 13.6 | | |
| Kirkland_Main-1261 | Kirkland_Manholes-1963 | 340.77 | Kirkland_Manholes-1858 | 335.71 | 100.1 | 5.06 | 8 | PVC | 0.01 | 1,585 | 53 | 95 | 149 | 9.4 | | |
| Kirkland_Main-1262 | Kirkland_Manholes-1859 | 326.96 | Kirkland_Manholes-1860 | 317.11 | 345 | 2.85 | 8 | PVC | 0.01 | 1,191 | 62 | 119 | 182 | 15.2 | | |
| Kirkland_Main-1263 | Kirkland_Manholes-1860 | 317.11 | Kirkland_Manholes-1861 | 303.96 | 398.6 | 3.3 | 8 | PVC | 0.01 | 1,281 | 63 | 123 | 186 | 14.5 | | |
| Kirkland_Main-1264 | Kirkland_Manholes-1861 | 303.96 | Kirkland_Manholes-1862 | 294.2 | 372.7 | 2.62 | 8 | PVC | 0.01 | 1,141 | 63 | 127 | 190 | 16.6 | | Drop Connection |
| Kirkland_Main-1265 | Kirkland_Manholes-2394 | 354.21 | Kirkland_Manholes-2393 | 339.78 | 142.1 | 10.15 | 8 | PVC | 0.01 | 2,247 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX287 | |
| Kirkland_Main-1266 | Kirkland_Manholes-2393 | 339.78 | Kirkland_Manholes-2395 | 331.59 | 110.8 | 7.39 | 8 | PVC | 0.01 | 1,917 | 9 | 24 | 32 | 1.7 | SM14-Ex-EX287 | |
| Kirkland_Main-1267 | Kirkland_Manholes-2405 | 418 | Kirkland_Manholes-2397 | 417.95 | 35.5 | 0.14 | 8 | PVC | 0.01 | 265 | 5 | 28 | 33 | 12.5 | | |
| Kirkland_Main-1268 | Kirkland_Manholes-2397 | 417.95 | Kirkland_Manholes-2398 | 416.84 | 162.8 | 0.68 | 8 | PVC | 0.01 | 582 | 6 | 32 | 38 | 6.5 | SM14-Ex-EX261 | |
| Kirkland_Main-1269 | Kirkland_Manholes-2404 | 419.23 | Kirkland_Manholes-2405 | 418 | 199.9 | 0.62 | 8 | PVC | 0.01 | 553 | 4 | 24 | 28 | 5 | | |
| Kirkland_Main-1270 | Kirkland_Manholes-2399 | 419.47 | Kirkland_Manholes-2404 | 419.23 | 32.8 | 0.73 | 8 | PVC | 0.01 | 603 | 1 | 8 | 9 | 1.4 | | |
| Kirkland_Main-1271 | Kirkland_Manholes-2403 | 420.2 | Kirkland_Manholes-2404 | 419.23 | 274.8 | 0.35 | 8 | PVC | 0.01 | 419 | 3 | 12 | 15 | 3.5 | | |
| Kirkland_Main-1272 | Kirkland_Manholes-2400 | 420.6 | Kirkland_Manholes-2399 | 419.47 | 159 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-1273 | Kirkland_Manholes-2402 | 421.38 | Kirkland_Manholes-2403 | 420.2 | 252.3 | 0.47 | 8 | PVC | 0.01 | 482 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-1274 | Kirkland_Manholes-2401 | 422.6 | Kirkland_Manholes-2402 | 421.38 | 262.8 | 0.46 | 8 | PVC | 0.01 | 480 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-1276 | Kirkland_Manholes-2398 | 416.84 | Kirkland_Manholes-2406 | 412.88 | 316.7 | 1.25 | 8 | PVC | 0.01 | 788 | 7 | 36 | 43 | 5.5 | SM14-Ex-EX261 | |
| Kirkland_Main-1277 | Kirkland_Manholes-2406 | 412.88 | Kirkland_Manholes-2396 | 406.38 | 222.1 | 2.93 | 8 | PVC | 0.01 | 1,206 | 9 | 40 | 49 | 4.1 | SM14-Ex-EX261 | |
| Kirkland_Main-1278 | Kirkland_Manholes-2396 | 406.38 | Kirkland_Manholes-2407 | 403.31 | 84.2 | 3.65 | 8 | PVC | 0.01 | 1,346 | 10 | 44 | 54 | 4 | SM14-Ex-EX261 | |
| Kirkland_Main-1279 | Kirkland_Manholes-2408 | 405.44 | Kirkland_Manholes-2409 | 401.93 | 26.6 | 13.2 | 8 | PVC | 0.01 | 2,561 | 0 | 8 | 8 | 0.3 | | |
| Kirkland_Main-1281 | Kirkland_Manholes-2409 | 401.93 | Kirkland_Manholes-2267 | 393.07 | 194.4 | 4.56 | 8 | PVC | 0.01 | 1,505 | 0 | 12 | 12 | 0.8 | | |
| Kirkland_Main-1282 | Kirkland_Manholes-2412 | 260.78 | Kirkland_Manholes-2411 | 259.15 | 122.6 | 1.33 | 8 | PVC | 0.01 | 813 | 6 | 12 | 18 | 2.2 | | |
| Kirkland_Main-1283 | Kirkland_Manholes-282 | 50.07 | Kirkland_Manholes-281 | 36.84 | 240.3 | 5.51 | 8 | PVC | 0.01 | 1,654 | 1 | 10 | 11 | 0.7 | SM10 | |
| Kirkland_Main-1284 | Kirkland_Manholes-284 | 50.6 | Kirkland_Manholes-282 | 50.07 | 132.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 3 | 3 | 0.7 | | |
| Kirkland_Main-1285 | Kirkland_Manholes-283 | 64.31 | Kirkland_Manholes-282 | 50.07 | 115.4 | 12.34 | 8 | PVC | 0.01 | 2,477 | 1 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-1286 | Kirkland_Manholes-273 | 69.52 | Kirkland_Manholes-247 | 65.14 | 92.5 | 4.74 | 8 | PVC | 0.01 | 1,534 | 50 | 139 | 188 | 12.3 | SM10 | |
| Kirkland_Main-1290 | Kirkland_Manholes-274 | 93.7 | Kirkland_Manholes-271 | 91.78 | 250.2 | 0.77 | 8 | PVC | 0.01 | 618 | 36 | 96 | 132 | 21.3 | SM10 | |
| Kirkland_Main-1292 | Kirkland_Manholes-277 | 72.24 | Kirkland_Manholes-278 | 56.62 | 141.8 | 11.02 | 8 | PVC | 0.01 | 2,340 | 2 | 3 | 6 | 0.2 | SM10 | |
| Kirkland_Main-1293 | Kirkland_Manholes-278 | 56.62 | Kirkland_Manholes-280 | 27.37 | 245.1 | 11.93 | 8 | PVC | 0.01 | 2,436 | 31 | 13 | 44 | 1.8 | SM10 | |
| Kirkland_Main-1294 | Kirkland_Manholes-276 | 92.16 | Kirkland_Manholes-299 | 66.63 | 263.6 | 9.68 | 8 | PVC | 0.01 | 2,194 | 2 | 6 | 9 | 0.4 | SM10 | |
| Kirkland_Main-1295 | Kirkland_Manholes-267 | 95.34 | Kirkland_Manholes-275 | 94.08 | 184.4 | 0.68 | 8 | PVC | 0.01 | 583 | 34 | 87 | 121 | 20.8 | SM10 | |
| Kirkland_Main-1296 | Kirkland_Manholes-275 | 94.08 | Kirkland_Manholes-274 | 93.7 | 61.9 | 0.61 | 8 | PVC | 0.01 | 553 | 34 | 92 | 126 | 22.8 | SM10 | |
| Kirkland_Main-1297 | Kirkland_Manholes-270 | 94.47 | Kirkland_Manholes-271 | 91.78 | 344.2 | 0.78 | 8 | PVC | 0.01 | 623 | 10 | 30 | 40 | 6.4 | SM10 | |
| Kirkland_Main-1298 | Kirkland_Manholes-269 | 103.08 | Kirkland_Manholes-270 | 94.47 | 190.8 | 4.51 | 8 | PVC | 0.01 | 1,498 | 7 | 26 | 32 | 2.2 | SM10 | |
| Kirkland_Main-1299 | Kirkland_Manholes-268 | 108.82 | Kirkland_Manholes-269 | 103.08 | 133.1 | 4.31 | 8 | PVC | 0.01 | 1,464 | 5 | 21 | 26 | 1.8 | SM10 | |
| Kirkland_Main-1300 | Kirkland_Manholes-2521 | 363.83 | Kirkland_Manholes-2525 | 348.63 | 167.1 | 9.09 | 8 | PVC | 0.01 | 2,126 | 2 | 5 | 7 | 0.3 | | |
| Kirkland_Main-1301 | Kirkland_Manholes-2519 | 384.75 | Kirkland_Manholes-2522 | 362.4 | 159.7 | 13.99 | 8 | PVC | 0.01 | 2,637 | 2 | 2 | 4 | 0.1 | | |
| Kirkland_Main-1302 | Kirkland_Manholes-2522 | 362.4 | Kirkland_Manholes-2523 | 357.31 | 64.3 | 7.92 | 8 | PVC | 0.01 | 1,984 | 2 | 5 | 7 | 0.3 | | |
| Kirkland_Main-1303 | Kirkland_Manholes-2523 | 357.31 | Kirkland_Manholes-2524 | 346.56 | 113.2 | 9.5 | 8 | PVC | 0.01 | 2,173 | 3 | 7 | 10 | 0.5 | | |
| Kirkland_Main-1304 | Kirkland_Manholes-2524 | 346.56 | Kirkland_Manholes-2527 | 340.94 | 187 | 3.01 | 8 | PVC | 0.01 | 1,222 | 22 | 30 | 52 | 4.3 | | |
| Kirkland_Main-1305 | Kirkland_Manholes-2526 | 336.85 | Kirkland_Manholes-2776 | 334.45 | 375.1 | 0.64 | 8 | PVC | 0.01 | 564 | 29 | 79 | 108 | 19.1 | | |
| Kirkland_Main-1306 | Kirkland_Manholes-2527 | 340.94 | Kirkland_Manholes-2526 | 336.85 | 509.8 | 0.8 | 8 | PVC | 0.01 | 631 | 29 | 77 | 105 | 16.7 | | |
| Kirkland_Main-1307 | Kirkland_Manholes-2525 | 348.63 | Kirkland_Manholes-2527 | 340.94 | 406 | 1.89 | 8 | PVC | 0.01 | 970 | 7 | 44 | 51 | 5.3 | | |
| Kirkland_Main-1308 | Kirkland_Manholes-2528 | 359.11 | Kirkland_Manholes-2525 | 348.63 | 235.4 | 4.45 | 8 | PVC | 0.01 | 1,488 | 4 | 37 | 41 | 2.8 | | |
| Kirkland_Main-1309 | Kirkland_Manholes-2529 | 365.07 | Kirkland_Manholes-2528 | 362.98 | 40.4 | 5.17 | 8 | PVC | 0.01 | 1,604 | 3 | 35 | 38 | 2.4 | | Drop Connection |
| Kirkland_Main-1310 | Kirkland_Manholes-2531 | 381.45 | Kirkland_Manholes-2529 | 365.07 | 303.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 3 | 33 | 36 | 2.2 | | |
| Kirkland_Main-1311 | Kirkland_Manholes-2530 | 382.12 | Kirkland_Manholes-2531 | 381.45 | 45.8 | 1.46 | 8 | PVC | 0.01 | 853 | 3 | 30 | 34 | 3.9 | | |
| Kirkland_Main-1312 | Kirkland_Manholes-2532 | 395.91 | Kirkland_Manholes-2530 | 382.12 | 311 | 4.43 | 8 | PVC | 0.01 | 1,485 | 2 | 28 | 30 | 2 | | |
| Kirkland_Main-1313 | Kirkland_Manholes-2534 | 391.7 | Kirkland_Manholes-2533 | 389.33 | 214.8 | 1.1 | 8 | PVC | 0.01 | 741 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX260 | |
| Kirkland_Main-1315 | Kirkland_Manholes-2535 | 407.5 | Kirkland_Manholes-2536 | 406.16 | 143.7 | 0.93 | 8 | PVC | 0.01 | 681 | 13 | 4 | 17 | 2.4 | | |
| Kirkland_Main-1316 | Kirkland_Manholes-2536 | 406.16 | Kirkland_Manholes-2537 | 404.02 | 173.1 | 1.24 | 8 | PVC | 0.01 | 784 | 17 | 8 | 25 | 3.2 | | |
| Kirkland_Main-1317 | Kirkland_Manholes-2537 | 404.02 | Kirkland_Manholes-2538 | 403.64 | 31.1 | 1.22 | 8 | PVC | 0.01 | 780 | 17 | 12 | 29 | 3.7 | | |
| Kirkland_Main-1318 | Kirkland_Manholes-2541 | 412.62 | Kirkland_Manholes-2538 | 403.64 | 249.5 | 3.6 | 8 | PVC | 0.01 | 1,338 | 5 | 12 | 16 | 1.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1320 | Kirkland_Manholes-2538 | 403.64 | Kirkland_Manholes-2542 | 402.84 | 199.8 | 0.4 | 8 | PVC | 0.01 | 446 | 22 | 28 | 50 | 11.3 | SM14-Ex-EX299 | |
| Kirkland_Main-1321 | Kirkland_Manholes-2539 | 420.17 | Kirkland_Manholes-2540 | 419.4 | 116.4 | 0.66 | 8 | PVC | 0.01 | 574 | 2 | 4 | 6 | 1 | SM14-Ex-EX299 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1322 | Kirkland_Manholes-2540 | 419.4 | Kirkland_Manholes-2541 | 412.62 | 255.5 | 2.65 | 8 | PVC | 0.01 | 1,149 | 3 | 8 | 11 | 1 | SM14-Ex-EX299 | |
| Kirkland_Main-1324 | Kirkland_Manholes-2542 | 402.84 | Kirkland_Manholes-2547 | 388.67 | 366.3 | 3.87 | 8 | PVC | 0.01 | 1,387 | 24 | 32 | 55 | 4 | SM14-Ex-EX299 | |
| Kirkland_Main-1325 | Kirkland_Manholes-2547 | 388.67 | Kirkland_Manholes-2549 | 373.53 | 148.8 | 10.17 | 8 | PVC | 0.01 | 2,249 | 25 | 36 | 60 | 2.7 | SM14-Ex-EX299 | |
| Kirkland_Main-1327 | Kirkland_Manholes-2543 | 398.38 | Kirkland_Manholes-2545 | 394.25 | 263.6 | 1.57 | 8 | PVC | 0.01 | 883 | 3 | 8 | 10 | 1.2 | | |
| Kirkland_Main-1328 | Kirkland_Manholes-2544 | 407.5 | Kirkland_Manholes-2543 | 398.38 | 295.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX308 | |
| Kirkland_Main-1329 | Kirkland_Manholes-2546 | 394.6 | Kirkland_Manholes-2545 | 394.25 | 207.1 | 0.17 | 8 | PVC | 0.01 | 290 | 0 | 4 | 4 | 1.5 | | |
| Kirkland_Main-1330 | Kirkland_Manholes-2545 | 394.25 | Kirkland_Manholes-2548 | 359.75 | 323.6 | 10.66 | 8 | PVC | 0.01 | 2,302 | 6 | 16 | 22 | 1 | | |
| Kirkland_Main-1331 | Kirkland_Manholes-2549 | 373.53 | Kirkland_Manholes-2550 | 363.01 | 106.8 | 9.85 | 8 | PVC | 0.01 | 2,213 | 25 | 40 | 64 | 2.9 | SM14-Ex-EX299 | |
| Kirkland_Main-1332 | Kirkland_Manholes-2550 | 363.01 | Kirkland_Manholes-2551 | 350.96 | 184.1 | 6.54 | 8 | PVC | 0.01 | 1,804 | 25 | 44 | 69 | 3.8 | SM14-Ex-EX299 | |
| Kirkland_Main-1333 | Kirkland_Manholes-2551 | 350.96 | Kirkland_Manholes-2552 | 332.83 | 142.8 | 12.69 | 8 | PVC | 0.01 | 2,512 | 36 | 83 | 120 | 4.8 | SM14-Ex-EX299 | |
| Kirkland_Main-1334 | Kirkland_Manholes-2552 | 332.83 | Kirkland_Manholes-2559 | 326.46 | 239.1 | 2.66 | 8 | PVC | 0.01 | 1,151 | 37 | 95 | 133 | 11.5 | SM14-Ex-EX299 | |
| Kirkland_Main-1335 | Kirkland_Manholes-2555 | 336.08 | Kirkland_Manholes-2552 | 332.83 | 311.9 | 1.04 | 8 | PVC | 0.01 | 720 | 1 | 8 | 9 | 1.3 | SM14-Ex-EX322 | |
| Kirkland_Main-1336 | Kirkland_Manholes-2553 | 338.58 | Kirkland_Manholes-2554 | 334.68 | 146 | 2.67 | 8 | PVC | 0.01 | 1,152 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX304 | |
| Kirkland_Main-1337 | Kirkland_Manholes-2892 | 130.3 | Kirkland_Manholes-7 | 127.07 | 138.9 | 2.32 | 8 | PVC | 0.01 | 1,075 | 1 | 1 | 3 | 0.2 | | |
| Kirkland_Main-1338 | Kirkland_Manholes-2554 | 334.68 | Kirkland_Manholes-2558 | 329.23 | 295.9 | 1.84 | 8 | PVC | 0.01 | 957 | 6 | 8 | 14 | 1.4 | SM14-Ex-EX304 | |
| Kirkland_Main-1339 | Kirkland_Manholes-2556 | 339.44 | Kirkland_Manholes-2555 | 336.08 | 338.5 | 0.99 | 8 | PVC | 0.01 | 702 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX322 | |
| Kirkland_Main-1340 | Kirkland_Manholes-2557 | 338.97 | Kirkland_Manholes-2564 | 326.24 | 273.9 | 4.65 | 8 | PVC | 0.01 | 1,520 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX303 | |
| Kirkland_Main-1341 | Kirkland_Manholes-2558 | 329.23 | Kirkland_Manholes-2562 | 315.88 | 275 | 4.86 | 8 | PVC | 0.01 | 1,554 | 6 | 12 | 18 | 1.2 | SM14-Ex-EX304 | |
| Kirkland_Main-1342 | Kirkland_Manholes-2559 | 326.46 | Kirkland_Manholes-2614 | 304.78 | 296.2 | 7.32 | 8 | PVC | 0.01 | 1,907 | 37 | 99 | 137 | 7.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1343 | Kirkland_Manholes-2561 | 358.82 | Kirkland_Manholes-2551 | 350.96 | 208.8 | 3.76 | 8 | PVC | 0.01 | 1,368 | 11 | 36 | 47 | 3.4 | | |
| Kirkland_Main-1344 | Kirkland_Manholes-2560 | 366.92 | Kirkland_Manholes-2561 | 358.82 | 174.3 | 4.65 | 8 | PVC | 0.01 | 1,520 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1345 | Kirkland_Manholes-2562 | 315.88 | Kirkland_Manholes-2563 | 304.66 | 203.7 | 5.51 | 8 | PVC | 0.01 | 1,655 | 7 | 16 | 23 | 1.4 | SM14-Ex-EX304 | |
| Kirkland_Main-1346 | Kirkland_Manholes-2563 | 304.66 | Kirkland_Manholes-2603 | 296.02 | 227.1 | 3.81 | 8 | PVC | 0.01 | 1,375 | 9 | 20 | 29 | 2.1 | SM14-Ex-EX304 | |
| Kirkland_Main-1347 | Kirkland_Manholes-2564 | 326.24 | Kirkland_Manholes-2565 | 315.02 | 180.1 | 6.23 | 8 | PVC | 0.01 | 1,760 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX303 | |
| Kirkland_Main-1349 | Kirkland_Manholes-2565 | 315.02 | Kirkland_Manholes-2590 | 303.32 | 215.8 | 5.42 | 8 | PVC | 0.01 | 1,642 | 7 | 40 | 47 | 2.9 | SM14-Ex-EX303 | |
| Kirkland_Main-1350 | Kirkland_Manholes-2567 | 316.05 | Kirkland_Manholes-2565 | 315.02 | 200.2 | 0.51 | 8 | PVC | 0.01 | 506 | 5 | 28 | 33 | 6.5 | SM14-Ex-EX307 | |
| Kirkland_Main-1353 | Kirkland_Manholes-2456 | 21.67 | Kirkland_Manholes-2458 | 21.12 | 286.3 | 0.19 | 12 | PVC | 0.01 | 911 | 46 | 110 | 156 | 17.1 | | |
| Kirkland_Main-1354 | Kirkland_Manholes-2104 | 41.29 | Kirkland_Manholes-2457 | 40.34 | 237.1 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 13 | 19 | 4.4 | SM14-Ex-EX231 | Drop Connection |
| Kirkland_Main-1355 | Kirkland_Manholes-2459 | 25.23 | Kirkland_Manholes-2458 | 21.12 | 57.9 | 7.1 | 8 | PVC | 0.01 | 1,879 | 0 | 13 | 13 | 0.7 | | |
| Kirkland_Main-1356 | Kirkland_Manholes-2458 | 21.12 | Kirkland_Manholes-2460 | 20.42 | 280.8 | 0.25 | 12 | PVC | 0.01 | 1,038 | 56 | 130 | 186 | 17.9 | | |
| Kirkland_Main-1357 | Kirkland_Manholes-2105 | 41.32 | Kirkland_Manholes-2459 | 40.36 | 240.6 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 6 | 7 | 1.5 | SM14-Ex-EX230 | Drop Connection |
| Kirkland_Main-1358 | Kirkland_Manholes-2460 | 20.42 | Kirkland_Manholes-2463 | 19.08 | 286.9 | 0.47 | 12 | PVC | 0.01 | 1,421 | 72 | 162 | 234 | 16.5 | | |
| Kirkland_Main-1359 | Kirkland_Manholes-2461 | 23.27 | Kirkland_Manholes-2460 | 20.42 | 36.9 | 7.72 | 8 | PVC | 0.01 | 1,959 | 8 | 19 | 27 | 1.4 | | |
| Kirkland_Main-1360 | Kirkland_Manholes-2106 | 63.43 | Kirkland_Manholes-2461 | 62.02 | 352 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 13 | 19 | 4.2 | SM14-Ex-EX227 | Drop Connection |
| Kirkland_Main-1361 | Kirkland_Manholes-2462 | 20.98 | Kirkland_Manholes-2460 | 20.42 | 12.7 | 4.42 | 8 | PVC | 0.01 | 1,483 | 8 | 6 | 15 | 1 | | |
| Kirkland_Main-1362 | Kirkland_Manholes-2463 | 19.08 | Kirkland_Manholes-2465 | 18.4 | 238.2 | 0.29 | 15 | PVC | 0.01 | 2,014 | 82 | 169 | 251 | 12.5 | | |
| Kirkland_Main-1363 | Kirkland_Manholes-2464 | 24.34 | Kirkland_Manholes-2465 | 24.15 | 46.3 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 32 | 45 | 10.1 | | Drop Connection |
| Kirkland_Main-1364 | Kirkland_Manholes-2465 | 18.4 | Kirkland_Manholes-2321 | 18.2 | 405.1 | 0.05 | 15 | PVC | 0.01 | 837 | 95 | 208 | 303 | 36.2 | | |
| Kirkland_Main-1365 | Kirkland_Manholes-2466 | 40.06 | Kirkland_Manholes-2464 | 24.34 | 133.9 | 11.74 | 8 | PVC | 0.01 | 2,416 | 12 | 26 | 38 | 1.6 | | |
| Kirkland_Main-1366 | Kirkland_Manholes-754 | 246.56 | Kirkland_Manholes-756 | 236.14 | 59.1 | 17.63 | 8 | PVC | 0.01 | 2,961 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1367 | Kirkland_Manholes-756 | 236.14 | Kirkland_Manholes-759 | 235.08 | 17.7 | 6 | 8 | PVC | 0.01 | 1,727 | 3 | 12 | 15 | 0.9 | | |
| Kirkland_Main-1368 | Kirkland_Manholes-759 | 235.08 | Kirkland_Manholes-755 | 223.34 | 72.1 | 16.27 | 8 | PVC | 0.01 | 2,844 | 4 | 16 | 20 | 0.7 | | |
| Kirkland_Main-1369 | Kirkland_Manholes-749 | 322.83 | Kirkland_Manholes-748 | 311.92 | 207.7 | 5.25 | 8 | PVC | 0.01 | 1,616 | 15 | 36 | 51 | 3.2 | SM14-Ex-EX71 | |
| Kirkland_Main-1370 | Kirkland_Manholes-743 | 333.02 | Kirkland_Manholes-749 | 322.83 | 238.3 | 4.28 | 8 | PVC | 0.01 | 1,458 | 14 | 32 | 45 | 3.1 | SM14-Ex-EX71 | |
| Kirkland_Main-1371 | Kirkland_Manholes-742 | 334.85 | Kirkland_Manholes-743 | 333.02 | 278.1 | 0.66 | 8 | PVC | 0.01 | 572 | 9 | 20 | 29 | 5 | SM14-Ex-EX71 | |
| Kirkland_Main-1372 | Kirkland_Manholes-744 | 343.43 | Kirkland_Manholes-743 | 333.02 | 155.4 | 6.7 | 8 | PVC | 0.01 | 1,825 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX73 | |
| Kirkland_Main-1373 | Kirkland_Manholes-1551 | 340.04 | Kirkland_Manholes-1548 | 334.13 | 358.9 | 1.65 | 8 | PVC | 0.01 | 905 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX122 | |
| Kirkland_Main-1374 | Kirkland_Manholes-1548 | 334.13 | Kirkland_Manholes-1547 | 314.76 | 165.7 | 11.69 | 8 | PVC | 0.01 | 2,411 | 2 | 8 | 10 | 0.4 | SM14-Ex-EX122 | |
| Kirkland_Main-1375 | Kirkland_Manholes-1554 | 318.87 | Kirkland_Manholes-1547 | 314.76 | 166.1 | 2.48 | 8 | PVC | 0.01 | 1,109 | 3 | 12 | 15 | 1.3 | SM14-Ex-EX122 | |
| Kirkland_Main-1376 | Kirkland_Manholes-1547 | 314.76 | Kirkland_Manholes-1553 | 308.15 | 101.4 | 6.52 | 8 | PVC | 0.01 | 1,800 | 5 | 24 | 29 | 1.6 | SM14-Ex-EX122 | |
| Kirkland_Main-1377 | Kirkland_Manholes-1549 | 335.84 | Kirkland_Manholes-1550 | 330.23 | 147.4 | 3.81 | 8 | PVC | 0.01 | 1,375 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX122 | |
| Kirkland_Main-1378 | Kirkland_Manholes-1550 | 330.23 | Kirkland_Manholes-1554 | 318.87 | 207.3 | 5.48 | 8 | PVC | 0.01 | 1,650 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX122 | |
| Kirkland_Main-1379 | Kirkland_Manholes-741 | 345.43 | Kirkland_Manholes-696 | 340.09 | 318.5 | 1.68 | 8 | PVC | 0.01 | 913 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX74 | |
| Kirkland_Main-1380 | Kirkland_Manholes-696 | 340.09 | Kirkland_Manholes-742 | 334.85 | 242.4 | 2.16 | 8 | PVC | 0.01 | 1,037 | 8 | 16 | 23 | 2.3 | SM14-Ex-EX71 | |
| Kirkland_Main-1381 | Kirkland_Manholes-820 | 351.15 | Kirkland_Manholes-821 | 328.81 | 334.9 | 6.67 | 8 | PVC | 0.01 | 1,821 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX72 | |
| Kirkland_Main-1382 | Kirkland_Manholes-745 | 351.42 | Kirkland_Manholes-744 | 343.43 | 306.7 | 2.6 | 8 | PVC | 0.01 | 1,138 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX73 | |
| Kirkland_Main-1383 | Kirkland_Manholes-821 | 328.81 | Kirkland_Manholes-746 | 326.06 | 200.6 | 1.37 | 8 | PVC | 0.01 | 825 | 2 | 8 | 10 | 1.2 | SM14-Ex-EX72 | |
| Kirkland_Main-1384 | Kirkland_Manholes-746 | 326.06 | Kirkland_Manholes-747 | 319.23 | 281 | 2.43 | 8 | PVC | 0.01 | 1,099 | 2 | 12 | 14 | 1.3 | SM14-Ex-EX72 | |
| Kirkland_Main-1385 | Kirkland_Manholes-747 | 319.23 | Kirkland_Manholes-748 | 311.92 | 331.6 | 2.2 | 8 | PVC | 0.01 | 1,047 | 3 | 16 | 19 | 1.8 | SM14-Ex-EX72 | |
| Kirkland_Main-1386 | Kirkland_Manholes-1562 | 206.57 | Kirkland_Manholes-1563 | 203.28 | 21.7 | 15.13 | 8 | PVC | 0.01 | 2,743 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-1387 | Kirkland_Manholes-1560 | 251.28 | Kirkland_Manholes-455 | 250.45 | 217.9 | 0.38 | 8 | PVC | 0.01 | 435 | 23 | 68 | 91 | 20.8 | SM14-Ex-EX68 | |
| Kirkland_Main-1388 | Kirkland_Manholes-1559 | 253.89 | Kirkland_Manholes-1560 | 251.28 | 258.2 | 1.01 | 8 | PVC | 0.01 | 709 | 22 | 64 | 86 | 12.1 | SM14-Ex-EX68 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1389 | Kirkland_Manholes-317 | 146.79 | Kirkland_Manholes-318 | 146.51 | 72.2 | 0.39 | 12 | PVC | 0.01 | 1,298 | 89 | 320 | 409 | 31.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1390 | Kirkland_Manholes-1052 | 151.4 | Kirkland_Manholes-316 | 147.8 | 353.6 | 1.02 | 8 | PVC | 0.01 | 711 | 89 | 303 | 392 | 55.1 | | |
| Kirkland_Main-1392 | Kirkland_Manholes-264 | 215.3 | Kirkland_Manholes-1099 | 211.44 | 157 | 2.46 | 8 | PVC | 0.01 | 1,105 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1398 | Kirkland_Manholes-836 | 335.7 | Kirkland_Manholes-835 | 335.4 | 62.1 | 0.48 | 8 | PVC | 0.01 | 490 | 11 | 28 | 39 | 7.9 | | |
| Kirkland_Main-1399 | Kirkland_Manholes-835 | 335.4 | Kirkland_Manholes-839 | 334.68 | 84.6 | 0.85 | 8 | PVC | 0.01 | 650 | 13 | 36 | 48 | 7.4 | | |
| Kirkland_Main-1400 | Kirkland_Manholes-837 | 336.53 | Kirkland_Manholes-836 | 335.7 | 248.7 | 0.33 | 8 | PVC | 0.01 | 407 | 10 | 24 | 34 | 8.3 | | |
| Kirkland_Main-1401 | Kirkland_Manholes-838 | 337.31 | Kirkland_Manholes-837 | 336.53 | 120.5 | 0.65 | 8 | PVC | 0.01 | 567 | 7 | 20 | 27 | 4.8 | | |
| Kirkland_Main-1402 | Kirkland_Manholes-840 | 326.85 | Kirkland_Manholes-841 | 325.94 | 71 | 1.28 | 8 | PVC | 0.01 | 798 | 19 | 56 | 74 | 9.3 | | |
| Kirkland_Main-1403 | Kirkland_Manholes-841 | 325.94 | Kirkland_Manholes-842 | 324.88 | 230.1 | 0.46 | 8 | PVC | 0.01 | 479 | 20 | 60 | 80 | 16.6 | | |
| Kirkland_Main-1404 | Kirkland_Manholes-843 | 340.26 | Kirkland_Manholes-842 | 324.88 | 172 | 8.94 | 8 | PVC | 0.01 | 2,108 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1405 | Kirkland_Manholes-844 | 342.5 | Kirkland_Manholes-845 | 341.21 | 161.2 | 0.8 | 8 | PVC | 0.01 | 631 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1406 | Kirkland_Manholes-846 | 342.07 | Kirkland_Manholes-845 | 341.21 | 84.3 | 1.02 | 8 | PVC | 0.01 | 712 | 3 | 16 | 19 | 2.7 | | |
| Kirkland_Main-1407 | Kirkland_Manholes-845 | 341.21 | Kirkland_Manholes-850 | 340.39 | 138.4 | 0.59 | 8 | PVC | 0.01 | 543 | 5 | 24 | 29 | 5.4 | | |
| Kirkland_Main-1408 | Kirkland_Manholes-849 | 342.42 | Kirkland_Manholes-846 | 342.07 | 117.3 | 0.3 | 8 | PVC | 0.01 | 385 | 2 | 12 | 14 | 3.7 | | |
| Kirkland_Main-1409 | Kirkland_Manholes-847 | 343.01 | Kirkland_Manholes-849 | 342.42 | 70.3 | 0.84 | 8 | PVC | 0.01 | 646 | 2 | 8 | 10 | 1.6 | | |
| Kirkland_Main-1410 | Kirkland_Manholes-848 | 344.32 | Kirkland_Manholes-847 | 343.01 | 145.5 | 0.9 | 8 | PVC | 0.01 | 669 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1411 | Kirkland_Manholes-850 | 340.39 | Kirkland_Manholes-851 | 339.16 | 69.3 | 1.78 | 8 | PVC | 0.01 | 941 | 6 | 28 | 34 | 3.6 | | |
| Kirkland_Main-1412 | Kirkland_Manholes-1538 | 302.73 | Kirkland_Manholes-1537 | 302.03 | 362.6 | 0.19 | 8 | PVC | 0.01 | 310 | 6 | 16 | 22 | 7.1 | SM14-Ex-EX124 | |
| Kirkland_Main-1413 | Kirkland_Manholes-1511 | 290.62 | Kirkland_Manholes-1509 | 286.35 | 84.7 | 5.04 | 8 | PVC | 0.01 | 1,583 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1414 | Kirkland_Manholes-1510 | 287.19 | Kirkland_Manholes-1509 | 286.35 | 79 | 1.06 | 8 | PVC | 0.01 | 727 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1415 | Kirkland_Manholes-1509 | 286.35 | Kirkland_Manholes-1508 | 277.83 | 283.5 | 3.01 | 8 | PVC | 0.01 | 1,222 | 3 | 12 | 15 | 1.2 | | Drop Connection |
| Kirkland_Main-1416 | Kirkland_Manholes-1537 | 302.03 | Kirkland_Manholes-1536 | 298.86 | 351.3 | 0.9 | 8 | PVC | 0.01 | 670 | 9 | 20 | 29 | 4.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1417 | Kirkland_Manholes-762 | 287.2 | Kirkland_Manholes-763 | 274.33 | 165.6 | 7.77 | 8 | PVC | 0.01 | 1,966 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX125 | |
| Kirkland_Main-1418 | Kirkland_Manholes-763 | 274.33 | Kirkland_Manholes-1531 | 265.03 | 234.1 | 3.97 | 8 | PVC | 0.01 | 1,405 | 4 | 8 | 12 | 0.9 | SM14-Ex-EX125 | |
| Kirkland_Main-1419 | Kirkland_Manholes-1541 | 294.69 | Kirkland_Manholes-1543 | 289 | 216.2 | 2.63 | 8 | PVC | 0.01 | 1,144 | 6 | 16 | 22 | 1.9 | SM14-Ex-EX123 | |
| Kirkland_Main-1420 | Kirkland_Manholes-1536 | 298.86 | Kirkland_Manholes-1518 | 277.88 | 393.1 | 5.34 | 8 | PVC | 0.01 | 1,629 | 10 | 24 | 34 | 2.1 | SM14-Ex-EX124 | |
| Kirkland_Main-1421 | Kirkland_Manholes-1544 | 284.46 | Kirkland_Manholes-1545 | 272.4 | 63.3 | 19.06 | 8 | PVC | 0.01 | 3,078 | 9 | 24 | 32 | 1.1 | SM14-Ex-EX123 | |
| Kirkland_Main-1422 | Kirkland_Manholes-1558 | 160.79 | O-20 | 159.86 | 16.6 | 5.62 | 8 | PVC | 0.01 | 1,671 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1424 | Kirkland_Manholes-1557 | 161.32 | O-21 | 159.86 | 64.6 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-1425 | Kirkland_Manholes-1556 | 178.05 | Kirkland_Manholes-1557 | 161.32 | 76.6 | 21.85 | 8 | PVC | 0.01 | 3,296 | 1 | 4 | 5 | 0.1 | | |
| Kirkland_Main-1427 | Kirkland_Manholes-541 | 450.25 | Kirkland_Manholes-542 | 440.69 | 230.2 | 4.15 | 8 | PVC | 0.01 | 1,437 | 8 | 68 | 76 | 5.3 | | |
| Kirkland_Main-1428 | Kirkland_Manholes-542 | 440.69 | Kirkland_Manholes-1978 | 440.32 | 89.3 | 0.41 | 8 | PVC | 0.01 | 454 | 9 | 72 | 80 | 17.7 | | |
| Kirkland_Main-1429 | Kirkland_Manholes-544 | 449.4 | Kirkland_Manholes-543 | 448.24 | 235 | 0.49 | 8 | PVC | 0.01 | 495 | 19 | 68 | 86 | 17.5 | | |
| Kirkland_Main-1430 | Kirkland_Manholes-546 | 452.43 | Kirkland_Manholes-545 | 450.22 | 300.2 | 0.74 | 8 | PVC | 0.01 | 605 | 15 | 60 | 75 | 12.4 | | |
| Kirkland_Main-1431 | Kirkland_Manholes-545 | 450.22 | Kirkland_Manholes-544 | 449.4 | 161.7 | 0.51 | 8 | PVC | 0.01 | 502 | 18 | 64 | 81 | 16.2 | | |
| Kirkland_Main-1432 | Kirkland_Manholes-547 | 452.62 | Kirkland_Manholes-546 | 452.43 | 162.6 | 0.12 | 8 | PVC | 0.01 | 243 | 13 | 56 | 69 | 28.4 | | |
| Kirkland_Main-1433 | Kirkland_Manholes-548 | 453.36 | Kirkland_Manholes-547 | 452.62 | 135.2 | 0.55 | 8 | PVC | 0.01 | 522 | 12 | 52 | 64 | 12.3 | | |
| Kirkland_Main-1434 | Kirkland_Manholes-549 | 453.9 | Kirkland_Manholes-548 | 453.36 | 128.1 | 0.42 | 8 | PVC | 0.01 | 456 | 11 | 40 | 50 | 11 | | |
| Kirkland_Main-1435 | Kirkland_Manholes-552 | 455.6 | Kirkland_Manholes-549 | 453.9 | 177.5 | 0.96 | 8 | PVC | 0.01 | 690 | 11 | 36 | 46 | 6.7 | | |
| Kirkland_Main-1436 | Kirkland_Manholes-550 | 455.89 | Kirkland_Manholes-552 | 455.6 | 183.6 | 0.16 | 8 | PVC | 0.01 | 280 | 1 | 4 | 5 | 1.7 | | |
| Kirkland_Main-1437 | Kirkland_Manholes-551 | 462.06 | Kirkland_Manholes-563 | 461.52 | 194.4 | 0.28 | 8 | PVC | 0.01 | 372 | 4 | 4 | 8 | 2.3 | | |
| Kirkland_Main-1438 | Kirkland_Manholes-553 | 455.61 | Kirkland_Manholes-552 | 455.6 | 92.3 | 0.01 | 8 | PVC | 0.01 | 73 | 10 | 28 | 37 | 50.9 | | |
| Kirkland_Main-1439 | Kirkland_Manholes-554 | 456.45 | Kirkland_Manholes-553 | 455.61 | 88.9 | 0.94 | 8 | PVC | 0.01 | 685 | 9 | 24 | 33 | 4.8 | | |
| Kirkland_Main-1440 | Kirkland_Manholes-558 | 457.55 | Kirkland_Manholes-554 | 456.45 | 287.7 | 0.38 | 8 | PVC | 0.01 | 436 | 7 | 16 | 23 | 5.2 | | |
| Kirkland_Main-1441 | Kirkland_Manholes-557 | 460.23 | Kirkland_Manholes-554 | 456.45 | 194.6 | 1.94 | 8 | PVC | 0.01 | 983 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1442 | Kirkland_Manholes-559 | 467.58 | Kirkland_Manholes-558 | 457.55 | 209.6 | 4.79 | 8 | PVC | 0.01 | 1,542 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1443 | Kirkland_Manholes-563 | 461.52 | Kirkland_Manholes-558 | 457.55 | 324.2 | 1.22 | 8 | PVC | 0.01 | 780 | 4 | 8 | 12 | 1.6 | | |
| Kirkland_Main-1444 | Kirkland_Manholes-562 | 483.8 | Kirkland_Manholes-560 | 483.4 | 99.9 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-1445 | Kirkland_Manholes-565 | 468.54 | Kirkland_Manholes-2020 | 468.34 | 312.4 | 0.06 | 10 | PVC | 0.01 | 326 | 74 | 143 | 217 | 66.5 | SM14-2035-DF12 | |
| Kirkland_Main-1446 | Kirkland_Manholes-564 | 469.28 | Kirkland_Manholes-565 | 468.54 | 228 | 0.32 | 10 | PVC | 0.01 | 728 | 73 | 139 | 213 | 29.2 | | |
| Kirkland_Main-1447 | Kirkland_Manholes-567 | 470.28 | Kirkland_Manholes-564 | 469.28 | 324.2 | 0.31 | 10 | PVC | 0.01 | 710 | 61 | 95 | 156 | 22 | | |
| Kirkland_Main-1448 | Kirkland_Manholes-3045 | 483.35 | Kirkland_Manholes-2029 | 479.06 | 297.6 | 1.44 | 8 | PVC | 0.01 | 846 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-1449 | Kirkland_Manholes-568 | 471.29 | Kirkland_Manholes-567 | 470.28 | 325 | 0.31 | 10 | PVC | 0.01 | 713 | 60 | 87 | 148 | 20.7 | | |
| Kirkland_Main-1450 | Kirkland_Manholes-569 | 473.29 | Kirkland_Manholes-568 | 471.29 | 178.4 | 1.12 | 10 | PVC | 0.01 | 1,354 | 60 | 83 | 143 | 10.6 | | |
| Kirkland_Main-1451 | Kirkland_Manholes-570 | 473.5 | Kirkland_Manholes-569 | 473.29 | 54.9 | 0.38 | 8 | PVC | 0.01 | 433 | 60 | 79 | 139 | 32.2 | | |
| Kirkland_Main-1452 | Kirkland_Manholes-1406 | 473.57 | Kirkland_Manholes-570 | 473.5 | 288.8 | 0.03 | 12 | PVC | 0.01 | 330 | 55 | 75 | 130 | 39.4 | SM14-Ex-EX275 | |
| Kirkland_Main-1453 | Kirkland_Manholes-571 | 472.91 | Kirkland_Manholes-567 | 470.28 | 172.6 | 1.52 | 8 | PVC | 0.01 | 870 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1454 | Kirkland_Manholes-575 | 113.73 | Kirkland_Manholes-574 | 110.98 | 152.2 | 1.81 | 8 | PVC | 0.01 | 948 | 2 | 8 | 10 | 1 | SM14-Ex-EX116 | |
| Kirkland_Main-1455 | Kirkland_Manholes-1665 | 94.21 | Kirkland_Manholes-1666 | 89.71 | 26.9 | 16.73 | 8 | PVC | 0.01 | 2,883 | 28 | 91 | 119 | 4.1 | | |
| Kirkland_Main-1456 | Kirkland_Manholes-957 | 315.92 | Kirkland_Manholes-958 | 300.6 | 184.6 | 8.3 | 8 | PVC | 0.01 | 2,031 | 3 | 20 | 23 | 1.1 | | |
| Kirkland_Main-1457 | Kirkland_Manholes-958 | 300.6 | Kirkland_Manholes-942 | 300.01 | 173 | 0.34 | 8 | PVC | 0.01 | 412 | 4 | 24 | 28 | 6.8 | | |
| Kirkland_Main-1458 | Kirkland_Manholes-960 | 258.67 | Kirkland_Manholes-959 | 252.05 | 190.9 | 3.47 | 8 | PVC | 0.01 | 1,313 | 2 | 4 | 6 | 0.5 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1459 | Kirkland_Manholes-2752 | 253.8 | Kirkland_Manholes-959 | 252.05 | 339.9 | 0.51 | 8 | PVC | 0.01 | 506 | 9 | 34 | 44 | 8.6 | | |
| Kirkland_Main-1460 | Kirkland_Manholes-959 | 252.05 | Kirkland_Manholes-963 | 250.7 | 229 | 0.59 | 8 | PVC | 0.01 | 541 | 14 | 43 | 56 | 10.4 | | |
| Kirkland_Main-1461 | Kirkland_Manholes-961 | 263.75 | Kirkland_Manholes-962 | 249.53 | 185.7 | 7.66 | 8 | PVC | 0.01 | 1,951 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1462 | Kirkland_Manholes-964 | 266.7 | Kirkland_Manholes-963 | 250.7 | 315.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1463 | Kirkland_Manholes-963 | 250.7 | Kirkland_Manholes-962 | 249.53 | 229.2 | 0.51 | 8 | PVC | 0.01 | 504 | 17 | 51 | 68 | 13.5 | | |
| Kirkland_Main-1464 | Kirkland_Manholes-962 | 249.53 | Kirkland_Manholes-966 | 247.26 | 381 | 0.59 | 8 | PVC | 0.01 | 544 | 20 | 60 | 79 | 14.6 | | |
| Kirkland_Main-1465 | Kirkland_Manholes-965 | 252.45 | Kirkland_Manholes-966 | 247.26 | 188.4 | 2.75 | 8 | PVC | 0.01 | 1,170 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1466 | Kirkland_Manholes-966 | 247.26 | Kirkland_Manholes-967 | 246.35 | 132.7 | 0.69 | 8 | PVC | 0.01 | 584 | 24 | 68 | 92 | 15.7 | | |
| Kirkland_Main-1467 | Kirkland_Manholes-968 | 245.61 | Kirkland_Manholes-969 | 239.3 | 150 | 4.21 | 8 | PVC | 0.01 | 1,446 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1468 | Kirkland_Manholes-969 | 239.3 | Kirkland_Manholes-970 | 236.6 | 291.2 | 0.93 | 8 | PVC | 0.01 | 679 | 1 | 9 | 9 | 1.4 | | |
| Kirkland_Main-1469 | Kirkland_Manholes-970 | 236.6 | Kirkland_Manholes-971 | 236.2 | 92.8 | 0.43 | 8 | PVC | 0.01 | 463 | 2 | 13 | 15 | 3.2 | | |
| Kirkland_Main-1470 | Kirkland_Manholes-967 | 246.35 | Kirkland_Manholes-972 | 246.27 | 41.8 | 0.2 | 8 | PVC | 0.01 | 314 | 24 | 73 | 96 | 30.6 | | |
| Kirkland_Main-1471 | Kirkland_Manholes-971 | 236.2 | Kirkland_Manholes-973 | 233.19 | 134.5 | 2.24 | 8 | PVC | 0.01 | 1,055 | 3 | 17 | 20 | 1.9 | SM14-Ex-EX2 | |
| Kirkland_Main-1472 | Kirkland_Manholes-974 | 234.1 | Kirkland_Manholes-973 | 233.19 | 211 | 0.43 | 8 | PVC | 0.01 | 463 | 2 | 9 | 10 | 2.2 | | |
| Kirkland_Main-1473 | Kirkland_Manholes-987 | 239.5 | Kirkland_Manholes-976 | 229.3 | 219.2 | 4.65 | 8 | PVC | 0.01 | 1,521 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1474 | Kirkland_Manholes-975 | 230.2 | Kirkland_Manholes-976 | 229.3 | 22.7 | 3.96 | 8 | PVC | 0.01 | 1,404 | 5 | 34 | 39 | 2.8 | | |
| Kirkland_Main-1475 | Kirkland_Manholes-973 | 233.19 | Kirkland_Manholes-975 | 230.2 | 123.5 | 2.42 | 8 | PVC | 0.01 | 1,097 | 5 | 30 | 35 | 3.2 | | |
| Kirkland_Main-1476 | Kirkland_Manholes-976 | 229.3 | Kirkland_Manholes-977 | 225.95 | 181.2 | 1.85 | 8 | PVC | 0.01 | 959 | 7 | 43 | 49 | 5.1 | | |
| Kirkland_Main-1478 | Kirkland_Manholes-1564 | 164.37 | O-15 | 160 | 18.2 | 24.07 | 8 | PVC | 0.01 | 3,459 | 2 | 16 | 18 | 0.5 | | |
| Kirkland_Main-1479 | Kirkland_Manholes-755 | 223.34 | Kirkland_Manholes-1565 | 218.86 | 20.1 | 22.24 | 8 | PVC | 0.01 | 3,325 | 4 | 20 | 24 | 0.7 | | |
| Kirkland_Main-1480 | Kirkland_Manholes-1567 | 133.87 | Kirkland_Manholes-1566 | 130.52 | 314.6 | 1.06 | 8 | PVC | 0.01 | 728 | 3 | 8 | 12 | 1.6 | SM14-Ex-EX119 | |
| Kirkland_Main-1481 | Kirkland_Manholes-1566 | 130.52 | Kirkland_Manholes-1604 | 117.22 | 313.5 | 4.24 | 8 | PVC | 0.01 | 1,452 | 4 | 16 | 20 | 1.4 | SM14-Ex-EX119 | |
| Kirkland_Main-1482 | Kirkland_Manholes-776 | 207.48 | Kirkland_Manholes-775 | 172.73 | 191.1 | 18.19 | 8 | PVC | 0.01 | 3,007 | 5 | 28 | 33 | 1.1 | | |
| Kirkland_Main-1483 | Kirkland_Manholes-1565 | 218.86 | Kirkland_Manholes-776 | 207.48 | 52.1 | 21.84 | 8 | PVC | 0.01 | 3,295 | 4 | 24 | 28 | 0.8 | | |
| Kirkland_Main-1484 | Kirkland_Manholes-1263 | 156.98 | Kirkland_Manholes-1262 | 156.59 | 13.2 | 2.96 | 8 | PVC | 0.01 | 1,213 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX111 | |
| Kirkland_Main-1485 | Kirkland_Manholes-1262 | 156.59 | Kirkland_Manholes-1261 | 144.57 | 314.4 | 3.82 | 8 | PVC | 0.01 | 1,379 | 4 | 41 | 46 | 3.3 | SM14-Ex-EX111 | |
| Kirkland_Main-1486 | Kirkland_Manholes-1260 | 164.33 | Kirkland_Manholes-1261 | 144.57 | 293.7 | 6.73 | 8 | PVC | 0.01 | 1,829 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX110 | |
| Kirkland_Main-1488 | Kirkland_Manholes-1259 | 154.8 | Kirkland_Manholes-1258 | 154.28 | 130.3 | 0.4 | 8 | PVC | 0.01 | 445 | 6 | 33 | 39 | 8.8 | SM14-Ex-EX108 | |
| Kirkland_Main-1489 | Kirkland_Manholes-1258 | 154.28 | Kirkland_Manholes-1257 | 152.6 | 347 | 0.48 | 8 | PVC | 0.01 | 491 | 13 | 66 | 79 | 16 | SM14-Ex-EX108 | |
| Kirkland_Main-1490 | Kirkland_Manholes-1257 | 152.6 | Kirkland_Manholes-1256 | 151.53 | 24 | 4.46 | 8 | PVC | 0.01 | 1,489 | 14 | 74 | 88 | 5.9 | SM14-Ex-EX108 | |
| Kirkland_Main-1494 | Kirkland_Manholes-2467 | 42.59 | Kirkland_Manholes-2466 | 40.06 | 76.4 | 3.31 | 8 | PVC | 0.01 | 1,283 | 9 | 19 | 29 | 2.2 | | |
| Kirkland_Main-1495 | Kirkland_Manholes-2469 | 49.1 | Kirkland_Manholes-2467 | 42.59 | 138.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 8 | 13 | 21 | 1.3 | | |
| Kirkland_Main-1496 | Kirkland_Manholes-2468 | 49.98 | Kirkland_Manholes-2469 | 49.48 | 124.2 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 6 | 13 | 3 | | Drop Connection |
| Kirkland_Main-1498 | Kirkland_Manholes-2470 | 236.6 | Kirkland_Manholes-2472 | 223.64 | 225 | 5.76 | 8 | PVC | 0.01 | 1,692 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX282 | |
| Kirkland_Main-1499 | Kirkland_Manholes-2472 | 223.64 | Kirkland_Manholes-2473 | 222.78 | 215.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.4 | SM14-Ex-EX282 | Drop Connection |
| Kirkland_Main-1500 | Kirkland_Manholes-2473 | 207.49 | Kirkland_Manholes-2474 | 188.45 | 212.3 | 8.97 | 8 | PVC | 0.01 | 2,111 | 5 | 16 | 21 | 1 | SM14-Ex-EX282 | |
| Kirkland_Main-1501 | Kirkland_Manholes-2471 | 234.47 | Kirkland_Manholes-2472 | 223.64 | 364.1 | 2.97 | 8 | PVC | 0.01 | 1,216 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX283 | |
| Kirkland_Main-1502 | Kirkland_Manholes-2474 | 188.45 | Kirkland_Manholes-2476 | 187.5 | 225.3 | 0.42 | 8 | PVC | 0.01 | 458 | 7 | 24 | 31 | 6.7 | SM14-Ex-EX282 | |
| Kirkland_Main-1505 | Kirkland_Manholes-2492 | 55.46 | Kirkland_Manholes-2666 | 55.28 | 147.8 | 0.12 | 18 | PVC | 0.01 | 2,139 | 109 | 316 | 425 | 19.9 | SM14-Ex-EX222 | |
| Kirkland_Main-1506 | Kirkland_Manholes-2088 | 57.39 | Kirkland_Manholes-2492 | 55.46 | 144 | 1.34 | 18 | PVC | 0.01 | 7,094 | 83 | 267 | 351 | 4.9 | SM14-Ex-EX222 | |
| Kirkland_Main-1507 | Kirkland_Manholes-2090 | 57.44 | Kirkland_Manholes-2088 | 57.39 | 370.9 | 0.01 | 18 | PVC | 0.01 | 712 | 83 | 255 | 338 | 47.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1508 | Kirkland_Manholes-2089 | 58.23 | Kirkland_Manholes-2088 | 57.39 | 14.1 | 5.97 | 8 | PVC | 0.01 | 1,723 | 0 | 6 | 6 | 0.4 | | |
| Kirkland_Main-1509 | Kirkland_Manholes-2620 | 281.06 | Kirkland_Manholes-2618 | 278.4 | 382.5 | 0.7 | 8 | PVC | 0.01 | 588 | 2 | 8 | 10 | 1.7 | SM14-Ex-EX299 | |
| Kirkland_Main-1510 | Kirkland_Manholes-2604 | 283.17 | Kirkland_Manholes-2620 | 281.06 | 375.6 | 0.56 | 8 | PVC | 0.01 | 528 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX299 | |
| Kirkland_Main-1512 | Kirkland_Manholes-2621 | 277.53 | Kirkland_Manholes-2433 | 276.88 | 161.5 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | SM14-Ex-EX244 | Drop Connection |
| Kirkland_Main-1513 | Kirkland_Manholes-2623 | 277.98 | Kirkland_Manholes-2622 | 271.8 | 433.3 | 1.43 | 8 | PVC | 0.01 | 842 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX281 | |
| Kirkland_Main-1514 | Kirkland_Manholes-2622 | 271.8 | Kirkland_Manholes-2625 | 260.54 | 221.9 | 5.07 | 8 | PVC | 0.01 | 1,588 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX281 | |
| Kirkland_Main-1515 | Kirkland_Manholes-2624 | 276.22 | Kirkland_Manholes-2635 | 275.48 | 185.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1 | SM14-Ex-EX294 | |
| Kirkland_Main-1516 | Kirkland_Manholes-2625 | 260.54 | Kirkland_Manholes-2626 | 246.92 | 188.3 | 7.23 | 8 | PVC | 0.01 | 1,896 | 2 | 12 | 14 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1517 | Kirkland_Manholes-2626 | 246.92 | Kirkland_Manholes-2627 | 215.5 | 237.8 | 13.21 | 8 | PVC | 0.01 | 2,563 | 2 | 16 | 18 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1518 | Kirkland_Manholes-2627 | 215.5 | Kirkland_Manholes-2628 | 186 | 220.8 | 13.36 | 8 | PVC | 0.01 | 2,577 | 4 | 20 | 24 | 0.9 | SM14-Ex-EX281 | |
| Kirkland_Main-1519 | Kirkland_Manholes-2476 | 187.5 | Kirkland_Manholes-2628 | 186 | 397.3 | 0.38 | 8 | PVC | 0.01 | 433 | 9 | 28 | 37 | 8.5 | SM14-Ex-EX282 | |
| Kirkland_Main-1520 | Kirkland_Manholes-2606 | 272.98 | Kirkland_Manholes-2607 | 264.34 | 256.6 | 3.37 | 8 | PVC | 0.01 | 1,294 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX298 | |
| Kirkland_Main-1521 | Kirkland_Manholes-2607 | 264.34 | Kirkland_Manholes-2608 | 229.39 | 401.2 | 8.71 | 8 | PVC | 0.01 | 2,081 | 5 | 8 | 13 | 0.6 | SM14-Ex-EX298 | Drop Connection |
| Kirkland_Main-1522 | Kirkland_Manholes-2608 | 227.04 | Kirkland_Manholes-2600 | 217.97 | 170.3 | 5.33 | 8 | PVC | 0.01 | 1,627 | 6 | 12 | 18 | 1.1 | SM14-Ex-EX298 | |
| Kirkland_Main-1523 | Kirkland_Manholes-2630 | 232.51 | Kirkland_Manholes-2629 | 172.55 | 421 | 14.24 | 8 | PVC | 0.01 | 2,661 | 9 | 20 | 29 | 1.1 | SM14-Ex-EX295 | |
| Kirkland_Main-1524 | Kirkland_Manholes-1219 | 264.33 | Kirkland_Manholes-1139 | 247.37 | 248 | 6.84 | 8 | PVC | 0.01 | 1,844 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX80 | |
| Kirkland_Main-1525 | Kirkland_Manholes-1139 | 247.37 | Kirkland_Manholes-1138 | 221.13 | 248.6 | 10.56 | 8 | PVC | 0.01 | 2,291 | 2 | 16 | 19 | 0.8 | SM14-Ex-EX80 | |
| Kirkland_Main-1526 | Kirkland_Manholes-1138 | 221.13 | Kirkland_Manholes-1141 | 204.1 | 177.9 | 9.57 | 8 | PVC | 0.01 | 2,181 | 3 | 25 | 28 | 1.3 | SM14-Ex-EX80 | |
| Kirkland_Main-1527 | Kirkland_Manholes-1152 | 135.47 | Kirkland_Manholes-1811 | 129.72 | 351.2 | 1.64 | 8 | PVC | 0.01 | 902 | 10 | 74 | 84 | 9.3 | SM10 | |
| Kirkland_Main-1528 | Kirkland_Manholes-1153 | 137.55 | Kirkland_Manholes-1154 | 131.73 | 270.2 | 2.15 | 8 | PVC | 0.01 | 1,035 | 2 | 8 | 10 | 1 | SM10 | |
| Kirkland_Main-1529 | Kirkland_Manholes-1154 | 131.73 | Kirkland_Manholes-1155 | 122.09 | 288.9 | 3.34 | 8 | PVC | 0.01 | 1,288 | 2 | 16 | 19 | 1.5 | SM10 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1530 | Kirkland_Manholes-1155 | 122.09 | Kirkland_Manholes-1156 | 108.19 | 328.7 | 4.23 | 8 | PVC | 0.01 | 1,450 | 3 | 25 | 28 | 1.9 | SM10 | |
| Kirkland_Main-1531 | Kirkland_Manholes-1156 | 108.19 | Kirkland_Manholes-1157 | 99.29 | 118.4 | 7.51 | 8 | PVC | 0.01 | 1,933 | 4 | 33 | 37 | 1.9 | SM10 | |
| Kirkland_Main-1532 | Kirkland_Manholes-1157 | 99.29 | Kirkland_Manholes-1159 | 82.66 | 203.9 | 8.16 | 8 | PVC | 0.01 | 2,014 | 9 | 66 | 74 | 3.7 | SM10 | |
| Kirkland_Main-1533 | Kirkland_Manholes-1159 | 82.66 | Kirkland_Manholes-1160 | 77.11 | 29.4 | 18.89 | 8 | PVC | 0.01 | 3,064 | 10 | 74 | 84 | 2.7 | | |
| Kirkland_Main-1534 | Kirkland_Manholes-1158 | 124.93 | Kirkland_Manholes-1157 | 99.29 | 160.8 | 15.95 | 8 | PVC | 0.01 | 2,816 | 4 | 25 | 28 | 1 | SM10 | |
| Kirkland_Main-1535 | Kirkland_Manholes-1162 | 78.51 | Kirkland_Manholes-1160 | 77.11 | 390.4 | 0.36 | 15 | PVC | 0.01 | 2,257 | 67 | 420 | 838 | 37.1 | | |
| Kirkland_Main-1536 | Kirkland_Manholes-1179 | 123.76 | Kirkland_Manholes-1163 | 96.51 | 315 | 8.65 | 8 | PVC | 0.01 | 2,074 | 38 | 165 | 203 | 9.8 | SM10 | |
| Kirkland_Main-1537 | Kirkland_Manholes-1163 | 96.51 | Kirkland_Manholes-1161 | 78.67 | 122.8 | 14.53 | 8 | PVC | 0.01 | 2,687 | 45 | 222 | 267 | 10 | SM14-Ex-EX77 | |
| Kirkland_Main-1538 | Kirkland_Manholes-1164 | 119.66 | Kirkland_Manholes-1163 | 96.51 | 338.6 | 6.84 | 8 | PVC | 0.01 | 1,844 | 6 | 49 | 56 | 3 | SM10 | |
| Kirkland_Main-1539 | Kirkland_Manholes-1165 | 133.24 | Kirkland_Manholes-1164 | 119.66 | 224 | 6.06 | 8 | PVC | 0.01 | 1,736 | 5 | 41 | 47 | 2.7 | SM10 | |
| Kirkland_Main-1540 | Kirkland_Manholes-1166 | 151.97 | Kirkland_Manholes-1165 | 133.24 | 158.7 | 11.8 | 8 | PVC | 0.01 | 2,422 | 1 | 8 | 9 | 0.4 | SM10 | |
| Kirkland_Main-1541 | Kirkland_Manholes-1167 | 140.51 | Kirkland_Manholes-1165 | 133.24 | 127.8 | 5.69 | 8 | PVC | 0.01 | 1,681 | 4 | 25 | 29 | 1.7 | SM10 | |
| Kirkland_Main-1542 | Kirkland_Manholes-1168 | 149.52 | Kirkland_Manholes-1167 | 140.51 | 328.4 | 2.74 | 8 | PVC | 0.01 | 1,168 | 3 | 16 | 20 | 1.7 | SM10 | |
| Kirkland_Main-1543 | Kirkland_Manholes-1169 | 156.83 | Kirkland_Manholes-1168 | 149.52 | 316.3 | 2.31 | 8 | PVC | 0.01 | 1,072 | 1 | 8 | 10 | 0.9 | SM10 | |
| Kirkland_Main-1544 | Kirkland_Manholes-662 | 248.07 | Kirkland_Manholes-651 | 247.63 | 225.4 | 0.2 | 15 | PVC | 0.01 | 1,665 | 231 | 1,013 | 1,244 | 74.7 | SM14-2035-DF9 | |
| Kirkland_Main-1545 | Kirkland_Manholes-653 | 238.2 | Kirkland_Manholes-639 | 237.89 | 305.4 | 0.1 | 21 | PVC | 0.01 | 2,946 | 207 | 477 | 683 | 23.2 | | |
| Kirkland_Main-1546 | Kirkland_Manholes-654 | 239.59 | Kirkland_Manholes-653 | 238.2 | 298.1 | 0.47 | 21 | PVC | 0.01 | 6,313 | 206 | 473 | 679 | 10.8 | | |
| Kirkland_Main-1547 | Kirkland_Manholes-655 | 240 | Kirkland_Manholes-654 | 239.59 | 255.9 | 0.16 | 21 | PVC | 0.01 | 3,700 | 205 | 469 | 674 | 18.2 | | Drop Connection |
| Kirkland_Main-1548 | Kirkland_Manholes-1574 | 241.8 | Kirkland_Manholes-657 | 241.69 | 265.5 | 0.04 | 21 | PVC | 0.01 | 1,882 | 204 | 457 | 661 | 35.1 | | |
| Kirkland_Main-1549 | Kirkland_Manholes-657 | 241.69 | Kirkland_Manholes-656 | 240.1 | 132.5 | 1.2 | 21 | PVC | 0.01 | 10,129 | 204 | 461 | 665 | 6.6 | | |
| Kirkland_Main-1550 | Kirkland_Manholes-656 | 240.1 | Kirkland_Manholes-655 | 240 | 131.8 | 0.08 | 21 | PVC | 0.01 | 2,546 | 204 | 465 | 669 | 26.3 | | Drop Connection |
| Kirkland_Main-1551 | Kirkland_Manholes-658 | 246.8 | Kirkland_Manholes-659 | 246.11 | 66.6 | 1.04 | 8 | PVC | 0.01 | 718 | 1 | 12 | 12 | 1.7 | | |
| Kirkland_Main-1552 | Kirkland_Manholes-660 | 246.84 | Kirkland_Manholes-659 | 246.11 | 57.6 | 1.27 | 8 | PVC | 0.01 | 793 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1553 | Kirkland_Manholes-659 | 246.11 | Kirkland_Manholes-661 | 245.17 | 89.4 | 1.05 | 8 | PVC | 0.01 | 723 | 3 | 20 | 23 | 3.1 | | |
| Kirkland_Main-1554 | Kirkland_Manholes-651 | 247.63 | Kirkland_Manholes-645 | 243.42 | 262.6 | 1.6 | 15 | PVC | 0.01 | 4,772 | 232 | 1,017 | 1,249 | 26.2 | SM14-2035-DF9 | |
| Kirkland_Main-1555 | Kirkland_Manholes-652 | 251.94 | Kirkland_Manholes-662 | 248.07 | 324.4 | 1.19 | 15 | PVC | 0.01 | 4,116 | 231 | 1,009 | 1,240 | 30.1 | SM14-2035-DF9 | |
| Kirkland_Main-1556 | Kirkland_Manholes-664 | 268.55 | Kirkland_Manholes-663 | 252.67 | 383.8 | 4.14 | 8 | PVC | 0.01 | 1,434 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1557 | Kirkland_Manholes-663 | 252.67 | Kirkland_Manholes-652 | 251.94 | 362.7 | 0.2 | 15 | PVC | 0.01 | 1,691 | 230 | 1,005 | 1,236 | 73.1 | SM14-2035-DF9 | |
| Kirkland_Main-1558 | Kirkland_Manholes-666 | 254.95 | Kirkland_Manholes-665 | 253.2 | 321.8 | 0.54 | 15 | PVC | 0.01 | 2,780 | 207 | 898 | 1,105 | 39.8 | | |
| Kirkland_Main-1559 | Kirkland_Manholes-665 | 253.2 | Kirkland_Manholes-663 | 252.67 | 360.1 | 0.15 | 18 | PVC | 0.01 | 2,351 | 228 | 997 | 1,225 | 52.1 | SM14-Ex-EX135 | |
| Kirkland_Main-1560 | Kirkland_Manholes-668 | 260.28 | Kirkland_Manholes-667 | 256.8 | 251.1 | 1.39 | 8 | PVC | 0.01 | 830 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-1561 | Kirkland_Manholes-667 | 256.8 | Kirkland_Manholes-665 | 253.2 | 386.9 | 0.93 | 8 | PVC | 0.01 | 680 | 18 | 95 | 114 | 16.7 | | |
| Kirkland_Main-1562 | Kirkland_Manholes-669 | 262.97 | Kirkland_Manholes-667 | 256.8 | 300.6 | 2.05 | 8 | PVC | 0.01 | 1,010 | 13 | 87 | 101 | 10 | | |
| Kirkland_Main-1563 | Kirkland_Manholes-671 | 267.47 | Kirkland_Manholes-670 | 264.24 | 114.1 | 2.83 | 8 | PVC | 0.01 | 1,186 | 7 | 24 | 31 | 2.6 | | |
| Kirkland_Main-1564 | Kirkland_Manholes-672 | 266.2 | Kirkland_Manholes-670 | 264.24 | 209.3 | 0.94 | 8 | PVC | 0.01 | 682 | 6 | 56 | 61 | 9 | | |
| Kirkland_Main-1565 | Kirkland_Manholes-670 | 264.24 | Kirkland_Manholes-669 | 262.97 | 88.5 | 1.43 | 8 | PVC | 0.01 | 844 | 13 | 83 | 96 | 11.4 | | |
| Kirkland_Main-1567 | Kirkland_Manholes-676 | 280.09 | Kirkland_Manholes-674 | 276.15 | 217.6 | 1.81 | 8 | PVC | 0.01 | 949 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-1568 | Kirkland_Manholes-674 | 276.15 | Kirkland_Manholes-675 | 275.52 | 20.5 | 3.07 | 8 | PVC | 0.01 | 1,235 | 5 | 16 | 21 | 1.7 | | |
| Kirkland_Main-1569 | Kirkland_Manholes-673 | 281.46 | Kirkland_Manholes-674 | 276.15 | 196.8 | 2.7 | 8 | PVC | 0.01 | 1,158 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-1570 | Kirkland_Manholes-675 | 275.52 | Kirkland_Manholes-671 | 267.47 | 256.7 | 3.14 | 8 | PVC | 0.01 | 1,249 | 6 | 20 | 25 | 2 | | |
| Kirkland_Main-1571 | Kirkland_Manholes-677 | 287.02 | Kirkland_Manholes-673 | 281.46 | 185.8 | 2.99 | 8 | PVC | 0.01 | 1,220 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1572 | Kirkland_Manholes-1728 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 120.1 | 0.95 | 12 | PVC | 0.01 | 2,026 | 69 | 58 | 127 | 6.3 | | |
| Kirkland_Main-1573 | Kirkland_Manholes-1727 | 26.48 | Kirkland_Manholes-1728 | 26.2 | 59.2 | 0.47 | 8 | PVC | 0.01 | 485 | 39 | 33 | 72 | 14.8 | | |
| Kirkland_Main-1574 | Kirkland_Manholes-1724 | 26.68 | Kirkland_Manholes-1727 | 26.48 | 122.2 | 0.16 | 8 | PVC | 0.01 | 285 | 39 | 25 | 63 | 22.3 | | |
| Kirkland_Main-1575 | Kirkland_Manholes-1725 | 28.56 | Kirkland_Manholes-1724 | 26.68 | 150.5 | 1.25 | 8 | PVC | 0.01 | 788 | 21 | 16 | 38 | 4.8 | | |
| Kirkland_Main-1576 | Kirkland_Manholes-1726 | 29.93 | Kirkland_Manholes-1725 | 28.56 | 57.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 7 | 8 | 16 | 1.4 | | |
| Kirkland_Main-1577 | Kirkland_Manholes-1650 | 145.43 | Kirkland_Manholes-1711 | 136.47 | 206.1 | 4.35 | 12 | PVC | 0.01 | 4,335 | 9 | 66 | 75 | 1.7 | SM14-Ex-EX196 | |
| Kirkland_Main-1578 | Kirkland_Manholes-1751 | 37.07 | Kirkland_Manholes-1750 | 33.34 | 26 | 14.35 | 8 | PVC | 0.01 | 2,670 | 0 | 8 | 8 | 0.3 | SM14-Ex-EX164 | |
| Kirkland_Main-1580 | Kirkland_Manholes-2722 | 21 | Kirkland_Manholes-3100 | 18.3 | 194.6 | 1.39 | 12 | PVC | 0.01 | 2,449 | 88 | 61 | 149 | 6.1 | SM14-Ex-EX289 | |
| Kirkland_Main-1585 | Kirkland_Manholes-1750 | 33.34 | Kirkland_Manholes-1749 | 32.74 | 150.9 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 18 | 4 | | Drop Connection |
| Kirkland_Main-1586 | Kirkland_Manholes-1749 | 30.51 | Kirkland_Manholes-1745 | 27.57 | 191.8 | 1.53 | 8 | PVC | 0.01 | 873 | 1 | 25 | 26 | 3 | | |
| Kirkland_Main-1587 | Kirkland_Manholes-1744 | 27.68 | Kirkland_Manholes-1745 | 27.57 | 23.9 | 0.46 | 8 | PVC | 0.01 | 479 | 0 | 8 | 8 | 1.7 | | |
| Kirkland_Main-1588 | Kirkland_Manholes-1955 | 335.45 | Kirkland_Manholes-1958 | 324.88 | 118.1 | 8.95 | 8 | PVC | 0.01 | 2,109 | 8 | 12 | 20 | 1 | | |
| Kirkland_Main-1589 | Kirkland_Manholes-1958 | 324.88 | Kirkland_Manholes-1939 | 324.34 | 135.7 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 20 | 28 | 6.4 | | |
| Kirkland_Main-1590 | Kirkland_Manholes-1959 | 325.55 | Kirkland_Manholes-1958 | 324.88 | 167.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-1591 | Kirkland_Manholes-1960 | 312.18 | Kirkland_Manholes-1892 | 301.26 | 279 | 3.91 | 8 | PVC | 0.01 | 1,395 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1592 | Kirkland_Manholes-1962 | 345.61 | Kirkland_Manholes-1961 | 341.24 | 157.8 | 2.77 | 8 | PVC | 0.01 | 1,173 | 13 | 4 | 17 | 1.5 | | |
| Kirkland_Main-1593 | Kirkland_Manholes-1961 | 341.24 | Kirkland_Manholes-1964 | 341.08 | 188.7 | 0.08 | 8 | PVC | 0.01 | 205 | 24 | 64 | 88 | 42.8 | | |
| Kirkland_Main-1594 | Kirkland_Manholes-1964 | 341.08 | Kirkland_Manholes-1963 | 340.77 | 13.1 | 2.37 | 8 | PVC | 0.01 | 1,085 | 53 | 91 | 145 | 13.3 | | |
| Kirkland_Main-1595 | Kirkland_Manholes-1965 | 345.05 | Kirkland_Manholes-1964 | 341.08 | 103.3 | 3.84 | 8 | PVC | 0.01 | 1,382 | 29 | 24 | 53 | 3.8 | | |
| Kirkland_Main-1596 | Kirkland_Manholes-1967 | 421.47 | Kirkland_Manholes-1966 | 418.21 | 134.2 | 2.43 | 8 | PVC | 0.01 | 1,099 | 28 | 155 | 183 | 16.7 | SM14-Ex-EX216 | |
| Kirkland_Main-1597 | Kirkland_Manholes-1968 | 421.67 | Kirkland_Manholes-1967 | 421.47 | 23.9 | 0.84 | 8 | PVC | 0.01 | 646 | 28 | 151 | 179 | 27.7 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1598 | Kirkland_Manholes-1969 | 423.5 | Kirkland_Manholes-1968 | 421.67 | 353.5 | 0.52 | 8 | PVC | 0.01 | 507 | 26 | 147 | 173 | 34.1 | | |
| Kirkland_Main-1599 | Kirkland_Manholes-1970 | 425.5 | Kirkland_Manholes-1969 | 423.5 | 200.6 | 1 | 8 | PVC | 0.01 | 704 | 3 | 16 | 19 | 2.7 | | |
| Kirkland_Main-1600 | Kirkland_Manholes-1974 | 432 | Kirkland_Manholes-1969 | 423.5 | 272.7 | 3.12 | 8 | PVC | 0.01 | 1,245 | 22 | 127 | 149 | 12 | | |
| Kirkland_Main-1601 | Kirkland_Manholes-1971 | 425.8 | Kirkland_Manholes-1970 | 425.5 | 74.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3.2 | | |
| Kirkland_Main-1602 | Kirkland_Manholes-1972 | 426.31 | Kirkland_Manholes-1971 | 425.8 | 127.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-1603 | Kirkland_Manholes-1973 | 430.86 | Kirkland_Manholes-1972 | 426.31 | 87.6 | 5.19 | 8 | PVC | 0.01 | 1,607 | 1 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1604 | Kirkland_Manholes-2631 | 265.77 | Kirkland_Manholes-2630 | 232.51 | 349 | 9.53 | 8 | PVC | 0.01 | 2,176 | 6 | 16 | 22 | 1 | SM14-Ex-EX295 | |
| Kirkland_Main-1605 | Kirkland_Manholes-2632 | 276.84 | Kirkland_Manholes-2631 | 265.77 | 241.2 | 4.59 | 8 | PVC | 0.01 | 1,510 | 4 | 12 | 15 | 1 | SM14-Ex-EX295 | |
| Kirkland_Main-1606 | Kirkland_Manholes-2649 | 147.51 | Kirkland_Manholes-2648 | 144.73 | 165.5 | 1.68 | 8 | PVC | 0.01 | 914 | 2 | 12 | 14 | 1.6 | | |
| Kirkland_Main-1607 | Kirkland_Manholes-2648 | 144.73 | Kirkland_Manholes-2647 | 132.46 | 109.5 | 11.21 | 8 | PVC | 0.01 | 2,360 | 3 | 18 | 21 | 0.9 | | |
| Kirkland_Main-1608 | Kirkland_Manholes-2647 | 132.46 | Kirkland_Manholes-2646 | 96.97 | 134.3 | 26.42 | 8 | PVC | 0.01 | 3,624 | 4 | 24 | 28 | 0.8 | | |
| Kirkland_Main-1609 | Kirkland_Manholes-2646 | 96.97 | Kirkland_Manholes-2645 | 79.04 | 111.3 | 16.11 | 8 | PVC | 0.01 | 2,830 | 6 | 30 | 36 | 1.3 | | |
| Kirkland_Main-1610 | Kirkland_Manholes-2650 | 148.19 | Kirkland_Manholes-2649 | 147.51 | 170.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 6 | 7 | 1.6 | | |
| Kirkland_Main-1611 | Kirkland_Manholes-2651 | 121.43 | Kirkland_Manholes-2652 | 57.18 | 251.5 | 25.55 | 8 | PVC | 0.01 | 3,564 | 2 | 6 | 8 | 0.2 | SM14-Ex-EX292 | |
| Kirkland_Main-1612 | Kirkland_Manholes-2654 | 54.76 | Kirkland_Manholes-2657 | 43.64 | 394.5 | 2.82 | 8 | PVC | 0.01 | 1,184 | 3 | 24 | 27 | 2.3 | SM14-Ex-EX291 | |
| Kirkland_Main-1613 | Kirkland_Manholes-2653 | 56.99 | Kirkland_Manholes-2654 | 54.76 | 13.8 | 16.21 | 8 | PVC | 0.01 | 2,839 | 3 | 18 | 21 | 0.8 | SM14-Ex-EX292 | |
| Kirkland_Main-1614 | Kirkland_Manholes-2652 | 57.18 | Kirkland_Manholes-2653 | 56.99 | 47.7 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.4 | SM14-Ex-EX292 | |
| Kirkland_Main-1615 | Kirkland_Manholes-2657 | 43.64 | Kirkland_Manholes-2656 | 33.93 | 250 | 3.88 | 8 | PVC | 0.01 | 1,389 | 4 | 30 | 35 | 2.5 | SM14-Ex-EX291 | |
| Kirkland_Main-1616 | Kirkland_Manholes-2655 | 44.22 | Kirkland_Manholes-2656 | 33.93 | 73.2 | 14.06 | 8 | PVC | 0.01 | 2,644 | 13 | 79 | 92 | 3.5 | SM14-Ex-EX293 | |
| Kirkland_Main-1617 | Kirkland_Manholes-2656 | 33.93 | Kirkland_Manholes-2658 | 29.62 | 118.6 | 3.63 | 8 | PVC | 0.01 | 1,344 | 17 | 115 | 132 | 9.9 | SM14-Ex-EX291 | |
| Kirkland_Main-1618 | Kirkland_Manholes-2658 | 29.62 | Kirkland_Manholes-2659 | 28.05 | 312.8 | 0.5 | 8 | PVC | 0.01 | 500 | 17 | 121 | 139 | 27.8 | SM14-Ex-EX291 | |
| Kirkland_Main-1619 | Kirkland_Manholes-2659 | 28.05 | Kirkland_Manholes-2660 | 26.87 | 281 | 0.42 | 8 | PVC | 0.01 | 457 | 19 | 128 | 146 | 32 | SM14-Ex-EX291 | |
| Kirkland_Main-1624 | Kirkland_Manholes-2726 | 12.39 | Kirkland_Manholes-2662 | 11.52 | 172.8 | 0.5 | 18 | PVC | 0.01 | 4,349 | 229 | 595 | 824 | 19 | SM14-Ex-EX289 | |
| Kirkland_Main-1625 | Kirkland_Manholes-2666 | 55.28 | Kirkland_Manholes-2667 | 55.1 | 203.4 | 0.09 | 18 | PVC | 0.01 | 1,823 | 109 | 322 | 431 | 23.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1626 | Kirkland_Manholes-2667 | 55.1 | Kirkland_Manholes-2665 | 53.92 | 196.9 | 0.6 | 18 | PVC | 0.01 | 4,744 | 109 | 328 | 437 | 9.2 | SM14-Ex-EX222 | |
| Kirkland_Main-1627 | Kirkland_Manholes-2665 | 53.92 | Kirkland_Manholes-3102 | 53.77 | 398.5 | 0.04 | 18 | PVC | 0.01 | 1,189 | 109 | 334 | 443 | 37.2 | SM14-Ex-EX222 | |
| Kirkland_Main-1629 | Kirkland_Manholes-2203 | 62.94 | Kirkland_Manholes-3102 | 53.77 | 55.2 | 16.62 | 8 | PVC | 0.01 | 2,874 | 12 | 61 | 73 | 2.5 | SM14-Ex-EX290 | |
| Kirkland_Main-1633 | Kirkland_Manholes-3101 | 52.44 | Kirkland_Manholes-2663 | 50.64 | 51.5 | 3.5 | 18 | PVC | 0.01 | 11,462 | 124 | 431 | 555 | 4.8 | SM14-Ex-EX222 | |
| Kirkland_Main-1634 | Kirkland_Manholes-250 | 115.74 | Kirkland_Manholes-268 | 108.82 | 144.1 | 4.8 | 8 | PVC | 0.01 | 1,545 | 4 | 17 | 21 | 1.3 | SM10 | |
| Kirkland_Main-1635 | Kirkland_Manholes-309 | 140.9 | Kirkland_Manholes-308 | 114.39 | 431.7 | 6.14 | 8 | PVC | 0.01 | 1,747 | 3 | 9 | 12 | 0.7 | SM10 | |
| Kirkland_Main-1636 | Kirkland_Manholes-308 | 114.39 | Kirkland_Manholes-307 | 105.6 | 319 | 2.76 | 8 | PVC | 0.01 | 1,170 | 6 | 27 | 33 | 2.8 | SM10 | |
| Kirkland_Main-1637 | Kirkland_Manholes-494 | 135.66 | Kirkland_Manholes-307 | 105.6 | 436.1 | 6.89 | 8 | PVC | 0.01 | 1,851 | 3 | 9 | 12 | 0.6 | SM10 | |
| Kirkland_Main-1638 | Kirkland_Manholes-241 | 14.7 | Kirkland_Manholes-2765 | 13.19 | 59.4 | 2.54 | 18 | PVC | 0.01 | 9,768 | 305 | 1,122 | 1,428 | 14.6 | SM3 | |
| Kirkland_Main-1639 | Kirkland_Manholes-240 | 17.1 | Kirkland_Manholes-2765 | 13.19 | 342.3 | 1.14 | 12 | PVC | 0.01 | 2,222 | 140 | 420 | 861 | 38.8 | SM14-Ex-EX42 | |
| Kirkland_Main-1640 | Kirkland_Manholes-239 | 27.77 | Kirkland_Manholes-240 | 17.1 | 321.9 | 3.31 | 12 | PVC | 0.01 | 3,784 | 140 | 416 | 857 | 22.6 | SM14-Ex-EX42 | |
| Kirkland_Main-1641 | Kirkland_Manholes-243 | 37.12 | Kirkland_Manholes-239 | 27.77 | 158.7 | 5.89 | 12 | PVC | 0.01 | 5,046 | 139 | 407 | 847 | 16.8 | SM14-Ex-EX38 | |
| Kirkland_Main-1642 | Kirkland_Manholes-244 | 47.57 | Kirkland_Manholes-243 | 46.95 | 154.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 137 | 403 | 841 | 64 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-1643 | Kirkland_Manholes-246 | 58 | Kirkland_Manholes-244 | 47.57 | 272.3 | 3.83 | 8 | PVC | 0.01 | 1,380 | 137 | 399 | 837 | 60.6 | SM14-Ex-EX38 | |
| Kirkland_Main-1645 | Kirkland_Manholes-901 | 304.32 | Kirkland_Manholes-900 | 302.97 | 52 | 2.59 | 8 | PVC | 0.01 | 1,135 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1646 | Kirkland_Manholes-902 | 304.94 | Kirkland_Manholes-900 | 302.97 | 236.8 | 0.83 | 8 | PVC | 0.01 | 643 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1647 | Kirkland_Manholes-900 | 302.97 | Kirkland_Manholes-904 | 289.03 | 425.5 | 3.28 | 8 | PVC | 0.01 | 1,276 | 5 | 24 | 29 | 2.3 | | |
| Kirkland_Main-1648 | Kirkland_Manholes-903 | 290.15 | Kirkland_Manholes-904 | 289.03 | 62.2 | 1.8 | 8 | PVC | 0.01 | 946 | 11 | 60 | 71 | 7.5 | | |
| Kirkland_Main-1649 | Kirkland_Manholes-904 | 289.03 | Kirkland_Manholes-905 | 283.61 | 138.2 | 3.92 | 8 | PVC | 0.01 | 1,396 | 16 | 87 | 104 | 7.4 | | |
| Kirkland_Main-1650 | Kirkland_Manholes-905 | 283.61 | Kirkland_Manholes-912 | 277.93 | 121.5 | 4.68 | 8 | PVC | 0.01 | 1,525 | 16 | 91 | 108 | 7.1 | | |
| Kirkland_Main-1651 | Kirkland_Manholes-906 | 293.01 | Kirkland_Manholes-907 | 291.52 | 150.3 | 0.99 | 8 | PVC | 0.01 | 702 | 4 | 40 | 44 | 6.3 | | |
| Kirkland_Main-1652 | Kirkland_Manholes-907 | 291.52 | Kirkland_Manholes-908 | 290.53 | 109.9 | 0.9 | 8 | PVC | 0.01 | 669 | 5 | 44 | 49 | 7.3 | | |
| Kirkland_Main-1653 | Kirkland_Manholes-908 | 290.53 | Kirkland_Manholes-903 | 290.15 | 324 | 0.12 | 8 | PVC | 0.01 | 241 | 10 | 56 | 65 | 27.1 | | |
| Kirkland_Main-1654 | Kirkland_Manholes-910 | 293.95 | Kirkland_Manholes-908 | 290.53 | 193.3 | 1.77 | 8 | PVC | 0.01 | 938 | 4 | 8 | 12 | 1.3 | | |
| Kirkland_Main-1655 | Kirkland_Manholes-909 | 297.88 | Kirkland_Manholes-910 | 293.95 | 188.4 | 2.09 | 8 | PVC | 0.01 | 1,018 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-1656 | Kirkland_Manholes-911 | 279.8 | Kirkland_Manholes-912 | 277.93 | 207.2 | 0.9 | 8 | PVC | 0.01 | 670 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1657 | Kirkland_Manholes-912 | 277.93 | Kirkland_Manholes-913 | 274.64 | 100.2 | 3.28 | 8 | PVC | 0.01 | 1,277 | 20 | 99 | 119 | 9.3 | | |
| Kirkland_Main-1658 | Kirkland_Manholes-913 | 274.64 | Kirkland_Manholes-917 | 265.16 | 288.9 | 3.28 | 8 | PVC | 0.01 | 1,277 | 21 | 103 | 124 | 9.7 | | |
| Kirkland_Main-1659 | Kirkland_Manholes-890 | 280.21 | Kirkland_Manholes-914 | 274.6 | 210.2 | 2.67 | 8 | PVC | 0.01 | 1,152 | 27 | 115 | 142 | 12.3 | | |
| Kirkland_Main-1660 | Kirkland_Manholes-914 | 274.6 | Kirkland_Manholes-915 | 272.06 | 86.6 | 2.93 | 8 | PVC | 0.01 | 1,207 | 30 | 127 | 157 | 13 | | |
| Kirkland_Main-1661 | Kirkland_Manholes-915 | 272.06 | Kirkland_Manholes-916 | 270.65 | 45.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 30 | 131 | 161 | 13 | | |
| Kirkland_Main-1662 | Kirkland_Manholes-627 | 275.98 | Kirkland_Manholes-914 | 274.6 | 212.1 | 0.65 | 8 | PVC | 0.01 | 569 | 2 | 8 | 10 | 1.8 | | |
| Kirkland_Main-1663 | Kirkland_Manholes-916 | 270.65 | Kirkland_Manholes-917 | 265.16 | 154.3 | 3.56 | 8 | PVC | 0.01 | 1,330 | 30 | 135 | 166 | 12.4 | | |
| Kirkland_Main-1664 | Kirkland_Manholes-917 | 265.16 | Kirkland_Manholes-918 | 264.4 | 332.4 | 0.23 | 12 | PVC | 0.01 | 994 | 52 | 246 | 299 | 30 | SM14-Ex-EX136 | |
| Kirkland_Main-1665 | Kirkland_Manholes-918 | 264.4 | Kirkland_Manholes-919 | 263.89 | 50.1 | 1.02 | 12 | PVC | 0.01 | 2,097 | 53 | 250 | 303 | 14.4 | SM14-Ex-EX136 | |
| Kirkland_Main-1666 | Kirkland_Manholes-919 | 263.89 | Kirkland_Manholes-920 | 263.16 | 175.4 | 0.42 | 12 | PVC | 0.01 | 1,341 | 53 | 254 | 307 | 22.9 | SM14-Ex-EX136 | |
| Kirkland_Main-1667 | Kirkland_Manholes-687 | 264 | Kirkland_Manholes-921 | 262.87 | 223.9 | 0.5 | 8 | PVC | 0.01 | 501 | 4 | 12 | 16 | 3.1 | | |
| Kirkland_Main-1668 | Kirkland_Manholes-920 | 263.16 | Kirkland_Manholes-921 | 262.87 | 116.1 | 0.25 | 12 | PVC | 0.01 | 1,039 | 54 | 258 | 312 | 30 | SM14-Ex-EX136 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1669 | Kirkland_Manholes-2064 | 426.84 | Kirkland_Manholes-2670 | 399.73 | 295.3 | 9.18 | 8 | PVC | 0.01 | 2,136 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1670 | Kirkland_Manholes-921 | 262.87 | Kirkland_Manholes-940 | 262.57 | 126.3 | 0.24 | 12 | PVC | 0.01 | 1,013 | 58 | 274 | 332 | 32.7 | SM14-Ex-EX136 | |
| Kirkland_Main-1671 | Kirkland_Manholes-940 | 262.57 | Kirkland_Manholes-939 | 261.56 | 302.2 | 0.33 | 12 | PVC | 0.01 | 1,200 | 61 | 278 | 339 | 28.3 | SM14-Ex-EX136 | |
| Kirkland_Main-1672 | Kirkland_Manholes-939 | 261.56 | Kirkland_Manholes-938 | 261.15 | 139.9 | 0.29 | 12 | PVC | 0.01 | 1,125 | 62 | 282 | 344 | 30.6 | SM14-Ex-EX136 | Drop Connection |
| Kirkland_Main-1673 | Kirkland_Manholes-925 | 289.69 | Kirkland_Manholes-924 | 268.15 | 361.6 | 5.96 | 8 | PVC | 0.01 | 1,721 | 13 | 60 | 73 | 4.2 | | |
| Kirkland_Main-1674 | Kirkland_Manholes-924 | 268.15 | Kirkland_Manholes-923 | 268.09 | 97.9 | 0.06 | 15 | PVC | 0.01 | 933 | 122 | 489 | 610 | 65.4 | SM14-Ex-EX138 | |
| Kirkland_Main-1675 | Kirkland_Manholes-922 | 269.99 | Kirkland_Manholes-923 | 268.09 | 235 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1676 | Kirkland_Manholes-923 | 268.09 | Kirkland_Manholes-929 | 267.98 | 60 | 0.18 | 12 | PVC | 0.01 | 890 | 123 | 497 | 619 | 69.6 | SM14-2035-DF10 | |
| Kirkland_Main-1678 | Kirkland_Manholes-927 | 307.71 | Kirkland_Manholes-926 | 302.74 | 56.6 | 8.77 | 8 | PVC | 0.01 | 2,089 | 6 | 8 | 14 | 0.7 | | |
| Kirkland_Main-1679 | Kirkland_Manholes-926 | 302.74 | Kirkland_Manholes-925 | 289.69 | 296 | 4.41 | 8 | PVC | 0.01 | 1,481 | 12 | 56 | 68 | 4.6 | | |
| Kirkland_Main-1680 | Kirkland_Manholes-928 | 294.43 | Kirkland_Manholes-930 | 277.33 | 346.1 | 4.94 | 8 | PVC | 0.01 | 1,567 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1681 | Kirkland_Manholes-930 | 277.33 | Kirkland_Manholes-929 | 267.98 | 33.8 | 27.65 | 8 | PVC | 0.01 | 3,707 | 3 | 8 | 11 | 0.3 | | |
| Kirkland_Main-1682 | Kirkland_Manholes-933 | 269.3 | Kirkland_Manholes-932 | 267 | 200 | 1.15 | 8 | PVC | 0.01 | 756 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1683 | Kirkland_Manholes-929 | 267.98 | Kirkland_Manholes-931 | 267.3 | 153.6 | 0.44 | 12 | PVC | 0.01 | 1,383 | 126 | 509 | 635 | 45.9 | | |
| Kirkland_Main-1684 | Kirkland_Manholes-931 | 267.3 | Kirkland_Manholes-932 | 267 | 103.9 | 0.29 | 12 | PVC | 0.01 | 1,117 | 126 | 513 | 639 | 57.2 | | |
| Kirkland_Main-1685 | Kirkland_Manholes-932 | 267 | Kirkland_Manholes-934 | 266.31 | 201.7 | 0.34 | 12 | PVC | 0.01 | 1,216 | 129 | 521 | 649 | 53.4 | | |
| Kirkland_Main-1686 | Kirkland_Manholes-950 | 293.99 | Kirkland_Manholes-934 | 266.31 | 270.7 | 10.22 | 8 | PVC | 0.01 | 2,254 | 5 | 32 | 37 | 1.6 | | |
| Kirkland_Main-1688 | Kirkland_Manholes-934 | 266.31 | Kirkland_Manholes-935 | 265.1 | 223.8 | 0.54 | 12 | PVC | 0.01 | 1,529 | 136 | 556 | 692 | 45.3 | | |
| Kirkland_Main-1689 | Kirkland_Manholes-937 | 264.43 | Kirkland_Manholes-938 | 264.12 | 49.3 | 0.62 | 12 | PVC | 0.01 | 1,641 | 143 | 608 | 751 | 45.8 | | Drop Connection |
| Kirkland_Main-1690 | Kirkland_Manholes-936 | 264.57 | Kirkland_Manholes-937 | 264.43 | 21.7 | 0.66 | 12 | PVC | 0.01 | 1,686 | 137 | 564 | 701 | 41.6 | | |
| Kirkland_Main-1691 | Kirkland_Manholes-935 | 265.1 | Kirkland_Manholes-936 | 264.57 | 71.3 | 0.74 | 12 | PVC | 0.01 | 1,788 | 137 | 560 | 697 | 39 | | |
| Kirkland_Main-1692 | Kirkland_Manholes-938 | 257.09 | Kirkland_Manholes-666 | 254.95 | 392.8 | 0.55 | 15 | PVC | 0.01 | 2,784 | 206 | 894 | 1,100 | 39.5 | | |
| Kirkland_Main-1693 | Kirkland_Manholes-941 | 287.52 | Kirkland_Manholes-937 | 264.43 | 281.4 | 8.21 | 8 | PVC | 0.01 | 2,020 | 6 | 40 | 46 | 2.3 | | |
| Kirkland_Main-1694 | Kirkland_Manholes-942 | 300.01 | Kirkland_Manholes-941 | 287.52 | 399.1 | 3.13 | 8 | PVC | 0.01 | 1,247 | 5 | 36 | 41 | 3.3 | | |
| Kirkland_Main-1695 | Kirkland_Manholes-943 | 306.11 | Kirkland_Manholes-944 | 304.9 | 190.1 | 0.64 | 8 | PVC | 0.01 | 563 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX137 | |
| Kirkland_Main-1696 | Kirkland_Manholes-946 | 335.98 | Kirkland_Manholes-945 | 330.63 | 152.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1697 | Kirkland_Manholes-945 | 330.63 | Kirkland_Manholes-944 | 304.9 | 238 | 10.81 | 8 | PVC | 0.01 | 2,318 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1698 | Kirkland_Manholes-947 | 299.2 | Kirkland_Manholes-948 | 296.38 | 132 | 2.14 | 8 | PVC | 0.01 | 1,031 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX137 | |
| Kirkland_Main-1699 | Kirkland_Manholes-944 | 304.9 | Kirkland_Manholes-948 | 296.38 | 218.3 | 3.9 | 8 | PVC | 0.01 | 1,393 | 3 | 16 | 19 | 1.3 | SM14-Ex-EX137 | |
| Kirkland_Main-1701 | Kirkland_Manholes-949 | 295.21 | Kirkland_Manholes-950 | 293.99 | 49 | 2.49 | 8 | PVC | 0.01 | 1,112 | 4 | 28 | 32 | 2.9 | | |
| Kirkland_Main-1702 | Kirkland_Manholes-948 | 296.38 | Kirkland_Manholes-949 | 295.21 | 143.9 | 0.81 | 8 | PVC | 0.01 | 636 | 4 | 24 | 28 | 4.4 | SM14-Ex-EX137 | |
| Kirkland_Main-1703 | Kirkland_Manholes-951 | 321.2 | Kirkland_Manholes-942 | 300.01 | 232.8 | 9.1 | 8 | PVC | 0.01 | 2,127 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-1704 | Kirkland_Manholes-952 | 325.62 | Kirkland_Manholes-951 | 321.2 | 323.7 | 1.37 | 8 | PVC | 0.01 | 824 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1705 | Kirkland_Manholes-953 | 318.51 | Kirkland_Manholes-954 | 318.45 | 75.8 | 0.08 | 8 | PVC | 0.01 | 198 | 1 | 4 | 5 | 2.3 | | |
| Kirkland_Main-1706 | Kirkland_Manholes-954 | 318.45 | Kirkland_Manholes-955 | 318.15 | 133.7 | 0.22 | 8 | PVC | 0.01 | 334 | 1 | 8 | 9 | 2.7 | | |
| Kirkland_Main-1707 | Kirkland_Manholes-1546 | 284.43 | Kirkland_Manholes-1545 | 272.4 | 160.7 | 7.49 | 8 | PVC | 0.01 | 1,929 | 8 | 40 | 48 | 2.5 | SM14-Ex-EX121 | |
| Kirkland_Main-1708 | Kirkland_Manholes-750 | 289.43 | Kirkland_Manholes-1546 | 284.43 | 152.8 | 3.27 | 8 | PVC | 0.01 | 1,275 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX121 | |
| Kirkland_Main-1709 | Kirkland_Manholes-1553 | 308.15 | Kirkland_Manholes-1546 | 284.43 | 340 | 6.98 | 8 | PVC | 0.01 | 1,862 | 6 | 28 | 33 | 1.8 | SM14-Ex-EX122 | |
| Kirkland_Main-1710 | Kirkland_Manholes-751 | 298.52 | Kirkland_Manholes-750 | 289.43 | 402.2 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 4 | 5 | 0.5 | SM14-Ex-EX121 | |
| Kirkland_Main-1711 | Kirkland_Manholes-748 | 311.92 | Kirkland_Manholes-752 | 265.45 | 362.2 | 12.83 | 8 | PVC | 0.01 | 2,525 | 19 | 56 | 75 | 3 | SM14-Ex-EX71 | |
| Kirkland_Main-1712 | Kirkland_Manholes-753 | 247.15 | Kirkland_Manholes-754 | 246.56 | 209.3 | 0.28 | 8 | PVC | 0.01 | 374 | 2 | 4 | 6 | 1.6 | | |
| Kirkland_Main-1713 | Kirkland_Manholes-1355 | 420.81 | Kirkland_Manholes-1357 | 417.32 | 183.1 | 1.91 | 8 | PVC | 0.01 | 973 | 7 | 36 | 43 | 4.4 | | |
| Kirkland_Main-1714 | Kirkland_Manholes-1356 | 418.13 | Kirkland_Manholes-1357 | 417.32 | 41.8 | 1.94 | 8 | PVC | 0.01 | 981 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX180 | |
| Kirkland_Main-1715 | Kirkland_Manholes-1357 | 417.32 | Kirkland_Manholes-1358 | 410.38 | 295.5 | 2.35 | 8 | PVC | 0.01 | 1,080 | 10 | 44 | 53 | 4.9 | SM14-Ex-EX180 | |
| Kirkland_Main-1716 | Kirkland_Manholes-1358 | 410.38 | Kirkland_Manholes-1359 | 407.6 | 322.3 | 0.86 | 8 | PVC | 0.01 | 655 | 11 | 48 | 58 | 8.9 | SM14-Ex-EX180 | |
| Kirkland_Main-1717 | Kirkland_Manholes-1359 | 407.6 | Kirkland_Manholes-1364 | 404.91 | 317.2 | 0.85 | 8 | PVC | 0.01 | 649 | 13 | 52 | 64 | 9.9 | SM14-Ex-EX180 | |
| Kirkland_Main-1718 | Kirkland_Manholes-1360 | 392.45 | Kirkland_Manholes-1361 | 390.34 | 26.4 | 7.99 | 8 | PVC | 0.01 | 1,993 | 5 | 20 | 25 | 1.2 | SM14-Ex-EX179 | |
| Kirkland_Main-1719 | Kirkland_Manholes-1361 | 390.34 | Kirkland_Manholes-1371 | 389.7 | 160.2 | 0.4 | 8 | PVC | 0.01 | 446 | 19 | 79 | 98 | 22 | | Drop Connection |
| Kirkland_Main-1720 | Kirkland_Manholes-1365 | 376.9 | Kirkland_Manholes-1371 | 376.15 | 121.9 | 0.62 | 8 | PVC | 0.01 | 553 | 43 | 83 | 126 | 22.8 | | |
| Kirkland_Main-1721 | Kirkland_Manholes-1366 | 377.95 | Kirkland_Manholes-1365 | 376.9 | 166.8 | 0.63 | 8 | PVC | 0.01 | 559 | 43 | 79 | 122 | 21.9 | | |
| Kirkland_Main-1722 | Kirkland_Manholes-1364 | 404.91 | Kirkland_Manholes-1361 | 390.34 | 354.3 | 4.11 | 8 | PVC | 0.01 | 1,430 | 14 | 56 | 69 | 4.9 | SM14-Ex-EX180 | |
| Kirkland_Main-1723 | Kirkland_Manholes-1362 | 399.37 | Kirkland_Manholes-1360 | 392.45 | 312.9 | 2.21 | 8 | PVC | 0.01 | 1,049 | 5 | 16 | 21 | 2 | SM14-Ex-EX179 | |
| Kirkland_Main-1724 | Kirkland_Manholes-1363 | 403.55 | Kirkland_Manholes-1362 | 399.37 | 238 | 1.76 | 8 | PVC | 0.01 | 934 | 3 | 12 | 15 | 1.6 | SM14-Ex-EX179 | |
| Kirkland_Main-1726 | Kirkland_Manholes-1367 | 392.51 | Kirkland_Manholes-1906 | 388.2 | 267.7 | 1.61 | 8 | PVC | 0.01 | 895 | 7 | 4 | 11 | 1.2 | | |
| Kirkland_Main-1727 | Kirkland_Manholes-1368 | 393.26 | Kirkland_Manholes-1369 | 387.01 | 105.4 | 5.93 | 8 | PVC | 0.01 | 1,717 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX178 | |
| Kirkland_Main-1728 | Kirkland_Manholes-1369 | 387.01 | Kirkland_Manholes-1370 | 385.7 | 133.5 | 0.98 | 8 | PVC | 0.01 | 698 | 1 | 8 | 9 | 1.3 | SM14-Ex-EX178 | |
| Kirkland_Main-1729 | Kirkland_Manholes-1370 | 385.7 | Kirkland_Manholes-1371 | 376.15 | 179.2 | 5.33 | 8 | PVC | 0.01 | 1,628 | 1 | 12 | 13 | 0.8 | SM14-Ex-EX178 | |
| Kirkland_Main-1730 | Kirkland_Manholes-534 | 432.55 | Kirkland_Manholes-1372 | 427.9 | 355.1 | 1.31 | 8 | PVC | 0.01 | 807 | 44 | 139 | 183 | 22.7 | SM14-Ex-EX218 | |
| Kirkland_Main-1731 | Kirkland_Manholes-560 | 483.4 | Kirkland_Manholes-561 | 481.3 | 94.5 | 2.22 | 8 | PVC | 0.01 | 1,051 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-1733 | Kirkland_Manholes-561 | 481.3 | Kirkland_Manholes-1374 | 479.93 | 141.7 | 0.97 | 8 | PVC | 0.01 | 693 | 4 | 12 | 16 | 2.3 | | |
| Kirkland_Main-1734 | Kirkland_Manholes-1376 | 483.23 | Kirkland_Manholes-1375 | 479.6 | 272.8 | 1.33 | 8 | PVC | 0.01 | 813 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1735 | Kirkland_Manholes-1375 | 479.6 | Kirkland_Manholes-1377 | 478.89 | 93.1 | 0.76 | 8 | PVC | 0.01 | 616 | 6 | 24 | 30 | 4.9 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1736 | Kirkland_Manholes-1377 | 478.89 | Kirkland_Manholes-1378 | 472.9 | 259 | 2.31 | 8 | PVC | 0.01 | 1,072 | 7 | 28 | 35 | 3.3 | | |
| Kirkland_Main-1737 | Kirkland_Manholes-1378 | 472.9 | Kirkland_Manholes-1379 | 471.21 | 302 | 0.56 | 8 | PVC | 0.01 | 527 | 11 | 32 | 42 | 8 | | |
| Kirkland_Main-1738 | Kirkland_Manholes-1374 | 479.93 | Kirkland_Manholes-1375 | 479.6 | 219.3 | 0.15 | 8 | PVC | 0.01 | 274 | 4 | 16 | 20 | 7.2 | | |
| Kirkland_Main-1739 | Kirkland_Manholes-1379 | 471.21 | Kirkland_Manholes-564 | 469.28 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 11 | 36 | 47 | 7.9 | | |
| Kirkland_Main-1740 | Kirkland_Manholes-340 | 235.81 | Kirkland_Manholes-341 | 235.59 | 47.2 | 0.47 | 8 | PVC | 0.01 | 482 | 13 | 79 | 93 | 19.3 | | |
| Kirkland_Main-1741 | Kirkland_Manholes-341 | 235.59 | Kirkland_Manholes-342 | 234.97 | 31.7 | 1.95 | 8 | PVC | 0.01 | 986 | 18 | 127 | 146 | 14.8 | SM14-Ex-EX49 | |
| Kirkland_Main-1742 | Kirkland_Manholes-342 | 234.97 | Kirkland_Manholes-351 | 234.93 | 111.2 | 0.04 | 12 | PVC | 0.01 | 394 | 18 | 131 | 150 | 37.9 | SM14-Ex-EX49 | |
| Kirkland_Main-1743 | Kirkland_Manholes-345 | 279.43 | Kirkland_Manholes-344 | 279.2 | 57.3 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 8 | 12 | 2.7 | | |
| Kirkland_Main-1744 | Kirkland_Manholes-344 | 279.2 | Kirkland_Manholes-346 | 254.2 | 328.7 | 7.61 | 8 | PVC | 0.01 | 1,944 | 5 | 12 | 17 | 0.9 | | |
| Kirkland_Main-1745 | Kirkland_Manholes-346 | 254.2 | Kirkland_Manholes-347 | 250.02 | 240.3 | 1.74 | 8 | PVC | 0.01 | 930 | 6 | 16 | 22 | 2.4 | | |
| Kirkland_Main-1746 | Kirkland_Manholes-348 | 251.65 | Kirkland_Manholes-347 | 250.02 | 50.6 | 3.22 | 8 | PVC | 0.01 | 1,266 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1747 | Kirkland_Manholes-347 | 250.02 | Kirkland_Manholes-349 | 238.18 | 204.7 | 5.78 | 8 | PVC | 0.01 | 1,695 | 9 | 24 | 33 | 2 | | |
| Kirkland_Main-1748 | Kirkland_Manholes-349 | 238.18 | Kirkland_Manholes-350 | 235.63 | 111.7 | 2.28 | 8 | PVC | 0.01 | 1,065 | 10 | 28 | 38 | 3.6 | | |
| Kirkland_Main-1749 | Kirkland_Manholes-1666 | 89.71 | Kirkland_Manholes-1673 | 84.18 | 111.9 | 4.94 | 8 | PVC | 0.01 | 1,568 | 42 | 148 | 190 | 12.2 | | |
| Kirkland_Main-1750 | Kirkland_Manholes-1672 | 91.63 | Kirkland_Manholes-1666 | 89.71 | 163.9 | 1.17 | 8 | PVC | 0.01 | 763 | 1 | 8 | 9 | 1.2 | | |
| Kirkland_Main-1751 | Kirkland_Manholes-1671 | 101.9 | Kirkland_Manholes-1667 | 101.23 | 167.6 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 8 | 13 | 3 | | |
| Kirkland_Main-1752 | Kirkland_Manholes-1669 | 132.92 | Kirkland_Manholes-1668 | 119.52 | 315.3 | 4.25 | 8 | PVC | 0.01 | 1,454 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1753 | Kirkland_Manholes-1670 | 121.1 | Kirkland_Manholes-1668 | 119.52 | 161.1 | 0.98 | 8 | PVC | 0.01 | 698 | 3 | 8 | 11 | 1.6 | | |
| Kirkland_Main-1754 | Kirkland_Manholes-1673 | 84.18 | Kirkland_Manholes-1674 | 78.95 | 158.5 | 3.3 | 8 | PVC | 0.01 | 1,281 | 42 | 156 | 199 | 15.5 | | |
| Kirkland_Main-1755 | Kirkland_Manholes-1677 | 88.12 | Kirkland_Manholes-1674 | 87.91 | 51.7 | 0.4 | 8 | PVC | 0.01 | 446 | 21 | 41 | 62 | 14 | | Drop Connection |
| Kirkland_Main-1756 | Kirkland_Manholes-1675 | 105.24 | Kirkland_Manholes-1676 | 98.96 | 116.6 | 5.39 | 8 | PVC | 0.01 | 1,636 | 3 | 8 | 12 | 0.7 | | |
| Kirkland_Main-1757 | Kirkland_Manholes-859 | 309.2 | Kirkland_Manholes-865 | 308.29 | 290.7 | 0.31 | 8 | PVC | 0.01 | 394 | 15 | 75 | 91 | 23.1 | SM14-Ex-EX51 | |
| Kirkland_Main-1758 | Kirkland_Manholes-860 | 317.71 | Kirkland_Manholes-859 | 309.2 | 202.9 | 4.19 | 8 | PVC | 0.01 | 1,444 | 12 | 68 | 80 | 5.5 | SM14-Ex-EX52 | |
| Kirkland_Main-1759 | Kirkland_Manholes-861 | 327.02 | Kirkland_Manholes-860 | 317.71 | 236.9 | 3.93 | 8 | PVC | 0.01 | 1,398 | 10 | 64 | 74 | 5.3 | SM14-Ex-EX52 | |
| Kirkland_Main-1760 | Kirkland_Manholes-856 | 333.21 | Kirkland_Manholes-861 | 327.02 | 162.2 | 3.82 | 8 | PVC | 0.01 | 1,377 | 9 | 60 | 69 | 5 | SM14-Ex-EX52 | |
| Kirkland_Main-1761 | Kirkland_Manholes-862 | 335.56 | Kirkland_Manholes-856 | 333.21 | 185.2 | 1.27 | 8 | PVC | 0.01 | 794 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX53 | |
| Kirkland_Main-1762 | Kirkland_Manholes-2254 | 240.28 | Kirkland_Manholes-2253 | 239.74 | 205.7 | 0.26 | 8 | PVC | 0.01 | 361 | 0 | 4 | 4 | 1.1 | SM14-Ex-EX247 | |
| Kirkland_Main-1763 | Kirkland_Manholes-863 | 341.24 | Kirkland_Manholes-864 | 334.74 | 171.5 | 3.79 | 8 | PVC | 0.01 | 1,373 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX50 | |
| Kirkland_Main-1764 | Kirkland_Manholes-864 | 334.74 | Kirkland_Manholes-865 | 308.29 | 391.4 | 6.76 | 8 | PVC | 0.01 | 1,833 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX50 | |
| Kirkland_Main-1765 | Kirkland_Manholes-866 | 314.35 | Kirkland_Manholes-865 | 308.29 | 226.5 | 2.68 | 8 | PVC | 0.01 | 1,153 | 7 | 28 | 35 | 3 | SM14-Ex-EX35 | |
| Kirkland_Main-1766 | Kirkland_Manholes-865 | 308.29 | Kirkland_Manholes-392 | 305 | 233.2 | 1.41 | 8 | PVC | 0.01 | 837 | 27 | 115 | 143 | 17 | SM14-Ex-EX50 | |
| Kirkland_Main-1767 | Kirkland_Manholes-867 | 319 | Kirkland_Manholes-866 | 314.35 | 119.3 | 3.9 | 8 | PVC | 0.01 | 1,392 | 6 | 24 | 29 | 2.1 | SM14-Ex-EX35 | |
| Kirkland_Main-1768 | Kirkland_Manholes-868 | 321.84 | Kirkland_Manholes-867 | 319 | 90.7 | 3.13 | 8 | PVC | 0.01 | 1,247 | 5 | 20 | 25 | 2 | SM14-Ex-EX35 | |
| Kirkland_Main-1769 | Kirkland_Manholes-869 | 325.94 | Kirkland_Manholes-868 | 321.84 | 101.3 | 4.05 | 8 | PVC | 0.01 | 1,418 | 4 | 16 | 20 | 1.4 | SM14-Ex-EX35 | |
| Kirkland_Main-1770 | Kirkland_Manholes-870 | 327.4 | Kirkland_Manholes-869 | 325.94 | 99.3 | 1.47 | 8 | PVC | 0.01 | 855 | 2 | 4 | 5 | 0.6 | SM14-Ex-EX35 | |
| Kirkland_Main-1771 | Kirkland_Manholes-871 | 340.54 | Kirkland_Manholes-872 | 339.98 | 74.2 | 0.75 | 8 | PVC | 0.01 | 612 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX35 | |
| Kirkland_Main-1772 | Kirkland_Manholes-872 | 339.98 | Kirkland_Manholes-869 | 325.94 | 265.2 | 5.29 | 8 | PVC | 0.01 | 1,622 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX35 | |
| Kirkland_Main-1773 | Kirkland_Manholes-874 | 310.68 | Kirkland_Manholes-382 | 308.23 | 108.1 | 2.27 | 8 | PVC | 0.01 | 1,062 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1774 | Kirkland_Manholes-875 | 310.4 | Kirkland_Manholes-1073 | 302.05 | 254.5 | 3.28 | 8 | PVC | 0.01 | 1,277 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-1775 | Kirkland_Manholes-2900 | 302.3 | Kirkland_Manholes-876 | 301.25 | 160.8 | 0.65 | 8 | PVC | 0.01 | 570 | 6 | 40 | 46 | 8 | | |
| Kirkland_Main-1776 | Kirkland_Manholes-876 | 301.25 | Kirkland_Manholes-337 | 291.09 | 336.8 | 3.02 | 8 | PVC | 0.01 | 1,225 | 7 | 60 | 67 | 5.4 | | |
| Kirkland_Main-1777 | Kirkland_Manholes-877 | 295.2 | Kirkland_Manholes-884 | 291.06 | 114.3 | 3.62 | 8 | PVC | 0.01 | 1,342 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1778 | Kirkland_Manholes-884 | 291.06 | Kirkland_Manholes-881 | 290.87 | 47 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.3 | | |
| Kirkland_Main-1779 | Kirkland_Manholes-705 | 293.8 | Kirkland_Manholes-884 | 291.06 | 213.2 | 1.29 | 8 | PVC | 0.01 | 800 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-1780 | Kirkland_Manholes-881 | 290.87 | Kirkland_Manholes-885 | 286.75 | 194.6 | 2.12 | 8 | PVC | 0.01 | 1,026 | 11 | 60 | 71 | 6.9 | | |
| Kirkland_Main-1781 | Kirkland_Manholes-880 | 294.11 | Kirkland_Manholes-881 | 290.87 | 199.3 | 1.63 | 8 | PVC | 0.01 | 899 | 8 | 44 | 52 | 5.8 | | |
| Kirkland_Main-1782 | Kirkland_Manholes-879 | 310.92 | Kirkland_Manholes-880 | 294.11 | 360 | 4.67 | 8 | PVC | 0.01 | 1,524 | 7 | 40 | 46 | 3 | | |
| Kirkland_Main-1783 | Kirkland_Manholes-878 | 325.66 | Kirkland_Manholes-879 | 310.92 | 320.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 5 | 36 | 40 | 2.7 | | |
| Kirkland_Main-1784 | Kirkland_Manholes-886 | 291.6 | Kirkland_Manholes-885 | 286.75 | 178.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1785 | Kirkland_Manholes-887 | 294.74 | Kirkland_Manholes-886 | 291.6 | 177.9 | 1.77 | 8 | PVC | 0.01 | 937 | 2 | 8 | 10 | 1 | | |
| Kirkland_Main-1786 | Kirkland_Manholes-888 | 307.6 | Kirkland_Manholes-887 | 294.74 | 260 | 4.95 | 8 | PVC | 0.01 | 1,568 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1788 | Kirkland_Manholes-885 | 286.75 | Kirkland_Manholes-889 | 285.3 | 34.9 | 4.16 | 8 | PVC | 0.01 | 1,437 | 14 | 75 | 90 | 6.2 | | |
| Kirkland_Main-1789 | Kirkland_Manholes-336 | 286.9 | Kirkland_Manholes-889 | 285.3 | 212.5 | 0.75 | 8 | PVC | 0.01 | 612 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1790 | Kirkland_Manholes-889 | 285.3 | Kirkland_Manholes-890 | 280.21 | 299.8 | 1.7 | 8 | PVC | 0.01 | 919 | 17 | 83 | 100 | 10.9 | | |
| Kirkland_Main-1791 | Kirkland_Manholes-891 | 282.85 | Kirkland_Manholes-890 | 280.21 | 269.2 | 0.98 | 8 | PVC | 0.01 | 698 | 9 | 28 | 37 | 5.2 | | |
| Kirkland_Main-1792 | Kirkland_Manholes-892 | 286 | Kirkland_Manholes-891 | 282.85 | 80.7 | 3.9 | 8 | PVC | 0.01 | 1,393 | 7 | 24 | 31 | 2.2 | | |
| Kirkland_Main-1793 | Kirkland_Manholes-895 | 303.91 | Kirkland_Manholes-896 | 303.5 | 71 | 0.58 | 8 | PVC | 0.01 | 536 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1794 | Kirkland_Manholes-896 | 303.5 | Kirkland_Manholes-893 | 293.25 | 259.5 | 3.95 | 8 | PVC | 0.01 | 1,401 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-1795 | Kirkland_Manholes-894 | 293.53 | Kirkland_Manholes-893 | 293.25 | 69.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-1796 | Kirkland_Manholes-893 | 293.25 | Kirkland_Manholes-892 | 286 | 208.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 5 | 20 | 25 | 1.9 | | |
| Kirkland_Main-1797 | Kirkland_Manholes-897 | 317.07 | Kirkland_Manholes-896 | 303.5 | 263.1 | 5.16 | 8 | PVC | 0.01 | 1,601 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1798 | Kirkland_Manholes-955 | 318.15 | Kirkland_Manholes-956 | 317.42 | 90.2 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 12 | 13 | 2.1 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1799 | Kirkland_Manholes-956 | 317.42 | Kirkland_Manholes-957 | 315.92 | 143.6 | 1.04 | 8 | PVC | 0.01 | 720 | 2 | 16 | 18 | 2.5 | | |
| Kirkland_Main-1800 | Kirkland_Manholes-1294 | 129.1 | Kirkland_Manholes-1295 | 119.7 | 303.2 | 3.1 | 8 | PVC | 0.01 | 1,242 | 3 | 8 | 11 | 0.9 | SM14-Ex-EX115 | |
| Kirkland_Main-1801 | Kirkland_Manholes-1296 | 129.32 | Kirkland_Manholes-1295 | 119.7 | 314.4 | 3.06 | 8 | PVC | 0.01 | 1,233 | 61 | 296 | 358 | 29 | SM6 | |
| Kirkland_Main-1802 | Kirkland_Manholes-1301 | 241.1 | Kirkland_Manholes-1300 | 221.25 | 201.1 | 9.87 | 8 | PVC | 0.01 | 2,215 | 3 | 16 | 20 | 0.9 | SM14-Ex-EX98 | |
| Kirkland_Main-1803 | Kirkland_Manholes-1299 | 227.62 | Kirkland_Manholes-1300 | 221.25 | 159.1 | 4 | 8 | PVC | 0.01 | 1,411 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX101 | |
| Kirkland_Main-1804 | Kirkland_Manholes-1300 | 221.25 | Kirkland_Manholes-1250 | 210.15 | 248.6 | 4.47 | 8 | PVC | 0.01 | 1,490 | 6 | 33 | 38 | 2.6 | SM14-Ex-EX101 | |
| Kirkland_Main-1805 | Kirkland_Manholes-1303 | 126.2 | Kirkland_Manholes-1295 | 119.7 | 386.9 | 1.68 | 8 | PVC | 0.01 | 914 | 3 | 8 | 11 | 1.2 | SM14-Ex-EX115 | |
| Kirkland_Main-1806 | Kirkland_Manholes-1304 | 180.12 | Kirkland_Manholes-1258 | 154.28 | 295.6 | 8.74 | 8 | PVC | 0.01 | 2,084 | 5 | 25 | 30 | 1.4 | SM14-Ex-EX106 | |
| Kirkland_Main-1807 | Kirkland_Manholes-1306 | 225.07 | Kirkland_Manholes-227 | 223.31 | 140.1 | 1.26 | 8 | PVC | 0.01 | 790 | 6 | 26 | 32 | 4 | | |
| Kirkland_Main-1808 | Kirkland_Manholes-1309 | 233.16 | Kirkland_Manholes-1308 | 229.72 | 344.3 | 1 | 8 | PVC | 0.01 | 705 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-1809 | Kirkland_Manholes-1308 | 229.72 | Kirkland_Manholes-1307 | 211.15 | 175.8 | 10.56 | 8 | PVC | 0.01 | 2,292 | 4 | 16 | 20 | 0.9 | | |
| Kirkland_Main-1810 | Kirkland_Manholes-1307 | 211.15 | Kirkland_Manholes-1252 | 181.71 | 226.9 | 12.97 | 8 | PVC | 0.01 | 2,540 | 7 | 25 | 31 | 1.2 | SM14-Ex-EX100 | |
| Kirkland_Main-1812 | Kirkland_Manholes-1275 | 185.58 | Kirkland_Manholes-1276 | 172.95 | 322.8 | 3.91 | 8 | PVC | 0.01 | 1,395 | 2 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1813 | Kirkland_Manholes-1279 | 163.99 | Kirkland_Manholes-1278 | 160.09 | 249.2 | 1.56 | 8 | PVC | 0.01 | 882 | 5 | 25 | 29 | 3.3 | SM14-Ex-EX103 | |
| Kirkland_Main-1814 | Kirkland_Manholes-1597 | 180.84 | Kirkland_Manholes-1601 | 173.67 | 138.4 | 5.18 | 8 | PVC | 0.01 | 1,605 | 53 | 159 | 212 | 13.2 | SM14-Ex-EX121 | |
| Kirkland_Main-1815 | Kirkland_Manholes-1603 | 202.22 | Kirkland_Manholes-1602 | 196.74 | 63.2 | 8.68 | 8 | PVC | 0.01 | 2,077 | 65 | 226 | 291 | 14 | SM14-Ex-EX172 | |
| Kirkland_Main-1817 | Kirkland_Manholes-1570 | 121.83 | Kirkland_Manholes-1604 | 117.22 | 301 | 1.53 | 8 | PVC | 0.01 | 872 | 3 | 8 | 12 | 1.3 | SM14-Ex-EX120 | |
| Kirkland_Main-1818 | Kirkland_Manholes-1604 | 117.22 | Kirkland_Manholes-1608 | 108.38 | 320.2 | 2.76 | 8 | PVC | 0.01 | 1,171 | 7 | 49 | 56 | 4.8 | SM14-Ex-EX119 | |
| Kirkland_Main-1823 | Kirkland_Manholes-1607 | 115.82 | Kirkland_Manholes-1608 | 108.38 | 281.1 | 2.65 | 8 | PVC | 0.01 | 1,147 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-1824 | Kirkland_Manholes-1608 | 108.38 | Kirkland_Manholes-1609 | 99.56 | 224.5 | 3.93 | 8 | PVC | 0.01 | 1,397 | 8 | 66 | 74 | 5.3 | SM14-Ex-EX119 | |
| Kirkland_Main-1825 | Kirkland_Manholes-1609 | 99.56 | Kirkland_Manholes-1610 | 98.61 | 103.1 | 0.92 | 8 | PVC | 0.01 | 677 | 8 | 74 | 82 | 12.2 | SM14-Ex-EX119 | |
| Kirkland_Main-1826 | Kirkland_Manholes-1615 | 109.23 | Kirkland_Manholes-1610 | 98.61 | 252.9 | 4.2 | 8 | PVC | 0.01 | 1,445 | 3 | 16 | 20 | 1.4 | | |
| Kirkland_Main-1827 | Kirkland_Manholes-1610 | 98.61 | Kirkland_Manholes-1611 | 98.01 | 137.6 | 0.44 | 8 | PVC | 0.01 | 466 | 11 | 99 | 110 | 23.7 | SM14-Ex-EX160 | |
| Kirkland_Main-1828 | Kirkland_Manholes-1611 | 98.01 | Kirkland_Manholes-1614 | 91.09 | 116.4 | 5.94 | 8 | PVC | 0.01 | 1,719 | 11 | 107 | 118 | 6.9 | SM14-Ex-EX167 | |
| Kirkland_Main-1830 | Kirkland_Manholes-350 | 235.63 | Kirkland_Manholes-351 | 234.93 | 99 | 0.71 | 8 | PVC | 0.01 | 593 | 12 | 32 | 43 | 7.3 | | |
| Kirkland_Main-1831 | Kirkland_Manholes-351 | 234.93 | Kirkland_Manholes-352 | 234.2 | 197.8 | 0.37 | 8 | PVC | 0.01 | 428 | 30 | 167 | 197 | 46 | | |
| Kirkland_Main-1832 | Kirkland_Manholes-353 | 237.24 | Kirkland_Manholes-352 | 234.2 | 58.3 | 5.21 | 8 | PVC | 0.01 | 1,609 | 0 | 8 | 8 | 0.5 | | |
| Kirkland_Main-1833 | Kirkland_Manholes-354 | 240.05 | Kirkland_Manholes-353 | 237.24 | 111.3 | 2.52 | 8 | PVC | 0.01 | 1,120 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1834 | Kirkland_Manholes-355 | 245.23 | Kirkland_Manholes-357 | 224.18 | 289.7 | 7.27 | 8 | PVC | 0.01 | 1,901 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1835 | Kirkland_Manholes-357 | 224.18 | Kirkland_Manholes-356 | 218.57 | 38.2 | 14.7 | 8 | PVC | 0.01 | 2,703 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-1836 | Kirkland_Manholes-356 | 218.57 | Kirkland_Manholes-358 | 217.4 | 168.8 | 0.69 | 21 | PVC | 0.01 | 7,697 | 528 | 1,927 | 2,455 | 31.9 | | |
| Kirkland_Main-1837 | Kirkland_Manholes-358 | 217.4 | Kirkland_Manholes-362 | 216.81 | 209.2 | 0.28 | 21 | PVC | 0.01 | 4,910 | 528 | 1,931 | 2,459 | 50.1 | | |
| Kirkland_Main-1838 | Kirkland_Manholes-365 | 215.67 | Kirkland_Manholes-366 | 214.9 | 145.3 | 0.53 | 8 | PVC | 0.01 | 513 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-1839 | Kirkland_Manholes-366 | 214.9 | Kirkland_Manholes-367 | 213.02 | 57.5 | 3.27 | 8 | PVC | 0.01 | 1,275 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-1840 | Kirkland_Manholes-364 | 215.51 | Kirkland_Manholes-367 | 213.02 | 231.6 | 1.07 | 18 | PVC | 0.01 | 6,354 | 538 | 1,987 | 2,525 | 39.7 | | |
| Kirkland_Main-1841 | Kirkland_Manholes-363 | 216.4 | Kirkland_Manholes-3048 | 215.92 | 195.5 | 0.25 | 21 | PVC | 0.01 | 4,581 | 533 | 1,951 | 2,484 | 54.2 | | |
| Kirkland_Main-1842 | Kirkland_Manholes-361 | 216.74 | Kirkland_Manholes-363 | 216.4 | 169.2 | 0.2 | 21 | PVC | 0.01 | 4,140 | 533 | 1,947 | 2,480 | 59.9 | | |
| Kirkland_Main-1843 | Kirkland_Manholes-359 | 233.48 | Kirkland_Manholes-360 | 230.84 | 309.4 | 0.85 | 8 | PVC | 0.01 | 651 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-1844 | Kirkland_Manholes-360 | 230.84 | Kirkland_Manholes-361 | 216.74 | 103.8 | 13.58 | 8 | PVC | 0.01 | 2,599 | 4 | 8 | 12 | 0.5 | | |
| Kirkland_Main-1845 | Kirkland_Manholes-400 | 274.94 | Kirkland_Manholes-399 | 268.35 | 106.2 | 6.21 | 8 | PVC | 0.01 | 1,757 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1846 | Kirkland_Manholes-399 | 268.35 | Kirkland_Manholes-394 | 266.89 | 274.5 | 0.53 | 8 | PVC | 0.01 | 514 | 3 | 8 | 11 | 2.1 | | |
| Kirkland_Main-1847 | Kirkland_Manholes-405 | 259.21 | Kirkland_Manholes-404 | 259.2 | 31.6 | 0.03 | 8 | PVC | 0.01 | 125 | 0 | 4 | 4 | 3.2 | | |
| Kirkland_Main-1848 | Kirkland_Manholes-404 | 259.2 | Kirkland_Manholes-403 | 257.79 | 99.7 | 1.41 | 8 | PVC | 0.01 | 839 | 0 | 8 | 8 | 1 | | |
| Kirkland_Main-1849 | Kirkland_Manholes-403 | 257.79 | Kirkland_Manholes-402 | 257.52 | 55.3 | 0.49 | 8 | PVC | 0.01 | 493 | 1 | 12 | 12 | 2.5 | | |
| Kirkland_Main-1850 | Kirkland_Manholes-402 | 257.52 | Kirkland_Manholes-401 | 256.8 | 97.3 | 0.74 | 8 | PVC | 0.01 | 607 | 1 | 16 | 17 | 2.8 | | |
| Kirkland_Main-1851 | Kirkland_Manholes-401 | 256.8 | Kirkland_Manholes-395 | 253.88 | 284.1 | 1.03 | 8 | PVC | 0.01 | 715 | 2 | 20 | 22 | 3.1 | | |
| Kirkland_Main-1852 | Kirkland_Manholes-406 | 288.66 | Kirkland_Manholes-393 | 288.03 | 160.6 | 0.39 | 8 | PVC | 0.01 | 442 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-1853 | Kirkland_Manholes-410 | 278.41 | Kirkland_Manholes-409 | 264.84 | 185.6 | 7.31 | 8 | PVC | 0.01 | 1,906 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1854 | Kirkland_Manholes-425 | 290.3 | Kirkland_Manholes-420 | 281.46 | 112.7 | 7.84 | 8 | PVC | 0.01 | 1,974 | 6 | 28 | 34 | 1.7 | | |
| Kirkland_Main-1855 | Kirkland_Manholes-370 | 206.64 | Kirkland_Manholes-2869 | 204.84 | 75.1 | 2.4 | 18 | PVC | 0.01 | 9,487 | 548 | 2,038 | 2,587 | 27.3 | | |
| Kirkland_Main-1856 | Kirkland_Manholes-436 | 58.61 | Kirkland_Manholes-437 | 58.56 | 24.6 | 0.22 | 15 | PVC | 0.01 | 1,769 | 197 | 644 | 842 | 47.6 | SM14-Ex-EX30 | |
| Kirkland_Main-1857 | Kirkland_Manholes-437 | 58.56 | Kirkland_Manholes-188 | 58.06 | 273 | 0.18 | 15 | PVC | 0.01 | 1,613 | 202 | 657 | 859 | 53.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1858 | Kirkland_Manholes-450 | 130.07 | Kirkland_Manholes-448 | 127.19 | 147.1 | 1.96 | 8 | PVC | 0.01 | 987 | 4 | 17 | 21 | 2.1 | | |
| Kirkland_Main-1859 | Kirkland_Manholes-448 | 127.19 | Kirkland_Manholes-449 | 124.43 | 143 | 1.93 | 8 | PVC | 0.01 | 979 | 4 | 21 | 25 | 2.5 | | |
| Kirkland_Main-1860 | Kirkland_Manholes-449 | 124.43 | Kirkland_Manholes-446 | 123.86 | 143.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 26 | 29 | 6.5 | | Drop Connection |
| Kirkland_Main-1861 | Kirkland_Manholes-447 | 95.3 | Kirkland_Manholes-446 | 94.25 | 125.1 | 0.84 | 8 | PVC | 0.01 | 646 | 0 | 4 | 4 | 0.7 | | |
| Kirkland_Main-1862 | Kirkland_Manholes-445 | 128.4 | Kirkland_Manholes-444 | 92.89 | 173.2 | 20.5 | 8 | PVC | 0.01 | 3,192 | 0 | 4 | 4 | 0.1 | | |
| Kirkland_Main-1863 | Kirkland_Manholes-446 | 94.25 | Kirkland_Manholes-444 | 92.89 | 143.2 | 0.95 | 8 | PVC | 0.01 | 687 | 4 | 34 | 38 | 5.5 | | |
| Kirkland_Main-1864 | Kirkland_Manholes-1522 | 291.35 | Kirkland_Manholes-145 | 271.65 | 161.3 | 12.21 | 8 | PVC | 0.01 | 2,464 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1865 | Kirkland_Manholes-145 | 271.65 | Kirkland_Manholes-1315 | 270.9 | 108.1 | 0.69 | 8 | PVC | 0.01 | 587 | 14 | 48 | 62 | 10.5 | | |
| Kirkland_Main-1866 | Kirkland_Manholes-1314 | 312.02 | Kirkland_Manholes-1522 | 291.35 | 177.8 | 11.62 | 8 | PVC | 0.01 | 2,404 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1867 | Kirkland_Manholes-1515 | 261.7 | Kirkland_Manholes-1516 | 259.7 | 167.2 | 1.2 | 8 | PVC | 0.01 | 771 | 33 | 147 | 180 | 23.4 | SM14-Ex-EX131 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1868 | Kirkland_Manholes-1516 | 259.7 | Kirkland_Manholes-1593 | 256.67 | 397.6 | 0.76 | 8 | PVC | 0.01 | 615 | 37 | 151 | 188 | 30.5 | SM14-Ex-EX131 | |
| Kirkland_Main-1869 | Kirkland_Manholes-1520 | 262.79 | Kirkland_Manholes-1517 | 262.15 | 299 | 0.21 | 8 | PVC | 0.01 | 326 | 2 | 4 | 6 | 1.7 | SM14-Ex-EX129 | |
| Kirkland_Main-1870 | Kirkland_Manholes-1518 | 277.88 | Kirkland_Manholes-1517 | 262.15 | 157.4 | 10 | 8 | PVC | 0.01 | 2,229 | 12 | 28 | 40 | 1.8 | SM14-Ex-EX124 | |
| Kirkland_Main-1871 | Kirkland_Manholes-1517 | 262.15 | Kirkland_Manholes-1592 | 255.76 | 316.1 | 2.02 | 8 | PVC | 0.01 | 1,002 | 14 | 36 | 50 | 5 | SM14-Ex-EX124 | |
| Kirkland_Main-1872 | Kirkland_Manholes-1519 | 265 | Kirkland_Manholes-1521 | 258.62 | 235.2 | 2.71 | 8 | PVC | 0.01 | 1,161 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX128 | |
| Kirkland_Main-1873 | Kirkland_Manholes-1521 | 258.62 | Kirkland_Manholes-1524 | 207.32 | 404.3 | 12.69 | 8 | PVC | 0.01 | 2,512 | 2 | 8 | 10 | 0.4 | SM14-Ex-EX128 | |
| Kirkland_Main-1874 | Kirkland_Manholes-1552 | 337.73 | Kirkland_Manholes-761 | 326.09 | 158.4 | 7.35 | 8 | PVC | 0.01 | 1,911 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1875 | Kirkland_Manholes-761 | 326.09 | Kirkland_Manholes-760 | 311.91 | 217.3 | 6.53 | 8 | PVC | 0.01 | 1,801 | 4 | 8 | 12 | 0.7 | SM14-Ex-EX124 | |
| Kirkland_Main-1876 | Kirkland_Manholes-760 | 311.91 | Kirkland_Manholes-1538 | 302.73 | 273.6 | 3.36 | 8 | PVC | 0.01 | 1,292 | 6 | 12 | 18 | 1.4 | SM14-Ex-EX124 | |
| Kirkland_Main-1877 | Kirkland_Manholes-1542 | 314.5 | Kirkland_Manholes-1541 | 294.69 | 208.5 | 9.5 | 8 | PVC | 0.01 | 2,173 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX123 | |
| Kirkland_Main-1878 | Kirkland_Manholes-1540 | 296.8 | Kirkland_Manholes-1541 | 294.69 | 76 | 2.78 | 8 | PVC | 0.01 | 1,175 | 4 | 8 | 12 | 1 | SM14-Ex-EX123 | |
| Kirkland_Main-1879 | Kirkland_Manholes-1539 | 301.51 | Kirkland_Manholes-1540 | 296.8 | 362.1 | 1.3 | 8 | PVC | 0.01 | 804 | 3 | 4 | 7 | 0.9 | SM14-Ex-EX123 | |
| Kirkland_Main-1880 | Kirkland_Manholes-1523 | 194.94 | Kirkland_Manholes-1597 | 180.84 | 315.7 | 4.47 | 8 | PVC | 0.01 | 1,490 | 45 | 143 | 188 | 12.6 | SM14-Ex-EX121 | |
| Kirkland_Main-1881 | Kirkland_Manholes-1524 | 207.32 | Kirkland_Manholes-1523 | 194.94 | 95.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 4 | 12 | 16 | 0.6 | SM14-Ex-EX128 | |
| Kirkland_Main-1882 | Kirkland_Manholes-1528 | 217.87 | Kirkland_Manholes-1523 | 194.94 | 317.2 | 7.23 | 8 | PVC | 0.01 | 1,896 | 41 | 127 | 168 | 8.9 | SM14-Ex-EX121 | |
| Kirkland_Main-1883 | Kirkland_Manholes-1525 | 281.6 | Kirkland_Manholes-1526 | 273.99 | 396.4 | 1.92 | 8 | PVC | 0.01 | 977 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX127 | |
| Kirkland_Main-1884 | Kirkland_Manholes-1526 | 273.99 | Kirkland_Manholes-1527 | 258.94 | 183.5 | 8.2 | 8 | PVC | 0.01 | 2,019 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX127 | |
| Kirkland_Main-1885 | Kirkland_Manholes-1527 | 258.94 | Kirkland_Manholes-1528 | 217.87 | 397.7 | 10.33 | 8 | PVC | 0.01 | 2,266 | 4 | 12 | 16 | 0.7 | SM14-Ex-EX127 | |
| Kirkland_Main-1886 | Kirkland_Manholes-1535 | 304.79 | Kirkland_Manholes-1534 | 301.8 | 155.7 | 1.92 | 8 | PVC | 0.01 | 977 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX126 | |
| Kirkland_Main-1887 | Kirkland_Manholes-1534 | 301.8 | Kirkland_Manholes-1533 | 294.07 | 244.9 | 3.16 | 8 | PVC | 0.01 | 1,253 | 1 | 8 | 9 | 0.7 | SM14-Ex-EX126 | |
| Kirkland_Main-1888 | Kirkland_Manholes-775 | 172.73 | KC_Manholes-5 | 169.15 | 345.4 | 1.04 | 8 | PVC | 0.01 | 718 | 5 | 32 | 37 | 5.2 | | |
| Kirkland_Main-1889 | Kirkland_Manholes-774 | 192.94 | KC_Manholes-5 | 169.15 | 221.2 | 10.75 | 8 | PVC | 0.01 | 2,312 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1890 | Kirkland_Manholes-773 | 227.51 | Kirkland_Manholes-774 | 192.94 | 170.2 | 20.31 | 8 | PVC | 0.01 | 3,177 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1891 | Kirkland_Manholes-772 | 214.68 | Kirkland_Manholes-771 | 213.99 | 63.9 | 1.08 | 8 | PVC | 0.01 | 733 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1892 | Kirkland_Manholes-443 | 91.49 | Kirkland_Manholes-442 | 83.66 | 233.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 40 | 47 | 87 | 6.8 | | |
| Kirkland_Main-1893 | Kirkland_Manholes-442 | 83.66 | Kirkland_Manholes-441 | 83.38 | 212.8 | 0.13 | 8 | PVC | 0.01 | 256 | 40 | 51 | 92 | 35.8 | | |
| Kirkland_Main-1894 | Kirkland_Manholes-441 | 83.38 | Kirkland_Manholes-433 | 80.24 | 108 | 2.91 | 8 | PVC | 0.01 | 1,202 | 40 | 55 | 96 | 8 | | |
| Kirkland_Main-1895 | Kirkland_Manholes-432 | 97.11 | Kirkland_Manholes-433 | 80.24 | 205.7 | 8.2 | 12 | PVC | 0.01 | 5,954 | 99 | 358 | 457 | 7.7 | SM14-Ex-EX30 | |
| Kirkland_Main-1896 | Kirkland_Manholes-426 | 144.6 | Kirkland_Manholes-427 | 143.58 | 254.5 | 0.4 | 12 | PVC | 0.01 | 1,315 | 93 | 333 | 426 | 32.4 | SM14-Ex-EX30 | |
| Kirkland_Main-1897 | Kirkland_Manholes-427 | 143.58 | Kirkland_Manholes-428 | 141.37 | 251.3 | 0.88 | 12 | PVC | 0.01 | 1,950 | 99 | 337 | 436 | 22.4 | SM14-Ex-EX30 | |
| Kirkland_Main-1898 | Kirkland_Manholes-428 | 141.37 | Kirkland_Manholes-429 | 138.12 | 320.6 | 1.01 | 12 | PVC | 0.01 | 2,093 | 99 | 341 | 440 | 21 | SM14-Ex-EX30 | |
| Kirkland_Main-1899 | Kirkland_Manholes-429 | 138.12 | Kirkland_Manholes-430 | 132.21 | 248.9 | 2.37 | 12 | PVC | 0.01 | 3,203 | 99 | 346 | 444 | 13.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1900 | Kirkland_Manholes-430 | 132.21 | Kirkland_Manholes-431 | 114.37 | 310.4 | 5.75 | 12 | PVC | 0.01 | 4,983 | 99 | 350 | 449 | 9 | SM14-Ex-EX30 | |
| Kirkland_Main-1901 | Kirkland_Manholes-431 | 114.37 | Kirkland_Manholes-432 | 97.11 | 290.4 | 5.94 | 12 | PVC | 0.01 | 5,068 | 99 | 354 | 453 | 8.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1902 | Kirkland_Manholes-433 | 80.24 | Kirkland_Manholes-434 | 74.08 | 187.9 | 3.28 | 12 | PVC | 0.01 | 3,764 | 139 | 418 | 557 | 14.8 | SM14-Ex-EX30 | |
| Kirkland_Main-1903 | Kirkland_Manholes-434 | 74.08 | Kirkland_Manholes-435 | 64.4 | 325.2 | 2.98 | 12 | PVC | 0.01 | 3,586 | 139 | 422 | 562 | 15.7 | SM14-Ex-EX30 | |
| Kirkland_Main-1904 | Kirkland_Manholes-439 | 82.56 | Kirkland_Manholes-438 | 74.46 | 270.1 | 3 | 8 | PVC | 0.01 | 1,221 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1905 | Kirkland_Manholes-438 | 74.46 | Kirkland_Manholes-435 | 64.4 | 260.6 | 3.86 | 8 | PVC | 0.01 | 1,385 | 58 | 213 | 271 | 19.6 | SM14-Ex-EX31 | |
| Kirkland_Main-1906 | Kirkland_Manholes-435 | 64.4 | Kirkland_Manholes-436 | 58.61 | 312.5 | 1.85 | 12 | PVC | 0.01 | 2,828 | 197 | 640 | 837 | 29.6 | SM14-Ex-EX30 | |
| Kirkland_Main-1907 | Kirkland_Manholes-1018 | 179.75 | Kirkland_Manholes-451 | 173.02 | 146.6 | 4.59 | 8 | PVC | 0.01 | 1,511 | 50 | 171 | 221 | 14.6 | SM14-Ex-EX31 | |
| Kirkland_Main-1908 | Kirkland_Manholes-453 | 159.42 | Kirkland_Manholes-454 | 126.39 | 122.9 | 26.88 | 8 | PVC | 0.01 | 3,655 | 52 | 184 | 236 | 6.4 | SM14-Ex-EX31 | |
| Kirkland_Main-1909 | Kirkland_Manholes-440 | 131.78 | Kirkland_Manholes-454 | 126.39 | 361.7 | 1.49 | 8 | PVC | 0.01 | 861 | 5 | 17 | 22 | 2.6 | SM14-Ex-EX31 | |
| Kirkland_Main-1910 | Kirkland_Manholes-1026 | 149.27 | Kirkland_Manholes-440 | 131.78 | 156.8 | 11.16 | 8 | PVC | 0.01 | 2,355 | 5 | 13 | 17 | 0.7 | | |
| Kirkland_Main-1911 | Kirkland_Manholes-451 | 173.02 | Kirkland_Manholes-452 | 170.49 | 70.2 | 3.6 | 8 | PVC | 0.01 | 1,339 | 50 | 175 | 225 | 16.8 | SM14-Ex-EX31 | |
| Kirkland_Main-1912 | Kirkland_Manholes-452 | 170.49 | Kirkland_Manholes-453 | 159.42 | 88.9 | 12.45 | 8 | PVC | 0.01 | 2,488 | 51 | 179 | 230 | 9.2 | SM14-Ex-EX31 | |
| Kirkland_Main-1913 | Kirkland_Manholes-454 | 126.39 | Kirkland_Manholes-438 | 74.46 | 305.4 | 17.01 | 8 | PVC | 0.01 | 2,907 | 58 | 205 | 263 | 9 | SM14-Ex-EX31 | |
| Kirkland_Main-1914 | Kirkland_Manholes-484 | 295.92 | Kirkland_Manholes-483 | 294.22 | 69.9 | 2.43 | 8 | PVC | 0.01 | 1,098 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1915 | Kirkland_Manholes-483 | 294.22 | Kirkland_Manholes-482 | 293.97 | 63.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-1916 | Kirkland_Manholes-481 | 300.21 | Kirkland_Manholes-482 | 293.97 | 44.6 | 13.98 | 8 | PVC | 0.01 | 2,636 | 7 | 40 | 47 | 1.8 | | |
| Kirkland_Main-1917 | Kirkland_Manholes-477 | 317.64 | Kirkland_Manholes-481 | 300.21 | 198.9 | 8.76 | 8 | PVC | 0.01 | 2,087 | 6 | 36 | 42 | 2 | | |
| Kirkland_Main-1918 | Kirkland_Manholes-478 | 318.91 | Kirkland_Manholes-477 | 317.64 | 130.7 | 0.97 | 8 | PVC | 0.01 | 695 | 5 | 32 | 37 | 5.3 | | |
| Kirkland_Main-1919 | Kirkland_Manholes-479 | 328.09 | Kirkland_Manholes-478 | 318.91 | 81.5 | 11.27 | 8 | PVC | 0.01 | 2,367 | 5 | 28 | 33 | 1.4 | | |
| Kirkland_Main-1920 | Kirkland_Manholes-476 | 330.32 | Kirkland_Manholes-475 | 322.42 | 166.4 | 4.75 | 8 | PVC | 0.01 | 1,536 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1921 | Kirkland_Manholes-475 | 322.42 | Kirkland_Manholes-473 | 288.65 | 238.6 | 14.15 | 8 | PVC | 0.01 | 2,653 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1922 | Kirkland_Manholes-474 | 290.07 | Kirkland_Manholes-473 | 288.65 | 187.1 | 0.76 | 8 | PVC | 0.01 | 614 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1923 | Kirkland_Manholes-473 | 288.65 | Kirkland_Manholes-468 | 238.51 | 297.1 | 16.88 | 8 | PVC | 0.01 | 2,896 | 5 | 16 | 21 | 0.7 | | |
| Kirkland_Main-1924 | Kirkland_Manholes-468 | 238.51 | Kirkland_Manholes-462 | 219.91 | 120.9 | 15.39 | 8 | PVC | 0.01 | 2,766 | 6 | 20 | 26 | 0.9 | | |
| Kirkland_Main-1925 | Kirkland_Manholes-463 | 227.23 | Kirkland_Manholes-462 | 219.91 | 71.2 | 10.28 | 8 | PVC | 0.01 | 2,261 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1926 | Kirkland_Manholes-464 | 254.44 | Kirkland_Manholes-463 | 227.23 | 171 | 15.91 | 8 | PVC | 0.01 | 2,812 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1927 | Kirkland_Manholes-462 | 219.91 | Kirkland_Manholes-465 | 166.54 | 349.5 | 15.27 | 8 | PVC | 0.01 | 2,755 | 8 | 32 | 40 | 1.4 | | |
| Kirkland_Main-1928 | Kirkland_Manholes-465 | 166.54 | Kirkland_Manholes-466 | 159.47 | 196.4 | 3.6 | 8 | PVC | 0.01 | 1,338 | 8 | 36 | 44 | 3.3 | | |
| Kirkland_Main-1929 | Kirkland_Manholes-467 | 166.95 | Kirkland_Manholes-466 | 159.47 | 59.4 | 12.59 | 8 | PVC | 0.01 | 2,502 | 5 | 16 | 21 | 0.8 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1930 | Kirkland_Manholes-469 | 217.48 | Kirkland_Manholes-470 | 207.2 | 162.3 | 6.34 | 8 | PVC | 0.01 | 1,775 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1931 | Kirkland_Manholes-471 | 208.89 | Kirkland_Manholes-470 | 207.2 | 106.2 | 1.59 | 8 | PVC | 0.01 | 889 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1932 | Kirkland_Manholes-470 | 207.2 | Kirkland_Manholes-472 | 192.62 | 137.7 | 10.59 | 8 | PVC | 0.01 | 2,294 | 2 | 12 | 13 | 0.6 | | |
| Kirkland_Main-1934 | Kirkland_Manholes-489 | 206.41 | Kirkland_Manholes-467 | 166.95 | 178.4 | 22.12 | 8 | PVC | 0.01 | 3,316 | 5 | 12 | 16 | 0.5 | | |
| Kirkland_Main-1935 | Kirkland_Manholes-491 | 317.17 | Kirkland_Manholes-492 | 300.1 | 240.7 | 7.09 | 8 | PVC | 0.01 | 1,878 | 3 | 8 | 11 | 0.6 | | |
| Kirkland_Main-1936 | Kirkland_Manholes-492 | 300.1 | Kirkland_Manholes-778 | 273.49 | 272.5 | 9.76 | 8 | PVC | 0.01 | 2,203 | 3 | 12 | 15 | 0.7 | | |
| Kirkland_Main-1937 | Kirkland_Manholes-778 | 273.49 | Kirkland_Manholes-783 | 251.91 | 166.5 | 12.96 | 8 | PVC | 0.01 | 2,539 | 4 | 16 | 20 | 0.8 | | |
| Kirkland_Main-1938 | Kirkland_Manholes-783 | 251.91 | Kirkland_Manholes-782 | 245.67 | 36.9 | 16.9 | 8 | PVC | 0.01 | 2,898 | 16 | 91 | 108 | 3.7 | | |
| Kirkland_Main-1939 | Kirkland_Manholes-779 | 276.61 | Kirkland_Manholes-486 | 260.65 | 97.8 | 16.33 | 8 | PVC | 0.01 | 2,849 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1940 | Kirkland_Manholes-486 | 260.65 | Kirkland_Manholes-487 | 257.38 | 130.2 | 2.51 | 8 | PVC | 0.01 | 1,117 | 12 | 68 | 79 | 7.1 | | |
| Kirkland_Main-1942 | Kirkland_Manholes-487 | 257.38 | Kirkland_Manholes-783 | 251.91 | 251.1 | 2.18 | 8 | PVC | 0.01 | 1,041 | 12 | 72 | 84 | 8 | | |
| Kirkland_Main-1943 | Kirkland_Manholes-781 | 270.16 | Kirkland_Manholes-782 | 245.67 | 162 | 15.11 | 8 | PVC | 0.01 | 2,741 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1944 | Kirkland_Manholes-780 | 304.33 | Kirkland_Manholes-781 | 270.16 | 338 | 10.11 | 8 | PVC | 0.01 | 2,242 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1945 | Kirkland_Manholes-782 | 245.67 | Kirkland_Manholes-785 | 203.06 | 217.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 19 | 103 | 122 | 3.9 | | |
| Kirkland_Main-1946 | Kirkland_Manholes-785 | 203.06 | Kirkland_Manholes-784 | 186.93 | 82.2 | 19.62 | 8 | PVC | 0.01 | 3,123 | 19 | 107 | 127 | 4.1 | | |
| Kirkland_Main-1947 | Kirkland_Manholes-784 | 186.93 | Kirkland_Manholes-786 | 173.41 | 68.9 | 19.64 | 8 | PVC | 0.01 | 3,124 | 58 | 262 | 321 | 10.3 | | |
| Kirkland_Main-1948 | Kirkland_Manholes-789 | 234.78 | Kirkland_Manholes-788 | 234.04 | 150 | 0.49 | 8 | PVC | 0.01 | 495 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1949 | Kirkland_Manholes-788 | 234.04 | Kirkland_Manholes-787 | 233.49 | 110.1 | 0.5 | 8 | PVC | 0.01 | 498 | 1 | 8 | 9 | 1.8 | | |
| Kirkland_Main-1950 | Kirkland_Manholes-787 | 233.49 | Kirkland_Manholes-790 | 227.7 | 106.2 | 5.45 | 8 | PVC | 0.01 | 1,646 | 2 | 12 | 14 | 0.8 | | |
| Kirkland_Main-1951 | Kirkland_Manholes-485 | 265.21 | Kirkland_Manholes-486 | 260.65 | 233.3 | 1.95 | 8 | PVC | 0.01 | 986 | 10 | 60 | 70 | 7.1 | | |
| Kirkland_Main-1952 | Kirkland_Manholes-490 | 279.75 | Kirkland_Manholes-485 | 265.21 | 234 | 6.21 | 8 | PVC | 0.01 | 1,758 | 9 | 56 | 65 | 3.7 | | |
| Kirkland_Main-1953 | Kirkland_Manholes-482 | 293.97 | Kirkland_Manholes-490 | 279.75 | 98.3 | 14.47 | 8 | PVC | 0.01 | 2,682 | 9 | 52 | 60 | 2.3 | | |
| Kirkland_Main-1954 | Kirkland_Manholes-791 | 327.42 | Kirkland_Manholes-491 | 317.17 | 287.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX47 | |
| Kirkland_Main-1955 | Kirkland_Manholes-796 | 329.52 | Kirkland_Manholes-479 | 328.09 | 60.4 | 2.37 | 8 | PVC | 0.01 | 1,085 | 4 | 24 | 28 | 2.6 | | |
| Kirkland_Main-1956 | Kirkland_Manholes-802 | 309.62 | Kirkland_Manholes-801 | 301.38 | 220.6 | 3.74 | 8 | PVC | 0.01 | 1,363 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1957 | Kirkland_Manholes-801 | 301.38 | Kirkland_Manholes-800 | 299.84 | 122.4 | 1.26 | 8 | PVC | 0.01 | 791 | 3 | 8 | 11 | 1.4 | | |
| Kirkland_Main-1958 | Kirkland_Manholes-800 | 299.84 | Kirkland_Manholes-799 | 299.17 | 200.4 | 0.33 | 8 | PVC | 0.01 | 408 | 4 | 12 | 16 | 3.9 | | |
| Kirkland_Main-1960 | Kirkland_Manholes-797 | 330.09 | Kirkland_Manholes-798 | 328.4 | 134 | 1.26 | 8 | PVC | 0.01 | 792 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1961 | Kirkland_Manholes-798 | 328.4 | Kirkland_Manholes-799 | 299.17 | 250.4 | 11.67 | 8 | PVC | 0.01 | 2,409 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1962 | Kirkland_Manholes-799 | 299.17 | Kirkland_Manholes-803 | 278.64 | 308 | 6.67 | 8 | PVC | 0.01 | 1,820 | 7 | 24 | 31 | 1.7 | | |
| Kirkland_Main-1963 | Kirkland_Manholes-805 | 300.26 | Kirkland_Manholes-806 | 295.73 | 104.4 | 4.34 | 8 | PVC | 0.01 | 1,468 | 6 | 24 | 30 | 2 | | |
| Kirkland_Main-1964 | Kirkland_Manholes-806 | 295.73 | Kirkland_Manholes-804 | 284.1 | 194.3 | 5.99 | 8 | PVC | 0.01 | 1,725 | 7 | 28 | 35 | 2 | | |
| Kirkland_Main-1965 | Kirkland_Manholes-807 | 300.8 | Kirkland_Manholes-805 | 300.26 | 78.9 | 0.68 | 8 | PVC | 0.01 | 583 | 6 | 20 | 26 | 4.4 | | |
| Kirkland_Main-1966 | Kirkland_Manholes-819 | 270.84 | Kirkland_Manholes-818 | 259.9 | 158.1 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1967 | Kirkland_Manholes-818 | 259.9 | Kirkland_Manholes-816 | 252.1 | 223.2 | 3.49 | 8 | PVC | 0.01 | 1,318 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1968 | Kirkland_Manholes-816 | 252.1 | Kirkland_Manholes-815 | 248.52 | 125.8 | 2.85 | 8 | PVC | 0.01 | 1,190 | 4 | 12 | 16 | 1.3 | | |
| Kirkland_Main-1969 | Kirkland_Manholes-817 | 249.75 | Kirkland_Manholes-815 | 248.52 | 170.1 | 0.72 | 8 | PVC | 0.01 | 600 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1970 | Kirkland_Manholes-814 | 224.81 | Kirkland_Manholes-813 | 224.1 | 119.5 | 0.59 | 8 | PVC | 0.01 | 543 | 31 | 127 | 158 | 29.1 | | |
| Kirkland_Main-1971 | Kirkland_Manholes-813 | 224.1 | Kirkland_Manholes-811 | 220.71 | 283.2 | 1.2 | 8 | PVC | 0.01 | 771 | 33 | 131 | 164 | 21.3 | | |
| Kirkland_Main-1972 | Kirkland_Manholes-810 | 231.27 | Kirkland_Manholes-811 | 220.71 | 86.4 | 12.23 | 8 | PVC | 0.01 | 2,465 | 4 | 12 | 16 | 0.6 | | |
| Kirkland_Main-1973 | Kirkland_Manholes-811 | 220.71 | Kirkland_Manholes-812 | 219.12 | 123.9 | 1.28 | 8 | PVC | 0.01 | 799 | 38 | 147 | 185 | 23.1 | | |
| Kirkland_Main-1974 | Kirkland_Manholes-809 | 238.49 | Kirkland_Manholes-810 | 231.27 | 197.7 | 3.65 | 8 | PVC | 0.01 | 1,347 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1975 | Kirkland_Manholes-808 | 239.21 | Kirkland_Manholes-809 | 238.5 | 177.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | Drop Connection |
| Kirkland_Main-1976 | Kirkland_Manholes-812 | 219.12 | Kirkland_Manholes-784 | 186.93 | 281.2 | 11.45 | 8 | PVC | 0.01 | 2,385 | 39 | 151 | 190 | 7.9 | | |
| Kirkland_Main-1977 | Kirkland_Manholes-822 | 337.49 | Kirkland_Manholes-823 | 321.62 | 170.9 | 9.29 | 8 | PVC | 0.01 | 2,149 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX69 | |
| Kirkland_Main-1978 | Kirkland_Manholes-823 | 321.62 | Kirkland_Manholes-824 | 311.58 | 159.2 | 6.3 | 8 | PVC | 0.01 | 1,770 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX69 | |
| Kirkland_Main-1979 | Kirkland_Manholes-824 | 311.58 | Kirkland_Manholes-825 | 285.55 | 131.7 | 19.76 | 8 | PVC | 0.01 | 3,134 | 2 | 12 | 14 | 0.4 | SM14-Ex-EX69 | |
| Kirkland_Main-1980 | Kirkland_Manholes-825 | 285.55 | Kirkland_Manholes-826 | 282.55 | 56.8 | 5.29 | 8 | PVC | 0.01 | 1,621 | 3 | 24 | 27 | 1.7 | SM14-Ex-EX69 | |
| Kirkland_Main-1981 | Kirkland_Manholes-827 | 295.62 | Kirkland_Manholes-828 | 285.89 | 94.5 | 10.29 | 8 | PVC | 0.01 | 2,262 | 0 | 4 | 4 | 0.2 | SM14-Ex-EX69 | |
| Kirkland_Main-1982 | Kirkland_Manholes-826 | 282.55 | Kirkland_Manholes-456 | 263.04 | 178.8 | 10.91 | 8 | PVC | 0.01 | 2,329 | 3 | 28 | 31 | 1.3 | SM14-Ex-EX69 | |
| Kirkland_Main-1983 | Kirkland_Manholes-828 | 285.89 | Kirkland_Manholes-825 | 285.55 | 69 | 0.49 | 8 | PVC | 0.01 | 495 | 1 | 8 | 9 | 1.8 | SM14-Ex-EX69 | |
| Kirkland_Main-1984 | Kirkland_Manholes-790 | 227.7 | Kirkland_Manholes-830 | 198.45 | 91.3 | 32.05 | 8 | PVC | 0.01 | 3,991 | 2 | 16 | 18 | 0.5 | | Slope verified in as-builts |
| Kirkland_Main-1985 | Kirkland_Manholes-830 | 198.45 | Kirkland_Manholes-831 | 192.6 | 15.9 | 36.68 | 8 | PVC | 0.01 | 4,270 | 4 | 24 | 28 | 0.6 | | Slope verified in as-builts |
| Kirkland_Main-1986 | Kirkland_Manholes-831 | 192.6 | Kirkland_Manholes-786 | 173.41 | 171.2 | 11.21 | 8 | PVC | 0.01 | 2,360 | 4 | 28 | 32 | 1.3 | SM14-Ex-EX46 | |
| Kirkland_Main-1987 | Kirkland_Manholes-461 | 269.91 | Kirkland_Manholes-460 | 268.13 | 121.9 | 1.46 | 8 | PVC | 0.01 | 852 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX68 | |
| Kirkland_Main-1988 | Kirkland_Manholes-460 | 268.13 | Kirkland_Manholes-456 | 263.04 | 170.9 | 2.98 | 8 | PVC | 0.01 | 1,217 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX68 | |
| Kirkland_Main-1989 | Kirkland_Manholes-455 | 250.45 | Kirkland_Manholes-457 | 235.02 | 148.1 | 10.42 | 8 | PVC | 0.01 | 2,276 | 29 | 111 | 140 | 6.1 | SM14-Ex-EX67 | |
| Kirkland_Main-1990 | Kirkland_Manholes-457 | 235.02 | Kirkland_Manholes-458 | 212.1 | 153.1 | 14.97 | 8 | PVC | 0.01 | 2,728 | 29 | 119 | 148 | 5.4 | SM14-Ex-EX67 | |
| Kirkland_Main-1991 | Kirkland_Manholes-459 | 247.75 | Kirkland_Manholes-457 | 235.02 | 263.1 | 4.84 | 8 | PVC | 0.01 | 1,551 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX67 | |
| Kirkland_Main-1992 | Kirkland_Manholes-456 | 263.04 | Kirkland_Manholes-455 | 262.36 | 18.8 | 3.61 | 8 | PVC | 0.01 | 1,339 | 5 | 40 | 45 | 3.3 | SM14-Ex-EX68 | Drop Connection |
| Kirkland_Main-1993 | Kirkland_Manholes-792 | 342.6 | Kirkland_Manholes-832 | 339.26 | 96.2 | 3.47 | 8 | PVC | 0.01 | 1,314 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX70 | |
| Kirkland_Main-1994 | Kirkland_Manholes-793 | 339.56 | Kirkland_Manholes-832 | 339.26 | 76 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | SM14-Ex-EX70 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1997 | Kirkland_Manholes-988 | 238.57 | Kirkland_Manholes-989 | 235.68 | 166.4 | 1.74 | 8 | PVC | 0.01 | 929 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1998 | Kirkland_Manholes-989 | 235.68 | Kirkland_Manholes-990 | 231.8 | 65.1 | 5.96 | 8 | PVC | 0.01 | 1,721 | 2 | 9 | 11 | 0.6 | | |
| Kirkland_Main-1999 | Kirkland_Manholes-990 | 231.8 | Kirkland_Manholes-991 | 230.6 | 208.7 | 0.57 | 8 | PVC | 0.01 | 535 | 4 | 13 | 16 | 3.1 | | |
| Kirkland_Main-2000 | Kirkland_Manholes-992 | 230.9 | Kirkland_Manholes-991 | 230.6 | 22.8 | 1.32 | 8 | PVC | 0.01 | 809 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-2001 | Kirkland_Manholes-991 | 230.6 | Kirkland_Manholes-993 | 229.29 | 112.3 | 1.17 | 8 | PVC | 0.01 | 762 | 4 | 21 | 26 | 3.4 | | |
| Kirkland_Main-2002 | Kirkland_Manholes-993 | 229.29 | Kirkland_Manholes-994 | 224.8 | 89 | 5.04 | 8 | PVC | 0.01 | 1,583 | 5 | 26 | 31 | 1.9 | | |
| Kirkland_Main-2003 | Kirkland_Manholes-996 | 225.97 | Kirkland_Manholes-994 | 224.8 | 53 | 2.21 | 8 | PVC | 0.01 | 1,047 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2004 | Kirkland_Manholes-994 | 224.8 | Kirkland_Manholes-995 | 224.6 | 50 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 34 | 39 | 8.8 | | |
| Kirkland_Main-2005 | Kirkland_Manholes-995 | 224.6 | Kirkland_Manholes-997 | 222.3 | 221.9 | 1.04 | 8 | PVC | 0.01 | 718 | 6 | 38 | 45 | 6.3 | | |
| Kirkland_Main-2006 | Kirkland_Manholes-997 | 222.3 | Kirkland_Manholes-998 | 220.4 | 187.6 | 1.01 | 8 | PVC | 0.01 | 710 | 6 | 43 | 49 | 6.9 | | |
| Kirkland_Main-2007 | Kirkland_Manholes-998 | 220.4 | Kirkland_Manholes-980 | 219.4 | 152.8 | 0.65 | 8 | PVC | 0.01 | 570 | 6 | 47 | 53 | 9.4 | | |
| Kirkland_Main-2008 | Kirkland_Manholes-980 | 219.4 | Kirkland_Manholes-981 | 218.7 | 155.5 | 0.45 | 8 | PVC | 0.01 | 473 | 18 | 115 | 133 | 28.2 | | |
| Kirkland_Main-2009 | Kirkland_Manholes-981 | 218.7 | Kirkland_Manholes-982 | 217.59 | 190.8 | 0.58 | 8 | PVC | 0.01 | 538 | 20 | 119 | 139 | 25.9 | | |
| Kirkland_Main-2010 | Kirkland_Manholes-982 | 217.59 | Kirkland_Manholes-983 | 215.91 | 138.4 | 1.21 | 8 | PVC | 0.01 | 777 | 25 | 124 | 149 | 19.2 | | |
| Kirkland_Main-2011 | Kirkland_Manholes-983 | 215.91 | Kirkland_Manholes-984 | 210.71 | 282.7 | 1.84 | 8 | PVC | 0.01 | 956 | 26 | 128 | 154 | 16.1 | | |
| Kirkland_Main-2012 | Kirkland_Manholes-984 | 210.71 | Kirkland_Manholes-985 | 205.92 | 47.8 | 10.03 | 8 | PVC | 0.01 | 2,232 | 29 | 132 | 161 | 7.2 | | |
| Kirkland_Main-2013 | Kirkland_Manholes-1001 | 230.61 | Kirkland_Manholes-1020 | 226.4 | 192.3 | 2.19 | 8 | PVC | 0.01 | 1,043 | 28 | 90 | 117 | 11.2 | | |
| Kirkland_Main-2014 | Kirkland_Manholes-1000 | 240.25 | Kirkland_Manholes-1001 | 230.61 | 249.9 | 3.86 | 8 | PVC | 0.01 | 1,385 | 26 | 85 | 112 | 8.1 | | |
| Kirkland_Main-2015 | Kirkland_Manholes-999 | 246.1 | Kirkland_Manholes-1000 | 240.25 | 246.4 | 2.37 | 8 | PVC | 0.01 | 1,086 | 25 | 81 | 106 | 9.7 | | |
| Kirkland_Main-2016 | Kirkland_Manholes-972 | 246.27 | Kirkland_Manholes-999 | 246.1 | 109.4 | 0.16 | 8 | PVC | 0.01 | 278 | 24 | 77 | 101 | 36.3 | | |
| Kirkland_Main-2017 | Kirkland_Manholes-1002 | 227.29 | Kirkland_Manholes-1003 | 219.05 | 401.3 | 2.05 | 8 | PVC | 0.01 | 1,010 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2018 | Kirkland_Manholes-1003 | 219.05 | Kirkland_Manholes-1004 | 214.11 | 181.5 | 2.72 | 8 | PVC | 0.01 | 1,163 | 4 | 9 | 12 | 1.1 | | |
| Kirkland_Main-2019 | Kirkland_Manholes-1006 | 216.58 | Kirkland_Manholes-1007 | 215.09 | 213.6 | 0.7 | 8 | PVC | 0.01 | 589 | 4 | 9 | 12 | 2.1 | | |
| Kirkland_Main-2020 | Kirkland_Manholes-1005 | 223.06 | Kirkland_Manholes-1006 | 216.58 | 398.8 | 1.63 | 8 | PVC | 0.01 | 899 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2023 | Kirkland_Manholes-1007 | 215.09 | Kirkland_Manholes-1004 | 214.11 | 335.8 | 0.29 | 8 | PVC | 0.01 | 381 | 5 | 13 | 18 | 4.8 | | |
| Kirkland_Main-2024 | Kirkland_Manholes-1012 | 211.42 | Kirkland_Manholes-1013 | 197.72 | 100.9 | 13.58 | 8 | PVC | 0.01 | 2,598 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2025 | Kirkland_Manholes-1013 | 197.72 | Kirkland_Manholes-1014 | 187.16 | 124 | 8.52 | 8 | PVC | 0.01 | 2,057 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2026 | Kirkland_Manholes-1014 | 187.16 | Kirkland_Manholes-1015 | 186.96 | 99 | 0.2 | 8 | PVC | 0.01 | 317 | 3 | 13 | 16 | 4.9 | | |
| Kirkland_Main-2027 | Kirkland_Manholes-1015 | 186.96 | Kirkland_Manholes-1016 | 185.35 | 120.5 | 1.34 | 8 | PVC | 0.01 | 815 | 5 | 17 | 22 | 2.7 | | |
| Kirkland_Main-2028 | Kirkland_Manholes-1016 | 185.35 | Kirkland_Manholes-1036 | 185.26 | 143 | 0.06 | 8 | PVC | 0.01 | 174 | 7 | 21 | 28 | 16.1 | | |
| Kirkland_Main-2029 | Kirkland_Manholes-1036 | 185.26 | Kirkland_Manholes-1030 | 184.08 | 404.9 | 0.29 | 10 | PVC | 0.01 | 690 | 7 | 26 | 32 | 4.7 | | |
| Kirkland_Main-2030 | Kirkland_Manholes-1030 | 184.08 | Kirkland_Manholes-1031 | 183.18 | 286.1 | 0.31 | 10 | PVC | 0.01 | 717 | 10 | 30 | 40 | 5.5 | | |
| Kirkland_Main-2031 | Kirkland_Manholes-1034 | 183.86 | Kirkland_Manholes-1031 | 183.18 | 169 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-2032 | Kirkland_Manholes-1031 | 183.18 | Kirkland_Manholes-1035 | 182.7 | 151.6 | 0.32 | 8 | PVC | 0.01 | 397 | 11 | 38 | 49 | 12.5 | | |
| Kirkland_Main-2033 | Kirkland_Manholes-1032 | 177.81 | Kirkland_Manholes-1033 | 173.21 | 285.6 | 1.61 | 8 | PVC | 0.01 | 895 | 3 | 9 | 12 | 1.3 | | |
| Kirkland_Main-2034 | Kirkland_Manholes-1004 | 214.11 | Kirkland_Manholes-1028 | 212.78 | 233.9 | 0.57 | 8 | PVC | 0.01 | 532 | 9 | 26 | 35 | 6.5 | | |
| Kirkland_Main-2035 | Kirkland_Manholes-1009 | 214.27 | Kirkland_Manholes-1008 | 211.28 | 293.5 | 1.02 | 8 | PVC | 0.01 | 712 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX19 | |
| Kirkland_Main-2036 | Kirkland_Manholes-1028 | 212.78 | Kirkland_Manholes-1008 | 211.28 | 261 | 0.57 | 8 | PVC | 0.01 | 534 | 9 | 30 | 39 | 7.3 | SM14-Ex-EX19 | |
| Kirkland_Main-2037 | Kirkland_Manholes-1008 | 211.28 | Kirkland_Manholes-1029 | 210.29 | 108.6 | 0.91 | 8 | PVC | 0.01 | 673 | 11 | 38 | 49 | 7.4 | SM14-Ex-EX19 | |
| Kirkland_Main-2038 | Kirkland_Manholes-1029 | 210.29 | Kirkland_Manholes-1010 | 207.69 | 265.5 | 0.98 | 8 | PVC | 0.01 | 698 | 11 | 43 | 54 | 7.7 | SM14-Ex-EX19 | |
| Kirkland_Main-2039 | Kirkland_Manholes-1010 | 207.69 | Kirkland_Manholes-1017 | 205.5 | 77.5 | 2.83 | 8 | PVC | 0.01 | 1,186 | 11 | 47 | 58 | 4.9 | SM14-Ex-EX19 | |
| Kirkland_Main-2040 | Kirkland_Manholes-1022 | 213.66 | Kirkland_Manholes-1023 | 207.88 | 245.2 | 2.36 | 8 | PVC | 0.01 | 1,083 | 35 | 111 | 145 | 13.4 | SM14-Ex-EX18 | |
| Kirkland_Main-2041 | Kirkland_Manholes-1023 | 207.88 | Kirkland_Manholes-1017 | 205.5 | 153 | 1.56 | 8 | PVC | 0.01 | 879 | 36 | 115 | 152 | 17.3 | SM14-Ex-EX18 | |
| Kirkland_Main-2042 | Kirkland_Manholes-1017 | 205.5 | Kirkland_Manholes-1018 | 179.75 | 288.9 | 8.91 | 8 | PVC | 0.01 | 2,105 | 48 | 166 | 215 | 10.2 | SM14-Ex-EX31 | |
| Kirkland_Main-2043 | Kirkland_Manholes-1025 | 183.2 | Kirkland_Manholes-1026 | 149.27 | 241.9 | 14.02 | 8 | PVC | 0.01 | 2,640 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-2044 | Kirkland_Manholes-1027 | 150.87 | Kirkland_Manholes-1026 | 149.27 | 180 | 0.89 | 8 | PVC | 0.01 | 665 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2045 | Kirkland_Manholes-1021 | 230.72 | Kirkland_Manholes-1020 | 230.54 | 45.4 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 11 | 2.5 | SM14-Ex-EX18 | Drop Connection |
| Kirkland_Main-2046 | Kirkland_Manholes-1020 | 226.4 | Kirkland_Manholes-1019 | 216.75 | 175.1 | 5.51 | 8 | PVC | 0.01 | 1,655 | 32 | 102 | 134 | 8.1 | SM14-Ex-EX18 | |
| Kirkland_Main-2047 | Kirkland_Manholes-1019 | 216.75 | Kirkland_Manholes-1022 | 213.66 | 284.9 | 1.08 | 8 | PVC | 0.01 | 734 | 33 | 107 | 140 | 19.1 | SM14-Ex-EX18 | |
| Kirkland_Main-2050 | Kirkland_Manholes-1037 | 180.8 | Kirkland_Manholes-1032 | 177.81 | 192.3 | 1.56 | 8 | PVC | 0.01 | 879 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2051 | Kirkland_Manholes-1041 | 211.62 | Kirkland_Manholes-1040 | 211.16 | 115.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2052 | Kirkland_Manholes-1040 | 211.16 | Kirkland_Manholes-1039 | 191.93 | 181.5 | 10.59 | 8 | PVC | 0.01 | 2,295 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2053 | Kirkland_Manholes-1039 | 191.93 | Kirkland_Manholes-1038 | 180.54 | 235.3 | 4.84 | 8 | PVC | 0.01 | 1,551 | 4 | 13 | 17 | 1.1 | | |
| Kirkland_Main-2054 | Kirkland_Manholes-1038 | 180.54 | Kirkland_Manholes-1042 | 180.42 | 296.4 | 0.04 | 8 | PVC | 0.01 | 140 | 21 | 81 | 102 | 73 | SM14-2035-DF6 | |
| Kirkland_Main-2055 | Kirkland_Manholes-1045 | 212.56 | Kirkland_Manholes-1044 | 190.19 | 362.7 | 6.17 | 8 | PVC | 0.01 | 1,751 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-2056 | Kirkland_Manholes-1044 | 190.19 | Kirkland_Manholes-1043 | 180.32 | 106.1 | 9.3 | 8 | PVC | 0.01 | 2,151 | 4 | 9 | 13 | 0.6 | | |
| Kirkland_Main-2057 | Kirkland_Manholes-1042 | 180.42 | Kirkland_Manholes-1043 | 180.32 | 14.1 | 0.71 | 8 | PVC | 0.01 | 594 | 22 | 85 | 107 | 18 | | |
| Kirkland_Main-2058 | Kirkland_Manholes-1051 | 183.74 | Kirkland_Manholes-1050 | 181.82 | 166.3 | 1.15 | 8 | PVC | 0.01 | 758 | 33 | 145 | 178 | 23.5 | | |
| Kirkland_Main-2059 | Kirkland_Manholes-1050 | 181.82 | Kirkland_Manholes-1049 | 169.63 | 230.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 40 | 149 | 189 | 11.7 | | |
| Kirkland_Main-2060 | Kirkland_Manholes-1049 | 169.63 | Kirkland_Manholes-1048 | 168.86 | 245.7 | 0.31 | 8 | PVC | 0.01 | 395 | 40 | 154 | 194 | 49.1 | | |
| Kirkland_Main-2061 | Kirkland_Manholes-986 | 204.38 | Kirkland_Manholes-1051 | 183.74 | 288.7 | 7.15 | 8 | PVC | 0.01 | 1,885 | 31 | 141 | 172 | 9.1 | | |
| Kirkland_Main-2062 | Kirkland_Manholes-1048 | 168.86 | Kirkland_Manholes-1047 | 166.5 | 308.6 | 0.76 | 8 | PVC | 0.01 | 617 | 46 | 158 | 204 | 33.1 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2063 | Kirkland_Manholes-1047 | 166.5 | Kirkland_Manholes-1046 | 162.86 | 368.8 | 0.99 | 8 | PVC | 0.01 | 700 | 46 | 162 | 208 | 29.7 | | |
| Kirkland_Main-2064 | Kirkland_Manholes-1053 | 228.57 | Kirkland_Manholes-1089 | 214.64 | 105.1 | 13.25 | 8 | PVC | 0.01 | 2,566 | 1 | 32 | 33 | 1.3 | | |
| Kirkland_Main-2065 | Kirkland_Manholes-1054 | 235.88 | Kirkland_Manholes-1053 | 228.57 | 61.2 | 11.95 | 8 | PVC | 0.01 | 2,437 | 1 | 28 | 29 | 1.2 | | |
| Kirkland_Main-2066 | Kirkland_Manholes-1062 | 265.12 | Kirkland_Manholes-1055 | 254.27 | 156.2 | 6.95 | 8 | PVC | 0.01 | 1,858 | 6 | 20 | 26 | 1.4 | | |
| Kirkland_Main-2067 | Kirkland_Manholes-1063 | 275.15 | Kirkland_Manholes-1062 | 265.12 | 144.2 | 6.96 | 8 | PVC | 0.01 | 1,860 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2068 | Kirkland_Manholes-1064 | 278.57 | Kirkland_Manholes-1062 | 265.12 | 154.9 | 8.68 | 8 | PVC | 0.01 | 2,078 | 4 | 12 | 16 | 0.8 | | |
| Kirkland_Main-2069 | Kirkland_Manholes-1055 | 254.27 | Kirkland_Manholes-1056 | 242.38 | 224 | 5.31 | 8 | PVC | 0.01 | 1,625 | 7 | 24 | 30 | 1.9 | | |
| Kirkland_Main-2070 | Kirkland_Manholes-1056 | 242.38 | Kirkland_Manholes-1057 | 237.15 | 108.2 | 4.83 | 8 | PVC | 0.01 | 1,550 | 8 | 28 | 36 | 2.3 | | |
| Kirkland_Main-2071 | Kirkland_Manholes-1057 | 237.15 | Kirkland_Manholes-1058 | 224.96 | 136.1 | 8.96 | 8 | PVC | 0.01 | 2,110 | 11 | 44 | 55 | 2.6 | | |
| Kirkland_Main-2072 | Kirkland_Manholes-1059 | 243.26 | Kirkland_Manholes-1057 | 237.15 | 201.9 | 3.03 | 8 | PVC | 0.01 | 1,227 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-2073 | Kirkland_Manholes-1061 | 271.51 | Kirkland_Manholes-1060 | 252.96 | 148.5 | 12.49 | 8 | PVC | 0.01 | 2,492 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2074 | Kirkland_Manholes-1060 | 252.96 | Kirkland_Manholes-1059 | 243.26 | 83.7 | 11.58 | 8 | PVC | 0.01 | 2,400 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2075 | Kirkland_Manholes-1103 | 198.97 | Kirkland_Manholes-1101 | 197.04 | 31 | 6.23 | 18 | PVC | 0.01 | 15,303 | 549 | 2,070 | 2,619 | 17.1 | | |
| Kirkland_Main-2076 | Kirkland_Manholes-1102 | 199.75 | Kirkland_Manholes-1101 | 197.04 | 30.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 3 | 40 | 42 | 2 | | |
| Kirkland_Main-2077 | Kirkland_Manholes-1100 | 201.72 | Kirkland_Manholes-1102 | 199.75 | 337.5 | 0.58 | 8 | PVC | 0.01 | 539 | 2 | 36 | 37 | 6.9 | | |
| Kirkland_Main-2078 | Kirkland_Manholes-1093 | 203.29 | Kirkland_Manholes-1100 | 201.72 | 272.4 | 0.58 | 8 | PVC | 0.01 | 535 | 0 | 32 | 32 | 6 | | |
| Kirkland_Main-2079 | Kirkland_Manholes-1095 | 206.07 | Kirkland_Manholes-1094 | 204.22 | 102 | 1.81 | 8 | PVC | 0.01 | 950 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2080 | Kirkland_Manholes-1094 | 204.22 | Kirkland_Manholes-1093 | 203.29 | 43.7 | 2.13 | 8 | PVC | 0.01 | 1,028 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-2081 | Kirkland_Manholes-1096 | 204.27 | Kirkland_Manholes-1093 | 203.29 | 162.1 | 0.6 | 8 | PVC | 0.01 | 548 | 0 | 20 | 20 | 3.6 | | |
| Kirkland_Main-2082 | Kirkland_Manholes-1098 | 205.6 | Kirkland_Manholes-1097 | 204.86 | 78.1 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2083 | Kirkland_Manholes-1097 | 204.86 | Kirkland_Manholes-1096 | 204.27 | 167.5 | 0.35 | 8 | PVC | 0.01 | 418 | 0 | 16 | 16 | 3.8 | | |
| Kirkland_Main-2084 | Kirkland_Manholes-1099 | 211.44 | Kirkland_Manholes-1097 | 204.86 | 308.5 | 2.13 | 8 | PVC | 0.01 | 1,030 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-2085 | Kirkland_Manholes-1079 | 238.18 | Kirkland_Manholes-1080 | 229.14 | 134.4 | 6.73 | 8 | PVC | 0.01 | 1,829 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2086 | Kirkland_Manholes-1080 | 229.14 | Kirkland_Manholes-1081 | 226.1 | 255.6 | 1.19 | 8 | PVC | 0.01 | 769 | 63 | 258 | 321 | 41.7 | | |
| Kirkland_Main-2087 | Kirkland_Manholes-1082 | 233.35 | Kirkland_Manholes-1081 | 226.1 | 142.6 | 5.08 | 8 | PVC | 0.01 | 1,590 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2088 | Kirkland_Manholes-1081 | 226.1 | Kirkland_Manholes-1070 | 224.89 | 260.5 | 0.46 | 8 | PVC | 0.01 | 481 | 64 | 266 | 331 | 68.8 | SM14-2035-DF7 | |
| Kirkland_Main-2089 | Kirkland_Manholes-1069 | 247.48 | Kirkland_Manholes-1070 | 224.89 | 321.6 | 7.02 | 8 | PVC | 0.01 | 1,869 | 64 | 226 | 467 | 25 | | |
| Kirkland_Main-2090 | Kirkland_Manholes-1067 | 259.57 | Kirkland_Manholes-1069 | 247.48 | 126 | 9.6 | 8 | PVC | 0.01 | 2,184 | 60 | 211 | 447 | 20.5 | | |
| Kirkland_Main-2091 | Kirkland_Manholes-1071 | 277.81 | Kirkland_Manholes-1067 | 259.57 | 242.2 | 7.53 | 8 | PVC | 0.01 | 1,935 | 15 | 60 | 74 | 3.8 | | |
| Kirkland_Main-2092 | Kirkland_Manholes-1072 | 288.83 | Kirkland_Manholes-1071 | 277.81 | 139.9 | 7.88 | 8 | PVC | 0.01 | 1,979 | 7 | 20 | 27 | 1.4 | | |
| Kirkland_Main-2093 | Kirkland_Manholes-1077 | 252.59 | Kirkland_Manholes-1069 | 247.48 | 346.5 | 1.47 | 8 | PVC | 0.01 | 856 | 4 | 12 | 16 | 1.8 | | |
| Kirkland_Main-2094 | Kirkland_Manholes-1078 | 305.14 | Kirkland_Manholes-1073 | 302.05 | 162.4 | 1.9 | 8 | PVC | 0.01 | 973 | 3 | 8 | 11 | 1.1 | | |
| Kirkland_Main-2095 | Kirkland_Manholes-1073 | 302.05 | Kirkland_Manholes-1072 | 288.83 | 375.1 | 3.52 | 8 | PVC | 0.01 | 1,324 | 6 | 16 | 22 | 1.6 | | |
| Kirkland_Main-2096 | Kirkland_Manholes-1074 | 295.05 | Kirkland_Manholes-1075 | 291.84 | 155.4 | 2.07 | 8 | PVC | 0.01 | 1,013 | 41 | 127 | 345 | 34 | | |
| Kirkland_Main-2097 | Kirkland_Manholes-1076 | 298.68 | Kirkland_Manholes-1074 | 295.05 | 108.2 | 3.36 | 8 | PVC | 0.01 | 1,291 | 41 | 123 | 340 | 26.3 | | |
| Kirkland_Main-2098 | Kirkland_Manholes-1068 | 279.38 | Kirkland_Manholes-1066 | 278.91 | 39.6 | 1.19 | 8 | PVC | 0.01 | 768 | 44 | 139 | 359 | 46.7 | | |
| Kirkland_Main-2099 | Kirkland_Manholes-1066 | 278.91 | Kirkland_Manholes-1065 | 260.88 | 143.1 | 12.6 | 8 | PVC | 0.01 | 2,502 | 44 | 143 | 363 | 14.5 | | |
| Kirkland_Main-2100 | Kirkland_Manholes-1065 | 260.88 | Kirkland_Manholes-1067 | 259.57 | 130 | 1.01 | 8 | PVC | 0.01 | 708 | 44 | 147 | 367 | 51.9 | | |
| Kirkland_Main-2101 | Kirkland_Manholes-1090 | 254.86 | Kirkland_Manholes-1091 | 251.69 | 82.2 | 3.86 | 8 | PVC | 0.01 | 1,385 | 1 | 16 | 17 | 1.2 | | |
| Kirkland_Main-2102 | Kirkland_Manholes-1091 | 251.69 | Kirkland_Manholes-1092 | 246.51 | 140.9 | 3.68 | 8 | PVC | 0.01 | 1,352 | 1 | 20 | 21 | 1.5 | | |
| Kirkland_Main-2103 | Kirkland_Manholes-1092 | 246.51 | Kirkland_Manholes-1054 | 235.88 | 141.8 | 7.5 | 8 | PVC | 0.01 | 1,931 | 1 | 24 | 25 | 1.3 | | |
| Kirkland_Main-2104 | Kirkland_Manholes-1089 | 214.64 | Kirkland_Manholes-1086 | 198.2 | 276 | 5.96 | 8 | PVC | 0.01 | 1,721 | 1 | 36 | 37 | 2.1 | | |
| Kirkland_Main-2105 | Kirkland_Manholes-1088 | 203.98 | Kirkland_Manholes-1087 | 203.79 | 103.7 | 0.19 | 8 | PVC | 0.01 | 306 | 5 | 4 | 8 | 2.8 | | |
| Kirkland_Main-2106 | Kirkland_Manholes-1087 | 203.79 | Kirkland_Manholes-1086 | 198.2 | 55.1 | 10.14 | 8 | PVC | 0.01 | 2,245 | 5 | 8 | 12 | 0.6 | | |
| Kirkland_Main-2107 | Kirkland_Manholes-1070 | 224.89 | Kirkland_Manholes-1083 | 220.88 | 227.5 | 1.76 | 12 | PVC | 0.01 | 2,760 | 130 | 497 | 802 | 29.1 | SM14-Ex-EX321 | |
| Kirkland_Main-2108 | Kirkland_Manholes-2996 | 220.63 | Kirkland_Manholes-1084 | 206.2 | 323.5 | 4.46 | 8 | PVC | 0.01 | 1,489 | 139 | 509 | 824 | 55.3 | | |
| Kirkland_Main-2109 | Kirkland_Manholes-1058 | 224.96 | Kirkland_Manholes-1084 | 206.2 | 342.8 | 5.47 | 8 | PVC | 0.01 | 1,649 | 12 | 48 | 59 | 3.6 | | |
| Kirkland_Main-2110 | Kirkland_Manholes-1084 | 206.2 | Kirkland_Manholes-1085 | 204.43 | 46.9 | 3.78 | 8 | PVC | 0.01 | 1,370 | 151 | 560 | 888 | 64.8 | | |
| Kirkland_Main-2111 | Kirkland_Manholes-1101 | 197.04 | Kirkland_Manholes-1104 | 196.79 | 207.5 | 0.12 | 24 | PVC | 0.01 | 4,572 | 552 | 2,114 | 2,666 | 58.3 | SM14-Ex-EX22 | |
| Kirkland_Main-2112 | Kirkland_Manholes-1112 | 179.44 | Kirkland_Manholes-1124 | 177.02 | 214.1 | 1.13 | 15 | PVC | 0.01 | 4,007 | 58 | 32 | 90 | 2.2 | | |
| Kirkland_Main-2113 | Kirkland_Manholes-1113 | 180.6 | Kirkland_Manholes-1112 | 179.44 | 131.8 | 0.88 | 15 | PVC | 0.01 | 3,535 | 50 | 24 | 74 | 2.1 | | |
| Kirkland_Main-2114 | Kirkland_Manholes-1117 | 196.58 | Kirkland_Manholes-1115 | 186.39 | 163.3 | 6.24 | 15 | PVC | 0.01 | 9,416 | 18 | 12 | 30 | 0.3 | | |
| Kirkland_Main-2115 | Kirkland_Manholes-1116 | 180.36 | Kirkland_Manholes-1112 | 179.44 | 120 | 0.77 | 8 | PVC | 0.01 | 617 | 3 | 4 | 7 | 1.2 | | |
| Kirkland_Main-2116 | Kirkland_Manholes-1119 | 159.49 | Kirkland_Manholes-1120 | 158.13 | 217.8 | 0.62 | 8 | PVC | 0.01 | 557 | 25 | 6 | 31 | 5.5 | | |
| Kirkland_Main-2117 | Kirkland_Manholes-1126 | 164.51 | Kirkland_Manholes-1127 | 163.92 | 310.2 | 0.19 | 24 | PVC | 0.01 | 5,757 | 280 | 683 | 1,139 | 19.8 | SM14-Ex-EX4 | |
| Kirkland_Main-2118 | Kirkland_Manholes-1134 | 223.76 | Kirkland_Manholes-1131 | 191.56 | 280.1 | 11.49 | 8 | PVC | 0.01 | 2,390 | 12 | 23 | 35 | 1.5 | SM14-Ex-EX63 | |
| Kirkland_Main-2119 | Kirkland_Manholes-1137 | 231.81 | Kirkland_Manholes-1135 | 210.01 | 166.8 | 13.07 | 8 | PVC | 0.01 | 2,549 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX81 | |
| Kirkland_Main-2120 | Kirkland_Manholes-1135 | 210.01 | Kirkland_Manholes-1131 | 191.56 | 334.9 | 5.51 | 8 | PVC | 0.01 | 1,655 | 2 | 13 | 15 | 0.9 | SM14-Ex-EX81 | |
| Kirkland_Main-2121 | Kirkland_Manholes-1136 | 213.62 | Kirkland_Manholes-1135 | 210.01 | 85.6 | 4.22 | 8 | PVC | 0.01 | 1,448 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX81 | |
| Kirkland_Main-2122 | Kirkland_Manholes-680 | 257.67 | Kirkland_Manholes-679 | 257.45 | 31.1 | 0.71 | 8 | PVC | 0.01 | 593 | 19 | 24 | 43 | 7.3 | | |
| Kirkland_Main-2123 | Kirkland_Manholes-679 | 257.45 | Kirkland_Manholes-681 | 256.89 | 146.9 | 0.38 | 8 | PVC | 0.01 | 435 | 19 | 32 | 51 | 11.7 | | |
| Kirkland_Main-2124 | Kirkland_Manholes-678 | 266.88 | Kirkland_Manholes-679 | 257.45 | 86.2 | 10.93 | 8 | PVC | 0.01 | 2,331 | 0 | 4 | 4 | 0.2 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2125 | Kirkland_Manholes-682 | 258.64 | Kirkland_Manholes-680 | 257.67 | 223 | 0.44 | 8 | PVC | 0.01 | 465 | 1 | 20 | 20 | 4.4 | | |
| Kirkland_Main-2126 | Kirkland_Manholes-685 | 255.36 | Kirkland_Manholes-1888 | 254.12 | 288.3 | 0.43 | 8 | PVC | 0.01 | 462 | 21 | 44 | 65 | 14 | | |
| Kirkland_Main-2127 | Kirkland_Manholes-684 | 256.25 | Kirkland_Manholes-685 | 255.36 | 200.3 | 0.44 | 8 | PVC | 0.01 | 469 | 19 | 40 | 59 | 12.6 | | |
| Kirkland_Main-2128 | Kirkland_Manholes-1740 | 35.99 | Kirkland_Manholes-1743 | 28.04 | 156.8 | 5.07 | 10 | PVC | 0.01 | 2,878 | 247 | 560 | 807 | 28 | | |
| Kirkland_Main-2129 | Kirkland_Manholes-1757 | 18.99 | Kirkland_Manholes-1756 | 15.01 | 53.7 | 7.42 | 8 | PVC | 0.01 | 1,920 | 5 | 6 | 12 | 0.6 | SM14-Ex-EX183 | |
| Kirkland_Main-2130 | Kirkland_Manholes-1756 | 15.01 | Kirkland_Manholes-1758 | 14.89 | 54.1 | 0.21 | 12 | PVC | 0.01 | 959 | 57 | 19 | 77 | 8 | SM14-Ex-EX183 | |
| Kirkland_Main-2131 | Kirkland_Manholes-1758 | 14.89 | Kirkland_Manholes-1759 | 14.76 | 60.8 | 0.23 | 12 | PVC | 0.01 | 991 | 60 | 26 | 86 | 8.7 | SM14-Ex-EX183 | |
| Kirkland_Main-2132 | Kirkland_Manholes-1759 | 14.76 | Kirkland_Manholes-1789 | 14.67 | 38.9 | 0.21 | 12 | PVC | 0.01 | 957 | 60 | 32 | 93 | 9.7 | SM14-Ex-EX183 | |
| Kirkland_Main-2133 | Kirkland_Manholes-2067 | 19 | Kirkland_Manholes-1756 | 15.01 | 217.5 | 1.84 | 12 | PVC | 0.01 | 2,816 | 46 | 6 | 52 | 1.9 | SM14-Ex-EX183 | |
| Kirkland_Main-2134 | Kirkland_Manholes-2305 | 15.26 | Kirkland_Manholes-1755 | 15.12 | 124.7 | 0.11 | 21 | PVC | 0.01 | 3,097 | 267 | 675 | 942 | 30.4 | | |
| Kirkland_Main-2135 | Kirkland_Manholes-1755 | 15.12 | Kirkland_Manholes-1753 | 14.83 | 381.1 | 0.08 | 21 | PVC | 0.01 | 2,550 | 267 | 682 | 949 | 37.2 | | |
| Kirkland_Main-2136 | Kirkland_Manholes-1753 | 14.83 | Kirkland_Manholes-1754 | 14.75 | 34.9 | 0.23 | 21 | PVC | 0.01 | 4,426 | 272 | 688 | 961 | 21.7 | | |
| Kirkland_Main-2137 | Kirkland_Manholes-1754 | 14.75 | Kirkland_Manholes-1789 | 14.67 | 165.1 | 0.05 | 21 | PVC | 0.01 | 2,035 | 279 | 695 | 974 | 47.8 | | |
| Kirkland_Main-2138 | Kirkland_Manholes-1692 | 35.9 | Kirkland_Manholes-736 | 28.45 | 107.1 | 6.96 | 8 | PVC | 0.01 | 1,860 | 60 | 272 | 332 | 17.8 | SM14-Ex-EX96 | |
| Kirkland_Main-2139 | Kirkland_Manholes-1694 | 44.12 | Kirkland_Manholes-1692 | 35.9 | 116.3 | 7.07 | 8 | PVC | 0.01 | 1,874 | 56 | 255 | 312 | 16.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2140 | Kirkland_Manholes-1701 | 49.81 | Kirkland_Manholes-1694 | 44.12 | 274.3 | 2.07 | 8 | PVC | 0.01 | 1,016 | 4 | 16 | 20 | 2 | SM14-Ex-EX152 | |
| Kirkland_Main-2141 | Kirkland_Manholes-1702 | 82.31 | Kirkland_Manholes-1701 | 49.81 | 296.4 | 10.96 | 8 | PVC | 0.01 | 2,335 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX152 | |
| Kirkland_Main-2142 | Kirkland_Manholes-1698 | 89.68 | Kirkland_Manholes-1697 | 68.77 | 247.3 | 8.45 | 8 | PVC | 0.01 | 2,050 | 1 | 8 | 10 | 0.5 | SM14-Ex-EX151 | |
| Kirkland_Main-2143 | Kirkland_Manholes-1697 | 68.77 | Kirkland_Manholes-1696 | 58.41 | 181 | 5.72 | 8 | PVC | 0.01 | 1,687 | 5 | 16 | 21 | 1.3 | SM14-Ex-EX151 | |
| Kirkland_Main-2144 | Kirkland_Manholes-614 | 87.89 | Kirkland_Manholes-1696 | 58.41 | 277.2 | 10.64 | 8 | PVC | 0.01 | 2,299 | 45 | 198 | 242 | 10.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2145 | Kirkland_Manholes-2025 | 477 | Kirkland_Manholes-2024 | 470.6 | 42.9 | 14.92 | 8 | PVC | 0.01 | 2,724 | 6 | 12 | 18 | 0.7 | | |
| Kirkland_Main-2146 | Kirkland_Manholes-2024 | 470.6 | Kirkland_Manholes-2023 | 466.76 | 120.1 | 3.2 | 8 | PVC | 0.01 | 1,261 | 7 | 16 | 23 | 1.8 | | |
| Kirkland_Main-2147 | Kirkland_Manholes-2019 | 467.83 | Kirkland_Manholes-2022 | 466 | 273.9 | 0.67 | 10 | PVC | 0.01 | 1,045 | 99 | 246 | 345 | 33.1 | | |
| Kirkland_Main-2148 | Kirkland_Manholes-2028 | 481.27 | Kirkland_Manholes-2026 | 474.59 | 90.6 | 7.37 | 8 | PVC | 0.01 | 1,914 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2149 | Kirkland_Manholes-2029 | 479.06 | Kirkland_Manholes-2027 | 477.1 | 283.3 | 0.69 | 8 | PVC | 0.01 | 586 | 21 | 75 | 97 | 16.5 | | |
| Kirkland_Main-2150 | Kirkland_Manholes-2027 | 477.1 | Kirkland_Manholes-2026 | 474.59 | 76.4 | 3.29 | 8 | PVC | 0.01 | 1,278 | 22 | 79 | 102 | 8 | | |
| Kirkland_Main-2151 | Kirkland_Manholes-2026 | 474.59 | Kirkland_Manholes-2021 | 473.17 | 135.7 | 1.05 | 8 | PVC | 0.01 | 721 | 24 | 87 | 111 | 15.4 | | |
| Kirkland_Main-2152 | Kirkland_Manholes-2033 | 462.47 | Kirkland_Manholes-2034 | 462.21 | 16.1 | 1.61 | 8 | PVC | 0.01 | 896 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2153 | Kirkland_Manholes-2034 | 462.21 | Kirkland_Manholes-2032 | 461.07 | 176.2 | 0.65 | 8 | PVC | 0.01 | 567 | 1 | 8 | 9 | 1.6 | | Drop Connection |
| Kirkland_Main-2154 | Kirkland_Manholes-2031 | 464.09 | Kirkland_Manholes-2032 | 458.97 | 79 | 6.48 | 8 | PVC | 0.01 | 1,795 | 109 | 282 | 392 | 21.8 | SM14-Ex-EX264 | |
| Kirkland_Main-2155 | Kirkland_Manholes-2030 | 465.11 | Kirkland_Manholes-2031 | 464.09 | 197.9 | 0.52 | 10 | PVC | 0.01 | 918 | 109 | 278 | 387 | 42.2 | | |
| Kirkland_Main-2156 | Kirkland_Manholes-2022 | 466 | Kirkland_Manholes-2030 | 465.11 | 389.3 | 0.23 | 10 | PVC | 0.01 | 611 | 107 | 270 | 377 | 61.7 | | |
| Kirkland_Main-2157 | Kirkland_Manholes-2035 | 454.4 | Kirkland_Manholes-2036 | 452.58 | 173.2 | 1.05 | 8 | PVC | 0.01 | 723 | 113 | 298 | 411 | 56.8 | SM14-Ex-EX264 | |
| Kirkland_Main-2158 | Kirkland_Manholes-2032 | 458.97 | Kirkland_Manholes-2035 | 454.4 | 196.5 | 2.33 | 8 | PVC | 0.01 | 1,075 | 112 | 294 | 406 | 37.7 | SM14-Ex-EX264 | |
| Kirkland_Main-2159 | Kirkland_Manholes-2039 | 480.14 | Kirkland_Manholes-2040 | 475.69 | 137 | 3.25 | 8 | PVC | 0.01 | 1,271 | 5 | 8 | 13 | 1 | SM14-Ex-EX266 | |
| Kirkland_Main-2160 | Kirkland_Manholes-2038 | 484.4 | Kirkland_Manholes-2039 | 480.14 | 188.8 | 2.26 | 8 | PVC | 0.01 | 1,059 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX266 | |
| Kirkland_Main-2161 | Kirkland_Manholes-2040 | 475.69 | Kirkland_Manholes-2037 | 465.67 | 362.6 | 2.76 | 8 | PVC | 0.01 | 1,172 | 7 | 12 | 19 | 1.6 | SM14-Ex-EX266 | |
| Kirkland_Main-2162 | Kirkland_Manholes-2672 | 373.35 | Kirkland_Manholes-2674 | 354.77 | 247.9 | 7.5 | 8 | PVC | 0.01 | 1,930 | 14 | 79 | 93 | 4.8 | SM14-Ex-EX209 | |
| Kirkland_Main-2163 | Kirkland_Manholes-2671 | 399.75 | Kirkland_Manholes-2672 | 373.35 | 240.8 | 10.97 | 8 | PVC | 0.01 | 2,335 | 13 | 75 | 88 | 3.8 | SM14-Ex-EX209 | |
| Kirkland_Main-2164 | Kirkland_Manholes-2674 | 354.77 | Kirkland_Manholes-2300 | 337.19 | 208.1 | 8.45 | 8 | PVC | 0.01 | 2,049 | 15 | 83 | 98 | 4.8 | SM14-Ex-EX209 | |
| Kirkland_Main-2165 | Kirkland_Manholes-2678 | 335.2 | Kirkland_Manholes-2681 | 334.86 | 198.8 | 0.17 | 12 | PVC | 0.01 | 860 | 37 | 167 | 204 | 23.7 | SM14-Ex-EX206 | |
| Kirkland_Main-2166 | Kirkland_Manholes-2680 | 361.93 | Kirkland_Manholes-2678 | 335.2 | 358.9 | 7.45 | 8 | PVC | 0.01 | 1,924 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-2167 | Kirkland_Manholes-2677 | 336.2 | Kirkland_Manholes-2678 | 335.2 | 208.7 | 0.48 | 12 | PVC | 0.01 | 1,439 | 34 | 159 | 193 | 13.4 | SM14-Ex-EX206 | |
| Kirkland_Main-2168 | Kirkland_Manholes-2676 | 336.73 | Kirkland_Manholes-2677 | 336.2 | 133.1 | 0.4 | 12 | PVC | 0.01 | 1,317 | 34 | 155 | 188 | 14.3 | SM14-Ex-EX206 | |
| Kirkland_Main-2169 | Kirkland_Manholes-2675 | 350.82 | Kirkland_Manholes-2676 | 336.73 | 223.6 | 6.3 | 8 | PVC | 0.01 | 1,770 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX208 | |
| Kirkland_Main-2170 | Kirkland_Manholes-2300 | 337.19 | Kirkland_Manholes-2676 | 336.73 | 113.6 | 0.4 | 12 | PVC | 0.01 | 1,317 | 30 | 143 | 173 | 13.1 | SM14-Ex-EX206 | |
| Kirkland_Main-2171 | Kirkland_Manholes-2697 | 234.26 | Kirkland_Manholes-2245 | 234.09 | 42.8 | 0.4 | 8 | PVC | 0.01 | 444 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2173 | Kirkland_Manholes-2682 | 228.77 | Kirkland_Manholes-2685 | 228.01 | 128.4 | 0.59 | 8 | PVC | 0.01 | 542 | 4 | 12 | 16 | 3 | SM14-Ex-EX201 | |
| Kirkland_Main-2174 | Kirkland_Manholes-2683 | 239.58 | Kirkland_Manholes-2682 | 228.77 | 368.9 | 2.93 | 8 | PVC | 0.01 | 1,207 | 3 | 8 | 11 | 0.9 | | |
| Kirkland_Main-2175 | Kirkland_Manholes-2684 | 244.68 | Kirkland_Manholes-2683 | 239.58 | 150.1 | 3.4 | 8 | PVC | 0.01 | 1,300 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2176 | Kirkland_Manholes-2685 | 228.01 | Kirkland_Manholes-2686 | 221.84 | 249.2 | 2.48 | 8 | PVC | 0.01 | 1,109 | 5 | 16 | 21 | 1.9 | SM14-Ex-EX201 | |
| Kirkland_Main-2177 | Kirkland_Manholes-2311 | 256.52 | Kirkland_Manholes-2310 | 256 | 129.9 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 13 | 17 | 3.7 | | |
| Kirkland_Main-2178 | Kirkland_Manholes-2688 | 231.59 | Kirkland_Manholes-2687 | 227.79 | 162.1 | 2.34 | 8 | PVC | 0.01 | 1,080 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-2179 | Kirkland_Manholes-2687 | 227.79 | Kirkland_Manholes-2686 | 221.84 | 261.7 | 2.27 | 8 | PVC | 0.01 | 1,063 | 4 | 12 | 16 | 1.5 | | |
| Kirkland_Main-2180 | Kirkland_Manholes-2689 | 235.04 | Kirkland_Manholes-2688 | 231.59 | 174.6 | 1.98 | 8 | PVC | 0.01 | 991 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2184 | Kirkland_Manholes-2691 | 211.09 | Kirkland_Manholes-2692 | 205.03 | 238.4 | 2.54 | 8 | PVC | 0.01 | 1,124 | 12 | 40 | 51 | 4.6 | SM14-Ex-EX201 | |
| Kirkland_Main-2185 | Kirkland_Manholes-2692 | 205.03 | Kirkland_Manholes-2693 | 198.67 | 215 | 2.96 | 8 | PVC | 0.01 | 1,213 | 12 | 44 | 56 | 4.6 | SM14-Ex-EX201 | |
| Kirkland_Main-2186 | Kirkland_Manholes-2693 | 198.67 | Kirkland_Manholes-2694 | 189.1 | 61.3 | 15.61 | 8 | PVC | 0.01 | 2,785 | 13 | 48 | 60 | 2.2 | SM14-Ex-EX201 | |
| Kirkland_Main-2187 | Kirkland_Manholes-2695 | 190.38 | Kirkland_Manholes-2694 | 189.1 | 280.3 | 0.46 | 8 | PVC | 0.01 | 476 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX201 | |
| Kirkland_Main-2188 | Kirkland_Manholes-2694 | 189.1 | Kirkland_Manholes-2698 | 186.34 | 272.4 | 1.01 | 8 | PVC | 0.01 | 710 | 13 | 56 | 69 | 9.7 | SM14-Ex-EX198 | |
| Kirkland_Main-2189 | Kirkland_Manholes-2701 | 219.11 | Kirkland_Manholes-2700 | 212.52 | 304.2 | 2.17 | 8 | PVC | 0.01 | 1,038 | 8 | 56 | 64 | 6.1 | | |
| Kirkland_Main-2190 | Kirkland_Manholes-2700 | 212.52 | Kirkland_Manholes-2699 | 190.07 | 286.1 | 7.85 | 8 | PVC | 0.01 | 1,975 | 10 | 60 | 69 | 3.5 | SM14-Ex-EX202 | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2191 | Kirkland_Manholes-2699 | 190.07 | Kirkland_Manholes-2696 | 172.94 | 342.2 | 5.01 | 8 | PVC | 0.01 | 1,578 | 10 | 64 | 74 | 4.7 | SM14-Ex-EX202 | |
| Kirkland_Main-2192 | Kirkland_Manholes-2706 | 252.55 | Kirkland_Manholes-2704 | 250.11 | 196.5 | 1.24 | 8 | PVC | 0.01 | 786 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2193 | Kirkland_Manholes-2704 | 250.11 | Kirkland_Manholes-2705 | 234.07 | 107.2 | 14.96 | 8 | PVC | 0.01 | 2,727 | 6 | 48 | 54 | 2 | | |
| Kirkland_Main-2194 | Kirkland_Manholes-2705 | 234.07 | Kirkland_Manholes-2701 | 219.11 | 291.8 | 5.13 | 8 | PVC | 0.01 | 1,596 | 8 | 52 | 60 | 3.7 | | |
| Kirkland_Main-2195 | Kirkland_Manholes-2710 | 293.33 | Kirkland_Manholes-2709 | 292.14 | 31.4 | 3.79 | 8 | PVC | 0.01 | 1,373 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2197 | Kirkland_Manholes-501 | 145.5 | Kirkland_Manholes-502 | 134.98 | 294 | 3.58 | 8 | PVC | 0.01 | 1,334 | 1 | 8 | 9 | 0.7 | SM10 | |
| Kirkland_Main-2198 | Kirkland_Manholes-502 | 134.98 | Kirkland_Manholes-1158 | 124.93 | 261.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 3 | 16 | 19 | 1.4 | SM10 | |
| Kirkland_Main-2199 | Kirkland_Manholes-1178 | 142.08 | Kirkland_Manholes-1179 | 123.76 | 339.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 5 | 25 | 30 | 1.8 | SM10 | |
| Kirkland_Main-2200 | Kirkland_Manholes-1177 | 164.29 | Kirkland_Manholes-1178 | 142.08 | 352.7 | 6.3 | 8 | PVC | 0.01 | 1,769 | 3 | 16 | 19 | 1.1 | SM10 | |
| Kirkland_Main-2201 | Kirkland_Manholes-1176 | 174.14 | Kirkland_Manholes-1177 | 164.29 | 198.1 | 4.97 | 8 | PVC | 0.01 | 1,572 | 1 | 8 | 9 | 0.6 | SM10 | |
| Kirkland_Main-2202 | Kirkland_Manholes-1174 | 178.7 | Kirkland_Manholes-1173 | 177.85 | 211.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | SM10 | Drop Connection |
| Kirkland_Main-2203 | Kirkland_Manholes-1175 | 174.04 | Kirkland_Manholes-1173 | 166.52 | 399.1 | 1.88 | 8 | PVC | 0.01 | 968 | 2 | 8 | 10 | 1 | SM10 | |
| Kirkland_Main-2204 | Kirkland_Manholes-1173 | 166.52 | Kirkland_Manholes-1172 | 164.12 | 183.3 | 1.31 | 8 | PVC | 0.01 | 807 | 6 | 25 | 31 | 3.8 | SM10 | |
| Kirkland_Main-2205 | Kirkland_Manholes-1172 | 164.12 | Kirkland_Manholes-1171 | 160.49 | 157.6 | 2.3 | 8 | PVC | 0.01 | 1,070 | 7 | 33 | 40 | 3.7 | SM14-Ex-EX79 | |
| Kirkland_Main-2206 | Kirkland_Manholes-2890 | 82 | Kirkland_Manholes-1162 | 78.51 | 88.5 | 3.95 | 8 | PVC | 0.01 | 1,400 | 0 | 8 | 359 | 25.6 | SM14-Ex-EX77 | |
| Kirkland_Main-2207 | Kirkland_Manholes-514 | 18.19 | Kirkland_Manholes-2958 | 17.19 | 133.7 | 0.75 | 8 | PVC | 0.01 | 610 | 30 | 212 | 242 | 39.7 | SM14-Ex-EX37 | |
| Kirkland_Main-2208 | Kirkland_Manholes-493 | 145.66 | Kirkland_Manholes-3107 | 127.14 | 403.7 | 4.59 | 8 | PVC | 0.01 | 1,510 | 2 | 8 | 10 | 0.7 | SM10 | |
| Kirkland_Main-2209 | Kirkland_Manholes-496 | 188.94 | Kirkland_Manholes-495 | 169.48 | 399.8 | 4.87 | 8 | PVC | 0.01 | 1,555 | 2 | 8 | 10 | 0.6 | SM10 | |
| Kirkland_Main-2210 | Kirkland_Manholes-497 | 188.11 | Kirkland_Manholes-499 | 185.94 | 314.9 | 0.69 | 8 | PVC | 0.01 | 585 | 14 | 58 | 71 | 12.2 | SM10 | |
| Kirkland_Main-2211 | Kirkland_Manholes-498 | 190.16 | Kirkland_Manholes-499 | 185.94 | 340.1 | 1.24 | 8 | PVC | 0.01 | 785 | 3 | 8 | 11 | 1.4 | SM10 | |
| Kirkland_Main-2213 | Kirkland_Manholes-510 | 78.8 | Kirkland_Manholes-509 | 76.43 | 10.6 | 22.33 | 15 | PVC | 0.01 | 17,810 | 5 | 41 | 46 | 0.3 | | |
| Kirkland_Main-2214 | Kirkland_Manholes-513 | 81.7 | Kirkland_Manholes-512 | 79.85 | 46 | 4.02 | 12 | PVC | 0.01 | 4,168 | 21 | 156 | 177 | 4.2 | SM14-Ex-EX76 | |
| Kirkland_Main-2215 | Kirkland_Manholes-1825 | 112.27 | Kirkland_Manholes-508 | 102 | 349.6 | 2.94 | 8 | PVC | 0.01 | 1,208 | 4 | 16 | 20 | 1.7 | SM10 | |
| Kirkland_Main-2216 | Kirkland_Manholes-508 | 102 | Kirkland_Manholes-507 | 100.47 | 381.8 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 25 | 30 | 6.7 | SM10 | Drop Connection |
| Kirkland_Main-2217 | Kirkland_Manholes-507 | 85.74 | Kirkland_Manholes-506 | 75.41 | 39.4 | 26.19 | 8 | PVC | 0.01 | 3,608 | 5 | 33 | 38 | 1.1 | | |
| Kirkland_Main-2218 | Kirkland_Manholes-506 | 75.41 | Kirkland_Manholes-505 | 74.06 | 314 | 0.43 | 15 | PVC | 0.01 | 2,471 | 88 | 593 | 1,031 | 41.7 | | |
| Kirkland_Main-2221 | Kirkland_Manholes-505 | 74.06 | Kirkland_Manholes-1824 | 72.16 | 261.9 | 0.73 | 15 | PVC | 0.01 | 3,210 | 88 | 601 | 1,040 | 32.4 | | |
| Kirkland_Main-2222 | Kirkland_Manholes-509 | 76.43 | Kirkland_Manholes-506 | 75.41 | 337.6 | 0.3 | 15 | PVC | 0.01 | 2,072 | 82 | 552 | 984 | 47.5 | | |
| Kirkland_Main-2224 | Kirkland_Manholes-1160 | 77.11 | Kirkland_Manholes-509 | 76.43 | 266.4 | 0.26 | 15 | PVC | 0.01 | 1,904 | 77 | 502 | 930 | 48.8 | | |
| Kirkland_Main-2225 | Kirkland_Manholes-511 | 79.24 | Kirkland_Manholes-1161 | 78.67 | 198.1 | 0.29 | 15 | PVC | 0.01 | 2,022 | 21 | 173 | 194 | 9.6 | | |
| Kirkland_Main-2226 | Kirkland_Manholes-512 | 79.85 | Kirkland_Manholes-511 | 79.24 | 306.1 | 0.2 | 15 | PVC | 0.01 | 1,683 | 21 | 165 | 186 | 11 | | |
| Kirkland_Main-2228 | Kirkland_Manholes-1533 | 294.07 | Kirkland_Manholes-1532 | 269.21 | 121 | 20.55 | 8 | PVC | 0.01 | 3,196 | 2 | 12 | 14 | 0.4 | SM14-Ex-EX126 | |
| Kirkland_Main-2229 | Kirkland_Manholes-1532 | 269.21 | Kirkland_Manholes-1531 | 265.03 | 88.5 | 4.72 | 8 | PVC | 0.01 | 1,532 | 2 | 16 | 18 | 1.2 | SM14-Ex-EX126 | |
| Kirkland_Main-2230 | Kirkland_Manholes-1211 | 186.99 | Kirkland_Manholes-1197 | 181.82 | 133.6 | 3.87 | 8 | | 0.012 | 1,156 | 1 | 33 | 34 | 3 | | |
| Kirkland_Main-2231 | Kirkland_Manholes-1531 | 265.03 | Kirkland_Manholes-1530 | 229.92 | 439.6 | 7.99 | 8 | PVC | 0.01 | 1,992 | 10 | 28 | 38 | 1.9 | SM14-Ex-EX125 | |
| Kirkland_Main-2232 | Kirkland_Manholes-1530 | 229.92 | Kirkland_Manholes-1529 | 223.45 | 269.7 | 2.4 | 8 | PVC | 0.01 | 1,092 | 33 | 107 | 141 | 12.9 | SM14-Ex-EX121 | |
| Kirkland_Main-2233 | Kirkland_Manholes-1529 | 223.45 | Kirkland_Manholes-1528 | 217.87 | 160.3 | 3.48 | 8 | PVC | 0.01 | 1,316 | 35 | 111 | 146 | 11.1 | SM14-Ex-EX121 | |
| Kirkland_Main-2235 | Kirkland_Manholes-1249 | 223.25 | Kirkland_Manholes-1250 | 210.15 | 250.9 | 5.22 | 8 | PVC | 0.01 | 1,611 | 15 | 99 | 114 | 7.1 | SM14-Ex-EX65 | |
| Kirkland_Main-2236 | Kirkland_Manholes-1246 | 238.47 | Kirkland_Manholes-1247 | 236.99 | 105.6 | 1.4 | 8 | PVC | 0.01 | 835 | 11 | 58 | 69 | 8.2 | SM14-Ex-EX65 | |
| Kirkland_Main-2237 | Kirkland_Manholes-1248 | 254.12 | Kirkland_Manholes-1247 | 236.99 | 222.2 | 7.71 | 8 | PVC | 0.01 | 1,958 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX97 | |
| Kirkland_Main-2238 | Kirkland_Manholes-1245 | 243.41 | Kirkland_Manholes-1246 | 238.47 | 272.7 | 1.81 | 8 | PVC | 0.01 | 949 | 9 | 49 | 59 | 6.2 | SM14-Ex-EX65 | |
| Kirkland_Main-2239 | Kirkland_Manholes-1244 | 254.14 | Kirkland_Manholes-1245 | 243.41 | 231.8 | 4.63 | 8 | PVC | 0.01 | 1,517 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX65 | |
| Kirkland_Main-2240 | Kirkland_Manholes-1242 | 244.28 | Kirkland_Manholes-208 | 241.09 | 154 | 2.07 | 8 | PVC | 0.01 | 1,015 | 2 | 9 | 11 | 1.1 | SM14-Ex-EX61 | |
| Kirkland_Main-2241 | Kirkland_Manholes-1237 | 263.8 | Kirkland_Manholes-1236 | 256.67 | 250.6 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX60 | |
| Kirkland_Main-2242 | Kirkland_Manholes-1239 | 270.66 | Kirkland_Manholes-1238 | 263.26 | 225.6 | 3.28 | 8 | PVC | 0.01 | 1,277 | 3 | 8 | 11 | 0.9 | SM14-Ex-EX95 | |
| Kirkland_Main-2244 | Kirkland_Manholes-1234 | 275.2 | Kirkland_Manholes-1233 | 274.4 | 31.3 | 2.55 | 8 | PVC | 0.01 | 1,127 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX96 | |
| Kirkland_Main-2245 | Kirkland_Manholes-1233 | 274.4 | Kirkland_Manholes-1232 | 271.55 | 317 | 0.9 | 8 | PVC | 0.01 | 669 | 5 | 25 | 30 | 4.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2246 | Kirkland_Manholes-1232 | 271.55 | Kirkland_Manholes-1231 | 254.08 | 347.6 | 5.03 | 8 | PVC | 0.01 | 1,581 | 8 | 33 | 41 | 2.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2247 | Kirkland_Manholes-1231 | 254.08 | Kirkland_Manholes-1230 | 236.32 | 352.2 | 5.04 | 8 | PVC | 0.01 | 1,583 | 12 | 41 | 53 | 3.3 | SM14-Ex-EX96 | |
| Kirkland_Main-2248 | Kirkland_Manholes-1414 | 476.69 | Kirkland_Manholes-1415 | 475.19 | 382.9 | 0.39 | 8 | PVC | 0.01 | 441 | 1 | 20 | 20 | 4.6 | | |
| Kirkland_Main-2249 | Kirkland_Manholes-1416 | 475.58 | Kirkland_Manholes-1415 | 475.19 | 141 | 0.28 | 8 | PVC | 0.01 | 371 | 3 | 20 | 23 | 6.1 | | |
| Kirkland_Main-2250 | Kirkland_Manholes-1417 | 477.64 | Kirkland_Manholes-1416 | 475.58 | 44.3 | 4.65 | 8 | PVC | 0.01 | 1,521 | 2 | 16 | 18 | 1.2 | | |
| Kirkland_Main-2251 | Kirkland_Manholes-1419 | 480.31 | Kirkland_Manholes-1418 | 477.42 | 188.2 | 1.54 | 8 | PVC | 0.01 | 874 | 1 | 12 | 12 | 1.4 | | |
| Kirkland_Main-2252 | Kirkland_Manholes-1420 | 487.42 | Kirkland_Manholes-1419 | 480.31 | 251.4 | 2.83 | 8 | PVC | 0.01 | 1,186 | 0 | 8 | 8 | 0.7 | | |
| Kirkland_Main-2253 | Kirkland_Manholes-1421 | 490.08 | Kirkland_Manholes-1420 | 487.42 | 280.7 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2255 | Kirkland_Manholes-1422 | 436.01 | Kirkland_Manholes-1423 | 431.09 | 115.7 | 4.25 | 8 | PVC | 0.01 | 1,454 | 4 | 2 | 6 | 0.4 | | |
| Kirkland_Main-2256 | Kirkland_Manholes-1423 | 431.09 | Kirkland_Manholes-1424 | 424.73 | 75.1 | 8.47 | 8 | PVC | 0.01 | 2,052 | 5 | 5 | 10 | 0.5 | | |
| Kirkland_Main-2257 | Kirkland_Manholes-1424 | 424.73 | Kirkland_Manholes-1425 | 416.33 | 120.8 | 6.95 | 8 | PVC | 0.01 | 1,859 | 6 | 7 | 13 | 0.7 | | |
| Kirkland_Main-2258 | Kirkland_Manholes-1425 | 416.33 | Kirkland_Manholes-2514 | 400.04 | 156.3 | 10.42 | 8 | PVC | 0.01 | 2,276 | 8 | 9 | 17 | 0.8 | | |
| Kirkland_Main-2260 | Kirkland_Manholes-1426 | 513.73 | Kirkland_Manholes-1427 | 513.21 | 150.6 | 0.34 | 8 | PVC | 0.01 | 413 | 2 | 4 | 6 | 1.5 | | |
| Kirkland_Main-2261 | Kirkland_Manholes-2186 | 104.5 | Kirkland_Manholes-2185 | 103.23 | 40.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 21 | 41 | 62 | 4.9 | | |
| Kirkland_Main-2262 | Kirkland_Manholes-2188 | 116.01 | Kirkland_Manholes-2187 | 114.37 | 29.7 | 5.52 | 8 | PVC | 0.01 | 1,657 | 0 | 8 | 9 | 0.5 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2263 | Kirkland_Manholes-2192 | 135.5 | Kirkland_Manholes-2191 | 134.63 | 54 | 1.61 | 8 | PVC | 0.01 | 895 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-2265 | Kirkland_Manholes-2120 | 156.16 | O-33 | 155.88 | 68.2 | 0.41 | 8 | PVC | 0.01 | 452 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2266 | Kirkland_Manholes-2121 | 179.17 | Kirkland_Manholes-2122 | 169.1 | 148.2 | 6.79 | 8 | PVC | 0.01 | 1,838 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX238 | |
| Kirkland_Main-2267 | Kirkland_Manholes-2122 | 169.1 | Kirkland_Manholes-2123 | 164.83 | 234.6 | 1.82 | 8 | PVC | 0.01 | 951 | 2 | 8 | 10 | 1.1 | SM14-Ex-EX238 | |
| Kirkland_Main-2268 | Kirkland_Manholes-2200 | 29.87 | Kirkland_Manholes-2202 | 26.91 | 11.2 | 26.5 | 8 | PVC | 0.01 | 3,629 | 49 | 19 | 68 | 1.9 | | Slope confirmed by as-builts |
| Kirkland_Main-2270 | Kirkland_Manholes-2209 | 69.6 | Kirkland_Manholes-2206 | 66.42 | 347.3 | 0.92 | 8 | PVC | 0.01 | 675 | 1 | 8 | 9 | 1.4 | SM8 | |
| Kirkland_Main-2271 | Kirkland_Manholes-2208 | 66.31 | Kirkland_Manholes-2207 | 65.6 | 145.2 | 0.49 | 8 | PVC | 0.01 | 493 | 0 | 6 | 7 | 1.4 | SM14-Ex-EX189 | Drop Connection |
| Kirkland_Main-2272 | Kirkland_Manholes-2216 | 56.6 | Kirkland_Manholes-2217 | 22.48 | 221.2 | 15.42 | 8 | PVC | 0.01 | 2,769 | 4 | 32 | 37 | 1.3 | | |
| Kirkland_Main-2273 | Kirkland_Manholes-2215 | 67.8 | Kirkland_Manholes-2214 | 67.15 | 122.4 | 0.53 | 8 | PVC | 0.01 | 514 | 2 | 6 | 8 | 1.6 | | |
| Kirkland_Main-2274 | Kirkland_Manholes-2214 | 67.15 | Kirkland_Manholes-2213 | 66.3 | 36.8 | 2.31 | 8 | PVC | 0.01 | 1,071 | 2 | 13 | 15 | 1.4 | | |
| Kirkland_Main-2275 | Kirkland_Manholes-2213 | 66.3 | Kirkland_Manholes-2216 | 56.6 | 199.9 | 4.85 | 8 | PVC | 0.01 | 1,553 | 3 | 26 | 29 | 1.9 | | |
| Kirkland_Main-2276 | Kirkland_Manholes-2212 | 72.13 | Kirkland_Manholes-2213 | 66.3 | 100 | 5.83 | 8 | PVC | 0.01 | 1,702 | 1 | 6 | 8 | 0.5 | SM14-Ex-EX190 | |
| Kirkland_Main-2278 | Kirkland_Manholes-2124 | 217.78 | Kirkland_Manholes-2303 | 195.57 | 353.2 | 6.29 | 12 | PVC | 0.01 | 5,212 | 253 | 886 | 1,139 | 21.9 | SM14-Ex-EX248 | |
| Kirkland_Main-2280 | Kirkland_Manholes-1463 | 498.43 | Kirkland_Manholes-1464 | 490.77 | 337.1 | 2.27 | 8 | PVC | 0.01 | 1,063 | 6 | 16 | 22 | 2 | SM14-Ex-EX271 | |
| Kirkland_Main-2281 | Kirkland_Manholes-1465 | 496.7 | Kirkland_Manholes-1464 | 490.77 | 350 | 1.69 | 8 | PVC | 0.01 | 917 | 5 | 12 | 17 | 1.9 | SM14-Ex-EX272 | |
| Kirkland_Main-2282 | Kirkland_Manholes-1464 | 490.77 | Kirkland_Manholes-1469 | 490.09 | 171.1 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 32 | 44 | 9.9 | SM14-Ex-EX271 | |
| Kirkland_Main-2283 | Kirkland_Manholes-1466 | 501.75 | Kirkland_Manholes-1465 | 496.7 | 399.1 | 1.27 | 8 | PVC | 0.01 | 793 | 3 | 8 | 11 | 1.3 | SM14-Ex-EX272 | |
| Kirkland_Main-2284 | Kirkland_Manholes-1467 | 507 | Kirkland_Manholes-1466 | 501.75 | 336.1 | 1.56 | 8 | PVC | 0.01 | 881 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX272 | |
| Kirkland_Main-2285 | Kirkland_Manholes-1470 | 502.07 | Kirkland_Manholes-1475 | 484.92 | 351.8 | 4.88 | 8 | PVC | 0.01 | 1,557 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX268 | |
| Kirkland_Main-2286 | Kirkland_Manholes-1471 | 502.1 | Kirkland_Manholes-1472 | 489.92 | 152.5 | 7.99 | 8 | PVC | 0.01 | 1,993 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX267 | |
| Kirkland_Main-2287 | Kirkland_Manholes-1472 | 489.92 | Kirkland_Manholes-1473 | 489.3 | 149.9 | 0.41 | 8 | PVC | 0.01 | 453 | 3 | 8 | 11 | 2.3 | SM14-Ex-EX267 | |
| Kirkland_Main-2288 | Kirkland_Manholes-1473 | 489.3 | Kirkland_Manholes-1474 | 483.04 | 397.5 | 1.57 | 8 | PVC | 0.01 | 885 | 4 | 12 | 16 | 1.8 | SM14-Ex-EX267 | |
| Kirkland_Main-2289 | Kirkland_Manholes-1474 | 483.04 | Kirkland_Manholes-1478 | 480.02 | 383.8 | 0.79 | 8 | PVC | 0.01 | 625 | 6 | 16 | 22 | 3.4 | SM14-Ex-EX267 | |
| Kirkland_Main-2290 | Kirkland_Manholes-1475 | 484.92 | Kirkland_Manholes-1476 | 483.18 | 394.8 | 0.44 | 8 | PVC | 0.01 | 468 | 2 | 8 | 10 | 2.1 | SM14-Ex-EX268 | |
| Kirkland_Main-2291 | Kirkland_Manholes-1476 | 483.18 | Kirkland_Manholes-1477 | 477.36 | 143.4 | 4.06 | 8 | PVC | 0.01 | 1,421 | 3 | 12 | 15 | 1 | SM14-Ex-EX268 | |
| Kirkland_Main-2292 | Kirkland_Manholes-1477 | 477.36 | Kirkland_Manholes-1481 | 462.54 | 116.7 | 12.7 | 8 | PVC | 0.01 | 2,512 | 3 | 16 | 19 | 0.8 | SM14-Ex-EX268 | |
| Kirkland_Main-2293 | Kirkland_Manholes-1478 | 480.02 | Kirkland_Manholes-1479 | 473.98 | 182.8 | 3.3 | 8 | PVC | 0.01 | 1,282 | 7 | 20 | 27 | 2.1 | SM14-Ex-EX267 | |
| Kirkland_Main-2294 | Kirkland_Manholes-1479 | 473.98 | Kirkland_Manholes-1483 | 455.88 | 188.4 | 9.61 | 8 | PVC | 0.01 | 2,185 | 8 | 24 | 32 | 1.5 | SM14-Ex-EX267 | |
| Kirkland_Main-2295 | Kirkland_Manholes-1482 | 457.77 | Kirkland_Manholes-1483 | 455.88 | 220.6 | 0.86 | 8 | PVC | 0.01 | 653 | 55 | 242 | 298 | 45.6 | SM14-Ex-EX214 | |
| Kirkland_Main-2296 | Kirkland_Manholes-1483 | 455.88 | Kirkland_Manholes-2042 | 455.6 | 242 | 0.12 | 12 | PVC | 0.01 | 707 | 64 | 270 | 334 | 47.2 | SM14-Ex-EX214 | |
| Kirkland_Main-2297 | Kirkland_Manholes-1480 | 465.84 | Kirkland_Manholes-1482 | 457.77 | 216.4 | 3.73 | 8 | PVC | 0.01 | 1,362 | 51 | 219 | 270 | 19.8 | SM14-Ex-EX214 | |
| Kirkland_Main-2298 | Kirkland_Manholes-2162 | 123.07 | Kirkland_Manholes-2139 | 96.6 | 399.7 | 6.62 | 8 | PVC | 0.01 | 1,814 | 4 | 16 | 21 | 1.1 | SM14-Ex-EX194 | |
| Kirkland_Main-2299 | Kirkland_Manholes-2161 | 148.95 | Kirkland_Manholes-2162 | 123.07 | 410.6 | 6.3 | 8 | PVC | 0.01 | 1,770 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX194 | |
| Kirkland_Main-2300 | Kirkland_Manholes-2239 | 125.2 | Kirkland_Manholes-2238 | 92.13 | 326.8 | 10.12 | 8 | PVC | 0.01 | 2,243 | 2 | 6 | 8 | 0.3 | SM14-Ex-EX224 | |
| Kirkland_Main-2301 | Kirkland_Manholes-2241 | 73.4 | Kirkland_Manholes-2240 | 69.07 | 226.1 | 1.92 | 8 | PVC | 0.01 | 976 | 2 | 6 | 8 | 0.8 | | |
| Kirkland_Main-2302 | Kirkland_Manholes-2159 | 84.71 | Kirkland_Manholes-2240 | 69.07 | 248.4 | 6.3 | 8 | PVC | 0.01 | 1,769 | 18 | 65 | 83 | 4.7 | | |
| Kirkland_Main-2303 | Kirkland_Manholes-2243 | 51.95 | Kirkland_Manholes-2244 | 43.69 | 203.1 | 4.07 | 8 | PVC | 0.01 | 1,422 | 2 | 6 | 8 | 0.6 | | |
| Kirkland_Main-2304 | Kirkland_Manholes-2240 | 69.07 | Kirkland_Manholes-2244 | 43.69 | 271.1 | 9.36 | 8 | PVC | 0.01 | 2,157 | 21 | 78 | 99 | 4.6 | | |
| Kirkland_Main-2305 | Kirkland_Manholes-2244 | 43.69 | Kirkland_Manholes-2155 | 42.84 | 213.7 | 0.4 | 8 | PVC | 0.01 | 446 | 26 | 91 | 117 | 26.3 | | Drop Connection |
| Kirkland_Main-2306 | Kirkland_Manholes-2494 | 170.93 | Kirkland_Manholes-2132 | 159.52 | 411.9 | 2.77 | 8 | PVC | 0.01 | 1,173 | 16 | 24 | 40 | 3.4 | SM14-Ex-EX236 | |
| Kirkland_Main-2307 | Kirkland_Manholes-2242 | 36.17 | Kirkland_Manholes-2317 | 17.2 | 251 | 7.56 | 8 | PVC | 0.01 | 1,938 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX191 | |
| Kirkland_Main-2308 | Kirkland_Manholes-2229 | 22.53 | Kirkland_Manholes-2313 | 22.37 | 40.9 | 0.4 | 8 | PVC | 0.01 | 446 | 15 | 39 | 54 | 12.1 | | Drop Connection |
| Kirkland_Main-2309 | Kirkland_Manholes-2228 | 23.08 | Kirkland_Manholes-2314 | 22.81 | 66.4 | 0.4 | 8 | PVC | 0.01 | 446 | 18 | 78 | 96 | 21.5 | | Drop Connection |
| Kirkland_Main-2311 | Kirkland_Manholes-2257 | 348.17 | Kirkland_Manholes-2256 | 329.88 | 184.1 | 9.94 | 8 | PVC | 0.01 | 2,222 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX254 | |
| Kirkland_Main-2312 | Kirkland_Manholes-2267 | 393.07 | Kirkland_Manholes-2266 | 392.8 | 100.8 | 0.27 | 8 | PVC | 0.01 | 365 | 2 | 16 | 18 | 4.9 | | |
| Kirkland_Main-2313 | Kirkland_Manholes-2715 | 29.78 | Kirkland_Manholes-2716 | 29.3 | 129 | 0.37 | 12 | PVC | 0.01 | 1,268 | 74 | 18 | 92 | 7.3 | | |
| Kirkland_Main-2314 | Kirkland_Manholes-2716 | 29.3 | Kirkland_Manholes-2717 | 21.61 | 141.2 | 5.45 | 12 | PVC | 0.01 | 4,851 | 74 | 24 | 98 | 2 | | |
| Kirkland_Main-2315 | Kirkland_Manholes-2717 | 21.61 | Kirkland_Manholes-2718 | 21.4 | 363.5 | 0.06 | 12 | PVC | 0.01 | 500 | 74 | 30 | 104 | 20.8 | | |
| Kirkland_Main-2316 | Kirkland_Manholes-2052 | 419.8 | Kirkland_Manholes-2280 | 418.85 | 171.1 | 0.56 | 8 | PVC | 0.01 | 525 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX262 | |
| Kirkland_Main-2317 | Kirkland_Manholes-2280 | 418.85 | Kirkland_Manholes-2279 | 418 | 153.8 | 0.55 | 8 | PVC | 0.01 | 524 | 2 | 8 | 10 | 1.9 | SM14-Ex-EX262 | |
| Kirkland_Main-2318 | Kirkland_Manholes-2274 | 417.36 | Kirkland_Manholes-2273 | 414.69 | 101.2 | 2.64 | 8 | PVC | 0.01 | 1,145 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2319 | Kirkland_Manholes-2279 | 418 | Kirkland_Manholes-2268 | 401.9 | 291.9 | 5.52 | 8 | PVC | 0.01 | 1,656 | 3 | 12 | 15 | 0.9 | SM14-Ex-EX262 | |
| Kirkland_Main-2320 | Kirkland_Manholes-2268 | 401.9 | Kirkland_Manholes-2269 | 398.2 | 115.6 | 3.2 | 8 | PVC | 0.01 | 1,262 | 14 | 64 | 78 | 6.2 | SM14-Ex-EX261 | |
| Kirkland_Main-2321 | Kirkland_Manholes-2270 | 403.21 | Kirkland_Manholes-2269 | 398.2 | 107.6 | 4.66 | 8 | PVC | 0.01 | 1,521 | 4 | 36 | 40 | 2.6 | | |
| Kirkland_Main-2322 | Kirkland_Manholes-2273 | 414.69 | Kirkland_Manholes-2272 | 410.23 | 107.4 | 4.15 | 8 | PVC | 0.01 | 1,437 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-2323 | Kirkland_Manholes-2272 | 410.23 | Kirkland_Manholes-2271 | 405.49 | 51.3 | 9.24 | 8 | PVC | 0.01 | 2,143 | 2 | 12 | 14 | 0.6 | | |
| Kirkland_Main-2324 | Kirkland_Manholes-2271 | 405.49 | Kirkland_Manholes-2270 | 403.21 | 91.2 | 2.5 | 8 | PVC | 0.01 | 1,115 | 4 | 32 | 36 | 3.2 | | |
| Kirkland_Main-2325 | Kirkland_Manholes-2276 | 410.45 | Kirkland_Manholes-2277 | 408.15 | 110.4 | 2.08 | 8 | PVC | 0.01 | 1,017 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-2326 | Kirkland_Manholes-2277 | 408.15 | Kirkland_Manholes-2278 | 406.74 | 80.9 | 1.74 | 8 | PVC | 0.01 | 931 | 2 | 12 | 14 | 1.5 | | |
| Kirkland_Main-2327 | Kirkland_Manholes-1228 | 189.87 | Kirkland_Manholes-1227 | 174.57 | 207.5 | 7.37 | 8 | PVC | 0.01 | 1,915 | 22 | 74 | 96 | 5 | SM14-Ex-EX96 | |
| Kirkland_Main-2329 | Kirkland_Manholes-1226 | 185.47 | Kirkland_Manholes-1227 | 174.57 | 349.3 | 3.12 | 8 | PVC | 0.01 | 1,245 | 2 | 8 | 11 | 0.8 | SM14-Ex-EX93 | |
| Kirkland_Main-2333 | Kirkland_Manholes-1209 | 251.94 | Kirkland_Manholes-1208 | 237.71 | 314.7 | 4.52 | 8 | PVC | 0.01 | 1,499 | 10 | 31 | 41 | 2.7 | SM14-Ex-EX90 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2335 | Kirkland_Manholes-1210 | 257.02 | Kirkland_Manholes-1209 | 251.94 | 317.5 | 1.6 | 8 | PVC | 0.01 | 892 | 7 | 23 | 30 | 3.3 | SM14-Ex-EX90 | |
| Kirkland_Main-2341 | Kirkland_Manholes-1214 | 261.31 | Kirkland_Manholes-1215 | 243.02 | 404.6 | 4.52 | 8 | PVC | 0.01 | 1,499 | 5 | 11 | 16 | 1.1 | SM14-Ex-EX90 | |
| Kirkland_Main-2342 | Kirkland_Manholes-1241 | 267.65 | Kirkland_Manholes-1215 | 243.02 | 241.5 | 10.2 | 8 | PVC | 0.01 | 2,252 | 3 | 4 | 7 | 0.3 | SM14-Ex-EX63 | |
| Kirkland_Main-2343 | Kirkland_Manholes-1215 | 243.02 | Kirkland_Manholes-1134 | 223.76 | 275.3 | 7 | 8 | PVC | 0.01 | 1,865 | 10 | 19 | 29 | 1.5 | SM14-Ex-EX63 | |
| Kirkland_Main-2344 | Kirkland_Manholes-1217 | 232.97 | Kirkland_Manholes-1218 | 220.85 | 252.7 | 4.8 | 8 | PVC | 0.01 | 1,544 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX59 | |
| Kirkland_Main-2345 | Kirkland_Manholes-1270 | 246.8 | Kirkland_Manholes-1245 | 243.41 | 285.9 | 1.19 | 8 | PVC | 0.01 | 768 | 1 | 8 | 9 | 1.2 | SM14-Ex-EX64 | |
| Kirkland_Main-2348 | Kirkland_Manholes-1276 | 172.95 | Kirkland_Manholes-1279 | 163.99 | 169.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 4 | 16 | 20 | 1.2 | | |
| Kirkland_Main-2349 | Kirkland_Manholes-1569 | 157.57 | Kirkland_Manholes-1293 | 152.35 | 333.3 | 1.57 | 8 | PVC | 0.01 | 882 | 4 | 8 | 12 | 1.4 | SM14-Ex-EX113 | |
| Kirkland_Main-2350 | Kirkland_Manholes-1293 | 152.35 | Kirkland_Manholes-1292 | 148.28 | 368.4 | 1.1 | 8 | PVC | 0.01 | 741 | 8 | 16 | 24 | 3.2 | SM14-Ex-EX113 | |
| Kirkland_Main-2351 | Kirkland_Manholes-1568 | 145.18 | Kirkland_Manholes-1297 | 132.74 | 335 | 3.71 | 8 | PVC | 0.01 | 1,359 | 2 | 8 | 11 | 0.8 | SM14-Ex-EX114 | |
| Kirkland_Main-2352 | Kirkland_Manholes-1297 | 132.74 | Kirkland_Manholes-1296 | 129.32 | 308.3 | 1.11 | 8 | PVC | 0.01 | 743 | 4 | 16 | 20 | 2.7 | SM14-Ex-EX114 | |
| Kirkland_Main-2353 | Kirkland_Manholes-1281 | 154.69 | Kirkland_Manholes-1292 | 148.28 | 310.6 | 2.06 | 8 | PVC | 0.01 | 1,013 | 46 | 247 | 293 | 28.9 | SM14-Ex-EX102 | |
| Kirkland_Main-2354 | Kirkland_Manholes-1292 | 148.28 | Kirkland_Manholes-1296 | 129.32 | 322 | 5.89 | 8 | PVC | 0.01 | 1,711 | 56 | 272 | 327 | 19.1 | SM14-Ex-EX102 | |
| Kirkland_Main-2357 | Kirkland_Manholes-1266 | 188.85 | Kirkland_Manholes-1264 | 172.1 | 141.2 | 11.87 | 8 | PVC | 0.01 | 2,429 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2358 | Kirkland_Manholes-1264 | 172.1 | Kirkland_Manholes-1265 | 168.12 | 70.1 | 5.67 | 8 | PVC | 0.01 | 1,679 | 1 | 16 | 18 | 1.1 | | |
| Kirkland_Main-2363 | Kirkland_Manholes-1273 | 182.86 | Kirkland_Manholes-1274 | 175.64 | 151.8 | 4.76 | 8 | PVC | 0.01 | 1,538 | 5 | 25 | 30 | 1.9 | | |
| Kirkland_Main-2364 | Kirkland_Manholes-1252 | 181.71 | Kirkland_Manholes-1277 | 163.83 | 245.6 | 7.28 | 8 | PVC | 0.01 | 1,902 | 37 | 189 | 226 | 11.9 | SM14-Ex-EX101 | |
| Kirkland_Main-2365 | Kirkland_Manholes-1277 | 163.83 | Kirkland_Manholes-1278 | 160.09 | 110.9 | 3.37 | 8 | PVC | 0.01 | 1,295 | 38 | 198 | 235 | 18.2 | SM14-Ex-EX102 | |
| Kirkland_Main-2366 | Kirkland_Manholes-1278 | 160.09 | Kirkland_Manholes-1280 | 156.25 | 144.5 | 2.66 | 8 | PVC | 0.01 | 1,149 | 43 | 231 | 273 | 23.8 | SM14-Ex-EX102 | |
| Kirkland_Main-2367 | Kirkland_Manholes-1280 | 156.25 | Kirkland_Manholes-1281 | 154.69 | 317.7 | 0.49 | 8 | PVC | 0.01 | 494 | 45 | 239 | 284 | 57.4 | SM14-Ex-EX102 | |
| Kirkland_Main-2369 | Kirkland_Manholes-1311 | 230.66 | Kirkland_Manholes-1312 | 230.27 | 96.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | |
| Kirkland_Main-2370 | Kirkland_Manholes-1313 | 230.7 | Kirkland_Manholes-1312 | 230.27 | 76.5 | 0.56 | 8 | PVC | 0.01 | 528 | 3 | 13 | 16 | 3.1 | | |
| Kirkland_Main-2371 | Kirkland_Manholes-1312 | 230.27 | Kirkland_Manholes-1306 | 225.07 | 369.5 | 1.41 | 8 | PVC | 0.01 | 836 | 4 | 21 | 25 | 3 | | |
| Kirkland_Main-2372 | Kirkland_Manholes-1513 | 263.11 | Kirkland_Manholes-1515 | 261.7 | 138 | 1.02 | 8 | PVC | 0.01 | 713 | 33 | 143 | 176 | 24.8 | SM14-Ex-EX131 | |
| Kirkland_Main-2373 | Kirkland_Manholes-1508 | 264.2 | Kirkland_Manholes-1514 | 263.47 | 179.7 | 0.41 | 8 | PVC | 0.01 | 450 | 31 | 131 | 162 | 36 | SM14-Ex-EX131 | |
| Kirkland_Main-2374 | Kirkland_Manholes-1684 | 76.22 | Kirkland_Manholes-1683 | 75.33 | 41.4 | 2.15 | 8 | PVC | 0.01 | 1,034 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-2375 | Kirkland_Manholes-1851 | 275 | Kirkland_Manholes-1316 | 272.4 | 254.5 | 1.02 | 8 | PVC | 0.01 | 713 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-2376 | Kirkland_Manholes-1317 | 271.64 | Kirkland_Manholes-924 | 268.15 | 334 | 1.04 | 12 | PVC | 0.01 | 2,125 | 108 | 425 | 533 | 25.1 | | |
| Kirkland_Main-2377 | Kirkland_Manholes-2984 | 277.63 | Kirkland_Manholes-1317 | 271.64 | 132.6 | 4.52 | 10 | PVC | 0.01 | 2,717 | 106 | 373 | 479 | 17.6 | | |
| Kirkland_Main-2378 | Kirkland_Manholes-1371 | 376.15 | Kirkland_Manholes-3081 | 373.55 | 185 | 1.41 | 8 | PVC | 0.01 | 836 | 65 | 179 | 244 | 29.2 | | |
| Kirkland_Main-2379 | Kirkland_Manholes-1319 | 372.4 | Kirkland_Manholes-1318 | 358.26 | 123 | 11.5 | 8 | PVC | 0.01 | 2,391 | 67 | 191 | 258 | 10.8 | | |
| Kirkland_Main-2380 | Kirkland_Manholes-1318 | 358.26 | Kirkland_Manholes-1320 | 342.61 | 140.9 | 11.1 | 10 | PVC | 0.01 | 4,260 | 67 | 195 | 262 | 6.2 | | |
| Kirkland_Main-2381 | Kirkland_Manholes-1320 | 342.61 | Kirkland_Manholes-1326 | 321.42 | 151.5 | 13.98 | 10 | PVC | 0.01 | 4,780 | 92 | 262 | 354 | 7.4 | | |
| Kirkland_Main-2382 | Kirkland_Manholes-1514 | 263.47 | Kirkland_Manholes-1513 | 263.11 | 127.9 | 0.28 | 8 | PVC | 0.01 | 374 | 32 | 135 | 167 | 44.6 | SM14-Ex-EX131 | |
| Kirkland_Main-2383 | Kirkland_Manholes-1507 | 265.94 | Kirkland_Manholes-1508 | 264.2 | 288.2 | 0.6 | 8 | PVC | 0.01 | 547 | 27 | 115 | 143 | 26 | SM14-Ex-EX131 | |
| Kirkland_Main-2384 | Kirkland_Manholes-1322 | 342.78 | Kirkland_Manholes-1320 | 342.61 | 36.2 | 0.47 | 8 | PVC | 0.01 | 483 | 24 | 64 | 88 | 18.1 | | |
| Kirkland_Main-2385 | Kirkland_Manholes-1321 | 355.4 | Kirkland_Manholes-1322 | 342.78 | 269.6 | 4.68 | 8 | PVC | 0.01 | 1,525 | 23 | 60 | 83 | 5.4 | | |
| Kirkland_Main-2386 | Kirkland_Manholes-1335 | 367.98 | Kirkland_Manholes-1321 | 355.4 | 137.9 | 9.12 | 8 | PVC | 0.01 | 2,129 | 22 | 56 | 78 | 3.6 | | |
| Kirkland_Main-2387 | Kirkland_Manholes-1323 | 332.91 | Kirkland_Manholes-1324 | 332.34 | 49.4 | 1.15 | 8 | PVC | 0.01 | 757 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2388 | Kirkland_Manholes-1324 | 332.34 | Kirkland_Manholes-1325 | 323.2 | 121 | 7.55 | 8 | PVC | 0.01 | 1,938 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-2389 | Kirkland_Manholes-1325 | 323.2 | Kirkland_Manholes-1326 | 321.42 | 174.1 | 1.02 | 8 | PVC | 0.01 | 713 | 2 | 12 | 14 | 2 | | |
| Kirkland_Main-2390 | Kirkland_Manholes-1326 | 321.42 | Kirkland_Manholes-1339 | 314.87 | 128.9 | 5.08 | 10 | PVC | 0.01 | 2,880 | 96 | 290 | 386 | 13.4 | | |
| Kirkland_Main-2391 | Kirkland_Manholes-1337 | 323.9 | Kirkland_Manholes-1326 | 321.42 | 30.5 | 8.12 | 8 | PVC | 0.01 | 2,009 | 1 | 12 | 13 | 0.7 | | |
| Kirkland_Main-2392 | Kirkland_Manholes-1327 | 326.71 | Kirkland_Manholes-1337 | 323.9 | 27.1 | 10.37 | 8 | PVC | 0.01 | 2,271 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2393 | Kirkland_Manholes-1328 | 394.1 | Kirkland_Manholes-1329 | 393.5 | 241.8 | 0.25 | 8 | PVC | 0.01 | 351 | 2 | 28 | 30 | 8.6 | | |
| Kirkland_Main-2394 | Kirkland_Manholes-1329 | 393.5 | Kirkland_Manholes-1330 | 392.47 | 187.9 | 0.55 | 8 | PVC | 0.01 | 522 | 4 | 32 | 35 | 6.8 | | |
| Kirkland_Main-2395 | Kirkland_Manholes-1330 | 392.47 | Kirkland_Manholes-1332 | 391.73 | 102.7 | 0.72 | 8 | PVC | 0.01 | 597 | 4 | 36 | 40 | 6.6 | | |
| Kirkland_Main-2396 | Kirkland_Manholes-1332 | 391.73 | Kirkland_Manholes-1333 | 390.44 | 145.6 | 0.89 | 8 | PVC | 0.01 | 664 | 20 | 44 | 64 | 9.6 | SM14-Ex-EX177 | Drop Connection |
| Kirkland_Main-2397 | Kirkland_Manholes-1331 | 393.51 | Kirkland_Manholes-1332 | 391.73 | 79.5 | 2.24 | 8 | PVC | 0.01 | 1,054 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX177 | |
| Kirkland_Main-2398 | Kirkland_Manholes-1333 | 387.1 | Kirkland_Manholes-1334 | 373.64 | 147.7 | 9.12 | 8 | PVC | 0.01 | 2,129 | 21 | 48 | 68 | 3.2 | | |
| Kirkland_Main-2399 | Kirkland_Manholes-1334 | 373.64 | Kirkland_Manholes-1335 | 367.98 | 202.7 | 2.79 | 8 | PVC | 0.01 | 1,178 | 21 | 52 | 73 | 6.2 | | |
| Kirkland_Main-2400 | Kirkland_Manholes-1336 | 341.09 | Kirkland_Manholes-1327 | 326.71 | 166.6 | 8.63 | 8 | PVC | 0.01 | 2,071 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2401 | Kirkland_Manholes-1338 | 316.17 | Kirkland_Manholes-1339 | 314.87 | 207.4 | 0.63 | 8 | PVC | 0.01 | 557 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-2402 | Kirkland_Manholes-1339 | 314.87 | Kirkland_Manholes-1342 | 287.41 | 238.7 | 11.5 | 10 | PVC | 0.01 | 4,335 | 98 | 298 | 396 | 9.1 | | Drop Connection |
| Kirkland_Main-2403 | Kirkland_Manholes-1345 | 289.73 | Kirkland_Manholes-1344 | 287.44 | 243.6 | 0.94 | 8 | PVC | 0.01 | 684 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2404 | Kirkland_Manholes-1344 | 287.44 | Kirkland_Manholes-1343 | 283.8 | 35.3 | 10.32 | 8 | PVC | 0.01 | 2,265 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2405 | Kirkland_Manholes-1343 | 283.8 | Kirkland_Manholes-1342 | 283.15 | 24.6 | 2.63 | 8 | PVC | 0.01 | 1,144 | 2 | 12 | 13 | 1.2 | | |
| Kirkland_Main-2406 | Kirkland_Manholes-1340 | 293.32 | Kirkland_Manholes-1342 | 293.12 | 51.1 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 56 | 62 | 14 | | Drop Connection |
| Kirkland_Main-2407 | Kirkland_Manholes-1341 | 299.38 | Kirkland_Manholes-1340 | 293.32 | 143.1 | 4.24 | 8 | PVC | 0.01 | 1,451 | 6 | 52 | 57 | 4 | | |
| Kirkland_Main-2408 | Kirkland_Manholes-1346 | 416.9 | Kirkland_Manholes-1351 | 414.82 | 383.4 | 0.54 | 8 | PVC | 0.01 | 519 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX181 | |
| Kirkland_Main-2409 | Kirkland_Manholes-1351 | 414.82 | Kirkland_Manholes-1350 | 414.2 | 207.6 | 0.3 | 12 | PVC | 0.01 | 1,136 | 52 | 179 | 231 | 20.4 | SM14-Ex-EX215 | |
| Kirkland_Main-2410 | Kirkland_Manholes-1350 | 414.2 | Kirkland_Manholes-1917 | 413.2 | 125.7 | 0.8 | 12 | PVC | 0.01 | 1,854 | 55 | 187 | 242 | 13.1 | SM14-Ex-EX215 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2411 | Kirkland_Manholes-1373 | 425.99 | Kirkland_Manholes-1350 | 414.2 | 373.4 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX217 | |
| Kirkland_Main-2412 | Kirkland_Manholes-612 | 119.17 | Kirkland_Manholes-613 | 104.8 | 247.7 | 5.8 | 8 | PVC | 0.01 | 1,698 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX149 | |
| Kirkland_Main-2413 | Kirkland_Manholes-613 | 104.8 | Kirkland_Manholes-614 | 87.89 | 231.1 | 7.32 | 8 | PVC | 0.01 | 1,907 | 3 | 16 | 20 | 1 | SM14-Ex-EX149 | |
| Kirkland_Main-2414 | Kirkland_Manholes-609 | 139.22 | Kirkland_Manholes-1799 | 133.76 | 308.5 | 1.77 | 8 | PVC | 0.01 | 938 | 2 | 8 | 10 | 1.1 | SM14-Ex-EX146 | |
| Kirkland_Main-2417 | Kirkland_Manholes-611 | 126.2 | Kirkland_Manholes-610 | 123.3 | 146.2 | 1.98 | 8 | PVC | 0.01 | 993 | 1 | 8 | 9 | 0.9 | SM14-Ex-EX148 | |
| Kirkland_Main-2418 | Kirkland_Manholes-610 | 123.3 | Kirkland_Manholes-1801 | 112.29 | 320.9 | 3.43 | 8 | PVC | 0.01 | 1,306 | 2 | 16 | 19 | 1.4 | SM14-Ex-EX148 | |
| Kirkland_Main-2420 | Kirkland_Manholes-585 | 162.05 | Kirkland_Manholes-1797 | 142.57 | 517.3 | 3.77 | 8 | PVC | 0.01 | 1,368 | 1 | 8 | 10 | 0.7 | SM14-Ex-EX144 | |
| Kirkland_Main-2424 | Kirkland_Manholes-582 | 179.11 | Kirkland_Manholes-583 | 174.24 | 247.1 | 1.97 | 8 | PVC | 0.01 | 990 | 2 | 8 | 10 | 1 | SM14-Ex-EX91 | |
| Kirkland_Main-2425 | Kirkland_Manholes-583 | 174.24 | Kirkland_Manholes-1796 | 160.8 | 295.1 | 4.55 | 8 | PVC | 0.01 | 1,505 | 3 | 16 | 20 | 1.3 | SM14-Ex-EX91 | |
| Kirkland_Main-2426 | Kirkland_Manholes-586 | 156.07 | Kirkland_Manholes-587 | 133.23 | 320.6 | 7.12 | 8 | PVC | 0.01 | 1,882 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX145 | |
| Kirkland_Main-2427 | Kirkland_Manholes-587 | 133.23 | Kirkland_Manholes-588 | 128.35 | 150.1 | 3.25 | 8 | PVC | 0.01 | 1,271 | 3 | 16 | 20 | 1.6 | SM14-Ex-EX145 | |
| Kirkland_Main-2428 | Kirkland_Manholes-580 | 147.12 | Kirkland_Manholes-588 | 128.35 | 316.6 | 5.93 | 8 | PVC | 0.01 | 1,717 | 29 | 115 | 144 | 8.4 | SM14-Ex-EX96 | |
| Kirkland_Main-2430 | Kirkland_Manholes-581 | 170.5 | Kirkland_Manholes-580 | 147.12 | 349.2 | 6.7 | 8 | PVC | 0.01 | 1,824 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX94 | |
| Kirkland_Main-2431 | Kirkland_Manholes-588 | 128.35 | Kirkland_Manholes-606 | 111.69 | 288.6 | 5.77 | 8 | PVC | 0.01 | 1,694 | 33 | 140 | 173 | 10.2 | SM14-Ex-EX96 | |
| Kirkland_Main-2432 | Kirkland_Manholes-1506 | 266.15 | Kirkland_Manholes-1507 | 265.94 | 137.9 | 0.15 | 8 | PVC | 0.01 | 275 | 27 | 111 | 138 | 50.2 | | |
| Kirkland_Main-2433 | Kirkland_Manholes-605 | 109.94 | Kirkland_Manholes-604 | 92.41 | 437.3 | 4.01 | 8 | PVC | 0.01 | 1,412 | 7 | 8 | 15 | 1 | SM14-Ex-EX160 | |
| Kirkland_Main-2434 | Kirkland_Manholes-590 | 118.3 | Kirkland_Manholes-591 | 102.05 | 327.5 | 4.96 | 8 | PVC | 0.01 | 1,571 | 5 | 16 | 21 | 1.4 | SM14-Ex-EX158 | |
| Kirkland_Main-2435 | Kirkland_Manholes-591 | 102.05 | Kirkland_Manholes-592 | 96.93 | 331.1 | 1.55 | 8 | PVC | 0.01 | 877 | 8 | 25 | 33 | 3.8 | SM14-Ex-EX158 | |
| Kirkland_Main-2436 | Kirkland_Manholes-592 | 96.93 | Kirkland_Manholes-602 | 90.22 | 292.3 | 2.3 | 8 | PVC | 0.01 | 1,068 | 71 | 370 | 442 | 41.4 | SM5 | |
| Kirkland_Main-2437 | Kirkland_Manholes-597 | 99.4 | Kirkland_Manholes-592 | 96.93 | 306.8 | 0.8 | 8 | PVC | 0.01 | 633 | 7 | 41 | 49 | 7.7 | SM14-Ex-EX158 | |
| Kirkland_Main-2438 | Kirkland_Manholes-1612 | 97.3 | Kirkland_Manholes-599 | 92.8 | 301.8 | 1.49 | 8 | PVC | 0.01 | 861 | 0 | 8 | 9 | 1 | SM14-Ex-EX160 | |
| Kirkland_Main-2440 | Kirkland_Manholes-573 | 132.21 | Kirkland_Manholes-572 | 113.73 | 388 | 4.76 | 8 | PVC | 0.01 | 1,539 | 3 | 8 | 12 | 0.8 | SM14-Ex-EX118 | |
| Kirkland_Main-2441 | Kirkland_Manholes-572 | 113.73 | Kirkland_Manholes-596 | 110.91 | 307.7 | 0.92 | 8 | PVC | 0.01 | 675 | 85 | 338 | 422 | 62.6 | SM14-Ex-EX117 | |
| Kirkland_Main-2442 | Kirkland_Manholes-595 | 103.44 | Kirkland_Manholes-597 | 99.4 | 155.7 | 2.6 | 8 | PVC | 0.01 | 1,136 | 6 | 33 | 39 | 3.4 | SM14-Ex-EX116 | |
| Kirkland_Main-2443 | Kirkland_Manholes-576 | 111.2 | Kirkland_Manholes-593 | 103.61 | 155.5 | 4.88 | 8 | PVC | 0.01 | 1,558 | 54 | 288 | 342 | 22 | SM5 | |
| Kirkland_Main-2444 | Kirkland_Manholes-593 | 103.61 | Kirkland_Manholes-592 | 96.93 | 157.1 | 4.25 | 8 | PVC | 0.01 | 1,454 | 55 | 296 | 351 | 24.2 | SM5 | |
| Kirkland_Main-2445 | Kirkland_Manholes-577 | 113.69 | Kirkland_Manholes-576 | 111.2 | 334.4 | 0.74 | 8 | PVC | 0.01 | 608 | 7 | 25 | 32 | 5.2 | SM14-Ex-EX112 | |
| Kirkland_Main-2446 | Kirkland_Manholes-578 | 130.09 | Kirkland_Manholes-577 | 113.69 | 328.9 | 4.99 | 8 | PVC | 0.01 | 1,574 | 4 | 16 | 20 | 1.3 | SM14-Ex-EX112 | |
| Kirkland_Main-2447 | Kirkland_Manholes-2065 | 431.1 | Kirkland_Manholes-2295 | 415.45 | 308.4 | 5.07 | 8 | PVC | 0.01 | 1,588 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2448 | Kirkland_Manholes-579 | 148.3 | Kirkland_Manholes-578 | 130.09 | 329.4 | 5.53 | 8 | PVC | 0.01 | 1,658 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX112 | |
| Kirkland_Main-2449 | Kirkland_Manholes-584 | 159.38 | Kirkland_Manholes-580 | 147.12 | 165.2 | 7.42 | 8 | PVC | 0.01 | 1,921 | 26 | 99 | 125 | 6.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2450 | Kirkland_Manholes-615 | 97.62 | Kirkland_Manholes-614 | 87.89 | 329.8 | 2.95 | 8 | PVC | 0.01 | 1,211 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX149 | |
| Kirkland_Main-2451 | Kirkland_Manholes-604 | 92.41 | Kirkland_Manholes-621 | 70.36 | 291.4 | 7.57 | 8 | PVC | 0.01 | 1,940 | 10 | 21 | 31 | 1.6 | SM14-Ex-EX161 | |
| Kirkland_Main-2452 | Kirkland_Manholes-626 | 276.72 | Kirkland_Manholes-627 | 275.98 | 244.8 | 0.3 | 8 | PVC | 0.01 | 388 | 1 | 4 | 5 | 1.3 | | |
| Kirkland_Main-2453 | Kirkland_Manholes-628 | 242.79 | Kirkland_Manholes-629 | 242.12 | 61.5 | 1.09 | 8 | PVC | 0.01 | 736 | 29 | 139 | 168 | 22.8 | | |
| Kirkland_Main-2454 | Kirkland_Manholes-629 | 242.12 | Kirkland_Manholes-630 | 239.43 | 331.8 | 0.81 | 8 | PVC | 0.01 | 635 | 30 | 143 | 173 | 27.2 | | |
| Kirkland_Main-2455 | Kirkland_Manholes-648 | 244.79 | Kirkland_Manholes-628 | 242.79 | 365.8 | 0.55 | 8 | PVC | 0.01 | 521 | 28 | 135 | 163 | 31.2 | | |
| Kirkland_Main-2456 | Kirkland_Manholes-631 | 237.5 | Kirkland_Manholes-632 | 237.32 | 36.6 | 0.5 | 8 | PVC | 0.01 | 498 | 30 | 151 | 181 | 36.3 | | Updated Per As-Builts (Drop Connection) |
| Kirkland_Main-2457 | Kirkland_Manholes-630 | 239.43 | Kirkland_Manholes-631 | 237.5 | 158.9 | 1.21 | 8 | PVC | 0.01 | 777 | 30 | 147 | 177 | 22.7 | | |
| Kirkland_Main-2458 | Kirkland_Manholes-633 | 234.78 | Kirkland_Manholes-634 | 228.12 | 123.4 | 5.4 | 21 | PVC | 0.01 | 21,481 | 458 | 1,542 | 2,000 | 9.3 | | |
| Kirkland_Main-2459 | Kirkland_Manholes-635 | 248.49 | Kirkland_Manholes-634 | 228.12 | 181.8 | 11.21 | 8 | PVC | 0.01 | 2,360 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2460 | Kirkland_Manholes-634 | 228.12 | Kirkland_Manholes-632 | 228 | 216.6 | 0.06 | 24 | PVC | 0.01 | 3,107 | 460 | 1,550 | 2,009 | 64.7 | SM14-Ex-EX75 | |
| Kirkland_Main-2461 | Kirkland_Manholes-632 | 228 | Kirkland_Manholes-636 | 227 | 153.6 | 0.65 | 21 | PVC | 0.01 | 7,460 | 490 | 1,705 | 2,194 | 29.4 | | |
| Kirkland_Main-2462 | Kirkland_Manholes-636 | 227 | Kirkland_Manholes-335 | 225.11 | 273.2 | 0.69 | 21 | PVC | 0.01 | 7,690 | 490 | 1,709 | 2,198 | 28.6 | | |
| Kirkland_Main-2466 | Kirkland_Manholes-640 | 237.92 | Kirkland_Manholes-639 | 237.89 | 31.5 | 0.1 | 18 | PVC | 0.01 | 1,891 | 244 | 1,049 | 1,293 | 68.4 | SM14-2035-DF8 | |
| Kirkland_Main-2467 | Kirkland_Manholes-639 | 237.89 | Kirkland_Manholes-638 | 236.51 | 242.7 | 0.57 | 21 | PVC | 0.01 | 6,971 | 451 | 1,530 | 1,981 | 28.4 | | |
| Kirkland_Main-2468 | Kirkland_Manholes-647 | 246.6 | Kirkland_Manholes-646 | 244.32 | 287.5 | 0.79 | 8 | PVC | 0.01 | 628 | 5 | 4 | 9 | 1.5 | | |
| Kirkland_Main-2469 | Kirkland_Manholes-646 | 244.32 | Kirkland_Manholes-645 | 243.42 | 85.6 | 1.05 | 8 | PVC | 0.01 | 723 | 6 | 8 | 14 | 1.9 | | |
| Kirkland_Main-2470 | Kirkland_Manholes-644 | 249.23 | Kirkland_Manholes-643 | 242.32 | 131.1 | 5.27 | 8 | PVC | 0.01 | 1,619 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2471 | Kirkland_Manholes-645 | 243.42 | Kirkland_Manholes-643 | 242.32 | 253.7 | 0.43 | 18 | PVC | 0.01 | 4,035 | 239 | 1,029 | 1,268 | 31.4 | | |
| Kirkland_Main-2472 | Kirkland_Manholes-643 | 242.32 | Kirkland_Manholes-642 | 242.1 | 113.5 | 0.19 | 18 | PVC | 0.01 | 2,698 | 241 | 1,037 | 1,278 | 47.4 | | |
| Kirkland_Main-2473 | Kirkland_Manholes-642 | 242.1 | Kirkland_Manholes-641 | 241.26 | 301.1 | 0.28 | 18 | PVC | 0.01 | 3,237 | 243 | 1,041 | 1,284 | 39.7 | | |
| Kirkland_Main-2474 | Kirkland_Manholes-641 | 241.26 | Kirkland_Manholes-640 | 237.92 | 280 | 1.19 | 18 | PVC | 0.01 | 6,693 | 244 | 1,045 | 1,289 | 19.3 | | |
| Kirkland_Main-2475 | Kirkland_Manholes-650 | 246.28 | Kirkland_Manholes-649 | 244.91 | 253.4 | 0.54 | 8 | PVC | 0.01 | 518 | 22 | 103 | 125 | 24.2 | | |
| Kirkland_Main-2476 | Kirkland_Manholes-661 | 245.17 | Kirkland_Manholes-648 | 244.79 | 204.2 | 0.19 | 8 | PVC | 0.01 | 304 | 4 | 24 | 27 | 9 | | |
| Kirkland_Main-2477 | Kirkland_Manholes-649 | 244.91 | Kirkland_Manholes-648 | 244.79 | 14.5 | 0.83 | 8 | PVC | 0.01 | 641 | 24 | 107 | 131 | 20.4 | | |
| Kirkland_Main-2478 | Kirkland_Manholes-681 | 256.89 | Kirkland_Manholes-684 | 256.25 | 143.5 | 0.45 | 8 | PVC | 0.01 | 473 | 19 | 36 | 55 | 11.6 | | |
| Kirkland_Main-2479 | Kirkland_Manholes-683 | 268.99 | Kirkland_Manholes-682 | 258.64 | 128.7 | 8.04 | 8 | PVC | 0.01 | 1,999 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2480 | Kirkland_Manholes-689 | 265.38 | Kirkland_Manholes-688 | 264.8 | 145.1 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-2481 | Kirkland_Manholes-688 | 264.8 | Kirkland_Manholes-687 | 264 | 200.3 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-2482 | Kirkland_Manholes-695 | 344.34 | Kirkland_Manholes-696 | 340.09 | 297.3 | 1.43 | 8 | PVC | 0.01 | 843 | 4 | 8 | 12 | 1.5 | SM14-Ex-EX74 | |
| Kirkland_Main-2483 | Kirkland_Manholes-829 | 344.99 | Kirkland_Manholes-695 | 344.34 | 301.8 | 0.22 | 8 | PVC | 0.01 | 327 | 2 | 4 | 5 | 1.7 | SM14-Ex-EX74 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2484 | Kirkland_Manholes-694 | 328.94 | Kirkland_Manholes-693 | 302.3 | 232.9 | 11.44 | 8 | PVC | 0.01 | 2,384 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2485 | Kirkland_Manholes-691 | 306.23 | Kirkland_Manholes-693 | 302.3 | 272.1 | 1.44 | 8 | PVC | 0.01 | 847 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-2486 | Kirkland_Manholes-692 | 325.47 | Kirkland_Manholes-691 | 306.23 | 258.4 | 7.45 | 8 | PVC | 0.01 | 1,924 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2487 | Kirkland_Manholes-693 | 302.3 | Kirkland_Manholes-807 | 300.8 | 136 | 1.1 | 8 | PVC | 0.01 | 741 | 6 | 16 | 22 | 2.9 | | |
| Kirkland_Main-2488 | Kirkland_Manholes-690 | 274.25 | Kirkland_Manholes-701 | 273.2 | 290.3 | 0.36 | 8 | PVC | 0.01 | 424 | 4 | 12 | 16 | 3.7 | | |
| Kirkland_Main-2489 | Kirkland_Manholes-699 | 288.54 | Kirkland_Manholes-701 | 273.2 | 288.8 | 5.31 | 8 | PVC | 0.01 | 1,625 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-2490 | Kirkland_Manholes-698 | 313.56 | Kirkland_Manholes-699 | 288.54 | 182.5 | 13.71 | 8 | PVC | 0.01 | 2,611 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2492 | Kirkland_Manholes-697 | 318.15 | Kirkland_Manholes-700 | 302.48 | 274.3 | 5.71 | 8 | PVC | 0.01 | 1,685 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2493 | Kirkland_Manholes-700 | 302.48 | Kirkland_Manholes-690 | 274.25 | 242.5 | 11.64 | 8 | PVC | 0.01 | 2,405 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-2494 | Kirkland_Manholes-703 | 275.12 | Kirkland_Manholes-704 | 272.37 | 210.2 | 1.31 | 8 | PVC | 0.01 | 806 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2495 | Kirkland_Manholes-702 | 273 | Kirkland_Manholes-704 | 272.37 | 144.8 | 0.44 | 8 | PVC | 0.01 | 465 | 9 | 28 | 37 | 8 | | |
| Kirkland_Main-2496 | Kirkland_Manholes-701 | 273.2 | Kirkland_Manholes-702 | 273 | 143.3 | 0.14 | 8 | PVC | 0.01 | 263 | 8 | 24 | 32 | 12.1 | | |
| Kirkland_Main-2497 | Kirkland_Manholes-723 | 131.03 | O-42 | 125.22 | 186.8 | 3.11 | 8 | PVC | 0.01 | 1,244 | 55 | 118 | 173 | 13.9 | SM14-2021-DF2 | |
| Kirkland_Main-2498 | Kirkland_Manholes-722 | 137.76 | Kirkland_Manholes-723 | 131.03 | 91.1 | 7.39 | 8 | PVC | 0.01 | 1,917 | 54 | 112 | 167 | 8.7 | SM14-2021-DF2 | |
| Kirkland_Main-2499 | Kirkland_Manholes-721 | 142.27 | Kirkland_Manholes-722 | 137.76 | 93.1 | 4.84 | 8 | PVC | 0.01 | 1,551 | 52 | 107 | 159 | 10.2 | SM14-2021-DF2 | |
| Kirkland_Main-2500 | Kirkland_Manholes-720 | 147.09 | Kirkland_Manholes-721 | 142.27 | 318.3 | 1.51 | 8 | PVC | 0.01 | 868 | 52 | 101 | 153 | 17.7 | SM14-2021-DF2 | |
| Kirkland_Main-2501 | Kirkland_Manholes-719 | 148.45 | Kirkland_Manholes-720 | 147.09 | 142.4 | 0.95 | 8 | PVC | 0.01 | 689 | 52 | 95 | 148 | 21.4 | SM14-2021-DF2 | |
| Kirkland_Main-2502 | Kirkland_Manholes-717 | 151.36 | Kirkland_Manholes-718 | 150.12 | 225.4 | 0.55 | 8 | PVC | 0.01 | 523 | 50 | 73 | 123 | 23.4 | SM14-2035-DF5 | |
| Kirkland_Main-2503 | Kirkland_Manholes-716 | 152.58 | Kirkland_Manholes-717 | 151.36 | 272.7 | 0.45 | 8 | PVC | 0.01 | 472 | 50 | 67 | 117 | 24.8 | SM14-2035-DF5 | |
| Kirkland_Main-2504 | Kirkland_Manholes-725 | 154.45 | Kirkland_Manholes-716 | 152.58 | 174.3 | 1.07 | 8 | PVC | 0.01 | 730 | 42 | 45 | 87 | 11.9 | | |
| Kirkland_Main-2505 | Kirkland_Manholes-726 | 155.56 | Kirkland_Manholes-725 | 154.45 | 157.9 | 0.7 | 8 | PVC | 0.01 | 591 | 42 | 39 | 81 | 13.8 | | |
| Kirkland_Main-2506 | Kirkland_Manholes-713 | 156.49 | Kirkland_Manholes-726 | 155.56 | 219 | 0.43 | 8 | PVC | 0.01 | 460 | 27 | 34 | 61 | 13.2 | | |
| Kirkland_Main-2507 | Kirkland_Manholes-712 | 157.06 | Kirkland_Manholes-713 | 156.49 | 30.1 | 1.89 | 8 | PVC | 0.01 | 971 | 27 | 28 | 55 | 5.7 | | |
| Kirkland_Main-2508 | Kirkland_Manholes-714 | 170.75 | Kirkland_Manholes-712 | 157.06 | 209.3 | 6.54 | 8 | PVC | 0.01 | 1,803 | 0 | 11 | 11 | 0.6 | | |
| Kirkland_Main-2509 | Kirkland_Manholes-715 | 181.7 | Kirkland_Manholes-714 | 170.75 | 155 | 7.07 | 8 | PVC | 0.01 | 1,874 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-2510 | Kirkland_Manholes-1398 | 27.8 | Kirkland_Manholes-1397 | 27.53 | 119.5 | 0.23 | 30 | PVC | 0.01 | 11,376 | 138 | 1,013 | 2,804 | 24.6 | SM14-Ex-EX154 | |
| Kirkland_Main-2511 | Kirkland_Manholes-1397 | 27.53 | Kirkland_Manholes-1396 | 27.46 | 145.3 | 0.05 | 30 | PVC | 0.01 | 5,139 | 138 | 1,021 | 2,812 | 54.7 | SM14-Ex-EX154 | |
| Kirkland_Main-2512 | Kirkland_Manholes-1399 | 44.47 | Kirkland_Manholes-1398 | 27.8 | 324.1 | 5.14 | 12 | PVC | 0.01 | 4,715 | 135 | 1,004 | 1,490 | 31.6 | SM14-Ex-EX143 | |
| Kirkland_Main-2513 | Kirkland_Manholes-1400 | 61.37 | Kirkland_Manholes-1399 | 44.47 | 267.9 | 6.31 | 12 | PVC | 0.01 | 5,221 | 133 | 996 | 1,480 | 28.3 | SM14-Ex-EX143 | |
| Kirkland_Main-2514 | Kirkland_Manholes-1401 | 76.78 | Kirkland_Manholes-1400 | 61.37 | 289.6 | 5.32 | 8 | | 0.012 | 1,355 | 30 | 280 | 310 | 22.9 | | |
| Kirkland_Main-2515 | Kirkland_Manholes-1402 | 82.36 | Kirkland_Manholes-1401 | 76.78 | 122 | 4.57 | 8 | | 0.012 | 1,257 | 29 | 263 | 292 | 23.3 | | |
| Kirkland_Main-2516 | Kirkland_Manholes-711 | 219.85 | Kirkland_Manholes-710 | 219.11 | 65.7 | 1.13 | 8 | PVC | 0.01 | 748 | 9 | 8 | 17 | 2.3 | | |
| Kirkland_Main-2517 | Kirkland_Manholes-710 | 219.11 | Kirkland_Manholes-709 | 218.2 | 118.5 | 0.77 | 8 | PVC | 0.01 | 618 | 9 | 12 | 21 | 3.4 | | |
| Kirkland_Main-2518 | Kirkland_Manholes-709 | 218.2 | Kirkland_Manholes-707 | 216.1 | 262.1 | 0.8 | 8 | PVC | 0.01 | 631 | 9 | 16 | 25 | 3.9 | | |
| Kirkland_Main-2519 | Kirkland_Manholes-708 | 217.66 | Kirkland_Manholes-707 | 216.1 | 74 | 2.11 | 8 | PVC | 0.01 | 1,024 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2520 | Kirkland_Manholes-707 | 216.1 | Kirkland_Manholes-706 | 215.57 | 102.1 | 0.52 | 8 | PVC | 0.01 | 508 | 9 | 24 | 33 | 6.4 | | |
| Kirkland_Main-2521 | Kirkland_Manholes-706 | 215.57 | Kirkland_Manholes-369 | 208.86 | 103.2 | 6.5 | 8 | PVC | 0.01 | 1,798 | 9 | 28 | 37 | 2 | | |
| Kirkland_Main-2522 | Kirkland_Manholes-1403 | 89.74 | Kirkland_Manholes-1402 | 82.36 | 156.6 | 4.71 | 8 | | 0.012 | 1,276 | 22 | 239 | 261 | 20.5 | | |
| Kirkland_Main-2523 | Kirkland_Manholes-1805 | 101.51 | Kirkland_Manholes-1403 | 89.74 | 269.7 | 4.36 | 8 | | 0.012 | 1,227 | 21 | 222 | 243 | 19.8 | | |
| Kirkland_Main-2524 | Kirkland_Manholes-1404 | 117.83 | Kirkland_Manholes-1805 | 101.51 | 279.3 | 5.84 | 8 | | 0.012 | 1,420 | 5 | 91 | 95 | 6.7 | | |
| Kirkland_Main-2525 | Kirkland_Manholes-1405 | 132.7 | Kirkland_Manholes-1404 | 117.83 | 317.4 | 4.68 | 8 | | 0.012 | 1,272 | 5 | 82 | 87 | 6.8 | | |
| Kirkland_Main-2526 | Kirkland_Manholes-1396 | 27.46 | Kirkland_Manholes-1395 | 27.24 | 179.5 | 0.12 | 30 | PVC | 0.01 | 8,435 | 225 | 1,348 | 3,226 | 38.2 | SM14-Ex-EX154 | |
| Kirkland_Main-2527 | Kirkland_Manholes-1395 | 27.24 | Kirkland_Manholes-739 | 26.87 | 399 | 0.09 | 30 | PVC | 0.01 | 7,287 | 226 | 1,356 | 3,236 | 44.4 | SM14-Ex-EX154 | |
| Kirkland_Main-2528 | Kirkland_Manholes-739 | 26.87 | Kirkland_Manholes-738 | 25.89 | 300.8 | 0.33 | 24 | PVC | 0.01 | 7,534 | 226 | 1,365 | 3,244 | 43.1 | | |
| Kirkland_Main-2532 | Kirkland_Manholes-738 | 25.89 | MH 05-714 | 25.01 | 257 | 0.34 | 24 | PVC | 0.01 | 7,724 | 246 | 1,414 | 3,313 | 42.9 | | Updated per as-built drawings |
| Kirkland_Main-2533 | Kirkland_Manholes-736 | 28.45 | Kirkland_Manholes-735 | 25.17 | 30.7 | 10.68 | 8 | PVC | 0.01 | 2,304 | 60 | 280 | 340 | 14.8 | | |
| Kirkland_Main-2534 | Kirkland_Manholes-735 | 25.17 | MH 05-714 | 25.01 | 98.1 | 0.16 | 24 | PVC | 0.01 | 5,330 | 550 | 2,050 | 2,600 | 48.8 | | Updated per as-built drawings |
| Kirkland_Main-2535 | Kirkland_Manholes-1705 | 33.28 | Kirkland_Manholes-757 | 27.8 | 142.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 15 | 33 | 48 | 3.5 | | |
| Kirkland_Main-2536 | Kirkland_Manholes-757 | 27.8 | Kirkland_Manholes-738 | 25.89 | 24.1 | 7.91 | 8 | PVC | 0.01 | 1,983 | 20 | 41 | 61 | 3.1 | | |
| Kirkland_Main-2537 | Kirkland_Manholes-734 | 25.7 | Kirkland_Manholes-735 | 25.17 | 249.9 | 0.21 | 24 | PVC | 0.01 | 6,079 | 490 | 1,762 | 2,252 | 37 | | |
| Kirkland_Main-2538 | Kirkland_Manholes-732 | 47.45 | Kirkland_Manholes-733 | 35.72 | 350.8 | 3.34 | 18 | PVC | 0.01 | 11,207 | 375 | 1,527 | 1,902 | 17 | | |
| Kirkland_Main-2539 | Kirkland_Manholes-731 | 53.54 | Kirkland_Manholes-732 | 47.45 | 265.7 | 2.29 | 18 | PVC | 0.01 | 9,278 | 375 | 1,519 | 1,894 | 20.4 | | |
| Kirkland_Main-2540 | Kirkland_Manholes-729 | 64.46 | Kirkland_Manholes-730 | 57.26 | 336.6 | 2.14 | 12 | PVC | 0.01 | 3,040 | 118 | 494 | 612 | 20.1 | | |
| Kirkland_Main-2541 | Kirkland_Manholes-730 | 57.26 | Kirkland_Manholes-731 | 53.54 | 101.9 | 3.65 | 18 | PVC | 0.01 | 11,709 | 287 | 1,054 | 1,341 | 11.4 | | |
| Kirkland_Main-2542 | Kirkland_Manholes-1436 | 518.03 | Kirkland_Manholes-1430 | 516.64 | 170 | 0.82 | 8 | PVC | 0.01 | 638 | 2 | 8 | 10 | 1.5 | | |
| Kirkland_Main-2543 | Kirkland_Manholes-1434 | 511.6 | Kirkland_Manholes-1431 | 510.8 | 175 | 0.46 | 8 | PVC | 0.01 | 477 | 8 | 32 | 40 | 8.4 | | |
| Kirkland_Main-2544 | Kirkland_Manholes-1431 | 510.8 | Kirkland_Manholes-1432 | 510.04 | 163.2 | 0.47 | 8 | PVC | 0.01 | 481 | 8 | 36 | 44 | 9.1 | | |
| Kirkland_Main-2545 | Kirkland_Manholes-1432 | 510.04 | Kirkland_Manholes-1433 | 509.55 | 97.9 | 0.5 | 8 | PVC | 0.01 | 499 | 9 | 40 | 49 | 9.8 | | |
| Kirkland_Main-2546 | Kirkland_Manholes-1433 | 509.55 | Kirkland_Manholes-1437 | 508.69 | 186 | 0.46 | 8 | PVC | 0.01 | 480 | 10 | 44 | 54 | 11.2 | | |
| Kirkland_Main-2547 | Kirkland_Manholes-1435 | 519.8 | Kirkland_Manholes-1436 | 518.03 | 159.8 | 1.11 | 8 | PVC | 0.01 | 742 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2548 | Kirkland_Manholes-1437 | 508.69 | Kirkland_Manholes-1438 | 507.49 | 258.4 | 0.46 | 8 | PVC | 0.01 | 480 | 11 | 48 | 58 | 12.2 | | |
| Kirkland_Main-2549 | Kirkland_Manholes-1438 | 507.49 | Kirkland_Manholes-1444 | 505.53 | 236.5 | 0.83 | 8 | PVC | 0.01 | 642 | 15 | 72 | 87 | 13.5 | SM14-Ex-EX269 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2550 | Kirkland_Manholes-1439 | 508.99 | Kirkland_Manholes-1438 | 507.49 | 261.3 | 0.57 | 8 | PVC | 0.01 | 534 | 5 | 20 | 25 | 4.6 | SM14-Ex-EX269 | |
| Kirkland_Main-2551 | Kirkland_Manholes-1441 | 509.69 | Kirkland_Manholes-1440 | 509.16 | 212.6 | 0.25 | 8 | PVC | 0.01 | 352 | 4 | 12 | 16 | 4.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2552 | Kirkland_Manholes-1440 | 509.16 | Kirkland_Manholes-1439 | 508.99 | 378 | 0.04 | 8 | PVC | 0.01 | 150 | 4 | 16 | 20 | 13.6 | SM14-Ex-EX269 | |
| Kirkland_Main-2554 | Kirkland_Manholes-1449 | 498.19 | Kirkland_Manholes-1450 | 496.32 | 291.2 | 0.64 | 8 | PVC | 0.01 | 565 | 22 | 127 | 149 | 26.4 | SM14-Ex-EX269 | |
| Kirkland_Main-2555 | Kirkland_Manholes-1450 | 496.32 | Kirkland_Manholes-1451 | 492.05 | 400.8 | 1.07 | 8 | PVC | 0.01 | 728 | 25 | 131 | 156 | 21.4 | SM14-Ex-EX269 | |
| Kirkland_Main-2556 | Kirkland_Manholes-1448 | 502.55 | Kirkland_Manholes-1449 | 498.19 | 186.7 | 2.34 | 8 | PVC | 0.01 | 1,078 | 21 | 123 | 144 | 13.4 | SM14-Ex-EX269 | |
| Kirkland_Main-2557 | Kirkland_Manholes-1447 | 503.26 | Kirkland_Manholes-1448 | 502.55 | 401.7 | 0.18 | 8 | PVC | 0.01 | 296 | 19 | 119 | 138 | 46.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2558 | Kirkland_Manholes-2976 | 503.85 | Kirkland_Manholes-1447 | 503.26 | 210.4 | 0.28 | 8 | PVC | 0.01 | 373 | 18 | 115 | 134 | 35.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2559 | Kirkland_Manholes-1444 | 505.53 | Kirkland_Manholes-1446 | 505.51 | 95.2 | 0.02 | 12 | PVC | 0.01 | 301 | 16 | 83 | 99 | 32.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2560 | Kirkland_Manholes-1446 | 505.51 | Kirkland_Manholes-1445 | 504.92 | 12.7 | 4.66 | 8 | PVC | 0.01 | 1,523 | 16 | 87 | 103 | 6.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2561 | Kirkland_Manholes-1442 | 510.02 | Kirkland_Manholes-1443 | 506.8 | 138.1 | 2.33 | 8 | PVC | 0.01 | 1,077 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX274 | |
| Kirkland_Main-2562 | Kirkland_Manholes-1443 | 506.8 | Kirkland_Manholes-1444 | 505.53 | 203.3 | 0.62 | 8 | PVC | 0.01 | 557 | 0 | 8 | 8 | 1.4 | SM14-Ex-EX274 | |
| Kirkland_Main-2563 | Kirkland_Manholes-1451 | 492.05 | Kirkland_Manholes-1452 | 486.6 | 321.3 | 1.7 | 8 | PVC | 0.01 | 918 | 27 | 135 | 162 | 17.6 | SM14-Ex-EX269 | |
| Kirkland_Main-2564 | Kirkland_Manholes-1452 | 486.6 | Kirkland_Manholes-1459 | 479.42 | 322.1 | 2.23 | 8 | PVC | 0.01 | 1,053 | 28 | 139 | 167 | 15.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2565 | Kirkland_Manholes-1453 | 500.71 | Kirkland_Manholes-1454 | 499.21 | 284.8 | 0.53 | 8 | PVC | 0.01 | 512 | 1 | 4 | 5 | 1 | SM14-Ex-EX270 | |
| Kirkland_Main-2566 | Kirkland_Manholes-1454 | 499.21 | Kirkland_Manholes-1455 | 496 | 348.8 | 0.92 | 8 | PVC | 0.01 | 676 | 3 | 8 | 11 | 1.6 | SM14-Ex-EX270 | |
| Kirkland_Main-2567 | Kirkland_Manholes-1455 | 496 | Kirkland_Manholes-1456 | 494.83 | 99.7 | 1.17 | 8 | PVC | 0.01 | 764 | 5 | 12 | 17 | 2.2 | SM14-Ex-EX270 | |
| Kirkland_Main-2568 | Kirkland_Manholes-1456 | 494.83 | Kirkland_Manholes-1457 | 481.56 | 320 | 4.15 | 8 | PVC | 0.01 | 1,436 | 6 | 16 | 22 | 1.5 | SM14-Ex-EX270 | |
| Kirkland_Main-2569 | Kirkland_Manholes-1461 | 483.24 | Kirkland_Manholes-1457 | 482.02 | 293.4 | 0.42 | 8 | PVC | 0.01 | 455 | 17 | 48 | 64 | 14.1 | SM14-Ex-EX214 | Drop Connection |
| Kirkland_Main-2570 | Kirkland_Manholes-1457 | 481.56 | Kirkland_Manholes-1458 | 481.15 | 103.4 | 0.4 | 8 | PVC | 0.01 | 444 | 23 | 68 | 91 | 20.4 | SM14-Ex-EX214 | |
| Kirkland_Main-2571 | Kirkland_Manholes-1458 | 481.15 | Kirkland_Manholes-1459 | 479.42 | 259.2 | 0.67 | 8 | PVC | 0.01 | 576 | 23 | 72 | 95 | 16.4 | SM14-Ex-EX214 | |
| Kirkland_Main-2572 | Kirkland_Manholes-1459 | 479.42 | Kirkland_Manholes-1480 | 465.84 | 411.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 51 | 215 | 266 | 20.8 | SM14-Ex-EX214 | |
| Kirkland_Main-2573 | Kirkland_Manholes-1460 | 490.4 | Kirkland_Manholes-1461 | 483.24 | 392 | 1.83 | 8 | PVC | 0.01 | 953 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX214 | |
| Kirkland_Main-2574 | Kirkland_Manholes-1469 | 490.09 | Kirkland_Manholes-1461 | 483.24 | 144.8 | 4.73 | 8 | PVC | 0.01 | 1,534 | 14 | 36 | 50 | 3.3 | SM14-Ex-EX271 | |
| Kirkland_Main-2575 | Kirkland_Manholes-608 | 134.68 | Kirkland_Manholes-607 | 127.97 | 148.5 | 4.52 | 8 | PVC | 0.01 | 1,499 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX147 | |
| Kirkland_Main-2576 | Kirkland_Manholes-607 | 127.97 | Kirkland_Manholes-606 | 111.69 | 332.5 | 4.9 | 8 | PVC | 0.01 | 1,560 | 4 | 16 | 20 | 1.3 | SM14-Ex-EX147 | |
| Kirkland_Main-2578 | Kirkland_Manholes-3035 | 266.43 | Kirkland_Manholes-1506 | 266.15 | 125.7 | 0.22 | 8 | PVC | 0.01 | 333 | 27 | 107 | 134 | 40.3 | | |
| Kirkland_Main-2579 | Kirkland_Manholes-1504 | 267.51 | Kirkland_Manholes-1505 | 267 | 104.1 | 0.49 | 8 | PVC | 0.01 | 493 | 22 | 83 | 105 | 21.3 | | |
| Kirkland_Main-2580 | Kirkland_Manholes-1503 | 273.94 | Kirkland_Manholes-1504 | 267.51 | 44 | 14.62 | 8 | PVC | 0.01 | 2,696 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-2581 | Kirkland_Manholes-1502 | 279.47 | Kirkland_Manholes-1503 | 273.94 | 90.7 | 6.09 | 8 | PVC | 0.01 | 1,741 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2582 | Kirkland_Manholes-1501 | 267.93 | Kirkland_Manholes-1504 | 267.51 | 165.4 | 0.25 | 8 | PVC | 0.01 | 355 | 20 | 72 | 92 | 25.8 | | |
| Kirkland_Main-2583 | Kirkland_Manholes-2255 | 245.88 | Kirkland_Manholes-2253 | 239.74 | 232.2 | 2.64 | 8 | PVC | 0.01 | 1,146 | 29 | 4 | 33 | 2.9 | SM14-Ex-EX247 | |
| Kirkland_Main-2584 | Kirkland_Manholes-1499 | 268.92 | Kirkland_Manholes-1501 | 267.93 | 240 | 0.41 | 8 | PVC | 0.01 | 453 | 19 | 68 | 87 | 19.1 | | |
| Kirkland_Main-2585 | Kirkland_Manholes-1500 | 287.29 | Kirkland_Manholes-1498 | 284.32 | 146.8 | 2.02 | 8 | PVC | 0.01 | 1,003 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2587 | Kirkland_Manholes-1498 | 284.32 | Kirkland_Manholes-1499 | 268.92 | 127.3 | 12.1 | 8 | PVC | 0.01 | 2,452 | 2 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2588 | Kirkland_Manholes-771 | 213.99 | Kirkland_Manholes-777 | 184.25 | 152.4 | 19.51 | 8 | PVC | 0.01 | 3,115 | 2 | 8 | 10 | 0.3 | | |
| Kirkland_Main-2589 | Kirkland_Manholes-777 | 184.25 | KC_Manholes-6 | 163.9 | 254 | 8.01 | 8 | PVC | 0.01 | 1,995 | 5 | 12 | 17 | 0.8 | | |
| Kirkland_Main-2590 | KC_Manholes-5 | 169.15 | KC_Manholes-6 | 163.9 | 285.7 | 1.84 | 8 | PVC | 0.01 | 956 | 9 | 44 | 53 | 5.5 | | |
| Kirkland_Main-2591 | KC_Manholes-6 | 163.9 | O-17 | 159.86 | 90.8 | 4.45 | 8 | PVC | 0.01 | 1,487 | 15 | 60 | 74 | 5 | | |
| Kirkland_Main-2592 | Kirkland_Manholes-766 | 182.72 | Kirkland_Manholes-1555 | 164.48 | 325.6 | 5.6 | 8 | PVC | 0.01 | 1,669 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-2593 | Kirkland_Manholes-1555 | 164.48 | O-18 | 159.86 | 33.3 | 13.89 | 8 | PVC | 0.01 | 2,628 | 4 | 12 | 15 | 0.6 | | |
| Kirkland_Main-2594 | Kirkland_Manholes-767 | 210.01 | Kirkland_Manholes-766 | 182.72 | 125.5 | 21.75 | 8 | PVC | 0.01 | 3,288 | 1 | 4 | 4 | 0.1 | | |
| Kirkland_Main-2595 | Kirkland_Manholes-765 | 257.59 | Kirkland_Manholes-764 | 244.77 | 266.3 | 4.81 | 8 | PVC | 0.01 | 1,547 | 20 | 72 | 91 | 5.9 | SM14-Ex-EX121 | |
| Kirkland_Main-2596 | Kirkland_Manholes-764 | 244.77 | Kirkland_Manholes-1530 | 229.92 | 292.5 | 5.08 | 8 | PVC | 0.01 | 1,589 | 21 | 75 | 97 | 6.1 | SM14-Ex-EX121 | |
| Kirkland_Main-2597 | Kirkland_Manholes-770 | 166.93 | Kirkland_Manholes-769 | 165.1 | 146.5 | 1.25 | 8 | PVC | 0.01 | 788 | 1 | 8 | 9 | 1.1 | | |
| Kirkland_Main-2598 | Kirkland_Manholes-769 | 165.1 | Kirkland_Manholes-768 | 159.83 | 42.8 | 12.31 | 8 | PVC | 0.01 | 2,474 | 3 | 16 | 19 | 0.8 | | |
| Kirkland_Main-2599 | Kirkland_Manholes-768 | 159.83 | O-19 | 156.57 | 65.3 | 5 | 8 | PVC | 0.01 | 1,577 | 3 | 20 | 23 | 1.5 | | |
| Kirkland_Main-2600 | Kirkland_Manholes-1600 | 216.22 | Kirkland_Manholes-1599 | 200.11 | 155.5 | 10.36 | 8 | PVC | 0.01 | 2,269 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX170 | |
| Kirkland_Main-2601 | Kirkland_Manholes-1614 | 91.09 | Kirkland_Manholes-1613 | 87.49 | 157.9 | 2.28 | 8 | PVC | 0.01 | 1,065 | 12 | 115 | 127 | 11.9 | SM14-Ex-EX167 | |
| Kirkland_Main-2602 | Kirkland_Manholes-1616 | 135.79 | Kirkland_Manholes-1615 | 109.23 | 291.4 | 9.11 | 8 | PVC | 0.01 | 2,128 | 2 | 8 | 11 | 0.5 | | |
| Kirkland_Main-2603 | Kirkland_Manholes-1617 | 246.15 | Kirkland_Manholes-1630 | 217.96 | 377.4 | 7.47 | 8 | PVC | 0.01 | 1,927 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2604 | Kirkland_Manholes-1618 | 259.44 | Kirkland_Manholes-1619 | 255.5 | 286.6 | 1.37 | 8 | PVC | 0.01 | 827 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX176 | |
| Kirkland_Main-2605 | Kirkland_Manholes-1619 | 255.5 | Kirkland_Manholes-1622 | 253.11 | 371.5 | 0.64 | 8 | PVC | 0.01 | 565 | 3 | 8 | 11 | 2 | SM14-Ex-EX176 | |
| Kirkland_Main-2607 | Kirkland_Manholes-1620 | 234.07 | Kirkland_Manholes-1621 | 227.94 | 53.2 | 11.53 | 8 | PVC | 0.01 | 2,394 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2608 | Kirkland_Manholes-1621 | 227.94 | Kirkland_Manholes-1631 | 193.59 | 278.6 | 12.33 | 8 | PVC | 0.01 | 2,476 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-2609 | Kirkland_Manholes-1623 | 294.92 | Kirkland_Manholes-1622 | 253.11 | 447.9 | 9.33 | 8 | PVC | 0.01 | 2,154 | 200 | 807 | 1,006 | 46.7 | SM7 | |
| Kirkland_Main-2610 | Kirkland_Manholes-1633 | 254.8 | Kirkland_Manholes-1622 | 253.11 | 303.2 | 0.56 | 8 | PVC | 0.01 | 526 | 8 | 16 | 24 | 4.6 | SM14-Ex-EX204 | |
| Kirkland_Main-2611 | Kirkland_Manholes-1626 | 191.61 | Kirkland_Manholes-1624 | 183.67 | 177.3 | 4.48 | 8 | PVC | 0.01 | 1,492 | 7 | 24 | 31 | 2.1 | | |
| Kirkland_Main-2615 | Kirkland_Manholes-1829 | 64.39 | Kirkland_Manholes-1830 | 64.02 | 316.5 | 0.12 | 18 | PVC | 0.01 | 2,096 | 102 | 700 | 1,152 | 55 | SM14-Ex-EX142 | |
| Kirkland_Main-2616 | Kirkland_Manholes-1830 | 64.02 | Kirkland_Manholes-1400 | 61.37 | 81.5 | 3.25 | 18 | PVC | 0.01 | 11,049 | 102 | 708 | 1,160 | 10.5 | SM14-Ex-EX142 | |
| Kirkland_Main-2617 | Kirkland_Manholes-1828 | 65.79 | Kirkland_Manholes-1829 | 64.39 | 312.6 | 0.45 | 15 | PVC | 0.01 | 2,522 | 101 | 692 | 1,143 | 45.3 | SM14-2035-DF11 | |
| Kirkland_Main-2618 | Kirkland_Manholes-1827 | 69.3 | Kirkland_Manholes-2994 | 67.86 | 357.5 | 0.4 | 15 | PVC | 0.01 | 2,392 | 98 | 659 | 1,107 | 46.3 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2619 | Kirkland_Manholes-1826 | 70.81 | Kirkland_Manholes-1827 | 69.3 | 214.2 | 0.71 | 15 | PVC | 0.01 | 3,165 | 96 | 650 | 1,097 | 34.7 | | |
| Kirkland_Main-2620 | Kirkland_Manholes-1824 | 72.16 | Kirkland_Manholes-1826 | 70.81 | 200.6 | 0.67 | 15 | PVC | 0.01 | 3,092 | 96 | 642 | 1,088 | 35.2 | | |
| Kirkland_Main-2621 | Kirkland_Manholes-1823 | 74.67 | Kirkland_Manholes-1824 | 72.16 | 26.9 | 9.32 | 8 | PVC | 0.01 | 2,153 | 7 | 33 | 40 | 1.9 | SM10 | |
| Kirkland_Main-2622 | Kirkland_Manholes-1822 | 87.17 | Kirkland_Manholes-1823 | 74.67 | 362.6 | 3.45 | 8 | PVC | 0.01 | 1,309 | 5 | 25 | 30 | 2.3 | SM10 | |
| Kirkland_Main-2623 | Kirkland_Manholes-1821 | 94.43 | Kirkland_Manholes-1822 | 87.17 | 350 | 2.07 | 8 | PVC | 0.01 | 1,015 | 4 | 16 | 20 | 2 | SM10 | |
| Kirkland_Main-2624 | Kirkland_Manholes-1820 | 95.81 | Kirkland_Manholes-1821 | 94.43 | 359.9 | 0.38 | 8 | PVC | 0.01 | 437 | 2 | 8 | 10 | 2.3 | SM10 | |
| Kirkland_Main-2625 | Kirkland_Manholes-1819 | 89.53 | Kirkland_Manholes-1402 | 82.36 | 241.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 6 | 16 | 23 | 1.9 | SM10 | |
| Kirkland_Main-2626 | Kirkland_Manholes-1818 | 98.86 | Kirkland_Manholes-1819 | 89.53 | 204 | 4.57 | 8 | PVC | 0.01 | 1,508 | 5 | 8 | 13 | 0.9 | SM10 | |
| Kirkland_Main-2628 | Kirkland_Manholes-1811 | 129.72 | Kirkland_Manholes-1812 | 126.33 | 178.5 | 1.9 | 8 | PVC | 0.01 | 972 | 12 | 82 | 94 | 9.7 | SM10 | |
| Kirkland_Main-2629 | Kirkland_Manholes-1812 | 126.33 | Kirkland_Manholes-1813 | 123.92 | 54.8 | 4.4 | 8 | PVC | 0.01 | 1,479 | 12 | 91 | 103 | 6.9 | SM14-Ex-EX139 | |
| Kirkland_Main-2630 | Kirkland_Manholes-1813 | 123.92 | Kirkland_Manholes-1814 | 117.44 | 111.3 | 5.82 | 8 | PVC | 0.01 | 1,701 | 13 | 99 | 112 | 6.6 | SM14-Ex-EX139 | |
| Kirkland_Main-2631 | Kirkland_Manholes-1814 | 117.44 | Kirkland_Manholes-1817 | 109.22 | 155.5 | 5.28 | 8 | PVC | 0.01 | 1,621 | 15 | 115 | 130 | 8 | SM10 | |
| Kirkland_Main-2632 | Kirkland_Manholes-1815 | 130.16 | Kirkland_Manholes-1814 | 117.44 | 475.8 | 2.67 | 8 | PVC | 0.01 | 1,153 | 2 | 8 | 10 | 0.9 | SM10 | |
| Kirkland_Main-2633 | Kirkland_Manholes-1816 | 115.31 | Kirkland_Manholes-1825 | 112.27 | 360.1 | 0.84 | 8 | PVC | 0.01 | 648 | 3 | 8 | 11 | 1.7 | SM10 | |
| Kirkland_Main-2634 | Kirkland_Manholes-1817 | 109.22 | Kirkland_Manholes-1805 | 101.51 | 328.6 | 2.35 | 8 | PVC | 0.01 | 1,080 | 15 | 123 | 139 | 12.8 | SM10 | |
| Kirkland_Main-2635 | Kirkland_Manholes-1831 | 166.9 | Kirkland_Manholes-1190 | 151.12 | 137.2 | 11.5 | 8 | PVC | 0.01 | 2,391 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX83 | |
| Kirkland_Main-2636 | Kirkland_Manholes-1837 | 12.2 | Kirkland_Manholes-1836 | 11 | 9.3 | 12.92 | 12 | PVC | 0.01 | 7,473 | 372 | 786 | 1,157 | 15.5 | | |
| Kirkland_Main-2637 | Kirkland_Manholes-1834 | 11.35 | Kirkland_Manholes-1835 | 11.1 | 27.9 | 0.9 | 12 | PVC | 0.01 | 1,967 | 16 | 91 | 106 | 5.4 | | |
| Kirkland_Main-2638 | Kirkland_Manholes-1835 | 11.1 | Kirkland_Manholes-1836 | 11 | 9.8 | 1.02 | 12 | PVC | 0.01 | 2,099 | 16 | 97 | 113 | 5.4 | | |
| Kirkland_Main-2639 | Kirkland_Manholes-1832 | 17.68 | Kirkland_Manholes-1833 | 16.5 | 43.9 | 2.69 | 8 | PVC | 0.01 | 1,155 | 2 | 6 | 9 | 0.7 | | |
| Kirkland_Main-2640 | Kirkland_Manholes-1794 | 12.63 | Kirkland_Manholes-1837 | 12.2 | 128.1 | 0.34 | 15 | PVC | 0.01 | 2,183 | 372 | 779 | 1,151 | 52.7 | | |
| Kirkland_Main-2641 | Kirkland_Manholes-2679 | 83.65 | Kirkland_Manholes-2880 | 81.72 | 80.2 | 2.41 | 8 | PVC | 0.01 | 1,094 | 0 | 6 | 6 | 0.6 | | |
| Kirkland_Main-2642 | Kirkland_Manholes-2880 | 81.72 | Kirkland_Manholes-2879 | 68.04 | 76.6 | 17.86 | 8 | PVC | 0.01 | 2,979 | 24 | 30 | 55 | 1.8 | | |
| Kirkland_Main-2644 | Kirkland_Manholes-2885 | 165.69 | Kirkland_Manholes-1111 | 165.6 | 145.4 | 0.06 | 8 | PVC | 0.01 | 175 | 0 | 4 | 4 | 2.3 | SM14-Ex-EX9 | |
| Kirkland_Main-2658 | Kirkland_Manholes-480 | 484.34 | Kirkland_Manholes-1493 | 479.91 | 224.4 | 1.97 | 8 | PVC | 0.01 | 991 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2659 | Kirkland_Manholes-3042 | 194.23 | Kirkland_Manholes-2474 | 188.45 | 173.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2663 | Kirkland_Manholes-2886 | 151 | Kirkland_Manholes-252 | 142.57 | 290.9 | 2.9 | 8 | PVC | 0.01 | 1,200 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX40 | |
| Kirkland_Main-2666 | Kirkland_Manholes-2887 | 302.33 | Kirkland_Manholes-2888 | 290.53 | 197 | 5.99 | 8 | PVC | 0.01 | 1,725 | 3 | 16 | 19 | 1.1 | | |
| Kirkland_Main-2667 | Kirkland_Manholes-1181 | 120.04 | Kirkland_Manholes-2889 | 83.33 | 400.3 | 9.17 | 8 | PVC | 0.01 | 2,135 | 3 | 9 | 12 | 0.6 | SM10 | |
| Kirkland_Main-2668 | Kirkland_Manholes-2889 | 83.33 | Kirkland_Manholes-305 | 74.69 | 164.1 | 5.26 | 8 | PVC | 0.01 | 1,618 | 5 | 18 | 23 | 1.4 | SM10 | |
| Kirkland_Main-2670 | Kirkland_Manholes-1624 | 183.67 | Kirkland_Manholes-1625 | 179.1 | 84.9 | 5.38 | 8 | PVC | 0.01 | 1,636 | 7 | 28 | 35 | 2.1 | | |
| Kirkland_Main-2671 | Kirkland_Manholes-1632 | 181.73 | Kirkland_Manholes-1625 | 179.1 | 96.8 | 2.72 | 8 | PVC | 0.01 | 1,162 | 3 | 16 | 19 | 1.6 | | |
| Kirkland_Main-2672 | Kirkland_Manholes-1627 | 199.21 | Kirkland_Manholes-1626 | 191.61 | 142.7 | 5.33 | 8 | PVC | 0.01 | 1,627 | 7 | 20 | 27 | 1.7 | | |
| Kirkland_Main-2673 | Kirkland_Manholes-1628 | 203.71 | Kirkland_Manholes-1627 | 199.21 | 47.7 | 9.43 | 8 | PVC | 0.01 | 2,165 | 7 | 16 | 22 | 1 | | |
| Kirkland_Main-2674 | Kirkland_Manholes-1629 | 216.45 | Kirkland_Manholes-1628 | 203.71 | 87.7 | 14.52 | 8 | PVC | 0.01 | 2,687 | 7 | 12 | 18 | 0.7 | | |
| Kirkland_Main-2675 | Kirkland_Manholes-1630 | 217.96 | Kirkland_Manholes-1629 | 216.45 | 15.3 | 9.86 | 8 | PVC | 0.01 | 2,214 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2676 | Kirkland_Manholes-1631 | 193.59 | Kirkland_Manholes-1632 | 181.73 | 96.1 | 12.34 | 8 | PVC | 0.01 | 2,477 | 3 | 12 | 15 | 0.6 | | |
| Kirkland_Main-2677 | Kirkland_Manholes-1712 | 141.37 | Kirkland_Manholes-1706 | 124.78 | 325.1 | 5.1 | 8 | PVC | 0.01 | 1,593 | 1 | 8 | 10 | 0.6 | SM14-Ex-EX166 | |
| Kirkland_Main-2678 | Kirkland_Manholes-1716 | 100.64 | Kirkland_Manholes-1715 | 96.61 | 119 | 3.39 | 8 | PVC | 0.01 | 1,298 | 15 | 8 | 23 | 1.8 | | |
| Kirkland_Main-2679 | Kirkland_Manholes-1715 | 96.61 | Kirkland_Manholes-1714 | 94.78 | 31.8 | 5.76 | 8 | PVC | 0.01 | 1,692 | 15 | 16 | 31 | 1.9 | | |
| Kirkland_Main-2680 | Kirkland_Manholes-1713 | 108.19 | Kirkland_Manholes-1714 | 94.78 | 126.8 | 10.57 | 8 | PVC | 0.01 | 2,293 | 9 | 8 | 17 | 0.7 | SM14-Ex-EX186 | |
| Kirkland_Main-2681 | Kirkland_Manholes-1714 | 94.78 | Kirkland_Manholes-1717 | 58.55 | 387.3 | 9.35 | 8 | PVC | 0.01 | 2,156 | 24 | 33 | 56 | 2.6 | SM14-Ex-EX186 | |
| Kirkland_Main-2685 | Kirkland_Manholes-1720 | 51.16 | Kirkland_Manholes-1722 | 47.26 | 30.1 | 12.97 | 8 | PVC | 0.01 | 2,539 | 39 | 25 | 63 | 2.5 | | |
| Kirkland_Main-2686 | Kirkland_Manholes-1721 | 54.75 | Kirkland_Manholes-1720 | 51.16 | 58.7 | 6.12 | 8 | PVC | 0.01 | 1,744 | 39 | 16 | 55 | 3.2 | SM14-Ex-EX185 | |
| Kirkland_Main-2687 | Kirkland_Manholes-1723 | 62.26 | Kirkland_Manholes-1721 | 54.75 | 207.5 | 3.62 | 8 | PVC | 0.01 | 1,341 | 36 | 8 | 45 | 3.3 | SM14-Ex-EX185 | |
| Kirkland_Main-2688 | Kirkland_Manholes-1711 | 136.47 | Kirkland_Manholes-1710 | 134.24 | 160.1 | 1.39 | 12 | PVC | 0.01 | 2,453 | 11 | 74 | 85 | 3.5 | SM14-Ex-EX196 | |
| Kirkland_Main-2689 | Kirkland_Manholes-1734 | 24.57 | Kirkland_Manholes-1737 | 24.2 | 117 | 0.32 | 12 | PVC | 0.01 | 1,169 | 92 | 132 | 224 | 19.1 | | |
| Kirkland_Main-2690 | Kirkland_Manholes-1735 | 26.22 | Kirkland_Manholes-1734 | 24.57 | 115.4 | 1.43 | 12 | PVC | 0.01 | 2,488 | 5 | 25 | 30 | 1.2 | | |
| Kirkland_Main-2691 | Kirkland_Manholes-1729 | 25.06 | Kirkland_Manholes-1734 | 24.57 | 158.2 | 0.31 | 12 | PVC | 0.01 | 1,157 | 87 | 99 | 185 | 16 | | |
| Kirkland_Main-2692 | Kirkland_Manholes-1730 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 35.3 | 3.23 | 8 | PVC | 0.01 | 1,268 | 17 | 33 | 50 | 4 | | |
| Kirkland_Main-2693 | Kirkland_Manholes-1731 | 27.35 | Kirkland_Manholes-1730 | 26.2 | 207.2 | 0.55 | 8 | PVC | 0.01 | 525 | 13 | 25 | 38 | 7.3 | | |
| Kirkland_Main-2694 | Kirkland_Manholes-1732 | 28.2 | Kirkland_Manholes-1731 | 27.35 | 54.4 | 1.56 | 8 | PVC | 0.01 | 882 | 6 | 16 | 23 | 2.6 | SM14-Ex-EX156 | |
| Kirkland_Main-2695 | Kirkland_Manholes-1733 | 28.74 | Kirkland_Manholes-1732 | 28.2 | 66.1 | 0.82 | 8 | PVC | 0.01 | 637 | 6 | 8 | 14 | 2.3 | SM14-Ex-EX156 | |
| Kirkland_Main-2696 | Kirkland_Manholes-1743 | 28.04 | Kirkland_Manholes-1746 | 27.54 | 238.6 | 0.21 | 15 | PVC | 0.01 | 1,725 | 247 | 568 | 816 | 47.3 | SM14-Ex-EX157 | |
| Kirkland_Main-2697 | Kirkland_Manholes-1746 | 27.54 | MH_Selection_06-13-2016-4 | 25.37 | 27.6 | 7.87 | 15 | PVC | 0.01 | 10,571 | 249 | 617 | 866 | 8.2 | SM14-Ex-EX157 | Updated per as-built drawings |
| Kirkland_Main-2700 | Kirkland_Manholes-1745 | 27.57 | Kirkland_Manholes-1746 | 27.54 | 73.9 | 0.04 | 8 | PVC | 0.01 | 142 | 1 | 41 | 43 | 29.9 | | |
| Kirkland_Main-2702 | Kirkland_Manholes-1737 | 24.2 | MH_Selection_06-13-2016-5 | 24.55 | 145.6 | -0.24 | 12 | PVC | 0.01 | 1,019 | 101 | 140 | 241 | 23.7 | | Updated per as-built drawings |
| Kirkland_Main-2703 | Kirkland_Manholes-1736 | 26.69 | Kirkland_Manholes-1735 | 26.22 | 88.6 | 0.53 | 8 | PVC | 0.01 | 513 | 5 | 16 | 22 | 4.2 | | |
| Kirkland_Main-2704 | Kirkland_Manholes-1752 | 27.81 | Kirkland_Manholes-1736 | 26.69 | 254.8 | 0.44 | 8 | PVC | 0.01 | 467 | 4 | 8 | 12 | 2.6 | | |
| Kirkland_Main-2705 | Kirkland_Manholes-1765 | 114.35 | Kirkland_Manholes-1764 | 112.57 | 108.8 | 1.64 | 8 | PVC | 0.01 | 902 | 2 | 8 | 10 | 1.1 | | |
| Kirkland_Main-2706 | Kirkland_Manholes-1764 | 112.57 | Kirkland_Manholes-1763 | 111.41 | 74.1 | 1.57 | 8 | PVC | 0.01 | 882 | 7 | 16 | 23 | 2.6 | | |
| Kirkland_Main-2707 | Kirkland_Manholes-1763 | 111.41 | Kirkland_Manholes-1761 | 99.41 | 212.2 | 5.65 | 10 | PVC | 0.01 | 3,040 | 12 | 58 | 70 | 2.3 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2708 | Kirkland_Manholes-1761 | 99.41 | Kirkland_Manholes-1762 | 98.88 | 52.5 | 1.01 | 12 | PVC | 0.01 | 2,089 | 29 | 198 | 227 | 10.8 | SM14-Ex-EX166 | |
| Kirkland_Main-2709 | Kirkland_Manholes-1706 | 124.78 | Kirkland_Manholes-1761 | 99.41 | 406.8 | 6.24 | 12 | PVC | 0.01 | 5,191 | 17 | 132 | 149 | 2.9 | SM14-Ex-EX166 | |
| Kirkland_Main-2710 | Kirkland_Manholes-1766 | 113.7 | Kirkland_Manholes-1763 | 111.41 | 43.4 | 5.28 | 8 | PVC | 0.01 | 1,620 | 5 | 33 | 38 | 2.3 | SM14-Ex-EX168 | |
| Kirkland_Main-2711 | Kirkland_Manholes-1767 | 122.16 | Kirkland_Manholes-1766 | 113.7 | 181 | 4.67 | 8 | PVC | 0.01 | 1,524 | 5 | 25 | 30 | 2 | SM14-Ex-EX168 | |
| Kirkland_Main-2712 | Kirkland_Manholes-1674 | 78.95 | Kirkland_Manholes-1774 | 71.66 | 398 | 1.83 | 8 | PVC | 0.01 | 954 | 65 | 206 | 270 | 28.3 | | |
| Kirkland_Main-2713 | Kirkland_Manholes-1774 | 71.66 | Kirkland_Manholes-1773 | 69.68 | 129.9 | 1.52 | 8 | PVC | 0.01 | 871 | 66 | 214 | 280 | 32.2 | | |
| Kirkland_Main-2714 | Kirkland_Manholes-1773 | 69.68 | Kirkland_Manholes-1772 | 68.31 | 220 | 0.62 | 8 | PVC | 0.01 | 556 | 73 | 222 | 296 | 53.2 | | |
| Kirkland_Main-2715 | Kirkland_Manholes-1768 | 72.13 | Kirkland_Manholes-1772 | 68.31 | 229.6 | 1.66 | 12 | PVC | 0.01 | 2,680 | 45 | 247 | 292 | 10.9 | SM14-Ex-EX166 | |
| Kirkland_Main-2716 | Kirkland_Manholes-1775 | 102.05 | Kirkland_Manholes-1771 | 101.91 | 35.5 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 8 | 13 | 2.9 | | Drop Connection |
| Kirkland_Main-2717 | Kirkland_Manholes-1771 | 99.82 | Kirkland_Manholes-1770 | 99.51 | 78 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 16 | 22 | 5 | | Drop Connection |
| Kirkland_Main-2718 | Kirkland_Manholes-1770 | 92.14 | Kirkland_Manholes-1769 | 80.52 | 165 | 7.04 | 8 | PVC | 0.01 | 1,871 | 7 | 25 | 31 | 1.7 | | |
| Kirkland_Main-2719 | Kirkland_Manholes-1769 | 80.52 | Kirkland_Manholes-1768 | 72.13 | 44.6 | 18.83 | 8 | PVC | 0.01 | 3,059 | 7 | 33 | 40 | 1.3 | | |
| Kirkland_Main-2720 | Kirkland_Manholes-1762 | 98.88 | Kirkland_Manholes-1768 | 72.13 | 281.2 | 9.51 | 12 | PVC | 0.01 | 6,412 | 30 | 206 | 235 | 3.7 | SM14-Ex-EX166 | |
| Kirkland_Main-2721 | Kirkland_Manholes-1742 | 45.09 | Kirkland_Manholes-1740 | 35.99 | 141.8 | 6.42 | 10 | PVC | 0.01 | 3,238 | 177 | 478 | 654 | 20.2 | | |
| Kirkland_Main-2722 | Kirkland_Manholes-1741 | 41.4 | Kirkland_Manholes-1740 | 35.99 | 19.3 | 27.98 | 8 | PVC | 0.01 | 3,729 | 71 | 74 | 145 | 3.9 | | |
| Kirkland_Main-2723 | Kirkland_Manholes-1722 | 47.26 | Kirkland_Manholes-1742 | 45.09 | 91 | 2.38 | 12 | PVC | 0.01 | 3,210 | 177 | 469 | 646 | 20.1 | | |
| Kirkland_Main-2724 | Kirkland_Manholes-1760 | 56.49 | Kirkland_Manholes-1722 | 47.26 | 220.7 | 4.18 | 10 | PVC | 0.01 | 2,614 | 138 | 436 | 574 | 22 | | |
| Kirkland_Main-2725 | Kirkland_Manholes-2143 | 61.9 | Kirkland_Manholes-1760 | 56.49 | 198.1 | 2.73 | 10 | PVC | 0.01 | 2,112 | 124 | 428 | 552 | 26.1 | | |
| Kirkland_Main-2726 | Kirkland_Manholes-1738 | 34.54 | Kirkland_Manholes-1728 | 26.2 | 233.5 | 3.57 | 8 | PVC | 0.01 | 1,333 | 30 | 16 | 47 | 3.5 | SM14-Ex-EX184 | |
| Kirkland_Main-2727 | Kirkland_Manholes-1739 | 35.68 | Kirkland_Manholes-1738 | 34.54 | 39.2 | 2.91 | 8 | PVC | 0.01 | 1,202 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX184 | |
| Kirkland_Main-2730 | Kirkland_Manholes-1783 | 44.54 | Kirkland_Manholes-1784 | 44.07 | 47.4 | 1 | 8 | PVC | 0.01 | 705 | 65 | 66 | 131 | 18.6 | | |
| Kirkland_Main-2731 | Kirkland_Manholes-1786 | 41.21 | Kirkland_Manholes-733 | 35.72 | 39.3 | 13.98 | 10 | PVC | 0.01 | 4,780 | 66 | 99 | 165 | 3.4 | | |
| Kirkland_Main-2732 | Kirkland_Manholes-1787 | 42.06 | Kirkland_Manholes-1786 | 41.21 | 134.7 | 0.63 | 10 | PVC | 0.01 | 1,016 | 66 | 91 | 157 | 15.4 | | |
| Kirkland_Main-2733 | Kirkland_Manholes-1785 | 42.96 | Kirkland_Manholes-1787 | 42.06 | 131.8 | 0.68 | 10 | PVC | 0.01 | 1,056 | 65 | 82 | 147 | 13.9 | | |
| Kirkland_Main-2734 | Kirkland_Manholes-1920 | 409.24 | Kirkland_Manholes-2925 | 409 | 89.7 | 0.27 | 12 | PVC | 0.01 | 1,075 | 90 | 366 | 455 | 42.3 | SM14-Ex-EX215 | |
| Kirkland_Main-2735 | Kirkland_Manholes-2925 | 409 | Kirkland_Manholes-1921 | 405.86 | 161.9 | 1.94 | 8 | PVC | 0.01 | 982 | 91 | 370 | 460 | 46.9 | SM14-Ex-EX215 | |
| Kirkland_Main-2736 | Kirkland_Manholes-1784 | 44.07 | Kirkland_Manholes-1785 | 42.96 | 150 | 0.74 | 10 | PVC | 0.01 | 1,100 | 65 | 74 | 139 | 12.7 | | |
| Kirkland_Main-2737 | Kirkland_Manholes-1782 | 44.9 | Kirkland_Manholes-1783 | 44.54 | 88.3 | 0.4 | 8 | PVC | 0.01 | 446 | 65 | 58 | 123 | 27.5 | | |
| Kirkland_Main-2738 | Kirkland_Manholes-1781 | 45.04 | Kirkland_Manholes-1782 | 44.9 | 34.7 | 0.4 | 8 | PVC | 0.01 | 446 | 65 | 49 | 114 | 25.7 | | |
| Kirkland_Main-2739 | Kirkland_Manholes-1777 | 45.35 | Kirkland_Manholes-1781 | 45.04 | 78.1 | 0.4 | 8 | PVC | 0.01 | 446 | 65 | 41 | 106 | 23.8 | | |
| Kirkland_Main-2740 | Kirkland_Manholes-1779 | 45.97 | Kirkland_Manholes-1778 | 45.85 | 28.6 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 16 | 21 | 4.8 | | |
| Kirkland_Main-2741 | Kirkland_Manholes-1778 | 45.85 | Kirkland_Manholes-1777 | 45.35 | 126.1 | 0.4 | 8 | PVC | 0.01 | 446 | 62 | 25 | 87 | 19.5 | | |
| Kirkland_Main-2742 | Kirkland_Manholes-1780 | 57.25 | Kirkland_Manholes-1779 | 45.97 | 252.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 5 | 8 | 13 | 0.9 | | |
| Kirkland_Main-2743 | Kirkland_Manholes-1776 | 46.25 | Kirkland_Manholes-1777 | 45.35 | 244.9 | 0.37 | 8 | PVC | 0.01 | 428 | 3 | 8 | 11 | 2.6 | | |
| Kirkland_Main-2745 | Kirkland_Manholes-1696 | 58.41 | Kirkland_Manholes-1695 | 51.29 | 146.7 | 4.85 | 8 | PVC | 0.01 | 1,553 | 50 | 222 | 273 | 17.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2746 | Kirkland_Manholes-1695 | 51.29 | Kirkland_Manholes-1694 | 44.12 | 135.5 | 5.29 | 8 | PVC | 0.01 | 1,622 | 52 | 231 | 283 | 17.4 | SM14-Ex-EX96 | |
| Kirkland_Main-2748 | Kirkland_Manholes-2107 | 69.19 | Kirkland_Manholes-2106 | 63.43 | 225 | 2.56 | 8 | PVC | 0.01 | 1,128 | 1 | 6 | 8 | 0.7 | SM14-Ex-EX227 | |
| Kirkland_Main-2749 | Kirkland_Manholes-2108 | 68.46 | Kirkland_Manholes-2109 | 59.77 | 298.6 | 2.91 | 8 | PVC | 0.01 | 1,203 | 52 | 146 | 198 | 16.5 | SM14-Ex-EX222 | |
| Kirkland_Main-2750 | Kirkland_Manholes-2119 | 72.3 | Kirkland_Manholes-2108 | 68.46 | 400.8 | 0.96 | 8 | PVC | 0.01 | 690 | 42 | 97 | 139 | 20.2 | SM14-Ex-EX222 | |
| Kirkland_Main-2751 | Kirkland_Manholes-2511 | 85.9 | Kirkland_Manholes-2108 | 85.31 | 148.4 | 0.4 | 8 | PVC | 0.01 | 446 | 10 | 43 | 52 | 11.8 | SM14-Ex-EX229 | Drop Connection |
| Kirkland_Main-2752 | Kirkland_Manholes-2109 | 59.77 | Kirkland_Manholes-2111 | 59.56 | 305.5 | 0.07 | 12 | PVC | 0.01 | 545 | 55 | 152 | 207 | 37.9 | SM14-Ex-EX222 | |
| Kirkland_Main-2753 | Kirkland_Manholes-2110 | 60.2 | Kirkland_Manholes-2111 | 59.56 | 55.5 | 1.15 | 8 | PVC | 0.01 | 757 | 13 | 36 | 49 | 6.5 | SM14-Ex-EX232 | |
| Kirkland_Main-2754 | Kirkland_Manholes-2112 | 88.66 | Kirkland_Manholes-2110 | 60.2 | 228.7 | 12.44 | 8 | PVC | 0.01 | 2,487 | 12 | 30 | 43 | 1.7 | SM14-Ex-EX232 | |
| Kirkland_Main-2755 | Kirkland_Manholes-2115 | 91.85 | Kirkland_Manholes-2112 | 88.66 | 62.8 | 5.08 | 8 | PVC | 0.01 | 1,589 | 8 | 24 | 32 | 2 | SM14-Ex-EX232 | |
| Kirkland_Main-2756 | Kirkland_Manholes-2113 | 121.3 | Kirkland_Manholes-2115 | 91.85 | 150.4 | 19.59 | 8 | PVC | 0.01 | 3,120 | 4 | 12 | 17 | 0.5 | SM14-Ex-EX232 | |
| Kirkland_Main-2757 | Kirkland_Manholes-2114 | 121.77 | Kirkland_Manholes-2113 | 121.3 | 207.4 | 0.23 | 8 | PVC | 0.01 | 336 | 3 | 6 | 9 | 2.7 | | |
| Kirkland_Main-2758 | Kirkland_Manholes-2116 | 91.9 | Kirkland_Manholes-2115 | 91.85 | 279.7 | 0.02 | 8 | PVC | 0.01 | 94 | 3 | 6 | 9 | 9.7 | SM14-Ex-EX232 | |
| Kirkland_Main-2759 | Kirkland_Manholes-2146 | 75.22 | Kirkland_Manholes-2117 | 74.65 | 143.2 | 0.4 | 8 | PVC | 0.01 | 446 | 28 | 85 | 113 | 25.4 | SM14-Ex-EX222 | Drop Connection |
| Kirkland_Main-2760 | Kirkland_Manholes-2117 | 73.78 | Kirkland_Manholes-2119 | 72.3 | 427.2 | 0.35 | 8 | PVC | 0.01 | 415 | 28 | 91 | 120 | 28.8 | SM14-Ex-EX222 | |
| Kirkland_Main-2761 | Kirkland_Manholes-2445 | 191.11 | Kirkland_Manholes-2490 | 173.27 | 210.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 20 | 68 | 87 | 4.2 | SM14-Ex-EX243 | |
| Kirkland_Main-2763 | Kirkland_Manholes-2446 | 217.36 | Kirkland_Manholes-2444 | 199.73 | 226.7 | 7.78 | 8 | PVC | 0.01 | 1,966 | 3 | 12 | 15 | 0.8 | SM14-Ex-EX245 | |
| Kirkland_Main-2765 | Kirkland_Manholes-1862 | 286.87 | Kirkland_Manholes-1863 | 286.75 | 31.1 | 0.4 | 8 | PVC | 0.01 | 446 | 63 | 131 | 194 | 43.5 | | Drop Connection |
| Kirkland_Main-2766 | Kirkland_Manholes-1863 | 286.33 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 3.06 | 8 | PVC | 0.01 | 1,233 | 63 | 135 | 198 | 16.1 | | |
| Kirkland_Main-2767 | Kirkland_Manholes-1864 | 285.22 | Kirkland_Manholes-1866 | 277.54 | 215.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 67 | 147 | 214 | 16.1 | | |
| Kirkland_Main-2768 | Kirkland_Manholes-1865 | 285.61 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 1.07 | 8 | PVC | 0.01 | 731 | 4 | 8 | 12 | 1.7 | | |
| Kirkland_Main-2769 | Kirkland_Manholes-2770 | 287.2 | Kirkland_Manholes-1865 | 285.61 | 339.1 | 0.47 | 8 | PVC | 0.01 | 483 | 4 | 4 | 8 | 1.7 | | |
| Kirkland_Main-2770 | Kirkland_Manholes-1871 | 279.1 | Kirkland_Manholes-1866 | 277.54 | 120.2 | 1.3 | 8 | PVC | 0.01 | 803 | 3 | 28 | 31 | 3.8 | | |
| Kirkland_Main-2771 | Kirkland_Manholes-1866 | 277.54 | Kirkland_Manholes-1867 | 276.54 | 31.1 | 3.22 | 8 | PVC | 0.01 | 1,264 | 70 | 179 | 249 | 19.7 | | |
| Kirkland_Main-2772 | Kirkland_Manholes-1867 | 276.54 | Kirkland_Manholes-1868 | 257.42 | 267.6 | 7.15 | 8 | PVC | 0.01 | 1,885 | 70 | 183 | 253 | 13.4 | | |
| Kirkland_Main-2773 | Kirkland_Manholes-1868 | 257.42 | Kirkland_Manholes-1888 | 254.12 | 73.1 | 4.51 | 10 | PVC | 0.01 | 2,715 | 116 | 262 | 378 | 13.9 | | |
| Kirkland_Main-2774 | Kirkland_Manholes-1887 | 260.26 | Kirkland_Manholes-1868 | 257.42 | 270 | 1.05 | 8 | PVC | 0.01 | 723 | 45 | 75 | 120 | 16.6 | | |
| Kirkland_Main-2775 | Kirkland_Manholes-1869 | 292.56 | Kirkland_Manholes-1870 | 286.99 | 206.4 | 2.7 | 8 | PVC | 0.01 | 1,158 | 3 | 4 | 7 | 0.6 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2776 | Kirkland_Manholes-1870 | 286.99 | Kirkland_Manholes-1871 | 279.1 | 130.7 | 6.04 | 8 | PVC | 0.01 | 1,732 | 3 | 8 | 11 | 0.6 | | |
| Kirkland_Main-2777 | Kirkland_Manholes-1872 | 282.33 | Kirkland_Manholes-1871 | 279.1 | 27.4 | 11.77 | 8 | PVC | 0.01 | 2,419 | 0 | 16 | 16 | 0.7 | | |
| Kirkland_Main-2778 | Kirkland_Manholes-1896 | 286.15 | Kirkland_Manholes-1872 | 282.33 | 252.6 | 1.51 | 8 | PVC | 0.01 | 867 | 0 | 12 | 12 | 1.4 | | |
| Kirkland_Main-2779 | Kirkland_Manholes-1895 | 288.31 | Kirkland_Manholes-1896 | 286.15 | 156.7 | 1.38 | 8 | PVC | 0.01 | 828 | 0 | 8 | 8 | 1 | | |
| Kirkland_Main-2781 | Kirkland_Manholes-1894 | 292.07 | Kirkland_Manholes-1895 | 288.31 | 37.7 | 9.98 | 8 | PVC | 0.01 | 2,227 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2785 | Kirkland_Manholes-1893 | 314.62 | Kirkland_Manholes-1892 | 301.26 | 174.3 | 7.66 | 8 | PVC | 0.01 | 1,952 | 21 | 32 | 53 | 2.7 | | |
| Kirkland_Main-2786 | Kirkland_Manholes-1892 | 301.26 | Kirkland_Manholes-1882 | 297.55 | 110.1 | 3.37 | 8 | PVC | 0.01 | 1,294 | 24 | 40 | 63 | 4.9 | | |
| Kirkland_Main-2787 | Kirkland_Manholes-1882 | 297.55 | Kirkland_Manholes-1885 | 271.65 | 301.6 | 8.59 | 8 | PVC | 0.01 | 2,066 | 29 | 44 | 73 | 3.5 | | |
| Kirkland_Main-2788 | Kirkland_Manholes-1883 | 295.15 | Kirkland_Manholes-1885 | 271.65 | 83.7 | 28.09 | 8 | PVC | 0.01 | 3,737 | 8 | 20 | 28 | 0.7 | | |
| Kirkland_Main-2789 | Kirkland_Manholes-1889 | 296.4 | Kirkland_Manholes-1883 | 295.15 | 155.2 | 0.81 | 8 | PVC | 0.01 | 633 | 8 | 16 | 24 | 3.8 | | |
| Kirkland_Main-2790 | Kirkland_Manholes-1884 | 299.38 | Kirkland_Manholes-1889 | 296.4 | 51.3 | 5.81 | 8 | PVC | 0.01 | 1,699 | 4 | 12 | 16 | 0.9 | | |
| Kirkland_Main-2791 | Kirkland_Manholes-1891 | 305.89 | Kirkland_Manholes-1890 | 303.36 | 105.7 | 2.39 | 8 | PVC | 0.01 | 1,091 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2792 | Kirkland_Manholes-1890 | 303.36 | Kirkland_Manholes-1884 | 299.38 | 71.4 | 5.58 | 8 | PVC | 0.01 | 1,665 | 4 | 8 | 12 | 0.7 | | |
| Kirkland_Main-2793 | Kirkland_Manholes-1885 | 271.65 | Kirkland_Manholes-1886 | 262.12 | 238.5 | 4 | 8 | PVC | 0.01 | 1,409 | 44 | 68 | 111 | 7.9 | | |
| Kirkland_Main-2794 | Kirkland_Manholes-1886 | 262.12 | Kirkland_Manholes-1887 | 260.26 | 298.4 | 0.62 | 8 | PVC | 0.01 | 557 | 44 | 72 | 115 | 20.7 | | |
| Kirkland_Main-2795 | Kirkland_Manholes-1888 | 254.12 | Kirkland_Manholes-1897 | 245.38 | 209.5 | 4.17 | 8 | PVC | 0.01 | 1,440 | 136 | 310 | 446 | 31 | | |
| Kirkland_Main-2796 | Kirkland_Manholes-1877 | 246.77 | Kirkland_Manholes-1873 | 243.35 | 391.2 | 0.87 | 8 | PVC | 0.01 | 659 | 55 | 119 | 174 | 26.4 | | |
| Kirkland_Main-2797 | Kirkland_Manholes-1873 | 243.35 | Kirkland_Manholes-1874 | 243.32 | 295.9 | 0.01 | 24 | PVC | 0.01 | 1,329 | 191 | 437 | 629 | 47.3 | SM14-Ex-EX134 | |
| Kirkland_Main-2798 | Kirkland_Manholes-1875 | 249.18 | Kirkland_Manholes-1876 | 247.77 | 111.8 | 1.26 | 8 | PVC | 0.01 | 792 | 22 | 4 | 26 | 3.3 | | |
| Kirkland_Main-2799 | Kirkland_Manholes-1876 | 247.77 | Kirkland_Manholes-1877 | 246.77 | 320.2 | 0.31 | 8 | PVC | 0.01 | 394 | 22 | 16 | 38 | 9.7 | | |
| Kirkland_Main-2800 | Kirkland_Manholes-1878 | 249.88 | Kirkland_Manholes-1877 | 246.77 | 242.5 | 1.28 | 8 | PVC | 0.01 | 798 | 32 | 99 | 132 | 16.5 | | |
| Kirkland_Main-2801 | Kirkland_Manholes-1874 | 243.32 | Kirkland_Manholes-1571 | 242.76 | 271.1 | 0.21 | 15 | PVC | 0.01 | 1,713 | 191 | 441 | 632 | 36.9 | | |
| Kirkland_Main-2802 | Kirkland_Manholes-1881 | 267.11 | Kirkland_Manholes-1879 | 258.08 | 239.4 | 3.77 | 8 | PVC | 0.01 | 1,369 | 30 | 87 | 117 | 8.6 | | |
| Kirkland_Main-2803 | Kirkland_Manholes-1880 | 260.03 | Kirkland_Manholes-1879 | 258.08 | 143.3 | 1.36 | 8 | PVC | 0.01 | 822 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2805 | Kirkland_Manholes-1879 | 258.08 | Kirkland_Manholes-1878 | 249.88 | 231.7 | 3.54 | 8 | PVC | 0.01 | 1,326 | 32 | 95 | 128 | 9.6 | | |
| Kirkland_Main-2806 | Kirkland_Manholes-1897 | 245.38 | Kirkland_Manholes-1873 | 243.35 | 282.6 | 0.72 | 10 | PVC | 0.01 | 1,084 | 136 | 314 | 450 | 41.6 | | |
| Kirkland_Main-2807 | Kirkland_Manholes-1902 | 406.33 | Kirkland_Manholes-1899 | 405.32 | 253.1 | 0.4 | 8 | PVC | 0.01 | 447 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-2808 | Kirkland_Manholes-1899 | 405.32 | Kirkland_Manholes-1898 | 404.75 | 141.4 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 9 | 2.1 | | |
| Kirkland_Main-2809 | Kirkland_Manholes-1898 | 404.75 | Kirkland_Manholes-1900 | 402.51 | 135.8 | 1.65 | 8 | PVC | 0.01 | 905 | 3 | 12 | 15 | 1.6 | | |
| Kirkland_Main-2810 | Kirkland_Manholes-1900 | 402.51 | Kirkland_Manholes-1901 | 396.95 | 219.6 | 2.53 | 8 | PVC | 0.01 | 1,122 | 4 | 16 | 20 | 1.8 | | |
| Kirkland_Main-2811 | Kirkland_Manholes-1901 | 396.95 | Kirkland_Manholes-1905 | 395.5 | 142.8 | 1.02 | 8 | PVC | 0.01 | 711 | 5 | 20 | 25 | 3.5 | | |
| Kirkland_Main-2812 | Kirkland_Manholes-1903 | 399.77 | Kirkland_Manholes-1904 | 399.67 | 107.5 | 0.09 | 8 | PVC | 0.01 | 215 | 3 | 12 | 15 | 7.1 | | |
| Kirkland_Main-2813 | Kirkland_Manholes-1904 | 399.67 | Kirkland_Manholes-1905 | 395.5 | 126.3 | 3.3 | 8 | PVC | 0.01 | 1,281 | 4 | 16 | 20 | 1.6 | | |
| Kirkland_Main-2814 | Kirkland_Manholes-2220 | 93.99 | Kirkland_Manholes-2219 | 92.24 | 194.8 | 0.9 | 8 | PVC | 0.01 | 668 | 1 | 6 | 7 | 1.1 | | |
| Kirkland_Main-2815 | Kirkland_Manholes-2219 | 92.24 | Kirkland_Manholes-2218 | 82.71 | 300.9 | 3.17 | 8 | PVC | 0.01 | 1,255 | 3 | 13 | 16 | 1.3 | | |
| Kirkland_Main-2824 | Kirkland_Manholes-2222 | 72.19 | Kirkland_Manholes-2221 | 60.29 | 232.5 | 5.12 | 8 | PVC | 0.01 | 1,595 | 3 | 19 | 23 | 1.4 | | |
| Kirkland_Main-2825 | Kirkland_Manholes-2223 | 75.05 | Kirkland_Manholes-2222 | 72.19 | 181.6 | 1.58 | 8 | PVC | 0.01 | 885 | 2 | 13 | 15 | 1.6 | | |
| Kirkland_Main-2826 | Kirkland_Manholes-2224 | 76.4 | Kirkland_Manholes-2223 | 75.05 | 210.4 | 0.64 | 8 | PVC | 0.01 | 565 | 1 | 6 | 7 | 1.3 | | |
| Kirkland_Main-2829 | Kirkland_Manholes-2233 | 60.15 | Kirkland_Manholes-2232 | 48.59 | 76.7 | 15.07 | 8 | PVC | 0.01 | 2,737 | 14 | 6 | 21 | 0.8 | | |
| Kirkland_Main-2830 | Kirkland_Manholes-2232 | 48.59 | Kirkland_Manholes-2231 | 25.71 | 219.7 | 10.42 | 8 | PVC | 0.01 | 2,275 | 15 | 13 | 28 | 1.2 | | |
| Kirkland_Main-2831 | Kirkland_Manholes-2231 | 25.71 | Kirkland_Manholes-2230 | 23.3 | 56.5 | 4.26 | 8 | PVC | 0.01 | 1,456 | 15 | 19 | 34 | 2.4 | | |
| Kirkland_Main-2832 | Kirkland_Manholes-2230 | 23.3 | Kirkland_Manholes-2229 | 22.53 | 34.1 | 2.26 | 8 | PVC | 0.01 | 1,060 | 15 | 32 | 47 | 4.5 | | |
| Kirkland_Main-2833 | Kirkland_Manholes-2210 | 47.75 | Kirkland_Manholes-2205 | 23.1 | 33.9 | 72.62 | 8 | PVC | 0.01 | 6,008 | 6 | 26 | 32 | 0.5 | SM14-Ex-EX189 | Slope verified in as-builts |
| Kirkland_Main-2834 | Kirkland_Manholes-2211 | 51.73 | Kirkland_Manholes-2210 | 47.75 | 86.6 | 4.6 | 8 | PVC | 0.01 | 1,512 | 6 | 19 | 26 | 1.7 | | |
| Kirkland_Main-2835 | Kirkland_Manholes-2207 | 54.13 | Kirkland_Manholes-2211 | 51.73 | 163.6 | 1.47 | 8 | PVC | 0.01 | 854 | 0 | 13 | 13 | 1.6 | | |
| Kirkland_Main-2836 | Kirkland_Manholes-2206 | 66.42 | Kirkland_Manholes-2198 | 65.46 | 282.2 | 0.34 | 8 | PVC | 0.01 | 411 | 2 | 16 | 18 | 4.4 | SM8 | |
| Kirkland_Main-2837 | Kirkland_Manholes-2198 | 65.46 | Kirkland_Manholes-2193 | 64.5 | 239.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 25 | 28 | 6.2 | SM14-Ex-EX187 | |
| Kirkland_Main-2839 | Kirkland_Manholes-2084 | 179.07 | Kirkland_Manholes-2069 | 170.43 | 427.7 | 2.02 | 12 | PVC | 0.01 | 2,954 | 62 | 72 | 134 | 4.5 | SM14-Ex-EX199 | |
| Kirkland_Main-2840 | Kirkland_Manholes-2085 | 183.55 | Kirkland_Manholes-2084 | 179.07 | 426.7 | 1.05 | 12 | PVC | 0.01 | 2,130 | 62 | 68 | 129 | 6.1 | SM14-Ex-EX199 | |
| Kirkland_Main-2841 | Kirkland_Manholes-2086 | 187.61 | Kirkland_Manholes-2085 | 183.55 | 445.4 | 0.91 | 12 | PVC | 0.01 | 1,985 | 60 | 64 | 123 | 6.2 | SM1 | |
| Kirkland_Main-2842 | Kirkland_Manholes-2074 | 213.49 | Kirkland_Manholes-2086 | 187.61 | 333.1 | 7.77 | 8 | PVC | 0.01 | 1,965 | 45 | 52 | 97 | 4.9 | SM14-Ex-EX246 | |
| Kirkland_Main-2843 | Kirkland_Manholes-2087 | 189.64 | Kirkland_Manholes-2086 | 187.61 | 250.4 | 0.81 | 12 | PVC | 0.01 | 1,872 | 8 | 8 | 16 | 0.8 | SM1 | |
| Kirkland_Main-2844 | Kirkland_Manholes-2301 | 194.13 | Kirkland_Manholes-2087 | 189.64 | 258.5 | 1.74 | 12 | PVC | 0.01 | 2,740 | 0 | 4 | 4 | 0.2 | SM1 | |
| Kirkland_Main-2845 | Kirkland_Manholes-2838 | 108.96 | Kirkland_Manholes-2837 | 104.37 | 77.8 | 5.9 | 8 | PVC | 0.01 | 1,712 | 5 | 6 | 11 | 0.7 | | |
| Kirkland_Main-2846 | Kirkland_Manholes-2837 | 104.37 | Kirkland_Manholes-2836 | 60.97 | 275.8 | 15.74 | 8 | PVC | 0.01 | 2,797 | 5 | 12 | 17 | 0.6 | | |
| Kirkland_Main-2847 | Kirkland_Manholes-2834 | 37.62 | Kirkland_Manholes-2849 | 29.21 | 55.8 | 15.07 | 12 | PVC | 0.01 | 8,071 | 32 | 128 | 159 | 2 | SM14-Ex-EX316 | |
| Kirkland_Main-2848 | Kirkland_Manholes-2833 | 29.99 | Kirkland_Manholes-2849 | 29.21 | 264.4 | 0.3 | 18 | PVC | 0.01 | 3,329 | 439 | 1,076 | 1,587 | 47.7 | SM14-Ex-EX309 | |
| Kirkland_Main-2849 | Kirkland_Manholes-2849 | 29.21 | Kirkland_Manholes-2848 | 28.9 | 205.9 | 0.15 | 24 | PVC | 0.01 | 5,112 | 471 | 1,210 | 1,752 | 34.3 | SM14-Ex-EX309 | Drop Connection |
| Kirkland_Main-2850 | Kirkland_Manholes-2848 | 27.55 | Kirkland_Manholes-2842 | 26.9 | 429.8 | 0.15 | 24 | PVC | 0.01 | 5,133 | 474 | 1,216 | 1,762 | 34.3 | SM14-Ex-EX309 | |
| Kirkland_Main-2851 | Kirkland_Manholes-1941 | 361.64 | Kirkland_Manholes-1942 | 350.59 | 169 | 6.54 | 8 | PVC | 0.01 | 1,803 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-2852 | Kirkland_Manholes-1943 | 356.18 | Kirkland_Manholes-1942 | 350.59 | 121.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2853 | Kirkland_Manholes-1942 | 350.59 | Kirkland_Manholes-1577 | 341.43 | 212 | 4.32 | 8 | PVC | 0.01 | 1,465 | 3 | 16 | 19 | 1.3 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2854 | Kirkland_Manholes-1944 | 388.13 | Kirkland_Manholes-1945 | 370.88 | 207.3 | 8.32 | 8 | PVC | 0.01 | 2,034 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2855 | Kirkland_Manholes-1945 | 370.88 | Kirkland_Manholes-1946 | 363.75 | 185.3 | 3.85 | 8 | PVC | 0.01 | 1,383 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-2856 | Kirkland_Manholes-1946 | 363.75 | Kirkland_Manholes-1947 | 358.01 | 122.1 | 4.7 | 8 | PVC | 0.01 | 1,529 | 2 | 12 | 13 | 0.9 | | |
| Kirkland_Main-2857 | Kirkland_Manholes-1947 | 358.01 | Kirkland_Manholes-1948 | 350.2 | 125.9 | 6.2 | 8 | PVC | 0.01 | 1,756 | 2 | 16 | 18 | 1 | | |
| Kirkland_Main-2858 | Kirkland_Manholes-1949 | 352.67 | Kirkland_Manholes-1948 | 350.2 | 274.7 | 0.9 | 8 | PVC | 0.01 | 669 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2859 | Kirkland_Manholes-1948 | 350.2 | Kirkland_Manholes-1950 | 344.53 | 121.4 | 4.67 | 8 | PVC | 0.01 | 1,524 | 5 | 24 | 29 | 1.9 | | |
| Kirkland_Main-2860 | Kirkland_Manholes-1950 | 344.53 | Kirkland_Manholes-1893 | 314.62 | 313.2 | 9.55 | 8 | PVC | 0.01 | 2,179 | 6 | 28 | 34 | 1.5 | | |
| Kirkland_Main-2861 | Kirkland_Manholes-1952 | 275.36 | Kirkland_Manholes-1951 | 275.06 | 208.2 | 0.14 | 8 | PVC | 0.01 | 268 | 3 | 40 | 43 | 16.1 | | |
| Kirkland_Main-2862 | Kirkland_Manholes-1953 | 290.71 | Kirkland_Manholes-1952 | 275.36 | 336.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 3 | 36 | 39 | 2.6 | | |
| Kirkland_Main-2863 | Kirkland_Manholes-1957 | 343.4 | Kirkland_Manholes-1956 | 335.87 | 142.5 | 5.28 | 8 | PVC | 0.01 | 1,620 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2864 | Kirkland_Manholes-1956 | 335.87 | Kirkland_Manholes-1955 | 335.45 | 105.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 8 | 8 | 1.8 | | |
| Kirkland_Main-2865 | Kirkland_Manholes-1975 | 436.73 | Kirkland_Manholes-1974 | 432 | 247.5 | 1.91 | 8 | PVC | 0.01 | 975 | 21 | 123 | 144 | 14.7 | | |
| Kirkland_Main-2866 | Kirkland_Manholes-1976 | 440.77 | Kirkland_Manholes-1975 | 436.73 | 231.1 | 1.75 | 8 | PVC | 0.01 | 932 | 9 | 40 | 49 | 5.2 | | |
| Kirkland_Main-2867 | Kirkland_Manholes-1978 | 440.32 | Kirkland_Manholes-1975 | 436.73 | 342.8 | 1.05 | 8 | PVC | 0.01 | 721 | 11 | 79 | 90 | 12.5 | | |
| Kirkland_Main-2868 | Kirkland_Manholes-1977 | 454.61 | Kirkland_Manholes-1976 | 440.77 | 262.5 | 5.27 | 8 | PVC | 0.01 | 1,619 | 5 | 32 | 37 | 2.3 | | |
| Kirkland_Main-2869 | Kirkland_Manholes-1980 | 464.9 | Kirkland_Manholes-1977 | 454.61 | 328.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 4 | 24 | 28 | 2.2 | | |
| Kirkland_Main-2870 | Kirkland_Manholes-1979 | 446.84 | Kirkland_Manholes-1978 | 440.32 | 179.3 | 3.64 | 8 | PVC | 0.01 | 1,345 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2871 | Kirkland_Manholes-1984 | 465.6 | Kirkland_Manholes-1980 | 464.9 | 159.8 | 0.44 | 8 | PVC | 0.01 | 467 | 3 | 16 | 19 | 4 | | |
| Kirkland_Main-2872 | Kirkland_Manholes-1982 | 470.94 | Kirkland_Manholes-1980 | 464.9 | 329.7 | 1.83 | 8 | PVC | 0.01 | 954 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2873 | Kirkland_Manholes-1985 | 470.88 | Kirkland_Manholes-1981 | 467.1 | 204.6 | 1.85 | 8 | PVC | 0.01 | 958 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2874 | Kirkland_Manholes-1986 | 467.24 | Kirkland_Manholes-1981 | 467.1 | 144.7 | 0.1 | 8 | PVC | 0.01 | 219 | 0 | 4 | 4 | 1.9 | | |
| Kirkland_Main-2875 | Kirkland_Manholes-1983 | 469.93 | Kirkland_Manholes-2019 | 467.83 | 75.8 | 2.77 | 8 | PVC | 0.01 | 1,174 | 1 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2876 | Kirkland_Manholes-1981 | 467.1 | Kirkland_Manholes-1984 | 465.6 | 153 | 0.98 | 8 | PVC | 0.01 | 698 | 1 | 12 | 13 | 1.9 | | |
| Kirkland_Main-2877 | Kirkland_Manholes-1987 | 443.37 | Kirkland_Manholes-1976 | 440.77 | 252.9 | 1.03 | 8 | PVC | 0.01 | 715 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2878 | Kirkland_Manholes-2002 | 429.3 | Kirkland_Manholes-2000 | 426.18 | 243.7 | 1.28 | 8 | PVC | 0.01 | 798 | 0 | 8 | 8 | 1 | SM14-Ex-EX209 | |
| Kirkland_Main-2879 | Kirkland_Manholes-2000 | 426.18 | Kirkland_Manholes-2001 | 424.5 | 24.1 | 6.98 | 8 | PVC | 0.01 | 1,863 | 12 | 64 | 75 | 4 | SM14-Ex-EX209 | |
| Kirkland_Main-2880 | Kirkland_Manholes-1999 | 430.91 | Kirkland_Manholes-2000 | 426.18 | 304.8 | 1.55 | 8 | PVC | 0.01 | 878 | 11 | 52 | 63 | 7.2 | SM14-Ex-EX211 | |
| Kirkland_Main-2881 | Kirkland_Manholes-2001 | 424.5 | Kirkland_Manholes-2063 | 422.68 | 357.6 | 0.51 | 8 | PVC | 0.01 | 503 | 12 | 68 | 79 | 15.8 | SM14-Ex-EX209 | |
| Kirkland_Main-2882 | Kirkland_Manholes-2003 | 431.01 | Kirkland_Manholes-2002 | 429.3 | 155.3 | 1.1 | 8 | PVC | 0.01 | 740 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2883 | Kirkland_Manholes-2015 | 418.27 | Kirkland_Manholes-2014 | 416.63 | 83.6 | 1.96 | 8 | PVC | 0.01 | 988 | 19 | 87 | 106 | 10.8 | | |
| Kirkland_Main-2884 | Kirkland_Manholes-2014 | 416.63 | Kirkland_Manholes-2013 | 413.74 | 146.6 | 1.97 | 8 | PVC | 0.01 | 990 | 19 | 91 | 111 | 11.2 | | |
| Kirkland_Main-2886 | Kirkland_Manholes-2010 | 424.43 | Kirkland_Manholes-2016 | 421.46 | 333.6 | 0.89 | 8 | PVC | 0.01 | 665 | 16 | 79 | 96 | 14.4 | | |
| Kirkland_Main-2887 | Kirkland_Manholes-2016 | 421.46 | Kirkland_Manholes-2015 | 418.27 | 330.4 | 0.97 | 8 | PVC | 0.01 | 693 | 18 | 83 | 101 | 14.6 | | |
| Kirkland_Main-2889 | Kirkland_Manholes-2021 | 473.17 | Kirkland_Manholes-2020 | 468.34 | 27.5 | 17.56 | 8 | PVC | 0.01 | 2,954 | 24 | 91 | 116 | 3.9 | | |
| Kirkland_Main-2890 | Kirkland_Manholes-2020 | 468.34 | Kirkland_Manholes-2019 | 467.83 | 127.5 | 0.4 | 10 | PVC | 0.01 | 809 | 98 | 238 | 337 | 41.7 | | |
| Kirkland_Main-2891 | Kirkland_Manholes-2023 | 466.76 | Kirkland_Manholes-2022 | 466 | 41.6 | 1.83 | 8 | PVC | 0.01 | 953 | 7 | 20 | 27 | 2.8 | | |
| Kirkland_Main-2892 | Kirkland_Manholes-2037 | 465.67 | Kirkland_Manholes-2036 | 452.58 | 367.2 | 3.57 | 8 | PVC | 0.01 | 1,331 | 9 | 16 | 25 | 1.9 | SM14-Ex-EX266 | |
| Kirkland_Main-2893 | Kirkland_Manholes-2041 | 465.42 | Kirkland_Manholes-2042 | 455.6 | 502.4 | 1.95 | 8 | PVC | 0.01 | 986 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX265 | |
| Kirkland_Main-2894 | Kirkland_Manholes-2042 | 455.6 | Kirkland_Manholes-2043 | 454.68 | 150.3 | 0.61 | 12 | PVC | 0.01 | 1,626 | 67 | 278 | 345 | 21.2 | SM14-Ex-EX214 | |
| Kirkland_Main-2895 | Kirkland_Manholes-2044 | 435.14 | Kirkland_Manholes-2045 | 432.5 | 20.8 | 12.67 | 12 | PVC | 0.01 | 7,399 | 69 | 286 | 355 | 4.8 | SM14-Ex-EX214 | |
| Kirkland_Main-2896 | Kirkland_Manholes-2043 | 454.68 | Kirkland_Manholes-2044 | 435.14 | 356.2 | 5.49 | 12 | PVC | 0.01 | 4,869 | 68 | 282 | 350 | 7.2 | SM14-Ex-EX214 | |
| Kirkland_Main-2897 | Kirkland_Manholes-2046 | 437.24 | Kirkland_Manholes-2045 | 432.5 | 199.5 | 2.38 | 10 | PVC | 0.01 | 1,970 | 127 | 338 | 464 | 23.6 | | |
| Kirkland_Main-2898 | Kirkland_Manholes-2047 | 441.15 | Kirkland_Manholes-2046 | 437.24 | 49.2 | 7.95 | 10 | PVC | 0.01 | 3,605 | 126 | 334 | 460 | 12.7 | | |
| Kirkland_Main-2899 | Kirkland_Manholes-2048 | 442.51 | Kirkland_Manholes-2047 | 441.15 | 76.6 | 1.77 | 8 | PVC | 0.01 | 939 | 125 | 330 | 455 | 48.5 | SM14-Ex-EX264 | |
| Kirkland_Main-2900 | Kirkland_Manholes-2049 | 454.48 | Kirkland_Manholes-2050 | 439.64 | 163.1 | 9.1 | 8 | PVC | 0.01 | 2,126 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX263 | |
| Kirkland_Main-2901 | Kirkland_Manholes-2050 | 439.64 | Kirkland_Manholes-2051 | 434.18 | 313 | 1.74 | 8 | PVC | 0.01 | 931 | 3 | 8 | 11 | 1.2 | SM14-Ex-EX263 | |
| Kirkland_Main-2902 | Kirkland_Manholes-2051 | 434.18 | Kirkland_Manholes-2054 | 429.73 | 307.2 | 1.45 | 8 | PVC | 0.01 | 849 | 5 | 12 | 17 | 2 | SM14-Ex-EX263 | |
| Kirkland_Main-2903 | Kirkland_Manholes-2053 | 424.91 | Kirkland_Manholes-2285 | 419.89 | 165.8 | 3.03 | 8 | PVC | 0.01 | 1,227 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX248 | |
| Kirkland_Main-2904 | Kirkland_Manholes-2054 | 429.73 | Kirkland_Manholes-2055 | 427.92 | 21.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 5 | 16 | 21 | 1 | | |
| Kirkland_Main-2905 | Kirkland_Manholes-3044 | 18.06 | Kirkland_Manholes-2736 | 17.76 | 69.7 | 0.43 | 18 | PVC | 0.01 | 4,020 | 212 | 516 | 728 | 18.1 | SM14-Ex-EX289 | |
| Kirkland_Main-2906 | Kirkland_Manholes-2045 | 432.5 | Kirkland_Manholes-2055 | 427.92 | 351.4 | 1.3 | 10 | PVC | 0.01 | 1,460 | 196 | 628 | 824 | 56.5 | | |
| Kirkland_Main-2907 | Kirkland_Manholes-2057 | 422.6 | Kirkland_Manholes-2056 | 422.2 | 14.4 | 2.79 | 10 | PVC | 0.01 | 2,134 | 203 | 664 | 866 | 40.6 | | |
| Kirkland_Main-2908 | Kirkland_Manholes-1848 | 462 | Kirkland_Manholes-1216 | 443.89 | 186.3 | 9.72 | 8 | PVC | 0.01 | 2,198 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2909 | Kirkland_Manholes-2056 | 422.2 | Kirkland_Manholes-2285 | 419.89 | 62.2 | 3.71 | 8 | PVC | 0.01 | 1,359 | 203 | 668 | 870 | 64.1 | | |
| Kirkland_Main-2910 | Kirkland_Manholes-2058 | 427.27 | Kirkland_Manholes-2057 | 422.6 | 119.2 | 3.92 | 10 | PVC | 0.01 | 2,531 | 202 | 660 | 862 | 34.1 | | |
| Kirkland_Main-2911 | Kirkland_Manholes-2055 | 427.92 | Kirkland_Manholes-2058 | 427.27 | 53.1 | 1.22 | 10 | PVC | 0.01 | 1,414 | 202 | 648 | 849 | 60.1 | | |
| Kirkland_Main-2912 | Kirkland_Manholes-2059 | 433 | Kirkland_Manholes-2058 | 427.27 | 231.2 | 2.48 | 8 | PVC | 0.01 | 1,110 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX213 | |
| Kirkland_Main-2913 | Kirkland_Manholes-3082 | 428.49 | Kirkland_Manholes-1992 | 427.27 | 187.8 | 0.65 | 8 | PVC | 0.01 | 568 | 2 | 8 | 10 | 1.8 | | |
| Kirkland_Main-2914 | Kirkland_Manholes-1992 | 427.27 | Kirkland_Manholes-2009 | 426.97 | 143.6 | 0.21 | 8 | PVC | 0.01 | 322 | 10 | 48 | 57 | 17.8 | | |
| Kirkland_Main-2915 | Kirkland_Manholes-1991 | 431.18 | Kirkland_Manholes-1992 | 427.27 | 327 | 1.2 | 8 | PVC | 0.01 | 771 | 7 | 36 | 43 | 5.6 | | |
| Kirkland_Main-2916 | Kirkland_Manholes-2004 | 427.75 | Kirkland_Manholes-2010 | 424.43 | 322.6 | 1.03 | 8 | PVC | 0.01 | 715 | 4 | 24 | 27 | 3.8 | | |
| Kirkland_Main-2917 | Kirkland_Manholes-2007 | 429.08 | Kirkland_Manholes-2004 | 427.75 | 98.7 | 1.35 | 8 | PVC | 0.01 | 819 | 4 | 20 | 23 | 2.9 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2918 | Kirkland_Manholes-2260 | 285.07 | Kirkland_Manholes-2259 | 272.05 | 278.2 | 4.68 | 12 | PVC | 0.01 | 4,497 | 238 | 854 | 1,092 | 24.3 | SM14-Ex-EX248 | |
| Kirkland_Main-2919 | Kirkland_Manholes-2259 | 272.05 | Kirkland_Manholes-2258 | 263.77 | 196.6 | 4.21 | 12 | PVC | 0.01 | 4,266 | 243 | 862 | 1,105 | 25.9 | SM14-Ex-EX248 | |
| Kirkland_Main-2920 | Kirkland_Manholes-2323 | 247.45 | Kirkland_Manholes-2324 | 245.37 | 33.9 | 6.13 | 8 | PVC | 0.01 | 1,746 | 35 | 131 | 166 | 9.5 | | |
| Kirkland_Main-2921 | Kirkland_Manholes-2322 | 259.98 | Kirkland_Manholes-2323 | 247.45 | 184.9 | 6.78 | 8 | PVC | 0.01 | 1,836 | 34 | 127 | 161 | 8.8 | SM14-Ex-EX252 | |
| Kirkland_Main-2922 | Kirkland_Manholes-2325 | 246.61 | Kirkland_Manholes-2324 | 245.37 | 131.1 | 0.95 | 8 | PVC | 0.01 | 686 | 5 | 12 | 17 | 2.4 | | |
| Kirkland_Main-2923 | Kirkland_Manholes-2329 | 258.36 | Kirkland_Manholes-2325 | 246.61 | 302.7 | 3.88 | 8 | PVC | 0.01 | 1,389 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-2924 | Kirkland_Manholes-2328 | 273.89 | Kirkland_Manholes-2329 | 258.36 | 228.5 | 6.8 | 8 | PVC | 0.01 | 1,838 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2925 | Kirkland_Manholes-2339 | 347.35 | Kirkland_Manholes-2337 | 345.83 | 131 | 1.16 | 8 | PVC | 0.01 | 760 | 3 | 8 | 11 | 1.4 | SM14-Ex-EX256 | |
| Kirkland_Main-2926 | Kirkland_Manholes-2337 | 345.83 | Kirkland_Manholes-2338 | 328.54 | 114.6 | 15.08 | 8 | PVC | 0.01 | 2,738 | 5 | 12 | 16 | 0.6 | SM14-Ex-EX256 | |
| Kirkland_Main-2927 | Kirkland_Manholes-2334 | 313.34 | Kirkland_Manholes-2333 | 308.81 | 129.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 25 | 75 | 100 | 7.6 | SM14-Ex-EX252 | |
| Kirkland_Main-2928 | Kirkland_Manholes-2333 | 308.81 | Kirkland_Manholes-2332 | 296.43 | 179.4 | 6.9 | 8 | PVC | 0.01 | 1,852 | 25 | 79 | 105 | 5.7 | SM14-Ex-EX252 | |
| Kirkland_Main-2929 | Kirkland_Manholes-2332 | 296.43 | Kirkland_Manholes-2331 | 295.51 | 98.1 | 0.94 | 8 | PVC | 0.01 | 683 | 27 | 87 | 115 | 16.8 | SM14-Ex-EX252 | |
| Kirkland_Main-2930 | Kirkland_Manholes-2718 | 21.4 | Kirkland_Manholes-2721 | 21.2 | 187 | 0.11 | 12 | PVC | 0.01 | 680 | 74 | 36 | 110 | 16.2 | SM14-Ex-EX289 | |
| Kirkland_Main-2931 | Kirkland_Manholes-2331 | 295.51 | Kirkland_Manholes-2330 | 295.18 | 115.3 | 0.29 | 8 | PVC | 0.01 | 377 | 28 | 91 | 119 | 31.6 | SM14-Ex-EX252 | |
| Kirkland_Main-2932 | Kirkland_Manholes-2327 | 280.44 | Kirkland_Manholes-2326 | 264.71 | 213.4 | 7.37 | 8 | PVC | 0.01 | 1,914 | 31 | 119 | 151 | 7.9 | SM14-Ex-EX252 | |
| Kirkland_Main-2933 | Kirkland_Manholes-2326 | 264.71 | Kirkland_Manholes-2322 | 259.98 | 165.9 | 2.85 | 8 | PVC | 0.01 | 1,190 | 33 | 123 | 156 | 13.1 | SM14-Ex-EX252 | |
| Kirkland_Main-2935 | Kirkland_Manholes-2342 | 370.03 | Kirkland_Manholes-2339 | 347.35 | 229.4 | 9.89 | 8 | PVC | 0.01 | 2,217 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX256 | |
| Kirkland_Main-2936 | Kirkland_Manholes-2340 | 335.99 | Kirkland_Manholes-2379 | 312.61 | 331.3 | 7.06 | 8 | PVC | 0.01 | 1,873 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX257 | |
| Kirkland_Main-2937 | Kirkland_Manholes-2338 | 328.54 | Kirkland_Manholes-2341 | 327.28 | 253.7 | 0.5 | 8 | PVC | 0.01 | 497 | 6 | 16 | 22 | 4.5 | SM14-Ex-EX256 | |
| Kirkland_Main-2938 | Kirkland_Manholes-2341 | 327.28 | Kirkland_Manholes-2335 | 323.22 | 289.5 | 1.4 | 8 | PVC | 0.01 | 835 | 9 | 24 | 33 | 3.9 | SM14-Ex-EX256 | |
| Kirkland_Main-2939 | Kirkland_Manholes-2336 | 342.09 | Kirkland_Manholes-2341 | 327.28 | 137.3 | 10.78 | 8 | PVC | 0.01 | 2,315 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX256 | Drop Connection |
| Kirkland_Main-2940 | Kirkland_Manholes-2349 | 361.19 | Kirkland_Manholes-2335 | 323.22 | 315.1 | 12.05 | 8 | PVC | 0.01 | 2,448 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX252 | |
| Kirkland_Main-2941 | Kirkland_Manholes-2335 | 323.22 | Kirkland_Manholes-2334 | 323.19 | 8.2 | 0.4 | 8 | PVC | 0.01 | 446 | 11 | 32 | 43 | 9.5 | SM14-Ex-EX252 | Drop Connection |
| Kirkland_Main-2942 | Kirkland_Manholes-2343 | 315.2 | Kirkland_Manholes-2348 | 314.6 | 208.7 | 0.29 | 8 | PVC | 0.01 | 378 | 13 | 36 | 49 | 12.8 | SM14-Ex-EX254 | |
| Kirkland_Main-2944 | Kirkland_Manholes-2915 | 422.99 | Kirkland_Manholes-2916 | 416.17 | 267.2 | 2.55 | 8 | PVC | 0.01 | 1,126 | 4 | 16 | 19 | 1.7 | | |
| Kirkland_Main-2945 | Kirkland_Manholes-2916 | 416.17 | Kirkland_Manholes-2936 | 415.17 | 403.5 | 0.25 | 8 | PVC | 0.01 | 351 | 5 | 24 | 29 | 8.3 | | |
| Kirkland_Main-2946 | Kirkland_Manholes-2917 | 449.84 | Kirkland_Manholes-2918 | 440.81 | 194.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2947 | Kirkland_Manholes-2918 | 440.81 | Kirkland_Manholes-2919 | 429.45 | 198.9 | 5.71 | 8 | PVC | 0.01 | 1,685 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-2948 | Kirkland_Manholes-2919 | 429.45 | Kirkland_Manholes-2915 | 422.99 | 217.1 | 2.98 | 8 | PVC | 0.01 | 1,216 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-2949 | Kirkland_Manholes-2922 | 91.28 | Kirkland_Manholes-2921 | 73.76 | 147.5 | 11.88 | 8 | PVC | 0.01 | 2,430 | 1 | 13 | 14 | 0.6 | | |
| Kirkland_Main-2951 | Kirkland_Manholes-2923 | 92.6 | Kirkland_Manholes-2922 | 91.28 | 84.5 | 1.56 | 8 | PVC | 0.01 | 881 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2952 | Kirkland_Manholes-2924 | 104.01 | Kirkland_Manholes-2922 | 91.28 | 265 | 4.8 | 8 | PVC | 0.01 | 1,545 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2953 | Kirkland_Manholes-2423 | 267.38 | Kirkland_Manholes-2421 | 253.02 | 328.6 | 4.37 | 8 | PVC | 0.01 | 1,474 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-2954 | Kirkland_Manholes-2429 | 273.52 | Kirkland_Manholes-2424 | 257.66 | 398.8 | 3.98 | 8 | PVC | 0.01 | 1,406 | 29 | 95 | 124 | 8.8 | SM14-Ex-EX260 | |
| Kirkland_Main-2955 | Kirkland_Manholes-2425 | 261.07 | Kirkland_Manholes-2424 | 257.66 | 270.7 | 1.26 | 12 | PVC | 0.01 | 2,333 | 179 | 211 | 389 | 16.7 | SM2 | |
| Kirkland_Main-2956 | Kirkland_Manholes-2426 | 264.11 | Kirkland_Manholes-2425 | 261.07 | 237.2 | 1.28 | 12 | PVC | 0.01 | 2,353 | 173 | 191 | 364 | 15.5 | SM2 | |
| Kirkland_Main-2957 | Kirkland_Manholes-2430 | 273.69 | Kirkland_Manholes-2425 | 261.07 | 254.1 | 4.97 | 8 | PVC | 0.01 | 1,571 | 5 | 16 | 21 | 1.3 | SM14-Ex-EX286 | |
| Kirkland_Main-2958 | Kirkland_Manholes-2427 | 267.5 | Kirkland_Manholes-2426 | 266.42 | 268.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 172 | 187 | 359 | 27.3 | SM2 | Drop Connection |
| Kirkland_Main-2959 | Kirkland_Manholes-2428 | 270.37 | Kirkland_Manholes-2427 | 267.5 | 310.1 | 0.93 | 8 | PVC | 0.01 | 678 | 120 | 159 | 279 | 41.1 | SM2 | |
| Kirkland_Main-2960 | Kirkland_Manholes-2431 | 277.03 | Kirkland_Manholes-2430 | 273.69 | 201.8 | 1.66 | 8 | PVC | 0.01 | 907 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2961 | Kirkland_Manholes-2433 | 263.87 | Kirkland_Manholes-2434 | 245.33 | 172.7 | 10.73 | 8 | PVC | 0.01 | 2,310 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2962 | Kirkland_Manholes-2434 | 245.33 | Kirkland_Manholes-2437 | 244.43 | 228.6 | 0.39 | 8 | PVC | 0.01 | 442 | 5 | 12 | 16 | 3.7 | SM14-Ex-EX244 | |
| Kirkland_Main-2963 | Kirkland_Manholes-2437 | 244.43 | Kirkland_Manholes-2436 | 225.88 | 256.7 | 7.23 | 8 | PVC | 0.01 | 1,895 | 6 | 16 | 22 | 1.2 | SM14-Ex-EX244 | |
| Kirkland_Main-2964 | Kirkland_Manholes-2514 | 400.04 | Kirkland_Manholes-2517 | 387 | 217.1 | 6.01 | 8 | PVC | 0.01 | 1,728 | 9 | 12 | 21 | 1.2 | | |
| Kirkland_Main-2965 | Kirkland_Manholes-2515 | 393.7 | Kirkland_Manholes-2516 | 391.18 | 190.1 | 1.33 | 8 | PVC | 0.01 | 812 | 4 | 2 | 6 | 0.7 | | |
| Kirkland_Main-2966 | Kirkland_Manholes-2516 | 391.18 | Kirkland_Manholes-2517 | 387 | 163.7 | 2.55 | 8 | PVC | 0.01 | 1,127 | 5 | 5 | 10 | 0.9 | | |
| Kirkland_Main-2967 | Kirkland_Manholes-2517 | 387 | Kirkland_Manholes-2518 | 378.45 | 142.8 | 5.99 | 8 | PVC | 0.01 | 1,725 | 15 | 19 | 34 | 2 | | |
| Kirkland_Main-2968 | Kirkland_Manholes-2518 | 378.45 | Kirkland_Manholes-2524 | 346.56 | 373.5 | 8.54 | 8 | PVC | 0.01 | 2,060 | 18 | 21 | 39 | 1.9 | | |
| Kirkland_Main-2969 | Kirkland_Manholes-2520 | 374.03 | Kirkland_Manholes-2521 | 363.83 | 98.2 | 10.38 | 8 | PVC | 0.01 | 2,272 | 2 | 2 | 4 | 0.2 | | |
| Kirkland_Main-2970 | Kirkland_Manholes-2435 | 226.37 | Kirkland_Manholes-2436 | 225.88 | 121.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | SM14-Ex-EX285 | |
| Kirkland_Main-2971 | Kirkland_Manholes-2436 | 225.88 | Kirkland_Manholes-2438 | 209.72 | 279.9 | 5.77 | 8 | PVC | 0.01 | 1,694 | 9 | 24 | 32 | 1.9 | SM14-Ex-EX244 | |
| Kirkland_Main-2972 | Kirkland_Manholes-2438 | 209.72 | Kirkland_Manholes-2441 | 205.09 | 260.5 | 1.78 | 8 | PVC | 0.01 | 940 | 13 | 36 | 49 | 5.2 | SM14-Ex-EX244 | |
| Kirkland_Main-2973 | Kirkland_Manholes-2439 | 217.92 | Kirkland_Manholes-2438 | 209.72 | 117.3 | 6.99 | 8 | PVC | 0.01 | 1,864 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX284 | |
| Kirkland_Main-2974 | Kirkland_Manholes-2440 | 242.45 | Kirkland_Manholes-2439 | 217.92 | 136.9 | 17.92 | 8 | PVC | 0.01 | 2,985 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX284 | |
| Kirkland_Main-2975 | Kirkland_Manholes-2441 | 205.09 | Kirkland_Manholes-2442 | 204.35 | 67.9 | 1.09 | 8 | PVC | 0.01 | 736 | 14 | 40 | 53 | 7.3 | SM14-Ex-EX244 | |
| Kirkland_Main-2977 | Kirkland_Manholes-2992 | 396.35 | Kirkland_Manholes-2991 | 395.79 | 171.2 | 0.33 | 8 | PVC | 0.01 | 403 | 2 | 20 | 22 | 5.4 | | |
| Kirkland_Main-2978 | Kirkland_Manholes-2991 | 395.79 | Kirkland_Manholes-1328 | 394.1 | 142.6 | 1.18 | 8 | PVC | 0.01 | 767 | 2 | 24 | 26 | 3.4 | | |
| Kirkland_Main-2979 | Kirkland_Manholes-2737 | 259.86 | Kirkland_Manholes-2310 | 256 | 91.2 | 4.23 | 8 | PVC | 0.01 | 1,451 | 3 | 9 | 12 | 0.8 | | |
| Kirkland_Main-2980 | Kirkland_Manholes-2442 | 204.35 | Kirkland_Manholes-2443 | 200 | 192.1 | 2.26 | 8 | PVC | 0.01 | 1,061 | 14 | 44 | 58 | 5.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2981 | Kirkland_Manholes-2444 | 199.73 | Kirkland_Manholes-2445 | 191.11 | 277 | 3.11 | 8 | PVC | 0.01 | 1,244 | 18 | 64 | 82 | 6.6 | SM14-Ex-EX244 | |
| Kirkland_Main-2982 | Kirkland_Manholes-2443 | 200 | Kirkland_Manholes-2444 | 199.73 | 20.4 | 1.32 | 8 | PVC | 0.01 | 810 | 15 | 48 | 63 | 7.7 | SM14-Ex-EX244 | |
| Kirkland_Main-2983 | Kirkland_Manholes-2668 | 18.29 | Kirkland_Manholes-2318 | 17.6 | 53.6 | 1.29 | 8 | PVC | 0.01 | 800 | 1 | 6 | 8 | 1 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2984 | Kirkland_Manholes-2320 | 18 | Kirkland_Manholes-2319 | 17.7 | 261.8 | 0.11 | 21 | PVC | 0.01 | 3,129 | 102 | 273 | 375 | 12 | | |
| Kirkland_Main-2985 | Kirkland_Manholes-2321 | 18.2 | Kirkland_Manholes-2320 | 18 | 193.7 | 0.1 | 21 | PVC | 0.01 | 2,971 | 97 | 214 | 312 | 10.5 | | |
| Kirkland_Main-2986 | Kirkland_Manholes-2303 | 195.57 | Kirkland_Manholes-2302 | 194.37 | 30.3 | 3.96 | 12 | PVC | 0.01 | 4,136 | 549 | 1,470 | 2,019 | 48.8 | SM2 | |
| Kirkland_Main-2987 | Kirkland_Manholes-2302 | 194.37 | Kirkland_Manholes-2304 | 192.91 | 51.2 | 2.85 | 12 | PVC | 0.01 | 3,510 | 549 | 1,474 | 2,023 | 57.7 | | |
| Kirkland_Main-2988 | Kirkland_Manholes-2285 | 419.89 | Kirkland_Manholes-2284 | 417.52 | 64.2 | 3.69 | 8 | PVC | 0.01 | 1,355 | 204 | 675 | 879 | 64.9 | SM14-Ex-EX248 | |
| Kirkland_Main-2989 | Kirkland_Manholes-2284 | 417.52 | Kirkland_Manholes-2282 | 401.71 | 231.8 | 6.82 | 8 | PVC | 0.01 | 1,841 | 204 | 679 | 884 | 48 | SM14-Ex-EX248 | |
| Kirkland_Main-2990 | Kirkland_Manholes-2263 | 374.13 | Kirkland_Manholes-2262 | 311.78 | 761.4 | 8.19 | 8 | PVC | 0.01 | 2,018 | 232 | 842 | 1,074 | 53.2 | SM14-Ex-EX248 | |
| Kirkland_Main-2991 | Kirkland_Manholes-2669 | 379.65 | Kirkland_Manholes-2290 | 372.36 | 83.4 | 8.74 | 8 | PVC | 0.01 | 2,084 | 4 | 4 | 8 | 0.4 | | |
| Kirkland_Main-2992 | Kirkland_Manholes-2290 | 372.36 | Kirkland_Manholes-2291 | 367.48 | 64.2 | 7.6 | 8 | PVC | 0.01 | 1,944 | 4 | 8 | 12 | 0.6 | | |
| Kirkland_Main-2993 | Kirkland_Manholes-2291 | 367.48 | Kirkland_Manholes-2292 | 366.54 | 71.9 | 1.31 | 8 | PVC | 0.01 | 806 | 5 | 12 | 17 | 2.1 | | |
| Kirkland_Main-2994 | Kirkland_Manholes-2292 | 366.54 | Kirkland_Manholes-2293 | 362.58 | 154 | 2.57 | 8 | PVC | 0.01 | 1,131 | 5 | 16 | 21 | 1.8 | | |
| Kirkland_Main-2995 | Kirkland_Manholes-2670 | 399.73 | Kirkland_Manholes-2298 | 382.52 | 120.1 | 14.33 | 8 | PVC | 0.01 | 2,669 | 3 | 8 | 11 | 0.4 | | Drop Connection |
| Kirkland_Main-2997 | Kirkland_Manholes-2673 | 372.3 | Kirkland_Manholes-2675 | 350.82 | 245.7 | 8.74 | 8 | PVC | 0.01 | 2,084 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX208 | |
| Kirkland_Main-2998 | Kirkland_Manholes-2709 | 292.14 | Kirkland_Manholes-2708 | 281.32 | 58.6 | 18.46 | 8 | PVC | 0.01 | 3,029 | 1 | 16 | 17 | 0.6 | | |
| Kirkland_Main-2999 | Kirkland_Manholes-2708 | 281.32 | Kirkland_Manholes-2707 | 271.62 | 125.5 | 7.73 | 8 | PVC | 0.01 | 1,960 | 1 | 20 | 21 | 1.1 | | |
| Kirkland_Main-3000 | Kirkland_Manholes-2711 | 316.09 | Kirkland_Manholes-2709 | 292.14 | 170 | 14.09 | 8 | PVC | 0.01 | 2,647 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-3001 | Kirkland_Manholes-2707 | 271.62 | Kirkland_Manholes-2704 | 250.11 | 214 | 10.05 | 8 | PVC | 0.01 | 2,235 | 2 | 24 | 26 | 1.2 | | |
| Kirkland_Main-3002 | Kirkland_Manholes-2703 | 250.19 | Kirkland_Manholes-2704 | 250.11 | 401.9 | 0.02 | 8 | PVC | 0.01 | 99 | 4 | 16 | 20 | 20 | | |
| Kirkland_Main-3003 | Kirkland_Manholes-2712 | 326.54 | Kirkland_Manholes-2711 | 316.09 | 154.3 | 6.77 | 8 | PVC | 0.01 | 1,835 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3005 | Kirkland_Manholes-2714 | 316.79 | Kirkland_Manholes-2713 | 280.32 | 397.8 | 9.17 | 8 | PVC | 0.01 | 2,135 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX204 | |
| Kirkland_Main-3006 | Kirkland_Manholes-2713 | 280.32 | Kirkland_Manholes-2702 | 256.62 | 323.4 | 7.33 | 8 | PVC | 0.01 | 1,909 | 4 | 8 | 12 | 0.6 | SM14-Ex-EX204 | |
| Kirkland_Main-3008 | Kirkland_Manholes-2721 | 21.2 | Kirkland_Manholes-2722 | 21 | 44.5 | 0.45 | 12 | PVC | 0.01 | 1,394 | 76 | 43 | 118 | 8.5 | SM14-Ex-EX289 | |
| Kirkland_Main-3009 | Kirkland_Manholes-2724 | 25.33 | Kirkland_Manholes-2723 | 21.5 | 122.9 | 3.12 | 8 | PVC | 0.01 | 1,245 | 11 | 6 | 17 | 1.4 | SM14-Ex-EX288 | |
| Kirkland_Main-3010 | Kirkland_Manholes-2723 | 21.5 | Kirkland_Manholes-2722 | 21 | 70.9 | 0.7 | 8 | PVC | 0.01 | 592 | 12 | 12 | 24 | 4.1 | SM14-Ex-EX288 | |
| Kirkland_Main-3011 | Kirkland_Manholes-2727 | 13 | Kirkland_Manholes-2726 | 12.39 | 121.7 | 0.5 | 18 | PVC | 0.01 | 4,339 | 227 | 589 | 816 | 18.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3012 | Kirkland_Manholes-2729 | 13.77 | Kirkland_Manholes-2727 | 13 | 208.7 | 0.37 | 18 | PVC | 0.01 | 3,723 | 226 | 583 | 809 | 21.7 | SM14-Ex-EX289 | |
| Kirkland_Main-3013 | Kirkland_Manholes-2730 | 14.43 | Kirkland_Manholes-2728 | 13.83 | 161.6 | 0.37 | 18 | PVC | 0.01 | 3,734 | 224 | 571 | 795 | 21.3 | SM14-Ex-EX289 | |
| Kirkland_Main-3014 | Kirkland_Manholes-2728 | 13.83 | Kirkland_Manholes-2729 | 13.77 | 16.5 | 0.36 | 18 | PVC | 0.01 | 3,696 | 226 | 577 | 803 | 21.7 | SM14-Ex-EX289 | |
| Kirkland_Main-3015 | Kirkland_Manholes-2731 | 15.6 | Kirkland_Manholes-2977 | 14.89 | 193.8 | 0.37 | 18 | PVC | 0.01 | 3,709 | 223 | 553 | 776 | 20.9 | SM14-Ex-EX289 | |
| Kirkland_Main-3016 | Kirkland_Manholes-2732 | 15.71 | Kirkland_Manholes-2731 | 15.6 | 29.6 | 0.37 | 18 | PVC | 0.01 | 3,738 | 221 | 547 | 768 | 20.5 | SM14-Ex-EX289 | |
| Kirkland_Main-3017 | Kirkland_Manholes-2733 | 16.02 | Kirkland_Manholes-2732 | 15.71 | 84.3 | 0.37 | 18 | PVC | 0.01 | 3,716 | 218 | 541 | 758 | 20.4 | SM14-Ex-EX289 | |
| Kirkland_Main-3018 | Kirkland_Manholes-2735 | 16.81 | Kirkland_Manholes-2733 | 16.02 | 214.5 | 0.37 | 18 | PVC | 0.01 | 3,719 | 217 | 534 | 751 | 20.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3019 | Kirkland_Manholes-2734 | 17.15 | Kirkland_Manholes-2735 | 16.81 | 92.8 | 0.37 | 18 | PVC | 0.01 | 3,710 | 216 | 528 | 744 | 20.1 | SM14-Ex-EX289 | |
| Kirkland_Main-3020 | Kirkland_Manholes-2736 | 17.76 | Kirkland_Manholes-2734 | 17.15 | 164.5 | 0.37 | 18 | PVC | 0.01 | 3,733 | 216 | 522 | 738 | 19.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3021 | Kirkland_Manholes-2741 | 83.04 | Kirkland_Manholes-2739 | 73.09 | 180.1 | 5.53 | 8 | PVC | 0.01 | 1,657 | 5 | 18 | 24 | 1.4 | | |
| Kirkland_Main-3022 | Kirkland_Manholes-2740 | 73.45 | Kirkland_Manholes-2739 | 73.09 | 167.3 | 0.22 | 8 | PVC | 0.01 | 327 | 0 | 6 | 6 | 1.9 | | |
| Kirkland_Main-3023 | Kirkland_Manholes-2739 | 73.09 | Kirkland_Manholes-2203 | 62.94 | 47.2 | 21.5 | 8 | PVC | 0.01 | 3,269 | 12 | 55 | 67 | 2 | | |
| Kirkland_Main-3024 | Kirkland_Manholes-2744 | 119.06 | Kirkland_Manholes-2739 | 73.09 | 200.2 | 22.96 | 8 | PVC | 0.01 | 3,378 | 7 | 24 | 31 | 0.9 | | |
| Kirkland_Main-3025 | Kirkland_Manholes-2745 | 129.7 | Kirkland_Manholes-2744 | 119.06 | 80.2 | 13.27 | 8 | PVC | 0.01 | 2,569 | 0 | 6 | 6 | 0.2 | | |
| Kirkland_Main-3026 | Kirkland_Manholes-2746 | 121.99 | Kirkland_Manholes-2744 | 119.06 | 88.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 0 | 12 | 12 | 0.9 | | |
| Kirkland_Main-3027 | Kirkland_Manholes-2747 | 133.27 | Kirkland_Manholes-2746 | 121.99 | 59.4 | 19 | 8 | PVC | 0.01 | 3,073 | 0 | 6 | 6 | 0.2 | | |
| Kirkland_Main-3028 | Kirkland_Manholes-2742 | 91.54 | Kirkland_Manholes-2741 | 83.04 | 69.2 | 12.29 | 8 | PVC | 0.01 | 2,471 | 5 | 12 | 18 | 0.7 | | |
| Kirkland_Main-3029 | Kirkland_Manholes-2743 | 92.6 | Kirkland_Manholes-2742 | 91.54 | 64.4 | 1.65 | 8 | PVC | 0.01 | 904 | 5 | 6 | 12 | 1.3 | | |
| Kirkland_Main-3030 | Kirkland_Manholes-2748 | 105.07 | Kirkland_Manholes-2749 | 94.38 | 144.8 | 7.38 | 8 | PVC | 0.01 | 1,916 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-3031 | Kirkland_Manholes-2749 | 94.38 | Kirkland_Manholes-2880 | 81.72 | 189.8 | 6.67 | 8 | PVC | 0.01 | 1,821 | 24 | 18 | 43 | 2.3 | | |
| Kirkland_Main-3032 | Kirkland_Manholes-2756 | 10.03 | Kirkland_Manholes-2754 | 9.95 | 319.1 | 0.03 | 36 | PVC | 0.01 | 6,161 | 506 | 1,841 | 2,649 | 43 | SM14-Ex-EX10 | |
| Kirkland_Main-3033 | Kirkland_Manholes-2757 | 10.95 | Kirkland_Manholes-2756 | 10.03 | 146.2 | 0.63 | 36 | PVC | 0.01 | 30,867 | 506 | 1,837 | 2,645 | 8.6 | SM14-Ex-EX10 | |
| Kirkland_Main-3036 | Kirkland_Manholes-2765 | 13.19 | Kirkland_Manholes-2763 | 13.15 | 315.8 | 0.01 | 36 | PVC | 0.01 | 4,380 | 445 | 1,547 | 2,293 | 52.4 | SM14-Ex-EX10 | |
| Kirkland_Main-3037 | Kirkland_Manholes-2766 | 361.12 | Kirkland_Manholes-2548 | 359.75 | 342.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-3038 | Kirkland_Manholes-397 | 247.33 | Kirkland_Manholes-376 | 239.8 | 215.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 55 | 226 | 282 | 21.4 | | |
| Kirkland_Main-3039 | Kirkland_Manholes-2769 | 260.32 | Kirkland_Manholes-1077 | 252.59 | 364.2 | 2.12 | 8 | PVC | 0.01 | 1,027 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-3044 | Kirkland_Manholes-2275 | 411.72 | Kirkland_Manholes-2276 | 410.45 | 52.8 | 2.4 | 8 | PVC | 0.01 | 1,093 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3045 | Kirkland_Manholes-2771 | 320.53 | Kirkland_Manholes-2772 | 308.23 | 258.2 | 4.76 | 8 | PVC | 0.01 | 1,539 | 29 | 88 | 117 | 7.6 | | |
| Kirkland_Main-3046 | Kirkland_Manholes-2776 | 334.45 | Kirkland_Manholes-2775 | 332.7 | 391.2 | 0.45 | 8 | PVC | 0.01 | 472 | 29 | 81 | 110 | 23.3 | | |
| Kirkland_Main-3047 | Kirkland_Manholes-2775 | 332.7 | Kirkland_Manholes-2774 | 330.08 | 382.8 | 0.68 | 8 | PVC | 0.01 | 583 | 29 | 84 | 112 | 19.3 | | |
| Kirkland_Main-3048 | Kirkland_Manholes-2774 | 330.08 | Kirkland_Manholes-2771 | 320.53 | 310.5 | 3.08 | 8 | PVC | 0.01 | 1,237 | 29 | 86 | 115 | 9.3 | | |
| Kirkland_Main-3049 | Kirkland_Manholes-2782 | 326.16 | Kirkland_Manholes-2781 | 293.52 | 273.1 | 11.95 | 8 | PVC | 0.01 | 2,438 | 0 | 3 | 3 | 0.1 | | |
| Kirkland_Main-3050 | Kirkland_Manholes-2781 | 293.52 | Kirkland_Manholes-2780 | 291.73 | 199 | 0.9 | 8 | PVC | 0.01 | 669 | 19 | 5 | 24 | 3.6 | | |
| Kirkland_Main-3051 | Kirkland_Manholes-2780 | 291.73 | Kirkland_Manholes-2779 | 288.37 | 73 | 4.6 | 8 | PVC | 0.01 | 1,512 | 19 | 8 | 27 | 1.8 | | |
| Kirkland_Main-3052 | Kirkland_Manholes-2779 | 288.37 | Kirkland_Manholes-2778 | 255.64 | 255.5 | 12.81 | 8 | PVC | 0.01 | 2,524 | 19 | 11 | 30 | 1.2 | | |
| Kirkland_Main-3053 | Kirkland_Manholes-2777 | 256.44 | Kirkland_Manholes-2778 | 255.64 | 115.8 | 0.69 | 8 | PVC | 0.01 | 586 | 0 | 3 | 3 | 0.5 | | |
| Kirkland_Main-3054 | Kirkland_Manholes-2785 | 259.34 | Kirkland_Manholes-2786 | 258.1 | 92.6 | 1.34 | 8 | PVC | 0.01 | 816 | 7 | 48 | 55 | 6.8 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3055 | Kirkland_Manholes-2784 | 262.56 | Kirkland_Manholes-2785 | 259.34 | 108.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 7 | 44 | 50 | 4.1 | | |
| Kirkland_Main-3057 | Kirkland_Manholes-2787 | 252.17 | Kirkland_Manholes-2788 | 251.6 | 73 | 0.78 | 8 | PVC | 0.01 | 623 | 14 | 87 | 102 | 16.3 | SM14-Ex-EX313 | |
| Kirkland_Main-3059 | Kirkland_Manholes-2798 | 192.18 | Kirkland_Manholes-2797 | 190.87 | 110.6 | 1.18 | 8 | PVC | 0.01 | 767 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX296 | |
| Kirkland_Main-3060 | Kirkland_Manholes-2797 | 190.87 | Kirkland_Manholes-2796 | 185.45 | 211.8 | 2.56 | 8 | PVC | 0.01 | 1,128 | 5 | 16 | 21 | 1.9 | SM14-Ex-EX296 | |
| Kirkland_Main-3061 | Kirkland_Manholes-2799 | 233.81 | Kirkland_Manholes-2800 | 221.07 | 125.6 | 10.15 | 8 | PVC | 0.01 | 2,246 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX302 | |
| Kirkland_Main-3062 | Kirkland_Manholes-2800 | 221.07 | Kirkland_Manholes-2797 | 190.87 | 260 | 11.62 | 8 | PVC | 0.01 | 2,403 | 2 | 8 | 10 | 0.4 | SM14-Ex-EX302 | |
| Kirkland_Main-3063 | Kirkland_Manholes-2802 | 238.36 | O-39 | 228.33 | 111.4 | 9 | 8 | PVC | 0.01 | 2,116 | 19 | 22 | 41 | 1.9 | | |
| Kirkland_Main-3064 | Kirkland_Manholes-2810 | 44.75 | Kirkland_Manholes-2809 | 44.5 | 62.2 | 0.4 | 8 | PVC | 0.01 | 446 | 22 | 91 | 114 | 25.5 | SM14-Ex-EX316 | Drop Connection |
| Kirkland_Main-3065 | Kirkland_Manholes-2808 | 55.6 | Kirkland_Manholes-2807 | 47.79 | 63.2 | 12.36 | 8 | PVC | 0.01 | 2,479 | 0 | 12 | 12 | 0.5 | SM14-Ex-EX317 | |
| Kirkland_Main-3066 | Kirkland_Manholes-2807 | 47.79 | Kirkland_Manholes-2810 | 44.75 | 258.6 | 1.18 | 8 | PVC | 0.01 | 764 | 1 | 79 | 80 | 10.5 | SM14-Ex-EX316 | |
| Kirkland_Main-3067 | Kirkland_Manholes-2806 | 53.14 | Kirkland_Manholes-2807 | 47.79 | 321.9 | 1.66 | 8 | PVC | 0.01 | 909 | 0 | 61 | 61 | 6.7 | SM14-Ex-EX316 | |
| Kirkland_Main-3068 | Kirkland_Manholes-2805 | 68.41 | Kirkland_Manholes-2806 | 53.14 | 319.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 0 | 55 | 55 | 3.5 | SM14-Ex-EX316 | |
| Kirkland_Main-3069 | Kirkland_Manholes-2811 | 70.36 | Kirkland_Manholes-2808 | 55.6 | 132.6 | 11.13 | 8 | PVC | 0.01 | 2,353 | 0 | 6 | 6 | 0.3 | SM14-Ex-EX317 | |
| Kirkland_Main-3070 | Kirkland_Manholes-2814 | 79.68 | Kirkland_Manholes-2805 | 68.41 | 70.6 | 15.96 | 8 | PVC | 0.01 | 2,817 | 0 | 6 | 6 | 0.2 | SM14-Ex-EX318 | |
| Kirkland_Main-3071 | Kirkland_Manholes-2815 | 71.41 | Kirkland_Manholes-2805 | 68.41 | 115.4 | 2.6 | 8 | PVC | 0.01 | 1,137 | 0 | 18 | 18 | 1.6 | SM14-Ex-EX318 | |
| Kirkland_Main-3072 | Kirkland_Manholes-2812 | 81.42 | Kirkland_Manholes-2815 | 71.41 | 284.3 | 3.52 | 8 | PVC | 0.01 | 1,323 | 0 | 12 | 12 | 0.9 | SM14-Ex-EX318 | |
| Kirkland_Main-3073 | Kirkland_Manholes-2813 | 84.17 | Kirkland_Manholes-2812 | 81.42 | 272.3 | 1.01 | 8 | PVC | 0.01 | 709 | 0 | 6 | 6 | 0.9 | SM14-Ex-EX318 | |
| Kirkland_Main-3074 | Kirkland_Manholes-2816 | 45.4 | Kirkland_Manholes-2810 | 44.75 | 163.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 6 | 7 | 1.6 | | |
| Kirkland_Main-3075 | Kirkland_Manholes-2822 | 57.68 | Kirkland_Manholes-2821 | 56.89 | 105.9 | 0.75 | 8 | PVC | 0.01 | 609 | 29 | 6 | 35 | 5.7 | | |
| Kirkland_Main-3076 | Kirkland_Manholes-2821 | 56.89 | Kirkland_Manholes-2820 | 55.04 | 95.1 | 1.94 | 8 | PVC | 0.01 | 983 | 30 | 12 | 42 | 4.3 | | |
| Kirkland_Main-3077 | Kirkland_Manholes-2820 | 55.04 | Kirkland_Manholes-2819 | 48.42 | 258.4 | 2.56 | 8 | PVC | 0.01 | 1,128 | 32 | 18 | 50 | 4.4 | | |
| Kirkland_Main-3078 | Kirkland_Manholes-2819 | 48.42 | Kirkland_Manholes-2817 | 44.74 | 95 | 3.87 | 8 | PVC | 0.01 | 1,388 | 32 | 24 | 57 | 4.1 | | |
| Kirkland_Main-3079 | Kirkland_Manholes-2818 | 48.57 | Kirkland_Manholes-2817 | 44.74 | 127 | 3.01 | 8 | PVC | 0.01 | 1,224 | 3 | 6 | 9 | 0.7 | | |
| Kirkland_Main-3080 | Kirkland_Manholes-2817 | 44.74 | Kirkland_Manholes-2823 | 34.33 | 329.7 | 3.16 | 8 | PVC | 0.01 | 1,253 | 35 | 36 | 72 | 5.7 | | |
| Kirkland_Main-3081 | Kirkland_Manholes-2827 | 39.5 | Kirkland_Manholes-2826 | 38.6 | 407 | 0.22 | 15 | PVC | 0.01 | 1,768 | 220 | 590 | 810 | 45.8 | SM14-Ex-EX319 | Drop Connection |
| Kirkland_Main-3082 | Kirkland_Manholes-2826 | 36.35 | Kirkland_Manholes-2823 | 34.33 | 324.1 | 0.62 | 15 | PVC | 0.01 | 2,973 | 228 | 596 | 824 | 27.7 | SM14-Ex-EX319 | |
| Kirkland_Main-3083 | Kirkland_Manholes-2823 | 34.33 | Kirkland_Manholes-2824 | 33.64 | 78.4 | 0.88 | 15 | PVC | 0.01 | 3,537 | 263 | 638 | 902 | 25.5 | SM14-Ex-EX319 | |
| Kirkland_Main-3084 | Kirkland_Manholes-2824 | 33.64 | Kirkland_Manholes-2825 | 33 | 93.6 | 0.69 | 15 | PVC | 0.01 | 3,124 | 264 | 645 | 908 | 29.1 | SM14-Ex-EX319 | |
| Kirkland_Main-3085 | Kirkland_Manholes-2830 | 52.24 | Kirkland_Manholes-2831 | 43.6 | 77.9 | 11.1 | 8 | PVC | 0.01 | 2,349 | 6 | 6 | 83 | 3.5 | | |
| Kirkland_Main-3088 | Kirkland_Manholes-2831 | 43.6 | Kirkland_Manholes-2829 | 40.2 | 467.6 | 0.73 | 12 | PVC | 0.01 | 1,772 | 152 | 401 | 625 | 35.3 | SM14-Ex-EX309 | |
| Kirkland_Main-3089 | Kirkland_Manholes-2825 | 33 | Kirkland_Manholes-2832 | 30.86 | 94.7 | 2.26 | 15 | PVC | 0.01 | 5,664 | 264 | 651 | 914 | 16.1 | SM14-Ex-EX319 | |
| Kirkland_Main-3090 | Kirkland_Manholes-2829 | 40.2 | Kirkland_Manholes-2832 | 30.86 | 260.5 | 3.59 | 12 | PVC | 0.01 | 3,936 | 152 | 407 | 631 | 16 | SM14-Ex-EX309 | |
| Kirkland_Main-3091 | Kirkland_Manholes-2828 | 34.38 | Kirkland_Manholes-2832 | 30.86 | 239.8 | 1.47 | 8 | PVC | 0.01 | 854 | 21 | 6 | 27 | 3.1 | | |
| Kirkland_Main-3092 | Kirkland_Manholes-2832 | 30.86 | Kirkland_Manholes-2833 | 29.99 | 303.3 | 0.29 | 18 | PVC | 0.01 | 3,283 | 437 | 1,070 | 1,579 | 48.1 | SM14-Ex-EX309 | |
| Kirkland_Main-3093 | Kirkland_Manholes-2839 | 98.83 | Kirkland_Manholes-2840 | 90.84 | 75.4 | 10.6 | 8 | PVC | 0.01 | 2,295 | 2 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3094 | Kirkland_Manholes-2841 | 31.53 | Kirkland_Manholes-2842 | 26.9 | 41.3 | 11.2 | 8 | PVC | 0.01 | 2,360 | 4 | 18 | 22 | 1 | SM14-Ex-EX310 | |
| Kirkland_Main-3095 | Kirkland_Manholes-2843 | 16.05 | YARROW POINT_WETWELL | 6 | 32.1 | 31.31 | 8 | PVC | 0.01 | 3,945 | 11 | 47 | 58 | 1.5 | SM14-Ex-EX315 | |
| Kirkland_Main-3096 | Kirkland_Manholes-2847 | 24.39 | Kirkland_Manholes-2854 | 20.28 | 103.2 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 5 | 5 | 0.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3097 | Kirkland_Manholes-2854 | 20.28 | Kirkland_Manholes-2855 | 19.82 | 135 | 0.34 | 8 | PVC | 0.01 | 411 | 0 | 9 | 9 | 2.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3098 | Kirkland_Manholes-2855 | 19.82 | Kirkland_Manholes-2846 | 17.72 | 172.2 | 1.22 | 8 | PVC | 0.01 | 779 | 0 | 14 | 14 | 1.8 | SM14-Ex-EX315 | |
| Kirkland_Main-3099 | Kirkland_Manholes-2846 | 17.72 | Kirkland_Manholes-2843 | 16.05 | 133.2 | 1.25 | 8 | PVC | 0.01 | 790 | 0 | 19 | 19 | 2.4 | SM14-Ex-EX315 | |
| Kirkland_Main-3100 | Kirkland_Manholes-2845 | 16.72 | Kirkland_Manholes-2843 | 16.05 | 68.4 | 0.97 | 8 | PVC | 0.01 | 696 | 11 | 19 | 30 | 4.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3102 | Kirkland_Manholes-2844 | 27.14 | Kirkland_Manholes-2843 | 26.59 | 137.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 5 | 5 | 1 | SM14-Ex-EX315 | Drop Connection |
| Kirkland_Main-3104 | Kirkland_Manholes-2809 | 42.91 | Kirkland_Manholes-2834 | 37.62 | 317.9 | 1.66 | 8 | PVC | 0.01 | 910 | 25 | 97 | 122 | 13.5 | SM14-Ex-EX316 | |
| Kirkland_Main-3105 | Kirkland_Manholes-2836 | 60.97 | Kirkland_Manholes-2835 | 50.93 | 162.4 | 6.18 | 8 | PVC | 0.01 | 1,753 | 6 | 18 | 24 | 1.4 | | |
| Kirkland_Main-3106 | Kirkland_Manholes-2835 | 50.93 | Kirkland_Manholes-2834 | 37.62 | 47.5 | 28.02 | 8 | PVC | 0.01 | 3,732 | 6 | 24 | 31 | 0.8 | | |
| Kirkland_Main-3108 | Kirkland_Manholes-2862 | 89.88 | Kirkland_Manholes-2863 | 49.4 | 272.9 | 14.83 | 8 | PVC | 0.01 | 2,716 | 7 | 9 | 16 | 0.6 | | |
| Kirkland_Main-3109 | Kirkland_Manholes-2861 | 109.7 | Kirkland_Manholes-2862 | 89.88 | 239.2 | 8.29 | 8 | PVC | 0.01 | 2,030 | 5 | 6 | 11 | 0.5 | | |
| Kirkland_Main-3110 | Kirkland_Manholes-2860 | 120.82 | Kirkland_Manholes-2861 | 109.7 | 223.4 | 4.98 | 8 | PVC | 0.01 | 1,573 | 2 | 3 | 5 | 0.3 | | |
| Kirkland_Main-3115 | Kirkland_Manholes-2883 | 268.55 | Kirkland_Manholes-2876 | 267.92 | 60.1 | 1.05 | 8 | PVC | 0.01 | 722 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-3116 | Kirkland_Manholes-2884 | 269.34 | Kirkland_Manholes-2883 | 268.55 | 63.9 | 1.24 | 8 | PVC | 0.01 | 784 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3118 | Kirkland_Manholes-2548 | 359.75 | Kirkland_Manholes-2891 | 359.09 | 165.1 | 0.4 | 8 | PVC | 0.01 | 448 | 8 | 24 | 32 | 7.2 | | |
| Kirkland_Main-3119 | Kirkland_Manholes-2891 | 359.09 | Kirkland_Manholes-2561 | 358.82 | 66.3 | 0.4 | 8 | PVC | 0.01 | 446 | 9 | 28 | 37 | 8.2 | | |
| Kirkland_Main-3121 | Kirkland_Manholes-2893 | 432.24 | Kirkland_Manholes-1991 | 431.18 | 280.1 | 0.38 | 8 | PVC | 0.01 | 434 | 2 | 4 | 6 | 1.5 | | |
| Kirkland_Main-3122 | Kirkland_Manholes-2894 | 306.1 | Kirkland_Manholes-2895 | 306 | 25.4 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 18 | 4 | | |
| Kirkland_Main-3123 | Kirkland_Manholes-2895 | 306 | Kirkland_Manholes-2896 | 304.88 | 150.3 | 0.75 | 8 | PVC | 0.01 | 609 | 2 | 20 | 22 | 3.6 | | |
| Kirkland_Main-3124 | Kirkland_Manholes-2896 | 304.88 | Kirkland_Manholes-2897 | 303.8 | 169.5 | 0.64 | 8 | PVC | 0.01 | 563 | 3 | 24 | 27 | 4.8 | | |
| Kirkland_Main-3125 | Kirkland_Manholes-2898 | 307.58 | Kirkland_Manholes-2897 | 303.8 | 40 | 9.44 | 8 | PVC | 0.01 | 2,166 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3126 | Kirkland_Manholes-2897 | 303.8 | Kirkland_Manholes-2899 | 303.26 | 125.6 | 0.43 | 8 | PVC | 0.01 | 462 | 4 | 32 | 36 | 7.8 | | |
| Kirkland_Main-3127 | Kirkland_Manholes-2899 | 303.26 | Kirkland_Manholes-2900 | 302.3 | 244.9 | 0.39 | 8 | PVC | 0.01 | 441 | 5 | 36 | 41 | 9.3 | | |
| Kirkland_Main-3128 | Kirkland_Manholes-882 | 297.25 | Kirkland_Manholes-345 | 279.43 | 305.8 | 5.83 | 8 | PVC | 0.01 | 1,702 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-3129 | Kirkland_Manholes-2901 | 294.77 | Kirkland_Manholes-883 | 294.42 | 87 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 17 | 3.8 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3130 | Kirkland_Manholes-883 | 294.42 | Kirkland_Manholes-906 | 293.01 | 64.9 | 2.17 | 8 | PVC | 0.01 | 1,039 | 4 | 36 | 40 | 3.8 | | |
| Kirkland_Main-3131 | Kirkland_Manholes-2902 | 301.02 | Kirkland_Manholes-883 | 294.42 | 322.3 | 2.05 | 8 | PVC | 0.01 | 1,009 | 3 | 16 | 19 | 1.9 | | |
| Kirkland_Main-3132 | Kirkland_Manholes-2903 | 301.35 | Kirkland_Manholes-2902 | 301.02 | 151.1 | 0.22 | 8 | PVC | 0.01 | 329 | 2 | 12 | 14 | 4.4 | | |
| Kirkland_Main-3133 | Kirkland_Manholes-2905 | 302.8 | Kirkland_Manholes-2904 | 301.39 | 65.9 | 2.14 | 8 | PVC | 0.01 | 1,031 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3134 | Kirkland_Manholes-2904 | 301.39 | Kirkland_Manholes-2903 | 301.35 | 153.8 | 0.03 | 8 | PVC | 0.01 | 114 | 1 | 8 | 9 | 8.1 | | |
| Kirkland_Main-3135 | Kirkland_Manholes-2913 | 474.42 | Kirkland_Manholes-1391 | 471.35 | 128.8 | 2.38 | 8 | PVC | 0.01 | 1,088 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-3136 | Kirkland_Manholes-2906 | 405.37 | Kirkland_Manholes-2907 | 402.62 | 299.9 | 0.92 | 8 | PVC | 0.01 | 675 | 1 | 21 | 22 | 3.3 | | |
| Kirkland_Main-3137 | Kirkland_Manholes-2907 | 402.62 | Kirkland_Manholes-2908 | 397.79 | 295.5 | 1.63 | 8 | PVC | 0.01 | 901 | 2 | 23 | 25 | 2.8 | | |
| Kirkland_Main-3138 | Kirkland_Manholes-2908 | 397.79 | Kirkland_Manholes-2532 | 395.91 | 85.9 | 2.19 | 8 | PVC | 0.01 | 1,043 | 2 | 26 | 27 | 2.6 | | |
| Kirkland_Main-3139 | Kirkland_Manholes-2910 | 412.56 | Kirkland_Manholes-2017 | 412 | 24.7 | 2.27 | 8 | PVC | 0.01 | 1,062 | 4 | 16 | 19 | 1.8 | | |
| Kirkland_Main-3140 | Kirkland_Manholes-2911 | 414.42 | Kirkland_Manholes-2910 | 412.56 | 288.8 | 0.64 | 8 | PVC | 0.01 | 566 | 3 | 12 | 15 | 2.6 | | |
| Kirkland_Main-3141 | Kirkland_Manholes-2909 | 423.03 | Kirkland_Manholes-2912 | 418.07 | 296 | 1.68 | 8 | PVC | 0.01 | 913 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3142 | Kirkland_Manholes-2912 | 418.07 | Kirkland_Manholes-2911 | 414.42 | 285.6 | 1.28 | 8 | PVC | 0.01 | 797 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-3143 | Kirkland_Manholes-2914 | 478.18 | Kirkland_Manholes-2913 | 474.42 | 305.5 | 1.23 | 8 | PVC | 0.01 | 782 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3144 | Kirkland_Manholes-2036 | 452.58 | Kirkland_Manholes-1216 | 443.89 | 347.4 | 2.5 | 8 | PVC | 0.01 | 1,115 | 123 | 318 | 441 | 39.5 | SM14-Ex-EX264 | |
| Kirkland_Main-3145 | Kirkland_Manholes-1216 | 443.89 | Kirkland_Manholes-2048 | 442.51 | 28.4 | 4.86 | 8 | PVC | 0.01 | 1,554 | 125 | 326 | 451 | 29 | SM14-Ex-EX264 | |
| Kirkland_Main-3146 | Kirkland_Manholes-1719 | 46.02 | Kirkland_Manholes-2935 | 44.9 | 241.2 | 0.46 | 8 | PVC | 0.01 | 480 | 71 | 58 | 128 | 26.7 | SM14-Ex-EX165 | |
| Kirkland_Main-3147 | Kirkland_Manholes-2935 | 44.9 | Kirkland_Manholes-1741 | 41.4 | 292.3 | 1.2 | 8 | PVC | 0.01 | 772 | 71 | 66 | 137 | 17.7 | SM14-Ex-EX165 | |
| Kirkland_Main-3150 | Kirkland_Manholes-733 | 35.72 | Kirkland_Manholes-758 | 27.19 | 290.4 | 2.94 | 18 | PVC | 0.01 | 10,503 | 486 | 1,745 | 2,232 | 21.3 | | |
| Kirkland_Main-3151 | Kirkland_Manholes-758 | 27.19 | Kirkland_Manholes-734 | 25.7 | 118.9 | 1.25 | 18 | PVC | 0.01 | 6,865 | 486 | 1,754 | 2,240 | 32.6 | | |
| Kirkland_Main-3152 | Kirkland_Manholes-1689 | 43.75 | Kirkland_Manholes-2927 | 38.62 | 107.6 | 4.77 | 8 | PVC | 0.01 | 1,540 | 46 | 103 | 149 | 9.7 | SM14-Ex-EX161 | |
| Kirkland_Main-3153 | Kirkland_Manholes-2927 | 38.62 | Kirkland_Manholes-733 | 35.72 | 20.9 | 13.88 | 8 | PVC | 0.01 | 2,627 | 46 | 111 | 157 | 6 | | |
| Kirkland_Main-3154 | Kirkland_Manholes-2928 | 60.36 | Kirkland_Manholes-730 | 57.26 | 71.9 | 4.31 | 18 | PVC | 0.01 | 12,722 | 141 | 552 | 692 | 5.4 | | |
| Kirkland_Main-3155 | Kirkland_Manholes-1372 | 427.9 | Kirkland_Manholes-2936 | 415.17 | 236.6 | 5.38 | 8 | PVC | 0.01 | 1,635 | 46 | 143 | 189 | 11.5 | SM14-Ex-EX218 | |
| Kirkland_Main-3156 | Kirkland_Manholes-2936 | 415.17 | Kirkland_Manholes-1351 | 415.08 | 21.5 | 0.4 | 8 | PVC | 0.01 | 446 | 52 | 171 | 223 | 50 | | Drop Connection |
| Kirkland_Main-3157 | Kirkland_Manholes-2937 | 243.36 | Kirkland_Manholes-2938 | 237.72 | 156 | 3.61 | 8 | PVC | 0.01 | 1,340 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-3158 | Kirkland_Manholes-2938 | 237.72 | Kirkland_Manholes-1313 | 237.26 | 115.6 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.7 | | Drop Connection |
| Kirkland_Main-3159 | Kirkland_Manholes-2939 | 317.33 | Kirkland_Manholes-2887 | 302.33 | 186.7 | 8.03 | 8 | PVC | 0.01 | 1,999 | 2 | 12 | 14 | 0.7 | | |
| Kirkland_Main-3161 | Kirkland_Manholes-2940 | 472.26 | Kirkland_Manholes-564 | 469.28 | 203.6 | 1.46 | 8 | PVC | 0.01 | 853 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3162 | Kirkland_Manholes-2943 | 249.65 | Kirkland_Manholes-1876 | 247.77 | 195.1 | 0.96 | 8 | PVC | 0.01 | 692 | 0 | 8 | 8 | 1.1 | | |
| Kirkland_Main-3163 | Kirkland_Manholes-2947 | 393.38 | Kirkland_Manholes-2946 | 380.26 | 237.2 | 5.53 | 8 | PVC | 0.01 | 1,658 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3164 | Kirkland_Manholes-2946 | 380.26 | Kirkland_Manholes-2945 | 367.86 | 240.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 6 | 20 | 26 | 1.6 | | |
| Kirkland_Main-3165 | Kirkland_Manholes-2945 | 367.86 | Kirkland_Manholes-2948 | 345.5 | 368 | 6.08 | 8 | PVC | 0.01 | 1,738 | 6 | 24 | 30 | 1.7 | | |
| Kirkland_Main-3166 | Kirkland_Manholes-2948 | 345.5 | Kirkland_Manholes-1933 | 343.68 | 135.8 | 1.34 | 8 | PVC | 0.01 | 816 | 6 | 28 | 34 | 4.2 | | |
| Kirkland_Main-3167 | Kirkland_Manholes-2171 | 166.42 | Kirkland_Manholes-1107 | 164.79 | 299.5 | 0.54 | 8 | PVC | 0.01 | 520 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX21 | |
| Kirkland_Main-3168 | Kirkland_Manholes-2942 | 127.29 | Kirkland_Manholes-2941 | 110.18 | 161.6 | 10.59 | 8 | PVC | 0.01 | 2,294 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3169 | Kirkland_Manholes-80 | 110.33 | Kirkland_Manholes-2941 | 110.18 | 10 | 1.51 | 8 | PVC | 0.01 | 866 | 3 | 4 | 7 | 0.8 | | |
| Kirkland_Main-3170 | Kirkland_Manholes-2941 | 110.18 | Kirkland_Manholes-144 | 88.96 | 389.8 | 5.44 | 8 | PVC | 0.01 | 1,645 | 4 | 13 | 17 | 1 | | |
| Kirkland_Main-3171 | Kirkland_Manholes-2949 | 387.42 | Kirkland_Manholes-2946 | 380.26 | 393.8 | 1.82 | 8 | PVC | 0.01 | 951 | 4 | 12 | 15 | 1.6 | | |
| Kirkland_Main-3172 | Kirkland_Manholes-2950 | 396.31 | Kirkland_Manholes-2949 | 387.42 | 98.6 | 9.02 | 8 | PVC | 0.01 | 2,117 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-3173 | Kirkland_Manholes-2951 | 398.98 | Kirkland_Manholes-2950 | 396.31 | 142 | 1.88 | 8 | PVC | 0.01 | 967 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3174 | Kirkland_Manholes-2952 | 137.34 | Kirkland_Manholes-2509 | 126.48 | 113.7 | 9.55 | 8 | PVC | 0.01 | 2,179 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3175 | Kirkland_Manholes-1035 | 182.7 | Kirkland_Manholes-2955 | 181.46 | 188.6 | 0.66 | 8 | PVC | 0.01 | 572 | 13 | 51 | 64 | 11.2 | | |
| Kirkland_Main-3176 | Kirkland_Manholes-2955 | 181.46 | Kirkland_Manholes-1038 | 180.54 | 146.6 | 0.63 | 8 | PVC | 0.01 | 559 | 17 | 64 | 81 | 14.5 | | |
| Kirkland_Main-3177 | Kirkland_Manholes-2954 | 183.8 | Kirkland_Manholes-2953 | 182.9 | 158.6 | 0.57 | 8 | PVC | 0.01 | 531 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-3178 | Kirkland_Manholes-2953 | 182.9 | Kirkland_Manholes-2955 | 181.46 | 297.7 | 0.48 | 8 | PVC | 0.01 | 490 | 3 | 9 | 12 | 2.4 | | |
| Kirkland_Main-3179 | Kirkland_Manholes-2956 | 306.62 | Kirkland_Manholes-876 | 301.25 | 262.2 | 2.05 | 8 | PVC | 0.01 | 1,009 | 1 | 16 | 17 | 1.7 | | |
| Kirkland_Main-3180 | Kirkland_Manholes-2958 | 17.19 | WAVERLY_WETWELL | 0 | 45.5 | 37.82 | 12 | PVC | 0.01 | 12,784 | 38 | 283 | 321 | 2.5 | | WW Influent Pipe |
| Kirkland_Main-3181 | Kirkland_Manholes-1622 | 253.11 | Kirkland_Manholes-528 | 238.38 | 149.4 | 9.86 | 8 | PVC | 0.01 | 2,214 | 213 | 834 | 1,048 | 47.3 | SM7 | |
| Kirkland_Main-3182 | Kirkland_Manholes-528 | 238.38 | Kirkland_Manholes-1634 | 223.49 | 152.1 | 9.79 | 8 | PVC | 0.01 | 2,206 | 216 | 838 | 1,054 | 47.8 | SM7 | |
| Kirkland_Main-3183 | Kirkland_Manholes-2971 | 508.46 | Kirkland_Manholes-2972 | 508.32 | 249.3 | 0.06 | 8 | PVC | 0.01 | 167 | 0 | 4 | 4 | 2.4 | | |
| Kirkland_Main-3185 | Kirkland_Manholes-2960 | 235.09 | Kirkland_Manholes-334 | 218.68 | 321.1 | 5.11 | 8 | PVC | 0.01 | 1,594 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3186 | Kirkland_Manholes-2961 | 466.63 | Kirkland_Manholes-2030 | 465.11 | 267.6 | 0.57 | 8 | PVC | 0.01 | 531 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-3187 | Kirkland_Manholes-2963 | 352.22 | Kirkland_Manholes-2962 | 351.81 | 165.5 | 0.25 | 8 | PVC | 0.01 | 351 | 1 | 4 | 5 | 1.4 | | |
| Kirkland_Main-3188 | Kirkland_Manholes-2962 | 351.81 | Kirkland_Manholes-2566 | 326.34 | 167.8 | 15.18 | 8 | PVC | 0.01 | 2,747 | 4 | 20 | 23 | 0.9 | | |
| Kirkland_Main-3189 | Kirkland_Manholes-2966 | 369.29 | Kirkland_Manholes-2965 | 368.34 | 79.6 | 1.19 | 8 | PVC | 0.01 | 770 | 10 | 4 | 14 | 1.8 | | |
| Kirkland_Main-3190 | Kirkland_Manholes-2965 | 368.34 | Kirkland_Manholes-2964 | 368.18 | 12 | 1.33 | 8 | PVC | 0.01 | 814 | 15 | 8 | 22 | 2.8 | | |
| Kirkland_Main-3191 | Kirkland_Manholes-2964 | 368.18 | Kirkland_Manholes-1916 | 361.73 | 249.5 | 2.59 | 8 | PVC | 0.01 | 1,134 | 15 | 12 | 27 | 2.4 | | |
| Kirkland_Main-3193 | Kirkland_Manholes-2967 | 87.15 | Kirkland_Manholes-2969 | 78.32 | 80.7 | 10.94 | 8 | PVC | 0.01 | 2,332 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3194 | Kirkland_Manholes-2968 | 78.98 | Kirkland_Manholes-2969 | 78.32 | 100.1 | 0.66 | 8 | PVC | 0.01 | 573 | 1 | 4 | 6 | 1 | | |
| Kirkland_Main-3195 | Kirkland_Manholes-2969 | 78.32 | Kirkland_Manholes-2970 | 61.2 | 152.9 | 11.2 | 8 | PVC | 0.01 | 2,359 | 3 | 13 | 16 | 0.7 | | |
| Kirkland_Main-3196 | Kirkland_Manholes-2970 | 61.2 | Kirkland_Manholes-200 | 55.31 | 178.6 | 3.3 | 8 | PVC | 0.01 | 1,280 | 4 | 17 | 21 | 1.6 | | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3197 | Kirkland_Manholes-1445 | 504.92 | Kirkland_Manholes-2976 | 503.85 | 186.4 | 0.57 | 8 | PVC | 0.01 | 534 | 16 | 91 | 108 | 20.2 | SM14-Ex-EX269 | |
| Kirkland_Main-3198 | Kirkland_Manholes-2972 | 508.32 | Kirkland_Manholes-2973 | 507.01 | 144.1 | 0.91 | 8 | PVC | 0.01 | 672 | 0 | 8 | 8 | 1.2 | | |
| Kirkland_Main-3199 | Kirkland_Manholes-2974 | 507.07 | Kirkland_Manholes-2973 | 507.01 | 168.1 | 0.04 | 8 | PVC | 0.01 | 133 | 0 | 4 | 4 | 3 | | |
| Kirkland_Main-3200 | Kirkland_Manholes-2973 | 507.01 | Kirkland_Manholes-2975 | 506.8 | 151.1 | 0.14 | 8 | PVC | 0.01 | 263 | 1 | 16 | 17 | 6.6 | | |
| Kirkland_Main-3201 | Kirkland_Manholes-2975 | 506.8 | Kirkland_Manholes-2976 | 503.85 | 22 | 13.39 | 8 | PVC | 0.01 | 2,579 | 1 | 20 | 21 | 0.8 | | |
| Kirkland_Main-3202 | Kirkland_Manholes-2978 | 14.63 | Kirkland_Manholes-2730 | 14.43 | 56 | 0.36 | 18 | PVC | 0.01 | 3,662 | 224 | 565 | 789 | 21.5 | SM14-Ex-EX289 | |
| Kirkland_Main-3203 | Kirkland_Manholes-2977 | 14.89 | Kirkland_Manholes-2978 | 14.63 | 69.2 | 0.38 | 18 | PVC | 0.01 | 3,758 | 223 | 559 | 782 | 20.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3204 | Kirkland_Manholes-2979 | 372.62 | Kirkland_Manholes-2980 | 359.59 | 69.3 | 18.82 | 8 | PVC | 0.01 | 3,058 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3205 | Kirkland_Manholes-2980 | 359.59 | Kirkland_Manholes-2981 | 355.43 | 97.4 | 4.27 | 8 | PVC | 0.01 | 1,457 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-3206 | Kirkland_Manholes-2981 | 355.43 | Kirkland_Manholes-2962 | 351.81 | 43.7 | 8.28 | 8 | PVC | 0.01 | 2,029 | 3 | 12 | 14 | 0.7 | | |
| Kirkland_Main-3207 | Kirkland_Manholes-2982 | 168 | Kirkland_Manholes-770 | 166.93 | 80.1 | 1.34 | 8 | PVC | 0.01 | 815 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3208 | Kirkland_Manholes-2983 | 235.2 | Kirkland_Manholes-974 | 234.1 | 148.8 | 0.74 | 8 | PVC | 0.01 | 606 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-3209 | Kirkland_Manholes-1342 | 283.15 | Kirkland_Manholes-2984 | 277.63 | 191.2 | 2.89 | 10 | PVC | 0.01 | 2,172 | 106 | 370 | 475 | 21.9 | | |
| Kirkland_Main-3210 | Kirkland_Manholes-2985 | 155.7 | Kirkland_Manholes-1648 | 152.03 | 36.5 | 10.07 | 8 | PVC | 0.01 | 2,237 | 3 | 16 | 19 | 0.9 | | |
| Kirkland_Main-3211 | Kirkland_Manholes-2986 | 155.86 | Kirkland_Manholes-2985 | 155.7 | 122.4 | 0.13 | 8 | PVC | 0.01 | 255 | 3 | 8 | 11 | 4.3 | | |
| Kirkland_Main-3213 | Kirkland_Manholes-2987 | 213 | Kirkland_Manholes-2988 | 212.12 | 123.5 | 0.71 | 8 | PVC | 0.01 | 595 | 3 | 4 | 8 | 1.3 | | |
| Kirkland_Main-3214 | Kirkland_Manholes-2988 | 212.12 | Kirkland_Manholes-2989 | 210.69 | 118.1 | 1.21 | 8 | PVC | 0.01 | 776 | 5 | 9 | 13 | 1.7 | | |
| Kirkland_Main-3215 | Kirkland_Manholes-2989 | 210.69 | Kirkland_Manholes-61 | 205.17 | 54.3 | 10.16 | 8 | PVC | 0.01 | 2,247 | 5 | 13 | 18 | 0.8 | | |
| Kirkland_Main-3216 | Kirkland_Manholes-2990 | 239.73 | Kirkland_Manholes-1021 | 230.72 | 366.4 | 2.46 | 8 | PVC | 0.01 | 1,106 | 2 | 4 | 7 | 0.6 | | |
| Kirkland_Main-3217 | Kirkland_Manholes-2993 | 335.98 | Kirkland_Manholes-2939 | 317.33 | 213.5 | 8.74 | 8 | PVC | 0.01 | 2,084 | 2 | 8 | 10 | 0.5 | | |
| Kirkland_Main-3218 | Kirkland_Manholes-1083 | 220.88 | Kirkland_Manholes-2996 | 220.63 | 31.5 | 0.79 | 12 | PVC | 0.01 | 1,851 | 130 | 501 | 806 | 43.6 | SM14-Ex-EX321 | |
| Kirkland_Main-3219 | Kirkland_Manholes-2995 | 224.98 | Kirkland_Manholes-2996 | 220.63 | 134.4 | 3.24 | 8 | PVC | 0.01 | 1,269 | 9 | 4 | 13 | 1 | | |
| Kirkland_Main-3220 | Kirkland_Manholes-2997 | 482.7 | Kirkland_Manholes-2998 | 482.02 | 242.2 | 0.28 | 8 | PVC | 0.01 | 374 | 0 | 4 | 4 | 1.2 | | |
| Kirkland_Main-3221 | Kirkland_Manholes-2998 | 482.02 | Kirkland_Manholes-555 | 477.96 | 81.6 | 4.97 | 8 | PVC | 0.01 | 1,572 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-3222 | Kirkland_Manholes-2999 | 479.74 | Kirkland_Manholes-3000 | 475.69 | 102.7 | 3.94 | 8 | PVC | 0.01 | 1,400 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3223 | Kirkland_Manholes-3000 | 475.69 | Kirkland_Manholes-3001 | 471.99 | 137.1 | 2.7 | 8 | PVC | 0.01 | 1,158 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-3224 | Kirkland_Manholes-3001 | 471.99 | Kirkland_Manholes-3002 | 466.73 | 134.5 | 3.91 | 8 | PVC | 0.01 | 1,394 | 1 | 12 | 13 | 0.9 | | |
| Kirkland_Main-3225 | Kirkland_Manholes-3002 | 466.73 | Kirkland_Manholes-3003 | 466.06 | 37 | 1.81 | 8 | PVC | 0.01 | 949 | 1 | 16 | 17 | 1.8 | | |
| Kirkland_Main-3226 | Kirkland_Manholes-3003 | 466.06 | Kirkland_Manholes-3004 | 465.24 | 79.1 | 1.04 | 8 | PVC | 0.01 | 718 | 1 | 20 | 21 | 2.9 | | |
| Kirkland_Main-3227 | Kirkland_Manholes-3004 | 465.24 | Kirkland_Manholes-3005 | 459.83 | 119.2 | 4.54 | 8 | PVC | 0.01 | 1,502 | 2 | 24 | 26 | 1.7 | | |
| Kirkland_Main-3228 | Kirkland_Manholes-3005 | 459.83 | Kirkland_Manholes-3006 | 456.1 | 91.8 | 4.07 | 8 | PVC | 0.01 | 1,422 | 2 | 28 | 30 | 2.1 | | |
| Kirkland_Main-3229 | Kirkland_Manholes-3007 | 456.9 | Kirkland_Manholes-3008 | 447.1 | 310.3 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-3230 | Kirkland_Manholes-3009 | 452.69 | Kirkland_Manholes-3008 | 447.1 | 238.1 | 2.35 | 8 | PVC | 0.01 | 1,080 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3231 | Kirkland_Manholes-3008 | 447.1 | Kirkland_Manholes-1990 | 439.8 | 282 | 2.59 | 8 | PVC | 0.01 | 1,134 | 2 | 16 | 18 | 1.6 | | |
| Kirkland_Main-3232 | Kirkland_Manholes-3010 | 442.64 | Kirkland_Manholes-3011 | 434.12 | 219.9 | 3.87 | 8 | PVC | 0.01 | 1,388 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3233 | Kirkland_Manholes-3011 | 434.12 | Kirkland_Manholes-2005 | 431.24 | 367.7 | 0.78 | 8 | PVC | 0.01 | 624 | 1 | 8 | 9 | 1.4 | | |
| Kirkland_Main-3234 | Kirkland_Manholes-2005 | 431.24 | Kirkland_Manholes-2006 | 430.4 | 270.9 | 0.31 | 8 | PVC | 0.01 | 393 | 1 | 12 | 13 | 3.4 | | |
| Kirkland_Main-3235 | Kirkland_Manholes-2006 | 430.4 | Kirkland_Manholes-2007 | 429.08 | 284.1 | 0.46 | 8 | PVC | 0.01 | 481 | 3 | 16 | 19 | 3.9 | | |
| Kirkland_Main-3236 | Kirkland_Manholes-3012 | 424.86 | Kirkland_Manholes-2011 | 417.75 | 388.4 | 1.83 | 8 | PVC | 0.01 | 954 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3237 | Kirkland_Manholes-3014 | 470 | Kirkland_Manholes-3013 | 459.93 | 193.2 | 5.21 | 8 | PVC | 0.01 | 1,610 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3238 | Kirkland_Manholes-3013 | 459.93 | Kirkland_Manholes-548 | 453.36 | 230.6 | 2.85 | 8 | PVC | 0.01 | 1,190 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-3239 | Kirkland_Manholes-3020 | 302.86 | Kirkland_Manholes-1341 | 299.38 | 98.7 | 3.52 | 8 | PVC | 0.01 | 1,324 | 5 | 48 | 53 | 4 | | |
| Kirkland_Main-3240 | Kirkland_Manholes-3019 | 303.35 | Kirkland_Manholes-3020 | 302.86 | 19.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 5 | 44 | 49 | 4.4 | | |
| Kirkland_Main-3241 | Kirkland_Manholes-3021 | 303.74 | Kirkland_Manholes-3019 | 303.35 | 54.4 | 0.72 | 8 | PVC | 0.01 | 597 | 5 | 40 | 45 | 7.5 | | |
| Kirkland_Main-3242 | Kirkland_Manholes-3022 | 311.69 | Kirkland_Manholes-3021 | 303.74 | 55.5 | 14.32 | 8 | PVC | 0.01 | 2,668 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-3243 | Kirkland_Manholes-3023 | 312.84 | Kirkland_Manholes-3021 | 303.74 | 71.1 | 12.8 | 8 | PVC | 0.01 | 2,523 | 5 | 32 | 37 | 1.5 | | |
| Kirkland_Main-3244 | Kirkland_Manholes-3018 | 329.19 | Kirkland_Manholes-3023 | 312.84 | 105.9 | 15.45 | 8 | PVC | 0.01 | 2,771 | 5 | 28 | 33 | 1.2 | | |
| Kirkland_Main-3245 | Kirkland_Manholes-3017 | 343.42 | Kirkland_Manholes-3018 | 329.19 | 180.7 | 7.87 | 8 | PVC | 0.01 | 1,978 | 4 | 24 | 28 | 1.4 | | |
| Kirkland_Main-3246 | Kirkland_Manholes-3015 | 371.23 | Kirkland_Manholes-3017 | 343.42 | 160.4 | 17.33 | 8 | PVC | 0.01 | 2,935 | 3 | 20 | 23 | 0.8 | | |
| Kirkland_Main-3247 | Kirkland_Manholes-3016 | 372.66 | Kirkland_Manholes-3015 | 371.23 | 122.5 | 1.17 | 8 | PVC | 0.01 | 762 | 3 | 16 | 19 | 2.4 | | |
| Kirkland_Main-3248 | Kirkland_Manholes-3024 | 372.77 | Kirkland_Manholes-1930 | 369.31 | 206.2 | 1.68 | 8 | PVC | 0.01 | 913 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3250 | Kirkland_Manholes-3025 | 189.5 | Kirkland_Manholes-3026 | 186.45 | 198.2 | 1.54 | 8 | PVC | 0.01 | 875 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3251 | Kirkland_Manholes-3026 | 186.45 | Kirkland_Manholes-1035 | 182.7 | 331 | 1.13 | 8 | PVC | 0.01 | 750 | 1 | 9 | 10 | 1.3 | | |
| Kirkland_Main-3252 | Kirkland_Manholes-3028 | 332.75 | Kirkland_Manholes-1582 | 332.21 | 111.6 | 0.48 | 12 | PVC | 0.01 | 1,446 | 39 | 179 | 217 | 15 | SM14-Ex-EX206 | |
| Kirkland_Main-3253 | Kirkland_Manholes-3027 | 333.49 | Kirkland_Manholes-3028 | 332.75 | 24.2 | 3.06 | 8 | PVC | 0.01 | 1,233 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3257 | Kirkland_Manholes-3031 | 384.74 | Kirkland_Manholes-1926 | 383.42 | 23.1 | 5.72 | 12 | PVC | 0.01 | 4,970 | 123 | 524 | 647 | 13 | | |
| Kirkland_Main-3258 | Kirkland_Manholes-1 | 73.25 | Kirkland_Manholes-21 | 62.08 | 92.5 | 12.08 | 8 | PVC | 0.01 | 2,451 | 7 | 21 | 28 | 1.2 | | |
| Kirkland_Main-3259 | Kirkland_Manholes-20 | 65.72 | Kirkland_Manholes-21 | 62.08 | 153.9 | 2.36 | 8 | PVC | 0.01 | 1,084 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3260 | Kirkland_Manholes-3070 | 330.73 | Kirkland_Manholes-927 | 307.71 | 144.8 | 15.9 | 8 | PVC | 0.01 | 2,811 | 6 | 4 | 10 | 0.4 | | |
| Kirkland_Main-3261 | Kirkland_Manholes-3078 | 370.92 | Kirkland_Manholes-3077 | 366.14 | 136.6 | 3.5 | 8 | PVC | 0.01 | 1,319 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3262 | Kirkland_Manholes-3077 | 366.14 | Kirkland_Manholes-3076 | 363.7 | 26.9 | 9.07 | 8 | PVC | 0.01 | 2,124 | 0 | 8 | 8 | 0.4 | | |
| Kirkland_Main-3263 | Kirkland_Manholes-3076 | 363.7 | Kirkland_Manholes-3075 | 343.97 | 114.4 | 17.24 | 8 | PVC | 0.01 | 2,928 | 0 | 12 | 12 | 0.4 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3264 | Kirkland_Manholes-3075 | 343.97 | Kirkland_Manholes-3079 | 316.42 | 161.6 | 17.05 | 8 | PVC | 0.01 | 2,911 | 1 | 16 | 17 | 0.6 | | |
| Kirkland_Main-3265 | Kirkland_Manholes-3079 | 316.42 | Kirkland_Manholes-3074 | 303.68 | 195.1 | 6.53 | 8 | PVC | 0.01 | 1,802 | 1 | 20 | 21 | 1.2 | | |
| Kirkland_Main-3266 | Kirkland_Manholes-3074 | 303.68 | Kirkland_Manholes-3073 | 289.21 | 131.6 | 10.99 | 8 | PVC | 0.01 | 2,337 | 1 | 24 | 25 | 1.1 | | |
| Kirkland_Main-3267 | Kirkland_Manholes-3073 | 289.21 | Kirkland_Manholes-3072 | 273.11 | 354 | 4.55 | 8 | PVC | 0.01 | 1,504 | 1 | 28 | 29 | 1.9 | | |
| Kirkland_Main-3268 | Kirkland_Manholes-3072 | 273.11 | Kirkland_Manholes-3071 | 273.04 | 17.1 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 32 | 33 | 7.5 | | |
| Kirkland_Main-3269 | Kirkland_Manholes-3071 | 273.04 | Kirkland_Manholes-1317 | 271.64 | 20.2 | 6.94 | 8 | PVC | 0.01 | 1,858 | 1 | 36 | 37 | 2 | | |
| Kirkland_Main-3270 | Kirkland_Manholes-3081 | 373.55 | Kirkland_Manholes-1319 | 372.4 | 30.4 | 3.78 | 8 | PVC | 0.01 | 1,371 | 65 | 187 | 252 | 18.4 | | |
| Kirkland_Main-3271 | Kirkland_Manholes-3080 | 382.34 | Kirkland_Manholes-3081 | 377.27 | 187.3 | 2.71 | 8 | PVC | 0.01 | 1,160 | 0 | 4 | 4 | 0.3 | | Drop Connection |
| Kirkland_Main-3272 | Kirkland_Manholes-3083 | 435.32 | Kirkland_Manholes-3082 | 428.49 | 311.8 | 2.19 | 8 | PVC | 0.01 | 1,044 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3273 | Kirkland_Manholes-3084 | 333.87 | Kirkland_Manholes-3085 | 329.83 | 142 | 2.85 | 8 | PVC | 0.01 | 1,189 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3274 | Kirkland_Manholes-3085 | 329.83 | Kirkland_Manholes-3086 | 304.85 | 242 | 10.32 | 12 | PVC | 0.01 | 6,678 | 1 | 8 | 8 | 0.1 | | |
| Kirkland_Main-3275 | Kirkland_Manholes-3086 | 304.85 | Kirkland_Manholes-3087 | 296.66 | 149.5 | 5.48 | 12 | PVC | 0.01 | 4,865 | 3 | 12 | 15 | 0.3 | | |
| Kirkland_Main-3276 | Kirkland_Manholes-3087 | 296.66 | Kirkland_Manholes-3088 | 288.51 | 213.4 | 3.82 | 8 | Concrete | 0.013 | 1,060 | 3 | 16 | 19 | 1.8 | | |
| Kirkland_Main-3277 | Kirkland_Manholes-3088 | 288.51 | Kirkland_Manholes-3089 | 268.55 | 207 | 9.64 | 8 | Concrete | 0.013 | 1,684 | 3 | 20 | 23 | 1.4 | | |
| Kirkland_Main-3278 | Kirkland_Manholes-3089 | 268.55 | Kirkland_Manholes-2427 | 267.5 | 263 | 0.4 | 8 | Concrete | 0.013 | 343 | 51 | 24 | 74 | 21.7 | | |
| Kirkland_Main-3279 | Kirkland_Manholes-2197 | 480.89 | Kirkland_Manholes-1417 | 477.64 | 213.1 | 1.52 | 8 | PVC | 0.01 | 871 | 2 | 12 | 14 | 1.6 | | |
| Kirkland_Main-3280 | Kirkland_Manholes-3090 | 416.74 | Kirkland_Manholes-2916 | 416.17 | 246 | 0.23 | 8 | PVC | 0.01 | 339 | 1 | 4 | 5 | 1.6 | | |
| Kirkland_Main-3281 | Kirkland_Manholes-3092 | 96.93 | Kirkland_Manholes-173 | 34.1 | 219.6 | 28.61 | 8 | PVC | 0.01 | 3,771 | 2 | 9 | 10 | 0.3 | | |
| Kirkland_Main-3282 | Kirkland_Manholes-3091 | 115.12 | Kirkland_Manholes-3092 | 96.93 | 129.4 | 14.06 | 8 | PVC | 0.01 | 2,644 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3283 | Kirkland_Manholes-3093 | 117.97 | Kirkland_Manholes-3094 | 63.71 | 388.1 | 13.98 | 8 | PVC | 0.01 | 2,636 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3284 | Kirkland_Manholes-3094 | 63.71 | Kirkland_Manholes-437 | 58.56 | 159.5 | 3.23 | 8 | PVC | 0.01 | 1,267 | 4 | 9 | 13 | 1 | | |
| Kirkland_Main-3285 | Kirkland_Manholes-3095 | 195.85 | Kirkland_Manholes-2070 | 185.96 | 195.6 | 5.06 | 8 | PVC | 0.01 | 1,585 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3287 | Kirkland_Manholes-205 | 228.15 | Kirkland_Manholes-3096 | 204.91 | 232.4 | 10 | 8 | PVC | 0.01 | 2,229 | 14 | 34 | 48 | 2.2 | SM14-Ex-EX57 | |
| Kirkland_Main-3288 | Kirkland_Manholes-3096 | 204.91 | Kirkland_Manholes-234 | 184.45 | 273.4 | 7.48 | 8 | PVC | 0.01 | 1,929 | 19 | 47 | 66 | 3.4 | SM14-Ex-EX57 | |
| Kirkland_Main-3289 | Kirkland_Manholes-1218 | 220.85 | Kirkland_Manholes-3096 | 204.91 | 278.6 | 5.72 | 8 | PVC | 0.01 | 1,686 | 4 | 9 | 13 | 0.7 | SM14-Ex-EX59 | |
| Kirkland_Main-3290 | Kirkland_Manholes-3097 | 172.14 | Kirkland_Manholes-1639 | 169.94 | 87.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 14 | 83 | 97 | 8.7 | SM14-Ex-EX202 | |
| Kirkland_Main-3291 | Kirkland_Manholes-3098 | 172.34 | Kirkland_Manholes-3097 | 172.14 | 17.4 | 1.15 | 8 | PVC | 0.01 | 757 | 13 | 79 | 93 | 12.3 | SM14-Ex-EX202 | |
| Kirkland_Main-3292 | Kirkland_Manholes-1640 | 188.59 | Kirkland_Manholes-3098 | 174.29 | 160.1 | 8.93 | 8 | PVC | 0.01 | 2,107 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX203 | Drop Connection |
| Kirkland_Main-3293 | Kirkland_Manholes-2696 | 172.94 | Kirkland_Manholes-3098 | 172.34 | 33 | 1.82 | 8 | PVC | 0.01 | 951 | 10 | 68 | 78 | 8.2 | SM14-Ex-EX202 | |
| Kirkland_Main-3294 | Kirkland_Manholes-3099 | 77.83 | Kirkland_Manholes-2204 | 53 | 99.4 | 24.97 | 8 | PVC | 0.01 | 3,523 | 3 | 12 | 15 | 0.4 | | |
| Kirkland_Main-3295 | Kirkland_Manholes-2725 | 97.33 | Kirkland_Manholes-3099 | 77.83 | 158.8 | 12.28 | 8 | PVC | 0.01 | 2,470 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3296 | Kirkland_Manholes-2663 | 50.64 | Kirkland_Manholes-3043 | 37.72 | 98.7 | 13.08 | 12 | PVC | 0.01 | 7,519 | 124 | 437 | 561 | 7.5 | | |
| Kirkland_Main-3297 | Kirkland_Manholes-3043 | 37.72 | Kirkland_Manholes-3044 | 18.06 | 181 | 10.86 | 12 | PVC | 0.01 | 6,850 | 124 | 443 | 567 | 8.3 | | |
| Kirkland_Main-3298 | Kirkland_Manholes-3106 | 117 | Kirkland_Manholes-3105 | 116.05 | 61.3 | 1.55 | 8 | PVC | 0.01 | 877 | 14 | 91 | 105 | 12 | SM10 | |
| Kirkland_Main-3299 | Kirkland_Manholes-3107 | 127.14 | Kirkland_Manholes-3106 | 117 | 167.2 | 6.07 | 8 | | 0.012 | 1,447 | 14 | 82 | 96 | 6.6 | SM10 | |
| Kirkland_Main-3300 | Kirkland_Manholes-1180 | 118.31 | Kirkland_Manholes-3108 | 104.6 | 196.1 | 6.99 | 8 | PVC | 0.01 | 1,864 | 1 | 8 | 9 | 0.5 | SM10 | |
| Kirkland_Main-3301 | Kirkland_Manholes-3103 | 113.84 | Kirkland_Manholes-3109 | 110.43 | 345.5 | 0.99 | 12 | PVC | 0.01 | 2,065 | 17 | 123 | 141 | 6.8 | SM10 | |
| Kirkland_Main-3302 | Kirkland_Manholes-3109 | 110.43 | Kirkland_Manholes-3108 | 104.6 | 85.9 | 6.79 | 8 | PVC | 0.01 | 1,837 | 18 | 132 | 150 | 8.1 | SM10 | |
| Kirkland_Main-3303 | Kirkland_Manholes-3108 | 104.6 | Kirkland_Manholes-513 | 81.7 | 198.3 | 11.55 | 8 | PVC | 0.01 | 2,396 | 19 | 148 | 167 | 7 | SM10 | |
| Kirkland_Main-3305 | Kirkland_Manholes-3105 | 116.05 | Kirkland_Manholes-3104 | 114.41 | 128.6 | 1.28 | 8 | PVC | 0.01 | 796 | 15 | 99 | 114 | 14.4 | SM10 | |
| Kirkland_Main-3306 | Kirkland_Manholes-3110 | 73.01 | Kirkland_Manholes-306 | 19.99 | 234 | 22.66 | 8 | PVC | 0.01 | 3,356 | 22 | 106 | 128 | 3.8 | SM10 | |
| Kirkland_Main-3307 | Kirkland_Manholes-305 | 74.69 | Kirkland_Manholes-3110 | 73.01 | 8.3 | 20.21 | 8 | PVC | 0.01 | 3,169 | 21 | 97 | 118 | 3.7 | SM10 | |
| Kirkland_Main-3308 | Kirkland_Manholes-3114 | 174.9 | Kirkland_Manholes-3113 | 173.48 | 159.7 | 0.89 | 8 | PVC | 0.01 | 665 | 32 | 4 | 36 | 5.4 | | |
| Kirkland_Main-3309 | Kirkland_Manholes-3113 | 173.48 | Kirkland_Manholes-3112 | 173.15 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 32 | 8 | 40 | 8.9 | | |
| Kirkland_Main-3310 | Kirkland_Manholes-3112 | 173.15 | Kirkland_Manholes-3111 | 170.05 | 248.7 | 1.25 | 8 | PVC | 0.01 | 787 | 32 | 12 | 44 | 5.6 | | |
| Kirkland_Main-3311 | Kirkland_Manholes-3111 | 170.05 | Kirkland_Manholes-1125 | 167.88 | 64.7 | 3.36 | 8 | PVC | 0.01 | 1,292 | 32 | 16 | 48 | 3.7 | | |
| Kirkland_Main-3314 | Kirkland_Manholes-3116 | 330.46 | Kirkland_Manholes-2933 | 328.79 | 108.5 | 1.54 | 8 | PVC | 0.01 | 875 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3315 | Kirkland_Manholes-3117 | 134.38 | Kirkland_Manholes-161 | 132.09 | 173.7 | 1.32 | 8 | PVC | 0.01 | 809 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3316 | Kirkland_Manholes-3118 | 331.75 | Kirkland_Manholes-2934 | 330.48 | 196.7 | 0.65 | 8 | PVC | 0.01 | 567 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-3317 | Kirkland_Manholes-3119 | 327.7 | Kirkland_Manholes-2932 | 327.56 | 161.9 | 0.09 | 8 | PVC | 0.01 | 207 | 2 | 20 | 22 | 10.7 | | |
| Kirkland_Main-3318 | Kirkland_Manholes-2933 | 328.79 | Kirkland_Manholes-3119 | 327.7 | 135.5 | 0.8 | 8 | PVC | 0.01 | 632 | 1 | 8 | 9 | 1.5 | | |
| Kirkland_Main-3319 | Kirkland_Manholes-2934 | 330.48 | Kirkland_Manholes-3119 | 327.7 | 250.4 | 1.11 | 8 | PVC | 0.01 | 743 | 1 | 8 | 9 | 1.2 | | |
| Kirkland_Main-3320 | Kirkland_Manholes-839 | 334.68 | Kirkland_Manholes-3121 | 329.59 | 187.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 14 | 40 | 54 | 4.6 | | |
| Kirkland_Main-3321 | Kirkland_Manholes-3120 | 345 | Kirkland_Manholes-3121 | 344.79 | 53.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | Drop Connection |
| Kirkland_Main-3322 | Kirkland_Manholes-3121 | 329.59 | Kirkland_Manholes-3122 | 329.14 | 65.3 | 0.69 | 8 | PVC | 0.01 | 585 | 15 | 48 | 62 | 10.7 | | |
| Kirkland_Main-3323 | Kirkland_Manholes-3122 | 329.14 | Kirkland_Manholes-840 | 326.85 | 337.3 | 0.68 | 8 | PVC | 0.01 | 581 | 17 | 52 | 69 | 11.8 | | |
| Kirkland_Main-3326 | Kirkland_Manholes-3123 | 227.69 | Kirkland_Manholes-2497 | 194.88 | 329.5 | 9.96 | 8 | PVC | 0.01 | 2,225 | 7 | 4 | 11 | 0.5 | SM14-Ex-EX236 | |
| Kirkland_Main-3332 | Kirkland_Manholes-3125 | 215.03 | Kirkland_Manholes-3124 | 203.5 | 175.2 | 6.58 | 8 | PVC | 0.01 | 1,809 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX20 | |
| Kirkland_Main-3333 | Kirkland_Manholes-3124 | 203.5 | Kirkland_Manholes-3126 | 177.5 | 261.8 | 9.93 | 8 | PVC | 0.01 | 2,222 | 2 | 9 | 10 | 0.5 | SM14-Ex-EX20 | |
| Kirkland_Main-3336 | Kirkland_Manholes-3006 | 456.1 | Kirkland_Manholes-539 | 454.38 | 165.4 | 1.04 | 8 | PVC | 0.01 | 719 | 3 | 32 | 34 | 4.8 | | |
| Kirkland_Main-3337 | Kirkland_Manholes-555 | 477.96 | Kirkland_Manholes-535 | 472.49 | 159.7 | 3.43 | 8 | PVC | 0.01 | 1,305 | 2 | 12 | 14 | 1.1 | | |
| Kirkland_Main-3338 | Kirkland_Manholes-2509 | 126.48 | Kirkland_Manholes-2508 | 120.01 | 60.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 2 | 12 | 15 | 0.6 | SM14-Ex-EX229 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3339 | Kirkland_Manholes-2566 | 326.34 | Kirkland_Manholes-2567 | 316.05 | 133.4 | 7.71 | 8 | PVC | 0.01 | 1,958 | 4 | 24 | 28 | 1.4 | SM14-Ex-EX307 | |
| Kirkland_Main-3340 | Kirkland_Manholes-728 | 70.86 | Kirkland_Manholes-2928 | 60.36 | 293.8 | 3.57 | 18 | PVC | 0.01 | 11,586 | 112 | 543 | 656 | 5.7 | | |
| Kirkland_Main-3341 | Kirkland_Manholes-3127 | 324.33 | Kirkland_Manholes-3128 | 323.94 | 81.4 | 0.48 | 8 | PVC | 0.01 | 488 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX54 | |
| Kirkland_Main-3344 | Kirkland_Manholes-3129 | 308.71 | Kirkland_Manholes-2956 | 306.62 | 67.6 | 3.09 | 8 | PVC | 0.01 | 1,240 | 1 | 12 | 13 | 1 | | |
| Kirkland_Main-3345 | Kirkland_Manholes-3130 | 70.51 | Kirkland_Manholes-3131 | 61.63 | 403.3 | 2.2 | 8 | PVC | 0.01 | 1,046 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3346 | Kirkland_Manholes-3131 | 61.63 | Kirkland_Manholes-201 | 56.98 | 404.6 | 1.15 | 8 | PVC | 0.01 | 756 | 0 | 9 | 9 | 1.1 | | |
| Kirkland_Main-3347 | Kirkland_Manholes-3132 | 514.05 | Kirkland_Manholes-3133 | 512.61 | 110 | 1.31 | 8 | PVC | 0.01 | 807 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3348 | Kirkland_Manholes-3133 | 512.61 | Kirkland_Manholes-1441 | 509.69 | 156.4 | 1.87 | 8 | PVC | 0.01 | 963 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-3349 | Kirkland_Manholes-3134 | 66.29 | Kirkland_Manholes-1828 | 65.79 | 294 | 0.17 | 15 | PVC | 0.01 | 1,554 | 100 | 683 | 1,134 | 73 | SM14-2035-DF11 | |
| Kirkland_Main-3350 | Kirkland_Manholes-2994 | 67.86 | Kirkland_Manholes-3135 | 66.49 | 13.6 | 10.06 | 15 | PVC | 0.01 | 11,957 | 99 | 667 | 1,116 | 9.3 | | |
| Kirkland_Main-3351 | Kirkland_Manholes-3135 | 66.49 | Kirkland_Manholes-3134 | 66.29 | 136.2 | 0.15 | 15 | PVC | 0.01 | 1,460 | 99 | 675 | 1,125 | 77 | SM14-2035-DF11 | |
| Kirkland_Main-3353 | Kirkland_Manholes-3137 | 192.8 | Kirkland_Manholes-1304 | 180.12 | 128.3 | 9.88 | 8 | PVC | 0.01 | 2,216 | 4 | 16 | 21 | 0.9 | SM14-Ex-EX106 | |
| Kirkland_Main-3354 | Kirkland_Manholes-1305 | 222.35 | Kirkland_Manholes-3137 | 192.8 | 245.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX106 | |
| Kirkland_Main-3356 | Kirkland_Manholes-3138 | 280.24 | Kirkland_Manholes-672 | 266.2 | 264 | 5.32 | 8 | PVC | 0.01 | 1,626 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-3357 | Kirkland_Manholes-3139 | 191.69 | Kirkland_Manholes-769 | 165.1 | 236 | 11.27 | 8 | PVC | 0.01 | 2,367 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3358 | Kirkland_Manholes-3140 | 184.54 | Kirkland_Manholes-520 | 182.65 | 320.9 | 0.59 | 8 | PVC | 0.01 | 541 | 2 | 8 | 10 | 1.9 | SM10 | |
| Kirkland_Main-3359 | Kirkland_Manholes-526 | 148.56 | Kirkland_Manholes-3141 | 141.49 | 317.3 | 2.23 | 8 | PVC | 0.01 | 1,052 | 4 | 33 | 37 | 3.6 | SM10 | |
| Kirkland_Main-3360 | Kirkland_Manholes-3141 | 141.49 | Kirkland_Manholes-3107 | 127.14 | 314.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 11 | 66 | 77 | 5.1 | SM10 | |
| Kirkland_Main-3361 | Kirkland_Manholes-495 | 169.48 | Kirkland_Manholes-3142 | 153.62 | 319.4 | 4.97 | 8 | PVC | 0.01 | 1,571 | 4 | 16 | 20 | 1.3 | SM10 | |
| Kirkland_Main-3362 | Kirkland_Manholes-3142 | 153.62 | Kirkland_Manholes-3141 | 141.49 | 269.1 | 4.51 | 8 | PVC | 0.01 | 1,497 | 6 | 25 | 30 | 2 | SM10 | |
| Kirkland_Main-3366 | Kirkland_Manholes-3148 | 304.94 | Kirkland_Manholes-3147 | 292.59 | 197.5 | 6.25 | 8 | PVC | 0.01 | 1,763 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3367 | Kirkland_Manholes-3147 | 292.59 | Kirkland_Manholes-3146 | 290.48 | 68.4 | 3.08 | 8 | PVC | 0.01 | 1,238 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-3368 | Kirkland_Manholes-3146 | 290.48 | Kirkland_Manholes-3145 | 283.25 | 74.7 | 9.68 | 8 | PVC | 0.01 | 2,194 | 1 | 12 | 13 | 0.6 | | |
| Kirkland_Main-3369 | Kirkland_Manholes-3149 | 279.32 | Kirkland_Manholes-672 | 266.2 | 331.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 5 | 48 | 53 | 3.8 | | |
| Kirkland_Main-3370 | Kirkland_Manholes-2888 | 290.53 | Kirkland_Manholes-3149 | 279.32 | 39.9 | 28.13 | 8 | PVC | 0.01 | 3,739 | 3 | 20 | 23 | 0.6 | | |
| Kirkland_Main-3371 | Kirkland_Manholes-3145 | 283.25 | Kirkland_Manholes-3149 | 279.32 | 272.6 | 1.44 | 8 | PVC | 0.01 | 847 | 2 | 24 | 25 | 3 | | |
| Kirkland_Main-3372 | Kirkland_Manholes-1382 | 428.64 | Kirkland_Manholes-3150 | 427.16 | 302.5 | 0.49 | 8 | PVC | 0.01 | 493 | 1 | 8 | 9 | 1.9 | | |
| Kirkland_Main-3373 | Kirkland_Manholes-3150 | 427.16 | Kirkland_Manholes-1347 | 427.05 | 67.8 | 0.16 | 8 | PVC | 0.01 | 284 | 2 | 12 | 14 | 4.8 | | |
| Kirkland_Main-3375 | Kirkland_Manholes-2803 | 158.22 | Kirkland_Manholes-3151 | 154.6 | 93.3 | 3.88 | 8 | PVC | 0.01 | 1,389 | 29 | 123 | 153 | 11 | SM14-Ex-EX313 | |
| Kirkland_Main-3376 | Kirkland_Manholes-2609 | 193.8 | Kirkland_Manholes-3152 | 172.55 | 189.8 | 11.2 | 8 | PVC | 0.01 | 2,359 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-3377 | Kirkland_Manholes-3154 | 166.6 | Kirkland_Manholes-3153 | 166.34 | 271.7 | 0.1 | 8 | PVC | 0.01 | 218 | 20 | 56 | 76 | 34.8 | SM14-Ex-EX294 | |
| Kirkland_Main-3378 | Kirkland_Manholes-2629 | 172.55 | Kirkland_Manholes-3154 | 166.6 | 85 | 7 | 8 | PVC | 0.01 | 1,865 | 11 | 24 | 35 | 1.9 | SM14-Ex-EX295 | |
| Kirkland_Main-3379 | Kirkland_Manholes-3155 | 166.88 | Kirkland_Manholes-3154 | 166.6 | 37.7 | 0.74 | 8 | PVC | 0.01 | 607 | 8 | 28 | 36 | 6 | SM14-Ex-EX294 | |
| Kirkland_Main-3380 | Kirkland_Manholes-2637 | 187.87 | Kirkland_Manholes-3156 | 168.61 | 186.4 | 10.33 | 8 | PVC | 0.01 | 2,267 | 8 | 20 | 28 | 1.2 | SM14-Ex-EX294 | |
| Kirkland_Main-3381 | Kirkland_Manholes-3156 | 168.61 | Kirkland_Manholes-3155 | 166.88 | 387 | 0.45 | 8 | PVC | 0.01 | 471 | 8 | 24 | 32 | 6.9 | SM14-Ex-EX294 | |
| Kirkland_Main-3382 | Kirkland_Manholes-3153 | 166.34 | O-37 | 146.26 | 92.7 | 21.67 | 8 | PVC | 0.01 | 3,282 | 85 | 282 | 367 | 11.2 | SM14-Ex-EX294 | |
| Kirkland_Main-3383 | Kirkland_Manholes-3157 | 158.55 | O-36 | 147.51 | 94.1 | 11.73 | 8 | PVC | 0.01 | 2,415 | 16 | 64 | 80 | 3.3 | SM14-Ex-EX281 | |
| Kirkland_Main-3384 | Kirkland_Manholes-3158 | 172.29 | Kirkland_Manholes-3157 | 158.55 | 121.1 | 11.35 | 8 | PVC | 0.01 | 2,375 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX281 | |
| Kirkland_Main-3385 | Kirkland_Manholes-2628 | 186 | Kirkland_Manholes-3159 | 168.84 | 190.6 | 9 | 8 | PVC | 0.01 | 2,115 | 14 | 52 | 65 | 3.1 | SM14-Ex-EX281 | |
| Kirkland_Main-3386 | Kirkland_Manholes-3159 | 168.84 | Kirkland_Manholes-3157 | 158.55 | 57.7 | 17.84 | 8 | PVC | 0.01 | 2,978 | 15 | 56 | 70 | 2.4 | SM14-Ex-EX281 | Drop Connection |
| Kirkland_Main-3387 | Kirkland_Manholes-2601 | 228.74 | Kirkland_Manholes-3160 | 174.95 | 323 | 16.65 | 8 | PVC | 0.01 | 2,877 | 34 | 127 | 161 | 5.6 | SM14-Ex-EX299 | |
| Kirkland_Main-3388 | Kirkland_Manholes-2796 | 185.45 | Kirkland_Manholes-3161 | 177.36 | 230.8 | 3.5 | 8 | PVC | 0.01 | 1,320 | 6 | 20 | 26 | 2 | SM14-Ex-EX296 | |
| Kirkland_Main-3389 | Kirkland_Manholes-2599 | 217.5 | Kirkland_Manholes-3161 | 177.36 | 310.3 | 12.94 | 8 | PVC | 0.01 | 2,536 | 4 | 16 | 20 | 0.8 | SM14-Ex-EX301 | |
| Kirkland_Main-3390 | Kirkland_Manholes-3162 | 175.71 | Kirkland_Manholes-3160 | 174.95 | 166.9 | 0.46 | 8 | PVC | 0.01 | 476 | 12 | 44 | 55 | 11.6 | SM14-Ex-EX296 | |
| Kirkland_Main-3391 | Kirkland_Manholes-3161 | 177.36 | Kirkland_Manholes-3162 | 175.71 | 336.3 | 0.49 | 8 | PVC | 0.01 | 494 | 11 | 40 | 51 | 10.3 | SM14-Ex-EX296 | |
| Kirkland_Main-3392 | Kirkland_Manholes-3160 | 174.95 | Kirkland_Manholes-3163 | 173.85 | 309.7 | 0.36 | 8 | PVC | 0.01 | 420 | 47 | 175 | 221 | 52.7 | SM14-Ex-EX296 | |
| Kirkland_Main-3393 | Kirkland_Manholes-3163 | 173.85 | Kirkland_Manholes-3152 | 172.55 | 286.2 | 0.45 | 8 | PVC | 0.01 | 475 | 55 | 195 | 250 | 52.6 | SM14-Ex-EX296 | |
| Kirkland_Main-3394 | Kirkland_Manholes-2600 | 217.97 | Kirkland_Manholes-3163 | 173.85 | 279.5 | 15.78 | 8 | PVC | 0.01 | 2,801 | 8 | 16 | 23 | 0.8 | SM14-Ex-EX298 | |
| Kirkland_Main-3395 | Kirkland_Manholes-3152 | 172.55 | Kirkland_Manholes-3164 | 171.21 | 150.7 | 0.89 | 8 | PVC | 0.01 | 665 | 57 | 207 | 263 | 39.6 | SM14-Ex-EX296 | |
| Kirkland_Main-3397 | Kirkland_Manholes-3164 | 171.21 | Kirkland_Manholes-3153 | 166.34 | 136.7 | 3.56 | 8 | PVC | 0.01 | 1,331 | 64 | 223 | 286 | 21.5 | SM14-Ex-EX296 | |
| Kirkland_Main-3398 | Kirkland_Manholes-2123 | 164.83 | Kirkland_Manholes-3165 | 156.79 | 188.1 | 4.27 | 8 | PVC | 0.01 | 1,457 | 3 | 12 | 15 | 1 | SM14-Ex-EX238 | |
| Kirkland_Main-3399 | Kirkland_Manholes-2493 | 157.85 | Kirkland_Manholes-3165 | 156.79 | 186.1 | 0.57 | 8 | PVC | 0.01 | 532 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX237 | |
| Kirkland_Main-3400 | Kirkland_Manholes-3165 | 156.79 | O-34 | 148.75 | 44.4 | 18.12 | 8 | PVC | 0.01 | 3,001 | 5 | 20 | 25 | 0.8 | SM14-Ex-EX238 | |
| Kirkland_Main-3401 | Kirkland_Manholes-3151 | 154.6 | O-38 | 150 | 83 | 5.54 | 12 | PVC | 0.01 | 4,894 | 29 | 127 | 157 | 3.2 | SM14-Ex-EX313 | |
| Kirkland_Main-3402 | Kirkland_Manholes-3166 | 161.38 | Kirkland_Manholes-3167 | 157.21 | 249.9 | 1.67 | 6 | Concrete | 0.013 | 325 | 8 | 12 | 20 | 6.1 | | |
| Kirkland_Main-3403 | Kirkland_Manholes-3167 | 157.21 | O-30 | 156.87 | 20.3 | 1.67 | 6 | Concrete | 0.013 | 326 | 8 | 16 | 24 | 7.3 | | Drop Connection |
| Kirkland_Main-3404 | Kirkland_Manholes-2068 | 163.08 | O-43 | 162.02 | 20.5 | 5.16 | 8 | PVC | 0.01 | 1,602 | 13 | 64 | 77 | 4.8 | SM14-Ex-EX198 | |
| Kirkland_Main-3405 | Kirkland_Manholes-2069 | 170.43 | Kirkland_Manholes-3168 | 162.8 | 388.5 | 1.96 | 8 | PVC | 0.01 | 988 | 76 | 95 | 171 | 17.3 | SM14-Ex-EX199 | |
| Kirkland_Main-3406 | Kirkland_Manholes-3168 | 162.8 | O-29 | 162.02 | 22.8 | 3.42 | 8 | PVC | 0.01 | 1,305 | 77 | 99 | 176 | 13.5 | SM14-Ex-EX199 | |
| Kirkland_Main-3407 | Kirkland_Manholes-3169 | 153.32 | Kirkland_Manholes-1708 | 148.34 | 451.5 | 1.1 | 12 | PVC | 0.01 | 2,183 | 0 | 8 | 8 | 0.4 | SM14-Ex-EX197 | |
| Kirkland_Main-3408 | Kirkland_Manholes-3170 | 175.74 | O-28 | 173.9 | 72.2 | 2.55 | 8 | PVC | 0.01 | 1,125 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3409 | Kirkland_Manholes-1642 | 158.76 | O-27 | 153.59 | 147.5 | 3.5 | 12 | PVC | 0.01 | 3,891 | 234 | 950 | 1,184 | 30.4 | SM7 | |

Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3410 | Kirkland_Manholes-1646 | 177.66 | O-23 | 163.59 | 79.6 | 17.67 | 8 | PVC | 0.01 | 2,963 | 0 | 4 | 4 | 0.1 | SM14-Ex-EX174 | |
| Kirkland_Main-3411 | Kirkland_Manholes-1602 | 196.74 | Kirkland_Manholes-3171 | 164.9 | 343.8 | 9.26 | 8 | PVC | 0.01 | 2,146 | 74 | 238 | 312 | 14.6 | SM14-Ex-EX172 | |
| Kirkland_Main-3412 | Kirkland_Manholes-3171 | 164.9 | O-22 | 163.59 | 29 | 4.51 | 12 | PVC | 0.01 | 4,416 | 132 | 421 | 553 | 12.5 | SM14-Ex-EX121 | |
| Kirkland_Main-3413 | Kirkland_Manholes-3172 | 165.73 | Kirkland_Manholes-3171 | 164.9 | 49.5 | 1.68 | 8 | PVC | 0.01 | 913 | 58 | 179 | 237 | 26 | SM14-Ex-EX121 | |
| Kirkland_Main-3414 | Kirkland_Manholes-1598 | 169.75 | Kirkland_Manholes-3172 | 165.73 | 259.8 | 1.55 | 8 | PVC | 0.01 | 877 | 58 | 175 | 233 | 26.6 | SM14-Ex-EX121 | |
| Kirkland_Main-3415 | Kirkland_Manholes-3173 | 155.95 | O-16 | 154.93 | 82 | 1.24 | 8 | PVC | 0.01 | 787 | 7 | 41 | 48 | 6.1 | | |
| Kirkland_Main-3416 | Kirkland_Manholes-1274 | 175.64 | Kirkland_Manholes-3173 | 155.95 | 196.1 | 10.04 | 8 | PVC | 0.01 | 2,234 | 6 | 33 | 39 | 1.7 | | |
| Kirkland_Main-3417 | Kirkland_Manholes-458 | 212.1 | O-14 | 173.22 | 270.2 | 14.39 | 8 | PVC | 0.01 | 2,674 | 31 | 123 | 154 | 5.7 | SM14-Ex-EX67 | |
| Kirkland_Main-3418 | Kirkland_Manholes-3174 | 172.82 | O-13 | 166.72 | 27.1 | 22.51 | 8 | PVC | 0.01 | 3,345 | 2 | 20 | 22 | 0.7 | | |
| Kirkland_Main-3419 | Kirkland_Manholes-472 | 192.62 | Kirkland_Manholes-3174 | 172.82 | 71.3 | 27.75 | 8 | PVC | 0.01 | 3,714 | 2 | 16 | 18 | 0.5 | | |
| Kirkland_Main-3420 | Kirkland_Manholes-466 | 159.47 | O-12 | 159.29 | 18.7 | 0.96 | 8 | PVC | 0.01 | 691 | 13 | 56 | 69 | 10 | SM14-Ex-EX45 | |
| Kirkland_Main-3421 | Kirkland_Manholes-786 | 173.41 | O-11 | 153.37 | 102.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 62 | 294 | 356 | 11.4 | | |
| Kirkland_Main-3422 | Kirkland_Manholes-3175 | 156.47 | Kirkland_Manholes-1105 | 155.49 | 245.4 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 282 | 356 | 79.8 | SM14-2021-DF3 | |
| Kirkland_Main-3424 | Kirkland_Manholes-3176 | 350.9 | Kirkland_Manholes-2993 | 335.98 | 232.3 | 6.42 | 8 | PVC | 0.01 | 1,787 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3425 | Kirkland_Manholes-3183 | 400.11 | Kirkland_Manholes-3182 | 398.7 | 286.4 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-3426 | Kirkland_Manholes-3182 | 398.7 | Kirkland_Manholes-3181 | 397.83 | 157.2 | 0.55 | 8 | PVC | 0.01 | 525 | 0 | 8 | 8 | 1.5 | | |
| Kirkland_Main-3427 | Kirkland_Manholes-3181 | 397.83 | Kirkland_Manholes-3180 | 396.32 | 304.9 | 0.5 | 8 | PVC | 0.01 | 496 | 0 | 12 | 12 | 2.5 | | |
| Kirkland_Main-3428 | Kirkland_Manholes-3177 | 399.25 | Kirkland_Manholes-3178 | 398.25 | 237 | 0.42 | 8 | PVC | 0.01 | 458 | 0 | 8 | 8 | 1.7 | | |
| Kirkland_Main-3429 | Kirkland_Manholes-3178 | 398.25 | Kirkland_Manholes-3179 | 397.18 | 174.5 | 0.61 | 8 | PVC | 0.01 | 552 | 0 | 12 | 12 | 2.2 | | |
| Kirkland_Main-3430 | Kirkland_Manholes-3179 | 397.18 | Kirkland_Manholes-3180 | 396.32 | 145.5 | 0.59 | 8 | PVC | 0.01 | 542 | 0 | 16 | 16 | 2.9 | | |
| Kirkland_Main-3431 | Kirkland_Manholes-3180 | 396.32 | Kirkland_Manholes-3186 | 394.01 | 374.3 | 0.62 | 8 | PVC | 0.01 | 554 | 1 | 32 | 32 | 5.8 | SM14-Ex-EX207 | |
| Kirkland_Main-3432 | Kirkland_Manholes-3186 | 394.01 | Kirkland_Manholes-3187 | 393.39 | 93.6 | 0.66 | 8 | PVC | 0.01 | 574 | 1 | 36 | 37 | 6.4 | SM14-Ex-EX207 | |
| Kirkland_Main-3433 | Kirkland_Manholes-3187 | 393.39 | Kirkland_Manholes-3188 | 392.16 | 246.3 | 0.5 | 8 | PVC | 0.01 | 498 | 1 | 40 | 41 | 8.2 | | |
| Kirkland_Main-3434 | Kirkland_Manholes-3185 | 403.06 | Kirkland_Manholes-3184 | 397.63 | 317.3 | 1.71 | 8 | PVC | 0.01 | 922 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3435 | Kirkland_Manholes-3184 | 397.63 | Kirkland_Manholes-3189 | 393.42 | 318.2 | 1.32 | 8 | PVC | 0.01 | 811 | 31 | 8 | 39 | 4.9 | | |
| Kirkland_Main-3436 | Kirkland_Manholes-3189 | 393.42 | Kirkland_Manholes-3188 | 392.16 | 76.3 | 1.65 | 8 | PVC | 0.01 | 906 | 31 | 16 | 47 | 5.2 | | |
| Kirkland_Main-3437 | Kirkland_Manholes-3188 | 392.16 | Kirkland_Manholes-1929 | 374.67 | 305.2 | 5.73 | 8 | PVC | 0.01 | 1,688 | 32 | 60 | 92 | 5.4 | | |
| Kirkland_Main-3438 | Kirkland_Manholes-3192 | 307.27 | Kirkland_Manholes-3191 | 306.22 | 126.1 | 0.84 | 8 | PVC | 0.01 | 644 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-3439 | Kirkland_Manholes-3191 | 306.22 | Kirkland_Manholes-2894 | 306.1 | 28.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3 | | |
| Kirkland_Main-3440 | Kirkland_Manholes-3190 | 323.62 | Kirkland_Manholes-3191 | 306.22 | 169.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3441 | Kirkland_Manholes-620 | 55.37 | Kirkland_Manholes-3193 | 49.78 | 279.6 | 2 | 8 | PVC | 0.01 | 997 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-3442 | Kirkland_Manholes-3193 | 49.78 | Kirkland_Manholes-619 | 48.43 | 193 | 0.7 | 8 | PVC | 0.01 | 590 | 0 | 16 | 17 | 2.8 | | |
| Kirkland_Main-3443 | Kirkland_Manholes-1685 | 57.24 | Kirkland_Manholes-731 | 53.54 | 120.6 | 3.07 | 12 | PVC | 0.01 | 3,640 | 88 | 457 | 545 | 15 | SM5 | |
| Kirkland_Main-3444 | Kirkland_Manholes-1852 | 284.97 | Kirkland_Manholes-3145 | 283.25 | 105.1 | 1.64 | 8 | PVC | 0.01 | 902 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-3445 | Kirkland_Manholes-2130 | 161.57 | O-31 | 156.67 | 31.5 | 15.55 | 8 | PVC | 0.01 | 2,780 | 21 | 24 | 44 | 1.6 | SM14-Ex-EX235 | |
| Kirkland_Main-3446 | Kirkland_Manholes-3195 | 259.3 | Kirkland_Manholes-682 | 258.64 | 178.4 | 0.37 | 8 | PVC | 0.01 | 429 | 1 | 12 | 13 | 2.9 | | |
| Kirkland_Main-3447 | Kirkland_Manholes-686 | 272.79 | Kirkland_Manholes-3195 | 262.73 | 170.3 | 5.91 | 8 | PVC | 0.01 | 1,714 | 0 | 4 | 4 | 0.2 | | Drop Connection |
| Kirkland_Main-3448 | Kirkland_Manholes-3194 | 260.3 | Kirkland_Manholes-3195 | 259.3 | 92.2 | 1.08 | 8 | PVC | 0.01 | 733 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3450 | Kirkland_Manholes-3198 | 69.13 | Kirkland_Manholes-2805 | 68.41 | 178.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 24 | 24 | 5.4 | | |
| Kirkland_Main-3451 | Kirkland_Manholes-3197 | 131.57 | Kirkland_Manholes-3196 | 122.5 | 306.9 | 2.96 | 8 | PVC | 0.01 | 1,212 | 1 | 8 | 10 | 0.8 | SM10 | |
| Kirkland_Main-3453 | Kirkland_Manholes-2804 | 82.15 | Kirkland_Manholes-3198 | 69.13 | 175.8 | 7.41 | 8 | PVC | 0.01 | 1,919 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-3454 | Kirkland_Manholes-3200 | 88.54 | Kirkland_Manholes-3199 | 84.4 | 128.7 | 3.22 | 8 | PVC | 0.01 | 1,264 | 0 | 6 | 6 | 0.5 | | |
| Kirkland_Main-3455 | Kirkland_Manholes-3199 | 84.4 | Kirkland_Manholes-3198 | 69.13 | 210.2 | 7.27 | 8 | PVC | 0.01 | 1,900 | 0 | 12 | 12 | 0.6 | | |
| Kirkland_Main-3456 | Kirkland_Manholes-2778 | 255.64 | Kirkland_Manholes-3201 | 243.59 | 148 | 8.14 | 8 | PVC | 0.01 | 2,012 | 19 | 16 | 35 | 1.7 | | |
| Kirkland_Main-3457 | Kirkland_Manholes-3201 | 243.59 | Kirkland_Manholes-2802 | 238.36 | 22.3 | 23.44 | 8 | PVC | 0.01 | 3,414 | 19 | 19 | 38 | 1.1 | | |
| Kirkland_Main-3458 | Kirkland_Manholes-2641 | 88.89 | Kirkland_Manholes-3202 | 66.61 | 82.1 | 27.14 | 8 | PVC | 0.01 | 3,673 | 5 | 24 | 30 | 0.8 | | |
| Kirkland_Main-3459 | Kirkland_Manholes-3202 | 66.61 | Kirkland_Manholes-3203 | 49.55 | 127.5 | 13.38 | 8 | PVC | 0.01 | 2,579 | 5 | 30 | 36 | 1.4 | | |
| Kirkland_Main-3461 | Kirkland_Manholes-3204 | 163.55 | Kirkland_Manholes-2130 | 161.57 | 74.1 | 2.67 | 8 | PVC | 0.01 | 1,153 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3462 | Kirkland_Manholes-3205 | 293.32 | Kirkland_Manholes-1852 | 284.97 | 245.2 | 3.41 | 8 | PVC | 0.01 | 1,301 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3463 | Kirkland_Manholes-3206 | 505.9 | Kirkland_Manholes-3207 | 502.85 | 330.6 | 0.92 | 8 | PVC | 0.01 | 677 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-3464 | Kirkland_Manholes-3207 | 502.85 | Kirkland_Manholes-3208 | 497.69 | 398.8 | 1.29 | 8 | PVC | 0.01 | 802 | 2 | 8 | 10 | 1.3 | | |
| Kirkland_Main-3465 | Kirkland_Manholes-3208 | 497.69 | Kirkland_Manholes-3209 | 497.22 | 90.8 | 0.52 | 8 | PVC | 0.01 | 507 | 2 | 12 | 14 | 2.8 | | |
| Kirkland_Main-3466 | Kirkland_Manholes-3209 | 497.22 | Kirkland_Manholes-3210 | 496.11 | 223.1 | 0.5 | 8 | PVC | 0.01 | 497 | 2 | 16 | 18 | 3.6 | | |
| Kirkland_Main-3467 | Kirkland_Manholes-3210 | 496.11 | Kirkland_Manholes-1494 | 496.1 | 92 | 0.01 | 8 | PVC | 0.01 | 74 | 2 | 20 | 22 | 30 | | |
| Kirkland_Main-3468 | Kirkland_Manholes-3212 | 420.94 | Kirkland_Manholes-3213 | 419.82 | 168.4 | 0.66 | 8 | PVC | 0.01 | 575 | 0 | 2 | 2 | 0.4 | | |
| Kirkland_Main-3469 | Kirkland_Manholes-3213 | 419.82 | Kirkland_Manholes-3214 | 418.95 | 128.5 | 0.68 | 8 | PVC | 0.01 | 580 | 0 | 5 | 5 | 0.8 | | |
| Kirkland_Main-3470 | Kirkland_Manholes-3211 | 420.5 | Kirkland_Manholes-3214 | 418.95 | 223.1 | 0.69 | 8 | PVC | 0.01 | 588 | 0 | 2 | 2 | 0.4 | | |
| Kirkland_Main-3471 | Kirkland_Manholes-3214 | 418.95 | Kirkland_Manholes-3215 | 418.25 | 213.6 | 0.33 | 8 | PVC | 0.01 | 404 | 0 | 9 | 9 | 2.3 | | |
| Kirkland_Main-3472 | Kirkland_Manholes-3215 | 418.25 | Kirkland_Manholes-3216 | 416.2 | 334.1 | 0.61 | 8 | PVC | 0.01 | 552 | 0 | 12 | 12 | 2.1 | | |
| Kirkland_Main-3473 | Kirkland_Manholes-3216 | 416.2 | Kirkland_Manholes-3217 | 414.96 | 329.2 | 0.38 | 8 | PVC | 0.01 | 433 | 0 | 14 | 14 | 3.2 | | |
| Kirkland_Main-3474 | Kirkland_Manholes-3217 | 414.96 | Kirkland_Manholes-3218 | 412.9 | 114.1 | 1.81 | 8 | PVC | 0.01 | 947 | 1 | 16 | 17 | 1.8 | | |
| Kirkland_Main-3475 | Kirkland_Manholes-3218 | 412.9 | Kirkland_Manholes-2906 | 405.37 | 172.8 | 4.36 | 8 | PVC | 0.01 | 1,472 | 1 | 19 | 20 | 1.3 | | |

## Existing with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3476 | Kirkland_Manholes-718 | 150.12 | Kirkland_Manholes-3219 | 149.17 | 95.4 | 1 | 8 | PVC | 0.01 | 703 | 50 | 79 | 128 | 18.2 | SM14-2035-DF5 | |
| Kirkland_Main-3477 | Kirkland_Manholes-3219 | 149.17 | Kirkland_Manholes-3220 | 148.71 | 120.2 | 0.38 | 8 | PVC | 0.01 | 436 | 50 | 84 | 134 | 30.7 | SM14-2021-DF2 | |
| Kirkland_Main-3478 | Kirkland_Manholes-3220 | 148.71 | Kirkland_Manholes-719 | 148.45 | 82.3 | 0.32 | 8 | PVC | 0.01 | 396 | 50 | 90 | 139 | 35.2 | SM14-2021-DF2 | |
| Kirkland_Main-3479 | Kirkland_Manholes-3221 | 407.29 | Kirkland_Manholes-3222 | 405.15 | 69.7 | 3.07 | 8 | PVC | 0.01 | 1,235 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3480 | Kirkland_Manholes-3222 | 405.15 | Kirkland_Manholes-1363 | 403.55 | 104.8 | 1.53 | 8 | PVC | 0.01 | 871 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-3481 | Kirkland_Manholes-3223 | 405.2 | Kirkland_Manholes-3224 | 400.94 | 146.9 | 2.9 | 8 | PVC | 0.01 | 1,201 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3482 | Kirkland_Manholes-3225 | 409.6 | Kirkland_Manholes-3224 | 400.94 | 369 | 2.35 | 8 | PVC | 0.01 | 1,080 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3483 | Kirkland_Manholes-3224 | 400.94 | Kirkland_Manholes-3226 | 396.71 | 176 | 2.4 | 8 | PVC | 0.01 | 1,093 | 2 | 12 | 14 | 1.3 | | |
| Kirkland_Main-3484 | Kirkland_Manholes-3226 | 396.71 | Kirkland_Manholes-2992 | 396.35 | 10.8 | 3.34 | 8 | PVC | 0.01 | 1,289 | 2 | 16 | 18 | 1.4 | | |
| Kirkland_Main-3485 | Kirkland_Manholes-3227 | 308.86 | Kirkland_Manholes-3228 | 299.55 | 189.6 | 4.91 | 8 | PVC | 0.01 | 1,562 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3486 | Kirkland_Manholes-3228 | 299.55 | Kirkland_Manholes-3229 | 296.76 | 44.7 | 6.24 | 8 | PVC | 0.01 | 1,761 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-3487 | Kirkland_Manholes-3229 | 296.76 | Kirkland_Manholes-2901 | 294.77 | 63.1 | 3.16 | 8 | PVC | 0.01 | 1,252 | 1 | 12 | 13 | 1 | | |
| Kirkland_Main-3488 | Kirkland_Manholes-3230 | 157.83 | Kirkland_Manholes-3231 | 156.85 | 192.6 | 0.51 | 8 | PVC | 0.01 | 503 | 0 | 6 | 6 | 1.1 | | |
| Kirkland_Main-3489 | Kirkland_Manholes-3231 | 156.85 | Kirkland_Manholes-3232 | 156.12 | 91 | 0.8 | 8 | PVC | 0.01 | 632 | 7 | 11 | 19 | 3 | | |
| Kirkland_Main-3490 | Kirkland_Manholes-3232 | 156.12 | Kirkland_Manholes-716 | 152.58 | 36.4 | 9.73 | 8 | PVC | 0.01 | 2,199 | 7 | 17 | 24 | 1.1 | | |
| Kirkland_Main-3492 | Kirkland_Manholes-3233 | 197.29 | Kirkland_Manholes-1117 | 196.58 | 41.1 | 1.73 | 15 | PVC | 0.01 | 4,957 | 16 | 4 | 20 | 0.4 | | |
| Kirkland_Main-3493 | Kirkland_Manholes-3235 | 436.7 | Kirkland_Manholes-2008 | 435.7 | 179.8 | 0.56 | 8 | PVC | 0.01 | 526 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-3494 | Kirkland_Manholes-3234 | 236.42 | Kirkland_Manholes-1249 | 223.25 | 243.5 | 5.41 | 8 | PVC | 0.01 | 1,640 | 15 | 91 | 105 | 6.4 | SM14-Ex-EX65 | |
| Kirkland_Main-3495 | Kirkland_Manholes-1247 | 236.99 | Kirkland_Manholes-3234 | 236.42 | 76.3 | 0.75 | 8 | PVC | 0.01 | 609 | 13 | 74 | 87 | 14.3 | SM14-Ex-EX65 | |
| Kirkland_Main-3496 | Kirkland_Manholes-3237 | 442.96 | Kirkland_Manholes-3235 | 436.7 | 126.7 | 4.94 | 8 | PVC | 0.01 | 1,567 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3497 | Kirkland_Manholes-3242 | 314.11 | Kirkland_Manholes-3243 | 305.45 | 217.3 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3498 | Kirkland_Manholes-3243 | 305.45 | Kirkland_Manholes-2372 | 304.48 | 24.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 0 | 8 | 8 | 0.6 | | |
| Kirkland_Main-3499 | Kirkland_Manholes-3241 | 300.47 | Kirkland_Manholes-3240 | 289.24 | 289.6 | 3.88 | 8 | PVC | 0.01 | 1,388 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3500 | Kirkland_Manholes-3240 | 289.24 | Kirkland_Manholes-3239 | 288.78 | 114.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.1 | | |
| Kirkland_Main-3501 | Kirkland_Manholes-3239 | 288.78 | Kirkland_Manholes-3238 | 285.43 | 95.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-3502 | Kirkland_Manholes-263 | 292.03 | Kirkland_Manholes-3238 | 285.43 | 114.2 | 5.78 | 8 | PVC | 0.01 | 1,695 | 29 | 99 | 128 | 7.6 | SM14-Ex-EX252 | |
| Kirkland_Main-3503 | Kirkland_Manholes-3238 | 285.43 | Kirkland_Manholes-2327 | 280.44 | 83.6 | 5.97 | 8 | PVC | 0.01 | 1,722 | 31 | 115 | 147 | 8.5 | SM14-Ex-EX252 | |
| Kirkland_Main-3505 | Kirkland_Manholes-3236 | 241.89 | Kirkland_Manholes-3234 | 236.42 | 154.2 | 3.55 | 8 | PVC | 0.01 | 1,328 | 1 | 8 | 10 | 0.7 | | |
| Kirkland_Main-3506 | Kirkland_Manholes-2486 | 152.49 | O-35 | 152.05 | 116.8 | 0.38 | 8 | PVC | 0.01 | 433 | 39 | 127 | 166 | 38.3 | SM14-Ex-EX239 | |
| Other_System_Main-6 | MH-320 | 399.28 | Kirkland_Manholes-3177 | 399.25 | 69.1 | 0.04 | 6 | PVC | 0.01 | 64 | 0 | 4 | 4 | 6.2 | | |
| Other_System_Main-7 | MH-317 | 393.56 | Kirkland_Manholes-3189 | 393.42 | 34.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Other_System_Main-8 | MH-326 | 162.67 | MH-323 | 161.73 | 233.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Other_System_Main-9 | MH-323 | 161.73 | Kirkland_Manholes-3166 | 161.38 | 88.4 | 0.4 | 6 | PVC | 0.01 | 207 | 8 | 8 | 16 | 7.6 | | |
| SS_Main_Selection_06-13-2016-1 | MH 05-714 | 24.7 | MH_Selection_06-13-2016-2 | 24.58 | 51.6 | 0.23 | 30 | Ductile Iron | 0.012 | 9,616 | 796 | 3,464 | 5,914 | 61.5 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-11 | MH_Selection_06-13-2016-4 | 21.4 | MH_Selection_06-13-2016-10 | 20.85 | 62.6 | 0.88 | 48 | Concrete | 0.013 | 60,432 | 1,045 | 4,082 | 6,780 | 11.2 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-12 | MH_Selection_06-13-2016-10 | 20.85 | MH_Selection_06-13-2016-11 | 20.7 | 78.4 | 0.19 | 48 | Concrete | 0.013 | 28,192 | 1,045 | 4,082 | 6,780 | 24 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-2 | MH_Selection_06-13-2016-3 | 22.2 | MH_Selection_06-13-2016-4 | 21.4 | 166.2 | 0.48 | 48 | Concrete | 0.013 | 44,726 | 796 | 3,464 | 5,914 | 13.2 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-3 | MH_Selection_06-13-2016-2 | 24.22 | MH_Selection_06-13-2016-6 | 24.16 | 7.3 | 0.82 | 30 | Ductile Iron | 0.012 | 18,021 | 796 | 3,464 | 5,914 | 32.8 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-4 | MH_Selection_06-13-2016-6 | 24.16 | MH_Selection_06-13-2016-7 | 23.6 | 28.1 | 1.99 | 30 | Ductile Iron | 0.012 | 28,152 | 796 | 3,464 | 5,914 | 21 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-5 | MH_Selection_06-13-2016-7 | 23.5 | MH_Selection_06-13-2016-8 | 22.81 | 32.8 | 2.11 | 48 | Concrete | 0.013 | 93,567 | 796 | 3,464 | 5,914 | 6.3 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-6 | MH_Selection_06-13-2016-8 | 22.81 | MH_Selection_06-13-2016-9 | 22.44 | 14.9 | 2.49 | 48 | Concrete | 0.013 | 101,749 | 796 | 3,464 | 5,914 | 5.8 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-7 | MH_Selection_06-13-2016-9 | 22.44 | MH_Selection_06-13-2016-3 | 22.2 | 69.4 | 0.35 | 48 | Concrete | 0.013 | 37,907 | 796 | 3,464 | 5,914 | 15.6 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-9 | MH_Selection_06-13-2016-5 | 24.55 | MH_Selection_06-13-2016-11 | 23.6 | 12.8 | 7.44 | 12 | PVC | 0.013 | 4,360.77 | 101.33 | 139.964 | 241.293 | 5.5 | | Updated per as-built drawings |

## Existing with Proposed Improvements - Peak Hour Flow - Pump Table

| Label | Status | Pump Definition | Pumped Flow (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|
| PLAZA_PUMP | On | LAKE PLAZA | 1,303 | 44.9 | |
| ROSEPT_PUMP | On | ROSE PT LANE | 301 | 65.8 | |
| SOUTHBAY_PUMP | On | SOUTH BAY | 180 | 190.0 | |
| TREND_PUMP | On | TREND | 176 | 25.0 | |
| WAVERLY_PUMP | On | WAVERLY PARK-Prop 350gpm | 350 | 116.1 | |
| YARROWBAYII_PUMP | On | YARROW POINT | 72 | 45.8 | |

## Existing with Proposed Improvements - Peak Hour Flow - Wet Well Table

| Label | Ground Elevation (ft) | Maximum Elevation (ft) | Initial Elevation (ft) | Minimum Elevation (ft) | Base Elevation (ft) | Flow In (gpm) | Flow Out (gpm) | Net Flow In (gpm) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| PLAZA_WW | 21.95 | 10 | 6.5 | 2 | 0 | 1,286 | 1,303 | -17 | |
| ROSEPT_WETWELL | 28.91 | 28 | 12 | 11 | 10 | 138 | 301 | -163 | |
| SOUTHBAY_WETWELL | 42.96 | 26.5 | 25 | 24 | 22 | 37 | 180 | -143 | |
| TREND_WETWELL | 340.3 | 330 | 330 | 321.5 | 317.75 | 102 | 176 | -75 | |
| WAVERLY_WETWELL | 27 | 10 | 2 | 1 | 0 | 321 | 350 | -30 | |
| YARROW POINT_WETWELL | 32.18 | 20 | 8 | 6 | 6 | 58 | 72 | -13 | |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin 3 | Kirkland_Manholes-3128 | 323.94 | Kirkland_Manholes-3129 | 308.71 | 343.2 | 4.44 | 8 | PVC | 0.01 | 1,485 | 1 | 8 | 9 | 0.6 | | |
| CO-1 | Kirkland_Manholes-293 | 22.09 | Kirkland_Manholes-310 | 21.69 | 516.5 | 0.08 | 12 | PVC | 0.01 | 578 | 1 | 18 | 19 | 3.2 | SM14-Ex-EX37 | |
| CO-2 | Kirkland_Manholes-310 | 21.69 | Kirkland_Manholes-311 | 21.29 | 254.7 | 0.16 | 12 | PVC | 0.01 | 824 | 4 | 27 | 30 | 3.7 | SM14-Ex-EX37 | |
| CO-6 | Kirkland_Manholes-1496 | 491.57 | Kirkland_Manholes-1461 | 483.24 | 408.5 | 2.04 | 8 | PVC | 0.01 | 1,007 | 0 | 4 | 4 | 0.4 | | |
| CO-8 | Kirkland_Manholes-1271 | 222.62 | Kirkland_Manholes-1272 | 197.83 | 531.9 | 4.66 | 8 | PVC | 0.01 | 1,522 | 0 | 8 | 9 | 0.6 | | |
| CO-9 | Kirkland_Manholes-1272 | 197.83 | Kirkland_Manholes-1273 | 182.86 | 225.5 | 6.64 | 8 | PVC | 0.01 | 1,817 | 4 | 16 | 20 | 1.1 | | |
| CO-11 | Kirkland_Manholes-3102 | 53.77 | Kirkland_Manholes-2664 | 53.2 | 380.4 | 0.15 | 18 | PVC | 0.01 | 2,372 | 137 | 403 | 540 | 22.8 | SM14-Ex-EX222 | |
| CO-13 | Kirkland_Manholes-2664 | 53.2 | Kirkland_Manholes-2204 | 53 | 65.8 | 0.3 | 18 | PVC | 0.01 | 3,378 | 137 | 409 | 546 | 16.2 | SM14-Ex-EX222 | |
| CO-14 | Kirkland_Manholes-2204 | 53 | Kirkland_Manholes-3101 | 52.44 | 123.2 | 0.45 | 18 | PVC | 0.01 | 4,132 | 140 | 428 | 568 | 13.7 | SM14-Ex-EX222 | |
| CO-15 | Kirkland_Manholes-978 | 222.9 | Kirkland_Manholes-979 | 219.9 | 335.8 | 0.89 | 8 | PVC | 0.01 | 666 | 9 | 52 | 61 | 9.1 | | |
| CO-17 | Kirkland_Manholes-979 | 219.9 | MH-327 | 219.64 | 97.4 | 0.27 | 8 | PVC | 0.01 | 364 | 9 | 56 | 65 | 18 | | |
| CO-18 | MH-327 | 219.64 | Kirkland_Manholes-980 | 219.4 | 90.3 | 0.27 | 8 | PVC | 0.01 | 364 | 14 | 65 | 79 | 21.6 | | |
| CO-19 | Kirkland_Manholes-1011 | 226.35 | MH-327 | 219.64 | 167.6 | 4 | 8 | PVC | 0.01 | 1,411 | 5 | 4 | 9 | 0.6 | | |
| CO-20 | Kirkland_Manholes-1907 | 380.32 | Kirkland_Manholes-1909 | 380 | 67.5 | 0.47 | 8 | PVC | 0.01 | 485 | 20 | 12 | 32 | 6.5 | | |
| CO-21 | Kirkland_Manholes-1909 | 380 | Kirkland_Manholes-1366 | 377.95 | 352.1 | 0.58 | 8 | PVC | 0.01 | 538 | 49 | 77 | 126 | 23.5 | | |
| CO-22 | Kirkland_Manholes-638 | 236.51 | Kirkland_Manholes-637 | 235.38 | 223.4 | 0.51 | 21 | PVC | 0.01 | 6,576 | 536 | 1,571 | 2,107 | 32 | | |
| CO-23 | Kirkland_Manholes-637 | 235.38 | Kirkland_Manholes-633 | 234.78 | 246.2 | 0.24 | 21 | PVC | 0.01 | 4,564 | 541 | 1,575 | 2,116 | 46.4 | | |
| CO-25 | Kirkland_Manholes-2644 | 74.88 | Kirkland_Manholes-2655 | 44.22 | 203.4 | 15.07 | 8 | PVC | 0.01 | 2,737 | 14 | 73 | 87 | 3.2 | | |
| CO-26 | Kirkland_Manholes-2642 | 102.55 | MH-328 | 82.65 | 111.2 | 17.89 | 8 | PVC | 0.01 | 2,982 | 2 | 12 | 14 | 0.5 | | |
| CO-27 | MH-328 | 82.65 | Kirkland_Manholes-2644 | 74.88 | 76.8 | 10.12 | 8 | PVC | 0.01 | 2,242 | 5 | 31 | 35 | 1.6 | | |
| CO-28 | Kirkland_Manholes-3144 | 94.3 | Kirkland_Manholes-3143 | 93.65 | 162.7 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 6 | 9 | 2 | SM14-Ex-EX293 | |
| CO-29 | Kirkland_Manholes-3143 | 93.65 | MH-328 | 82.65 | 108.8 | 10.11 | 8 | PVC | 0.01 | 2,242 | 3 | 12 | 16 | 0.7 | SM14-Ex-EX293 | |
| CO-30 | Kirkland_Manholes-2662 | 11.52 | Kirkland_Manholes-2661 | 11.28 | 48.5 | 0.49 | 18 | PVC | 0.01 | 4,311 | 259 | 605 | 864 | 20.1 | SM14-Ex-EX289 | |
| CO-31 | Kirkland_Manholes-2661 | 11.28 | Kirkland_Manholes-2851 | 10.8 | 93.8 | 0.51 | 18 | PVC | 0.01 | 4,385 | 287 | 782 | 1,069 | 24.4 | SM14-Ex-EX289 | |
| CO-32 | Kirkland_Manholes-3203 | 49.55 | Kirkland_Manholes-2660 | 26.87 | 244.8 | 9.27 | 8 | PVC | 0.01 | 2,146 | 7 | 37 | 43 | 2 | | |
| CO-33 | Kirkland_Manholes-2660 | 26.87 | Kirkland_Manholes-2661 | 11.28 | 44 | 35.46 | 8 | PVC | 0.01 | 4,198 | 28 | 171 | 199 | 4.7 | | |
| CO-34 | Kirkland_Manholes-2221 | 60.29 | Kirkland_Manholes-2225 | 40.46 | 244.8 | 8.1 | 8 | PVC | 0.01 | 2,007 | 12 | 52 | 64 | 3.2 | | |
| CO-35 | Kirkland_Manholes-2225 | 40.46 | Kirkland_Manholes-2228 | 25 | 165.9 | 9.32 | 8 | PVC | 0.01 | 2,152 | 20 | 71 | 92 | 4.3 | | Drop Connection |
| CO-36 | Kirkland_Manholes-2081 | 95.66 | Kirkland_Manholes-2218 | 82.71 | 188.1 | 6.88 | 8 | PVC | 0.01 | 1,850 | 1 | 6 | 7 | 0.4 | | |
| CO-37 | Kirkland_Manholes-2218 | 82.71 | Kirkland_Manholes-2221 | 60.29 | 246.5 | 9.1 | 8 | PVC | 0.01 | 2,126 | 8 | 26 | 34 | 1.6 | | |
| CO-38 | Kirkland_Manholes-2227 | 45.3 | Kirkland_Manholes-2226 | 43.3 | 93.8 | 2.13 | 8 | PVC | 0.01 | 1,029 | 2 | 6 | 9 | 0.9 | | |
| CO-39 | Kirkland_Manholes-2226 | 43.3 | Kirkland_Manholes-2225 | 40.46 | 248.3 | 1.14 | 8 | PVC | 0.01 | 754 | 7 | 13 | 20 | 2.6 | | |
| CO-41 | Kirkland_Manholes-1046 | 162.86 | Kirkland_Manholes-3175 | 156.47 | 218.7 | 2.92 | 8 | PVC | 0.01 | 1,205 | 125 | 281 | 407 | 33.7 | | |
| CO-42 | Kirkland_Manholes-1043 | 180.32 | Kirkland_Manholes-3126 | 177.5 | 189.3 | 1.49 | 8 | PVC | 0.01 | 861 | 31 | 100 | 130 | 15.1 | | |
| CO-43 | Kirkland_Manholes-3126 | 177.5 | Kirkland_Manholes-1046 | 162.86 | 197.5 | 7.41 | 8 | PVC | 0.01 | 1,920 | 33 | 112 | 145 | 7.6 | | |
| CO-44 | Kirkland_Manholes-61 | 205.17 | Kirkland_Manholes-64 | 204.5 | 110.3 | 0.61 | 8 | PVC | 0.01 | 550 | 9 | 30 | 39 | 7.1 | SM14-Ex-EX6 | |
| CO-45 | Kirkland_Manholes-64 | 204.5 | Kirkland_Manholes-65 | 199.61 | 323.5 | 1.51 | 8 | PVC | 0.01 | 867 | 11 | 35 | 46 | 5.3 | SM14-Ex-EX6 | |
| CO-47 | Kirkland_Manholes-2410 | 409.57 | Kirkland_Manholes-2408 | 405.44 | 108.3 | 3.82 | 8 | PVC | 0.01 | 1,377 | 0 | 4 | 4 | 0.3 | | |
| CO-48 | Kirkland_Manholes-2135 | 110 | Kirkland_Manholes-2156 | 109.44 | 35 | 1.6 | 8 | PVC | 0.01 | 892 | 9 | 32 | 42 | 4.7 | | |
| CO-49 | Kirkland_Manholes-2156 | 109.44 | Kirkland_Manholes-2157 | 100.18 | 171 | 5.42 | 8 | PVC | 0.01 | 1,641 | 9 | 39 | 48 | 3 | | |
| CO-50 | Kirkland_Manholes-2190 | 132.39 | Kirkland_Manholes-2189 | 112.21 | 288.2 | 7 | 8 | PVC | 0.01 | 1,866 | 7 | 25 | 31 | 1.7 | | |
| CO-51 | Kirkland_Manholes-2189 | 112.21 | Kirkland_Manholes-2186 | 104.5 | 321.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 13 | 33 | 46 | 4.2 | | |
| CO-52 | Kirkland_Manholes-2169 | 142.85 | Kirkland_Manholes-2168 | 127.32 | 219.5 | 7.07 | 8 | PVC | 0.01 | 1,875 | 1 | 16 | 18 | 1 | SM14-Ex-EX193 | |
| CO-53 | Kirkland_Manholes-2168 | 127.32 | Kirkland_Manholes-2167 | 120.69 | 65.4 | 10.14 | 8 | PVC | 0.01 | 2,245 | 3 | 25 | 27 | 1.2 | SM14-Ex-EX193 | |
| CO-54 | Kirkland_Manholes-2165 | 94.99 | Kirkland_Manholes-2164 | 90.37 | 91.4 | 5.05 | 8 | PVC | 0.01 | 1,585 | 9 | 49 | 58 | 3.7 | | |
| CO-55 | Kirkland_Manholes-2164 | 90.37 | Kirkland_Manholes-2140 | 88.47 | 43.9 | 4.33 | 8 | PVC | 0.01 | 1,468 | 9 | 58 | 67 | 4.6 | | |
| CO-56 | Kirkland_Manholes-1703 | 58 | Kirkland_Manholes-1704 | 54.53 | 111.1 | 3.12 | 8 | PVC | 0.01 | 1,246 | 6 | 16 | 22 | 1.8 | SM14-Ex-EX153 | |
| CO-57 | Kirkland_Manholes-1704 | 54.53 | Kirkland_Manholes-1705 | 33.28 | 211.8 | 10.03 | 8 | PVC | 0.01 | 2,233 | 6 | 25 | 30 | 1.4 | SM14-Ex-EX153 | |
| CO-58 | Kirkland_Manholes-1810 | 85.96 | Kirkland_Manholes-1808 | 66.8 | 280.2 | 6.84 | 8 | PVC | 0.01 | 1,844 | 74 | 286 | 360 | 19.5 | SM4 | |
| CO-59 | Kirkland_Manholes-1808 | 66.8 | Kirkland_Manholes-1807 | 44.26 | 183.9 | 12.26 | 8 | PVC | 0.01 | 2,469 | 75 | 295 | 370 | 15 | SM4 | |
| CO-60 | Kirkland_Manholes-1718 | 72.96 | Kirkland_Manholes-1717 | 58.55 | 301.8 | 4.77 | 8 | PVC | 0.01 | 1,541 | 1 | 8 | 10 | 0.6 | SM14-Ex-EX165 | |
| CO-61 | Kirkland_Manholes-1717 | 58.55 | Kirkland_Manholes-1719 | 46.02 | 243.6 | 5.14 | 8 | PVC | 0.01 | 1,599 | 30 | 49 | 79 | 4.9 | SM14-Ex-EX165 | |
| CO-62 | Kirkland_Manholes-1605 | 146.86 | Kirkland_Manholes-1606 | 138.24 | 64.3 | 13.41 | 8 | PVC | 0.01 | 2,582 | 0 | 8 | 8 | 0.3 | SM14-Ex-EX120 | |
| CO-63 | Kirkland_Manholes-1606 | 138.24 | Kirkland_Manholes-1604 | 117.22 | 209.3 | 10.04 | 8 | PVC | 0.01 | 2,234 | 0 | 16 | 16 | 0.7 | SM14-Ex-EX120 | |
| CO-64 | Kirkland_Manholes-3029 | 503.06 | Kirkland_Manholes-1462 | 498.98 | 186.9 | 2.18 | 8 | PVC | 0.01 | 1,042 | 1 | 4 | 6 | 0.5 | SM14-Ex-EX273 | |
| CO-66 | Kirkland_Manholes-1468 | 502.5 | Kirkland_Manholes-1462 | 498.98 | 381.4 | 0.92 | 8 | PVC | 0.01 | 677 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX271 | |
| CO-67 | Kirkland_Manholes-1462 | 498.98 | Kirkland_Manholes-1463 | 498.43 | 46.4 | 1.18 | 8 | PVC | 0.01 | 767 | 5 | 12 | 17 | 2.2 | SM14-Ex-EX271 | |
| CO-69 | Kirkland_Manholes-1251 | 198.9 | Kirkland_Manholes-1252 | 181.71 | 334.6 | 5.14 | 8 | PVC | 0.01 | 1,598 | 32 | 157 | 189 | 11.8 | SM14-Ex-EX101 | |
| CO-70 | Kirkland_Manholes-1250 | 210.15 | Kirkland_Manholes-1251 | 198.9 | 400 | 2.81 | 8 | PVC | 0.01 | 1,182 | 25 | 140 | 165 | 14 | SM14-Ex-EX101 | |
| CO-71 | Kirkland_Manholes-1310 | 231.57 | Kirkland_Manholes-1251 | 198.9 | 267.1 | 12.23 | 8 | PVC | 0.01 | 2,466 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX99 | |
| CO-72 | Kirkland_Manholes-230 | 172.81 | Kirkland_Manholes-228 | 142.32 | 167.5 | 18.2 | 8 | PVC | 0.01 | 3,008 | 48 | 121 | 169 | 5.6 | | |
| CO-73 | Kirkland_Manholes-3115 | 187.58 | Kirkland_Manholes-228 | 142.32 | 414 | 10.93 | 8 | PVC | 0.01 | 2,331 | 3 | 4 | 7 | 0.3 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-74 | Kirkland_Manholes-1287 | 140.18 | Kirkland_Manholes-1288 | 139.29 | 58.2 | 1.53 | 8 | PVC | 0.01 | 872 | 33 | 165 | 197 | 22.6 | SM14-Ex-EX105 | |
| CO-75 | Kirkland_Manholes-1288 | 139.29 | Kirkland_Manholes-1289 | 131.61 | 344.5 | 2.23 | 8 | PVC | 0.01 | 1,053 | 37 | 173 | 210 | 19.9 | SM14-Ex-EX105 | |
| CO-77 | Kirkland_Manholes-1255 | 163.1 | Kirkland_Manholes-1256 | 151.53 | 106.9 | 10.82 | 8 | PVC | 0.01 | 2,319 | 5 | 33 | 38 | 1.6 | SM14-Ex-EX104 | |
| CO-78 | Kirkland_Manholes-1253 | 189.17 | MH-329 | 183.73 | 57.5 | 9.46 | 8 | PVC | 0.01 | 2,169 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX104 | |
| CO-80 | Kirkland_Manholes-1254 | 186 | MH-329 | 183.73 | 30.2 | 7.52 | 8 | PVC | 0.01 | 1,934 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX104 | |
| CO-81 | MH-329 | 183.73 | Kirkland_Manholes-1255 | 163.1 | 274.1 | 7.53 | 8 | PVC | 0.01 | 1,934 | 3 | 25 | 28 | 1.4 | SM14-Ex-EX104 | |
| CO-83 | Kirkland_Manholes-279 | 76.14 | Kirkland_Manholes-278 | 56.62 | 239.7 | 8.14 | 8 | PVC | 0.01 | 2,012 | 32 | 6 | 39 | 1.9 | SM10 | |
| CO-84 | Kirkland_Manholes-271 | 91.78 | Kirkland_Manholes-272 | 84 | 313.5 | 2.48 | 8 | PVC | 0.01 | 1,111 | 54 | 132 | 186 | 16.7 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| CO-85 | Kirkland_Manholes-272 | 84 | Kirkland_Manholes-273 | 69.52 | 161.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 56 | 136 | 192 | 9.1 | SM10 | |
| CO-89 | Kirkland_Manholes-1221 | 265 | Kirkland_Manholes-1210 | 257.02 | 313.6 | 2.54 | 8 | PVC | 0.01 | 1,125 | 5 | 15 | 19 | 1.7 | SM14-Ex-EX90 | |
| CO-90 | Kirkland_Manholes-1208 | 237.71 | Kirkland_Manholes-1207 | 214.35 | 271 | 8.62 | 8 | PVC | 0.01 | 2,070 | 13 | 39 | 53 | 2.5 | SM14-Ex-EX90 | |
| CO-91 | Kirkland_Manholes-1207 | 214.35 | Kirkland_Manholes-1206 | 193.92 | 362.6 | 5.63 | 8 | PVC | 0.01 | 1,673 | 17 | 47 | 64 | 3.8 | SM14-Ex-EX90 | |
| CO-92 | Kirkland_Manholes-1142 | 218.06 | Kirkland_Manholes-1146 | 215.3 | 316.4 | 0.87 | 8 | PVC | 0.01 | 659 | 9 | 33 | 42 | 6.4 | SM4 | |
| CO-93 | Kirkland_Manholes-1223 | 241.1 | Kirkland_Manholes-1146 | 215.3 | 349.8 | 7.38 | 8 | PVC | 0.01 | 1,915 | 3 | 8 | 12 | 0.6 | SM14-Ex-EX86 | |
| CO-94 | Kirkland_Manholes-1199 | 190.02 | Kirkland_Manholes-1198 | 189.72 | 153.8 | 0.19 | 8 | PVC | 0.01 | 311 | 12 | 8 | 20 | 6.4 | SM14-Ex-EX80 | |
| CO-95 | Kirkland_Manholes-1141 | 204.1 | Kirkland_Manholes-1198 | 189.72 | 107.3 | 13.4 | 8 | PVC | 0.01 | 2,581 | 5 | 33 | 38 | 1.5 | SM14-Ex-EX80 | |
| CO-96 | Kirkland_Manholes-3104 | 114.41 | Kirkland_Manholes-3103 | 113.84 | 31.2 | 1.83 | 8 | PVC | 0.01 | 953 | 18 | 107 | 125 | 13.1 | SM10 | |
| CO-97 | Kirkland_Manholes-517 | 138.64 | Kirkland_Manholes-3103 | 113.84 | 358.5 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 8 | 9 | 0.5 | SM10 | |
| CO-98 | Kirkland_Manholes-3196 | 122.5 | Kirkland_Manholes-503 | 118 | 198.4 | 2.27 | 8 | PVC | 0.01 | 1,062 | 3 | 16 | 20 | 1.9 | SM10 | |
| CO-100 | Kirkland_Manholes-503 | 118 | Kirkland_Manholes-504 | 108.24 | 276.3 | 3.53 | 8 | PVC | 0.01 | 1,325 | 4 | 25 | 29 | 2.2 | SM14-Ex-EX78 | |
| CO-101 | Kirkland_Manholes-504 | 108.24 | Kirkland_Manholes-510 | 78.8 | 269.3 | 10.93 | 8 | PVC | 0.01 | 2,331 | 5 | 33 | 38 | 1.6 | SM14-Ex-EX78 | |
| CO-102 | Kirkland_Manholes-2573 | 298.95 | Kirkland_Manholes-2572 | 298.88 | 17.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 19 | 4.2 | | |
| CO-103 | Kirkland_Manholes-2959 | 355.76 | Kirkland_Manholes-2572 | 298.88 | 327.6 | 17.36 | 8 | PVC | 0.01 | 2,938 | 1 | 4 | 5 | 0.2 | | |
| CO-104 | Kirkland_Manholes-2783 | 269.77 | Kirkland_Manholes-2784 | 262.56 | 166.7 | 4.32 | 8 | PVC | 0.01 | 1,466 | 7 | 41 | 47 | 3.2 | | |
| CO-105 | Kirkland_Manholes-2578 | 278.46 | Kirkland_Manholes-2783 | 269.77 | 170.6 | 5.09 | 8 | PVC | 0.01 | 1,591 | 6 | 37 | 43 | 2.7 | | |
| CO-106 | Kirkland_Manholes-2921 | 73.76 | Kirkland_Manholes-2920 | 63.77 | 70.3 | 14.2 | 8 | PVC | 0.01 | 2,657 | 3 | 17 | 21 | 0.8 | | |
| CO-107 | Kirkland_Manholes-2920 | 63.77 | Kirkland_Manholes-177 | 35.5 | 126.7 | 22.31 | 8 | | 0.012 | 2,775 | 4 | 22 | 26 | 0.9 | | |
| CO-109 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1221 | 265 | 237.1 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 8 | 1.9 | SM14-Ex-EX90 | |
| CO-110 | Kirkland_Manholes-2686 | 221.84 | Kirkland_Manholes-2690 | 217.58 | 240.3 | 1.77 | 8 | PVC | 0.01 | 939 | 12 | 33 | 44 | 4.7 | SM14-Ex-EX201 | |
| CO-111 | Kirkland_Manholes-2690 | 217.58 | Kirkland_Manholes-2691 | 211.09 | 233.1 | 2.78 | 8 | PVC | 0.01 | 1,176 | 13 | 37 | 49 | 4.2 | SM14-Ex-EX201 | |
| CO-112 | Kirkland_Manholes-2612 | 250.12 | Kirkland_Manholes-2613 | 203.91 | 357.8 | 12.91 | 8 | PVC | 0.01 | 2,534 | 4 | 8 | 12 | 0.5 | SM14-Ex-EX297 | |
| CO-113 | Kirkland_Manholes-2613 | 203.91 | Kirkland_Manholes-3164 | 171.21 | 256.4 | 12.76 | 8 | PVC | 0.01 | 2,518 | 7 | 12 | 19 | 0.8 | SM14-Ex-EX297 | |
| CO-114 | Kirkland_Manholes-488 | 256.69 | Kirkland_Manholes-489 | 206.41 | 218.5 | 23.01 | 8 | PVC | 0.01 | 3,382 | 2 | 4 | 6 | 0.2 | | |
| CO-115 | Kirkland_Manholes-834 | 245.56 | Kirkland_Manholes-489 | 206.41 | 278.5 | 14.06 | 8 | PVC | 0.01 | 2,644 | 2 | 4 | 6 | 0.2 | | |
| CO-116 | Kirkland_Manholes-599 | 92.8 | Kirkland_Manholes-600 | 91.95 | 330.6 | 0.26 | 8 | PVC | 0.01 | 357 | 15 | 16 | 32 | 8.8 | SM14-Ex-EX160 | |
| CO-120 | Kirkland_Manholes-601 | 92.05 | Kirkland_Manholes-602 | 90.22 | 280.5 | 0.65 | 8 | PVC | 0.01 | 569 | 12 | 16 | 28 | 4.9 | SM14-Ex-EX160 | |
| CO-123 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-604 | 92.41 | 322.7 | 0.77 | 8 | PVC | 0.01 | 618 | 2 | 4 | 6 | 1 | SM14-Ex-EX160 | |
| CO-124 | Kirkland_Manholes-594 | 105.16 | Kirkland_Manholes-595 | 103.44 | 177 | 0.97 | 12 | PVC | 0.01 | 2,049 | 1 | 8 | 10 | 0.5 | SM14-Ex-EX116 | |
| CO-125 | MH-321 | 218.02 | MH-322 | 217.7 | 80.6 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| CO-126 | MH-322 | 217.7 | Kirkland_Manholes-2446 | 217.36 | 85 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 11 | 2.4 | | |
| CO-127 | MH-315 | 235.18 | MH-316 | 235.06 | 29.4 | 0.41 | 6 | Concrete | 0.013 | 161 | 1 | 4 | 5 | 3.1 | | |
| CO-128 | MH-316 | 235.06 | Kirkland_Manholes-2602 | 234.19 | 216.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | SM14-Ex-EX300 | |
| CO-130 | MH-330 | 93.13 | Kirkland_Manholes-601 | 92.05 | 270.2 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | SM14-Ex-EX160 | |
| CO-133 | Kirkland_Manholes-2269 | 398.2 | Kirkland_Manholes-2266 | 392.8 | 346.8 | 1.56 | 8 | PVC | 0.01 | 880 | 22 | 106 | 128 | 14.5 | SM14-Ex-EX261 | |
| CO-139 | Kirkland_Manholes-2703 | 250.19 | MH-333 | 250.73 | 32.9 | 1.64 | 8 | PVC | 0.01 | 904 | 3 | 12 | 15 | 1.7 | | |
| CO-140 | MH-333 | 250.73 | MH-334 | 252.1 | 150.3 | 0.91 | 8 | PVC | 0.01 | 673 | 2 | 8 | 10 | 1.4 | | |
| CO-141 | MH-334 | 252.1 | MH-335 | 253.55 | 221.6 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 4 | 5 | 0.9 | | |
| CO-142 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1214 | 261.31 | 224.5 | 2.07 | 8 | PVC | 0.01 | 1,013 | 2 | 6 | 8 | 0.8 | SM14-Ex-EX90 | |
| CO-143 | Kirkland_Manholes-2593 | 284.96 | Kirkland_Manholes-2604 | 283.17 | 324.7 | 0.55 | 8 | PVC | 0.01 | 524 | 27 | 94 | 0 | 0 | SM14-Ex-EX299 | |
| CO-148 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-602 | 90.22 | 228.3 | 2.05 | 8 | PVC | 0.01 | 1,008 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX160 | |
| CO-149 | MH-336 | 98.65 | Kirkland_Manholes-276 | 92.16 | 227.3 | 2.86 | 8 | PVC | 0.01 | 1,191 | 0 | 3 | 3 | 0.3 | SM10 | |
| CO-150 | MH-337 | 92.45 | Kirkland_Manholes-279 | 76.14 | 213.9 | 7.63 | 8 | PVC | 0.01 | 1,947 | 0 | 3 | 3 | 0.2 | SM10 | |
| CO-151 | MH-338 | 119.57 | Kirkland_Manholes-308 | 114.39 | 316.2 | 1.64 | 8 | PVC | 0.01 | 902 | 0 | 9 | 9 | 1 | SM10 | |
| CO-152 | MH-339 | 159.67 | Kirkland_Manholes-524 | 157.52 | 274.1 | 0.78 | 8 | PVC | 0.01 | 624 | 0 | 8 | 8 | 1.3 | SM10 | |
| CO-154 | MH_Selection_06-13-2016-11 | 20.6 | O-26 | 20.25 | 45 | 0.78 | 48 | Concrete | 0.013 | 56,862 | 1,784 | 4,225 | 7,760 | 13.6 | | Updated per as-built drawings |
| KC_Main-2 | KC_Manholes-18 | 10.29 | KC_Manholes-19 | 10.24 | 10.1 | 0.5 | 24 | PVC | 0.01 | 9,299 | 807 | 2,054 | 2,933 | 31.5 | SM14-Ex-EX289 | |
| KC_Main-28 | KC_Manholes-19 | 10.24 | O-6 | 10 | 47.9 | 0.5 | 24 | PVC | 0.01 | 9,344 | 862 | 2,060 | 2,994 | 32 | SM14-Ex-EX289 | |
| Kirkland_Main-1 | Kirkland_Manholes-2 | 142.59 | Kirkland_Manholes-3 | 141.09 | 316.3 | 0.47 | 8 | PVC | 0.01 | 486 | 0 | 1 | 1 | 0.3 | | |
| Kirkland_Main-2 | Kirkland_Manholes-4 | 139.47 | Kirkland_Manholes-5 | 138.65 | 146.8 | 0.56 | 8 | PVC | 0.01 | 527 | 16 | 4 | 21 | 3.9 | | |
| Kirkland_Main-3 | Kirkland_Manholes-3 | 141.09 | Kirkland_Manholes-4 | 139.47 | 325.9 | 0.5 | 8 | PVC | 0.01 | 497 | 16 | 3 | 19 | 3.8 | | |
| Kirkland_Main-4 | Kirkland_Manholes-6 | 127.8 | Kirkland_Manholes-7 | 127.07 | 145 | 0.5 | 8 | PVC | 0.01 | 500 | 17 | 7 | 25 | 4.9 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-5 | Kirkland_Manholes-5 | 138.65 | Kirkland_Manholes-6 | 127.8 | 166.2 | 6.53 | 8 | PVC | 0.01 | 1,801 | 17 | 6 | 22 | 1.2 | | |
| Kirkland_Main-6 | Kirkland_Manholes-8 | 108.29 | Kirkland_Manholes-9 | 99.39 | 204.3 | 4.36 | 8 | PVC | 0.01 | 1,471 | 18 | 12 | 30 | 2.1 | | |
| Kirkland_Main-7 | Kirkland_Manholes-7 | 127.07 | Kirkland_Manholes-8 | 108.29 | 154 | 12.2 | 8 | PVC | 0.01 | 2,462 | 18 | 10 | 29 | 1.2 | | |
| Kirkland_Main-8 | Kirkland_Manholes-9 | 99.39 | Kirkland_Manholes-99 | 74.09 | 252.3 | 10.03 | 8 | PVC | 0.01 | 2,233 | 65 | 13 | 79 | 3.5 | | |
| Kirkland_Main-10 | Kirkland_Manholes-10 | 249.23 | Kirkland_Manholes-11 | 247.5 | 365.2 | 0.47 | 8 | PVC | 0.01 | 485 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-11 | Kirkland_Manholes-11 | 247.5 | Kirkland_Manholes-12 | 246.57 | 355.7 | 0.26 | 8 | PVC | 0.01 | 360 | 3 | 8 | 11 | 3 | | |
| Kirkland_Main-12 | Kirkland_Manholes-12 | 246.57 | Kirkland_Manholes-650 | 246.28 | 73.5 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 12 | 18 | 4 | | |
| Kirkland_Main-13 | Kirkland_Manholes-13 | 266.08 | Kirkland_Manholes-917 | 265.16 | 206.5 | 0.45 | 8 | PVC | 0.01 | 471 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-14 | Kirkland_Manholes-14 | 260.99 | Kirkland_Manholes-15 | 248.41 | 274.7 | 4.58 | 8 | PVC | 0.01 | 1,509 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-15 | Kirkland_Manholes-16 | 249.63 | Kirkland_Manholes-15 | 248.41 | 56 | 2.18 | 8 | PVC | 0.01 | 1,041 | 18 | 77 | 95 | 9.2 | | |
| Kirkland_Main-16 | Kirkland_Manholes-17 | 247.29 | Kirkland_Manholes-650 | 246.28 | 284.1 | 0.36 | 8 | PVC | 0.01 | 420 | 22 | 90 | 111 | 26.5 | | |
| Kirkland_Main-17 | Kirkland_Manholes-3034 | 97.65 | Kirkland_Manholes-3033 | 93.75 | 20 | 19.51 | 8 | PVC | 0.01 | 3,114 | 0 | 4 | 5 | 0.2 | | |
| Kirkland_Main-18 | Kirkland_Manholes-3033 | 93.75 | Kirkland_Manholes-3032 | 86.58 | 55.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 0 | 9 | 9 | 0.4 | | |
| Kirkland_Main-19 | Kirkland_Manholes-3032 | 86.58 | Kirkland_Manholes-22 | 82.71 | 39.7 | 9.76 | 8 | PVC | 0.01 | 2,202 | 0 | 13 | 13 | 0.6 | | |
| Kirkland_Main-20 | Kirkland_Manholes-22 | 82.71 | Kirkland_Manholes-1 | 73.25 | 125.9 | 7.51 | 8 | PVC | 0.01 | 1,932 | 1 | 17 | 18 | 0.9 | | |
| Kirkland_Main-21 | Kirkland_Manholes-15 | 248.41 | Kirkland_Manholes-17 | 247.29 | 382.5 | 0.29 | 8 | PVC | 0.01 | 382 | 19 | 85 | 105 | 27.4 | | |
| Kirkland_Main-22 | Kirkland_Manholes-18 | 254.35 | Kirkland_Manholes-16 | 249.63 | 106.2 | 4.45 | 8 | PVC | 0.01 | 1,487 | 17 | 73 | 90 | 6 | | |
| Kirkland_Main-23 | Kirkland_Manholes-19 | 254.88 | Kirkland_Manholes-18 | 254.35 | 102.4 | 0.52 | 8 | PVC | 0.01 | 507 | 16 | 69 | 85 | 16.7 | | |
| Kirkland_Main-24 | Kirkland_Manholes-23 | 269.98 | Kirkland_Manholes-19 | 254.88 | 324.5 | 4.65 | 8 | PVC | 0.01 | 1,521 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-25 | Kirkland_Manholes-622 | 255 | Kirkland_Manholes-19 | 254.88 | 84.5 | 0.14 | 8 | PVC | 0.01 | 266 | 14 | 61 | 75 | 28.1 | | |
| Kirkland_Main-26 | Kirkland_Manholes-624 | 257.73 | Kirkland_Manholes-623 | 256.4 | 95.1 | 1.4 | 8 | PVC | 0.01 | 834 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-27 | Kirkland_Manholes-623 | 256.4 | Kirkland_Manholes-622 | 255 | 306.3 | 0.46 | 8 | PVC | 0.01 | 477 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-28 | Kirkland_Manholes-625 | 258 | Kirkland_Manholes-622 | 255 | 179.1 | 1.67 | 8 | PVC | 0.01 | 912 | 11 | 49 | 60 | 6.5 | | |
| Kirkland_Main-29 | Kirkland_Manholes-28 | 182.96 | Kirkland_Manholes-29 | 182.79 | 41.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 8 | 1.9 | | |
| Kirkland_Main-30 | Kirkland_Manholes-29 | 182.79 | Kirkland_Manholes-25 | 175.02 | 121.6 | 6.39 | 8 | PVC | 0.01 | 1,783 | 19 | 43 | 62 | 3.5 | | |
| Kirkland_Main-31 | Kirkland_Manholes-36 | 251.25 | Kirkland_Manholes-35 | 222.04 | 280.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-32 | Kirkland_Manholes-35 | 222.04 | Kirkland_Manholes-34 | 221.71 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 9 | 13 | 3 | | |
| Kirkland_Main-33 | Kirkland_Manholes-34 | 221.71 | Kirkland_Manholes-32 | 220.36 | 300.4 | 0.45 | 8 | PVC | 0.01 | 473 | 6 | 13 | 19 | 4.1 | | |
| Kirkland_Main-34 | Kirkland_Manholes-32 | 220.36 | Kirkland_Manholes-33 | 219.84 | 21.3 | 2.44 | 8 | PVC | 0.01 | 1,102 | 7 | 17 | 25 | 2.2 | | |
| Kirkland_Main-35 | Kirkland_Manholes-33 | 219.84 | Kirkland_Manholes-31 | 218.88 | 40.1 | 2.39 | 8 | PVC | 0.01 | 1,091 | 8 | 22 | 30 | 2.7 | | |
| Kirkland_Main-36 | Kirkland_Manholes-37 | 238.46 | Kirkland_Manholes-31 | 218.88 | 419.9 | 4.66 | 8 | PVC | 0.01 | 1,523 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-37 | Kirkland_Manholes-31 | 218.88 | Kirkland_Manholes-30 | 193.77 | 330.5 | 7.6 | 8 | PVC | 0.01 | 1,943 | 11 | 30 | 41 | 2.1 | | |
| Kirkland_Main-38 | Kirkland_Manholes-30 | 193.77 | Kirkland_Manholes-29 | 182.79 | 147.1 | 7.46 | 8 | PVC | 0.01 | 1,926 | 14 | 35 | 49 | 2.5 | | |
| Kirkland_Main-39 | Kirkland_Manholes-40 | 185.88 | Kirkland_Manholes-41 | 184.86 | 116.1 | 0.88 | 8 | PVC | 0.01 | 661 | 0 | 9 | 9 | 1.4 | | |
| Kirkland_Main-40 | Kirkland_Manholes-41 | 184.86 | Kirkland_Manholes-38 | 173.18 | 108.4 | 10.78 | 8 | PVC | 0.01 | 2,314 | 1 | 13 | 14 | 0.6 | | |
| Kirkland_Main-41 | Kirkland_Manholes-39 | 193.85 | Kirkland_Manholes-40 | 185.88 | 407 | 1.96 | 8 | PVC | 0.01 | 987 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-42 | Kirkland_Manholes-54 | 66.84 | Kirkland_Manholes-103 | 59.75 | 133.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 41 | 156 | 197 | 12.1 | SM14-Ex-EX13 | |
| Kirkland_Main-43 | Kirkland_Manholes-47 | 192.83 | Kirkland_Manholes-48 | 169.78 | 343.8 | 6.71 | 8 | PVC | 0.01 | 1,826 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX13 | |
| Kirkland_Main-44 | Kirkland_Manholes-48 | 169.78 | Kirkland_Manholes-49 | 164.6 | 338.4 | 1.53 | 8 | PVC | 0.01 | 872 | 3 | 9 | 12 | 1.4 | SM14-Ex-EX13 | |
| Kirkland_Main-45 | Kirkland_Manholes-49 | 164.6 | Kirkland_Manholes-50 | 161.4 | 179.7 | 1.78 | 8 | PVC | 0.01 | 941 | 26 | 112 | 139 | 14.7 | SM14-Ex-EX13 | |
| Kirkland_Main-46 | Kirkland_Manholes-50 | 161.4 | Kirkland_Manholes-51 | 157.39 | 303.6 | 1.32 | 8 | PVC | 0.01 | 810 | 28 | 117 | 144 | 17.8 | SM14-Ex-EX13 | |
| Kirkland_Main-47 | Kirkland_Manholes-51 | 157.39 | Kirkland_Manholes-52 | 124.84 | 333.7 | 9.75 | 8 | PVC | 0.01 | 2,202 | 30 | 121 | 151 | 6.8 | SM14-Ex-EX13 | |
| Kirkland_Main-48 | Kirkland_Manholes-59 | 155.25 | Kirkland_Manholes-58 | 153.05 | 131 | 1.68 | 8 | PVC | 0.01 | 914 | 1 | 4 | 6 | 0.6 | SM14-Ex-EX14 | |
| Kirkland_Main-49 | Kirkland_Manholes-58 | 153.05 | Kirkland_Manholes-57 | 140.82 | 263.2 | 4.65 | 8 | PVC | 0.01 | 1,520 | 2 | 9 | 11 | 0.7 | SM14-Ex-EX14 | |
| Kirkland_Main-50 | Kirkland_Manholes-57 | 140.82 | Kirkland_Manholes-56 | 112.82 | 272.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 5 | 13 | 18 | 0.8 | SM14-Ex-EX14 | |
| Kirkland_Main-51 | Kirkland_Manholes-56 | 112.82 | Kirkland_Manholes-55 | 79.92 | 269.4 | 12.21 | 8 | PVC | 0.01 | 2,464 | 7 | 17 | 25 | 1 | SM14-Ex-EX14 | |
| Kirkland_Main-52 | Kirkland_Manholes-55 | 79.92 | Kirkland_Manholes-54 | 66.84 | 152.2 | 8.59 | 8 | PVC | 0.01 | 2,067 | 9 | 22 | 31 | 1.5 | SM14-Ex-EX14 | |
| Kirkland_Main-53 | Kirkland_Manholes-52 | 124.84 | Kirkland_Manholes-53 | 83.26 | 336 | 12.38 | 8 | PVC | 0.01 | 2,480 | 32 | 125 | 157 | 6.3 | SM14-Ex-EX13 | |
| Kirkland_Main-54 | Kirkland_Manholes-53 | 83.26 | Kirkland_Manholes-54 | 66.84 | 148.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 32 | 130 | 162 | 6.9 | SM14-Ex-EX13 | |
| Kirkland_Main-55 | Kirkland_Manholes-62 | 222.28 | Kirkland_Manholes-63 | 216.98 | 205.6 | 2.58 | 8 | PVC | 0.01 | 1,132 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-56 | Kirkland_Manholes-63 | 216.98 | Kirkland_Manholes-60 | 215.88 | 80.7 | 1.36 | 8 | PVC | 0.01 | 823 | 2 | 9 | 11 | 1.3 | | |
| Kirkland_Main-57 | Kirkland_Manholes-60 | 215.88 | Kirkland_Manholes-61 | 215.72 | 40.6 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 13 | 16 | 3.6 | | Drop Connection |
| Kirkland_Main-58 | Kirkland_Manholes-65 | 199.61 | Kirkland_Manholes-66 | 186.65 | 326.2 | 3.97 | 8 | PVC | 0.01 | 1,405 | 13 | 39 | 51 | 3.7 | SM14-Ex-EX6 | |
| Kirkland_Main-59 | Kirkland_Manholes-66 | 186.65 | Kirkland_Manholes-67 | 185.01 | 47 | 3.49 | 8 | PVC | 0.01 | 1,317 | 43 | 104 | 146 | 11.1 | SM14-Ex-EX17 | |
| Kirkland_Main-61 | Kirkland_Manholes-72 | 160.29 | Kirkland_Manholes-70 | 152.59 | 265.8 | 2.9 | 8 | PVC | 0.01 | 1,200 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX15 | |
| Kirkland_Main-62 | Kirkland_Manholes-985 | 205.92 | Kirkland_Manholes-986 | 204.38 | 192.7 | 0.8 | 8 | PVC | 0.01 | 630 | 43 | 138 | 182 | 28.8 | SM14-Ex-EX3 | |
| Kirkland_Main-63 | Kirkland_Manholes-242 | 21.02 | Kirkland_Manholes-2761 | 12.79 | 68 | 12.1 | 8 | PVC | 0.01 | 2,453 | 70 | 268 | 338 | 13.8 | | |
| Kirkland_Main-64 | Kirkland_Manholes-1033 | 173.21 | Kirkland_Manholes-450 | 130.07 | 239 | 18.05 | 8 | PVC | 0.01 | 2,996 | 5 | 13 | 18 | 0.6 | | |
| Kirkland_Main-65 | Kirkland_Manholes-71 | 153 | Kirkland_Manholes-70 | 152.59 | 153.6 | 0.27 | 8 | PVC | 0.01 | 364 | 1 | 4 | 6 | 1.5 | SM14-Ex-EX16 | |
| Kirkland_Main-66 | Kirkland_Manholes-69 | 159.19 | Kirkland_Manholes-70 | 152.59 | 340.9 | 1.94 | 8 | PVC | 0.01 | 981 | 4 | 9 | 13 | 1.3 | SM14-Ex-EX16 | |
| Kirkland_Main-67 | Kirkland_Manholes-68 | 178.61 | Kirkland_Manholes-69 | 159.19 | 346.1 | 5.61 | 8 | PVC | 0.01 | 1,670 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX16 | |
| Kirkland_Main-68 | Kirkland_Manholes-73 | 249.05 | Kirkland_Manholes-74 | 244.74 | 143 | 3.01 | 8 | PVC | 0.01 | 1,224 | 0 | 4 | 5 | 0.4 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-69 | Kirkland_Manholes-77 | 217.04 | Kirkland_Manholes-78 | 207.46 | 342.9 | 2.79 | 8 | PVC | 0.01 | 1,178 | 10 | 22 | 31 | 2.7 | SM14-Ex-EX7 | |
| Kirkland_Main-70 | Kirkland_Manholes-76 | 225.56 | Kirkland_Manholes-77 | 217.04 | 294.1 | 2.9 | 8 | PVC | 0.01 | 1,200 | 6 | 17 | 23 | 1.9 | SM14-Ex-EX7 | |
| Kirkland_Main-71 | Kirkland_Manholes-75 | 235.08 | Kirkland_Manholes-76 | 225.56 | 281.9 | 3.38 | 8 | PVC | 0.01 | 1,296 | 3 | 13 | 16 | 1.3 | SM14-Ex-EX7 | |
| Kirkland_Main-72 | Kirkland_Manholes-74 | 244.74 | Kirkland_Manholes-75 | 235.08 | 281.2 | 3.44 | 8 | PVC | 0.01 | 1,307 | 2 | 9 | 11 | 0.8 | SM14-Ex-EX7 | |
| Kirkland_Main-75 | Kirkland_Manholes-79 | 197.48 | Kirkland_Manholes-66 | 186.65 | 235.2 | 4.6 | 8 | PVC | 0.01 | 1,513 | 28 | 61 | 88 | 5.8 | SM14-Ex-EX17 | |
| Kirkland_Main-76 | Kirkland_Manholes-78 | 207.46 | Kirkland_Manholes-79 | 197.48 | 229.3 | 4.35 | 8 | PVC | 0.01 | 1,471 | 26 | 56 | 82 | 5.6 | SM14-Ex-EX17 | |
| Kirkland_Main-78 | Kirkland_Manholes-46 | 167.44 | Kirkland_Manholes-43 | 166.66 | 144 | 0.54 | 8 | PVC | 0.01 | 519 | 0 | 9 | 9 | 1.7 | SM14-Ex-EX5 | |
| Kirkland_Main-79 | Kirkland_Manholes-43 | 166.66 | Kirkland_Manholes-44 | 166.02 | 96.1 | 0.67 | 8 | PVC | 0.01 | 575 | 22 | 91 | 112 | 19.5 | SM14-Ex-EX5 | |
| Kirkland_Main-80 | Kirkland_Manholes-45 | 166.8 | Kirkland_Manholes-44 | 166.02 | 115.5 | 0.68 | 8 | PVC | 0.01 | 579 | 0 | 4 | 4 | 0.7 | SM14-Ex-EX5 | |
| Kirkland_Main-81 | Kirkland_Manholes-27 | 172.24 | Kirkland_Manholes-26 | 167.35 | 165.4 | 2.96 | 8 | PVC | 0.01 | 1,212 | 2 | 22 | 24 | 2 | SM14-Ex-EX5 | |
| Kirkland_Main-82 | Kirkland_Manholes-26 | 167.35 | Kirkland_Manholes-43 | 166.66 | 133.3 | 0.52 | 8 | PVC | 0.01 | 507 | 21 | 78 | 99 | 19.6 | SM14-Ex-EX5 | |
| Kirkland_Main-84 | Kirkland_Manholes-38 | 173.18 | Kirkland_Manholes-27 | 172.24 | 235.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 17 | 19 | 4.3 | SM14-Ex-EX5 | |
| Kirkland_Main-85 | Kirkland_Manholes-24 | 172.7 | Kirkland_Manholes-26 | 167.35 | 274.1 | 1.95 | 8 | PVC | 0.01 | 985 | 19 | 52 | 71 | 7.2 | SM14-Ex-EX5 | |
| Kirkland_Main-86 | Kirkland_Manholes-42 | 173.4 | Kirkland_Manholes-46 | 167.44 | 195.7 | 3.04 | 8 | PVC | 0.01 | 1,230 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX5 | |
| Kirkland_Main-87 | Kirkland_Manholes-25 | 175.02 | Kirkland_Manholes-24 | 172.7 | 94.4 | 2.46 | 8 | PVC | 0.01 | 1,105 | 19 | 48 | 67 | 6 | SM14-Ex-EX5 | |
| Kirkland_Main-88 | Kirkland_Manholes-44 | 166.02 | Kirkland_Manholes-49 | 164.6 | 321.6 | 0.44 | 8 | PVC | 0.01 | 469 | 22 | 100 | 121 | 25.8 | SM14-Ex-EX5 | |
| Kirkland_Main-90 | Kirkland_Manholes-81 | 88.9 | Kirkland_Manholes-143 | 71.16 | 340.9 | 5.2 | 8 | PVC | 0.01 | 1,608 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-91 | Kirkland_Manholes-70 | 152.59 | Kirkland_Manholes-82 | 150.35 | 263.6 | 0.85 | 8 | PVC | 0.01 | 650 | 8 | 22 | 30 | 4.6 | SM14-Ex-EX15 | |
| Kirkland_Main-92 | Kirkland_Manholes-85 | 147.38 | Kirkland_Manholes-84 | 141.87 | 73.4 | 7.51 | 8 | PVC | 0.01 | 1,932 | 4 | 9 | 12 | 0.6 | SM14-Ex-EX24 | |
| Kirkland_Main-93 | Kirkland_Manholes-83 | 157.35 | Kirkland_Manholes-85 | 147.38 | 229.6 | 4.34 | 8 | PVC | 0.01 | 1,469 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX24 | |
| Kirkland_Main-95 | Kirkland_Manholes-82 | 150.35 | Kirkland_Manholes-86 | 148.26 | 180.8 | 1.16 | 8 | PVC | 0.01 | 758 | 10 | 26 | 36 | 4.7 | SM14-Ex-EX15 | |
| Kirkland_Main-96 | Kirkland_Manholes-87 | 163.95 | Kirkland_Manholes-147 | 139.14 | 319.7 | 7.76 | 8 | PVC | 0.01 | 1,964 | 45 | 112 | 158 | 8 | SM14-Ex-EX25 | |
| Kirkland_Main-97 | Kirkland_Manholes-67 | 185.01 | Kirkland_Manholes-87 | 163.95 | 332 | 6.34 | 8 | PVC | 0.01 | 1,776 | 43 | 108 | 151 | 8.5 | SM14-Ex-EX25 | |
| Kirkland_Main-98 | Kirkland_Manholes-88 | 192.85 | Kirkland_Manholes-89 | 177.59 | 273.6 | 5.58 | 8 | PVC | 0.01 | 1,665 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX26 | |
| Kirkland_Main-99 | Kirkland_Manholes-90 | 174.66 | Kirkland_Manholes-91 | 170.09 | 87.7 | 5.21 | 8 | PVC | 0.01 | 1,609 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX27 | |
| Kirkland_Main-100 | Kirkland_Manholes-92 | 172.99 | Kirkland_Manholes-91 | 170.09 | 82 | 3.53 | 8 | PVC | 0.01 | 1,325 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX27 | |
| Kirkland_Main-101 | Kirkland_Manholes-91 | 170.09 | Kirkland_Manholes-152 | 157.79 | 45.8 | 26.87 | 8 | PVC | 0.01 | 3,654 | 3 | 13 | 16 | 0.4 | SM14-Ex-EX27 | Slope verified in as-builts |
| Kirkland_Main-103 | Kirkland_Manholes-98 | 253.76 | Kirkland_Manholes-97 | 241.6 | 353.8 | 3.44 | 8 | PVC | 0.01 | 1,307 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX8 | |
| Kirkland_Main-104 | Kirkland_Manholes-2944 | 250.07 | Kirkland_Manholes-2943 | 249.65 | 93.4 | 0.45 | 8 | PVC | 0.01 | 473 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-105 | Kirkland_Manholes-97 | 241.6 | Kirkland_Manholes-95 | 228.66 | 356.1 | 3.63 | 8 | PVC | 0.01 | 1,344 | 6 | 9 | 15 | 1.1 | SM14-Ex-EX8 | |
| Kirkland_Main-106 | Kirkland_Manholes-95 | 228.66 | Kirkland_Manholes-96 | 228 | 106.1 | 0.62 | 8 | PVC | 0.01 | 556 | 8 | 13 | 21 | 3.8 | SM14-Ex-EX8 | |
| Kirkland_Main-107 | Kirkland_Manholes-96 | 228 | Kirkland_Manholes-93 | 223.12 | 245.5 | 1.99 | 8 | PVC | 0.01 | 994 | 9 | 17 | 26 | 2.6 | SM14-Ex-EX8 | |
| Kirkland_Main-108 | Kirkland_Manholes-93 | 223.12 | Kirkland_Manholes-94 | 210.17 | 176.3 | 7.35 | 8 | PVC | 0.01 | 1,911 | 11 | 22 | 32 | 1.7 | SM14-Ex-EX8 | |
| Kirkland_Main-109 | Kirkland_Manholes-94 | 210.17 | Kirkland_Manholes-78 | 207.46 | 295.3 | 0.92 | 8 | PVC | 0.01 | 675 | 14 | 30 | 44 | 6.5 | SM14-Ex-EX17 | |
| Kirkland_Main-110 | Kirkland_Manholes-1024 | 212.11 | Kirkland_Manholes-94 | 210.17 | 143.5 | 1.35 | 8 | PVC | 0.01 | 820 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX17 | |
| Kirkland_Main-111 | Kirkland_Manholes-106 | 44.49 | Kirkland_Manholes-242 | 21.02 | 301.2 | 7.79 | 8 | PVC | 0.01 | 1,968 | 53 | 212 | 265 | 13.5 | SM14-Ex-EX12 | |
| Kirkland_Main-112 | Kirkland_Manholes-105 | 48.51 | Kirkland_Manholes-106 | 44.49 | 358.2 | 1.12 | 8 | PVC | 0.01 | 747 | 51 | 208 | 259 | 34.7 | SM14-Ex-EX12 | |
| Kirkland_Main-113 | Kirkland_Manholes-103 | 59.75 | Kirkland_Manholes-105 | 48.51 | 350.5 | 3.21 | 8 | PVC | 0.01 | 1,263 | 50 | 203 | 253 | 20.1 | SM14-Ex-EX12 | |
| Kirkland_Main-114 | Kirkland_Manholes-104 | 60.14 | Kirkland_Manholes-103 | 59.75 | 61 | 0.64 | 8 | PVC | 0.01 | 564 | 9 | 43 | 52 | 9.3 | | |
| Kirkland_Main-115 | Kirkland_Manholes-102 | 61.04 | Kirkland_Manholes-104 | 60.14 | 158.9 | 0.57 | 8 | PVC | 0.01 | 531 | 8 | 39 | 47 | 8.9 | | |
| Kirkland_Main-116 | Kirkland_Manholes-101 | 61.95 | Kirkland_Manholes-102 | 61.04 | 98.7 | 0.92 | 8 | PVC | 0.01 | 676 | 8 | 35 | 43 | 6.3 | | |
| Kirkland_Main-117 | Kirkland_Manholes-99 | 74.09 | O-41 | 72.48 | 38.5 | 4.19 | 8 | PVC | 0.01 | 1,443 | 74 | 15 | 89 | 6.1 | | |
| Kirkland_Main-119 | Kirkland_Manholes-107 | 262.65 | Kirkland_Manholes-2737 | 259.86 | 239.4 | 1.17 | 8 | PVC | 0.01 | 761 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-120 | Kirkland_Manholes-109 | 325.4 | Kirkland_Manholes-110 | 324.77 | 37.7 | 1.67 | 8 | PVC | 0.01 | 912 | 13 | 53 | 67 | 7.3 | | |
| Kirkland_Main-121 | Kirkland_Manholes-110 | 324.77 | Kirkland_Manholes-111 | 324 | 11.2 | 6.85 | 8 | PVC | 0.01 | 1,846 | 21 | 76 | 97 | 5.2 | | |
| Kirkland_Main-122 | Kirkland_Manholes-108 | 326.5 | Kirkland_Manholes-109 | 325.4 | 336.7 | 0.33 | 8 | PVC | 0.01 | 403 | 11 | 30 | 41 | 10.3 | | |
| Kirkland_Main-123 | Kirkland_Manholes-112 | 326.56 | Kirkland_Manholes-110 | 324.77 | 134.2 | 1.33 | 8 | PVC | 0.01 | 814 | 7 | 15 | 22 | 2.7 | | |
| Kirkland_Main-124 | Kirkland_Manholes-113 | 357.54 | Kirkland_Manholes-112 | 326.56 | 558 | 5.55 | 8 | PVC | 0.01 | 1,661 | 5 | 8 | 12 | 0.7 | | |
| Kirkland_Main-125 | Kirkland_Manholes-134 | 351.46 | Kirkland_Manholes-835 | 347 | 314.9 | 1.42 | 8 | PVC | 0.01 | 839 | 2 | 4 | 6 | 0.7 | | Drop Connection |
| Kirkland_Main-126 | Kirkland_Manholes-128 | 355.4 | Kirkland_Manholes-127 | 354 | 128.2 | 1.09 | 8 | PVC | 0.01 | 737 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-127 | Kirkland_Manholes-127 | 354 | Kirkland_Manholes-126 | 343.91 | 279.9 | 3.6 | 8 | PVC | 0.01 | 1,339 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-128 | Kirkland_Manholes-126 | 343.91 | Kirkland_Manholes-125 | 337.71 | 240.8 | 2.58 | 8 | PVC | 0.01 | 1,131 | 5 | 12 | 17 | 1.5 | | |
| Kirkland_Main-129 | Kirkland_Manholes-125 | 337.71 | Kirkland_Manholes-838 | 337.31 | 98.6 | 0.41 | 8 | PVC | 0.01 | 449 | 7 | 16 | 23 | 5.2 | | |
| Kirkland_Main-130 | Kirkland_Manholes-129 | 356.73 | Kirkland_Manholes-130 | 350.77 | 205.5 | 2.9 | 8 | PVC | 0.01 | 1,201 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX32 | |
| Kirkland_Main-131 | Kirkland_Manholes-130 | 350.77 | Kirkland_Manholes-131 | 322.01 | 184.9 | 15.56 | 8 | PVC | 0.01 | 2,781 | 4 | 8 | 12 | 0.4 | | |
| Kirkland_Main-132 | Kirkland_Manholes-133 | 323.35 | Kirkland_Manholes-131 | 322.01 | 242.6 | 0.55 | 8 | PVC | 0.01 | 524 | 29 | 73 | 102 | 19.5 | | |
| Kirkland_Main-133 | Kirkland_Manholes-842 | 324.88 | Kirkland_Manholes-133 | 323.35 | 209.8 | 0.73 | 8 | PVC | 0.01 | 602 | 27 | 69 | 96 | 16 | | |
| Kirkland_Main-134 | Kirkland_Manholes-131 | 322.01 | Kirkland_Manholes-132 | 319.83 | 182.3 | 1.2 | 8 | PVC | 0.01 | 771 | 34 | 85 | 120 | 15.5 | | |
| Kirkland_Main-135 | Kirkland_Manholes-132 | 319.83 | Kirkland_Manholes-116 | 315.23 | 159 | 2.89 | 8 | PVC | 0.01 | 1,199 | 36 | 90 | 125 | 10.5 | | |
| Kirkland_Main-136 | Kirkland_Manholes-115 | 335.3 | Kirkland_Manholes-116 | 315.23 | 256.3 | 7.83 | 8 | PVC | 0.01 | 1,973 | 3 | 8 | 187 | 9.5 | | |
| Kirkland_Main-137 | Kirkland_Manholes-114 | 360.4 | Kirkland_Manholes-115 | 335.3 | 252.2 | 9.95 | 8 | PVC | 0.01 | 2,224 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-138 | Kirkland_Manholes-1806 | 38.89 | Kirkland_Manholes-2926 | 31.46 | 54.5 | 13.64 | 8 | PVC | 0.01 | 2,604 | 98 | 311 | 409 | 15.7 | SM4 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-139 | Kirkland_Manholes-2926 | 31.46 | Kirkland_Manholes-1396 | 27.46 | 24.1 | 16.61 | 8 | PVC | 0.01 | 2,873 | 98 | 319 | 418 | 14.5 | SM4 | |
| Kirkland_Main-140 | Kirkland_Manholes-123 | 328.2 | Kirkland_Manholes-124 | 326.1 | 151.9 | 1.38 | 8 | PVC | 0.01 | 829 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-141 | Kirkland_Manholes-124 | 326.1 | Kirkland_Manholes-109 | 325.4 | 313.3 | 0.22 | 8 | PVC | 0.01 | 333 | 2 | 15 | 18 | 5.3 | | |
| Kirkland_Main-142 | Kirkland_Manholes-122 | 345.33 | Kirkland_Manholes-108 | 326.5 | 238.6 | 7.89 | 8 | PVC | 0.01 | 1,981 | 11 | 23 | 34 | 1.7 | | |
| Kirkland_Main-143 | Kirkland_Manholes-120 | 360.7 | Kirkland_Manholes-121 | 358.16 | 294.2 | 0.86 | 8 | PVC | 0.01 | 655 | 4 | 8 | 12 | 1.8 | | |
| Kirkland_Main-144 | Kirkland_Manholes-121 | 358.16 | Kirkland_Manholes-122 | 345.33 | 387.6 | 3.31 | 8 | PVC | 0.01 | 1,283 | 7 | 15 | 22 | 1.7 | | |
| Kirkland_Main-145 | Kirkland_Manholes-119 | 359.58 | Kirkland_Manholes-118 | 354.26 | 105.6 | 5.04 | 8 | PVC | 0.01 | 1,583 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-146 | Kirkland_Manholes-118 | 354.26 | Kirkland_Manholes-117 | 315.69 | 251.8 | 15.32 | 8 | PVC | 0.01 | 2,760 | 2 | 8 | 11 | 0.4 | | |
| Kirkland_Main-147 | Kirkland_Manholes-117 | 315.69 | Kirkland_Manholes-116 | 315.23 | 331.8 | 0.14 | 8 | PVC | 0.01 | 263 | 3 | 12 | 15 | 5.8 | | |
| Kirkland_Main-148 | Kirkland_Manholes-116 | 315.23 | Kirkland_Manholes-137 | 298.8 | 246.4 | 6.67 | 8 | PVC | 0.01 | 1,821 | 43 | 114 | 333 | 18.3 | | |
| Kirkland_Main-149 | Kirkland_Manholes-137 | 298.8 | Kirkland_Manholes-1076 | 298.68 | 103.3 | 0.12 | 12 | PVC | 0.01 | 709 | 46 | 122 | 344 | 48.6 | SM14-Ex-EX23 | |
| Kirkland_Main-150 | Kirkland_Manholes-138 | 300.28 | Kirkland_Manholes-137 | 298.8 | 187.2 | 0.79 | 8 | PVC | 0.01 | 627 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-151 | Kirkland_Manholes-135 | 297.13 | Kirkland_Manholes-136 | 295.76 | 244.5 | 0.56 | 8 | PVC | 0.01 | 528 | 2 | 4 | 6 | 1.2 | | |
| Kirkland_Main-152 | Kirkland_Manholes-136 | 295.76 | Kirkland_Manholes-1064 | 278.57 | 324.4 | 5.3 | 8 | PVC | 0.01 | 1,623 | 4 | 8 | 12 | 0.7 | | |
| Kirkland_Main-154 | Kirkland_Manholes-139 | 305.82 | Kirkland_Manholes-1078 | 305.14 | 98 | 0.69 | 8 | PVC | 0.01 | 587 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-156 | Kirkland_Manholes-140 | 281.69 | Kirkland_Manholes-141 | 277.32 | 84.7 | 5.16 | 8 | PVC | 0.01 | 1,601 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-157 | Kirkland_Manholes-141 | 277.32 | Kirkland_Manholes-142 | 276.94 | 95.7 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | Drop Connection |
| Kirkland_Main-158 | Kirkland_Manholes-142 | 255.54 | Kirkland_Manholes-1090 | 254.86 | 50.7 | 1.34 | 8 | PVC | 0.01 | 817 | 1 | 12 | 13 | 1.6 | | |
| Kirkland_Main-160 | Kirkland_Manholes-111 | 324 | TREND_WETWELL | 317.75 | 16.6 | 37.69 | 8 | PVC | 0.01 | 4,328 | 21 | 84 | 105 | 2.4 | | |
| Kirkland_Main-161 | Kirkland_Manholes-144 | 88.96 | Kirkland_Manholes-146 | 84.42 | 39.5 | 11.5 | 8 | PVC | 0.01 | 2,391 | 7 | 17 | 24 | 1 | | |
| Kirkland_Main-162 | Kirkland_Manholes-86 | 148.26 | Kirkland_Manholes-157 | 123.36 | 221.1 | 11.26 | 8 | PVC | 0.01 | 2,366 | 11 | 30 | 41 | 1.7 | SM14-Ex-EX15 | |
| Kirkland_Main-163 | Kirkland_Manholes-84 | 141.87 | Kirkland_Manholes-155 | 126.86 | 190.9 | 7.86 | 8 | PVC | 0.01 | 1,977 | 5 | 13 | 18 | 0.9 | SM14-Ex-EX24 | |
| Kirkland_Main-164 | Kirkland_Manholes-156 | 125.08 | Kirkland_Manholes-157 | 123.36 | 264.1 | 0.65 | 8 | PVC | 0.01 | 569 | 7 | 22 | 29 | 5.1 | SM14-Ex-EX24 | |
| Kirkland_Main-165 | Kirkland_Manholes-157 | 123.36 | Kirkland_Manholes-158 | 121.97 | 144.6 | 0.96 | 8 | PVC | 0.01 | 691 | 19 | 56 | 75 | 10.9 | SM14-Ex-EX15 | |
| Kirkland_Main-166 | Kirkland_Manholes-147 | 139.14 | Kirkland_Manholes-148 | 138.62 | 289.8 | 0.18 | 8 | PVC | 0.01 | 299 | 48 | 117 | 164 | 55.1 | SM14-Ex-EX25 | |
| Kirkland_Main-167 | Kirkland_Manholes-148 | 138.62 | Kirkland_Manholes-149 | 122.95 | 57.1 | 27.47 | 8 | PVC | 0.01 | 3,695 | 48 | 121 | 169 | 4.6 | SM14-Ex-EX25 | |
| Kirkland_Main-168 | Kirkland_Manholes-149 | 122.95 | Kirkland_Manholes-150 | 116.05 | 168.5 | 4.1 | 8 | PVC | 0.01 | 1,427 | 48 | 125 | 174 | 12.2 | SM14-Ex-EX25 | |
| Kirkland_Main-169 | Kirkland_Manholes-153 | 130.01 | Kirkland_Manholes-150 | 116.05 | 56.4 | 24.77 | 8 | PVC | 0.01 | 3,509 | 5 | 17 | 23 | 0.6 | SM14-Ex-EX26 | |
| Kirkland_Main-170 | Kirkland_Manholes-150 | 116.05 | Kirkland_Manholes-159 | 80.68 | 226.3 | 15.63 | 8 | PVC | 0.01 | 2,788 | 59 | 169 | 227 | 8.2 | SM14-Ex-EX28 | |
| Kirkland_Main-171 | Kirkland_Manholes-151 | 132.11 | Kirkland_Manholes-150 | 116.05 | 132.2 | 12.15 | 8 | PVC | 0.01 | 2,458 | 4 | 22 | 25 | 1 | SM14-Ex-EX27 | |
| Kirkland_Main-172 | Kirkland_Manholes-152 | 157.79 | Kirkland_Manholes-151 | 132.11 | 148.9 | 17.25 | 8 | PVC | 0.01 | 2,928 | 3 | 17 | 20 | 0.7 | SM14-Ex-EX27 | |
| Kirkland_Main-173 | Kirkland_Manholes-174 | 143.33 | Kirkland_Manholes-153 | 130.01 | 57.7 | 23.09 | 8 | PVC | 0.01 | 3,388 | 5 | 13 | 18 | 0.5 | SM14-Ex-EX26 | |
| Kirkland_Main-174 | Kirkland_Manholes-89 | 177.59 | Kirkland_Manholes-174 | 143.33 | 179.4 | 19.1 | 8 | PVC | 0.01 | 3,081 | 4 | 9 | 13 | 0.4 | SM14-Ex-EX26 | |
| Kirkland_Main-175 | Kirkland_Manholes-155 | 126.86 | Kirkland_Manholes-156 | 125.08 | 248.1 | 0.72 | 8 | PVC | 0.01 | 597 | 5 | 17 | 23 | 3.8 | SM14-Ex-EX24 | |
| Kirkland_Main-176 | Kirkland_Manholes-158 | 121.97 | Kirkland_Manholes-160 | 41.73 | 324.9 | 24.69 | 8 | PVC | 0.01 | 3,504 | 21 | 61 | 81 | 2.3 | SM14-Ex-EX15 | |
| Kirkland_Main-177 | Kirkland_Manholes-160 | 41.73 | Kirkland_Manholes-175 | 34.4 | 159.3 | 4.6 | 8 | PVC | 0.01 | 1,512 | 22 | 65 | 87 | 5.7 | SM14-Ex-EX15 | |
| Kirkland_Main-178 | Kirkland_Manholes-168 | 22.33 | Kirkland_Manholes-166 | 21.44 | 221.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 6 | 1.3 | | |
| Kirkland_Main-179 | Kirkland_Manholes-165 | 60.59 | Kirkland_Manholes-166 | 21.44 | 398.8 | 9.82 | 8 | PVC | 0.01 | 2,209 | 1 | 4 | 6 | 0.3 | | |
| Kirkland_Main-180 | Kirkland_Manholes-166 | 21.44 | Kirkland_Manholes-167 | 21.4 | 9.5 | 0.4 | 8 | PVC | 0.01 | 445 | 3 | 13 | 16 | 3.5 | | Drop Connection |
| Kirkland_Main-181 | Kirkland_Manholes-143 | 71.16 | Kirkland_Manholes-164 | 59.16 | 83.9 | 14.3 | 8 | PVC | 0.01 | 2,666 | 15 | 48 | 63 | 2.3 | | |
| Kirkland_Main-182 | Kirkland_Manholes-146 | 84.42 | Kirkland_Manholes-143 | 71.16 | 154.2 | 8.6 | 8 | PVC | 0.01 | 2,067 | 12 | 39 | 51 | 2.5 | | |
| Kirkland_Main-183 | Kirkland_Manholes-163 | 106.36 | Kirkland_Manholes-146 | 84.42 | 161.9 | 13.55 | 8 | PVC | 0.01 | 2,596 | 5 | 17 | 22 | 0.9 | | |
| Kirkland_Main-184 | Kirkland_Manholes-161 | 132.09 | Kirkland_Manholes-162 | 124.37 | 152 | 5.08 | 8 | PVC | 0.01 | 1,589 | 4 | 9 | 12 | 0.8 | | |
| Kirkland_Main-185 | Kirkland_Manholes-162 | 124.37 | Kirkland_Manholes-163 | 106.36 | 185.8 | 9.69 | 8 | PVC | 0.01 | 2,195 | 4 | 13 | 17 | 0.8 | | |
| Kirkland_Main-186 | Kirkland_Manholes-169 | 21.92 | Kirkland_Manholes-167 | 19.46 | 234.8 | 1.05 | 18 | PVC | 0.01 | 6,274 | 392 | 1,116 | 1,508 | 24 | SM3 | |
| Kirkland_Main-187 | Kirkland_Manholes-170 | 23.23 | Kirkland_Manholes-169 | 21.92 | 100.1 | 1.31 | 18 | PVC | 0.01 | 7,012 | 389 | 1,099 | 1,488 | 21.2 | SM3 | |
| Kirkland_Main-188 | Kirkland_Manholes-2762 | 13.1 | Kirkland_Manholes-2761 | 12.79 | 196.5 | 0.16 | 36 | PVC | 0.01 | 15,458 | 554 | 1,577 | 2,432 | 15.7 | SM14-Ex-EX10 | |
| Kirkland_Main-189 | Kirkland_Manholes-173 | 34.1 | Kirkland_Manholes-172 | 31.43 | 44.6 | 5.99 | 8 | PVC | 0.01 | 1,725 | 3 | 13 | 16 | 0.9 | | |
| Kirkland_Main-190 | Kirkland_Manholes-178 | 67.04 | Kirkland_Manholes-179 | 37.91 | 174.4 | 16.71 | 8 | PVC | 0.01 | 2,882 | 5 | 9 | 13 | 0.5 | | |
| Kirkland_Main-191 | Kirkland_Manholes-154 | 101.95 | Kirkland_Manholes-178 | 67.04 | 253.3 | 13.78 | 8 | PVC | 0.01 | 2,617 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-192 | Kirkland_Manholes-188 | 58.06 | Kirkland_Manholes-187 | 54.23 | 46.2 | 8.28 | 15 | PVC | 0.01 | 10,848 | 273 | 671 | 944 | 8.7 | SM14-Ex-EX30 | |
| Kirkland_Main-193 | Kirkland_Manholes-187 | 54.23 | Kirkland_Manholes-185 | 53.13 | 306 | 0.36 | 36 | PVC | 0.01 | 23,331 | 274 | 675 | 949 | 4.1 | SM14-Ex-EX30 | |
| Kirkland_Main-194 | Kirkland_Manholes-159 | 80.68 | Kirkland_Manholes-186 | 56.15 | 205.5 | 11.94 | 8 | PVC | 0.01 | 2,436 | 60 | 173 | 233 | 9.5 | SM14-Ex-EX28 | |
| Kirkland_Main-195 | Kirkland_Manholes-189 | 57.91 | Kirkland_Manholes-186 | 56.15 | 258.6 | 0.68 | 8 | PVC | 0.01 | 582 | 2 | 4 | 6 | 1 | SM14-Ex-EX29 | |
| Kirkland_Main-196 | Kirkland_Manholes-186 | 56.15 | Kirkland_Manholes-185 | 53.13 | 48.4 | 6.24 | 12 | PVC | 0.01 | 5,193 | 63 | 182 | 244 | 4.7 | SM14-Ex-EX28 | |
| Kirkland_Main-197 | Kirkland_Manholes-185 | 53.13 | Kirkland_Manholes-183 | 41.05 | 170.7 | 7.08 | 15 | PVC | 0.01 | 10,026 | 337 | 861 | 1,198 | 11.9 | SM14-Ex-EX30 | |
| Kirkland_Main-198 | Kirkland_Manholes-182 | 53.5 | Kirkland_Manholes-181 | 38.4 | 151.6 | 9.96 | 8 | PVC | 0.01 | 2,225 | 1 | 4 | 6 | 0.3 | | |
| Kirkland_Main-199 | Kirkland_Manholes-314 | 150.22 | Kirkland_Manholes-315 | 148.46 | 139.8 | 1.26 | 8 | PVC | 0.01 | 791 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-200 | Kirkland_Manholes-315 | 148.46 | Kirkland_Manholes-316 | 147.8 | 125.4 | 0.53 | 8 | PVC | 0.01 | 512 | 0 | 9 | 9 | 1.7 | | |
| Kirkland_Main-201 | Kirkland_Manholes-316 | 147.8 | Kirkland_Manholes-317 | 146.79 | 246.9 | 0.41 | 12 | PVC | 0.01 | 1,330 | 143 | 320 | 463 | 34.8 | SM14-Ex-EX30 | |
| Kirkland_Main-202 | Kirkland_Manholes-1205 | 19.63 | Kirkland_Manholes-1850 | 19.39 | 404.6 | 0.06 | 8 | PVC | 0.01 | 172 | 1 | 6 | 7 | 4.2 | SM10 | |
| Kirkland_Main-203 | Kirkland_Manholes-1187 | 22.69 | Kirkland_Manholes-1188 | 22.09 | 184.7 | 0.32 | 12 | PVC | 0.01 | 1,185 | 1 | 9 | 9 | 0.8 | SM14-Ex-EX37 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-204 | Kirkland_Manholes-1188 | 22.09 | Kirkland_Manholes-1189 | 21.99 | 127.3 | 0.08 | 12 | PVC | 0.01 | 583 | 2 | 18 | 20 | 3.4 | SM14-Ex-EX37 | |
| Kirkland_Main-205 | Kirkland_Manholes-1189 | 21.99 | Kirkland_Manholes-1202 | 18.39 | 139.2 | 2.59 | 12 | PVC | 0.01 | 3,343 | 3 | 27 | 30 | 0.9 | SM14-Ex-EX37 | |
| Kirkland_Main-206 | Kirkland_Manholes-1202 | 18.39 | Kirkland_Manholes-1203 | 18.22 | 388.5 | 0.04 | 12 | PVC | 0.01 | 435 | 6 | 35 | 41 | 9.4 | SM14-Ex-EX37 | |
| Kirkland_Main-207 | Kirkland_Manholes-1203 | 18.22 | Kirkland_Manholes-1204 | 17.89 | 122.5 | 0.27 | 12 | PVC | 0.01 | 1,079 | 6 | 44 | 51 | 4.7 | SM14-Ex-EX37 | |
| Kirkland_Main-208 | Kirkland_Manholes-1204 | 17.89 | Kirkland_Manholes-516 | 17.69 | 304.6 | 0.07 | 12 | PVC | 0.01 | 533 | 8 | 53 | 61 | 11.5 | SM14-Ex-EX37 | |
| Kirkland_Main-209 | Kirkland_Manholes-1197 | 181.82 | Kirkland_Manholes-1196 | 172.3 | 310.3 | 3.07 | 8 | | 0.012 | 1,029 | 4 | 41 | 45 | 4.4 | | |
| Kirkland_Main-210 | Kirkland_Manholes-1196 | 172.3 | Kirkland_Manholes-1195 | 162.64 | 327.7 | 2.95 | 8 | | 0.012 | 1,009 | 4 | 49 | 54 | 5.3 | | |
| Kirkland_Main-211 | Kirkland_Manholes-1195 | 162.64 | Kirkland_Manholes-1190 | 151.12 | 307.8 | 3.74 | 8 | | 0.012 | 1,137 | 5 | 58 | 62 | 5.5 | | |
| Kirkland_Main-212 | Kirkland_Manholes-1190 | 151.12 | Kirkland_Manholes-1405 | 132.7 | 345 | 5.34 | 8 | | 0.012 | 1,358 | 6 | 74 | 80 | 5.9 | | |
| Kirkland_Main-213 | Kirkland_Manholes-1191 | 345.24 | Kirkland_Manholes-1192 | 340.89 | 127.3 | 3.42 | 6 | Vitrified Clay | 0.013 | 465 | 16 | 4 | 20 | 4.2 | | |
| Kirkland_Main-214 | Kirkland_Manholes-1192 | 340.89 | Kirkland_Manholes-1193 | 318.62 | 250.8 | 8.88 | 6 | Vitrified Clay | 0.013 | 750 | 67 | 8 | 76 | 10.1 | | |
| Kirkland_Main-215 | Kirkland_Manholes-1193 | 318.62 | Kirkland_Manholes-1194 | 312.16 | 165.2 | 3.91 | 6 | Vitrified Clay | 0.013 | 498 | 67 | 12 | 80 | 16 | | |
| Kirkland_Main-216 | Kirkland_Manholes-1194 | 312.16 | Kirkland_Manholes-1212 | 307.51 | 140.5 | 3.31 | 6 | Concrete | 0.013 | 458 | 67 | 16 | 84 | 18.3 | | |
| Kirkland_Main-217 | Kirkland_Manholes-1146 | 215.3 | Kirkland_Manholes-500 | 209.24 | 317 | 1.91 | 8 | PVC | 0.01 | 975 | 14 | 49 | 64 | 6.5 | SM4 | |
| Kirkland_Main-218 | Kirkland_Manholes-1225 | 212.63 | Kirkland_Manholes-1147 | 194.47 | 343.1 | 5.29 | 8 | PVC | 0.01 | 1,622 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX88 | |
| Kirkland_Main-219 | Kirkland_Manholes-500 | 209.24 | Kirkland_Manholes-1147 | 194.47 | 315.3 | 4.68 | 8 | PVC | 0.01 | 1,526 | 20 | 66 | 86 | 5.7 | SM4 | |
| Kirkland_Main-220 | Kirkland_Manholes-1149 | 192.13 | Kirkland_Manholes-1148 | 179.25 | 269.3 | 4.78 | 8 | PVC | 0.01 | 1,542 | 20 | 64 | 84 | 5.4 | SM14-Ex-EX89 | |
| Kirkland_Main-221 | Kirkland_Manholes-1147 | 194.47 | Kirkland_Manholes-1148 | 179.25 | 319 | 4.77 | 8 | PVC | 0.01 | 1,540 | 25 | 82 | 107 | 6.9 | SM4 | |
| Kirkland_Main-222 | Kirkland_Manholes-1148 | 179.25 | Kirkland_Manholes-1796 | 160.8 | 313.7 | 5.88 | 8 | PVC | 0.01 | 1,710 | 47 | 155 | 201 | 11.8 | SM4 | |
| Kirkland_Main-223 | Kirkland_Manholes-1171 | 160.49 | Kirkland_Manholes-1150 | 151.79 | 210.3 | 4.14 | 8 | PVC | 0.01 | 1,434 | 11 | 41 | 53 | 3.7 | SM10 | |
| Kirkland_Main-224 | Kirkland_Manholes-1129 | 164.28 | Kirkland_Manholes-1128 | 162.57 | 73.5 | 2.33 | 8 | PVC | 0.01 | 1,075 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX4 | |
| Kirkland_Main-225 | Kirkland_Manholes-1111 | 165.6 | O-8 | 165.51 | 22.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | |
| Kirkland_Main-227 | Kirkland_Manholes-197 | 50.1 | Kirkland_Manholes-196 | 49.03 | 107.3 | 1 | 8 | PVC | 0.01 | 704 | 8 | 35 | 43 | 6.1 | SM14-Ex-EX43 | |
| Kirkland_Main-228 | Kirkland_Manholes-196 | 49.03 | Kirkland_Manholes-195 | 48.03 | 74.6 | 1.34 | 8 | PVC | 0.01 | 816 | 9 | 39 | 48 | 5.9 | SM14-Ex-EX43 | |
| Kirkland_Main-229 | Kirkland_Manholes-740 | 221.28 | Kirkland_Manholes-711 | 219.85 | 98.7 | 1.45 | 8 | PVC | 0.01 | 849 | 10 | 4 | 14 | 1.7 | | |
| Kirkland_Main-230 | Kirkland_Manholes-1107 | 164.79 | O-9 | 160.2 | 26.3 | 17.47 | 8 | PVC | 0.01 | 2,947 | 0 | 8 | 8 | 0.3 | SM14-Ex-EX21 | |
| Kirkland_Main-231 | Kirkland_Manholes-1106 | 168.9 | O-10 | 168.5 | 24.6 | 1.64 | 18 | PVC | 0.01 | 7,851 | 692 | 2,173 | 2,865 | 36.5 | | Drop Connection |
| Kirkland_Main-232 | Kirkland_Manholes-1118 | 200.71 | Kirkland_Manholes-1117 | 196.58 | 128.3 | 3.22 | 8 | PVC | 0.01 | 1,265 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-233 | Kirkland_Manholes-1115 | 186.39 | Kirkland_Manholes-1114 | 181.51 | 185.2 | 2.63 | 15 | PVC | 0.01 | 6,118 | 21 | 16 | 37 | 0.6 | | |
| Kirkland_Main-234 | Kirkland_Manholes-1114 | 181.51 | Kirkland_Manholes-1113 | 180.6 | 148.4 | 0.61 | 15 | PVC | 0.01 | 2,952 | 38 | 20 | 59 | 2 | | |
| Kirkland_Main-235 | Kirkland_Manholes-1143 | 203.09 | Kirkland_Manholes-1144 | 194 | 101.9 | 8.92 | 8 | PVC | 0.01 | 2,105 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX82 | |
| Kirkland_Main-236 | Kirkland_Manholes-1144 | 194 | Kirkland_Manholes-1145 | 190.6 | 30.2 | 11.26 | 8 | PVC | 0.01 | 2,366 | 1 | 16 | 18 | 0.7 | | |
| Kirkland_Main-237 | Kirkland_Manholes-1145 | 190.6 | Kirkland_Manholes-1211 | 186.99 | 174.5 | 2.07 | 8 | PVC | 0.01 | 1,014 | 4 | 25 | 28 | 2.8 | | |
| Kirkland_Main-238 | Kirkland_Manholes-1184 | 19.39 | Kirkland_Manholes-1185 | 19.29 | 139.1 | 0.07 | 12 | PVC | 0.01 | 557 | 32 | 177 | 209 | 37.5 | SM14-Ex-EX37 | |
| Kirkland_Main-239 | Kirkland_Manholes-1183 | 19.89 | Kirkland_Manholes-1184 | 19.39 | 178.8 | 0.28 | 12 | PVC | 0.01 | 1,099 | 30 | 168 | 198 | 18.1 | SM14-Ex-EX37 | |
| Kirkland_Main-242 | Kirkland_Manholes-1131 | 191.56 | Kirkland_Manholes-1200 | 169.25 | 277.8 | 8.03 | 8 | PVC | 0.01 | 1,998 | 18 | 41 | 59 | 2.9 | SM14-Ex-EX63 | |
| Kirkland_Main-243 | Kirkland_Manholes-1200 | 169.25 | Kirkland_Manholes-1201 | 159.96 | 155.1 | 5.99 | 8 | PVC | 0.01 | 1,726 | 21 | 45 | 66 | 3.8 | SM14-Ex-EX62 | |
| Kirkland_Main-244 | Kirkland_Manholes-1201 | 159.96 | Kirkland_Manholes-1182 | 159 | 65 | 1.48 | 8 | PVC | 0.01 | 857 | 22 | 50 | 72 | 8.4 | SM14-Ex-EX62 | |
| Kirkland_Main-245 | Kirkland_Manholes-1182 | 159 | Kirkland_Manholes-529 | 155.16 | 83.2 | 4.62 | 8 | PVC | 0.01 | 1,515 | 23 | 54 | 77 | 5.1 | SM14-Ex-EX62 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-246 | Kirkland_Manholes-529 | 155.16 | Kirkland_Manholes-527 | 146.55 | 210.2 | 4.1 | 8 | PVC | 0.01 | 1,427 | 23 | 58 | 81 | 5.7 | SM10 | |
| Kirkland_Main-247 | Kirkland_Manholes-516 | 17.69 | Kirkland_Manholes-2958 | 17.19 | 310.2 | 0.16 | 12 | PVC | 0.01 | 835 | 9 | 62 | 71 | 8.5 | SM14-Ex-EX37 | |
| Kirkland_Main-248 | Kirkland_Manholes-318 | 146.51 | Kirkland_Manholes-2957 | 145.86 | 162.1 | 0.4 | 12 | PVC | 0.01 | 1,315 | 143 | 329 | 471 | 35.9 | SM14-Ex-EX30 | |
| Kirkland_Main-249 | Kirkland_Manholes-2957 | 145.86 | Kirkland_Manholes-426 | 144.6 | 315.5 | 0.4 | 12 | PVC | 0.01 | 1,315 | 147 | 333 | 480 | 36.5 | SM14-Ex-EX30 | |
| Kirkland_Main-251 | Kirkland_Manholes-524 | 157.52 | Kirkland_Manholes-525 | 156.27 | 278.3 | 0.45 | 8 | PVC | 0.01 | 473 | 2 | 16 | 18 | 3.9 | SM10 | |
| Kirkland_Main-253 | Kirkland_Manholes-2932 | 327.56 | Kirkland_Manholes-2931 | 326.77 | 30 | 2.63 | 8 | PVC | 0.01 | 1,144 | 3 | 24 | 28 | 2.4 | | |
| Kirkland_Main-254 | Kirkland_Manholes-2931 | 326.77 | Kirkland_Manholes-2930 | 326.38 | 131.8 | 0.3 | 8 | PVC | 0.01 | 384 | 4 | 28 | 33 | 8.5 | | |
| Kirkland_Main-255 | Kirkland_Manholes-2930 | 326.38 | Kirkland_Manholes-878 | 325.66 | 147.9 | 0.49 | 8 | PVC | 0.01 | 492 | 5 | 33 | 37 | 7.6 | | |
| Kirkland_Main-257 | Kirkland_Manholes-2345 | 343.84 | Kirkland_Manholes-2343 | 315.2 | 169.5 | 16.9 | 8 | PVC | 0.01 | 2,898 | 7 | 20 | 28 | 1 | SM14-Ex-EX255 | |
| Kirkland_Main-258 | Kirkland_Manholes-2344 | 315.75 | Kirkland_Manholes-2343 | 315.2 | 137.3 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 12 | 19 | 4.3 | SM14-Ex-EX254 | |
| Kirkland_Main-259 | Kirkland_Manholes-2256 | 329.88 | Kirkland_Manholes-2344 | 315.75 | 334.7 | 4.22 | 8 | PVC | 0.01 | 1,449 | 4 | 8 | 12 | 0.8 | SM14-Ex-EX254 | |
| Kirkland_Main-261 | Kirkland_Manholes-2346 | 349.24 | Kirkland_Manholes-2345 | 343.84 | 323.2 | 1.67 | 8 | PVC | 0.01 | 911 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX255 | |
| Kirkland_Main-262 | Kirkland_Manholes-2347 | 359.76 | Kirkland_Manholes-2345 | 343.84 | 158.1 | 10.07 | 8 | PVC | 0.01 | 2,237 | 3 | 12 | 15 | 0.7 | SM14-Ex-EX255 | |
| Kirkland_Main-263 | Kirkland_Manholes-2348 | 314.6 | Kirkland_Manholes-2334 | 313.34 | 224.3 | 0.56 | 8 | PVC | 0.01 | 528 | 16 | 41 | 56 | 10.7 | SM14-Ex-EX254 | |
| Kirkland_Main-264 | Kirkland_Manholes-2350 | 364.04 | Kirkland_Manholes-2347 | 359.76 | 357 | 1.2 | 8 | PVC | 0.01 | 772 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX255 | |
| Kirkland_Main-265 | Kirkland_Manholes-2351 | 360.37 | Kirkland_Manholes-2347 | 359.76 | 181.2 | 0.34 | 8 | PVC | 0.01 | 409 | 1 | 4 | 5 | 1.3 | SM14-Ex-EX255 | |
| Kirkland_Main-266 | Kirkland_Manholes-2352 | 284.5 | Kirkland_Manholes-2259 | 272.05 | 240.1 | 5.18 | 8 | PVC | 0.01 | 1,605 | 0 | 4 | 5 | 0.3 | SM14-Ex-EX250 | |
| Kirkland_Main-267 | Kirkland_Manholes-2353 | 298.2 | Kirkland_Manholes-2332 | 296.43 | 253 | 0.7 | 8 | PVC | 0.01 | 590 | 2 | 4 | 6 | 1.1 | SM14-Ex-EX253 | |
| Kirkland_Main-268 | Kirkland_Manholes-2355 | 240.55 | Kirkland_Manholes-2124 | 217.78 | 364.4 | 6.25 | 12 | PVC | 0.01 | 5,196 | 308 | 903 | 1,211 | 23.3 | SM14-Ex-EX248 | |
| Kirkland_Main-269 | Kirkland_Manholes-2354 | 256.04 | Kirkland_Manholes-2355 | 240.55 | 281.2 | 5.51 | 12 | PVC | 0.01 | 4,879 | 305 | 899 | 1,204 | 24.7 | SM14-Ex-EX248 | |
| Kirkland_Main-270 | Kirkland_Manholes-2357 | 271.18 | Kirkland_Manholes-2354 | 256.04 | 199.4 | 7.59 | 8 | PVC | 0.01 | 1,943 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX249 | |
| Kirkland_Main-271 | Kirkland_Manholes-2258 | 263.77 | Kirkland_Manholes-2354 | 256.04 | 150.5 | 5.14 | 12 | PVC | 0.01 | 4,711 | 301 | 887 | 1,188 | 25.2 | SM14-Ex-EX248 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-272 | Kirkland_Manholes-2356 | 278.21 | Kirkland_Manholes-2357 | 271.18 | 149.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-273 | Kirkland_Manholes-2324 | 245.37 | Kirkland_Manholes-2420 | 230.11 | 227.1 | 6.72 | 8 | PVC | 0.01 | 1,828 | 45 | 151 | 196 | 10.7 | | |
| Kirkland_Main-274 | Kirkland_Manholes-2358 | 262.09 | Kirkland_Manholes-2412 | 260.78 | 357.3 | 0.37 | 8 | PVC | 0.01 | 427 | 4 | 8 | 12 | 2.9 | | |
| Kirkland_Main-275 | Kirkland_Manholes-2359 | 271.5 | Kirkland_Manholes-2358 | 262.09 | 128.6 | 7.32 | 8 | PVC | 0.01 | 1,907 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-276 | Kirkland_Manholes-2362 | 285.37 | Kirkland_Manholes-2360 | 266.1 | 385.1 | 5 | 8 | PVC | 0.01 | 1,577 | 21 | 61 | 82 | 5.2 | | |
| Kirkland_Main-277 | Kirkland_Manholes-2360 | 266.1 | Kirkland_Manholes-2411 | 259.15 | 259.9 | 2.67 | 8 | PVC | 0.01 | 1,153 | 23 | 65 | 88 | 7.6 | | |
| Kirkland_Main-278 | Kirkland_Manholes-2361 | 291.01 | Kirkland_Manholes-2362 | 285.37 | 28 | 20.16 | 8 | PVC | 0.01 | 3,166 | 3 | 8 | 12 | 0.4 | | |
| Kirkland_Main-279 | Kirkland_Manholes-2371 | 291.2 | Kirkland_Manholes-2362 | 285.37 | 123.7 | 4.71 | 8 | PVC | 0.01 | 1,530 | 17 | 49 | 66 | 4.3 | | |
| Kirkland_Main-280 | Kirkland_Manholes-2363 | 291.88 | Kirkland_Manholes-2361 | 291.01 | 353 | 0.25 | 8 | PVC | 0.01 | 350 | 2 | 4 | 6 | 1.7 | | |
| Kirkland_Main-281 | Kirkland_Manholes-2364 | 284.3 | Kirkland_Manholes-2429 | 273.52 | 255 | 4.23 | 8 | PVC | 0.01 | 1,450 | 30 | 94 | 123 | 8.5 | SM14-Ex-EX260 | |
| Kirkland_Main-282 | Kirkland_Manholes-2382 | 327.1 | Kirkland_Manholes-2369 | 315.99 | 220.4 | 5.04 | 8 | PVC | 0.01 | 1,583 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-283 | Kirkland_Manholes-2369 | 315.99 | Kirkland_Manholes-2370 | 312.97 | 65.7 | 4.59 | 8 | PVC | 0.01 | 1,511 | 25 | 69 | 94 | 6.3 | SM14-Ex-EX260 | |
| Kirkland_Main-284 | Kirkland_Manholes-2383 | 328.5 | Kirkland_Manholes-2369 | 315.99 | 277.1 | 4.51 | 8 | PVC | 0.01 | 1,498 | 21 | 61 | 82 | 5.5 | SM14-Ex-EX260 | |
| Kirkland_Main-285 | Kirkland_Manholes-2370 | 312.97 | Kirkland_Manholes-2367 | 295.27 | 303.5 | 5.83 | 8 | PVC | 0.01 | 1,703 | 26 | 73 | 99 | 5.8 | SM14-Ex-EX260 | |
| Kirkland_Main-286 | Kirkland_Manholes-2365 | 289.93 | Kirkland_Manholes-2364 | 284.3 | 103.6 | 5.44 | 8 | PVC | 0.01 | 1,644 | 29 | 90 | 118 | 7.2 | SM14-Ex-EX260 | |
| Kirkland_Main-287 | Kirkland_Manholes-2367 | 295.27 | Kirkland_Manholes-2366 | 292.68 | 34.9 | 7.43 | 8 | PVC | 0.01 | 1,921 | 27 | 77 | 104 | 5.4 | SM14-Ex-EX260 | |
| Kirkland_Main-288 | Kirkland_Manholes-181 | 38.4 | Kirkland_Manholes-180 | 38.25 | 24 | 0.62 | 8 | PVC | 0.01 | 555 | 2 | 13 | 15 | 2.6 | | |
| Kirkland_Main-289 | Kirkland_Manholes-184 | 40.15 | Kirkland_Manholes-181 | 38.4 | 362.3 | 0.48 | 8 | PVC | 0.01 | 490 | 0 | 4 | 5 | 0.9 | | |
| Kirkland_Main-290 | Kirkland_Manholes-180 | 38.25 | Kirkland_Manholes-179 | 37.91 | 155.1 | 0.22 | 18 | PVC | 0.01 | 2,874 | 354 | 960 | 1,314 | 45.7 | SM3 | |
| Kirkland_Main-291 | Kirkland_Manholes-179 | 37.91 | Kirkland_Manholes-177 | 35.5 | 248.2 | 0.97 | 18 | PVC | 0.01 | 6,039 | 359 | 973 | 1,332 | 22.1 | SM3 | |
| Kirkland_Main-292 | Kirkland_Manholes-177 | 35.5 | Kirkland_Manholes-176 | 34.72 | 401.5 | 0.19 | 18 | PVC | 0.01 | 2,705 | 363 | 999 | 1,363 | 50.4 | SM3 | |
| Kirkland_Main-293 | Kirkland_Manholes-176 | 34.72 | Kirkland_Manholes-175 | 34.4 | 144.6 | 0.22 | 18 | PVC | 0.01 | 2,875 | 364 | 1,004 | 1,367 | 47.6 | SM3 | |
| Kirkland_Main-294 | Kirkland_Manholes-175 | 34.4 | Kirkland_Manholes-171 | 25.99 | 328.5 | 2.56 | 18 | PVC | 0.01 | 9,806 | 385 | 1,073 | 1,458 | 14.9 | SM3 | |
| Kirkland_Main-295 | Kirkland_Manholes-171 | 25.99 | Kirkland_Manholes-170 | 25.29 | 316.1 | 0.22 | 18 | PVC | 0.01 | 2,875 | 388 | 1,095 | 1,483 | 51.6 | SM3 | Drop Connection |
| Kirkland_Main-296 | Kirkland_Manholes-172 | 31.43 | Kirkland_Manholes-171 | 31.34 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 17 | 20 | 4.5 | | Drop Connection |
| Kirkland_Main-297 | Kirkland_Manholes-190 | 38.49 | Kirkland_Manholes-180 | 38.25 | 107 | 0.22 | 15 | PVC | 0.01 | 1,763 | 352 | 943 | 1,295 | 73.5 | SM3 | |
| Kirkland_Main-298 | Kirkland_Manholes-183 | 41.05 | Kirkland_Manholes-190 | 38.49 | 284.2 | 0.9 | 15 | PVC | 0.01 | 3,580 | 352 | 939 | 1,290 | 36 | SM3 | |
| Kirkland_Main-299 | Kirkland_Manholes-167 | 19.46 | Kirkland_Manholes-241 | 14.7 | 339.1 | 1.4 | 18 | PVC | 0.01 | 7,261 | 395 | 1,133 | 1,529 | 21.1 | SM3 | |
| Kirkland_Main-300 | Kirkland_Manholes-164 | 59.16 | Kirkland_Manholes-242 | 58.15 | 252.4 | 0.4 | 8 | PVC | 0.01 | 446 | 17 | 52 | 68 | 15.4 | | Drop Connection |
| Kirkland_Main-301 | Kirkland_Manholes-203 | 83.91 | Kirkland_Manholes-202 | 68.28 | 127.4 | 12.27 | 8 | PVC | 0.01 | 2,470 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-302 | Kirkland_Manholes-202 | 68.28 | Kirkland_Manholes-204 | 54.86 | 133.6 | 10.05 | 8 | PVC | 0.01 | 2,235 | 1 | 9 | 10 | 0.4 | | |
| Kirkland_Main-303 | Kirkland_Manholes-204 | 54.86 | Kirkland_Manholes-169 | 21.92 | 184.1 | 17.89 | 8 | PVC | 0.01 | 2,982 | 3 | 13 | 16 | 0.5 | | |
| Kirkland_Main-304 | Kirkland_Manholes-209 | 226.32 | Kirkland_Manholes-210 | 216.33 | 137.5 | 7.27 | 8 | PVC | 0.01 | 1,901 | 3 | 4 | 7 | 0.4 | SM14-Ex-EX66 | |
| Kirkland_Main-306 | Kirkland_Manholes-214 | 228.3 | Kirkland_Manholes-213 | 213.69 | 210.7 | 6.93 | 8 | PVC | 0.01 | 1,856 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-307 | Kirkland_Manholes-213 | 213.69 | Kirkland_Manholes-212 | 184.62 | 186.4 | 15.59 | 8 | PVC | 0.01 | 2,784 | 7 | 9 | 15 | 0.5 | | |
| Kirkland_Main-308 | Kirkland_Manholes-212 | 184.62 | Kirkland_Manholes-216 | 184.01 | 222.7 | 0.27 | 8 | PVC | 0.01 | 369 | 38 | 100 | 137 | 37.2 | | |
| Kirkland_Main-309 | Kirkland_Manholes-211 | 186.37 | Kirkland_Manholes-212 | 184.62 | 362.4 | 0.48 | 8 | PVC | 0.01 | 490 | 29 | 87 | 115 | 23.6 | | |
| Kirkland_Main-310 | Kirkland_Manholes-210 | 216.33 | Kirkland_Manholes-211 | 186.37 | 372.2 | 8.05 | 8 | PVC | 0.01 | 2,000 | 6 | 9 | 14 | 0.7 | SM14-Ex-EX66 | |
| Kirkland_Main-312 | Kirkland_Manholes-216 | 184.01 | Kirkland_Manholes-217 | 183.22 | 296 | 0.27 | 8 | PVC | 0.01 | 364 | 39 | 104 | 143 | 39.2 | | |
| Kirkland_Main-313 | Kirkland_Manholes-215 | 220.47 | Kirkland_Manholes-217 | 183.22 | 347.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 4 | 4 | 9 | 0.4 | | |
| Kirkland_Main-314 | Kirkland_Manholes-208 | 241.09 | Kirkland_Manholes-207 | 240.8 | 258.2 | 0.11 | 8 | PVC | 0.01 | 236 | 4 | 13 | 17 | 7.2 | SM14-Ex-EX57 | |
| Kirkland_Main-315 | Kirkland_Manholes-207 | 240.8 | Kirkland_Manholes-206 | 239.08 | 251.3 | 0.68 | 8 | PVC | 0.01 | 583 | 7 | 17 | 25 | 4.2 | SM14-Ex-EX57 | |
| Kirkland_Main-316 | Kirkland_Manholes-1236 | 256.67 | Kirkland_Manholes-206 | 239.08 | 279.5 | 6.29 | 8 | PVC | 0.01 | 1,769 | 5 | 9 | 14 | 0.8 | SM14-Ex-EX60 | |
| Kirkland_Main-317 | Kirkland_Manholes-206 | 239.08 | Kirkland_Manholes-205 | 228.15 | 235.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 14 | 30 | 44 | 2.9 | SM14-Ex-EX57 | |
| Kirkland_Main-318 | Kirkland_Manholes-227 | 223.31 | Kirkland_Manholes-226 | 219.39 | 138.6 | 2.83 | 8 | PVC | 0.01 | 1,186 | 7 | 30 | 37 | 3.1 | | |
| Kirkland_Main-319 | Kirkland_Manholes-229 | 178.29 | Kirkland_Manholes-230 | 172.81 | 192.8 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-321 | Kirkland_Manholes-2569 | 300.83 | Kirkland_Manholes-2570 | 299.81 | 42.2 | 2.42 | 8 | PVC | 0.01 | 1,096 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-323 | Kirkland_Manholes-2570 | 299.81 | Kirkland_Manholes-2573 | 298.95 | 117.6 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 12 | 15 | 2.4 | | |
| Kirkland_Main-325 | Kirkland_Manholes-2574 | 291.72 | Kirkland_Manholes-2578 | 278.46 | 194.2 | 6.83 | 8 | PVC | 0.01 | 1,842 | 6 | 33 | 38 | 2.1 | | |
| Kirkland_Main-326 | Kirkland_Manholes-2575 | 296.63 | Kirkland_Manholes-2574 | 291.72 | 277.7 | 1.77 | 8 | PVC | 0.01 | 938 | 5 | 28 | 33 | 3.6 | | |
| Kirkland_Main-327 | Kirkland_Manholes-2572 | 298.88 | Kirkland_Manholes-2575 | 296.63 | 102.9 | 2.19 | 8 | PVC | 0.01 | 1,042 | 4 | 24 | 28 | 2.7 | | |
| Kirkland_Main-330 | Kirkland_Manholes-2576 | 288.87 | Kirkland_Manholes-2577 | 284.91 | 171.7 | 2.31 | 8 | PVC | 0.01 | 1,071 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-331 | Kirkland_Manholes-2577 | 284.91 | Kirkland_Manholes-2580 | 279.25 | 137.4 | 4.12 | 8 | PVC | 0.01 | 1,431 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-332 | Kirkland_Manholes-2580 | 279.25 | Kirkland_Manholes-2579 | 271.58 | 247.7 | 3.1 | 8 | PVC | 0.01 | 1,241 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-333 | Kirkland_Manholes-2582 | 256.45 | Kirkland_Manholes-2583 | 255.68 | 58.5 | 1.32 | 8 | PVC | 0.01 | 809 | 14 | 77 | 92 | 11.3 | SM14-Ex-EX313 | |
| Kirkland_Main-334 | Kirkland_Manholes-2583 | 255.68 | Kirkland_Manholes-2584 | 252.35 | 54.4 | 6.12 | 8 | PVC | 0.01 | 1,744 | 15 | 81 | 96 | 5.5 | SM14-Ex-EX313 | |
| Kirkland_Main-335 | Kirkland_Manholes-2584 | 252.35 | Kirkland_Manholes-2787 | 252.17 | 133.2 | 0.14 | 8 | PVC | 0.01 | 259 | 15 | 85 | 101 | 38.8 | SM14-Ex-EX313 | |
| Kirkland_Main-336 | Kirkland_Manholes-2581 | 260.74 | Kirkland_Manholes-2582 | 256.45 | 63.8 | 6.72 | 8 | PVC | 0.01 | 1,828 | 5 | 20 | 26 | 1.4 | | |
| Kirkland_Main-337 | Kirkland_Manholes-2786 | 258.1 | Kirkland_Manholes-2582 | 256.45 | 266.6 | 0.62 | 8 | PVC | 0.01 | 555 | 9 | 53 | 62 | 11.2 | | |
| Kirkland_Main-338 | Kirkland_Manholes-2579 | 271.58 | Kirkland_Manholes-2581 | 260.74 | 232.4 | 4.66 | 8 | PVC | 0.01 | 1,523 | 4 | 16 | 20 | 1.3 | | |
| Kirkland_Main-339 | Kirkland_Manholes-2586 | 274.45 | Kirkland_Manholes-2585 | 272.57 | 43.2 | 4.35 | 8 | PVC | 0.01 | 1,471 | 1 | 8 | 9 | 0.6 | | |
| Kirkland_Main-340 | Kirkland_Manholes-2587 | 285.24 | Kirkland_Manholes-2586 | 274.45 | 298.8 | 3.61 | 8 | PVC | 0.01 | 1,340 | 1 | 4 | 5 | 0.4 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-342 | Kirkland_Manholes-2588 | 292.14 | Kirkland_Manholes-2589 | 286.31 | 102.9 | 5.66 | 8 | PVC | 0.01 | 1,678 | 24 | 81 | 105 | 6.3 | SM14-Ex-EX303 | |
| Kirkland_Main-343 | Kirkland_Manholes-2591 | 288.43 | Kirkland_Manholes-2589 | 286.31 | 198.2 | 1.07 | 8 | PVC | 0.01 | 729 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX305 | |
| Kirkland_Main-344 | Kirkland_Manholes-2590 | 303.32 | Kirkland_Manholes-2588 | 292.14 | 220.1 | 5.08 | 8 | PVC | 0.01 | 1,589 | 9 | 45 | 54 | 3.4 | SM14-Ex-EX303 | |
| Kirkland_Main-345 | Kirkland_Manholes-2592 | 294.57 | Kirkland_Manholes-2588 | 292.14 | 159.1 | 1.53 | 8 | PVC | 0.01 | 871 | 3 | 8 | 11 | 1.2 | SM14-Ex-EX306 | |
| Kirkland_Main-346 | Kirkland_Manholes-2589 | 286.31 | Kirkland_Manholes-2593 | 281.14 | 131.6 | 3.93 | 8 | PVC | 0.01 | 1,398 | 27 | 90 | 116 | 8.3 | SM14-Ex-EX303 | |
| Kirkland_Main-347 | Kirkland_Manholes-2593 | 281.14 | Kirkland_Manholes-2585 | 272.57 | 372.5 | 2.3 | 8 | PVC | 0.01 | 1,069 | 27 | 94 | 121 | 11.3 | SM14-Ex-EX299 | |
| Kirkland_Main-348 | Kirkland_Manholes-2585 | 272.57 | Kirkland_Manholes-2595 | 270.48 | 180.9 | 1.16 | 8 | PVC | 0.01 | 758 | 29 | 106 | 135 | 17.8 | SM14-Ex-EX299 | |
| Kirkland_Main-349 | Kirkland_Manholes-2595 | 270.48 | Kirkland_Manholes-2594 | 263.61 | 407.7 | 1.68 | 8 | PVC | 0.01 | 915 | 31 | 110 | 141 | 15.4 | SM14-Ex-EX299 | |
| Kirkland_Main-350 | Kirkland_Manholes-2594 | 263.61 | Kirkland_Manholes-2601 | 228.74 | 402.9 | 8.65 | 8 | PVC | 0.01 | 2,074 | 34 | 114 | 148 | 7.1 | SM14-Ex-EX299 | |
| Kirkland_Main-352 | Kirkland_Manholes-2598 | 252.13 | Kirkland_Manholes-2599 | 217.5 | 325.5 | 10.64 | 8 | PVC | 0.01 | 2,300 | 3 | 12 | 15 | 0.7 | SM14-Ex-EX301 | |
| Kirkland_Main-353 | Kirkland_Manholes-2597 | 256.37 | Kirkland_Manholes-2598 | 252.13 | 172.1 | 2.46 | 8 | PVC | 0.01 | 1,107 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX301 | |
| Kirkland_Main-354 | Kirkland_Manholes-2596 | 262.84 | Kirkland_Manholes-2597 | 256.37 | 380.5 | 1.7 | 8 | PVC | 0.01 | 919 | 0 | 4 | 4 | 0.5 | SM14-Ex-EX301 | |
| Kirkland_Main-355 | Kirkland_Manholes-853 | 340.38 | Kirkland_Manholes-851 | 339.16 | 105.8 | 1.16 | 8 | PVC | 0.01 | 758 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-356 | Kirkland_Manholes-851 | 339.16 | Kirkland_Manholes-852 | 338.63 | 131.5 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 37 | 44 | 9.8 | | |
| Kirkland_Main-357 | Kirkland_Manholes-852 | 338.63 | Kirkland_Manholes-854 | 336.98 | 245.6 | 0.67 | 8 | PVC | 0.01 | 578 | 7 | 41 | 48 | 8.3 | | |
| Kirkland_Main-358 | Kirkland_Manholes-854 | 336.98 | Kirkland_Manholes-855 | 335.54 | 321 | 0.45 | 8 | PVC | 0.01 | 472 | 8 | 45 | 53 | 11.2 | | |
| Kirkland_Main-359 | Kirkland_Manholes-855 | 335.54 | Kirkland_Manholes-857 | 334.93 | 126.6 | 0.48 | 8 | PVC | 0.01 | 489 | 9 | 49 | 57 | 11.7 | | |
| Kirkland_Main-360 | Kirkland_Manholes-857 | 334.93 | Kirkland_Manholes-856 | 333.21 | 25.3 | 6.8 | 8 | PVC | 0.01 | 1,838 | 9 | 53 | 62 | 3.4 | | |
| Kirkland_Main-361 | Kirkland_Manholes-858 | 311.1 | Kirkland_Manholes-859 | 309.2 | 142 | 1.34 | 8 | PVC | 0.01 | 816 | 3 | 4 | 7 | 0.8 | SM14-Ex-EX51 | |
| Kirkland_Main-362 | Kirkland_Manholes-198 | 52.1 | Kirkland_Manholes-197 | 50.1 | 250.9 | 0.8 | 8 | PVC | 0.01 | 630 | 6 | 30 | 37 | 5.8 | SM14-Ex-EX43 | |
| Kirkland_Main-363 | Kirkland_Manholes-1648 | 152.03 | Kirkland_Manholes-1649 | 151.45 | 206.3 | 0.28 | 12 | PVC | 0.01 | 1,100 | 5 | 33 | 38 | 3.4 | SM14-Ex-EX196 | |
| Kirkland_Main-364 | Kirkland_Manholes-1649 | 151.45 | Kirkland_Manholes-1650 | 145.43 | 128.4 | 4.69 | 12 | PVC | 0.01 | 4,501 | 8 | 41 | 49 | 1.1 | SM14-Ex-EX196 | |
| Kirkland_Main-365 | Kirkland_Manholes-1651 | 160.29 | Kirkland_Manholes-1650 | 145.43 | 297.8 | 4.99 | 8 | PVC | 0.01 | 1,575 | 0 | 16 | 17 | 1.1 | | |
| Kirkland_Main-366 | Kirkland_Manholes-1652 | 161.6 | Kirkland_Manholes-1651 | 160.29 | 197.8 | 0.66 | 8 | PVC | 0.01 | 574 | 0 | 8 | 9 | 1.5 | | |
| Kirkland_Main-369 | Kirkland_Manholes-1654 | 136.96 | Kirkland_Manholes-1653 | 127.26 | 270 | 3.59 | 8 | PVC | 0.01 | 1,336 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX168 | |
| Kirkland_Main-370 | Kirkland_Manholes-1653 | 127.26 | Kirkland_Manholes-1767 | 122.16 | 112.6 | 4.53 | 8 | PVC | 0.01 | 1,501 | 6 | 16 | 22 | 1.5 | SM14-Ex-EX168 | |
| Kirkland_Main-372 | Kirkland_Manholes-977 | 225.95 | Kirkland_Manholes-978 | 222.9 | 113.4 | 2.69 | 8 | PVC | 0.01 | 1,157 | 9 | 48 | 56 | 4.9 | | |
| Kirkland_Main-374 | Kirkland_Manholes-2858 | 23.78 | Kirkland_Manholes-2857 | 19.7 | 174.1 | 2.34 | 8 | PVC | 0.01 | 1,079 | 0 | 5 | 5 | 0.4 | SM14-Ex-EX315 | |
| Kirkland_Main-376 | Kirkland_Manholes-2865 | 30.12 | Kirkland_Manholes-2864 | 27 | 7.9 | 39.25 | 8 | PVC | 0.01 | 4,417 | 14 | 23 | 38 | 0.9 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-377 | Kirkland_Manholes-2866 | 31.02 | Kirkland_Manholes-2867 | 30.31 | 15.5 | 4.58 | 8 | PVC | 0.01 | 1,509 | 10 | 17 | 27 | 1.8 | SM14-Ex-EX314 | |
| Kirkland_Main-378 | Kirkland_Manholes-2867 | 30.31 | Kirkland_Manholes-2865 | 30.12 | 118.6 | 0.16 | 8 | PVC | 0.01 | 282 | 10 | 20 | 30 | 10.7 | SM14-Ex-EX314 | |
| Kirkland_Main-379 | Kirkland_Manholes-2863 | 49.4 | Kirkland_Manholes-2866 | 31.02 | 310.1 | 5.93 | 8 | PVC | 0.01 | 1,716 | 8 | 13 | 21 | 1.2 | | |
| Kirkland_Main-380 | Kirkland_Manholes-1905 | 395.5 | Kirkland_Manholes-1906 | 388.2 | 277.5 | 2.63 | 8 | PVC | 0.01 | 1,143 | 11 | 41 | 52 | 4.5 | | |
| Kirkland_Main-381 | Kirkland_Manholes-1906 | 388.2 | Kirkland_Manholes-1908 | 383.29 | 92.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 20 | 49 | 69 | 4.2 | | |
| Kirkland_Main-382 | Kirkland_Manholes-1908 | 383.29 | Kirkland_Manholes-1909 | 380 | 18.3 | 18.02 | 8 | PVC | 0.01 | 2,993 | 30 | 61 | 91 | 3 | | |
| Kirkland_Main-383 | Kirkland_Manholes-1910 | 392.49 | Kirkland_Manholes-1908 | 383.29 | 192.6 | 4.78 | 8 | PVC | 0.01 | 1,541 | 10 | 8 | 18 | 1.2 | | |
| Kirkland_Main-386 | Kirkland_Manholes-1911 | 394.49 | Kirkland_Manholes-1910 | 392.49 | 114.9 | 1.74 | 8 | PVC | 0.01 | 930 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-388 | Kirkland_Manholes-1912 | 380.62 | Kirkland_Manholes-1907 | 380.32 | 64.6 | 0.46 | 8 | PVC | 0.01 | 480 | 20 | 8 | 28 | 5.8 | | |
| Kirkland_Main-389 | Kirkland_Manholes-1913 | 381.47 | Kirkland_Manholes-1912 | 380.62 | 181.1 | 0.47 | 8 | PVC | 0.01 | 483 | 20 | 4 | 24 | 4.9 | | |
| Kirkland_Main-390 | Kirkland_Manholes-1915 | 403.84 | Kirkland_Manholes-1903 | 399.77 | 113 | 3.6 | 8 | PVC | 0.01 | 1,338 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-391 | Kirkland_Manholes-1914 | 376.04 | Kirkland_Manholes-1916 | 361.73 | 343.6 | 4.16 | 8 | PVC | 0.01 | 1,439 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-392 | Kirkland_Manholes-1916 | 361.73 | Kirkland_Manholes-1965 | 345.05 | 397.2 | 4.2 | 8 | PVC | 0.01 | 1,445 | 33 | 20 | 53 | 3.7 | | |
| Kirkland_Main-393 | Kirkland_Manholes-1917 | 413.2 | Kirkland_Manholes-1919 | 411.73 | 326.8 | 0.45 | 12 | PVC | 0.01 | 1,394 | 77 | 195 | 272 | 19.5 | SM14-Ex-EX215 | |
| Kirkland_Main-394 | Kirkland_Manholes-1918 | 411.61 | Kirkland_Manholes-1920 | 409.24 | 389.6 | 0.61 | 12 | PVC | 0.01 | 1,622 | 115 | 366 | 481 | 29.7 | SM14-Ex-EX215 | |
| Kirkland_Main-395 | Kirkland_Manholes-1919 | 411.73 | Kirkland_Manholes-1918 | 411.61 | 19.4 | 0.61 | 12 | PVC | 0.01 | 1,622 | 79 | 199 | 278 | 17.1 | SM14-Ex-EX215 | |
| Kirkland_Main-396 | Kirkland_Manholes-1966 | 418.21 | Kirkland_Manholes-1918 | 411.61 | 309.4 | 2.13 | 8 | PVC | 0.01 | 1,030 | 35 | 163 | 198 | 19.2 | SM14-Ex-EX216 | |
| Kirkland_Main-397 | Kirkland_Manholes-2018 | 417.59 | Kirkland_Manholes-1920 | 409.24 | 266.4 | 3.13 | 8 | PVC | 0.01 | 1,248 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-398 | Kirkland_Manholes-2017 | 412 | Kirkland_Manholes-1921 | 405.86 | 284.9 | 2.16 | 8 | PVC | 0.01 | 1,035 | 6 | 20 | 27 | 2.6 | | |
| Kirkland_Main-399 | Kirkland_Manholes-1921 | 405.86 | Kirkland_Manholes-1923 | 399.87 | 337.2 | 1.78 | 12 | PVC | 0.01 | 2,771 | 125 | 403 | 528 | 19 | SM14-Ex-EX215 | Drop Connection |
| Kirkland_Main-400 | Kirkland_Manholes-2013 | 413.74 | Kirkland_Manholes-1922 | 401.71 | 397 | 3.03 | 8 | PVC | 0.01 | 1,227 | 26 | 98 | 124 | 10.1 | | |
| Kirkland_Main-401 | Kirkland_Manholes-1924 | 396.12 | Kirkland_Manholes-1925 | 391.68 | 40.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 5 | 16 | 21 | 0.9 | | |
| Kirkland_Main-402 | Kirkland_Manholes-2012 | 406.67 | Kirkland_Manholes-1924 | 396.12 | 354.7 | 2.97 | 8 | PVC | 0.01 | 1,216 | 4 | 12 | 16 | 1.3 | | |
| Kirkland_Main-403 | Kirkland_Manholes-1926 | 383.42 | Kirkland_Manholes-1927 | 378.37 | 328.1 | 1.54 | 12 | PVC | 0.01 | 2,579 | 159 | 541 | 700 | 27.2 | SM14-Ex-EX205 | |
| Kirkland_Main-404 | Kirkland_Manholes-1927 | 378.37 | Kirkland_Manholes-1928 | 375.97 | 126.7 | 1.89 | 12 | PVC | 0.01 | 2,862 | 159 | 545 | 704 | 24.6 | SM14-Ex-EX205 | |
| Kirkland_Main-405 | Kirkland_Manholes-1922 | 401.71 | Kirkland_Manholes-3030 | 397.75 | 20.7 | 19.14 | 8 | PVC | 0.01 | 3,085 | 28 | 102 | 130 | 4.2 | | |
| Kirkland_Main-406 | Kirkland_Manholes-1923 | 399.87 | Kirkland_Manholes-3030 | 397.75 | 24.4 | 8.7 | 12 | PVC | 0.01 | 6,130 | 125 | 407 | 532 | 8.7 | | |
| Kirkland_Main-407 | Kirkland_Manholes-3030 | 397.75 | Kirkland_Manholes-1925 | 391.68 | 339.3 | 1.79 | 12 | PVC | 0.01 | 2,781 | 153 | 513 | 666 | 23.9 | | |
| Kirkland_Main-408 | Kirkland_Manholes-1925 | 391.68 | Kirkland_Manholes-3031 | 384.74 | 433.2 | 1.6 | 12 | PVC | 0.01 | 2,631 | 159 | 533 | 692 | 26.3 | | |
| Kirkland_Main-409 | Kirkland_Manholes-2750 | 105.56 | Kirkland_Manholes-2749 | 94.38 | 64.8 | 17.26 | 8 | PVC | 0.01 | 2,929 | 28 | 6 | 34 | 1.1 | | |
| Kirkland_Main-410 | Kirkland_Manholes-2751 | 82.43 | Kirkland_Manholes-2879 | 68.04 | 243.9 | 5.9 | 8 | PVC | 0.01 | 1,713 | 0 | 6 | 6 | 0.4 | SM14-Ex-EX280 | |
| Kirkland_Main-412 | Kirkland_Manholes-373 | 230.9 | Kirkland_Manholes-1080 | 229.14 | 244 | 0.72 | 8 | PVC | 0.01 | 599 | 72 | 256 | 328 | 54.8 | | |
| Kirkland_Main-413 | Kirkland_Manholes-195 | 48.03 | Kirkland_Manholes-193 | 45.46 | 195.3 | 1.32 | 8 | PVC | 0.01 | 809 | 10 | 43 | 54 | 6.6 | SM14-Ex-EX43 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-414 | Kirkland_Manholes-193 | 45.46 | Kirkland_Manholes-192 | 42.9 | 32.1 | 7.96 | 8 | PVC | 0.01 | 1,990 | 10 | 48 | 58 | 2.9 | SM14-Ex-EX43 | |
| Kirkland_Main-415 | Kirkland_Manholes-194 | 50.84 | Kirkland_Manholes-192 | 50.61 | 58.2 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 8 | 1.8 | | Drop Connection |
| Kirkland_Main-416 | Kirkland_Manholes-192 | 42.9 | Kirkland_Manholes-191 | 42.5 | 357.1 | 0.11 | 8 | PVC | 0.01 | 236 | 14 | 69 | 83 | 35.3 | SM14-Ex-EX44 | |
| Kirkland_Main-417 | Kirkland_Manholes-191 | 42.5 | Kirkland_Manholes-183 | 41.05 | 287.2 | 0.5 | 8 | PVC | 0.01 | 501 | 14 | 74 | 88 | 17.5 | SM14-Ex-EX44 | |
| Kirkland_Main-418 | Kirkland_Manholes-201 | 56.98 | Kirkland_Manholes-192 | 42.9 | 368.5 | 3.82 | 8 | PVC | 0.01 | 1,378 | 0 | 13 | 13 | 0.9 | SM14-Ex-EX43 | |
| Kirkland_Main-419 | Kirkland_Manholes-199 | 54.68 | Kirkland_Manholes-198 | 52.1 | 112.6 | 2.29 | 8 | PVC | 0.01 | 1,067 | 5 | 26 | 31 | 2.9 | SM14-Ex-EX43 | |
| Kirkland_Main-420 | Kirkland_Manholes-2310 | 256 | Kirkland_Manholes-2738 | 255.5 | 66.4 | 0.75 | 8 | PVC | 0.01 | 612 | 10 | 26 | 36 | 5.9 | | |
| Kirkland_Main-421 | Kirkland_Manholes-2738 | 255.5 | Kirkland_Manholes-2752 | 253.8 | 209.4 | 0.81 | 8 | PVC | 0.01 | 635 | 12 | 30 | 42 | 6.6 | | |
| Kirkland_Main-422 | Kirkland_Manholes-2754 | 9.95 | O-40 | 9.81 | 113.1 | 0.12 | 36 | PVC | 0.01 | 13,690 | 625 | 1,871 | 2,797 | 20.4 | SM14-Ex-EX10 | Drop Connection |
| Kirkland_Main-423 | Kirkland_Manholes-2761 | 12.79 | Kirkland_Manholes-2759 | 11.56 | 416.9 | 0.3 | 36 | PVC | 0.01 | 21,139 | 624 | 1,849 | 2,775 | 13.1 | SM14-Ex-EX10 | |
| Kirkland_Main-425 | Kirkland_Manholes-2759 | 11.56 | Kirkland_Manholes-2758 | 11.2 | 391.7 | 0.09 | 36 | PVC | 0.01 | 11,798 | 624 | 1,854 | 2,779 | 23.6 | SM14-Ex-EX10 | |
| Kirkland_Main-426 | Kirkland_Manholes-2758 | 11.2 | Kirkland_Manholes-2757 | 10.95 | 117.7 | 0.21 | 36 | PVC | 0.01 | 17,933 | 625 | 1,858 | 2,784 | 15.5 | SM14-Ex-EX10 | |
| Kirkland_Main-428 | Kirkland_Manholes-217 | 183.22 | Kirkland_Manholes-230 | 172.81 | 258.2 | 4.03 | 8 | PVC | 0.01 | 1,416 | 46 | 112 | 158 | 11.2 | | |
| Kirkland_Main-429 | Kirkland_Manholes-228 | 142.32 | Kirkland_Manholes-232 | 112.59 | 208.3 | 14.27 | 8 | PVC | 0.01 | 2,663 | 51 | 130 | 181 | 6.8 | | |
| Kirkland_Main-430 | Kirkland_Manholes-226 | 219.39 | Kirkland_Manholes-225 | 214.73 | 200.7 | 2.32 | 8 | PVC | 0.01 | 1,074 | 8 | 35 | 43 | 4 | | |
| Kirkland_Main-431 | Kirkland_Manholes-225 | 214.73 | Kirkland_Manholes-223 | 193.39 | 169.1 | 12.62 | 8 | PVC | 0.01 | 2,505 | 10 | 39 | 49 | 1.9 | | |
| Kirkland_Main-432 | Kirkland_Manholes-223 | 193.39 | Kirkland_Manholes-224 | 189.69 | 263.2 | 1.41 | 8 | PVC | 0.01 | 836 | 21 | 69 | 90 | 10.8 | | |
| Kirkland_Main-433 | Kirkland_Manholes-222 | 194.04 | Kirkland_Manholes-223 | 193.39 | 133.1 | 0.49 | 8 | PVC | 0.01 | 493 | 10 | 26 | 36 | 7.3 | | |
| Kirkland_Main-434 | Kirkland_Manholes-221 | 194.75 | Kirkland_Manholes-222 | 194.04 | 121.4 | 0.58 | 8 | PVC | 0.01 | 539 | 9 | 22 | 31 | 5.7 | | |
| Kirkland_Main-435 | Kirkland_Manholes-219 | 195.26 | Kirkland_Manholes-221 | 194.75 | 115.1 | 0.44 | 8 | PVC | 0.01 | 469 | 8 | 17 | 26 | 5.4 | | |
| Kirkland_Main-436 | Kirkland_Manholes-220 | 211.06 | Kirkland_Manholes-219 | 195.26 | 185.5 | 8.52 | 8 | PVC | 0.01 | 2,057 | 5 | 9 | 13 | 0.7 | | |
| Kirkland_Main-437 | Kirkland_Manholes-218 | 197.04 | Kirkland_Manholes-219 | 195.26 | 182.3 | 0.98 | 8 | PVC | 0.01 | 697 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-438 | Kirkland_Manholes-233 | 215.48 | Kirkland_Manholes-220 | 211.06 | 169.3 | 2.61 | 8 | PVC | 0.01 | 1,139 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-439 | Kirkland_Manholes-224 | 189.69 | Kirkland_Manholes-211 | 186.37 | 292.8 | 1.13 | 8 | PVC | 0.01 | 751 | 22 | 74 | 95 | 12.7 | | |
| Kirkland_Main-440 | Kirkland_Manholes-266 | 97.98 | Kirkland_Manholes-267 | 95.34 | 145 | 1.82 | 8 | PVC | 0.01 | 951 | 37 | 84 | 121 | 12.7 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-441 | Kirkland_Manholes-265 | 110.6 | Kirkland_Manholes-266 | 97.98 | 184.6 | 6.84 | 8 | PVC | 0.01 | 1,844 | 36 | 80 | 115 | 6.3 | SM10 | |
| Kirkland_Main-442 | Kirkland_Manholes-262 | 118.9 | Kirkland_Manholes-265 | 110.6 | 150.8 | 5.51 | 8 | PVC | 0.01 | 1,654 | 34 | 76 | 110 | 6.6 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-443 | Kirkland_Manholes-261 | 130.12 | Kirkland_Manholes-262 | 118.9 | 278.9 | 4.02 | 8 | PVC | 0.01 | 1,414 | 31 | 71 | 102 | 7.2 | SM10 | |
| Kirkland_Main-444 | Kirkland_Manholes-258 | 141.4 | Kirkland_Manholes-261 | 130.12 | 280.6 | 4.02 | 8 | PVC | 0.01 | 1,414 | 27 | 67 | 94 | 6.6 | SM10 | |
| Kirkland_Main-445 | Kirkland_Manholes-527 | 146.55 | Kirkland_Manholes-258 | 141.4 | 279.2 | 1.84 | 8 | PVC | 0.01 | 958 | 25 | 63 | 88 | 9.2 | SM10 | |
| Kirkland_Main-446 | Kirkland_Manholes-259 | 136.12 | Kirkland_Manholes-260 | 130.49 | 137.7 | 4.09 | 8 | PVC | 0.01 | 1,426 | 2 | 4 | 6 | 0.4 | SM10 | |
| Kirkland_Main-447 | Kirkland_Manholes-260 | 130.49 | Kirkland_Manholes-251 | 119.87 | 263.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 3 | 9 | 12 | 0.8 | SM10 | |
| Kirkland_Main-448 | Kirkland_Manholes-251 | 119.87 | Kirkland_Manholes-250 | 115.74 | 110.4 | 3.74 | 8 | PVC | 0.01 | 1,363 | 4 | 13 | 17 | 1.2 | SM14-Ex-EX55 | |
| Kirkland_Main-449 | Kirkland_Manholes-253 | 121.6 | Kirkland_Manholes-254 | 100.7 | 323.7 | 6.46 | 8 | PVC | 0.01 | 1,791 | 35 | 78 | 113 | 6.3 | SM14-Ex-EX40 | |
| Kirkland_Main-450 | Kirkland_Manholes-252 | 142.57 | Kirkland_Manholes-253 | 121.6 | 327.2 | 6.41 | 8 | PVC | 0.01 | 1,785 | 35 | 74 | 109 | 6.1 | SM14-Ex-EX40 | |
| Kirkland_Main-451 | Kirkland_Manholes-257 | 165.98 | Kirkland_Manholes-252 | 142.57 | 284 | 8.24 | 8 | PVC | 0.01 | 2,024 | 34 | 65 | 99 | 4.9 | SM14-Ex-EX57 | |
| Kirkland_Main-452 | Kirkland_Manholes-234 | 184.45 | Kirkland_Manholes-257 | 165.98 | 280.4 | 6.59 | 8 | PVC | 0.01 | 1,810 | 25 | 52 | 76 | 4.2 | SM14-Ex-EX57 | |
| Kirkland_Main-453 | Kirkland_Manholes-1133 | 181.56 | Kirkland_Manholes-257 | 165.98 | 274.2 | 5.68 | 8 | PVC | 0.01 | 1,681 | 8 | 9 | 17 | 1 | SM14-Ex-EX58 | |
| Kirkland_Main-454 | Kirkland_Manholes-231 | 144.64 | Kirkland_Manholes-236 | 135.22 | 190.5 | 4.95 | 8 | PVC | 0.01 | 1,568 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX56 | |
| Kirkland_Main-455 | Kirkland_Manholes-235 | 144.29 | Kirkland_Manholes-236 | 135.22 | 77.1 | 11.76 | 8 | PVC | 0.01 | 2,418 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX56 | |
| Kirkland_Main-456 | Kirkland_Manholes-236 | 135.22 | Kirkland_Manholes-237 | 112.26 | 221.2 | 10.38 | 8 | PVC | 0.01 | 2,271 | 4 | 13 | 17 | 0.7 | SM14-Ex-EX56 | |
| Kirkland_Main-457 | Kirkland_Manholes-232 | 112.59 | Kirkland_Manholes-237 | 112.26 | 229.8 | 0.14 | 8 | PVC | 0.01 | 267 | 51 | 134 | 185 | 69.4 | SM14-Ex-EX41 | |
| Kirkland_Main-458 | Kirkland_Manholes-237 | 112.26 | Kirkland_Manholes-254 | 100.7 | 413.4 | 2.8 | 8 | PVC | 0.01 | 1,179 | 56 | 151 | 208 | 17.6 | SM14-Ex-EX41 | |
| Kirkland_Main-459 | Kirkland_Manholes-254 | 100.7 | Kirkland_Manholes-255 | 81.45 | 344 | 5.6 | 8 | PVC | 0.01 | 1,668 | 92 | 234 | 326 | 19.5 | SM14-Ex-EX40 | |
| Kirkland_Main-460 | Kirkland_Manholes-249 | 98.75 | Kirkland_Manholes-248 | 82.01 | 263.5 | 6.35 | 8 | PVC | 0.01 | 1,777 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX39 | |
| Kirkland_Main-461 | Kirkland_Manholes-255 | 81.45 | Kirkland_Manholes-256 | 63.52 | 326.4 | 5.49 | 8 | PVC | 0.01 | 1,653 | 94 | 238 | 332 | 20.1 | SM14-Ex-EX40 | |
| Kirkland_Main-462 | Kirkland_Manholes-256 | 63.52 | Kirkland_Manholes-245 | 59.23 | 36.4 | 11.78 | 8 | PVC | 0.01 | 2,420 | 95 | 242 | 337 | 13.9 | SM14-Ex-EX40 | |
| Kirkland_Main-463 | Kirkland_Manholes-248 | 82.01 | Kirkland_Manholes-245 | 59.23 | 346.7 | 6.57 | 8 | PVC | 0.01 | 1,807 | 2 | 9 | 11 | 0.6 | SM14-Ex-EX39 | |
| Kirkland_Main-464 | Kirkland_Manholes-245 | 59.23 | Kirkland_Manholes-246 | 59.12 | 26.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 98 | 255 | 353 | 26.8 | SM14-Ex-EX40 | Drop Connection |
| Kirkland_Main-465 | Kirkland_Manholes-247 | 65.14 | Kirkland_Manholes-246 | 64.57 | 142.8 | 0.4 | 8 | PVC | 0.01 | 446 | 57 | 145 | 202 | 45.3 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-466 | Kirkland_Manholes-291 | 21.49 | Kirkland_Manholes-290 | 19.2 | 13 | 17.62 | 12 | PVC | 0.01 | 8,726 | 49 | 64 | 113 | 1.3 | SM10 | |
| Kirkland_Main-467 | Kirkland_Manholes-290 | 19.2 | ROSEPT_WETWELL | 14.96 | 16.7 | 25.32 | 8 | PVC | 0.01 | 3,548 | 59 | 86 | 145 | 4.1 | SM10 | |
| Kirkland_Main-468 | Kirkland_Manholes-289 | 31.71 | Kirkland_Manholes-287 | 23.53 | 51 | 16.05 | 8 | PVC | 0.01 | 2,825 | 10 | 22 | 33 | 1.2 | SM10 | |
| Kirkland_Main-469 | Kirkland_Manholes-288 | 19.33 | Kirkland_Manholes-290 | 19.2 | 135.3 | 0.1 | 8 | PVC | 0.01 | 219 | 8 | 19 | 27 | 12.5 | SM10 | |
| Kirkland_Main-470 | Kirkland_Manholes-287 | 23.53 | Kirkland_Manholes-291 | 21.49 | 128.7 | 1.58 | 8 | PVC | 0.01 | 887 | 49 | 61 | 110 | 12.4 | SM10 | |
| Kirkland_Main-471 | Kirkland_Manholes-286 | 24.15 | Kirkland_Manholes-287 | 23.53 | 96.6 | 0.64 | 12 | PVC | 0.01 | 1,665 | 39 | 35 | 74 | 4.5 | SM10 | |
| Kirkland_Main-472 | Kirkland_Manholes-285 | 19.59 | Kirkland_Manholes-288 | 19.33 | 259.3 | 0.1 | 8 | PVC | 0.01 | 223 | 8 | 16 | 24 | 10.8 | SM10 | |
| Kirkland_Main-473 | Kirkland_Manholes-292 | 22.37 | Kirkland_Manholes-293 | 22.09 | 126.6 | 0.22 | 12 | PVC | 0.01 | 967 | 0 | 9 | 9 | 0.9 | SM14-Ex-EX37 | |
| Kirkland_Main-474 | Kirkland_Manholes-297 | 22.86 | Kirkland_Manholes-296 | 21.27 | 137.3 | 1.16 | 8 | PVC | 0.01 | 759 | 2 | 3 | 6 | 0.7 | SM14-Ex-EX36 | |
| Kirkland_Main-475 | Kirkland_Manholes-296 | 21.27 | Kirkland_Manholes-295 | 20.59 | 313.5 | 0.22 | 8 | PVC | 0.01 | 328 | 4 | 6 | 11 | 3.3 | SM10 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-476 | Kirkland_Manholes-295 | 20.59 | Kirkland_Manholes-294 | 20.11 | 95.2 | 0.5 | 8 | PVC | 0.01 | 501 | 5 | 10 | 15 | 3 | SM10 | |
| Kirkland_Main-477 | Kirkland_Manholes-294 | 20.11 | Kirkland_Manholes-285 | 19.59 | 185.3 | 0.28 | 8 | PVC | 0.01 | 373 | 7 | 13 | 19 | 5.2 | SM10 | |
| Kirkland_Main-478 | Kirkland_Manholes-311 | 21.29 | Kirkland_Manholes-312 | 20.99 | 124.6 | 0.24 | 12 | PVC | 0.01 | 1,020 | 4 | 35 | 40 | 3.9 | SM14-Ex-EX37 | |
| Kirkland_Main-479 | Kirkland_Manholes-312 | 20.99 | Kirkland_Manholes-306 | 19.99 | 281.9 | 0.35 | 12 | PVC | 0.01 | 1,238 | 6 | 44 | 50 | 4 | SM14-Ex-EX37 | |
| Kirkland_Main-480 | Kirkland_Manholes-362 | 216.81 | Kirkland_Manholes-361 | 216.74 | 35.2 | 0.2 | 21 | PVC | 0.01 | 4,142 | 629 | 1,982 | 2,610 | 63 | | |
| Kirkland_Main-481 | Kirkland_Manholes-367 | 213.02 | Kirkland_Manholes-368 | 212.3 | 160.3 | 0.45 | 18 | PVC | 0.01 | 4,107 | 642 | 2,047 | 2,688 | 65.5 | | |
| Kirkland_Main-482 | Kirkland_Manholes-368 | 212.3 | Kirkland_Manholes-369 | 208.86 | 249.4 | 1.38 | 18 | PVC | 0.01 | 7,198 | 642 | 2,051 | 2,692 | 37.4 | | |
| Kirkland_Main-483 | Kirkland_Manholes-369 | 208.86 | Kirkland_Manholes-370 | 206.64 | 246.4 | 0.9 | 18 | PVC | 0.01 | 5,817 | 656 | 2,083 | 2,740 | 47.1 | | |
| Kirkland_Main-484 | Kirkland_Manholes-371 | 213.58 | Kirkland_Manholes-2872 | 207.03 | 240.7 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-485 | Kirkland_Manholes-372 | 241.98 | Kirkland_Manholes-373 | 230.9 | 143.8 | 7.71 | 8 | PVC | 0.01 | 1,957 | 0 | 4 | 5 | 0.2 | | |
| Kirkland_Main-486 | Kirkland_Manholes-375 | 234.87 | Kirkland_Manholes-373 | 230.9 | 271 | 1.46 | 8 | PVC | 0.01 | 853 | 70 | 248 | 319 | 37.3 | | |
| Kirkland_Main-487 | Kirkland_Manholes-374 | 244.09 | Kirkland_Manholes-375 | 234.87 | 143.4 | 6.43 | 8 | PVC | 0.01 | 1,788 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-488 | Kirkland_Manholes-535 | 472.49 | Kirkland_Manholes-536 | 466.05 | 355.6 | 1.81 | 8 | PVC | 0.01 | 949 | 3 | 16 | 19 | 2 | | |
| Kirkland_Main-489 | Kirkland_Manholes-536 | 466.05 | Kirkland_Manholes-539 | 454.38 | 292.6 | 3.99 | 8 | PVC | 0.01 | 1,408 | 5 | 20 | 25 | 1.8 | | |
| Kirkland_Main-490 | Kirkland_Manholes-537 | 455.9 | Kirkland_Manholes-539 | 454.38 | 190.6 | 0.8 | 8 | PVC | 0.01 | 630 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-491 | Kirkland_Manholes-539 | 454.38 | Kirkland_Manholes-540 | 453.6 | 170.3 | 0.46 | 8 | PVC | 0.01 | 477 | 9 | 61 | 70 | 14.7 | | |
| Kirkland_Main-492 | Kirkland_Manholes-540 | 453.6 | Kirkland_Manholes-541 | 450.25 | 325.9 | 1.03 | 8 | PVC | 0.01 | 715 | 10 | 65 | 75 | 10.6 | | |
| Kirkland_Main-493 | Kirkland_Manholes-538 | 457.48 | Kirkland_Manholes-1977 | 454.61 | 403.8 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-494 | Kirkland_Manholes-596 | 110.91 | Kirkland_Manholes-600 | 91.95 | 293.8 | 6.45 | 8 | PVC | 0.01 | 1,791 | 101 | 354 | 455 | 25.4 | SM14-Ex-EX117 | |
| Kirkland_Main-495 | Kirkland_Manholes-598 | 118.14 | Kirkland_Manholes-596 | 110.91 | 360.7 | 2 | 8 | PVC | 0.01 | 998 | 4 | 8 | 12 | 1.2 | SM14-Ex-EX159 | |
| Kirkland_Main-496 | Kirkland_Manholes-606 | 111.69 | Kirkland_Manholes-614 | 87.89 | 289.9 | 8.21 | 8 | PVC | 0.01 | 2,020 | 44 | 165 | 209 | 10.3 | SM14-Ex-EX96 | |
| Kirkland_Main-497 | Kirkland_Manholes-238 | 85.65 | Kirkland_Manholes-239 | 27.77 | 394.9 | 14.66 | 8 | PVC | 0.01 | 2,699 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-502 | Kirkland_Manholes-200 | 55.31 | Kirkland_Manholes-199 | 54.68 | 46 | 1.37 | 8 | PVC | 0.01 | 825 | 4 | 22 | 26 | 3.1 | | |
| Kirkland_Main-503 | Kirkland_Manholes-2330 | 295.18 | Kirkland_Manholes-263 | 292.03 | 86.5 | 3.64 | 8 | PVC | 0.01 | 1,346 | 32 | 98 | 130 | 9.7 | SM14-Ex-EX252 | |
| Kirkland_Main-504 | Kirkland_Manholes-2768 | 263.56 | Kirkland_Manholes-2769 | 260.32 | 376.9 | 0.86 | 8 | PVC | 0.01 | 654 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-505 | Kirkland_Manholes-280 | 27.37 | Kirkland_Manholes-286 | 24.15 | 372.8 | 0.86 | 12 | PVC | 0.01 | 1,932 | 37 | 29 | 65 | 3.4 | SM10 | |
| Kirkland_Main-509 | Kirkland_Manholes-313 | 62.05 | Kirkland_Manholes-286 | 24.15 | 229.1 | 16.54 | 8 | PVC | 0.01 | 2,868 | 2 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-510 | Kirkland_Manholes-804 | 284.1 | Kirkland_Manholes-319 | 281.98 | 84.4 | 2.51 | 8 | PVC | 0.01 | 1,117 | 9 | 33 | 42 | 3.7 | | |
| Kirkland_Main-511 | Kirkland_Manholes-319 | 281.98 | Kirkland_Manholes-320 | 278.6 | 79.1 | 4.27 | 8 | PVC | 0.01 | 1,458 | 10 | 37 | 47 | 3.2 | | |
| Kirkland_Main-512 | Kirkland_Manholes-320 | 278.6 | Kirkland_Manholes-321 | 265.74 | 204.3 | 6.3 | 8 | PVC | 0.01 | 1,769 | 11 | 41 | 52 | 2.9 | | |
| Kirkland_Main-513 | Kirkland_Manholes-321 | 265.74 | Kirkland_Manholes-322 | 263.88 | 72.5 | 2.57 | 8 | PVC | 0.01 | 1,129 | 12 | 45 | 57 | 5 | | |
| Kirkland_Main-514 | Kirkland_Manholes-322 | 263.88 | Kirkland_Manholes-323 | 244.99 | 177.9 | 10.62 | 8 | PVC | 0.01 | 2,297 | 22 | 77 | 99 | 4.3 | | |
| Kirkland_Main-515 | Kirkland_Manholes-803 | 278.64 | Kirkland_Manholes-322 | 263.88 | 141.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 10 | 28 | 39 | 1.7 | | |
| Kirkland_Main-516 | Kirkland_Manholes-323 | 244.99 | Kirkland_Manholes-324 | 240.21 | 186.2 | 2.57 | 8 | PVC | 0.01 | 1,130 | 23 | 81 | 104 | 9.2 | | |
| Kirkland_Main-517 | Kirkland_Manholes-815 | 248.52 | Kirkland_Manholes-324 | 240.21 | 137.2 | 6.05 | 8 | PVC | 0.01 | 1,735 | 7 | 20 | 28 | 1.6 | | |
| Kirkland_Main-518 | Kirkland_Manholes-324 | 240.21 | Kirkland_Manholes-325 | 236.62 | 39.9 | 9.01 | 8 | PVC | 0.01 | 2,116 | 30 | 106 | 136 | 6.4 | | |
| Kirkland_Main-519 | Kirkland_Manholes-325 | 236.62 | Kirkland_Manholes-327 | 230.43 | 89 | 6.95 | 8 | PVC | 0.01 | 1,859 | 31 | 114 | 145 | 7.8 | | |
| Kirkland_Main-520 | Kirkland_Manholes-326 | 238.6 | Kirkland_Manholes-325 | 236.62 | 142.9 | 1.39 | 8 | PVC | 0.01 | 830 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-521 | Kirkland_Manholes-327 | 230.43 | Kirkland_Manholes-328 | 228.68 | 117.4 | 1.49 | 8 | PVC | 0.01 | 861 | 32 | 118 | 150 | 17.4 | | |
| Kirkland_Main-522 | Kirkland_Manholes-328 | 228.68 | Kirkland_Manholes-329 | 227.48 | 172.3 | 0.7 | 8 | PVC | 0.01 | 588 | 32 | 122 | 154 | 26.2 | | |
| Kirkland_Main-523 | Kirkland_Manholes-329 | 227.48 | Kirkland_Manholes-814 | 224.81 | 265.5 | 1.01 | 8 | PVC | 0.01 | 707 | 34 | 126 | 160 | 22.6 | | |
| Kirkland_Main-524 | Kirkland_Manholes-335 | 225.11 | Kirkland_Manholes-330 | 224.74 | 400.7 | 0.09 | 24 | PVC | 0.01 | 4,011 | 583 | 1,754 | 2,337 | 58.3 | SM14-2021-DF4 | |
| Kirkland_Main-525 | Kirkland_Manholes-330 | 224.74 | Kirkland_Manholes-331 | 223 | 199.5 | 0.87 | 21 | PVC | 0.01 | 8,635 | 584 | 1,758 | 2,342 | 27.1 | | |
| Kirkland_Main-526 | Kirkland_Manholes-331 | 223 | Kirkland_Manholes-332 | 219.57 | 217.5 | 1.58 | 21 | PVC | 0.01 | 11,610 | 584 | 1,762 | 2,346 | 20.2 | | |
| Kirkland_Main-527 | Kirkland_Manholes-332 | 219.57 | Kirkland_Manholes-334 | 218.68 | 182 | 0.49 | 21 | PVC | 0.01 | 6,464 | 585 | 1,766 | 2,351 | 36.4 | | |
| Kirkland_Main-528 | Kirkland_Manholes-333 | 225.59 | Kirkland_Manholes-334 | 218.68 | 199.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 39 | 187 | 226 | 17.3 | | |
| Kirkland_Main-529 | Kirkland_Manholes-352 | 234.2 | Kirkland_Manholes-333 | 225.59 | 382.7 | 2.25 | 8 | PVC | 0.01 | 1,058 | 38 | 183 | 221 | 20.9 | | |
| Kirkland_Main-530 | Kirkland_Manholes-334 | 218.68 | Kirkland_Manholes-356 | 218.57 | 161 | 0.07 | 30 | PVC | 0.01 | 6,255 | 627 | 1,961 | 2,588 | 41.4 | SM14-Ex-EX48 | |
| Kirkland_Main-531 | Kirkland_Manholes-337 | 291.09 | Kirkland_Manholes-338 | 268.5 | 343.3 | 6.58 | 8 | PVC | 0.01 | 1,809 | 13 | 65 | 78 | 4.3 | | |
| Kirkland_Main-532 | Kirkland_Manholes-343 | 274.46 | Kirkland_Manholes-338 | 268.5 | 356.6 | 1.67 | 8 | PVC | 0.01 | 912 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-533 | Kirkland_Manholes-338 | 268.5 | Kirkland_Manholes-339 | 249.19 | 361.1 | 5.35 | 8 | PVC | 0.01 | 1,631 | 17 | 73 | 90 | 5.5 | | |
| Kirkland_Main-534 | Kirkland_Manholes-1543 | 289 | Kirkland_Manholes-1544 | 284.46 | 416.8 | 1.09 | 8 | PVC | 0.01 | 736 | 8 | 20 | 29 | 3.9 | SM14-Ex-EX123 | |
| Kirkland_Main-535 | Kirkland_Manholes-1545 | 272.4 | Kirkland_Manholes-765 | 257.59 | 249.5 | 5.94 | 8 | PVC | 0.01 | 1,718 | 20 | 69 | 89 | 5.2 | SM14-Ex-EX121 | |
| Kirkland_Main-536 | Kirkland_Manholes-1571 | 242.76 | Kirkland_Manholes-1572 | 242.19 | 318.3 | 0.18 | 15 | PVC | 0.01 | 1,595 | 221 | 456 | 676 | 42.4 | | |
| Kirkland_Main-537 | Kirkland_Manholes-1573 | 242.13 | Kirkland_Manholes-1574 | 241.8 | 67.8 | 0.49 | 18 | PVC | 0.01 | 4,277 | 221 | 464 | 685 | 16 | SM14-Ex-EX133 | |
| Kirkland_Main-538 | Kirkland_Manholes-1572 | 242.19 | Kirkland_Manholes-1573 | 242.13 | 243.5 | 0.02 | 18 | PVC | 0.01 | 962 | 221 | 460 | 681 | 70.7 | SM14-Ex-EX133 | |
| Kirkland_Main-539 | Kirkland_Manholes-1576 | 330.99 | Kirkland_Manholes-1575 | 314.42 | 250.6 | 6.61 | 8 | PVC | 0.01 | 1,813 | 4 | 28 | 32 | 1.8 | | |
| Kirkland_Main-540 | Kirkland_Manholes-1577 | 341.43 | Kirkland_Manholes-1576 | 330.99 | 181.7 | 5.75 | 8 | PVC | 0.01 | 1,690 | 4 | 24 | 28 | 1.7 | | |
| Kirkland_Main-541 | Kirkland_Manholes-1578 | 344.66 | Kirkland_Manholes-1577 | 341.43 | 47.3 | 6.83 | 8 | PVC | 0.01 | 1,843 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-542 | Kirkland_Manholes-1579 | 359.44 | Kirkland_Manholes-1580 | 335.19 | 206.7 | 11.73 | 12 | PVC | 0.01 | 7,121 | 197 | 619 | 816 | 11.5 | SM14-Ex-EX205 | |
| Kirkland_Main-543 | Kirkland_Manholes-1580 | 335.19 | Kirkland_Manholes-1581 | 324.95 | 171.4 | 5.98 | 12 | PVC | 0.01 | 5,081 | 198 | 623 | 820 | 16.1 | SM14-Ex-EX205 | |
| Kirkland_Main-544 | Kirkland_Manholes-1582 | 332.21 | Kirkland_Manholes-1581 | 324.95 | 160.1 | 4.53 | 12 | PVC | 0.01 | 4,426 | 51 | 195 | 246 | 5.6 | SM14-Ex-EX206 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-545 | Kirkland_Manholes-1581 | 324.95 | Kirkland_Manholes-1623 | 294.92 | 398.1 | 7.54 | 12 | PVC | 0.01 | 5,709 | 249 | 822 | 1,071 | 18.8 | SM14-Ex-EX205 | |
| Kirkland_Main-546 | Kirkland_Manholes-2681 | 334.86 | Kirkland_Manholes-3028 | 332.75 | 289 | 0.73 | 12 | PVC | 0.01 | 1,776 | 45 | 175 | 220 | 12.4 | SM14-Ex-EX206 | |
| Kirkland_Main-547 | Kirkland_Manholes-1583 | 333.82 | Kirkland_Manholes-1582 | 332.21 | 16.6 | 9.69 | 8 | PVC | 0.01 | 2,195 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-548 | Kirkland_Manholes-1584 | 346.72 | Kirkland_Manholes-1583 | 333.82 | 203.1 | 6.35 | 8 | PVC | 0.01 | 1,777 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-549 | Kirkland_Manholes-1575 | 314.42 | Kirkland_Manholes-1953 | 290.71 | 326.1 | 7.27 | 8 | PVC | 0.01 | 1,901 | 4 | 33 | 36 | 1.9 | | |
| Kirkland_Main-550 | Kirkland_Manholes-1150 | 151.79 | Kirkland_Manholes-1151 | 143.36 | 156.6 | 5.38 | 8 | PVC | 0.01 | 1,636 | 14 | 58 | 71 | 4.4 | SM10 | |
| Kirkland_Main-551 | Kirkland_Manholes-1151 | 143.36 | Kirkland_Manholes-1152 | 135.47 | 158.3 | 4.98 | 8 | PVC | 0.01 | 1,574 | 15 | 66 | 81 | 5.1 | SM10 | |
| Kirkland_Main-552 | Kirkland_Manholes-1170 | 153.9 | Kirkland_Manholes-1150 | 151.79 | 249.2 | 0.85 | 8 | PVC | 0.01 | 649 | 2 | 8 | 10 | 1.5 | SM10 | |
| Kirkland_Main-553 | Kirkland_Manholes-306 | 19.99 | Kirkland_Manholes-1183 | 19.89 | 217.6 | 0.05 | 12 | PVC | 0.01 | 446 | 30 | 159 | 190 | 42.5 | SM14-Ex-EX37 | |
| Kirkland_Main-554 | Kirkland_Manholes-304 | 75.98 | Kirkland_Manholes-303 | 75.38 | 34.2 | 1.76 | 8 | PVC | 0.01 | 934 | 18 | 62 | 80 | 8.5 | SM10 | |
| Kirkland_Main-555 | Kirkland_Manholes-303 | 75.38 | Kirkland_Manholes-305 | 74.69 | 171.5 | 0.4 | 8 | PVC | 0.01 | 447 | 18 | 71 | 88 | 19.8 | SM10 | |
| Kirkland_Main-556 | Kirkland_Manholes-302 | 78.72 | Kirkland_Manholes-304 | 75.98 | 177.4 | 1.54 | 8 | PVC | 0.01 | 876 | 17 | 53 | 70 | 8 | SM10 | |
| Kirkland_Main-557 | Kirkland_Manholes-307 | 105.6 | Kirkland_Manholes-302 | 78.72 | 385.1 | 6.98 | 8 | PVC | 0.01 | 1,863 | 16 | 44 | 60 | 3.2 | SM10 | |
| Kirkland_Main-558 | Kirkland_Manholes-301 | 74.29 | Kirkland_Manholes-300 | 70.39 | 326.3 | 1.2 | 8 | PVC | 0.01 | 771 | 3 | 3 | 6 | 0.7 | SM10 | |
| Kirkland_Main-559 | Kirkland_Manholes-1316 | 272.4 | Kirkland_Manholes-1317 | 271.64 | 47 | 1.62 | 8 | PVC | 0.01 | 896 | 1 | 12 | 14 | 1.5 | | |
| Kirkland_Main-563 | Kirkland_Manholes-300 | 70.39 | Kirkland_Manholes-299 | 66.63 | 324 | 1.16 | 8 | PVC | 0.01 | 760 | 6 | 6 | 13 | 1.7 | SM10 | |
| Kirkland_Main-564 | Kirkland_Manholes-388 | 297.69 | Kirkland_Manholes-389 | 295.78 | 310.4 | 0.62 | 8 | PVC | 0.01 | 553 | 9 | 20 | 29 | 5.3 | SM14-Ex-EX33 | |
| Kirkland_Main-565 | Kirkland_Manholes-390 | 304.37 | Kirkland_Manholes-391 | 302.9 | 200.9 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 4 | 6 | 1 | SM14-Ex-EX34 | |
| Kirkland_Main-566 | Kirkland_Manholes-392 | 305 | Kirkland_Manholes-391 | 302.9 | 116.9 | 1.8 | 8 | PVC | 0.01 | 945 | 33 | 122 | 155 | 16.4 | SM14-Ex-EX50 | |
| Kirkland_Main-567 | Kirkland_Manholes-2568 | 299.24 | Kirkland_Manholes-2592 | 294.57 | 199 | 2.35 | 8 | PVC | 0.01 | 1,080 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX306 | |
| Kirkland_Main-568 | Kirkland_Manholes-2571 | 325.07 | Kirkland_Manholes-2570 | 299.81 | 188.9 | 13.37 | 8 | PVC | 0.01 | 2,578 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-569 | Kirkland_Manholes-2602 | 234.19 | Kirkland_Manholes-2601 | 228.74 | 344.4 | 1.58 | 8 | PVC | 0.01 | 887 | 3 | 12 | 15 | 1.7 | SM14-Ex-EX300 | |
| Kirkland_Main-570 | Kirkland_Manholes-2603 | 296.02 | Kirkland_Manholes-2588 | 292.14 | 272.1 | 1.43 | 8 | PVC | 0.01 | 842 | 12 | 24 | 36 | 4.3 | SM14-Ex-EX304 | |
| Kirkland_Main-573 | Kirkland_Manholes-2610 | 205.21 | Kirkland_Manholes-2609 | 193.8 | 79.9 | 14.28 | 8 | PVC | 0.01 | 2,664 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-574 | Kirkland_Manholes-1380 | 448.63 | Kirkland_Manholes-1386 | 447.82 | 272.6 | 0.3 | 8 | PVC | 0.01 | 384 | 7 | 8 | 15 | 3.9 | SM14-Ex-EX219 | |
| Kirkland_Main-575 | Kirkland_Manholes-1383 | 449.36 | Kirkland_Manholes-1380 | 448.63 | 231 | 0.32 | 8 | PVC | 0.01 | 396 | 4 | 4 | 8 | 2.1 | SM14-Ex-EX219 | |
| Kirkland_Main-576 | Kirkland_Manholes-1381 | 441.1 | Kirkland_Manholes-1382 | 428.64 | 320.7 | 3.88 | 8 | PVC | 0.01 | 1,390 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-577 | Kirkland_Manholes-1384 | 452.11 | Kirkland_Manholes-1385 | 450.86 | 206.1 | 0.61 | 8 | PVC | 0.01 | 549 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-578 | Kirkland_Manholes-1385 | 450.86 | Kirkland_Manholes-1386 | 447.82 | 69.1 | 4.4 | 8 | PVC | 0.01 | 1,479 | 2 | 8 | 11 | 0.7 | | |
| Kirkland_Main-579 | Kirkland_Manholes-1386 | 447.82 | Kirkland_Manholes-1387 | 446.83 | 200.1 | 0.49 | 8 | PVC | 0.01 | 496 | 10 | 20 | 30 | 6.1 | SM14-Ex-EX219 | |
| Kirkland_Main-580 | Kirkland_Manholes-1387 | 446.83 | Kirkland_Manholes-1388 | 445.49 | 260.4 | 0.51 | 8 | PVC | 0.01 | 506 | 33 | 98 | 130 | 25.8 | SM14-Ex-EX219 | |
| Kirkland_Main-581 | Kirkland_Manholes-1388 | 445.49 | Kirkland_Manholes-1389 | 444.08 | 265.9 | 0.53 | 8 | PVC | 0.01 | 513 | 34 | 102 | 136 | 26.5 | SM14-Ex-EX219 | |
| Kirkland_Main-582 | Kirkland_Manholes-1390 | 457.46 | Kirkland_Manholes-1389 | 444.08 | 260.4 | 5.14 | 8 | PVC | 0.01 | 1,598 | 7 | 24 | 31 | 2 | SM14-Ex-EX218 | |
| Kirkland_Main-583 | Kirkland_Manholes-1389 | 444.08 | Kirkland_Manholes-532 | 443.04 | 161.2 | 0.65 | 8 | PVC | 0.01 | 566 | 43 | 130 | 173 | 30.6 | SM14-Ex-EX218 | |
| Kirkland_Main-584 | Kirkland_Manholes-532 | 443.04 | Kirkland_Manholes-533 | 442.23 | 169.5 | 0.48 | 8 | PVC | 0.01 | 487 | 47 | 134 | 181 | 37.2 | SM14-Ex-EX218 | |
| Kirkland_Main-585 | Kirkland_Manholes-533 | 442.23 | Kirkland_Manholes-534 | 432.55 | 269 | 3.6 | 8 | PVC | 0.01 | 1,337 | 49 | 138 | 188 | 14 | SM14-Ex-EX218 | |
| Kirkland_Main-586 | Kirkland_Manholes-530 | 464.47 | Kirkland_Manholes-1390 | 457.46 | 207.2 | 3.38 | 8 | PVC | 0.01 | 1,297 | 6 | 20 | 26 | 2 | SM14-Ex-EX218 | |
| Kirkland_Main-587 | Kirkland_Manholes-1391 | 471.35 | Kirkland_Manholes-530 | 464.47 | 201.7 | 3.41 | 8 | PVC | 0.01 | 1,302 | 3 | 12 | 15 | 1.2 | SM14-Ex-EX218 | |
| Kirkland_Main-588 | Kirkland_Manholes-543 | 448.24 | Kirkland_Manholes-1387 | 446.83 | 163.4 | 0.86 | 8 | PVC | 0.01 | 655 | 23 | 73 | 96 | 14.6 | | |
| Kirkland_Main-589 | Kirkland_Manholes-531 | 468.8 | Kirkland_Manholes-530 | 464.47 | 218 | 1.99 | 8 | PVC | 0.01 | 994 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-590 | Kirkland_Manholes-339 | 249.19 | Kirkland_Manholes-340 | 235.81 | 214 | 6.25 | 8 | PVC | 0.01 | 1,763 | 17 | 77 | 95 | 5.4 | | |
| Kirkland_Main-592 | Kirkland_Manholes-2009 | 426.97 | Kirkland_Manholes-2010 | 424.43 | 206.3 | 1.23 | 8 | PVC | 0.01 | 782 | 14 | 53 | 67 | 8.6 | | |
| Kirkland_Main-593 | Kirkland_Manholes-2011 | 417.75 | Kirkland_Manholes-2012 | 406.67 | 363.8 | 3.05 | 8 | PVC | 0.01 | 1,230 | 2 | 8 | 11 | 0.9 | | |
| Kirkland_Main-594 | Kirkland_Manholes-1989 | 447.97 | Kirkland_Manholes-1990 | 439.8 | 245.1 | 3.33 | 8 | PVC | 0.01 | 1,287 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-595 | Kirkland_Manholes-1990 | 439.8 | Kirkland_Manholes-1991 | 431.18 | 131.7 | 6.55 | 8 | PVC | 0.01 | 1,804 | 7 | 28 | 35 | 1.9 | | |
| Kirkland_Main-596 | Kirkland_Manholes-556 | 457.9 | Kirkland_Manholes-3007 | 456.9 | 222.1 | 0.45 | 8 | PVC | 0.01 | 473 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-597 | Kirkland_Manholes-2495 | 184.35 | Kirkland_Manholes-2494 | 170.93 | 403.6 | 3.33 | 8 | PVC | 0.01 | 1,286 | 13 | 20 | 34 | 2.6 | SM14-Ex-EX236 | |
| Kirkland_Main-598 | Kirkland_Manholes-2496 | 191.57 | Kirkland_Manholes-2495 | 184.35 | 278.9 | 2.59 | 8 | PVC | 0.01 | 1,134 | 11 | 16 | 27 | 2.4 | SM14-Ex-EX236 | |
| Kirkland_Main-599 | Kirkland_Manholes-2497 | 194.88 | Kirkland_Manholes-2498 | 194.29 | 45.2 | 1.3 | 8 | PVC | 0.01 | 805 | 9 | 8 | 18 | 2.2 | SM14-Ex-EX236 | |
| Kirkland_Main-600 | Kirkland_Manholes-2498 | 194.29 | Kirkland_Manholes-2496 | 191.57 | 77.4 | 3.51 | 8 | PVC | 0.01 | 1,322 | 10 | 12 | 23 | 1.7 | SM14-Ex-EX236 | |
| Kirkland_Main-601 | Kirkland_Manholes-2237 | 143.38 | Kirkland_Manholes-2499 | 140.38 | 322.1 | 0.93 | 8 | PVC | 0.01 | 680 | 4 | 6 | 10 | 1.5 | SM14-Ex-EX225 | |
| Kirkland_Main-602 | Kirkland_Manholes-2499 | 140.38 | Kirkland_Manholes-2500 | 122.66 | 273.4 | 6.48 | 8 | PVC | 0.01 | 1,795 | 6 | 12 | 18 | 1 | SM14-Ex-EX225 | |
| Kirkland_Main-603 | Kirkland_Manholes-2500 | 122.66 | Kirkland_Manholes-2501 | 104.86 | 254.1 | 7.01 | 8 | PVC | 0.01 | 1,866 | 7 | 18 | 26 | 1.4 | SM14-Ex-EX225 | |
| Kirkland_Main-604 | Kirkland_Manholes-2501 | 104.86 | Kirkland_Manholes-2502 | 102.46 | 257.9 | 0.93 | 8 | PVC | 0.01 | 680 | 10 | 24 | 34 | 5 | SM14-Ex-EX225 | |
| Kirkland_Main-605 | Kirkland_Manholes-2502 | 102.46 | Kirkland_Manholes-2503 | 101.49 | 223.5 | 0.43 | 8 | PVC | 0.01 | 464 | 14 | 31 | 45 | 9.6 | SM14-Ex-EX225 | |
| Kirkland_Main-606 | Kirkland_Manholes-2504 | 121.59 | Kirkland_Manholes-2503 | 101.49 | 254 | 7.91 | 8 | PVC | 0.01 | 1,983 | 5 | 12 | 18 | 0.9 | SM14-Ex-EX223 | |
| Kirkland_Main-607 | Kirkland_Manholes-2503 | 101.49 | Kirkland_Manholes-2507 | 88.29 | 256.5 | 5.15 | 8 | PVC | 0.01 | 1,599 | 21 | 49 | 70 | 4.3 | SM14-Ex-EX223 | |
| Kirkland_Main-608 | Kirkland_Manholes-2505 | 125.11 | Kirkland_Manholes-2504 | 121.59 | 387.3 | 0.91 | 8 | PVC | 0.01 | 672 | 3 | 6 | 9 | 1.3 | SM14-Ex-EX223 | |
| Kirkland_Main-609 | Kirkland_Manholes-2763 | 13.15 | Kirkland_Manholes-2762 | 13.1 | 227.4 | 0.02 | 36 | PVC | 0.01 | 5,771 | 554 | 1,572 | 2,428 | 42.1 | SM14-Ex-EX10 | |
| Kirkland_Main-610 | Kirkland_Manholes-2238 | 92.13 | Kirkland_Manholes-2118 | 82.91 | 342.6 | 2.69 | 8 | PVC | 0.01 | 1,157 | 5 | 12 | 17 | 1.5 | SM14-Ex-EX224 | |
| Kirkland_Main-611 | Kirkland_Manholes-2118 | 82.91 | Kirkland_Manholes-2146 | 75.22 | 210 | 3.66 | 8 | PVC | 0.01 | 1,349 | 31 | 79 | 110 | 8.2 | SM14-Ex-EX223 | |
| Kirkland_Main-612 | Kirkland_Manholes-2506 | 86.22 | Kirkland_Manholes-2118 | 82.91 | 249.1 | 1.33 | 8 | PVC | 0.01 | 813 | 23 | 61 | 84 | 10.4 | SM14-Ex-EX223 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-613 | Kirkland_Manholes-2507 | 88.29 | Kirkland_Manholes-2506 | 86.22 | 236.4 | 0.88 | 8 | PVC | 0.01 | 660 | 22 | 55 | 77 | 11.6 | SM14-Ex-EX223 | |
| Kirkland_Main-614 | Kirkland_Manholes-2508 | 120.01 | Kirkland_Manholes-2510 | 102.3 | 301.7 | 5.87 | 8 | PVC | 0.01 | 1,708 | 5 | 18 | 23 | 1.3 | SM14-Ex-EX229 | |
| Kirkland_Main-615 | Kirkland_Manholes-2144 | 65.5 | Kirkland_Manholes-2143 | 61.9 | 34.5 | 10.44 | 8 | PVC | 0.01 | 2,279 | 74 | 82 | 156 | 6.9 | | |
| Kirkland_Main-616 | Kirkland_Manholes-2145 | 63.1 | Kirkland_Manholes-2143 | 61.9 | 31.4 | 3.82 | 8 | PVC | 0.01 | 1,377 | 5 | 49 | 54 | 4 | | |
| Kirkland_Main-618 | Kirkland_Manholes-2170 | 148.68 | Kirkland_Manholes-2169 | 142.85 | 119.8 | 4.87 | 8 | PVC | 0.01 | 1,555 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX193 | |
| Kirkland_Main-622 | Kirkland_Manholes-2167 | 120.69 | Kirkland_Manholes-2166 | 108.92 | 118.4 | 9.94 | 8 | PVC | 0.01 | 2,223 | 3 | 33 | 36 | 1.6 | SM14-Ex-EX193 | |
| Kirkland_Main-623 | Kirkland_Manholes-2166 | 108.92 | Kirkland_Manholes-2165 | 94.99 | 230.8 | 6.04 | 8 | PVC | 0.01 | 1,732 | 7 | 41 | 48 | 2.8 | SM14-Ex-EX193 | |
| Kirkland_Main-626 | Kirkland_Manholes-2719 | 31.99 | Kirkland_Manholes-2715 | 29.78 | 252.5 | 0.88 | 8 | PVC | 0.01 | 660 | 83 | 12 | 96 | 14.5 | | |
| Kirkland_Main-627 | Kirkland_Manholes-2278 | 406.74 | Kirkland_Manholes-2271 | 405.49 | 96 | 1.3 | 8 | PVC | 0.01 | 805 | 2 | 16 | 19 | 2.3 | | |
| Kirkland_Main-630 | Kirkland_Manholes-2407 | 403.31 | Kirkland_Manholes-2268 | 401.9 | 163.6 | 0.86 | 8 | PVC | 0.01 | 655 | 13 | 49 | 62 | 9.4 | SM14-Ex-EX261 | |
| Kirkland_Main-631 | Kirkland_Manholes-2266 | 392.8 | Kirkland_Manholes-2265 | 392 | 110.1 | 0.73 | 8 | PVC | 0.01 | 601 | 25 | 126 | 151 | 25.1 | SM14-Ex-EX212 | |
| Kirkland_Main-632 | Kirkland_Manholes-2265 | 392 | Kirkland_Manholes-2263 | 374.13 | 447.5 | 3.99 | 8 | PVC | 0.01 | 1,409 | 25 | 130 | 155 | 11 | SM14-Ex-EX212 | |
| Kirkland_Main-633 | Kirkland_Manholes-2245 | 234.09 | Kirkland_Manholes-2074 | 213.49 | 327.6 | 6.29 | 8 | PVC | 0.01 | 1,768 | 49 | 49 | 98 | 5.5 | SM14-Ex-EX246 | |
| Kirkland_Main-634 | Kirkland_Manholes-2253 | 239.74 | Kirkland_Manholes-2252 | 236.86 | 193.1 | 1.49 | 8 | PVC | 0.01 | 861 | 35 | 12 | 47 | 5.4 | SM14-Ex-EX247 | |
| Kirkland_Main-635 | Kirkland_Manholes-2252 | 236.86 | Kirkland_Manholes-2245 | 234.09 | 241.6 | 1.15 | 8 | PVC | 0.01 | 755 | 40 | 16 | 56 | 7.5 | SM14-Ex-EX247 | |
| Kirkland_Main-636 | Kirkland_Manholes-2246 | 246.17 | Kirkland_Manholes-2245 | 234.09 | 185.5 | 6.51 | 8 | PVC | 0.01 | 1,799 | 7 | 24 | 31 | 1.7 | SM14-Ex-EX246 | |
| Kirkland_Main-637 | Kirkland_Manholes-2247 | 249.9 | Kirkland_Manholes-2246 | 246.17 | 310.7 | 1.2 | 8 | PVC | 0.01 | 773 | 5 | 20 | 25 | 3.3 | SM14-Ex-EX246 | |
| Kirkland_Main-638 | Kirkland_Manholes-2251 | 257.04 | Kirkland_Manholes-2247 | 249.9 | 237.7 | 3 | 8 | PVC | 0.01 | 1,222 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX246 | |
| Kirkland_Main-639 | Kirkland_Manholes-2248 | 259.41 | Kirkland_Manholes-2247 | 249.9 | 197.8 | 4.81 | 8 | PVC | 0.01 | 1,546 | 4 | 12 | 16 | 1 | | |
| Kirkland_Main-640 | Kirkland_Manholes-2249 | 263.29 | Kirkland_Manholes-2248 | 259.41 | 137.3 | 2.82 | 8 | PVC | 0.01 | 1,185 | 4 | 8 | 12 | 1 | | |
| Kirkland_Main-641 | Kirkland_Manholes-2250 | 275.69 | Kirkland_Manholes-2249 | 263.29 | 113.4 | 10.94 | 8 | PVC | 0.01 | 2,332 | 4 | 4 | 8 | 0.3 | | |
| Kirkland_Main-642 | Kirkland_Manholes-2261 | 305.59 | Kirkland_Manholes-2260 | 285.07 | 409.2 | 5.01 | 12 | PVC | 0.01 | 4,655 | 294 | 871 | 1,165 | 25 | SM14-Ex-EX248 | |
| Kirkland_Main-643 | Kirkland_Manholes-2262 | 311.78 | Kirkland_Manholes-2261 | 305.59 | 133.8 | 4.62 | 12 | PVC | 0.01 | 4,470 | 291 | 867 | 1,158 | 25.9 | SM14-Ex-EX248 | |
| Kirkland_Main-644 | Kirkland_Manholes-21 | 62.08 | Kirkland_Manholes-101 | 61.95 | 7 | 1.85 | 8 | PVC | 0.01 | 960 | 8 | 30 | 38 | 4 | | |
| Kirkland_Main-645 | Kirkland_Manholes-3038 | 279.17 | Kirkland_Manholes-3039 | 278.83 | 84.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-646 | Kirkland_Manholes-3039 | 278.83 | Kirkland_Manholes-3035 | 266.43 | 233.8 | 5.3 | 8 | PVC | 0.01 | 1,624 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-647 | Kirkland_Manholes-3037 | 277.97 | Kirkland_Manholes-3036 | 268.75 | 180.1 | 5.12 | 8 | PVC | 0.01 | 1,595 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-648 | Kirkland_Manholes-3036 | 268.75 | Kirkland_Manholes-3035 | 266.43 | 62.1 | 3.74 | 8 | PVC | 0.01 | 1,363 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-649 | Kirkland_Manholes-1505 | 267 | Kirkland_Manholes-3035 | 266.43 | 67.6 | 0.84 | 8 | PVC | 0.01 | 647 | 25 | 90 | 115 | 17.7 | | |
| Kirkland_Main-650 | Kirkland_Manholes-3040 | 208.06 | Kirkland_Manholes-3041 | 198.95 | 98.1 | 9.29 | 8 | PVC | 0.01 | 2,148 | 6 | 4 | 10 | 0.5 | | |
| Kirkland_Main-651 | Kirkland_Manholes-3041 | 198.95 | Kirkland_Manholes-1602 | 196.74 | 179.4 | 1.23 | 8 | PVC | 0.01 | 782 | 8 | 8 | 17 | 2.1 | | |
| Kirkland_Main-652 | Kirkland_Manholes-3100 | 18.3 | Kirkland_Manholes-3044 | 18.06 | 60.9 | 0.39 | 18 | PVC | 0.01 | 3,847 | 100 | 67 | 167 | 4.3 | SM14-Ex-EX289 | |
| Kirkland_Main-653 | Kirkland_Manholes-566 | 483.97 | Kirkland_Manholes-3045 | 483.35 | 154.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-655 | Kirkland_Manholes-3046 | 250.83 | Kirkland_Manholes-3047 | 250.39 | 298.9 | 0.15 | 8 | PVC | 0.01 | 271 | 2 | 4 | 6 | 2.1 | | |
| Kirkland_Main-656 | Kirkland_Manholes-3047 | 250.39 | Kirkland_Manholes-396 | 249.55 | 18.8 | 4.48 | 8 | PVC | 0.01 | 1,492 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-657 | Kirkland_Manholes-3048 | 215.92 | Kirkland_Manholes-364 | 215.51 | 48.9 | 0.84 | 21 | PVC | 0.01 | 8,463 | 637 | 2,014 | 2,651 | 31.3 | | |
| Kirkland_Main-658 | Kirkland_Manholes-3051 | 246.2 | Kirkland_Manholes-3050 | 235.83 | 120.9 | 8.58 | 8 | PVC | 0.01 | 2,065 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-659 | Kirkland_Manholes-3050 | 235.83 | Kirkland_Manholes-3049 | 221.64 | 223.5 | 6.35 | 8 | PVC | 0.01 | 1,776 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-660 | Kirkland_Manholes-3049 | 221.64 | Kirkland_Manholes-3048 | 215.92 | 33.6 | 17.02 | 8 | PVC | 0.01 | 2,909 | 2 | 12 | 14 | 0.5 | | |
| Kirkland_Main-661 | Kirkland_Manholes-3054 | 230.52 | Kirkland_Manholes-3053 | 227.56 | 179.1 | 1.65 | 8 | PVC | 0.01 | 906 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-662 | Kirkland_Manholes-3052 | 228.3 | Kirkland_Manholes-3053 | 227.56 | 79.8 | 0.93 | 8 | PVC | 0.01 | 679 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-663 | Kirkland_Manholes-3053 | 227.56 | Kirkland_Manholes-3055 | 218.26 | 198.6 | 4.68 | 8 | PVC | 0.01 | 1,526 | 3 | 12 | 15 | 1 | | |
| Kirkland_Main-664 | Kirkland_Manholes-3055 | 218.26 | Kirkland_Manholes-364 | 215.51 | 19.7 | 13.95 | 8 | PVC | 0.01 | 2,634 | 3 | 16 | 19 | 0.7 | | |
| Kirkland_Main-665 | Kirkland_Manholes-3058 | 393.03 | Kirkland_Manholes-3057 | 384.71 | 254 | 3.28 | 8 | PVC | 0.01 | 1,276 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-666 | Kirkland_Manholes-3057 | 384.71 | Kirkland_Manholes-3056 | 382.54 | 53.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-667 | Kirkland_Manholes-3056 | 382.54 | Kirkland_Manholes-3016 | 372.66 | 250.2 | 3.95 | 8 | PVC | 0.01 | 1,401 | 3 | 12 | 15 | 1.1 | | |
| Kirkland_Main-668 | Kirkland_Manholes-3062 | 383.23 | Kirkland_Manholes-3063 | 372.82 | 282.2 | 3.69 | 8 | PVC | 0.01 | 1,354 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-669 | Kirkland_Manholes-3063 | 372.82 | Kirkland_Manholes-3061 | 361.76 | 319.4 | 3.46 | 8 | PVC | 0.01 | 1,312 | 1 | 8 | 9 | 0.7 | | |
| Kirkland_Main-670 | Kirkland_Manholes-3061 | 361.76 | Kirkland_Manholes-3060 | 360.51 | 136.8 | 0.91 | 8 | PVC | 0.01 | 674 | 1 | 12 | 13 | 1.9 | | |
| Kirkland_Main-671 | Kirkland_Manholes-3059 | 374.97 | Kirkland_Manholes-3060 | 371.3 | 316.1 | 1.16 | 8 | PVC | 0.01 | 760 | 1 | 4 | 5 | 0.6 | | Drop Connection |
| Kirkland_Main-672 | Kirkland_Manholes-3060 | 360.51 | Kirkland_Manholes-3064 | 358.68 | 232.8 | 0.79 | 8 | PVC | 0.01 | 625 | 3 | 20 | 23 | 3.7 | | |
| Kirkland_Main-673 | Kirkland_Manholes-3064 | 358.68 | Kirkland_Manholes-3065 | 358.3 | 94.6 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 24 | 28 | 6.2 | | |
| Kirkland_Main-674 | Kirkland_Manholes-3065 | 358.3 | Kirkland_Manholes-3066 | 356.12 | 87.4 | 2.49 | 8 | PVC | 0.01 | 1,113 | 5 | 28 | 33 | 3 | | |
| Kirkland_Main-675 | Kirkland_Manholes-3066 | 356.12 | Kirkland_Manholes-3067 | 344.94 | 288.6 | 3.87 | 8 | PVC | 0.01 | 1,388 | 7 | 33 | 39 | 2.8 | | |
| Kirkland_Main-676 | Kirkland_Manholes-3067 | 344.94 | Kirkland_Manholes-3068 | 332.11 | 210.6 | 6.09 | 8 | PVC | 0.01 | 1,740 | 7 | 37 | 43 | 2.5 | | |
| Kirkland_Main-677 | Kirkland_Manholes-3068 | 332.11 | Kirkland_Manholes-3069 | 304.52 | 266.1 | 10.37 | 8 | PVC | 0.01 | 2,270 | 7 | 41 | 48 | 2.1 | | |
| Kirkland_Main-678 | Kirkland_Manholes-3069 | 304.52 | Kirkland_Manholes-926 | 302.74 | 43.6 | 4.09 | 8 | PVC | 0.01 | 1,425 | 7 | 45 | 52 | 3.7 | | |
| Kirkland_Main-679 | Kirkland_Manholes-299 | 66.63 | Kirkland_Manholes-298 | 56.65 | 96.2 | 10.37 | 8 | PVC | 0.01 | 2,271 | 10 | 16 | 26 | 1.1 | SM10 | |
| Kirkland_Main-680 | Kirkland_Manholes-298 | 56.65 | Kirkland_Manholes-289 | 31.71 | 154.4 | 16.15 | 8 | PVC | 0.01 | 2,834 | 10 | 19 | 29 | 1 | SM10 | |
| Kirkland_Main-681 | Kirkland_Manholes-281 | 36.84 | Kirkland_Manholes-280 | 27.37 | 236.3 | 4.01 | 8 | PVC | 0.01 | 1,411 | 2 | 13 | 14 | 1 | SM10 | |
| Kirkland_Main-682 | Kirkland_Manholes-752 | 265.45 | Kirkland_Manholes-1559 | 253.89 | 158.5 | 7.29 | 8 | PVC | 0.01 | 1,904 | 23 | 61 | 84 | 4.4 | SM14-Ex-EX68 | |
| Kirkland_Main-683 | Kirkland_Manholes-1561 | 229.17 | Kirkland_Manholes-1562 | 206.57 | 130 | 17.39 | 8 | PVC | 0.01 | 2,940 | 1 | 4 | 5 | 0.2 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-684 | Kirkland_Manholes-1563 | 203.28 | Kirkland_Manholes-1564 | 164.37 | 189.8 | 20.5 | 8 | PVC | 0.01 | 3,192 | 1 | 12 | 14 | 0.4 | | |
| Kirkland_Main-685 | Kirkland_Manholes-1347 | 427.05 | Kirkland_Manholes-1349 | 426.8 | 216.3 | 0.12 | 8 | PVC | 0.01 | 240 | 4 | 16 | 20 | 8.3 | | |
| Kirkland_Main-686 | Kirkland_Manholes-1349 | 426.8 | Kirkland_Manholes-1348 | 423.36 | 47.3 | 7.28 | 8 | PVC | 0.01 | 1,902 | 4 | 20 | 25 | 1.3 | | |
| Kirkland_Main-687 | Kirkland_Manholes-1348 | 423.36 | Kirkland_Manholes-1354 | 421.4 | 318.8 | 0.61 | 8 | PVC | 0.01 | 553 | 5 | 24 | 30 | 5.4 | | |
| Kirkland_Main-688 | Kirkland_Manholes-1352 | 406.36 | Kirkland_Manholes-1903 | 399.77 | 227.2 | 2.9 | 8 | PVC | 0.01 | 1,201 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-689 | Kirkland_Manholes-1353 | 422.52 | Kirkland_Manholes-1354 | 421.4 | 133.4 | 0.84 | 8 | PVC | 0.01 | 646 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-690 | Kirkland_Manholes-1354 | 421.4 | Kirkland_Manholes-1355 | 420.81 | 87.2 | 0.68 | 8 | PVC | 0.01 | 580 | 8 | 33 | 40 | 6.9 | | |
| Kirkland_Main-691 | Kirkland_Manholes-832 | 339.26 | Kirkland_Manholes-794 | 336.64 | 92.4 | 2.84 | 8 | PVC | 0.01 | 1,188 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-692 | Kirkland_Manholes-794 | 336.64 | Kirkland_Manholes-795 | 330.76 | 102.1 | 5.76 | 8 | PVC | 0.01 | 1,692 | 3 | 16 | 19 | 1.1 | | |
| Kirkland_Main-693 | Kirkland_Manholes-795 | 330.76 | Kirkland_Manholes-796 | 329.52 | 188.4 | 0.66 | 8 | PVC | 0.01 | 572 | 4 | 20 | 24 | 4.3 | | |
| Kirkland_Main-694 | Kirkland_Manholes-833 | 205 | Kirkland_Manholes-830 | 198.45 | 115.6 | 5.67 | 8 | PVC | 0.01 | 1,678 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-695 | Kirkland_Manholes-1212 | 307.51 | Kirkland_Manholes-1213 | 300.54 | 162.4 | 4.29 | 6 | Concrete | 0.013 | 522 | 67 | 20 | 88 | 16.8 | | |
| Kirkland_Main-696 | Kirkland_Manholes-1213 | 300.54 | Kirkland_Manholes-2616 | 274.02 | 226.7 | 11.7 | 6 | Concrete | 0.013 | 861 | 67 | 24 | 92 | 10.7 | | |
| Kirkland_Main-697 | Kirkland_Manholes-515 | 18.45 | Kirkland_Manholes-514 | 18.19 | 122.3 | 0.21 | 12 | PVC | 0.01 | 953 | 34 | 203 | 237 | 24.9 | SM14-Ex-EX37 | |
| Kirkland_Main-698 | Kirkland_Manholes-1186 | 18.89 | Kirkland_Manholes-515 | 18.45 | 232.7 | 0.19 | 12 | PVC | 0.01 | 907 | 34 | 195 | 228 | 25.1 | SM14-Ex-EX37 | |
| Kirkland_Main-699 | Kirkland_Manholes-1185 | 19.29 | Kirkland_Manholes-1186 | 18.89 | 267.9 | 0.15 | 12 | PVC | 0.01 | 803 | 32 | 186 | 218 | 27.2 | SM14-Ex-EX37 | |
| Kirkland_Main-700 | Kirkland_Manholes-2510 | 102.3 | Kirkland_Manholes-2511 | 85.9 | 155.2 | 10.57 | 8 | PVC | 0.01 | 2,292 | 7 | 24 | 31 | 1.4 | SM14-Ex-EX229 | |
| Kirkland_Main-701 | Kirkland_Manholes-2512 | 90.74 | Kirkland_Manholes-2511 | 85.9 | 110.5 | 4.38 | 8 | PVC | 0.01 | 1,475 | 2 | 12 | 14 | 1 | SM14-Ex-EX228 | |
| Kirkland_Main-703 | Kirkland_Manholes-2513 | 104.61 | Kirkland_Manholes-2512 | 90.74 | 161.7 | 8.58 | 8 | PVC | 0.01 | 2,065 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX228 | |
| Kirkland_Main-704 | Kirkland_Manholes-1988 | 449.74 | Kirkland_Manholes-1989 | 447.97 | 257 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-705 | Kirkland_Manholes-2008 | 435.7 | Kirkland_Manholes-1993 | 435.41 | 162.8 | 0.18 | 8 | PVC | 0.01 | 298 | 6 | 16 | 22 | 7.5 | | |
| Kirkland_Main-706 | Kirkland_Manholes-2060 | 437.6 | Kirkland_Manholes-2008 | 435.7 | 259.6 | 0.73 | 8 | PVC | 0.01 | 603 | 3 | 4 | 7 | 1.2 | | |
| Kirkland_Main-707 | Kirkland_Manholes-1993 | 435.41 | Kirkland_Manholes-2061 | 434.9 | 121.2 | 0.42 | 8 | PVC | 0.01 | 457 | 6 | 20 | 27 | 5.8 | | |
| Kirkland_Main-708 | Kirkland_Manholes-2061 | 434.9 | Kirkland_Manholes-1994 | 434.42 | 35 | 1.37 | 8 | PVC | 0.01 | 826 | 7 | 24 | 31 | 3.8 | | |
| Kirkland_Main-709 | Kirkland_Manholes-1994 | 434.42 | Kirkland_Manholes-1995 | 433.71 | 121.9 | 0.58 | 8 | PVC | 0.01 | 538 | 7 | 28 | 36 | 6.6 | | |
| Kirkland_Main-710 | Kirkland_Manholes-1995 | 433.71 | Kirkland_Manholes-1996 | 432.86 | 110.9 | 0.77 | 8 | PVC | 0.01 | 617 | 9 | 37 | 46 | 7.4 | | |
| Kirkland_Main-711 | Kirkland_Manholes-1996 | 432.86 | Kirkland_Manholes-1997 | 432.14 | 299.5 | 0.24 | 8 | PVC | 0.01 | 346 | 9 | 41 | 50 | 14.5 | | |
| Kirkland_Main-712 | Kirkland_Manholes-1998 | 432.54 | Kirkland_Manholes-1997 | 432.14 | 196.8 | 0.2 | 8 | PVC | 0.01 | 318 | 1 | 4 | 5 | 1.7 | SM14-Ex-EX211 | |
| Kirkland_Main-713 | Kirkland_Manholes-1997 | 432.14 | Kirkland_Manholes-1999 | 430.91 | 331.2 | 0.37 | 8 | PVC | 0.01 | 430 | 13 | 49 | 62 | 14.4 | SM14-Ex-EX211 | |
| Kirkland_Main-714 | Kirkland_Manholes-2062 | 435.63 | Kirkland_Manholes-1995 | 433.71 | 265.8 | 0.72 | 8 | PVC | 0.01 | 599 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-717 | Kirkland_Manholes-2063 | 422.68 | Kirkland_Manholes-2671 | 399.75 | 265 | 8.65 | 8 | PVC | 0.01 | 2,074 | 15 | 73 | 89 | 4.3 | SM14-Ex-EX209 | |
| Kirkland_Main-718 | Kirkland_Manholes-2066 | 434.49 | Kirkland_Manholes-2059 | 433 | 119.7 | 1.24 | 8 | PVC | 0.01 | 787 | 14 | 4 | 18 | 2.2 | SM14-Ex-EX213 | |
| Kirkland_Main-719 | Kirkland_Manholes-2698 | 186.34 | Kirkland_Manholes-2068 | 163.08 | 368.4 | 6.31 | 8 | PVC | 0.01 | 1,772 | 15 | 61 | 76 | 4.3 | SM14-Ex-EX198 | |
| Kirkland_Main-720 | Kirkland_Manholes-2073 | 208.76 | Kirkland_Manholes-2072 | 202.36 | 249.4 | 2.57 | 8 | PVC | 0.01 | 1,129 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX200 | |
| Kirkland_Main-721 | Kirkland_Manholes-2072 | 202.36 | Kirkland_Manholes-2071 | 194.98 | 377.1 | 1.96 | 8 | PVC | 0.01 | 986 | 6 | 8 | 14 | 1.4 | SM14-Ex-EX200 | |
| Kirkland_Main-722 | Kirkland_Manholes-2071 | 194.98 | Kirkland_Manholes-2070 | 185.96 | 391.2 | 2.31 | 8 | PVC | 0.01 | 1,071 | 9 | 12 | 22 | 2 | SM14-Ex-EX200 | |
| Kirkland_Main-723 | Kirkland_Manholes-2070 | 185.96 | Kirkland_Manholes-2069 | 170.43 | 333.6 | 4.65 | 8 | PVC | 0.01 | 1,521 | 13 | 20 | 33 | 2.2 | SM14-Ex-EX200 | |
| Kirkland_Main-724 | Kirkland_Manholes-2082 | 247.37 | Kirkland_Manholes-2083 | 246.89 | 120.8 | 0.4 | 8 | PVC | 0.01 | 447 | 0 | 4 | 4 | 1 | | |
| Kirkland_Main-725 | Kirkland_Manholes-2083 | 246.89 | Kirkland_Manholes-658 | 246.8 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2 | | |
| Kirkland_Main-727 | Kirkland_Manholes-2077 | 125.7 | Kirkland_Manholes-2078 | 109.29 | 215.7 | 7.61 | 8 | PVC | 0.01 | 1,945 | 34 | 25 | 58 | 3 | SM14-Ex-EX195 | |
| Kirkland_Main-728 | Kirkland_Manholes-2076 | 138.89 | Kirkland_Manholes-2077 | 125.7 | 187.9 | 7.02 | 8 | PVC | 0.01 | 1,868 | 31 | 16 | 48 | 2.5 | SM14-Ex-EX195 | |
| Kirkland_Main-729 | Kirkland_Manholes-2075 | 153.92 | Kirkland_Manholes-2076 | 138.89 | 219.4 | 6.85 | 8 | PVC | 0.01 | 1,845 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX195 | |
| Kirkland_Main-731 | Kirkland_Manholes-574 | 110.98 | Kirkland_Manholes-595 | 103.44 | 159.1 | 4.74 | 8 | PVC | 0.01 | 1,535 | 3 | 16 | 20 | 1.3 | SM14-Ex-EX116 | |
| Kirkland_Main-736 | Kirkland_Manholes-1656 | 125.68 | Kirkland_Manholes-1655 | 123.15 | 42 | 6.03 | 8 | PVC | 0.01 | 1,731 | 9 | 8 | 17 | 1 | | |
| Kirkland_Main-737 | Kirkland_Manholes-1655 | 123.15 | Kirkland_Manholes-1657 | 121.13 | 91.5 | 2.21 | 8 | PVC | 0.01 | 1,048 | 9 | 16 | 25 | 2.4 | | |
| Kirkland_Main-738 | Kirkland_Manholes-1658 | 125.68 | Kirkland_Manholes-1657 | 125.55 | 31.5 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 8 | 11 | 2.5 | | Drop Connection |
| Kirkland_Main-739 | Kirkland_Manholes-1657 | 121.13 | Kirkland_Manholes-1659 | 116.52 | 191.7 | 2.41 | 8 | PVC | 0.01 | 1,093 | 11 | 33 | 44 | 4.1 | | |
| Kirkland_Main-740 | Kirkland_Manholes-1659 | 116.52 | Kirkland_Manholes-1660 | 110.77 | 122.6 | 4.69 | 8 | PVC | 0.01 | 1,527 | 29 | 41 | 71 | 4.6 | | |
| Kirkland_Main-741 | Kirkland_Manholes-1660 | 110.77 | Kirkland_Manholes-1662 | 100.46 | 127.6 | 8.08 | 8 | PVC | 0.01 | 2,004 | 29 | 49 | 79 | 3.9 | | |
| Kirkland_Main-742 | Kirkland_Manholes-1663 | 103.65 | Kirkland_Manholes-1661 | 102.19 | 55.6 | 2.62 | 8 | PVC | 0.01 | 1,142 | 2 | 16 | 19 | 1.6 | | |
| Kirkland_Main-743 | Kirkland_Manholes-1661 | 102.19 | Kirkland_Manholes-1662 | 100.46 | 11.1 | 15.62 | 8 | PVC | 0.01 | 2,786 | 2 | 25 | 27 | 1 | | |
| Kirkland_Main-744 | Kirkland_Manholes-1662 | 100.46 | Kirkland_Manholes-1665 | 94.21 | 177.6 | 3.52 | 8 | PVC | 0.01 | 1,322 | 32 | 82 | 114 | 8.6 | | |
| Kirkland_Main-745 | Kirkland_Manholes-1664 | 108.5 | Kirkland_Manholes-1663 | 103.65 | 57.4 | 8.45 | 8 | PVC | 0.01 | 2,049 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX169 | |
| Kirkland_Main-746 | Kirkland_Manholes-1667 | 101.23 | Kirkland_Manholes-1666 | 89.71 | 215.8 | 5.34 | 8 | PVC | 0.01 | 1,629 | 15 | 41 | 56 | 3.4 | | |
| Kirkland_Main-747 | Kirkland_Manholes-1668 | 119.52 | Kirkland_Manholes-1667 | 101.23 | 220.6 | 8.29 | 8 | PVC | 0.01 | 2,030 | 9 | 25 | 34 | 1.7 | | |
| Kirkland_Main-748 | Kirkland_Manholes-1295 | 119.7 | Kirkland_Manholes-572 | 113.73 | 319.3 | 1.87 | 8 | PVC | 0.01 | 964 | 90 | 321 | 411 | 42.6 | SM14-Ex-EX117 | |
| Kirkland_Main-749 | Kirkland_Manholes-1256 | 151.53 | Kirkland_Manholes-1284 | 145.84 | 256.4 | 2.22 | 8 | PVC | 0.01 | 1,050 | 21 | 115 | 136 | 13 | SM14-Ex-EX108 | |
| Kirkland_Main-750 | Kirkland_Manholes-1283 | 147.65 | Kirkland_Manholes-1284 | 145.84 | 53.9 | 3.36 | 8 | PVC | 0.01 | 1,292 | 4 | 16 | 21 | 1.6 | SM14-Ex-EX108 | |
| Kirkland_Main-751 | Kirkland_Manholes-1282 | 154.9 | Kirkland_Manholes-1283 | 147.65 | 295.8 | 2.45 | 8 | PVC | 0.01 | 1,104 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX108 | |
| Kirkland_Main-753 | Kirkland_Manholes-1284 | 145.84 | Kirkland_Manholes-1287 | 140.18 | 314.1 | 1.8 | 8 | PVC | 0.01 | 946 | 27 | 140 | 167 | 17.7 | SM14-Ex-EX105 | |
| Kirkland_Main-755 | Kirkland_Manholes-1285 | 150.78 | Kirkland_Manholes-1286 | 147.03 | 125.8 | 2.98 | 8 | PVC | 0.01 | 1,217 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX109 | |
| Kirkland_Main-756 | Kirkland_Manholes-1286 | 147.03 | Kirkland_Manholes-1287 | 140.18 | 192.2 | 3.56 | 8 | PVC | 0.01 | 1,331 | 4 | 16 | 20 | 1.5 | SM14-Ex-EX109 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-757 | Kirkland_Manholes-1289 | 131.61 | Kirkland_Manholes-1290 | 127.52 | 235.4 | 1.74 | 8 | PVC | 0.01 | 929 | 39 | 181 | 221 | 23.7 | SM14-Ex-EX105 | |
| Kirkland_Main-758 | Kirkland_Manholes-1290 | 127.52 | Kirkland_Manholes-576 | 111.2 | 318.6 | 5.12 | 8 | PVC | 0.01 | 1,596 | 52 | 255 | 308 | 19.3 | SM14-Ex-EX105 | |
| Kirkland_Main-759 | Kirkland_Manholes-1291 | 137.27 | Kirkland_Manholes-1290 | 127.52 | 280.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 11 | 66 | 77 | 5.9 | SM14-Ex-EX111 | |
| Kirkland_Main-760 | Kirkland_Manholes-1261 | 144.57 | Kirkland_Manholes-1291 | 137.27 | 276 | 2.64 | 8 | PVC | 0.01 | 1,147 | 9 | 58 | 66 | 5.8 | SM14-Ex-EX111 | |
| Kirkland_Main-761 | Kirkland_Manholes-1227 | 174.57 | Kirkland_Manholes-584 | 159.38 | 158.7 | 9.57 | 8 | PVC | 0.01 | 2,181 | 28 | 91 | 119 | 5.5 | SM14-Ex-EX96 | |
| Kirkland_Main-762 | Kirkland_Manholes-1238 | 263.26 | Kirkland_Manholes-1298 | 253.38 | 261 | 3.78 | 8 | PVC | 0.01 | 1,372 | 4 | 16 | 20 | 1.5 | SM14-Ex-EX64 | |
| Kirkland_Main-763 | Kirkland_Manholes-1298 | 253.38 | Kirkland_Manholes-1245 | 243.41 | 258.4 | 3.86 | 8 | PVC | 0.01 | 1,385 | 7 | 25 | 32 | 2.3 | SM14-Ex-EX64 | |
| Kirkland_Main-765 | Kirkland_Manholes-1302 | 252.61 | Kirkland_Manholes-1301 | 241.1 | 158.8 | 7.25 | 8 | PVC | 0.01 | 1,898 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX98 | |
| Kirkland_Main-766 | Kirkland_Manholes-1230 | 236.32 | Kirkland_Manholes-1229 | 218.73 | 349.5 | 5.03 | 8 | PVC | 0.01 | 1,582 | 19 | 58 | 76 | 4.8 | SM14-Ex-EX96 | |
| Kirkland_Main-767 | Kirkland_Manholes-1229 | 218.73 | Kirkland_Manholes-1228 | 189.87 | 369 | 7.82 | 8 | PVC | 0.01 | 1,972 | 23 | 66 | 89 | 4.5 | SM14-Ex-EX96 | |
| Kirkland_Main-768 | Kirkland_Manholes-727 | 84.25 | Kirkland_Manholes-728 | 70.86 | 152.9 | 8.76 | 8 | PVC | 0.01 | 2,086 | 142 | 536 | 678 | 32.5 | SM14-Ex-EX117 | |
| Kirkland_Main-769 | Kirkland_Manholes-1407 | 474.89 | Kirkland_Manholes-1406 | 473.57 | 319.1 | 0.41 | 8 | PVC | 0.01 | 453 | 33 | 28 | 62 | 13.6 | | |
| Kirkland_Main-770 | Kirkland_Manholes-1415 | 475.19 | Kirkland_Manholes-1406 | 473.57 | 245.1 | 0.66 | 8 | PVC | 0.01 | 573 | 35 | 45 | 80 | 13.9 | | |
| Kirkland_Main-771 | Kirkland_Manholes-1408 | 476.13 | Kirkland_Manholes-1407 | 474.89 | 287.1 | 0.43 | 8 | PVC | 0.01 | 463 | 9 | 24 | 33 | 7.2 | | |
| Kirkland_Main-772 | Kirkland_Manholes-1409 | 479.33 | Kirkland_Manholes-1408 | 476.13 | 271.9 | 1.18 | 8 | PVC | 0.01 | 765 | 9 | 20 | 29 | 3.8 | | |
| Kirkland_Main-773 | Kirkland_Manholes-1410 | 479.58 | Kirkland_Manholes-1409 | 479.33 | 219 | 0.11 | 8 | PVC | 0.01 | 238 | 8 | 16 | 24 | 10.2 | | |
| Kirkland_Main-774 | Kirkland_Manholes-1411 | 480.36 | Kirkland_Manholes-1410 | 479.58 | 194.5 | 0.4 | 8 | PVC | 0.01 | 445 | 8 | 12 | 20 | 4.5 | | |
| Kirkland_Main-775 | Kirkland_Manholes-1412 | 483.98 | Kirkland_Manholes-1411 | 480.36 | 100.6 | 3.6 | 8 | PVC | 0.01 | 1,338 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-776 | Kirkland_Manholes-1853 | 276.11 | Kirkland_Manholes-1851 | 275 | 191.4 | 0.58 | 8 | PVC | 0.01 | 537 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-777 | Kirkland_Manholes-1772 | 68.31 | Kirkland_Manholes-2929 | 66.75 | 69.5 | 2.25 | 12 | PVC | 0.01 | 3,115 | 134 | 478 | 612 | 19.6 | SM14-Ex-EX166 | |
| Kirkland_Main-778 | Kirkland_Manholes-2929 | 66.75 | Kirkland_Manholes-729 | 64.46 | 261.6 | 0.88 | 12 | PVC | 0.01 | 1,946 | 134 | 486 | 620 | 31.9 | SM14-Ex-EX166 | |
| Kirkland_Main-780 | Kirkland_Manholes-1413 | 481 | Kirkland_Manholes-1411 | 480.36 | 161.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 8 | 1.8 | | |
| Kirkland_Main-781 | Kirkland_Manholes-1418 | 477.42 | Kirkland_Manholes-1414 | 476.69 | 182.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 18 | 4 | | |
| Kirkland_Main-782 | Kirkland_Manholes-2078 | 109.29 | Kirkland_Manholes-2079 | 101.7 | 225.4 | 3.37 | 8 | PVC | 0.01 | 1,294 | 39 | 33 | 72 | 5.6 | SM14-Ex-EX195 | |
| Kirkland_Main-783 | Kirkland_Manholes-2079 | 101.7 | Kirkland_Manholes-2080 | 100.3 | 24.2 | 5.79 | 8 | PVC | 0.01 | 1,697 | 41 | 41 | 82 | 4.8 | | |
| Kirkland_Main-784 | Kirkland_Manholes-2129 | 162.62 | Kirkland_Manholes-2130 | 161.57 | 13 | 8.1 | 12 | PVC | 0.01 | 5,916 | 0 | 8 | 8 | 0.1 | SM14-Ex-EX235 | |
| Kirkland_Main-785 | Kirkland_Manholes-2128 | 162.8 | Kirkland_Manholes-2129 | 162.62 | 31 | 0.58 | 12 | PVC | 0.01 | 1,584 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-786 | Kirkland_Manholes-2127 | 166.38 | Kirkland_Manholes-2130 | 161.57 | 81 | 5.94 | 8 | PVC | 0.01 | 1,718 | 23 | 8 | 31 | 1.8 | SM14-Ex-EX235 | |
| Kirkland_Main-787 | Kirkland_Manholes-2131 | 158.3 | O-32 | 156.08 | 22.1 | 10.06 | 15 | PVC | 0.01 | 11,953 | 676 | 1,550 | 2,226 | 18.6 | SM14-Ex-EX236 | |
| Kirkland_Main-788 | Kirkland_Manholes-2139 | 96.6 | Kirkland_Manholes-2138 | 94.8 | 32.5 | 5.54 | 8 | PVC | 0.01 | 1,659 | 5 | 25 | 30 | 1.8 | | |
| Kirkland_Main-789 | Kirkland_Manholes-2154 | 28.66 | Kirkland_Manholes-2153 | 28.2 | 11.2 | 4.1 | 8 | PVC | 0.01 | 1,428 | 3 | 39 | 42 | 3 | SM14-Ex-EX220 | |
| Kirkland_Main-790 | Kirkland_Manholes-2153 | 28.2 | Kirkland_Manholes-2152 | 27.32 | 8.5 | 10.4 | 8 | PVC | 0.01 | 2,274 | 3 | 45 | 49 | 2.2 | SM14-Ex-EX220 | |
| Kirkland_Main-791 | Kirkland_Manholes-2152 | 27.32 | Kirkland_Manholes-2320 | 18 | 38.7 | 24.05 | 8 | PVC | 0.01 | 3,458 | 3 | 52 | 55 | 1.6 | | |
| Kirkland_Main-792 | Kirkland_Manholes-2151 | 49.81 | Kirkland_Manholes-2154 | 28.66 | 303.9 | 6.96 | 8 | PVC | 0.01 | 1,860 | 3 | 32 | 36 | 1.9 | SM14-Ex-EX220 | |
| Kirkland_Main-793 | Kirkland_Manholes-2150 | 50.98 | Kirkland_Manholes-2151 | 49.81 | 135.2 | 0.87 | 8 | PVC | 0.01 | 656 | 2 | 26 | 28 | 4.2 | SM14-Ex-EX220 | |
| Kirkland_Main-794 | Kirkland_Manholes-2149 | 76.26 | Kirkland_Manholes-2150 | 50.98 | 227.7 | 11.1 | 8 | PVC | 0.01 | 2,349 | 1 | 19 | 20 | 0.9 | SM14-Ex-EX220 | |
| Kirkland_Main-795 | Kirkland_Manholes-2148 | 77.03 | Kirkland_Manholes-2149 | 76.26 | 100.5 | 0.77 | 8 | PVC | 0.01 | 617 | 0 | 13 | 13 | 2.1 | SM14-Ex-EX220 | |
| Kirkland_Main-796 | Kirkland_Manholes-2147 | 92.38 | Kirkland_Manholes-2148 | 77.03 | 204.1 | 7.52 | 8 | PVC | 0.01 | 1,934 | 0 | 6 | 6 | 0.3 | SM14-Ex-EX220 | |
| Kirkland_Main-800 | Kirkland_Manholes-2158 | 102.11 | Kirkland_Manholes-2157 | 100.18 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 3 | 6 | 9 | 1.5 | | |
| Kirkland_Main-801 | Kirkland_Manholes-2160 | 86.23 | Kirkland_Manholes-2159 | 84.71 | 220.9 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 6 | 8 | 1.3 | | |
| Kirkland_Main-802 | Kirkland_Manholes-2157 | 100.18 | Kirkland_Manholes-2159 | 84.71 | 251.5 | 6.15 | 8 | PVC | 0.01 | 1,749 | 16 | 52 | 68 | 3.9 | | |
| Kirkland_Main-804 | Kirkland_Manholes-2134 | 124.65 | Kirkland_Manholes-2135 | 110 | 281.7 | 5.2 | 8 | PVC | 0.01 | 1,608 | 6 | 26 | 32 | 2 | SM14-Ex-EX221 | |
| Kirkland_Main-805 | Kirkland_Manholes-2133 | 139 | Kirkland_Manholes-2134 | 124.65 | 362.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 3 | 19 | 22 | 1.6 | SM14-Ex-EX221 | |
| Kirkland_Main-806 | Kirkland_Manholes-2132 | 159.52 | Kirkland_Manholes-2131 | 158.3 | 73.8 | 1.65 | 15 | PVC | 0.01 | 4,846 | 671 | 1,546 | 2,217 | 45.8 | SM14-Ex-EX236 | |
| Kirkland_Main-807 | Kirkland_Manholes-2126 | 177.6 | Kirkland_Manholes-2127 | 166.38 | 202.1 | 5.55 | 8 | PVC | 0.01 | 1,661 | 23 | 4 | 27 | 1.6 | SM14-Ex-EX235 | |
| Kirkland_Main-808 | Kirkland_Manholes-2125 | 177.39 | Kirkland_Manholes-2132 | 159.52 | 237.1 | 7.54 | 12 | PVC | 0.01 | 5,707 | 653 | 1,518 | 2,171 | 38 | | |
| Kirkland_Main-809 | Kirkland_Manholes-2304 | 192.91 | Kirkland_Manholes-2125 | 177.39 | 277.3 | 5.6 | 12 | PVC | 0.01 | 4,918 | 653 | 1,514 | 2,167 | 44.1 | | |
| Kirkland_Main-810 | Kirkland_Manholes-2136 | 110.1 | Kirkland_Manholes-2137 | 107.9 | 254.4 | 0.86 | 10 | PVC | 0.01 | 1,189 | 1 | 8 | 10 | 0.8 | | |
| Kirkland_Main-811 | Kirkland_Manholes-2137 | 107.9 | Kirkland_Manholes-2080 | 100.3 | 293.2 | 2.59 | 10 | PVC | 0.01 | 2,058 | 6 | 16 | 23 | 1.1 | | |
| Kirkland_Main-812 | Kirkland_Manholes-2080 | 100.3 | Kirkland_Manholes-2138 | 94.8 | 252.5 | 2.18 | 10 | PVC | 0.01 | 1,887 | 47 | 66 | 113 | 6 | | |
| Kirkland_Main-813 | Kirkland_Manholes-2138 | 94.8 | Kirkland_Manholes-2140 | 88.47 | 239.3 | 2.65 | 10 | PVC | 0.01 | 2,079 | 53 | 99 | 152 | 7.3 | | |
| Kirkland_Main-814 | Kirkland_Manholes-2140 | 88.47 | Kirkland_Manholes-2141 | 73.53 | 356.2 | 4.19 | 10 | PVC | 0.01 | 2,618 | 62 | 165 | 227 | 8.7 | | |
| Kirkland_Main-815 | Kirkland_Manholes-2141 | 73.53 | Kirkland_Manholes-2142 | 68.99 | 196.1 | 2.31 | 10 | PVC | 0.01 | 1,945 | 99 | 214 | 313 | 16.1 | | |
| Kirkland_Main-816 | Kirkland_Manholes-2142 | 68.99 | Kirkland_Manholes-2143 | 61.9 | 284.3 | 2.49 | 10 | PVC | 0.01 | 2,019 | 105 | 288 | 394 | 19.5 | | |
| Kirkland_Main-817 | Kirkland_Manholes-2876 | 267.92 | Kirkland_Manholes-2877 | 259.41 | 173 | 4.92 | 8 | PVC | 0.01 | 1,564 | 5 | 20 | 25 | 1.6 | | |
| Kirkland_Main-818 | Kirkland_Manholes-2877 | 259.41 | Kirkland_Manholes-625 | 258 | 37.7 | 3.74 | 8 | PVC | 0.01 | 1,364 | 5 | 24 | 30 | 2.2 | | |
| Kirkland_Main-819 | Kirkland_Manholes-2878 | 269.8 | Kirkland_Manholes-2876 | 267.92 | 58 | 3.24 | 8 | PVC | 0.01 | 1,269 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-820 | Kirkland_Manholes-2882 | 274.26 | Kirkland_Manholes-2878 | 269.8 | 141 | 3.16 | 8 | PVC | 0.01 | 1,254 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-821 | Kirkland_Manholes-1801 | 112.29 | Kirkland_Manholes-1802 | 95.68 | 270.4 | 6.14 | 8 | PVC | 0.01 | 1,747 | 65 | 253 | 319 | 18.2 | SM4 | |
| Kirkland_Main-822 | Kirkland_Manholes-1803 | 87.57 | Kirkland_Manholes-1401 | 76.78 | 133.9 | 8.06 | 8 | PVC | 0.01 | 2,002 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX141 | |
| Kirkland_Main-823 | Kirkland_Manholes-1804 | 103.12 | Kirkland_Manholes-1403 | 89.74 | 129.7 | 10.32 | 8 | PVC | 0.01 | 2,265 | 1 | 8 | 10 | 0.4 | SM14-Ex-EX140 | |
| Kirkland_Main-826 | Kirkland_Manholes-1807 | 44.26 | Kirkland_Manholes-1806 | 38.89 | 57.7 | 9.3 | 8 | PVC | 0.01 | 2,150 | 95 | 303 | 398 | 18.5 | SM4 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-827 | Kirkland_Manholes-589 | 126.06 | Kirkland_Manholes-590 | 118.3 | 332.1 | 2.34 | 8 | PVC | 0.01 | 1,078 | 3 | 8 | 11 | 1 | SM14-Ex-EX158 | |
| Kirkland_Main-828 | Kirkland_Manholes-1802 | 95.68 | Kirkland_Manholes-1810 | 85.96 | 289.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 72 | 278 | 351 | 27.1 | SM4 | |
| Kirkland_Main-829 | Kirkland_Manholes-1833 | 16.5 | Kirkland_Manholes-1793 | 15.37 | 141.1 | 0.8 | 8 | PVC | 0.01 | 631 | 2 | 13 | 15 | 2.4 | | |
| Kirkland_Main-830 | Kirkland_Manholes-1836 | 11 | Kirkland_Manholes-1791 | 8.2 | 291.3 | 0.96 | 15 | PVC | 0.01 | 3,695 | 475 | 890 | 1,365 | 36.9 | | |
| Kirkland_Main-832 | Kirkland_Manholes-1850 | 19.39 | Kirkland_Manholes-1849 | 16.69 | 373.2 | 0.72 | 8 | PVC | 0.01 | 600 | 5 | 13 | 18 | 3 | SM10 | |
| Kirkland_Main-833 | Kirkland_Manholes-1849 | 16.69 | Kirkland_Manholes-1847 | 16.59 | 254.1 | 0.04 | 8 | PVC | 0.01 | 140 | 6 | 19 | 25 | 17.9 | SM10 | |
| Kirkland_Main-834 | Kirkland_Manholes-1847 | 16.59 | Kirkland_Manholes-1846 | 15.1 | 93.2 | 1.6 | 12 | PVC | 0.01 | 2,628 | 6 | 26 | 32 | 1.2 | SM10 | |
| Kirkland_Main-835 | Kirkland_Manholes-2633 | 278.44 | Kirkland_Manholes-2632 | 276.84 | 129.7 | 1.23 | 8 | PVC | 0.01 | 783 | 4 | 8 | 12 | 1.5 | SM14-Ex-EX295 | |
| Kirkland_Main-837 | Kirkland_Manholes-2605 | 280.73 | Kirkland_Manholes-2633 | 278.44 | 217.9 | 1.05 | 8 | PVC | 0.01 | 723 | 2 | 4 | 6 | 0.9 | SM14-Ex-EX295 | |
| Kirkland_Main-838 | Kirkland_Manholes-2634 | 286.56 | Kirkland_Manholes-2635 | 275.48 | 268.8 | 4.12 | 8 | PVC | 0.01 | 1,431 | 4 | 4 | 8 | 0.5 | SM14-Ex-EX294 | |
| Kirkland_Main-839 | Kirkland_Manholes-2635 | 275.48 | Kirkland_Manholes-2636 | 245.46 | 401.2 | 7.48 | 8 | PVC | 0.01 | 1,929 | 6 | 12 | 18 | 0.9 | SM14-Ex-EX294 | |
| Kirkland_Main-840 | Kirkland_Manholes-2636 | 245.46 | Kirkland_Manholes-2637 | 187.87 | 397.8 | 14.48 | 8 | PVC | 0.01 | 2,683 | 7 | 16 | 23 | 0.9 | SM14-Ex-EX294 | |
| Kirkland_Main-841 | Kirkland_Manholes-2640 | 93.15 | Kirkland_Manholes-2641 | 88.89 | 86.7 | 4.91 | 8 | PVC | 0.01 | 1,563 | 6 | 18 | 24 | 1.6 | | |
| Kirkland_Main-842 | Kirkland_Manholes-2639 | 115.66 | Kirkland_Manholes-2640 | 93.15 | 98.6 | 22.84 | 8 | PVC | 0.01 | 3,369 | 4 | 12 | 16 | 0.5 | | |
| Kirkland_Main-843 | Kirkland_Manholes-2638 | 117.25 | Kirkland_Manholes-2639 | 115.66 | 47.5 | 3.35 | 8 | PVC | 0.01 | 1,290 | 2 | 6 | 8 | 0.6 | | |
| Kirkland_Main-844 | Kirkland_Manholes-2643 | 117.26 | Kirkland_Manholes-2642 | 102.55 | 182.7 | 8.05 | 8 | PVC | 0.01 | 2,001 | 2 | 6 | 8 | 0.4 | | |
| Kirkland_Main-848 | Kirkland_Manholes-2645 | 79.04 | Kirkland_Manholes-2644 | 74.88 | 115.7 | 3.59 | 8 | PVC | 0.01 | 1,337 | 8 | 37 | 45 | 3.4 | | |
| Kirkland_Main-850 | Kirkland_Manholes-1481 | 462.54 | Kirkland_Manholes-1482 | 457.77 | 84.3 | 5.66 | 8 | PVC | 0.01 | 1,677 | 4 | 20 | 25 | 1.5 | SM14-Ex-EX268 | |
| Kirkland_Main-851 | Kirkland_Manholes-1495 | 496.81 | Kirkland_Manholes-1484 | 495.36 | 362.4 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-852 | Kirkland_Manholes-1484 | 495.36 | Kirkland_Manholes-1485 | 486.98 | 151.8 | 5.52 | 8 | PVC | 0.01 | 1,657 | 6 | 33 | 39 | 2.3 | | |
| Kirkland_Main-853 | Kirkland_Manholes-1485 | 486.98 | Kirkland_Manholes-1486 | 483.92 | 112.4 | 2.72 | 8 | PVC | 0.01 | 1,163 | 14 | 49 | 63 | 5.4 | | |
| Kirkland_Main-854 | Kirkland_Manholes-1486 | 483.92 | Kirkland_Manholes-1488 | 482.18 | 104.3 | 1.67 | 8 | PVC | 0.01 | 910 | 16 | 53 | 69 | 7.6 | | |
| Kirkland_Main-855 | Kirkland_Manholes-1488 | 482.18 | Kirkland_Manholes-1489 | 480.6 | 353.4 | 0.45 | 8 | PVC | 0.01 | 471 | 20 | 61 | 81 | 17.2 | | |
| Kirkland_Main-856 | Kirkland_Manholes-1487 | 483.25 | Kirkland_Manholes-1488 | 482.18 | 163.9 | 0.65 | 8 | PVC | 0.01 | 570 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-857 | Kirkland_Manholes-1489 | 480.6 | Kirkland_Manholes-2029 | 479.06 | 117.8 | 1.31 | 8 | PVC | 0.01 | 806 | 21 | 65 | 87 | 10.7 | | |
| Kirkland_Main-858 | Kirkland_Manholes-1490 | 499.13 | Kirkland_Manholes-1492 | 491.87 | 290.5 | 2.5 | 8 | PVC | 0.01 | 1,115 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-859 | Kirkland_Manholes-1492 | 491.87 | Kirkland_Manholes-1491 | 489.53 | 101 | 2.32 | 8 | PVC | 0.01 | 1,073 | 4 | 8 | 13 | 1.2 | | |
| Kirkland_Main-860 | Kirkland_Manholes-1491 | 489.53 | Kirkland_Manholes-1485 | 486.98 | 404.5 | 0.63 | 8 | PVC | 0.01 | 560 | 6 | 12 | 19 | 3.3 | | |
| Kirkland_Main-861 | Kirkland_Manholes-1493 | 479.91 | Kirkland_Manholes-2025 | 477 | 402.9 | 0.72 | 8 | PVC | 0.01 | 599 | 7 | 8 | 15 | 2.5 | | |
| Kirkland_Main-862 | Kirkland_Manholes-1494 | 496.1 | Kirkland_Manholes-1484 | 495.36 | 68.3 | 1.08 | 8 | PVC | 0.01 | 734 | 5 | 24 | 29 | 3.9 | | |
| Kirkland_Main-865 | Kirkland_Manholes-2234 | 145.49 | Kirkland_Manholes-2235 | 140.92 | 280.9 | 1.63 | 8 | PVC | 0.01 | 899 | 3 | 6 | 9 | 1.1 | SM14-Ex-EX221 | |
| Kirkland_Main-866 | Kirkland_Manholes-2235 | 140.92 | Kirkland_Manholes-2133 | 139 | 112.7 | 1.7 | 8 | PVC | 0.01 | 920 | 3 | 13 | 16 | 1.7 | SM14-Ex-EX221 | |
| Kirkland_Main-867 | Kirkland_Manholes-2236 | 23.9 | Kirkland_Manholes-2230 | 23.3 | 57.5 | 1.04 | 8 | PVC | 0.01 | 720 | 0 | 6 | 6 | 0.9 | | |
| Kirkland_Main-868 | Kirkland_Manholes-2702 | 256.62 | Kirkland_Manholes-1633 | 254.8 | 313.1 | 0.58 | 8 | PVC | 0.01 | 538 | 6 | 12 | 18 | 3.4 | SM14-Ex-EX204 | |
| Kirkland_Main-869 | Kirkland_Manholes-1634 | 223.49 | Kirkland_Manholes-1635 | 192.35 | 312.2 | 9.97 | 8 | PVC | 0.01 | 2,227 | 271 | 863 | 1,134 | 50.9 | SM7 | |
| Kirkland_Main-870 | Kirkland_Manholes-1635 | 192.35 | Kirkland_Manholes-1638 | 164.94 | 265.5 | 10.33 | 8 | PVC | 0.01 | 2,266 | 273 | 867 | 1,140 | 50.3 | SM7 | |
| Kirkland_Main-871 | Kirkland_Manholes-1636 | 172.84 | Kirkland_Manholes-1637 | 170.82 | 135.8 | 1.49 | 8 | PVC | 0.01 | 860 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-872 | Kirkland_Manholes-1637 | 170.82 | Kirkland_Manholes-1639 | 169.94 | 172.1 | 0.51 | 8 | PVC | 0.01 | 504 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-873 | Kirkland_Manholes-1639 | 169.94 | Kirkland_Manholes-1638 | 164.94 | 235.7 | 2.12 | 8 | PVC | 0.01 | 1,027 | 18 | 98 | 116 | 11.3 | SM14-Ex-EX202 | |
| Kirkland_Main-874 | Kirkland_Manholes-1638 | 164.94 | Kirkland_Manholes-1642 | 158.76 | 65.1 | 9.49 | 8 | PVC | 0.01 | 2,172 | 292 | 968 | 1,260 | 58 | SM7 | |
| Kirkland_Main-875 | Kirkland_Manholes-1641 | 205.91 | Kirkland_Manholes-1640 | 188.59 | 221.5 | 7.82 | 8 | PVC | 0.01 | 1,971 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX203 | |
| Kirkland_Main-877 | Kirkland_Manholes-1643 | 156.25 | Kirkland_Manholes-1648 | 152.03 | 150 | 2.81 | 8 | PVC | 0.01 | 1,183 | 1 | 8 | 10 | 0.8 | SM14-Ex-EX196 | |
| Kirkland_Main-878 | Kirkland_Manholes-1644 | 159.14 | O-25 | 154.59 | 17.5 | 26 | 8 | PVC | 0.01 | 3,595 | 19 | 57 | 76 | 2.1 | | |
| Kirkland_Main-879 | Kirkland_Manholes-1645 | 171.46 | Kirkland_Manholes-1644 | 159.14 | 257.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 19 | 53 | 72 | 4.6 | | |
| Kirkland_Main-880 | Kirkland_Manholes-1625 | 179.1 | Kirkland_Manholes-1645 | 171.46 | 179.3 | 4.26 | 8 | PVC | 0.01 | 1,455 | 12 | 49 | 61 | 4.2 | | |
| Kirkland_Main-881 | Kirkland_Manholes-1647 | 165.32 | O-24 | 163.59 | 78.9 | 2.18 | 8 | PVC | 0.01 | 1,042 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX175 | |
| Kirkland_Main-882 | Kirkland_Manholes-1676 | 98.96 | Kirkland_Manholes-1677 | 88.12 | 84.8 | 12.79 | 8 | PVC | 0.01 | 2,521 | 24 | 33 | 57 | 2.3 | | |
| Kirkland_Main-883 | Kirkland_Manholes-1678 | 99.76 | Kirkland_Manholes-1676 | 98.96 | 128.1 | 0.62 | 8 | PVC | 0.01 | 557 | 20 | 16 | 36 | 6.5 | | |
| Kirkland_Main-884 | Kirkland_Manholes-1679 | 107.21 | Kirkland_Manholes-1678 | 99.76 | 181.8 | 4.1 | 8 | PVC | 0.01 | 1,427 | 20 | 8 | 28 | 2 | | |
| Kirkland_Main-885 | Kirkland_Manholes-1683 | 75.33 | Kirkland_Manholes-1682 | 74.03 | 148.9 | 0.87 | 8 | PVC | 0.01 | 659 | 3 | 16 | 19 | 2.9 | | |
| Kirkland_Main-886 | Kirkland_Manholes-1682 | 74.03 | Kirkland_Manholes-1681 | 72.36 | 31.7 | 5.27 | 8 | PVC | 0.01 | 1,619 | 3 | 25 | 28 | 1.7 | | |
| Kirkland_Main-887 | Kirkland_Manholes-602 | 90.22 | Kirkland_Manholes-1680 | 83.64 | 138.4 | 4.75 | 8 | PVC | 0.01 | 1,537 | 95 | 400 | 494 | 32.2 | SM5 | |
| Kirkland_Main-888 | Kirkland_Manholes-1680 | 83.64 | Kirkland_Manholes-1681 | 72.36 | 151.4 | 7.45 | 8 | PVC | 0.01 | 1,925 | 96 | 408 | 504 | 26.2 | SM5 | |
| Kirkland_Main-889 | Kirkland_Manholes-600 | 91.95 | Kirkland_Manholes-1687 | 86.12 | 197.8 | 2.95 | 8 | PVC | 0.01 | 1,210 | 121 | 379 | 500 | 41.3 | SM14-Ex-EX117 | |
| Kirkland_Main-890 | Kirkland_Manholes-1788 | 86.3 | Kirkland_Manholes-727 | 84.25 | 363.6 | 0.56 | 8 | PVC | 0.01 | 529 | 14 | 132 | 146 | 27.6 | SM14-Ex-EX167 | |
| Kirkland_Main-891 | Kirkland_Manholes-1686 | 60.42 | Kirkland_Manholes-1685 | 57.24 | 38.9 | 8.17 | 8 | PVC | 0.01 | 2,016 | 0 | 8 | 8 | 0.4 | | |
| Kirkland_Main-892 | Kirkland_Manholes-1681 | 72.36 | Kirkland_Manholes-1685 | 57.24 | 220.4 | 6.86 | 8 | PVC | 0.01 | 1,846 | 99 | 441 | 540 | 29.3 | SM5 | |
| Kirkland_Main-893 | Kirkland_Manholes-1687 | 86.12 | Kirkland_Manholes-727 | 84.25 | 76.5 | 2.45 | 8 | PVC | 0.01 | 1,103 | 128 | 396 | 523 | 47.5 | SM14-Ex-EX117 | |
| Kirkland_Main-894 | Kirkland_Manholes-1688 | 86.4 | Kirkland_Manholes-1687 | 86.26 | 34.9 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 8 | 15 | 3.4 | | Drop Connection |
| Kirkland_Main-895 | Kirkland_Manholes-621 | 70.36 | Kirkland_Manholes-618 | 51.3 | 271.9 | 7.01 | 8 | PVC | 0.01 | 1,867 | 40 | 29 | 69 | 3.7 | SM14-Ex-EX161 | |
| Kirkland_Main-896 | Kirkland_Manholes-617 | 67.92 | Kirkland_Manholes-618 | 51.3 | 164.3 | 10.11 | 8 | PVC | 0.01 | 2,242 | 7 | 16 | 23 | 1 | SM14-Ex-EX162 | |
| Kirkland_Main-897 | Kirkland_Manholes-1690 | 47.42 | Kirkland_Manholes-1689 | 43.75 | 38.1 | 9.62 | 8 | PVC | 0.01 | 2,187 | 29 | 16 | 45 | 2.1 | SM14-Ex-EX163 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-898 | Kirkland_Manholes-2864 | 27 | SOUTHBAY_WETWELL | 22 | 7.5 | 67.05 | 8 | PVC | 0.01 | 5,773 | 14 | 27 | 41 | 0.7 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-900 | Kirkland_Manholes-1691 | 49.07 | Kirkland_Manholes-1690 | 47.42 | 170.4 | 0.97 | 8 | PVC | 0.01 | 694 | 28 | 8 | 37 | 5.3 | SM14-Ex-EX163 | |
| Kirkland_Main-901 | Kirkland_Manholes-618 | 51.3 | Kirkland_Manholes-619 | 48.43 | 55.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 47 | 54 | 100 | 6.3 | SM14-Ex-EX161 | |
| Kirkland_Main-902 | Kirkland_Manholes-619 | 48.43 | Kirkland_Manholes-1689 | 43.75 | 128.1 | 3.65 | 8 | PVC | 0.01 | 1,347 | 47 | 78 | 125 | 9.3 | SM14-Ex-EX161 | |
| Kirkland_Main-903 | Kirkland_Manholes-1693 | 36.33 | Kirkland_Manholes-1692 | 35.9 | 53.8 | 0.8 | 8 | PVC | 0.01 | 630 | 4 | 8 | 12 | 1.9 | | |
| Kirkland_Main-905 | Kirkland_Manholes-1809 | 70.83 | Kirkland_Manholes-1703 | 58 | 295.2 | 4.35 | 8 | PVC | 0.01 | 1,470 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX153 | |
| Kirkland_Main-910 | Kirkland_Manholes-1707 | 126.28 | Kirkland_Manholes-1706 | 124.78 | 10 | 14.96 | 12 | PVC | 0.01 | 8,041 | 17 | 115 | 132 | 1.6 | SM14-Ex-EX196 | |
| Kirkland_Main-911 | Kirkland_Manholes-1710 | 134.24 | Kirkland_Manholes-1709 | 133.97 | 34.7 | 0.78 | 12 | PVC | 0.01 | 1,833 | 14 | 82 | 96 | 5.2 | SM14-Ex-EX196 | |
| Kirkland_Main-912 | Kirkland_Manholes-1708 | 148.34 | Kirkland_Manholes-1709 | 133.97 | 305.2 | 4.71 | 12 | PVC | 0.01 | 4,511 | 2 | 16 | 18 | 0.4 | SM14-Ex-EX197 | |
| Kirkland_Main-913 | Kirkland_Manholes-1709 | 133.97 | Kirkland_Manholes-1707 | 126.28 | 136.1 | 5.65 | 12 | PVC | 0.01 | 4,942 | 16 | 107 | 123 | 2.5 | SM14-Ex-EX196 | |
| Kirkland_Main-914 | Kirkland_Manholes-2281 | 374.95 | Kirkland_Manholes-2263 | 374.13 | 166.2 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX212 | |
| Kirkland_Main-915 | Kirkland_Manholes-2283 | 405.87 | Kirkland_Manholes-2282 | 401.71 | 113.4 | 3.67 | 8 | PVC | 0.01 | 1,350 | 6 | 20 | 26 | 1.9 | | |
| Kirkland_Main-916 | Kirkland_Manholes-2295 | 415.45 | Kirkland_Manholes-2294 | 370.88 | 306.7 | 14.53 | 8 | PVC | 0.01 | 2,688 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-917 | Kirkland_Manholes-2294 | 370.88 | Kirkland_Manholes-2293 | 362.58 | 254.1 | 3.27 | 8 | PVC | 0.01 | 1,274 | 4 | 12 | 16 | 1.3 | | |
| Kirkland_Main-918 | Kirkland_Manholes-2298 | 374.75 | Kirkland_Manholes-2297 | 358.91 | 231 | 6.86 | 8 | PVC | 0.01 | 1,846 | 5 | 12 | 17 | 0.9 | SM14-Ex-EX210 | |
| Kirkland_Main-919 | Kirkland_Manholes-2297 | 358.91 | Kirkland_Manholes-2296 | 354.23 | 230.5 | 2.03 | 8 | PVC | 0.01 | 1,005 | 6 | 16 | 22 | 2.2 | SM14-Ex-EX210 | |
| Kirkland_Main-920 | Kirkland_Manholes-2772 | 308.23 | O-3 | 307.9 | 81.9 | 0.4 | 8 | PVC | 0.01 | 446 | 50 | 115 | 165 | 36.9 | | Drop Connection |
| Kirkland_Main-921 | Kirkland_Manholes-2293 | 362.58 | Kirkland_Manholes-2296 | 354.23 | 294.7 | 2.83 | 8 | PVC | 0.01 | 1,187 | 10 | 33 | 43 | 3.6 | | |
| Kirkland_Main-922 | Kirkland_Manholes-2299 | 342.7 | Kirkland_Manholes-2300 | 337.19 | 153.2 | 3.6 | 8 | PVC | 0.01 | 1,337 | 17 | 57 | 74 | 5.6 | SM14-Ex-EX206 | |
| Kirkland_Main-923 | Kirkland_Manholes-2296 | 354.23 | Kirkland_Manholes-2299 | 342.7 | 146.7 | 7.86 | 8 | PVC | 0.01 | 1,976 | 17 | 53 | 70 | 3.5 | SM14-Ex-EX206 | |
| Kirkland_Main-924 | Kirkland_Manholes-2264 | 383.3 | Kirkland_Manholes-2263 | 374.13 | 85.7 | 10.7 | 8 | PVC | 0.01 | 2,307 | 264 | 724 | 988 | 42.8 | SM14-Ex-EX248 | |
| Kirkland_Main-925 | Kirkland_Manholes-2432 | 257.14 | Kirkland_Manholes-2312 | 256.91 | 169.1 | 0.14 | 8 | PVC | 0.01 | 260 | 2 | 4 | 6 | 2.3 | | |
| Kirkland_Main-926 | Kirkland_Manholes-2312 | 256.91 | Kirkland_Manholes-2311 | 256.52 | 196.4 | 0.2 | 8 | PVC | 0.01 | 314 | 3 | 9 | 12 | 3.8 | | |
| Kirkland_Main-927 | Kirkland_Manholes-2282 | 401.71 | Kirkland_Manholes-2264 | 383.3 | 409.8 | 4.49 | 8 | PVC | 0.01 | 1,494 | 264 | 720 | 984 | 65.8 | SM14-Ex-EX248 | |
| Kirkland_Main-928 | Kirkland_Manholes-2288 | 423.18 | Kirkland_Manholes-2286 | 420.26 | 97.3 | 3 | 8 | PVC | 0.01 | 1,221 | 3 | 8 | 11 | 0.9 | | |
| Kirkland_Main-929 | Kirkland_Manholes-2289 | 426.62 | Kirkland_Manholes-2288 | 423.18 | 150.1 | 2.29 | 8 | PVC | 0.01 | 1,067 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-930 | Kirkland_Manholes-2286 | 420.26 | Kirkland_Manholes-2287 | 418.83 | 164.5 | 0.87 | 8 | PVC | 0.01 | 657 | 4 | 12 | 16 | 2.5 | | |
| Kirkland_Main-931 | Kirkland_Manholes-2287 | 418.83 | Kirkland_Manholes-2283 | 405.87 | 87.5 | 14.81 | 8 | PVC | 0.01 | 2,714 | 6 | 16 | 22 | 0.8 | | |
| Kirkland_Main-932 | Kirkland_Manholes-1585 | 238.49 | Kirkland_Manholes-1586 | 212.55 | 318.9 | 8.13 | 8 | PVC | 0.01 | 2,011 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX173 | |
| Kirkland_Main-933 | Kirkland_Manholes-1586 | 212.55 | Kirkland_Manholes-1587 | 210.95 | 268.2 | 0.6 | 8 | PVC | 0.01 | 545 | 3 | 8 | 11 | 2 | SM14-Ex-EX173 | |
| Kirkland_Main-934 | Kirkland_Manholes-1589 | 233.01 | Kirkland_Manholes-1587 | 210.95 | 318.8 | 6.92 | 8 | PVC | 0.01 | 1,855 | 67 | 212 | 279 | 15 | SM14-Ex-EX171 | |
| Kirkland_Main-935 | Kirkland_Manholes-1587 | 210.95 | Kirkland_Manholes-1603 | 202.22 | 137.6 | 6.34 | 8 | PVC | 0.01 | 1,776 | 73 | 228 | 301 | 17 | SM14-Ex-EX172 | |
| Kirkland_Main-936 | Kirkland_Manholes-1588 | 231.21 | Kirkland_Manholes-1587 | 230.56 | 162.2 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | SM14-Ex-EX172 | Drop Connection |
| Kirkland_Main-938 | Kirkland_Manholes-1590 | 241.99 | Kirkland_Manholes-1589 | 233.01 | 173.6 | 5.17 | 8 | PVC | 0.01 | 1,603 | 66 | 208 | 274 | 17.1 | SM14-Ex-EX171 | |
| Kirkland_Main-939 | Kirkland_Manholes-1591 | 253.12 | Kirkland_Manholes-1590 | 241.99 | 399.8 | 2.78 | 8 | PVC | 0.01 | 1,176 | 64 | 203 | 268 | 22.7 | SM14-Ex-EX171 | |
| Kirkland_Main-940 | Kirkland_Manholes-1592 | 255.76 | Kirkland_Manholes-1591 | 253.12 | 306.5 | 0.86 | 8 | PVC | 0.01 | 654 | 61 | 199 | 260 | 39.8 | SM14-Ex-EX124 | |
| Kirkland_Main-942 | Kirkland_Manholes-1593 | 256.67 | Kirkland_Manholes-1592 | 255.76 | 194.7 | 0.47 | 8 | PVC | 0.01 | 482 | 45 | 159 | 203 | 42.2 | SM14-Ex-EX131 | |
| Kirkland_Main-943 | Kirkland_Manholes-1594 | 254.46 | Kirkland_Manholes-1595 | 245.33 | 353 | 2.59 | 8 | PVC | 0.01 | 1,134 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX130 | |
| Kirkland_Main-944 | Kirkland_Manholes-1595 | 245.33 | Kirkland_Manholes-1596 | 228.98 | 200 | 8.17 | 8 | PVC | 0.01 | 2,016 | 5 | 8 | 13 | 0.6 | SM14-Ex-EX130 | |
| Kirkland_Main-945 | Kirkland_Manholes-1596 | 228.98 | Kirkland_Manholes-1597 | 180.84 | 398.5 | 12.08 | 8 | PVC | 0.01 | 2,450 | 6 | 12 | 19 | 0.8 | SM14-Ex-EX130 | |
| Kirkland_Main-946 | Kirkland_Manholes-1601 | 173.67 | Kirkland_Manholes-1598 | 169.75 | 176.3 | 2.22 | 8 | PVC | 0.01 | 1,051 | 61 | 167 | 228 | 21.7 | SM14-Ex-EX121 | |
| Kirkland_Main-947 | Kirkland_Manholes-1599 | 200.11 | Kirkland_Manholes-1598 | 169.75 | 271.2 | 11.19 | 8 | PVC | 0.01 | 2,359 | 4 | 8 | 12 | 0.5 | SM14-Ex-EX170 | |
| Kirkland_Main-948 | Kirkland_Manholes-379 | 279.26 | Kirkland_Manholes-380 | 277.21 | 303.7 | 0.67 | 8 | PVC | 0.01 | 579 | 3 | 8 | 11 | 1.9 | | |
| Kirkland_Main-949 | Kirkland_Manholes-378 | 285.63 | Kirkland_Manholes-379 | 279.26 | 366.8 | 1.74 | 8 | PVC | 0.01 | 929 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-950 | Kirkland_Manholes-377 | 262.82 | Kirkland_Manholes-376 | 239.8 | 319.8 | 7.2 | 8 | PVC | 0.01 | 1,892 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-951 | Kirkland_Manholes-376 | 239.8 | Kirkland_Manholes-375 | 234.87 | 251.6 | 1.96 | 8 | PVC | 0.01 | 987 | 67 | 240 | 307 | 31.1 | | |
| Kirkland_Main-953 | Kirkland_Manholes-382 | 308.23 | Kirkland_Manholes-381 | 307.41 | 91.4 | 0.9 | 8 | PVC | 0.01 | 668 | 3 | 8 | 11 | 1.6 | | |
| Kirkland_Main-954 | Kirkland_Manholes-381 | 307.41 | Kirkland_Manholes-383 | 304.37 | 123.9 | 2.45 | 8 | PVC | 0.01 | 1,104 | 3 | 12 | 15 | 1.4 | | |
| Kirkland_Main-955 | Kirkland_Manholes-383 | 304.37 | Kirkland_Manholes-384 | 296.91 | 253.7 | 2.94 | 8 | PVC | 0.01 | 1,209 | 4 | 16 | 21 | 1.7 | | |
| Kirkland_Main-956 | Kirkland_Manholes-384 | 296.91 | Kirkland_Manholes-424 | 292.81 | 99.3 | 4.13 | 8 | PVC | 0.01 | 1,432 | 6 | 20 | 26 | 1.8 | | |
| Kirkland_Main-957 | Kirkland_Manholes-873 | 311.45 | Kirkland_Manholes-385 | 303.54 | 299 | 2.65 | 8 | PVC | 0.01 | 1,147 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX33 | |
| Kirkland_Main-958 | Kirkland_Manholes-385 | 303.54 | Kirkland_Manholes-387 | 300.3 | 93.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 3 | 8 | 11 | 0.9 | SM14-Ex-EX33 | |
| Kirkland_Main-959 | Kirkland_Manholes-386 | 300.85 | Kirkland_Manholes-387 | 300.3 | 138.6 | 0.4 | 8 | PVC | 0.01 | 444 | 3 | 4 | 7 | 1.5 | SM14-Ex-EX33 | |
| Kirkland_Main-960 | Kirkland_Manholes-387 | 300.3 | Kirkland_Manholes-388 | 297.69 | 129.3 | 2.02 | 8 | PVC | 0.01 | 1,002 | 7 | 16 | 23 | 2.3 | SM14-Ex-EX33 | |
| Kirkland_Main-962 | Kirkland_Manholes-2611 | 254.27 | Kirkland_Manholes-2612 | 250.12 | 152.9 | 2.71 | 8 | PVC | 0.01 | 1,162 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX297 | |
| Kirkland_Main-963 | Kirkland_Manholes-1075 | 291.84 | Kirkland_Manholes-1121 | 289.91 | 99 | 1.95 | 8 | PVC | 0.01 | 984 | 49 | 134 | 359 | 36.5 | | |
| Kirkland_Main-964 | Kirkland_Manholes-1121 | 289.91 | Kirkland_Manholes-1068 | 279.38 | 106.4 | 9.89 | 8 | PVC | 0.01 | 2,218 | 50 | 138 | 364 | 16.4 | | |
| Kirkland_Main-966 | Kirkland_Manholes-1105 | 155.49 | Kirkland_Manholes-1052 | 151.4 | 310 | 1.32 | 8 | PVC | 0.01 | 810 | 136 | 303 | 438 | 54.1 | | |
| Kirkland_Main-967 | Kirkland_Manholes-1108 | 160.8 | Kirkland_Manholes-1105 | 155.49 | 333.3 | 1.59 | 8 | PVC | 0.01 | 890 | 10 | 13 | 23 | 2.6 | | |
| Kirkland_Main-968 | Kirkland_Manholes-1104 | 175.28 | Kirkland_Manholes-1106 | 168.9 | 388 | 1.64 | 18 | PVC | 0.01 | 7,859 | 692 | 2,169 | 2,861 | 36.4 | | |
| Kirkland_Main-969 | Kirkland_Manholes-1109 | 162.78 | Kirkland_Manholes-1108 | 160.8 | 303.1 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 9 | 10 | 1.8 | | |
| Kirkland_Main-970 | Kirkland_Manholes-1110 | 163.51 | Kirkland_Manholes-1109 | 162.78 | 317.4 | 0.23 | 8 | PVC | 0.01 | 338 | 1 | 4 | 5 | 1.6 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-972 | Kirkland_Manholes-1128 | 162.57 | O-7 | 162.29 | 71 | 0.4 | 24 | PVC | 0.01 | 8,346 | 331 | 712 | 1,219 | 14.6 | SM14-Ex-EX4 | |
| Kirkland_Main-973 | Kirkland_Manholes-1127 | 163.92 | Kirkland_Manholes-1128 | 162.57 | 132.6 | 1.02 | 24 | PVC | 0.01 | 13,318 | 331 | 704 | 1,211 | 9.1 | SM14-Ex-EX4 | |
| Kirkland_Main-974 | Kirkland_Manholes-1086 | 198.2 | Kirkland_Manholes-1122 | 184.29 | 391.8 | 3.55 | 8 | PVC | 0.01 | 1,328 | 11 | 49 | 60 | 4.5 | | |
| Kirkland_Main-975 | Kirkland_Manholes-1122 | 184.29 | Kirkland_Manholes-1123 | 182.63 | 257.7 | 0.64 | 24 | PVC | 0.01 | 10,594 | 222 | 635 | 1,033 | 9.7 | SM14-Ex-EX4 | |
| Kirkland_Main-976 | Kirkland_Manholes-1130 | 185.43 | Kirkland_Manholes-1122 | 185.35 | 20.3 | 0.4 | 12 | PVC | 0.01 | 1,314 | 199 | 582 | 957 | 72.8 | SM14-Ex-EX320 | Drop Connection |
| Kirkland_Main-977 | Kirkland_Manholes-1123 | 182.63 | Kirkland_Manholes-1124 | 177.02 | 186.2 | 3.01 | 24 | PVC | 0.01 | 22,913 | 229 | 639 | 1,044 | 4.6 | SM14-Ex-EX4 | |
| Kirkland_Main-978 | Kirkland_Manholes-1124 | 177.02 | Kirkland_Manholes-1125 | 167.88 | 251.4 | 3.64 | 24 | PVC | 0.01 | 25,165 | 295 | 675 | 1,146 | 4.6 | SM14-Ex-EX4 | |
| Kirkland_Main-979 | Kirkland_Manholes-1125 | 167.88 | Kirkland_Manholes-1126 | 164.51 | 134.8 | 2.5 | 24 | PVC | 0.01 | 20,870 | 331 | 696 | 1,203 | 5.8 | SM14-Ex-EX4 | |
| Kirkland_Main-980 | Kirkland_Manholes-2840 | 90.84 | Kirkland_Manholes-2841 | 31.53 | 332.1 | 17.86 | 8 | PVC | 0.01 | 2,980 | 3 | 12 | 15 | 0.5 | SM14-Ex-EX310 | |
| Kirkland_Main-981 | Kirkland_Manholes-2851 | 10.8 | Kirkland_Manholes-2852 | 10.72 | 17.2 | 0.47 | 18 | PVC | 0.01 | 4,181 | 287 | 788 | 1,076 | 25.7 | SM14-Ex-EX289 | |
| Kirkland_Main-982 | Kirkland_Manholes-2853 | 25.84 | Kirkland_Manholes-2852 | 10.72 | 47.1 | 32.11 | 8 | PVC | 0.01 | 3,995 | 0 | 6 | 6 | 0.2 | SM14-Ex-EX289 | |
| Kirkland_Main-983 | Kirkland_Manholes-2852 | 10.72 | KC_Manholes-18 | 10.29 | 84.8 | 0.51 | 18 | PVC | 0.01 | 4,364 | 287 | 800 | 1,088 | 24.9 | SM14-Ex-EX289 | |
| Kirkland_Main-984 | Kirkland_Manholes-2788 | 251.6 | Kirkland_Manholes-2789 | 247.4 | 283.4 | 1.48 | 8 | PVC | 0.01 | 858 | 17 | 94 | 111 | 12.9 | SM14-Ex-EX313 | |
| Kirkland_Main-985 | Kirkland_Manholes-2789 | 247.4 | Kirkland_Manholes-2790 | 235.81 | 170.4 | 6.8 | 8 | PVC | 0.01 | 1,839 | 19 | 98 | 117 | 6.4 | SM14-Ex-EX313 | |
| Kirkland_Main-987 | Kirkland_Manholes-2790 | 235.81 | Kirkland_Manholes-2791 | 226.53 | 127.8 | 7.26 | 8 | PVC | 0.01 | 1,900 | 20 | 102 | 122 | 6.4 | SM14-Ex-EX313 | |
| Kirkland_Main-988 | Kirkland_Manholes-2791 | 226.53 | Kirkland_Manholes-2792 | 199.25 | 298.7 | 9.13 | 8 | PVC | 0.01 | 2,131 | 22 | 106 | 127 | 6 | SM14-Ex-EX313 | |
| Kirkland_Main-989 | Kirkland_Manholes-2794 | 201.04 | Kirkland_Manholes-2792 | 199.25 | 290.5 | 0.62 | 8 | PVC | 0.01 | 553 | 3 | 8 | 11 | 2 | SM14-Ex-EX312 | |
| Kirkland_Main-991 | Kirkland_Manholes-2795 | 201.42 | Kirkland_Manholes-2794 | 201.04 | 162 | 0.23 | 8 | PVC | 0.01 | 341 | 1 | 4 | 5 | 1.6 | SM14-Ex-EX312 | |
| Kirkland_Main-992 | Kirkland_Manholes-2792 | 199.25 | Kirkland_Manholes-2793 | 190.95 | 116.2 | 7.14 | 8 | PVC | 0.01 | 1,885 | 33 | 118 | 151 | 8 | SM14-Ex-EX313 | |
| Kirkland_Main-993 | Kirkland_Manholes-2793 | 190.95 | Kirkland_Manholes-2803 | 158.22 | 135.7 | 24.12 | 8 | PVC | 0.01 | 3,462 | 34 | 122 | 156 | 4.5 | SM14-Ex-EX313 | |
| Kirkland_Main-994 | Kirkland_Manholes-2842 | 26.9 | Kirkland_Manholes-2850 | 13.3 | 475.2 | 2.86 | 24 | PVC | 0.01 | 22,330 | 518 | 1,242 | 1,832 | 8.2 | SM14-Ex-EX309 | |
| Kirkland_Main-995 | Kirkland_Manholes-2850 | 13.3 | KC_Manholes-18 | 10.29 | 41.7 | 7.21 | 24 | PVC | 0.01 | 35,453 | 520 | 1,248 | 1,839 | 5.2 | SM14-Ex-EX309 | |
| Kirkland_Main-996 | Kirkland_Manholes-2856 | 18.03 | Kirkland_Manholes-2845 | 16.72 | 134.6 | 0.98 | 8 | PVC | 0.01 | 696 | 13 | 14 | 27 | 3.9 | SM14-Ex-EX315 | |
| Kirkland_Main-997 | Kirkland_Manholes-2857 | 19.7 | Kirkland_Manholes-2856 | 18.03 | 135.5 | 1.23 | 8 | PVC | 0.01 | 783 | 13 | 9 | 22 | 2.8 | SM14-Ex-EX315 | |
| Kirkland_Main-998 | Kirkland_Manholes-1928 | 375.97 | Kirkland_Manholes-1929 | 374.67 | 53.7 | 2.42 | 12 | PVC | 0.01 | 3,235 | 159 | 549 | 708 | 21.9 | SM14-Ex-EX205 | |
| Kirkland_Main-999 | Kirkland_Manholes-1929 | 374.67 | Kirkland_Manholes-1579 | 359.44 | 398.3 | 3.82 | 12 | PVC | 0.01 | 4,065 | 197 | 614 | 812 | 20 | SM14-Ex-EX205 | |
| Kirkland_Main-1000 | Kirkland_Manholes-1930 | 369.31 | Kirkland_Manholes-1931 | 367.07 | 97.4 | 2.3 | 8 | PVC | 0.01 | 1,069 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-1001 | Kirkland_Manholes-1931 | 367.07 | Kirkland_Manholes-1932 | 360.4 | 233.1 | 2.86 | 8 | PVC | 0.01 | 1,193 | 4 | 12 | 16 | 1.4 | | |
| Kirkland_Main-1003 | Kirkland_Manholes-1932 | 360.4 | Kirkland_Manholes-1954 | 357.36 | 158.2 | 1.92 | 8 | PVC | 0.01 | 977 | 4 | 16 | 20 | 2.1 | | |
| Kirkland_Main-1004 | Kirkland_Manholes-1935 | 274.07 | Kirkland_Manholes-1881 | 267.11 | 156.7 | 4.44 | 8 | PVC | 0.01 | 1,486 | 35 | 85 | 121 | 8.1 | | |
| Kirkland_Main-1005 | Kirkland_Manholes-1951 | 275.06 | Kirkland_Manholes-1935 | 274.07 | 209.5 | 0.47 | 8 | PVC | 0.01 | 485 | 19 | 45 | 63 | 13.1 | | |
| Kirkland_Main-1006 | Kirkland_Manholes-1936 | 301.29 | Kirkland_Manholes-1935 | 274.07 | 237.6 | 11.46 | 8 | PVC | 0.01 | 2,387 | 15 | 37 | 51 | 2.2 | | |
| Kirkland_Main-1007 | Kirkland_Manholes-1933 | 343.68 | Kirkland_Manholes-1934 | 342.88 | 296 | 0.27 | 8 | PVC | 0.01 | 367 | 7 | 33 | 40 | 10.9 | | |
| Kirkland_Main-1008 | Kirkland_Manholes-1954 | 357.36 | Kirkland_Manholes-1934 | 342.88 | 118.8 | 12.19 | 8 | PVC | 0.01 | 2,462 | 5 | 20 | 25 | 1 | | |
| Kirkland_Main-1009 | Kirkland_Manholes-1934 | 342.88 | Kirkland_Manholes-1961 | 341.24 | 125.1 | 1.31 | 8 | PVC | 0.01 | 807 | 12 | 57 | 69 | 8.6 | | |
| Kirkland_Main-1010 | Kirkland_Manholes-1938 | 323.43 | Kirkland_Manholes-1936 | 301.29 | 243 | 9.11 | 8 | PVC | 0.01 | 2,128 | 12 | 33 | 45 | 2.1 | | |
| Kirkland_Main-1011 | Kirkland_Manholes-1939 | 324.34 | Kirkland_Manholes-1938 | 323.43 | 100 | 0.91 | 8 | PVC | 0.01 | 673 | 10 | 24 | 34 | 5.1 | | |
| Kirkland_Main-1012 | Kirkland_Manholes-1937 | 332.23 | Kirkland_Manholes-1938 | 323.43 | 194.4 | 4.53 | 8 | PVC | 0.01 | 1,500 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1013 | Kirkland_Manholes-1940 | 363.18 | Kirkland_Manholes-1941 | 361.64 | 56.6 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1014 | Kirkland_Manholes-391 | 302.9 | Kirkland_Manholes-389 | 295.78 | 243.6 | 2.92 | 8 | PVC | 0.01 | 1,205 | 36 | 130 | 166 | 13.8 | SM14-Ex-EX50 | |
| Kirkland_Main-1015 | Kirkland_Manholes-389 | 295.78 | Kirkland_Manholes-393 | 288.03 | 97.8 | 7.93 | 8 | PVC | 0.01 | 1,985 | 46 | 155 | 200 | 10.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1016 | Kirkland_Manholes-393 | 288.03 | Kirkland_Manholes-380 | 277.21 | 135.7 | 7.97 | 8 | PVC | 0.01 | 1,991 | 49 | 163 | 212 | 10.6 | SM14-Ex-EX50 | |
| Kirkland_Main-1017 | Kirkland_Manholes-395 | 253.88 | Kirkland_Manholes-396 | 249.55 | 242.3 | 1.79 | 8 | PVC | 0.01 | 942 | 59 | 212 | 271 | 28.8 | | |
| Kirkland_Main-1018 | Kirkland_Manholes-398 | 254.33 | Kirkland_Manholes-397 | 247.33 | 147.9 | 4.73 | 8 | PVC | 0.01 | 1,534 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1019 | Kirkland_Manholes-396 | 249.55 | Kirkland_Manholes-397 | 247.33 | 240.2 | 0.92 | 8 | PVC | 0.01 | 678 | 63 | 224 | 287 | 42.3 | | |
| Kirkland_Main-1020 | Kirkland_Manholes-394 | 266.89 | Kirkland_Manholes-395 | 253.88 | 150 | 8.67 | 8 | PVC | 0.01 | 2,076 | 56 | 187 | 244 | 11.7 | SM14-Ex-EX50 | |
| Kirkland_Main-1021 | Kirkland_Manholes-380 | 277.21 | Kirkland_Manholes-394 | 266.89 | 136.7 | 7.55 | 8 | PVC | 0.01 | 1,937 | 52 | 175 | 227 | 11.7 | SM14-Ex-EX50 | |
| Kirkland_Main-1022 | Kirkland_Manholes-898 | 306.89 | Kirkland_Manholes-899 | 305.17 | 102.3 | 1.68 | 8 | PVC | 0.01 | 914 | 1 | 8 | 9 | 1 | | |
| Kirkland_Main-1023 | Kirkland_Manholes-899 | 305.17 | Kirkland_Manholes-900 | 302.97 | 237.5 | 0.93 | 8 | PVC | 0.01 | 679 | 3 | 12 | 15 | 2.3 | | |
| Kirkland_Main-1024 | Kirkland_Manholes-444 | 92.89 | Kirkland_Manholes-443 | 91.49 | 172.9 | 0.81 | 8 | PVC | 0.01 | 634 | 5 | 43 | 48 | 7.6 | | |
| Kirkland_Main-1025 | Kirkland_Manholes-525 | 156.27 | Kirkland_Manholes-526 | 148.56 | 279.6 | 2.76 | 8 | PVC | 0.01 | 1,171 | 4 | 25 | 29 | 2.5 | SM10 | |
| Kirkland_Main-1027 | Kirkland_Manholes-1198 | 189.72 | Kirkland_Manholes-497 | 188.11 | 129.7 | 1.24 | 8 | PVC | 0.01 | 786 | 17 | 49 | 66 | 8.5 | SM14-Ex-EX80 | |
| Kirkland_Main-1030 | Kirkland_Manholes-520 | 182.65 | Kirkland_Manholes-519 | 157.09 | 301.6 | 8.48 | 8 | PVC | 0.01 | 2,053 | 5 | 16 | 21 | 1 | SM10 | |
| Kirkland_Main-1031 | Kirkland_Manholes-499 | 185.94 | Kirkland_Manholes-523 | 180.21 | 279.4 | 2.05 | 8 | PVC | 0.01 | 1,010 | 24 | 74 | 98 | 9.7 | SM10 | |
| Kirkland_Main-1032 | Kirkland_Manholes-523 | 180.21 | Kirkland_Manholes-522 | 152.47 | 278.9 | 9.95 | 8 | PVC | 0.01 | 2,224 | 26 | 82 | 109 | 4.9 | SM10 | |
| Kirkland_Main-1033 | Kirkland_Manholes-522 | 152.47 | Kirkland_Manholes-521 | 145.96 | 154.4 | 4.22 | 8 | PVC | 0.01 | 1,448 | 28 | 91 | 118 | 8.2 | SM10 | |
| Kirkland_Main-1034 | Kirkland_Manholes-521 | 145.96 | Kirkland_Manholes-518 | 138.7 | 160.6 | 4.52 | 8 | PVC | 0.01 | 1,499 | 29 | 99 | 128 | 8.5 | SM10 | |
| Kirkland_Main-1036 | Kirkland_Manholes-518 | 138.7 | Kirkland_Manholes-1179 | 123.76 | 316.8 | 4.72 | 8 | PVC | 0.01 | 1,531 | 37 | 132 | 169 | 11 | SM10 | |
| Kirkland_Main-1037 | Kirkland_Manholes-519 | 157.09 | Kirkland_Manholes-518 | 138.7 | 337.5 | 5.45 | 8 | PVC | 0.01 | 1,646 | 8 | 25 | 32 | 2 | SM10 | |
| Kirkland_Main-1041 | Kirkland_Manholes-1235 | 275.6 | Kirkland_Manholes-1233 | 274.4 | 201.2 | 0.6 | 8 | PVC | 0.01 | 545 | 3 | 8 | 11 | 2 | | |
| Kirkland_Main-1042 | Kirkland_Manholes-1240 | 250.21 | Kirkland_Manholes-1230 | 236.32 | 226.8 | 6.13 | 8 | PVC | 0.01 | 1,745 | 5 | 8 | 13 | 0.8 | SM14-Ex-EX92 | |
| Kirkland_Main-1043 | Kirkland_Manholes-1243 | 249.45 | Kirkland_Manholes-1242 | 244.28 | 74.2 | 6.97 | 8 | PVC | 0.01 | 1,862 | 1 | 4 | 6 | 0.3 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1044 | Kirkland_Manholes-1206 | 193.92 | Kirkland_Manholes-1149 | 192.13 | 296.5 | 0.6 | 8 | PVC | 0.01 | 548 | 18 | 56 | 74 | 13.4 | SM14-Ex-EX89 | |
| Kirkland_Main-1049 | Kirkland_Manholes-1268 | 189.24 | Kirkland_Manholes-1269 | 174.05 | 110.9 | 13.69 | 8 | PVC | 0.01 | 2,609 | 4 | 16 | 21 | 0.8 | SM14-Ex-EX107 | |
| Kirkland_Main-1050 | Kirkland_Manholes-1269 | 174.05 | Kirkland_Manholes-1259 | 154.8 | 228.2 | 8.43 | 8 | PVC | 0.01 | 2,048 | 5 | 25 | 30 | 1.5 | SM14-Ex-EX107 | |
| Kirkland_Main-1051 | Kirkland_Manholes-1267 | 201.75 | Kirkland_Manholes-1268 | 189.24 | 323.1 | 3.87 | 8 | PVC | 0.01 | 1,387 | 4 | 8 | 12 | 0.9 | SM14-Ex-EX107 | |
| Kirkland_Main-1052 | Kirkland_Manholes-1265 | 168.12 | Kirkland_Manholes-1262 | 156.59 | 138.9 | 8.3 | 8 | PVC | 0.01 | 2,031 | 4 | 25 | 29 | 1.4 | | |
| Kirkland_Main-1053 | Kirkland_Manholes-1497 | 270.45 | Kirkland_Manholes-1499 | 268.92 | 211.1 | 0.72 | 8 | PVC | 0.01 | 600 | 18 | 57 | 75 | 12.5 | | |
| Kirkland_Main-1054 | Kirkland_Manholes-1315 | 270.9 | Kirkland_Manholes-1497 | 270.45 | 108.5 | 0.41 | 8 | PVC | 0.01 | 454 | 17 | 53 | 70 | 15.3 | | |
| Kirkland_Main-1055 | Kirkland_Manholes-704 | 272.37 | Kirkland_Manholes-145 | 271.65 | 145.7 | 0.49 | 8 | PVC | 0.01 | 496 | 14 | 37 | 50 | 10.1 | | |
| Kirkland_Main-1057 | Kirkland_Manholes-1220 | 255.3 | Kirkland_Manholes-1140 | 220.91 | 332.7 | 10.34 | 8 | PVC | 0.01 | 2,267 | 2 | 8 | 11 | 0.5 | SM14-Ex-EX84 | |
| Kirkland_Main-1058 | Kirkland_Manholes-1222 | 248.84 | Kirkland_Manholes-1142 | 218.06 | 350.4 | 8.79 | 8 | PVC | 0.01 | 2,090 | 4 | 8 | 12 | 0.6 | SM14-Ex-EX85 | |
| Kirkland_Main-1059 | Kirkland_Manholes-1140 | 220.91 | Kirkland_Manholes-1142 | 218.06 | 314 | 0.91 | 8 | PVC | 0.01 | 672 | 5 | 16 | 22 | 3.2 | SM4 | |
| Kirkland_Main-1061 | Kirkland_Manholes-1224 | 232.76 | Kirkland_Manholes-500 | 209.24 | 344.5 | 6.83 | 8 | PVC | 0.01 | 1,842 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX87 | |
| Kirkland_Main-1062 | Kirkland_Manholes-1085 | 204.43 | Kirkland_Manholes-1130 | 185.43 | 381.7 | 4.98 | 8 | PVC | 0.01 | 1,573 | 174 | 578 | 928 | 59 | | |
| Kirkland_Main-1063 | Kirkland_Manholes-1120 | 158.13 | Kirkland_Manholes-712 | 157.06 | 229.6 | 0.47 | 8 | PVC | 0.01 | 481 | 31 | 12 | 42 | 8.8 | SM14-Ex-EX1 | |
| Kirkland_Main-1066 | Kirkland_Manholes-1512 | 281.18 | Kirkland_Manholes-1513 | 263.11 | 227.7 | 7.94 | 8 | PVC | 0.01 | 1,986 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX132 | |
| Kirkland_Main-1067 | Kirkland_Manholes-1161 | 78.67 | Kirkland_Manholes-1162 | 78.51 | 20.6 | 0.78 | 15 | PVC | 0.01 | 3,326 | 78 | 404 | 482 | 14.5 | SM14-Ex-EX77 | |
| Kirkland_Main-1068 | Kirkland_Manholes-1132 | 188.66 | Kirkland_Manholes-1133 | 181.56 | 258.9 | 2.74 | 8 | PVC | 0.01 | 1,168 | 3 | 4 | 8 | 0.7 | SM14-Ex-EX58 | |
| Kirkland_Main-1069 | Kirkland_Manholes-616 | 72.16 | Kirkland_Manholes-617 | 67.92 | 242.5 | 1.75 | 8 | PVC | 0.01 | 932 | 4 | 8 | 12 | 1.3 | SM14-Ex-EX162 | |
| Kirkland_Main-1070 | Kirkland_Manholes-1699 | 108.13 | Kirkland_Manholes-1700 | 106.17 | 216.2 | 0.91 | 8 | PVC | 0.01 | 671 | 0 | 8 | 8 | 1.2 | SM14-Ex-EX150 | |
| Kirkland_Main-1071 | Kirkland_Manholes-1700 | 106.17 | Kirkland_Manholes-1802 | 95.68 | 325.3 | 3.22 | 8 | PVC | 0.01 | 1,266 | 4 | 16 | 21 | 1.6 | SM14-Ex-EX150 | |
| Kirkland_Main-1074 | Kirkland_Manholes-1613 | 87.49 | Kirkland_Manholes-1788 | 86.3 | 197.1 | 0.6 | 8 | PVC | 0.01 | 548 | 14 | 124 | 138 | 25.2 | SM14-Ex-EX167 | |
| Kirkland_Main-1075 | Kirkland_Manholes-1793 | 15.37 | Kirkland_Manholes-1794 | 12.63 | 22.1 | 12.39 | 8 | PVC | 0.01 | 2,482 | 30 | 19 | 49 | 2 | | |
| Kirkland_Main-1076 | Kirkland_Manholes-1795 | 13.3 | Kirkland_Manholes-1794 | 12.63 | 41.9 | 1.6 | 15 | PVC | 0.01 | 4,763 | 425 | 753 | 1,178 | 24.7 | | |
| Kirkland_Main-1077 | Kirkland_Manholes-1789 | 14.67 | Kirkland_Manholes-1790 | 14.6 | 18.2 | 0.38 | 21 | PVC | 0.01 | 5,726 | 418 | 734 | 1,152 | 20.1 | | |
| Kirkland_Main-1078 | Kirkland_Manholes-1790 | 14.6 | Kirkland_Manholes-1792 | 14.49 | 82.9 | 0.13 | 21 | PVC | 0.01 | 3,367 | 418 | 740 | 1,159 | 34.4 | | |
| Kirkland_Main-1079 | Kirkland_Manholes-1791 | 8.2 | PLAZA_WW | 6 | 10.6 | 20.76 | 18 | PVC | 0.01 | 27,925 | 475 | 896 | 1,372 | 4.9 | SM14-Ex-EX182 | |
| Kirkland_Main-1080 | Kirkland_Manholes-1792 | 14.49 | Kirkland_Manholes-1795 | 13.3 | 199 | 0.6 | 21 | PVC | 0.01 | 7,159 | 419 | 747 | 1,166 | 16.3 | | |
| Kirkland_Main-1081 | Kirkland_Manholes-1800 | 147.89 | Kirkland_Manholes-1799 | 133.76 | 154.6 | 9.14 | 8 | PVC | 0.01 | 2,131 | 2 | 8 | 11 | 0.5 | SM14-Ex-EX146 | |
| Kirkland_Main-1082 | Kirkland_Manholes-1799 | 133.76 | Kirkland_Manholes-1798 | 126.65 | 165.5 | 4.3 | 8 | PVC | 0.01 | 1,461 | 6 | 25 | 31 | 2.1 | SM14-Ex-EX146 | |
| Kirkland_Main-1083 | Kirkland_Manholes-1797 | 142.57 | Kirkland_Manholes-1798 | 126.65 | 291.9 | 5.45 | 8 | PVC | 0.01 | 1,647 | 56 | 196 | 251 | 15.3 | SM4 | |
| Kirkland_Main-1084 | Kirkland_Manholes-1796 | 160.8 | Kirkland_Manholes-1797 | 142.57 | 315.3 | 5.78 | 8 | PVC | 0.01 | 1,695 | 52 | 179 | 232 | 13.7 | SM4 | |
| Kirkland_Main-1085 | Kirkland_Manholes-1798 | 126.65 | Kirkland_Manholes-1801 | 112.29 | 288.6 | 4.97 | 8 | PVC | 0.01 | 1,573 | 62 | 229 | 291 | 18.5 | SM4 | |
| Kirkland_Main-1086 | Kirkland_Manholes-2191 | 134.63 | Kirkland_Manholes-2190 | 132.39 | 117.1 | 1.91 | 8 | PVC | 0.01 | 975 | 4 | 16 | 20 | 2.1 | | |
| Kirkland_Main-1088 | Kirkland_Manholes-2194 | 68 | Kirkland_Manholes-2193 | 64.5 | 142 | 2.47 | 8 | PVC | 0.01 | 1,107 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX187 | |
| Kirkland_Main-1089 | Kirkland_Manholes-2193 | 64.5 | Kirkland_Manholes-2145 | 63.1 | 194.7 | 0.72 | 8 | PVC | 0.01 | 598 | 5 | 41 | 46 | 7.7 | SM14-Ex-EX187 | |
| Kirkland_Main-1091 | Kirkland_Manholes-2187 | 114.37 | Kirkland_Manholes-2185 | 103.23 | 164.5 | 6.77 | 8 | PVC | 0.01 | 1,835 | 6 | 16 | 23 | 1.2 | SM14-Ex-EX188 | |
| Kirkland_Main-1092 | Kirkland_Manholes-2185 | 103.23 | Kirkland_Manholes-2184 | 75.09 | 227 | 12.4 | 8 | PVC | 0.01 | 2,482 | 35 | 66 | 101 | 4.1 | SM14-Ex-EX188 | |
| Kirkland_Main-1093 | Kirkland_Manholes-2184 | 75.09 | Kirkland_Manholes-2144 | 65.5 | 214.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 35 | 74 | 109 | 7.3 | SM14-Ex-EX188 | |
| Kirkland_Main-1094 | Kirkland_Manholes-2199 | 42.12 | Kirkland_Manholes-2201 | 34.26 | 130.3 | 6.03 | 8 | PVC | 0.01 | 1,731 | 55 | 6 | 62 | 3.6 | | |
| Kirkland_Main-1095 | Kirkland_Manholes-2201 | 34.26 | Kirkland_Manholes-2200 | 29.87 | 27.9 | 15.75 | 8 | PVC | 0.01 | 2,798 | 55 | 13 | 68 | 2.4 | | |
| Kirkland_Main-1096 | Kirkland_Manholes-2098 | 53.6 | Kirkland_Manholes-2097 | 45.25 | 198.1 | 4.22 | 8 | PVC | 0.01 | 1,448 | 2 | 6 | 9 | 0.6 | SM14-Ex-EX233 | |
| Kirkland_Main-1097 | Kirkland_Manholes-2195 | 483.44 | Kirkland_Manholes-2196 | 481.85 | 326.8 | 0.49 | 8 | PVC | 0.01 | 492 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-1098 | Kirkland_Manholes-2196 | 481.85 | Kirkland_Manholes-2197 | 480.89 | 188.7 | 0.51 | 8 | PVC | 0.01 | 503 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-1099 | Kirkland_Manholes-2111 | 59.56 | Kirkland_Manholes-2099 | 57.72 | 398 | 0.46 | 12 | PVC | 0.01 | 1,413 | 78 | 196 | 274 | 19.4 | SM14-Ex-EX222 | |
| Kirkland_Main-1100 | Kirkland_Manholes-2100 | 58.67 | Kirkland_Manholes-2099 | 57.72 | 62.5 | 1.52 | 8 | PVC | 0.01 | 869 | 9 | 18 | 28 | 3.2 | SM14-Ex-EX234 | |
| Kirkland_Main-1101 | Kirkland_Manholes-2101 | 73.68 | Kirkland_Manholes-2100 | 58.67 | 124.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 9 | 12 | 21 | 0.9 | | |
| Kirkland_Main-1102 | Kirkland_Manholes-2102 | 127.52 | Kirkland_Manholes-2101 | 73.68 | 250.6 | 21.48 | 8 | PVC | 0.01 | 3,268 | 4 | 6 | 11 | 0.3 | | |
| Kirkland_Main-1104 | Kirkland_Manholes-2103 | 51.49 | Kirkland_Manholes-2104 | 41.29 | 235.7 | 4.33 | 8 | PVC | 0.01 | 1,467 | 0 | 6 | 7 | 0.5 | SM14-Ex-EX231 | |
| Kirkland_Main-1105 | Kirkland_Manholes-2447 | 28.08 | Kirkland_Manholes-2448 | 25.41 | 138 | 1.94 | 12 | PVC | 0.01 | 2,892 | 1 | 6 | 8 | 0.3 | | |
| Kirkland_Main-1106 | Kirkland_Manholes-2448 | 25.41 | Kirkland_Manholes-2451 | 24.29 | 346.6 | 0.32 | 12 | PVC | 0.01 | 1,182 | 14 | 19 | 34 | 2.8 | | |
| Kirkland_Main-1107 | Kirkland_Manholes-2449 | 27.6 | Kirkland_Manholes-2448 | 25.41 | 29.8 | 7.34 | 8 | PVC | 0.01 | 1,910 | 11 | 6 | 17 | 0.9 | | |
| Kirkland_Main-1108 | Kirkland_Manholes-2450 | 27.97 | Kirkland_Manholes-2451 | 24.29 | 50.3 | 7.31 | 8 | PVC | 0.01 | 1,906 | 2 | 13 | 15 | 0.8 | | |
| Kirkland_Main-1109 | Kirkland_Manholes-2491 | 35.69 | Kirkland_Manholes-2450 | 27.97 | 197.9 | 3.9 | 8 | PVC | 0.01 | 1,393 | 1 | 6 | 8 | 0.5 | SM14-Ex-EX278 | |
| Kirkland_Main-1110 | Kirkland_Manholes-2451 | 24.29 | Kirkland_Manholes-2452 | 24.18 | 330.9 | 0.03 | 12 | PVC | 0.01 | 374 | 16 | 39 | 55 | 14.7 | | |
| Kirkland_Main-1111 | Kirkland_Manholes-2452 | 24.18 | Kirkland_Manholes-2454 | 23.57 | 255.1 | 0.24 | 12 | PVC | 0.01 | 1,016 | 25 | 58 | 84 | 8.3 | | |
| Kirkland_Main-1112 | Kirkland_Manholes-2453 | 27.74 | Kirkland_Manholes-2452 | 24.18 | 62.2 | 5.72 | 8 | PVC | 0.01 | 1,686 | 9 | 13 | 22 | 1.3 | | |
| Kirkland_Main-1113 | Kirkland_Manholes-2093 | 44.98 | Kirkland_Manholes-2453 | 27.74 | 236.1 | 7.3 | 8 | PVC | 0.01 | 1,905 | 8 | 6 | 14 | 0.7 | SM14-Ex-EX276 | |
| Kirkland_Main-1114 | Kirkland_Manholes-2097 | 45.25 | Kirkland_Manholes-2455 | 44.41 | 209.1 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 13 | 25 | 5.6 | SM14-Ex-EX233 | Drop Connection |
| Kirkland_Main-1115 | Kirkland_Manholes-2455 | 26.2 | Kirkland_Manholes-2454 | 23.57 | 36.4 | 7.21 | 8 | PVC | 0.01 | 1,893 | 14 | 19 | 33 | 1.7 | SM14-Ex-EX233 | |
| Kirkland_Main-1116 | Kirkland_Manholes-2454 | 23.57 | Kirkland_Manholes-2456 | 21.67 | 413.5 | 0.46 | 12 | PVC | 0.01 | 1,410 | 39 | 84 | 123 | 8.8 | | |
| Kirkland_Main-1117 | Kirkland_Manholes-2457 | 26.27 | Kirkland_Manholes-2456 | 21.67 | 49.5 | 9.28 | 8 | PVC | 0.01 | 2,148 | 8 | 19 | 27 | 1.3 | | |
| Kirkland_Main-1118 | Kirkland_Manholes-2202 | 26.91 | Kirkland_Manholes-2305 | 25.32 | 49.2 | 3.23 | 8 | PVC | 0.01 | 1,266 | 55 | 26 | 81 | 6.4 | | Drop Connection |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1119 | Kirkland_Manholes-2205 | 23.1 | Kirkland_Manholes-2306 | 15.63 | 44.6 | 16.73 | 8 | PVC | 0.01 | 2,884 | 7 | 32 | 40 | 1.4 | | Drop Connection |
| Kirkland_Main-1120 | Kirkland_Manholes-2306 | 15.63 | Kirkland_Manholes-2305 | 15.26 | 357 | 0.1 | 21 | PVC | 0.01 | 2,976 | 276 | 643 | 919 | 30.9 | | |
| Kirkland_Main-1121 | Kirkland_Manholes-2307 | 15.73 | Kirkland_Manholes-2306 | 15.63 | 136.3 | 0.07 | 21 | PVC | 0.01 | 2,504 | 269 | 604 | 873 | 34.8 | | |
| Kirkland_Main-1122 | Kirkland_Manholes-2217 | 22.48 | Kirkland_Manholes-2308 | 22.33 | 38 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 39 | 51 | 11.5 | | Drop Connection |
| Kirkland_Main-1123 | Kirkland_Manholes-2308 | 15.98 | Kirkland_Manholes-2307 | 15.73 | 271.4 | 0.09 | 21 | PVC | 0.01 | 2,806 | 259 | 598 | 857 | 30.5 | | |
| Kirkland_Main-1124 | Kirkland_Manholes-2309 | 16.24 | Kirkland_Manholes-2308 | 15.98 | 211.8 | 0.12 | 21 | PVC | 0.01 | 3,239 | 245 | 552 | 797 | 24.6 | | |
| Kirkland_Main-1125 | Kirkland_Manholes-2313 | 16.39 | Kirkland_Manholes-2309 | 16.24 | 162.2 | 0.09 | 21 | PVC | 0.01 | 2,811 | 240 | 546 | 785 | 27.9 | | |
| Kirkland_Main-1126 | Kirkland_Manholes-2314 | 16.65 | Kirkland_Manholes-2313 | 16.39 | 183.4 | 0.14 | 21 | PVC | 0.01 | 3,481 | 223 | 500 | 723 | 20.8 | | |
| Kirkland_Main-1127 | Kirkland_Manholes-2315 | 16.77 | Kirkland_Manholes-2314 | 16.65 | 235.7 | 0.05 | 21 | PVC | 0.01 | 2,086 | 202 | 416 | 618 | 29.6 | | |
| Kirkland_Main-1128 | Kirkland_Manholes-2316 | 17.03 | Kirkland_Manholes-2315 | 16.77 | 315.7 | 0.08 | 21 | PVC | 0.01 | 2,653 | 202 | 409 | 611 | 23 | | |
| Kirkland_Main-1129 | Kirkland_Manholes-2317 | 17.2 | Kirkland_Manholes-2316 | 17.03 | 183.4 | 0.09 | 21 | PVC | 0.01 | 2,815 | 191 | 403 | 594 | 21.1 | | |
| Kirkland_Main-1130 | Kirkland_Manholes-2155 | 23.66 | Kirkland_Manholes-2318 | 17.6 | 47.1 | 12.87 | 8 | PVC | 0.01 | 2,530 | 54 | 97 | 152 | 6 | | |
| Kirkland_Main-1131 | Kirkland_Manholes-2318 | 17.6 | Kirkland_Manholes-2317 | 17.2 | 364 | 0.11 | 21 | PVC | 0.01 | 3,053 | 182 | 390 | 572 | 18.7 | | |
| Kirkland_Main-1132 | Kirkland_Manholes-2319 | 17.7 | Kirkland_Manholes-2318 | 17.6 | 48.4 | 0.21 | 21 | PVC | 0.01 | 4,200 | 127 | 279 | 406 | 9.7 | | |
| Kirkland_Main-1136 | Kirkland_Manholes-2874 | 209.8 | Kirkland_Manholes-2873 | 208.01 | 164.9 | 1.09 | 8 | PVC | 0.01 | 735 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-1137 | Kirkland_Manholes-2873 | 208.01 | Kirkland_Manholes-2872 | 207.03 | 88.7 | 1.1 | 8 | PVC | 0.01 | 741 | 0 | 8 | 8 | 1.1 | | |
| Kirkland_Main-1138 | Kirkland_Manholes-2872 | 207.03 | Kirkland_Manholes-2871 | 205.15 | 113.5 | 1.66 | 8 | PVC | 0.01 | 907 | 0 | 16 | 16 | 1.8 | | |
| Kirkland_Main-1139 | Kirkland_Manholes-2871 | 205.15 | Kirkland_Manholes-2869 | 204.84 | 44.2 | 0.7 | 8 | PVC | 0.01 | 591 | 0 | 20 | 20 | 3.4 | | |
| Kirkland_Main-1140 | Kirkland_Manholes-2869 | 204.84 | Kirkland_Manholes-2870 | 201.21 | 123.4 | 2.94 | 18 | PVC | 0.01 | 10,510 | 657 | 2,112 | 2,769 | 26.3 | | |
| Kirkland_Main-1141 | Kirkland_Manholes-2870 | 201.21 | Kirkland_Manholes-1103 | 198.97 | 205 | 1.09 | 18 | PVC | 0.01 | 6,407 | 657 | 2,116 | 2,773 | 43.3 | | |
| Kirkland_Main-1142 | Kirkland_Manholes-2875 | 310.11 | Kirkland_Manholes-898 | 306.89 | 269.8 | 1.19 | 8 | PVC | 0.01 | 770 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1143 | Kirkland_Manholes-2475 | 210.58 | Kirkland_Manholes-2477 | 189.6 | 360 | 5.83 | 8 | PVC | 0.01 | 1,702 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX241 | |
| Kirkland_Main-1144 | Kirkland_Manholes-2478 | 190.32 | Kirkland_Manholes-2477 | 189.6 | 67.1 | 1.07 | 8 | PVC | 0.01 | 730 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX241 | |
| Kirkland_Main-1145 | Kirkland_Manholes-2477 | 189.6 | Kirkland_Manholes-2479 | 186.26 | 224.2 | 1.49 | 8 | PVC | 0.01 | 861 | 4 | 12 | 16 | 1.9 | SM14-Ex-EX241 | |
| Kirkland_Main-1146 | Kirkland_Manholes-2479 | 186.26 | Kirkland_Manholes-2482 | 184.91 | 81 | 1.67 | 8 | PVC | 0.01 | 910 | 7 | 24 | 32 | 3.5 | | |
| Kirkland_Main-1147 | Kirkland_Manholes-2480 | 187.23 | Kirkland_Manholes-2479 | 186.26 | 143.4 | 0.68 | 8 | PVC | 0.01 | 580 | 3 | 8 | 11 | 1.9 | SM14-Ex-EX241 | |
| Kirkland_Main-1148 | Kirkland_Manholes-2489 | 190.15 | Kirkland_Manholes-2480 | 187.23 | 230.1 | 1.27 | 8 | PVC | 0.01 | 794 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX241 | |
| Kirkland_Main-1149 | Kirkland_Manholes-2481 | 184.88 | Kirkland_Manholes-2490 | 173.27 | 348.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 2 | 4 | 7 | 0.5 | SM14-Ex-EX242 | |
| Kirkland_Main-1150 | Kirkland_Manholes-2482 | 184.91 | Kirkland_Manholes-2483 | 165.54 | 140.6 | 13.78 | 8 | PVC | 0.01 | 2,617 | 8 | 28 | 37 | 1.4 | | |
| Kirkland_Main-1152 | Kirkland_Manholes-2483 | 165.54 | Kirkland_Manholes-2488 | 154.5 | 273.8 | 4.03 | 8 | PVC | 0.01 | 1,416 | 10 | 33 | 42 | 3 | | |
| Kirkland_Main-1153 | Kirkland_Manholes-2488 | 154.5 | Kirkland_Manholes-2487 | 153.78 | 111.9 | 0.64 | 8 | PVC | 0.01 | 566 | 11 | 37 | 48 | 8.5 | | |
| Kirkland_Main-1154 | Kirkland_Manholes-2490 | 173.27 | Kirkland_Manholes-2485 | 153.26 | 284.1 | 7.04 | 8 | PVC | 0.01 | 1,871 | 27 | 77 | 105 | 5.6 | SM14-Ex-EX242 | |
| Kirkland_Main-1156 | Kirkland_Manholes-2484 | 189.79 | Kirkland_Manholes-2485 | 153.26 | 364.5 | 10.02 | 8 | PVC | 0.01 | 2,232 | 2 | 4 | 7 | 0.3 | SM14-Ex-EX239 | |
| Kirkland_Main-1157 | Kirkland_Manholes-2487 | 153.78 | Kirkland_Manholes-2486 | 152.49 | 105 | 1.23 | 8 | PVC | 0.01 | 782 | 11 | 41 | 52 | 6.7 | | |
| Kirkland_Main-1158 | Kirkland_Manholes-2485 | 153.26 | Kirkland_Manholes-2486 | 152.49 | 113.6 | 0.68 | 8 | PVC | 0.01 | 580 | 31 | 85 | 117 | 20.1 | SM14-Ex-EX239 | |
| Kirkland_Main-1159 | Kirkland_Manholes-1429 | 514.5 | Kirkland_Manholes-1427 | 513.21 | 125.2 | 1.03 | 8 | PVC | 0.01 | 715 | 4 | 16 | 20 | 2.8 | | |
| Kirkland_Main-1160 | Kirkland_Manholes-1427 | 513.21 | Kirkland_Manholes-1428 | 512.46 | 129.3 | 0.58 | 8 | PVC | 0.01 | 537 | 6 | 24 | 31 | 5.7 | | |
| Kirkland_Main-1161 | Kirkland_Manholes-1428 | 512.46 | Kirkland_Manholes-1434 | 511.6 | 190.6 | 0.45 | 8 | PVC | 0.01 | 474 | 7 | 28 | 35 | 7.5 | | |
| Kirkland_Main-1162 | Kirkland_Manholes-1430 | 516.64 | Kirkland_Manholes-1429 | 514.5 | 144.2 | 1.48 | 8 | PVC | 0.01 | 859 | 3 | 12 | 15 | 1.8 | | |
| Kirkland_Main-1164 | Kirkland_Manholes-2175 | 133.14 | Kirkland_Manholes-2174 | 132.67 | 117.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 10 | 2.1 | | |
| Kirkland_Main-1165 | Kirkland_Manholes-2174 | 132.67 | Kirkland_Manholes-2173 | 131.99 | 11.1 | 6.13 | 8 | PVC | 0.01 | 1,745 | 2 | 16 | 19 | 1.1 | | |
| Kirkland_Main-1166 | Kirkland_Manholes-2173 | 131.99 | Kirkland_Manholes-2172 | 130.6 | 348.2 | 0.4 | 8 | PVC | 0.01 | 446 | 25 | 25 | 50 | 11.3 | SM14-Ex-EX192 | Drop Connection |
| Kirkland_Main-1167 | Kirkland_Manholes-2172 | 107.91 | Kirkland_Manholes-2163 | 75.42 | 383.7 | 8.47 | 8 | PVC | 0.01 | 2,052 | 27 | 33 | 60 | 2.9 | SM14-Ex-EX192 | |
| Kirkland_Main-1168 | Kirkland_Manholes-2163 | 75.42 | Kirkland_Manholes-2141 | 73.53 | 47.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 28 | 41 | 69 | 4.9 | | |
| Kirkland_Main-1169 | Kirkland_Manholes-2183 | 146.45 | Kirkland_Manholes-2182 | 136.23 | 145.7 | 7.02 | 8 | PVC | 0.01 | 1,868 | 0 | 8 | 9 | 0.5 | | |
| Kirkland_Main-1170 | Kirkland_Manholes-2182 | 136.23 | Kirkland_Manholes-2181 | 133.52 | 88.2 | 3.07 | 8 | PVC | 0.01 | 1,236 | 0 | 16 | 17 | 1.4 | | |
| Kirkland_Main-1171 | Kirkland_Manholes-2181 | 133.52 | Kirkland_Manholes-2180 | 125.44 | 163.5 | 4.94 | 8 | PVC | 0.01 | 1,567 | 1 | 25 | 26 | 1.7 | | |
| Kirkland_Main-1172 | Kirkland_Manholes-2180 | 125.44 | Kirkland_Manholes-2179 | 120.67 | 330.4 | 1.44 | 8 | PVC | 0.01 | 847 | 4 | 33 | 37 | 4.3 | | |
| Kirkland_Main-1173 | Kirkland_Manholes-2179 | 120.67 | Kirkland_Manholes-2178 | 102.28 | 199.5 | 9.22 | 8 | PVC | 0.01 | 2,140 | 6 | 41 | 47 | 2.2 | | |
| Kirkland_Main-1174 | Kirkland_Manholes-2178 | 102.28 | Kirkland_Manholes-2177 | 75.93 | 214.6 | 12.28 | 8 | PVC | 0.01 | 2,471 | 7 | 49 | 56 | 2.3 | | |
| Kirkland_Main-1175 | Kirkland_Manholes-2177 | 75.93 | Kirkland_Manholes-2176 | 70.83 | 149.4 | 3.41 | 8 | PVC | 0.01 | 1,303 | 7 | 58 | 64 | 5 | | |
| Kirkland_Main-1176 | Kirkland_Manholes-2176 | 70.83 | Kirkland_Manholes-2142 | 68.99 | 36.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 7 | 66 | 73 | 4.6 | | |
| Kirkland_Main-1177 | Kirkland_Manholes-2366 | 292.68 | Kirkland_Manholes-2365 | 289.93 | 42.5 | 6.47 | 8 | PVC | 0.01 | 1,794 | 27 | 81 | 108 | 6 | SM14-Ex-EX260 | |
| Kirkland_Main-1178 | Kirkland_Manholes-2368 | 290.87 | Kirkland_Manholes-2365 | 289.93 | 48.6 | 1.94 | 8 | PVC | 0.01 | 981 | 1 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1179 | Kirkland_Manholes-2372 | 304.48 | Kirkland_Manholes-2371 | 291.2 | 253.9 | 5.23 | 8 | PVC | 0.01 | 1,613 | 16 | 45 | 60 | 3.7 | SM14-Ex-EX257 | |
| Kirkland_Main-1180 | Kirkland_Manholes-2378 | 312.05 | Kirkland_Manholes-2372 | 304.48 | 224.1 | 3.38 | 8 | PVC | 0.01 | 1,296 | 11 | 24 | 36 | 2.8 | SM14-Ex-EX257 | |
| Kirkland_Main-1181 | Kirkland_Manholes-2373 | 306.85 | Kirkland_Manholes-2372 | 304.48 | 403.1 | 0.59 | 8 | PVC | 0.01 | 541 | 3 | 8 | 11 | 2 | SM14-Ex-EX258 | |
| Kirkland_Main-1182 | Kirkland_Manholes-2374 | 307.1 | Kirkland_Manholes-2373 | 306.85 | 109.8 | 0.23 | 8 | PVC | 0.01 | 336 | 1 | 4 | 5 | 1.6 | SM14-Ex-EX258 | |
| Kirkland_Main-1183 | Kirkland_Manholes-2376 | 359.31 | Kirkland_Manholes-2375 | 323.76 | 368.2 | 9.66 | 8 | PVC | 0.01 | 2,191 | 5 | 4 | 9 | 0.4 | SM14-Ex-EX259 | |
| Kirkland_Main-1184 | Kirkland_Manholes-2375 | 323.76 | Kirkland_Manholes-2377 | 320.51 | 173.5 | 1.87 | 8 | PVC | 0.01 | 965 | 7 | 8 | 15 | 1.5 | SM14-Ex-EX259 | |
| Kirkland_Main-1185 | Kirkland_Manholes-2377 | 320.51 | Kirkland_Manholes-2378 | 312.05 | 352.3 | 2.4 | 8 | PVC | 0.01 | 1,093 | 9 | 12 | 21 | 1.9 | SM14-Ex-EX259 | |
| Kirkland_Main-1186 | Kirkland_Manholes-2379 | 312.61 | Kirkland_Manholes-2378 | 312.05 | 23.8 | 2.35 | 8 | PVC | 0.01 | 1,081 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX257 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1187 | Kirkland_Manholes-2380 | 290.72 | Kirkland_Manholes-2430 | 273.69 | 397.1 | 4.29 | 8 | PVC | 0.01 | 1,460 | 3 | 8 | 11 | 0.7 | SM14-Ex-EX286 | |
| Kirkland_Main-1188 | Kirkland_Manholes-2381 | 293.12 | Kirkland_Manholes-2380 | 290.72 | 144.3 | 1.66 | 8 | PVC | 0.01 | 909 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX286 | |
| Kirkland_Main-1189 | Kirkland_Manholes-2385 | 343.75 | Kirkland_Manholes-2383 | 328.5 | 173.4 | 8.79 | 8 | PVC | 0.01 | 2,091 | 9 | 24 | 34 | 1.6 | SM14-Ex-EX260 | |
| Kirkland_Main-1190 | Kirkland_Manholes-2384 | 330.79 | Kirkland_Manholes-2383 | 328.5 | 64.4 | 3.56 | 8 | PVC | 0.01 | 1,330 | 11 | 33 | 44 | 3.3 | SM14-Ex-EX287 | |
| Kirkland_Main-1191 | Kirkland_Manholes-2395 | 331.59 | Kirkland_Manholes-2384 | 330.79 | 136.8 | 0.58 | 8 | PVC | 0.01 | 539 | 10 | 28 | 39 | 7.2 | SM14-Ex-EX287 | |
| Kirkland_Main-1192 | Kirkland_Manholes-2386 | 373.02 | Kirkland_Manholes-2385 | 343.75 | 310.7 | 9.42 | 8 | PVC | 0.01 | 2,164 | 8 | 20 | 28 | 1.3 | SM14-Ex-EX260 | |
| Kirkland_Main-1193 | Kirkland_Manholes-2387 | 380.46 | Kirkland_Manholes-2386 | 373.02 | 399.9 | 1.86 | 8 | PVC | 0.01 | 962 | 6 | 16 | 23 | 2.3 | SM14-Ex-EX260 | |
| Kirkland_Main-1194 | Kirkland_Manholes-2388 | 388.18 | Kirkland_Manholes-2387 | 380.46 | 279.2 | 2.76 | 8 | PVC | 0.01 | 1,172 | 4 | 12 | 16 | 1.4 | SM14-Ex-EX260 | |
| Kirkland_Main-1195 | Kirkland_Manholes-2533 | 389.33 | Kirkland_Manholes-2388 | 388.18 | 396.1 | 0.29 | 8 | PVC | 0.01 | 380 | 2 | 8 | 10 | 2.7 | SM14-Ex-EX260 | |
| Kirkland_Main-1196 | Kirkland_Manholes-2389 | 365.8 | Kirkland_Manholes-2390 | 359.58 | 183.8 | 3.38 | 8 | PVC | 0.01 | 1,297 | 3 | 4 | 7 | 0.5 | SM14-Ex-EX287 | |
| Kirkland_Main-1197 | Kirkland_Manholes-2390 | 359.58 | Kirkland_Manholes-2391 | 347.6 | 291 | 4.12 | 8 | PVC | 0.01 | 1,430 | 5 | 8 | 13 | 0.9 | SM14-Ex-EX287 | |
| Kirkland_Main-1198 | Kirkland_Manholes-2391 | 347.6 | Kirkland_Manholes-2392 | 345.7 | 123.7 | 1.54 | 8 | PVC | 0.01 | 874 | 7 | 12 | 19 | 2.2 | SM14-Ex-EX287 | |
| Kirkland_Main-1199 | Kirkland_Manholes-2392 | 345.7 | Kirkland_Manholes-2393 | 339.78 | 135.6 | 4.36 | 8 | PVC | 0.01 | 1,473 | 8 | 16 | 24 | 1.6 | SM14-Ex-EX287 | |
| Kirkland_Main-1200 | Kirkland_Manholes-2411 | 259.15 | Kirkland_Manholes-2413 | 251.1 | 165.8 | 4.86 | 8 | PVC | 0.01 | 1,554 | 30 | 81 | 111 | 7.2 | | |
| Kirkland_Main-1201 | Kirkland_Manholes-2419 | 203.52 | Kirkland_Manholes-2303 | 195.57 | 329.3 | 2.41 | 12 | PVC | 0.01 | 3,230 | 335 | 594 | 929 | 28.8 | SM2 | |
| Kirkland_Main-1202 | Kirkland_Manholes-2418 | 218.73 | Kirkland_Manholes-2419 | 203.52 | 222.4 | 6.84 | 12 | PVC | 0.01 | 5,436 | 325 | 590 | 915 | 16.8 | SM2 | |
| Kirkland_Main-1203 | Kirkland_Manholes-2417 | 230.48 | Kirkland_Manholes-2418 | 218.73 | 175.2 | 6.71 | 12 | PVC | 0.01 | 5,384 | 279 | 431 | 710 | 13.2 | SM2 | |
| Kirkland_Main-1204 | Kirkland_Manholes-2416 | 242.81 | Kirkland_Manholes-2417 | 230.48 | 262.7 | 4.69 | 12 | PVC | 0.01 | 4,503 | 276 | 427 | 703 | 15.6 | SM2 | |
| Kirkland_Main-1205 | Kirkland_Manholes-2420 | 230.11 | Kirkland_Manholes-2418 | 218.73 | 227.2 | 5.01 | 8 | PVC | 0.01 | 1,578 | 46 | 155 | 201 | 12.7 | SM14-Ex-EX251 | |
| Kirkland_Main-1206 | Kirkland_Manholes-2415 | 247.52 | Kirkland_Manholes-2416 | 242.81 | 265.9 | 1.77 | 12 | PVC | 0.01 | 2,766 | 274 | 423 | 697 | 25.2 | SM2 | |
| Kirkland_Main-1207 | Kirkland_Manholes-2720 | 32.22 | Kirkland_Manholes-2719 | 31.99 | 57.5 | 0.4 | 8 | PVC | 0.01 | 446 | 83 | 6 | 90 | 20.1 | | |
| Kirkland_Main-1208 | Kirkland_Manholes-2414 | 248.96 | Kirkland_Manholes-2415 | 247.52 | 131.3 | 1.1 | 12 | PVC | 0.01 | 2,177 | 272 | 419 | 692 | 31.8 | SM2 | |
| Kirkland_Main-1209 | Kirkland_Manholes-2413 | 251.1 | Kirkland_Manholes-2414 | 248.96 | 118.1 | 1.81 | 12 | PVC | 0.01 | 2,798 | 272 | 415 | 687 | 24.6 | SM2 | |
| Kirkland_Main-1210 | Kirkland_Manholes-2421 | 253.02 | Kirkland_Manholes-2413 | 251.1 | 118.9 | 1.61 | 12 | PVC | 0.01 | 2,641 | 242 | 330 | 571 | 21.6 | SM2 | |
| Kirkland_Main-1211 | Kirkland_Manholes-2422 | 254.09 | Kirkland_Manholes-2421 | 253.02 | 92.9 | 1.15 | 12 | PVC | 0.01 | 2,230 | 238 | 321 | 559 | 25.1 | SM2 | |
| Kirkland_Main-1212 | Kirkland_Manholes-2424 | 257.66 | Kirkland_Manholes-2422 | 254.09 | 323.2 | 1.1 | 12 | PVC | 0.01 | 2,185 | 237 | 317 | 554 | 25.4 | SM2 | |
| Kirkland_Main-1213 | Kirkland_Manholes-2879 | 68.04 | Kirkland_Manholes-2492 | 55.46 | 56.8 | 22.14 | 8 | PVC | 0.01 | 3,317 | 28 | 43 | 70 | 2.1 | | |
| Kirkland_Main-1214 | Kirkland_Manholes-2091 | 57.76 | Kirkland_Manholes-2090 | 57.52 | 58.9 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.3 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1215 | Kirkland_Manholes-2094 | 57.58 | Kirkland_Manholes-2090 | 57.44 | 314.4 | 0.04 | 15 | PVC | 0.01 | 795 | 91 | 238 | 329 | 41.4 | SM14-Ex-EX222 | |
| Kirkland_Main-1216 | Kirkland_Manholes-2092 | 79.95 | Kirkland_Manholes-2091 | 79.51 | 110.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 8 | 1.9 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1218 | Kirkland_Manholes-2095 | 60.47 | Kirkland_Manholes-2094 | 57.58 | 55.7 | 5.18 | 8 | PVC | 0.01 | 1,605 | 2 | 12 | 15 | 0.9 | SM14-Ex-EX277 | |
| Kirkland_Main-1219 | Kirkland_Manholes-2096 | 71.29 | Kirkland_Manholes-2095 | 60.47 | 119 | 9.09 | 8 | PVC | 0.01 | 2,126 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX277 | |
| Kirkland_Main-1220 | Kirkland_Manholes-2099 | 57.72 | Kirkland_Manholes-2094 | 57.58 | 259 | 0.05 | 12 | PVC | 0.01 | 483 | 88 | 220 | 308 | 63.7 | SM14-Ex-EX222 | |
| Kirkland_Main-1223 | Kirkland_Manholes-2614 | 304.78 | Kirkland_Manholes-2615 | 302.07 | 237.1 | 1.14 | 8 | PVC | 0.01 | 754 | 42 | 106 | 148 | 19.7 | SM14-Ex-EX299 | |
| Kirkland_Main-1224 | Kirkland_Manholes-2615 | 302.07 | Kirkland_Manholes-2618 | 301.8 | 67.7 | 0.4 | 8 | PVC | 0.01 | 446 | 42 | 110 | 152 | 34.2 | SM14-Ex-EX299 | Drop Connection |
| Kirkland_Main-1225 | Kirkland_Manholes-2618 | 278.4 | Kirkland_Manholes-2617 | 276.43 | 274.1 | 0.72 | 8 | PVC | 0.01 | 598 | 48 | 122 | 170 | 28.4 | SM2 | |
| Kirkland_Main-1226 | Kirkland_Manholes-2617 | 276.43 | Kirkland_Manholes-2616 | 275.44 | 246.8 | 0.4 | 8 | PVC | 0.01 | 446 | 66 | 126 | 192 | 43.1 | SM2 | Drop Connection |
| Kirkland_Main-1227 | Kirkland_Manholes-2616 | 274.02 | Kirkland_Manholes-2619 | 272.54 | 173.9 | 0.85 | 8 | PVC | 0.01 | 650 | 135 | 155 | 290 | 44.5 | SM2 | |
| Kirkland_Main-1228 | Kirkland_Manholes-2619 | 272.54 | Kirkland_Manholes-2428 | 270.37 | 122.7 | 1.77 | 8 | PVC | 0.01 | 937 | 135 | 159 | 294 | 31.3 | SM2 | |
| Kirkland_Main-1229 | Kirkland_Manholes-407 | 266.31 | Kirkland_Manholes-409 | 264.84 | 123.1 | 1.19 | 8 | PVC | 0.01 | 771 | 2 | 8 | 10 | 1.3 | | |
| Kirkland_Main-1230 | Kirkland_Manholes-409 | 264.84 | Kirkland_Manholes-419 | 263.82 | 78.4 | 1.3 | 8 | PVC | 0.01 | 804 | 4 | 16 | 20 | 2.5 | | |
| Kirkland_Main-1231 | Kirkland_Manholes-411 | 265.96 | Kirkland_Manholes-412 | 253.7 | 218.8 | 5.6 | 8 | PVC | 0.01 | 1,669 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1232 | Kirkland_Manholes-412 | 253.7 | Kirkland_Manholes-413 | 252.76 | 178.3 | 0.53 | 8 | PVC | 0.01 | 512 | 2 | 8 | 10 | 2 | | |
| Kirkland_Main-1233 | Kirkland_Manholes-413 | 252.76 | Kirkland_Manholes-414 | 251.5 | 46.6 | 2.7 | 8 | PVC | 0.01 | 1,159 | 3 | 12 | 15 | 1.3 | | |
| Kirkland_Main-1234 | Kirkland_Manholes-414 | 251.5 | Kirkland_Manholes-415 | 250.52 | 65.4 | 1.5 | 8 | PVC | 0.01 | 863 | 3 | 16 | 19 | 2.2 | | |
| Kirkland_Main-1235 | Kirkland_Manholes-415 | 250.52 | Kirkland_Manholes-416 | 248.58 | 58.4 | 3.32 | 8 | PVC | 0.01 | 1,285 | 4 | 20 | 24 | 1.9 | | |
| Kirkland_Main-1236 | Kirkland_Manholes-416 | 248.58 | Kirkland_Manholes-417 | 237.12 | 157.3 | 7.28 | 8 | PVC | 0.01 | 1,903 | 5 | 24 | 29 | 1.5 | | |
| Kirkland_Main-1237 | Kirkland_Manholes-417 | 237.12 | Kirkland_Manholes-2767 | 236.02 | 47.6 | 2.31 | 8 | PVC | 0.01 | 1,071 | 5 | 28 | 34 | 3.2 | | |
| Kirkland_Main-1238 | Kirkland_Manholes-2767 | 236.02 | Kirkland_Manholes-418 | 235.93 | 86.7 | 0.1 | 8 | PVC | 0.01 | 227 | 5 | 33 | 38 | 16.7 | | |
| Kirkland_Main-1239 | Kirkland_Manholes-408 | 267.9 | Kirkland_Manholes-407 | 266.31 | 113.3 | 1.4 | 8 | PVC | 0.01 | 835 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1240 | Kirkland_Manholes-419 | 263.82 | Kirkland_Manholes-625 | 258 | 200 | 2.91 | 8 | PVC | 0.01 | 1,203 | 5 | 20 | 25 | 2.1 | | |
| Kirkland_Main-1241 | Kirkland_Manholes-420 | 281.46 | Kirkland_Manholes-1071 | 277.81 | 358.8 | 1.02 | 8 | PVC | 0.01 | 711 | 8 | 37 | 45 | 6.3 | | |
| Kirkland_Main-1242 | Kirkland_Manholes-418 | 235.93 | Kirkland_Manholes-421 | 235.77 | 9.8 | 1.63 | 8 | PVC | 0.01 | 901 | 5 | 37 | 42 | 4.7 | | |
| Kirkland_Main-1243 | Kirkland_Manholes-422 | 235.64 | Kirkland_Manholes-341 | 235.59 | 30.3 | 0.17 | 8 | PVC | 0.01 | 287 | 6 | 45 | 51 | 17.7 | SM14-Ex-EX49 | |
| Kirkland_Main-1244 | Kirkland_Manholes-421 | 235.77 | Kirkland_Manholes-422 | 235.64 | 135.2 | 0.1 | 8 | PVC | 0.01 | 219 | 6 | 41 | 47 | 21.4 | SM14-Ex-EX49 | |
| Kirkland_Main-1245 | Kirkland_Manholes-423 | 284.5 | Kirkland_Manholes-420 | 281.46 | 237.1 | 1.28 | 8 | PVC | 0.01 | 798 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1246 | Kirkland_Manholes-424 | 292.81 | Kirkland_Manholes-425 | 290.3 | 45.2 | 5.56 | 8 | PVC | 0.01 | 1,662 | 6 | 24 | 30 | 1.8 | | |
| Kirkland_Main-1247 | Kirkland_Manholes-1846 | 15.1 | Kirkland_Manholes-1845 | 14.95 | 208.8 | 0.07 | 12 | PVC | 0.01 | 557 | 6 | 32 | 39 | 6.9 | SM10 | |
| Kirkland_Main-1248 | Kirkland_Manholes-1845 | 14.95 | Kirkland_Manholes-1844 | 14.08 | 225.8 | 0.39 | 12 | PVC | 0.01 | 1,290 | 7 | 39 | 46 | 3.5 | SM10 | |
| Kirkland_Main-1249 | Kirkland_Manholes-1844 | 14.08 | Kirkland_Manholes-1843 | 13.9 | 253.8 | 0.07 | 12 | PVC | 0.01 | 554 | 9 | 45 | 54 | 9.8 | SM10 | |
| Kirkland_Main-1250 | Kirkland_Manholes-1843 | 13.9 | Kirkland_Manholes-1842 | 13.84 | 237.6 | 0.03 | 12 | PVC | 0.01 | 330 | 9 | 52 | 61 | 18.5 | SM10 | |
| Kirkland_Main-1251 | Kirkland_Manholes-1842 | 13.84 | Kirkland_Manholes-1841 | 13.3 | 228.3 | 0.24 | 12 | PVC | 0.01 | 1,011 | 10 | 58 | 69 | 6.8 | SM10 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1252 | Kirkland_Manholes-1840 | 12.98 | Kirkland_Manholes-1839 | 12.1 | 208.1 | 0.42 | 12 | PVC | 0.01 | 1,352 | 16 | 71 | 88 | 6.5 | SM10 | |
| Kirkland_Main-1253 | Kirkland_Manholes-1839 | 12.1 | Kirkland_Manholes-1838 | 12 | 159.4 | 0.06 | 12 | PVC | 0.01 | 521 | 16 | 78 | 94 | 18.1 | | |
| Kirkland_Main-1254 | Kirkland_Manholes-1838 | 12 | Kirkland_Manholes-1834 | 11.35 | 218.3 | 0.3 | 12 | PVC | 0.01 | 1,134 | 18 | 84 | 102 | 9 | | |
| Kirkland_Main-1255 | Kirkland_Manholes-1841 | 13.3 | Kirkland_Manholes-1840 | 12.98 | 311 | 0.1 | 12 | PVC | 0.01 | 667 | 11 | 65 | 76 | 11.4 | SM10 | |
| Kirkland_Main-1256 | Kirkland_Manholes-1854 | 359.04 | Kirkland_Manholes-1855 | 357.41 | 200.3 | 0.81 | 8 | PVC | 0.01 | 636 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-1257 | Kirkland_Manholes-1855 | 357.41 | Kirkland_Manholes-1856 | 346.8 | 232 | 4.57 | 8 | PVC | 0.01 | 1,508 | 0 | 8 | 8 | 0.5 | | |
| Kirkland_Main-1258 | Kirkland_Manholes-1856 | 346.8 | Kirkland_Manholes-1857 | 344.14 | 121.8 | 2.18 | 8 | PVC | 0.01 | 1,042 | 7 | 12 | 19 | 1.8 | | |
| Kirkland_Main-1259 | Kirkland_Manholes-1857 | 344.14 | Kirkland_Manholes-1858 | 335.71 | 162.8 | 5.18 | 8 | PVC | 0.01 | 1,605 | 7 | 16 | 23 | 1.5 | | |
| Kirkland_Main-1260 | Kirkland_Manholes-1858 | 335.71 | Kirkland_Manholes-1859 | 326.96 | 255.9 | 3.42 | 8 | PVC | 0.01 | 1,304 | 71 | 118 | 189 | 14.5 | | |
| Kirkland_Main-1261 | Kirkland_Manholes-1963 | 340.77 | Kirkland_Manholes-1858 | 335.71 | 100.1 | 5.06 | 8 | PVC | 0.01 | 1,585 | 61 | 98 | 159 | 10 | | |
| Kirkland_Main-1262 | Kirkland_Manholes-1859 | 326.96 | Kirkland_Manholes-1860 | 317.11 | 345 | 2.85 | 8 | PVC | 0.01 | 1,191 | 71 | 122 | 193 | 16.2 | | |
| Kirkland_Main-1263 | Kirkland_Manholes-1860 | 317.11 | Kirkland_Manholes-1861 | 303.96 | 398.6 | 3.3 | 8 | PVC | 0.01 | 1,281 | 72 | 126 | 198 | 15.4 | | |
| Kirkland_Main-1264 | Kirkland_Manholes-1861 | 303.96 | Kirkland_Manholes-1862 | 294.2 | 372.7 | 2.62 | 8 | PVC | 0.01 | 1,141 | 72 | 130 | 202 | 17.7 | | Drop Connection |
| Kirkland_Main-1265 | Kirkland_Manholes-2394 | 354.21 | Kirkland_Manholes-2393 | 339.78 | 142.1 | 10.15 | 8 | PVC | 0.01 | 2,247 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX287 | |
| Kirkland_Main-1266 | Kirkland_Manholes-2393 | 339.78 | Kirkland_Manholes-2395 | 331.59 | 110.8 | 7.39 | 8 | PVC | 0.01 | 1,917 | 10 | 24 | 34 | 1.8 | SM14-Ex-EX287 | |
| Kirkland_Main-1267 | Kirkland_Manholes-2405 | 418 | Kirkland_Manholes-2397 | 417.95 | 35.5 | 0.14 | 8 | PVC | 0.01 | 265 | 6 | 28 | 35 | 13.2 | | |
| Kirkland_Main-1268 | Kirkland_Manholes-2397 | 417.95 | Kirkland_Manholes-2398 | 416.84 | 162.8 | 0.68 | 8 | PVC | 0.01 | 582 | 7 | 33 | 40 | 6.8 | SM14-Ex-EX261 | |
| Kirkland_Main-1269 | Kirkland_Manholes-2404 | 419.23 | Kirkland_Manholes-2405 | 418 | 199.9 | 0.62 | 8 | PVC | 0.01 | 553 | 5 | 24 | 29 | 5.3 | | |
| Kirkland_Main-1270 | Kirkland_Manholes-2399 | 419.47 | Kirkland_Manholes-2404 | 419.23 | 32.8 | 0.73 | 8 | PVC | 0.01 | 603 | 1 | 8 | 9 | 1.5 | | |
| Kirkland_Main-1271 | Kirkland_Manholes-2403 | 420.2 | Kirkland_Manholes-2404 | 419.23 | 274.8 | 0.35 | 8 | PVC | 0.01 | 419 | 3 | 12 | 16 | 3.7 | | |
| Kirkland_Main-1272 | Kirkland_Manholes-2400 | 420.6 | Kirkland_Manholes-2399 | 419.47 | 159 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-1273 | Kirkland_Manholes-2402 | 421.38 | Kirkland_Manholes-2403 | 420.2 | 252.3 | 0.47 | 8 | PVC | 0.01 | 482 | 2 | 8 | 11 | 2.2 | | |
| Kirkland_Main-1274 | Kirkland_Manholes-2401 | 422.6 | Kirkland_Manholes-2402 | 421.38 | 262.8 | 0.46 | 8 | PVC | 0.01 | 480 | 2 | 4 | 6 | 1.2 | | |
| Kirkland_Main-1276 | Kirkland_Manholes-2398 | 416.84 | Kirkland_Manholes-2406 | 412.88 | 316.7 | 1.25 | 8 | PVC | 0.01 | 788 | 9 | 37 | 45 | 5.8 | SM14-Ex-EX261 | |
| Kirkland_Main-1277 | Kirkland_Manholes-2406 | 412.88 | Kirkland_Manholes-2396 | 406.38 | 222.1 | 2.93 | 8 | PVC | 0.01 | 1,206 | 11 | 41 | 52 | 4.3 | SM14-Ex-EX261 | |
| Kirkland_Main-1278 | Kirkland_Manholes-2396 | 406.38 | Kirkland_Manholes-2407 | 403.31 | 84.2 | 3.65 | 8 | PVC | 0.01 | 1,346 | 12 | 45 | 57 | 4.2 | SM14-Ex-EX261 | |
| Kirkland_Main-1279 | Kirkland_Manholes-2408 | 405.44 | Kirkland_Manholes-2409 | 401.93 | 26.6 | 13.2 | 8 | PVC | 0.01 | 2,561 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-1281 | Kirkland_Manholes-2409 | 401.93 | Kirkland_Manholes-2267 | 393.07 | 194.4 | 4.56 | 8 | PVC | 0.01 | 1,505 | 1 | 12 | 13 | 0.9 | | |
| Kirkland_Main-1282 | Kirkland_Manholes-2412 | 260.78 | Kirkland_Manholes-2411 | 259.15 | 122.6 | 1.33 | 8 | PVC | 0.01 | 813 | 7 | 12 | 19 | 2.4 | | |
| Kirkland_Main-1283 | Kirkland_Manholes-282 | 50.07 | Kirkland_Manholes-281 | 36.84 | 240.3 | 5.51 | 8 | PVC | 0.01 | 1,654 | 2 | 10 | 11 | 0.7 | SM10 | |
| Kirkland_Main-1284 | Kirkland_Manholes-284 | 50.6 | Kirkland_Manholes-282 | 50.07 | 132.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 3 | 3 | 0.7 | | |
| Kirkland_Main-1285 | Kirkland_Manholes-283 | 64.31 | Kirkland_Manholes-282 | 50.07 | 115.4 | 12.34 | 8 | PVC | 0.01 | 2,477 | 2 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-1286 | Kirkland_Manholes-273 | 69.52 | Kirkland_Manholes-247 | 65.14 | 92.5 | 4.74 | 8 | PVC | 0.01 | 1,534 | 56 | 140 | 197 | 12.8 | SM10 | |
| Kirkland_Main-1290 | Kirkland_Manholes-274 | 93.7 | Kirkland_Manholes-271 | 91.78 | 250.2 | 0.77 | 8 | PVC | 0.01 | 618 | 40 | 97 | 138 | 22.3 | SM10 | |
| Kirkland_Main-1292 | Kirkland_Manholes-277 | 72.24 | Kirkland_Manholes-278 | 56.62 | 141.8 | 11.02 | 8 | PVC | 0.01 | 2,340 | 3 | 3 | 6 | 0.3 | SM10 | |
| Kirkland_Main-1293 | Kirkland_Manholes-278 | 56.62 | Kirkland_Manholes-280 | 27.37 | 245.1 | 11.93 | 8 | PVC | 0.01 | 2,436 | 35 | 13 | 48 | 2 | SM10 | |
| Kirkland_Main-1294 | Kirkland_Manholes-276 | 92.16 | Kirkland_Manholes-299 | 66.63 | 263.6 | 9.68 | 8 | PVC | 0.01 | 2,194 | 3 | 6 | 9 | 0.4 | SM10 | |
| Kirkland_Main-1295 | Kirkland_Manholes-267 | 95.34 | Kirkland_Manholes-275 | 94.08 | 184.4 | 0.68 | 8 | PVC | 0.01 | 583 | 38 | 88 | 127 | 21.7 | SM10 | |
| Kirkland_Main-1296 | Kirkland_Manholes-275 | 94.08 | Kirkland_Manholes-274 | 93.7 | 61.9 | 0.61 | 8 | PVC | 0.01 | 553 | 39 | 93 | 132 | 23.9 | SM10 | |
| Kirkland_Main-1297 | Kirkland_Manholes-270 | 94.47 | Kirkland_Manholes-271 | 91.78 | 344.2 | 0.78 | 8 | PVC | 0.01 | 623 | 11 | 30 | 41 | 6.6 | SM10 | |
| Kirkland_Main-1298 | Kirkland_Manholes-269 | 103.08 | Kirkland_Manholes-270 | 94.47 | 190.8 | 4.51 | 8 | PVC | 0.01 | 1,498 | 7 | 26 | 33 | 2.2 | SM10 | |
| Kirkland_Main-1299 | Kirkland_Manholes-268 | 108.82 | Kirkland_Manholes-269 | 103.08 | 133.1 | 4.31 | 8 | PVC | 0.01 | 1,464 | 5 | 22 | 27 | 1.8 | SM10 | |
| Kirkland_Main-1300 | Kirkland_Manholes-2521 | 363.83 | Kirkland_Manholes-2525 | 348.63 | 167.1 | 9.09 | 8 | PVC | 0.01 | 2,126 | 3 | 6 | 8 | 0.4 | | |
| Kirkland_Main-1301 | Kirkland_Manholes-2519 | 384.75 | Kirkland_Manholes-2522 | 362.4 | 159.7 | 13.99 | 8 | PVC | 0.01 | 2,637 | 2 | 3 | 5 | 0.2 | | |
| Kirkland_Main-1302 | Kirkland_Manholes-2522 | 362.4 | Kirkland_Manholes-2523 | 357.31 | 64.3 | 7.92 | 8 | PVC | 0.01 | 1,984 | 2 | 6 | 8 | 0.4 | | |
| Kirkland_Main-1303 | Kirkland_Manholes-2523 | 357.31 | Kirkland_Manholes-2524 | 346.56 | 113.2 | 9.5 | 8 | PVC | 0.01 | 2,173 | 3 | 9 | 12 | 0.6 | | |
| Kirkland_Main-1304 | Kirkland_Manholes-2524 | 346.56 | Kirkland_Manholes-2527 | 340.94 | 187 | 3.01 | 8 | PVC | 0.01 | 1,222 | 41 | 38 | 79 | 6.4 | | |
| Kirkland_Main-1305 | Kirkland_Manholes-2526 | 336.85 | Kirkland_Manholes-2776 | 334.45 | 375.1 | 0.64 | 8 | PVC | 0.01 | 564 | 50 | 100 | 150 | 26.6 | | |
| Kirkland_Main-1306 | Kirkland_Manholes-2527 | 340.94 | Kirkland_Manholes-2526 | 336.85 | 509.8 | 0.8 | 8 | PVC | 0.01 | 631 | 50 | 97 | 147 | 23.3 | | |
| Kirkland_Main-1307 | Kirkland_Manholes-2525 | 348.63 | Kirkland_Manholes-2527 | 340.94 | 406 | 1.89 | 8 | PVC | 0.01 | 970 | 9 | 56 | 65 | 6.7 | | |
| Kirkland_Main-1308 | Kirkland_Manholes-2528 | 359.11 | Kirkland_Manholes-2525 | 348.63 | 235.4 | 4.45 | 8 | PVC | 0.01 | 1,488 | 6 | 47 | 53 | 3.6 | | |
| Kirkland_Main-1309 | Kirkland_Manholes-2529 | 365.07 | Kirkland_Manholes-2528 | 362.98 | 40.4 | 5.17 | 8 | PVC | 0.01 | 1,604 | 5 | 44 | 49 | 3.1 | | Drop Connection |
| Kirkland_Main-1310 | Kirkland_Manholes-2531 | 381.45 | Kirkland_Manholes-2529 | 365.07 | 303.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 5 | 41 | 47 | 2.8 | | |
| Kirkland_Main-1311 | Kirkland_Manholes-2530 | 382.12 | Kirkland_Manholes-2531 | 381.45 | 45.8 | 1.46 | 8 | PVC | 0.01 | 853 | 5 | 38 | 44 | 5.1 | | |
| Kirkland_Main-1312 | Kirkland_Manholes-2532 | 395.91 | Kirkland_Manholes-2530 | 382.12 | 311 | 4.43 | 8 | PVC | 0.01 | 1,485 | 4 | 35 | 39 | 2.6 | | |
| Kirkland_Main-1313 | Kirkland_Manholes-2534 | 391.7 | Kirkland_Manholes-2533 | 389.33 | 214.8 | 1.1 | 8 | PVC | 0.01 | 741 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX260 | |
| Kirkland_Main-1315 | Kirkland_Manholes-2535 | 407.5 | Kirkland_Manholes-2536 | 406.16 | 143.7 | 0.93 | 8 | PVC | 0.01 | 681 | 14 | 4 | 18 | 2.7 | | |
| Kirkland_Main-1316 | Kirkland_Manholes-2536 | 406.16 | Kirkland_Manholes-2537 | 404.02 | 173.1 | 1.24 | 8 | PVC | 0.01 | 784 | 19 | 8 | 28 | 3.5 | | |
| Kirkland_Main-1317 | Kirkland_Manholes-2537 | 404.02 | Kirkland_Manholes-2538 | 403.64 | 31.1 | 1.22 | 8 | PVC | 0.01 | 780 | 19 | 12 | 32 | 4.1 | | |
| Kirkland_Main-1318 | Kirkland_Manholes-2541 | 412.62 | Kirkland_Manholes-2538 | 403.64 | 249.5 | 3.6 | 8 | PVC | 0.01 | 1,338 | 5 | 12 | 17 | 1.3 | SM14-Ex-EX299 | |
| Kirkland_Main-1320 | Kirkland_Manholes-2538 | 403.64 | Kirkland_Manholes-2542 | 402.84 | 199.8 | 0.4 | 8 | PVC | 0.01 | 446 | 25 | 28 | 54 | 12.1 | SM14-Ex-EX299 | |
| Kirkland_Main-1321 | Kirkland_Manholes-2539 | 420.17 | Kirkland_Manholes-2540 | 419.4 | 116.4 | 0.66 | 8 | PVC | 0.01 | 574 | 2 | 4 | 6 | 1.1 | SM14-Ex-EX299 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1322 | Kirkland_Manholes-2540 | 419.4 | Kirkland_Manholes-2541 | 412.62 | 255.5 | 2.65 | 8 | PVC | 0.01 | 1,149 | 4 | 8 | 12 | 1 | SM14-Ex-EX299 | |
| Kirkland_Main-1324 | Kirkland_Manholes-2542 | 402.84 | Kirkland_Manholes-2547 | 388.67 | 366.3 | 3.87 | 8 | PVC | 0.01 | 1,387 | 27 | 33 | 59 | 4.3 | SM14-Ex-EX299 | |
| Kirkland_Main-1325 | Kirkland_Manholes-2547 | 388.67 | Kirkland_Manholes-2549 | 373.53 | 148.8 | 10.17 | 8 | PVC | 0.01 | 2,249 | 28 | 37 | 64 | 2.9 | SM14-Ex-EX299 | |
| Kirkland_Main-1327 | Kirkland_Manholes-2543 | 398.38 | Kirkland_Manholes-2545 | 394.25 | 263.6 | 1.57 | 8 | PVC | 0.01 | 883 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-1328 | Kirkland_Manholes-2544 | 407.5 | Kirkland_Manholes-2543 | 398.38 | 295.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX308 | |
| Kirkland_Main-1329 | Kirkland_Manholes-2546 | 394.6 | Kirkland_Manholes-2545 | 394.25 | 207.1 | 0.17 | 8 | PVC | 0.01 | 290 | 0 | 4 | 4 | 1.5 | | |
| Kirkland_Main-1330 | Kirkland_Manholes-2545 | 394.25 | Kirkland_Manholes-2548 | 359.75 | 323.6 | 10.66 | 8 | PVC | 0.01 | 2,302 | 7 | 16 | 24 | 1 | | |
| Kirkland_Main-1331 | Kirkland_Manholes-2549 | 373.53 | Kirkland_Manholes-2550 | 363.01 | 106.8 | 9.85 | 8 | PVC | 0.01 | 2,213 | 28 | 41 | 69 | 3.1 | SM14-Ex-EX299 | |
| Kirkland_Main-1332 | Kirkland_Manholes-2550 | 363.01 | Kirkland_Manholes-2551 | 350.96 | 184.1 | 6.54 | 8 | PVC | 0.01 | 1,804 | 28 | 45 | 73 | 4.1 | SM14-Ex-EX299 | |
| Kirkland_Main-1333 | Kirkland_Manholes-2551 | 350.96 | Kirkland_Manholes-2552 | 332.83 | 142.8 | 12.69 | 8 | PVC | 0.01 | 2,512 | 41 | 85 | 127 | 5 | SM14-Ex-EX299 | |
| Kirkland_Main-1334 | Kirkland_Manholes-2552 | 332.83 | Kirkland_Manholes-2559 | 326.46 | 239.1 | 2.66 | 8 | PVC | 0.01 | 1,151 | 42 | 98 | 140 | 12.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1335 | Kirkland_Manholes-2555 | 336.08 | Kirkland_Manholes-2552 | 332.83 | 311.9 | 1.04 | 8 | PVC | 0.01 | 720 | 1 | 8 | 9 | 1.3 | SM14-Ex-EX322 | |
| Kirkland_Main-1336 | Kirkland_Manholes-2553 | 338.58 | Kirkland_Manholes-2554 | 334.68 | 146 | 2.67 | 8 | PVC | 0.01 | 1,152 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX304 | |
| Kirkland_Main-1337 | Kirkland_Manholes-2892 | 130.3 | Kirkland_Manholes-7 | 127.07 | 138.9 | 2.32 | 8 | PVC | 0.01 | 1,075 | 1 | 1 | 3 | 0.3 | | |
| Kirkland_Main-1338 | Kirkland_Manholes-2554 | 334.68 | Kirkland_Manholes-2558 | 329.23 | 295.9 | 1.84 | 8 | PVC | 0.01 | 957 | 7 | 8 | 15 | 1.5 | SM14-Ex-EX304 | |
| Kirkland_Main-1339 | Kirkland_Manholes-2556 | 339.44 | Kirkland_Manholes-2555 | 336.08 | 338.5 | 0.99 | 8 | PVC | 0.01 | 702 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX322 | |
| Kirkland_Main-1340 | Kirkland_Manholes-2557 | 338.97 | Kirkland_Manholes-2564 | 326.24 | 273.9 | 4.65 | 8 | PVC | 0.01 | 1,520 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX303 | |
| Kirkland_Main-1341 | Kirkland_Manholes-2558 | 329.23 | Kirkland_Manholes-2562 | 315.88 | 275 | 4.86 | 8 | PVC | 0.01 | 1,554 | 7 | 12 | 19 | 1.3 | SM14-Ex-EX304 | |
| Kirkland_Main-1342 | Kirkland_Manholes-2559 | 326.46 | Kirkland_Manholes-2614 | 304.78 | 296.2 | 7.32 | 8 | PVC | 0.01 | 1,907 | 42 | 102 | 144 | 7.6 | SM14-Ex-EX299 | |
| Kirkland_Main-1343 | Kirkland_Manholes-2561 | 358.82 | Kirkland_Manholes-2551 | 350.96 | 208.8 | 3.76 | 8 | PVC | 0.01 | 1,368 | 13 | 37 | 49 | 3.6 | | |
| Kirkland_Main-1344 | Kirkland_Manholes-2560 | 366.92 | Kirkland_Manholes-2561 | 358.82 | 174.3 | 4.65 | 8 | PVC | 0.01 | 1,520 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1345 | Kirkland_Manholes-2562 | 315.88 | Kirkland_Manholes-2563 | 304.66 | 203.7 | 5.51 | 8 | PVC | 0.01 | 1,655 | 8 | 16 | 24 | 1.5 | SM14-Ex-EX304 | |
| Kirkland_Main-1346 | Kirkland_Manholes-2563 | 304.66 | Kirkland_Manholes-2603 | 296.02 | 227.1 | 3.81 | 8 | PVC | 0.01 | 1,375 | 10 | 20 | 30 | 2.2 | SM14-Ex-EX304 | |
| Kirkland_Main-1347 | Kirkland_Manholes-2564 | 326.24 | Kirkland_Manholes-2565 | 315.02 | 180.1 | 6.23 | 8 | PVC | 0.01 | 1,760 | 1 | 8 | 10 | 0.5 | SM14-Ex-EX303 | |
| Kirkland_Main-1349 | Kirkland_Manholes-2565 | 315.02 | Kirkland_Manholes-2590 | 303.32 | 215.8 | 5.42 | 8 | PVC | 0.01 | 1,642 | 8 | 41 | 49 | 3 | SM14-Ex-EX303 | |
| Kirkland_Main-1350 | Kirkland_Manholes-2567 | 316.05 | Kirkland_Manholes-2565 | 315.02 | 200.2 | 0.51 | 8 | PVC | 0.01 | 506 | 6 | 28 | 34 | 6.8 | SM14-Ex-EX307 | |
| Kirkland_Main-1353 | Kirkland_Manholes-2456 | 21.67 | Kirkland_Manholes-2458 | 21.12 | 286.3 | 0.19 | 12 | PVC | 0.01 | 911 | 62 | 110 | 173 | 18.9 | | |
| Kirkland_Main-1354 | Kirkland_Manholes-2104 | 41.29 | Kirkland_Manholes-2457 | 40.34 | 237.1 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 13 | 20 | 4.5 | SM14-Ex-EX231 | Drop Connection |
| Kirkland_Main-1355 | Kirkland_Manholes-2459 | 25.23 | Kirkland_Manholes-2458 | 21.12 | 57.9 | 7.1 | 8 | PVC | 0.01 | 1,879 | 0 | 13 | 13 | 0.7 | | |
| Kirkland_Main-1356 | Kirkland_Manholes-2458 | 21.12 | Kirkland_Manholes-2460 | 20.42 | 280.8 | 0.25 | 12 | PVC | 0.01 | 1,038 | 74 | 130 | 204 | 19.6 | | |
| Kirkland_Main-1357 | Kirkland_Manholes-2105 | 41.32 | Kirkland_Manholes-2459 | 40.36 | 240.6 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 6 | 7 | 1.5 | SM14-Ex-EX230 | Drop Connection |
| Kirkland_Main-1358 | Kirkland_Manholes-2460 | 20.42 | Kirkland_Manholes-2463 | 19.08 | 286.9 | 0.47 | 12 | PVC | 0.01 | 1,421 | 92 | 162 | 255 | 17.9 | | |
| Kirkland_Main-1359 | Kirkland_Manholes-2461 | 23.27 | Kirkland_Manholes-2460 | 20.42 | 36.9 | 7.72 | 8 | PVC | 0.01 | 1,959 | 9 | 19 | 28 | 1.5 | | |
| Kirkland_Main-1360 | Kirkland_Manholes-2106 | 63.43 | Kirkland_Manholes-2461 | 62.02 | 352 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 13 | 20 | 4.4 | SM14-Ex-EX227 | Drop Connection |
| Kirkland_Main-1361 | Kirkland_Manholes-2462 | 20.98 | Kirkland_Manholes-2460 | 20.42 | 12.7 | 4.42 | 8 | PVC | 0.01 | 1,483 | 9 | 6 | 16 | 1.1 | | |
| Kirkland_Main-1362 | Kirkland_Manholes-2463 | 19.08 | Kirkland_Manholes-2465 | 18.4 | 238.2 | 0.29 | 15 | PVC | 0.01 | 2,014 | 104 | 169 | 273 | 13.5 | | |
| Kirkland_Main-1363 | Kirkland_Manholes-2464 | 24.34 | Kirkland_Manholes-2465 | 24.15 | 46.3 | 0.4 | 8 | PVC | 0.01 | 446 | 14 | 32 | 47 | 10.5 | | Drop Connection |
| Kirkland_Main-1364 | Kirkland_Manholes-2465 | 18.4 | Kirkland_Manholes-2321 | 18.2 | 405.1 | 0.05 | 15 | PVC | 0.01 | 837 | 118 | 208 | 326 | 39 | | |
| Kirkland_Main-1365 | Kirkland_Manholes-2466 | 40.06 | Kirkland_Manholes-2464 | 24.34 | 133.9 | 11.74 | 8 | PVC | 0.01 | 2,416 | 14 | 26 | 40 | 1.6 | | |
| Kirkland_Main-1366 | Kirkland_Manholes-754 | 246.56 | Kirkland_Manholes-756 | 236.14 | 59.1 | 17.63 | 8 | PVC | 0.01 | 2,961 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1367 | Kirkland_Manholes-756 | 236.14 | Kirkland_Manholes-759 | 235.08 | 17.7 | 6 | 8 | PVC | 0.01 | 1,727 | 3 | 12 | 15 | 0.9 | | |
| Kirkland_Main-1368 | Kirkland_Manholes-759 | 235.08 | Kirkland_Manholes-755 | 223.34 | 72.1 | 16.27 | 8 | PVC | 0.01 | 2,844 | 4 | 16 | 21 | 0.7 | | |
| Kirkland_Main-1369 | Kirkland_Manholes-749 | 322.83 | Kirkland_Manholes-748 | 311.92 | 207.7 | 5.25 | 8 | PVC | 0.01 | 1,616 | 17 | 37 | 54 | 3.3 | SM14-Ex-EX71 | |
| Kirkland_Main-1370 | Kirkland_Manholes-743 | 333.02 | Kirkland_Manholes-749 | 322.83 | 238.3 | 4.28 | 8 | PVC | 0.01 | 1,458 | 16 | 33 | 48 | 3.3 | SM14-Ex-EX71 | |
| Kirkland_Main-1371 | Kirkland_Manholes-742 | 334.85 | Kirkland_Manholes-743 | 333.02 | 278.1 | 0.66 | 8 | PVC | 0.01 | 572 | 10 | 20 | 30 | 5.3 | SM14-Ex-EX71 | |
| Kirkland_Main-1372 | Kirkland_Manholes-744 | 343.43 | Kirkland_Manholes-743 | 333.02 | 155.4 | 6.7 | 8 | PVC | 0.01 | 1,825 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX73 | |
| Kirkland_Main-1373 | Kirkland_Manholes-1551 | 340.04 | Kirkland_Manholes-1548 | 334.13 | 358.9 | 1.65 | 8 | PVC | 0.01 | 905 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX122 | |
| Kirkland_Main-1374 | Kirkland_Manholes-1548 | 334.13 | Kirkland_Manholes-1547 | 314.76 | 165.7 | 11.69 | 8 | PVC | 0.01 | 2,411 | 2 | 8 | 10 | 0.4 | SM14-Ex-EX122 | |
| Kirkland_Main-1375 | Kirkland_Manholes-1554 | 318.87 | Kirkland_Manholes-1547 | 314.76 | 166.1 | 2.48 | 8 | PVC | 0.01 | 1,109 | 3 | 12 | 16 | 1.4 | SM14-Ex-EX122 | |
| Kirkland_Main-1376 | Kirkland_Manholes-1547 | 314.76 | Kirkland_Manholes-1553 | 308.15 | 101.4 | 6.52 | 8 | PVC | 0.01 | 1,800 | 6 | 24 | 31 | 1.7 | SM14-Ex-EX122 | |
| Kirkland_Main-1377 | Kirkland_Manholes-1549 | 335.84 | Kirkland_Manholes-1550 | 330.23 | 147.4 | 3.81 | 8 | PVC | 0.01 | 1,375 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX122 | |
| Kirkland_Main-1378 | Kirkland_Manholes-1550 | 330.23 | Kirkland_Manholes-1554 | 318.87 | 207.3 | 5.48 | 8 | PVC | 0.01 | 1,650 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX122 | |
| Kirkland_Main-1379 | Kirkland_Manholes-741 | 345.43 | Kirkland_Manholes-696 | 340.09 | 318.5 | 1.68 | 8 | PVC | 0.01 | 913 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX74 | |
| Kirkland_Main-1380 | Kirkland_Manholes-696 | 340.09 | Kirkland_Manholes-742 | 334.85 | 242.4 | 2.16 | 8 | PVC | 0.01 | 1,037 | 9 | 16 | 25 | 2.4 | SM14-Ex-EX71 | |
| Kirkland_Main-1381 | Kirkland_Manholes-820 | 351.15 | Kirkland_Manholes-821 | 328.81 | 334.9 | 6.67 | 8 | PVC | 0.01 | 1,821 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX72 | |
| Kirkland_Main-1382 | Kirkland_Manholes-745 | 351.42 | Kirkland_Manholes-744 | 343.43 | 306.7 | 2.6 | 8 | PVC | 0.01 | 1,138 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX73 | |
| Kirkland_Main-1383 | Kirkland_Manholes-821 | 328.81 | Kirkland_Manholes-746 | 326.06 | 200.6 | 1.37 | 8 | PVC | 0.01 | 825 | 2 | 8 | 10 | 1.2 | SM14-Ex-EX72 | |
| Kirkland_Main-1384 | Kirkland_Manholes-746 | 326.06 | Kirkland_Manholes-747 | 319.23 | 281 | 2.43 | 8 | PVC | 0.01 | 1,099 | 3 | 12 | 15 | 1.4 | SM14-Ex-EX72 | |
| Kirkland_Main-1385 | Kirkland_Manholes-747 | 319.23 | Kirkland_Manholes-748 | 311.92 | 331.6 | 2.2 | 8 | PVC | 0.01 | 1,047 | 4 | 16 | 20 | 1.9 | SM14-Ex-EX72 | |
| Kirkland_Main-1386 | Kirkland_Manholes-1562 | 206.57 | Kirkland_Manholes-1563 | 203.28 | 21.7 | 15.13 | 8 | PVC | 0.01 | 2,743 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-1387 | Kirkland_Manholes-1560 | 251.28 | Kirkland_Manholes-455 | 250.45 | 217.9 | 0.38 | 8 | PVC | 0.01 | 435 | 26 | 69 | 95 | 21.9 | SM14-Ex-EX68 | |
| Kirkland_Main-1388 | Kirkland_Manholes-1559 | 253.89 | Kirkland_Manholes-1560 | 251.28 | 258.2 | 1.01 | 8 | PVC | 0.01 | 709 | 25 | 65 | 90 | 12.7 | SM14-Ex-EX68 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1389 | Kirkland_Manholes-317 | 146.79 | Kirkland_Manholes-318 | 146.51 | 72.2 | 0.39 | 12 | PVC | 0.01 | 1,298 | 143 | 324 | 467 | 36 | SM14-Ex-EX30 | |
| Kirkland_Main-1390 | Kirkland_Manholes-1052 | 151.4 | Kirkland_Manholes-316 | 147.8 | 353.6 | 1.02 | 8 | PVC | 0.01 | 711 | 142 | 307 | 450 | 63.2 | | |
| Kirkland_Main-1392 | Kirkland_Manholes-264 | 215.3 | Kirkland_Manholes-1099 | 211.44 | 157 | 2.46 | 8 | PVC | 0.01 | 1,105 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1398 | Kirkland_Manholes-836 | 335.7 | Kirkland_Manholes-835 | 335.4 | 62.1 | 0.48 | 8 | PVC | 0.01 | 490 | 13 | 28 | 41 | 8.4 | | |
| Kirkland_Main-1399 | Kirkland_Manholes-835 | 335.4 | Kirkland_Manholes-839 | 334.68 | 84.6 | 0.85 | 8 | PVC | 0.01 | 650 | 15 | 37 | 51 | 7.9 | | |
| Kirkland_Main-1400 | Kirkland_Manholes-837 | 336.53 | Kirkland_Manholes-836 | 335.7 | 248.7 | 0.33 | 8 | PVC | 0.01 | 407 | 11 | 24 | 36 | 8.8 | | |
| Kirkland_Main-1401 | Kirkland_Manholes-838 | 337.31 | Kirkland_Manholes-837 | 336.53 | 120.5 | 0.65 | 8 | PVC | 0.01 | 567 | 8 | 20 | 28 | 5 | | |
| Kirkland_Main-1402 | Kirkland_Manholes-840 | 326.85 | Kirkland_Manholes-841 | 325.94 | 71 | 1.28 | 8 | PVC | 0.01 | 798 | 22 | 57 | 79 | 9.9 | | |
| Kirkland_Main-1403 | Kirkland_Manholes-841 | 325.94 | Kirkland_Manholes-842 | 324.88 | 230.1 | 0.46 | 8 | PVC | 0.01 | 479 | 23 | 61 | 84 | 17.6 | | |
| Kirkland_Main-1404 | Kirkland_Manholes-843 | 340.26 | Kirkland_Manholes-842 | 324.88 | 172 | 8.94 | 8 | PVC | 0.01 | 2,108 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-1405 | Kirkland_Manholes-844 | 342.5 | Kirkland_Manholes-845 | 341.21 | 161.2 | 0.8 | 8 | PVC | 0.01 | 631 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1406 | Kirkland_Manholes-846 | 342.07 | Kirkland_Manholes-845 | 341.21 | 84.3 | 1.02 | 8 | PVC | 0.01 | 712 | 4 | 16 | 20 | 2.8 | | |
| Kirkland_Main-1407 | Kirkland_Manholes-845 | 341.21 | Kirkland_Manholes-850 | 340.39 | 138.4 | 0.59 | 8 | PVC | 0.01 | 543 | 7 | 24 | 31 | 5.7 | | |
| Kirkland_Main-1408 | Kirkland_Manholes-849 | 342.42 | Kirkland_Manholes-846 | 342.07 | 117.3 | 0.3 | 8 | PVC | 0.01 | 385 | 3 | 12 | 15 | 4 | | |
| Kirkland_Main-1409 | Kirkland_Manholes-847 | 343.01 | Kirkland_Manholes-849 | 342.42 | 70.3 | 0.84 | 8 | PVC | 0.01 | 646 | 3 | 8 | 11 | 1.7 | | |
| Kirkland_Main-1410 | Kirkland_Manholes-848 | 344.32 | Kirkland_Manholes-847 | 343.01 | 145.5 | 0.9 | 8 | PVC | 0.01 | 669 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-1411 | Kirkland_Manholes-850 | 340.39 | Kirkland_Manholes-851 | 339.16 | 69.3 | 1.78 | 8 | PVC | 0.01 | 941 | 7 | 28 | 36 | 3.8 | | |
| Kirkland_Main-1412 | Kirkland_Manholes-1538 | 302.73 | Kirkland_Manholes-1537 | 302.03 | 362.6 | 0.19 | 8 | PVC | 0.01 | 310 | 7 | 16 | 23 | 7.6 | SM14-Ex-EX124 | |
| Kirkland_Main-1413 | Kirkland_Manholes-1511 | 290.62 | Kirkland_Manholes-1509 | 286.35 | 84.7 | 5.04 | 8 | PVC | 0.01 | 1,583 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1414 | Kirkland_Manholes-1510 | 287.19 | Kirkland_Manholes-1509 | 286.35 | 79 | 1.06 | 8 | PVC | 0.01 | 727 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1415 | Kirkland_Manholes-1509 | 286.35 | Kirkland_Manholes-1508 | 277.83 | 283.5 | 3.01 | 8 | PVC | 0.01 | 1,222 | 3 | 12 | 15 | 1.3 | | Drop Connection |
| Kirkland_Main-1416 | Kirkland_Manholes-1537 | 302.03 | Kirkland_Manholes-1536 | 298.86 | 351.3 | 0.9 | 8 | PVC | 0.01 | 670 | 11 | 20 | 31 | 4.6 | SM14-Ex-EX124 | |
| Kirkland_Main-1417 | Kirkland_Manholes-762 | 287.2 | Kirkland_Manholes-763 | 274.33 | 165.6 | 7.77 | 8 | PVC | 0.01 | 1,966 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX125 | |
| Kirkland_Main-1418 | Kirkland_Manholes-763 | 274.33 | Kirkland_Manholes-1531 | 265.03 | 234.1 | 3.97 | 8 | PVC | 0.01 | 1,405 | 5 | 8 | 13 | 0.9 | SM14-Ex-EX125 | |
| Kirkland_Main-1419 | Kirkland_Manholes-1541 | 294.69 | Kirkland_Manholes-1543 | 289 | 216.2 | 2.63 | 8 | PVC | 0.01 | 1,144 | 6 | 16 | 23 | 2 | SM14-Ex-EX123 | |
| Kirkland_Main-1420 | Kirkland_Manholes-1536 | 298.86 | Kirkland_Manholes-1518 | 277.88 | 393.1 | 5.34 | 8 | PVC | 0.01 | 1,629 | 12 | 24 | 36 | 2.2 | SM14-Ex-EX124 | |
| Kirkland_Main-1421 | Kirkland_Manholes-1544 | 284.46 | Kirkland_Manholes-1545 | 272.4 | 63.3 | 19.06 | 8 | PVC | 0.01 | 3,078 | 10 | 24 | 34 | 1.1 | SM14-Ex-EX123 | |
| Kirkland_Main-1422 | Kirkland_Manholes-1558 | 160.79 | O-20 | 159.86 | 16.6 | 5.62 | 8 | PVC | 0.01 | 1,671 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1424 | Kirkland_Manholes-1557 | 161.32 | O-21 | 159.86 | 64.6 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-1425 | Kirkland_Manholes-1556 | 178.05 | Kirkland_Manholes-1557 | 161.32 | 76.6 | 21.85 | 8 | PVC | 0.01 | 3,296 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1427 | Kirkland_Manholes-541 | 450.25 | Kirkland_Manholes-542 | 440.69 | 230.2 | 4.15 | 8 | PVC | 0.01 | 1,437 | 11 | 69 | 80 | 5.6 | | |
| Kirkland_Main-1428 | Kirkland_Manholes-542 | 440.69 | Kirkland_Manholes-1978 | 440.32 | 89.3 | 0.41 | 8 | PVC | 0.01 | 454 | 11 | 73 | 84 | 18.6 | | |
| Kirkland_Main-1429 | Kirkland_Manholes-544 | 449.4 | Kirkland_Manholes-543 | 448.24 | 235 | 0.49 | 8 | PVC | 0.01 | 495 | 22 | 69 | 91 | 18.4 | | |
| Kirkland_Main-1430 | Kirkland_Manholes-546 | 452.43 | Kirkland_Manholes-545 | 450.22 | 300.2 | 0.74 | 8 | PVC | 0.01 | 605 | 18 | 61 | 79 | 13 | | |
| Kirkland_Main-1431 | Kirkland_Manholes-545 | 450.22 | Kirkland_Manholes-544 | 449.4 | 161.7 | 0.51 | 8 | PVC | 0.01 | 502 | 21 | 65 | 86 | 17.1 | | |
| Kirkland_Main-1432 | Kirkland_Manholes-547 | 452.62 | Kirkland_Manholes-546 | 452.43 | 162.6 | 0.12 | 8 | PVC | 0.01 | 243 | 16 | 57 | 73 | 29.9 | | |
| Kirkland_Main-1433 | Kirkland_Manholes-548 | 453.36 | Kirkland_Manholes-547 | 452.62 | 135.2 | 0.55 | 8 | PVC | 0.01 | 522 | 15 | 53 | 67 | 12.9 | | |
| Kirkland_Main-1434 | Kirkland_Manholes-549 | 453.9 | Kirkland_Manholes-548 | 453.36 | 128.1 | 0.42 | 8 | PVC | 0.01 | 456 | 12 | 41 | 53 | 11.6 | | |
| Kirkland_Main-1435 | Kirkland_Manholes-552 | 455.6 | Kirkland_Manholes-549 | 453.9 | 177.5 | 0.96 | 8 | PVC | 0.01 | 690 | 12 | 37 | 49 | 7.1 | | |
| Kirkland_Main-1436 | Kirkland_Manholes-550 | 455.89 | Kirkland_Manholes-552 | 455.6 | 183.6 | 0.16 | 8 | PVC | 0.01 | 280 | 1 | 4 | 5 | 1.7 | | |
| Kirkland_Main-1437 | Kirkland_Manholes-551 | 462.06 | Kirkland_Manholes-563 | 461.52 | 194.4 | 0.28 | 8 | PVC | 0.01 | 372 | 5 | 4 | 9 | 2.4 | | |
| Kirkland_Main-1438 | Kirkland_Manholes-553 | 455.61 | Kirkland_Manholes-552 | 455.6 | 92.3 | 0.01 | 8 | PVC | 0.01 | 73 | 11 | 28 | 39 | 53.8 | | |
| Kirkland_Main-1439 | Kirkland_Manholes-554 | 456.45 | Kirkland_Manholes-553 | 455.61 | 88.9 | 0.94 | 8 | PVC | 0.01 | 685 | 10 | 24 | 35 | 5.1 | | |
| Kirkland_Main-1440 | Kirkland_Manholes-558 | 457.55 | Kirkland_Manholes-554 | 456.45 | 287.7 | 0.38 | 8 | PVC | 0.01 | 436 | 8 | 16 | 24 | 5.5 | | |
| Kirkland_Main-1441 | Kirkland_Manholes-557 | 460.23 | Kirkland_Manholes-554 | 456.45 | 194.6 | 1.94 | 8 | PVC | 0.01 | 983 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1442 | Kirkland_Manholes-559 | 467.58 | Kirkland_Manholes-558 | 457.55 | 209.6 | 4.79 | 8 | PVC | 0.01 | 1,542 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1443 | Kirkland_Manholes-563 | 461.52 | Kirkland_Manholes-558 | 457.55 | 324.2 | 1.22 | 8 | PVC | 0.01 | 780 | 5 | 8 | 13 | 1.7 | | |
| Kirkland_Main-1444 | Kirkland_Manholes-562 | 483.8 | Kirkland_Manholes-560 | 483.4 | 99.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-1445 | Kirkland_Manholes-565 | 468.54 | Kirkland_Manholes-2020 | 468.34 | 312.4 | 0.06 | 10 | PVC | 0.01 | 326 | 90 | 146 | 237 | 72.7 | SM14-2035-DF12 | |
| Kirkland_Main-1446 | Kirkland_Manholes-564 | 469.28 | Kirkland_Manholes-565 | 468.54 | 228 | 0.32 | 10 | PVC | 0.01 | 728 | 90 | 142 | 232 | 31.9 | | |
| Kirkland_Main-1447 | Kirkland_Manholes-567 | 470.28 | Kirkland_Manholes-564 | 469.28 | 324.2 | 0.31 | 10 | PVC | 0.01 | 710 | 75 | 98 | 173 | 24.4 | | |
| Kirkland_Main-1448 | Kirkland_Manholes-3045 | 483.35 | Kirkland_Manholes-2029 | 479.06 | 297.6 | 1.44 | 8 | PVC | 0.01 | 846 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-1449 | Kirkland_Manholes-568 | 471.29 | Kirkland_Manholes-567 | 470.28 | 325 | 0.31 | 10 | PVC | 0.01 | 713 | 75 | 90 | 164 | 23 | | |
| Kirkland_Main-1450 | Kirkland_Manholes-569 | 473.29 | Kirkland_Manholes-568 | 471.29 | 178.4 | 1.12 | 10 | PVC | 0.01 | 1,354 | 74 | 85 | 160 | 11.8 | | |
| Kirkland_Main-1451 | Kirkland_Manholes-570 | 473.5 | Kirkland_Manholes-569 | 473.29 | 54.9 | 0.38 | 8 | PVC | 0.01 | 433 | 74 | 81 | 156 | 35.9 | | |
| Kirkland_Main-1452 | Kirkland_Manholes-1406 | 473.57 | Kirkland_Manholes-570 | 473.5 | 288.8 | 0.03 | 12 | PVC | 0.01 | 330 | 68 | 77 | 146 | 44.1 | SM14-Ex-EX275 | |
| Kirkland_Main-1453 | Kirkland_Manholes-571 | 472.91 | Kirkland_Manholes-567 | 470.28 | 172.6 | 1.52 | 8 | PVC | 0.01 | 870 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-1454 | Kirkland_Manholes-575 | 113.73 | Kirkland_Manholes-574 | 110.98 | 152.2 | 1.81 | 8 | PVC | 0.01 | 948 | 2 | 8 | 10 | 1 | SM14-Ex-EX116 | |
| Kirkland_Main-1455 | Kirkland_Manholes-1665 | 94.21 | Kirkland_Manholes-1666 | 89.71 | 26.9 | 16.73 | 8 | PVC | 0.01 | 2,883 | 32 | 91 | 122 | 4.2 | | |
| Kirkland_Main-1456 | Kirkland_Manholes-957 | 315.92 | Kirkland_Manholes-958 | 300.6 | 184.6 | 8.3 | 8 | PVC | 0.01 | 2,031 | 4 | 20 | 24 | 1.2 | | |
| Kirkland_Main-1457 | Kirkland_Manholes-958 | 300.6 | Kirkland_Manholes-942 | 300.01 | 173 | 0.34 | 8 | PVC | 0.01 | 412 | 5 | 24 | 29 | 7 | | |
| Kirkland_Main-1458 | Kirkland_Manholes-960 | 258.67 | Kirkland_Manholes-959 | 252.05 | 190.9 | 3.47 | 8 | PVC | 0.01 | 1,313 | 3 | 4 | 7 | 0.5 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1459 | Kirkland_Manholes-2752 | 253.8 | Kirkland_Manholes-959 | 252.05 | 339.9 | 0.51 | 8 | PVC | 0.01 | 506 | 12 | 35 | 47 | 9.2 | | |
| Kirkland_Main-1460 | Kirkland_Manholes-959 | 252.05 | Kirkland_Manholes-963 | 250.7 | 229 | 0.59 | 8 | PVC | 0.01 | 541 | 17 | 43 | 60 | 11.1 | | |
| Kirkland_Main-1461 | Kirkland_Manholes-961 | 263.75 | Kirkland_Manholes-962 | 249.53 | 185.7 | 7.66 | 8 | PVC | 0.01 | 1,951 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1462 | Kirkland_Manholes-964 | 266.7 | Kirkland_Manholes-963 | 250.7 | 315.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1463 | Kirkland_Manholes-963 | 250.7 | Kirkland_Manholes-962 | 249.53 | 229.2 | 0.51 | 8 | PVC | 0.01 | 504 | 20 | 52 | 72 | 14.3 | | |
| Kirkland_Main-1464 | Kirkland_Manholes-962 | 249.53 | Kirkland_Manholes-966 | 247.26 | 381 | 0.59 | 8 | PVC | 0.01 | 544 | 23 | 61 | 84 | 15.4 | | |
| Kirkland_Main-1465 | Kirkland_Manholes-965 | 252.45 | Kirkland_Manholes-966 | 247.26 | 188.4 | 2.75 | 8 | PVC | 0.01 | 1,170 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-1466 | Kirkland_Manholes-966 | 247.26 | Kirkland_Manholes-967 | 246.35 | 132.7 | 0.69 | 8 | PVC | 0.01 | 584 | 28 | 69 | 97 | 16.6 | | |
| Kirkland_Main-1467 | Kirkland_Manholes-968 | 245.61 | Kirkland_Manholes-969 | 239.3 | 150 | 4.21 | 8 | PVC | 0.01 | 1,446 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1468 | Kirkland_Manholes-969 | 239.3 | Kirkland_Manholes-970 | 236.6 | 291.2 | 0.93 | 8 | PVC | 0.01 | 679 | 1 | 9 | 10 | 1.5 | | |
| Kirkland_Main-1469 | Kirkland_Manholes-970 | 236.6 | Kirkland_Manholes-971 | 236.2 | 92.8 | 0.43 | 8 | PVC | 0.01 | 463 | 3 | 13 | 16 | 3.4 | | |
| Kirkland_Main-1470 | Kirkland_Manholes-967 | 246.35 | Kirkland_Manholes-972 | 246.27 | 41.8 | 0.2 | 8 | PVC | 0.01 | 314 | 28 | 74 | 102 | 32.3 | | |
| Kirkland_Main-1471 | Kirkland_Manholes-971 | 236.2 | Kirkland_Manholes-973 | 233.19 | 134.5 | 2.24 | 8 | PVC | 0.01 | 1,055 | 3 | 17 | 21 | 2 | SM14-Ex-EX2 | |
| Kirkland_Main-1472 | Kirkland_Manholes-974 | 234.1 | Kirkland_Manholes-973 | 233.19 | 211 | 0.43 | 8 | PVC | 0.01 | 463 | 2 | 9 | 11 | 2.3 | | |
| Kirkland_Main-1473 | Kirkland_Manholes-987 | 239.5 | Kirkland_Manholes-976 | 229.3 | 219.2 | 4.65 | 8 | PVC | 0.01 | 1,521 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1474 | Kirkland_Manholes-975 | 230.2 | Kirkland_Manholes-976 | 229.3 | 22.7 | 3.96 | 8 | PVC | 0.01 | 1,404 | 6 | 35 | 41 | 2.9 | | |
| Kirkland_Main-1475 | Kirkland_Manholes-973 | 233.19 | Kirkland_Manholes-975 | 230.2 | 123.5 | 2.42 | 8 | PVC | 0.01 | 1,097 | 6 | 30 | 36 | 3.3 | | |
| Kirkland_Main-1476 | Kirkland_Manholes-976 | 229.3 | Kirkland_Manholes-977 | 225.95 | 181.2 | 1.85 | 8 | PVC | 0.01 | 959 | 8 | 43 | 51 | 5.3 | | |
| Kirkland_Main-1478 | Kirkland_Manholes-1564 | 164.37 | O-15 | 160 | 18.2 | 24.07 | 8 | PVC | 0.01 | 3,459 | 2 | 16 | 18 | 0.5 | | |
| Kirkland_Main-1479 | Kirkland_Manholes-755 | 223.34 | Kirkland_Manholes-1565 | 218.86 | 20.1 | 22.24 | 8 | PVC | 0.01 | 3,325 | 4 | 20 | 25 | 0.7 | | |
| Kirkland_Main-1480 | Kirkland_Manholes-1567 | 133.87 | Kirkland_Manholes-1566 | 130.52 | 314.6 | 1.06 | 8 | PVC | 0.01 | 728 | 4 | 8 | 12 | 1.6 | SM14-Ex-EX119 | |
| Kirkland_Main-1481 | Kirkland_Manholes-1566 | 130.52 | Kirkland_Manholes-1604 | 117.22 | 313.5 | 4.24 | 8 | PVC | 0.01 | 1,452 | 4 | 16 | 21 | 1.4 | SM14-Ex-EX119 | |
| Kirkland_Main-1482 | Kirkland_Manholes-776 | 207.48 | Kirkland_Manholes-775 | 172.73 | 191.1 | 18.19 | 8 | PVC | 0.01 | 3,007 | 5 | 28 | 34 | 1.1 | | |
| Kirkland_Main-1483 | Kirkland_Manholes-1565 | 218.86 | Kirkland_Manholes-776 | 207.48 | 52.1 | 21.84 | 8 | PVC | 0.01 | 3,295 | 4 | 24 | 29 | 0.9 | | |
| Kirkland_Main-1484 | Kirkland_Manholes-1263 | 156.98 | Kirkland_Manholes-1262 | 156.59 | 13.2 | 2.96 | 8 | PVC | 0.01 | 1,213 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX111 | |
| Kirkland_Main-1485 | Kirkland_Manholes-1262 | 156.59 | Kirkland_Manholes-1261 | 144.57 | 314.4 | 3.82 | 8 | PVC | 0.01 | 1,379 | 5 | 41 | 46 | 3.4 | SM14-Ex-EX111 | |
| Kirkland_Main-1486 | Kirkland_Manholes-1260 | 164.33 | Kirkland_Manholes-1261 | 144.57 | 293.7 | 6.73 | 8 | PVC | 0.01 | 1,829 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX110 | |
| Kirkland_Main-1488 | Kirkland_Manholes-1259 | 154.8 | Kirkland_Manholes-1258 | 154.28 | 130.3 | 0.4 | 8 | PVC | 0.01 | 445 | 7 | 33 | 40 | 9 | SM14-Ex-EX108 | |
| Kirkland_Main-1489 | Kirkland_Manholes-1258 | 154.28 | Kirkland_Manholes-1257 | 152.6 | 347 | 0.48 | 8 | PVC | 0.01 | 491 | 15 | 66 | 80 | 16.4 | SM14-Ex-EX108 | |
| Kirkland_Main-1490 | Kirkland_Manholes-1257 | 152.6 | Kirkland_Manholes-1256 | 151.53 | 24 | 4.46 | 8 | PVC | 0.01 | 1,489 | 16 | 74 | 90 | 6 | SM14-Ex-EX108 | |
| Kirkland_Main-1494 | Kirkland_Manholes-2467 | 42.59 | Kirkland_Manholes-2466 | 40.06 | 76.4 | 3.31 | 8 | PVC | 0.01 | 1,283 | 10 | 19 | 30 | 2.3 | | |
| Kirkland_Main-1495 | Kirkland_Manholes-2469 | 49.1 | Kirkland_Manholes-2467 | 42.59 | 138.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 9 | 13 | 22 | 1.4 | | |
| Kirkland_Main-1496 | Kirkland_Manholes-2468 | 49.98 | Kirkland_Manholes-2469 | 49.48 | 124.2 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 6 | 14 | 3.2 | | Drop Connection |
| Kirkland_Main-1498 | Kirkland_Manholes-2470 | 236.6 | Kirkland_Manholes-2472 | 223.64 | 225 | 5.76 | 8 | PVC | 0.01 | 1,692 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX282 | |
| Kirkland_Main-1499 | Kirkland_Manholes-2472 | 223.64 | Kirkland_Manholes-2473 | 222.78 | 215.8 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 12 | 16 | 3.6 | SM14-Ex-EX282 | Drop Connection |
| Kirkland_Main-1500 | Kirkland_Manholes-2473 | 207.49 | Kirkland_Manholes-2474 | 188.45 | 212.3 | 8.97 | 8 | PVC | 0.01 | 2,111 | 6 | 16 | 22 | 1.1 | SM14-Ex-EX282 | |
| Kirkland_Main-1501 | Kirkland_Manholes-2471 | 234.47 | Kirkland_Manholes-2472 | 223.64 | 364.1 | 2.97 | 8 | PVC | 0.01 | 1,216 | 1 | 4 | 6 | 0.5 | SM14-Ex-EX283 | |
| Kirkland_Main-1502 | Kirkland_Manholes-2474 | 188.45 | Kirkland_Manholes-2476 | 187.5 | 225.3 | 0.42 | 8 | PVC | 0.01 | 458 | 8 | 24 | 32 | 7 | SM14-Ex-EX282 | |
| Kirkland_Main-1505 | Kirkland_Manholes-2492 | 55.46 | Kirkland_Manholes-2666 | 55.28 | 147.8 | 0.12 | 18 | PVC | 0.01 | 2,139 | 123 | 318 | 441 | 20.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1506 | Kirkland_Manholes-2088 | 57.39 | Kirkland_Manholes-2492 | 55.46 | 144 | 1.34 | 18 | PVC | 0.01 | 7,094 | 94 | 269 | 363 | 5.1 | SM14-Ex-EX222 | |
| Kirkland_Main-1507 | Kirkland_Manholes-2090 | 57.44 | Kirkland_Manholes-2088 | 57.39 | 370.9 | 0.01 | 18 | PVC | 0.01 | 712 | 94 | 257 | 351 | 49.3 | SM14-Ex-EX222 | |
| Kirkland_Main-1508 | Kirkland_Manholes-2089 | 58.23 | Kirkland_Manholes-2088 | 57.39 | 14.1 | 5.97 | 8 | PVC | 0.01 | 1,723 | 0 | 6 | 6 | 0.4 | | |
| Kirkland_Main-1509 | Kirkland_Manholes-2620 | 281.06 | Kirkland_Manholes-2618 | 278.4 | 382.5 | 0.7 | 8 | PVC | 0.01 | 588 | 2 | 8 | 10 | 1.7 | SM14-Ex-EX299 | |
| Kirkland_Main-1510 | Kirkland_Manholes-2604 | 283.17 | Kirkland_Manholes-2620 | 281.06 | 375.6 | 0.56 | 8 | PVC | 0.01 | 528 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX299 | |
| Kirkland_Main-1512 | Kirkland_Manholes-2621 | 277.53 | Kirkland_Manholes-2433 | 276.88 | 161.5 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 6 | 1.2 | SM14-Ex-EX244 | Drop Connection |
| Kirkland_Main-1513 | Kirkland_Manholes-2623 | 277.98 | Kirkland_Manholes-2622 | 271.8 | 433.3 | 1.43 | 8 | PVC | 0.01 | 842 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX281 | |
| Kirkland_Main-1514 | Kirkland_Manholes-2622 | 271.8 | Kirkland_Manholes-2625 | 260.54 | 221.9 | 5.07 | 8 | PVC | 0.01 | 1,588 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX281 | |
| Kirkland_Main-1515 | Kirkland_Manholes-2624 | 276.22 | Kirkland_Manholes-2635 | 275.48 | 185.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | SM14-Ex-EX294 | |
| Kirkland_Main-1516 | Kirkland_Manholes-2625 | 260.54 | Kirkland_Manholes-2626 | 246.92 | 188.3 | 7.23 | 8 | PVC | 0.01 | 1,896 | 2 | 12 | 14 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1517 | Kirkland_Manholes-2626 | 246.92 | Kirkland_Manholes-2627 | 215.5 | 237.8 | 13.21 | 8 | PVC | 0.01 | 2,563 | 2 | 16 | 19 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1518 | Kirkland_Manholes-2627 | 215.5 | Kirkland_Manholes-2628 | 186 | 220.8 | 13.36 | 8 | PVC | 0.01 | 2,577 | 4 | 20 | 25 | 1 | SM14-Ex-EX281 | |
| Kirkland_Main-1519 | Kirkland_Manholes-2476 | 187.5 | Kirkland_Manholes-2628 | 186 | 397.3 | 0.38 | 8 | PVC | 0.01 | 433 | 11 | 28 | 39 | 9 | SM14-Ex-EX282 | |
| Kirkland_Main-1520 | Kirkland_Manholes-2606 | 272.98 | Kirkland_Manholes-2607 | 264.34 | 256.6 | 3.37 | 8 | PVC | 0.01 | 1,294 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX298 | |
| Kirkland_Main-1521 | Kirkland_Manholes-2607 | 264.34 | Kirkland_Manholes-2608 | 229.39 | 401.2 | 8.71 | 8 | PVC | 0.01 | 2,081 | 5 | 8 | 13 | 0.6 | SM14-Ex-EX298 | Drop Connection |
| Kirkland_Main-1522 | Kirkland_Manholes-2608 | 227.04 | Kirkland_Manholes-2600 | 217.97 | 170.3 | 5.33 | 8 | PVC | 0.01 | 1,627 | 7 | 12 | 19 | 1.2 | SM14-Ex-EX298 | |
| Kirkland_Main-1523 | Kirkland_Manholes-2630 | 232.51 | Kirkland_Manholes-2629 | 172.55 | 421 | 14.24 | 8 | PVC | 0.01 | 2,661 | 11 | 20 | 31 | 1.2 | SM14-Ex-EX295 | |
| Kirkland_Main-1524 | Kirkland_Manholes-1219 | 264.33 | Kirkland_Manholes-1139 | 247.37 | 248 | 6.84 | 8 | PVC | 0.01 | 1,844 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX80 | |
| Kirkland_Main-1525 | Kirkland_Manholes-1139 | 247.37 | Kirkland_Manholes-1138 | 221.13 | 248.6 | 10.56 | 8 | PVC | 0.01 | 2,291 | 3 | 16 | 19 | 0.8 | SM14-Ex-EX80 | |
| Kirkland_Main-1526 | Kirkland_Manholes-1138 | 221.13 | Kirkland_Manholes-1141 | 204.1 | 177.9 | 9.57 | 8 | PVC | 0.01 | 2,181 | 3 | 25 | 28 | 1.3 | SM14-Ex-EX80 | |
| Kirkland_Main-1527 | Kirkland_Manholes-1152 | 135.47 | Kirkland_Manholes-1811 | 129.72 | 351.2 | 1.64 | 8 | PVC | 0.01 | 902 | 15 | 74 | 89 | 9.8 | SM10 | |
| Kirkland_Main-1528 | Kirkland_Manholes-1153 | 137.55 | Kirkland_Manholes-1154 | 131.73 | 270.2 | 2.15 | 8 | PVC | 0.01 | 1,035 | 2 | 8 | 10 | 1 | SM10 | |
| Kirkland_Main-1529 | Kirkland_Manholes-1154 | 131.73 | Kirkland_Manholes-1155 | 122.09 | 288.9 | 3.34 | 8 | PVC | 0.01 | 1,288 | 3 | 16 | 19 | 1.5 | SM10 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1530 | Kirkland_Manholes-1155 | 122.09 | Kirkland_Manholes-1156 | 108.19 | 328.7 | 4.23 | 8 | PVC | 0.01 | 1,450 | 4 | 25 | 28 | 2 | SM10 | |
| Kirkland_Main-1531 | Kirkland_Manholes-1156 | 108.19 | Kirkland_Manholes-1157 | 99.29 | 118.4 | 7.51 | 8 | PVC | 0.01 | 1,933 | 5 | 33 | 38 | 2 | SM10 | |
| Kirkland_Main-1532 | Kirkland_Manholes-1157 | 99.29 | Kirkland_Manholes-1159 | 82.66 | 203.9 | 8.16 | 8 | PVC | 0.01 | 2,014 | 10 | 66 | 76 | 3.8 | SM10 | |
| Kirkland_Main-1533 | Kirkland_Manholes-1159 | 82.66 | Kirkland_Manholes-1160 | 77.11 | 29.4 | 18.89 | 8 | PVC | 0.01 | 3,064 | 11 | 74 | 85 | 2.8 | | |
| Kirkland_Main-1534 | Kirkland_Manholes-1158 | 124.93 | Kirkland_Manholes-1157 | 99.29 | 160.8 | 15.95 | 8 | PVC | 0.01 | 2,816 | 4 | 25 | 29 | 1 | SM10 | |
| Kirkland_Main-1535 | Kirkland_Manholes-1162 | 78.51 | Kirkland_Manholes-1160 | 77.11 | 390.4 | 0.36 | 15 | PVC | 0.01 | 2,257 | 79 | 420 | 849 | 37.6 | | |
| Kirkland_Main-1536 | Kirkland_Manholes-1179 | 123.76 | Kirkland_Manholes-1163 | 96.51 | 315 | 8.65 | 8 | PVC | 0.01 | 2,074 | 46 | 165 | 210 | 10.1 | SM10 | |
| Kirkland_Main-1537 | Kirkland_Manholes-1163 | 96.51 | Kirkland_Manholes-1161 | 78.67 | 122.8 | 14.53 | 8 | PVC | 0.01 | 2,687 | 53 | 222 | 276 | 10.3 | SM14-Ex-EX77 | |
| Kirkland_Main-1538 | Kirkland_Manholes-1164 | 119.66 | Kirkland_Manholes-1163 | 96.51 | 338.6 | 6.84 | 8 | PVC | 0.01 | 1,844 | 7 | 49 | 56 | 3.1 | SM10 | |
| Kirkland_Main-1539 | Kirkland_Manholes-1165 | 133.24 | Kirkland_Manholes-1164 | 119.66 | 224 | 6.06 | 8 | PVC | 0.01 | 1,736 | 6 | 41 | 47 | 2.7 | SM10 | |
| Kirkland_Main-1540 | Kirkland_Manholes-1166 | 151.97 | Kirkland_Manholes-1165 | 133.24 | 158.7 | 11.8 | 8 | PVC | 0.01 | 2,422 | 1 | 8 | 9 | 0.4 | SM10 | |
| Kirkland_Main-1541 | Kirkland_Manholes-1167 | 140.51 | Kirkland_Manholes-1165 | 133.24 | 127.8 | 5.69 | 8 | PVC | 0.01 | 1,681 | 5 | 25 | 30 | 1.8 | SM10 | |
| Kirkland_Main-1542 | Kirkland_Manholes-1168 | 149.52 | Kirkland_Manholes-1167 | 140.51 | 328.4 | 2.74 | 8 | PVC | 0.01 | 1,168 | 4 | 16 | 20 | 1.7 | SM10 | |
| Kirkland_Main-1543 | Kirkland_Manholes-1169 | 156.83 | Kirkland_Manholes-1168 | 149.52 | 316.3 | 2.31 | 8 | PVC | 0.01 | 1,072 | 1 | 8 | 10 | 0.9 | SM10 | |
| Kirkland_Main-1544 | Kirkland_Manholes-662 | 248.07 | Kirkland_Manholes-651 | 247.63 | 225.4 | 0.2 | 15 | PVC | 0.01 | 1,665 | 279 | 1,038 | 1,317 | 79.1 | SM14-2035-DF9 | |
| Kirkland_Main-1545 | Kirkland_Manholes-653 | 238.2 | Kirkland_Manholes-639 | 237.89 | 305.4 | 0.1 | 21 | PVC | 0.01 | 2,946 | 238 | 488 | 726 | 24.7 | | |
| Kirkland_Main-1546 | Kirkland_Manholes-654 | 239.59 | Kirkland_Manholes-653 | 238.2 | 298.1 | 0.47 | 21 | PVC | 0.01 | 6,313 | 237 | 484 | 722 | 11.4 | | |
| Kirkland_Main-1547 | Kirkland_Manholes-655 | 240 | Kirkland_Manholes-654 | 239.59 | 255.9 | 0.16 | 21 | PVC | 0.01 | 3,700 | 237 | 480 | 717 | 19.4 | | Drop Connection |
| Kirkland_Main-1548 | Kirkland_Manholes-1574 | 241.8 | Kirkland_Manholes-657 | 241.69 | 265.5 | 0.04 | 21 | PVC | 0.01 | 1,882 | 235 | 468 | 703 | 37.4 | | |
| Kirkland_Main-1549 | Kirkland_Manholes-657 | 241.69 | Kirkland_Manholes-656 | 240.1 | 132.5 | 1.2 | 21 | PVC | 0.01 | 10,129 | 235 | 472 | 707 | 7 | | |
| Kirkland_Main-1550 | Kirkland_Manholes-656 | 240.1 | Kirkland_Manholes-655 | 240 | 131.8 | 0.08 | 21 | PVC | 0.01 | 2,546 | 235 | 476 | 711 | 27.9 | | Drop Connection |
| Kirkland_Main-1551 | Kirkland_Manholes-658 | 246.8 | Kirkland_Manholes-659 | 246.11 | 66.6 | 1.04 | 8 | PVC | 0.01 | 718 | 1 | 12 | 13 | 1.8 | | |
| Kirkland_Main-1552 | Kirkland_Manholes-660 | 246.84 | Kirkland_Manholes-659 | 246.11 | 57.6 | 1.27 | 8 | PVC | 0.01 | 793 | 3 | 4 | 7 | 0.8 | | |
| Kirkland_Main-1553 | Kirkland_Manholes-659 | 246.11 | Kirkland_Manholes-661 | 245.17 | 89.4 | 1.05 | 8 | PVC | 0.01 | 723 | 3 | 20 | 24 | 3.3 | | |
| Kirkland_Main-1554 | Kirkland_Manholes-651 | 247.63 | Kirkland_Manholes-645 | 243.42 | 262.6 | 1.6 | 15 | PVC | 0.01 | 4,772 | 281 | 1,042 | 1,322 | 27.7 | SM14-2035-DF9 | |
| Kirkland_Main-1555 | Kirkland_Manholes-652 | 251.94 | Kirkland_Manholes-662 | 248.07 | 324.4 | 1.19 | 15 | PVC | 0.01 | 4,116 | 279 | 1,034 | 1,313 | 31.9 | SM14-2035-DF9 | |
| Kirkland_Main-1556 | Kirkland_Manholes-664 | 268.55 | Kirkland_Manholes-663 | 252.67 | 383.8 | 4.14 | 8 | PVC | 0.01 | 1,434 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1557 | Kirkland_Manholes-663 | 252.67 | Kirkland_Manholes-652 | 251.94 | 362.7 | 0.2 | 15 | PVC | 0.01 | 1,691 | 279 | 1,029 | 1,308 | 77.4 | SM14-2035-DF9 | |
| Kirkland_Main-1558 | Kirkland_Manholes-666 | 254.95 | Kirkland_Manholes-665 | 253.2 | 321.8 | 0.54 | 15 | PVC | 0.01 | 2,780 | 250 | 920 | 1,169 | 42.1 | | |
| Kirkland_Main-1559 | Kirkland_Manholes-665 | 253.2 | Kirkland_Manholes-663 | 252.67 | 360.1 | 0.15 | 18 | PVC | 0.01 | 2,351 | 275 | 1,021 | 1,297 | 55.1 | SM14-Ex-EX135 | |
| Kirkland_Main-1560 | Kirkland_Manholes-668 | 260.28 | Kirkland_Manholes-667 | 256.8 | 251.1 | 1.39 | 8 | PVC | 0.01 | 830 | 4 | 4 | 8 | 1 | | |
| Kirkland_Main-1561 | Kirkland_Manholes-667 | 256.8 | Kirkland_Manholes-665 | 253.2 | 386.9 | 0.93 | 8 | PVC | 0.01 | 680 | 24 | 98 | 121 | 17.8 | | |
| Kirkland_Main-1562 | Kirkland_Manholes-669 | 262.97 | Kirkland_Manholes-667 | 256.8 | 300.6 | 2.05 | 8 | PVC | 0.01 | 1,010 | 18 | 90 | 107 | 10.6 | | |
| Kirkland_Main-1563 | Kirkland_Manholes-671 | 267.47 | Kirkland_Manholes-670 | 264.24 | 114.1 | 2.83 | 8 | PVC | 0.01 | 1,186 | 8 | 24 | 32 | 2.7 | | |
| Kirkland_Main-1564 | Kirkland_Manholes-672 | 266.2 | Kirkland_Manholes-670 | 264.24 | 209.3 | 0.94 | 8 | PVC | 0.01 | 682 | 9 | 57 | 66 | 9.7 | | |
| Kirkland_Main-1565 | Kirkland_Manholes-670 | 264.24 | Kirkland_Manholes-669 | 262.97 | 88.5 | 1.43 | 8 | PVC | 0.01 | 844 | 17 | 85 | 102 | 12.1 | | |
| Kirkland_Main-1567 | Kirkland_Manholes-676 | 280.09 | Kirkland_Manholes-674 | 276.15 | 217.6 | 1.81 | 8 | PVC | 0.01 | 949 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-1568 | Kirkland_Manholes-674 | 276.15 | Kirkland_Manholes-675 | 275.52 | 20.5 | 3.07 | 8 | PVC | 0.01 | 1,235 | 6 | 16 | 22 | 1.8 | | |
| Kirkland_Main-1569 | Kirkland_Manholes-673 | 281.46 | Kirkland_Manholes-674 | 276.15 | 196.8 | 2.7 | 8 | PVC | 0.01 | 1,158 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-1570 | Kirkland_Manholes-675 | 275.52 | Kirkland_Manholes-671 | 267.47 | 256.7 | 3.14 | 8 | PVC | 0.01 | 1,249 | 6 | 20 | 27 | 2.1 | | |
| Kirkland_Main-1571 | Kirkland_Manholes-677 | 287.02 | Kirkland_Manholes-673 | 281.46 | 185.8 | 2.99 | 8 | PVC | 0.01 | 1,220 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1572 | Kirkland_Manholes-1728 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 120.1 | 0.95 | 12 | PVC | 0.01 | 2,026 | 93 | 58 | 151 | 7.4 | | |
| Kirkland_Main-1573 | Kirkland_Manholes-1727 | 26.48 | Kirkland_Manholes-1728 | 26.2 | 59.2 | 0.47 | 8 | PVC | 0.01 | 485 | 59 | 33 | 92 | 18.9 | | |
| Kirkland_Main-1574 | Kirkland_Manholes-1724 | 26.68 | Kirkland_Manholes-1727 | 26.48 | 122.2 | 0.16 | 8 | PVC | 0.01 | 285 | 59 | 25 | 83 | 29.3 | | |
| Kirkland_Main-1575 | Kirkland_Manholes-1725 | 28.56 | Kirkland_Manholes-1724 | 26.68 | 150.5 | 1.25 | 8 | PVC | 0.01 | 788 | 39 | 16 | 56 | 7.1 | | |
| Kirkland_Main-1576 | Kirkland_Manholes-1726 | 29.93 | Kirkland_Manholes-1725 | 28.56 | 57.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 23 | 8 | 31 | 2.9 | | |
| Kirkland_Main-1577 | Kirkland_Manholes-1650 | 145.43 | Kirkland_Manholes-1711 | 136.47 | 206.1 | 4.35 | 12 | PVC | 0.01 | 4,335 | 10 | 66 | 76 | 1.8 | SM14-Ex-EX196 | |
| Kirkland_Main-1578 | Kirkland_Manholes-1751 | 37.07 | Kirkland_Manholes-1750 | 33.34 | 26 | 14.35 | 8 | PVC | 0.01 | 2,670 | 0 | 8 | 8 | 0.3 | SM14-Ex-EX164 | |
| Kirkland_Main-1580 | Kirkland_Manholes-2722 | 21 | Kirkland_Manholes-3100 | 18.3 | 194.6 | 1.39 | 12 | PVC | 0.01 | 2,449 | 100 | 61 | 161 | 6.6 | SM14-Ex-EX289 | |
| Kirkland_Main-1585 | Kirkland_Manholes-1750 | 33.34 | Kirkland_Manholes-1749 | 32.74 | 150.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 18 | 4 | | Drop Connection |
| Kirkland_Main-1586 | Kirkland_Manholes-1749 | 30.51 | Kirkland_Manholes-1745 | 27.57 | 191.8 | 1.53 | 8 | PVC | 0.01 | 873 | 2 | 25 | 26 | 3 | | |
| Kirkland_Main-1587 | Kirkland_Manholes-1744 | 27.68 | Kirkland_Manholes-1745 | 27.57 | 23.9 | 0.46 | 8 | PVC | 0.01 | 479 | 0 | 8 | 8 | 1.7 | | |
| Kirkland_Main-1588 | Kirkland_Manholes-1955 | 335.45 | Kirkland_Manholes-1958 | 324.88 | 118.1 | 8.95 | 8 | PVC | 0.01 | 2,109 | 10 | 12 | 22 | 1 | | |
| Kirkland_Main-1589 | Kirkland_Manholes-1958 | 324.88 | Kirkland_Manholes-1939 | 324.34 | 135.7 | 0.4 | 8 | PVC | 0.01 | 446 | 10 | 20 | 30 | 6.7 | | |
| Kirkland_Main-1590 | Kirkland_Manholes-1959 | 325.55 | Kirkland_Manholes-1958 | 324.88 | 167.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Kirkland_Main-1591 | Kirkland_Manholes-1960 | 312.18 | Kirkland_Manholes-1892 | 301.26 | 279 | 3.91 | 8 | PVC | 0.01 | 1,395 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-1592 | Kirkland_Manholes-1962 | 345.61 | Kirkland_Manholes-1961 | 341.24 | 157.8 | 2.77 | 8 | PVC | 0.01 | 1,173 | 15 | 4 | 19 | 1.6 | | |
| Kirkland_Main-1593 | Kirkland_Manholes-1961 | 341.24 | Kirkland_Manholes-1964 | 341.08 | 188.7 | 0.08 | 8 | PVC | 0.01 | 205 | 28 | 65 | 93 | 45.3 | | |
| Kirkland_Main-1594 | Kirkland_Manholes-1964 | 341.08 | Kirkland_Manholes-1963 | 340.77 | 13.1 | 2.37 | 8 | PVC | 0.01 | 1,085 | 61 | 94 | 155 | 14.2 | | |
| Kirkland_Main-1595 | Kirkland_Manholes-1965 | 345.05 | Kirkland_Manholes-1964 | 341.08 | 103.3 | 3.84 | 8 | PVC | 0.01 | 1,382 | 33 | 24 | 58 | 4.2 | | |
| Kirkland_Main-1596 | Kirkland_Manholes-1967 | 421.47 | Kirkland_Manholes-1966 | 418.21 | 134.2 | 2.43 | 8 | PVC | 0.01 | 1,099 | 35 | 159 | 194 | 17.6 | SM14-Ex-EX216 | |
| Kirkland_Main-1597 | Kirkland_Manholes-1968 | 421.67 | Kirkland_Manholes-1967 | 421.47 | 23.9 | 0.84 | 8 | PVC | 0.01 | 646 | 34 | 155 | 189 | 29.2 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1598 | Kirkland_Manholes-1969 | 423.5 | Kirkland_Manholes-1968 | 421.67 | 353.5 | 0.52 | 8 | PVC | 0.01 | 507 | 32 | 151 | 183 | 36 | | |
| Kirkland_Main-1599 | Kirkland_Manholes-1970 | 425.5 | Kirkland_Manholes-1969 | 423.5 | 200.6 | 1 | 8 | PVC | 0.01 | 704 | 4 | 16 | 20 | 2.9 | | |
| Kirkland_Main-1600 | Kirkland_Manholes-1974 | 432 | Kirkland_Manholes-1969 | 423.5 | 272.7 | 3.12 | 8 | PVC | 0.01 | 1,245 | 27 | 130 | 158 | 12.7 | | |
| Kirkland_Main-1601 | Kirkland_Manholes-1971 | 425.8 | Kirkland_Manholes-1970 | 425.5 | 74.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.4 | | |
| Kirkland_Main-1602 | Kirkland_Manholes-1972 | 426.31 | Kirkland_Manholes-1971 | 425.8 | 127.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.3 | | |
| Kirkland_Main-1603 | Kirkland_Manholes-1973 | 430.86 | Kirkland_Manholes-1972 | 426.31 | 87.6 | 5.19 | 8 | PVC | 0.01 | 1,607 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1604 | Kirkland_Manholes-2631 | 265.77 | Kirkland_Manholes-2630 | 232.51 | 349 | 9.53 | 8 | PVC | 0.01 | 2,176 | 6 | 16 | 23 | 1 | SM14-Ex-EX295 | |
| Kirkland_Main-1605 | Kirkland_Manholes-2632 | 276.84 | Kirkland_Manholes-2631 | 265.77 | 241.2 | 4.59 | 8 | PVC | 0.01 | 1,510 | 4 | 12 | 16 | 1.1 | SM14-Ex-EX295 | |
| Kirkland_Main-1606 | Kirkland_Manholes-2649 | 147.51 | Kirkland_Manholes-2648 | 144.73 | 165.5 | 1.68 | 8 | PVC | 0.01 | 914 | 2 | 12 | 15 | 1.6 | | |
| Kirkland_Main-1607 | Kirkland_Manholes-2648 | 144.73 | Kirkland_Manholes-2647 | 132.46 | 109.5 | 11.21 | 8 | PVC | 0.01 | 2,360 | 4 | 18 | 22 | 0.9 | | |
| Kirkland_Main-1608 | Kirkland_Manholes-2647 | 132.46 | Kirkland_Manholes-2646 | 96.97 | 134.3 | 26.42 | 8 | PVC | 0.01 | 3,624 | 4 | 24 | 29 | 0.8 | | |
| Kirkland_Main-1609 | Kirkland_Manholes-2646 | 96.97 | Kirkland_Manholes-2645 | 79.04 | 111.3 | 16.11 | 8 | PVC | 0.01 | 2,830 | 7 | 31 | 37 | 1.3 | | |
| Kirkland_Main-1610 | Kirkland_Manholes-2650 | 148.19 | Kirkland_Manholes-2649 | 147.51 | 170.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 6 | 7 | 1.6 | | |
| Kirkland_Main-1611 | Kirkland_Manholes-2651 | 121.43 | Kirkland_Manholes-2652 | 57.18 | 251.5 | 25.55 | 8 | PVC | 0.01 | 3,564 | 2 | 6 | 8 | 0.2 | SM14-Ex-EX292 | |
| Kirkland_Main-1612 | Kirkland_Manholes-2654 | 54.76 | Kirkland_Manholes-2657 | 43.64 | 394.5 | 2.82 | 8 | PVC | 0.01 | 1,184 | 4 | 24 | 28 | 2.4 | SM14-Ex-EX291 | |
| Kirkland_Main-1613 | Kirkland_Manholes-2653 | 56.99 | Kirkland_Manholes-2654 | 54.76 | 13.8 | 16.21 | 8 | PVC | 0.01 | 2,839 | 4 | 18 | 22 | 0.8 | SM14-Ex-EX292 | |
| Kirkland_Main-1614 | Kirkland_Manholes-2652 | 57.18 | Kirkland_Manholes-2653 | 56.99 | 47.7 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 12 | 16 | 3.5 | SM14-Ex-EX292 | |
| Kirkland_Main-1615 | Kirkland_Manholes-2657 | 43.64 | Kirkland_Manholes-2656 | 33.93 | 250 | 3.88 | 8 | PVC | 0.01 | 1,389 | 5 | 31 | 35 | 2.5 | SM14-Ex-EX291 | |
| Kirkland_Main-1616 | Kirkland_Manholes-2655 | 44.22 | Kirkland_Manholes-2656 | 33.93 | 73.2 | 14.06 | 8 | PVC | 0.01 | 2,644 | 14 | 79 | 94 | 3.6 | SM14-Ex-EX293 | |
| Kirkland_Main-1617 | Kirkland_Manholes-2656 | 33.93 | Kirkland_Manholes-2658 | 29.62 | 118.6 | 3.63 | 8 | PVC | 0.01 | 1,344 | 19 | 116 | 135 | 10.1 | SM14-Ex-EX291 | |
| Kirkland_Main-1618 | Kirkland_Manholes-2658 | 29.62 | Kirkland_Manholes-2659 | 28.05 | 312.8 | 0.5 | 8 | PVC | 0.01 | 500 | 20 | 122 | 142 | 28.4 | SM14-Ex-EX291 | |
| Kirkland_Main-1619 | Kirkland_Manholes-2659 | 28.05 | Kirkland_Manholes-2660 | 26.87 | 281 | 0.42 | 8 | PVC | 0.01 | 457 | 21 | 128 | 149 | 32.7 | SM14-Ex-EX291 | |
| Kirkland_Main-1624 | Kirkland_Manholes-2726 | 12.39 | Kirkland_Manholes-2662 | 11.52 | 172.8 | 0.5 | 18 | PVC | 0.01 | 4,349 | 259 | 599 | 858 | 19.7 | SM14-Ex-EX289 | |
| Kirkland_Main-1625 | Kirkland_Manholes-2666 | 55.28 | Kirkland_Manholes-2667 | 55.1 | 203.4 | 0.09 | 18 | PVC | 0.01 | 1,823 | 123 | 324 | 447 | 24.5 | SM14-Ex-EX222 | |
| Kirkland_Main-1626 | Kirkland_Manholes-2667 | 55.1 | Kirkland_Manholes-2665 | 53.92 | 196.9 | 0.6 | 18 | PVC | 0.01 | 4,744 | 123 | 330 | 453 | 9.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1627 | Kirkland_Manholes-2665 | 53.92 | Kirkland_Manholes-3102 | 53.77 | 398.5 | 0.04 | 18 | PVC | 0.01 | 1,189 | 123 | 336 | 459 | 38.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1629 | Kirkland_Manholes-2203 | 62.94 | Kirkland_Manholes-3102 | 53.77 | 55.2 | 16.62 | 8 | PVC | 0.01 | 2,874 | 14 | 61 | 75 | 2.6 | SM14-Ex-EX290 | |
| Kirkland_Main-1633 | Kirkland_Manholes-3101 | 52.44 | Kirkland_Manholes-2663 | 50.64 | 51.5 | 3.5 | 18 | PVC | 0.01 | 11,462 | 140 | 434 | 574 | 5 | SM14-Ex-EX222 | |
| Kirkland_Main-1634 | Kirkland_Manholes-250 | 115.74 | Kirkland_Manholes-268 | 108.82 | 144.1 | 4.8 | 8 | PVC | 0.01 | 1,545 | 4 | 17 | 21 | 1.4 | SM10 | |
| Kirkland_Main-1635 | Kirkland_Manholes-309 | 140.9 | Kirkland_Manholes-308 | 114.39 | 431.7 | 6.14 | 8 | PVC | 0.01 | 1,747 | 3 | 9 | 12 | 0.7 | SM10 | |
| Kirkland_Main-1636 | Kirkland_Manholes-308 | 114.39 | Kirkland_Manholes-307 | 105.6 | 319 | 2.76 | 8 | PVC | 0.01 | 1,170 | 7 | 27 | 34 | 2.9 | SM10 | |
| Kirkland_Main-1637 | Kirkland_Manholes-494 | 135.66 | Kirkland_Manholes-307 | 105.6 | 436.1 | 6.89 | 8 | PVC | 0.01 | 1,851 | 3 | 9 | 12 | 0.7 | SM10 | |
| Kirkland_Main-1638 | Kirkland_Manholes-241 | 14.7 | Kirkland_Manholes-2765 | 13.19 | 59.4 | 2.54 | 18 | PVC | 0.01 | 9,768 | 395 | 1,138 | 1,533 | 15.7 | SM3 | |
| Kirkland_Main-1639 | Kirkland_Manholes-240 | 17.1 | Kirkland_Manholes-2765 | 13.19 | 342.3 | 1.14 | 12 | PVC | 0.01 | 2,222 | 159 | 426 | 886 | 39.9 | SM14-Ex-EX42 | |
| Kirkland_Main-1640 | Kirkland_Manholes-239 | 27.77 | Kirkland_Manholes-240 | 17.1 | 321.9 | 3.31 | 12 | PVC | 0.01 | 3,784 | 159 | 422 | 881 | 23.3 | SM14-Ex-EX42 | |
| Kirkland_Main-1641 | Kirkland_Manholes-243 | 37.12 | Kirkland_Manholes-239 | 27.77 | 158.7 | 5.89 | 12 | PVC | 0.01 | 5,046 | 157 | 413 | 871 | 17.3 | SM14-Ex-EX38 | |
| Kirkland_Main-1642 | Kirkland_Manholes-244 | 47.57 | Kirkland_Manholes-243 | 46.95 | 154.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 155 | 409 | 865 | 65.8 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-1643 | Kirkland_Manholes-246 | 58 | Kirkland_Manholes-244 | 47.57 | 272.3 | 3.83 | 8 | PVC | 0.01 | 1,380 | 155 | 404 | 860 | 62.4 | SM14-Ex-EX38 | |
| Kirkland_Main-1645 | Kirkland_Manholes-901 | 304.32 | Kirkland_Manholes-900 | 302.97 | 52 | 2.59 | 8 | PVC | 0.01 | 1,135 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1646 | Kirkland_Manholes-902 | 304.94 | Kirkland_Manholes-900 | 302.97 | 236.8 | 0.83 | 8 | PVC | 0.01 | 643 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1647 | Kirkland_Manholes-900 | 302.97 | Kirkland_Manholes-904 | 289.03 | 425.5 | 3.28 | 8 | PVC | 0.01 | 1,276 | 6 | 24 | 30 | 2.3 | | |
| Kirkland_Main-1648 | Kirkland_Manholes-903 | 290.15 | Kirkland_Manholes-904 | 289.03 | 62.2 | 1.8 | 8 | PVC | 0.01 | 946 | 14 | 61 | 75 | 7.9 | | |
| Kirkland_Main-1649 | Kirkland_Manholes-904 | 289.03 | Kirkland_Manholes-905 | 283.61 | 138.2 | 3.92 | 8 | PVC | 0.01 | 1,396 | 19 | 90 | 109 | 7.8 | | |
| Kirkland_Main-1650 | Kirkland_Manholes-905 | 283.61 | Kirkland_Manholes-912 | 277.93 | 121.5 | 4.68 | 8 | PVC | 0.01 | 1,525 | 20 | 94 | 113 | 7.4 | | |
| Kirkland_Main-1651 | Kirkland_Manholes-906 | 293.01 | Kirkland_Manholes-907 | 291.52 | 150.3 | 0.99 | 8 | PVC | 0.01 | 702 | 6 | 41 | 46 | 6.6 | | |
| Kirkland_Main-1652 | Kirkland_Manholes-907 | 291.52 | Kirkland_Manholes-908 | 290.53 | 109.9 | 0.9 | 8 | PVC | 0.01 | 669 | 7 | 45 | 51 | 7.7 | | |
| Kirkland_Main-1653 | Kirkland_Manholes-908 | 290.53 | Kirkland_Manholes-903 | 290.15 | 324 | 0.12 | 8 | PVC | 0.01 | 241 | 12 | 57 | 69 | 28.5 | | |
| Kirkland_Main-1654 | Kirkland_Manholes-910 | 293.95 | Kirkland_Manholes-908 | 290.53 | 193.3 | 1.77 | 8 | PVC | 0.01 | 938 | 5 | 8 | 13 | 1.4 | | |
| Kirkland_Main-1655 | Kirkland_Manholes-909 | 297.88 | Kirkland_Manholes-910 | 293.95 | 188.4 | 2.09 | 8 | PVC | 0.01 | 1,018 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-1656 | Kirkland_Manholes-911 | 279.8 | Kirkland_Manholes-912 | 277.93 | 207.2 | 0.9 | 8 | PVC | 0.01 | 670 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1657 | Kirkland_Manholes-912 | 277.93 | Kirkland_Manholes-913 | 274.64 | 100.2 | 3.28 | 8 | PVC | 0.01 | 1,277 | 23 | 102 | 125 | 9.8 | | |
| Kirkland_Main-1658 | Kirkland_Manholes-913 | 274.64 | Kirkland_Manholes-917 | 265.16 | 288.9 | 3.28 | 8 | PVC | 0.01 | 1,277 | 24 | 106 | 130 | 10.2 | | |
| Kirkland_Main-1659 | Kirkland_Manholes-890 | 280.21 | Kirkland_Manholes-914 | 274.6 | 210.2 | 2.67 | 8 | PVC | 0.01 | 1,152 | 32 | 118 | 150 | 13 | | |
| Kirkland_Main-1660 | Kirkland_Manholes-914 | 274.6 | Kirkland_Manholes-915 | 272.06 | 86.6 | 2.93 | 8 | PVC | 0.01 | 1,207 | 35 | 130 | 166 | 13.7 | | |
| Kirkland_Main-1661 | Kirkland_Manholes-915 | 272.06 | Kirkland_Manholes-916 | 270.65 | 45.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 36 | 134 | 170 | 13.8 | | |
| Kirkland_Main-1662 | Kirkland_Manholes-627 | 275.98 | Kirkland_Manholes-914 | 274.6 | 212.1 | 0.65 | 8 | PVC | 0.01 | 569 | 3 | 8 | 11 | 1.9 | | |
| Kirkland_Main-1663 | Kirkland_Manholes-916 | 270.65 | Kirkland_Manholes-917 | 265.16 | 154.3 | 3.56 | 8 | PVC | 0.01 | 1,330 | 36 | 138 | 175 | 13.1 | | |
| Kirkland_Main-1664 | Kirkland_Manholes-917 | 265.16 | Kirkland_Manholes-918 | 264.4 | 332.4 | 0.23 | 12 | PVC | 0.01 | 994 | 62 | 252 | 314 | 31.6 | SM14-Ex-EX136 | |
| Kirkland_Main-1665 | Kirkland_Manholes-918 | 264.4 | Kirkland_Manholes-919 | 263.89 | 50.1 | 1.02 | 12 | PVC | 0.01 | 2,097 | 62 | 256 | 319 | 15.2 | SM14-Ex-EX136 | |
| Kirkland_Main-1666 | Kirkland_Manholes-919 | 263.89 | Kirkland_Manholes-920 | 263.16 | 175.4 | 0.42 | 12 | PVC | 0.01 | 1,341 | 63 | 260 | 323 | 24.1 | SM14-Ex-EX136 | |
| Kirkland_Main-1667 | Kirkland_Manholes-687 | 264 | Kirkland_Manholes-921 | 262.87 | 223.9 | 0.5 | 8 | PVC | 0.01 | 501 | 4 | 12 | 16 | 3.3 | | |
| Kirkland_Main-1668 | Kirkland_Manholes-920 | 263.16 | Kirkland_Manholes-921 | 262.87 | 116.1 | 0.25 | 12 | PVC | 0.01 | 1,039 | 64 | 264 | 328 | 31.6 | SM14-Ex-EX136 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1669 | Kirkland_Manholes-2064 | 426.84 | Kirkland_Manholes-2670 | 399.73 | 295.3 | 9.18 | 8 | PVC | 0.01 | 2,136 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1670 | Kirkland_Manholes-921 | 262.87 | Kirkland_Manholes-940 | 262.57 | 126.3 | 0.24 | 12 | PVC | 0.01 | 1,013 | 68 | 281 | 349 | 34.4 | SM14-Ex-EX136 | |
| Kirkland_Main-1671 | Kirkland_Manholes-940 | 262.57 | Kirkland_Manholes-939 | 261.56 | 302.2 | 0.33 | 12 | PVC | 0.01 | 1,200 | 72 | 285 | 357 | 29.7 | SM14-Ex-EX136 | |
| Kirkland_Main-1672 | Kirkland_Manholes-939 | 261.56 | Kirkland_Manholes-938 | 261.15 | 139.9 | 0.29 | 12 | PVC | 0.01 | 1,125 | 73 | 289 | 362 | 32.1 | SM14-Ex-EX136 | Drop Connection |
| Kirkland_Main-1673 | Kirkland_Manholes-925 | 289.69 | Kirkland_Manholes-924 | 268.15 | 361.6 | 5.96 | 8 | PVC | 0.01 | 1,721 | 16 | 61 | 77 | 4.5 | | |
| Kirkland_Main-1674 | Kirkland_Manholes-924 | 268.15 | Kirkland_Manholes-923 | 268.09 | 97.9 | 0.06 | 15 | PVC | 0.01 | 933 | 148 | 501 | 649 | 69.5 | SM14-Ex-EX138 | |
| Kirkland_Main-1675 | Kirkland_Manholes-922 | 269.99 | Kirkland_Manholes-923 | 268.09 | 235 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-1676 | Kirkland_Manholes-923 | 268.09 | Kirkland_Manholes-929 | 267.98 | 60 | 0.18 | 12 | PVC | 0.01 | 890 | 149 | 509 | 658 | 73.9 | SM14-2035-DF10 | |
| Kirkland_Main-1678 | Kirkland_Manholes-927 | 307.71 | Kirkland_Manholes-926 | 302.74 | 56.6 | 8.77 | 8 | PVC | 0.01 | 2,089 | 7 | 8 | 15 | 0.7 | | |
| Kirkland_Main-1679 | Kirkland_Manholes-926 | 302.74 | Kirkland_Manholes-925 | 289.69 | 296 | 4.41 | 8 | PVC | 0.01 | 1,481 | 15 | 57 | 72 | 4.8 | | |
| Kirkland_Main-1680 | Kirkland_Manholes-928 | 294.43 | Kirkland_Manholes-930 | 277.33 | 346.1 | 4.94 | 8 | PVC | 0.01 | 1,567 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-1681 | Kirkland_Manholes-930 | 277.33 | Kirkland_Manholes-929 | 267.98 | 33.8 | 27.65 | 8 | PVC | 0.01 | 3,707 | 4 | 8 | 12 | 0.3 | | |
| Kirkland_Main-1682 | Kirkland_Manholes-933 | 269.3 | Kirkland_Manholes-932 | 267 | 200 | 1.15 | 8 | PVC | 0.01 | 756 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1683 | Kirkland_Manholes-929 | 267.98 | Kirkland_Manholes-931 | 267.3 | 153.6 | 0.44 | 12 | PVC | 0.01 | 1,383 | 153 | 521 | 674 | 48.7 | | |
| Kirkland_Main-1684 | Kirkland_Manholes-931 | 267.3 | Kirkland_Manholes-932 | 267 | 103.9 | 0.29 | 12 | PVC | 0.01 | 1,117 | 154 | 525 | 678 | 60.7 | | |
| Kirkland_Main-1685 | Kirkland_Manholes-932 | 267 | Kirkland_Manholes-934 | 266.31 | 201.7 | 0.34 | 12 | PVC | 0.01 | 1,216 | 157 | 533 | 690 | 56.7 | | |
| Kirkland_Main-1686 | Kirkland_Manholes-950 | 293.99 | Kirkland_Manholes-934 | 266.31 | 270.7 | 10.22 | 8 | PVC | 0.01 | 2,254 | 7 | 33 | 40 | 1.8 | | |
| Kirkland_Main-1688 | Kirkland_Manholes-934 | 266.31 | Kirkland_Manholes-935 | 265.1 | 223.8 | 0.54 | 12 | PVC | 0.01 | 1,529 | 165 | 570 | 735 | 48.1 | | |
| Kirkland_Main-1689 | Kirkland_Manholes-937 | 264.43 | Kirkland_Manholes-938 | 264.12 | 49.3 | 0.62 | 12 | PVC | 0.01 | 1,641 | 174 | 623 | 797 | 48.6 | | Drop Connection |
| Kirkland_Main-1690 | Kirkland_Manholes-936 | 264.57 | Kirkland_Manholes-937 | 264.43 | 21.7 | 0.66 | 12 | PVC | 0.01 | 1,686 | 167 | 578 | 744 | 44.2 | | |
| Kirkland_Main-1691 | Kirkland_Manholes-935 | 265.1 | Kirkland_Manholes-936 | 264.57 | 71.3 | 0.74 | 12 | PVC | 0.01 | 1,788 | 167 | 574 | 740 | 41.4 | | |
| Kirkland_Main-1692 | Kirkland_Manholes-938 | 257.09 | Kirkland_Manholes-666 | 254.95 | 392.8 | 0.55 | 15 | PVC | 0.01 | 2,784 | 248 | 916 | 1,163 | 41.8 | | |
| Kirkland_Main-1693 | Kirkland_Manholes-941 | 287.52 | Kirkland_Manholes-937 | 264.43 | 281.4 | 8.21 | 8 | PVC | 0.01 | 2,020 | 7 | 41 | 48 | 2.4 | | |
| Kirkland_Main-1694 | Kirkland_Manholes-942 | 300.01 | Kirkland_Manholes-941 | 287.52 | 399.1 | 3.13 | 8 | PVC | 0.01 | 1,247 | 6 | 37 | 43 | 3.4 | | |
| Kirkland_Main-1695 | Kirkland_Manholes-943 | 306.11 | Kirkland_Manholes-944 | 304.9 | 190.1 | 0.64 | 8 | PVC | 0.01 | 563 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX137 | |
| Kirkland_Main-1696 | Kirkland_Manholes-946 | 335.98 | Kirkland_Manholes-945 | 330.63 | 152.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1697 | Kirkland_Manholes-945 | 330.63 | Kirkland_Manholes-944 | 304.9 | 238 | 10.81 | 8 | PVC | 0.01 | 2,318 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1698 | Kirkland_Manholes-947 | 299.2 | Kirkland_Manholes-948 | 296.38 | 132 | 2.14 | 8 | PVC | 0.01 | 1,031 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX137 | |
| Kirkland_Main-1699 | Kirkland_Manholes-944 | 304.9 | Kirkland_Manholes-948 | 296.38 | 218.3 | 3.9 | 8 | PVC | 0.01 | 1,393 | 4 | 16 | 20 | 1.4 | SM14-Ex-EX137 | |
| Kirkland_Main-1701 | Kirkland_Manholes-949 | 295.21 | Kirkland_Manholes-950 | 293.99 | 49 | 2.49 | 8 | PVC | 0.01 | 1,112 | 6 | 28 | 34 | 3.1 | | |
| Kirkland_Main-1702 | Kirkland_Manholes-948 | 296.38 | Kirkland_Manholes-949 | 295.21 | 143.9 | 0.81 | 8 | PVC | 0.01 | 636 | 5 | 24 | 30 | 4.7 | SM14-Ex-EX137 | |
| Kirkland_Main-1703 | Kirkland_Manholes-951 | 321.2 | Kirkland_Manholes-942 | 300.01 | 232.8 | 9.1 | 8 | PVC | 0.01 | 2,127 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-1704 | Kirkland_Manholes-952 | 325.62 | Kirkland_Manholes-951 | 321.2 | 323.7 | 1.37 | 8 | PVC | 0.01 | 824 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1705 | Kirkland_Manholes-953 | 318.51 | Kirkland_Manholes-954 | 318.45 | 75.8 | 0.08 | 8 | PVC | 0.01 | 198 | 1 | 4 | 5 | 2.5 | | |
| Kirkland_Main-1706 | Kirkland_Manholes-954 | 318.45 | Kirkland_Manholes-955 | 318.15 | 133.7 | 0.22 | 8 | PVC | 0.01 | 334 | 1 | 8 | 9 | 2.8 | | |
| Kirkland_Main-1707 | Kirkland_Manholes-1546 | 284.43 | Kirkland_Manholes-1545 | 272.4 | 160.7 | 7.49 | 8 | PVC | 0.01 | 1,929 | 9 | 41 | 50 | 2.6 | SM14-Ex-EX121 | |
| Kirkland_Main-1708 | Kirkland_Manholes-750 | 289.43 | Kirkland_Manholes-1546 | 284.43 | 152.8 | 3.27 | 8 | PVC | 0.01 | 1,275 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX121 | |
| Kirkland_Main-1709 | Kirkland_Manholes-1553 | 308.15 | Kirkland_Manholes-1546 | 284.43 | 340 | 6.98 | 8 | PVC | 0.01 | 1,862 | 6 | 28 | 35 | 1.9 | SM14-Ex-EX122 | |
| Kirkland_Main-1710 | Kirkland_Manholes-751 | 298.52 | Kirkland_Manholes-750 | 289.43 | 402.2 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX121 | |
| Kirkland_Main-1711 | Kirkland_Manholes-748 | 311.92 | Kirkland_Manholes-752 | 265.45 | 362.2 | 12.83 | 8 | PVC | 0.01 | 2,525 | 22 | 57 | 79 | 3.1 | SM14-Ex-EX71 | |
| Kirkland_Main-1712 | Kirkland_Manholes-753 | 247.15 | Kirkland_Manholes-754 | 246.56 | 209.3 | 0.28 | 8 | PVC | 0.01 | 374 | 2 | 4 | 7 | 1.7 | | |
| Kirkland_Main-1713 | Kirkland_Manholes-1355 | 420.81 | Kirkland_Manholes-1357 | 417.32 | 183.1 | 1.91 | 8 | PVC | 0.01 | 973 | 10 | 37 | 46 | 4.7 | | |
| Kirkland_Main-1714 | Kirkland_Manholes-1356 | 418.13 | Kirkland_Manholes-1357 | 417.32 | 41.8 | 1.94 | 8 | PVC | 0.01 | 981 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX180 | |
| Kirkland_Main-1715 | Kirkland_Manholes-1357 | 417.32 | Kirkland_Manholes-1358 | 410.38 | 295.5 | 2.35 | 8 | PVC | 0.01 | 1,080 | 12 | 45 | 57 | 5.3 | SM14-Ex-EX180 | |
| Kirkland_Main-1716 | Kirkland_Manholes-1358 | 410.38 | Kirkland_Manholes-1359 | 407.6 | 322.3 | 0.86 | 8 | PVC | 0.01 | 655 | 14 | 49 | 62 | 9.5 | SM14-Ex-EX180 | |
| Kirkland_Main-1717 | Kirkland_Manholes-1359 | 407.6 | Kirkland_Manholes-1364 | 404.91 | 317.2 | 0.85 | 8 | PVC | 0.01 | 649 | 16 | 53 | 69 | 10.6 | SM14-Ex-EX180 | |
| Kirkland_Main-1718 | Kirkland_Manholes-1360 | 392.45 | Kirkland_Manholes-1361 | 390.34 | 26.4 | 7.99 | 8 | PVC | 0.01 | 1,993 | 9 | 20 | 29 | 1.5 | SM14-Ex-EX179 | |
| Kirkland_Main-1719 | Kirkland_Manholes-1361 | 390.34 | Kirkland_Manholes-1371 | 389.7 | 160.2 | 0.4 | 8 | PVC | 0.01 | 446 | 26 | 81 | 108 | 24.1 | | Drop Connection |
| Kirkland_Main-1720 | Kirkland_Manholes-1365 | 376.9 | Kirkland_Manholes-1371 | 376.15 | 121.9 | 0.62 | 8 | PVC | 0.01 | 553 | 49 | 85 | 134 | 24.3 | | |
| Kirkland_Main-1721 | Kirkland_Manholes-1366 | 377.95 | Kirkland_Manholes-1365 | 376.9 | 166.8 | 0.63 | 8 | PVC | 0.01 | 559 | 49 | 81 | 130 | 23.3 | | |
| Kirkland_Main-1722 | Kirkland_Manholes-1364 | 404.91 | Kirkland_Manholes-1361 | 390.34 | 354.3 | 4.11 | 8 | PVC | 0.01 | 1,430 | 17 | 57 | 74 | 5.2 | SM14-Ex-EX180 | |
| Kirkland_Main-1723 | Kirkland_Manholes-1362 | 399.37 | Kirkland_Manholes-1360 | 392.45 | 312.9 | 2.21 | 8 | PVC | 0.01 | 1,049 | 5 | 16 | 22 | 2.1 | SM14-Ex-EX179 | |
| Kirkland_Main-1724 | Kirkland_Manholes-1363 | 403.55 | Kirkland_Manholes-1362 | 399.37 | 238 | 1.76 | 8 | PVC | 0.01 | 934 | 4 | 12 | 16 | 1.7 | SM14-Ex-EX179 | |
| Kirkland_Main-1726 | Kirkland_Manholes-1367 | 392.51 | Kirkland_Manholes-1906 | 388.2 | 267.7 | 1.61 | 8 | PVC | 0.01 | 895 | 8 | 4 | 12 | 1.4 | | |
| Kirkland_Main-1727 | Kirkland_Manholes-1368 | 393.26 | Kirkland_Manholes-1369 | 387.01 | 105.4 | 5.93 | 8 | PVC | 0.01 | 1,717 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX178 | |
| Kirkland_Main-1728 | Kirkland_Manholes-1369 | 387.01 | Kirkland_Manholes-1370 | 385.7 | 133.5 | 0.98 | 8 | PVC | 0.01 | 698 | 1 | 8 | 9 | 1.3 | SM14-Ex-EX178 | |
| Kirkland_Main-1729 | Kirkland_Manholes-1370 | 385.7 | Kirkland_Manholes-1371 | 376.15 | 179.2 | 5.33 | 8 | PVC | 0.01 | 1,628 | 1 | 12 | 13 | 0.8 | SM14-Ex-EX178 | |
| Kirkland_Main-1730 | Kirkland_Manholes-534 | 432.55 | Kirkland_Manholes-1372 | 427.9 | 355.1 | 1.31 | 8 | PVC | 0.01 | 807 | 61 | 142 | 203 | 25.2 | SM14-Ex-EX218 | |
| Kirkland_Main-1731 | Kirkland_Manholes-560 | 483.4 | Kirkland_Manholes-561 | 481.3 | 94.5 | 2.22 | 8 | PVC | 0.01 | 1,051 | 3 | 8 | 11 | 1.1 | | |
| Kirkland_Main-1733 | Kirkland_Manholes-561 | 481.3 | Kirkland_Manholes-1374 | 479.93 | 141.7 | 0.97 | 8 | PVC | 0.01 | 693 | 4 | 12 | 16 | 2.4 | | |
| Kirkland_Main-1734 | Kirkland_Manholes-1376 | 483.23 | Kirkland_Manholes-1375 | 479.6 | 272.8 | 1.33 | 8 | PVC | 0.01 | 813 | 3 | 4 | 7 | 0.8 | | |
| Kirkland_Main-1735 | Kirkland_Manholes-1375 | 479.6 | Kirkland_Manholes-1377 | 478.89 | 93.1 | 0.76 | 8 | PVC | 0.01 | 616 | 7 | 24 | 32 | 5.1 | | |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1736 | Kirkland_Manholes-1377 | 478.89 | Kirkland_Manholes-1378 | 472.9 | 259 | 2.31 | 8 | PVC | 0.01 | 1,072 | 9 | 28 | 37 | 3.5 | | |
| Kirkland_Main-1737 | Kirkland_Manholes-1378 | 472.9 | Kirkland_Manholes-1379 | 471.21 | 302 | 0.56 | 8 | PVC | 0.01 | 527 | 12 | 33 | 45 | 8.5 | | |
| Kirkland_Main-1738 | Kirkland_Manholes-1374 | 479.93 | Kirkland_Manholes-1375 | 479.6 | 219.3 | 0.15 | 8 | PVC | 0.01 | 274 | 4 | 16 | 21 | 7.5 | | |
| Kirkland_Main-1739 | Kirkland_Manholes-1379 | 471.21 | Kirkland_Manholes-564 | 469.28 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 13 | 37 | 50 | 8.4 | | |
| Kirkland_Main-1740 | Kirkland_Manholes-340 | 235.81 | Kirkland_Manholes-341 | 235.59 | 47.2 | 0.47 | 8 | PVC | 0.01 | 482 | 17 | 81 | 99 | 20.5 | | |
| Kirkland_Main-1741 | Kirkland_Manholes-341 | 235.59 | Kirkland_Manholes-342 | 234.97 | 31.7 | 1.95 | 8 | PVC | 0.01 | 986 | 23 | 130 | 154 | 15.6 | SM14-Ex-EX49 | |
| Kirkland_Main-1742 | Kirkland_Manholes-342 | 234.97 | Kirkland_Manholes-351 | 234.93 | 111.2 | 0.04 | 12 | PVC | 0.01 | 394 | 23 | 134 | 158 | 40 | SM14-Ex-EX49 | |
| Kirkland_Main-1743 | Kirkland_Manholes-345 | 279.43 | Kirkland_Manholes-344 | 279.2 | 57.3 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 8 | 13 | 2.9 | | |
| Kirkland_Main-1744 | Kirkland_Manholes-344 | 279.2 | Kirkland_Manholes-346 | 254.2 | 328.7 | 7.61 | 8 | PVC | 0.01 | 1,944 | 7 | 12 | 19 | 1 | | |
| Kirkland_Main-1745 | Kirkland_Manholes-346 | 254.2 | Kirkland_Manholes-347 | 250.02 | 240.3 | 1.74 | 8 | PVC | 0.01 | 930 | 8 | 16 | 24 | 2.6 | | |
| Kirkland_Main-1746 | Kirkland_Manholes-348 | 251.65 | Kirkland_Manholes-347 | 250.02 | 50.6 | 3.22 | 8 | PVC | 0.01 | 1,266 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1747 | Kirkland_Manholes-347 | 250.02 | Kirkland_Manholes-349 | 238.18 | 204.7 | 5.78 | 8 | PVC | 0.01 | 1,695 | 11 | 24 | 35 | 2.1 | | |
| Kirkland_Main-1748 | Kirkland_Manholes-349 | 238.18 | Kirkland_Manholes-350 | 235.63 | 111.7 | 2.28 | 8 | PVC | 0.01 | 1,065 | 12 | 28 | 40 | 3.8 | | |
| Kirkland_Main-1749 | Kirkland_Manholes-1666 | 89.71 | Kirkland_Manholes-1673 | 84.18 | 111.9 | 4.94 | 8 | PVC | 0.01 | 1,568 | 48 | 148 | 196 | 12.5 | | |
| Kirkland_Main-1750 | Kirkland_Manholes-1672 | 91.63 | Kirkland_Manholes-1666 | 89.71 | 163.9 | 1.17 | 8 | PVC | 0.01 | 763 | 1 | 8 | 9 | 1.2 | | |
| Kirkland_Main-1751 | Kirkland_Manholes-1671 | 101.9 | Kirkland_Manholes-1667 | 101.23 | 167.6 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 8 | 14 | 3.1 | | |
| Kirkland_Main-1752 | Kirkland_Manholes-1669 | 132.92 | Kirkland_Manholes-1668 | 119.52 | 315.3 | 4.25 | 8 | PVC | 0.01 | 1,454 | 4 | 8 | 12 | 0.8 | | |
| Kirkland_Main-1753 | Kirkland_Manholes-1670 | 121.1 | Kirkland_Manholes-1668 | 119.52 | 161.1 | 0.98 | 8 | PVC | 0.01 | 698 | 3 | 8 | 11 | 1.6 | | |
| Kirkland_Main-1754 | Kirkland_Manholes-1673 | 84.18 | Kirkland_Manholes-1674 | 78.95 | 158.5 | 3.3 | 8 | PVC | 0.01 | 1,281 | 48 | 157 | 204 | 16 | | |
| Kirkland_Main-1755 | Kirkland_Manholes-1677 | 88.12 | Kirkland_Manholes-1674 | 87.91 | 51.7 | 0.4 | 8 | PVC | 0.01 | 446 | 24 | 41 | 65 | 14.6 | | Drop Connection |
| Kirkland_Main-1756 | Kirkland_Manholes-1675 | 105.24 | Kirkland_Manholes-1676 | 98.96 | 116.6 | 5.39 | 8 | PVC | 0.01 | 1,636 | 4 | 8 | 12 | 0.7 | | |
| Kirkland_Main-1757 | Kirkland_Manholes-859 | 309.2 | Kirkland_Manholes-865 | 308.29 | 290.7 | 0.31 | 8 | PVC | 0.01 | 394 | 19 | 77 | 96 | 24.3 | SM14-Ex-EX51 | |
| Kirkland_Main-1758 | Kirkland_Manholes-860 | 317.71 | Kirkland_Manholes-859 | 309.2 | 202.9 | 4.19 | 8 | PVC | 0.01 | 1,444 | 15 | 69 | 84 | 5.8 | SM14-Ex-EX52 | |
| Kirkland_Main-1759 | Kirkland_Manholes-861 | 327.02 | Kirkland_Manholes-860 | 317.71 | 236.9 | 3.93 | 8 | PVC | 0.01 | 1,398 | 13 | 65 | 78 | 5.6 | SM14-Ex-EX52 | |
| Kirkland_Main-1760 | Kirkland_Manholes-856 | 333.21 | Kirkland_Manholes-861 | 327.02 | 162.2 | 3.82 | 8 | PVC | 0.01 | 1,377 | 11 | 61 | 72 | 5.2 | SM14-Ex-EX52 | |
| Kirkland_Main-1761 | Kirkland_Manholes-862 | 335.56 | Kirkland_Manholes-856 | 333.21 | 185.2 | 1.27 | 8 | PVC | 0.01 | 794 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX53 | |
| Kirkland_Main-1762 | Kirkland_Manholes-2254 | 240.28 | Kirkland_Manholes-2253 | 239.74 | 205.7 | 0.26 | 8 | PVC | 0.01 | 361 | 0 | 4 | 4 | 1.1 | SM14-Ex-EX247 | |
| Kirkland_Main-1763 | Kirkland_Manholes-863 | 341.24 | Kirkland_Manholes-864 | 334.74 | 171.5 | 3.79 | 8 | PVC | 0.01 | 1,373 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX50 | |
| Kirkland_Main-1764 | Kirkland_Manholes-864 | 334.74 | Kirkland_Manholes-865 | 308.29 | 391.4 | 6.76 | 8 | PVC | 0.01 | 1,833 | 3 | 8 | 12 | 0.6 | SM14-Ex-EX50 | |
| Kirkland_Main-1765 | Kirkland_Manholes-866 | 314.35 | Kirkland_Manholes-865 | 308.29 | 226.5 | 2.68 | 8 | PVC | 0.01 | 1,153 | 8 | 28 | 36 | 3.2 | SM14-Ex-EX35 | |
| Kirkland_Main-1766 | Kirkland_Manholes-865 | 308.29 | Kirkland_Manholes-392 | 305 | 233.2 | 1.41 | 8 | PVC | 0.01 | 837 | 32 | 118 | 150 | 17.9 | SM14-Ex-EX50 | |
| Kirkland_Main-1767 | Kirkland_Manholes-867 | 319 | Kirkland_Manholes-866 | 314.35 | 119.3 | 3.9 | 8 | PVC | 0.01 | 1,392 | 6 | 24 | 31 | 2.2 | SM14-Ex-EX35 | |
| Kirkland_Main-1768 | Kirkland_Manholes-868 | 321.84 | Kirkland_Manholes-867 | 319 | 90.7 | 3.13 | 8 | PVC | 0.01 | 1,247 | 6 | 20 | 26 | 2.1 | SM14-Ex-EX35 | |
| Kirkland_Main-1769 | Kirkland_Manholes-869 | 325.94 | Kirkland_Manholes-868 | 321.84 | 101.3 | 4.05 | 8 | PVC | 0.01 | 1,418 | 5 | 16 | 21 | 1.5 | SM14-Ex-EX35 | |
| Kirkland_Main-1770 | Kirkland_Manholes-870 | 327.4 | Kirkland_Manholes-869 | 325.94 | 99.3 | 1.47 | 8 | PVC | 0.01 | 855 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX35 | |
| Kirkland_Main-1771 | Kirkland_Manholes-871 | 340.54 | Kirkland_Manholes-872 | 339.98 | 74.2 | 0.75 | 8 | PVC | 0.01 | 612 | 1 | 4 | 5 | 0.8 | SM14-Ex-EX35 | |
| Kirkland_Main-1772 | Kirkland_Manholes-872 | 339.98 | Kirkland_Manholes-869 | 325.94 | 265.2 | 5.29 | 8 | PVC | 0.01 | 1,622 | 3 | 8 | 11 | 0.7 | SM14-Ex-EX35 | |
| Kirkland_Main-1773 | Kirkland_Manholes-874 | 310.68 | Kirkland_Manholes-382 | 308.23 | 108.1 | 2.27 | 8 | PVC | 0.01 | 1,062 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1774 | Kirkland_Manholes-875 | 310.4 | Kirkland_Manholes-1073 | 302.05 | 254.5 | 3.28 | 8 | PVC | 0.01 | 1,277 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-1775 | Kirkland_Manholes-2900 | 302.3 | Kirkland_Manholes-876 | 301.25 | 160.8 | 0.65 | 8 | PVC | 0.01 | 570 | 8 | 41 | 48 | 8.5 | | |
| Kirkland_Main-1776 | Kirkland_Manholes-876 | 301.25 | Kirkland_Manholes-337 | 291.09 | 336.8 | 3.02 | 8 | PVC | 0.01 | 1,225 | 10 | 61 | 71 | 5.8 | | |
| Kirkland_Main-1777 | Kirkland_Manholes-877 | 295.2 | Kirkland_Manholes-884 | 291.06 | 114.3 | 3.62 | 8 | PVC | 0.01 | 1,342 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1778 | Kirkland_Manholes-884 | 291.06 | Kirkland_Manholes-881 | 290.87 | 47 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 12 | 15 | 3.5 | | |
| Kirkland_Main-1779 | Kirkland_Manholes-705 | 293.8 | Kirkland_Manholes-884 | 291.06 | 213.2 | 1.29 | 8 | PVC | 0.01 | 800 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1780 | Kirkland_Manholes-881 | 290.87 | Kirkland_Manholes-885 | 286.75 | 194.6 | 2.12 | 8 | PVC | 0.01 | 1,026 | 14 | 61 | 75 | 7.3 | | |
| Kirkland_Main-1781 | Kirkland_Manholes-880 | 294.11 | Kirkland_Manholes-881 | 290.87 | 199.3 | 1.63 | 8 | PVC | 0.01 | 899 | 10 | 45 | 55 | 6.1 | | |
| Kirkland_Main-1782 | Kirkland_Manholes-879 | 310.92 | Kirkland_Manholes-880 | 294.11 | 360 | 4.67 | 8 | PVC | 0.01 | 1,524 | 9 | 41 | 49 | 3.2 | | |
| Kirkland_Main-1783 | Kirkland_Manholes-878 | 325.66 | Kirkland_Manholes-879 | 310.92 | 320.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 6 | 37 | 43 | 2.8 | | |
| Kirkland_Main-1784 | Kirkland_Manholes-886 | 291.6 | Kirkland_Manholes-885 | 286.75 | 178.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 4 | 12 | 16 | 1.4 | | |
| Kirkland_Main-1785 | Kirkland_Manholes-887 | 294.74 | Kirkland_Manholes-886 | 291.6 | 177.9 | 1.77 | 8 | PVC | 0.01 | 937 | 2 | 8 | 11 | 1.1 | | |
| Kirkland_Main-1786 | Kirkland_Manholes-888 | 307.6 | Kirkland_Manholes-887 | 294.74 | 260 | 4.95 | 8 | PVC | 0.01 | 1,568 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1788 | Kirkland_Manholes-885 | 286.75 | Kirkland_Manholes-889 | 285.3 | 34.9 | 4.16 | 8 | PVC | 0.01 | 1,437 | 18 | 77 | 95 | 6.6 | | |
| Kirkland_Main-1789 | Kirkland_Manholes-336 | 286.9 | Kirkland_Manholes-889 | 285.3 | 212.5 | 0.75 | 8 | PVC | 0.01 | 612 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1790 | Kirkland_Manholes-889 | 285.3 | Kirkland_Manholes-890 | 280.21 | 299.8 | 1.7 | 8 | PVC | 0.01 | 919 | 21 | 85 | 106 | 11.5 | | |
| Kirkland_Main-1791 | Kirkland_Manholes-891 | 282.85 | Kirkland_Manholes-890 | 280.21 | 269.2 | 0.98 | 8 | PVC | 0.01 | 698 | 10 | 28 | 39 | 5.5 | | |
| Kirkland_Main-1792 | Kirkland_Manholes-892 | 286 | Kirkland_Manholes-891 | 282.85 | 80.7 | 3.9 | 8 | PVC | 0.01 | 1,393 | 8 | 24 | 32 | 2.3 | | |
| Kirkland_Main-1793 | Kirkland_Manholes-895 | 303.91 | Kirkland_Manholes-896 | 303.5 | 71 | 0.58 | 8 | PVC | 0.01 | 536 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1794 | Kirkland_Manholes-896 | 303.5 | Kirkland_Manholes-893 | 293.25 | 259.5 | 3.95 | 8 | PVC | 0.01 | 1,401 | 3 | 12 | 15 | 1.1 | | |
| Kirkland_Main-1795 | Kirkland_Manholes-894 | 293.53 | Kirkland_Manholes-893 | 293.25 | 69.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-1796 | Kirkland_Manholes-893 | 293.25 | Kirkland_Manholes-892 | 286 | 208.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 6 | 20 | 26 | 2 | | |
| Kirkland_Main-1797 | Kirkland_Manholes-897 | 317.07 | Kirkland_Manholes-896 | 303.5 | 263.1 | 5.16 | 8 | PVC | 0.01 | 1,601 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1798 | Kirkland_Manholes-955 | 318.15 | Kirkland_Manholes-956 | 317.42 | 90.2 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 12 | 14 | 2.1 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1799 | Kirkland_Manholes-956 | 317.42 | Kirkland_Manholes-957 | 315.92 | 143.6 | 1.04 | 8 | PVC | 0.01 | 720 | 3 | 16 | 19 | 2.6 | | |
| Kirkland_Main-1800 | Kirkland_Manholes-1294 | 129.1 | Kirkland_Manholes-1295 | 119.7 | 303.2 | 3.1 | 8 | PVC | 0.01 | 1,242 | 4 | 8 | 12 | 1 | SM14-Ex-EX115 | |
| Kirkland_Main-1801 | Kirkland_Manholes-1296 | 129.32 | Kirkland_Manholes-1295 | 119.7 | 314.4 | 3.06 | 8 | PVC | 0.01 | 1,233 | 69 | 297 | 366 | 29.7 | SM6 | |
| Kirkland_Main-1802 | Kirkland_Manholes-1301 | 241.1 | Kirkland_Manholes-1300 | 221.25 | 201.1 | 9.87 | 8 | PVC | 0.01 | 2,215 | 4 | 16 | 20 | 0.9 | SM14-Ex-EX98 | |
| Kirkland_Main-1803 | Kirkland_Manholes-1299 | 227.62 | Kirkland_Manholes-1300 | 221.25 | 159.1 | 4 | 8 | PVC | 0.01 | 1,411 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX101 | |
| Kirkland_Main-1804 | Kirkland_Manholes-1300 | 221.25 | Kirkland_Manholes-1250 | 210.15 | 248.6 | 4.47 | 8 | PVC | 0.01 | 1,490 | 6 | 33 | 39 | 2.6 | SM14-Ex-EX101 | |
| Kirkland_Main-1805 | Kirkland_Manholes-1303 | 126.2 | Kirkland_Manholes-1295 | 119.7 | 386.9 | 1.68 | 8 | PVC | 0.01 | 914 | 3 | 8 | 12 | 1.3 | SM14-Ex-EX115 | |
| Kirkland_Main-1806 | Kirkland_Manholes-1304 | 180.12 | Kirkland_Manholes-1258 | 154.28 | 295.6 | 8.74 | 8 | PVC | 0.01 | 2,084 | 6 | 25 | 31 | 1.5 | SM14-Ex-EX106 | |
| Kirkland_Main-1807 | Kirkland_Manholes-1306 | 225.07 | Kirkland_Manholes-227 | 223.31 | 140.1 | 1.26 | 8 | PVC | 0.01 | 790 | 7 | 26 | 33 | 4.2 | | |
| Kirkland_Main-1808 | Kirkland_Manholes-1309 | 233.16 | Kirkland_Manholes-1308 | 229.72 | 344.3 | 1 | 8 | PVC | 0.01 | 705 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-1809 | Kirkland_Manholes-1308 | 229.72 | Kirkland_Manholes-1307 | 211.15 | 175.8 | 10.56 | 8 | PVC | 0.01 | 2,292 | 4 | 16 | 21 | 0.9 | | |
| Kirkland_Main-1810 | Kirkland_Manholes-1307 | 211.15 | Kirkland_Manholes-1252 | 181.71 | 226.9 | 12.97 | 8 | PVC | 0.01 | 2,540 | 8 | 25 | 32 | 1.3 | SM14-Ex-EX100 | |
| Kirkland_Main-1812 | Kirkland_Manholes-1275 | 185.58 | Kirkland_Manholes-1276 | 172.95 | 322.8 | 3.91 | 8 | PVC | 0.01 | 1,395 | 3 | 8 | 11 | 0.8 | | |
| Kirkland_Main-1813 | Kirkland_Manholes-1279 | 163.99 | Kirkland_Manholes-1278 | 160.09 | 249.2 | 1.56 | 8 | PVC | 0.01 | 882 | 5 | 25 | 30 | 3.4 | SM14-Ex-EX103 | |
| Kirkland_Main-1814 | Kirkland_Manholes-1597 | 180.84 | Kirkland_Manholes-1601 | 173.67 | 138.4 | 5.18 | 8 | PVC | 0.01 | 1,605 | 60 | 163 | 223 | 13.9 | SM14-Ex-EX121 | |
| Kirkland_Main-1815 | Kirkland_Manholes-1603 | 202.22 | Kirkland_Manholes-1602 | 196.74 | 63.2 | 8.68 | 8 | PVC | 0.01 | 2,077 | 73 | 232 | 305 | 14.7 | SM14-Ex-EX172 | |
| Kirkland_Main-1817 | Kirkland_Manholes-1570 | 121.83 | Kirkland_Manholes-1604 | 117.22 | 301 | 1.53 | 8 | PVC | 0.01 | 872 | 4 | 8 | 12 | 1.4 | SM14-Ex-EX120 | |
| Kirkland_Main-1818 | Kirkland_Manholes-1604 | 117.22 | Kirkland_Manholes-1608 | 108.38 | 320.2 | 2.76 | 8 | PVC | 0.01 | 1,171 | 8 | 49 | 57 | 4.9 | SM14-Ex-EX119 | |
| Kirkland_Main-1823 | Kirkland_Manholes-1607 | 115.82 | Kirkland_Manholes-1608 | 108.38 | 281.1 | 2.65 | 8 | PVC | 0.01 | 1,147 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-1824 | Kirkland_Manholes-1608 | 108.38 | Kirkland_Manholes-1609 | 99.56 | 224.5 | 3.93 | 8 | PVC | 0.01 | 1,397 | 10 | 66 | 76 | 5.4 | SM14-Ex-EX119 | |
| Kirkland_Main-1825 | Kirkland_Manholes-1609 | 99.56 | Kirkland_Manholes-1610 | 98.61 | 103.1 | 0.92 | 8 | PVC | 0.01 | 677 | 11 | 74 | 85 | 12.5 | SM14-Ex-EX119 | |
| Kirkland_Main-1826 | Kirkland_Manholes-1615 | 109.23 | Kirkland_Manholes-1610 | 98.61 | 252.9 | 4.2 | 8 | PVC | 0.01 | 1,445 | 4 | 16 | 20 | 1.4 | | |
| Kirkland_Main-1827 | Kirkland_Manholes-1610 | 98.61 | Kirkland_Manholes-1611 | 98.01 | 137.6 | 0.44 | 8 | PVC | 0.01 | 466 | 14 | 99 | 113 | 24.3 | SM14-Ex-EX160 | |
| Kirkland_Main-1828 | Kirkland_Manholes-1611 | 98.01 | Kirkland_Manholes-1614 | 91.09 | 116.4 | 5.94 | 8 | PVC | 0.01 | 1,719 | 14 | 107 | 121 | 7.1 | SM14-Ex-EX167 | |
| Kirkland_Main-1830 | Kirkland_Manholes-350 | 235.63 | Kirkland_Manholes-351 | 234.93 | 99 | 0.71 | 8 | PVC | 0.01 | 593 | 14 | 33 | 46 | 7.8 | | |
| Kirkland_Main-1831 | Kirkland_Manholes-351 | 234.93 | Kirkland_Manholes-352 | 234.2 | 197.8 | 0.37 | 8 | PVC | 0.01 | 428 | 37 | 171 | 208 | 48.6 | | |
| Kirkland_Main-1832 | Kirkland_Manholes-353 | 237.24 | Kirkland_Manholes-352 | 234.2 | 58.3 | 5.21 | 8 | PVC | 0.01 | 1,609 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-1833 | Kirkland_Manholes-354 | 240.05 | Kirkland_Manholes-353 | 237.24 | 111.3 | 2.52 | 8 | PVC | 0.01 | 1,120 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1834 | Kirkland_Manholes-355 | 245.23 | Kirkland_Manholes-357 | 224.18 | 289.7 | 7.27 | 8 | PVC | 0.01 | 1,901 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1835 | Kirkland_Manholes-357 | 224.18 | Kirkland_Manholes-356 | 218.57 | 38.2 | 14.7 | 8 | PVC | 0.01 | 2,703 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1836 | Kirkland_Manholes-356 | 218.57 | Kirkland_Manholes-358 | 217.4 | 168.8 | 0.69 | 21 | PVC | 0.01 | 7,697 | 628 | 1,974 | 2,602 | 33.8 | | |
| Kirkland_Main-1837 | Kirkland_Manholes-358 | 217.4 | Kirkland_Manholes-362 | 216.81 | 209.2 | 0.28 | 21 | PVC | 0.01 | 4,910 | 629 | 1,978 | 2,606 | 53.1 | | |
| Kirkland_Main-1838 | Kirkland_Manholes-365 | 215.67 | Kirkland_Manholes-366 | 214.9 | 145.3 | 0.53 | 8 | PVC | 0.01 | 513 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-1839 | Kirkland_Manholes-366 | 214.9 | Kirkland_Manholes-367 | 213.02 | 57.5 | 3.27 | 8 | PVC | 0.01 | 1,275 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-1840 | Kirkland_Manholes-364 | 215.51 | Kirkland_Manholes-367 | 213.02 | 231.6 | 1.07 | 18 | PVC | 0.01 | 6,354 | 640 | 2,035 | 2,675 | 42.1 | | |
| Kirkland_Main-1841 | Kirkland_Manholes-363 | 216.4 | Kirkland_Manholes-3048 | 215.92 | 195.5 | 0.25 | 21 | PVC | 0.01 | 4,581 | 634 | 1,998 | 2,632 | 57.5 | | |
| Kirkland_Main-1842 | Kirkland_Manholes-361 | 216.74 | Kirkland_Manholes-363 | 216.4 | 169.2 | 0.2 | 21 | PVC | 0.01 | 4,140 | 634 | 1,994 | 2,628 | 63.5 | | |
| Kirkland_Main-1843 | Kirkland_Manholes-359 | 233.48 | Kirkland_Manholes-360 | 230.84 | 309.4 | 0.85 | 8 | PVC | 0.01 | 651 | 3 | 4 | 7 | 1.1 | | |
| Kirkland_Main-1844 | Kirkland_Manholes-360 | 230.84 | Kirkland_Manholes-361 | 216.74 | 103.8 | 13.58 | 8 | PVC | 0.01 | 2,599 | 5 | 8 | 13 | 0.5 | | |
| Kirkland_Main-1845 | Kirkland_Manholes-400 | 274.94 | Kirkland_Manholes-399 | 268.35 | 106.2 | 6.21 | 8 | PVC | 0.01 | 1,757 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1846 | Kirkland_Manholes-399 | 268.35 | Kirkland_Manholes-394 | 266.89 | 274.5 | 0.53 | 8 | PVC | 0.01 | 514 | 3 | 8 | 11 | 2.2 | | |
| Kirkland_Main-1847 | Kirkland_Manholes-405 | 259.21 | Kirkland_Manholes-404 | 259.2 | 31.6 | 0.03 | 8 | PVC | 0.01 | 125 | 0 | 4 | 4 | 3.2 | | |
| Kirkland_Main-1848 | Kirkland_Manholes-404 | 259.2 | Kirkland_Manholes-403 | 257.79 | 99.7 | 1.41 | 8 | PVC | 0.01 | 839 | 1 | 8 | 9 | 1 | | |
| Kirkland_Main-1849 | Kirkland_Manholes-403 | 257.79 | Kirkland_Manholes-402 | 257.52 | 55.3 | 0.49 | 8 | PVC | 0.01 | 493 | 1 | 12 | 13 | 2.6 | | |
| Kirkland_Main-1850 | Kirkland_Manholes-402 | 257.52 | Kirkland_Manholes-401 | 256.8 | 97.3 | 0.74 | 8 | PVC | 0.01 | 607 | 2 | 16 | 18 | 3 | | |
| Kirkland_Main-1851 | Kirkland_Manholes-401 | 256.8 | Kirkland_Manholes-395 | 253.88 | 284.1 | 1.03 | 8 | PVC | 0.01 | 715 | 2 | 20 | 23 | 3.2 | | |
| Kirkland_Main-1852 | Kirkland_Manholes-406 | 288.66 | Kirkland_Manholes-393 | 288.03 | 160.6 | 0.39 | 8 | PVC | 0.01 | 442 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-1853 | Kirkland_Manholes-410 | 278.41 | Kirkland_Manholes-409 | 264.84 | 185.6 | 7.31 | 8 | PVC | 0.01 | 1,906 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1854 | Kirkland_Manholes-425 | 290.3 | Kirkland_Manholes-420 | 281.46 | 112.7 | 7.84 | 8 | PVC | 0.01 | 1,974 | 7 | 28 | 36 | 1.8 | | |
| Kirkland_Main-1855 | Kirkland_Manholes-370 | 206.64 | Kirkland_Manholes-2869 | 204.84 | 75.1 | 2.4 | 18 | PVC | 0.01 | 9,487 | 656 | 2,087 | 2,744 | 28.9 | | |
| Kirkland_Main-1856 | Kirkland_Manholes-436 | 58.61 | Kirkland_Manholes-437 | 58.56 | 24.6 | 0.22 | 15 | PVC | 0.01 | 1,769 | 267 | 653 | 920 | 52 | SM14-Ex-EX30 | |
| Kirkland_Main-1857 | Kirkland_Manholes-437 | 58.56 | Kirkland_Manholes-188 | 58.06 | 273 | 0.18 | 15 | PVC | 0.01 | 1,613 | 272 | 666 | 938 | 58.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1858 | Kirkland_Manholes-450 | 130.07 | Kirkland_Manholes-448 | 127.19 | 147.1 | 1.96 | 8 | PVC | 0.01 | 987 | 5 | 17 | 22 | 2.2 | | |
| Kirkland_Main-1859 | Kirkland_Manholes-448 | 127.19 | Kirkland_Manholes-449 | 124.43 | 143 | 1.93 | 8 | PVC | 0.01 | 979 | 5 | 22 | 26 | 2.7 | | |
| Kirkland_Main-1860 | Kirkland_Manholes-449 | 124.43 | Kirkland_Manholes-446 | 123.86 | 143.4 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 26 | 31 | 6.9 | | Drop Connection |
| Kirkland_Main-1861 | Kirkland_Manholes-447 | 95.3 | Kirkland_Manholes-446 | 94.25 | 125.1 | 0.84 | 8 | PVC | 0.01 | 646 | 0 | 4 | 4 | 0.7 | | |
| Kirkland_Main-1862 | Kirkland_Manholes-445 | 128.4 | Kirkland_Manholes-444 | 92.89 | 173.2 | 20.5 | 8 | PVC | 0.01 | 3,192 | 0 | 4 | 4 | 0.1 | | |
| Kirkland_Main-1863 | Kirkland_Manholes-446 | 94.25 | Kirkland_Manholes-444 | 92.89 | 143.2 | 0.95 | 8 | PVC | 0.01 | 687 | 5 | 35 | 39 | 5.7 | | |
| Kirkland_Main-1864 | Kirkland_Manholes-1522 | 291.35 | Kirkland_Manholes-145 | 271.65 | 161.3 | 12.21 | 8 | PVC | 0.01 | 2,464 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-1865 | Kirkland_Manholes-145 | 271.65 | Kirkland_Manholes-1315 | 270.9 | 108.1 | 0.69 | 8 | PVC | 0.01 | 587 | 16 | 49 | 65 | 11.1 | | |
| Kirkland_Main-1866 | Kirkland_Manholes-1314 | 312.02 | Kirkland_Manholes-1522 | 291.35 | 177.8 | 11.62 | 8 | PVC | 0.01 | 2,404 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1867 | Kirkland_Manholes-1515 | 261.7 | Kirkland_Manholes-1516 | 259.7 | 167.2 | 1.2 | 8 | PVC | 0.01 | 771 | 38 | 151 | 188 | 24.4 | SM14-Ex-EX131 | |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1868 | Kirkland_Manholes-1516 | 259.7 | Kirkland_Manholes-1593 | 256.67 | 397.6 | 0.76 | 8 | PVC | 0.01 | 615 | 42 | 155 | 197 | 31.9 | SM14-Ex-EX131 | |
| Kirkland_Main-1869 | Kirkland_Manholes-1520 | 262.79 | Kirkland_Manholes-1517 | 262.15 | 299 | 0.21 | 8 | PVC | 0.01 | 326 | 2 | 4 | 6 | 1.8 | SM14-Ex-EX129 | |
| Kirkland_Main-1870 | Kirkland_Manholes-1518 | 277.88 | Kirkland_Manholes-1517 | 262.15 | 157.4 | 10 | 8 | PVC | 0.01 | 2,229 | 13 | 28 | 42 | 1.9 | SM14-Ex-EX124 | |
| Kirkland_Main-1871 | Kirkland_Manholes-1517 | 262.15 | Kirkland_Manholes-1592 | 255.76 | 316.1 | 2.02 | 8 | PVC | 0.01 | 1,002 | 16 | 37 | 53 | 5.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1872 | Kirkland_Manholes-1519 | 265 | Kirkland_Manholes-1521 | 258.62 | 235.2 | 2.71 | 8 | PVC | 0.01 | 1,161 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX128 | |
| Kirkland_Main-1873 | Kirkland_Manholes-1521 | 258.62 | Kirkland_Manholes-1524 | 207.32 | 404.3 | 12.69 | 8 | PVC | 0.01 | 2,512 | 3 | 8 | 11 | 0.4 | SM14-Ex-EX128 | |
| Kirkland_Main-1874 | Kirkland_Manholes-1552 | 337.73 | Kirkland_Manholes-761 | 326.09 | 158.4 | 7.35 | 8 | PVC | 0.01 | 1,911 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1875 | Kirkland_Manholes-761 | 326.09 | Kirkland_Manholes-760 | 311.91 | 217.3 | 6.53 | 8 | PVC | 0.01 | 1,801 | 5 | 8 | 13 | 0.7 | SM14-Ex-EX124 | |
| Kirkland_Main-1876 | Kirkland_Manholes-760 | 311.91 | Kirkland_Manholes-1538 | 302.73 | 273.6 | 3.36 | 8 | PVC | 0.01 | 1,292 | 7 | 12 | 19 | 1.5 | SM14-Ex-EX124 | |
| Kirkland_Main-1877 | Kirkland_Manholes-1542 | 314.5 | Kirkland_Manholes-1541 | 294.69 | 208.5 | 9.5 | 8 | PVC | 0.01 | 2,173 | 1 | 4 | 6 | 0.3 | SM14-Ex-EX123 | |
| Kirkland_Main-1878 | Kirkland_Manholes-1540 | 296.8 | Kirkland_Manholes-1541 | 294.69 | 76 | 2.78 | 8 | PVC | 0.01 | 1,175 | 4 | 8 | 12 | 1 | SM14-Ex-EX123 | |
| Kirkland_Main-1879 | Kirkland_Manholes-1539 | 301.51 | Kirkland_Manholes-1540 | 296.8 | 362.1 | 1.3 | 8 | PVC | 0.01 | 804 | 3 | 4 | 7 | 0.9 | SM14-Ex-EX123 | |
| Kirkland_Main-1880 | Kirkland_Manholes-1523 | 194.94 | Kirkland_Manholes-1597 | 180.84 | 315.7 | 4.47 | 8 | PVC | 0.01 | 1,490 | 51 | 146 | 198 | 13.3 | SM14-Ex-EX121 | |
| Kirkland_Main-1881 | Kirkland_Manholes-1524 | 207.32 | Kirkland_Manholes-1523 | 194.94 | 95.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 4 | 12 | 17 | 0.7 | SM14-Ex-EX128 | |
| Kirkland_Main-1882 | Kirkland_Manholes-1528 | 217.87 | Kirkland_Manholes-1523 | 194.94 | 317.2 | 7.23 | 8 | PVC | 0.01 | 1,896 | 46 | 130 | 176 | 9.3 | SM14-Ex-EX121 | |
| Kirkland_Main-1883 | Kirkland_Manholes-1525 | 281.6 | Kirkland_Manholes-1526 | 273.99 | 396.4 | 1.92 | 8 | PVC | 0.01 | 977 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX127 | |
| Kirkland_Main-1884 | Kirkland_Manholes-1526 | 273.99 | Kirkland_Manholes-1527 | 258.94 | 183.5 | 8.2 | 8 | PVC | 0.01 | 2,019 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX127 | |
| Kirkland_Main-1885 | Kirkland_Manholes-1527 | 258.94 | Kirkland_Manholes-1528 | 217.87 | 397.7 | 10.33 | 8 | PVC | 0.01 | 2,266 | 5 | 12 | 17 | 0.8 | SM14-Ex-EX127 | |
| Kirkland_Main-1886 | Kirkland_Manholes-1535 | 304.79 | Kirkland_Manholes-1534 | 301.8 | 155.7 | 1.92 | 8 | PVC | 0.01 | 977 | 0 | 4 | 5 | 0.5 | SM14-Ex-EX126 | |
| Kirkland_Main-1887 | Kirkland_Manholes-1534 | 301.8 | Kirkland_Manholes-1533 | 294.07 | 244.9 | 3.16 | 8 | PVC | 0.01 | 1,253 | 1 | 8 | 10 | 0.8 | SM14-Ex-EX126 | |
| Kirkland_Main-1888 | Kirkland_Manholes-775 | 172.73 | KC_Manholes-5 | 169.15 | 345.4 | 1.04 | 8 | PVC | 0.01 | 718 | 6 | 33 | 39 | 5.4 | | |
| Kirkland_Main-1889 | Kirkland_Manholes-774 | 192.94 | KC_Manholes-5 | 169.15 | 221.2 | 10.75 | 8 | PVC | 0.01 | 2,312 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-1890 | Kirkland_Manholes-773 | 227.51 | Kirkland_Manholes-774 | 192.94 | 170.2 | 20.31 | 8 | PVC | 0.01 | 3,177 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1891 | Kirkland_Manholes-772 | 214.68 | Kirkland_Manholes-771 | 213.99 | 63.9 | 1.08 | 8 | PVC | 0.01 | 733 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1892 | Kirkland_Manholes-443 | 91.49 | Kirkland_Manholes-442 | 83.66 | 233.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 46 | 48 | 94 | 7.3 | | |
| Kirkland_Main-1893 | Kirkland_Manholes-442 | 83.66 | Kirkland_Manholes-441 | 83.38 | 212.8 | 0.13 | 8 | PVC | 0.01 | 256 | 46 | 52 | 98 | 38.4 | | |
| Kirkland_Main-1894 | Kirkland_Manholes-441 | 83.38 | Kirkland_Manholes-433 | 80.24 | 108 | 2.91 | 8 | PVC | 0.01 | 1,202 | 46 | 56 | 103 | 8.5 | | |
| Kirkland_Main-1895 | Kirkland_Manholes-432 | 97.11 | Kirkland_Manholes-433 | 80.24 | 205.7 | 8.2 | 12 | PVC | 0.01 | 5,954 | 153 | 363 | 517 | 8.7 | SM14-Ex-EX30 | |
| Kirkland_Main-1896 | Kirkland_Manholes-426 | 144.6 | Kirkland_Manholes-427 | 143.58 | 254.5 | 0.4 | 12 | PVC | 0.01 | 1,315 | 147 | 337 | 484 | 36.8 | SM14-Ex-EX30 | |
| Kirkland_Main-1897 | Kirkland_Manholes-427 | 143.58 | Kirkland_Manholes-428 | 141.37 | 251.3 | 0.88 | 12 | PVC | 0.01 | 1,950 | 153 | 342 | 495 | 25.4 | SM14-Ex-EX30 | |
| Kirkland_Main-1898 | Kirkland_Manholes-428 | 141.37 | Kirkland_Manholes-429 | 138.12 | 320.6 | 1.01 | 12 | PVC | 0.01 | 2,093 | 153 | 346 | 499 | 23.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1899 | Kirkland_Manholes-429 | 138.12 | Kirkland_Manholes-430 | 132.21 | 248.9 | 2.37 | 12 | PVC | 0.01 | 3,203 | 153 | 350 | 504 | 15.7 | SM14-Ex-EX30 | |
| Kirkland_Main-1900 | Kirkland_Manholes-430 | 132.21 | Kirkland_Manholes-431 | 114.37 | 310.4 | 5.75 | 12 | PVC | 0.01 | 4,983 | 153 | 355 | 508 | 10.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1901 | Kirkland_Manholes-431 | 114.37 | Kirkland_Manholes-432 | 97.11 | 290.4 | 5.94 | 12 | PVC | 0.01 | 5,068 | 153 | 359 | 512 | 10.1 | SM14-Ex-EX30 | |
| Kirkland_Main-1902 | Kirkland_Manholes-433 | 80.24 | Kirkland_Manholes-434 | 74.08 | 187.9 | 3.28 | 12 | PVC | 0.01 | 3,764 | 200 | 424 | 624 | 16.6 | SM14-Ex-EX30 | |
| Kirkland_Main-1903 | Kirkland_Manholes-434 | 74.08 | Kirkland_Manholes-435 | 64.4 | 325.2 | 2.98 | 12 | PVC | 0.01 | 3,586 | 200 | 428 | 628 | 17.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1904 | Kirkland_Manholes-439 | 82.56 | Kirkland_Manholes-438 | 74.46 | 270.1 | 3 | 8 | PVC | 0.01 | 1,221 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-1905 | Kirkland_Manholes-438 | 74.46 | Kirkland_Manholes-435 | 64.4 | 260.6 | 3.86 | 8 | PVC | 0.01 | 1,385 | 67 | 216 | 283 | 20.5 | SM14-Ex-EX31 | |
| Kirkland_Main-1906 | Kirkland_Manholes-435 | 64.4 | Kirkland_Manholes-436 | 58.61 | 312.5 | 1.85 | 12 | PVC | 0.01 | 2,828 | 267 | 649 | 916 | 32.4 | SM14-Ex-EX30 | |
| Kirkland_Main-1907 | Kirkland_Manholes-1018 | 179.75 | Kirkland_Manholes-451 | 173.02 | 146.6 | 4.59 | 8 | PVC | 0.01 | 1,511 | 58 | 173 | 231 | 15.3 | SM14-Ex-EX31 | |
| Kirkland_Main-1908 | Kirkland_Manholes-453 | 159.42 | Kirkland_Manholes-454 | 126.39 | 122.9 | 26.88 | 8 | PVC | 0.01 | 3,655 | 61 | 186 | 247 | 6.7 | SM14-Ex-EX31 | |
| Kirkland_Main-1909 | Kirkland_Manholes-440 | 131.78 | Kirkland_Manholes-454 | 126.39 | 361.7 | 1.49 | 8 | PVC | 0.01 | 861 | 6 | 17 | 23 | 2.7 | SM14-Ex-EX31 | |
| Kirkland_Main-1910 | Kirkland_Manholes-1026 | 149.27 | Kirkland_Manholes-440 | 131.78 | 156.8 | 11.16 | 8 | PVC | 0.01 | 2,355 | 5 | 13 | 18 | 0.8 | | |
| Kirkland_Main-1911 | Kirkland_Manholes-451 | 173.02 | Kirkland_Manholes-452 | 170.49 | 70.2 | 3.6 | 8 | PVC | 0.01 | 1,339 | 59 | 177 | 236 | 17.6 | SM14-Ex-EX31 | |
| Kirkland_Main-1912 | Kirkland_Manholes-452 | 170.49 | Kirkland_Manholes-453 | 159.42 | 88.9 | 12.45 | 8 | PVC | 0.01 | 2,488 | 59 | 182 | 241 | 9.7 | SM14-Ex-EX31 | |
| Kirkland_Main-1913 | Kirkland_Manholes-454 | 126.39 | Kirkland_Manholes-438 | 74.46 | 305.4 | 17.01 | 8 | PVC | 0.01 | 2,907 | 67 | 208 | 275 | 9.5 | SM14-Ex-EX31 | |
| Kirkland_Main-1914 | Kirkland_Manholes-484 | 295.92 | Kirkland_Manholes-483 | 294.22 | 69.9 | 2.43 | 8 | PVC | 0.01 | 1,098 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1915 | Kirkland_Manholes-483 | 294.22 | Kirkland_Manholes-482 | 293.97 | 63.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-1916 | Kirkland_Manholes-481 | 300.21 | Kirkland_Manholes-482 | 293.97 | 44.6 | 13.98 | 8 | PVC | 0.01 | 2,636 | 8 | 41 | 48 | 1.8 | | |
| Kirkland_Main-1917 | Kirkland_Manholes-477 | 317.64 | Kirkland_Manholes-481 | 300.21 | 198.9 | 8.76 | 8 | PVC | 0.01 | 2,087 | 7 | 37 | 44 | 2.1 | | |
| Kirkland_Main-1918 | Kirkland_Manholes-478 | 318.91 | Kirkland_Manholes-477 | 317.64 | 130.7 | 0.97 | 8 | PVC | 0.01 | 695 | 6 | 33 | 38 | 5.5 | | |
| Kirkland_Main-1919 | Kirkland_Manholes-479 | 328.09 | Kirkland_Manholes-478 | 318.91 | 81.5 | 11.27 | 8 | PVC | 0.01 | 2,367 | 6 | 28 | 34 | 1.4 | | |
| Kirkland_Main-1920 | Kirkland_Manholes-476 | 330.32 | Kirkland_Manholes-475 | 322.42 | 166.4 | 4.75 | 8 | PVC | 0.01 | 1,536 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1921 | Kirkland_Manholes-475 | 322.42 | Kirkland_Manholes-473 | 288.65 | 238.6 | 14.15 | 8 | PVC | 0.01 | 2,653 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1922 | Kirkland_Manholes-474 | 290.07 | Kirkland_Manholes-473 | 288.65 | 187.1 | 0.76 | 8 | PVC | 0.01 | 614 | 3 | 4 | 7 | 1.1 | | |
| Kirkland_Main-1923 | Kirkland_Manholes-473 | 288.65 | Kirkland_Manholes-468 | 238.51 | 297.1 | 16.88 | 8 | PVC | 0.01 | 2,896 | 6 | 16 | 22 | 0.8 | | |
| Kirkland_Main-1924 | Kirkland_Manholes-468 | 238.51 | Kirkland_Manholes-462 | 219.91 | 120.9 | 15.39 | 8 | PVC | 0.01 | 2,766 | 7 | 20 | 27 | 1 | | |
| Kirkland_Main-1925 | Kirkland_Manholes-463 | 227.23 | Kirkland_Manholes-462 | 219.91 | 71.2 | 10.28 | 8 | PVC | 0.01 | 2,261 | 2 | 8 | 10 | 0.5 | | |
| Kirkland_Main-1926 | Kirkland_Manholes-464 | 254.44 | Kirkland_Manholes-463 | 227.23 | 171 | 15.91 | 8 | PVC | 0.01 | 2,812 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1927 | Kirkland_Manholes-462 | 219.91 | Kirkland_Manholes-465 | 166.54 | 349.5 | 15.27 | 8 | PVC | 0.01 | 2,755 | 9 | 33 | 41 | 1.5 | | |
| Kirkland_Main-1928 | Kirkland_Manholes-465 | 166.54 | Kirkland_Manholes-466 | 159.47 | 196.4 | 3.6 | 8 | PVC | 0.01 | 1,338 | 10 | 37 | 46 | 3.5 | | |
| Kirkland_Main-1929 | Kirkland_Manholes-467 | 166.95 | Kirkland_Manholes-466 | 159.47 | 59.4 | 12.59 | 8 | PVC | 0.01 | 2,502 | 5 | 16 | 22 | 0.9 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1930 | Kirkland_Manholes-469 | 217.48 | Kirkland_Manholes-470 | 207.2 | 162.3 | 6.34 | 8 | PVC | 0.01 | 1,775 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1931 | Kirkland_Manholes-471 | 208.89 | Kirkland_Manholes-470 | 207.2 | 106.2 | 1.59 | 8 | PVC | 0.01 | 889 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1932 | Kirkland_Manholes-470 | 207.2 | Kirkland_Manholes-472 | 192.62 | 137.7 | 10.59 | 8 | PVC | 0.01 | 2,294 | 2 | 12 | 14 | 0.6 | | |
| Kirkland_Main-1934 | Kirkland_Manholes-489 | 206.41 | Kirkland_Manholes-467 | 166.95 | 178.4 | 22.12 | 8 | PVC | 0.01 | 3,316 | 5 | 12 | 17 | 0.5 | | |
| Kirkland_Main-1935 | Kirkland_Manholes-491 | 317.17 | Kirkland_Manholes-492 | 300.1 | 240.7 | 7.09 | 8 | PVC | 0.01 | 1,878 | 3 | 8 | 11 | 0.6 | | |
| Kirkland_Main-1936 | Kirkland_Manholes-492 | 300.1 | Kirkland_Manholes-778 | 273.49 | 272.5 | 9.76 | 8 | PVC | 0.01 | 2,203 | 4 | 12 | 16 | 0.7 | | |
| Kirkland_Main-1937 | Kirkland_Manholes-778 | 273.49 | Kirkland_Manholes-783 | 251.91 | 166.5 | 12.96 | 8 | PVC | 0.01 | 2,539 | 5 | 16 | 21 | 0.8 | | |
| Kirkland_Main-1938 | Kirkland_Manholes-783 | 251.91 | Kirkland_Manholes-782 | 245.67 | 36.9 | 16.9 | 8 | PVC | 0.01 | 2,898 | 18 | 94 | 112 | 3.9 | | |
| Kirkland_Main-1939 | Kirkland_Manholes-779 | 276.61 | Kirkland_Manholes-486 | 260.65 | 97.8 | 16.33 | 8 | PVC | 0.01 | 2,849 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-1940 | Kirkland_Manholes-486 | 260.65 | Kirkland_Manholes-487 | 257.38 | 130.2 | 2.51 | 8 | PVC | 0.01 | 1,117 | 13 | 69 | 82 | 7.4 | | |
| Kirkland_Main-1942 | Kirkland_Manholes-487 | 257.38 | Kirkland_Manholes-783 | 251.91 | 251.1 | 2.18 | 8 | PVC | 0.01 | 1,041 | 14 | 73 | 87 | 8.4 | | |
| Kirkland_Main-1943 | Kirkland_Manholes-781 | 270.16 | Kirkland_Manholes-782 | 245.67 | 162 | 15.11 | 8 | PVC | 0.01 | 2,741 | 3 | 8 | 11 | 0.4 | | |
| Kirkland_Main-1944 | Kirkland_Manholes-780 | 304.33 | Kirkland_Manholes-781 | 270.16 | 338 | 10.11 | 8 | PVC | 0.01 | 2,242 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1945 | Kirkland_Manholes-782 | 245.67 | Kirkland_Manholes-785 | 203.06 | 217.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 21 | 106 | 127 | 4.1 | | |
| Kirkland_Main-1946 | Kirkland_Manholes-785 | 203.06 | Kirkland_Manholes-784 | 186.93 | 82.2 | 19.62 | 8 | PVC | 0.01 | 3,123 | 22 | 110 | 132 | 4.2 | | |
| Kirkland_Main-1947 | Kirkland_Manholes-784 | 186.93 | Kirkland_Manholes-786 | 173.41 | 68.9 | 19.64 | 8 | PVC | 0.01 | 3,124 | 66 | 269 | 335 | 10.7 | | |
| Kirkland_Main-1948 | Kirkland_Manholes-789 | 234.78 | Kirkland_Manholes-788 | 234.04 | 150 | 0.49 | 8 | PVC | 0.01 | 495 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1949 | Kirkland_Manholes-788 | 234.04 | Kirkland_Manholes-787 | 233.49 | 110.1 | 0.5 | 8 | PVC | 0.01 | 498 | 1 | 8 | 9 | 1.9 | | |
| Kirkland_Main-1950 | Kirkland_Manholes-787 | 233.49 | Kirkland_Manholes-790 | 227.7 | 106.2 | 5.45 | 8 | PVC | 0.01 | 1,646 | 2 | 12 | 14 | 0.9 | | |
| Kirkland_Main-1951 | Kirkland_Manholes-485 | 265.21 | Kirkland_Manholes-486 | 260.65 | 233.3 | 1.95 | 8 | PVC | 0.01 | 986 | 12 | 61 | 73 | 7.4 | | |
| Kirkland_Main-1952 | Kirkland_Manholes-490 | 279.75 | Kirkland_Manholes-485 | 265.21 | 234 | 6.21 | 8 | PVC | 0.01 | 1,758 | 10 | 57 | 67 | 3.8 | | |
| Kirkland_Main-1953 | Kirkland_Manholes-482 | 293.97 | Kirkland_Manholes-490 | 279.75 | 98.3 | 14.47 | 8 | PVC | 0.01 | 2,682 | 10 | 53 | 63 | 2.3 | | |
| Kirkland_Main-1954 | Kirkland_Manholes-791 | 327.42 | Kirkland_Manholes-491 | 317.17 | 287.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX47 | |
| Kirkland_Main-1955 | Kirkland_Manholes-796 | 329.52 | Kirkland_Manholes-479 | 328.09 | 60.4 | 2.37 | 8 | PVC | 0.01 | 1,085 | 5 | 24 | 29 | 2.7 | | |
| Kirkland_Main-1956 | Kirkland_Manholes-802 | 309.62 | Kirkland_Manholes-801 | 301.38 | 220.6 | 3.74 | 8 | PVC | 0.01 | 1,363 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1957 | Kirkland_Manholes-801 | 301.38 | Kirkland_Manholes-800 | 299.84 | 122.4 | 1.26 | 8 | PVC | 0.01 | 791 | 3 | 8 | 11 | 1.5 | | |
| Kirkland_Main-1958 | Kirkland_Manholes-800 | 299.84 | Kirkland_Manholes-799 | 299.17 | 200.4 | 0.33 | 8 | PVC | 0.01 | 408 | 5 | 12 | 17 | 4.1 | | |
| Kirkland_Main-1960 | Kirkland_Manholes-797 | 330.09 | Kirkland_Manholes-798 | 328.4 | 134 | 1.26 | 8 | PVC | 0.01 | 792 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1961 | Kirkland_Manholes-798 | 328.4 | Kirkland_Manholes-799 | 299.17 | 250.4 | 11.67 | 8 | PVC | 0.01 | 2,409 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-1962 | Kirkland_Manholes-799 | 299.17 | Kirkland_Manholes-803 | 278.64 | 308 | 6.67 | 8 | PVC | 0.01 | 1,820 | 8 | 24 | 33 | 1.8 | | |
| Kirkland_Main-1963 | Kirkland_Manholes-805 | 300.26 | Kirkland_Manholes-806 | 295.73 | 104.4 | 4.34 | 8 | PVC | 0.01 | 1,468 | 7 | 24 | 31 | 2.1 | | |
| Kirkland_Main-1964 | Kirkland_Manholes-806 | 295.73 | Kirkland_Manholes-804 | 284.1 | 194.3 | 5.99 | 8 | PVC | 0.01 | 1,725 | 8 | 28 | 36 | 2.1 | | |
| Kirkland_Main-1965 | Kirkland_Manholes-807 | 300.8 | Kirkland_Manholes-805 | 300.26 | 78.9 | 0.68 | 8 | PVC | 0.01 | 583 | 7 | 20 | 27 | 4.6 | | |
| Kirkland_Main-1966 | Kirkland_Manholes-819 | 270.84 | Kirkland_Manholes-818 | 259.9 | 158.1 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1967 | Kirkland_Manholes-818 | 259.9 | Kirkland_Manholes-816 | 252.1 | 223.2 | 3.49 | 8 | PVC | 0.01 | 1,318 | 3 | 8 | 11 | 0.9 | | |
| Kirkland_Main-1968 | Kirkland_Manholes-816 | 252.1 | Kirkland_Manholes-815 | 248.52 | 125.8 | 2.85 | 8 | PVC | 0.01 | 1,190 | 4 | 12 | 17 | 1.4 | | |
| Kirkland_Main-1969 | Kirkland_Manholes-817 | 249.75 | Kirkland_Manholes-815 | 248.52 | 170.1 | 0.72 | 8 | PVC | 0.01 | 600 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-1970 | Kirkland_Manholes-814 | 224.81 | Kirkland_Manholes-813 | 224.1 | 119.5 | 0.59 | 8 | PVC | 0.01 | 543 | 35 | 130 | 166 | 30.5 | | |
| Kirkland_Main-1971 | Kirkland_Manholes-813 | 224.1 | Kirkland_Manholes-811 | 220.71 | 283.2 | 1.2 | 8 | PVC | 0.01 | 771 | 37 | 134 | 172 | 22.2 | | |
| Kirkland_Main-1972 | Kirkland_Manholes-810 | 231.27 | Kirkland_Manholes-811 | 220.71 | 86.4 | 12.23 | 8 | PVC | 0.01 | 2,465 | 5 | 12 | 17 | 0.7 | | |
| Kirkland_Main-1973 | Kirkland_Manholes-811 | 220.71 | Kirkland_Manholes-812 | 219.12 | 123.9 | 1.28 | 8 | PVC | 0.01 | 799 | 43 | 151 | 193 | 24.2 | | |
| Kirkland_Main-1974 | Kirkland_Manholes-809 | 238.49 | Kirkland_Manholes-810 | 231.27 | 197.7 | 3.65 | 8 | PVC | 0.01 | 1,347 | 3 | 8 | 12 | 0.9 | | |
| Kirkland_Main-1975 | Kirkland_Manholes-808 | 239.21 | Kirkland_Manholes-809 | 238.5 | 177.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | Drop Connection |
| Kirkland_Main-1976 | Kirkland_Manholes-812 | 219.12 | Kirkland_Manholes-784 | 186.93 | 281.2 | 11.45 | 8 | PVC | 0.01 | 2,385 | 44 | 155 | 198 | 8.3 | | |
| Kirkland_Main-1977 | Kirkland_Manholes-822 | 337.49 | Kirkland_Manholes-823 | 321.62 | 170.9 | 9.29 | 8 | PVC | 0.01 | 2,149 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX69 | |
| Kirkland_Main-1978 | Kirkland_Manholes-823 | 321.62 | Kirkland_Manholes-824 | 311.58 | 159.2 | 6.3 | 8 | PVC | 0.01 | 1,770 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX69 | |
| Kirkland_Main-1979 | Kirkland_Manholes-824 | 311.58 | Kirkland_Manholes-825 | 285.55 | 131.7 | 19.76 | 8 | PVC | 0.01 | 3,134 | 2 | 12 | 14 | 0.5 | SM14-Ex-EX69 | |
| Kirkland_Main-1980 | Kirkland_Manholes-825 | 285.55 | Kirkland_Manholes-826 | 282.55 | 56.8 | 5.29 | 8 | PVC | 0.01 | 1,621 | 4 | 24 | 28 | 1.7 | SM14-Ex-EX69 | |
| Kirkland_Main-1981 | Kirkland_Manholes-827 | 295.62 | Kirkland_Manholes-828 | 285.89 | 94.5 | 10.29 | 8 | PVC | 0.01 | 2,262 | 0 | 4 | 5 | 0.2 | SM14-Ex-EX69 | |
| Kirkland_Main-1982 | Kirkland_Manholes-826 | 282.55 | Kirkland_Manholes-456 | 263.04 | 178.8 | 10.91 | 8 | PVC | 0.01 | 2,329 | 4 | 28 | 32 | 1.4 | SM14-Ex-EX69 | |
| Kirkland_Main-1983 | Kirkland_Manholes-828 | 285.89 | Kirkland_Manholes-825 | 285.55 | 69 | 0.49 | 8 | PVC | 0.01 | 495 | 1 | 8 | 9 | 1.9 | SM14-Ex-EX69 | |
| Kirkland_Main-1984 | Kirkland_Manholes-790 | 227.7 | Kirkland_Manholes-830 | 198.45 | 91.3 | 32.05 | 8 | PVC | 0.01 | 3,991 | 3 | 16 | 19 | 0.5 | | Slope verified in as-builts |
| Kirkland_Main-1985 | Kirkland_Manholes-830 | 198.45 | Kirkland_Manholes-831 | 192.6 | 15.9 | 36.68 | 8 | PVC | 0.01 | 4,270 | 4 | 24 | 29 | 0.7 | | Slope verified in as-builts |
| Kirkland_Main-1986 | Kirkland_Manholes-831 | 192.6 | Kirkland_Manholes-786 | 173.41 | 171.2 | 11.21 | 8 | PVC | 0.01 | 2,360 | 4 | 28 | 33 | 1.4 | SM14-Ex-EX46 | |
| Kirkland_Main-1987 | Kirkland_Manholes-461 | 269.91 | Kirkland_Manholes-460 | 268.13 | 121.9 | 1.46 | 8 | PVC | 0.01 | 852 | 1 | 4 | 6 | 0.7 | SM14-Ex-EX68 | |
| Kirkland_Main-1988 | Kirkland_Manholes-460 | 268.13 | Kirkland_Manholes-456 | 263.04 | 170.9 | 2.98 | 8 | PVC | 0.01 | 1,217 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX68 | |
| Kirkland_Main-1989 | Kirkland_Manholes-455 | 250.45 | Kirkland_Manholes-457 | 235.02 | 148.1 | 10.42 | 8 | PVC | 0.01 | 2,276 | 32 | 114 | 146 | 6.4 | SM14-Ex-EX67 | |
| Kirkland_Main-1990 | Kirkland_Manholes-457 | 235.02 | Kirkland_Manholes-458 | 212.1 | 153.1 | 14.97 | 8 | PVC | 0.01 | 2,728 | 33 | 122 | 155 | 5.7 | SM14-Ex-EX67 | |
| Kirkland_Main-1991 | Kirkland_Manholes-459 | 247.75 | Kirkland_Manholes-457 | 235.02 | 263.1 | 4.84 | 8 | PVC | 0.01 | 1,551 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX67 | |
| Kirkland_Main-1992 | Kirkland_Manholes-456 | 263.04 | Kirkland_Manholes-455 | 262.36 | 18.8 | 3.61 | 8 | PVC | 0.01 | 1,339 | 6 | 41 | 46 | 3.5 | SM14-Ex-EX68 | Drop Connection |
| Kirkland_Main-1993 | Kirkland_Manholes-792 | 342.6 | Kirkland_Manholes-832 | 339.26 | 96.2 | 3.47 | 8 | PVC | 0.01 | 1,314 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX70 | |
| Kirkland_Main-1994 | Kirkland_Manholes-793 | 339.56 | Kirkland_Manholes-832 | 339.26 | 76 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | SM14-Ex-EX70 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1997 | Kirkland_Manholes-988 | 238.57 | Kirkland_Manholes-989 | 235.68 | 166.4 | 1.74 | 8 | PVC | 0.01 | 929 | 1 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1998 | Kirkland_Manholes-989 | 235.68 | Kirkland_Manholes-990 | 231.8 | 65.1 | 5.96 | 8 | PVC | 0.01 | 1,721 | 3 | 9 | 11 | 0.6 | | |
| Kirkland_Main-1999 | Kirkland_Manholes-990 | 231.8 | Kirkland_Manholes-991 | 230.6 | 208.7 | 0.57 | 8 | PVC | 0.01 | 535 | 4 | 13 | 17 | 3.2 | | |
| Kirkland_Main-2000 | Kirkland_Manholes-992 | 230.9 | Kirkland_Manholes-991 | 230.6 | 22.8 | 1.32 | 8 | PVC | 0.01 | 809 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-2001 | Kirkland_Manholes-991 | 230.6 | Kirkland_Manholes-993 | 229.29 | 112.3 | 1.17 | 8 | PVC | 0.01 | 762 | 5 | 22 | 27 | 3.5 | | |
| Kirkland_Main-2002 | Kirkland_Manholes-993 | 229.29 | Kirkland_Manholes-994 | 224.8 | 89 | 5.04 | 8 | PVC | 0.01 | 1,583 | 6 | 26 | 32 | 2 | | |
| Kirkland_Main-2003 | Kirkland_Manholes-996 | 225.97 | Kirkland_Manholes-994 | 224.8 | 53 | 2.21 | 8 | PVC | 0.01 | 1,047 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2004 | Kirkland_Manholes-994 | 224.8 | Kirkland_Manholes-995 | 224.6 | 50 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 35 | 40 | 9 | | |
| Kirkland_Main-2005 | Kirkland_Manholes-995 | 224.6 | Kirkland_Manholes-997 | 222.3 | 221.9 | 1.04 | 8 | PVC | 0.01 | 718 | 7 | 39 | 46 | 6.4 | | |
| Kirkland_Main-2006 | Kirkland_Manholes-997 | 222.3 | Kirkland_Manholes-998 | 220.4 | 187.6 | 1.01 | 8 | PVC | 0.01 | 710 | 7 | 43 | 51 | 7.1 | | |
| Kirkland_Main-2007 | Kirkland_Manholes-998 | 220.4 | Kirkland_Manholes-980 | 219.4 | 152.8 | 0.65 | 8 | PVC | 0.01 | 570 | 7 | 48 | 55 | 9.6 | | |
| Kirkland_Main-2008 | Kirkland_Manholes-980 | 219.4 | Kirkland_Manholes-981 | 218.7 | 155.5 | 0.45 | 8 | PVC | 0.01 | 473 | 21 | 117 | 138 | 29.1 | | |
| Kirkland_Main-2009 | Kirkland_Manholes-981 | 218.7 | Kirkland_Manholes-982 | 217.59 | 190.8 | 0.58 | 8 | PVC | 0.01 | 538 | 33 | 121 | 154 | 28.6 | | |
| Kirkland_Main-2010 | Kirkland_Manholes-982 | 217.59 | Kirkland_Manholes-983 | 215.91 | 138.4 | 1.21 | 8 | PVC | 0.01 | 777 | 39 | 125 | 165 | 21.2 | | |
| Kirkland_Main-2011 | Kirkland_Manholes-983 | 215.91 | Kirkland_Manholes-984 | 210.71 | 282.7 | 1.84 | 8 | PVC | 0.01 | 956 | 40 | 130 | 170 | 17.8 | | |
| Kirkland_Main-2012 | Kirkland_Manholes-984 | 210.71 | Kirkland_Manholes-985 | 205.92 | 47.8 | 10.03 | 8 | PVC | 0.01 | 2,232 | 43 | 134 | 177 | 7.9 | | |
| Kirkland_Main-2013 | Kirkland_Manholes-1001 | 230.61 | Kirkland_Manholes-1020 | 226.4 | 192.3 | 2.19 | 8 | PVC | 0.01 | 1,043 | 33 | 91 | 124 | 11.8 | | |
| Kirkland_Main-2014 | Kirkland_Manholes-1000 | 240.25 | Kirkland_Manholes-1001 | 230.61 | 249.9 | 3.86 | 8 | PVC | 0.01 | 1,385 | 31 | 87 | 118 | 8.5 | | |
| Kirkland_Main-2015 | Kirkland_Manholes-999 | 246.1 | Kirkland_Manholes-1000 | 240.25 | 246.4 | 2.37 | 8 | PVC | 0.01 | 1,086 | 29 | 82 | 111 | 10.3 | | |
| Kirkland_Main-2016 | Kirkland_Manholes-972 | 246.27 | Kirkland_Manholes-999 | 246.1 | 109.4 | 0.16 | 8 | PVC | 0.01 | 278 | 29 | 78 | 106 | 38.3 | | |
| Kirkland_Main-2017 | Kirkland_Manholes-1002 | 227.29 | Kirkland_Manholes-1003 | 219.05 | 401.3 | 2.05 | 8 | PVC | 0.01 | 1,010 | 2 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2018 | Kirkland_Manholes-1003 | 219.05 | Kirkland_Manholes-1004 | 214.11 | 181.5 | 2.72 | 8 | PVC | 0.01 | 1,163 | 4 | 9 | 13 | 1.1 | | |
| Kirkland_Main-2019 | Kirkland_Manholes-1006 | 216.58 | Kirkland_Manholes-1007 | 215.09 | 213.6 | 0.7 | 8 | PVC | 0.01 | 589 | 4 | 9 | 13 | 2.2 | | |
| Kirkland_Main-2020 | Kirkland_Manholes-1005 | 223.06 | Kirkland_Manholes-1006 | 216.58 | 398.8 | 1.63 | 8 | PVC | 0.01 | 899 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2023 | Kirkland_Manholes-1007 | 215.09 | Kirkland_Manholes-1004 | 214.11 | 335.8 | 0.29 | 8 | PVC | 0.01 | 381 | 6 | 13 | 19 | 5.1 | | |
| Kirkland_Main-2024 | Kirkland_Manholes-1012 | 211.42 | Kirkland_Manholes-1013 | 197.72 | 100.9 | 13.58 | 8 | PVC | 0.01 | 2,598 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2025 | Kirkland_Manholes-1013 | 197.72 | Kirkland_Manholes-1014 | 187.16 | 124 | 8.52 | 8 | PVC | 0.01 | 2,057 | 3 | 9 | 12 | 0.6 | | |
| Kirkland_Main-2026 | Kirkland_Manholes-1014 | 187.16 | Kirkland_Manholes-1015 | 186.96 | 99 | 0.2 | 8 | PVC | 0.01 | 317 | 3 | 13 | 16 | 5.1 | | |
| Kirkland_Main-2027 | Kirkland_Manholes-1015 | 186.96 | Kirkland_Manholes-1016 | 185.35 | 120.5 | 1.34 | 8 | PVC | 0.01 | 815 | 5 | 17 | 23 | 2.8 | | |
| Kirkland_Main-2028 | Kirkland_Manholes-1016 | 185.35 | Kirkland_Manholes-1036 | 185.26 | 143 | 0.06 | 8 | PVC | 0.01 | 174 | 8 | 22 | 29 | 16.7 | | |
| Kirkland_Main-2029 | Kirkland_Manholes-1036 | 185.26 | Kirkland_Manholes-1030 | 184.08 | 404.9 | 0.29 | 10 | PVC | 0.01 | 690 | 8 | 26 | 34 | 4.9 | | |
| Kirkland_Main-2030 | Kirkland_Manholes-1030 | 184.08 | Kirkland_Manholes-1031 | 183.18 | 286.1 | 0.31 | 10 | PVC | 0.01 | 717 | 11 | 30 | 41 | 5.8 | | |
| Kirkland_Main-2031 | Kirkland_Manholes-1034 | 183.86 | Kirkland_Manholes-1031 | 183.18 | 169 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 6 | 1.2 | | |
| Kirkland_Main-2032 | Kirkland_Manholes-1031 | 183.18 | Kirkland_Manholes-1035 | 182.7 | 151.6 | 0.32 | 8 | PVC | 0.01 | 397 | 13 | 39 | 52 | 13.2 | | |
| Kirkland_Main-2033 | Kirkland_Manholes-1032 | 177.81 | Kirkland_Manholes-1033 | 173.21 | 285.6 | 1.61 | 8 | PVC | 0.01 | 895 | 4 | 9 | 12 | 1.4 | | |
| Kirkland_Main-2034 | Kirkland_Manholes-1004 | 214.11 | Kirkland_Manholes-1028 | 212.78 | 233.9 | 0.57 | 8 | PVC | 0.01 | 532 | 11 | 26 | 37 | 6.9 | | |
| Kirkland_Main-2035 | Kirkland_Manholes-1009 | 214.27 | Kirkland_Manholes-1008 | 211.28 | 293.5 | 1.02 | 8 | PVC | 0.01 | 712 | 2 | 4 | 7 | 0.9 | SM14-Ex-EX19 | |
| Kirkland_Main-2036 | Kirkland_Manholes-1028 | 212.78 | Kirkland_Manholes-1008 | 211.28 | 261 | 0.57 | 8 | PVC | 0.01 | 534 | 11 | 30 | 41 | 7.7 | SM14-Ex-EX19 | |
| Kirkland_Main-2037 | Kirkland_Manholes-1008 | 211.28 | Kirkland_Manholes-1029 | 210.29 | 108.6 | 0.91 | 8 | PVC | 0.01 | 673 | 13 | 39 | 52 | 7.7 | SM14-Ex-EX19 | |
| Kirkland_Main-2038 | Kirkland_Manholes-1029 | 210.29 | Kirkland_Manholes-1010 | 207.69 | 265.5 | 0.98 | 8 | PVC | 0.01 | 698 | 13 | 43 | 56 | 8 | SM14-Ex-EX19 | |
| Kirkland_Main-2039 | Kirkland_Manholes-1010 | 207.69 | Kirkland_Manholes-1017 | 205.5 | 77.5 | 2.83 | 8 | PVC | 0.01 | 1,186 | 13 | 48 | 61 | 5.1 | SM14-Ex-EX19 | |
| Kirkland_Main-2040 | Kirkland_Manholes-1022 | 213.66 | Kirkland_Manholes-1023 | 207.88 | 245.2 | 2.36 | 8 | PVC | 0.01 | 1,083 | 40 | 112 | 153 | 14.1 | SM14-Ex-EX18 | |
| Kirkland_Main-2041 | Kirkland_Manholes-1023 | 207.88 | Kirkland_Manholes-1017 | 205.5 | 153 | 1.56 | 8 | PVC | 0.01 | 879 | 43 | 117 | 159 | 18.1 | SM14-Ex-EX18 | |
| Kirkland_Main-2042 | Kirkland_Manholes-1017 | 205.5 | Kirkland_Manholes-1018 | 179.75 | 288.9 | 8.91 | 8 | PVC | 0.01 | 2,105 | 56 | 169 | 225 | 10.7 | SM14-Ex-EX31 | |
| Kirkland_Main-2043 | Kirkland_Manholes-1025 | 183.2 | Kirkland_Manholes-1026 | 149.27 | 241.9 | 14.02 | 8 | PVC | 0.01 | 2,640 | 3 | 4 | 8 | 0.3 | | |
| Kirkland_Main-2044 | Kirkland_Manholes-1027 | 150.87 | Kirkland_Manholes-1026 | 149.27 | 180 | 0.89 | 8 | PVC | 0.01 | 665 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2045 | Kirkland_Manholes-1021 | 230.72 | Kirkland_Manholes-1020 | 230.54 | 45.4 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.6 | SM14-Ex-EX18 | Drop Connection |
| Kirkland_Main-2046 | Kirkland_Manholes-1020 | 226.4 | Kirkland_Manholes-1019 | 216.75 | 175.1 | 5.51 | 8 | PVC | 0.01 | 1,655 | 37 | 104 | 141 | 8.5 | SM14-Ex-EX18 | |
| Kirkland_Main-2047 | Kirkland_Manholes-1019 | 216.75 | Kirkland_Manholes-1022 | 213.66 | 284.9 | 1.08 | 8 | PVC | 0.01 | 734 | 39 | 108 | 147 | 20 | SM14-Ex-EX18 | |
| Kirkland_Main-2050 | Kirkland_Manholes-1037 | 180.8 | Kirkland_Manholes-1032 | 177.81 | 192.3 | 1.56 | 8 | PVC | 0.01 | 879 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2051 | Kirkland_Manholes-1041 | 211.62 | Kirkland_Manholes-1040 | 211.16 | 115.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-2052 | Kirkland_Manholes-1040 | 211.16 | Kirkland_Manholes-1039 | 191.93 | 181.5 | 10.59 | 8 | PVC | 0.01 | 2,295 | 3 | 9 | 12 | 0.5 | | |
| Kirkland_Main-2053 | Kirkland_Manholes-1039 | 191.93 | Kirkland_Manholes-1038 | 180.54 | 235.3 | 4.84 | 8 | PVC | 0.01 | 1,551 | 5 | 13 | 18 | 1.1 | | |
| Kirkland_Main-2054 | Kirkland_Manholes-1038 | 180.54 | Kirkland_Manholes-1042 | 180.42 | 296.4 | 0.04 | 8 | PVC | 0.01 | 140 | 25 | 82 | 108 | 76.9 | SM14-2035-DF6 | |
| Kirkland_Main-2055 | Kirkland_Manholes-1045 | 212.56 | Kirkland_Manholes-1044 | 190.19 | 362.7 | 6.17 | 8 | PVC | 0.01 | 1,751 | 3 | 4 | 8 | 0.4 | | |
| Kirkland_Main-2056 | Kirkland_Manholes-1044 | 190.19 | Kirkland_Manholes-1043 | 180.32 | 106.1 | 9.3 | 8 | PVC | 0.01 | 2,151 | 5 | 9 | 13 | 0.6 | | |
| Kirkland_Main-2057 | Kirkland_Manholes-1042 | 180.42 | Kirkland_Manholes-1043 | 180.32 | 14.1 | 0.71 | 8 | PVC | 0.01 | 594 | 26 | 87 | 113 | 18.9 | | |
| Kirkland_Main-2058 | Kirkland_Manholes-1051 | 183.74 | Kirkland_Manholes-1050 | 181.82 | 166.3 | 1.15 | 8 | PVC | 0.01 | 758 | 77 | 147 | 224 | 29.6 | | |
| Kirkland_Main-2059 | Kirkland_Manholes-1050 | 181.82 | Kirkland_Manholes-1049 | 169.63 | 230.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 85 | 151 | 237 | 14.6 | | |
| Kirkland_Main-2060 | Kirkland_Manholes-1049 | 169.63 | Kirkland_Manholes-1048 | 168.86 | 245.7 | 0.31 | 8 | PVC | 0.01 | 395 | 85 | 156 | 241 | 61.1 | | |
| Kirkland_Main-2061 | Kirkland_Manholes-986 | 204.38 | Kirkland_Manholes-1051 | 183.74 | 288.7 | 7.15 | 8 | PVC | 0.01 | 1,885 | 75 | 143 | 218 | 11.6 | | |
| Kirkland_Main-2062 | Kirkland_Manholes-1048 | 168.86 | Kirkland_Manholes-1047 | 166.5 | 308.6 | 0.76 | 8 | PVC | 0.01 | 617 | 92 | 160 | 252 | 40.9 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2063 | Kirkland_Manholes-1047 | 166.5 | Kirkland_Manholes-1046 | 162.86 | 368.8 | 0.99 | 8 | PVC | 0.01 | 700 | 92 | 164 | 256 | 36.6 | | |
| Kirkland_Main-2064 | Kirkland_Manholes-1053 | 228.57 | Kirkland_Manholes-1089 | 214.64 | 105.1 | 13.25 | 8 | PVC | 0.01 | 2,566 | 1 | 33 | 34 | 1.3 | | |
| Kirkland_Main-2065 | Kirkland_Manholes-1054 | 235.88 | Kirkland_Manholes-1053 | 228.57 | 61.2 | 11.95 | 8 | PVC | 0.01 | 2,437 | 1 | 28 | 29 | 1.2 | | |
| Kirkland_Main-2066 | Kirkland_Manholes-1062 | 265.12 | Kirkland_Manholes-1055 | 254.27 | 156.2 | 6.95 | 8 | PVC | 0.01 | 1,858 | 7 | 20 | 27 | 1.5 | | |
| Kirkland_Main-2067 | Kirkland_Manholes-1063 | 275.15 | Kirkland_Manholes-1062 | 265.12 | 144.2 | 6.96 | 8 | PVC | 0.01 | 1,860 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2068 | Kirkland_Manholes-1064 | 278.57 | Kirkland_Manholes-1062 | 265.12 | 154.9 | 8.68 | 8 | PVC | 0.01 | 2,078 | 5 | 12 | 17 | 0.8 | | |
| Kirkland_Main-2069 | Kirkland_Manholes-1055 | 254.27 | Kirkland_Manholes-1056 | 242.38 | 224 | 5.31 | 8 | PVC | 0.01 | 1,625 | 8 | 24 | 32 | 2 | | |
| Kirkland_Main-2070 | Kirkland_Manholes-1056 | 242.38 | Kirkland_Manholes-1057 | 237.15 | 108.2 | 4.83 | 8 | PVC | 0.01 | 1,550 | 9 | 28 | 38 | 2.4 | | |
| Kirkland_Main-2071 | Kirkland_Manholes-1057 | 237.15 | Kirkland_Manholes-1058 | 224.96 | 136.1 | 8.96 | 8 | PVC | 0.01 | 2,110 | 13 | 45 | 57 | 2.7 | | |
| Kirkland_Main-2072 | Kirkland_Manholes-1059 | 243.26 | Kirkland_Manholes-1057 | 237.15 | 201.9 | 3.03 | 8 | PVC | 0.01 | 1,227 | 3 | 12 | 15 | 1.2 | | |
| Kirkland_Main-2073 | Kirkland_Manholes-1061 | 271.51 | Kirkland_Manholes-1060 | 252.96 | 148.5 | 12.49 | 8 | PVC | 0.01 | 2,492 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2074 | Kirkland_Manholes-1060 | 252.96 | Kirkland_Manholes-1059 | 243.26 | 83.7 | 11.58 | 8 | PVC | 0.01 | 2,400 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2075 | Kirkland_Manholes-1103 | 198.97 | Kirkland_Manholes-1101 | 197.04 | 31 | 6.23 | 18 | PVC | 0.01 | 15,303 | 657 | 2,120 | 2,777 | 18.1 | | |
| Kirkland_Main-2076 | Kirkland_Manholes-1102 | 199.75 | Kirkland_Manholes-1101 | 197.04 | 30.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 3 | 41 | 44 | 2.1 | | |
| Kirkland_Main-2077 | Kirkland_Manholes-1100 | 201.72 | Kirkland_Manholes-1102 | 199.75 | 337.5 | 0.58 | 8 | PVC | 0.01 | 539 | 2 | 37 | 38 | 7.1 | | |
| Kirkland_Main-2078 | Kirkland_Manholes-1093 | 203.29 | Kirkland_Manholes-1100 | 201.72 | 272.4 | 0.58 | 8 | PVC | 0.01 | 535 | 0 | 33 | 33 | 6.1 | | |
| Kirkland_Main-2079 | Kirkland_Manholes-1095 | 206.07 | Kirkland_Manholes-1094 | 204.22 | 102 | 1.81 | 8 | PVC | 0.01 | 950 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2080 | Kirkland_Manholes-1094 | 204.22 | Kirkland_Manholes-1093 | 203.29 | 43.7 | 2.13 | 8 | PVC | 0.01 | 1,028 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-2081 | Kirkland_Manholes-1096 | 204.27 | Kirkland_Manholes-1093 | 203.29 | 162.1 | 0.6 | 8 | PVC | 0.01 | 548 | 0 | 20 | 20 | 3.7 | | |
| Kirkland_Main-2082 | Kirkland_Manholes-1098 | 205.6 | Kirkland_Manholes-1097 | 204.86 | 78.1 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2083 | Kirkland_Manholes-1097 | 204.86 | Kirkland_Manholes-1096 | 204.27 | 167.5 | 0.35 | 8 | PVC | 0.01 | 418 | 0 | 16 | 16 | 3.9 | | |
| Kirkland_Main-2084 | Kirkland_Manholes-1099 | 211.44 | Kirkland_Manholes-1097 | 204.86 | 308.5 | 2.13 | 8 | PVC | 0.01 | 1,030 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-2085 | Kirkland_Manholes-1079 | 238.18 | Kirkland_Manholes-1080 | 229.14 | 134.4 | 6.73 | 8 | PVC | 0.01 | 1,829 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2086 | Kirkland_Manholes-1080 | 229.14 | Kirkland_Manholes-1081 | 226.1 | 255.6 | 1.19 | 8 | PVC | 0.01 | 769 | 73 | 264 | 337 | 43.8 | | |
| Kirkland_Main-2087 | Kirkland_Manholes-1082 | 233.35 | Kirkland_Manholes-1081 | 226.1 | 142.6 | 5.08 | 8 | PVC | 0.01 | 1,590 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2088 | Kirkland_Manholes-1081 | 226.1 | Kirkland_Manholes-1070 | 224.89 | 260.5 | 0.46 | 8 | PVC | 0.01 | 481 | 74 | 273 | 347 | 72.2 | SM14-2035-DF7 | |
| Kirkland_Main-2089 | Kirkland_Manholes-1069 | 247.48 | Kirkland_Manholes-1070 | 224.89 | 321.6 | 7.02 | 8 | PVC | 0.01 | 1,869 | 73 | 232 | 482 | 25.8 | | |
| Kirkland_Main-2090 | Kirkland_Manholes-1067 | 259.57 | Kirkland_Manholes-1069 | 247.48 | 126 | 9.6 | 8 | PVC | 0.01 | 2,184 | 68 | 216 | 460 | 21.1 | | |
| Kirkland_Main-2091 | Kirkland_Manholes-1071 | 277.81 | Kirkland_Manholes-1067 | 259.57 | 242.2 | 7.53 | 8 | PVC | 0.01 | 1,935 | 17 | 61 | 78 | 4 | | |
| Kirkland_Main-2092 | Kirkland_Manholes-1072 | 288.83 | Kirkland_Manholes-1071 | 277.81 | 139.9 | 7.88 | 8 | PVC | 0.01 | 1,979 | 8 | 20 | 28 | 1.4 | | |
| Kirkland_Main-2093 | Kirkland_Manholes-1077 | 252.59 | Kirkland_Manholes-1069 | 247.48 | 346.5 | 1.47 | 8 | PVC | 0.01 | 856 | 4 | 12 | 16 | 1.9 | | |
| Kirkland_Main-2094 | Kirkland_Manholes-1078 | 305.14 | Kirkland_Manholes-1073 | 302.05 | 162.4 | 1.9 | 8 | PVC | 0.01 | 973 | 3 | 8 | 11 | 1.2 | | |
| Kirkland_Main-2095 | Kirkland_Manholes-1073 | 302.05 | Kirkland_Manholes-1072 | 288.83 | 375.1 | 3.52 | 8 | PVC | 0.01 | 1,324 | 7 | 16 | 23 | 1.7 | | |
| Kirkland_Main-2096 | Kirkland_Manholes-1074 | 295.05 | Kirkland_Manholes-1075 | 291.84 | 155.4 | 2.07 | 8 | PVC | 0.01 | 1,013 | 47 | 130 | 354 | 34.9 | | |
| Kirkland_Main-2097 | Kirkland_Manholes-1076 | 298.68 | Kirkland_Manholes-1074 | 295.05 | 108.2 | 3.36 | 8 | PVC | 0.01 | 1,291 | 47 | 126 | 349 | 27 | | |
| Kirkland_Main-2098 | Kirkland_Manholes-1068 | 279.38 | Kirkland_Manholes-1066 | 278.91 | 39.6 | 1.19 | 8 | PVC | 0.01 | 768 | 50 | 142 | 369 | 48 | | |
| Kirkland_Main-2099 | Kirkland_Manholes-1066 | 278.91 | Kirkland_Manholes-1065 | 260.88 | 143.1 | 12.6 | 8 | PVC | 0.01 | 2,502 | 50 | 146 | 373 | 14.9 | | |
| Kirkland_Main-2100 | Kirkland_Manholes-1065 | 260.88 | Kirkland_Manholes-1067 | 259.57 | 130 | 1.01 | 8 | PVC | 0.01 | 708 | 51 | 151 | 377 | 53.3 | | |
| Kirkland_Main-2101 | Kirkland_Manholes-1090 | 254.86 | Kirkland_Manholes-1091 | 251.69 | 82.2 | 3.86 | 8 | PVC | 0.01 | 1,385 | 1 | 16 | 17 | 1.2 | | |
| Kirkland_Main-2102 | Kirkland_Manholes-1091 | 251.69 | Kirkland_Manholes-1092 | 246.51 | 140.9 | 3.68 | 8 | PVC | 0.01 | 1,352 | 1 | 20 | 21 | 1.6 | | |
| Kirkland_Main-2103 | Kirkland_Manholes-1092 | 246.51 | Kirkland_Manholes-1054 | 235.88 | 141.8 | 7.5 | 8 | PVC | 0.01 | 1,931 | 1 | 24 | 25 | 1.3 | | |
| Kirkland_Main-2104 | Kirkland_Manholes-1089 | 214.64 | Kirkland_Manholes-1086 | 198.2 | 276 | 5.96 | 8 | PVC | 0.01 | 1,721 | 1 | 37 | 38 | 2.2 | | |
| Kirkland_Main-2105 | Kirkland_Manholes-1088 | 203.98 | Kirkland_Manholes-1087 | 203.79 | 103.7 | 0.19 | 8 | PVC | 0.01 | 306 | 5 | 4 | 9 | 3 | | |
| Kirkland_Main-2106 | Kirkland_Manholes-1087 | 203.79 | Kirkland_Manholes-1086 | 198.2 | 55.1 | 10.14 | 8 | PVC | 0.01 | 2,245 | 5 | 8 | 13 | 0.6 | | |
| Kirkland_Main-2107 | Kirkland_Manholes-1070 | 224.89 | Kirkland_Manholes-1083 | 220.88 | 227.5 | 1.76 | 12 | PVC | 0.01 | 2,760 | 149 | 509 | 834 | 30.2 | SM14-Ex-EX321 | |
| Kirkland_Main-2108 | Kirkland_Manholes-2996 | 220.63 | Kirkland_Manholes-1084 | 206.2 | 323.5 | 4.46 | 8 | PVC | 0.01 | 1,489 | 159 | 521 | 856 | 57.5 | | |
| Kirkland_Main-2109 | Kirkland_Manholes-1058 | 224.96 | Kirkland_Manholes-1084 | 206.2 | 342.8 | 5.47 | 8 | PVC | 0.01 | 1,649 | 13 | 49 | 62 | 3.8 | | |
| Kirkland_Main-2110 | Kirkland_Manholes-1084 | 206.2 | Kirkland_Manholes-1085 | 204.43 | 46.9 | 3.78 | 8 | PVC | 0.01 | 1,370 | 173 | 574 | 923 | 67.4 | | |
| Kirkland_Main-2111 | Kirkland_Manholes-1101 | 197.04 | Kirkland_Manholes-1104 | 196.79 | 207.5 | 0.12 | 24 | PVC | 0.01 | 4,572 | 660 | 2,165 | 2,825 | 61.8 | SM14-Ex-EX22 | |
| Kirkland_Main-2112 | Kirkland_Manholes-1112 | 179.44 | Kirkland_Manholes-1124 | 177.02 | 214.1 | 1.13 | 15 | PVC | 0.01 | 4,007 | 66 | 33 | 98 | 2.5 | | |
| Kirkland_Main-2113 | Kirkland_Manholes-1113 | 180.6 | Kirkland_Manholes-1112 | 179.44 | 131.8 | 0.88 | 15 | PVC | 0.01 | 3,535 | 57 | 24 | 81 | 2.3 | | |
| Kirkland_Main-2114 | Kirkland_Manholes-1117 | 196.58 | Kirkland_Manholes-1115 | 186.39 | 163.3 | 6.24 | 15 | PVC | 0.01 | 9,416 | 21 | 12 | 33 | 0.3 | | |
| Kirkland_Main-2115 | Kirkland_Manholes-1116 | 180.36 | Kirkland_Manholes-1112 | 179.44 | 120 | 0.77 | 8 | PVC | 0.01 | 617 | 4 | 4 | 8 | 1.3 | | |
| Kirkland_Main-2116 | Kirkland_Manholes-1119 | 159.49 | Kirkland_Manholes-1120 | 158.13 | 217.8 | 0.62 | 8 | PVC | 0.01 | 557 | 29 | 6 | 34 | 6.2 | | |
| Kirkland_Main-2117 | Kirkland_Manholes-1126 | 164.51 | Kirkland_Manholes-1127 | 163.92 | 310.2 | 0.19 | 24 | PVC | 0.01 | 5,757 | 331 | 700 | 1,207 | 21 | SM14-Ex-EX4 | |
| Kirkland_Main-2118 | Kirkland_Manholes-1134 | 223.76 | Kirkland_Manholes-1131 | 191.56 | 280.1 | 11.49 | 8 | PVC | 0.01 | 2,390 | 14 | 24 | 37 | 1.6 | SM14-Ex-EX63 | |
| Kirkland_Main-2119 | Kirkland_Manholes-1137 | 231.81 | Kirkland_Manholes-1135 | 210.01 | 166.8 | 13.07 | 8 | PVC | 0.01 | 2,549 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX81 | |
| Kirkland_Main-2120 | Kirkland_Manholes-1135 | 210.01 | Kirkland_Manholes-1131 | 191.56 | 334.9 | 5.51 | 8 | PVC | 0.01 | 1,655 | 2 | 13 | 15 | 0.9 | SM14-Ex-EX81 | |
| Kirkland_Main-2121 | Kirkland_Manholes-1136 | 213.62 | Kirkland_Manholes-1135 | 210.01 | 85.6 | 4.22 | 8 | PVC | 0.01 | 1,448 | 0 | 4 | 4 | 0.3 | SM14-Ex-EX81 | |
| Kirkland_Main-2122 | Kirkland_Manholes-680 | 257.67 | Kirkland_Manholes-679 | 257.45 | 31.1 | 0.71 | 8 | PVC | 0.01 | 593 | 22 | 24 | 46 | 7.8 | | |
| Kirkland_Main-2123 | Kirkland_Manholes-679 | 257.45 | Kirkland_Manholes-681 | 256.89 | 146.9 | 0.38 | 8 | PVC | 0.01 | 435 | 22 | 33 | 55 | 12.6 | | |
| Kirkland_Main-2124 | Kirkland_Manholes-678 | 266.88 | Kirkland_Manholes-679 | 257.45 | 86.2 | 10.93 | 8 | PVC | 0.01 | 2,331 | 0 | 4 | 4 | 0.2 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2125 | Kirkland_Manholes-682 | 258.64 | Kirkland_Manholes-680 | 257.67 | 223 | 0.44 | 8 | PVC | 0.01 | 465 | 1 | 20 | 21 | 4.6 | | |
| Kirkland_Main-2126 | Kirkland_Manholes-685 | 255.36 | Kirkland_Manholes-1888 | 254.12 | 288.3 | 0.43 | 8 | PVC | 0.01 | 462 | 24 | 45 | 69 | 14.9 | | |
| Kirkland_Main-2127 | Kirkland_Manholes-684 | 256.25 | Kirkland_Manholes-685 | 255.36 | 200.3 | 0.44 | 8 | PVC | 0.01 | 469 | 22 | 41 | 63 | 13.4 | | |
| Kirkland_Main-2128 | Kirkland_Manholes-1740 | 35.99 | Kirkland_Manholes-1743 | 28.04 | 156.8 | 5.07 | 10 | PVC | 0.01 | 2,878 | 324 | 560 | 885 | 30.7 | | |
| Kirkland_Main-2129 | Kirkland_Manholes-1757 | 18.99 | Kirkland_Manholes-1756 | 15.01 | 53.7 | 7.42 | 8 | PVC | 0.01 | 1,920 | 6 | 6 | 12 | 0.6 | SM14-Ex-EX183 | |
| Kirkland_Main-2130 | Kirkland_Manholes-1756 | 15.01 | Kirkland_Manholes-1758 | 14.89 | 54.1 | 0.21 | 12 | PVC | 0.01 | 959 | 65 | 19 | 85 | 8.8 | SM14-Ex-EX183 | |
| Kirkland_Main-2131 | Kirkland_Manholes-1758 | 14.89 | Kirkland_Manholes-1759 | 14.76 | 60.8 | 0.23 | 12 | PVC | 0.01 | 991 | 68 | 26 | 94 | 9.5 | SM14-Ex-EX183 | |
| Kirkland_Main-2132 | Kirkland_Manholes-1759 | 14.76 | Kirkland_Manholes-1789 | 14.67 | 38.9 | 0.21 | 12 | PVC | 0.01 | 957 | 68 | 32 | 101 | 10.5 | SM14-Ex-EX183 | |
| Kirkland_Main-2133 | Kirkland_Manholes-2067 | 19 | Kirkland_Manholes-1756 | 15.01 | 217.5 | 1.84 | 12 | PVC | 0.01 | 2,816 | 52 | 6 | 59 | 2.1 | SM14-Ex-EX183 | |
| Kirkland_Main-2134 | Kirkland_Manholes-2305 | 15.26 | Kirkland_Manholes-1755 | 15.12 | 124.7 | 0.11 | 21 | PVC | 0.01 | 3,097 | 336 | 676 | 1,012 | 32.7 | | |
| Kirkland_Main-2135 | Kirkland_Manholes-1755 | 15.12 | Kirkland_Manholes-1753 | 14.83 | 381.1 | 0.08 | 21 | PVC | 0.01 | 2,550 | 336 | 682 | 1,018 | 39.9 | | |
| Kirkland_Main-2136 | Kirkland_Manholes-1753 | 14.83 | Kirkland_Manholes-1754 | 14.75 | 34.9 | 0.23 | 21 | PVC | 0.01 | 4,426 | 343 | 689 | 1,031 | 23.3 | | |
| Kirkland_Main-2137 | Kirkland_Manholes-1754 | 14.75 | Kirkland_Manholes-1789 | 14.67 | 165.1 | 0.05 | 21 | PVC | 0.01 | 2,035 | 350 | 695 | 1,045 | 51.3 | | |
| Kirkland_Main-2138 | Kirkland_Manholes-1692 | 35.9 | Kirkland_Manholes-736 | 28.45 | 107.1 | 6.96 | 8 | PVC | 0.01 | 1,860 | 76 | 272 | 348 | 18.7 | SM14-Ex-EX96 | |
| Kirkland_Main-2139 | Kirkland_Manholes-1694 | 44.12 | Kirkland_Manholes-1692 | 35.9 | 116.3 | 7.07 | 8 | PVC | 0.01 | 1,874 | 72 | 255 | 328 | 17.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2140 | Kirkland_Manholes-1701 | 49.81 | Kirkland_Manholes-1694 | 44.12 | 274.3 | 2.07 | 8 | PVC | 0.01 | 1,016 | 8 | 16 | 25 | 2.5 | SM14-Ex-EX152 | |
| Kirkland_Main-2141 | Kirkland_Manholes-1702 | 82.31 | Kirkland_Manholes-1701 | 49.81 | 296.4 | 10.96 | 8 | PVC | 0.01 | 2,335 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX152 | |
| Kirkland_Main-2142 | Kirkland_Manholes-1698 | 89.68 | Kirkland_Manholes-1697 | 68.77 | 247.3 | 8.45 | 8 | PVC | 0.01 | 2,050 | 1 | 8 | 10 | 0.5 | SM14-Ex-EX151 | |
| Kirkland_Main-2143 | Kirkland_Manholes-1697 | 68.77 | Kirkland_Manholes-1696 | 58.41 | 181 | 5.72 | 8 | PVC | 0.01 | 1,687 | 8 | 16 | 24 | 1.5 | SM14-Ex-EX151 | |
| Kirkland_Main-2144 | Kirkland_Manholes-614 | 87.89 | Kirkland_Manholes-1696 | 58.41 | 277.2 | 10.64 | 8 | PVC | 0.01 | 2,299 | 51 | 198 | 248 | 10.8 | SM14-Ex-EX96 | |
| Kirkland_Main-2145 | Kirkland_Manholes-2025 | 477 | Kirkland_Manholes-2024 | 470.6 | 42.9 | 14.92 | 8 | PVC | 0.01 | 2,724 | 8 | 12 | 20 | 0.7 | | |
| Kirkland_Main-2146 | Kirkland_Manholes-2024 | 470.6 | Kirkland_Manholes-2023 | 466.76 | 120.1 | 3.2 | 8 | PVC | 0.01 | 1,261 | 8 | 16 | 25 | 2 | | |
| Kirkland_Main-2147 | Kirkland_Manholes-2019 | 467.83 | Kirkland_Manholes-2022 | 466 | 273.9 | 0.67 | 10 | PVC | 0.01 | 1,045 | 121 | 252 | 373 | 35.7 | | |
| Kirkland_Main-2148 | Kirkland_Manholes-2028 | 481.27 | Kirkland_Manholes-2026 | 474.59 | 90.6 | 7.37 | 8 | PVC | 0.01 | 1,914 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2149 | Kirkland_Manholes-2029 | 479.06 | Kirkland_Manholes-2027 | 477.1 | 283.3 | 0.69 | 8 | PVC | 0.01 | 586 | 25 | 77 | 103 | 17.5 | | |
| Kirkland_Main-2150 | Kirkland_Manholes-2027 | 477.1 | Kirkland_Manholes-2026 | 474.59 | 76.4 | 3.29 | 8 | PVC | 0.01 | 1,278 | 27 | 81 | 108 | 8.5 | | |
| Kirkland_Main-2151 | Kirkland_Manholes-2026 | 474.59 | Kirkland_Manholes-2021 | 473.17 | 135.7 | 1.05 | 8 | PVC | 0.01 | 721 | 29 | 90 | 118 | 16.4 | | |
| Kirkland_Main-2152 | Kirkland_Manholes-2033 | 462.47 | Kirkland_Manholes-2034 | 462.21 | 16.1 | 1.61 | 8 | PVC | 0.01 | 896 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-2153 | Kirkland_Manholes-2034 | 462.21 | Kirkland_Manholes-2032 | 461.07 | 176.2 | 0.65 | 8 | PVC | 0.01 | 567 | 1 | 8 | 10 | 1.7 | | Drop Connection |
| Kirkland_Main-2154 | Kirkland_Manholes-2031 | 464.09 | Kirkland_Manholes-2032 | 458.97 | 79 | 6.48 | 8 | PVC | 0.01 | 1,795 | 133 | 289 | 422 | 23.5 | SM14-Ex-EX264 | |
| Kirkland_Main-2155 | Kirkland_Manholes-2030 | 465.11 | Kirkland_Manholes-2031 | 464.09 | 197.9 | 0.52 | 10 | PVC | 0.01 | 918 | 133 | 285 | 418 | 45.5 | | |
| Kirkland_Main-2156 | Kirkland_Manholes-2022 | 466 | Kirkland_Manholes-2030 | 465.11 | 389.3 | 0.23 | 10 | PVC | 0.01 | 611 | 131 | 277 | 407 | 66.6 | | |
| Kirkland_Main-2157 | Kirkland_Manholes-2035 | 454.4 | Kirkland_Manholes-2036 | 452.58 | 173.2 | 1.05 | 8 | PVC | 0.01 | 723 | 137 | 305 | 442 | 61.2 | SM14-Ex-EX264 | |
| Kirkland_Main-2158 | Kirkland_Manholes-2032 | 458.97 | Kirkland_Manholes-2035 | 454.4 | 196.5 | 2.33 | 8 | PVC | 0.01 | 1,075 | 136 | 301 | 437 | 40.6 | SM14-Ex-EX264 | |
| Kirkland_Main-2159 | Kirkland_Manholes-2039 | 480.14 | Kirkland_Manholes-2040 | 475.69 | 137 | 3.25 | 8 | PVC | 0.01 | 1,271 | 6 | 8 | 14 | 1.1 | SM14-Ex-EX266 | |
| Kirkland_Main-2160 | Kirkland_Manholes-2038 | 484.4 | Kirkland_Manholes-2039 | 480.14 | 188.8 | 2.26 | 8 | PVC | 0.01 | 1,059 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX266 | |
| Kirkland_Main-2161 | Kirkland_Manholes-2040 | 475.69 | Kirkland_Manholes-2037 | 465.67 | 362.6 | 2.76 | 8 | PVC | 0.01 | 1,172 | 8 | 12 | 21 | 1.8 | SM14-Ex-EX266 | |
| Kirkland_Main-2162 | Kirkland_Manholes-2672 | 373.35 | Kirkland_Manholes-2674 | 354.77 | 247.9 | 7.5 | 8 | PVC | 0.01 | 1,930 | 17 | 81 | 99 | 5.1 | SM14-Ex-EX209 | |
| Kirkland_Main-2163 | Kirkland_Manholes-2671 | 399.75 | Kirkland_Manholes-2672 | 373.35 | 240.8 | 10.97 | 8 | PVC | 0.01 | 2,335 | 16 | 77 | 94 | 4 | SM14-Ex-EX209 | |
| Kirkland_Main-2164 | Kirkland_Manholes-2674 | 354.77 | Kirkland_Manholes-2300 | 337.19 | 208.1 | 8.45 | 8 | PVC | 0.01 | 2,049 | 18 | 85 | 104 | 5.1 | SM14-Ex-EX209 | |
| Kirkland_Main-2165 | Kirkland_Manholes-2678 | 335.2 | Kirkland_Manholes-2681 | 334.86 | 198.8 | 0.17 | 12 | PVC | 0.01 | 860 | 44 | 171 | 215 | 25 | SM14-Ex-EX206 | |
| Kirkland_Main-2166 | Kirkland_Manholes-2680 | 361.93 | Kirkland_Manholes-2678 | 335.2 | 358.9 | 7.45 | 8 | PVC | 0.01 | 1,924 | 3 | 4 | 8 | 0.4 | | |
| Kirkland_Main-2167 | Kirkland_Manholes-2677 | 336.2 | Kirkland_Manholes-2678 | 335.2 | 208.7 | 0.48 | 12 | PVC | 0.01 | 1,439 | 40 | 163 | 203 | 14.1 | SM14-Ex-EX206 | |
| Kirkland_Main-2168 | Kirkland_Manholes-2676 | 336.73 | Kirkland_Manholes-2677 | 336.2 | 133.1 | 0.4 | 12 | PVC | 0.01 | 1,317 | 40 | 159 | 199 | 15.1 | SM14-Ex-EX206 | |
| Kirkland_Main-2169 | Kirkland_Manholes-2675 | 350.82 | Kirkland_Manholes-2676 | 336.73 | 223.6 | 6.3 | 8 | PVC | 0.01 | 1,770 | 4 | 8 | 12 | 0.7 | SM14-Ex-EX208 | |
| Kirkland_Main-2170 | Kirkland_Manholes-2300 | 337.19 | Kirkland_Manholes-2676 | 336.73 | 113.6 | 0.4 | 12 | PVC | 0.01 | 1,317 | 36 | 146 | 182 | 13.8 | SM14-Ex-EX206 | |
| Kirkland_Main-2171 | Kirkland_Manholes-2697 | 234.26 | Kirkland_Manholes-2245 | 234.09 | 42.8 | 0.4 | 8 | PVC | 0.01 | 444 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2173 | Kirkland_Manholes-2682 | 228.77 | Kirkland_Manholes-2685 | 228.01 | 128.4 | 0.59 | 8 | PVC | 0.01 | 542 | 5 | 12 | 17 | 3.2 | SM14-Ex-EX201 | |
| Kirkland_Main-2174 | Kirkland_Manholes-2683 | 239.58 | Kirkland_Manholes-2682 | 228.77 | 368.9 | 2.93 | 8 | PVC | 0.01 | 1,207 | 3 | 8 | 11 | 0.9 | | |
| Kirkland_Main-2175 | Kirkland_Manholes-2684 | 244.68 | Kirkland_Manholes-2683 | 239.58 | 150.1 | 3.4 | 8 | PVC | 0.01 | 1,300 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2176 | Kirkland_Manholes-2685 | 228.01 | Kirkland_Manholes-2686 | 221.84 | 249.2 | 2.48 | 8 | PVC | 0.01 | 1,109 | 6 | 16 | 22 | 2 | SM14-Ex-EX201 | |
| Kirkland_Main-2177 | Kirkland_Manholes-2311 | 256.52 | Kirkland_Manholes-2310 | 256 | 129.9 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 13 | 18 | 4.1 | | |
| Kirkland_Main-2178 | Kirkland_Manholes-2688 | 231.59 | Kirkland_Manholes-2687 | 227.79 | 162.1 | 2.34 | 8 | PVC | 0.01 | 1,080 | 3 | 8 | 11 | 1.1 | | |
| Kirkland_Main-2179 | Kirkland_Manholes-2687 | 227.79 | Kirkland_Manholes-2686 | 221.84 | 261.7 | 2.27 | 8 | PVC | 0.01 | 1,063 | 5 | 12 | 17 | 1.6 | | |
| Kirkland_Main-2180 | Kirkland_Manholes-2689 | 235.04 | Kirkland_Manholes-2688 | 231.59 | 174.6 | 1.98 | 8 | PVC | 0.01 | 991 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2184 | Kirkland_Manholes-2691 | 211.09 | Kirkland_Manholes-2692 | 205.03 | 238.4 | 2.54 | 8 | PVC | 0.01 | 1,124 | 13 | 41 | 54 | 4.8 | SM14-Ex-EX201 | |
| Kirkland_Main-2185 | Kirkland_Manholes-2692 | 205.03 | Kirkland_Manholes-2693 | 198.67 | 215 | 2.96 | 8 | PVC | 0.01 | 1,213 | 14 | 45 | 59 | 4.8 | SM14-Ex-EX201 | |
| Kirkland_Main-2186 | Kirkland_Manholes-2693 | 198.67 | Kirkland_Manholes-2694 | 189.1 | 61.3 | 15.61 | 8 | PVC | 0.01 | 2,785 | 14 | 49 | 63 | 2.3 | SM14-Ex-EX201 | |
| Kirkland_Main-2187 | Kirkland_Manholes-2695 | 190.38 | Kirkland_Manholes-2694 | 189.1 | 280.3 | 0.46 | 8 | PVC | 0.01 | 476 | 0 | 4 | 4 | 0.9 | SM14-Ex-EX201 | |
| Kirkland_Main-2188 | Kirkland_Manholes-2694 | 189.1 | Kirkland_Manholes-2698 | 186.34 | 272.4 | 1.01 | 8 | PVC | 0.01 | 710 | 15 | 57 | 72 | 10.1 | SM14-Ex-EX198 | |
| Kirkland_Main-2189 | Kirkland_Manholes-2701 | 219.11 | Kirkland_Manholes-2700 | 212.52 | 304.2 | 2.17 | 8 | PVC | 0.01 | 1,038 | 10 | 57 | 67 | 6.4 | | |
| Kirkland_Main-2190 | Kirkland_Manholes-2700 | 212.52 | Kirkland_Manholes-2699 | 190.07 | 286.1 | 7.85 | 8 | PVC | 0.01 | 1,975 | 11 | 61 | 72 | 3.7 | SM14-Ex-EX202 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2191 | Kirkland_Manholes-2699 | 190.07 | Kirkland_Manholes-2696 | 172.94 | 342.2 | 5.01 | 8 | PVC | 0.01 | 1,578 | 12 | 65 | 77 | 4.9 | SM14-Ex-EX202 | |
| Kirkland_Main-2192 | Kirkland_Manholes-2706 | 252.55 | Kirkland_Manholes-2704 | 250.11 | 196.5 | 1.24 | 8 | PVC | 0.01 | 786 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2193 | Kirkland_Manholes-2704 | 250.11 | Kirkland_Manholes-2705 | 234.07 | 107.2 | 14.96 | 8 | PVC | 0.01 | 2,727 | 7 | 49 | 56 | 2.1 | | |
| Kirkland_Main-2194 | Kirkland_Manholes-2705 | 234.07 | Kirkland_Manholes-2701 | 219.11 | 291.8 | 5.13 | 8 | PVC | 0.01 | 1,596 | 9 | 53 | 62 | 3.9 | | |
| Kirkland_Main-2195 | Kirkland_Manholes-2710 | 293.33 | Kirkland_Manholes-2709 | 292.14 | 31.4 | 3.79 | 8 | PVC | 0.01 | 1,373 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2197 | Kirkland_Manholes-501 | 145.5 | Kirkland_Manholes-502 | 134.98 | 294 | 3.58 | 8 | PVC | 0.01 | 1,334 | 1 | 8 | 9 | 0.7 | SM10 | |
| Kirkland_Main-2198 | Kirkland_Manholes-502 | 134.98 | Kirkland_Manholes-1158 | 124.93 | 261.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 3 | 16 | 20 | 1.4 | SM10 | |
| Kirkland_Main-2199 | Kirkland_Manholes-1178 | 142.08 | Kirkland_Manholes-1179 | 123.76 | 339.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 6 | 25 | 31 | 1.9 | SM10 | |
| Kirkland_Main-2200 | Kirkland_Manholes-1177 | 164.29 | Kirkland_Manholes-1178 | 142.08 | 352.7 | 6.3 | 8 | PVC | 0.01 | 1,769 | 3 | 16 | 20 | 1.1 | SM10 | |
| Kirkland_Main-2201 | Kirkland_Manholes-1176 | 174.14 | Kirkland_Manholes-1177 | 164.29 | 198.1 | 4.97 | 8 | PVC | 0.01 | 1,572 | 1 | 8 | 9 | 0.6 | SM10 | |
| Kirkland_Main-2202 | Kirkland_Manholes-1174 | 178.7 | Kirkland_Manholes-1173 | 177.85 | 211.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.3 | SM10 | Drop Connection |
| Kirkland_Main-2203 | Kirkland_Manholes-1175 | 174.04 | Kirkland_Manholes-1173 | 166.52 | 399.1 | 1.88 | 8 | PVC | 0.01 | 968 | 2 | 8 | 10 | 1.1 | SM10 | |
| Kirkland_Main-2204 | Kirkland_Manholes-1173 | 166.52 | Kirkland_Manholes-1172 | 164.12 | 183.3 | 1.31 | 8 | PVC | 0.01 | 807 | 7 | 25 | 32 | 3.9 | SM10 | |
| Kirkland_Main-2205 | Kirkland_Manholes-1172 | 164.12 | Kirkland_Manholes-1171 | 160.49 | 157.6 | 2.3 | 8 | PVC | 0.01 | 1,070 | 8 | 33 | 41 | 3.8 | SM14-Ex-EX79 | |
| Kirkland_Main-2206 | Kirkland_Manholes-2890 | 82 | Kirkland_Manholes-1162 | 78.51 | 88.5 | 3.95 | 8 | PVC | 0.01 | 1,400 | 0 | 8 | 359 | 25.6 | SM14-Ex-EX77 | |
| Kirkland_Main-2207 | Kirkland_Manholes-514 | 18.19 | Kirkland_Manholes-2958 | 17.19 | 133.7 | 0.75 | 8 | PVC | 0.01 | 610 | 34 | 212 | 246 | 40.3 | SM14-Ex-EX37 | |
| Kirkland_Main-2208 | Kirkland_Manholes-493 | 145.66 | Kirkland_Manholes-3107 | 127.14 | 403.7 | 4.59 | 8 | PVC | 0.01 | 1,510 | 2 | 8 | 10 | 0.7 | SM10 | |
| Kirkland_Main-2209 | Kirkland_Manholes-496 | 188.94 | Kirkland_Manholes-495 | 169.48 | 399.8 | 4.87 | 8 | PVC | 0.01 | 1,555 | 2 | 8 | 10 | 0.6 | SM10 | |
| Kirkland_Main-2210 | Kirkland_Manholes-497 | 188.11 | Kirkland_Manholes-499 | 185.94 | 314.9 | 0.69 | 8 | PVC | 0.01 | 585 | 18 | 58 | 75 | 12.9 | SM10 | |
| Kirkland_Main-2211 | Kirkland_Manholes-498 | 190.16 | Kirkland_Manholes-499 | 185.94 | 340.1 | 1.24 | 8 | PVC | 0.01 | 785 | 4 | 8 | 12 | 1.5 | SM10 | |
| Kirkland_Main-2213 | Kirkland_Manholes-510 | 78.8 | Kirkland_Manholes-509 | 76.43 | 10.6 | 22.33 | 15 | PVC | 0.01 | 17,810 | 6 | 41 | 47 | 0.3 | | |
| Kirkland_Main-2214 | Kirkland_Manholes-513 | 81.7 | Kirkland_Manholes-512 | 79.85 | 46 | 4.02 | 12 | PVC | 0.01 | 4,168 | 23 | 157 | 180 | 4.3 | SM14-Ex-EX76 | |
| Kirkland_Main-2215 | Kirkland_Manholes-1825 | 112.27 | Kirkland_Manholes-508 | 102 | 349.6 | 2.94 | 8 | PVC | 0.01 | 1,208 | 4 | 16 | 21 | 1.7 | SM10 | |
| Kirkland_Main-2216 | Kirkland_Manholes-508 | 102 | Kirkland_Manholes-507 | 100.47 | 381.8 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 25 | 31 | 6.9 | SM10 | Drop Connection |
| Kirkland_Main-2217 | Kirkland_Manholes-507 | 85.74 | Kirkland_Manholes-506 | 75.41 | 39.4 | 26.19 | 8 | PVC | 0.01 | 3,608 | 6 | 33 | 39 | 1.1 | | |
| Kirkland_Main-2218 | Kirkland_Manholes-506 | 75.41 | Kirkland_Manholes-505 | 74.06 | 314 | 0.43 | 15 | PVC | 0.01 | 2,471 | 101 | 593 | 1,045 | 42.3 | | |
| Kirkland_Main-2221 | Kirkland_Manholes-505 | 74.06 | Kirkland_Manholes-1824 | 72.16 | 261.9 | 0.73 | 15 | PVC | 0.01 | 3,210 | 102 | 602 | 1,054 | 32.8 | | |
| Kirkland_Main-2222 | Kirkland_Manholes-509 | 76.43 | Kirkland_Manholes-506 | 75.41 | 337.6 | 0.3 | 15 | PVC | 0.01 | 2,072 | 95 | 552 | 998 | 48.2 | | |
| Kirkland_Main-2224 | Kirkland_Manholes-1160 | 77.11 | Kirkland_Manholes-509 | 76.43 | 266.4 | 0.26 | 15 | PVC | 0.01 | 1,904 | 90 | 503 | 943 | 49.5 | | |
| Kirkland_Main-2225 | Kirkland_Manholes-511 | 79.24 | Kirkland_Manholes-1161 | 78.67 | 198.1 | 0.29 | 15 | PVC | 0.01 | 2,022 | 24 | 173 | 197 | 9.8 | | |
| Kirkland_Main-2226 | Kirkland_Manholes-512 | 79.85 | Kirkland_Manholes-511 | 79.24 | 306.1 | 0.2 | 15 | PVC | 0.01 | 1,683 | 24 | 165 | 189 | 11.2 | | |
| Kirkland_Main-2228 | Kirkland_Manholes-1533 | 294.07 | Kirkland_Manholes-1532 | 269.21 | 121 | 20.55 | 8 | PVC | 0.01 | 3,196 | 2 | 12 | 14 | 0.4 | SM14-Ex-EX126 | |
| Kirkland_Main-2229 | Kirkland_Manholes-1532 | 269.21 | Kirkland_Manholes-1531 | 265.03 | 88.5 | 4.72 | 8 | PVC | 0.01 | 1,532 | 2 | 16 | 19 | 1.2 | SM14-Ex-EX126 | |
| Kirkland_Main-2230 | Kirkland_Manholes-1211 | 186.99 | Kirkland_Manholes-1197 | 181.82 | 133.6 | 3.87 | 8 | | 0.012 | 1,156 | 4 | 33 | 37 | 3.2 | | |
| Kirkland_Main-2231 | Kirkland_Manholes-1531 | 265.03 | Kirkland_Manholes-1530 | 229.92 | 439.6 | 7.99 | 8 | PVC | 0.01 | 1,992 | 11 | 28 | 40 | 2 | SM14-Ex-EX125 | |
| Kirkland_Main-2232 | Kirkland_Manholes-1530 | 229.92 | Kirkland_Manholes-1529 | 223.45 | 269.7 | 2.4 | 8 | PVC | 0.01 | 1,092 | 38 | 110 | 147 | 13.5 | SM14-Ex-EX121 | |
| Kirkland_Main-2233 | Kirkland_Manholes-1529 | 223.45 | Kirkland_Manholes-1528 | 217.87 | 160.3 | 3.48 | 8 | PVC | 0.01 | 1,316 | 40 | 114 | 154 | 11.7 | SM14-Ex-EX121 | |
| Kirkland_Main-2235 | Kirkland_Manholes-1249 | 223.25 | Kirkland_Manholes-1250 | 210.15 | 250.9 | 5.22 | 8 | PVC | 0.01 | 1,611 | 17 | 99 | 116 | 7.2 | SM14-Ex-EX65 | |
| Kirkland_Main-2236 | Kirkland_Manholes-1246 | 238.47 | Kirkland_Manholes-1247 | 236.99 | 105.6 | 1.4 | 8 | PVC | 0.01 | 835 | 12 | 58 | 70 | 8.4 | SM14-Ex-EX65 | |
| Kirkland_Main-2237 | Kirkland_Manholes-1248 | 254.12 | Kirkland_Manholes-1247 | 236.99 | 222.2 | 7.71 | 8 | PVC | 0.01 | 1,958 | 1 | 8 | 10 | 0.5 | SM14-Ex-EX97 | |
| Kirkland_Main-2238 | Kirkland_Manholes-1245 | 243.41 | Kirkland_Manholes-1246 | 238.47 | 272.7 | 1.81 | 8 | PVC | 0.01 | 949 | 11 | 49 | 60 | 6.3 | SM14-Ex-EX65 | |
| Kirkland_Main-2239 | Kirkland_Manholes-1244 | 254.14 | Kirkland_Manholes-1245 | 243.41 | 231.8 | 4.63 | 8 | PVC | 0.01 | 1,517 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX65 | |
| Kirkland_Main-2240 | Kirkland_Manholes-1242 | 244.28 | Kirkland_Manholes-208 | 241.09 | 154 | 2.07 | 8 | PVC | 0.01 | 1,015 | 3 | 9 | 11 | 1.1 | SM14-Ex-EX61 | |
| Kirkland_Main-2241 | Kirkland_Manholes-1237 | 263.8 | Kirkland_Manholes-1236 | 256.67 | 250.6 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX60 | |
| Kirkland_Main-2242 | Kirkland_Manholes-1239 | 270.66 | Kirkland_Manholes-1238 | 263.26 | 225.6 | 3.28 | 8 | PVC | 0.01 | 1,277 | 3 | 8 | 12 | 0.9 | SM14-Ex-EX95 | |
| Kirkland_Main-2244 | Kirkland_Manholes-1234 | 275.2 | Kirkland_Manholes-1233 | 274.4 | 31.3 | 2.55 | 8 | PVC | 0.01 | 1,127 | 1 | 8 | 10 | 0.9 | SM14-Ex-EX96 | |
| Kirkland_Main-2245 | Kirkland_Manholes-1233 | 274.4 | Kirkland_Manholes-1232 | 271.55 | 317 | 0.9 | 8 | PVC | 0.01 | 669 | 6 | 25 | 31 | 4.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2246 | Kirkland_Manholes-1232 | 271.55 | Kirkland_Manholes-1231 | 254.08 | 347.6 | 5.03 | 8 | PVC | 0.01 | 1,581 | 9 | 33 | 42 | 2.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2247 | Kirkland_Manholes-1231 | 254.08 | Kirkland_Manholes-1230 | 236.32 | 352.2 | 5.04 | 8 | PVC | 0.01 | 1,583 | 13 | 41 | 54 | 3.4 | SM14-Ex-EX96 | |
| Kirkland_Main-2248 | Kirkland_Manholes-1414 | 476.69 | Kirkland_Manholes-1415 | 475.19 | 382.9 | 0.39 | 8 | PVC | 0.01 | 441 | 2 | 20 | 22 | 5 | | |
| Kirkland_Main-2249 | Kirkland_Manholes-1416 | 475.58 | Kirkland_Manholes-1415 | 475.19 | 141 | 0.28 | 8 | PVC | 0.01 | 371 | 4 | 20 | 24 | 6.5 | | |
| Kirkland_Main-2250 | Kirkland_Manholes-1417 | 477.64 | Kirkland_Manholes-1416 | 475.58 | 44.3 | 4.65 | 8 | PVC | 0.01 | 1,521 | 3 | 16 | 19 | 1.3 | | |
| Kirkland_Main-2251 | Kirkland_Manholes-1419 | 480.31 | Kirkland_Manholes-1418 | 477.42 | 188.2 | 1.54 | 8 | PVC | 0.01 | 874 | 2 | 12 | 14 | 1.6 | | |
| Kirkland_Main-2252 | Kirkland_Manholes-1420 | 487.42 | Kirkland_Manholes-1419 | 480.31 | 251.4 | 2.83 | 8 | PVC | 0.01 | 1,186 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-2253 | Kirkland_Manholes-1421 | 490.08 | Kirkland_Manholes-1420 | 487.42 | 280.7 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2255 | Kirkland_Manholes-1422 | 436.01 | Kirkland_Manholes-1423 | 431.09 | 115.7 | 4.25 | 8 | PVC | 0.01 | 1,454 | 4 | 3 | 7 | 0.5 | | |
| Kirkland_Main-2256 | Kirkland_Manholes-1423 | 431.09 | Kirkland_Manholes-1424 | 424.73 | 75.1 | 8.47 | 8 | PVC | 0.01 | 2,052 | 6 | 6 | 12 | 0.6 | | |
| Kirkland_Main-2257 | Kirkland_Manholes-1424 | 424.73 | Kirkland_Manholes-1425 | 416.33 | 120.8 | 6.95 | 8 | PVC | 0.01 | 1,859 | 7 | 9 | 16 | 0.9 | | |
| Kirkland_Main-2258 | Kirkland_Manholes-1425 | 416.33 | Kirkland_Manholes-2514 | 400.04 | 156.3 | 10.42 | 8 | PVC | 0.01 | 2,276 | 9 | 12 | 21 | 0.9 | | |
| Kirkland_Main-2260 | Kirkland_Manholes-1426 | 513.73 | Kirkland_Manholes-1427 | 513.21 | 150.6 | 0.34 | 8 | PVC | 0.01 | 413 | 2 | 4 | 7 | 1.6 | | |
| Kirkland_Main-2261 | Kirkland_Manholes-2186 | 104.5 | Kirkland_Manholes-2185 | 103.23 | 40.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 23 | 41 | 64 | 5.2 | | |
| Kirkland_Main-2262 | Kirkland_Manholes-2188 | 116.01 | Kirkland_Manholes-2187 | 114.37 | 29.7 | 5.52 | 8 | PVC | 0.01 | 1,657 | 1 | 8 | 9 | 0.5 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2263 | Kirkland_Manholes-2192 | 135.5 | Kirkland_Manholes-2191 | 134.63 | 54 | 1.61 | 8 | PVC | 0.01 | 895 | 0 | 8 | 8 | 0.9 | | |
| Kirkland_Main-2265 | Kirkland_Manholes-2120 | 156.16 | O-33 | 155.88 | 68.2 | 0.41 | 8 | PVC | 0.01 | 452 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-2266 | Kirkland_Manholes-2121 | 179.17 | Kirkland_Manholes-2122 | 169.1 | 148.2 | 6.79 | 8 | PVC | 0.01 | 1,838 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX238 | |
| Kirkland_Main-2267 | Kirkland_Manholes-2122 | 169.1 | Kirkland_Manholes-2123 | 164.83 | 234.6 | 1.82 | 8 | PVC | 0.01 | 951 | 2 | 8 | 11 | 1.1 | SM14-Ex-EX238 | |
| Kirkland_Main-2268 | Kirkland_Manholes-2200 | 29.87 | Kirkland_Manholes-2202 | 26.91 | 11.2 | 26.5 | 8 | PVC | 0.01 | 3,629 | 55 | 19 | 75 | 2.1 | | Slope confirmed by as-builts |
| Kirkland_Main-2270 | Kirkland_Manholes-2209 | 69.6 | Kirkland_Manholes-2206 | 66.42 | 347.3 | 0.92 | 8 | PVC | 0.01 | 675 | 1 | 8 | 9 | 1.4 | SM8 | |
| Kirkland_Main-2271 | Kirkland_Manholes-2208 | 66.31 | Kirkland_Manholes-2207 | 65.6 | 145.2 | 0.49 | 8 | PVC | 0.01 | 493 | 0 | 6 | 7 | 1.4 | SM14-Ex-EX189 | Drop Connection |
| Kirkland_Main-2272 | Kirkland_Manholes-2216 | 56.6 | Kirkland_Manholes-2217 | 22.48 | 221.2 | 15.42 | 8 | PVC | 0.01 | 2,769 | 5 | 32 | 38 | 1.4 | | |
| Kirkland_Main-2273 | Kirkland_Manholes-2215 | 67.8 | Kirkland_Manholes-2214 | 67.15 | 122.4 | 0.53 | 8 | PVC | 0.01 | 514 | 2 | 6 | 9 | 1.7 | | |
| Kirkland_Main-2274 | Kirkland_Manholes-2214 | 67.15 | Kirkland_Manholes-2213 | 66.3 | 36.8 | 2.31 | 8 | PVC | 0.01 | 1,071 | 2 | 13 | 15 | 1.4 | | |
| Kirkland_Main-2275 | Kirkland_Manholes-2213 | 66.3 | Kirkland_Manholes-2216 | 56.6 | 199.9 | 4.85 | 8 | PVC | 0.01 | 1,553 | 4 | 26 | 30 | 1.9 | | |
| Kirkland_Main-2276 | Kirkland_Manholes-2212 | 72.13 | Kirkland_Manholes-2213 | 66.3 | 100 | 5.83 | 8 | PVC | 0.01 | 1,702 | 2 | 6 | 8 | 0.5 | SM14-Ex-EX190 | |
| Kirkland_Main-2278 | Kirkland_Manholes-2124 | 217.78 | Kirkland_Manholes-2303 | 195.57 | 353.2 | 6.29 | 12 | PVC | 0.01 | 5,212 | 316 | 907 | 1,223 | 23.5 | SM14-Ex-EX248 | |
| Kirkland_Main-2280 | Kirkland_Manholes-1463 | 498.43 | Kirkland_Manholes-1464 | 490.77 | 337.1 | 2.27 | 8 | PVC | 0.01 | 1,063 | 6 | 16 | 23 | 2.1 | SM14-Ex-EX271 | |
| Kirkland_Main-2281 | Kirkland_Manholes-1465 | 496.7 | Kirkland_Manholes-1464 | 490.77 | 350 | 1.69 | 8 | PVC | 0.01 | 917 | 7 | 12 | 19 | 2 | SM14-Ex-EX272 | |
| Kirkland_Main-2282 | Kirkland_Manholes-1464 | 490.77 | Kirkland_Manholes-1469 | 490.09 | 171.1 | 0.4 | 8 | PVC | 0.01 | 446 | 15 | 33 | 47 | 10.6 | SM14-Ex-EX271 | |
| Kirkland_Main-2283 | Kirkland_Manholes-1466 | 501.75 | Kirkland_Manholes-1465 | 496.7 | 399.1 | 1.27 | 8 | PVC | 0.01 | 793 | 3 | 8 | 12 | 1.5 | SM14-Ex-EX272 | |
| Kirkland_Main-2284 | Kirkland_Manholes-1467 | 507 | Kirkland_Manholes-1466 | 501.75 | 336.1 | 1.56 | 8 | PVC | 0.01 | 881 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX272 | |
| Kirkland_Main-2285 | Kirkland_Manholes-1470 | 502.07 | Kirkland_Manholes-1475 | 484.92 | 351.8 | 4.88 | 8 | PVC | 0.01 | 1,557 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX268 | |
| Kirkland_Main-2286 | Kirkland_Manholes-1471 | 502.1 | Kirkland_Manholes-1472 | 489.92 | 152.5 | 7.99 | 8 | PVC | 0.01 | 1,993 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX267 | |
| Kirkland_Main-2287 | Kirkland_Manholes-1472 | 489.92 | Kirkland_Manholes-1473 | 489.3 | 149.9 | 0.41 | 8 | PVC | 0.01 | 453 | 3 | 8 | 11 | 2.5 | SM14-Ex-EX267 | |
| Kirkland_Main-2288 | Kirkland_Manholes-1473 | 489.3 | Kirkland_Manholes-1474 | 483.04 | 397.5 | 1.57 | 8 | PVC | 0.01 | 885 | 4 | 12 | 17 | 1.9 | SM14-Ex-EX267 | |
| Kirkland_Main-2289 | Kirkland_Manholes-1474 | 483.04 | Kirkland_Manholes-1478 | 480.02 | 383.8 | 0.79 | 8 | PVC | 0.01 | 625 | 7 | 16 | 23 | 3.6 | SM14-Ex-EX267 | |
| Kirkland_Main-2290 | Kirkland_Manholes-1475 | 484.92 | Kirkland_Manholes-1476 | 483.18 | 394.8 | 0.44 | 8 | PVC | 0.01 | 468 | 2 | 8 | 10 | 2.2 | SM14-Ex-EX268 | |
| Kirkland_Main-2291 | Kirkland_Manholes-1476 | 483.18 | Kirkland_Manholes-1477 | 477.36 | 143.4 | 4.06 | 8 | PVC | 0.01 | 1,421 | 3 | 12 | 15 | 1.1 | SM14-Ex-EX268 | |
| Kirkland_Main-2292 | Kirkland_Manholes-1477 | 477.36 | Kirkland_Manholes-1481 | 462.54 | 116.7 | 12.7 | 8 | PVC | 0.01 | 2,512 | 4 | 16 | 20 | 0.8 | SM14-Ex-EX268 | |
| Kirkland_Main-2293 | Kirkland_Manholes-1478 | 480.02 | Kirkland_Manholes-1479 | 473.98 | 182.8 | 3.3 | 8 | PVC | 0.01 | 1,282 | 8 | 20 | 29 | 2.2 | SM14-Ex-EX267 | |
| Kirkland_Main-2294 | Kirkland_Manholes-1479 | 473.98 | Kirkland_Manholes-1483 | 455.88 | 188.4 | 9.61 | 8 | PVC | 0.01 | 2,185 | 9 | 24 | 33 | 1.5 | SM14-Ex-EX267 | |
| Kirkland_Main-2295 | Kirkland_Manholes-1482 | 457.77 | Kirkland_Manholes-1483 | 455.88 | 220.6 | 0.86 | 8 | PVC | 0.01 | 653 | 65 | 248 | 313 | 48 | SM14-Ex-EX214 | |
| Kirkland_Main-2296 | Kirkland_Manholes-1483 | 455.88 | Kirkland_Manholes-2042 | 455.6 | 242 | 0.12 | 12 | PVC | 0.01 | 707 | 75 | 277 | 352 | 49.7 | SM14-Ex-EX214 | |
| Kirkland_Main-2297 | Kirkland_Manholes-1480 | 465.84 | Kirkland_Manholes-1482 | 457.77 | 216.4 | 3.73 | 8 | PVC | 0.01 | 1,362 | 61 | 224 | 284 | 20.9 | SM14-Ex-EX214 | |
| Kirkland_Main-2298 | Kirkland_Manholes-2162 | 123.07 | Kirkland_Manholes-2139 | 96.6 | 399.7 | 6.62 | 8 | PVC | 0.01 | 1,814 | 5 | 16 | 21 | 1.2 | SM14-Ex-EX194 | |
| Kirkland_Main-2299 | Kirkland_Manholes-2161 | 148.95 | Kirkland_Manholes-2162 | 123.07 | 410.6 | 6.3 | 8 | PVC | 0.01 | 1,770 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX194 | |
| Kirkland_Main-2300 | Kirkland_Manholes-2239 | 125.2 | Kirkland_Manholes-2238 | 92.13 | 326.8 | 10.12 | 8 | PVC | 0.01 | 2,243 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX224 | |
| Kirkland_Main-2301 | Kirkland_Manholes-2241 | 73.4 | Kirkland_Manholes-2240 | 69.07 | 226.1 | 1.92 | 8 | PVC | 0.01 | 976 | 2 | 6 | 8 | 0.8 | | |
| Kirkland_Main-2302 | Kirkland_Manholes-2159 | 84.71 | Kirkland_Manholes-2240 | 69.07 | 248.4 | 6.3 | 8 | PVC | 0.01 | 1,769 | 20 | 65 | 85 | 4.8 | | |
| Kirkland_Main-2303 | Kirkland_Manholes-2243 | 51.95 | Kirkland_Manholes-2244 | 43.69 | 203.1 | 4.07 | 8 | PVC | 0.01 | 1,422 | 2 | 6 | 9 | 0.6 | | |
| Kirkland_Main-2304 | Kirkland_Manholes-2240 | 69.07 | Kirkland_Manholes-2244 | 43.69 | 271.1 | 9.36 | 8 | PVC | 0.01 | 2,157 | 24 | 78 | 102 | 4.7 | | |
| Kirkland_Main-2305 | Kirkland_Manholes-2244 | 43.69 | Kirkland_Manholes-2155 | 42.84 | 213.7 | 0.4 | 8 | PVC | 0.01 | 446 | 30 | 91 | 121 | 27.1 | | Drop Connection |
| Kirkland_Main-2306 | Kirkland_Manholes-2494 | 170.93 | Kirkland_Manholes-2132 | 159.52 | 411.9 | 2.77 | 8 | PVC | 0.01 | 1,173 | 18 | 24 | 42 | 3.6 | SM14-Ex-EX236 | |
| Kirkland_Main-2307 | Kirkland_Manholes-2242 | 36.17 | Kirkland_Manholes-2317 | 17.2 | 251 | 7.56 | 8 | PVC | 0.01 | 1,938 | 2 | 6 | 8 | 0.4 | SM14-Ex-EX191 | |
| Kirkland_Main-2308 | Kirkland_Manholes-2229 | 22.53 | Kirkland_Manholes-2313 | 22.37 | 40.9 | 0.4 | 8 | PVC | 0.01 | 446 | 17 | 39 | 56 | 12.5 | | Drop Connection |
| Kirkland_Main-2309 | Kirkland_Manholes-2228 | 23.08 | Kirkland_Manholes-2314 | 22.81 | 66.4 | 0.4 | 8 | PVC | 0.01 | 446 | 21 | 78 | 99 | 22.1 | | Drop Connection |
| Kirkland_Main-2311 | Kirkland_Manholes-2257 | 348.17 | Kirkland_Manholes-2256 | 329.88 | 184.1 | 9.94 | 8 | PVC | 0.01 | 2,222 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX254 | |
| Kirkland_Main-2312 | Kirkland_Manholes-2267 | 393.07 | Kirkland_Manholes-2266 | 392.8 | 100.8 | 0.27 | 8 | PVC | 0.01 | 365 | 3 | 16 | 19 | 5.2 | | |
| Kirkland_Main-2313 | Kirkland_Manholes-2715 | 29.78 | Kirkland_Manholes-2716 | 29.3 | 129 | 0.37 | 12 | PVC | 0.01 | 1,268 | 83 | 18 | 102 | 8 | | |
| Kirkland_Main-2314 | Kirkland_Manholes-2716 | 29.3 | Kirkland_Manholes-2717 | 21.61 | 141.2 | 5.45 | 12 | PVC | 0.01 | 4,851 | 83 | 24 | 108 | 2.2 | | |
| Kirkland_Main-2315 | Kirkland_Manholes-2717 | 21.61 | Kirkland_Manholes-2718 | 21.4 | 363.5 | 0.06 | 12 | PVC | 0.01 | 500 | 83 | 31 | 114 | 22.8 | | |
| Kirkland_Main-2316 | Kirkland_Manholes-2052 | 419.8 | Kirkland_Manholes-2280 | 418.85 | 171.1 | 0.56 | 8 | PVC | 0.01 | 525 | 1 | 4 | 5 | 1 | SM14-Ex-EX262 | |
| Kirkland_Main-2317 | Kirkland_Manholes-2280 | 418.85 | Kirkland_Manholes-2279 | 418 | 153.8 | 0.55 | 8 | PVC | 0.01 | 524 | 2 | 8 | 10 | 2 | SM14-Ex-EX262 | |
| Kirkland_Main-2318 | Kirkland_Manholes-2274 | 417.36 | Kirkland_Manholes-2273 | 414.69 | 101.2 | 2.64 | 8 | PVC | 0.01 | 1,145 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-2319 | Kirkland_Manholes-2279 | 418 | Kirkland_Manholes-2268 | 401.9 | 291.9 | 5.52 | 8 | PVC | 0.01 | 1,656 | 3 | 12 | 15 | 0.9 | SM14-Ex-EX262 | |
| Kirkland_Main-2320 | Kirkland_Manholes-2268 | 401.9 | Kirkland_Manholes-2269 | 398.2 | 115.6 | 3.2 | 8 | PVC | 0.01 | 1,262 | 17 | 65 | 82 | 6.5 | SM14-Ex-EX261 | |
| Kirkland_Main-2321 | Kirkland_Manholes-2270 | 403.21 | Kirkland_Manholes-2269 | 398.2 | 107.6 | 4.66 | 8 | PVC | 0.01 | 1,521 | 5 | 37 | 42 | 2.7 | | |
| Kirkland_Main-2322 | Kirkland_Manholes-2273 | 414.69 | Kirkland_Manholes-2272 | 410.23 | 107.4 | 4.15 | 8 | PVC | 0.01 | 1,437 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-2323 | Kirkland_Manholes-2272 | 410.23 | Kirkland_Manholes-2271 | 405.49 | 51.3 | 9.24 | 8 | PVC | 0.01 | 2,143 | 2 | 12 | 14 | 0.7 | | |
| Kirkland_Main-2324 | Kirkland_Manholes-2271 | 405.49 | Kirkland_Manholes-2270 | 403.21 | 91.2 | 2.5 | 8 | PVC | 0.01 | 1,115 | 5 | 33 | 37 | 3.3 | | |
| Kirkland_Main-2325 | Kirkland_Manholes-2276 | 410.45 | Kirkland_Manholes-2277 | 408.15 | 110.4 | 2.08 | 8 | PVC | 0.01 | 1,017 | 2 | 8 | 10 | 1 | | |
| Kirkland_Main-2326 | Kirkland_Manholes-2277 | 408.15 | Kirkland_Manholes-2278 | 406.74 | 80.9 | 1.74 | 8 | PVC | 0.01 | 931 | 2 | 12 | 14 | 1.6 | | |
| Kirkland_Main-2327 | Kirkland_Manholes-1228 | 189.87 | Kirkland_Manholes-1227 | 174.57 | 207.5 | 7.37 | 8 | PVC | 0.01 | 1,915 | 25 | 74 | 99 | 5.2 | SM14-Ex-EX96 | |
| Kirkland_Main-2329 | Kirkland_Manholes-1226 | 185.47 | Kirkland_Manholes-1227 | 174.57 | 349.3 | 3.12 | 8 | PVC | 0.01 | 1,245 | 3 | 8 | 11 | 0.9 | SM14-Ex-EX93 | |
| Kirkland_Main-2333 | Kirkland_Manholes-1209 | 251.94 | Kirkland_Manholes-1208 | 237.71 | 314.7 | 4.52 | 8 | PVC | 0.01 | 1,499 | 11 | 31 | 42 | 2.8 | SM14-Ex-EX90 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2335 | Kirkland_Manholes-1210 | 257.02 | Kirkland_Manholes-1209 | 251.94 | 317.5 | 1.6 | 8 | PVC | 0.01 | 892 | 8 | 23 | 31 | 3.5 | SM14-Ex-EX90 | |
| Kirkland_Main-2341 | Kirkland_Manholes-1214 | 261.31 | Kirkland_Manholes-1215 | 243.02 | 404.6 | 4.52 | 8 | PVC | 0.01 | 1,499 | 6 | 11 | 17 | 1.1 | SM14-Ex-EX90 | |
| Kirkland_Main-2342 | Kirkland_Manholes-1241 | 267.65 | Kirkland_Manholes-1215 | 243.02 | 241.5 | 10.2 | 8 | PVC | 0.01 | 2,252 | 4 | 4 | 8 | 0.4 | SM14-Ex-EX63 | |
| Kirkland_Main-2343 | Kirkland_Manholes-1215 | 243.02 | Kirkland_Manholes-1134 | 223.76 | 275.3 | 7 | 8 | PVC | 0.01 | 1,865 | 11 | 19 | 30 | 1.6 | SM14-Ex-EX63 | |
| Kirkland_Main-2344 | Kirkland_Manholes-1217 | 232.97 | Kirkland_Manholes-1218 | 220.85 | 252.7 | 4.8 | 8 | PVC | 0.01 | 1,544 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX59 | |
| Kirkland_Main-2345 | Kirkland_Manholes-1270 | 246.8 | Kirkland_Manholes-1245 | 243.41 | 285.9 | 1.19 | 8 | PVC | 0.01 | 768 | 1 | 8 | 9 | 1.2 | SM14-Ex-EX64 | |
| Kirkland_Main-2348 | Kirkland_Manholes-1276 | 172.95 | Kirkland_Manholes-1279 | 163.99 | 169.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 4 | 16 | 21 | 1.3 | | |
| Kirkland_Main-2349 | Kirkland_Manholes-1569 | 157.57 | Kirkland_Manholes-1293 | 152.35 | 333.3 | 1.57 | 8 | PVC | 0.01 | 882 | 5 | 8 | 13 | 1.5 | SM14-Ex-EX113 | |
| Kirkland_Main-2350 | Kirkland_Manholes-1293 | 152.35 | Kirkland_Manholes-1292 | 148.28 | 368.4 | 1.1 | 8 | PVC | 0.01 | 741 | 9 | 16 | 25 | 3.4 | SM14-Ex-EX113 | |
| Kirkland_Main-2351 | Kirkland_Manholes-1568 | 145.18 | Kirkland_Manholes-1297 | 132.74 | 335 | 3.71 | 8 | PVC | 0.01 | 1,359 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX114 | |
| Kirkland_Main-2352 | Kirkland_Manholes-1297 | 132.74 | Kirkland_Manholes-1296 | 129.32 | 308.3 | 1.11 | 8 | PVC | 0.01 | 743 | 4 | 16 | 21 | 2.8 | SM14-Ex-EX114 | |
| Kirkland_Main-2353 | Kirkland_Manholes-1281 | 154.69 | Kirkland_Manholes-1292 | 148.28 | 310.6 | 2.06 | 8 | PVC | 0.01 | 1,013 | 52 | 247 | 299 | 29.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2354 | Kirkland_Manholes-1292 | 148.28 | Kirkland_Manholes-1296 | 129.32 | 322 | 5.89 | 8 | PVC | 0.01 | 1,711 | 63 | 272 | 335 | 19.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2357 | Kirkland_Manholes-1266 | 188.85 | Kirkland_Manholes-1264 | 172.1 | 141.2 | 11.87 | 8 | PVC | 0.01 | 2,429 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-2358 | Kirkland_Manholes-1264 | 172.1 | Kirkland_Manholes-1265 | 168.12 | 70.1 | 5.67 | 8 | PVC | 0.01 | 1,679 | 1 | 16 | 18 | 1.1 | | |
| Kirkland_Main-2363 | Kirkland_Manholes-1273 | 182.86 | Kirkland_Manholes-1274 | 175.64 | 151.8 | 4.76 | 8 | PVC | 0.01 | 1,538 | 5 | 25 | 30 | 2 | | |
| Kirkland_Main-2364 | Kirkland_Manholes-1252 | 181.71 | Kirkland_Manholes-1277 | 163.83 | 245.6 | 7.28 | 8 | PVC | 0.01 | 1,902 | 42 | 190 | 231 | 12.2 | SM14-Ex-EX101 | |
| Kirkland_Main-2365 | Kirkland_Manholes-1277 | 163.83 | Kirkland_Manholes-1278 | 160.09 | 110.9 | 3.37 | 8 | PVC | 0.01 | 1,295 | 43 | 198 | 241 | 18.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2366 | Kirkland_Manholes-1278 | 160.09 | Kirkland_Manholes-1280 | 156.25 | 144.5 | 2.66 | 8 | PVC | 0.01 | 1,149 | 48 | 231 | 279 | 24.3 | SM14-Ex-EX102 | |
| Kirkland_Main-2367 | Kirkland_Manholes-1280 | 156.25 | Kirkland_Manholes-1281 | 154.69 | 317.7 | 0.49 | 8 | PVC | 0.01 | 494 | 51 | 239 | 290 | 58.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2369 | Kirkland_Manholes-1311 | 230.66 | Kirkland_Manholes-1312 | 230.27 | 96.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 1 | | |
| Kirkland_Main-2370 | Kirkland_Manholes-1313 | 230.7 | Kirkland_Manholes-1312 | 230.27 | 76.5 | 0.56 | 8 | PVC | 0.01 | 528 | 4 | 13 | 17 | 3.2 | | |
| Kirkland_Main-2371 | Kirkland_Manholes-1312 | 230.27 | Kirkland_Manholes-1306 | 225.07 | 369.5 | 1.41 | 8 | PVC | 0.01 | 836 | 4 | 22 | 26 | 3.1 | | |
| Kirkland_Main-2372 | Kirkland_Manholes-1513 | 263.11 | Kirkland_Manholes-1515 | 261.7 | 138 | 1.02 | 8 | PVC | 0.01 | 713 | 38 | 146 | 184 | 25.9 | SM14-Ex-EX131 | |
| Kirkland_Main-2373 | Kirkland_Manholes-1508 | 264.2 | Kirkland_Manholes-1514 | 263.47 | 179.7 | 0.41 | 8 | PVC | 0.01 | 450 | 35 | 134 | 169 | 37.6 | SM14-Ex-EX131 | |
| Kirkland_Main-2374 | Kirkland_Manholes-1684 | 76.22 | Kirkland_Manholes-1683 | 75.33 | 41.4 | 2.15 | 8 | PVC | 0.01 | 1,034 | 3 | 8 | 11 | 1.1 | | |
| Kirkland_Main-2375 | Kirkland_Manholes-1851 | 275 | Kirkland_Manholes-1316 | 272.4 | 254.5 | 1.02 | 8 | PVC | 0.01 | 713 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-2376 | Kirkland_Manholes-1317 | 271.64 | Kirkland_Manholes-924 | 268.15 | 334 | 1.04 | 12 | PVC | 0.01 | 2,125 | 132 | 435 | 568 | 26.7 | | |
| Kirkland_Main-2377 | Kirkland_Manholes-2984 | 277.63 | Kirkland_Manholes-1317 | 271.64 | 132.6 | 4.52 | 10 | PVC | 0.01 | 2,717 | 129 | 383 | 511 | 18.8 | | |
| Kirkland_Main-2378 | Kirkland_Manholes-1371 | 376.15 | Kirkland_Manholes-3081 | 373.55 | 185 | 1.41 | 8 | PVC | 0.01 | 836 | 79 | 183 | 262 | 31.4 | | |
| Kirkland_Main-2379 | Kirkland_Manholes-1319 | 372.4 | Kirkland_Manholes-1318 | 358.26 | 123 | 11.5 | 8 | PVC | 0.01 | 2,391 | 82 | 195 | 277 | 11.6 | | |
| Kirkland_Main-2380 | Kirkland_Manholes-1318 | 358.26 | Kirkland_Manholes-1320 | 342.61 | 140.9 | 11.1 | 10 | PVC | 0.01 | 4,260 | 82 | 199 | 281 | 6.6 | | |
| Kirkland_Main-2381 | Kirkland_Manholes-1320 | 342.61 | Kirkland_Manholes-1326 | 321.42 | 151.5 | 13.98 | 10 | PVC | 0.01 | 4,780 | 112 | 269 | 380 | 8 | | |
| Kirkland_Main-2382 | Kirkland_Manholes-1514 | 263.47 | Kirkland_Manholes-1513 | 263.11 | 127.9 | 0.28 | 8 | PVC | 0.01 | 374 | 36 | 138 | 175 | 46.7 | SM14-Ex-EX131 | |
| Kirkland_Main-2383 | Kirkland_Manholes-1507 | 265.94 | Kirkland_Manholes-1508 | 264.2 | 288.2 | 0.6 | 8 | PVC | 0.01 | 547 | 31 | 118 | 149 | 27.2 | SM14-Ex-EX131 | |
| Kirkland_Main-2384 | Kirkland_Manholes-1322 | 342.78 | Kirkland_Manholes-1320 | 342.61 | 36.2 | 0.47 | 8 | PVC | 0.01 | 483 | 29 | 65 | 95 | 19.6 | | |
| Kirkland_Main-2385 | Kirkland_Manholes-1321 | 355.4 | Kirkland_Manholes-1322 | 342.78 | 269.6 | 4.68 | 8 | PVC | 0.01 | 1,525 | 29 | 61 | 90 | 5.9 | | |
| Kirkland_Main-2386 | Kirkland_Manholes-1335 | 367.98 | Kirkland_Manholes-1321 | 355.4 | 137.9 | 9.12 | 8 | PVC | 0.01 | 2,129 | 27 | 57 | 84 | 3.9 | | |
| Kirkland_Main-2387 | Kirkland_Manholes-1323 | 332.91 | Kirkland_Manholes-1324 | 332.34 | 49.4 | 1.15 | 8 | PVC | 0.01 | 757 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2388 | Kirkland_Manholes-1324 | 332.34 | Kirkland_Manholes-1325 | 323.2 | 121 | 7.55 | 8 | PVC | 0.01 | 1,938 | 2 | 8 | 10 | 0.5 | | |
| Kirkland_Main-2389 | Kirkland_Manholes-1325 | 323.2 | Kirkland_Manholes-1326 | 321.42 | 174.1 | 1.02 | 8 | PVC | 0.01 | 713 | 3 | 12 | 15 | 2.1 | | |
| Kirkland_Main-2390 | Kirkland_Manholes-1326 | 321.42 | Kirkland_Manholes-1339 | 314.87 | 128.9 | 5.08 | 10 | PVC | 0.01 | 2,880 | 117 | 297 | 414 | 14.4 | | |
| Kirkland_Main-2391 | Kirkland_Manholes-1337 | 323.9 | Kirkland_Manholes-1326 | 321.42 | 30.5 | 8.12 | 8 | PVC | 0.01 | 2,009 | 2 | 12 | 14 | 0.7 | | |
| Kirkland_Main-2392 | Kirkland_Manholes-1327 | 326.71 | Kirkland_Manholes-1337 | 323.9 | 27.1 | 10.37 | 8 | PVC | 0.01 | 2,271 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2393 | Kirkland_Manholes-1328 | 394.1 | Kirkland_Manholes-1329 | 393.5 | 241.8 | 0.25 | 8 | PVC | 0.01 | 351 | 5 | 28 | 33 | 9.5 | | |
| Kirkland_Main-2394 | Kirkland_Manholes-1329 | 393.5 | Kirkland_Manholes-1330 | 392.47 | 187.9 | 0.55 | 8 | PVC | 0.01 | 522 | 6 | 33 | 39 | 7.4 | | |
| Kirkland_Main-2395 | Kirkland_Manholes-1330 | 392.47 | Kirkland_Manholes-1332 | 391.73 | 102.7 | 0.72 | 8 | PVC | 0.01 | 597 | 7 | 37 | 43 | 7.2 | | |
| Kirkland_Main-2396 | Kirkland_Manholes-1332 | 391.73 | Kirkland_Manholes-1333 | 390.44 | 145.6 | 0.89 | 8 | PVC | 0.01 | 664 | 25 | 45 | 70 | 10.5 | SM14-Ex-EX177 | Drop Connection |
| Kirkland_Main-2397 | Kirkland_Manholes-1331 | 393.51 | Kirkland_Manholes-1332 | 391.73 | 79.5 | 2.24 | 8 | PVC | 0.01 | 1,054 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX177 | |
| Kirkland_Main-2398 | Kirkland_Manholes-1333 | 387.1 | Kirkland_Manholes-1334 | 373.64 | 147.7 | 9.12 | 8 | PVC | 0.01 | 2,129 | 26 | 49 | 74 | 3.5 | | |
| Kirkland_Main-2399 | Kirkland_Manholes-1334 | 373.64 | Kirkland_Manholes-1335 | 367.98 | 202.7 | 2.79 | 8 | PVC | 0.01 | 1,178 | 26 | 53 | 79 | 6.7 | | |
| Kirkland_Main-2400 | Kirkland_Manholes-1336 | 341.09 | Kirkland_Manholes-1327 | 326.71 | 166.6 | 8.63 | 8 | PVC | 0.01 | 2,071 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2401 | Kirkland_Manholes-1338 | 316.17 | Kirkland_Manholes-1339 | 314.87 | 207.4 | 0.63 | 8 | PVC | 0.01 | 557 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-2402 | Kirkland_Manholes-1339 | 314.87 | Kirkland_Manholes-1342 | 287.41 | 238.7 | 11.5 | 10 | PVC | 0.01 | 4,335 | 119 | 305 | 424 | 9.8 | | Drop Connection |
| Kirkland_Main-2403 | Kirkland_Manholes-1345 | 289.73 | Kirkland_Manholes-1344 | 287.44 | 243.6 | 0.94 | 8 | PVC | 0.01 | 684 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-2404 | Kirkland_Manholes-1344 | 287.44 | Kirkland_Manholes-1343 | 283.8 | 35.3 | 10.32 | 8 | PVC | 0.01 | 2,265 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2405 | Kirkland_Manholes-1343 | 283.8 | Kirkland_Manholes-1342 | 283.15 | 24.6 | 2.63 | 8 | PVC | 0.01 | 1,144 | 2 | 12 | 14 | 1.2 | | |
| Kirkland_Main-2406 | Kirkland_Manholes-1340 | 293.32 | Kirkland_Manholes-1342 | 293.12 | 51.1 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 57 | 65 | 14.6 | | Drop Connection |
| Kirkland_Main-2407 | Kirkland_Manholes-1341 | 299.38 | Kirkland_Manholes-1340 | 293.32 | 143.1 | 4.24 | 8 | PVC | 0.01 | 1,451 | 7 | 53 | 60 | 4.2 | | |
| Kirkland_Main-2408 | Kirkland_Manholes-1346 | 416.9 | Kirkland_Manholes-1351 | 414.82 | 383.4 | 0.54 | 8 | PVC | 0.01 | 519 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX181 | |
| Kirkland_Main-2409 | Kirkland_Manholes-1351 | 414.82 | Kirkland_Manholes-1350 | 414.2 | 207.6 | 0.3 | 12 | PVC | 0.01 | 1,136 | 72 | 183 | 255 | 22.4 | SM14-Ex-EX215 | |
| Kirkland_Main-2410 | Kirkland_Manholes-1350 | 414.2 | Kirkland_Manholes-1917 | 413.2 | 125.7 | 0.8 | 12 | PVC | 0.01 | 1,854 | 75 | 191 | 266 | 14.4 | SM14-Ex-EX215 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2411 | Kirkland_Manholes-1373 | 425.99 | Kirkland_Manholes-1350 | 414.2 | 373.4 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX217 | |
| Kirkland_Main-2412 | Kirkland_Manholes-612 | 119.17 | Kirkland_Manholes-613 | 104.8 | 247.7 | 5.8 | 8 | PVC | 0.01 | 1,698 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX149 | |
| Kirkland_Main-2413 | Kirkland_Manholes-613 | 104.8 | Kirkland_Manholes-614 | 87.89 | 231.1 | 7.32 | 8 | PVC | 0.01 | 1,907 | 4 | 16 | 20 | 1.1 | SM14-Ex-EX149 | |
| Kirkland_Main-2414 | Kirkland_Manholes-609 | 139.22 | Kirkland_Manholes-1799 | 133.76 | 308.5 | 1.77 | 8 | PVC | 0.01 | 938 | 2 | 8 | 11 | 1.1 | SM14-Ex-EX146 | |
| Kirkland_Main-2417 | Kirkland_Manholes-611 | 126.2 | Kirkland_Manholes-610 | 123.3 | 146.2 | 1.98 | 8 | PVC | 0.01 | 993 | 1 | 8 | 9 | 0.9 | SM14-Ex-EX148 | |
| Kirkland_Main-2418 | Kirkland_Manholes-610 | 123.3 | Kirkland_Manholes-1801 | 112.29 | 320.9 | 3.43 | 8 | PVC | 0.01 | 1,306 | 3 | 16 | 19 | 1.5 | SM14-Ex-EX148 | |
| Kirkland_Main-2420 | Kirkland_Manholes-585 | 162.05 | Kirkland_Manholes-1797 | 142.57 | 517.3 | 3.77 | 8 | PVC | 0.01 | 1,368 | 1 | 8 | 10 | 0.7 | SM14-Ex-EX144 | |
| Kirkland_Main-2424 | Kirkland_Manholes-582 | 179.11 | Kirkland_Manholes-583 | 174.24 | 247.1 | 1.97 | 8 | PVC | 0.01 | 990 | 2 | 8 | 10 | 1 | SM14-Ex-EX91 | |
| Kirkland_Main-2425 | Kirkland_Manholes-583 | 174.24 | Kirkland_Manholes-1796 | 160.8 | 295.1 | 4.55 | 8 | PVC | 0.01 | 1,505 | 4 | 16 | 20 | 1.3 | SM14-Ex-EX91 | |
| Kirkland_Main-2426 | Kirkland_Manholes-586 | 156.07 | Kirkland_Manholes-587 | 133.23 | 320.6 | 7.12 | 8 | PVC | 0.01 | 1,882 | 1 | 8 | 9 | 0.5 | SM14-Ex-EX145 | |
| Kirkland_Main-2427 | Kirkland_Manholes-587 | 133.23 | Kirkland_Manholes-588 | 128.35 | 150.1 | 3.25 | 8 | PVC | 0.01 | 1,271 | 4 | 16 | 20 | 1.6 | SM14-Ex-EX145 | |
| Kirkland_Main-2428 | Kirkland_Manholes-580 | 147.12 | Kirkland_Manholes-588 | 128.35 | 316.6 | 5.93 | 8 | PVC | 0.01 | 1,717 | 32 | 115 | 148 | 8.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2430 | Kirkland_Manholes-581 | 170.5 | Kirkland_Manholes-580 | 147.12 | 349.2 | 6.7 | 8 | PVC | 0.01 | 1,824 | 2 | 8 | 11 | 0.6 | SM14-Ex-EX94 | |
| Kirkland_Main-2431 | Kirkland_Manholes-588 | 128.35 | Kirkland_Manholes-606 | 111.69 | 288.6 | 5.77 | 8 | PVC | 0.01 | 1,694 | 37 | 140 | 177 | 10.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2432 | Kirkland_Manholes-1506 | 266.15 | Kirkland_Manholes-1507 | 265.94 | 137.9 | 0.15 | 8 | PVC | 0.01 | 275 | 31 | 114 | 144 | 52.5 | | |
| Kirkland_Main-2433 | Kirkland_Manholes-605 | 109.94 | Kirkland_Manholes-604 | 92.41 | 437.3 | 4.01 | 8 | PVC | 0.01 | 1,412 | 7 | 8 | 16 | 1.1 | SM14-Ex-EX160 | |
| Kirkland_Main-2434 | Kirkland_Manholes-590 | 118.3 | Kirkland_Manholes-591 | 102.05 | 327.5 | 4.96 | 8 | PVC | 0.01 | 1,571 | 5 | 16 | 22 | 1.4 | SM14-Ex-EX158 | |
| Kirkland_Main-2435 | Kirkland_Manholes-591 | 102.05 | Kirkland_Manholes-592 | 96.93 | 331.1 | 1.55 | 8 | PVC | 0.01 | 877 | 9 | 25 | 34 | 3.9 | SM14-Ex-EX158 | |
| Kirkland_Main-2436 | Kirkland_Manholes-592 | 96.93 | Kirkland_Manholes-602 | 90.22 | 292.3 | 2.3 | 8 | PVC | 0.01 | 1,068 | 81 | 371 | 452 | 42.3 | SM5 | |
| Kirkland_Main-2437 | Kirkland_Manholes-597 | 99.4 | Kirkland_Manholes-592 | 96.93 | 306.8 | 0.8 | 8 | PVC | 0.01 | 633 | 8 | 41 | 50 | 7.8 | SM14-Ex-EX158 | |
| Kirkland_Main-2438 | Kirkland_Manholes-1612 | 97.3 | Kirkland_Manholes-599 | 92.8 | 301.8 | 1.49 | 8 | PVC | 0.01 | 861 | 0 | 8 | 9 | 1 | SM14-Ex-EX160 | |
| Kirkland_Main-2440 | Kirkland_Manholes-573 | 132.21 | Kirkland_Manholes-572 | 113.73 | 388 | 4.76 | 8 | PVC | 0.01 | 1,539 | 4 | 8 | 12 | 0.8 | SM14-Ex-EX118 | |
| Kirkland_Main-2441 | Kirkland_Manholes-572 | 113.73 | Kirkland_Manholes-596 | 110.91 | 307.7 | 0.92 | 8 | PVC | 0.01 | 675 | 96 | 338 | 434 | 64.3 | SM14-Ex-EX117 | |
| Kirkland_Main-2442 | Kirkland_Manholes-595 | 103.44 | Kirkland_Manholes-597 | 99.4 | 155.7 | 2.6 | 8 | PVC | 0.01 | 1,136 | 7 | 33 | 40 | 3.5 | SM14-Ex-EX116 | |
| Kirkland_Main-2443 | Kirkland_Manholes-576 | 111.2 | Kirkland_Manholes-593 | 103.61 | 155.5 | 4.88 | 8 | PVC | 0.01 | 1,558 | 61 | 288 | 349 | 22.4 | SM5 | |
| Kirkland_Main-2444 | Kirkland_Manholes-593 | 103.61 | Kirkland_Manholes-592 | 96.93 | 157.1 | 4.25 | 8 | PVC | 0.01 | 1,454 | 62 | 297 | 359 | 24.7 | SM5 | |
| Kirkland_Main-2445 | Kirkland_Manholes-577 | 113.69 | Kirkland_Manholes-576 | 111.2 | 334.4 | 0.74 | 8 | PVC | 0.01 | 608 | 8 | 25 | 33 | 5.3 | SM14-Ex-EX112 | |
| Kirkland_Main-2446 | Kirkland_Manholes-578 | 130.09 | Kirkland_Manholes-577 | 113.69 | 328.9 | 4.99 | 8 | PVC | 0.01 | 1,574 | 4 | 16 | 21 | 1.3 | SM14-Ex-EX112 | |
| Kirkland_Main-2447 | Kirkland_Manholes-2065 | 431.1 | Kirkland_Manholes-2295 | 415.45 | 308.4 | 5.07 | 8 | PVC | 0.01 | 1,588 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2448 | Kirkland_Manholes-579 | 148.3 | Kirkland_Manholes-578 | 130.09 | 329.4 | 5.53 | 8 | PVC | 0.01 | 1,658 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX112 | |
| Kirkland_Main-2449 | Kirkland_Manholes-584 | 159.38 | Kirkland_Manholes-580 | 147.12 | 165.2 | 7.42 | 8 | PVC | 0.01 | 1,921 | 29 | 99 | 128 | 6.7 | SM14-Ex-EX96 | |
| Kirkland_Main-2450 | Kirkland_Manholes-615 | 97.62 | Kirkland_Manholes-614 | 87.89 | 329.8 | 2.95 | 8 | PVC | 0.01 | 1,211 | 1 | 8 | 9 | 0.8 | SM14-Ex-EX149 | |
| Kirkland_Main-2451 | Kirkland_Manholes-604 | 92.41 | Kirkland_Manholes-621 | 70.36 | 291.4 | 7.57 | 8 | PVC | 0.01 | 1,940 | 12 | 21 | 32 | 1.7 | SM14-Ex-EX161 | |
| Kirkland_Main-2452 | Kirkland_Manholes-626 | 276.72 | Kirkland_Manholes-627 | 275.98 | 244.8 | 0.3 | 8 | PVC | 0.01 | 388 | 1 | 4 | 5 | 1.4 | | |
| Kirkland_Main-2453 | Kirkland_Manholes-628 | 242.79 | Kirkland_Manholes-629 | 242.12 | 61.5 | 1.09 | 8 | PVC | 0.01 | 736 | 36 | 142 | 178 | 24.3 | | |
| Kirkland_Main-2454 | Kirkland_Manholes-629 | 242.12 | Kirkland_Manholes-630 | 239.43 | 331.8 | 0.81 | 8 | PVC | 0.01 | 635 | 37 | 146 | 184 | 28.9 | | |
| Kirkland_Main-2455 | Kirkland_Manholes-648 | 244.79 | Kirkland_Manholes-628 | 242.79 | 365.8 | 0.55 | 8 | PVC | 0.01 | 521 | 35 | 138 | 173 | 33.2 | | |
| Kirkland_Main-2456 | Kirkland_Manholes-631 | 237.5 | Kirkland_Manholes-632 | 237.32 | 36.6 | 0.5 | 8 | PVC | 0.01 | 498 | 38 | 155 | 193 | 38.6 | | Updated Per As-Builts (Drop Connection) |
| Kirkland_Main-2457 | Kirkland_Manholes-630 | 239.43 | Kirkland_Manholes-631 | 237.5 | 158.9 | 1.21 | 8 | PVC | 0.01 | 777 | 38 | 151 | 188 | 24.2 | | |
| Kirkland_Main-2458 | Kirkland_Manholes-633 | 234.78 | Kirkland_Manholes-634 | 228.12 | 123.4 | 5.4 | 21 | PVC | 0.01 | 21,481 | 542 | 1,579 | 2,121 | 9.9 | | |
| Kirkland_Main-2459 | Kirkland_Manholes-635 | 248.49 | Kirkland_Manholes-634 | 228.12 | 181.8 | 11.21 | 8 | PVC | 0.01 | 2,360 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2460 | Kirkland_Manholes-634 | 228.12 | Kirkland_Manholes-632 | 228 | 216.6 | 0.06 | 24 | PVC | 0.01 | 3,107 | 543 | 1,587 | 2,130 | 68.6 | SM14-Ex-EX75 | |
| Kirkland_Main-2461 | Kirkland_Manholes-632 | 228 | Kirkland_Manholes-636 | 227 | 153.6 | 0.65 | 21 | PVC | 0.01 | 7,460 | 581 | 1,746 | 2,327 | 31.2 | | |
| Kirkland_Main-2462 | Kirkland_Manholes-636 | 227 | Kirkland_Manholes-335 | 225.11 | 273.2 | 0.69 | 21 | PVC | 0.01 | 7,690 | 581 | 1,750 | 2,331 | 30.3 | | |
| Kirkland_Main-2466 | Kirkland_Manholes-640 | 237.92 | Kirkland_Manholes-639 | 237.89 | 31.5 | 0.1 | 18 | PVC | 0.01 | 1,891 | 295 | 1,074 | 1,370 | 72.4 | SM14-2035-DF8 | |
| Kirkland_Main-2467 | Kirkland_Manholes-639 | 237.89 | Kirkland_Manholes-638 | 236.51 | 242.7 | 0.57 | 21 | PVC | 0.01 | 6,971 | 533 | 1,567 | 2,100 | 30.1 | | |
| Kirkland_Main-2468 | Kirkland_Manholes-647 | 246.6 | Kirkland_Manholes-646 | 244.32 | 287.5 | 0.79 | 8 | PVC | 0.01 | 628 | 6 | 4 | 10 | 1.6 | | |
| Kirkland_Main-2469 | Kirkland_Manholes-646 | 244.32 | Kirkland_Manholes-645 | 243.42 | 85.6 | 1.05 | 8 | PVC | 0.01 | 723 | 7 | 8 | 15 | 2 | | |
| Kirkland_Main-2470 | Kirkland_Manholes-644 | 249.23 | Kirkland_Manholes-643 | 242.32 | 131.1 | 5.27 | 8 | PVC | 0.01 | 1,619 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2471 | Kirkland_Manholes-645 | 243.42 | Kirkland_Manholes-643 | 242.32 | 253.7 | 0.43 | 18 | PVC | 0.01 | 4,035 | 289 | 1,054 | 1,343 | 33.3 | | |
| Kirkland_Main-2472 | Kirkland_Manholes-643 | 242.32 | Kirkland_Manholes-642 | 242.1 | 113.5 | 0.19 | 18 | PVC | 0.01 | 2,698 | 291 | 1,062 | 1,353 | 50.2 | | |
| Kirkland_Main-2473 | Kirkland_Manholes-642 | 242.1 | Kirkland_Manholes-641 | 241.26 | 301.1 | 0.28 | 18 | PVC | 0.01 | 3,237 | 294 | 1,066 | 1,360 | 42 | | |
| Kirkland_Main-2474 | Kirkland_Manholes-641 | 241.26 | Kirkland_Manholes-640 | 237.92 | 280 | 1.19 | 18 | PVC | 0.01 | 6,693 | 295 | 1,070 | 1,365 | 20.4 | | |
| Kirkland_Main-2475 | Kirkland_Manholes-650 | 246.28 | Kirkland_Manholes-649 | 244.91 | 253.4 | 0.54 | 8 | PVC | 0.01 | 518 | 28 | 106 | 134 | 25.9 | | |
| Kirkland_Main-2476 | Kirkland_Manholes-661 | 245.17 | Kirkland_Manholes-648 | 244.79 | 204.2 | 0.19 | 8 | PVC | 0.01 | 304 | 4 | 24 | 29 | 9.4 | | |
| Kirkland_Main-2477 | Kirkland_Manholes-649 | 244.91 | Kirkland_Manholes-648 | 244.79 | 14.5 | 0.83 | 8 | PVC | 0.01 | 641 | 30 | 110 | 140 | 21.9 | | |
| Kirkland_Main-2478 | Kirkland_Manholes-681 | 256.89 | Kirkland_Manholes-684 | 256.25 | 143.5 | 0.45 | 8 | PVC | 0.01 | 473 | 22 | 37 | 59 | 12.4 | | |
| Kirkland_Main-2479 | Kirkland_Manholes-683 | 268.99 | Kirkland_Manholes-682 | 258.64 | 128.7 | 8.04 | 8 | PVC | 0.01 | 1,999 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2480 | Kirkland_Manholes-689 | 265.38 | Kirkland_Manholes-688 | 264.8 | 145.1 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-2481 | Kirkland_Manholes-688 | 264.8 | Kirkland_Manholes-687 | 264 | 200.3 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.3 | | |
| Kirkland_Main-2482 | Kirkland_Manholes-695 | 344.34 | Kirkland_Manholes-696 | 340.09 | 297.3 | 1.43 | 8 | PVC | 0.01 | 843 | 5 | 8 | 13 | 1.6 | SM14-Ex-EX74 | |
| Kirkland_Main-2483 | Kirkland_Manholes-829 | 344.99 | Kirkland_Manholes-695 | 344.34 | 301.8 | 0.22 | 8 | PVC | 0.01 | 327 | 2 | 4 | 6 | 1.8 | SM14-Ex-EX74 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2484 | Kirkland_Manholes-694 | 328.94 | Kirkland_Manholes-693 | 302.3 | 232.9 | 11.44 | 8 | PVC | 0.01 | 2,384 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2485 | Kirkland_Manholes-691 | 306.23 | Kirkland_Manholes-693 | 302.3 | 272.1 | 1.44 | 8 | PVC | 0.01 | 847 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-2486 | Kirkland_Manholes-692 | 325.47 | Kirkland_Manholes-691 | 306.23 | 258.4 | 7.45 | 8 | PVC | 0.01 | 1,924 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2487 | Kirkland_Manholes-693 | 302.3 | Kirkland_Manholes-807 | 300.8 | 136 | 1.1 | 8 | PVC | 0.01 | 741 | 6 | 16 | 23 | 3.1 | | |
| Kirkland_Main-2488 | Kirkland_Manholes-690 | 274.25 | Kirkland_Manholes-701 | 273.2 | 290.3 | 0.36 | 8 | PVC | 0.01 | 424 | 4 | 12 | 16 | 3.9 | | |
| Kirkland_Main-2489 | Kirkland_Manholes-699 | 288.54 | Kirkland_Manholes-701 | 273.2 | 288.8 | 5.31 | 8 | PVC | 0.01 | 1,625 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-2490 | Kirkland_Manholes-698 | 313.56 | Kirkland_Manholes-699 | 288.54 | 182.5 | 13.71 | 8 | PVC | 0.01 | 2,611 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2492 | Kirkland_Manholes-697 | 318.15 | Kirkland_Manholes-700 | 302.48 | 274.3 | 5.71 | 8 | PVC | 0.01 | 1,685 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2493 | Kirkland_Manholes-700 | 302.48 | Kirkland_Manholes-690 | 274.25 | 242.5 | 11.64 | 8 | PVC | 0.01 | 2,405 | 3 | 8 | 12 | 0.5 | | |
| Kirkland_Main-2494 | Kirkland_Manholes-703 | 275.12 | Kirkland_Manholes-704 | 272.37 | 210.2 | 1.31 | 8 | PVC | 0.01 | 806 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2495 | Kirkland_Manholes-702 | 273 | Kirkland_Manholes-704 | 272.37 | 144.8 | 0.44 | 8 | PVC | 0.01 | 465 | 11 | 28 | 39 | 8.4 | | |
| Kirkland_Main-2496 | Kirkland_Manholes-701 | 273.2 | Kirkland_Manholes-702 | 273 | 143.3 | 0.14 | 8 | PVC | 0.01 | 263 | 9 | 24 | 34 | 12.7 | | |
| Kirkland_Main-2497 | Kirkland_Manholes-723 | 131.03 | O-42 | 125.22 | 186.8 | 3.11 | 12 | PVC | 0.01 | 3,666 | 304 | 122 | 426 | 11.6 | SM14-2021-DF2 | |
| Kirkland_Main-2498 | Kirkland_Manholes-722 | 137.76 | Kirkland_Manholes-723 | 131.03 | 91.1 | 7.39 | 12 | PVC | 0.01 | 5,651 | 303 | 116 | 419 | 7.4 | SM14-2021-DF2 | |
| Kirkland_Main-2499 | Kirkland_Manholes-721 | 142.27 | Kirkland_Manholes-722 | 137.76 | 93.1 | 4.84 | 12 | PVC | 0.01 | 4,574 | 300 | 111 | 411 | 9 | SM14-2021-DF2 | |
| Kirkland_Main-2500 | Kirkland_Manholes-720 | 147.09 | Kirkland_Manholes-721 | 142.27 | 318.3 | 1.51 | 12 | PVC | 0.01 | 2,558 | 300 | 105 | 405 | 15.8 | SM14-2021-DF2 | |
| Kirkland_Main-2501 | Kirkland_Manholes-719 | 148.45 | Kirkland_Manholes-720 | 147.09 | 142.4 | 0.95 | 12 | PVC | 0.01 | 2,031 | 300 | 99 | 399 | 19.7 | SM14-2021-DF2 | |
| Kirkland_Main-2502 | Kirkland_Manholes-717 | 151.36 | Kirkland_Manholes-718 | 150.12 | 225.4 | 0.55 | 8 | PVC | 0.01 | 523 | 297 | 76 | 373 | 71.3 | SM14-2035-DF5 | |
| Kirkland_Main-2503 | Kirkland_Manholes-716 | 152.58 | Kirkland_Manholes-717 | 151.36 | 272.7 | 0.45 | 8 | PVC | 0.01 | 472 | 297 | 70 | 367 | 77.9 | SM14-2035-DF5 | |
| Kirkland_Main-2504 | Kirkland_Manholes-725 | 154.45 | Kirkland_Manholes-716 | 152.58 | 174.3 | 1.07 | 8 | PVC | 0.01 | 730 | 289 | 47 | 335 | 45.9 | | |
| Kirkland_Main-2505 | Kirkland_Manholes-726 | 155.56 | Kirkland_Manholes-725 | 154.45 | 157.9 | 0.7 | 8 | PVC | 0.01 | 591 | 289 | 41 | 330 | 55.8 | | |
| Kirkland_Main-2506 | Kirkland_Manholes-713 | 156.49 | Kirkland_Manholes-726 | 155.56 | 219 | 0.43 | 8 | PVC | 0.01 | 460 | 272 | 35 | 307 | 66.7 | | |
| Kirkland_Main-2507 | Kirkland_Manholes-712 | 157.06 | Kirkland_Manholes-713 | 156.49 | 30.1 | 1.89 | 8 | PVC | 0.01 | 971 | 272 | 29 | 301 | 31 | | |
| Kirkland_Main-2508 | Kirkland_Manholes-714 | 170.75 | Kirkland_Manholes-712 | 157.06 | 209.3 | 6.54 | 8 | PVC | 0.01 | 1,803 | 241 | 12 | 253 | 14 | | |
| Kirkland_Main-2509 | Kirkland_Manholes-715 | 181.7 | Kirkland_Manholes-714 | 170.75 | 155 | 7.07 | 8 | PVC | 0.01 | 1,874 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-2510 | Kirkland_Manholes-1398 | 27.8 | Kirkland_Manholes-1397 | 27.53 | 119.5 | 0.23 | 30 | PVC | 0.01 | 11,376 | 164 | 1,014 | 2,929 | 25.7 | SM14-Ex-EX154 | |
| Kirkland_Main-2511 | Kirkland_Manholes-1397 | 27.53 | Kirkland_Manholes-1396 | 27.46 | 145.3 | 0.05 | 30 | PVC | 0.01 | 5,139 | 164 | 1,022 | 2,937 | 57.1 | SM14-Ex-EX154 | |
| Kirkland_Main-2512 | Kirkland_Manholes-1399 | 44.47 | Kirkland_Manholes-1398 | 27.8 | 324.1 | 5.14 | 12 | PVC | 0.01 | 4,715 | 160 | 1,005 | 1,516 | 32.2 | SM14-Ex-EX143 | |
| Kirkland_Main-2513 | Kirkland_Manholes-1400 | 61.37 | Kirkland_Manholes-1399 | 44.47 | 267.9 | 6.31 | 12 | PVC | 0.01 | 5,221 | 159 | 997 | 1,506 | 28.8 | SM14-Ex-EX143 | |
| Kirkland_Main-2514 | Kirkland_Manholes-1401 | 76.78 | Kirkland_Manholes-1400 | 61.37 | 289.6 | 5.32 | 8 | | 0.012 | 1,355 | 40 | 280 | 320 | 23.6 | | |
| Kirkland_Main-2515 | Kirkland_Manholes-1402 | 82.36 | Kirkland_Manholes-1401 | 76.78 | 122 | 4.57 | 8 | | 0.012 | 1,257 | 38 | 264 | 302 | 24 | | |
| Kirkland_Main-2516 | Kirkland_Manholes-711 | 219.85 | Kirkland_Manholes-710 | 219.11 | 65.7 | 1.13 | 8 | PVC | 0.01 | 748 | 10 | 8 | 18 | 2.4 | | |
| Kirkland_Main-2517 | Kirkland_Manholes-710 | 219.11 | Kirkland_Manholes-709 | 218.2 | 118.5 | 0.77 | 8 | PVC | 0.01 | 618 | 10 | 12 | 22 | 3.6 | | |
| Kirkland_Main-2518 | Kirkland_Manholes-709 | 218.2 | Kirkland_Manholes-707 | 216.1 | 262.1 | 0.8 | 8 | PVC | 0.01 | 631 | 10 | 16 | 26 | 4.2 | | |
| Kirkland_Main-2519 | Kirkland_Manholes-708 | 217.66 | Kirkland_Manholes-707 | 216.1 | 74 | 2.11 | 8 | PVC | 0.01 | 1,024 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2520 | Kirkland_Manholes-707 | 216.1 | Kirkland_Manholes-706 | 215.57 | 102.1 | 0.52 | 8 | PVC | 0.01 | 508 | 10 | 24 | 34 | 6.8 | | |
| Kirkland_Main-2521 | Kirkland_Manholes-706 | 215.57 | Kirkland_Manholes-369 | 208.86 | 103.2 | 6.5 | 8 | PVC | 0.01 | 1,798 | 10 | 28 | 39 | 2.1 | | |
| Kirkland_Main-2522 | Kirkland_Manholes-1403 | 89.74 | Kirkland_Manholes-1402 | 82.36 | 156.6 | 4.71 | 8 | | 0.012 | 1,276 | 31 | 239 | 270 | 21.1 | | |
| Kirkland_Main-2523 | Kirkland_Manholes-1805 | 101.51 | Kirkland_Manholes-1403 | 89.74 | 269.7 | 4.36 | 8 | | 0.012 | 1,227 | 29 | 222 | 252 | 20.5 | | |
| Kirkland_Main-2524 | Kirkland_Manholes-1404 | 117.83 | Kirkland_Manholes-1805 | 101.51 | 279.3 | 5.84 | 8 | | 0.012 | 1,420 | 8 | 91 | 98 | 6.9 | | |
| Kirkland_Main-2525 | Kirkland_Manholes-1405 | 132.7 | Kirkland_Manholes-1404 | 117.83 | 317.4 | 4.68 | 8 | | 0.012 | 1,272 | 8 | 82 | 90 | 7.1 | | |
| Kirkland_Main-2526 | Kirkland_Manholes-1396 | 27.46 | Kirkland_Manholes-1395 | 27.24 | 179.5 | 0.12 | 30 | PVC | 0.01 | 8,435 | 262 | 1,349 | 3,363 | 39.9 | SM14-Ex-EX154 | |
| Kirkland_Main-2527 | Kirkland_Manholes-1395 | 27.24 | Kirkland_Manholes-739 | 26.87 | 399 | 0.09 | 30 | PVC | 0.01 | 7,287 | 264 | 1,358 | 3,373 | 46.3 | SM14-Ex-EX154 | |
| Kirkland_Main-2528 | Kirkland_Manholes-739 | 26.87 | Kirkland_Manholes-738 | 25.89 | 300.8 | 0.33 | 24 | PVC | 0.01 | 7,534 | 264 | 1,366 | 3,381 | 44.9 | | |
| Kirkland_Main-2532 | Kirkland_Manholes-738 | 25.89 | MH 05-714 | 25.01 | 257 | 0.34 | 24 | PVC | 0.01 | 7,724 | 286 | 1,415 | 3,453 | 44.7 | | Updated per as-built drawings |
| Kirkland_Main-2533 | Kirkland_Manholes-736 | 28.45 | Kirkland_Manholes-735 | 25.17 | 30.7 | 10.68 | 8 | PVC | 0.01 | 2,304 | 76 | 280 | 356 | 15.5 | | |
| Kirkland_Main-2534 | Kirkland_Manholes-735 | 25.17 | MH 05-714 | 25.01 | 98.1 | 0.16 | 24 | PVC | 0.01 | 5,330 | 998 | 2,052 | 3,050 | 57.2 | | Updated per as-built drawings |
| Kirkland_Main-2535 | Kirkland_Manholes-1705 | 33.28 | Kirkland_Manholes-757 | 27.8 | 142.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 17 | 33 | 50 | 3.6 | | |
| Kirkland_Main-2536 | Kirkland_Manholes-757 | 27.8 | Kirkland_Manholes-738 | 25.89 | 24.1 | 7.91 | 8 | PVC | 0.01 | 1,983 | 22 | 41 | 63 | 3.2 | | |
| Kirkland_Main-2537 | Kirkland_Manholes-734 | 25.7 | Kirkland_Manholes-735 | 25.17 | 249.9 | 0.21 | 24 | PVC | 0.01 | 6,079 | 922 | 1,763 | 2,685 | 44.2 | | |
| Kirkland_Main-2538 | Kirkland_Manholes-732 | 47.45 | Kirkland_Manholes-733 | 35.72 | 350.8 | 3.34 | 18 | PVC | 0.01 | 11,207 | 535 | 1,529 | 2,063 | 18.4 | | |
| Kirkland_Main-2539 | Kirkland_Manholes-731 | 53.54 | Kirkland_Manholes-732 | 47.45 | 265.7 | 2.29 | 18 | PVC | 0.01 | 9,278 | 439 | 1,520 | 1,959 | 21.1 | | |
| Kirkland_Main-2540 | Kirkland_Manholes-729 | 64.46 | Kirkland_Manholes-730 | 57.26 | 336.6 | 2.14 | 12 | PVC | 0.01 | 3,040 | 134 | 494 | 628 | 20.7 | | |
| Kirkland_Main-2541 | Kirkland_Manholes-730 | 57.26 | Kirkland_Manholes-731 | 53.54 | 101.9 | 3.65 | 18 | PVC | 0.01 | 11,709 | 340 | 1,055 | 1,394 | 11.9 | | |
| Kirkland_Main-2542 | Kirkland_Manholes-1436 | 518.03 | Kirkland_Manholes-1430 | 516.64 | 170 | 0.82 | 8 | PVC | 0.01 | 638 | 2 | 8 | 10 | 1.6 | | |
| Kirkland_Main-2543 | Kirkland_Manholes-1434 | 511.6 | Kirkland_Manholes-1431 | 510.8 | 175 | 0.46 | 8 | PVC | 0.01 | 477 | 10 | 33 | 43 | 9 | | |
| Kirkland_Main-2544 | Kirkland_Manholes-1431 | 510.8 | Kirkland_Manholes-1432 | 510.04 | 163.2 | 0.47 | 8 | PVC | 0.01 | 481 | 10 | 37 | 47 | 9.7 | | |
| Kirkland_Main-2545 | Kirkland_Manholes-1432 | 510.04 | Kirkland_Manholes-1433 | 509.55 | 97.9 | 0.5 | 8 | PVC | 0.01 | 499 | 12 | 41 | 52 | 10.5 | | |
| Kirkland_Main-2546 | Kirkland_Manholes-1433 | 509.55 | Kirkland_Manholes-1437 | 508.69 | 186 | 0.46 | 8 | PVC | 0.01 | 480 | 13 | 45 | 57 | 11.9 | | |
| Kirkland_Main-2547 | Kirkland_Manholes-1435 | 519.8 | Kirkland_Manholes-1436 | 518.03 | 159.8 | 1.11 | 8 | PVC | 0.01 | 742 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2548 | Kirkland_Manholes-1437 | 508.69 | Kirkland_Manholes-1438 | 507.49 | 258.4 | 0.46 | 8 | PVC | 0.01 | 480 | 13 | 49 | 62 | 13 | | |
| Kirkland_Main-2549 | Kirkland_Manholes-1438 | 507.49 | Kirkland_Manholes-1444 | 505.53 | 236.5 | 0.83 | 8 | PVC | 0.01 | 642 | 19 | 73 | 92 | 14.3 | SM14-Ex-EX269 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2550 | Kirkland_Manholes-1439 | 508.99 | Kirkland_Manholes-1438 | 507.49 | 261.3 | 0.57 | 8 | PVC | 0.01 | 534 | 6 | 20 | 26 | 4.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2551 | Kirkland_Manholes-1441 | 509.69 | Kirkland_Manholes-1440 | 509.16 | 212.6 | 0.25 | 8 | PVC | 0.01 | 352 | 5 | 12 | 17 | 4.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2552 | Kirkland_Manholes-1440 | 509.16 | Kirkland_Manholes-1439 | 508.99 | 378 | 0.04 | 8 | PVC | 0.01 | 150 | 5 | 16 | 21 | 14.3 | SM14-Ex-EX269 | |
| Kirkland_Main-2554 | Kirkland_Manholes-1449 | 498.19 | Kirkland_Manholes-1450 | 496.32 | 291.2 | 0.64 | 8 | PVC | 0.01 | 565 | 26 | 130 | 156 | 27.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2555 | Kirkland_Manholes-1450 | 496.32 | Kirkland_Manholes-1451 | 492.05 | 400.8 | 1.07 | 8 | PVC | 0.01 | 728 | 29 | 134 | 163 | 22.5 | SM14-Ex-EX269 | |
| Kirkland_Main-2556 | Kirkland_Manholes-1448 | 502.55 | Kirkland_Manholes-1449 | 498.19 | 186.7 | 2.34 | 8 | PVC | 0.01 | 1,078 | 25 | 126 | 151 | 14 | SM14-Ex-EX269 | |
| Kirkland_Main-2557 | Kirkland_Manholes-1447 | 503.26 | Kirkland_Manholes-1448 | 502.55 | 401.7 | 0.18 | 8 | PVC | 0.01 | 296 | 23 | 122 | 145 | 48.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2558 | Kirkland_Manholes-2976 | 503.85 | Kirkland_Manholes-1447 | 503.26 | 210.4 | 0.28 | 8 | PVC | 0.01 | 373 | 22 | 118 | 140 | 37.5 | SM14-Ex-EX269 | |
| Kirkland_Main-2559 | Kirkland_Manholes-1444 | 505.53 | Kirkland_Manholes-1446 | 505.51 | 95.2 | 0.02 | 12 | PVC | 0.01 | 301 | 19 | 85 | 105 | 34.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2560 | Kirkland_Manholes-1446 | 505.51 | Kirkland_Manholes-1445 | 504.92 | 12.7 | 4.66 | 8 | PVC | 0.01 | 1,523 | 19 | 90 | 109 | 7.1 | SM14-Ex-EX269 | |
| Kirkland_Main-2561 | Kirkland_Manholes-1442 | 510.02 | Kirkland_Manholes-1443 | 506.8 | 138.1 | 2.33 | 8 | PVC | 0.01 | 1,077 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX274 | |
| Kirkland_Main-2562 | Kirkland_Manholes-1443 | 506.8 | Kirkland_Manholes-1444 | 505.53 | 203.3 | 0.62 | 8 | PVC | 0.01 | 557 | 0 | 8 | 8 | 1.5 | SM14-Ex-EX274 | |
| Kirkland_Main-2563 | Kirkland_Manholes-1451 | 492.05 | Kirkland_Manholes-1452 | 486.6 | 321.3 | 1.7 | 8 | PVC | 0.01 | 918 | 32 | 138 | 170 | 18.5 | SM14-Ex-EX269 | |
| Kirkland_Main-2564 | Kirkland_Manholes-1452 | 486.6 | Kirkland_Manholes-1459 | 479.42 | 322.1 | 2.23 | 8 | PVC | 0.01 | 1,053 | 33 | 142 | 176 | 16.7 | SM14-Ex-EX269 | |
| Kirkland_Main-2565 | Kirkland_Manholes-1453 | 500.71 | Kirkland_Manholes-1454 | 499.21 | 284.8 | 0.53 | 8 | PVC | 0.01 | 512 | 1 | 4 | 5 | 1.1 | SM14-Ex-EX270 | |
| Kirkland_Main-2566 | Kirkland_Manholes-1454 | 499.21 | Kirkland_Manholes-1455 | 496 | 348.8 | 0.92 | 8 | PVC | 0.01 | 676 | 4 | 8 | 12 | 1.7 | SM14-Ex-EX270 | |
| Kirkland_Main-2567 | Kirkland_Manholes-1455 | 496 | Kirkland_Manholes-1456 | 494.83 | 99.7 | 1.17 | 8 | PVC | 0.01 | 764 | 5 | 12 | 17 | 2.3 | SM14-Ex-EX270 | |
| Kirkland_Main-2568 | Kirkland_Manholes-1456 | 494.83 | Kirkland_Manholes-1457 | 481.56 | 320 | 4.15 | 8 | PVC | 0.01 | 1,436 | 7 | 16 | 23 | 1.6 | SM14-Ex-EX270 | |
| Kirkland_Main-2569 | Kirkland_Manholes-1461 | 483.24 | Kirkland_Manholes-1457 | 482.02 | 293.4 | 0.42 | 8 | PVC | 0.01 | 455 | 20 | 49 | 69 | 15.1 | SM14-Ex-EX214 | Drop Connection |
| Kirkland_Main-2570 | Kirkland_Manholes-1457 | 481.56 | Kirkland_Manholes-1458 | 481.15 | 103.4 | 0.4 | 8 | PVC | 0.01 | 444 | 27 | 69 | 96 | 21.7 | SM14-Ex-EX214 | |
| Kirkland_Main-2571 | Kirkland_Manholes-1458 | 481.15 | Kirkland_Manholes-1459 | 479.42 | 259.2 | 0.67 | 8 | PVC | 0.01 | 576 | 27 | 73 | 100 | 17.4 | SM14-Ex-EX214 | |
| Kirkland_Main-2572 | Kirkland_Manholes-1459 | 479.42 | Kirkland_Manholes-1480 | 465.84 | 411.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 61 | 220 | 280 | 21.9 | SM14-Ex-EX214 | |
| Kirkland_Main-2573 | Kirkland_Manholes-1460 | 490.4 | Kirkland_Manholes-1461 | 483.24 | 392 | 1.83 | 8 | PVC | 0.01 | 953 | 3 | 4 | 7 | 0.7 | SM14-Ex-EX214 | |
| Kirkland_Main-2574 | Kirkland_Manholes-1469 | 490.09 | Kirkland_Manholes-1461 | 483.24 | 144.8 | 4.73 | 8 | PVC | 0.01 | 1,534 | 17 | 37 | 53 | 3.5 | SM14-Ex-EX271 | |
| Kirkland_Main-2575 | Kirkland_Manholes-608 | 134.68 | Kirkland_Manholes-607 | 127.97 | 148.5 | 4.52 | 8 | PVC | 0.01 | 1,499 | 1 | 8 | 9 | 0.6 | SM14-Ex-EX147 | |
| Kirkland_Main-2576 | Kirkland_Manholes-607 | 127.97 | Kirkland_Manholes-606 | 111.69 | 332.5 | 4.9 | 8 | PVC | 0.01 | 1,560 | 4 | 16 | 21 | 1.3 | SM14-Ex-EX147 | |
| Kirkland_Main-2578 | Kirkland_Manholes-3035 | 266.43 | Kirkland_Manholes-1506 | 266.15 | 125.7 | 0.22 | 8 | PVC | 0.01 | 333 | 30 | 110 | 140 | 42.1 | | |
| Kirkland_Main-2579 | Kirkland_Manholes-1504 | 267.51 | Kirkland_Manholes-1505 | 267 | 104.1 | 0.49 | 8 | PVC | 0.01 | 493 | 24 | 85 | 110 | 22.3 | | |
| Kirkland_Main-2580 | Kirkland_Manholes-1503 | 273.94 | Kirkland_Manholes-1504 | 267.51 | 44 | 14.62 | 8 | PVC | 0.01 | 2,696 | 1 | 8 | 9 | 0.3 | | |
| Kirkland_Main-2581 | Kirkland_Manholes-1502 | 279.47 | Kirkland_Manholes-1503 | 273.94 | 90.7 | 6.09 | 8 | PVC | 0.01 | 1,741 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2582 | Kirkland_Manholes-1501 | 267.93 | Kirkland_Manholes-1504 | 267.51 | 165.4 | 0.25 | 8 | PVC | 0.01 | 355 | 23 | 73 | 96 | 27.1 | | |
| Kirkland_Main-2583 | Kirkland_Manholes-2255 | 245.88 | Kirkland_Manholes-2253 | 239.74 | 232.2 | 2.64 | 8 | PVC | 0.01 | 1,146 | 33 | 4 | 37 | 3.3 | SM14-Ex-EX247 | |
| Kirkland_Main-2584 | Kirkland_Manholes-1499 | 268.92 | Kirkland_Manholes-1501 | 267.93 | 240 | 0.41 | 8 | PVC | 0.01 | 453 | 22 | 69 | 91 | 20.1 | | |
| Kirkland_Main-2585 | Kirkland_Manholes-1500 | 287.29 | Kirkland_Manholes-1498 | 284.32 | 146.8 | 2.02 | 8 | PVC | 0.01 | 1,003 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-2587 | Kirkland_Manholes-1498 | 284.32 | Kirkland_Manholes-1499 | 268.92 | 127.3 | 12.1 | 8 | PVC | 0.01 | 2,452 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2588 | Kirkland_Manholes-771 | 213.99 | Kirkland_Manholes-777 | 184.25 | 152.4 | 19.51 | 8 | PVC | 0.01 | 3,115 | 3 | 8 | 11 | 0.3 | | |
| Kirkland_Main-2589 | Kirkland_Manholes-777 | 184.25 | KC_Manholes-6 | 163.9 | 254 | 8.01 | 8 | PVC | 0.01 | 1,995 | 5 | 12 | 17 | 0.9 | | |
| Kirkland_Main-2590 | KC_Manholes-5 | 169.15 | KC_Manholes-6 | 163.9 | 285.7 | 1.84 | 8 | PVC | 0.01 | 956 | 10 | 45 | 55 | 5.8 | | |
| Kirkland_Main-2591 | KC_Manholes-6 | 163.9 | O-17 | 159.86 | 90.8 | 4.45 | 8 | PVC | 0.01 | 1,487 | 17 | 61 | 78 | 5.2 | | |
| Kirkland_Main-2592 | Kirkland_Manholes-766 | 182.72 | Kirkland_Manholes-1555 | 164.48 | 325.6 | 5.6 | 8 | PVC | 0.01 | 1,669 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-2593 | Kirkland_Manholes-1555 | 164.48 | O-18 | 159.86 | 33.3 | 13.89 | 8 | PVC | 0.01 | 2,628 | 4 | 12 | 16 | 0.6 | | |
| Kirkland_Main-2594 | Kirkland_Manholes-767 | 210.01 | Kirkland_Manholes-766 | 182.72 | 125.5 | 21.75 | 8 | PVC | 0.01 | 3,288 | 1 | 4 | 5 | 0.1 | | |
| Kirkland_Main-2595 | Kirkland_Manholes-765 | 257.59 | Kirkland_Manholes-764 | 244.77 | 266.3 | 4.81 | 8 | PVC | 0.01 | 1,547 | 22 | 73 | 96 | 6.2 | SM14-Ex-EX121 | |
| Kirkland_Main-2596 | Kirkland_Manholes-764 | 244.77 | Kirkland_Manholes-1530 | 229.92 | 292.5 | 5.08 | 8 | PVC | 0.01 | 1,589 | 24 | 77 | 102 | 6.4 | SM14-Ex-EX121 | |
| Kirkland_Main-2597 | Kirkland_Manholes-770 | 166.93 | Kirkland_Manholes-769 | 165.1 | 146.5 | 1.25 | 8 | PVC | 0.01 | 788 | 1 | 8 | 9 | 1.2 | | |
| Kirkland_Main-2598 | Kirkland_Manholes-769 | 165.1 | Kirkland_Manholes-768 | 159.83 | 42.8 | 12.31 | 8 | PVC | 0.01 | 2,474 | 3 | 16 | 19 | 0.8 | | |
| Kirkland_Main-2599 | Kirkland_Manholes-768 | 159.83 | O-19 | 156.57 | 65.3 | 5 | 8 | PVC | 0.01 | 1,577 | 4 | 20 | 24 | 1.5 | | |
| Kirkland_Main-2600 | Kirkland_Manholes-1600 | 216.22 | Kirkland_Manholes-1599 | 200.11 | 155.5 | 10.36 | 8 | PVC | 0.01 | 2,269 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX170 | |
| Kirkland_Main-2601 | Kirkland_Manholes-1614 | 91.09 | Kirkland_Manholes-1613 | 87.49 | 157.9 | 2.28 | 8 | PVC | 0.01 | 1,065 | 14 | 115 | 130 | 12.2 | SM14-Ex-EX167 | |
| Kirkland_Main-2602 | Kirkland_Manholes-1616 | 135.79 | Kirkland_Manholes-1615 | 109.23 | 291.4 | 9.11 | 8 | PVC | 0.01 | 2,128 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-2603 | Kirkland_Manholes-1617 | 246.15 | Kirkland_Manholes-1630 | 217.96 | 377.4 | 7.47 | 8 | PVC | 0.01 | 1,927 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2604 | Kirkland_Manholes-1618 | 259.44 | Kirkland_Manholes-1619 | 255.5 | 286.6 | 1.37 | 8 | PVC | 0.01 | 827 | 1 | 4 | 5 | 0.6 | SM14-Ex-EX176 | |
| Kirkland_Main-2605 | Kirkland_Manholes-1619 | 255.5 | Kirkland_Manholes-1622 | 253.11 | 371.5 | 0.64 | 8 | PVC | 0.01 | 565 | 4 | 8 | 12 | 2.1 | SM14-Ex-EX176 | |
| Kirkland_Main-2607 | Kirkland_Manholes-1620 | 234.07 | Kirkland_Manholes-1621 | 227.94 | 53.2 | 11.53 | 8 | PVC | 0.01 | 2,394 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2608 | Kirkland_Manholes-1621 | 227.94 | Kirkland_Manholes-1631 | 193.59 | 278.6 | 12.33 | 8 | PVC | 0.01 | 2,476 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-2609 | Kirkland_Manholes-1623 | 294.92 | Kirkland_Manholes-1622 | 253.11 | 447.9 | 9.33 | 8 | PVC | 0.01 | 2,154 | 252 | 826 | 1,078 | 50.1 | SM7 | |
| Kirkland_Main-2610 | Kirkland_Manholes-1633 | 254.8 | Kirkland_Manholes-1622 | 253.11 | 303.2 | 0.56 | 8 | PVC | 0.01 | 526 | 9 | 16 | 25 | 4.8 | SM14-Ex-EX204 | |
| Kirkland_Main-2611 | Kirkland_Manholes-1626 | 191.61 | Kirkland_Manholes-1624 | 183.67 | 177.3 | 4.48 | 8 | PVC | 0.01 | 1,492 | 8 | 24 | 33 | 2.2 | | |
| Kirkland_Main-2615 | Kirkland_Manholes-1829 | 64.39 | Kirkland_Manholes-1830 | 64.02 | 316.5 | 0.12 | 18 | PVC | 0.01 | 2,096 | 118 | 700 | 1,169 | 55.8 | SM14-Ex-EX142 | |
| Kirkland_Main-2616 | Kirkland_Manholes-1830 | 64.02 | Kirkland_Manholes-1400 | 61.37 | 81.5 | 3.25 | 18 | PVC | 0.01 | 11,049 | 118 | 709 | 1,177 | 10.7 | SM14-Ex-EX142 | |
| Kirkland_Main-2617 | Kirkland_Manholes-1828 | 65.79 | Kirkland_Manholes-1829 | 64.39 | 312.6 | 0.45 | 15 | PVC | 0.01 | 2,522 | 117 | 692 | 1,159 | 46 | SM14-2035-DF11 | |
| Kirkland_Main-2618 | Kirkland_Manholes-1827 | 69.3 | Kirkland_Manholes-2994 | 67.86 | 357.5 | 0.4 | 15 | PVC | 0.01 | 2,392 | 113 | 659 | 1,122 | 46.9 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2619 | Kirkland_Manholes-1826 | 70.81 | Kirkland_Manholes-1827 | 69.3 | 214.2 | 0.71 | 15 | PVC | 0.01 | 3,165 | 111 | 651 | 1,112 | 35.1 | | |
| Kirkland_Main-2620 | Kirkland_Manholes-1824 | 72.16 | Kirkland_Manholes-1826 | 70.81 | 200.6 | 0.67 | 15 | PVC | 0.01 | 3,092 | 110 | 643 | 1,104 | 35.7 | | |
| Kirkland_Main-2621 | Kirkland_Manholes-1823 | 74.67 | Kirkland_Manholes-1824 | 72.16 | 26.9 | 9.32 | 8 | PVC | 0.01 | 2,153 | 8 | 33 | 41 | 1.9 | SM10 | |
| Kirkland_Main-2622 | Kirkland_Manholes-1822 | 87.17 | Kirkland_Manholes-1823 | 74.67 | 362.6 | 3.45 | 8 | PVC | 0.01 | 1,309 | 6 | 25 | 31 | 2.3 | SM10 | |
| Kirkland_Main-2623 | Kirkland_Manholes-1821 | 94.43 | Kirkland_Manholes-1822 | 87.17 | 350 | 2.07 | 8 | PVC | 0.01 | 1,015 | 5 | 16 | 21 | 2.1 | SM10 | |
| Kirkland_Main-2624 | Kirkland_Manholes-1820 | 95.81 | Kirkland_Manholes-1821 | 94.43 | 359.9 | 0.38 | 8 | PVC | 0.01 | 437 | 2 | 8 | 10 | 2.3 | SM10 | |
| Kirkland_Main-2625 | Kirkland_Manholes-1819 | 89.53 | Kirkland_Manholes-1402 | 82.36 | 241.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 7 | 16 | 24 | 2 | SM10 | |
| Kirkland_Main-2626 | Kirkland_Manholes-1818 | 98.86 | Kirkland_Manholes-1819 | 89.53 | 204 | 4.57 | 8 | PVC | 0.01 | 1,508 | 6 | 8 | 14 | 0.9 | SM10 | |
| Kirkland_Main-2628 | Kirkland_Manholes-1811 | 129.72 | Kirkland_Manholes-1812 | 126.33 | 178.5 | 1.9 | 8 | PVC | 0.01 | 972 | 17 | 82 | 99 | 10.2 | SM10 | |
| Kirkland_Main-2629 | Kirkland_Manholes-1812 | 126.33 | Kirkland_Manholes-1813 | 123.92 | 54.8 | 4.4 | 8 | PVC | 0.01 | 1,479 | 17 | 91 | 107 | 7.3 | SM14-Ex-EX139 | |
| Kirkland_Main-2630 | Kirkland_Manholes-1813 | 123.92 | Kirkland_Manholes-1814 | 117.44 | 111.3 | 5.82 | 8 | PVC | 0.01 | 1,701 | 18 | 99 | 117 | 6.9 | SM14-Ex-EX139 | |
| Kirkland_Main-2631 | Kirkland_Manholes-1814 | 117.44 | Kirkland_Manholes-1817 | 109.22 | 155.5 | 5.28 | 8 | PVC | 0.01 | 1,621 | 20 | 115 | 136 | 8.4 | SM10 | |
| Kirkland_Main-2632 | Kirkland_Manholes-1815 | 130.16 | Kirkland_Manholes-1814 | 117.44 | 475.8 | 2.67 | 8 | PVC | 0.01 | 1,153 | 2 | 8 | 10 | 0.9 | SM10 | |
| Kirkland_Main-2633 | Kirkland_Manholes-1816 | 115.31 | Kirkland_Manholes-1825 | 112.27 | 360.1 | 0.84 | 8 | PVC | 0.01 | 648 | 3 | 8 | 12 | 1.8 | SM10 | |
| Kirkland_Main-2634 | Kirkland_Manholes-1817 | 109.22 | Kirkland_Manholes-1805 | 101.51 | 328.6 | 2.35 | 8 | PVC | 0.01 | 1,080 | 20 | 124 | 144 | 13.3 | SM10 | |
| Kirkland_Main-2635 | Kirkland_Manholes-1831 | 166.9 | Kirkland_Manholes-1190 | 151.12 | 137.2 | 11.5 | 8 | PVC | 0.01 | 2,391 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX83 | |
| Kirkland_Main-2636 | Kirkland_Manholes-1837 | 12.2 | Kirkland_Manholes-1836 | 11 | 9.3 | 12.92 | 12 | PVC | 0.01 | 7,473 | 455 | 786 | 1,241 | 16.6 | | |
| Kirkland_Main-2637 | Kirkland_Manholes-1834 | 11.35 | Kirkland_Manholes-1835 | 11.1 | 27.9 | 0.9 | 12 | PVC | 0.01 | 1,967 | 18 | 91 | 109 | 5.5 | | |
| Kirkland_Main-2638 | Kirkland_Manholes-1835 | 11.1 | Kirkland_Manholes-1836 | 11 | 9.8 | 1.02 | 12 | PVC | 0.01 | 2,099 | 18 | 97 | 115 | 5.5 | | |
| Kirkland_Main-2639 | Kirkland_Manholes-1832 | 17.68 | Kirkland_Manholes-1833 | 16.5 | 43.9 | 2.69 | 8 | PVC | 0.01 | 1,155 | 2 | 6 | 9 | 0.8 | | |
| Kirkland_Main-2640 | Kirkland_Manholes-1794 | 12.63 | Kirkland_Manholes-1837 | 12.2 | 128.1 | 0.34 | 15 | PVC | 0.01 | 2,183 | 455 | 779 | 1,234 | 56.5 | | |
| Kirkland_Main-2641 | Kirkland_Manholes-2679 | 83.65 | Kirkland_Manholes-2880 | 81.72 | 80.2 | 2.41 | 8 | PVC | 0.01 | 1,094 | 0 | 6 | 6 | 0.6 | | |
| Kirkland_Main-2642 | Kirkland_Manholes-2880 | 81.72 | Kirkland_Manholes-2879 | 68.04 | 76.6 | 17.86 | 8 | PVC | 0.01 | 2,979 | 28 | 31 | 58 | 1.9 | | |
| Kirkland_Main-2644 | Kirkland_Manholes-2885 | 165.69 | Kirkland_Manholes-1111 | 165.6 | 145.4 | 0.06 | 8 | PVC | 0.01 | 175 | 0 | 4 | 4 | 2.3 | SM14-Ex-EX9 | |
| Kirkland_Main-2658 | Kirkland_Manholes-480 | 484.34 | Kirkland_Manholes-1493 | 479.91 | 224.4 | 1.97 | 8 | PVC | 0.01 | 991 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2659 | Kirkland_Manholes-3042 | 194.23 | Kirkland_Manholes-2474 | 188.45 | 173.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2663 | Kirkland_Manholes-2886 | 151 | Kirkland_Manholes-252 | 142.57 | 290.9 | 2.9 | 8 | PVC | 0.01 | 1,200 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX40 | |
| Kirkland_Main-2666 | Kirkland_Manholes-2887 | 302.33 | Kirkland_Manholes-2888 | 290.53 | 197 | 5.99 | 8 | PVC | 0.01 | 1,725 | 4 | 16 | 21 | 1.2 | | |
| Kirkland_Main-2667 | Kirkland_Manholes-1181 | 120.04 | Kirkland_Manholes-2889 | 83.33 | 400.3 | 9.17 | 8 | PVC | 0.01 | 2,135 | 3 | 9 | 12 | 0.6 | SM10 | |
| Kirkland_Main-2668 | Kirkland_Manholes-2889 | 83.33 | Kirkland_Manholes-305 | 74.69 | 164.1 | 5.26 | 8 | PVC | 0.01 | 1,618 | 6 | 18 | 24 | 1.5 | SM10 | |
| Kirkland_Main-2670 | Kirkland_Manholes-1624 | 183.67 | Kirkland_Manholes-1625 | 179.1 | 84.9 | 5.38 | 8 | PVC | 0.01 | 1,636 | 8 | 28 | 37 | 2.2 | | |
| Kirkland_Main-2671 | Kirkland_Manholes-1632 | 181.73 | Kirkland_Manholes-1625 | 179.1 | 96.8 | 2.72 | 8 | PVC | 0.01 | 1,162 | 3 | 16 | 20 | 1.7 | | |
| Kirkland_Main-2672 | Kirkland_Manholes-1627 | 199.21 | Kirkland_Manholes-1626 | 191.61 | 142.7 | 5.33 | 8 | PVC | 0.01 | 1,627 | 8 | 20 | 29 | 1.8 | | |
| Kirkland_Main-2673 | Kirkland_Manholes-1628 | 203.71 | Kirkland_Manholes-1627 | 199.21 | 47.7 | 9.43 | 8 | PVC | 0.01 | 2,165 | 7 | 16 | 24 | 1.1 | | |
| Kirkland_Main-2674 | Kirkland_Manholes-1629 | 216.45 | Kirkland_Manholes-1628 | 203.71 | 87.7 | 14.52 | 8 | PVC | 0.01 | 2,687 | 7 | 12 | 20 | 0.7 | | |
| Kirkland_Main-2675 | Kirkland_Manholes-1630 | 217.96 | Kirkland_Manholes-1629 | 216.45 | 15.3 | 9.86 | 8 | PVC | 0.01 | 2,214 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2676 | Kirkland_Manholes-1631 | 193.59 | Kirkland_Manholes-1632 | 181.73 | 96.1 | 12.34 | 8 | PVC | 0.01 | 2,477 | 3 | 12 | 15 | 0.6 | | |
| Kirkland_Main-2677 | Kirkland_Manholes-1712 | 141.37 | Kirkland_Manholes-1706 | 124.78 | 325.1 | 5.1 | 8 | PVC | 0.01 | 1,593 | 1 | 8 | 10 | 0.6 | SM14-Ex-EX166 | |
| Kirkland_Main-2678 | Kirkland_Manholes-1716 | 100.64 | Kirkland_Manholes-1715 | 96.61 | 119 | 3.39 | 8 | PVC | 0.01 | 1,298 | 17 | 8 | 25 | 1.9 | | |
| Kirkland_Main-2679 | Kirkland_Manholes-1715 | 96.61 | Kirkland_Manholes-1714 | 94.78 | 31.8 | 5.76 | 8 | PVC | 0.01 | 1,692 | 17 | 16 | 33 | 2 | | |
| Kirkland_Main-2680 | Kirkland_Manholes-1713 | 108.19 | Kirkland_Manholes-1714 | 94.78 | 126.8 | 10.57 | 8 | PVC | 0.01 | 2,293 | 10 | 8 | 18 | 0.8 | SM14-Ex-EX186 | |
| Kirkland_Main-2681 | Kirkland_Manholes-1714 | 94.78 | Kirkland_Manholes-1717 | 58.55 | 387.3 | 9.35 | 8 | PVC | 0.01 | 2,156 | 27 | 33 | 60 | 2.8 | SM14-Ex-EX186 | |
| Kirkland_Main-2685 | Kirkland_Manholes-1720 | 51.16 | Kirkland_Manholes-1722 | 47.26 | 30.1 | 12.97 | 8 | PVC | 0.01 | 2,539 | 44 | 25 | 68 | 2.7 | | |
| Kirkland_Main-2686 | Kirkland_Manholes-1721 | 54.75 | Kirkland_Manholes-1720 | 51.16 | 58.7 | 6.12 | 8 | PVC | 0.01 | 1,744 | 44 | 16 | 60 | 3.5 | SM14-Ex-EX185 | |
| Kirkland_Main-2687 | Kirkland_Manholes-1723 | 62.26 | Kirkland_Manholes-1721 | 54.75 | 207.5 | 3.62 | 8 | PVC | 0.01 | 1,341 | 41 | 8 | 50 | 3.7 | SM14-Ex-EX185 | |
| Kirkland_Main-2688 | Kirkland_Manholes-1711 | 136.47 | Kirkland_Manholes-1710 | 134.24 | 160.1 | 1.39 | 12 | PVC | 0.01 | 2,453 | 12 | 74 | 86 | 3.5 | SM14-Ex-EX196 | |
| Kirkland_Main-2689 | Kirkland_Manholes-1734 | 24.57 | Kirkland_Manholes-1737 | 24.2 | 117 | 0.32 | 12 | PVC | 0.01 | 1,169 | 163 | 132 | 294 | 25.2 | | |
| Kirkland_Main-2690 | Kirkland_Manholes-1735 | 26.22 | Kirkland_Manholes-1734 | 24.57 | 115.4 | 1.43 | 12 | PVC | 0.01 | 2,488 | 50 | 25 | 74 | 3 | | |
| Kirkland_Main-2691 | Kirkland_Manholes-1729 | 25.06 | Kirkland_Manholes-1734 | 24.57 | 158.2 | 0.31 | 12 | PVC | 0.01 | 1,157 | 113 | 99 | 212 | 18.3 | | |
| Kirkland_Main-2692 | Kirkland_Manholes-1730 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 35.3 | 3.23 | 8 | PVC | 0.01 | 1,268 | 20 | 33 | 53 | 4.2 | | |
| Kirkland_Main-2693 | Kirkland_Manholes-1731 | 27.35 | Kirkland_Manholes-1730 | 26.2 | 207.2 | 0.55 | 8 | PVC | 0.01 | 525 | 15 | 25 | 40 | 7.6 | | |
| Kirkland_Main-2694 | Kirkland_Manholes-1732 | 28.2 | Kirkland_Manholes-1731 | 27.35 | 54.4 | 1.56 | 8 | PVC | 0.01 | 882 | 7 | 16 | 24 | 2.7 | SM14-Ex-EX156 | |
| Kirkland_Main-2695 | Kirkland_Manholes-1733 | 28.74 | Kirkland_Manholes-1732 | 28.2 | 66.1 | 0.82 | 8 | PVC | 0.01 | 637 | 7 | 8 | 15 | 2.4 | SM14-Ex-EX156 | |
| Kirkland_Main-2696 | Kirkland_Manholes-1743 | 28.04 | Kirkland_Manholes-1746 | 27.54 | 238.6 | 0.21 | 15 | PVC | 0.01 | 1,725 | 324 | 569 | 893 | 51.7 | SM14-Ex-EX157 | |
| Kirkland_Main-2697 | Kirkland_Manholes-1746 | 27.54 | MH_Selection_06-13-2016-4 | 25.37 | 27.6 | 7.87 | 15 | PVC | 0.01 | 10,571 | 326 | 618 | 944 | 8.9 | SM14-Ex-EX157 | Updated per as-built drawings |
| Kirkland_Main-2700 | Kirkland_Manholes-1745 | 27.57 | Kirkland_Manholes-1746 | 27.54 | 73.9 | 0.04 | 8 | PVC | 0.01 | 142 | 2 | 41 | 43 | 30.1 | | |
| Kirkland_Main-2702 | Kirkland_Manholes-1737 | 24.2 | MH_Selection_06-13-2016-5 | 24.55 | 145.6 | -0.24 | 12 | PVC | 0.01 | 1,019 | 173 | 140 | 313 | 30.7 | | Updated per as-built drawings |
| Kirkland_Main-2703 | Kirkland_Manholes-1736 | 26.69 | Kirkland_Manholes-1735 | 26.22 | 88.6 | 0.53 | 8 | PVC | 0.01 | 513 | 50 | 16 | 66 | 12.9 | | |
| Kirkland_Main-2704 | Kirkland_Manholes-1752 | 27.81 | Kirkland_Manholes-1736 | 26.69 | 254.8 | 0.44 | 8 | PVC | 0.01 | 467 | 4 | 8 | 13 | 2.7 | | |
| Kirkland_Main-2705 | Kirkland_Manholes-1765 | 114.35 | Kirkland_Manholes-1764 | 112.57 | 108.8 | 1.64 | 8 | PVC | 0.01 | 902 | 2 | 8 | 10 | 1.2 | | |
| Kirkland_Main-2706 | Kirkland_Manholes-1764 | 112.57 | Kirkland_Manholes-1763 | 111.41 | 74.1 | 1.57 | 8 | PVC | 0.01 | 882 | 8 | 16 | 24 | 2.7 | | |
| Kirkland_Main-2707 | Kirkland_Manholes-1763 | 111.41 | Kirkland_Manholes-1761 | 99.41 | 212.2 | 5.65 | 10 | PVC | 0.01 | 3,040 | 13 | 58 | 71 | 2.3 | | |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2708 | Kirkland_Manholes-1761 | 99.41 | Kirkland_Manholes-1762 | 98.88 | 52.5 | 1.01 | 12 | PVC | 0.01 | 2,089 | 33 | 198 | 231 | 11 | SM14-Ex-EX166 | |
| Kirkland_Main-2709 | Kirkland_Manholes-1706 | 124.78 | Kirkland_Manholes-1761 | 99.41 | 406.8 | 6.24 | 12 | PVC | 0.01 | 5,191 | 19 | 132 | 151 | 2.9 | SM14-Ex-EX166 | |
| Kirkland_Main-2710 | Kirkland_Manholes-1766 | 113.7 | Kirkland_Manholes-1763 | 111.41 | 43.4 | 5.28 | 8 | PVC | 0.01 | 1,620 | 6 | 33 | 39 | 2.4 | SM14-Ex-EX168 | |
| Kirkland_Main-2711 | Kirkland_Manholes-1767 | 122.16 | Kirkland_Manholes-1766 | 113.7 | 181 | 4.67 | 8 | PVC | 0.01 | 1,524 | 6 | 25 | 30 | 2 | SM14-Ex-EX168 | |
| Kirkland_Main-2712 | Kirkland_Manholes-1674 | 78.95 | Kirkland_Manholes-1774 | 71.66 | 398 | 1.83 | 8 | PVC | 0.01 | 954 | 73 | 206 | 279 | 29.3 | | |
| Kirkland_Main-2713 | Kirkland_Manholes-1774 | 71.66 | Kirkland_Manholes-1773 | 69.68 | 129.9 | 1.52 | 8 | PVC | 0.01 | 871 | 75 | 214 | 290 | 33.3 | | |
| Kirkland_Main-2714 | Kirkland_Manholes-1773 | 69.68 | Kirkland_Manholes-1772 | 68.31 | 220 | 0.62 | 8 | PVC | 0.01 | 556 | 83 | 222 | 306 | 55 | | |
| Kirkland_Main-2715 | Kirkland_Manholes-1768 | 72.13 | Kirkland_Manholes-1772 | 68.31 | 229.6 | 1.66 | 12 | PVC | 0.01 | 2,680 | 51 | 247 | 298 | 11.1 | SM14-Ex-EX166 | |
| Kirkland_Main-2716 | Kirkland_Manholes-1775 | 102.05 | Kirkland_Manholes-1771 | 101.91 | 35.5 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 8 | 14 | 3.1 | | Drop Connection |
| Kirkland_Main-2717 | Kirkland_Manholes-1771 | 99.82 | Kirkland_Manholes-1770 | 99.51 | 78 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 16 | 23 | 5.2 | | Drop Connection |
| Kirkland_Main-2718 | Kirkland_Manholes-1770 | 92.14 | Kirkland_Manholes-1769 | 80.52 | 165 | 7.04 | 8 | PVC | 0.01 | 1,871 | 8 | 25 | 32 | 1.7 | | |
| Kirkland_Main-2719 | Kirkland_Manholes-1769 | 80.52 | Kirkland_Manholes-1768 | 72.13 | 44.6 | 18.83 | 8 | PVC | 0.01 | 3,059 | 8 | 33 | 41 | 1.3 | | |
| Kirkland_Main-2720 | Kirkland_Manholes-1762 | 98.88 | Kirkland_Manholes-1768 | 72.13 | 281.2 | 9.51 | 12 | PVC | 0.01 | 6,412 | 33 | 206 | 239 | 3.7 | SM14-Ex-EX166 | |
| Kirkland_Main-2721 | Kirkland_Manholes-1742 | 45.09 | Kirkland_Manholes-1740 | 35.99 | 141.8 | 6.42 | 10 | PVC | 0.01 | 3,238 | 244 | 478 | 722 | 22.3 | | |
| Kirkland_Main-2722 | Kirkland_Manholes-1741 | 41.4 | Kirkland_Manholes-1740 | 35.99 | 19.3 | 27.98 | 8 | PVC | 0.01 | 3,729 | 80 | 74 | 154 | 4.1 | | |
| Kirkland_Main-2723 | Kirkland_Manholes-1722 | 47.26 | Kirkland_Manholes-1742 | 45.09 | 91 | 2.38 | 12 | PVC | 0.01 | 3,210 | 244 | 470 | 714 | 22.2 | | |
| Kirkland_Main-2724 | Kirkland_Manholes-1760 | 56.49 | Kirkland_Manholes-1722 | 47.26 | 220.7 | 4.18 | 10 | PVC | 0.01 | 2,614 | 200 | 437 | 637 | 24.4 | | |
| Kirkland_Main-2725 | Kirkland_Manholes-2143 | 61.9 | Kirkland_Manholes-1760 | 56.49 | 198.1 | 2.73 | 10 | PVC | 0.01 | 2,112 | 184 | 428 | 613 | 29 | | |
| Kirkland_Main-2726 | Kirkland_Manholes-1738 | 34.54 | Kirkland_Manholes-1728 | 26.2 | 233.5 | 3.57 | 8 | PVC | 0.01 | 1,333 | 34 | 16 | 51 | 3.8 | SM14-Ex-EX184 | |
| Kirkland_Main-2727 | Kirkland_Manholes-1739 | 35.68 | Kirkland_Manholes-1738 | 34.54 | 39.2 | 2.91 | 8 | PVC | 0.01 | 1,202 | 0 | 8 | 8 | 0.7 | SM14-Ex-EX184 | |
| Kirkland_Main-2730 | Kirkland_Manholes-1783 | 44.54 | Kirkland_Manholes-1784 | 44.07 | 47.4 | 1 | 8 | PVC | 0.01 | 705 | 74 | 66 | 140 | 19.8 | | |
| Kirkland_Main-2731 | Kirkland_Manholes-1786 | 41.21 | Kirkland_Manholes-733 | 35.72 | 39.3 | 13.98 | 10 | PVC | 0.01 | 4,780 | 306 | 99 | 404 | 8.5 | | |
| Kirkland_Main-2732 | Kirkland_Manholes-1787 | 42.06 | Kirkland_Manholes-1786 | 41.21 | 134.7 | 0.63 | 10 | PVC | 0.01 | 1,016 | 306 | 91 | 396 | 39 | | |
| Kirkland_Main-2733 | Kirkland_Manholes-1785 | 42.96 | Kirkland_Manholes-1787 | 42.06 | 131.8 | 0.68 | 10 | PVC | 0.01 | 1,056 | 304 | 82 | 387 | 36.6 | | |
| Kirkland_Main-2734 | Kirkland_Manholes-1920 | 409.24 | Kirkland_Manholes-2925 | 409 | 89.7 | 0.27 | 12 | PVC | 0.01 | 1,075 | 117 | 374 | 491 | 45.7 | SM14-Ex-EX215 | |
| Kirkland_Main-2735 | Kirkland_Manholes-2925 | 409 | Kirkland_Manholes-1921 | 405.86 | 161.9 | 1.94 | 8 | PVC | 0.01 | 982 | 118 | 378 | 496 | 50.5 | SM14-Ex-EX215 | |
| Kirkland_Main-2736 | Kirkland_Manholes-1784 | 44.07 | Kirkland_Manholes-1785 | 42.96 | 150 | 0.74 | 10 | PVC | 0.01 | 1,100 | 304 | 74 | 379 | 34.4 | | |
| Kirkland_Main-2737 | Kirkland_Manholes-1782 | 44.9 | Kirkland_Manholes-1783 | 44.54 | 88.3 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 58 | 131 | 29.4 | | |
| Kirkland_Main-2738 | Kirkland_Manholes-1781 | 45.04 | Kirkland_Manholes-1782 | 44.9 | 34.7 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 49 | 123 | 27.6 | | |
| Kirkland_Main-2739 | Kirkland_Manholes-1777 | 45.35 | Kirkland_Manholes-1781 | 45.04 | 78.1 | 0.4 | 8 | PVC | 0.01 | 446 | 74 | 41 | 115 | 25.8 | | |
| Kirkland_Main-2740 | Kirkland_Manholes-1779 | 45.97 | Kirkland_Manholes-1778 | 45.85 | 28.6 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 16 | 22 | 5 | | |
| Kirkland_Main-2741 | Kirkland_Manholes-1778 | 45.85 | Kirkland_Manholes-1777 | 45.35 | 126.1 | 0.4 | 8 | PVC | 0.01 | 446 | 70 | 25 | 95 | 21.3 | | |
| Kirkland_Main-2742 | Kirkland_Manholes-1780 | 57.25 | Kirkland_Manholes-1779 | 45.97 | 252.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 6 | 8 | 14 | 0.9 | | |
| Kirkland_Main-2743 | Kirkland_Manholes-1776 | 46.25 | Kirkland_Manholes-1777 | 45.35 | 244.9 | 0.37 | 8 | PVC | 0.01 | 428 | 3 | 8 | 11 | 2.7 | | |
| Kirkland_Main-2745 | Kirkland_Manholes-1696 | 58.41 | Kirkland_Manholes-1695 | 51.29 | 146.7 | 4.85 | 8 | PVC | 0.01 | 1,553 | 60 | 222 | 282 | 18.2 | SM14-Ex-EX96 | |
| Kirkland_Main-2746 | Kirkland_Manholes-1695 | 51.29 | Kirkland_Manholes-1694 | 44.12 | 135.5 | 5.29 | 8 | PVC | 0.01 | 1,622 | 64 | 231 | 294 | 18.1 | SM14-Ex-EX96 | |
| Kirkland_Main-2748 | Kirkland_Manholes-2107 | 69.19 | Kirkland_Manholes-2106 | 63.43 | 225 | 2.56 | 8 | PVC | 0.01 | 1,128 | 1 | 6 | 8 | 0.7 | SM14-Ex-EX227 | |
| Kirkland_Main-2749 | Kirkland_Manholes-2108 | 68.46 | Kirkland_Manholes-2109 | 59.77 | 298.6 | 2.91 | 8 | PVC | 0.01 | 1,203 | 59 | 147 | 206 | 17.1 | SM14-Ex-EX222 | |
| Kirkland_Main-2750 | Kirkland_Manholes-2119 | 72.3 | Kirkland_Manholes-2108 | 68.46 | 400.8 | 0.96 | 8 | PVC | 0.01 | 690 | 48 | 98 | 146 | 21.1 | SM14-Ex-EX222 | |
| Kirkland_Main-2751 | Kirkland_Manholes-2511 | 85.9 | Kirkland_Manholes-2108 | 85.31 | 148.4 | 0.4 | 8 | PVC | 0.01 | 446 | 11 | 43 | 54 | 12.1 | SM14-Ex-EX229 | Drop Connection |
| Kirkland_Main-2752 | Kirkland_Manholes-2109 | 59.77 | Kirkland_Manholes-2111 | 59.56 | 305.5 | 0.07 | 12 | PVC | 0.01 | 545 | 62 | 153 | 215 | 39.4 | SM14-Ex-EX222 | |
| Kirkland_Main-2753 | Kirkland_Manholes-2110 | 60.2 | Kirkland_Manholes-2111 | 59.56 | 55.5 | 1.15 | 8 | PVC | 0.01 | 757 | 14 | 37 | 51 | 6.7 | SM14-Ex-EX232 | |
| Kirkland_Main-2754 | Kirkland_Manholes-2112 | 88.66 | Kirkland_Manholes-2110 | 60.2 | 228.7 | 12.44 | 8 | PVC | 0.01 | 2,487 | 14 | 31 | 44 | 1.8 | SM14-Ex-EX232 | |
| Kirkland_Main-2755 | Kirkland_Manholes-2115 | 91.85 | Kirkland_Manholes-2112 | 88.66 | 62.8 | 5.08 | 8 | PVC | 0.01 | 1,589 | 9 | 24 | 34 | 2.1 | SM14-Ex-EX232 | |
| Kirkland_Main-2756 | Kirkland_Manholes-2113 | 121.3 | Kirkland_Manholes-2115 | 91.85 | 150.4 | 19.59 | 8 | PVC | 0.01 | 3,120 | 5 | 12 | 17 | 0.6 | SM14-Ex-EX232 | |
| Kirkland_Main-2757 | Kirkland_Manholes-2114 | 121.77 | Kirkland_Manholes-2113 | 121.3 | 207.4 | 0.23 | 8 | PVC | 0.01 | 336 | 4 | 6 | 10 | 2.9 | | |
| Kirkland_Main-2758 | Kirkland_Manholes-2116 | 91.9 | Kirkland_Manholes-2115 | 91.85 | 279.7 | 0.02 | 8 | PVC | 0.01 | 94 | 3 | 6 | 10 | 10.2 | SM14-Ex-EX232 | |
| Kirkland_Main-2759 | Kirkland_Manholes-2146 | 75.22 | Kirkland_Manholes-2117 | 74.65 | 143.2 | 0.4 | 8 | PVC | 0.01 | 446 | 32 | 86 | 118 | 26.4 | SM14-Ex-EX222 | Drop Connection |
| Kirkland_Main-2760 | Kirkland_Manholes-2117 | 73.78 | Kirkland_Manholes-2119 | 72.3 | 427.2 | 0.35 | 8 | PVC | 0.01 | 415 | 32 | 92 | 124 | 29.9 | SM14-Ex-EX222 | |
| Kirkland_Main-2761 | Kirkland_Manholes-2445 | 191.11 | Kirkland_Manholes-2490 | 173.27 | 210.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 22 | 69 | 91 | 4.5 | SM14-Ex-EX243 | |
| Kirkland_Main-2763 | Kirkland_Manholes-2446 | 217.36 | Kirkland_Manholes-2444 | 199.73 | 226.7 | 7.78 | 8 | PVC | 0.01 | 1,966 | 4 | 12 | 16 | 0.8 | SM14-Ex-EX245 | |
| Kirkland_Main-2765 | Kirkland_Manholes-1862 | 286.87 | Kirkland_Manholes-1863 | 286.75 | 31.1 | 0.4 | 8 | PVC | 0.01 | 446 | 72 | 134 | 206 | 46.2 | | Drop Connection |
| Kirkland_Main-2766 | Kirkland_Manholes-1863 | 286.33 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 3.06 | 8 | PVC | 0.01 | 1,233 | 72 | 138 | 210 | 17.1 | | |
| Kirkland_Main-2767 | Kirkland_Manholes-1864 | 285.22 | Kirkland_Manholes-1866 | 277.54 | 215.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 77 | 151 | 228 | 17.1 | | |
| Kirkland_Main-2768 | Kirkland_Manholes-1865 | 285.61 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 1.07 | 8 | PVC | 0.01 | 731 | 5 | 8 | 13 | 1.8 | | |
| Kirkland_Main-2769 | Kirkland_Manholes-2770 | 287.2 | Kirkland_Manholes-1865 | 285.61 | 339.1 | 0.47 | 8 | PVC | 0.01 | 483 | 5 | 4 | 9 | 1.8 | | |
| Kirkland_Main-2770 | Kirkland_Manholes-1871 | 279.1 | Kirkland_Manholes-1866 | 277.54 | 120.2 | 1.3 | 8 | PVC | 0.01 | 803 | 3 | 28 | 32 | 4 | | |
| Kirkland_Main-2771 | Kirkland_Manholes-1866 | 277.54 | Kirkland_Manholes-1867 | 276.54 | 31.1 | 3.22 | 8 | PVC | 0.01 | 1,264 | 81 | 183 | 264 | 20.9 | | |
| Kirkland_Main-2772 | Kirkland_Manholes-1867 | 276.54 | Kirkland_Manholes-1868 | 257.42 | 267.6 | 7.15 | 8 | PVC | 0.01 | 1,885 | 81 | 187 | 268 | 14.2 | | |
| Kirkland_Main-2773 | Kirkland_Manholes-1868 | 257.42 | Kirkland_Manholes-1888 | 254.12 | 73.1 | 4.51 | 10 | PVC | 0.01 | 2,715 | 132 | 269 | 401 | 14.8 | | |
| Kirkland_Main-2774 | Kirkland_Manholes-1887 | 260.26 | Kirkland_Manholes-1868 | 257.42 | 270 | 1.05 | 8 | PVC | 0.01 | 723 | 51 | 77 | 128 | 17.8 | | |
| Kirkland_Main-2775 | Kirkland_Manholes-1869 | 292.56 | Kirkland_Manholes-1870 | 286.99 | 206.4 | 2.7 | 8 | PVC | 0.01 | 1,158 | 3 | 4 | 7 | 0.6 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2776 | Kirkland_Manholes-1870 | 286.99 | Kirkland_Manholes-1871 | 279.1 | 130.7 | 6.04 | 8 | PVC | 0.01 | 1,732 | 3 | 8 | 11 | 0.7 | | |
| Kirkland_Main-2777 | Kirkland_Manholes-1872 | 282.33 | Kirkland_Manholes-1871 | 279.1 | 27.4 | 11.77 | 8 | PVC | 0.01 | 2,419 | 0 | 16 | 16 | 0.7 | | |
| Kirkland_Main-2778 | Kirkland_Manholes-1896 | 286.15 | Kirkland_Manholes-1872 | 282.33 | 252.6 | 1.51 | 8 | PVC | 0.01 | 867 | 0 | 12 | 12 | 1.4 | | |
| Kirkland_Main-2779 | Kirkland_Manholes-1895 | 288.31 | Kirkland_Manholes-1896 | 286.15 | 156.7 | 1.38 | 8 | PVC | 0.01 | 828 | 0 | 8 | 8 | 1 | | |
| Kirkland_Main-2781 | Kirkland_Manholes-1894 | 292.07 | Kirkland_Manholes-1895 | 288.31 | 37.7 | 9.98 | 8 | PVC | 0.01 | 2,227 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-2785 | Kirkland_Manholes-1893 | 314.62 | Kirkland_Manholes-1892 | 301.26 | 174.3 | 7.66 | 8 | PVC | 0.01 | 1,952 | 24 | 33 | 57 | 2.9 | | |
| Kirkland_Main-2786 | Kirkland_Manholes-1892 | 301.26 | Kirkland_Manholes-1882 | 297.55 | 110.1 | 3.37 | 8 | PVC | 0.01 | 1,294 | 27 | 41 | 68 | 5.2 | | |
| Kirkland_Main-2787 | Kirkland_Manholes-1882 | 297.55 | Kirkland_Manholes-1885 | 271.65 | 301.6 | 8.59 | 8 | PVC | 0.01 | 2,066 | 33 | 45 | 78 | 3.8 | | |
| Kirkland_Main-2788 | Kirkland_Manholes-1883 | 295.15 | Kirkland_Manholes-1885 | 271.65 | 83.7 | 28.09 | 8 | PVC | 0.01 | 3,737 | 9 | 20 | 29 | 0.8 | | |
| Kirkland_Main-2789 | Kirkland_Manholes-1889 | 296.4 | Kirkland_Manholes-1883 | 295.15 | 155.2 | 0.81 | 8 | PVC | 0.01 | 633 | 9 | 16 | 25 | 4 | | |
| Kirkland_Main-2790 | Kirkland_Manholes-1884 | 299.38 | Kirkland_Manholes-1889 | 296.4 | 51.3 | 5.81 | 8 | PVC | 0.01 | 1,699 | 5 | 12 | 17 | 1 | | |
| Kirkland_Main-2791 | Kirkland_Manholes-1891 | 305.89 | Kirkland_Manholes-1890 | 303.36 | 105.7 | 2.39 | 8 | PVC | 0.01 | 1,091 | 4 | 4 | 8 | 0.7 | | |
| Kirkland_Main-2792 | Kirkland_Manholes-1890 | 303.36 | Kirkland_Manholes-1884 | 299.38 | 71.4 | 5.58 | 8 | PVC | 0.01 | 1,665 | 5 | 8 | 13 | 0.8 | | |
| Kirkland_Main-2793 | Kirkland_Manholes-1885 | 271.65 | Kirkland_Manholes-1886 | 262.12 | 238.5 | 4 | 8 | PVC | 0.01 | 1,409 | 50 | 69 | 119 | 8.4 | | |
| Kirkland_Main-2794 | Kirkland_Manholes-1886 | 262.12 | Kirkland_Manholes-1887 | 260.26 | 298.4 | 0.62 | 8 | PVC | 0.01 | 557 | 50 | 73 | 123 | 22.1 | | |
| Kirkland_Main-2795 | Kirkland_Manholes-1888 | 254.12 | Kirkland_Manholes-1897 | 245.38 | 209.5 | 4.17 | 8 | PVC | 0.01 | 1,440 | 156 | 317 | 474 | 32.9 | | |
| Kirkland_Main-2796 | Kirkland_Manholes-1877 | 246.77 | Kirkland_Manholes-1873 | 243.35 | 391.2 | 0.87 | 8 | PVC | 0.01 | 659 | 64 | 122 | 186 | 28.3 | | |
| Kirkland_Main-2797 | Kirkland_Manholes-1873 | 243.35 | Kirkland_Manholes-1874 | 243.32 | 295.9 | 0.01 | 24 | PVC | 0.01 | 1,329 | 221 | 448 | 668 | 50.3 | SM14-Ex-EX134 | |
| Kirkland_Main-2798 | Kirkland_Manholes-1875 | 249.18 | Kirkland_Manholes-1876 | 247.77 | 111.8 | 1.26 | 8 | PVC | 0.01 | 792 | 25 | 4 | 29 | 3.7 | | |
| Kirkland_Main-2799 | Kirkland_Manholes-1876 | 247.77 | Kirkland_Manholes-1877 | 246.77 | 320.2 | 0.31 | 8 | PVC | 0.01 | 394 | 25 | 16 | 42 | 10.6 | | |
| Kirkland_Main-2800 | Kirkland_Manholes-1878 | 249.88 | Kirkland_Manholes-1877 | 246.77 | 242.5 | 1.28 | 8 | PVC | 0.01 | 798 | 39 | 102 | 140 | 17.6 | | |
| Kirkland_Main-2801 | Kirkland_Manholes-1874 | 243.32 | Kirkland_Manholes-1571 | 242.76 | 271.1 | 0.21 | 15 | PVC | 0.01 | 1,713 | 221 | 452 | 672 | 39.3 | | |
| Kirkland_Main-2802 | Kirkland_Manholes-1881 | 267.11 | Kirkland_Manholes-1879 | 258.08 | 239.4 | 3.77 | 8 | PVC | 0.01 | 1,369 | 36 | 90 | 126 | 9.2 | | |
| Kirkland_Main-2803 | Kirkland_Manholes-1880 | 260.03 | Kirkland_Manholes-1879 | 258.08 | 143.3 | 1.36 | 8 | PVC | 0.01 | 822 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2805 | Kirkland_Manholes-1879 | 258.08 | Kirkland_Manholes-1878 | 249.88 | 231.7 | 3.54 | 8 | PVC | 0.01 | 1,326 | 39 | 98 | 136 | 10.3 | | |
| Kirkland_Main-2806 | Kirkland_Manholes-1897 | 245.38 | Kirkland_Manholes-1873 | 243.35 | 282.6 | 0.72 | 10 | PVC | 0.01 | 1,084 | 156 | 321 | 478 | 44.1 | | |
| Kirkland_Main-2807 | Kirkland_Manholes-1902 | 406.33 | Kirkland_Manholes-1899 | 405.32 | 253.1 | 0.4 | 8 | PVC | 0.01 | 447 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-2808 | Kirkland_Manholes-1899 | 405.32 | Kirkland_Manholes-1898 | 404.75 | 141.4 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-2809 | Kirkland_Manholes-1898 | 404.75 | Kirkland_Manholes-1900 | 402.51 | 135.8 | 1.65 | 8 | PVC | 0.01 | 905 | 3 | 12 | 15 | 1.7 | | |
| Kirkland_Main-2810 | Kirkland_Manholes-1900 | 402.51 | Kirkland_Manholes-1901 | 396.95 | 219.6 | 2.53 | 8 | PVC | 0.01 | 1,122 | 5 | 16 | 21 | 1.9 | | |
| Kirkland_Main-2811 | Kirkland_Manholes-1901 | 396.95 | Kirkland_Manholes-1905 | 395.5 | 142.8 | 1.02 | 8 | PVC | 0.01 | 711 | 5 | 20 | 26 | 3.6 | | |
| Kirkland_Main-2812 | Kirkland_Manholes-1903 | 399.77 | Kirkland_Manholes-1904 | 399.67 | 107.5 | 0.09 | 8 | PVC | 0.01 | 215 | 4 | 12 | 16 | 7.5 | | |
| Kirkland_Main-2813 | Kirkland_Manholes-1904 | 399.67 | Kirkland_Manholes-1905 | 395.5 | 126.3 | 3.3 | 8 | PVC | 0.01 | 1,281 | 5 | 16 | 21 | 1.7 | | |
| Kirkland_Main-2814 | Kirkland_Manholes-2220 | 93.99 | Kirkland_Manholes-2219 | 92.24 | 194.8 | 0.9 | 8 | PVC | 0.01 | 668 | 1 | 6 | 7 | 1.1 | | |
| Kirkland_Main-2815 | Kirkland_Manholes-2219 | 92.24 | Kirkland_Manholes-2218 | 82.71 | 300.9 | 3.17 | 8 | PVC | 0.01 | 1,255 | 3 | 13 | 16 | 1.3 | | |
| Kirkland_Main-2824 | Kirkland_Manholes-2222 | 72.19 | Kirkland_Manholes-2221 | 60.29 | 232.5 | 5.12 | 8 | PVC | 0.01 | 1,595 | 4 | 19 | 23 | 1.5 | | |
| Kirkland_Main-2825 | Kirkland_Manholes-2223 | 75.05 | Kirkland_Manholes-2222 | 72.19 | 181.6 | 1.58 | 8 | PVC | 0.01 | 885 | 2 | 13 | 15 | 1.7 | | |
| Kirkland_Main-2826 | Kirkland_Manholes-2224 | 76.4 | Kirkland_Manholes-2223 | 75.05 | 210.4 | 0.64 | 8 | PVC | 0.01 | 565 | 1 | 6 | 7 | 1.3 | | |
| Kirkland_Main-2829 | Kirkland_Manholes-2233 | 60.15 | Kirkland_Manholes-2232 | 48.59 | 76.7 | 15.07 | 8 | PVC | 0.01 | 2,737 | 16 | 6 | 23 | 0.8 | | |
| Kirkland_Main-2830 | Kirkland_Manholes-2232 | 48.59 | Kirkland_Manholes-2231 | 25.71 | 219.7 | 10.42 | 8 | PVC | 0.01 | 2,275 | 17 | 13 | 30 | 1.3 | | |
| Kirkland_Main-2831 | Kirkland_Manholes-2231 | 25.71 | Kirkland_Manholes-2230 | 23.3 | 56.5 | 4.26 | 8 | PVC | 0.01 | 1,456 | 17 | 19 | 36 | 2.5 | | |
| Kirkland_Main-2832 | Kirkland_Manholes-2230 | 23.3 | Kirkland_Manholes-2229 | 22.53 | 34.1 | 2.26 | 8 | PVC | 0.01 | 1,060 | 17 | 32 | 49 | 4.6 | | |
| Kirkland_Main-2833 | Kirkland_Manholes-2210 | 47.75 | Kirkland_Manholes-2205 | 23.1 | 33.9 | 72.62 | 8 | PVC | 0.01 | 6,008 | 7 | 26 | 33 | 0.6 | SM14-Ex-EX189 | Slope verified in as-builts |
| Kirkland_Main-2834 | Kirkland_Manholes-2211 | 51.73 | Kirkland_Manholes-2210 | 47.75 | 86.6 | 4.6 | 8 | PVC | 0.01 | 1,512 | 7 | 19 | 27 | 1.8 | | |
| Kirkland_Main-2835 | Kirkland_Manholes-2207 | 54.13 | Kirkland_Manholes-2211 | 51.73 | 163.6 | 1.47 | 8 | PVC | 0.01 | 854 | 0 | 13 | 13 | 1.6 | | |
| Kirkland_Main-2836 | Kirkland_Manholes-2206 | 66.42 | Kirkland_Manholes-2198 | 65.46 | 282.2 | 0.34 | 8 | PVC | 0.01 | 411 | 2 | 16 | 18 | 4.4 | SM8 | |
| Kirkland_Main-2837 | Kirkland_Manholes-2198 | 65.46 | Kirkland_Manholes-2193 | 64.5 | 239.8 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 25 | 28 | 6.3 | SM14-Ex-EX187 | |
| Kirkland_Main-2839 | Kirkland_Manholes-2084 | 179.07 | Kirkland_Manholes-2069 | 170.43 | 427.7 | 2.02 | 12 | PVC | 0.01 | 2,954 | 70 | 73 | 144 | 4.9 | SM14-Ex-EX199 | |
| Kirkland_Main-2840 | Kirkland_Manholes-2085 | 183.55 | Kirkland_Manholes-2084 | 179.07 | 426.7 | 1.05 | 12 | PVC | 0.01 | 2,130 | 70 | 69 | 139 | 6.5 | SM14-Ex-EX199 | |
| Kirkland_Main-2841 | Kirkland_Manholes-2086 | 187.61 | Kirkland_Manholes-2085 | 183.55 | 445.4 | 0.91 | 12 | PVC | 0.01 | 1,985 | 68 | 65 | 133 | 6.7 | SM1 | |
| Kirkland_Main-2842 | Kirkland_Manholes-2074 | 213.49 | Kirkland_Manholes-2086 | 187.61 | 333.1 | 7.77 | 8 | PVC | 0.01 | 1,965 | 51 | 53 | 104 | 5.3 | SM14-Ex-EX246 | |
| Kirkland_Main-2843 | Kirkland_Manholes-2087 | 189.64 | Kirkland_Manholes-2086 | 187.61 | 250.4 | 0.81 | 12 | PVC | 0.01 | 1,872 | 9 | 8 | 17 | 0.9 | SM1 | |
| Kirkland_Main-2844 | Kirkland_Manholes-2301 | 194.13 | Kirkland_Manholes-2087 | 189.64 | 258.5 | 1.74 | 12 | PVC | 0.01 | 2,740 | 0 | 4 | 4 | 0.2 | SM1 | |
| Kirkland_Main-2845 | Kirkland_Manholes-2838 | 108.96 | Kirkland_Manholes-2837 | 104.37 | 77.8 | 5.9 | 8 | PVC | 0.01 | 1,712 | 6 | 6 | 12 | 0.7 | | |
| Kirkland_Main-2846 | Kirkland_Manholes-2837 | 104.37 | Kirkland_Manholes-2836 | 60.97 | 275.8 | 15.74 | 8 | PVC | 0.01 | 2,797 | 6 | 12 | 18 | 0.6 | | |
| Kirkland_Main-2847 | Kirkland_Manholes-2834 | 37.62 | Kirkland_Manholes-2849 | 29.21 | 55.8 | 15.07 | 12 | PVC | 0.01 | 8,071 | 36 | 128 | 164 | 2 | SM14-Ex-EX316 | |
| Kirkland_Main-2848 | Kirkland_Manholes-2833 | 29.99 | Kirkland_Manholes-2849 | 29.21 | 264.4 | 0.3 | 18 | PVC | 0.01 | 3,329 | 474 | 1,077 | 1,622 | 48.7 | SM14-Ex-EX309 | |
| Kirkland_Main-2849 | Kirkland_Manholes-2849 | 29.21 | Kirkland_Manholes-2848 | 28.9 | 205.9 | 0.15 | 24 | PVC | 0.01 | 5,112 | 509 | 1,211 | 1,792 | 35.1 | SM14-Ex-EX309 | Drop Connection |
| Kirkland_Main-2850 | Kirkland_Manholes-2848 | 27.55 | Kirkland_Manholes-2842 | 26.9 | 429.8 | 0.15 | 24 | PVC | 0.01 | 5,133 | 514 | 1,217 | 1,802 | 35.1 | SM14-Ex-EX309 | |
| Kirkland_Main-2851 | Kirkland_Manholes-1941 | 361.64 | Kirkland_Manholes-1942 | 350.59 | 169 | 6.54 | 8 | PVC | 0.01 | 1,803 | 3 | 8 | 11 | 0.6 | | |
| Kirkland_Main-2852 | Kirkland_Manholes-1943 | 356.18 | Kirkland_Manholes-1942 | 350.59 | 121.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2853 | Kirkland_Manholes-1942 | 350.59 | Kirkland_Manholes-1577 | 341.43 | 212 | 4.32 | 8 | PVC | 0.01 | 1,465 | 3 | 16 | 19 | 1.3 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2854 | Kirkland_Manholes-1944 | 388.13 | Kirkland_Manholes-1945 | 370.88 | 207.3 | 8.32 | 8 | PVC | 0.01 | 2,034 | 0 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2855 | Kirkland_Manholes-1945 | 370.88 | Kirkland_Manholes-1946 | 363.75 | 185.3 | 3.85 | 8 | PVC | 0.01 | 1,383 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-2856 | Kirkland_Manholes-1946 | 363.75 | Kirkland_Manholes-1947 | 358.01 | 122.1 | 4.7 | 8 | PVC | 0.01 | 1,529 | 2 | 12 | 14 | 0.9 | | |
| Kirkland_Main-2857 | Kirkland_Manholes-1947 | 358.01 | Kirkland_Manholes-1948 | 350.2 | 125.9 | 6.2 | 8 | PVC | 0.01 | 1,756 | 2 | 16 | 19 | 1.1 | | |
| Kirkland_Main-2858 | Kirkland_Manholes-1949 | 352.67 | Kirkland_Manholes-1948 | 350.2 | 274.7 | 0.9 | 8 | PVC | 0.01 | 669 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2859 | Kirkland_Manholes-1948 | 350.2 | Kirkland_Manholes-1950 | 344.53 | 121.4 | 4.67 | 8 | PVC | 0.01 | 1,524 | 6 | 24 | 30 | 2 | | |
| Kirkland_Main-2860 | Kirkland_Manholes-1950 | 344.53 | Kirkland_Manholes-1893 | 314.62 | 313.2 | 9.55 | 8 | PVC | 0.01 | 2,179 | 7 | 28 | 35 | 1.6 | | |
| Kirkland_Main-2861 | Kirkland_Manholes-1952 | 275.36 | Kirkland_Manholes-1951 | 275.06 | 208.2 | 0.14 | 8 | PVC | 0.01 | 268 | 4 | 41 | 45 | 16.7 | | |
| Kirkland_Main-2862 | Kirkland_Manholes-1953 | 290.71 | Kirkland_Manholes-1952 | 275.36 | 336.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 4 | 37 | 41 | 2.7 | | |
| Kirkland_Main-2863 | Kirkland_Manholes-1957 | 343.4 | Kirkland_Manholes-1956 | 335.87 | 142.5 | 5.28 | 8 | PVC | 0.01 | 1,620 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-2864 | Kirkland_Manholes-1956 | 335.87 | Kirkland_Manholes-1955 | 335.45 | 105.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 8 | 8 | 1.8 | | |
| Kirkland_Main-2865 | Kirkland_Manholes-1975 | 436.73 | Kirkland_Manholes-1974 | 432 | 247.5 | 1.91 | 8 | PVC | 0.01 | 975 | 25 | 126 | 151 | 15.5 | | |
| Kirkland_Main-2866 | Kirkland_Manholes-1976 | 440.77 | Kirkland_Manholes-1975 | 436.73 | 231.1 | 1.75 | 8 | PVC | 0.01 | 932 | 11 | 41 | 51 | 5.5 | | |
| Kirkland_Main-2867 | Kirkland_Manholes-1978 | 440.32 | Kirkland_Manholes-1975 | 436.73 | 342.8 | 1.05 | 8 | PVC | 0.01 | 721 | 13 | 81 | 95 | 13.1 | | |
| Kirkland_Main-2868 | Kirkland_Manholes-1977 | 454.61 | Kirkland_Manholes-1976 | 440.77 | 262.5 | 5.27 | 8 | PVC | 0.01 | 1,619 | 7 | 33 | 39 | 2.4 | | |
| Kirkland_Main-2869 | Kirkland_Manholes-1980 | 464.9 | Kirkland_Manholes-1977 | 454.61 | 328.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 5 | 24 | 29 | 2.3 | | |
| Kirkland_Main-2870 | Kirkland_Manholes-1979 | 446.84 | Kirkland_Manholes-1978 | 440.32 | 179.3 | 3.64 | 8 | PVC | 0.01 | 1,345 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-2871 | Kirkland_Manholes-1984 | 465.6 | Kirkland_Manholes-1980 | 464.9 | 159.8 | 0.44 | 8 | PVC | 0.01 | 467 | 3 | 16 | 20 | 4.2 | | |
| Kirkland_Main-2872 | Kirkland_Manholes-1982 | 470.94 | Kirkland_Manholes-1980 | 464.9 | 329.7 | 1.83 | 8 | PVC | 0.01 | 954 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2873 | Kirkland_Manholes-1985 | 470.88 | Kirkland_Manholes-1981 | 467.1 | 204.6 | 1.85 | 8 | PVC | 0.01 | 958 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2874 | Kirkland_Manholes-1986 | 467.24 | Kirkland_Manholes-1981 | 467.1 | 144.7 | 0.1 | 8 | PVC | 0.01 | 219 | 0 | 4 | 4 | 2 | | |
| Kirkland_Main-2875 | Kirkland_Manholes-1983 | 469.93 | Kirkland_Manholes-2019 | 467.83 | 75.8 | 2.77 | 8 | PVC | 0.01 | 1,174 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2876 | Kirkland_Manholes-1981 | 467.1 | Kirkland_Manholes-1984 | 465.6 | 153 | 0.98 | 8 | PVC | 0.01 | 698 | 2 | 12 | 14 | 2 | | |
| Kirkland_Main-2877 | Kirkland_Manholes-1987 | 443.37 | Kirkland_Manholes-1976 | 440.77 | 252.9 | 1.03 | 8 | PVC | 0.01 | 715 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2878 | Kirkland_Manholes-2002 | 429.3 | Kirkland_Manholes-2000 | 426.18 | 243.7 | 1.28 | 8 | PVC | 0.01 | 798 | 1 | 8 | 9 | 1.1 | SM14-Ex-EX209 | |
| Kirkland_Main-2879 | Kirkland_Manholes-2000 | 426.18 | Kirkland_Manholes-2001 | 424.5 | 24.1 | 6.98 | 8 | PVC | 0.01 | 1,863 | 15 | 65 | 80 | 4.3 | SM14-Ex-EX209 | |
| Kirkland_Main-2880 | Kirkland_Manholes-1999 | 430.91 | Kirkland_Manholes-2000 | 426.18 | 304.8 | 1.55 | 8 | PVC | 0.01 | 878 | 14 | 53 | 67 | 7.7 | SM14-Ex-EX211 | |
| Kirkland_Main-2881 | Kirkland_Manholes-2001 | 424.5 | Kirkland_Manholes-2063 | 422.68 | 357.6 | 0.51 | 8 | PVC | 0.01 | 503 | 15 | 69 | 84 | 16.7 | SM14-Ex-EX209 | |
| Kirkland_Main-2882 | Kirkland_Manholes-2003 | 431.01 | Kirkland_Manholes-2002 | 429.3 | 155.3 | 1.1 | 8 | PVC | 0.01 | 740 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-2883 | Kirkland_Manholes-2015 | 418.27 | Kirkland_Manholes-2014 | 416.63 | 83.6 | 1.96 | 8 | PVC | 0.01 | 988 | 24 | 90 | 114 | 11.5 | | |
| Kirkland_Main-2884 | Kirkland_Manholes-2014 | 416.63 | Kirkland_Manholes-2013 | 413.74 | 146.6 | 1.97 | 8 | PVC | 0.01 | 990 | 25 | 94 | 118 | 12 | | |
| Kirkland_Main-2886 | Kirkland_Manholes-2010 | 424.43 | Kirkland_Manholes-2016 | 421.46 | 333.6 | 0.89 | 8 | PVC | 0.01 | 665 | 21 | 81 | 102 | 15.4 | | |
| Kirkland_Main-2887 | Kirkland_Manholes-2016 | 421.46 | Kirkland_Manholes-2015 | 418.27 | 330.4 | 0.97 | 8 | PVC | 0.01 | 693 | 23 | 85 | 108 | 15.6 | | |
| Kirkland_Main-2889 | Kirkland_Manholes-2021 | 473.17 | Kirkland_Manholes-2020 | 468.34 | 27.5 | 17.56 | 8 | PVC | 0.01 | 2,954 | 29 | 94 | 123 | 4.2 | | |
| Kirkland_Main-2890 | Kirkland_Manholes-2020 | 468.34 | Kirkland_Manholes-2019 | 467.83 | 127.5 | 0.4 | 10 | PVC | 0.01 | 809 | 120 | 244 | 364 | 45 | | |
| Kirkland_Main-2891 | Kirkland_Manholes-2023 | 466.76 | Kirkland_Manholes-2022 | 466 | 41.6 | 1.83 | 8 | PVC | 0.01 | 953 | 9 | 20 | 29 | 3.1 | | |
| Kirkland_Main-2892 | Kirkland_Manholes-2037 | 465.67 | Kirkland_Manholes-2036 | 452.58 | 367.2 | 3.57 | 8 | PVC | 0.01 | 1,331 | 11 | 16 | 27 | 2 | SM14-Ex-EX266 | |
| Kirkland_Main-2893 | Kirkland_Manholes-2041 | 465.42 | Kirkland_Manholes-2042 | 455.6 | 502.4 | 1.95 | 8 | PVC | 0.01 | 986 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX265 | |
| Kirkland_Main-2894 | Kirkland_Manholes-2042 | 455.6 | Kirkland_Manholes-2043 | 454.68 | 150.3 | 0.61 | 12 | PVC | 0.01 | 1,626 | 78 | 285 | 363 | 22.3 | SM14-Ex-EX214 | |
| Kirkland_Main-2895 | Kirkland_Manholes-2044 | 435.14 | Kirkland_Manholes-2045 | 432.5 | 20.8 | 12.67 | 12 | PVC | 0.01 | 7,399 | 81 | 293 | 374 | 5 | SM14-Ex-EX214 | |
| Kirkland_Main-2896 | Kirkland_Manholes-2043 | 454.68 | Kirkland_Manholes-2044 | 435.14 | 356.2 | 5.49 | 12 | PVC | 0.01 | 4,869 | 79 | 289 | 368 | 7.6 | SM14-Ex-EX214 | |
| Kirkland_Main-2897 | Kirkland_Manholes-2046 | 437.24 | Kirkland_Manholes-2045 | 432.5 | 199.5 | 2.38 | 10 | PVC | 0.01 | 1,970 | 153 | 346 | 499 | 25.3 | | |
| Kirkland_Main-2898 | Kirkland_Manholes-2047 | 441.15 | Kirkland_Manholes-2046 | 437.24 | 49.2 | 7.95 | 10 | PVC | 0.01 | 3,605 | 152 | 342 | 494 | 13.7 | | |
| Kirkland_Main-2899 | Kirkland_Manholes-2048 | 442.51 | Kirkland_Manholes-2047 | 441.15 | 76.6 | 1.77 | 8 | PVC | 0.01 | 939 | 152 | 338 | 490 | 52.1 | SM14-Ex-EX264 | |
| Kirkland_Main-2900 | Kirkland_Manholes-2049 | 454.48 | Kirkland_Manholes-2050 | 439.64 | 163.1 | 9.1 | 8 | PVC | 0.01 | 2,126 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX263 | |
| Kirkland_Main-2901 | Kirkland_Manholes-2050 | 439.64 | Kirkland_Manholes-2051 | 434.18 | 313 | 1.74 | 8 | PVC | 0.01 | 931 | 3 | 8 | 12 | 1.2 | SM14-Ex-EX263 | |
| Kirkland_Main-2902 | Kirkland_Manholes-2051 | 434.18 | Kirkland_Manholes-2054 | 429.73 | 307.2 | 1.45 | 8 | PVC | 0.01 | 849 | 5 | 12 | 18 | 2.1 | SM14-Ex-EX263 | |
| Kirkland_Main-2903 | Kirkland_Manholes-2053 | 424.91 | Kirkland_Manholes-2285 | 419.89 | 165.8 | 3.03 | 8 | PVC | 0.01 | 1,227 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX248 | |
| Kirkland_Main-2904 | Kirkland_Manholes-2054 | 429.73 | Kirkland_Manholes-2055 | 427.92 | 21.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 6 | 16 | 22 | 1.1 | | |
| Kirkland_Main-2905 | Kirkland_Manholes-3044 | 18.06 | Kirkland_Manholes-2736 | 17.76 | 69.7 | 0.43 | 18 | PVC | 0.01 | 4,020 | 240 | 519 | 759 | 18.9 | SM14-Ex-EX289 | |
| Kirkland_Main-2906 | Kirkland_Manholes-2045 | 432.5 | Kirkland_Manholes-2055 | 427.92 | 351.4 | 1.3 | 10 | PVC | 0.01 | 1,460 | 235 | 643 | 878 | 60.1 | | |
| Kirkland_Main-2907 | Kirkland_Manholes-2057 | 422.6 | Kirkland_Manholes-2056 | 422.2 | 14.4 | 2.79 | 10 | PVC | 0.01 | 2,134 | 255 | 680 | 934 | 43.8 | | |
| Kirkland_Main-2908 | Kirkland_Manholes-1848 | 462 | Kirkland_Manholes-1216 | 443.89 | 186.3 | 9.72 | 8 | PVC | 0.01 | 2,198 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2909 | Kirkland_Manholes-2056 | 422.2 | Kirkland_Manholes-2285 | 419.89 | 62.2 | 3.71 | 8 | PVC | 0.01 | 1,359 | 255 | 684 | 939 | 69.1 | | |
| Kirkland_Main-2910 | Kirkland_Manholes-2058 | 427.27 | Kirkland_Manholes-2057 | 422.6 | 119.2 | 3.92 | 10 | PVC | 0.01 | 2,531 | 254 | 675 | 930 | 36.7 | | |
| Kirkland_Main-2911 | Kirkland_Manholes-2055 | 427.92 | Kirkland_Manholes-2058 | 427.27 | 53.1 | 1.22 | 10 | PVC | 0.01 | 1,414 | 241 | 663 | 904 | 63.9 | | |
| Kirkland_Main-2912 | Kirkland_Manholes-2059 | 433 | Kirkland_Manholes-2058 | 427.27 | 231.2 | 2.48 | 8 | PVC | 0.01 | 1,110 | 14 | 8 | 22 | 2 | SM14-Ex-EX213 | |
| Kirkland_Main-2913 | Kirkland_Manholes-3082 | 428.49 | Kirkland_Manholes-1992 | 427.27 | 187.8 | 0.65 | 8 | PVC | 0.01 | 568 | 3 | 8 | 11 | 2 | | |
| Kirkland_Main-2914 | Kirkland_Manholes-1992 | 427.27 | Kirkland_Manholes-2009 | 426.97 | 143.6 | 0.21 | 8 | PVC | 0.01 | 322 | 13 | 49 | 61 | 19.1 | | |
| Kirkland_Main-2915 | Kirkland_Manholes-1991 | 431.18 | Kirkland_Manholes-1992 | 427.27 | 327 | 1.2 | 8 | PVC | 0.01 | 771 | 10 | 37 | 46 | 6 | | |
| Kirkland_Main-2916 | Kirkland_Manholes-2004 | 427.75 | Kirkland_Manholes-2010 | 424.43 | 322.6 | 1.03 | 8 | PVC | 0.01 | 715 | 5 | 24 | 29 | 4.1 | | |
| Kirkland_Main-2917 | Kirkland_Manholes-2007 | 429.08 | Kirkland_Manholes-2004 | 427.75 | 98.7 | 1.35 | 8 | PVC | 0.01 | 819 | 5 | 20 | 25 | 3.1 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2918 | Kirkland_Manholes-2260 | 285.07 | Kirkland_Manholes-2259 | 272.05 | 278.2 | 4.68 | 12 | PVC | 0.01 | 4,497 | 295 | 875 | 1,170 | 26 | SM14-Ex-EX248 | |
| Kirkland_Main-2919 | Kirkland_Manholes-2259 | 272.05 | Kirkland_Manholes-2258 | 263.77 | 196.6 | 4.21 | 12 | PVC | 0.01 | 4,266 | 301 | 883 | 1,184 | 27.7 | SM14-Ex-EX248 | |
| Kirkland_Main-2920 | Kirkland_Manholes-2323 | 247.45 | Kirkland_Manholes-2324 | 245.37 | 33.9 | 6.13 | 8 | PVC | 0.01 | 1,746 | 40 | 134 | 174 | 10 | | |
| Kirkland_Main-2921 | Kirkland_Manholes-2322 | 259.98 | Kirkland_Manholes-2323 | 247.45 | 184.9 | 6.78 | 8 | PVC | 0.01 | 1,836 | 39 | 130 | 169 | 9.2 | SM14-Ex-EX252 | |
| Kirkland_Main-2922 | Kirkland_Manholes-2325 | 246.61 | Kirkland_Manholes-2324 | 245.37 | 131.1 | 0.95 | 8 | PVC | 0.01 | 686 | 5 | 12 | 17 | 2.5 | | |
| Kirkland_Main-2923 | Kirkland_Manholes-2329 | 258.36 | Kirkland_Manholes-2325 | 246.61 | 302.7 | 3.88 | 8 | PVC | 0.01 | 1,389 | 4 | 8 | 12 | 0.9 | | |
| Kirkland_Main-2924 | Kirkland_Manholes-2328 | 273.89 | Kirkland_Manholes-2329 | 258.36 | 228.5 | 6.8 | 8 | PVC | 0.01 | 1,838 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2925 | Kirkland_Manholes-2339 | 347.35 | Kirkland_Manholes-2337 | 345.83 | 131 | 1.16 | 8 | PVC | 0.01 | 760 | 3 | 8 | 11 | 1.5 | SM14-Ex-EX256 | |
| Kirkland_Main-2926 | Kirkland_Manholes-2337 | 345.83 | Kirkland_Manholes-2338 | 328.54 | 114.6 | 15.08 | 8 | PVC | 0.01 | 2,738 | 5 | 12 | 17 | 0.6 | SM14-Ex-EX256 | |
| Kirkland_Main-2927 | Kirkland_Manholes-2334 | 313.34 | Kirkland_Manholes-2333 | 308.81 | 129.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 28 | 77 | 105 | 8 | SM14-Ex-EX252 | |
| Kirkland_Main-2928 | Kirkland_Manholes-2333 | 308.81 | Kirkland_Manholes-2332 | 296.43 | 179.4 | 6.9 | 8 | PVC | 0.01 | 1,852 | 29 | 81 | 110 | 5.9 | SM14-Ex-EX252 | |
| Kirkland_Main-2929 | Kirkland_Manholes-2332 | 296.43 | Kirkland_Manholes-2331 | 295.51 | 98.1 | 0.94 | 8 | PVC | 0.01 | 683 | 31 | 90 | 121 | 17.7 | SM14-Ex-EX252 | |
| Kirkland_Main-2930 | Kirkland_Manholes-2718 | 21.4 | Kirkland_Manholes-2721 | 21.2 | 187 | 0.11 | 12 | PVC | 0.01 | 680 | 83 | 37 | 120 | 17.7 | SM14-Ex-EX289 | |
| Kirkland_Main-2931 | Kirkland_Manholes-2331 | 295.51 | Kirkland_Manholes-2330 | 295.18 | 115.3 | 0.29 | 8 | PVC | 0.01 | 377 | 31 | 94 | 125 | 33.1 | SM14-Ex-EX252 | |
| Kirkland_Main-2932 | Kirkland_Manholes-2327 | 280.44 | Kirkland_Manholes-2326 | 264.71 | 213.4 | 7.37 | 8 | PVC | 0.01 | 1,914 | 36 | 122 | 158 | 8.2 | SM14-Ex-EX252 | |
| Kirkland_Main-2933 | Kirkland_Manholes-2326 | 264.71 | Kirkland_Manholes-2322 | 259.98 | 165.9 | 2.85 | 8 | PVC | 0.01 | 1,190 | 37 | 126 | 163 | 13.7 | SM14-Ex-EX252 | |
| Kirkland_Main-2935 | Kirkland_Manholes-2342 | 370.03 | Kirkland_Manholes-2339 | 347.35 | 229.4 | 9.89 | 8 | PVC | 0.01 | 2,217 | 3 | 4 | 7 | 0.3 | SM14-Ex-EX256 | |
| Kirkland_Main-2936 | Kirkland_Manholes-2340 | 335.99 | Kirkland_Manholes-2379 | 312.61 | 331.3 | 7.06 | 8 | PVC | 0.01 | 1,873 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX257 | |
| Kirkland_Main-2937 | Kirkland_Manholes-2338 | 328.54 | Kirkland_Manholes-2341 | 327.28 | 253.7 | 0.5 | 8 | PVC | 0.01 | 497 | 7 | 16 | 23 | 4.7 | SM14-Ex-EX256 | |
| Kirkland_Main-2938 | Kirkland_Manholes-2341 | 327.28 | Kirkland_Manholes-2335 | 323.22 | 289.5 | 1.4 | 8 | PVC | 0.01 | 835 | 10 | 24 | 34 | 4.1 | SM14-Ex-EX256 | |
| Kirkland_Main-2939 | Kirkland_Manholes-2336 | 342.09 | Kirkland_Manholes-2341 | 327.28 | 137.3 | 10.78 | 8 | PVC | 0.01 | 2,315 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX256 | Drop Connection |
| Kirkland_Main-2940 | Kirkland_Manholes-2349 | 361.19 | Kirkland_Manholes-2335 | 323.22 | 315.1 | 12.05 | 8 | PVC | 0.01 | 2,448 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX252 | |
| Kirkland_Main-2941 | Kirkland_Manholes-2335 | 323.22 | Kirkland_Manholes-2334 | 323.19 | 8.2 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 33 | 45 | 10 | SM14-Ex-EX252 | Drop Connection |
| Kirkland_Main-2942 | Kirkland_Manholes-2343 | 315.2 | Kirkland_Manholes-2348 | 314.6 | 208.7 | 0.29 | 8 | PVC | 0.01 | 378 | 15 | 37 | 51 | 13.5 | SM14-Ex-EX254 | |
| Kirkland_Main-2944 | Kirkland_Manholes-2915 | 422.99 | Kirkland_Manholes-2916 | 416.17 | 267.2 | 2.55 | 8 | PVC | 0.01 | 1,126 | 5 | 16 | 21 | 1.9 | | |
| Kirkland_Main-2945 | Kirkland_Manholes-2916 | 416.17 | Kirkland_Manholes-2936 | 415.17 | 403.5 | 0.25 | 8 | PVC | 0.01 | 351 | 7 | 24 | 31 | 8.9 | | |
| Kirkland_Main-2946 | Kirkland_Manholes-2917 | 449.84 | Kirkland_Manholes-2918 | 440.81 | 194.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2947 | Kirkland_Manholes-2918 | 440.81 | Kirkland_Manholes-2919 | 429.45 | 198.9 | 5.71 | 8 | PVC | 0.01 | 1,685 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-2948 | Kirkland_Manholes-2919 | 429.45 | Kirkland_Manholes-2915 | 422.99 | 217.1 | 2.98 | 8 | PVC | 0.01 | 1,216 | 4 | 12 | 16 | 1.3 | | |
| Kirkland_Main-2949 | Kirkland_Manholes-2922 | 91.28 | Kirkland_Manholes-2921 | 73.76 | 147.5 | 11.88 | 8 | PVC | 0.01 | 2,430 | 2 | 13 | 15 | 0.6 | | |
| Kirkland_Main-2951 | Kirkland_Manholes-2923 | 92.6 | Kirkland_Manholes-2922 | 91.28 | 84.5 | 1.56 | 8 | PVC | 0.01 | 881 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2952 | Kirkland_Manholes-2924 | 104.01 | Kirkland_Manholes-2922 | 91.28 | 265 | 4.8 | 8 | PVC | 0.01 | 1,545 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2953 | Kirkland_Manholes-2423 | 267.38 | Kirkland_Manholes-2421 | 253.02 | 328.6 | 4.37 | 8 | PVC | 0.01 | 1,474 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-2954 | Kirkland_Manholes-2429 | 273.52 | Kirkland_Manholes-2424 | 257.66 | 398.8 | 3.98 | 8 | PVC | 0.01 | 1,406 | 33 | 98 | 130 | 9.3 | SM14-Ex-EX260 | |
| Kirkland_Main-2955 | Kirkland_Manholes-2425 | 261.07 | Kirkland_Manholes-2424 | 257.66 | 270.7 | 1.26 | 12 | PVC | 0.01 | 2,333 | 203 | 216 | 418 | 17.9 | SM2 | |
| Kirkland_Main-2956 | Kirkland_Manholes-2426 | 264.11 | Kirkland_Manholes-2425 | 261.07 | 237.2 | 1.28 | 12 | PVC | 0.01 | 2,353 | 196 | 195 | 391 | 16.6 | SM2 | |
| Kirkland_Main-2957 | Kirkland_Manholes-2430 | 273.69 | Kirkland_Manholes-2425 | 261.07 | 254.1 | 4.97 | 8 | PVC | 0.01 | 1,571 | 5 | 16 | 22 | 1.4 | SM14-Ex-EX286 | |
| Kirkland_Main-2958 | Kirkland_Manholes-2427 | 267.5 | Kirkland_Manholes-2426 | 266.42 | 268.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 195 | 191 | 386 | 29.4 | SM2 | Drop Connection |
| Kirkland_Main-2959 | Kirkland_Manholes-2428 | 270.37 | Kirkland_Manholes-2427 | 267.5 | 310.1 | 0.93 | 8 | PVC | 0.01 | 678 | 136 | 163 | 299 | 44.1 | SM2 | |
| Kirkland_Main-2960 | Kirkland_Manholes-2431 | 277.03 | Kirkland_Manholes-2430 | 273.69 | 201.8 | 1.66 | 8 | PVC | 0.01 | 907 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-2961 | Kirkland_Manholes-2433 | 263.87 | Kirkland_Manholes-2434 | 245.33 | 172.7 | 10.73 | 8 | PVC | 0.01 | 2,310 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2962 | Kirkland_Manholes-2434 | 245.33 | Kirkland_Manholes-2437 | 244.43 | 228.6 | 0.39 | 8 | PVC | 0.01 | 442 | 5 | 12 | 17 | 3.9 | SM14-Ex-EX244 | |
| Kirkland_Main-2963 | Kirkland_Manholes-2437 | 244.43 | Kirkland_Manholes-2436 | 225.88 | 256.7 | 7.23 | 8 | PVC | 0.01 | 1,895 | 7 | 16 | 23 | 1.2 | SM14-Ex-EX244 | |
| Kirkland_Main-2964 | Kirkland_Manholes-2514 | 400.04 | Kirkland_Manholes-2517 | 387 | 217.1 | 6.01 | 8 | PVC | 0.01 | 1,728 | 10 | 15 | 25 | 1.4 | | |
| Kirkland_Main-2965 | Kirkland_Manholes-2515 | 393.7 | Kirkland_Manholes-2516 | 391.18 | 190.1 | 1.33 | 8 | PVC | 0.01 | 812 | 4 | 3 | 7 | 0.9 | | |
| Kirkland_Main-2966 | Kirkland_Manholes-2516 | 391.18 | Kirkland_Manholes-2517 | 387 | 163.7 | 2.55 | 8 | PVC | 0.01 | 1,127 | 6 | 6 | 12 | 1.1 | | |
| Kirkland_Main-2967 | Kirkland_Manholes-2517 | 387 | Kirkland_Manholes-2518 | 378.45 | 142.8 | 5.99 | 8 | PVC | 0.01 | 1,725 | 17 | 23 | 41 | 2.4 | | |
| Kirkland_Main-2968 | Kirkland_Manholes-2518 | 378.45 | Kirkland_Manholes-2524 | 346.56 | 373.5 | 8.54 | 8 | PVC | 0.01 | 2,060 | 36 | 26 | 62 | 3 | | |
| Kirkland_Main-2969 | Kirkland_Manholes-2520 | 374.03 | Kirkland_Manholes-2521 | 363.83 | 98.2 | 10.38 | 8 | PVC | 0.01 | 2,272 | 2 | 3 | 5 | 0.2 | | |
| Kirkland_Main-2970 | Kirkland_Manholes-2435 | 226.37 | Kirkland_Manholes-2436 | 225.88 | 121.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | SM14-Ex-EX285 | |
| Kirkland_Main-2971 | Kirkland_Manholes-2436 | 225.88 | Kirkland_Manholes-2438 | 209.72 | 279.9 | 5.77 | 8 | PVC | 0.01 | 1,694 | 10 | 24 | 34 | 2 | SM14-Ex-EX244 | |
| Kirkland_Main-2972 | Kirkland_Manholes-2438 | 209.72 | Kirkland_Manholes-2441 | 205.09 | 260.5 | 1.78 | 8 | PVC | 0.01 | 940 | 15 | 37 | 52 | 5.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2973 | Kirkland_Manholes-2439 | 217.92 | Kirkland_Manholes-2438 | 209.72 | 117.3 | 6.99 | 8 | PVC | 0.01 | 1,864 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX284 | |
| Kirkland_Main-2974 | Kirkland_Manholes-2440 | 242.45 | Kirkland_Manholes-2439 | 217.92 | 136.9 | 17.92 | 8 | PVC | 0.01 | 2,985 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX284 | |
| Kirkland_Main-2975 | Kirkland_Manholes-2441 | 205.09 | Kirkland_Manholes-2442 | 204.35 | 67.9 | 1.09 | 8 | PVC | 0.01 | 736 | 16 | 41 | 56 | 7.6 | SM14-Ex-EX244 | |
| Kirkland_Main-2977 | Kirkland_Manholes-2992 | 396.35 | Kirkland_Manholes-2991 | 395.79 | 171.2 | 0.33 | 8 | PVC | 0.01 | 403 | 2 | 20 | 23 | 5.6 | | |
| Kirkland_Main-2978 | Kirkland_Manholes-2991 | 395.79 | Kirkland_Manholes-1328 | 394.1 | 142.6 | 1.18 | 8 | PVC | 0.01 | 767 | 2 | 24 | 27 | 3.5 | | |
| Kirkland_Main-2979 | Kirkland_Manholes-2737 | 259.86 | Kirkland_Manholes-2310 | 256 | 91.2 | 4.23 | 8 | PVC | 0.01 | 1,451 | 4 | 9 | 13 | 0.9 | | |
| Kirkland_Main-2980 | Kirkland_Manholes-2442 | 204.35 | Kirkland_Manholes-2443 | 200 | 192.1 | 2.26 | 8 | PVC | 0.01 | 1,061 | 16 | 45 | 61 | 5.7 | SM14-Ex-EX244 | |
| Kirkland_Main-2981 | Kirkland_Manholes-2444 | 199.73 | Kirkland_Manholes-2445 | 191.11 | 277 | 3.11 | 8 | PVC | 0.01 | 1,244 | 21 | 65 | 86 | 6.9 | SM14-Ex-EX244 | |
| Kirkland_Main-2982 | Kirkland_Manholes-2443 | 200 | Kirkland_Manholes-2444 | 199.73 | 20.4 | 1.32 | 8 | PVC | 0.01 | 810 | 17 | 49 | 66 | 8.1 | SM14-Ex-EX244 | |
| Kirkland_Main-2983 | Kirkland_Manholes-2668 | 18.29 | Kirkland_Manholes-2318 | 17.6 | 53.6 | 1.29 | 8 | PVC | 0.01 | 800 | 2 | 6 | 8 | 1 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2984 | Kirkland_Manholes-2320 | 18 | Kirkland_Manholes-2319 | 17.7 | 261.8 | 0.11 | 21 | PVC | 0.01 | 3,129 | 127 | 273 | 399 | 12.8 | | |
| Kirkland_Main-2985 | Kirkland_Manholes-2321 | 18.2 | Kirkland_Manholes-2320 | 18 | 193.7 | 0.1 | 21 | PVC | 0.01 | 2,971 | 121 | 214 | 335 | 11.3 | | |
| Kirkland_Main-2986 | Kirkland_Manholes-2303 | 195.57 | Kirkland_Manholes-2302 | 194.37 | 30.3 | 3.96 | 12 | PVC | 0.01 | 4,136 | 651 | 1,506 | 2,157 | 52.1 | SM2 | |
| Kirkland_Main-2987 | Kirkland_Manholes-2302 | 194.37 | Kirkland_Manholes-2304 | 192.91 | 51.2 | 2.85 | 12 | PVC | 0.01 | 3,510 | 651 | 1,510 | 2,161 | 61.6 | | |
| Kirkland_Main-2988 | Kirkland_Manholes-2285 | 419.89 | Kirkland_Manholes-2284 | 417.52 | 64.2 | 3.69 | 8 | PVC | 0.01 | 1,355 | 257 | 692 | 948 | 70 | SM14-Ex-EX248 | |
| Kirkland_Main-2989 | Kirkland_Manholes-2284 | 417.52 | Kirkland_Manholes-2282 | 401.71 | 231.8 | 6.82 | 8 | PVC | 0.01 | 1,841 | 257 | 696 | 953 | 51.8 | SM14-Ex-EX248 | |
| Kirkland_Main-2990 | Kirkland_Manholes-2263 | 374.13 | Kirkland_Manholes-2262 | 311.78 | 761.4 | 8.19 | 8 | PVC | 0.01 | 2,018 | 288 | 863 | 1,151 | 57 | SM14-Ex-EX248 | |
| Kirkland_Main-2991 | Kirkland_Manholes-2669 | 379.65 | Kirkland_Manholes-2290 | 372.36 | 83.4 | 8.74 | 8 | PVC | 0.01 | 2,084 | 5 | 4 | 9 | 0.4 | | |
| Kirkland_Main-2992 | Kirkland_Manholes-2290 | 372.36 | Kirkland_Manholes-2291 | 367.48 | 64.2 | 7.6 | 8 | PVC | 0.01 | 1,944 | 5 | 8 | 13 | 0.7 | | |
| Kirkland_Main-2993 | Kirkland_Manholes-2291 | 367.48 | Kirkland_Manholes-2292 | 366.54 | 71.9 | 1.31 | 8 | PVC | 0.01 | 806 | 5 | 12 | 18 | 2.2 | | |
| Kirkland_Main-2994 | Kirkland_Manholes-2292 | 366.54 | Kirkland_Manholes-2293 | 362.58 | 154 | 2.57 | 8 | PVC | 0.01 | 1,131 | 6 | 16 | 22 | 1.9 | | |
| Kirkland_Main-2995 | Kirkland_Manholes-2670 | 399.73 | Kirkland_Manholes-2298 | 382.52 | 120.1 | 14.33 | 8 | PVC | 0.01 | 2,669 | 3 | 8 | 11 | 0.4 | | Drop Connection |
| Kirkland_Main-2997 | Kirkland_Manholes-2673 | 372.3 | Kirkland_Manholes-2675 | 350.82 | 245.7 | 8.74 | 8 | PVC | 0.01 | 2,084 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX208 | |
| Kirkland_Main-2998 | Kirkland_Manholes-2709 | 292.14 | Kirkland_Manholes-2708 | 281.32 | 58.6 | 18.46 | 8 | PVC | 0.01 | 3,029 | 2 | 16 | 18 | 0.6 | | |
| Kirkland_Main-2999 | Kirkland_Manholes-2708 | 281.32 | Kirkland_Manholes-2707 | 271.62 | 125.5 | 7.73 | 8 | PVC | 0.01 | 1,960 | 2 | 20 | 22 | 1.1 | | |
| Kirkland_Main-3000 | Kirkland_Manholes-2711 | 316.09 | Kirkland_Manholes-2709 | 292.14 | 170 | 14.09 | 8 | PVC | 0.01 | 2,647 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-3001 | Kirkland_Manholes-2707 | 271.62 | Kirkland_Manholes-2704 | 250.11 | 214 | 10.05 | 8 | PVC | 0.01 | 2,235 | 2 | 24 | 27 | 1.2 | | |
| Kirkland_Main-3002 | Kirkland_Manholes-2703 | 250.19 | Kirkland_Manholes-2704 | 250.11 | 401.9 | 0.02 | 8 | PVC | 0.01 | 99 | 5 | 16 | 21 | 21.1 | | |
| Kirkland_Main-3003 | Kirkland_Manholes-2712 | 326.54 | Kirkland_Manholes-2711 | 316.09 | 154.3 | 6.77 | 8 | PVC | 0.01 | 1,835 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3005 | Kirkland_Manholes-2714 | 316.79 | Kirkland_Manholes-2713 | 280.32 | 397.8 | 9.17 | 8 | PVC | 0.01 | 2,135 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX204 | |
| Kirkland_Main-3006 | Kirkland_Manholes-2713 | 280.32 | Kirkland_Manholes-2702 | 256.62 | 323.4 | 7.33 | 8 | PVC | 0.01 | 1,909 | 5 | 8 | 13 | 0.7 | SM14-Ex-EX204 | |
| Kirkland_Main-3008 | Kirkland_Manholes-2721 | 21.2 | Kirkland_Manholes-2722 | 21 | 44.5 | 0.45 | 12 | PVC | 0.01 | 1,394 | 86 | 43 | 129 | 9.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3009 | Kirkland_Manholes-2724 | 25.33 | Kirkland_Manholes-2723 | 21.5 | 122.9 | 3.12 | 8 | PVC | 0.01 | 1,245 | 12 | 6 | 18 | 1.5 | SM14-Ex-EX288 | |
| Kirkland_Main-3010 | Kirkland_Manholes-2723 | 21.5 | Kirkland_Manholes-2722 | 21 | 70.9 | 0.7 | 8 | PVC | 0.01 | 592 | 14 | 12 | 26 | 4.4 | SM14-Ex-EX288 | |
| Kirkland_Main-3011 | Kirkland_Manholes-2727 | 13 | Kirkland_Manholes-2726 | 12.39 | 121.7 | 0.5 | 18 | PVC | 0.01 | 4,339 | 257 | 593 | 850 | 19.6 | SM14-Ex-EX289 | |
| Kirkland_Main-3012 | Kirkland_Manholes-2729 | 13.77 | Kirkland_Manholes-2727 | 13 | 208.7 | 0.37 | 18 | PVC | 0.01 | 3,723 | 256 | 587 | 842 | 22.6 | SM14-Ex-EX289 | |
| Kirkland_Main-3013 | Kirkland_Manholes-2730 | 14.43 | Kirkland_Manholes-2728 | 13.83 | 161.6 | 0.37 | 18 | PVC | 0.01 | 3,734 | 254 | 574 | 828 | 22.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3014 | Kirkland_Manholes-2728 | 13.83 | Kirkland_Manholes-2729 | 13.77 | 16.5 | 0.36 | 18 | PVC | 0.01 | 3,696 | 256 | 580 | 836 | 22.6 | SM14-Ex-EX289 | |
| Kirkland_Main-3015 | Kirkland_Manholes-2731 | 15.6 | Kirkland_Manholes-2977 | 14.89 | 193.8 | 0.37 | 18 | PVC | 0.01 | 3,709 | 252 | 556 | 808 | 21.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3016 | Kirkland_Manholes-2732 | 15.71 | Kirkland_Manholes-2731 | 15.6 | 29.6 | 0.37 | 18 | PVC | 0.01 | 3,738 | 250 | 550 | 800 | 21.4 | SM14-Ex-EX289 | |
| Kirkland_Main-3017 | Kirkland_Manholes-2733 | 16.02 | Kirkland_Manholes-2732 | 15.71 | 84.3 | 0.37 | 18 | PVC | 0.01 | 3,716 | 247 | 544 | 790 | 21.3 | SM14-Ex-EX289 | |
| Kirkland_Main-3018 | Kirkland_Manholes-2735 | 16.81 | Kirkland_Manholes-2733 | 16.02 | 214.5 | 0.37 | 18 | PVC | 0.01 | 3,719 | 246 | 538 | 783 | 21.1 | SM14-Ex-EX289 | |
| Kirkland_Main-3019 | Kirkland_Manholes-2734 | 17.15 | Kirkland_Manholes-2735 | 16.81 | 92.8 | 0.37 | 18 | PVC | 0.01 | 3,710 | 244 | 532 | 776 | 20.9 | SM14-Ex-EX289 | |
| Kirkland_Main-3020 | Kirkland_Manholes-2736 | 17.76 | Kirkland_Manholes-2734 | 17.15 | 164.5 | 0.37 | 18 | PVC | 0.01 | 3,733 | 244 | 525 | 770 | 20.6 | SM14-Ex-EX289 | |
| Kirkland_Main-3021 | Kirkland_Manholes-2741 | 83.04 | Kirkland_Manholes-2739 | 73.09 | 180.1 | 5.53 | 8 | PVC | 0.01 | 1,657 | 6 | 18 | 24 | 1.5 | | |
| Kirkland_Main-3022 | Kirkland_Manholes-2740 | 73.45 | Kirkland_Manholes-2739 | 73.09 | 167.3 | 0.22 | 8 | PVC | 0.01 | 327 | 0 | 6 | 6 | 1.9 | | |
| Kirkland_Main-3023 | Kirkland_Manholes-2739 | 73.09 | Kirkland_Manholes-2203 | 62.94 | 47.2 | 21.5 | 8 | PVC | 0.01 | 3,269 | 14 | 55 | 69 | 2.1 | | |
| Kirkland_Main-3024 | Kirkland_Manholes-2744 | 119.06 | Kirkland_Manholes-2739 | 73.09 | 200.2 | 22.96 | 8 | PVC | 0.01 | 3,378 | 8 | 24 | 32 | 0.9 | | |
| Kirkland_Main-3025 | Kirkland_Manholes-2745 | 129.7 | Kirkland_Manholes-2744 | 119.06 | 80.2 | 13.27 | 8 | PVC | 0.01 | 2,569 | 0 | 6 | 6 | 0.2 | | |
| Kirkland_Main-3026 | Kirkland_Manholes-2746 | 121.99 | Kirkland_Manholes-2744 | 119.06 | 88.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 0 | 12 | 12 | 1 | | |
| Kirkland_Main-3027 | Kirkland_Manholes-2747 | 133.27 | Kirkland_Manholes-2746 | 121.99 | 59.4 | 19 | 8 | PVC | 0.01 | 3,073 | 0 | 6 | 6 | 0.2 | | |
| Kirkland_Main-3028 | Kirkland_Manholes-2742 | 91.54 | Kirkland_Manholes-2741 | 83.04 | 69.2 | 12.29 | 8 | PVC | 0.01 | 2,471 | 6 | 12 | 18 | 0.7 | | |
| Kirkland_Main-3029 | Kirkland_Manholes-2743 | 92.6 | Kirkland_Manholes-2742 | 91.54 | 64.4 | 1.65 | 8 | PVC | 0.01 | 904 | 6 | 6 | 12 | 1.4 | | |
| Kirkland_Main-3030 | Kirkland_Manholes-2748 | 105.07 | Kirkland_Manholes-2749 | 94.38 | 144.8 | 7.38 | 8 | PVC | 0.01 | 1,916 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-3031 | Kirkland_Manholes-2749 | 94.38 | Kirkland_Manholes-2880 | 81.72 | 189.8 | 6.67 | 8 | PVC | 0.01 | 1,821 | 28 | 18 | 46 | 2.5 | | |
| Kirkland_Main-3032 | Kirkland_Manholes-2756 | 10.03 | Kirkland_Manholes-2754 | 9.95 | 319.1 | 0.03 | 36 | PVC | 0.01 | 6,161 | 625 | 1,867 | 2,793 | 45.3 | SM14-Ex-EX10 | |
| Kirkland_Main-3033 | Kirkland_Manholes-2757 | 10.95 | Kirkland_Manholes-2756 | 10.03 | 146.2 | 0.63 | 36 | PVC | 0.01 | 30,867 | 625 | 1,862 | 2,789 | 9 | SM14-Ex-EX10 | |
| Kirkland_Main-3036 | Kirkland_Manholes-2765 | 13.19 | Kirkland_Manholes-2763 | 13.15 | 315.8 | 0.01 | 36 | PVC | 0.01 | 4,380 | 554 | 1,568 | 2,423 | 55.3 | SM14-Ex-EX10 | |
| Kirkland_Main-3037 | Kirkland_Manholes-2766 | 361.12 | Kirkland_Manholes-2548 | 359.75 | 342.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-3038 | Kirkland_Manholes-397 | 247.33 | Kirkland_Manholes-376 | 239.8 | 215.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 64 | 232 | 296 | 22.5 | | |
| Kirkland_Main-3039 | Kirkland_Manholes-2769 | 260.32 | Kirkland_Manholes-1077 | 252.59 | 364.2 | 2.12 | 8 | PVC | 0.01 | 1,027 | 3 | 8 | 11 | 1.1 | | |
| Kirkland_Main-3044 | Kirkland_Manholes-2275 | 411.72 | Kirkland_Manholes-2276 | 410.45 | 52.8 | 2.4 | 8 | PVC | 0.01 | 1,093 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3045 | Kirkland_Manholes-2771 | 320.53 | Kirkland_Manholes-2772 | 308.23 | 258.2 | 4.76 | 8 | PVC | 0.01 | 1,539 | 50 | 112 | 162 | 10.5 | | |
| Kirkland_Main-3046 | Kirkland_Manholes-2776 | 334.45 | Kirkland_Manholes-2775 | 332.7 | 391.2 | 0.45 | 8 | PVC | 0.01 | 472 | 50 | 103 | 153 | 32.4 | | |
| Kirkland_Main-3047 | Kirkland_Manholes-2775 | 332.7 | Kirkland_Manholes-2774 | 330.08 | 382.8 | 0.68 | 8 | PVC | 0.01 | 583 | 50 | 106 | 156 | 26.7 | | |
| Kirkland_Main-3048 | Kirkland_Manholes-2774 | 330.08 | Kirkland_Manholes-2771 | 320.53 | 310.5 | 3.08 | 8 | PVC | 0.01 | 1,237 | 50 | 109 | 159 | 12.8 | | |
| Kirkland_Main-3049 | Kirkland_Manholes-2782 | 326.16 | Kirkland_Manholes-2781 | 293.52 | 273.1 | 11.95 | 8 | PVC | 0.01 | 2,438 | 0 | 3 | 3 | 0.1 | | |
| Kirkland_Main-3050 | Kirkland_Manholes-2781 | 293.52 | Kirkland_Manholes-2780 | 291.73 | 199 | 0.9 | 8 | PVC | 0.01 | 669 | 22 | 5 | 27 | 4 | | |
| Kirkland_Main-3051 | Kirkland_Manholes-2780 | 291.73 | Kirkland_Manholes-2779 | 288.37 | 73 | 4.6 | 8 | PVC | 0.01 | 1,512 | 22 | 8 | 30 | 2 | | |
| Kirkland_Main-3052 | Kirkland_Manholes-2779 | 288.37 | Kirkland_Manholes-2778 | 255.64 | 255.5 | 12.81 | 8 | PVC | 0.01 | 2,524 | 22 | 11 | 32 | 1.3 | | |
| Kirkland_Main-3053 | Kirkland_Manholes-2777 | 256.44 | Kirkland_Manholes-2778 | 255.64 | 115.8 | 0.69 | 8 | PVC | 0.01 | 586 | 0 | 3 | 3 | 0.5 | | |
| Kirkland_Main-3054 | Kirkland_Manholes-2785 | 259.34 | Kirkland_Manholes-2786 | 258.1 | 92.6 | 1.34 | 8 | PVC | 0.01 | 816 | 9 | 49 | 57 | 7 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3055 | Kirkland_Manholes-2784 | 262.56 | Kirkland_Manholes-2785 | 259.34 | 108.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 8 | 45 | 52 | 4.3 | | |
| Kirkland_Main-3057 | Kirkland_Manholes-2787 | 252.17 | Kirkland_Manholes-2788 | 251.6 | 73 | 0.78 | 8 | PVC | 0.01 | 623 | 16 | 90 | 106 | 17 | SM14-Ex-EX313 | |
| Kirkland_Main-3059 | Kirkland_Manholes-2798 | 192.18 | Kirkland_Manholes-2797 | 190.87 | 110.6 | 1.18 | 8 | PVC | 0.01 | 767 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX296 | |
| Kirkland_Main-3060 | Kirkland_Manholes-2797 | 190.87 | Kirkland_Manholes-2796 | 185.45 | 211.8 | 2.56 | 8 | PVC | 0.01 | 1,128 | 6 | 16 | 22 | 2 | SM14-Ex-EX296 | |
| Kirkland_Main-3061 | Kirkland_Manholes-2799 | 233.81 | Kirkland_Manholes-2800 | 221.07 | 125.6 | 10.15 | 8 | PVC | 0.01 | 2,246 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX302 | |
| Kirkland_Main-3062 | Kirkland_Manholes-2800 | 221.07 | Kirkland_Manholes-2797 | 190.87 | 260 | 11.62 | 8 | PVC | 0.01 | 2,403 | 3 | 8 | 11 | 0.4 | SM14-Ex-EX302 | |
| Kirkland_Main-3063 | Kirkland_Manholes-2802 | 238.36 | O-39 | 228.33 | 111.4 | 9 | 8 | PVC | 0.01 | 2,116 | 22 | 22 | 43 | 2 | | |
| Kirkland_Main-3064 | Kirkland_Manholes-2810 | 44.75 | Kirkland_Manholes-2809 | 44.5 | 62.2 | 0.4 | 8 | PVC | 0.01 | 446 | 25 | 92 | 117 | 26.2 | SM14-Ex-EX316 | Drop Connection |
| Kirkland_Main-3065 | Kirkland_Manholes-2808 | 55.6 | Kirkland_Manholes-2807 | 47.79 | 63.2 | 12.36 | 8 | PVC | 0.01 | 2,479 | 0 | 12 | 12 | 0.5 | SM14-Ex-EX317 | |
| Kirkland_Main-3066 | Kirkland_Manholes-2807 | 47.79 | Kirkland_Manholes-2810 | 44.75 | 258.6 | 1.18 | 8 | PVC | 0.01 | 764 | 1 | 79 | 81 | 10.5 | SM14-Ex-EX316 | |
| Kirkland_Main-3067 | Kirkland_Manholes-2806 | 53.14 | Kirkland_Manholes-2807 | 47.79 | 321.9 | 1.66 | 8 | PVC | 0.01 | 909 | 0 | 61 | 61 | 6.7 | SM14-Ex-EX316 | |
| Kirkland_Main-3068 | Kirkland_Manholes-2805 | 68.41 | Kirkland_Manholes-2806 | 53.14 | 319.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 0 | 55 | 55 | 3.6 | SM14-Ex-EX316 | |
| Kirkland_Main-3069 | Kirkland_Manholes-2811 | 70.36 | Kirkland_Manholes-2808 | 55.6 | 132.6 | 11.13 | 8 | PVC | 0.01 | 2,353 | 0 | 6 | 6 | 0.3 | SM14-Ex-EX317 | |
| Kirkland_Main-3070 | Kirkland_Manholes-2814 | 79.68 | Kirkland_Manholes-2805 | 68.41 | 70.6 | 15.96 | 8 | PVC | 0.01 | 2,817 | 0 | 6 | 6 | 0.2 | SM14-Ex-EX318 | |
| Kirkland_Main-3071 | Kirkland_Manholes-2815 | 71.41 | Kirkland_Manholes-2805 | 68.41 | 115.4 | 2.6 | 8 | PVC | 0.01 | 1,137 | 0 | 18 | 18 | 1.6 | SM14-Ex-EX318 | |
| Kirkland_Main-3072 | Kirkland_Manholes-2812 | 81.42 | Kirkland_Manholes-2815 | 71.41 | 284.3 | 3.52 | 8 | PVC | 0.01 | 1,323 | 0 | 12 | 12 | 0.9 | SM14-Ex-EX318 | |
| Kirkland_Main-3073 | Kirkland_Manholes-2813 | 84.17 | Kirkland_Manholes-2812 | 81.42 | 272.3 | 1.01 | 8 | PVC | 0.01 | 709 | 0 | 6 | 6 | 0.9 | SM14-Ex-EX318 | |
| Kirkland_Main-3074 | Kirkland_Manholes-2816 | 45.4 | Kirkland_Manholes-2810 | 44.75 | 163.3 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 6 | 7 | 1.6 | | |
| Kirkland_Main-3075 | Kirkland_Manholes-2822 | 57.68 | Kirkland_Manholes-2821 | 56.89 | 105.9 | 0.75 | 8 | PVC | 0.01 | 609 | 33 | 6 | 39 | 6.4 | | |
| Kirkland_Main-3076 | Kirkland_Manholes-2821 | 56.89 | Kirkland_Manholes-2820 | 55.04 | 95.1 | 1.94 | 8 | PVC | 0.01 | 983 | 34 | 12 | 46 | 4.7 | | |
| Kirkland_Main-3077 | Kirkland_Manholes-2820 | 55.04 | Kirkland_Manholes-2819 | 48.42 | 258.4 | 2.56 | 8 | PVC | 0.01 | 1,128 | 36 | 18 | 54 | 4.8 | | |
| Kirkland_Main-3078 | Kirkland_Manholes-2819 | 48.42 | Kirkland_Manholes-2817 | 44.74 | 95 | 3.87 | 8 | PVC | 0.01 | 1,388 | 36 | 24 | 61 | 4.4 | | |
| Kirkland_Main-3079 | Kirkland_Manholes-2818 | 48.57 | Kirkland_Manholes-2817 | 44.74 | 127 | 3.01 | 8 | PVC | 0.01 | 1,224 | 3 | 6 | 9 | 0.7 | | |
| Kirkland_Main-3080 | Kirkland_Manholes-2817 | 44.74 | Kirkland_Manholes-2823 | 34.33 | 329.7 | 3.16 | 8 | PVC | 0.01 | 1,253 | 40 | 37 | 77 | 6.1 | | |
| Kirkland_Main-3081 | Kirkland_Manholes-2827 | 39.5 | Kirkland_Manholes-2826 | 38.6 | 407 | 0.22 | 15 | PVC | 0.01 | 1,768 | 227 | 590 | 817 | 46.2 | SM14-Ex-EX319 | Drop Connection |
| Kirkland_Main-3082 | Kirkland_Manholes-2826 | 36.35 | Kirkland_Manholes-2823 | 34.33 | 324.1 | 0.62 | 15 | PVC | 0.01 | 2,973 | 236 | 596 | 832 | 28 | SM14-Ex-EX319 | |
| Kirkland_Main-3083 | Kirkland_Manholes-2823 | 34.33 | Kirkland_Manholes-2824 | 33.64 | 78.4 | 0.88 | 15 | PVC | 0.01 | 3,537 | 276 | 639 | 914 | 25.9 | SM14-Ex-EX319 | |
| Kirkland_Main-3084 | Kirkland_Manholes-2824 | 33.64 | Kirkland_Manholes-2825 | 33 | 93.6 | 0.69 | 15 | PVC | 0.01 | 3,124 | 276 | 645 | 921 | 29.5 | SM14-Ex-EX319 | |
| Kirkland_Main-3085 | Kirkland_Manholes-2830 | 52.24 | Kirkland_Manholes-2831 | 43.6 | 77.9 | 11.1 | 8 | PVC | 0.01 | 2,349 | 6 | 6 | 84 | 3.6 | | |
| Kirkland_Main-3088 | Kirkland_Manholes-2831 | 43.6 | Kirkland_Manholes-2829 | 40.2 | 467.6 | 0.73 | 12 | PVC | 0.01 | 1,772 | 158 | 401 | 630 | 35.6 | SM14-Ex-EX309 | |
| Kirkland_Main-3089 | Kirkland_Manholes-2825 | 33 | Kirkland_Manholes-2832 | 30.86 | 94.7 | 2.26 | 15 | PVC | 0.01 | 5,664 | 276 | 651 | 927 | 16.4 | SM14-Ex-EX319 | |
| Kirkland_Main-3090 | Kirkland_Manholes-2829 | 40.2 | Kirkland_Manholes-2832 | 30.86 | 260.5 | 3.59 | 12 | PVC | 0.01 | 3,936 | 158 | 408 | 637 | 16.2 | SM14-Ex-EX309 | |
| Kirkland_Main-3091 | Kirkland_Manholes-2828 | 34.38 | Kirkland_Manholes-2832 | 30.86 | 239.8 | 1.47 | 8 | PVC | 0.01 | 854 | 38 | 6 | 44 | 5.1 | | |
| Kirkland_Main-3092 | Kirkland_Manholes-2832 | 30.86 | Kirkland_Manholes-2833 | 29.99 | 303.3 | 0.29 | 18 | PVC | 0.01 | 3,283 | 471 | 1,071 | 1,613 | 49.1 | SM14-Ex-EX309 | |
| Kirkland_Main-3093 | Kirkland_Manholes-2839 | 98.83 | Kirkland_Manholes-2840 | 90.84 | 75.4 | 10.6 | 8 | PVC | 0.01 | 2,295 | 2 | 6 | 8 | 0.4 | | |
| Kirkland_Main-3094 | Kirkland_Manholes-2841 | 31.53 | Kirkland_Manholes-2842 | 26.9 | 41.3 | 11.2 | 8 | PVC | 0.01 | 2,360 | 5 | 18 | 23 | 1 | SM14-Ex-EX310 | |
| Kirkland_Main-3095 | Kirkland_Manholes-2843 | 16.05 | YARROW POINT_WETWELL | 6 | 32.1 | 31.31 | 8 | PVC | 0.01 | 3,945 | 13 | 47 | 60 | 1.5 | SM14-Ex-EX315 | |
| Kirkland_Main-3096 | Kirkland_Manholes-2847 | 24.39 | Kirkland_Manholes-2854 | 20.28 | 103.2 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 5 | 5 | 0.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3097 | Kirkland_Manholes-2854 | 20.28 | Kirkland_Manholes-2855 | 19.82 | 135 | 0.34 | 8 | PVC | 0.01 | 411 | 0 | 9 | 9 | 2.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3098 | Kirkland_Manholes-2855 | 19.82 | Kirkland_Manholes-2846 | 17.72 | 172.2 | 1.22 | 8 | PVC | 0.01 | 779 | 0 | 14 | 14 | 1.8 | SM14-Ex-EX315 | |
| Kirkland_Main-3099 | Kirkland_Manholes-2846 | 17.72 | Kirkland_Manholes-2843 | 16.05 | 133.2 | 1.25 | 8 | PVC | 0.01 | 790 | 0 | 19 | 19 | 2.4 | SM14-Ex-EX315 | |
| Kirkland_Main-3100 | Kirkland_Manholes-2845 | 16.72 | Kirkland_Manholes-2843 | 16.05 | 68.4 | 0.97 | 8 | PVC | 0.01 | 696 | 13 | 19 | 32 | 4.5 | SM14-Ex-EX315 | |
| Kirkland_Main-3102 | Kirkland_Manholes-2844 | 27.14 | Kirkland_Manholes-2843 | 26.59 | 137.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 5 | 5 | 1 | SM14-Ex-EX315 | Drop Connection |
| Kirkland_Main-3104 | Kirkland_Manholes-2809 | 42.91 | Kirkland_Manholes-2834 | 37.62 | 317.9 | 1.66 | 8 | PVC | 0.01 | 910 | 29 | 98 | 126 | 13.9 | SM14-Ex-EX316 | |
| Kirkland_Main-3105 | Kirkland_Manholes-2836 | 60.97 | Kirkland_Manholes-2835 | 50.93 | 162.4 | 6.18 | 8 | PVC | 0.01 | 1,753 | 7 | 18 | 25 | 1.4 | | |
| Kirkland_Main-3106 | Kirkland_Manholes-2835 | 50.93 | Kirkland_Manholes-2834 | 37.62 | 47.5 | 28.02 | 8 | PVC | 0.01 | 3,732 | 7 | 24 | 32 | 0.8 | | |
| Kirkland_Main-3108 | Kirkland_Manholes-2862 | 89.88 | Kirkland_Manholes-2863 | 49.4 | 272.9 | 14.83 | 8 | PVC | 0.01 | 2,716 | 8 | 10 | 18 | 0.7 | | |
| Kirkland_Main-3109 | Kirkland_Manholes-2861 | 109.7 | Kirkland_Manholes-2862 | 89.88 | 239.2 | 8.29 | 8 | PVC | 0.01 | 2,030 | 5 | 7 | 12 | 0.6 | | |
| Kirkland_Main-3110 | Kirkland_Manholes-2860 | 120.82 | Kirkland_Manholes-2861 | 109.7 | 223.4 | 4.98 | 8 | PVC | 0.01 | 1,573 | 2 | 3 | 5 | 0.3 | | |
| Kirkland_Main-3115 | Kirkland_Manholes-2883 | 268.55 | Kirkland_Manholes-2876 | 267.92 | 60.1 | 1.05 | 8 | PVC | 0.01 | 722 | 2 | 8 | 10 | 1.4 | | |
| Kirkland_Main-3116 | Kirkland_Manholes-2884 | 269.34 | Kirkland_Manholes-2883 | 268.55 | 63.9 | 1.24 | 8 | PVC | 0.01 | 784 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-3118 | Kirkland_Manholes-2548 | 359.75 | Kirkland_Manholes-2891 | 359.09 | 165.1 | 0.4 | 8 | PVC | 0.01 | 448 | 9 | 24 | 34 | 7.6 | | |
| Kirkland_Main-3119 | Kirkland_Manholes-2891 | 359.09 | Kirkland_Manholes-2561 | 358.82 | 66.3 | 0.4 | 8 | PVC | 0.01 | 446 | 10 | 28 | 39 | 8.7 | | |
| Kirkland_Main-3121 | Kirkland_Manholes-2893 | 432.24 | Kirkland_Manholes-1991 | 431.18 | 280.1 | 0.38 | 8 | PVC | 0.01 | 434 | 3 | 4 | 7 | 1.6 | | |
| Kirkland_Main-3122 | Kirkland_Manholes-2894 | 306.1 | Kirkland_Manholes-2895 | 306 | 25.4 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 16 | 19 | 4.2 | | |
| Kirkland_Main-3123 | Kirkland_Manholes-2895 | 306 | Kirkland_Manholes-2896 | 304.88 | 150.3 | 0.75 | 8 | PVC | 0.01 | 609 | 3 | 20 | 23 | 3.8 | | |
| Kirkland_Main-3124 | Kirkland_Manholes-2896 | 304.88 | Kirkland_Manholes-2897 | 303.8 | 169.5 | 0.64 | 8 | PVC | 0.01 | 563 | 4 | 24 | 28 | 5 | | |
| Kirkland_Main-3125 | Kirkland_Manholes-2898 | 307.58 | Kirkland_Manholes-2897 | 303.8 | 40 | 9.44 | 8 | PVC | 0.01 | 2,166 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3126 | Kirkland_Manholes-2897 | 303.8 | Kirkland_Manholes-2899 | 303.26 | 125.6 | 0.43 | 8 | PVC | 0.01 | 462 | 5 | 33 | 38 | 8.2 | | |
| Kirkland_Main-3127 | Kirkland_Manholes-2899 | 303.26 | Kirkland_Manholes-2900 | 302.3 | 244.9 | 0.39 | 8 | PVC | 0.01 | 441 | 7 | 37 | 43 | 9.8 | | |
| Kirkland_Main-3128 | Kirkland_Manholes-882 | 297.25 | Kirkland_Manholes-345 | 279.43 | 305.8 | 5.83 | 8 | PVC | 0.01 | 1,702 | 3 | 4 | 8 | 0.4 | | |
| Kirkland_Main-3129 | Kirkland_Manholes-2901 | 294.77 | Kirkland_Manholes-883 | 294.42 | 87 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 16 | 17 | 3.9 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3130 | Kirkland_Manholes-883 | 294.42 | Kirkland_Manholes-906 | 293.01 | 64.9 | 2.17 | 8 | PVC | 0.01 | 1,039 | 5 | 37 | 42 | 4 | | |
| Kirkland_Main-3131 | Kirkland_Manholes-2902 | 301.02 | Kirkland_Manholes-883 | 294.42 | 322.3 | 2.05 | 8 | PVC | 0.01 | 1,009 | 4 | 16 | 20 | 2 | | |
| Kirkland_Main-3132 | Kirkland_Manholes-2903 | 301.35 | Kirkland_Manholes-2902 | 301.02 | 151.1 | 0.22 | 8 | PVC | 0.01 | 329 | 3 | 12 | 15 | 4.6 | | |
| Kirkland_Main-3133 | Kirkland_Manholes-2905 | 302.8 | Kirkland_Manholes-2904 | 301.39 | 65.9 | 2.14 | 8 | PVC | 0.01 | 1,031 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3134 | Kirkland_Manholes-2904 | 301.39 | Kirkland_Manholes-2903 | 301.35 | 153.8 | 0.03 | 8 | PVC | 0.01 | 114 | 2 | 8 | 10 | 8.5 | | |
| Kirkland_Main-3135 | Kirkland_Manholes-2913 | 474.42 | Kirkland_Manholes-1391 | 471.35 | 128.8 | 2.38 | 8 | PVC | 0.01 | 1,088 | 1 | 8 | 9 | 0.9 | | |
| Kirkland_Main-3136 | Kirkland_Manholes-2906 | 405.37 | Kirkland_Manholes-2907 | 402.62 | 299.9 | 0.92 | 8 | PVC | 0.01 | 675 | 3 | 26 | 29 | 4.3 | | |
| Kirkland_Main-3137 | Kirkland_Manholes-2907 | 402.62 | Kirkland_Manholes-2908 | 397.79 | 295.5 | 1.63 | 8 | PVC | 0.01 | 901 | 3 | 29 | 33 | 3.6 | | |
| Kirkland_Main-3138 | Kirkland_Manholes-2908 | 397.79 | Kirkland_Manholes-2532 | 395.91 | 85.9 | 2.19 | 8 | PVC | 0.01 | 1,043 | 3 | 32 | 36 | 3.4 | | |
| Kirkland_Main-3139 | Kirkland_Manholes-2910 | 412.56 | Kirkland_Manholes-2017 | 412 | 24.7 | 2.27 | 8 | PVC | 0.01 | 1,062 | 5 | 16 | 21 | 2 | | |
| Kirkland_Main-3140 | Kirkland_Manholes-2911 | 414.42 | Kirkland_Manholes-2910 | 412.56 | 288.8 | 0.64 | 8 | PVC | 0.01 | 566 | 4 | 12 | 17 | 2.9 | | |
| Kirkland_Main-3141 | Kirkland_Manholes-2909 | 423.03 | Kirkland_Manholes-2912 | 418.07 | 296 | 1.68 | 8 | PVC | 0.01 | 913 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-3142 | Kirkland_Manholes-2912 | 418.07 | Kirkland_Manholes-2911 | 414.42 | 285.6 | 1.28 | 8 | PVC | 0.01 | 797 | 3 | 8 | 12 | 1.4 | | |
| Kirkland_Main-3143 | Kirkland_Manholes-2914 | 478.18 | Kirkland_Manholes-2913 | 474.42 | 305.5 | 1.23 | 8 | PVC | 0.01 | 782 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3144 | Kirkland_Manholes-2036 | 452.58 | Kirkland_Manholes-1216 | 443.89 | 347.4 | 2.5 | 8 | PVC | 0.01 | 1,115 | 148 | 326 | 474 | 42.5 | SM14-Ex-EX264 | |
| Kirkland_Main-3145 | Kirkland_Manholes-1216 | 443.89 | Kirkland_Manholes-2048 | 442.51 | 28.4 | 4.86 | 8 | PVC | 0.01 | 1,554 | 151 | 334 | 485 | 31.2 | SM14-Ex-EX264 | |
| Kirkland_Main-3146 | Kirkland_Manholes-1719 | 46.02 | Kirkland_Manholes-2935 | 44.9 | 241.2 | 0.46 | 8 | PVC | 0.01 | 480 | 80 | 58 | 138 | 28.6 | SM14-Ex-EX165 | |
| Kirkland_Main-3147 | Kirkland_Manholes-2935 | 44.9 | Kirkland_Manholes-1741 | 41.4 | 292.3 | 1.2 | 8 | PVC | 0.01 | 772 | 80 | 66 | 146 | 18.9 | SM14-Ex-EX165 | |
| Kirkland_Main-3150 | Kirkland_Manholes-733 | 35.72 | Kirkland_Manholes-758 | 27.19 | 290.4 | 2.94 | 18 | PVC | 0.01 | 10,503 | 918 | 1,747 | 2,665 | 25.4 | | |
| Kirkland_Main-3151 | Kirkland_Manholes-758 | 27.19 | Kirkland_Manholes-734 | 25.7 | 118.9 | 1.25 | 18 | PVC | 0.01 | 6,865 | 918 | 1,755 | 2,673 | 38.9 | | |
| Kirkland_Main-3152 | Kirkland_Manholes-1689 | 43.75 | Kirkland_Manholes-2927 | 38.62 | 107.6 | 4.77 | 8 | PVC | 0.01 | 1,540 | 78 | 103 | 181 | 11.7 | SM14-Ex-EX161 | |
| Kirkland_Main-3153 | Kirkland_Manholes-2927 | 38.62 | Kirkland_Manholes-733 | 35.72 | 20.9 | 13.88 | 8 | PVC | 0.01 | 2,627 | 78 | 111 | 189 | 7.2 | | |
| Kirkland_Main-3154 | Kirkland_Manholes-2928 | 60.36 | Kirkland_Manholes-730 | 57.26 | 71.9 | 4.31 | 18 | PVC | 0.01 | 12,722 | 174 | 552 | 726 | 5.7 | | |
| Kirkland_Main-3155 | Kirkland_Manholes-1372 | 427.9 | Kirkland_Manholes-2936 | 415.17 | 236.6 | 5.38 | 8 | PVC | 0.01 | 1,635 | 63 | 146 | 210 | 12.8 | SM14-Ex-EX218 | |
| Kirkland_Main-3156 | Kirkland_Manholes-2936 | 415.17 | Kirkland_Manholes-1351 | 415.08 | 21.5 | 0.4 | 8 | PVC | 0.01 | 446 | 71 | 175 | 246 | 55.2 | | Drop Connection |
| Kirkland_Main-3157 | Kirkland_Manholes-2937 | 243.36 | Kirkland_Manholes-2938 | 237.72 | 156 | 3.61 | 8 | PVC | 0.01 | 1,340 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-3158 | Kirkland_Manholes-2938 | 237.72 | Kirkland_Manholes-1313 | 237.26 | 115.6 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 9 | 13 | 2.8 | | Drop Connection |
| Kirkland_Main-3159 | Kirkland_Manholes-2939 | 317.33 | Kirkland_Manholes-2887 | 302.33 | 186.7 | 8.03 | 8 | PVC | 0.01 | 1,999 | 3 | 12 | 16 | 0.8 | | |
| Kirkland_Main-3161 | Kirkland_Manholes-2940 | 472.26 | Kirkland_Manholes-564 | 469.28 | 203.6 | 1.46 | 8 | PVC | 0.01 | 853 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3162 | Kirkland_Manholes-2943 | 249.65 | Kirkland_Manholes-1876 | 247.77 | 195.1 | 0.96 | 8 | PVC | 0.01 | 692 | 0 | 8 | 8 | 1.2 | | |
| Kirkland_Main-3163 | Kirkland_Manholes-2947 | 393.38 | Kirkland_Manholes-2946 | 380.26 | 237.2 | 5.53 | 8 | PVC | 0.01 | 1,658 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3164 | Kirkland_Manholes-2946 | 380.26 | Kirkland_Manholes-2945 | 367.86 | 240.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 7 | 20 | 28 | 1.7 | | |
| Kirkland_Main-3165 | Kirkland_Manholes-2945 | 367.86 | Kirkland_Manholes-2948 | 345.5 | 368 | 6.08 | 8 | PVC | 0.01 | 1,738 | 7 | 24 | 32 | 1.8 | | |
| Kirkland_Main-3166 | Kirkland_Manholes-2948 | 345.5 | Kirkland_Manholes-1933 | 343.68 | 135.8 | 1.34 | 8 | PVC | 0.01 | 816 | 7 | 28 | 36 | 4.4 | | |
| Kirkland_Main-3167 | Kirkland_Manholes-2171 | 166.42 | Kirkland_Manholes-1107 | 164.79 | 299.5 | 0.54 | 8 | PVC | 0.01 | 520 | 0 | 4 | 4 | 0.8 | SM14-Ex-EX21 | |
| Kirkland_Main-3168 | Kirkland_Manholes-2942 | 127.29 | Kirkland_Manholes-2941 | 110.18 | 161.6 | 10.59 | 8 | PVC | 0.01 | 2,294 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-3169 | Kirkland_Manholes-80 | 110.33 | Kirkland_Manholes-2941 | 110.18 | 10 | 1.51 | 8 | PVC | 0.01 | 866 | 3 | 4 | 7 | 0.8 | | |
| Kirkland_Main-3170 | Kirkland_Manholes-2941 | 110.18 | Kirkland_Manholes-144 | 88.96 | 389.8 | 5.44 | 8 | PVC | 0.01 | 1,645 | 5 | 13 | 18 | 1.1 | | |
| Kirkland_Main-3171 | Kirkland_Manholes-2949 | 387.42 | Kirkland_Manholes-2946 | 380.26 | 393.8 | 1.82 | 8 | PVC | 0.01 | 951 | 4 | 12 | 16 | 1.7 | | |
| Kirkland_Main-3172 | Kirkland_Manholes-2950 | 396.31 | Kirkland_Manholes-2949 | 387.42 | 98.6 | 9.02 | 8 | PVC | 0.01 | 2,117 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-3173 | Kirkland_Manholes-2951 | 398.98 | Kirkland_Manholes-2950 | 396.31 | 142 | 1.88 | 8 | PVC | 0.01 | 967 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-3174 | Kirkland_Manholes-2952 | 137.34 | Kirkland_Manholes-2509 | 126.48 | 113.7 | 9.55 | 8 | PVC | 0.01 | 2,179 | 2 | 6 | 8 | 0.4 | | |
| Kirkland_Main-3175 | Kirkland_Manholes-1035 | 182.7 | Kirkland_Manholes-2955 | 181.46 | 188.6 | 0.66 | 8 | PVC | 0.01 | 572 | 16 | 52 | 68 | 11.9 | | |
| Kirkland_Main-3176 | Kirkland_Manholes-2955 | 181.46 | Kirkland_Manholes-1038 | 180.54 | 146.6 | 0.63 | 8 | PVC | 0.01 | 559 | 20 | 65 | 85 | 15.3 | | |
| Kirkland_Main-3177 | Kirkland_Manholes-2954 | 183.8 | Kirkland_Manholes-2953 | 182.9 | 158.6 | 0.57 | 8 | PVC | 0.01 | 531 | 1 | 4 | 6 | 1.1 | | |
| Kirkland_Main-3178 | Kirkland_Manholes-2953 | 182.9 | Kirkland_Manholes-2955 | 181.46 | 297.7 | 0.48 | 8 | PVC | 0.01 | 490 | 3 | 9 | 12 | 2.5 | | |
| Kirkland_Main-3179 | Kirkland_Manholes-2956 | 306.62 | Kirkland_Manholes-876 | 301.25 | 262.2 | 2.05 | 8 | PVC | 0.01 | 1,009 | 2 | 16 | 18 | 1.8 | | |
| Kirkland_Main-3180 | Kirkland_Manholes-2958 | 17.19 | WAVERLY_WETWELL | 0 | 45.5 | 37.82 | 12 | PVC | 0.01 | 12,784 | 43 | 283 | 326 | 2.5 | | WW Influent Pipe |
| Kirkland_Main-3181 | Kirkland_Manholes-1622 | 253.11 | Kirkland_Manholes-528 | 238.38 | 149.4 | 9.86 | 8 | PVC | 0.01 | 2,214 | 268 | 855 | 1,122 | 50.7 | SM7 | |
| Kirkland_Main-3182 | Kirkland_Manholes-528 | 238.38 | Kirkland_Manholes-1634 | 223.49 | 152.1 | 9.79 | 8 | PVC | 0.01 | 2,206 | 270 | 859 | 1,129 | 51.2 | SM7 | |
| Kirkland_Main-3183 | Kirkland_Manholes-2971 | 508.46 | Kirkland_Manholes-2972 | 508.32 | 249.3 | 0.06 | 8 | PVC | 0.01 | 167 | 0 | 4 | 4 | 2.4 | | |
| Kirkland_Main-3185 | Kirkland_Manholes-2960 | 235.09 | Kirkland_Manholes-334 | 218.68 | 321.1 | 5.11 | 8 | PVC | 0.01 | 1,594 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3186 | Kirkland_Manholes-2961 | 466.63 | Kirkland_Manholes-2030 | 465.11 | 267.6 | 0.57 | 8 | PVC | 0.01 | 531 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-3187 | Kirkland_Manholes-2963 | 352.22 | Kirkland_Manholes-2962 | 351.81 | 165.5 | 0.25 | 8 | PVC | 0.01 | 351 | 1 | 4 | 5 | 1.5 | | |
| Kirkland_Main-3188 | Kirkland_Manholes-2962 | 351.81 | Kirkland_Manholes-2566 | 326.34 | 167.8 | 15.18 | 8 | PVC | 0.01 | 2,747 | 4 | 20 | 25 | 0.9 | | |
| Kirkland_Main-3189 | Kirkland_Manholes-2966 | 369.29 | Kirkland_Manholes-2965 | 368.34 | 79.6 | 1.19 | 8 | PVC | 0.01 | 770 | 11 | 4 | 15 | 2 | | |
| Kirkland_Main-3190 | Kirkland_Manholes-2965 | 368.34 | Kirkland_Manholes-2964 | 368.18 | 12 | 1.33 | 8 | PVC | 0.01 | 814 | 16 | 8 | 25 | 3 | | |
| Kirkland_Main-3191 | Kirkland_Manholes-2964 | 368.18 | Kirkland_Manholes-1916 | 361.73 | 249.5 | 2.59 | 8 | PVC | 0.01 | 1,134 | 17 | 12 | 29 | 2.6 | | |
| Kirkland_Main-3193 | Kirkland_Manholes-2967 | 87.15 | Kirkland_Manholes-2969 | 78.32 | 80.7 | 10.94 | 8 | PVC | 0.01 | 2,332 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3194 | Kirkland_Manholes-2968 | 78.98 | Kirkland_Manholes-2969 | 78.32 | 100.1 | 0.66 | 8 | PVC | 0.01 | 573 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-3195 | Kirkland_Manholes-2969 | 78.32 | Kirkland_Manholes-2970 | 61.2 | 152.9 | 11.2 | 8 | PVC | 0.01 | 2,359 | 3 | 13 | 16 | 0.7 | | |
| Kirkland_Main-3196 | Kirkland_Manholes-2970 | 61.2 | Kirkland_Manholes-200 | 55.31 | 178.6 | 3.3 | 8 | PVC | 0.01 | 1,280 | 4 | 17 | 21 | 1.7 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3197 | Kirkland_Manholes-1445 | 504.92 | Kirkland_Manholes-2976 | 503.85 | 186.4 | 0.57 | 8 | PVC | 0.01 | 534 | 20 | 94 | 113 | 21.2 | SM14-Ex-EX269 | |
| Kirkland_Main-3198 | Kirkland_Manholes-2972 | 508.32 | Kirkland_Manholes-2973 | 507.01 | 144.1 | 0.91 | 8 | PVC | 0.01 | 672 | 0 | 8 | 8 | 1.2 | | |
| Kirkland_Main-3199 | Kirkland_Manholes-2974 | 507.07 | Kirkland_Manholes-2973 | 507.01 | 168.1 | 0.04 | 8 | PVC | 0.01 | 133 | 0 | 4 | 4 | 3.1 | | |
| Kirkland_Main-3200 | Kirkland_Manholes-2973 | 507.01 | Kirkland_Manholes-2975 | 506.8 | 151.1 | 0.14 | 8 | PVC | 0.01 | 263 | 2 | 16 | 18 | 6.8 | | |
| Kirkland_Main-3201 | Kirkland_Manholes-2975 | 506.8 | Kirkland_Manholes-2976 | 503.85 | 22 | 13.39 | 8 | PVC | 0.01 | 2,579 | 2 | 20 | 22 | 0.9 | | |
| Kirkland_Main-3202 | Kirkland_Manholes-2978 | 14.63 | Kirkland_Manholes-2730 | 14.43 | 56 | 0.36 | 18 | PVC | 0.01 | 3,662 | 254 | 568 | 822 | 22.4 | SM14-Ex-EX289 | |
| Kirkland_Main-3203 | Kirkland_Manholes-2977 | 14.89 | Kirkland_Manholes-2978 | 14.63 | 69.2 | 0.38 | 18 | PVC | 0.01 | 3,758 | 253 | 562 | 815 | 21.7 | SM14-Ex-EX289 | |
| Kirkland_Main-3204 | Kirkland_Manholes-2979 | 372.62 | Kirkland_Manholes-2980 | 359.59 | 69.3 | 18.82 | 8 | PVC | 0.01 | 3,058 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3205 | Kirkland_Manholes-2980 | 359.59 | Kirkland_Manholes-2981 | 355.43 | 97.4 | 4.27 | 8 | PVC | 0.01 | 1,457 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-3206 | Kirkland_Manholes-2981 | 355.43 | Kirkland_Manholes-2962 | 351.81 | 43.7 | 8.28 | 8 | PVC | 0.01 | 2,029 | 3 | 12 | 15 | 0.8 | | |
| Kirkland_Main-3207 | Kirkland_Manholes-2982 | 168 | Kirkland_Manholes-770 | 166.93 | 80.1 | 1.34 | 8 | PVC | 0.01 | 815 | 0 | 4 | 4 | 0.5 | | |
| Kirkland_Main-3208 | Kirkland_Manholes-2983 | 235.2 | Kirkland_Manholes-974 | 234.1 | 148.8 | 0.74 | 8 | PVC | 0.01 | 606 | 1 | 4 | 6 | 0.9 | | |
| Kirkland_Main-3209 | Kirkland_Manholes-1342 | 283.15 | Kirkland_Manholes-2984 | 277.63 | 191.2 | 2.89 | 10 | PVC | 0.01 | 2,172 | 129 | 378 | 507 | 23.3 | | |
| Kirkland_Main-3210 | Kirkland_Manholes-2985 | 155.7 | Kirkland_Manholes-1648 | 152.03 | 36.5 | 10.07 | 8 | PVC | 0.01 | 2,237 | 3 | 16 | 20 | 0.9 | | |
| Kirkland_Main-3211 | Kirkland_Manholes-2986 | 155.86 | Kirkland_Manholes-2985 | 155.7 | 122.4 | 0.13 | 8 | PVC | 0.01 | 255 | 3 | 8 | 11 | 4.4 | | |
| Kirkland_Main-3213 | Kirkland_Manholes-2987 | 213 | Kirkland_Manholes-2988 | 212.12 | 123.5 | 0.71 | 8 | PVC | 0.01 | 595 | 4 | 4 | 8 | 1.4 | | |
| Kirkland_Main-3214 | Kirkland_Manholes-2988 | 212.12 | Kirkland_Manholes-2989 | 210.69 | 118.1 | 1.21 | 8 | PVC | 0.01 | 776 | 5 | 9 | 14 | 1.8 | | |
| Kirkland_Main-3215 | Kirkland_Manholes-2989 | 210.69 | Kirkland_Manholes-61 | 205.17 | 54.3 | 10.16 | 8 | PVC | 0.01 | 2,247 | 5 | 13 | 18 | 0.8 | | |
| Kirkland_Main-3216 | Kirkland_Manholes-2990 | 239.73 | Kirkland_Manholes-1021 | 230.72 | 366.4 | 2.46 | 8 | PVC | 0.01 | 1,106 | 3 | 4 | 7 | 0.6 | | |
| Kirkland_Main-3217 | Kirkland_Manholes-2993 | 335.98 | Kirkland_Manholes-2939 | 317.33 | 213.5 | 8.74 | 8 | PVC | 0.01 | 2,084 | 3 | 8 | 11 | 0.5 | | |
| Kirkland_Main-3218 | Kirkland_Manholes-1083 | 220.88 | Kirkland_Manholes-2996 | 220.63 | 31.5 | 0.79 | 12 | PVC | 0.01 | 1,851 | 149 | 513 | 838 | 45.2 | SM14-Ex-EX321 | |
| Kirkland_Main-3219 | Kirkland_Manholes-2995 | 224.98 | Kirkland_Manholes-2996 | 220.63 | 134.4 | 3.24 | 8 | PVC | 0.01 | 1,269 | 11 | 4 | 15 | 1.1 | | |
| Kirkland_Main-3220 | Kirkland_Manholes-2997 | 482.7 | Kirkland_Manholes-2998 | 482.02 | 242.2 | 0.28 | 8 | PVC | 0.01 | 374 | 1 | 4 | 5 | 1.3 | | |
| Kirkland_Main-3221 | Kirkland_Manholes-2998 | 482.02 | Kirkland_Manholes-555 | 477.96 | 81.6 | 4.97 | 8 | PVC | 0.01 | 1,572 | 2 | 8 | 10 | 0.6 | | |
| Kirkland_Main-3222 | Kirkland_Manholes-2999 | 479.74 | Kirkland_Manholes-3000 | 475.69 | 102.7 | 3.94 | 8 | PVC | 0.01 | 1,400 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3223 | Kirkland_Manholes-3000 | 475.69 | Kirkland_Manholes-3001 | 471.99 | 137.1 | 2.7 | 8 | PVC | 0.01 | 1,158 | 1 | 8 | 9 | 0.8 | | |
| Kirkland_Main-3224 | Kirkland_Manholes-3001 | 471.99 | Kirkland_Manholes-3002 | 466.73 | 134.5 | 3.91 | 8 | PVC | 0.01 | 1,394 | 2 | 12 | 14 | 1 | | |
| Kirkland_Main-3225 | Kirkland_Manholes-3002 | 466.73 | Kirkland_Manholes-3003 | 466.06 | 37 | 1.81 | 8 | PVC | 0.01 | 949 | 2 | 16 | 18 | 1.9 | | |
| Kirkland_Main-3226 | Kirkland_Manholes-3003 | 466.06 | Kirkland_Manholes-3004 | 465.24 | 79.1 | 1.04 | 8 | PVC | 0.01 | 718 | 2 | 20 | 22 | 3.1 | | |
| Kirkland_Main-3227 | Kirkland_Manholes-3004 | 465.24 | Kirkland_Manholes-3005 | 459.83 | 119.2 | 4.54 | 8 | PVC | 0.01 | 1,502 | 2 | 24 | 27 | 1.8 | | |
| Kirkland_Main-3228 | Kirkland_Manholes-3005 | 459.83 | Kirkland_Manholes-3006 | 456.1 | 91.8 | 4.07 | 8 | PVC | 0.01 | 1,422 | 3 | 28 | 31 | 2.2 | | |
| Kirkland_Main-3229 | Kirkland_Manholes-3007 | 456.9 | Kirkland_Manholes-3008 | 447.1 | 310.3 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-3230 | Kirkland_Manholes-3009 | 452.69 | Kirkland_Manholes-3008 | 447.1 | 238.1 | 2.35 | 8 | PVC | 0.01 | 1,080 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3231 | Kirkland_Manholes-3008 | 447.1 | Kirkland_Manholes-1990 | 439.8 | 282 | 2.59 | 8 | PVC | 0.01 | 1,134 | 4 | 16 | 20 | 1.8 | | |
| Kirkland_Main-3232 | Kirkland_Manholes-3010 | 442.64 | Kirkland_Manholes-3011 | 434.12 | 219.9 | 3.87 | 8 | PVC | 0.01 | 1,388 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3233 | Kirkland_Manholes-3011 | 434.12 | Kirkland_Manholes-2005 | 431.24 | 367.7 | 0.78 | 8 | PVC | 0.01 | 624 | 1 | 8 | 9 | 1.5 | | |
| Kirkland_Main-3234 | Kirkland_Manholes-2005 | 431.24 | Kirkland_Manholes-2006 | 430.4 | 270.9 | 0.31 | 8 | PVC | 0.01 | 393 | 2 | 12 | 14 | 3.6 | | |
| Kirkland_Main-3235 | Kirkland_Manholes-2006 | 430.4 | Kirkland_Manholes-2007 | 429.08 | 284.1 | 0.46 | 8 | PVC | 0.01 | 481 | 4 | 16 | 20 | 4.1 | | |
| Kirkland_Main-3236 | Kirkland_Manholes-3012 | 424.86 | Kirkland_Manholes-2011 | 417.75 | 388.4 | 1.83 | 8 | PVC | 0.01 | 954 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3237 | Kirkland_Manholes-3014 | 470 | Kirkland_Manholes-3013 | 459.93 | 193.2 | 5.21 | 8 | PVC | 0.01 | 1,610 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3238 | Kirkland_Manholes-3013 | 459.93 | Kirkland_Manholes-548 | 453.36 | 230.6 | 2.85 | 8 | PVC | 0.01 | 1,190 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-3239 | Kirkland_Manholes-3020 | 302.86 | Kirkland_Manholes-1341 | 299.38 | 98.7 | 3.52 | 8 | PVC | 0.01 | 1,324 | 7 | 49 | 56 | 4.2 | | |
| Kirkland_Main-3240 | Kirkland_Manholes-3019 | 303.35 | Kirkland_Manholes-3020 | 302.86 | 19.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 7 | 45 | 52 | 4.6 | | |
| Kirkland_Main-3241 | Kirkland_Manholes-3021 | 303.74 | Kirkland_Manholes-3019 | 303.35 | 54.4 | 0.72 | 8 | PVC | 0.01 | 597 | 7 | 41 | 47 | 7.9 | | |
| Kirkland_Main-3242 | Kirkland_Manholes-3022 | 311.69 | Kirkland_Manholes-3021 | 303.74 | 55.5 | 14.32 | 8 | PVC | 0.01 | 2,668 | 0 | 4 | 4 | 0.2 | | |
| Kirkland_Main-3243 | Kirkland_Manholes-3023 | 312.84 | Kirkland_Manholes-3021 | 303.74 | 71.1 | 12.8 | 8 | PVC | 0.01 | 2,523 | 6 | 33 | 39 | 1.5 | | |
| Kirkland_Main-3244 | Kirkland_Manholes-3018 | 329.19 | Kirkland_Manholes-3023 | 312.84 | 105.9 | 15.45 | 8 | PVC | 0.01 | 2,771 | 6 | 28 | 34 | 1.2 | | |
| Kirkland_Main-3245 | Kirkland_Manholes-3017 | 343.42 | Kirkland_Manholes-3018 | 329.19 | 180.7 | 7.87 | 8 | PVC | 0.01 | 1,978 | 5 | 24 | 30 | 1.5 | | |
| Kirkland_Main-3246 | Kirkland_Manholes-3015 | 371.23 | Kirkland_Manholes-3017 | 343.42 | 160.4 | 17.33 | 8 | PVC | 0.01 | 2,935 | 4 | 20 | 25 | 0.8 | | |
| Kirkland_Main-3247 | Kirkland_Manholes-3016 | 372.66 | Kirkland_Manholes-3015 | 371.23 | 122.5 | 1.17 | 8 | PVC | 0.01 | 762 | 3 | 16 | 20 | 2.6 | | |
| Kirkland_Main-3248 | Kirkland_Manholes-3024 | 372.77 | Kirkland_Manholes-1930 | 369.31 | 206.2 | 1.68 | 8 | PVC | 0.01 | 913 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-3250 | Kirkland_Manholes-3025 | 189.5 | Kirkland_Manholes-3026 | 186.45 | 198.2 | 1.54 | 8 | PVC | 0.01 | 875 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3251 | Kirkland_Manholes-3026 | 186.45 | Kirkland_Manholes-1035 | 182.7 | 331 | 1.13 | 8 | PVC | 0.01 | 750 | 2 | 9 | 10 | 1.4 | | |
| Kirkland_Main-3252 | Kirkland_Manholes-3028 | 332.75 | Kirkland_Manholes-1582 | 332.21 | 111.6 | 0.48 | 12 | PVC | 0.01 | 1,446 | 48 | 183 | 232 | 16 | SM14-Ex-EX206 | |
| Kirkland_Main-3253 | Kirkland_Manholes-3027 | 333.49 | Kirkland_Manholes-3028 | 332.75 | 24.2 | 3.06 | 8 | PVC | 0.01 | 1,233 | 4 | 4 | 8 | 0.6 | | |
| Kirkland_Main-3257 | Kirkland_Manholes-3031 | 384.74 | Kirkland_Manholes-1926 | 383.42 | 23.1 | 5.72 | 12 | PVC | 0.01 | 4,970 | 159 | 537 | 696 | 14 | | |
| Kirkland_Main-3258 | Kirkland_Manholes-1 | 73.25 | Kirkland_Manholes-21 | 62.08 | 92.5 | 12.08 | 8 | PVC | 0.01 | 2,451 | 8 | 22 | 30 | 1.2 | | |
| Kirkland_Main-3259 | Kirkland_Manholes-20 | 65.72 | Kirkland_Manholes-21 | 62.08 | 153.9 | 2.36 | 8 | PVC | 0.01 | 1,084 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3260 | Kirkland_Manholes-3070 | 330.73 | Kirkland_Manholes-927 | 307.71 | 144.8 | 15.9 | 8 | PVC | 0.01 | 2,811 | 7 | 4 | 11 | 0.4 | | |
| Kirkland_Main-3261 | Kirkland_Manholes-3078 | 370.92 | Kirkland_Manholes-3077 | 366.14 | 136.6 | 3.5 | 8 | PVC | 0.01 | 1,319 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3262 | Kirkland_Manholes-3077 | 366.14 | Kirkland_Manholes-3076 | 363.7 | 26.9 | 9.07 | 8 | PVC | 0.01 | 2,124 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-3263 | Kirkland_Manholes-3076 | 363.7 | Kirkland_Manholes-3075 | 343.97 | 114.4 | 17.24 | 8 | PVC | 0.01 | 2,928 | 1 | 12 | 13 | 0.4 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3264 | Kirkland_Manholes-3075 | 343.97 | Kirkland_Manholes-3079 | 316.42 | 161.6 | 17.05 | 8 | PVC | 0.01 | 2,911 | 1 | 16 | 17 | 0.6 | | |
| Kirkland_Main-3265 | Kirkland_Manholes-3079 | 316.42 | Kirkland_Manholes-3074 | 303.68 | 195.1 | 6.53 | 8 | PVC | 0.01 | 1,802 | 1 | 20 | 22 | 1.2 | | |
| Kirkland_Main-3266 | Kirkland_Manholes-3074 | 303.68 | Kirkland_Manholes-3073 | 289.21 | 131.6 | 10.99 | 8 | PVC | 0.01 | 2,337 | 2 | 24 | 26 | 1.1 | | |
| Kirkland_Main-3267 | Kirkland_Manholes-3073 | 289.21 | Kirkland_Manholes-3072 | 273.11 | 354 | 4.55 | 8 | PVC | 0.01 | 1,504 | 2 | 28 | 30 | 2 | | |
| Kirkland_Main-3268 | Kirkland_Manholes-3072 | 273.11 | Kirkland_Manholes-3071 | 273.04 | 17.1 | 0.4 | 8 | PVC | 0.01 | 445 | 2 | 33 | 35 | 7.8 | | |
| Kirkland_Main-3269 | Kirkland_Manholes-3071 | 273.04 | Kirkland_Manholes-1317 | 271.64 | 20.2 | 6.94 | 8 | PVC | 0.01 | 1,858 | 2 | 37 | 39 | 2.1 | | |
| Kirkland_Main-3270 | Kirkland_Manholes-3081 | 373.55 | Kirkland_Manholes-1319 | 372.4 | 30.4 | 3.78 | 8 | PVC | 0.01 | 1,371 | 79 | 191 | 270 | 19.7 | | |
| Kirkland_Main-3271 | Kirkland_Manholes-3080 | 382.34 | Kirkland_Manholes-3081 | 377.27 | 187.3 | 2.71 | 8 | PVC | 0.01 | 1,160 | 0 | 4 | 4 | 0.4 | | Drop Connection |
| Kirkland_Main-3272 | Kirkland_Manholes-3083 | 435.32 | Kirkland_Manholes-3082 | 428.49 | 311.8 | 2.19 | 8 | PVC | 0.01 | 1,044 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3273 | Kirkland_Manholes-3084 | 333.87 | Kirkland_Manholes-3085 | 329.83 | 142 | 2.85 | 8 | PVC | 0.01 | 1,189 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3274 | Kirkland_Manholes-3085 | 329.83 | Kirkland_Manholes-3086 | 304.85 | 242 | 10.32 | 12 | PVC | 0.01 | 6,678 | 1 | 8 | 9 | 0.1 | | |
| Kirkland_Main-3275 | Kirkland_Manholes-3086 | 304.85 | Kirkland_Manholes-3087 | 296.66 | 149.5 | 5.48 | 12 | PVC | 0.01 | 4,865 | 4 | 12 | 16 | 0.3 | | |
| Kirkland_Main-3276 | Kirkland_Manholes-3087 | 296.66 | Kirkland_Manholes-3088 | 288.51 | 213.4 | 3.82 | 8 | Concrete | 0.013 | 1,060 | 4 | 16 | 20 | 1.9 | | |
| Kirkland_Main-3277 | Kirkland_Manholes-3088 | 288.51 | Kirkland_Manholes-3089 | 268.55 | 207 | 9.64 | 8 | Concrete | 0.013 | 1,684 | 4 | 20 | 24 | 1.4 | | |
| Kirkland_Main-3278 | Kirkland_Manholes-3089 | 268.55 | Kirkland_Manholes-2427 | 267.5 | 263 | 0.4 | 8 | Concrete | 0.013 | 343 | 57 | 24 | 82 | 23.8 | | |
| Kirkland_Main-3279 | Kirkland_Manholes-2197 | 480.89 | Kirkland_Manholes-1417 | 477.64 | 213.1 | 1.52 | 8 | PVC | 0.01 | 871 | 2 | 12 | 14 | 1.7 | | |
| Kirkland_Main-3280 | Kirkland_Manholes-3090 | 416.74 | Kirkland_Manholes-2916 | 416.17 | 246 | 0.23 | 8 | PVC | 0.01 | 339 | 2 | 4 | 6 | 1.7 | | |
| Kirkland_Main-3281 | Kirkland_Manholes-3092 | 96.93 | Kirkland_Manholes-173 | 34.1 | 219.6 | 28.61 | 8 | PVC | 0.01 | 3,771 | 2 | 9 | 11 | 0.3 | | |
| Kirkland_Main-3282 | Kirkland_Manholes-3091 | 115.12 | Kirkland_Manholes-3092 | 96.93 | 129.4 | 14.06 | 8 | PVC | 0.01 | 2,644 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3283 | Kirkland_Manholes-3093 | 117.97 | Kirkland_Manholes-3094 | 63.71 | 388.1 | 13.98 | 8 | PVC | 0.01 | 2,636 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3284 | Kirkland_Manholes-3094 | 63.71 | Kirkland_Manholes-437 | 58.56 | 159.5 | 3.23 | 8 | PVC | 0.01 | 1,267 | 5 | 9 | 13 | 1.1 | | |
| Kirkland_Main-3285 | Kirkland_Manholes-3095 | 195.85 | Kirkland_Manholes-2070 | 185.96 | 195.6 | 5.06 | 8 | PVC | 0.01 | 1,585 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3287 | Kirkland_Manholes-205 | 228.15 | Kirkland_Manholes-3096 | 204.91 | 232.4 | 10 | 8 | PVC | 0.01 | 2,229 | 16 | 35 | 51 | 2.3 | SM14-Ex-EX57 | |
| Kirkland_Main-3288 | Kirkland_Manholes-3096 | 204.91 | Kirkland_Manholes-234 | 184.45 | 273.4 | 7.48 | 8 | PVC | 0.01 | 1,929 | 22 | 48 | 69 | 3.6 | SM14-Ex-EX57 | |
| Kirkland_Main-3289 | Kirkland_Manholes-1218 | 220.85 | Kirkland_Manholes-3096 | 204.91 | 278.6 | 5.72 | 8 | PVC | 0.01 | 1,686 | 5 | 9 | 13 | 0.8 | SM14-Ex-EX59 | |
| Kirkland_Main-3290 | Kirkland_Manholes-3097 | 172.14 | Kirkland_Manholes-1639 | 169.94 | 87.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 16 | 85 | 101 | 9.1 | SM14-Ex-EX202 | |
| Kirkland_Main-3291 | Kirkland_Manholes-3098 | 172.34 | Kirkland_Manholes-3097 | 172.14 | 17.4 | 1.15 | 8 | PVC | 0.01 | 757 | 16 | 81 | 97 | 12.8 | SM14-Ex-EX202 | |
| Kirkland_Main-3292 | Kirkland_Manholes-1640 | 188.59 | Kirkland_Manholes-3098 | 174.29 | 160.1 | 8.93 | 8 | PVC | 0.01 | 2,107 | 4 | 8 | 12 | 0.6 | SM14-Ex-EX203 | Drop Connection |
| Kirkland_Main-3293 | Kirkland_Manholes-2696 | 172.94 | Kirkland_Manholes-3098 | 172.34 | 33 | 1.82 | 8 | PVC | 0.01 | 951 | 12 | 69 | 81 | 8.5 | SM14-Ex-EX202 | |
| Kirkland_Main-3294 | Kirkland_Manholes-3099 | 77.83 | Kirkland_Manholes-2204 | 53 | 99.4 | 24.97 | 8 | PVC | 0.01 | 3,523 | 3 | 12 | 15 | 0.4 | | |
| Kirkland_Main-3295 | Kirkland_Manholes-2725 | 97.33 | Kirkland_Manholes-3099 | 77.83 | 158.8 | 12.28 | 8 | PVC | 0.01 | 2,470 | 2 | 6 | 8 | 0.3 | | |
| Kirkland_Main-3296 | Kirkland_Manholes-2663 | 50.64 | Kirkland_Manholes-3043 | 37.72 | 98.7 | 13.08 | 12 | PVC | 0.01 | 7,519 | 140 | 440 | 580 | 7.7 | | |
| Kirkland_Main-3297 | Kirkland_Manholes-3043 | 37.72 | Kirkland_Manholes-3044 | 18.06 | 181 | 10.86 | 12 | PVC | 0.01 | 6,850 | 140 | 446 | 586 | 8.6 | | |
| Kirkland_Main-3298 | Kirkland_Manholes-3106 | 117 | Kirkland_Manholes-3105 | 116.05 | 61.3 | 1.55 | 8 | PVC | 0.01 | 877 | 16 | 91 | 107 | 12.2 | SM10 | |
| Kirkland_Main-3299 | Kirkland_Manholes-3107 | 127.14 | Kirkland_Manholes-3106 | 117 | 167.2 | 6.07 | 8 | | 0.012 | 1,447 | 16 | 82 | 98 | 6.8 | SM10 | |
| Kirkland_Main-3300 | Kirkland_Manholes-1180 | 118.31 | Kirkland_Manholes-3108 | 104.6 | 196.1 | 6.99 | 8 | PVC | 0.01 | 1,864 | 1 | 8 | 9 | 0.5 | SM10 | |
| Kirkland_Main-3301 | Kirkland_Manholes-3103 | 113.84 | Kirkland_Manholes-3109 | 110.43 | 345.5 | 0.99 | 12 | PVC | 0.01 | 2,065 | 19 | 124 | 143 | 6.9 | SM10 | |
| Kirkland_Main-3302 | Kirkland_Manholes-3109 | 110.43 | Kirkland_Manholes-3108 | 104.6 | 85.9 | 6.79 | 8 | PVC | 0.01 | 1,837 | 20 | 132 | 152 | 8.3 | SM10 | |
| Kirkland_Main-3303 | Kirkland_Manholes-3108 | 104.6 | Kirkland_Manholes-513 | 81.7 | 198.3 | 11.55 | 8 | PVC | 0.01 | 2,396 | 22 | 148 | 170 | 7.1 | SM10 | |
| Kirkland_Main-3305 | Kirkland_Manholes-3105 | 116.05 | Kirkland_Manholes-3104 | 114.41 | 128.6 | 1.28 | 8 | PVC | 0.01 | 796 | 18 | 99 | 116 | 14.6 | SM10 | |
| Kirkland_Main-3306 | Kirkland_Manholes-3110 | 73.01 | Kirkland_Manholes-306 | 19.99 | 234 | 22.66 | 8 | PVC | 0.01 | 3,356 | 25 | 106 | 131 | 3.9 | SM10 | |
| Kirkland_Main-3307 | Kirkland_Manholes-305 | 74.69 | Kirkland_Manholes-3110 | 73.01 | 8.3 | 20.21 | 8 | PVC | 0.01 | 3,169 | 24 | 97 | 121 | 3.8 | SM10 | |
| Kirkland_Main-3308 | Kirkland_Manholes-3114 | 174.9 | Kirkland_Manholes-3113 | 173.48 | 159.7 | 0.89 | 8 | PVC | 0.01 | 665 | 36 | 4 | 40 | 6 | | |
| Kirkland_Main-3309 | Kirkland_Manholes-3113 | 173.48 | Kirkland_Manholes-3112 | 173.15 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 36 | 8 | 44 | 9.9 | | |
| Kirkland_Main-3310 | Kirkland_Manholes-3112 | 173.15 | Kirkland_Manholes-3111 | 170.05 | 248.7 | 1.25 | 8 | PVC | 0.01 | 787 | 36 | 12 | 48 | 6.1 | | |
| Kirkland_Main-3311 | Kirkland_Manholes-3111 | 170.05 | Kirkland_Manholes-1125 | 167.88 | 64.7 | 3.36 | 8 | PVC | 0.01 | 1,292 | 36 | 16 | 52 | 4.1 | | |
| Kirkland_Main-3314 | Kirkland_Manholes-3116 | 330.46 | Kirkland_Manholes-2933 | 328.79 | 108.5 | 1.54 | 8 | PVC | 0.01 | 875 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3315 | Kirkland_Manholes-3117 | 134.38 | Kirkland_Manholes-161 | 132.09 | 173.7 | 1.32 | 8 | PVC | 0.01 | 809 | 2 | 4 | 7 | 0.8 | | |
| Kirkland_Main-3316 | Kirkland_Manholes-3118 | 331.75 | Kirkland_Manholes-2934 | 330.48 | 196.7 | 0.65 | 8 | PVC | 0.01 | 567 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-3317 | Kirkland_Manholes-3119 | 327.7 | Kirkland_Manholes-2932 | 327.56 | 161.9 | 0.09 | 8 | PVC | 0.01 | 207 | 3 | 20 | 24 | 11.5 | | |
| Kirkland_Main-3318 | Kirkland_Manholes-2933 | 328.79 | Kirkland_Manholes-3119 | 327.7 | 135.5 | 0.8 | 8 | PVC | 0.01 | 632 | 2 | 8 | 10 | 1.6 | | |
| Kirkland_Main-3319 | Kirkland_Manholes-2934 | 330.48 | Kirkland_Manholes-3119 | 327.7 | 250.4 | 1.11 | 8 | PVC | 0.01 | 743 | 1 | 8 | 9 | 1.3 | | |
| Kirkland_Main-3320 | Kirkland_Manholes-839 | 334.68 | Kirkland_Manholes-3121 | 329.59 | 187.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 16 | 41 | 57 | 4.9 | | |
| Kirkland_Main-3321 | Kirkland_Manholes-3120 | 345 | Kirkland_Manholes-3121 | 344.79 | 53.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | | Drop Connection |
| Kirkland_Main-3322 | Kirkland_Manholes-3121 | 329.59 | Kirkland_Manholes-3122 | 329.14 | 65.3 | 0.69 | 8 | PVC | 0.01 | 585 | 17 | 49 | 66 | 11.3 | | |
| Kirkland_Main-3323 | Kirkland_Manholes-3122 | 329.14 | Kirkland_Manholes-840 | 326.85 | 337.3 | 0.68 | 8 | PVC | 0.01 | 581 | 20 | 53 | 73 | 12.5 | | |
| Kirkland_Main-3326 | Kirkland_Manholes-3123 | 227.69 | Kirkland_Manholes-2497 | 194.88 | 329.5 | 9.96 | 8 | PVC | 0.01 | 2,225 | 8 | 4 | 12 | 0.5 | SM14-Ex-EX236 | |
| Kirkland_Main-3332 | Kirkland_Manholes-3125 | 215.03 | Kirkland_Manholes-3124 | 203.5 | 175.2 | 6.58 | 8 | PVC | 0.01 | 1,809 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX20 | |
| Kirkland_Main-3333 | Kirkland_Manholes-3124 | 203.5 | Kirkland_Manholes-3126 | 177.5 | 261.8 | 9.93 | 8 | PVC | 0.01 | 2,222 | 2 | 9 | 10 | 0.5 | SM14-Ex-EX20 | |
| Kirkland_Main-3336 | Kirkland_Manholes-3006 | 456.1 | Kirkland_Manholes-539 | 454.38 | 165.4 | 1.04 | 8 | PVC | 0.01 | 719 | 3 | 33 | 36 | 5 | | |
| Kirkland_Main-3337 | Kirkland_Manholes-555 | 477.96 | Kirkland_Manholes-535 | 472.49 | 159.7 | 3.43 | 8 | PVC | 0.01 | 1,305 | 2 | 12 | 15 | 1.1 | | |
| Kirkland_Main-3338 | Kirkland_Manholes-2509 | 126.48 | Kirkland_Manholes-2508 | 120.01 | 60.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 3 | 12 | 15 | 0.6 | SM14-Ex-EX229 | |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3339 | Kirkland_Manholes-2566 | 326.34 | Kirkland_Manholes-2567 | 316.05 | 133.4 | 7.71 | 8 | PVC | 0.01 | 1,958 | 4 | 24 | 29 | 1.5 | SM14-Ex-EX307 | |
| Kirkland_Main-3340 | Kirkland_Manholes-728 | 70.86 | Kirkland_Manholes-2928 | 60.36 | 293.8 | 3.57 | 18 | PVC | 0.01 | 11,586 | 142 | 544 | 686 | 5.9 | | |
| Kirkland_Main-3341 | Kirkland_Manholes-3127 | 324.33 | Kirkland_Manholes-3128 | 323.94 | 81.4 | 0.48 | 8 | PVC | 0.01 | 488 | 0 | 4 | 4 | 0.9 | SM14-Ex-EX54 | |
| Kirkland_Main-3344 | Kirkland_Manholes-3129 | 308.71 | Kirkland_Manholes-2956 | 306.62 | 67.6 | 3.09 | 8 | PVC | 0.01 | 1,240 | 2 | 12 | 14 | 1.1 | | |
| Kirkland_Main-3345 | Kirkland_Manholes-3130 | 70.51 | Kirkland_Manholes-3131 | 61.63 | 403.3 | 2.2 | 8 | PVC | 0.01 | 1,046 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3346 | Kirkland_Manholes-3131 | 61.63 | Kirkland_Manholes-201 | 56.98 | 404.6 | 1.15 | 8 | PVC | 0.01 | 756 | 0 | 9 | 9 | 1.1 | | |
| Kirkland_Main-3347 | Kirkland_Manholes-3132 | 514.05 | Kirkland_Manholes-3133 | 512.61 | 110 | 1.31 | 8 | PVC | 0.01 | 807 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-3348 | Kirkland_Manholes-3133 | 512.61 | Kirkland_Manholes-1441 | 509.69 | 156.4 | 1.87 | 8 | PVC | 0.01 | 963 | 0 | 8 | 9 | 0.9 | | |
| Kirkland_Main-3349 | Kirkland_Manholes-3134 | 66.29 | Kirkland_Manholes-1828 | 65.79 | 294 | 0.17 | 15 | PVC | 0.01 | 1,554 | 116 | 684 | 1,150 | 74 | SM14-2035-DF11 | |
| Kirkland_Main-3350 | Kirkland_Manholes-2994 | 67.86 | Kirkland_Manholes-3135 | 66.49 | 13.6 | 10.06 | 15 | PVC | 0.01 | 11,957 | 114 | 667 | 1,132 | 9.5 | | |
| Kirkland_Main-3351 | Kirkland_Manholes-3135 | 66.49 | Kirkland_Manholes-3134 | 66.29 | 136.2 | 0.15 | 15 | PVC | 0.01 | 1,460 | 114 | 676 | 1,141 | 78.1 | SM14-2035-DF11 | |
| Kirkland_Main-3353 | Kirkland_Manholes-3137 | 192.8 | Kirkland_Manholes-1304 | 180.12 | 128.3 | 9.88 | 8 | PVC | 0.01 | 2,216 | 5 | 16 | 21 | 1 | SM14-Ex-EX106 | |
| Kirkland_Main-3354 | Kirkland_Manholes-1305 | 222.35 | Kirkland_Manholes-3137 | 192.8 | 245.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 3 | 8 | 12 | 0.5 | SM14-Ex-EX106 | |
| Kirkland_Main-3356 | Kirkland_Manholes-3138 | 280.24 | Kirkland_Manholes-672 | 266.2 | 264 | 5.32 | 8 | PVC | 0.01 | 1,626 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3357 | Kirkland_Manholes-3139 | 191.69 | Kirkland_Manholes-769 | 165.1 | 236 | 11.27 | 8 | PVC | 0.01 | 2,367 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3358 | Kirkland_Manholes-3140 | 184.54 | Kirkland_Manholes-520 | 182.65 | 320.9 | 0.59 | 8 | PVC | 0.01 | 541 | 2 | 8 | 11 | 2 | SM10 | |
| Kirkland_Main-3359 | Kirkland_Manholes-526 | 148.56 | Kirkland_Manholes-3141 | 141.49 | 317.3 | 2.23 | 8 | PVC | 0.01 | 1,052 | 5 | 33 | 38 | 3.6 | SM10 | |
| Kirkland_Main-3360 | Kirkland_Manholes-3141 | 141.49 | Kirkland_Manholes-3107 | 127.14 | 314.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 12 | 66 | 78 | 5.2 | SM10 | |
| Kirkland_Main-3361 | Kirkland_Manholes-495 | 169.48 | Kirkland_Manholes-3142 | 153.62 | 319.4 | 4.97 | 8 | PVC | 0.01 | 1,571 | 4 | 16 | 21 | 1.3 | SM10 | |
| Kirkland_Main-3362 | Kirkland_Manholes-3142 | 153.62 | Kirkland_Manholes-3141 | 141.49 | 269.1 | 4.51 | 8 | PVC | 0.01 | 1,497 | 7 | 25 | 31 | 2.1 | SM10 | |
| Kirkland_Main-3366 | Kirkland_Manholes-3148 | 304.94 | Kirkland_Manholes-3147 | 292.59 | 197.5 | 6.25 | 8 | PVC | 0.01 | 1,763 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3367 | Kirkland_Manholes-3147 | 292.59 | Kirkland_Manholes-3146 | 290.48 | 68.4 | 3.08 | 8 | PVC | 0.01 | 1,238 | 2 | 8 | 10 | 0.8 | | |
| Kirkland_Main-3368 | Kirkland_Manholes-3146 | 290.48 | Kirkland_Manholes-3145 | 283.25 | 74.7 | 9.68 | 8 | PVC | 0.01 | 2,194 | 2 | 12 | 14 | 0.6 | | |
| Kirkland_Main-3369 | Kirkland_Manholes-3149 | 279.32 | Kirkland_Manholes-672 | 266.2 | 331.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 8 | 49 | 57 | 4 | | |
| Kirkland_Main-3370 | Kirkland_Manholes-2888 | 290.53 | Kirkland_Manholes-3149 | 279.32 | 39.9 | 28.13 | 8 | PVC | 0.01 | 3,739 | 5 | 20 | 25 | 0.7 | | |
| Kirkland_Main-3371 | Kirkland_Manholes-3145 | 283.25 | Kirkland_Manholes-3149 | 279.32 | 272.6 | 1.44 | 8 | PVC | 0.01 | 847 | 3 | 24 | 27 | 3.2 | | |
| Kirkland_Main-3372 | Kirkland_Manholes-1382 | 428.64 | Kirkland_Manholes-3150 | 427.16 | 302.5 | 0.49 | 8 | PVC | 0.01 | 493 | 2 | 8 | 10 | 2.1 | | |
| Kirkland_Main-3373 | Kirkland_Manholes-3150 | 427.16 | Kirkland_Manholes-1347 | 427.05 | 67.8 | 0.16 | 8 | PVC | 0.01 | 284 | 3 | 12 | 15 | 5.4 | | |
| Kirkland_Main-3375 | Kirkland_Manholes-2803 | 158.22 | Kirkland_Manholes-3151 | 154.6 | 93.3 | 3.88 | 8 | PVC | 0.01 | 1,389 | 34 | 126 | 160 | 11.5 | SM14-Ex-EX313 | |
| Kirkland_Main-3376 | Kirkland_Manholes-2609 | 193.8 | Kirkland_Manholes-3152 | 172.55 | 189.8 | 11.2 | 8 | PVC | 0.01 | 2,359 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-3377 | Kirkland_Manholes-3154 | 166.6 | Kirkland_Manholes-3153 | 166.34 | 271.7 | 0.1 | 8 | PVC | 0.01 | 218 | 23 | 57 | 80 | 36.7 | SM14-Ex-EX294 | |
| Kirkland_Main-3378 | Kirkland_Manholes-2629 | 172.55 | Kirkland_Manholes-3154 | 166.6 | 85 | 7 | 8 | PVC | 0.01 | 1,865 | 12 | 24 | 37 | 2 | SM14-Ex-EX295 | |
| Kirkland_Main-3379 | Kirkland_Manholes-3155 | 166.88 | Kirkland_Manholes-3154 | 166.6 | 37.7 | 0.74 | 8 | PVC | 0.01 | 607 | 10 | 28 | 38 | 6.3 | SM14-Ex-EX294 | |
| Kirkland_Main-3380 | Kirkland_Manholes-2637 | 187.87 | Kirkland_Manholes-3156 | 168.61 | 186.4 | 10.33 | 8 | PVC | 0.01 | 2,267 | 10 | 20 | 30 | 1.3 | SM14-Ex-EX294 | |
| Kirkland_Main-3381 | Kirkland_Manholes-3156 | 168.61 | Kirkland_Manholes-3155 | 166.88 | 387 | 0.45 | 8 | PVC | 0.01 | 471 | 10 | 24 | 34 | 7.2 | SM14-Ex-EX294 | |
| Kirkland_Main-3382 | Kirkland_Manholes-3153 | 166.34 | O-37 | 146.26 | 92.7 | 21.67 | 8 | PVC | 0.01 | 3,282 | 96 | 289 | 385 | 11.7 | SM14-Ex-EX294 | |
| Kirkland_Main-3383 | Kirkland_Manholes-3157 | 158.55 | O-36 | 147.51 | 94.1 | 11.73 | 8 | PVC | 0.01 | 2,415 | 18 | 65 | 84 | 3.5 | SM14-Ex-EX281 | |
| Kirkland_Main-3384 | Kirkland_Manholes-3158 | 172.29 | Kirkland_Manholes-3157 | 158.55 | 121.1 | 11.35 | 8 | PVC | 0.01 | 2,375 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX281 | |
| Kirkland_Main-3385 | Kirkland_Manholes-2628 | 186 | Kirkland_Manholes-3159 | 168.84 | 190.6 | 9 | 8 | PVC | 0.01 | 2,115 | 16 | 53 | 68 | 3.2 | SM14-Ex-EX281 | |
| Kirkland_Main-3386 | Kirkland_Manholes-3159 | 168.84 | Kirkland_Manholes-3157 | 158.55 | 57.7 | 17.84 | 8 | PVC | 0.01 | 2,978 | 17 | 57 | 74 | 2.5 | SM14-Ex-EX281 | Drop Connection |
| Kirkland_Main-3387 | Kirkland_Manholes-2601 | 228.74 | Kirkland_Manholes-3160 | 174.95 | 323 | 16.65 | 8 | PVC | 0.01 | 2,877 | 38 | 130 | 169 | 5.9 | SM14-Ex-EX299 | |
| Kirkland_Main-3388 | Kirkland_Manholes-2796 | 185.45 | Kirkland_Manholes-3161 | 177.36 | 230.8 | 3.5 | 8 | PVC | 0.01 | 1,320 | 7 | 20 | 27 | 2.1 | SM14-Ex-EX296 | |
| Kirkland_Main-3389 | Kirkland_Manholes-2599 | 217.5 | Kirkland_Manholes-3161 | 177.36 | 310.3 | 12.94 | 8 | PVC | 0.01 | 2,536 | 5 | 16 | 21 | 0.8 | SM14-Ex-EX301 | |
| Kirkland_Main-3390 | Kirkland_Manholes-3162 | 175.71 | Kirkland_Manholes-3160 | 174.95 | 166.9 | 0.46 | 8 | PVC | 0.01 | 476 | 13 | 45 | 58 | 12.2 | SM14-Ex-EX296 | |
| Kirkland_Main-3391 | Kirkland_Manholes-3161 | 177.36 | Kirkland_Manholes-3162 | 175.71 | 336.3 | 0.49 | 8 | PVC | 0.01 | 494 | 13 | 41 | 53 | 10.8 | SM14-Ex-EX296 | |
| Kirkland_Main-3392 | Kirkland_Manholes-3160 | 174.95 | Kirkland_Manholes-3163 | 173.85 | 309.7 | 0.36 | 8 | PVC | 0.01 | 420 | 53 | 179 | 232 | 55.2 | SM14-Ex-EX296 | |
| Kirkland_Main-3393 | Kirkland_Manholes-3163 | 173.85 | Kirkland_Manholes-3152 | 172.55 | 286.2 | 0.45 | 8 | PVC | 0.01 | 475 | 63 | 199 | 262 | 55.2 | SM14-Ex-EX296 | |
| Kirkland_Main-3394 | Kirkland_Manholes-2600 | 217.97 | Kirkland_Manholes-3163 | 173.85 | 279.5 | 15.78 | 8 | PVC | 0.01 | 2,801 | 9 | 16 | 25 | 0.9 | SM14-Ex-EX298 | |
| Kirkland_Main-3395 | Kirkland_Manholes-3152 | 172.55 | Kirkland_Manholes-3164 | 171.21 | 150.7 | 0.89 | 8 | PVC | 0.01 | 665 | 64 | 212 | 276 | 41.5 | SM14-Ex-EX296 | |
| Kirkland_Main-3397 | Kirkland_Manholes-3164 | 171.21 | Kirkland_Manholes-3153 | 166.34 | 136.7 | 3.56 | 8 | PVC | 0.01 | 1,331 | 72 | 228 | 300 | 22.5 | SM14-Ex-EX296 | |
| Kirkland_Main-3398 | Kirkland_Manholes-2123 | 164.83 | Kirkland_Manholes-3165 | 156.79 | 188.1 | 4.27 | 8 | PVC | 0.01 | 1,457 | 4 | 12 | 16 | 1.1 | SM14-Ex-EX238 | |
| Kirkland_Main-3399 | Kirkland_Manholes-2493 | 157.85 | Kirkland_Manholes-3165 | 156.79 | 186.1 | 0.57 | 8 | PVC | 0.01 | 532 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX237 | |
| Kirkland_Main-3400 | Kirkland_Manholes-3165 | 156.79 | O-34 | 148.75 | 44.4 | 18.12 | 8 | PVC | 0.01 | 3,001 | 5 | 20 | 26 | 0.9 | SM14-Ex-EX238 | |
| Kirkland_Main-3401 | Kirkland_Manholes-3151 | 154.6 | O-38 | 150 | 83 | 5.54 | 12 | PVC | 0.01 | 4,894 | 34 | 130 | 164 | 3.3 | SM14-Ex-EX313 | |
| Kirkland_Main-3402 | Kirkland_Manholes-3166 | 161.38 | Kirkland_Manholes-3167 | 157.21 | 249.9 | 1.67 | 6 | Concrete | 0.013 | 325 | 9 | 12 | 21 | 6.5 | | |
| Kirkland_Main-3403 | Kirkland_Manholes-3167 | 157.21 | O-30 | 156.87 | 20.3 | 1.67 | 6 | Concrete | 0.013 | 326 | 9 | 16 | 25 | 7.7 | | Drop Connection |
| Kirkland_Main-3404 | Kirkland_Manholes-2068 | 163.08 | O-43 | 162.02 | 20.5 | 5.16 | 8 | PVC | 0.01 | 1,602 | 15 | 65 | 80 | 5 | SM14-Ex-EX198 | |
| Kirkland_Main-3405 | Kirkland_Manholes-2069 | 170.43 | Kirkland_Manholes-3168 | 162.8 | 388.5 | 1.96 | 8 | PVC | 0.01 | 988 | 86 | 98 | 183 | 18.6 | SM14-Ex-EX199 | |
| Kirkland_Main-3406 | Kirkland_Manholes-3168 | 162.8 | O-29 | 162.02 | 22.8 | 3.42 | 8 | PVC | 0.01 | 1,305 | 87 | 102 | 189 | 14.5 | SM14-Ex-EX199 | |
| Kirkland_Main-3407 | Kirkland_Manholes-3169 | 153.32 | Kirkland_Manholes-1708 | 148.34 | 451.5 | 1.1 | 12 | PVC | 0.01 | 2,183 | 0 | 8 | 8 | 0.4 | SM14-Ex-EX197 | |
| Kirkland_Main-3408 | Kirkland_Manholes-3170 | 175.74 | O-28 | 173.9 | 72.2 | 2.55 | 8 | PVC | 0.01 | 1,125 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3409 | Kirkland_Manholes-1642 | 158.76 | O-27 | 153.59 | 147.5 | 3.5 | 12 | PVC | 0.01 | 3,891 | 292 | 973 | 1,264 | 32.5 | SM7 | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3410 | Kirkland_Manholes-1646 | 177.66 | O-23 | 163.59 | 79.6 | 17.67 | 8 | PVC | 0.01 | 2,963 | 0 | 4 | 4 | 0.1 | SM14-Ex-EX174 | |
| Kirkland_Main-3411 | Kirkland_Manholes-1602 | 196.74 | Kirkland_Manholes-3171 | 164.9 | 343.8 | 9.26 | 8 | PVC | 0.01 | 2,146 | 84 | 244 | 328 | 15.3 | SM14-Ex-EX172 | |
| Kirkland_Main-3412 | Kirkland_Manholes-3171 | 164.9 | O-22 | 163.59 | 29 | 4.51 | 12 | PVC | 0.01 | 4,416 | 150 | 431 | 581 | 13.2 | SM14-Ex-EX121 | |
| Kirkland_Main-3413 | Kirkland_Manholes-3172 | 165.73 | Kirkland_Manholes-3171 | 164.9 | 49.5 | 1.68 | 8 | PVC | 0.01 | 913 | 66 | 183 | 249 | 27.3 | SM14-Ex-EX121 | |
| Kirkland_Main-3414 | Kirkland_Manholes-1598 | 169.75 | Kirkland_Manholes-3172 | 165.73 | 259.8 | 1.55 | 8 | PVC | 0.01 | 877 | 66 | 179 | 245 | 27.9 | SM14-Ex-EX121 | |
| Kirkland_Main-3415 | Kirkland_Manholes-3173 | 155.95 | O-16 | 154.93 | 82 | 1.24 | 8 | PVC | 0.01 | 787 | 8 | 41 | 49 | 6.2 | | |
| Kirkland_Main-3416 | Kirkland_Manholes-1274 | 175.64 | Kirkland_Manholes-3173 | 155.95 | 196.1 | 10.04 | 8 | PVC | 0.01 | 2,234 | 7 | 33 | 40 | 1.8 | | |
| Kirkland_Main-3417 | Kirkland_Manholes-458 | 212.1 | O-14 | 173.22 | 270.2 | 14.39 | 8 | PVC | 0.01 | 2,674 | 35 | 126 | 161 | 6 | SM14-Ex-EX67 | |
| Kirkland_Main-3418 | Kirkland_Manholes-3174 | 172.82 | O-13 | 166.72 | 27.1 | 22.51 | 8 | PVC | 0.01 | 3,345 | 2 | 20 | 23 | 0.7 | | |
| Kirkland_Main-3419 | Kirkland_Manholes-472 | 192.62 | Kirkland_Manholes-3174 | 172.82 | 71.3 | 27.75 | 8 | PVC | 0.01 | 3,714 | 2 | 16 | 19 | 0.5 | | |
| Kirkland_Main-3420 | Kirkland_Manholes-466 | 159.47 | O-12 | 159.29 | 18.7 | 0.96 | 8 | PVC | 0.01 | 691 | 15 | 57 | 72 | 10.4 | SM14-Ex-EX45 | |
| Kirkland_Main-3421 | Kirkland_Manholes-786 | 173.41 | O-11 | 153.37 | 102.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 70 | 301 | 372 | 11.9 | | |
| Kirkland_Main-3422 | Kirkland_Manholes-3175 | 156.47 | Kirkland_Manholes-1105 | 155.49 | 245.4 | 0.4 | 12 | PVC | 0.01 | 1,315 | 125 | 286 | 411 | 31.3 | SM14-2021-DF3 | |
| Kirkland_Main-3424 | Kirkland_Manholes-3176 | 350.9 | Kirkland_Manholes-2993 | 335.98 | 232.3 | 6.42 | 8 | PVC | 0.01 | 1,787 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3425 | Kirkland_Manholes-3183 | 400.11 | Kirkland_Manholes-3182 | 398.7 | 286.4 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 4 | 0.8 | | |
| Kirkland_Main-3426 | Kirkland_Manholes-3182 | 398.7 | Kirkland_Manholes-3181 | 397.83 | 157.2 | 0.55 | 8 | PVC | 0.01 | 525 | 0 | 8 | 8 | 1.6 | | |
| Kirkland_Main-3427 | Kirkland_Manholes-3181 | 397.83 | Kirkland_Manholes-3180 | 396.32 | 304.9 | 0.5 | 8 | PVC | 0.01 | 496 | 0 | 12 | 13 | 2.5 | | |
| Kirkland_Main-3428 | Kirkland_Manholes-3177 | 399.25 | Kirkland_Manholes-3178 | 398.25 | 237 | 0.42 | 8 | PVC | 0.01 | 458 | 0 | 8 | 8 | 1.8 | | |
| Kirkland_Main-3429 | Kirkland_Manholes-3178 | 398.25 | Kirkland_Manholes-3179 | 397.18 | 174.5 | 0.61 | 8 | PVC | 0.01 | 552 | 0 | 12 | 12 | 2.2 | | |
| Kirkland_Main-3430 | Kirkland_Manholes-3179 | 397.18 | Kirkland_Manholes-3180 | 396.32 | 145.5 | 0.59 | 8 | PVC | 0.01 | 542 | 0 | 16 | 16 | 3 | | |
| Kirkland_Main-3431 | Kirkland_Manholes-3180 | 396.32 | Kirkland_Manholes-3186 | 394.01 | 374.3 | 0.62 | 8 | PVC | 0.01 | 554 | 1 | 33 | 33 | 6 | SM14-Ex-EX207 | |
| Kirkland_Main-3432 | Kirkland_Manholes-3186 | 394.01 | Kirkland_Manholes-3187 | 393.39 | 93.6 | 0.66 | 8 | PVC | 0.01 | 574 | 1 | 37 | 38 | 6.6 | SM14-Ex-EX207 | |
| Kirkland_Main-3433 | Kirkland_Manholes-3187 | 393.39 | Kirkland_Manholes-3188 | 392.16 | 246.3 | 0.5 | 8 | PVC | 0.01 | 498 | 1 | 41 | 42 | 8.4 | | |
| Kirkland_Main-3434 | Kirkland_Manholes-3185 | 403.06 | Kirkland_Manholes-3184 | 397.63 | 317.3 | 1.71 | 8 | PVC | 0.01 | 922 | 0 | 4 | 4 | 0.4 | | |
| Kirkland_Main-3435 | Kirkland_Manholes-3184 | 397.63 | Kirkland_Manholes-3189 | 393.42 | 318.2 | 1.32 | 8 | PVC | 0.01 | 811 | 37 | 8 | 45 | 5.5 | | |
| Kirkland_Main-3436 | Kirkland_Manholes-3189 | 393.42 | Kirkland_Manholes-3188 | 392.16 | 76.3 | 1.65 | 8 | PVC | 0.01 | 906 | 37 | 16 | 53 | 5.9 | | |
| Kirkland_Main-3437 | Kirkland_Manholes-3188 | 392.16 | Kirkland_Manholes-1929 | 374.67 | 305.2 | 5.73 | 8 | PVC | 0.01 | 1,688 | 38 | 61 | 99 | 5.9 | | |
| Kirkland_Main-3438 | Kirkland_Manholes-3192 | 307.27 | Kirkland_Manholes-3191 | 306.22 | 126.1 | 0.84 | 8 | PVC | 0.01 | 644 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-3439 | Kirkland_Manholes-3191 | 306.22 | Kirkland_Manholes-2894 | 306.1 | 28.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 12 | 14 | 3.2 | | |
| Kirkland_Main-3440 | Kirkland_Manholes-3190 | 323.62 | Kirkland_Manholes-3191 | 306.22 | 169.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3441 | Kirkland_Manholes-620 | 55.37 | Kirkland_Manholes-3193 | 49.78 | 279.6 | 2 | 8 | PVC | 0.01 | 997 | 0 | 8 | 8 | 0.8 | | |
| Kirkland_Main-3442 | Kirkland_Manholes-3193 | 49.78 | Kirkland_Manholes-619 | 48.43 | 193 | 0.7 | 8 | PVC | 0.01 | 590 | 0 | 16 | 17 | 2.8 | | |
| Kirkland_Main-3443 | Kirkland_Manholes-1685 | 57.24 | Kirkland_Manholes-731 | 53.54 | 120.6 | 3.07 | 12 | PVC | 0.01 | 3,640 | 100 | 457 | 557 | 15.3 | SM5 | |
| Kirkland_Main-3444 | Kirkland_Manholes-1852 | 284.97 | Kirkland_Manholes-3145 | 283.25 | 105.1 | 1.64 | 8 | PVC | 0.01 | 902 | 0 | 8 | 9 | 0.9 | | |
| Kirkland_Main-3445 | Kirkland_Manholes-2130 | 161.57 | O-31 | 156.67 | 31.5 | 15.55 | 8 | PVC | 0.01 | 2,780 | 23 | 24 | 48 | 1.7 | SM14-Ex-EX235 | |
| Kirkland_Main-3446 | Kirkland_Manholes-3195 | 259.3 | Kirkland_Manholes-682 | 258.64 | 178.4 | 0.37 | 8 | PVC | 0.01 | 429 | 1 | 12 | 13 | 3 | | |
| Kirkland_Main-3447 | Kirkland_Manholes-686 | 272.79 | Kirkland_Manholes-3195 | 262.73 | 170.3 | 5.91 | 8 | PVC | 0.01 | 1,714 | 0 | 4 | 4 | 0.3 | | Drop Connection |
| Kirkland_Main-3448 | Kirkland_Manholes-3194 | 260.3 | Kirkland_Manholes-3195 | 259.3 | 92.2 | 1.08 | 8 | PVC | 0.01 | 733 | 0 | 4 | 4 | 0.6 | | |
| Kirkland_Main-3450 | Kirkland_Manholes-3198 | 69.13 | Kirkland_Manholes-2805 | 68.41 | 178.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 24 | 24 | 5.5 | | |
| Kirkland_Main-3451 | Kirkland_Manholes-3197 | 131.57 | Kirkland_Manholes-3196 | 122.5 | 306.9 | 2.96 | 8 | PVC | 0.01 | 1,212 | 2 | 8 | 10 | 0.8 | SM10 | |
| Kirkland_Main-3453 | Kirkland_Manholes-2804 | 82.15 | Kirkland_Manholes-3198 | 69.13 | 175.8 | 7.41 | 8 | PVC | 0.01 | 1,919 | 0 | 6 | 6 | 0.3 | | |
| Kirkland_Main-3454 | Kirkland_Manholes-3200 | 88.54 | Kirkland_Manholes-3199 | 84.4 | 128.7 | 3.22 | 8 | PVC | 0.01 | 1,264 | 0 | 6 | 6 | 0.5 | | |
| Kirkland_Main-3455 | Kirkland_Manholes-3199 | 84.4 | Kirkland_Manholes-3198 | 69.13 | 210.2 | 7.27 | 8 | PVC | 0.01 | 1,900 | 0 | 12 | 12 | 0.6 | | |
| Kirkland_Main-3456 | Kirkland_Manholes-2778 | 255.64 | Kirkland_Manholes-3201 | 243.59 | 148 | 8.14 | 8 | PVC | 0.01 | 2,012 | 22 | 16 | 38 | 1.9 | | |
| Kirkland_Main-3457 | Kirkland_Manholes-3201 | 243.59 | Kirkland_Manholes-2802 | 238.36 | 22.3 | 23.44 | 8 | PVC | 0.01 | 3,414 | 22 | 19 | 40 | 1.2 | | |
| Kirkland_Main-3458 | Kirkland_Manholes-2641 | 88.89 | Kirkland_Manholes-3202 | 66.61 | 82.1 | 27.14 | 8 | PVC | 0.01 | 3,673 | 6 | 24 | 30 | 0.8 | | |
| Kirkland_Main-3459 | Kirkland_Manholes-3202 | 66.61 | Kirkland_Manholes-3203 | 49.55 | 127.5 | 13.38 | 8 | PVC | 0.01 | 2,579 | 6 | 31 | 36 | 1.4 | | |
| Kirkland_Main-3461 | Kirkland_Manholes-3204 | 163.55 | Kirkland_Manholes-2130 | 161.57 | 74.1 | 2.67 | 8 | PVC | 0.01 | 1,153 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3462 | Kirkland_Manholes-3205 | 293.32 | Kirkland_Manholes-1852 | 284.97 | 245.2 | 3.41 | 8 | PVC | 0.01 | 1,301 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3463 | Kirkland_Manholes-3206 | 505.9 | Kirkland_Manholes-3207 | 502.85 | 330.6 | 0.92 | 8 | PVC | 0.01 | 677 | 1 | 4 | 6 | 0.8 | | |
| Kirkland_Main-3464 | Kirkland_Manholes-3207 | 502.85 | Kirkland_Manholes-3208 | 497.69 | 398.8 | 1.29 | 8 | PVC | 0.01 | 802 | 3 | 8 | 11 | 1.4 | | |
| Kirkland_Main-3465 | Kirkland_Manholes-3208 | 497.69 | Kirkland_Manholes-3209 | 497.22 | 90.8 | 0.52 | 8 | PVC | 0.01 | 507 | 3 | 12 | 16 | 3.1 | | |
| Kirkland_Main-3466 | Kirkland_Manholes-3209 | 497.22 | Kirkland_Manholes-3210 | 496.11 | 223.1 | 0.5 | 8 | PVC | 0.01 | 497 | 4 | 16 | 20 | 4 | | |
| Kirkland_Main-3467 | Kirkland_Manholes-3210 | 496.11 | Kirkland_Manholes-1494 | 496.1 | 92 | 0.01 | 8 | PVC | 0.01 | 74 | 4 | 20 | 24 | 32.7 | | |
| Kirkland_Main-3468 | Kirkland_Manholes-3212 | 420.94 | Kirkland_Manholes-3213 | 419.82 | 168.4 | 0.66 | 8 | PVC | 0.01 | 575 | 0 | 3 | 3 | 0.6 | | |
| Kirkland_Main-3469 | Kirkland_Manholes-3213 | 419.82 | Kirkland_Manholes-3214 | 418.95 | 128.5 | 0.68 | 8 | PVC | 0.01 | 580 | 0 | 6 | 6 | 1.1 | | |
| Kirkland_Main-3470 | Kirkland_Manholes-3211 | 420.5 | Kirkland_Manholes-3214 | 418.95 | 223.1 | 0.69 | 8 | PVC | 0.01 | 588 | 0 | 3 | 3 | 0.6 | | |
| Kirkland_Main-3471 | Kirkland_Manholes-3214 | 418.95 | Kirkland_Manholes-3215 | 418.25 | 213.6 | 0.33 | 8 | PVC | 0.01 | 404 | 1 | 12 | 13 | 3.1 | | |
| Kirkland_Main-3472 | Kirkland_Manholes-3215 | 418.25 | Kirkland_Manholes-3216 | 416.2 | 334.1 | 0.61 | 8 | PVC | 0.01 | 552 | 1 | 15 | 16 | 2.8 | | |
| Kirkland_Main-3473 | Kirkland_Manholes-3216 | 416.2 | Kirkland_Manholes-3217 | 414.96 | 329.2 | 0.38 | 8 | PVC | 0.01 | 433 | 1 | 18 | 19 | 4.3 | | |
| Kirkland_Main-3474 | Kirkland_Manholes-3217 | 414.96 | Kirkland_Manholes-3218 | 412.9 | 114.1 | 1.81 | 8 | PVC | 0.01 | 947 | 2 | 21 | 23 | 2.4 | | |
| Kirkland_Main-3475 | Kirkland_Manholes-3218 | 412.9 | Kirkland_Manholes-2906 | 405.37 | 172.8 | 4.36 | 8 | PVC | 0.01 | 1,472 | 2 | 23 | 26 | 1.8 | | |

2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3476 | Kirkland_Manholes-718 | 150.12 | Kirkland_Manholes-3219 | 149.17 | 95.4 | 1 | 8 | PVC | 0.01 | 703 | 297 | 81 | 379 | 53.9 | SM14-2035-DF5 | |
| Kirkland_Main-3477 | Kirkland_Manholes-3219 | 149.17 | Kirkland_Manholes-3220 | 148.71 | 120.2 | 0.38 | 12 | PVC | 0.01 | 1,286 | 297 | 87 | 385 | 29.9 | SM14-2021-DF2 | |
| Kirkland_Main-3478 | Kirkland_Manholes-3220 | 148.71 | Kirkland_Manholes-719 | 148.45 | 82.3 | 0.32 | 12 | PVC | 0.01 | 1,168 | 297 | 93 | 390 | 33.4 | SM14-2021-DF2 | |
| Kirkland_Main-3479 | Kirkland_Manholes-3221 | 407.29 | Kirkland_Manholes-3222 | 405.15 | 69.7 | 3.07 | 8 | PVC | 0.01 | 1,235 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3480 | Kirkland_Manholes-3222 | 405.15 | Kirkland_Manholes-1363 | 403.55 | 104.8 | 1.53 | 8 | PVC | 0.01 | 871 | 3 | 8 | 11 | 1.3 | | |
| Kirkland_Main-3481 | Kirkland_Manholes-3223 | 405.2 | Kirkland_Manholes-3224 | 400.94 | 146.9 | 2.9 | 8 | PVC | 0.01 | 1,201 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3482 | Kirkland_Manholes-3225 | 409.6 | Kirkland_Manholes-3224 | 400.94 | 369 | 2.35 | 8 | PVC | 0.01 | 1,080 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3483 | Kirkland_Manholes-3224 | 400.94 | Kirkland_Manholes-3226 | 396.71 | 176 | 2.4 | 8 | PVC | 0.01 | 1,093 | 2 | 12 | 15 | 1.3 | | |
| Kirkland_Main-3484 | Kirkland_Manholes-3226 | 396.71 | Kirkland_Manholes-2992 | 396.35 | 10.8 | 3.34 | 8 | PVC | 0.01 | 1,289 | 2 | 16 | 19 | 1.4 | | |
| Kirkland_Main-3485 | Kirkland_Manholes-3227 | 308.86 | Kirkland_Manholes-3228 | 299.55 | 189.6 | 4.91 | 8 | PVC | 0.01 | 1,562 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3486 | Kirkland_Manholes-3228 | 299.55 | Kirkland_Manholes-3229 | 296.76 | 44.7 | 6.24 | 8 | PVC | 0.01 | 1,761 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-3487 | Kirkland_Manholes-3229 | 296.76 | Kirkland_Manholes-2901 | 294.77 | 63.1 | 3.16 | 8 | PVC | 0.01 | 1,252 | 1 | 12 | 13 | 1 | | |
| Kirkland_Main-3488 | Kirkland_Manholes-3230 | 157.83 | Kirkland_Manholes-3231 | 156.85 | 192.6 | 0.51 | 8 | PVC | 0.01 | 503 | 0 | 6 | 6 | 1.2 | | |
| Kirkland_Main-3489 | Kirkland_Manholes-3231 | 156.85 | Kirkland_Manholes-3232 | 156.12 | 91 | 0.8 | 8 | PVC | 0.01 | 632 | 8 | 12 | 20 | 3.2 | | |
| Kirkland_Main-3490 | Kirkland_Manholes-3232 | 156.12 | Kirkland_Manholes-716 | 152.58 | 36.4 | 9.73 | 8 | PVC | 0.01 | 2,199 | 8 | 17 | 26 | 1.2 | | |
| Kirkland_Main-3492 | Kirkland_Manholes-3233 | 197.29 | Kirkland_Manholes-1117 | 196.58 | 41.1 | 1.73 | 15 | PVC | 0.01 | 4,957 | 19 | 4 | 23 | 0.5 | | |
| Kirkland_Main-3493 | Kirkland_Manholes-3235 | 436.7 | Kirkland_Manholes-2008 | 435.7 | 179.8 | 0.56 | 8 | PVC | 0.01 | 526 | 3 | 8 | 11 | 2.1 | | |
| Kirkland_Main-3494 | Kirkland_Manholes-3234 | 236.42 | Kirkland_Manholes-1249 | 223.25 | 243.5 | 5.41 | 8 | PVC | 0.01 | 1,640 | 17 | 91 | 107 | 6.5 | SM14-Ex-EX65 | |
| Kirkland_Main-3495 | Kirkland_Manholes-1247 | 236.99 | Kirkland_Manholes-3234 | 236.42 | 76.3 | 0.75 | 8 | PVC | 0.01 | 609 | 15 | 74 | 89 | 14.6 | SM14-Ex-EX65 | |
| Kirkland_Main-3496 | Kirkland_Manholes-3237 | 442.96 | Kirkland_Manholes-3235 | 436.7 | 126.7 | 4.94 | 8 | PVC | 0.01 | 1,567 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3497 | Kirkland_Manholes-3242 | 314.11 | Kirkland_Manholes-3243 | 305.45 | 217.3 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 4 | 4 | 0.3 | | |
| Kirkland_Main-3498 | Kirkland_Manholes-3243 | 305.45 | Kirkland_Manholes-2372 | 304.48 | 24.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 0 | 8 | 8 | 0.6 | | |
| Kirkland_Main-3499 | Kirkland_Manholes-3241 | 300.47 | Kirkland_Manholes-3240 | 289.24 | 289.6 | 3.88 | 8 | PVC | 0.01 | 1,388 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3500 | Kirkland_Manholes-3240 | 289.24 | Kirkland_Manholes-3239 | 288.78 | 114.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.2 | | |
| Kirkland_Main-3501 | Kirkland_Manholes-3239 | 288.78 | Kirkland_Manholes-3238 | 285.43 | 95.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 2 | 12 | 14 | 1.1 | | |
| Kirkland_Main-3502 | Kirkland_Manholes-263 | 292.03 | Kirkland_Manholes-3238 | 285.43 | 114.2 | 5.78 | 8 | PVC | 0.01 | 1,695 | 33 | 102 | 135 | 7.9 | SM14-Ex-EX252 | |
| Kirkland_Main-3503 | Kirkland_Manholes-3238 | 285.43 | Kirkland_Manholes-2327 | 280.44 | 83.6 | 5.97 | 8 | PVC | 0.01 | 1,722 | 35 | 118 | 153 | 8.9 | SM14-Ex-EX252 | |
| Kirkland_Main-3505 | Kirkland_Manholes-3236 | 241.89 | Kirkland_Manholes-3234 | 236.42 | 154.2 | 3.55 | 8 | PVC | 0.01 | 1,328 | 2 | 8 | 10 | 0.7 | | |
| Kirkland_Main-3506 | Kirkland_Manholes-2486 | 152.49 | O-35 | 152.05 | 116.8 | 0.38 | 8 | PVC | 0.01 | 433 | 44 | 130 | 174 | 40.2 | SM14-Ex-EX239 | |
| Other_System_Main-6 | MH-320 | 399.28 | Kirkland_Manholes-3177 | 399.25 | 69.1 | 0.04 | 6 | PVC | 0.01 | 64 | 0 | 4 | 4 | 6.4 | | |
| Other_System_Main-7 | MH-317 | 393.56 | Kirkland_Manholes-3189 | 393.42 | 34.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Other_System_Main-8 | MH-326 | 162.67 | MH-323 | 161.73 | 233.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 4 | 0.9 | | |
| Other_System_Main-9 | MH-323 | 161.73 | Kirkland_Manholes-3166 | 161.38 | 88.4 | 0.4 | 6 | PVC | 0.01 | 207 | 9 | 8 | 17 | 8.2 | | |
| SS_Main_Selection_06-13-2016-1 | MH 05-714 | 24.7 | MH_Selection_06-13-2016-2 | 24.58 | 51.6 | 0.23 | 30 | Ductile Iron | 0.012 | 9,616 | 1,285 | 3,467 | 6,503 | 67.6 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-11 | MH_Selection_06-13-2016-4 | 21.4 | MH_Selection_06-13-2016-10 | 20.85 | 62.6 | 0.88 | 48 | Concrete | 0.013 | 60,432 | 1,610 | 4,085 | 7,446 | 12.3 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-12 | MH_Selection_06-13-2016-10 | 20.85 | MH_Selection_06-13-2016-11 | 20.7 | 78.4 | 0.19 | 48 | Concrete | 0.013 | 28,192 | 1,610 | 4,085 | 7,446 | 26.4 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-2 | MH_Selection_06-13-2016-3 | 22.2 | MH_Selection_06-13-2016-4 | 21.4 | 166.2 | 0.48 | 48 | Concrete | 0.013 | 44,726 | 1,285 | 3,467 | 6,503 | 14.5 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-3 | MH_Selection_06-13-2016-2 | 24.22 | MH_Selection_06-13-2016-6 | 24.16 | 7.3 | 0.82 | 30 | Ductile Iron | 0.012 | 18,021 | 1,285 | 3,467 | 6,503 | 36.1 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-4 | MH_Selection_06-13-2016-6 | 24.16 | MH_Selection_06-13-2016-7 | 23.6 | 28.1 | 1.99 | 30 | Ductile Iron | 0.012 | 28,152 | 1,285 | 3,467 | 6,503 | 23.1 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-5 | MH_Selection_06-13-2016-7 | 23.5 | MH_Selection_06-13-2016-8 | 22.81 | 32.8 | 2.11 | 48 | Concrete | 0.013 | 93,567 | 1,285 | 3,467 | 6,503 | 6.9 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-6 | MH_Selection_06-13-2016-8 | 22.81 | MH_Selection_06-13-2016-9 | 22.44 | 14.9 | 2.49 | 48 | Concrete | 0.013 | 101,749 | 1,285 | 3,467 | 6,503 | 6.4 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-7 | MH_Selection_06-13-2016-9 | 22.44 | MH_Selection_06-13-2016-3 | 22.2 | 69.4 | 0.35 | 48 | Concrete | 0.013 | 37,907 | 1,285 | 3,467 | 6,503 | 17.2 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-9 | MH_Selection_06-13-2016-5 | 24.55 | MH_Selection_06-13-2016-11 | 23.6 | 12.8 | 7.44 | 12 | PVC | 0.013 | 4,360.77 | 173.28 | 140.079 | 313.359 | 7.2 | | Updated per as-built drawings |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Pump Table

| Label | Status | Pump Definition | Pumped Flow (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|
| PLAZA_PUMP | On | LAKE PLAZA-Prop 1,400gpm | 1,400 | 48.2 | |
| ROSEPT_PUMP | On | ROSE PT LANE | 301 | 65.8 | |
| SOUTHBAY_PUMP | On | SOUTH BAY | 180 | 190.0 | |
| TREND_PUMP | On | TREND | 176 | 25.0 | |
| WAVERLY_PUMP | On | WAVERLY PARK-Prop 350gpm | 350 | 116.1 | |
| YARROWBAYII_PUMP | On | YARROW POINT | 72 | 45.8 | |

## 2021 (6-year) with Proposed Improvements - Peak Hour Flow - Wet Well Table

| Label | Ground Elevation (ft) | Maximum Elevation (ft) | Initial Elevation (ft) | Minimum Elevation (ft) | Base Elevation (ft) | Flow In (gpm) | Flow Out (gpm) | Net Flow In (gpm) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| PLAZA_WW | 21.95 | 10 | 6.5 | 2 | 0 | 1,372 | 1,400 | -29 | |
| ROSEPT_WETWELL | 28.91 | 28 | 12 | 11 | 10 | 145 | 301 | -156 | |
| SOUTHBAY_WETWELL | 42.96 | 26.5 | 25 | 24 | 22 | 41 | 180 | -139 | |
| TREND_WETWELL | 340.3 | 330 | 330 | 321.5 | 317.75 | 105 | 176 | -71 | |
| WAVERLY_WETWELL | 27 | 10 | 2 | 1 | 0 | 326 | 350 | -25 | |
| YARROW POINT_WETWELL | 32.18 | 20 | 8 | 6 | 6 | 60 | 72 | -12 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin 3 | Kirkland_Manholes-3128 | 323.94 | Kirkland_Manholes-3129 | 308.71 | 343.2 | 4.44 | 8 | PVC | 0.01 | 1,485 | 3 | 9 | 12 | 0.8 | | |
| CO-1 | Kirkland_Manholes-293 | 22.09 | Kirkland_Manholes-310 | 21.69 | 516.5 | 0.08 | 12 | PVC | 0.01 | 578 | 1 | 18 | 19 | 3.3 | SM14-Ex-EX37 | |
| CO-2 | Kirkland_Manholes-310 | 21.69 | Kirkland_Manholes-311 | 21.29 | 254.7 | 0.16 | 12 | PVC | 0.01 | 824 | 4 | 27 | 31 | 3.7 | SM14-Ex-EX37 | |
| CO-6 | Kirkland_Manholes-1496 | 491.57 | Kirkland_Manholes-1461 | 483.24 | 408.5 | 2.04 | 8 | PVC | 0.01 | 1,007 | 0 | 4 | 5 | 0.5 | | |
| CO-8 | Kirkland_Manholes-1271 | 222.62 | Kirkland_Manholes-1272 | 197.83 | 531.9 | 4.66 | 8 | PVC | 0.01 | 1,522 | 1 | 8 | 9 | 0.6 | | |
| CO-9 | Kirkland_Manholes-1272 | 197.83 | Kirkland_Manholes-1273 | 182.86 | 225.5 | 6.64 | 8 | PVC | 0.01 | 1,817 | 5 | 17 | 22 | 1.2 | | |
| CO-11 | Kirkland_Manholes-3102 | 53.77 | Kirkland_Manholes-2664 | 53.2 | 380.4 | 0.15 | 18 | PVC | 0.01 | 2,372 | 212 | 409 | 621 | 26.2 | SM14-Ex-EX222 | |
| CO-13 | Kirkland_Manholes-2664 | 53.2 | Kirkland_Manholes-2204 | 53 | 65.8 | 0.3 | 18 | PVC | 0.01 | 3,378 | 213 | 415 | 628 | 18.6 | SM14-Ex-EX222 | |
| CO-14 | Kirkland_Manholes-2204 | 53 | Kirkland_Manholes-3101 | 52.44 | 123.2 | 0.45 | 18 | PVC | 0.01 | 4,132 | 220 | 433 | 653 | 15.8 | SM14-Ex-EX222 | |
| CO-15 | Kirkland_Manholes-978 | 222.9 | Kirkland_Manholes-979 | 219.9 | 335.8 | 0.89 | 8 | PVC | 0.01 | 666 | 14 | 54 | 67 | 10.1 | | |
| CO-17 | Kirkland_Manholes-979 | 219.9 | MH-327 | 219.64 | 97.4 | 0.27 | 8 | PVC | 0.01 | 364 | 14 | 58 | 72 | 19.9 | | |
| CO-18 | MH-327 | 219.64 | Kirkland_Manholes-980 | 219.4 | 90.3 | 0.27 | 8 | PVC | 0.01 | 364 | 19 | 67 | 86 | 23.7 | | |
| CO-19 | Kirkland_Manholes-1011 | 226.35 | MH-327 | 219.64 | 167.6 | 4 | 8 | PVC | 0.01 | 1,411 | 5 | 4 | 9 | 0.7 | | |
| CO-20 | Kirkland_Manholes-1907 | 380.32 | Kirkland_Manholes-1909 | 380 | 67.5 | 0.47 | 8 | PVC | 0.01 | 485 | 20 | 13 | 33 | 6.9 | | |
| CO-21 | Kirkland_Manholes-1909 | 380 | Kirkland_Manholes-1366 | 377.95 | 352.1 | 0.58 | 8 | PVC | 0.01 | 538 | 56 | 82 | 138 | 25.6 | | |
| CO-22 | Kirkland_Manholes-638 | 236.51 | Kirkland_Manholes-637 | 235.38 | 223.4 | 0.51 | 21 | PVC | 0.01 | 6,576 | 696 | 1,657 | 2,353 | 35.8 | | |
| CO-23 | Kirkland_Manholes-637 | 235.38 | Kirkland_Manholes-633 | 234.78 | 246.2 | 0.24 | 21 | PVC | 0.01 | 4,564 | 701 | 1,661 | 2,363 | 51.8 | | |
| CO-25 | Kirkland_Manholes-2644 | 74.88 | Kirkland_Manholes-2655 | 44.22 | 203.4 | 15.07 | 8 | PVC | 0.01 | 2,737 | 27 | 74 | 102 | 3.7 | | |
| CO-26 | Kirkland_Manholes-2642 | 102.55 | MH-328 | 82.65 | 111.2 | 17.89 | 8 | PVC | 0.01 | 2,982 | 4 | 12 | 16 | 0.5 | | |
| CO-27 | MH-328 | 82.65 | Kirkland_Manholes-2644 | 74.88 | 76.8 | 10.12 | 8 | PVC | 0.01 | 2,242 | 11 | 31 | 42 | 1.9 | | |
| CO-28 | Kirkland_Manholes-3144 | 94.3 | Kirkland_Manholes-3143 | 93.65 | 162.7 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 6 | 10 | 2.3 | SM14-Ex-EX293 | |
| CO-29 | Kirkland_Manholes-3143 | 93.65 | MH-328 | 82.65 | 108.8 | 10.11 | 8 | PVC | 0.01 | 2,242 | 6 | 12 | 18 | 0.8 | SM14-Ex-EX293 | |
| CO-30 | Kirkland_Manholes-2662 | 11.52 | Kirkland_Manholes-2661 | 11.28 | 48.5 | 0.49 | 18 | PVC | 0.01 | 4,311 | 372 | 613 | 985 | 22.9 | SM14-Ex-EX289 | |
| CO-31 | Kirkland_Manholes-2661 | 11.28 | Kirkland_Manholes-2851 | 10.8 | 93.8 | 0.51 | 18 | PVC | 0.01 | 4,385 | 433 | 793 | 1,226 | 28 | SM14-Ex-EX289 | |
| CO-32 | Kirkland_Manholes-3203 | 49.55 | Kirkland_Manholes-2660 | 26.87 | 244.8 | 9.27 | 8 | PVC | 0.01 | 2,146 | 14 | 37 | 51 | 2.4 | | |
| CO-33 | Kirkland_Manholes-2660 | 26.87 | Kirkland_Manholes-2661 | 11.28 | 44 | 35.46 | 8 | PVC | 0.01 | 4,198 | 60 | 173 | 233 | 5.6 | | |
| CO-34 | Kirkland_Manholes-2221 | 60.29 | Kirkland_Manholes-2225 | 40.46 | 244.8 | 8.1 | 8 | PVC | 0.01 | 2,007 | 13 | 52 | 65 | 3.3 | | |
| CO-35 | Kirkland_Manholes-2225 | 40.46 | Kirkland_Manholes-2228 | 25 | 165.9 | 9.32 | 8 | PVC | 0.01 | 2,152 | 22 | 72 | 93 | 4.3 | | Drop Connection |
| CO-36 | Kirkland_Manholes-2081 | 95.66 | Kirkland_Manholes-2218 | 82.71 | 188.1 | 6.88 | 8 | PVC | 0.01 | 1,850 | 1 | 7 | 7 | 0.4 | | |
| CO-37 | Kirkland_Manholes-2218 | 82.71 | Kirkland_Manholes-2221 | 60.29 | 246.5 | 9.1 | 8 | PVC | 0.01 | 2,126 | 9 | 26 | 35 | 1.6 | | |
| CO-38 | Kirkland_Manholes-2227 | 45.3 | Kirkland_Manholes-2226 | 43.3 | 93.8 | 2.13 | 8 | PVC | 0.01 | 1,029 | 3 | 7 | 9 | 0.9 | | |
| CO-39 | Kirkland_Manholes-2226 | 43.3 | Kirkland_Manholes-2225 | 40.46 | 248.3 | 1.14 | 8 | PVC | 0.01 | 754 | 7 | 13 | 20 | 2.7 | | |
| CO-41 | Kirkland_Manholes-1046 | 162.86 | Kirkland_Manholes-3175 | 156.47 | 218.7 | 2.92 | 8 | PVC | 0.01 | 1,205 | 151 | 290 | 441 | 36.6 | | |
| CO-42 | Kirkland_Manholes-1043 | 180.32 | Kirkland_Manholes-3126 | 177.5 | 189.3 | 1.49 | 8 | PVC | 0.01 | 861 | 42 | 103 | 144 | 16.8 | | |
| CO-43 | Kirkland_Manholes-3126 | 177.5 | Kirkland_Manholes-1046 | 162.86 | 197.5 | 7.41 | 8 | PVC | 0.01 | 1,920 | 45 | 116 | 161 | 8.4 | | |
| CO-44 | Kirkland_Manholes-61 | 205.17 | Kirkland_Manholes-64 | 204.5 | 110.3 | 0.61 | 8 | PVC | 0.01 | 550 | 11 | 31 | 42 | 7.7 | SM14-Ex-EX6 | |
| CO-45 | Kirkland_Manholes-64 | 204.5 | Kirkland_Manholes-65 | 199.61 | 323.5 | 1.51 | 8 | PVC | 0.01 | 867 | 14 | 36 | 49 | 5.7 | SM14-Ex-EX6 | |
| CO-47 | Kirkland_Manholes-2410 | 409.57 | Kirkland_Manholes-2408 | 405.44 | 108.3 | 3.82 | 8 | PVC | 0.01 | 1,377 | 1 | 4 | 5 | 0.4 | | |
| CO-48 | Kirkland_Manholes-2135 | 110 | Kirkland_Manholes-2156 | 109.44 | 35 | 1.6 | 8 | PVC | 0.01 | 892 | 10 | 33 | 42 | 4.7 | | |
| CO-49 | Kirkland_Manholes-2156 | 109.44 | Kirkland_Manholes-2157 | 100.18 | 171 | 5.42 | 8 | PVC | 0.01 | 1,641 | 10 | 39 | 49 | 3 | | |
| CO-50 | Kirkland_Manholes-2190 | 132.39 | Kirkland_Manholes-2189 | 112.21 | 288.2 | 7 | 8 | PVC | 0.01 | 1,866 | 9 | 25 | 33 | 1.8 | | |
| CO-51 | Kirkland_Manholes-2189 | 112.21 | Kirkland_Manholes-2186 | 104.5 | 321.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 15 | 33 | 48 | 4.4 | | |
| CO-52 | Kirkland_Manholes-2169 | 142.85 | Kirkland_Manholes-2168 | 127.32 | 219.5 | 7.07 | 8 | PVC | 0.01 | 1,875 | 3 | 17 | 19 | 1 | SM14-Ex-EX193 | |
| CO-53 | Kirkland_Manholes-2168 | 127.32 | Kirkland_Manholes-2167 | 120.69 | 65.4 | 10.14 | 8 | PVC | 0.01 | 2,245 | 4 | 25 | 29 | 1.3 | SM14-Ex-EX193 | |
| CO-54 | Kirkland_Manholes-2165 | 94.99 | Kirkland_Manholes-2164 | 90.37 | 91.4 | 5.05 | 8 | PVC | 0.01 | 1,585 | 13 | 50 | 62 | 3.9 | | |
| CO-55 | Kirkland_Manholes-2164 | 90.37 | Kirkland_Manholes-2140 | 88.47 | 43.9 | 4.33 | 8 | PVC | 0.01 | 1,468 | 14 | 58 | 72 | 4.9 | | |
| CO-56 | Kirkland_Manholes-1703 | 58 | Kirkland_Manholes-1704 | 54.53 | 111.1 | 3.12 | 8 | PVC | 0.01 | 1,246 | 7 | 17 | 24 | 1.9 | SM14-Ex-EX153 | |
| CO-57 | Kirkland_Manholes-1704 | 54.53 | Kirkland_Manholes-1705 | 33.28 | 211.8 | 10.03 | 8 | PVC | 0.01 | 2,233 | 8 | 25 | 32 | 1.5 | SM14-Ex-EX153 | |
| CO-58 | Kirkland_Manholes-1810 | 85.96 | Kirkland_Manholes-1808 | 66.8 | 280.2 | 6.84 | 8 | PVC | 0.01 | 1,844 | 97 | 287 | 384 | 20.8 | SM4 | |
| CO-59 | Kirkland_Manholes-1808 | 66.8 | Kirkland_Manholes-1807 | 44.26 | 183.9 | 12.26 | 8 | PVC | 0.01 | 2,469 | 98 | 295 | 394 | 16 | SM4 | |
| CO-60 | Kirkland_Manholes-1718 | 72.96 | Kirkland_Manholes-1717 | 58.55 | 301.8 | 4.77 | 8 | PVC | 0.01 | 1,541 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX165 | |
| CO-61 | Kirkland_Manholes-1717 | 58.55 | Kirkland_Manholes-1719 | 46.02 | 243.6 | 5.14 | 8 | PVC | 0.01 | 1,599 | 33 | 50 | 83 | 5.2 | SM14-Ex-EX165 | |
| CO-62 | Kirkland_Manholes-1605 | 146.86 | Kirkland_Manholes-1606 | 138.24 | 64.3 | 13.41 | 8 | PVC | 0.01 | 2,582 | 1 | 8 | 9 | 0.3 | SM14-Ex-EX120 | |
| CO-63 | Kirkland_Manholes-1606 | 138.24 | Kirkland_Manholes-1604 | 117.22 | 209.3 | 10.04 | 8 | PVC | 0.01 | 2,234 | 1 | 17 | 18 | 0.8 | SM14-Ex-EX120 | |
| CO-64 | Kirkland_Manholes-3029 | 503.06 | Kirkland_Manholes-1462 | 498.98 | 186.9 | 2.18 | 8 | PVC | 0.01 | 1,042 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX273 | |
| CO-66 | Kirkland_Manholes-1468 | 502.5 | Kirkland_Manholes-1462 | 498.98 | 381.4 | 0.92 | 8 | PVC | 0.01 | 677 | 3 | 4 | 7 | 1 | SM14-Ex-EX271 | |
| CO-67 | Kirkland_Manholes-1462 | 498.98 | Kirkland_Manholes-1463 | 498.43 | 46.4 | 1.18 | 8 | PVC | 0.01 | 767 | 6 | 13 | 19 | 2.5 | SM14-Ex-EX271 | |
| CO-69 | Kirkland_Manholes-1251 | 198.9 | Kirkland_Manholes-1252 | 181.71 | 334.6 | 5.14 | 8 | PVC | 0.01 | 1,598 | 45 | 157 | 202 | 12.6 | SM14-Ex-EX101 | |
| CO-70 | Kirkland_Manholes-1250 | 210.15 | Kirkland_Manholes-1251 | 198.9 | 400 | 2.81 | 8 | PVC | 0.01 | 1,182 | 36 | 140 | 176 | 14.9 | SM14-Ex-EX101 | |
| CO-71 | Kirkland_Manholes-1310 | 231.57 | Kirkland_Manholes-1251 | 198.9 | 267.1 | 12.23 | 8 | PVC | 0.01 | 2,466 | 4 | 8 | 12 | 0.5 | SM14-Ex-EX99 | |
| CO-72 | Kirkland_Manholes-230 | 172.81 | Kirkland_Manholes-228 | 142.32 | 167.5 | 18.2 | 8 | PVC | 0.01 | 3,008 | 57 | 125 | 182 | 6.1 | | |
| CO-73 | Kirkland_Manholes-3115 | 187.58 | Kirkland_Manholes-228 | 142.32 | 414 | 10.93 | 8 | PVC | 0.01 | 2,331 | 3 | 4 | 7 | 0.3 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-74 | Kirkland_Manholes-1287 | 140.18 | Kirkland_Manholes-1288 | 139.29 | 58.2 | 1.53 | 8 | PVC | 0.01 | 872 | 46 | 165 | 211 | 24.2 | SM14-Ex-EX105 | |
| CO-75 | Kirkland_Manholes-1288 | 139.29 | Kirkland_Manholes-1289 | 131.61 | 344.5 | 2.23 | 8 | PVC | 0.01 | 1,053 | 51 | 173 | 224 | 21.3 | SM14-Ex-EX105 | |
| CO-77 | Kirkland_Manholes-1255 | 163.1 | Kirkland_Manholes-1256 | 151.53 | 106.9 | 10.82 | 8 | PVC | 0.01 | 2,319 | 7 | 33 | 40 | 1.7 | SM14-Ex-EX104 | |
| CO-78 | Kirkland_Manholes-1253 | 189.17 | MH-329 | 183.73 | 57.5 | 9.46 | 8 | PVC | 0.01 | 2,169 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX104 | |
| CO-80 | Kirkland_Manholes-1254 | 186 | MH-329 | 183.73 | 30.2 | 7.52 | 8 | PVC | 0.01 | 1,934 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX104 | |
| CO-81 | MH-329 | 183.73 | Kirkland_Manholes-1255 | 163.1 | 274.1 | 7.53 | 8 | PVC | 0.01 | 1,934 | 5 | 25 | 30 | 1.5 | SM14-Ex-EX104 | |
| CO-83 | Kirkland_Manholes-279 | 76.14 | Kirkland_Manholes-278 | 56.62 | 239.7 | 8.14 | 8 | PVC | 0.01 | 2,012 | 33 | 6 | 39 | 1.9 | SM10 | |
| CO-84 | Kirkland_Manholes-271 | 91.78 | Kirkland_Manholes-272 | 84 | 313.5 | 2.48 | 8 | PVC | 0.01 | 1,111 | 64 | 136 | 200 | 18 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| CO-85 | Kirkland_Manholes-272 | 84 | Kirkland_Manholes-273 | 69.52 | 161.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 67 | 140 | 207 | 9.8 | SM10 | |
| CO-89 | Kirkland_Manholes-1221 | 265 | Kirkland_Manholes-1210 | 257.02 | 313.6 | 2.54 | 8 | PVC | 0.01 | 1,125 | 6 | 15 | 21 | 1.8 | SM14-Ex-EX90 | |
| CO-90 | Kirkland_Manholes-1208 | 237.71 | Kirkland_Manholes-1207 | 214.35 | 271 | 8.62 | 8 | PVC | 0.01 | 2,070 | 16 | 39 | 56 | 2.7 | SM14-Ex-EX90 | |
| CO-91 | Kirkland_Manholes-1207 | 214.35 | Kirkland_Manholes-1206 | 193.92 | 362.6 | 5.63 | 8 | PVC | 0.01 | 1,673 | 20 | 48 | 68 | 4.1 | SM14-Ex-EX90 | |
| CO-92 | Kirkland_Manholes-1142 | 218.06 | Kirkland_Manholes-1146 | 215.3 | 316.4 | 0.87 | 8 | PVC | 0.01 | 659 | 12 | 33 | 45 | 6.9 | SM4 | |
| CO-93 | Kirkland_Manholes-1223 | 241.1 | Kirkland_Manholes-1146 | 215.3 | 349.8 | 7.38 | 8 | PVC | 0.01 | 1,915 | 4 | 8 | 12 | 0.6 | SM14-Ex-EX86 | |
| CO-94 | Kirkland_Manholes-1199 | 190.02 | Kirkland_Manholes-1198 | 189.72 | 153.8 | 0.19 | 8 | PVC | 0.01 | 311 | 13 | 8 | 21 | 6.7 | SM14-Ex-EX80 | |
| CO-95 | Kirkland_Manholes-1141 | 204.1 | Kirkland_Manholes-1198 | 189.72 | 107.3 | 13.4 | 8 | PVC | 0.01 | 2,581 | 8 | 33 | 41 | 1.6 | SM14-Ex-EX80 | |
| CO-96 | Kirkland_Manholes-3104 | 114.41 | Kirkland_Manholes-3103 | 113.84 | 31.2 | 1.83 | 8 | PVC | 0.01 | 953 | 26 | 107 | 133 | 14 | SM10 | |
| CO-97 | Kirkland_Manholes-517 | 138.64 | Kirkland_Manholes-3103 | 113.84 | 358.5 | 6.92 | 8 | PVC | 0.01 | 1,854 | 2 | 8 | 10 | 0.5 | SM10 | |
| CO-98 | Kirkland_Manholes-3196 | 122.5 | Kirkland_Manholes-503 | 118 | 198.4 | 2.27 | 8 | PVC | 0.01 | 1,062 | 5 | 17 | 21 | 2 | SM10 | |
| CO-100 | Kirkland_Manholes-503 | 118 | Kirkland_Manholes-504 | 108.24 | 276.3 | 3.53 | 8 | PVC | 0.01 | 1,325 | 6 | 25 | 31 | 2.3 | SM14-Ex-EX78 | |
| CO-101 | Kirkland_Manholes-504 | 108.24 | Kirkland_Manholes-510 | 78.8 | 269.3 | 10.93 | 8 | PVC | 0.01 | 2,331 | 8 | 33 | 41 | 1.8 | SM14-Ex-EX78 | |
| CO-102 | Kirkland_Manholes-2573 | 298.95 | Kirkland_Manholes-2572 | 298.88 | 17.9 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 17 | 21 | 4.7 | | |
| CO-103 | Kirkland_Manholes-2959 | 355.76 | Kirkland_Manholes-2572 | 298.88 | 327.6 | 17.36 | 8 | PVC | 0.01 | 2,938 | 2 | 4 | 6 | 0.2 | | |
| CO-104 | Kirkland_Manholes-2783 | 269.77 | Kirkland_Manholes-2784 | 262.56 | 166.7 | 4.32 | 8 | PVC | 0.01 | 1,466 | 10 | 43 | 53 | 3.6 | | |
| CO-105 | Kirkland_Manholes-2578 | 278.46 | Kirkland_Manholes-2783 | 269.77 | 170.6 | 5.09 | 8 | PVC | 0.01 | 1,591 | 9 | 39 | 48 | 3 | | |
| CO-106 | Kirkland_Manholes-2921 | 73.76 | Kirkland_Manholes-2920 | 63.77 | 70.3 | 14.2 | 8 | PVC | 0.01 | 2,657 | 7 | 18 | 24 | 0.9 | | |
| CO-107 | Kirkland_Manholes-2920 | 63.77 | Kirkland_Manholes-177 | 35.5 | 126.7 | 22.31 | 8 | | 0.012 | 2,775 | 8 | 22 | 30 | 1.1 | | |
| CO-109 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1221 | 265 | 237.1 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 6 | 9 | 2 | SM14-Ex-EX90 | |
| CO-110 | Kirkland_Manholes-2686 | 221.84 | Kirkland_Manholes-2690 | 217.58 | 240.3 | 1.77 | 8 | PVC | 0.01 | 939 | 14 | 34 | 49 | 5.2 | SM14-Ex-EX201 | |
| CO-111 | Kirkland_Manholes-2690 | 217.58 | Kirkland_Manholes-2691 | 211.09 | 233.1 | 2.78 | 8 | PVC | 0.01 | 1,176 | 16 | 39 | 54 | 4.6 | SM14-Ex-EX201 | |
| CO-112 | Kirkland_Manholes-2612 | 250.12 | Kirkland_Manholes-2613 | 203.91 | 357.8 | 12.91 | 8 | PVC | 0.01 | 2,534 | 5 | 9 | 13 | 0.5 | SM14-Ex-EX297 | |
| CO-113 | Kirkland_Manholes-2613 | 203.91 | Kirkland_Manholes-3164 | 171.21 | 256.4 | 12.76 | 8 | PVC | 0.01 | 2,518 | 8 | 13 | 21 | 0.8 | SM14-Ex-EX297 | |
| CO-114 | Kirkland_Manholes-488 | 256.69 | Kirkland_Manholes-489 | 206.41 | 218.5 | 23.01 | 8 | PVC | 0.01 | 3,382 | 2 | 4 | 6 | 0.2 | | |
| CO-115 | Kirkland_Manholes-834 | 245.56 | Kirkland_Manholes-489 | 206.41 | 278.5 | 14.06 | 8 | PVC | 0.01 | 2,644 | 2 | 4 | 7 | 0.2 | | |
| CO-116 | Kirkland_Manholes-599 | 92.8 | Kirkland_Manholes-600 | 91.95 | 330.6 | 0.26 | 8 | PVC | 0.01 | 357 | 16 | 17 | 33 | 9.2 | SM14-Ex-EX160 | |
| CO-120 | Kirkland_Manholes-601 | 92.05 | Kirkland_Manholes-602 | 90.22 | 280.5 | 0.65 | 8 | PVC | 0.01 | 569 | 13 | 17 | 29 | 5.2 | SM14-Ex-EX160 | |
| CO-123 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-604 | 92.41 | 322.7 | 0.77 | 8 | PVC | 0.01 | 618 | 3 | 4 | 7 | 1.1 | SM14-Ex-EX160 | |
| CO-124 | Kirkland_Manholes-594 | 105.16 | Kirkland_Manholes-595 | 103.44 | 177 | 0.97 | 12 | PVC | 0.01 | 2,049 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX116 | |
| CO-125 | MH-321 | 218.02 | MH-322 | 217.7 | 80.6 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | |
| CO-126 | MH-322 | 217.7 | Kirkland_Manholes-2446 | 217.36 | 85 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.6 | | |
| CO-127 | MH-315 | 235.18 | MH-316 | 235.06 | 29.4 | 0.41 | 6 | Concrete | 0.013 | 161 | 1 | 4 | 5 | 3.4 | | |
| CO-128 | MH-316 | 235.06 | Kirkland_Manholes-2602 | 234.19 | 216.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 9 | 11 | 2.4 | SM14-Ex-EX300 | |
| CO-130 | MH-330 | 93.13 | Kirkland_Manholes-601 | 92.05 | 270.2 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 8 | 9 | 2.1 | SM14-Ex-EX160 | |
| CO-133 | Kirkland_Manholes-2269 | 398.2 | Kirkland_Manholes-2266 | 392.8 | 346.8 | 1.56 | 8 | PVC | 0.01 | 880 | 31 | 112 | 143 | 16.3 | SM14-Ex-EX261 | |
| CO-139 | Kirkland_Manholes-2703 | 250.19 | MH-333 | 250.73 | 32.9 | 1.64 | 8 | PVC | 0.01 | 904 | 4 | 13 | 17 | 1.9 | | |
| CO-140 | MH-333 | 250.73 | MH-334 | 252.1 | 150.3 | 0.91 | 8 | PVC | 0.01 | 673 | 3 | 9 | 11 | 1.7 | | |
| CO-141 | MH-334 | 252.1 | MH-335 | 253.55 | 221.6 | 0.65 | 8 | PVC | 0.01 | 570 | 1 | 4 | 5 | 1 | | |
| CO-142 | Kirkland_Manholes-2881 | 265.95 | Kirkland_Manholes-1214 | 261.31 | 224.5 | 2.07 | 8 | PVC | 0.01 | 1,013 | 3 | 6 | 9 | 0.9 | SM14-Ex-EX90 | |
| CO-143 | Kirkland_Manholes-2593 | 284.96 | Kirkland_Manholes-2604 | 283.17 | 324.7 | 0.55 | 8 | PVC | 0.01 | 524 | 35 | 99 | 0 | 0 | SM14-Ex-EX299 | |
| CO-148 | Kirkland_Manholes-603 | 94.89 | Kirkland_Manholes-602 | 90.22 | 228.3 | 2.05 | 8 | PVC | 0.01 | 1,008 | 3 | 4 | 7 | 0.7 | SM14-Ex-EX160 | |
| CO-149 | MH-336 | 98.65 | Kirkland_Manholes-276 | 92.16 | 227.3 | 2.86 | 8 | PVC | 0.01 | 1,191 | 0 | 3 | 4 | 0.3 | SM10 | |
| CO-150 | MH-337 | 92.45 | Kirkland_Manholes-279 | 76.14 | 213.9 | 7.63 | 8 | PVC | 0.01 | 1,947 | 0 | 3 | 4 | 0.2 | SM10 | |
| CO-151 | MH-338 | 119.57 | Kirkland_Manholes-308 | 114.39 | 316.2 | 1.64 | 8 | PVC | 0.01 | 902 | 0 | 9 | 9 | 1 | SM10 | |
| CO-152 | MH-339 | 159.67 | Kirkland_Manholes-524 | 157.52 | 274.1 | 0.78 | 8 | PVC | 0.01 | 624 | 0 | 8 | 9 | 1.4 | SM10 | |
| CO-154 | MH_Selection_06-13-2016-11 | 20.6 | O-26 | 20.25 | 45 | 0.78 | 48 | Concrete | 0.013 | 56,862 | 2,122 | 4,233 | 8,107 | 14.3 | | Updated per as-built drawings |
| KC_Main-2 | KC_Manholes-18 | 10.29 | KC_Manholes-19 | 10.24 | 10.1 | 0.5 | 24 | PVC | 0.01 | 9,299 | 1,028 | 2,069 | 3,169 | 34.1 | SM14-Ex-EX289 | |
| KC_Main-28 | KC_Manholes-19 | 10.24 | O-6 | 10 | 47.9 | 0.5 | 24 | PVC | 0.01 | 9,344 | 1,084 | 2,075 | 3,231 | 34.6 | SM14-Ex-EX289 | |
| Kirkland_Main-1 | Kirkland_Manholes-2 | 142.59 | Kirkland_Manholes-3 | 141.09 | 316.3 | 0.47 | 8 | PVC | 0.01 | 486 | 0 | 1 | 2 | 0.3 | | |
| Kirkland_Main-2 | Kirkland_Manholes-4 | 139.47 | Kirkland_Manholes-5 | 138.65 | 146.8 | 0.56 | 8 | PVC | 0.01 | 527 | 16 | 4 | 21 | 3.9 | | |
| Kirkland_Main-3 | Kirkland_Manholes-3 | 141.09 | Kirkland_Manholes-4 | 139.47 | 325.9 | 0.5 | 8 | PVC | 0.01 | 497 | 16 | 3 | 19 | 3.8 | | |
| Kirkland_Main-4 | Kirkland_Manholes-6 | 127.8 | Kirkland_Manholes-7 | 127.07 | 145 | 0.5 | 8 | PVC | 0.01 | 500 | 17 | 7 | 25 | 4.9 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-5 | Kirkland_Manholes-5 | 138.65 | Kirkland_Manholes-6 | 127.8 | 166.2 | 6.53 | 8 | PVC | 0.01 | 1,801 | 17 | 6 | 23 | 1.3 | | |
| Kirkland_Main-6 | Kirkland_Manholes-8 | 108.29 | Kirkland_Manholes-9 | 99.39 | 204.3 | 4.36 | 8 | PVC | 0.01 | 1,471 | 19 | 12 | 31 | 2.1 | | |
| Kirkland_Main-7 | Kirkland_Manholes-7 | 127.07 | Kirkland_Manholes-8 | 108.29 | 154 | 12.2 | 8 | PVC | 0.01 | 2,462 | 19 | 10 | 29 | 1.2 | | |
| Kirkland_Main-8 | Kirkland_Manholes-9 | 99.39 | Kirkland_Manholes-99 | 74.09 | 252.3 | 10.03 | 8 | PVC | 0.01 | 2,233 | 66 | 13 | 79 | 3.5 | | |
| Kirkland_Main-10 | Kirkland_Manholes-10 | 249.23 | Kirkland_Manholes-11 | 247.5 | 365.2 | 0.47 | 8 | PVC | 0.01 | 485 | 2 | 4 | 6 | 1.2 | | |
| Kirkland_Main-11 | Kirkland_Manholes-11 | 247.5 | Kirkland_Manholes-12 | 246.57 | 355.7 | 0.26 | 8 | PVC | 0.01 | 360 | 4 | 9 | 13 | 3.6 | | |
| Kirkland_Main-12 | Kirkland_Manholes-12 | 246.57 | Kirkland_Manholes-650 | 246.28 | 73.5 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 13 | 21 | 4.7 | | |
| Kirkland_Main-13 | Kirkland_Manholes-13 | 266.08 | Kirkland_Manholes-917 | 265.16 | 206.5 | 0.45 | 8 | PVC | 0.01 | 471 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-14 | Kirkland_Manholes-14 | 260.99 | Kirkland_Manholes-15 | 248.41 | 274.7 | 4.58 | 8 | PVC | 0.01 | 1,509 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-15 | Kirkland_Manholes-16 | 249.63 | Kirkland_Manholes-15 | 248.41 | 56 | 2.18 | 8 | PVC | 0.01 | 1,041 | 24 | 82 | 106 | 10.2 | | |
| Kirkland_Main-16 | Kirkland_Manholes-17 | 247.29 | Kirkland_Manholes-650 | 246.28 | 284.1 | 0.36 | 8 | PVC | 0.01 | 420 | 29 | 94 | 124 | 29.4 | | |
| Kirkland_Main-17 | Kirkland_Manholes-3034 | 97.65 | Kirkland_Manholes-3033 | 93.75 | 20 | 19.51 | 8 | PVC | 0.01 | 3,114 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-18 | Kirkland_Manholes-3033 | 93.75 | Kirkland_Manholes-3032 | 86.58 | 55.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 1 | 9 | 10 | 0.4 | | |
| Kirkland_Main-19 | Kirkland_Manholes-3032 | 86.58 | Kirkland_Manholes-22 | 82.71 | 39.7 | 9.76 | 8 | PVC | 0.01 | 2,202 | 1 | 13 | 15 | 0.7 | | |
| Kirkland_Main-20 | Kirkland_Manholes-22 | 82.71 | Kirkland_Manholes-1 | 73.25 | 125.9 | 7.51 | 8 | PVC | 0.01 | 1,932 | 2 | 18 | 20 | 1 | | |
| Kirkland_Main-21 | Kirkland_Manholes-15 | 248.41 | Kirkland_Manholes-17 | 247.29 | 382.5 | 0.29 | 8 | PVC | 0.01 | 382 | 26 | 90 | 116 | 30.5 | | |
| Kirkland_Main-22 | Kirkland_Manholes-18 | 254.35 | Kirkland_Manholes-16 | 249.63 | 106.2 | 4.45 | 8 | PVC | 0.01 | 1,487 | 23 | 77 | 100 | 6.7 | | |
| Kirkland_Main-23 | Kirkland_Manholes-19 | 254.88 | Kirkland_Manholes-18 | 254.35 | 102.4 | 0.52 | 8 | PVC | 0.01 | 507 | 21 | 73 | 94 | 18.6 | | |
| Kirkland_Main-24 | Kirkland_Manholes-23 | 269.98 | Kirkland_Manholes-19 | 254.88 | 324.5 | 4.65 | 8 | PVC | 0.01 | 1,521 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-25 | Kirkland_Manholes-622 | 255 | Kirkland_Manholes-19 | 254.88 | 84.5 | 0.14 | 8 | PVC | 0.01 | 266 | 19 | 64 | 83 | 31.3 | | |
| Kirkland_Main-26 | Kirkland_Manholes-624 | 257.73 | Kirkland_Manholes-623 | 256.4 | 95.1 | 1.4 | 8 | PVC | 0.01 | 834 | 1 | 4 | 6 | 0.7 | | |
| Kirkland_Main-27 | Kirkland_Manholes-623 | 256.4 | Kirkland_Manholes-622 | 255 | 306.3 | 0.46 | 8 | PVC | 0.01 | 477 | 3 | 9 | 12 | 2.4 | | |
| Kirkland_Main-28 | Kirkland_Manholes-625 | 258 | Kirkland_Manholes-622 | 255 | 179.1 | 1.67 | 8 | PVC | 0.01 | 912 | 15 | 52 | 66 | 7.3 | | |
| Kirkland_Main-29 | Kirkland_Manholes-28 | 182.96 | Kirkland_Manholes-29 | 182.79 | 41.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 9 | 2 | | |
| Kirkland_Main-30 | Kirkland_Manholes-29 | 182.79 | Kirkland_Manholes-25 | 175.02 | 121.6 | 6.39 | 8 | PVC | 0.01 | 1,783 | 25 | 45 | 69 | 3.9 | | |
| Kirkland_Main-31 | Kirkland_Manholes-36 | 251.25 | Kirkland_Manholes-35 | 222.04 | 280.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 5 | 4 | 9 | 0.4 | | |
| Kirkland_Main-32 | Kirkland_Manholes-35 | 222.04 | Kirkland_Manholes-34 | 221.71 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 9 | 16 | 3.6 | | |
| Kirkland_Main-33 | Kirkland_Manholes-34 | 221.71 | Kirkland_Manholes-32 | 220.36 | 300.4 | 0.45 | 8 | PVC | 0.01 | 473 | 9 | 13 | 23 | 4.8 | | |
| Kirkland_Main-34 | Kirkland_Manholes-32 | 220.36 | Kirkland_Manholes-33 | 219.84 | 21.3 | 2.44 | 8 | PVC | 0.01 | 1,102 | 11 | 18 | 29 | 2.6 | | |
| Kirkland_Main-35 | Kirkland_Manholes-33 | 219.84 | Kirkland_Manholes-31 | 218.88 | 40.1 | 2.39 | 8 | PVC | 0.01 | 1,091 | 12 | 22 | 34 | 3.1 | | |
| Kirkland_Main-36 | Kirkland_Manholes-37 | 238.46 | Kirkland_Manholes-31 | 218.88 | 419.9 | 4.66 | 8 | PVC | 0.01 | 1,523 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-37 | Kirkland_Manholes-31 | 218.88 | Kirkland_Manholes-30 | 193.77 | 330.5 | 7.6 | 8 | PVC | 0.01 | 1,943 | 16 | 31 | 47 | 2.4 | | |
| Kirkland_Main-38 | Kirkland_Manholes-30 | 193.77 | Kirkland_Manholes-29 | 182.79 | 147.1 | 7.46 | 8 | PVC | 0.01 | 1,926 | 19 | 36 | 55 | 2.8 | | |
| Kirkland_Main-39 | Kirkland_Manholes-40 | 185.88 | Kirkland_Manholes-41 | 184.86 | 116.1 | 0.88 | 8 | PVC | 0.01 | 661 | 1 | 9 | 10 | 1.5 | | |
| Kirkland_Main-40 | Kirkland_Manholes-41 | 184.86 | Kirkland_Manholes-38 | 173.18 | 108.4 | 10.78 | 8 | PVC | 0.01 | 2,314 | 2 | 13 | 16 | 0.7 | | |
| Kirkland_Main-41 | Kirkland_Manholes-39 | 193.85 | Kirkland_Manholes-40 | 185.88 | 407 | 1.96 | 8 | PVC | 0.01 | 987 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-42 | Kirkland_Manholes-54 | 66.84 | Kirkland_Manholes-103 | 59.75 | 133.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 56 | 161 | 216 | 13.3 | SM14-Ex-EX13 | |
| Kirkland_Main-43 | Kirkland_Manholes-47 | 192.83 | Kirkland_Manholes-48 | 169.78 | 343.8 | 6.71 | 8 | PVC | 0.01 | 1,826 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX13 | |
| Kirkland_Main-44 | Kirkland_Manholes-48 | 169.78 | Kirkland_Manholes-49 | 164.6 | 338.4 | 1.53 | 8 | PVC | 0.01 | 872 | 4 | 9 | 13 | 1.5 | SM14-Ex-EX13 | |
| Kirkland_Main-45 | Kirkland_Manholes-49 | 164.6 | Kirkland_Manholes-50 | 161.4 | 179.7 | 1.78 | 8 | PVC | 0.01 | 941 | 37 | 116 | 153 | 16.3 | SM14-Ex-EX13 | |
| Kirkland_Main-46 | Kirkland_Manholes-50 | 161.4 | Kirkland_Manholes-51 | 157.39 | 303.6 | 1.32 | 8 | PVC | 0.01 | 810 | 39 | 120 | 159 | 19.6 | SM14-Ex-EX13 | |
| Kirkland_Main-47 | Kirkland_Manholes-51 | 157.39 | Kirkland_Manholes-52 | 124.84 | 333.7 | 9.75 | 8 | PVC | 0.01 | 2,202 | 41 | 125 | 166 | 7.5 | SM14-Ex-EX13 | |
| Kirkland_Main-48 | Kirkland_Manholes-59 | 155.25 | Kirkland_Manholes-58 | 153.05 | 131 | 1.68 | 8 | PVC | 0.01 | 914 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX14 | |
| Kirkland_Main-49 | Kirkland_Manholes-58 | 153.05 | Kirkland_Manholes-57 | 140.82 | 263.2 | 4.65 | 8 | PVC | 0.01 | 1,520 | 3 | 9 | 12 | 0.8 | SM14-Ex-EX14 | |
| Kirkland_Main-50 | Kirkland_Manholes-57 | 140.82 | Kirkland_Manholes-56 | 112.82 | 272.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 6 | 13 | 20 | 0.9 | SM14-Ex-EX14 | |
| Kirkland_Main-51 | Kirkland_Manholes-56 | 112.82 | Kirkland_Manholes-55 | 79.92 | 269.4 | 12.21 | 8 | PVC | 0.01 | 2,464 | 9 | 18 | 27 | 1.1 | SM14-Ex-EX14 | |
| Kirkland_Main-52 | Kirkland_Manholes-55 | 79.92 | Kirkland_Manholes-54 | 66.84 | 152.2 | 8.59 | 8 | PVC | 0.01 | 2,067 | 11 | 22 | 33 | 1.6 | SM14-Ex-EX14 | |
| Kirkland_Main-53 | Kirkland_Manholes-52 | 124.84 | Kirkland_Manholes-53 | 83.26 | 336 | 12.38 | 8 | PVC | 0.01 | 2,480 | 43 | 129 | 173 | 7 | SM14-Ex-EX13 | |
| Kirkland_Main-54 | Kirkland_Manholes-53 | 83.26 | Kirkland_Manholes-54 | 66.84 | 148.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 44 | 134 | 178 | 7.6 | SM14-Ex-EX13 | |
| Kirkland_Main-55 | Kirkland_Manholes-62 | 222.28 | Kirkland_Manholes-63 | 216.98 | 205.6 | 2.58 | 8 | PVC | 0.01 | 1,132 | 2 | 4 | 7 | 0.6 | | |
| Kirkland_Main-56 | Kirkland_Manholes-63 | 216.98 | Kirkland_Manholes-60 | 215.88 | 80.7 | 1.36 | 8 | PVC | 0.01 | 823 | 3 | 9 | 12 | 1.4 | | |
| Kirkland_Main-57 | Kirkland_Manholes-60 | 215.88 | Kirkland_Manholes-61 | 215.72 | 40.6 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 13 | 17 | 3.9 | | Drop Connection |
| Kirkland_Main-58 | Kirkland_Manholes-65 | 199.61 | Kirkland_Manholes-66 | 186.65 | 326.2 | 3.97 | 8 | PVC | 0.01 | 1,405 | 15 | 40 | 56 | 4 | SM14-Ex-EX6 | |
| Kirkland_Main-59 | Kirkland_Manholes-66 | 186.65 | Kirkland_Manholes-67 | 185.01 | 47 | 3.49 | 8 | PVC | 0.01 | 1,317 | 51 | 107 | 158 | 12 | SM14-Ex-EX17 | |
| Kirkland_Main-61 | Kirkland_Manholes-72 | 160.29 | Kirkland_Manholes-70 | 152.59 | 265.8 | 2.9 | 8 | PVC | 0.01 | 1,200 | 2 | 4 | 7 | 0.6 | SM14-Ex-EX15 | |
| Kirkland_Main-62 | Kirkland_Manholes-985 | 205.92 | Kirkland_Manholes-986 | 204.38 | 192.7 | 0.8 | 8 | PVC | 0.01 | 630 | 54 | 143 | 197 | 31.3 | SM14-Ex-EX3 | |
| Kirkland_Main-63 | Kirkland_Manholes-242 | 21.02 | Kirkland_Manholes-2761 | 12.79 | 68 | 12.1 | 8 | PVC | 0.01 | 2,453 | 95 | 277 | 372 | 15.2 | | |
| Kirkland_Main-64 | Kirkland_Manholes-1033 | 173.21 | Kirkland_Manholes-450 | 130.07 | 239 | 18.05 | 8 | PVC | 0.01 | 2,996 | 8 | 13 | 21 | 0.7 | | |
| Kirkland_Main-65 | Kirkland_Manholes-71 | 153 | Kirkland_Manholes-70 | 152.59 | 153.6 | 0.27 | 8 | PVC | 0.01 | 364 | 2 | 4 | 6 | 1.7 | SM14-Ex-EX16 | |
| Kirkland_Main-66 | Kirkland_Manholes-69 | 159.19 | Kirkland_Manholes-70 | 152.59 | 340.9 | 1.94 | 8 | PVC | 0.01 | 981 | 5 | 9 | 14 | 1.4 | SM14-Ex-EX16 | |
| Kirkland_Main-67 | Kirkland_Manholes-68 | 178.61 | Kirkland_Manholes-69 | 159.19 | 346.1 | 5.61 | 8 | PVC | 0.01 | 1,670 | 2 | 4 | 7 | 0.4 | SM14-Ex-EX16 | |
| Kirkland_Main-68 | Kirkland_Manholes-73 | 249.05 | Kirkland_Manholes-74 | 244.74 | 143 | 3.01 | 8 | PVC | 0.01 | 1,224 | 1 | 4 | 5 | 0.4 | | |

## 2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-69 | Kirkland_Manholes-77 | 217.04 | Kirkland_Manholes-78 | 207.46 | 342.9 | 2.79 | 8 | PVC | 0.01 | 1,178 | 11 | 22 | 34 | 2.9 | SM14-Ex-EX7 | |
| Kirkland_Main-70 | Kirkland_Manholes-76 | 225.56 | Kirkland_Manholes-77 | 217.04 | 294.1 | 2.9 | 8 | PVC | 0.01 | 1,200 | 7 | 18 | 25 | 2.1 | SM14-Ex-EX7 | |
| Kirkland_Main-71 | Kirkland_Manholes-75 | 235.08 | Kirkland_Manholes-76 | 225.56 | 281.9 | 3.38 | 8 | PVC | 0.01 | 1,296 | 4 | 13 | 18 | 1.4 | SM14-Ex-EX7 | |
| Kirkland_Main-72 | Kirkland_Manholes-74 | 244.74 | Kirkland_Manholes-75 | 235.08 | 281.2 | 3.44 | 8 | PVC | 0.01 | 1,307 | 3 | 9 | 12 | 0.9 | SM14-Ex-EX7 | |
| Kirkland_Main-75 | Kirkland_Manholes-79 | 197.48 | Kirkland_Manholes-66 | 186.65 | 235.2 | 4.6 | 8 | PVC | 0.01 | 1,513 | 33 | 62 | 95 | 6.3 | SM14-Ex-EX17 | |
| Kirkland_Main-76 | Kirkland_Manholes-78 | 207.46 | Kirkland_Manholes-79 | 197.48 | 229.3 | 4.35 | 8 | PVC | 0.01 | 1,471 | 31 | 58 | 89 | 6 | SM14-Ex-EX17 | |
| Kirkland_Main-78 | Kirkland_Manholes-46 | 167.44 | Kirkland_Manholes-43 | 166.66 | 144 | 0.54 | 8 | PVC | 0.01 | 519 | 1 | 9 | 10 | 1.9 | SM14-Ex-EX5 | |
| Kirkland_Main-79 | Kirkland_Manholes-43 | 166.66 | Kirkland_Manholes-44 | 166.02 | 96.1 | 0.67 | 8 | PVC | 0.01 | 575 | 31 | 94 | 125 | 21.6 | SM14-Ex-EX5 | |
| Kirkland_Main-80 | Kirkland_Manholes-45 | 166.8 | Kirkland_Manholes-44 | 166.02 | 115.5 | 0.68 | 8 | PVC | 0.01 | 579 | 0 | 4 | 5 | 0.8 | SM14-Ex-EX5 | |
| Kirkland_Main-81 | Kirkland_Manholes-27 | 172.24 | Kirkland_Manholes-26 | 167.35 | 165.4 | 2.96 | 8 | PVC | 0.01 | 1,212 | 4 | 22 | 26 | 2.1 | SM14-Ex-EX5 | |
| Kirkland_Main-82 | Kirkland_Manholes-26 | 167.35 | Kirkland_Manholes-43 | 166.66 | 133.3 | 0.52 | 8 | PVC | 0.01 | 507 | 30 | 80 | 110 | 21.7 | SM14-Ex-EX5 | |
| Kirkland_Main-84 | Kirkland_Manholes-38 | 173.18 | Kirkland_Manholes-27 | 172.24 | 235.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 18 | 21 | 4.8 | SM14-Ex-EX5 | |
| Kirkland_Main-85 | Kirkland_Manholes-24 | 172.7 | Kirkland_Manholes-26 | 167.35 | 274.1 | 1.95 | 8 | PVC | 0.01 | 985 | 25 | 54 | 79 | 8 | SM14-Ex-EX5 | |
| Kirkland_Main-86 | Kirkland_Manholes-42 | 173.4 | Kirkland_Manholes-46 | 167.44 | 195.7 | 3.04 | 8 | PVC | 0.01 | 1,230 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX5 | |
| Kirkland_Main-87 | Kirkland_Manholes-25 | 175.02 | Kirkland_Manholes-24 | 172.7 | 94.4 | 2.46 | 8 | PVC | 0.01 | 1,105 | 25 | 49 | 74 | 6.7 | SM14-Ex-EX5 | |
| Kirkland_Main-88 | Kirkland_Manholes-44 | 166.02 | Kirkland_Manholes-49 | 164.6 | 321.6 | 0.44 | 8 | PVC | 0.01 | 469 | 31 | 103 | 134 | 28.6 | SM14-Ex-EX5 | |
| Kirkland_Main-90 | Kirkland_Manholes-81 | 88.9 | Kirkland_Manholes-143 | 71.16 | 340.9 | 5.2 | 8 | PVC | 0.01 | 1,608 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-91 | Kirkland_Manholes-70 | 152.59 | Kirkland_Manholes-82 | 150.35 | 263.6 | 0.85 | 8 | PVC | 0.01 | 650 | 10 | 22 | 33 | 5 | SM14-Ex-EX15 | |
| Kirkland_Main-92 | Kirkland_Manholes-85 | 147.38 | Kirkland_Manholes-84 | 141.87 | 73.4 | 7.51 | 8 | PVC | 0.01 | 1,932 | 4 | 9 | 13 | 0.7 | SM14-Ex-EX24 | |
| Kirkland_Main-93 | Kirkland_Manholes-83 | 157.35 | Kirkland_Manholes-85 | 147.38 | 229.6 | 4.34 | 8 | PVC | 0.01 | 1,469 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX24 | |
| Kirkland_Main-95 | Kirkland_Manholes-82 | 150.35 | Kirkland_Manholes-86 | 148.26 | 180.8 | 1.16 | 8 | PVC | 0.01 | 758 | 12 | 27 | 39 | 5.1 | SM14-Ex-EX15 | |
| Kirkland_Main-96 | Kirkland_Manholes-87 | 163.95 | Kirkland_Manholes-147 | 139.14 | 319.7 | 7.76 | 8 | PVC | 0.01 | 1,964 | 54 | 116 | 170 | 8.7 | SM14-Ex-EX25 | |
| Kirkland_Main-97 | Kirkland_Manholes-67 | 185.01 | Kirkland_Manholes-87 | 163.95 | 332 | 6.34 | 8 | PVC | 0.01 | 1,776 | 52 | 112 | 163 | 9.2 | SM14-Ex-EX25 | |
| Kirkland_Main-98 | Kirkland_Manholes-88 | 192.85 | Kirkland_Manholes-89 | 177.59 | 273.6 | 5.58 | 8 | PVC | 0.01 | 1,665 | 2 | 4 | 7 | 0.4 | SM14-Ex-EX26 | |
| Kirkland_Main-99 | Kirkland_Manholes-90 | 174.66 | Kirkland_Manholes-91 | 170.09 | 87.7 | 5.21 | 8 | PVC | 0.01 | 1,609 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX27 | |
| Kirkland_Main-100 | Kirkland_Manholes-92 | 172.99 | Kirkland_Manholes-91 | 170.09 | 82 | 3.53 | 8 | PVC | 0.01 | 1,325 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX27 | |
| Kirkland_Main-101 | Kirkland_Manholes-91 | 170.09 | Kirkland_Manholes-152 | 157.79 | 45.8 | 26.87 | 8 | PVC | 0.01 | 3,654 | 4 | 13 | 17 | 0.5 | SM14-Ex-EX27 | Slope verified in as-builts |
| Kirkland_Main-103 | Kirkland_Manholes-98 | 253.76 | Kirkland_Manholes-97 | 241.6 | 353.8 | 3.44 | 8 | PVC | 0.01 | 1,307 | 3 | 4 | 8 | 0.6 | SM14-Ex-EX8 | |
| Kirkland_Main-104 | Kirkland_Manholes-2944 | 250.07 | Kirkland_Manholes-2943 | 249.65 | 93.4 | 0.45 | 8 | PVC | 0.01 | 473 | 0 | 4 | 5 | 1 | | |
| Kirkland_Main-105 | Kirkland_Manholes-97 | 241.6 | Kirkland_Manholes-95 | 228.66 | 356.1 | 3.63 | 8 | PVC | 0.01 | 1,344 | 7 | 9 | 15 | 1.2 | SM14-Ex-EX8 | |
| Kirkland_Main-106 | Kirkland_Manholes-95 | 228.66 | Kirkland_Manholes-96 | 228 | 106.1 | 0.62 | 8 | PVC | 0.01 | 556 | 9 | 13 | 23 | 4.1 | SM14-Ex-EX8 | |
| Kirkland_Main-107 | Kirkland_Manholes-96 | 228 | Kirkland_Manholes-93 | 223.12 | 245.5 | 1.99 | 8 | PVC | 0.01 | 994 | 11 | 18 | 28 | 2.9 | SM14-Ex-EX8 | |
| Kirkland_Main-108 | Kirkland_Manholes-93 | 223.12 | Kirkland_Manholes-94 | 210.17 | 176.3 | 7.35 | 8 | PVC | 0.01 | 1,911 | 13 | 22 | 35 | 1.8 | SM14-Ex-EX8 | |
| Kirkland_Main-109 | Kirkland_Manholes-94 | 210.17 | Kirkland_Manholes-78 | 207.46 | 295.3 | 0.92 | 8 | PVC | 0.01 | 675 | 17 | 31 | 48 | 7.1 | SM14-Ex-EX17 | |
| Kirkland_Main-110 | Kirkland_Manholes-1024 | 212.11 | Kirkland_Manholes-94 | 210.17 | 143.5 | 1.35 | 8 | PVC | 0.01 | 820 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX17 | |
| Kirkland_Main-111 | Kirkland_Manholes-106 | 44.49 | Kirkland_Manholes-242 | 21.02 | 301.2 | 7.79 | 8 | PVC | 0.01 | 1,968 | 72 | 219 | 291 | 14.8 | SM14-Ex-EX12 | |
| Kirkland_Main-112 | Kirkland_Manholes-105 | 48.51 | Kirkland_Manholes-106 | 44.49 | 358.2 | 1.12 | 8 | PVC | 0.01 | 747 | 70 | 214 | 284 | 38 | SM14-Ex-EX12 | |
| Kirkland_Main-113 | Kirkland_Manholes-103 | 59.75 | Kirkland_Manholes-105 | 48.51 | 350.5 | 3.21 | 8 | PVC | 0.01 | 1,263 | 68 | 210 | 278 | 22 | SM14-Ex-EX12 | |
| Kirkland_Main-114 | Kirkland_Manholes-104 | 60.14 | Kirkland_Manholes-103 | 59.75 | 61 | 0.64 | 8 | PVC | 0.01 | 564 | 12 | 45 | 57 | 10.1 | | |
| Kirkland_Main-115 | Kirkland_Manholes-102 | 61.04 | Kirkland_Manholes-104 | 60.14 | 158.9 | 0.57 | 8 | PVC | 0.01 | 531 | 11 | 40 | 51 | 9.7 | | |
| Kirkland_Main-116 | Kirkland_Manholes-101 | 61.95 | Kirkland_Manholes-102 | 61.04 | 98.7 | 0.92 | 8 | PVC | 0.01 | 676 | 11 | 36 | 46 | 6.8 | | |
| Kirkland_Main-117 | Kirkland_Manholes-99 | 74.09 | O-41 | 72.48 | 38.5 | 4.19 | 8 | PVC | 0.01 | 1,443 | 74 | 15 | 89 | 6.2 | | |
| Kirkland_Main-119 | Kirkland_Manholes-107 | 262.65 | Kirkland_Manholes-2737 | 259.86 | 239.4 | 1.17 | 8 | PVC | 0.01 | 761 | 4 | 4 | 9 | 1.1 | | |
| Kirkland_Main-120 | Kirkland_Manholes-109 | 325.4 | Kirkland_Manholes-110 | 324.77 | 37.7 | 1.67 | 8 | PVC | 0.01 | 912 | 16 | 54 | 70 | 7.6 | | |
| Kirkland_Main-121 | Kirkland_Manholes-110 | 324.77 | Kirkland_Manholes-111 | 324 | 11.2 | 6.85 | 8 | PVC | 0.01 | 1,846 | 24 | 77 | 101 | 5.5 | | |
| Kirkland_Main-122 | Kirkland_Manholes-108 | 326.5 | Kirkland_Manholes-109 | 325.4 | 336.7 | 0.33 | 8 | PVC | 0.01 | 403 | 13 | 31 | 43 | 10.8 | | |
| Kirkland_Main-123 | Kirkland_Manholes-112 | 326.56 | Kirkland_Manholes-110 | 324.77 | 134.2 | 1.33 | 8 | PVC | 0.01 | 814 | 8 | 15 | 23 | 2.8 | | |
| Kirkland_Main-124 | Kirkland_Manholes-113 | 357.54 | Kirkland_Manholes-112 | 326.56 | 558 | 5.55 | 8 | PVC | 0.01 | 1,661 | 5 | 8 | 13 | 0.8 | | |
| Kirkland_Main-125 | Kirkland_Manholes-134 | 351.46 | Kirkland_Manholes-835 | 347 | 314.9 | 1.42 | 8 | PVC | 0.01 | 839 | 2 | 4 | 6 | 0.8 | | Drop Connection |
| Kirkland_Main-126 | Kirkland_Manholes-128 | 355.4 | Kirkland_Manholes-127 | 354 | 128.2 | 1.09 | 8 | PVC | 0.01 | 737 | 2 | 4 | 7 | 0.9 | | |
| Kirkland_Main-127 | Kirkland_Manholes-127 | 354 | Kirkland_Manholes-126 | 343.91 | 279.9 | 3.6 | 8 | PVC | 0.01 | 1,339 | 4 | 9 | 12 | 0.9 | | |
| Kirkland_Main-128 | Kirkland_Manholes-126 | 343.91 | Kirkland_Manholes-125 | 337.71 | 240.8 | 2.58 | 8 | PVC | 0.01 | 1,131 | 6 | 13 | 19 | 1.7 | | |
| Kirkland_Main-129 | Kirkland_Manholes-125 | 337.71 | Kirkland_Manholes-838 | 337.31 | 98.6 | 0.41 | 8 | PVC | 0.01 | 449 | 8 | 17 | 26 | 5.7 | | |
| Kirkland_Main-130 | Kirkland_Manholes-129 | 356.73 | Kirkland_Manholes-130 | 350.77 | 205.5 | 2.9 | 8 | PVC | 0.01 | 1,201 | 3 | 4 | 8 | 0.6 | SM14-Ex-EX32 | |
| Kirkland_Main-131 | Kirkland_Manholes-130 | 350.77 | Kirkland_Manholes-131 | 322.01 | 184.9 | 15.56 | 8 | PVC | 0.01 | 2,781 | 5 | 9 | 14 | 0.5 | | |
| Kirkland_Main-132 | Kirkland_Manholes-133 | 323.35 | Kirkland_Manholes-131 | 322.01 | 242.6 | 0.55 | 8 | PVC | 0.01 | 524 | 36 | 77 | 113 | 21.5 | | |
| Kirkland_Main-133 | Kirkland_Manholes-842 | 324.88 | Kirkland_Manholes-133 | 323.35 | 209.8 | 0.73 | 8 | PVC | 0.01 | 602 | 34 | 73 | 107 | 17.7 | | |
| Kirkland_Main-134 | Kirkland_Manholes-131 | 322.01 | Kirkland_Manholes-132 | 319.83 | 182.3 | 1.2 | 8 | PVC | 0.01 | 771 | 42 | 90 | 132 | 17.2 | | |
| Kirkland_Main-135 | Kirkland_Manholes-132 | 319.83 | Kirkland_Manholes-116 | 315.23 | 159 | 2.89 | 8 | PVC | 0.01 | 1,199 | 44 | 94 | 139 | 11.5 | | |
| Kirkland_Main-136 | Kirkland_Manholes-115 | 335.3 | Kirkland_Manholes-116 | 315.23 | 256.3 | 7.83 | 8 | PVC | 0.01 | 1,973 | 4 | 9 | 188 | 9.5 | | |
| Kirkland_Main-137 | Kirkland_Manholes-114 | 360.4 | Kirkland_Manholes-115 | 335.3 | 252.2 | 9.95 | 8 | PVC | 0.01 | 2,224 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-138 | Kirkland_Manholes-1806 | 38.89 | Kirkland_Manholes-2926 | 31.46 | 54.5 | 13.64 | 8 | PVC | 0.01 | 2,604 | 123 | 312 | 435 | 16.7 | SM4 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-139 | Kirkland_Manholes-2926 | 31.46 | Kirkland_Manholes-1396 | 27.46 | 24.1 | 16.61 | 8 | PVC | 0.01 | 2,873 | 124 | 320 | 444 | 15.4 | SM4 | |
| Kirkland_Main-140 | Kirkland_Manholes-123 | 328.2 | Kirkland_Manholes-124 | 326.1 | 151.9 | 1.38 | 8 | PVC | 0.01 | 829 | 3 | 8 | 10 | 1.2 | | |
| Kirkland_Main-141 | Kirkland_Manholes-124 | 326.1 | Kirkland_Manholes-109 | 325.4 | 313.3 | 0.22 | 8 | PVC | 0.01 | 333 | 3 | 15 | 18 | 5.5 | | |
| Kirkland_Main-142 | Kirkland_Manholes-122 | 345.33 | Kirkland_Manholes-108 | 326.5 | 238.6 | 7.89 | 8 | PVC | 0.01 | 1,981 | 12 | 23 | 35 | 1.8 | | |
| Kirkland_Main-143 | Kirkland_Manholes-120 | 360.7 | Kirkland_Manholes-121 | 358.16 | 294.2 | 0.86 | 8 | PVC | 0.01 | 655 | 4 | 8 | 12 | 1.9 | | |
| Kirkland_Main-144 | Kirkland_Manholes-121 | 358.16 | Kirkland_Manholes-122 | 345.33 | 387.6 | 3.31 | 8 | PVC | 0.01 | 1,283 | 8 | 15 | 23 | 1.8 | | |
| Kirkland_Main-145 | Kirkland_Manholes-119 | 359.58 | Kirkland_Manholes-118 | 354.26 | 105.6 | 5.04 | 8 | PVC | 0.01 | 1,583 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-146 | Kirkland_Manholes-118 | 354.26 | Kirkland_Manholes-117 | 315.69 | 251.8 | 15.32 | 8 | PVC | 0.01 | 2,760 | 3 | 9 | 12 | 0.4 | | |
| Kirkland_Main-147 | Kirkland_Manholes-117 | 315.69 | Kirkland_Manholes-116 | 315.23 | 331.8 | 0.14 | 8 | PVC | 0.01 | 263 | 4 | 13 | 17 | 6.4 | | |
| Kirkland_Main-148 | Kirkland_Manholes-116 | 315.23 | Kirkland_Manholes-137 | 298.8 | 246.4 | 6.67 | 8 | PVC | 0.01 | 1,821 | 53 | 120 | 350 | 19.2 | | |
| Kirkland_Main-149 | Kirkland_Manholes-137 | 298.8 | Kirkland_Manholes-1076 | 298.68 | 103.3 | 0.12 | 12 | PVC | 0.01 | 709 | 57 | 129 | 362 | 51.1 | SM14-Ex-EX23 | |
| Kirkland_Main-150 | Kirkland_Manholes-138 | 300.28 | Kirkland_Manholes-137 | 298.8 | 187.2 | 0.79 | 8 | PVC | 0.01 | 627 | 2 | 4 | 7 | 1 | | |
| Kirkland_Main-151 | Kirkland_Manholes-135 | 297.13 | Kirkland_Manholes-136 | 295.76 | 244.5 | 0.56 | 8 | PVC | 0.01 | 528 | 2 | 4 | 7 | 1.3 | | |
| Kirkland_Main-152 | Kirkland_Manholes-136 | 295.76 | Kirkland_Manholes-1064 | 278.57 | 324.4 | 5.3 | 8 | PVC | 0.01 | 1,623 | 4 | 9 | 13 | 0.8 | | |
| Kirkland_Main-154 | Kirkland_Manholes-139 | 305.82 | Kirkland_Manholes-1078 | 305.14 | 98 | 0.69 | 8 | PVC | 0.01 | 587 | 1 | 4 | 6 | 1 | | |
| Kirkland_Main-156 | Kirkland_Manholes-140 | 281.69 | Kirkland_Manholes-141 | 277.32 | 84.7 | 5.16 | 8 | PVC | 0.01 | 1,601 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-157 | Kirkland_Manholes-141 | 277.32 | Kirkland_Manholes-142 | 276.94 | 95.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 9 | 10 | 2.3 | | Drop Connection |
| Kirkland_Main-158 | Kirkland_Manholes-142 | 255.54 | Kirkland_Manholes-1090 | 254.86 | 50.7 | 1.34 | 8 | PVC | 0.01 | 817 | 2 | 13 | 15 | 1.8 | | |
| Kirkland_Main-160 | Kirkland_Manholes-111 | 324 | TREND_WETWELL | 317.75 | 16.6 | 37.69 | 8 | PVC | 0.01 | 4,328 | 25 | 85 | 109 | 2.5 | | |
| Kirkland_Main-161 | Kirkland_Manholes-144 | 88.96 | Kirkland_Manholes-146 | 84.42 | 39.5 | 11.5 | 8 | PVC | 0.01 | 2,391 | 9 | 18 | 27 | 1.1 | | |
| Kirkland_Main-162 | Kirkland_Manholes-86 | 148.26 | Kirkland_Manholes-157 | 123.36 | 221.1 | 11.26 | 8 | PVC | 0.01 | 2,366 | 13 | 31 | 45 | 1.9 | SM14-Ex-EX15 | |
| Kirkland_Main-163 | Kirkland_Manholes-84 | 141.87 | Kirkland_Manholes-155 | 126.86 | 190.9 | 7.86 | 8 | PVC | 0.01 | 1,977 | 6 | 13 | 19 | 1 | SM14-Ex-EX24 | |
| Kirkland_Main-164 | Kirkland_Manholes-156 | 125.08 | Kirkland_Manholes-157 | 123.36 | 264.1 | 0.65 | 8 | PVC | 0.01 | 569 | 9 | 22 | 31 | 5.5 | SM14-Ex-EX24 | |
| Kirkland_Main-165 | Kirkland_Manholes-157 | 123.36 | Kirkland_Manholes-158 | 121.97 | 144.6 | 0.96 | 8 | PVC | 0.01 | 691 | 24 | 58 | 82 | 11.8 | SM14-Ex-EX15 | |
| Kirkland_Main-166 | Kirkland_Manholes-147 | 139.14 | Kirkland_Manholes-148 | 138.62 | 289.8 | 0.18 | 8 | PVC | 0.01 | 299 | 57 | 120 | 178 | 59.4 | SM14-Ex-EX25 | |
| Kirkland_Main-167 | Kirkland_Manholes-148 | 138.62 | Kirkland_Manholes-149 | 122.95 | 57.1 | 27.47 | 8 | PVC | 0.01 | 3,695 | 58 | 125 | 183 | 4.9 | SM14-Ex-EX25 | |
| Kirkland_Main-168 | Kirkland_Manholes-149 | 122.95 | Kirkland_Manholes-150 | 116.05 | 168.5 | 4.1 | 8 | PVC | 0.01 | 1,427 | 58 | 129 | 188 | 13.2 | SM14-Ex-EX25 | |
| Kirkland_Main-169 | Kirkland_Manholes-153 | 130.01 | Kirkland_Manholes-150 | 116.05 | 56.4 | 24.77 | 8 | PVC | 0.01 | 3,509 | 7 | 18 | 25 | 0.7 | SM14-Ex-EX26 | |
| Kirkland_Main-170 | Kirkland_Manholes-150 | 116.05 | Kirkland_Manholes-159 | 80.68 | 226.3 | 15.63 | 8 | PVC | 0.01 | 2,788 | 72 | 174 | 246 | 8.8 | SM14-Ex-EX28 | |
| Kirkland_Main-171 | Kirkland_Manholes-151 | 132.11 | Kirkland_Manholes-150 | 116.05 | 132.2 | 12.15 | 8 | PVC | 0.01 | 2,458 | 5 | 22 | 28 | 1.1 | SM14-Ex-EX27 | |
| Kirkland_Main-172 | Kirkland_Manholes-152 | 157.79 | Kirkland_Manholes-151 | 132.11 | 148.9 | 17.25 | 8 | PVC | 0.01 | 2,928 | 4 | 18 | 22 | 0.8 | SM14-Ex-EX27 | |
| Kirkland_Main-173 | Kirkland_Manholes-174 | 143.33 | Kirkland_Manholes-153 | 130.01 | 57.7 | 23.09 | 8 | PVC | 0.01 | 3,388 | 6 | 13 | 19 | 0.6 | SM14-Ex-EX26 | |
| Kirkland_Main-174 | Kirkland_Manholes-89 | 177.59 | Kirkland_Manholes-174 | 143.33 | 179.4 | 19.1 | 8 | PVC | 0.01 | 3,081 | 5 | 9 | 14 | 0.4 | SM14-Ex-EX26 | |
| Kirkland_Main-175 | Kirkland_Manholes-155 | 126.86 | Kirkland_Manholes-156 | 125.08 | 248.1 | 0.72 | 8 | PVC | 0.01 | 597 | 7 | 18 | 24 | 4.1 | SM14-Ex-EX24 | |
| Kirkland_Main-176 | Kirkland_Manholes-158 | 121.97 | Kirkland_Manholes-160 | 41.73 | 324.9 | 24.69 | 8 | PVC | 0.01 | 3,504 | 26 | 62 | 88 | 2.5 | SM14-Ex-EX15 | |
| Kirkland_Main-177 | Kirkland_Manholes-160 | 41.73 | Kirkland_Manholes-175 | 34.4 | 159.3 | 4.6 | 8 | PVC | 0.01 | 1,512 | 27 | 67 | 94 | 6.2 | SM14-Ex-EX15 | |
| Kirkland_Main-178 | Kirkland_Manholes-168 | 22.33 | Kirkland_Manholes-166 | 21.44 | 221.6 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-179 | Kirkland_Manholes-165 | 60.59 | Kirkland_Manholes-166 | 21.44 | 398.8 | 9.82 | 8 | PVC | 0.01 | 2,209 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-180 | Kirkland_Manholes-166 | 21.44 | Kirkland_Manholes-167 | 21.4 | 9.5 | 0.4 | 8 | PVC | 0.01 | 445 | 4 | 13 | 17 | 3.9 | | Drop Connection |
| Kirkland_Main-181 | Kirkland_Manholes-143 | 71.16 | Kirkland_Manholes-164 | 59.16 | 83.9 | 14.3 | 8 | PVC | 0.01 | 2,666 | 20 | 49 | 69 | 2.6 | | |
| Kirkland_Main-182 | Kirkland_Manholes-146 | 84.42 | Kirkland_Manholes-143 | 71.16 | 154.2 | 8.6 | 8 | PVC | 0.01 | 2,067 | 17 | 40 | 57 | 2.8 | | |
| Kirkland_Main-183 | Kirkland_Manholes-163 | 106.36 | Kirkland_Manholes-146 | 84.42 | 161.9 | 13.55 | 8 | PVC | 0.01 | 2,596 | 7 | 18 | 25 | 1 | | |
| Kirkland_Main-184 | Kirkland_Manholes-161 | 132.09 | Kirkland_Manholes-162 | 124.37 | 152 | 5.08 | 8 | PVC | 0.01 | 1,589 | 5 | 9 | 14 | 0.9 | | |
| Kirkland_Main-185 | Kirkland_Manholes-162 | 124.37 | Kirkland_Manholes-163 | 106.36 | 185.8 | 9.69 | 8 | PVC | 0.01 | 2,195 | 6 | 13 | 20 | 0.9 | | |
| Kirkland_Main-186 | Kirkland_Manholes-169 | 21.92 | Kirkland_Manholes-167 | 19.46 | 234.8 | 1.05 | 18 | PVC | 0.01 | 6,274 | 490 | 1,151 | 1,641 | 26.2 | SM3 | |
| Kirkland_Main-187 | Kirkland_Manholes-170 | 23.23 | Kirkland_Manholes-169 | 21.92 | 100.1 | 1.31 | 18 | PVC | 0.01 | 7,012 | 485 | 1,134 | 1,619 | 23.1 | SM3 | |
| Kirkland_Main-188 | Kirkland_Manholes-2762 | 13.1 | Kirkland_Manholes-2761 | 12.79 | 196.5 | 0.16 | 36 | PVC | 0.01 | 15,458 | 687 | 1,626 | 2,614 | 16.9 | SM14-Ex-EX10 | |
| Kirkland_Main-189 | Kirkland_Manholes-173 | 34.1 | Kirkland_Manholes-172 | 31.43 | 44.6 | 5.99 | 8 | PVC | 0.01 | 1,725 | 4 | 13 | 17 | 1 | | |
| Kirkland_Main-190 | Kirkland_Manholes-178 | 67.04 | Kirkland_Manholes-179 | 37.91 | 174.4 | 16.71 | 8 | PVC | 0.01 | 2,882 | 6 | 9 | 15 | 0.5 | | |
| Kirkland_Main-191 | Kirkland_Manholes-154 | 101.95 | Kirkland_Manholes-178 | 67.04 | 253.3 | 13.78 | 8 | PVC | 0.01 | 2,617 | 3 | 4 | 8 | 0.3 | | |
| Kirkland_Main-192 | Kirkland_Manholes-188 | 58.06 | Kirkland_Manholes-187 | 54.23 | 46.2 | 8.28 | 15 | PVC | 0.01 | 10,848 | 333 | 692 | 1,025 | 9.4 | SM14-Ex-EX30 | |
| Kirkland_Main-193 | Kirkland_Manholes-187 | 54.23 | Kirkland_Manholes-185 | 53.13 | 306 | 0.36 | 36 | PVC | 0.01 | 23,331 | 334 | 696 | 1,031 | 4.4 | SM14-Ex-EX30 | |
| Kirkland_Main-194 | Kirkland_Manholes-159 | 80.68 | Kirkland_Manholes-186 | 56.15 | 205.5 | 11.94 | 8 | PVC | 0.01 | 2,436 | 73 | 179 | 252 | 10.3 | SM14-Ex-EX28 | |
| Kirkland_Main-195 | Kirkland_Manholes-189 | 57.91 | Kirkland_Manholes-186 | 56.15 | 258.6 | 0.68 | 8 | PVC | 0.01 | 582 | 2 | 4 | 6 | 1.1 | SM14-Ex-EX29 | |
| Kirkland_Main-196 | Kirkland_Manholes-186 | 56.15 | Kirkland_Manholes-185 | 53.13 | 48.4 | 6.24 | 12 | PVC | 0.01 | 5,193 | 77 | 187 | 264 | 5.1 | SM14-Ex-EX28 | |
| Kirkland_Main-197 | Kirkland_Manholes-185 | 53.13 | Kirkland_Manholes-183 | 41.05 | 170.7 | 7.08 | 15 | PVC | 0.01 | 10,026 | 412 | 888 | 1,300 | 13 | SM14-Ex-EX30 | |
| Kirkland_Main-198 | Kirkland_Manholes-182 | 53.5 | Kirkland_Manholes-181 | 38.4 | 151.6 | 9.96 | 8 | PVC | 0.01 | 2,225 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-199 | Kirkland_Manholes-314 | 150.22 | Kirkland_Manholes-315 | 148.46 | 139.8 | 1.26 | 8 | PVC | 0.01 | 791 | 0 | 4 | 5 | 0.6 | | |
| Kirkland_Main-200 | Kirkland_Manholes-315 | 148.46 | Kirkland_Manholes-316 | 147.8 | 125.4 | 0.53 | 8 | PVC | 0.01 | 512 | 1 | 9 | 10 | 1.9 | | |
| Kirkland_Main-201 | Kirkland_Manholes-316 | 147.8 | Kirkland_Manholes-317 | 146.79 | 246.9 | 0.41 | 12 | PVC | 0.01 | 1,330 | 171 | 330 | 501 | 37.7 | SM14-Ex-EX30 | |
| Kirkland_Main-202 | Kirkland_Manholes-1205 | 19.63 | Kirkland_Manholes-1850 | 19.39 | 404.6 | 0.06 | 8 | PVC | 0.01 | 172 | 1 | 7 | 7 | 4.3 | SM10 | |
| Kirkland_Main-203 | Kirkland_Manholes-1187 | 22.69 | Kirkland_Manholes-1188 | 22.09 | 184.7 | 0.32 | 12 | PVC | 0.01 | 1,185 | 1 | 9 | 10 | 0.8 | SM14-Ex-EX37 | |

## 2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-204 | Kirkland_Manholes-1188 | 22.09 | Kirkland_Manholes-1189 | 21.99 | 127.3 | 0.08 | 12 | PVC | 0.01 | 583 | 2 | 18 | 20 | 3.4 | SM14-Ex-EX37 | |
| Kirkland_Main-205 | Kirkland_Manholes-1189 | 21.99 | Kirkland_Manholes-1202 | 18.39 | 139.2 | 2.59 | 12 | PVC | 0.01 | 3,343 | 4 | 27 | 30 | 0.9 | SM14-Ex-EX37 | |
| Kirkland_Main-206 | Kirkland_Manholes-1202 | 18.39 | Kirkland_Manholes-1203 | 18.22 | 388.5 | 0.04 | 12 | PVC | 0.01 | 435 | 6 | 35 | 42 | 9.6 | SM14-Ex-EX37 | |
| Kirkland_Main-207 | Kirkland_Manholes-1203 | 18.22 | Kirkland_Manholes-1204 | 17.89 | 122.5 | 0.27 | 12 | PVC | 0.01 | 1,079 | 7 | 44 | 51 | 4.8 | SM14-Ex-EX37 | |
| Kirkland_Main-208 | Kirkland_Manholes-1204 | 17.89 | Kirkland_Manholes-516 | 17.69 | 304.6 | 0.07 | 12 | PVC | 0.01 | 533 | 9 | 53 | 62 | 11.7 | SM14-Ex-EX37 | |
| Kirkland_Main-209 | Kirkland_Manholes-1197 | 181.82 | Kirkland_Manholes-1196 | 172.3 | 310.3 | 3.07 | 8 | | 0.012 | 1,029 | 7 | 41 | 48 | 4.7 | | |
| Kirkland_Main-210 | Kirkland_Manholes-1196 | 172.3 | Kirkland_Manholes-1195 | 162.64 | 327.7 | 2.95 | 8 | | 0.012 | 1,009 | 8 | 50 | 58 | 5.7 | | |
| Kirkland_Main-211 | Kirkland_Manholes-1195 | 162.64 | Kirkland_Manholes-1190 | 151.12 | 307.8 | 3.74 | 8 | | 0.012 | 1,137 | 9 | 58 | 67 | 5.9 | | |
| Kirkland_Main-212 | Kirkland_Manholes-1190 | 151.12 | Kirkland_Manholes-1405 | 132.7 | 345 | 5.34 | 8 | | 0.012 | 1,358 | 12 | 74 | 87 | 6.4 | | |
| Kirkland_Main-213 | Kirkland_Manholes-1191 | 345.24 | Kirkland_Manholes-1192 | 340.89 | 127.3 | 3.42 | 6 | Vitrified Clay | 0.013 | 465 | 16 | 4 | 20 | 4.4 | | |
| Kirkland_Main-214 | Kirkland_Manholes-1192 | 340.89 | Kirkland_Manholes-1193 | 318.62 | 250.8 | 8.88 | 6 | Vitrified Clay | 0.013 | 750 | 68 | 9 | 77 | 10.2 | | |
| Kirkland_Main-215 | Kirkland_Manholes-1193 | 318.62 | Kirkland_Manholes-1194 | 312.16 | 165.2 | 3.91 | 6 | Vitrified Clay | 0.013 | 498 | 68 | 13 | 81 | 16.3 | | |
| Kirkland_Main-216 | Kirkland_Manholes-1194 | 312.16 | Kirkland_Manholes-1212 | 307.51 | 140.5 | 3.31 | 6 | Concrete | 0.013 | 458 | 69 | 17 | 86 | 18.7 | | |
| Kirkland_Main-217 | Kirkland_Manholes-1146 | 215.3 | Kirkland_Manholes-500 | 209.24 | 317 | 1.91 | 8 | PVC | 0.01 | 975 | 18 | 50 | 68 | 7 | SM4 | |
| Kirkland_Main-218 | Kirkland_Manholes-1225 | 212.63 | Kirkland_Manholes-1147 | 194.47 | 343.1 | 5.29 | 8 | PVC | 0.01 | 1,622 | 2 | 8 | 11 | 0.7 | SM14-Ex-EX88 | |
| Kirkland_Main-219 | Kirkland_Manholes-500 | 209.24 | Kirkland_Manholes-1147 | 194.47 | 315.3 | 4.68 | 8 | PVC | 0.01 | 1,526 | 26 | 66 | 92 | 6 | SM4 | |
| Kirkland_Main-220 | Kirkland_Manholes-1149 | 192.13 | Kirkland_Manholes-1148 | 179.25 | 269.3 | 4.78 | 8 | PVC | 0.01 | 1,542 | 25 | 64 | 89 | 5.8 | SM14-Ex-EX89 | |
| Kirkland_Main-221 | Kirkland_Manholes-1147 | 194.47 | Kirkland_Manholes-1148 | 179.25 | 319 | 4.77 | 8 | PVC | 0.01 | 1,540 | 31 | 83 | 114 | 7.4 | SM4 | |
| Kirkland_Main-222 | Kirkland_Manholes-1148 | 179.25 | Kirkland_Manholes-1796 | 160.8 | 313.7 | 5.88 | 8 | PVC | 0.01 | 1,710 | 59 | 155 | 214 | 12.5 | SM4 | |
| Kirkland_Main-223 | Kirkland_Manholes-1171 | 160.49 | Kirkland_Manholes-1150 | 151.79 | 210.3 | 4.14 | 8 | PVC | 0.01 | 1,434 | 15 | 41 | 56 | 3.9 | SM10 | |
| Kirkland_Main-224 | Kirkland_Manholes-1129 | 164.28 | Kirkland_Manholes-1128 | 162.57 | 73.5 | 2.33 | 8 | PVC | 0.01 | 1,075 | 0 | 4 | 4 | 0.4 | SM14-Ex-EX4 | |
| Kirkland_Main-225 | Kirkland_Manholes-1111 | 165.6 | O-8 | 165.51 | 22.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 9 | 10 | 2.2 | | |
| Kirkland_Main-227 | Kirkland_Manholes-197 | 50.1 | Kirkland_Manholes-196 | 49.03 | 107.3 | 1 | 8 | PVC | 0.01 | 704 | 12 | 36 | 47 | 6.7 | SM14-Ex-EX43 | |
| Kirkland_Main-228 | Kirkland_Manholes-196 | 49.03 | Kirkland_Manholes-195 | 48.03 | 74.6 | 1.34 | 8 | PVC | 0.01 | 816 | 12 | 40 | 53 | 6.4 | SM14-Ex-EX43 | |
| Kirkland_Main-229 | Kirkland_Manholes-740 | 221.28 | Kirkland_Manholes-711 | 219.85 | 98.7 | 1.45 | 8 | PVC | 0.01 | 849 | 10 | 4 | 15 | 1.7 | | |
| Kirkland_Main-230 | Kirkland_Manholes-1107 | 164.79 | O-9 | 160.2 | 26.3 | 17.47 | 8 | PVC | 0.01 | 2,947 | 1 | 9 | 9 | 0.3 | SM14-Ex-EX21 | |
| Kirkland_Main-231 | Kirkland_Manholes-1106 | 168.9 | O-10 | 168.5 | 24.6 | 1.64 | 18 | PVC | 0.01 | 7,851 | 913 | 2,292 | 3,205 | 40.8 | | Drop Connection |
| Kirkland_Main-232 | Kirkland_Manholes-1118 | 200.71 | Kirkland_Manholes-1117 | 196.58 | 128.3 | 3.22 | 8 | PVC | 0.01 | 1,265 | 2 | 4 | 7 | 0.5 | | |
| Kirkland_Main-233 | Kirkland_Manholes-1115 | 186.39 | Kirkland_Manholes-1114 | 181.51 | 185.2 | 2.63 | 15 | PVC | 0.01 | 6,118 | 22 | 17 | 39 | 0.6 | | |
| Kirkland_Main-234 | Kirkland_Manholes-1114 | 181.51 | Kirkland_Manholes-1113 | 180.6 | 148.4 | 0.61 | 15 | PVC | 0.01 | 2,952 | 40 | 21 | 61 | 2.1 | | |
| Kirkland_Main-235 | Kirkland_Manholes-1143 | 203.09 | Kirkland_Manholes-1144 | 194 | 101.9 | 8.92 | 8 | PVC | 0.01 | 2,105 | 1 | 8 | 10 | 0.5 | SM14-Ex-EX82 | |
| Kirkland_Main-236 | Kirkland_Manholes-1144 | 194 | Kirkland_Manholes-1145 | 190.6 | 30.2 | 11.26 | 8 | PVC | 0.01 | 2,366 | 3 | 17 | 19 | 0.8 | | |
| Kirkland_Main-237 | Kirkland_Manholes-1145 | 190.6 | Kirkland_Manholes-1211 | 186.99 | 174.5 | 2.07 | 8 | PVC | 0.01 | 1,014 | 6 | 25 | 30 | 3 | | |
| Kirkland_Main-238 | Kirkland_Manholes-1184 | 19.39 | Kirkland_Manholes-1185 | 19.29 | 139.1 | 0.07 | 12 | PVC | 0.01 | 557 | 36 | 177 | 212 | 38.1 | SM14-Ex-EX37 | |
| Kirkland_Main-239 | Kirkland_Manholes-1183 | 19.89 | Kirkland_Manholes-1184 | 19.39 | 178.8 | 0.28 | 12 | PVC | 0.01 | 1,099 | 34 | 168 | 202 | 18.4 | SM14-Ex-EX37 | |
| Kirkland_Main-242 | Kirkland_Manholes-1131 | 191.56 | Kirkland_Manholes-1200 | 169.25 | 277.8 | 8.03 | 8 | PVC | 0.01 | 1,998 | 21 | 42 | 63 | 3.2 | SM14-Ex-EX63 | |
| Kirkland_Main-243 | Kirkland_Manholes-1200 | 169.25 | Kirkland_Manholes-1201 | 159.96 | 155.1 | 5.99 | 8 | PVC | 0.01 | 1,726 | 25 | 47 | 71 | 4.1 | SM14-Ex-EX62 | |
| Kirkland_Main-244 | Kirkland_Manholes-1201 | 159.96 | Kirkland_Manholes-1182 | 159 | 65 | 1.48 | 8 | PVC | 0.01 | 857 | 26 | 51 | 77 | 9 | SM14-Ex-EX62 | |
| Kirkland_Main-245 | Kirkland_Manholes-1182 | 159 | Kirkland_Manholes-529 | 155.16 | 83.2 | 4.62 | 8 | PVC | 0.01 | 1,515 | 27 | 55 | 82 | 5.4 | SM14-Ex-EX62 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-246 | Kirkland_Manholes-529 | 155.16 | Kirkland_Manholes-527 | 146.55 | 210.2 | 4.1 | 8 | PVC | 0.01 | 1,427 | 28 | 60 | 88 | 6.1 | SM10 | |
| Kirkland_Main-247 | Kirkland_Manholes-516 | 17.69 | Kirkland_Manholes-2958 | 17.19 | 310.2 | 0.16 | 12 | PVC | 0.01 | 835 | 10 | 62 | 72 | 8.6 | SM14-Ex-EX37 | |
| Kirkland_Main-248 | Kirkland_Manholes-318 | 146.51 | Kirkland_Manholes-2957 | 145.86 | 162.1 | 0.4 | 12 | PVC | 0.01 | 1,315 | 171 | 339 | 511 | 38.8 | SM14-Ex-EX30 | |
| Kirkland_Main-249 | Kirkland_Manholes-2957 | 145.86 | Kirkland_Manholes-426 | 144.6 | 315.5 | 0.4 | 12 | PVC | 0.01 | 1,315 | 176 | 344 | 519 | 39.5 | SM14-Ex-EX30 | |
| Kirkland_Main-251 | Kirkland_Manholes-524 | 157.52 | Kirkland_Manholes-525 | 156.27 | 278.3 | 0.45 | 8 | PVC | 0.01 | 473 | 3 | 17 | 19 | 4.1 | SM10 | |
| Kirkland_Main-253 | Kirkland_Manholes-2932 | 327.56 | Kirkland_Manholes-2931 | 326.77 | 30 | 2.63 | 8 | PVC | 0.01 | 1,144 | 7 | 26 | 33 | 2.9 | | |
| Kirkland_Main-254 | Kirkland_Manholes-2931 | 326.77 | Kirkland_Manholes-2930 | 326.38 | 131.8 | 0.3 | 8 | PVC | 0.01 | 384 | 8 | 30 | 38 | 10 | | |
| Kirkland_Main-255 | Kirkland_Manholes-2930 | 326.38 | Kirkland_Manholes-878 | 325.66 | 147.9 | 0.49 | 8 | PVC | 0.01 | 492 | 10 | 34 | 44 | 9 | | |
| Kirkland_Main-257 | Kirkland_Manholes-2345 | 343.84 | Kirkland_Manholes-2343 | 315.2 | 169.5 | 16.9 | 8 | PVC | 0.01 | 2,898 | 9 | 21 | 30 | 1 | SM14-Ex-EX255 | |
| Kirkland_Main-258 | Kirkland_Manholes-2344 | 315.75 | Kirkland_Manholes-2343 | 315.2 | 137.3 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 13 | 21 | 4.6 | SM14-Ex-EX254 | |
| Kirkland_Main-259 | Kirkland_Manholes-2256 | 329.88 | Kirkland_Manholes-2344 | 315.75 | 334.7 | 4.22 | 8 | PVC | 0.01 | 1,449 | 5 | 9 | 13 | 0.9 | SM14-Ex-EX254 | |
| Kirkland_Main-261 | Kirkland_Manholes-2346 | 349.24 | Kirkland_Manholes-2345 | 343.84 | 323.2 | 1.67 | 8 | PVC | 0.01 | 911 | 2 | 4 | 7 | 0.7 | SM14-Ex-EX255 | |
| Kirkland_Main-262 | Kirkland_Manholes-2347 | 359.76 | Kirkland_Manholes-2345 | 343.84 | 158.1 | 10.07 | 8 | PVC | 0.01 | 2,237 | 4 | 13 | 16 | 0.7 | SM14-Ex-EX255 | |
| Kirkland_Main-263 | Kirkland_Manholes-2348 | 314.6 | Kirkland_Manholes-2334 | 313.34 | 224.3 | 0.56 | 8 | PVC | 0.01 | 528 | 19 | 43 | 62 | 11.7 | SM14-Ex-EX254 | |
| Kirkland_Main-264 | Kirkland_Manholes-2350 | 364.04 | Kirkland_Manholes-2347 | 359.76 | 357 | 1.2 | 8 | PVC | 0.01 | 772 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX255 | |
| Kirkland_Main-265 | Kirkland_Manholes-2351 | 360.37 | Kirkland_Manholes-2347 | 359.76 | 181.2 | 0.34 | 8 | PVC | 0.01 | 409 | 2 | 4 | 6 | 1.4 | SM14-Ex-EX255 | |
| Kirkland_Main-266 | Kirkland_Manholes-2352 | 284.5 | Kirkland_Manholes-2259 | 272.05 | 240.1 | 5.18 | 8 | PVC | 0.01 | 1,605 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX250 | |
| Kirkland_Main-267 | Kirkland_Manholes-2353 | 298.2 | Kirkland_Manholes-2332 | 296.43 | 253 | 0.7 | 8 | PVC | 0.01 | 590 | 3 | 4 | 7 | 1.2 | SM14-Ex-EX253 | |
| Kirkland_Main-268 | Kirkland_Manholes-2355 | 240.55 | Kirkland_Manholes-2124 | 217.78 | 364.4 | 6.25 | 12 | PVC | 0.01 | 5,196 | 409 | 953 | 1,362 | 26.2 | SM14-Ex-EX248 | |
| Kirkland_Main-269 | Kirkland_Manholes-2354 | 256.04 | Kirkland_Manholes-2355 | 240.55 | 281.2 | 5.51 | 12 | PVC | 0.01 | 4,879 | 406 | 949 | 1,354 | 27.8 | SM14-Ex-EX248 | |
| Kirkland_Main-270 | Kirkland_Manholes-2357 | 271.18 | Kirkland_Manholes-2354 | 256.04 | 199.4 | 7.59 | 8 | PVC | 0.01 | 1,943 | 3 | 9 | 12 | 0.6 | SM14-Ex-EX249 | |
| Kirkland_Main-271 | Kirkland_Manholes-2258 | 263.77 | Kirkland_Manholes-2354 | 256.04 | 150.5 | 5.14 | 12 | PVC | 0.01 | 4,711 | 401 | 936 | 1,337 | 28.4 | SM14-Ex-EX248 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-272 | Kirkland_Manholes-2356 | 278.21 | Kirkland_Manholes-2357 | 271.18 | 149.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-273 | Kirkland_Manholes-2324 | 245.37 | Kirkland_Manholes-2420 | 230.11 | 227.1 | 6.72 | 8 | PVC | 0.01 | 1,828 | 57 | 159 | 216 | 11.8 | | |
| Kirkland_Main-274 | Kirkland_Manholes-2358 | 262.09 | Kirkland_Manholes-2412 | 260.78 | 357.3 | 0.37 | 8 | PVC | 0.01 | 427 | 5 | 9 | 13 | 3.1 | | |
| Kirkland_Main-275 | Kirkland_Manholes-2359 | 271.5 | Kirkland_Manholes-2358 | 262.09 | 128.6 | 7.32 | 8 | PVC | 0.01 | 1,907 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-276 | Kirkland_Manholes-2362 | 285.37 | Kirkland_Manholes-2360 | 266.1 | 385.1 | 5 | 8 | PVC | 0.01 | 1,577 | 26 | 64 | 90 | 5.7 | | |
| Kirkland_Main-277 | Kirkland_Manholes-2360 | 266.1 | Kirkland_Manholes-2411 | 259.15 | 259.9 | 2.67 | 8 | PVC | 0.01 | 1,153 | 28 | 69 | 97 | 8.4 | | |
| Kirkland_Main-278 | Kirkland_Manholes-2361 | 291.01 | Kirkland_Manholes-2362 | 285.37 | 28 | 20.16 | 8 | PVC | 0.01 | 3,166 | 4 | 9 | 13 | 0.4 | | |
| Kirkland_Main-279 | Kirkland_Manholes-2371 | 291.2 | Kirkland_Manholes-2362 | 285.37 | 123.7 | 4.71 | 8 | PVC | 0.01 | 1,530 | 21 | 52 | 72 | 4.7 | | |
| Kirkland_Main-280 | Kirkland_Manholes-2363 | 291.88 | Kirkland_Manholes-2361 | 291.01 | 353 | 0.25 | 8 | PVC | 0.01 | 350 | 2 | 4 | 7 | 1.9 | | |
| Kirkland_Main-281 | Kirkland_Manholes-2364 | 284.3 | Kirkland_Manholes-2429 | 273.52 | 255 | 4.23 | 8 | PVC | 0.01 | 1,450 | 37 | 99 | 136 | 9.4 | SM14-Ex-EX260 | |
| Kirkland_Main-282 | Kirkland_Manholes-2382 | 327.1 | Kirkland_Manholes-2369 | 315.99 | 220.4 | 5.04 | 8 | PVC | 0.01 | 1,583 | 3 | 4 | 8 | 0.5 | | |
| Kirkland_Main-283 | Kirkland_Manholes-2369 | 315.99 | Kirkland_Manholes-2370 | 312.97 | 65.7 | 4.59 | 8 | PVC | 0.01 | 1,511 | 31 | 73 | 104 | 6.9 | SM14-Ex-EX260 | |
| Kirkland_Main-284 | Kirkland_Manholes-2383 | 328.5 | Kirkland_Manholes-2369 | 315.99 | 277.1 | 4.51 | 8 | PVC | 0.01 | 1,498 | 26 | 64 | 90 | 6 | SM14-Ex-EX260 | |
| Kirkland_Main-285 | Kirkland_Manholes-2370 | 312.97 | Kirkland_Manholes-2367 | 295.27 | 303.5 | 5.83 | 8 | PVC | 0.01 | 1,703 | 32 | 77 | 109 | 6.4 | SM14-Ex-EX260 | |
| Kirkland_Main-286 | Kirkland_Manholes-2365 | 289.93 | Kirkland_Manholes-2364 | 284.3 | 103.6 | 5.44 | 8 | PVC | 0.01 | 1,644 | 36 | 94 | 130 | 7.9 | SM14-Ex-EX260 | |
| Kirkland_Main-287 | Kirkland_Manholes-2367 | 295.27 | Kirkland_Manholes-2366 | 292.68 | 34.9 | 7.43 | 8 | PVC | 0.01 | 1,921 | 33 | 82 | 115 | 6 | SM14-Ex-EX260 | |
| Kirkland_Main-288 | Kirkland_Manholes-181 | 38.4 | Kirkland_Manholes-180 | 38.25 | 24 | 0.62 | 8 | PVC | 0.01 | 555 | 3 | 13 | 16 | 2.9 | | |
| Kirkland_Main-289 | Kirkland_Manholes-184 | 40.15 | Kirkland_Manholes-181 | 38.4 | 362.3 | 0.48 | 8 | PVC | 0.01 | 490 | 1 | 4 | 5 | 1 | | |
| Kirkland_Main-290 | Kirkland_Manholes-180 | 38.25 | Kirkland_Manholes-179 | 37.91 | 155.1 | 0.22 | 18 | PVC | 0.01 | 2,874 | 437 | 991 | 1,427 | 49.7 | SM3 | |
| Kirkland_Main-291 | Kirkland_Manholes-179 | 37.91 | Kirkland_Manholes-177 | 35.5 | 248.2 | 0.97 | 18 | PVC | 0.01 | 6,039 | 443 | 1,004 | 1,447 | 24 | SM3 | |
| Kirkland_Main-292 | Kirkland_Manholes-177 | 35.5 | Kirkland_Manholes-176 | 34.72 | 401.5 | 0.19 | 18 | PVC | 0.01 | 2,705 | 451 | 1,031 | 1,482 | 54.8 | SM3 | |
| Kirkland_Main-293 | Kirkland_Manholes-176 | 34.72 | Kirkland_Manholes-175 | 34.4 | 144.6 | 0.22 | 18 | PVC | 0.01 | 2,875 | 452 | 1,035 | 1,487 | 51.7 | SM3 | |
| Kirkland_Main-294 | Kirkland_Manholes-175 | 34.4 | Kirkland_Manholes-171 | 25.99 | 328.5 | 2.56 | 18 | PVC | 0.01 | 9,806 | 479 | 1,107 | 1,586 | 16.2 | SM3 | |
| Kirkland_Main-295 | Kirkland_Manholes-171 | 25.99 | Kirkland_Manholes-170 | 25.29 | 316.1 | 0.22 | 18 | PVC | 0.01 | 2,875 | 484 | 1,129 | 1,613 | 56.1 | SM3 | Drop Connection |
| Kirkland_Main-296 | Kirkland_Manholes-172 | 31.43 | Kirkland_Manholes-171 | 31.34 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 18 | 22 | 5 | | Drop Connection |
| Kirkland_Main-297 | Kirkland_Manholes-190 | 38.49 | Kirkland_Manholes-180 | 38.25 | 107 | 0.22 | 15 | PVC | 0.01 | 1,763 | 434 | 973 | 1,407 | 79.8 | SM3 | |
| Kirkland_Main-298 | Kirkland_Manholes-183 | 41.05 | Kirkland_Manholes-190 | 38.49 | 284.2 | 0.9 | 15 | PVC | 0.01 | 3,580 | 433 | 968 | 1,401 | 39.1 | SM3 | |
| Kirkland_Main-299 | Kirkland_Manholes-167 | 19.46 | Kirkland_Manholes-241 | 14.7 | 339.1 | 1.4 | 18 | PVC | 0.01 | 7,261 | 494 | 1,169 | 1,663 | 22.9 | SM3 | |
| Kirkland_Main-300 | Kirkland_Manholes-164 | 59.16 | Kirkland_Manholes-242 | 58.15 | 252.4 | 0.4 | 8 | PVC | 0.01 | 446 | 22 | 54 | 76 | 17 | | Drop Connection |
| Kirkland_Main-301 | Kirkland_Manholes-203 | 83.91 | Kirkland_Manholes-202 | 68.28 | 127.4 | 12.27 | 8 | PVC | 0.01 | 2,470 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-302 | Kirkland_Manholes-202 | 68.28 | Kirkland_Manholes-204 | 54.86 | 133.6 | 10.05 | 8 | PVC | 0.01 | 2,235 | 2 | 9 | 11 | 0.5 | | |
| Kirkland_Main-303 | Kirkland_Manholes-204 | 54.86 | Kirkland_Manholes-169 | 21.92 | 184.1 | 17.89 | 8 | PVC | 0.01 | 2,982 | 4 | 13 | 18 | 0.6 | | |
| Kirkland_Main-304 | Kirkland_Manholes-209 | 226.32 | Kirkland_Manholes-210 | 216.33 | 137.5 | 7.27 | 8 | PVC | 0.01 | 1,901 | 3 | 4 | 7 | 0.4 | SM14-Ex-EX66 | |
| Kirkland_Main-306 | Kirkland_Manholes-214 | 228.3 | Kirkland_Manholes-213 | 213.69 | 210.7 | 6.93 | 8 | PVC | 0.01 | 1,856 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-307 | Kirkland_Manholes-213 | 213.69 | Kirkland_Manholes-212 | 184.62 | 186.4 | 15.59 | 8 | PVC | 0.01 | 2,784 | 7 | 9 | 16 | 0.6 | | |
| Kirkland_Main-308 | Kirkland_Manholes-212 | 184.62 | Kirkland_Manholes-216 | 184.01 | 222.7 | 0.27 | 8 | PVC | 0.01 | 369 | 45 | 103 | 148 | 40.1 | | |
| Kirkland_Main-309 | Kirkland_Manholes-211 | 186.37 | Kirkland_Manholes-212 | 184.62 | 362.4 | 0.48 | 8 | PVC | 0.01 | 490 | 36 | 89 | 125 | 25.5 | | |
| Kirkland_Main-310 | Kirkland_Manholes-210 | 216.33 | Kirkland_Manholes-211 | 186.37 | 372.2 | 8.05 | 8 | PVC | 0.01 | 2,000 | 6 | 9 | 15 | 0.8 | SM14-Ex-EX66 | |
| Kirkland_Main-312 | Kirkland_Manholes-216 | 184.01 | Kirkland_Manholes-217 | 183.22 | 296 | 0.27 | 8 | PVC | 0.01 | 364 | 47 | 107 | 154 | 42.3 | | |
| Kirkland_Main-313 | Kirkland_Manholes-215 | 220.47 | Kirkland_Manholes-217 | 183.22 | 347.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 5 | 4 | 9 | 0.4 | | |
| Kirkland_Main-314 | Kirkland_Manholes-208 | 241.09 | Kirkland_Manholes-207 | 240.8 | 258.2 | 0.11 | 8 | PVC | 0.01 | 236 | 5 | 13 | 18 | 7.8 | SM14-Ex-EX57 | |
| Kirkland_Main-315 | Kirkland_Manholes-207 | 240.8 | Kirkland_Manholes-206 | 239.08 | 251.3 | 0.68 | 8 | PVC | 0.01 | 583 | 9 | 18 | 26 | 4.5 | SM14-Ex-EX57 | |
| Kirkland_Main-316 | Kirkland_Manholes-1236 | 256.67 | Kirkland_Manholes-206 | 239.08 | 279.5 | 6.29 | 8 | PVC | 0.01 | 1,769 | 6 | 9 | 15 | 0.8 | SM14-Ex-EX60 | |
| Kirkland_Main-317 | Kirkland_Manholes-206 | 239.08 | Kirkland_Manholes-205 | 228.15 | 235.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 16 | 31 | 47 | 3.1 | SM14-Ex-EX57 | |
| Kirkland_Main-318 | Kirkland_Manholes-227 | 223.31 | Kirkland_Manholes-226 | 219.39 | 138.6 | 2.83 | 8 | PVC | 0.01 | 1,186 | 9 | 31 | 41 | 3.4 | | |
| Kirkland_Main-319 | Kirkland_Manholes-229 | 178.29 | Kirkland_Manholes-230 | 172.81 | 192.8 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 6 | 0.5 | | |
| Kirkland_Main-321 | Kirkland_Manholes-2569 | 300.83 | Kirkland_Manholes-2570 | 299.81 | 42.2 | 2.42 | 8 | PVC | 0.01 | 1,096 | 1 | 4 | 6 | 0.5 | | |
| Kirkland_Main-323 | Kirkland_Manholes-2570 | 299.81 | Kirkland_Manholes-2573 | 298.95 | 117.6 | 0.73 | 8 | PVC | 0.01 | 603 | 3 | 13 | 16 | 2.7 | | |
| Kirkland_Main-325 | Kirkland_Manholes-2574 | 291.72 | Kirkland_Manholes-2578 | 278.46 | 194.2 | 6.83 | 8 | PVC | 0.01 | 1,842 | 8 | 34 | 43 | 2.3 | | |
| Kirkland_Main-326 | Kirkland_Manholes-2575 | 296.63 | Kirkland_Manholes-2574 | 291.72 | 277.7 | 1.77 | 8 | PVC | 0.01 | 938 | 8 | 30 | 38 | 4 | | |
| Kirkland_Main-327 | Kirkland_Manholes-2572 | 298.88 | Kirkland_Manholes-2575 | 296.63 | 102.9 | 2.19 | 8 | PVC | 0.01 | 1,042 | 6 | 26 | 32 | 3.1 | | |
| Kirkland_Main-330 | Kirkland_Manholes-2576 | 288.87 | Kirkland_Manholes-2577 | 284.91 | 171.7 | 2.31 | 8 | PVC | 0.01 | 1,071 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-331 | Kirkland_Manholes-2577 | 284.91 | Kirkland_Manholes-2580 | 279.25 | 137.4 | 4.12 | 8 | PVC | 0.01 | 1,431 | 3 | 9 | 12 | 0.8 | | |
| Kirkland_Main-332 | Kirkland_Manholes-2580 | 279.25 | Kirkland_Manholes-2579 | 271.58 | 247.7 | 3.1 | 8 | PVC | 0.01 | 1,241 | 4 | 13 | 17 | 1.4 | | |
| Kirkland_Main-333 | Kirkland_Manholes-2582 | 256.45 | Kirkland_Manholes-2583 | 255.68 | 58.5 | 1.32 | 8 | PVC | 0.01 | 809 | 21 | 82 | 103 | 12.7 | SM14-Ex-EX313 | |
| Kirkland_Main-334 | Kirkland_Manholes-2583 | 255.68 | Kirkland_Manholes-2584 | 252.35 | 54.4 | 6.12 | 8 | PVC | 0.01 | 1,744 | 22 | 86 | 108 | 6.2 | SM14-Ex-EX313 | |
| Kirkland_Main-335 | Kirkland_Manholes-2584 | 252.35 | Kirkland_Manholes-2787 | 252.17 | 133.2 | 0.14 | 8 | PVC | 0.01 | 259 | 23 | 90 | 113 | 43.5 | SM14-Ex-EX313 | |
| Kirkland_Main-336 | Kirkland_Manholes-2581 | 260.74 | Kirkland_Manholes-2582 | 256.45 | 63.8 | 6.72 | 8 | PVC | 0.01 | 1,828 | 7 | 21 | 29 | 1.6 | | |
| Kirkland_Main-337 | Kirkland_Manholes-2786 | 258.1 | Kirkland_Manholes-2582 | 256.45 | 266.6 | 0.62 | 8 | PVC | 0.01 | 555 | 14 | 56 | 69 | 12.5 | | |
| Kirkland_Main-338 | Kirkland_Manholes-2579 | 271.58 | Kirkland_Manholes-2581 | 260.74 | 232.4 | 4.66 | 8 | PVC | 0.01 | 1,523 | 6 | 17 | 23 | 1.5 | | |
| Kirkland_Main-339 | Kirkland_Manholes-2586 | 274.45 | Kirkland_Manholes-2585 | 272.57 | 43.2 | 4.35 | 8 | PVC | 0.01 | 1,471 | 2 | 9 | 10 | 0.7 | | |
| Kirkland_Main-340 | Kirkland_Manholes-2587 | 285.24 | Kirkland_Manholes-2586 | 274.45 | 298.8 | 3.61 | 8 | PVC | 0.01 | 1,340 | 1 | 4 | 6 | 0.4 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-342 | Kirkland_Manholes-2588 | 292.14 | Kirkland_Manholes-2589 | 286.31 | 102.9 | 5.66 | 8 | PVC | 0.01 | 1,678 | 31 | 86 | 117 | 7 | SM14-Ex-EX303 | |
| Kirkland_Main-343 | Kirkland_Manholes-2591 | 288.43 | Kirkland_Manholes-2589 | 286.31 | 198.2 | 1.07 | 8 | PVC | 0.01 | 729 | 1 | 4 | 6 | 0.8 | SM14-Ex-EX305 | |
| Kirkland_Main-344 | Kirkland_Manholes-2590 | 303.32 | Kirkland_Manholes-2588 | 292.14 | 220.1 | 5.08 | 8 | PVC | 0.01 | 1,589 | 13 | 47 | 60 | 3.8 | SM14-Ex-EX303 | |
| Kirkland_Main-345 | Kirkland_Manholes-2592 | 294.57 | Kirkland_Manholes-2588 | 292.14 | 159.1 | 1.53 | 8 | PVC | 0.01 | 871 | 3 | 9 | 12 | 1.4 | SM14-Ex-EX306 | |
| Kirkland_Main-346 | Kirkland_Manholes-2589 | 286.31 | Kirkland_Manholes-2593 | 281.14 | 131.6 | 3.93 | 8 | PVC | 0.01 | 1,398 | 34 | 94 | 129 | 9.2 | SM14-Ex-EX303 | |
| Kirkland_Main-347 | Kirkland_Manholes-2593 | 281.14 | Kirkland_Manholes-2585 | 272.57 | 372.5 | 2.3 | 8 | PVC | 0.01 | 1,069 | 35 | 99 | 134 | 12.5 | SM14-Ex-EX299 | |
| Kirkland_Main-348 | Kirkland_Manholes-2585 | 272.57 | Kirkland_Manholes-2595 | 270.48 | 180.9 | 1.16 | 8 | PVC | 0.01 | 758 | 38 | 112 | 149 | 19.7 | SM14-Ex-EX299 | |
| Kirkland_Main-349 | Kirkland_Manholes-2595 | 270.48 | Kirkland_Manholes-2594 | 263.61 | 407.7 | 1.68 | 8 | PVC | 0.01 | 915 | 40 | 116 | 156 | 17.1 | SM14-Ex-EX299 | |
| Kirkland_Main-350 | Kirkland_Manholes-2594 | 263.61 | Kirkland_Manholes-2601 | 228.74 | 402.9 | 8.65 | 8 | PVC | 0.01 | 2,074 | 44 | 120 | 164 | 7.9 | SM14-Ex-EX299 | |
| Kirkland_Main-352 | Kirkland_Manholes-2598 | 252.13 | Kirkland_Manholes-2599 | 217.5 | 325.5 | 10.64 | 8 | PVC | 0.01 | 2,300 | 4 | 13 | 17 | 0.7 | SM14-Ex-EX301 | |
| Kirkland_Main-353 | Kirkland_Manholes-2597 | 256.37 | Kirkland_Manholes-2598 | 252.13 | 172.1 | 2.46 | 8 | PVC | 0.01 | 1,107 | 2 | 9 | 10 | 0.9 | SM14-Ex-EX301 | |
| Kirkland_Main-354 | Kirkland_Manholes-2596 | 262.84 | Kirkland_Manholes-2597 | 256.37 | 380.5 | 1.7 | 8 | PVC | 0.01 | 919 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX301 | |
| Kirkland_Main-355 | Kirkland_Manholes-853 | 340.38 | Kirkland_Manholes-851 | 339.16 | 105.8 | 1.16 | 8 | PVC | 0.01 | 758 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-356 | Kirkland_Manholes-851 | 339.16 | Kirkland_Manholes-852 | 338.63 | 131.5 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 39 | 50 | 11.3 | | |
| Kirkland_Main-357 | Kirkland_Manholes-852 | 338.63 | Kirkland_Manholes-854 | 336.98 | 245.6 | 0.67 | 8 | PVC | 0.01 | 578 | 12 | 43 | 55 | 9.5 | | |
| Kirkland_Main-358 | Kirkland_Manholes-854 | 336.98 | Kirkland_Manholes-855 | 335.54 | 321 | 0.45 | 8 | PVC | 0.01 | 472 | 14 | 47 | 61 | 12.9 | | |
| Kirkland_Main-359 | Kirkland_Manholes-855 | 335.54 | Kirkland_Manholes-857 | 334.93 | 126.6 | 0.48 | 8 | PVC | 0.01 | 489 | 14 | 52 | 66 | 13.5 | | |
| Kirkland_Main-360 | Kirkland_Manholes-857 | 334.93 | Kirkland_Manholes-856 | 333.21 | 25.3 | 6.8 | 8 | PVC | 0.01 | 1,838 | 15 | 56 | 71 | 3.9 | | |
| Kirkland_Main-361 | Kirkland_Manholes-858 | 311.1 | Kirkland_Manholes-859 | 309.2 | 142 | 1.34 | 8 | PVC | 0.01 | 816 | 3 | 4 | 7 | 0.9 | SM14-Ex-EX51 | |
| Kirkland_Main-362 | Kirkland_Manholes-198 | 52.1 | Kirkland_Manholes-197 | 50.1 | 250.9 | 0.8 | 8 | PVC | 0.01 | 630 | 9 | 31 | 40 | 6.4 | SM14-Ex-EX43 | |
| Kirkland_Main-363 | Kirkland_Manholes-1648 | 152.03 | Kirkland_Manholes-1649 | 151.45 | 206.3 | 0.28 | 12 | PVC | 0.01 | 1,100 | 7 | 33 | 40 | 3.7 | SM14-Ex-EX196 | |
| Kirkland_Main-364 | Kirkland_Manholes-1649 | 151.45 | Kirkland_Manholes-1650 | 145.43 | 128.4 | 4.69 | 12 | PVC | 0.01 | 4,501 | 11 | 41 | 52 | 1.2 | SM14-Ex-EX196 | |
| Kirkland_Main-365 | Kirkland_Manholes-1651 | 160.29 | Kirkland_Manholes-1650 | 145.43 | 297.8 | 4.99 | 8 | PVC | 0.01 | 1,575 | 2 | 17 | 18 | 1.2 | | |
| Kirkland_Main-366 | Kirkland_Manholes-1652 | 161.6 | Kirkland_Manholes-1651 | 160.29 | 197.8 | 0.66 | 8 | PVC | 0.01 | 574 | 1 | 8 | 9 | 1.6 | | |
| Kirkland_Main-369 | Kirkland_Manholes-1654 | 136.96 | Kirkland_Manholes-1653 | 127.26 | 270 | 3.59 | 8 | PVC | 0.01 | 1,336 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX168 | |
| Kirkland_Main-370 | Kirkland_Manholes-1653 | 127.26 | Kirkland_Manholes-1767 | 122.16 | 112.6 | 4.53 | 8 | PVC | 0.01 | 1,501 | 7 | 17 | 24 | 1.6 | SM14-Ex-EX168 | |
| Kirkland_Main-372 | Kirkland_Manholes-977 | 225.95 | Kirkland_Manholes-978 | 222.9 | 113.4 | 2.69 | 8 | PVC | 0.01 | 1,157 | 13 | 49 | 62 | 5.4 | | |
| Kirkland_Main-374 | Kirkland_Manholes-2858 | 23.78 | Kirkland_Manholes-2857 | 19.7 | 174.1 | 2.34 | 8 | PVC | 0.01 | 1,079 | 0 | 5 | 5 | 0.4 | SM14-Ex-EX315 | |
| Kirkland_Main-376 | Kirkland_Manholes-2865 | 30.12 | Kirkland_Manholes-2864 | 27 | 7.9 | 39.25 | 8 | PVC | 0.01 | 4,417 | 15 | 28 | 43 | 1 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-377 | Kirkland_Manholes-2866 | 31.02 | Kirkland_Manholes-2867 | 30.31 | 15.5 | 4.58 | 8 | PVC | 0.01 | 1,509 | 10 | 20 | 31 | 2 | SM14-Ex-EX314 | |
| Kirkland_Main-378 | Kirkland_Manholes-2867 | 30.31 | Kirkland_Manholes-2865 | 30.12 | 118.6 | 0.16 | 8 | PVC | 0.01 | 282 | 10 | 24 | 35 | 12.3 | SM14-Ex-EX314 | |
| Kirkland_Main-379 | Kirkland_Manholes-2863 | 49.4 | Kirkland_Manholes-2866 | 31.02 | 310.1 | 5.93 | 8 | PVC | 0.01 | 1,716 | 8 | 16 | 24 | 1.4 | | |
| Kirkland_Main-380 | Kirkland_Manholes-1905 | 395.5 | Kirkland_Manholes-1906 | 388.2 | 277.5 | 2.63 | 8 | PVC | 0.01 | 1,143 | 15 | 43 | 58 | 5.1 | | |
| Kirkland_Main-381 | Kirkland_Manholes-1906 | 388.2 | Kirkland_Manholes-1908 | 383.29 | 92.4 | 5.31 | 8 | PVC | 0.01 | 1,625 | 25 | 52 | 77 | 4.7 | | |
| Kirkland_Main-382 | Kirkland_Manholes-1908 | 383.29 | Kirkland_Manholes-1909 | 380 | 18.3 | 18.02 | 8 | PVC | 0.01 | 2,993 | 36 | 64 | 100 | 3.3 | | |
| Kirkland_Main-383 | Kirkland_Manholes-1910 | 392.49 | Kirkland_Manholes-1908 | 383.29 | 192.6 | 4.78 | 8 | PVC | 0.01 | 1,541 | 10 | 9 | 19 | 1.2 | | |
| Kirkland_Main-386 | Kirkland_Manholes-1911 | 394.49 | Kirkland_Manholes-1910 | 392.49 | 114.9 | 1.74 | 8 | PVC | 0.01 | 930 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-388 | Kirkland_Manholes-1912 | 380.62 | Kirkland_Manholes-1907 | 380.32 | 64.6 | 0.46 | 8 | PVC | 0.01 | 480 | 20 | 9 | 29 | 6 | | |
| Kirkland_Main-389 | Kirkland_Manholes-1913 | 381.47 | Kirkland_Manholes-1912 | 380.62 | 181.1 | 0.47 | 8 | PVC | 0.01 | 483 | 20 | 4 | 24 | 5 | | |
| Kirkland_Main-390 | Kirkland_Manholes-1915 | 403.84 | Kirkland_Manholes-1903 | 399.77 | 113 | 3.6 | 8 | PVC | 0.01 | 1,338 | 2 | 4 | 7 | 0.5 | | |
| Kirkland_Main-391 | Kirkland_Manholes-1914 | 376.04 | Kirkland_Manholes-1916 | 361.73 | 343.6 | 4.16 | 8 | PVC | 0.01 | 1,439 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-392 | Kirkland_Manholes-1916 | 361.73 | Kirkland_Manholes-1965 | 345.05 | 397.2 | 4.2 | 8 | PVC | 0.01 | 1,445 | 35 | 21 | 56 | 3.9 | | |
| Kirkland_Main-393 | Kirkland_Manholes-1917 | 413.2 | Kirkland_Manholes-1919 | 411.73 | 326.8 | 0.45 | 12 | PVC | 0.01 | 1,394 | 98 | 206 | 304 | 21.8 | SM14-Ex-EX215 | |
| Kirkland_Main-394 | Kirkland_Manholes-1918 | 411.61 | Kirkland_Manholes-1920 | 409.24 | 389.6 | 0.61 | 12 | PVC | 0.01 | 1,622 | 155 | 386 | 542 | 33.4 | SM14-Ex-EX215 | |
| Kirkland_Main-395 | Kirkland_Manholes-1919 | 411.73 | Kirkland_Manholes-1918 | 411.61 | 19.4 | 0.61 | 12 | PVC | 0.01 | 1,622 | 100 | 210 | 310 | 19.1 | SM14-Ex-EX215 | |
| Kirkland_Main-396 | Kirkland_Manholes-1966 | 418.21 | Kirkland_Manholes-1918 | 411.61 | 309.4 | 2.13 | 8 | PVC | 0.01 | 1,030 | 55 | 172 | 226 | 22 | SM14-Ex-EX216 | |
| Kirkland_Main-397 | Kirkland_Manholes-2018 | 417.59 | Kirkland_Manholes-1920 | 409.24 | 266.4 | 3.13 | 8 | PVC | 0.01 | 1,248 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-398 | Kirkland_Manholes-2017 | 412 | Kirkland_Manholes-1921 | 405.86 | 284.9 | 2.16 | 8 | PVC | 0.01 | 1,035 | 11 | 21 | 32 | 3.1 | | |
| Kirkland_Main-399 | Kirkland_Manholes-1921 | 405.86 | Kirkland_Manholes-1923 | 399.87 | 337.2 | 1.78 | 12 | PVC | 0.01 | 2,771 | 172 | 425 | 597 | 21.5 | SM14-Ex-EX215 | Drop Connection |
| Kirkland_Main-400 | Kirkland_Manholes-2013 | 413.74 | Kirkland_Manholes-1922 | 401.71 | 397 | 3.03 | 8 | PVC | 0.01 | 1,227 | 41 | 103 | 144 | 11.7 | | |
| Kirkland_Main-401 | Kirkland_Manholes-1924 | 396.12 | Kirkland_Manholes-1925 | 391.68 | 40.1 | 11.08 | 8 | PVC | 0.01 | 2,347 | 7 | 17 | 24 | 1 | | |
| Kirkland_Main-402 | Kirkland_Manholes-2012 | 406.67 | Kirkland_Manholes-1924 | 396.12 | 354.7 | 2.97 | 8 | PVC | 0.01 | 1,216 | 5 | 13 | 18 | 1.5 | | |
| Kirkland_Main-403 | Kirkland_Manholes-1926 | 383.42 | Kirkland_Manholes-1927 | 378.37 | 328.1 | 1.54 | 12 | PVC | 0.01 | 2,579 | 225 | 571 | 796 | 30.9 | SM14-Ex-EX205 | |
| Kirkland_Main-404 | Kirkland_Manholes-1927 | 378.37 | Kirkland_Manholes-1928 | 375.97 | 126.7 | 1.89 | 12 | PVC | 0.01 | 2,862 | 225 | 575 | 800 | 28 | SM14-Ex-EX205 | |
| Kirkland_Main-405 | Kirkland_Manholes-1922 | 401.71 | Kirkland_Manholes-3030 | 397.75 | 20.7 | 19.14 | 8 | PVC | 0.01 | 3,085 | 43 | 107 | 151 | 4.9 | | |
| Kirkland_Main-406 | Kirkland_Manholes-1923 | 399.87 | Kirkland_Manholes-3030 | 397.75 | 24.4 | 8.7 | 12 | PVC | 0.01 | 6,130 | 172 | 429 | 601 | 9.8 | | |
| Kirkland_Main-407 | Kirkland_Manholes-3030 | 397.75 | Kirkland_Manholes-1925 | 391.68 | 339.3 | 1.79 | 12 | PVC | 0.01 | 2,781 | 216 | 541 | 757 | 27.2 | | |
| Kirkland_Main-408 | Kirkland_Manholes-1925 | 391.68 | Kirkland_Manholes-3031 | 384.74 | 433.2 | 1.6 | 12 | PVC | 0.01 | 2,631 | 224 | 562 | 786 | 29.9 | | |
| Kirkland_Main-409 | Kirkland_Manholes-2750 | 105.56 | Kirkland_Manholes-2749 | 94.38 | 64.8 | 17.26 | 8 | PVC | 0.01 | 2,929 | 29 | 6 | 35 | 1.2 | | |
| Kirkland_Main-410 | Kirkland_Manholes-2751 | 82.43 | Kirkland_Manholes-2879 | 68.04 | 243.9 | 5.9 | 8 | PVC | 0.01 | 1,713 | 1 | 6 | 7 | 0.4 | SM14-Ex-EX280 | |
| Kirkland_Main-412 | Kirkland_Manholes-373 | 230.9 | Kirkland_Manholes-1080 | 229.14 | 244 | 0.72 | 8 | PVC | 0.01 | 599 | 95 | 270 | 366 | 61 | | |
| Kirkland_Main-413 | Kirkland_Manholes-195 | 48.03 | Kirkland_Manholes-193 | 45.46 | 195.3 | 1.32 | 8 | PVC | 0.01 | 809 | 14 | 45 | 59 | 7.3 | SM14-Ex-EX43 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-414 | Kirkland_Manholes-193 | 45.46 | Kirkland_Manholes-192 | 42.9 | 32.1 | 7.96 | 8 | PVC | 0.01 | 1,990 | 14 | 49 | 63 | 3.2 | SM14-Ex-EX43 | |
| Kirkland_Main-415 | Kirkland_Manholes-194 | 50.84 | Kirkland_Manholes-192 | 50.61 | 58.2 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 4 | 8 | 1.9 | | Drop Connection |
| Kirkland_Main-416 | Kirkland_Manholes-192 | 42.9 | Kirkland_Manholes-191 | 42.5 | 357.1 | 0.11 | 8 | PVC | 0.01 | 236 | 20 | 71 | 91 | 38.6 | SM14-Ex-EX44 | |
| Kirkland_Main-417 | Kirkland_Manholes-191 | 42.5 | Kirkland_Manholes-183 | 41.05 | 287.2 | 0.5 | 8 | PVC | 0.01 | 501 | 20 | 76 | 96 | 19.2 | SM14-Ex-EX44 | |
| Kirkland_Main-418 | Kirkland_Manholes-201 | 56.98 | Kirkland_Manholes-192 | 42.9 | 368.5 | 3.82 | 8 | PVC | 0.01 | 1,378 | 1 | 13 | 14 | 1 | SM14-Ex-EX43 | |
| Kirkland_Main-419 | Kirkland_Manholes-199 | 54.68 | Kirkland_Manholes-198 | 52.1 | 112.6 | 2.29 | 8 | PVC | 0.01 | 1,067 | 7 | 27 | 34 | 3.2 | SM14-Ex-EX43 | |
| Kirkland_Main-420 | Kirkland_Manholes-2310 | 256 | Kirkland_Manholes-2738 | 255.5 | 66.4 | 0.75 | 8 | PVC | 0.01 | 612 | 15 | 27 | 42 | 6.8 | | |
| Kirkland_Main-421 | Kirkland_Manholes-2738 | 255.5 | Kirkland_Manholes-2752 | 253.8 | 209.4 | 0.81 | 8 | PVC | 0.01 | 635 | 17 | 31 | 48 | 7.6 | | |
| Kirkland_Main-422 | Kirkland_Manholes-2754 | 9.95 | O-40 | 9.81 | 113.1 | 0.12 | 36 | PVC | 0.01 | 13,690 | 783 | 1,930 | 3,014 | 22 | SM14-Ex-EX10 | Drop Connection |
| Kirkland_Main-423 | Kirkland_Manholes-2761 | 12.79 | Kirkland_Manholes-2759 | 11.56 | 416.9 | 0.3 | 36 | PVC | 0.01 | 21,139 | 782 | 1,907 | 2,990 | 14.1 | SM14-Ex-EX10 | |
| Kirkland_Main-425 | Kirkland_Manholes-2759 | 11.56 | Kirkland_Manholes-2758 | 11.2 | 391.7 | 0.09 | 36 | PVC | 0.01 | 11,798 | 782 | 1,912 | 2,995 | 25.4 | SM14-Ex-EX10 | |
| Kirkland_Main-426 | Kirkland_Manholes-2758 | 11.2 | Kirkland_Manholes-2757 | 10.95 | 117.7 | 0.21 | 36 | PVC | 0.01 | 17,933 | 782 | 1,916 | 2,999 | 16.7 | SM14-Ex-EX10 | |
| Kirkland_Main-428 | Kirkland_Manholes-217 | 183.22 | Kirkland_Manholes-230 | 172.81 | 258.2 | 4.03 | 8 | PVC | 0.01 | 1,416 | 55 | 116 | 171 | 12.1 | | |
| Kirkland_Main-429 | Kirkland_Manholes-228 | 142.32 | Kirkland_Manholes-232 | 112.59 | 208.3 | 14.27 | 8 | PVC | 0.01 | 2,663 | 61 | 134 | 195 | 7.3 | | |
| Kirkland_Main-430 | Kirkland_Manholes-226 | 219.39 | Kirkland_Manholes-225 | 214.73 | 200.7 | 2.32 | 8 | PVC | 0.01 | 1,074 | 11 | 36 | 47 | 4.3 | | |
| Kirkland_Main-431 | Kirkland_Manholes-225 | 214.73 | Kirkland_Manholes-223 | 193.39 | 169.1 | 12.62 | 8 | PVC | 0.01 | 2,505 | 13 | 40 | 53 | 2.1 | | |
| Kirkland_Main-432 | Kirkland_Manholes-223 | 193.39 | Kirkland_Manholes-224 | 189.69 | 263.2 | 1.41 | 8 | PVC | 0.01 | 836 | 26 | 71 | 98 | 11.7 | | |
| Kirkland_Main-433 | Kirkland_Manholes-222 | 194.04 | Kirkland_Manholes-223 | 193.39 | 133.1 | 0.49 | 8 | PVC | 0.01 | 493 | 12 | 27 | 39 | 7.9 | | |
| Kirkland_Main-434 | Kirkland_Manholes-221 | 194.75 | Kirkland_Manholes-222 | 194.04 | 121.4 | 0.58 | 8 | PVC | 0.01 | 539 | 11 | 22 | 33 | 6.1 | | |
| Kirkland_Main-435 | Kirkland_Manholes-219 | 195.26 | Kirkland_Manholes-221 | 194.75 | 115.1 | 0.44 | 8 | PVC | 0.01 | 469 | 10 | 18 | 27 | 5.8 | | |
| Kirkland_Main-436 | Kirkland_Manholes-220 | 211.06 | Kirkland_Manholes-219 | 195.26 | 185.5 | 8.52 | 8 | PVC | 0.01 | 2,057 | 5 | 9 | 14 | 0.7 | | |
| Kirkland_Main-437 | Kirkland_Manholes-218 | 197.04 | Kirkland_Manholes-219 | 195.26 | 182.3 | 0.98 | 8 | PVC | 0.01 | 697 | 2 | 4 | 7 | 1 | | |
| Kirkland_Main-438 | Kirkland_Manholes-233 | 215.48 | Kirkland_Manholes-220 | 211.06 | 169.3 | 2.61 | 8 | PVC | 0.01 | 1,139 | 3 | 4 | 8 | 0.7 | | |
| Kirkland_Main-439 | Kirkland_Manholes-224 | 189.69 | Kirkland_Manholes-211 | 186.37 | 292.8 | 1.13 | 8 | PVC | 0.01 | 751 | 27 | 76 | 103 | 13.7 | | |
| Kirkland_Main-440 | Kirkland_Manholes-266 | 97.98 | Kirkland_Manholes-267 | 95.34 | 145 | 1.82 | 8 | PVC | 0.01 | 951 | 43 | 87 | 130 | 13.7 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-441 | Kirkland_Manholes-265 | 110.6 | Kirkland_Manholes-266 | 97.98 | 184.6 | 6.84 | 8 | PVC | 0.01 | 1,844 | 42 | 82 | 124 | 6.7 | SM10 | |
| Kirkland_Main-442 | Kirkland_Manholes-262 | 118.9 | Kirkland_Manholes-265 | 110.6 | 150.8 | 5.51 | 8 | PVC | 0.01 | 1,654 | 40 | 78 | 118 | 7.1 | SM10 | If flow exceeds capacity, overflow MH will be activated; model appropriately. |
| Kirkland_Main-443 | Kirkland_Manholes-261 | 130.12 | Kirkland_Manholes-262 | 118.9 | 278.9 | 4.02 | 8 | PVC | 0.01 | 1,414 | 36 | 73 | 110 | 7.7 | SM10 | |
| Kirkland_Main-444 | Kirkland_Manholes-258 | 141.4 | Kirkland_Manholes-261 | 130.12 | 280.6 | 4.02 | 8 | PVC | 0.01 | 1,414 | 32 | 69 | 101 | 7.1 | SM10 | |
| Kirkland_Main-445 | Kirkland_Manholes-527 | 146.55 | Kirkland_Manholes-258 | 141.4 | 279.2 | 1.84 | 8 | PVC | 0.01 | 958 | 30 | 64 | 95 | 9.9 | SM10 | |
| Kirkland_Main-446 | Kirkland_Manholes-259 | 136.12 | Kirkland_Manholes-260 | 130.49 | 137.7 | 4.09 | 8 | PVC | 0.01 | 1,426 | 2 | 4 | 6 | 0.4 | SM10 | |
| Kirkland_Main-447 | Kirkland_Manholes-260 | 130.49 | Kirkland_Manholes-251 | 119.87 | 263.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 4 | 9 | 12 | 0.9 | SM10 | |
| Kirkland_Main-448 | Kirkland_Manholes-251 | 119.87 | Kirkland_Manholes-250 | 115.74 | 110.4 | 3.74 | 8 | PVC | 0.01 | 1,363 | 5 | 13 | 18 | 1.3 | SM14-Ex-EX55 | |
| Kirkland_Main-449 | Kirkland_Manholes-253 | 121.6 | Kirkland_Manholes-254 | 100.7 | 323.7 | 6.46 | 8 | PVC | 0.01 | 1,791 | 41 | 80 | 122 | 6.8 | SM14-Ex-EX40 | |
| Kirkland_Main-450 | Kirkland_Manholes-252 | 142.57 | Kirkland_Manholes-253 | 121.6 | 327.2 | 6.41 | 8 | PVC | 0.01 | 1,785 | 40 | 76 | 116 | 6.5 | SM14-Ex-EX40 | |
| Kirkland_Main-451 | Kirkland_Manholes-257 | 165.98 | Kirkland_Manholes-252 | 142.57 | 284 | 8.24 | 8 | PVC | 0.01 | 2,024 | 39 | 67 | 106 | 5.2 | SM14-Ex-EX57 | |
| Kirkland_Main-452 | Kirkland_Manholes-234 | 184.45 | Kirkland_Manholes-257 | 165.98 | 280.4 | 6.59 | 8 | PVC | 0.01 | 1,810 | 28 | 54 | 82 | 4.5 | SM14-Ex-EX57 | |
| Kirkland_Main-453 | Kirkland_Manholes-1133 | 181.56 | Kirkland_Manholes-257 | 165.98 | 274.2 | 5.68 | 8 | PVC | 0.01 | 1,681 | 9 | 9 | 17 | 1 | SM14-Ex-EX58 | |
| Kirkland_Main-454 | Kirkland_Manholes-231 | 144.64 | Kirkland_Manholes-236 | 135.22 | 190.5 | 4.95 | 8 | PVC | 0.01 | 1,568 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX56 | |
| Kirkland_Main-455 | Kirkland_Manholes-235 | 144.29 | Kirkland_Manholes-236 | 135.22 | 77.1 | 11.76 | 8 | PVC | 0.01 | 2,418 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX56 | |
| Kirkland_Main-456 | Kirkland_Manholes-236 | 135.22 | Kirkland_Manholes-237 | 112.26 | 221.2 | 10.38 | 8 | PVC | 0.01 | 2,271 | 5 | 13 | 18 | 0.8 | SM14-Ex-EX56 | |
| Kirkland_Main-457 | Kirkland_Manholes-232 | 112.59 | Kirkland_Manholes-237 | 112.26 | 229.8 | 0.14 | 8 | PVC | 0.01 | 267 | 62 | 138 | 200 | 75 | SM14-Ex-EX41 | |
| Kirkland_Main-458 | Kirkland_Manholes-237 | 112.26 | Kirkland_Manholes-254 | 100.7 | 413.4 | 2.8 | 8 | PVC | 0.01 | 1,179 | 68 | 156 | 224 | 19 | SM14-Ex-EX41 | |
| Kirkland_Main-459 | Kirkland_Manholes-254 | 100.7 | Kirkland_Manholes-255 | 81.45 | 344 | 5.6 | 8 | PVC | 0.01 | 1,668 | 110 | 241 | 351 | 21.1 | SM14-Ex-EX40 | |
| Kirkland_Main-460 | Kirkland_Manholes-249 | 98.75 | Kirkland_Manholes-248 | 82.01 | 263.5 | 6.35 | 8 | PVC | 0.01 | 1,777 | 1 | 4 | 6 | 0.3 | SM14-Ex-EX39 | |
| Kirkland_Main-461 | Kirkland_Manholes-255 | 81.45 | Kirkland_Manholes-256 | 63.52 | 326.4 | 5.49 | 8 | PVC | 0.01 | 1,653 | 112 | 245 | 358 | 21.7 | SM14-Ex-EX40 | |
| Kirkland_Main-462 | Kirkland_Manholes-256 | 63.52 | Kirkland_Manholes-245 | 59.23 | 36.4 | 11.78 | 8 | PVC | 0.01 | 2,420 | 113 | 250 | 363 | 15 | SM14-Ex-EX40 | |
| Kirkland_Main-463 | Kirkland_Manholes-248 | 82.01 | Kirkland_Manholes-245 | 59.23 | 346.7 | 6.57 | 8 | PVC | 0.01 | 1,807 | 3 | 9 | 12 | 0.6 | SM14-Ex-EX39 | |
| Kirkland_Main-464 | Kirkland_Manholes-245 | 59.23 | Kirkland_Manholes-246 | 59.12 | 26.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 117 | 263 | 381 | 28.9 | SM14-Ex-EX40 | Drop Connection |
| Kirkland_Main-465 | Kirkland_Manholes-247 | 65.14 | Kirkland_Manholes-246 | 64.57 | 142.8 | 0.4 | 8 | PVC | 0.01 | 446 | 68 | 149 | 217 | 48.8 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-466 | Kirkland_Manholes-291 | 21.49 | Kirkland_Manholes-290 | 19.2 | 13 | 17.62 | 12 | PVC | 0.01 | 8,726 | 55 | 64 | 118 | 1.4 | SM10 | |
| Kirkland_Main-467 | Kirkland_Manholes-290 | 19.2 | ROSEPT_WETWELL | 14.96 | 16.7 | 25.32 | 8 | PVC | 0.01 | 3,548 | 66 | 86 | 152 | 4.3 | SM10 | |
| Kirkland_Main-468 | Kirkland_Manholes-289 | 31.71 | Kirkland_Manholes-287 | 23.53 | 51 | 16.05 | 8 | PVC | 0.01 | 2,825 | 12 | 22 | 35 | 1.2 | SM10 | |
| Kirkland_Main-469 | Kirkland_Manholes-288 | 19.33 | Kirkland_Manholes-290 | 19.2 | 135.3 | 0.1 | 8 | PVC | 0.01 | 219 | 10 | 19 | 29 | 13.2 | SM10 | |
| Kirkland_Main-470 | Kirkland_Manholes-287 | 23.53 | Kirkland_Manholes-291 | 21.49 | 128.7 | 1.58 | 8 | PVC | 0.01 | 887 | 54 | 61 | 115 | 13 | SM10 | |
| Kirkland_Main-471 | Kirkland_Manholes-286 | 24.15 | Kirkland_Manholes-287 | 23.53 | 96.6 | 0.64 | 12 | PVC | 0.01 | 1,665 | 42 | 35 | 77 | 4.6 | SM10 | |
| Kirkland_Main-472 | Kirkland_Manholes-285 | 19.59 | Kirkland_Manholes-288 | 19.33 | 259.3 | 0.1 | 8 | PVC | 0.01 | 223 | 9 | 16 | 25 | 11.3 | SM10 | |
| Kirkland_Main-473 | Kirkland_Manholes-292 | 22.37 | Kirkland_Manholes-293 | 22.09 | 126.6 | 0.22 | 12 | PVC | 0.01 | 967 | 0 | 9 | 9 | 0.9 | SM14-Ex-EX37 | |
| Kirkland_Main-474 | Kirkland_Manholes-297 | 22.86 | Kirkland_Manholes-296 | 21.27 | 137.3 | 1.16 | 8 | PVC | 0.01 | 759 | 3 | 3 | 6 | 0.8 | SM14-Ex-EX36 | |
| Kirkland_Main-475 | Kirkland_Manholes-296 | 21.27 | Kirkland_Manholes-295 | 20.59 | 313.5 | 0.22 | 8 | PVC | 0.01 | 328 | 5 | 6 | 11 | 3.4 | SM10 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-476 | Kirkland_Manholes-295 | 20.59 | Kirkland_Manholes-294 | 20.11 | 95.2 | 0.5 | 8 | PVC | 0.01 | 501 | 6 | 10 | 16 | 3.1 | SM10 | |
| Kirkland_Main-477 | Kirkland_Manholes-294 | 20.11 | Kirkland_Manholes-285 | 19.59 | 185.3 | 0.28 | 8 | PVC | 0.01 | 373 | 8 | 13 | 20 | 5.5 | SM10 | |
| Kirkland_Main-478 | Kirkland_Manholes-311 | 21.29 | Kirkland_Manholes-312 | 20.99 | 124.6 | 0.24 | 12 | PVC | 0.01 | 1,020 | 5 | 35 | 40 | 4 | SM14-Ex-EX37 | |
| Kirkland_Main-479 | Kirkland_Manholes-312 | 20.99 | Kirkland_Manholes-306 | 19.99 | 281.9 | 0.35 | 12 | PVC | 0.01 | 1,238 | 7 | 44 | 51 | 4.1 | SM14-Ex-EX37 | |
| Kirkland_Main-480 | Kirkland_Manholes-362 | 216.81 | Kirkland_Manholes-361 | 216.74 | 35.2 | 0.2 | 21 | PVC | 0.01 | 4,142 | 833 | 2,091 | 2,924 | 70.6 | | |
| Kirkland_Main-481 | Kirkland_Manholes-367 | 213.02 | Kirkland_Manholes-368 | 212.3 | 160.3 | 0.45 | 18 | PVC | 0.01 | 4,107 | 852 | 2,159 | 3,011 | 73.3 | | |
| Kirkland_Main-482 | Kirkland_Manholes-368 | 212.3 | Kirkland_Manholes-369 | 208.86 | 249.4 | 1.38 | 18 | PVC | 0.01 | 7,198 | 852 | 2,164 | 3,016 | 41.9 | | |
| Kirkland_Main-483 | Kirkland_Manholes-369 | 208.86 | Kirkland_Manholes-370 | 206.64 | 246.4 | 0.9 | 18 | PVC | 0.01 | 5,817 | 870 | 2,198 | 3,067 | 52.7 | | |
| Kirkland_Main-484 | Kirkland_Manholes-371 | 213.58 | Kirkland_Manholes-2872 | 207.03 | 240.7 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-485 | Kirkland_Manholes-372 | 241.98 | Kirkland_Manholes-373 | 230.9 | 143.8 | 7.71 | 8 | PVC | 0.01 | 1,957 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-486 | Kirkland_Manholes-375 | 234.87 | Kirkland_Manholes-373 | 230.9 | 271 | 1.46 | 8 | PVC | 0.01 | 853 | 93 | 262 | 355 | 41.6 | | |
| Kirkland_Main-487 | Kirkland_Manholes-374 | 244.09 | Kirkland_Manholes-375 | 234.87 | 143.4 | 6.43 | 8 | PVC | 0.01 | 1,788 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-488 | Kirkland_Manholes-535 | 472.49 | Kirkland_Manholes-536 | 466.05 | 355.6 | 1.81 | 8 | PVC | 0.01 | 949 | 4 | 17 | 21 | 2.3 | | |
| Kirkland_Main-489 | Kirkland_Manholes-536 | 466.05 | Kirkland_Manholes-539 | 454.38 | 292.6 | 3.99 | 8 | PVC | 0.01 | 1,408 | 7 | 21 | 29 | 2 | | |
| Kirkland_Main-490 | Kirkland_Manholes-537 | 455.9 | Kirkland_Manholes-539 | 454.38 | 190.6 | 0.8 | 8 | PVC | 0.01 | 630 | 1 | 4 | 6 | 0.9 | | |
| Kirkland_Main-491 | Kirkland_Manholes-539 | 454.38 | Kirkland_Manholes-540 | 453.6 | 170.3 | 0.46 | 8 | PVC | 0.01 | 477 | 16 | 64 | 80 | 16.8 | | |
| Kirkland_Main-492 | Kirkland_Manholes-540 | 453.6 | Kirkland_Manholes-541 | 450.25 | 325.9 | 1.03 | 8 | PVC | 0.01 | 715 | 18 | 69 | 86 | 12.1 | | |
| Kirkland_Main-493 | Kirkland_Manholes-538 | 457.48 | Kirkland_Manholes-1977 | 454.61 | 403.8 | 0.71 | 8 | PVC | 0.01 | 594 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-494 | Kirkland_Manholes-596 | 110.91 | Kirkland_Manholes-600 | 91.95 | 293.8 | 6.45 | 8 | PVC | 0.01 | 1,791 | 129 | 355 | 484 | 27 | SM14-Ex-EX117 | |
| Kirkland_Main-495 | Kirkland_Manholes-598 | 118.14 | Kirkland_Manholes-596 | 110.91 | 360.7 | 2 | 8 | PVC | 0.01 | 998 | 4 | 8 | 12 | 1.2 | SM14-Ex-EX159 | |
| Kirkland_Main-496 | Kirkland_Manholes-606 | 111.69 | Kirkland_Manholes-614 | 87.89 | 289.9 | 8.21 | 8 | PVC | 0.01 | 2,020 | 57 | 165 | 222 | 11 | SM14-Ex-EX96 | |
| Kirkland_Main-497 | Kirkland_Manholes-238 | 85.65 | Kirkland_Manholes-239 | 27.77 | 394.9 | 14.66 | 8 | PVC | 0.01 | 2,699 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-502 | Kirkland_Manholes-200 | 55.31 | Kirkland_Manholes-199 | 54.68 | 46 | 1.37 | 8 | PVC | 0.01 | 825 | 6 | 22 | 28 | 3.4 | | |
| Kirkland_Main-503 | Kirkland_Manholes-2330 | 295.18 | Kirkland_Manholes-263 | 292.03 | 86.5 | 3.64 | 8 | PVC | 0.01 | 1,346 | 40 | 103 | 143 | 10.6 | SM14-Ex-EX252 | |
| Kirkland_Main-504 | Kirkland_Manholes-2768 | 263.56 | Kirkland_Manholes-2769 | 260.32 | 376.9 | 0.86 | 8 | PVC | 0.01 | 654 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-505 | Kirkland_Manholes-280 | 27.37 | Kirkland_Manholes-286 | 24.15 | 372.8 | 0.86 | 12 | PVC | 0.01 | 1,932 | 39 | 29 | 68 | 3.5 | SM10 | |
| Kirkland_Main-509 | Kirkland_Manholes-313 | 62.05 | Kirkland_Manholes-286 | 24.15 | 229.1 | 16.54 | 8 | PVC | 0.01 | 2,868 | 2 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-510 | Kirkland_Manholes-804 | 284.1 | Kirkland_Manholes-319 | 281.98 | 84.4 | 2.51 | 8 | PVC | 0.01 | 1,117 | 12 | 34 | 46 | 4.1 | | |
| Kirkland_Main-511 | Kirkland_Manholes-319 | 281.98 | Kirkland_Manholes-320 | 278.6 | 79.1 | 4.27 | 8 | PVC | 0.01 | 1,458 | 13 | 39 | 52 | 3.5 | | |
| Kirkland_Main-512 | Kirkland_Manholes-320 | 278.6 | Kirkland_Manholes-321 | 265.74 | 204.3 | 6.3 | 8 | PVC | 0.01 | 1,769 | 14 | 43 | 57 | 3.2 | | |
| Kirkland_Main-513 | Kirkland_Manholes-321 | 265.74 | Kirkland_Manholes-322 | 263.88 | 72.5 | 2.57 | 8 | PVC | 0.01 | 1,129 | 15 | 47 | 63 | 5.5 | | |
| Kirkland_Main-514 | Kirkland_Manholes-322 | 263.88 | Kirkland_Manholes-323 | 244.99 | 177.9 | 10.62 | 8 | PVC | 0.01 | 2,297 | 28 | 82 | 110 | 4.8 | | |
| Kirkland_Main-515 | Kirkland_Manholes-803 | 278.64 | Kirkland_Manholes-322 | 263.88 | 141.7 | 10.41 | 8 | PVC | 0.01 | 2,275 | 13 | 30 | 43 | 1.9 | | |
| Kirkland_Main-516 | Kirkland_Manholes-323 | 244.99 | Kirkland_Manholes-324 | 240.21 | 186.2 | 2.57 | 8 | PVC | 0.01 | 1,130 | 29 | 86 | 115 | 10.2 | | |
| Kirkland_Main-517 | Kirkland_Manholes-815 | 248.52 | Kirkland_Manholes-324 | 240.21 | 137.2 | 6.05 | 8 | PVC | 0.01 | 1,735 | 9 | 21 | 30 | 1.7 | | |
| Kirkland_Main-518 | Kirkland_Manholes-324 | 240.21 | Kirkland_Manholes-325 | 236.62 | 39.9 | 9.01 | 8 | PVC | 0.01 | 2,116 | 39 | 112 | 150 | 7.1 | | |
| Kirkland_Main-519 | Kirkland_Manholes-325 | 236.62 | Kirkland_Manholes-327 | 230.43 | 89 | 6.95 | 8 | PVC | 0.01 | 1,859 | 40 | 120 | 160 | 8.6 | | |
| Kirkland_Main-520 | Kirkland_Manholes-326 | 238.6 | Kirkland_Manholes-325 | 236.62 | 142.9 | 1.39 | 8 | PVC | 0.01 | 830 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-521 | Kirkland_Manholes-327 | 230.43 | Kirkland_Manholes-328 | 228.68 | 117.4 | 1.49 | 8 | PVC | 0.01 | 861 | 41 | 124 | 165 | 19.2 | | |
| Kirkland_Main-522 | Kirkland_Manholes-328 | 228.68 | Kirkland_Manholes-329 | 227.48 | 172.3 | 0.7 | 8 | PVC | 0.01 | 588 | 42 | 129 | 171 | 29 | | |
| Kirkland_Main-523 | Kirkland_Manholes-329 | 227.48 | Kirkland_Manholes-814 | 224.81 | 265.5 | 1.01 | 8 | PVC | 0.01 | 707 | 44 | 133 | 177 | 25 | | |
| Kirkland_Main-524 | Kirkland_Manholes-335 | 225.11 | Kirkland_Manholes-330 | 224.74 | 400.7 | 0.09 | 24 | PVC | 0.01 | 4,011 | 762 | 1,850 | 2,612 | 65.1 | SM14-2021-DF4 | |
| Kirkland_Main-525 | Kirkland_Manholes-330 | 224.74 | Kirkland_Manholes-331 | 223 | 199.5 | 0.87 | 21 | PVC | 0.01 | 8,635 | 762 | 1,854 | 2,617 | 30.3 | | |
| Kirkland_Main-526 | Kirkland_Manholes-331 | 223 | Kirkland_Manholes-332 | 219.57 | 217.5 | 1.58 | 21 | PVC | 0.01 | 11,610 | 763 | 1,859 | 2,621 | 22.6 | | |
| Kirkland_Main-527 | Kirkland_Manholes-332 | 219.57 | Kirkland_Manholes-334 | 218.68 | 182 | 0.49 | 21 | PVC | 0.01 | 6,464 | 764 | 1,863 | 2,627 | 40.6 | | |
| Kirkland_Main-528 | Kirkland_Manholes-333 | 225.59 | Kirkland_Manholes-334 | 218.68 | 199.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 61 | 197 | 258 | 19.7 | | |
| Kirkland_Main-529 | Kirkland_Manholes-352 | 234.2 | Kirkland_Manholes-333 | 225.59 | 382.7 | 2.25 | 8 | PVC | 0.01 | 1,058 | 59 | 193 | 252 | 23.8 | | |
| Kirkland_Main-530 | Kirkland_Manholes-334 | 218.68 | Kirkland_Manholes-356 | 218.57 | 161 | 0.07 | 30 | PVC | 0.01 | 6,255 | 828 | 2,069 | 2,897 | 46.3 | SM14-Ex-EX48 | |
| Kirkland_Main-531 | Kirkland_Manholes-337 | 291.09 | Kirkland_Manholes-338 | 268.5 | 343.3 | 6.58 | 8 | PVC | 0.01 | 1,809 | 23 | 69 | 91 | 5 | | |
| Kirkland_Main-532 | Kirkland_Manholes-343 | 274.46 | Kirkland_Manholes-338 | 268.5 | 356.6 | 1.67 | 8 | PVC | 0.01 | 912 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-533 | Kirkland_Manholes-338 | 268.5 | Kirkland_Manholes-339 | 249.19 | 361.1 | 5.35 | 8 | PVC | 0.01 | 1,631 | 27 | 77 | 104 | 6.4 | | |
| Kirkland_Main-534 | Kirkland_Manholes-1543 | 289 | Kirkland_Manholes-1544 | 284.46 | 416.8 | 1.09 | 8 | PVC | 0.01 | 736 | 10 | 21 | 31 | 4.3 | SM14-Ex-EX123 | |
| Kirkland_Main-535 | Kirkland_Manholes-1545 | 272.4 | Kirkland_Manholes-765 | 257.59 | 249.5 | 5.94 | 8 | PVC | 0.01 | 1,718 | 25 | 73 | 98 | 5.7 | SM14-Ex-EX121 | |
| Kirkland_Main-536 | Kirkland_Manholes-1571 | 242.76 | Kirkland_Manholes-1572 | 242.19 | 318.3 | 0.18 | 15 | PVC | 0.01 | 1,595 | 262 | 481 | 742 | 46.5 | | |
| Kirkland_Main-537 | Kirkland_Manholes-1573 | 242.13 | Kirkland_Manholes-1574 | 241.8 | 67.8 | 0.49 | 18 | PVC | 0.01 | 4,277 | 262 | 489 | 752 | 17.6 | SM14-Ex-EX133 | |
| Kirkland_Main-538 | Kirkland_Manholes-1572 | 242.19 | Kirkland_Manholes-1573 | 242.13 | 243.5 | 0.02 | 18 | PVC | 0.01 | 962 | 262 | 485 | 747 | 77.6 | SM14-Ex-EX133 | |
| Kirkland_Main-539 | Kirkland_Manholes-1576 | 330.99 | Kirkland_Manholes-1575 | 314.42 | 250.6 | 6.61 | 8 | PVC | 0.01 | 1,813 | 7 | 30 | 37 | 2 | | |
| Kirkland_Main-540 | Kirkland_Manholes-1577 | 341.43 | Kirkland_Manholes-1576 | 330.99 | 181.7 | 5.75 | 8 | PVC | 0.01 | 1,690 | 6 | 26 | 32 | 1.9 | | |
| Kirkland_Main-541 | Kirkland_Manholes-1578 | 344.66 | Kirkland_Manholes-1577 | 341.43 | 47.3 | 6.83 | 8 | PVC | 0.01 | 1,843 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-542 | Kirkland_Manholes-1579 | 359.44 | Kirkland_Manholes-1580 | 335.19 | 206.7 | 11.73 | 12 | PVC | 0.01 | 7,121 | 269 | 652 | 922 | 12.9 | SM14-Ex-EX205 | |
| Kirkland_Main-543 | Kirkland_Manholes-1580 | 335.19 | Kirkland_Manholes-1581 | 324.95 | 171.4 | 5.98 | 12 | PVC | 0.01 | 5,081 | 270 | 657 | 926 | 18.2 | SM14-Ex-EX205 | |
| Kirkland_Main-544 | Kirkland_Manholes-1582 | 332.21 | Kirkland_Manholes-1581 | 324.95 | 160.1 | 4.53 | 12 | PVC | 0.01 | 4,426 | 70 | 206 | 276 | 6.2 | SM14-Ex-EX206 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-545 | Kirkland_Manholes-1581 | 324.95 | Kirkland_Manholes-1623 | 294.92 | 398.1 | 7.54 | 12 | PVC | 0.01 | 5,709 | 340 | 867 | 1,207 | 21.1 | SM14-Ex-EX205 | |
| Kirkland_Main-546 | Kirkland_Manholes-2681 | 334.86 | Kirkland_Manholes-3028 | 332.75 | 289 | 0.73 | 12 | PVC | 0.01 | 1,776 | 62 | 185 | 246 | 13.9 | SM14-Ex-EX206 | |
| Kirkland_Main-547 | Kirkland_Manholes-1583 | 333.82 | Kirkland_Manholes-1582 | 332.21 | 16.6 | 9.69 | 8 | PVC | 0.01 | 2,195 | 3 | 9 | 12 | 0.5 | | |
| Kirkland_Main-548 | Kirkland_Manholes-1584 | 346.72 | Kirkland_Manholes-1583 | 333.82 | 203.1 | 6.35 | 8 | PVC | 0.01 | 1,777 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-549 | Kirkland_Manholes-1575 | 314.42 | Kirkland_Manholes-1953 | 290.71 | 326.1 | 7.27 | 8 | PVC | 0.01 | 1,901 | 7 | 34 | 41 | 2.2 | | |
| Kirkland_Main-550 | Kirkland_Manholes-1150 | 151.79 | Kirkland_Manholes-1151 | 143.36 | 156.6 | 5.38 | 8 | PVC | 0.01 | 1,636 | 18 | 58 | 76 | 4.6 | SM10 | |
| Kirkland_Main-551 | Kirkland_Manholes-1151 | 143.36 | Kirkland_Manholes-1152 | 135.47 | 158.3 | 4.98 | 8 | PVC | 0.01 | 1,574 | 20 | 66 | 86 | 5.5 | SM10 | |
| Kirkland_Main-552 | Kirkland_Manholes-1170 | 153.9 | Kirkland_Manholes-1150 | 151.79 | 249.2 | 0.85 | 8 | PVC | 0.01 | 649 | 2 | 8 | 11 | 1.6 | SM10 | |
| Kirkland_Main-553 | Kirkland_Manholes-306 | 19.99 | Kirkland_Manholes-1183 | 19.89 | 217.6 | 0.05 | 12 | PVC | 0.01 | 446 | 34 | 159 | 193 | 43.3 | SM14-Ex-EX37 | |
| Kirkland_Main-554 | Kirkland_Manholes-304 | 75.98 | Kirkland_Manholes-303 | 75.38 | 34.2 | 1.76 | 8 | PVC | 0.01 | 934 | 19 | 62 | 81 | 8.7 | SM10 | |
| Kirkland_Main-555 | Kirkland_Manholes-303 | 75.38 | Kirkland_Manholes-305 | 74.69 | 171.5 | 0.4 | 8 | PVC | 0.01 | 447 | 19 | 71 | 90 | 20.1 | SM10 | |
| Kirkland_Main-556 | Kirkland_Manholes-302 | 78.72 | Kirkland_Manholes-304 | 75.98 | 177.4 | 1.54 | 8 | PVC | 0.01 | 876 | 18 | 53 | 71 | 8.1 | SM10 | |
| Kirkland_Main-557 | Kirkland_Manholes-307 | 105.6 | Kirkland_Manholes-302 | 78.72 | 385.1 | 6.98 | 8 | PVC | 0.01 | 1,863 | 17 | 44 | 61 | 3.3 | SM10 | |
| Kirkland_Main-558 | Kirkland_Manholes-301 | 74.29 | Kirkland_Manholes-300 | 70.39 | 326.3 | 1.2 | 8 | PVC | 0.01 | 771 | 3 | 3 | 6 | 0.8 | SM10 | |
| Kirkland_Main-559 | Kirkland_Manholes-1316 | 272.4 | Kirkland_Manholes-1317 | 271.64 | 47 | 1.62 | 8 | PVC | 0.01 | 896 | 3 | 13 | 16 | 1.7 | | |
| Kirkland_Main-563 | Kirkland_Manholes-300 | 70.39 | Kirkland_Manholes-299 | 66.63 | 324 | 1.16 | 8 | PVC | 0.01 | 760 | 7 | 6 | 13 | 1.7 | SM10 | |
| Kirkland_Main-564 | Kirkland_Manholes-388 | 297.69 | Kirkland_Manholes-389 | 295.78 | 310.4 | 0.62 | 8 | PVC | 0.01 | 553 | 10 | 21 | 32 | 5.7 | SM14-Ex-EX33 | |
| Kirkland_Main-565 | Kirkland_Manholes-390 | 304.37 | Kirkland_Manholes-391 | 302.9 | 200.9 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 4 | 6 | 1 | SM14-Ex-EX34 | |
| Kirkland_Main-566 | Kirkland_Manholes-392 | 305 | Kirkland_Manholes-391 | 302.9 | 116.9 | 1.8 | 8 | PVC | 0.01 | 945 | 45 | 129 | 174 | 18.4 | SM14-Ex-EX50 | |
| Kirkland_Main-567 | Kirkland_Manholes-2568 | 299.24 | Kirkland_Manholes-2592 | 294.57 | 199 | 2.35 | 8 | PVC | 0.01 | 1,080 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX306 | |
| Kirkland_Main-568 | Kirkland_Manholes-2571 | 325.07 | Kirkland_Manholes-2570 | 299.81 | 188.9 | 13.37 | 8 | PVC | 0.01 | 2,578 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-569 | Kirkland_Manholes-2602 | 234.19 | Kirkland_Manholes-2601 | 228.74 | 344.4 | 1.58 | 8 | PVC | 0.01 | 887 | 4 | 13 | 17 | 1.9 | SM14-Ex-EX300 | |
| Kirkland_Main-570 | Kirkland_Manholes-2603 | 296.02 | Kirkland_Manholes-2588 | 292.14 | 272.1 | 1.43 | 8 | PVC | 0.01 | 842 | 14 | 26 | 40 | 4.7 | SM14-Ex-EX304 | |
| Kirkland_Main-573 | Kirkland_Manholes-2610 | 205.21 | Kirkland_Manholes-2609 | 193.8 | 79.9 | 14.28 | 8 | PVC | 0.01 | 2,664 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-574 | Kirkland_Manholes-1380 | 448.63 | Kirkland_Manholes-1386 | 447.82 | 272.6 | 0.3 | 8 | PVC | 0.01 | 384 | 8 | 9 | 16 | 4.3 | SM14-Ex-EX219 | |
| Kirkland_Main-575 | Kirkland_Manholes-1383 | 449.36 | Kirkland_Manholes-1380 | 448.63 | 231 | 0.32 | 8 | PVC | 0.01 | 396 | 5 | 4 | 9 | 2.3 | SM14-Ex-EX219 | |
| Kirkland_Main-576 | Kirkland_Manholes-1381 | 441.1 | Kirkland_Manholes-1382 | 428.64 | 320.7 | 3.88 | 8 | PVC | 0.01 | 1,390 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-577 | Kirkland_Manholes-1384 | 452.11 | Kirkland_Manholes-1385 | 450.86 | 206.1 | 0.61 | 8 | PVC | 0.01 | 549 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-578 | Kirkland_Manholes-1385 | 450.86 | Kirkland_Manholes-1386 | 447.82 | 69.1 | 4.4 | 8 | PVC | 0.01 | 1,479 | 3 | 9 | 12 | 0.8 | | |
| Kirkland_Main-579 | Kirkland_Manholes-1386 | 447.82 | Kirkland_Manholes-1387 | 446.83 | 200.1 | 0.49 | 8 | PVC | 0.01 | 496 | 12 | 21 | 33 | 6.7 | SM14-Ex-EX219 | |
| Kirkland_Main-580 | Kirkland_Manholes-1387 | 446.83 | Kirkland_Manholes-1388 | 445.49 | 260.4 | 0.51 | 8 | PVC | 0.01 | 506 | 42 | 103 | 145 | 28.7 | SM14-Ex-EX219 | |
| Kirkland_Main-581 | Kirkland_Manholes-1388 | 445.49 | Kirkland_Manholes-1389 | 444.08 | 265.9 | 0.53 | 8 | PVC | 0.01 | 513 | 44 | 107 | 151 | 29.5 | SM14-Ex-EX219 | |
| Kirkland_Main-582 | Kirkland_Manholes-1390 | 457.46 | Kirkland_Manholes-1389 | 444.08 | 260.4 | 5.14 | 8 | PVC | 0.01 | 1,598 | 10 | 26 | 36 | 2.2 | SM14-Ex-EX218 | |
| Kirkland_Main-583 | Kirkland_Manholes-1389 | 444.08 | Kirkland_Manholes-532 | 443.04 | 161.2 | 0.65 | 8 | PVC | 0.01 | 566 | 56 | 137 | 193 | 34.2 | SM14-Ex-EX218 | |
| Kirkland_Main-584 | Kirkland_Manholes-532 | 443.04 | Kirkland_Manholes-533 | 442.23 | 169.5 | 0.48 | 8 | PVC | 0.01 | 487 | 60 | 142 | 202 | 41.5 | SM14-Ex-EX218 | |
| Kirkland_Main-585 | Kirkland_Manholes-533 | 442.23 | Kirkland_Manholes-534 | 432.55 | 269 | 3.6 | 8 | PVC | 0.01 | 1,337 | 63 | 146 | 209 | 15.6 | SM14-Ex-EX218 | |
| Kirkland_Main-586 | Kirkland_Manholes-530 | 464.47 | Kirkland_Manholes-1390 | 457.46 | 207.2 | 3.38 | 8 | PVC | 0.01 | 1,297 | 9 | 21 | 30 | 2.3 | SM14-Ex-EX218 | |
| Kirkland_Main-587 | Kirkland_Manholes-1391 | 471.35 | Kirkland_Manholes-530 | 464.47 | 201.7 | 3.41 | 8 | PVC | 0.01 | 1,302 | 4 | 13 | 17 | 1.3 | SM14-Ex-EX218 | |
| Kirkland_Main-588 | Kirkland_Manholes-543 | 448.24 | Kirkland_Manholes-1387 | 446.83 | 163.4 | 0.86 | 8 | PVC | 0.01 | 655 | 30 | 77 | 107 | 16.3 | | |
| Kirkland_Main-589 | Kirkland_Manholes-531 | 468.8 | Kirkland_Manholes-530 | 464.47 | 218 | 1.99 | 8 | PVC | 0.01 | 994 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-590 | Kirkland_Manholes-339 | 249.19 | Kirkland_Manholes-340 | 235.81 | 214 | 6.25 | 8 | PVC | 0.01 | 1,763 | 28 | 82 | 110 | 6.2 | | |
| Kirkland_Main-592 | Kirkland_Manholes-2009 | 426.97 | Kirkland_Manholes-2010 | 424.43 | 206.3 | 1.23 | 8 | PVC | 0.01 | 782 | 22 | 56 | 78 | 10 | | |
| Kirkland_Main-593 | Kirkland_Manholes-2011 | 417.75 | Kirkland_Manholes-2012 | 406.67 | 363.8 | 3.05 | 8 | PVC | 0.01 | 1,230 | 4 | 9 | 12 | 1 | | |
| Kirkland_Main-594 | Kirkland_Manholes-1989 | 447.97 | Kirkland_Manholes-1990 | 439.8 | 245.1 | 3.33 | 8 | PVC | 0.01 | 1,287 | 3 | 9 | 12 | 0.9 | | |
| Kirkland_Main-595 | Kirkland_Manholes-1990 | 439.8 | Kirkland_Manholes-1991 | 431.18 | 131.7 | 6.55 | 8 | PVC | 0.01 | 1,804 | 11 | 30 | 41 | 2.3 | | |
| Kirkland_Main-596 | Kirkland_Manholes-556 | 457.9 | Kirkland_Manholes-3007 | 456.9 | 222.1 | 0.45 | 8 | PVC | 0.01 | 473 | 1 | 4 | 6 | 1.2 | | |
| Kirkland_Main-597 | Kirkland_Manholes-2495 | 184.35 | Kirkland_Manholes-2494 | 170.93 | 403.6 | 3.33 | 8 | PVC | 0.01 | 1,286 | 15 | 21 | 36 | 2.8 | SM14-Ex-EX236 | |
| Kirkland_Main-598 | Kirkland_Manholes-2496 | 191.57 | Kirkland_Manholes-2495 | 184.35 | 278.9 | 2.59 | 8 | PVC | 0.01 | 1,134 | 12 | 17 | 30 | 2.6 | SM14-Ex-EX236 | |
| Kirkland_Main-599 | Kirkland_Manholes-2497 | 194.88 | Kirkland_Manholes-2498 | 194.29 | 45.2 | 1.3 | 8 | PVC | 0.01 | 805 | 10 | 9 | 19 | 2.3 | SM14-Ex-EX236 | |
| Kirkland_Main-600 | Kirkland_Manholes-2498 | 194.29 | Kirkland_Manholes-2496 | 191.57 | 77.4 | 3.51 | 8 | PVC | 0.01 | 1,322 | 11 | 13 | 24 | 1.8 | SM14-Ex-EX236 | |
| Kirkland_Main-601 | Kirkland_Manholes-2237 | 143.38 | Kirkland_Manholes-2499 | 140.38 | 322.1 | 0.93 | 8 | PVC | 0.01 | 680 | 5 | 6 | 11 | 1.7 | SM14-Ex-EX225 | |
| Kirkland_Main-602 | Kirkland_Manholes-2499 | 140.38 | Kirkland_Manholes-2500 | 122.66 | 273.4 | 6.48 | 8 | PVC | 0.01 | 1,795 | 8 | 12 | 21 | 1.1 | SM14-Ex-EX225 | |
| Kirkland_Main-603 | Kirkland_Manholes-2500 | 122.66 | Kirkland_Manholes-2501 | 104.86 | 254.1 | 7.01 | 8 | PVC | 0.01 | 1,866 | 11 | 19 | 29 | 1.6 | SM14-Ex-EX225 | |
| Kirkland_Main-604 | Kirkland_Manholes-2501 | 104.86 | Kirkland_Manholes-2502 | 102.46 | 257.9 | 0.93 | 8 | PVC | 0.01 | 680 | 14 | 25 | 39 | 5.7 | SM14-Ex-EX225 | |
| Kirkland_Main-605 | Kirkland_Manholes-2502 | 102.46 | Kirkland_Manholes-2503 | 101.49 | 223.5 | 0.43 | 8 | PVC | 0.01 | 464 | 20 | 31 | 51 | 10.9 | SM14-Ex-EX225 | |
| Kirkland_Main-606 | Kirkland_Manholes-2504 | 121.59 | Kirkland_Manholes-2503 | 101.49 | 254 | 7.91 | 8 | PVC | 0.01 | 1,983 | 8 | 12 | 20 | 1 | SM14-Ex-EX223 | |
| Kirkland_Main-607 | Kirkland_Manholes-2503 | 101.49 | Kirkland_Manholes-2507 | 88.29 | 256.5 | 5.15 | 8 | PVC | 0.01 | 1,599 | 30 | 50 | 79 | 5 | SM14-Ex-EX223 | |
| Kirkland_Main-608 | Kirkland_Manholes-2505 | 125.11 | Kirkland_Manholes-2504 | 121.59 | 387.3 | 0.91 | 8 | PVC | 0.01 | 672 | 4 | 6 | 10 | 1.5 | SM14-Ex-EX223 | |
| Kirkland_Main-609 | Kirkland_Manholes-2763 | 13.15 | Kirkland_Manholes-2762 | 13.1 | 227.4 | 0.02 | 36 | PVC | 0.01 | 5,771 | 687 | 1,622 | 2,610 | 45.2 | SM14-Ex-EX10 | |
| Kirkland_Main-610 | Kirkland_Manholes-2238 | 92.13 | Kirkland_Manholes-2118 | 82.91 | 342.6 | 2.69 | 8 | PVC | 0.01 | 1,157 | 7 | 12 | 20 | 1.7 | SM14-Ex-EX224 | |
| Kirkland_Main-611 | Kirkland_Manholes-2118 | 82.91 | Kirkland_Manholes-2146 | 75.22 | 210 | 3.66 | 8 | PVC | 0.01 | 1,349 | 45 | 81 | 126 | 9.3 | SM14-Ex-EX223 | |
| Kirkland_Main-612 | Kirkland_Manholes-2506 | 86.22 | Kirkland_Manholes-2118 | 82.91 | 249.1 | 1.33 | 8 | PVC | 0.01 | 813 | 35 | 62 | 97 | 11.9 | SM14-Ex-EX223 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-613 | Kirkland_Manholes-2507 | 88.29 | Kirkland_Manholes-2506 | 86.22 | 236.4 | 0.88 | 8 | PVC | 0.01 | 660 | 32 | 56 | 88 | 13.3 | SM14-Ex-EX223 | |
| Kirkland_Main-614 | Kirkland_Manholes-2508 | 120.01 | Kirkland_Manholes-2510 | 102.3 | 301.7 | 5.87 | 8 | PVC | 0.01 | 1,708 | 8 | 19 | 27 | 1.6 | SM14-Ex-EX229 | |
| Kirkland_Main-615 | Kirkland_Manholes-2144 | 65.5 | Kirkland_Manholes-2143 | 61.9 | 34.5 | 10.44 | 8 | PVC | 0.01 | 2,279 | 80 | 83 | 163 | 7.2 | | |
| Kirkland_Main-616 | Kirkland_Manholes-2145 | 63.1 | Kirkland_Manholes-2143 | 61.9 | 31.4 | 3.82 | 8 | PVC | 0.01 | 1,377 | 9 | 50 | 59 | 4.2 | | |
| Kirkland_Main-618 | Kirkland_Manholes-2170 | 148.68 | Kirkland_Manholes-2169 | 142.85 | 119.8 | 4.87 | 8 | PVC | 0.01 | 1,555 | 1 | 8 | 10 | 0.6 | SM14-Ex-EX193 | |
| Kirkland_Main-622 | Kirkland_Manholes-2167 | 120.69 | Kirkland_Manholes-2166 | 108.92 | 118.4 | 9.94 | 8 | PVC | 0.01 | 2,223 | 6 | 33 | 39 | 1.7 | SM14-Ex-EX193 | |
| Kirkland_Main-623 | Kirkland_Manholes-2166 | 108.92 | Kirkland_Manholes-2165 | 94.99 | 230.8 | 6.04 | 8 | PVC | 0.01 | 1,732 | 10 | 41 | 51 | 3 | SM14-Ex-EX193 | |
| Kirkland_Main-626 | Kirkland_Manholes-2719 | 31.99 | Kirkland_Manholes-2715 | 29.78 | 252.5 | 0.88 | 8 | PVC | 0.01 | 660 | 86 | 12 | 98 | 14.9 | | |
| Kirkland_Main-627 | Kirkland_Manholes-2278 | 406.74 | Kirkland_Manholes-2271 | 405.49 | 96 | 1.3 | 8 | PVC | 0.01 | 805 | 4 | 17 | 21 | 2.6 | | |
| Kirkland_Main-630 | Kirkland_Manholes-2407 | 403.31 | Kirkland_Manholes-2268 | 401.9 | 163.6 | 0.86 | 8 | PVC | 0.01 | 655 | 18 | 52 | 69 | 10.6 | SM14-Ex-EX261 | |
| Kirkland_Main-631 | Kirkland_Manholes-2266 | 392.8 | Kirkland_Manholes-2265 | 392 | 110.1 | 0.73 | 8 | PVC | 0.01 | 601 | 36 | 133 | 169 | 28.1 | SM14-Ex-EX212 | |
| Kirkland_Main-632 | Kirkland_Manholes-2265 | 392 | Kirkland_Manholes-2263 | 374.13 | 447.5 | 3.99 | 8 | PVC | 0.01 | 1,409 | 36 | 137 | 174 | 12.3 | SM14-Ex-EX212 | |
| Kirkland_Main-633 | Kirkland_Manholes-2245 | 234.09 | Kirkland_Manholes-2074 | 213.49 | 327.6 | 6.29 | 8 | PVC | 0.01 | 1,768 | 53 | 52 | 104 | 5.9 | SM14-Ex-EX246 | |
| Kirkland_Main-634 | Kirkland_Manholes-2253 | 239.74 | Kirkland_Manholes-2252 | 236.86 | 193.1 | 1.49 | 8 | PVC | 0.01 | 861 | 36 | 13 | 49 | 5.6 | SM14-Ex-EX247 | |
| Kirkland_Main-635 | Kirkland_Manholes-2252 | 236.86 | Kirkland_Manholes-2245 | 234.09 | 241.6 | 1.15 | 8 | PVC | 0.01 | 755 | 41 | 17 | 58 | 7.7 | SM14-Ex-EX247 | |
| Kirkland_Main-636 | Kirkland_Manholes-2246 | 246.17 | Kirkland_Manholes-2245 | 234.09 | 185.5 | 6.51 | 8 | PVC | 0.01 | 1,799 | 9 | 26 | 34 | 1.9 | SM14-Ex-EX246 | |
| Kirkland_Main-637 | Kirkland_Manholes-2247 | 249.9 | Kirkland_Manholes-2246 | 246.17 | 310.7 | 1.2 | 8 | PVC | 0.01 | 773 | 6 | 21 | 28 | 3.6 | SM14-Ex-EX246 | |
| Kirkland_Main-638 | Kirkland_Manholes-2251 | 257.04 | Kirkland_Manholes-2247 | 249.9 | 237.7 | 3 | 8 | PVC | 0.01 | 1,222 | 0 | 4 | 5 | 0.4 | SM14-Ex-EX246 | |
| Kirkland_Main-639 | Kirkland_Manholes-2248 | 259.41 | Kirkland_Manholes-2247 | 249.9 | 197.8 | 4.81 | 8 | PVC | 0.01 | 1,546 | 5 | 13 | 18 | 1.1 | | |
| Kirkland_Main-640 | Kirkland_Manholes-2249 | 263.29 | Kirkland_Manholes-2248 | 259.41 | 137.3 | 2.82 | 8 | PVC | 0.01 | 1,185 | 5 | 9 | 13 | 1.1 | | |
| Kirkland_Main-641 | Kirkland_Manholes-2250 | 275.69 | Kirkland_Manholes-2249 | 263.29 | 113.4 | 10.94 | 8 | PVC | 0.01 | 2,332 | 4 | 4 | 9 | 0.4 | | |
| Kirkland_Main-642 | Kirkland_Manholes-2261 | 305.59 | Kirkland_Manholes-2260 | 285.07 | 409.2 | 5.01 | 12 | PVC | 0.01 | 4,655 | 393 | 919 | 1,311 | 28.2 | SM14-Ex-EX248 | |
| Kirkland_Main-643 | Kirkland_Manholes-2262 | 311.78 | Kirkland_Manholes-2261 | 305.59 | 133.8 | 4.62 | 12 | PVC | 0.01 | 4,470 | 390 | 914 | 1,304 | 29.2 | SM14-Ex-EX248 | |
| Kirkland_Main-644 | Kirkland_Manholes-21 | 62.08 | Kirkland_Manholes-101 | 61.95 | 7 | 1.85 | 8 | PVC | 0.01 | 960 | 10 | 31 | 42 | 4.3 | | |
| Kirkland_Main-645 | Kirkland_Manholes-3038 | 279.17 | Kirkland_Manholes-3039 | 278.83 | 84.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-646 | Kirkland_Manholes-3039 | 278.83 | Kirkland_Manholes-3035 | 266.43 | 233.8 | 5.3 | 8 | PVC | 0.01 | 1,624 | 4 | 9 | 12 | 0.8 | | |
| Kirkland_Main-647 | Kirkland_Manholes-3037 | 277.97 | Kirkland_Manholes-3036 | 268.75 | 180.1 | 5.12 | 8 | PVC | 0.01 | 1,595 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-648 | Kirkland_Manholes-3036 | 268.75 | Kirkland_Manholes-3035 | 266.43 | 62.1 | 3.74 | 8 | PVC | 0.01 | 1,363 | 3 | 9 | 11 | 0.8 | | |
| Kirkland_Main-649 | Kirkland_Manholes-1505 | 267 | Kirkland_Manholes-3035 | 266.43 | 67.6 | 0.84 | 8 | PVC | 0.01 | 647 | 32 | 94 | 127 | 19.6 | | |
| Kirkland_Main-650 | Kirkland_Manholes-3040 | 208.06 | Kirkland_Manholes-3041 | 198.95 | 98.1 | 9.29 | 8 | PVC | 0.01 | 2,148 | 7 | 4 | 11 | 0.5 | | |
| Kirkland_Main-651 | Kirkland_Manholes-3041 | 198.95 | Kirkland_Manholes-1602 | 196.74 | 179.4 | 1.23 | 8 | PVC | 0.01 | 782 | 9 | 9 | 18 | 2.3 | | |
| Kirkland_Main-652 | Kirkland_Manholes-3100 | 18.3 | Kirkland_Manholes-3044 | 18.06 | 60.9 | 0.39 | 18 | PVC | 0.01 | 3,847 | 112 | 68 | 180 | 4.7 | SM14-Ex-EX289 | |
| Kirkland_Main-653 | Kirkland_Manholes-566 | 483.97 | Kirkland_Manholes-3045 | 483.35 | 154.3 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-655 | Kirkland_Manholes-3046 | 250.83 | Kirkland_Manholes-3047 | 250.39 | 298.9 | 0.15 | 8 | PVC | 0.01 | 271 | 2 | 4 | 7 | 2.5 | | |
| Kirkland_Main-656 | Kirkland_Manholes-3047 | 250.39 | Kirkland_Manholes-396 | 249.55 | 18.8 | 4.48 | 8 | PVC | 0.01 | 1,492 | 4 | 9 | 13 | 0.9 | | |
| Kirkland_Main-657 | Kirkland_Manholes-3048 | 215.92 | Kirkland_Manholes-364 | 215.51 | 48.9 | 0.84 | 21 | PVC | 0.01 | 8,463 | 844 | 2,125 | 2,969 | 35.1 | | |
| Kirkland_Main-658 | Kirkland_Manholes-3051 | 246.2 | Kirkland_Manholes-3050 | 235.83 | 120.9 | 8.58 | 8 | PVC | 0.01 | 2,065 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-659 | Kirkland_Manholes-3050 | 235.83 | Kirkland_Manholes-3049 | 221.64 | 223.5 | 6.35 | 8 | PVC | 0.01 | 1,776 | 2 | 9 | 11 | 0.6 | | |
| Kirkland_Main-660 | Kirkland_Manholes-3049 | 221.64 | Kirkland_Manholes-3048 | 215.92 | 33.6 | 17.02 | 8 | PVC | 0.01 | 2,909 | 3 | 13 | 16 | 0.6 | | |
| Kirkland_Main-661 | Kirkland_Manholes-3054 | 230.52 | Kirkland_Manholes-3053 | 227.56 | 179.1 | 1.65 | 8 | PVC | 0.01 | 906 | 2 | 4 | 7 | 0.7 | | |
| Kirkland_Main-662 | Kirkland_Manholes-3052 | 228.3 | Kirkland_Manholes-3053 | 227.56 | 79.8 | 0.93 | 8 | PVC | 0.01 | 679 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-663 | Kirkland_Manholes-3053 | 227.56 | Kirkland_Manholes-3055 | 218.26 | 198.6 | 4.68 | 8 | PVC | 0.01 | 1,526 | 4 | 13 | 17 | 1.1 | | |
| Kirkland_Main-664 | Kirkland_Manholes-3055 | 218.26 | Kirkland_Manholes-364 | 215.51 | 19.7 | 13.95 | 8 | PVC | 0.01 | 2,634 | 5 | 17 | 22 | 0.8 | | |
| Kirkland_Main-665 | Kirkland_Manholes-3058 | 393.03 | Kirkland_Manholes-3057 | 384.71 | 254 | 3.28 | 8 | PVC | 0.01 | 1,276 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-666 | Kirkland_Manholes-3057 | 384.71 | Kirkland_Manholes-3056 | 382.54 | 53.8 | 4.03 | 8 | PVC | 0.01 | 1,415 | 3 | 9 | 12 | 0.8 | | |
| Kirkland_Main-667 | Kirkland_Manholes-3056 | 382.54 | Kirkland_Manholes-3016 | 372.66 | 250.2 | 3.95 | 8 | PVC | 0.01 | 1,401 | 5 | 13 | 18 | 1.3 | | |
| Kirkland_Main-668 | Kirkland_Manholes-3062 | 383.23 | Kirkland_Manholes-3063 | 372.82 | 282.2 | 3.69 | 8 | PVC | 0.01 | 1,354 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-669 | Kirkland_Manholes-3063 | 372.82 | Kirkland_Manholes-3061 | 361.76 | 319.4 | 3.46 | 8 | PVC | 0.01 | 1,312 | 2 | 9 | 10 | 0.8 | | |
| Kirkland_Main-670 | Kirkland_Manholes-3061 | 361.76 | Kirkland_Manholes-3060 | 360.51 | 136.8 | 0.91 | 8 | PVC | 0.01 | 674 | 2 | 13 | 15 | 2.2 | | |
| Kirkland_Main-671 | Kirkland_Manholes-3059 | 374.97 | Kirkland_Manholes-3060 | 371.3 | 316.1 | 1.16 | 8 | PVC | 0.01 | 760 | 1 | 4 | 6 | 0.7 | | Drop Connection |
| Kirkland_Main-672 | Kirkland_Manholes-3060 | 360.51 | Kirkland_Manholes-3064 | 358.68 | 232.8 | 0.79 | 8 | PVC | 0.01 | 625 | 6 | 21 | 28 | 4.4 | | |
| Kirkland_Main-673 | Kirkland_Manholes-3064 | 358.68 | Kirkland_Manholes-3065 | 358.3 | 94.6 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 26 | 32 | 7.3 | | |
| Kirkland_Main-674 | Kirkland_Manholes-3065 | 358.3 | Kirkland_Manholes-3066 | 356.12 | 87.4 | 2.49 | 8 | PVC | 0.01 | 1,113 | 8 | 30 | 38 | 3.4 | | |
| Kirkland_Main-675 | Kirkland_Manholes-3066 | 356.12 | Kirkland_Manholes-3067 | 344.94 | 288.6 | 3.87 | 8 | PVC | 0.01 | 1,388 | 11 | 34 | 45 | 3.3 | | |
| Kirkland_Main-676 | Kirkland_Manholes-3067 | 344.94 | Kirkland_Manholes-3068 | 332.11 | 210.6 | 6.09 | 8 | PVC | 0.01 | 1,740 | 11 | 39 | 50 | 2.9 | | |
| Kirkland_Main-677 | Kirkland_Manholes-3068 | 332.11 | Kirkland_Manholes-3069 | 304.52 | 266.1 | 10.37 | 8 | PVC | 0.01 | 2,270 | 12 | 43 | 55 | 2.4 | | |
| Kirkland_Main-678 | Kirkland_Manholes-3069 | 304.52 | Kirkland_Manholes-926 | 302.74 | 43.6 | 4.09 | 8 | PVC | 0.01 | 1,425 | 12 | 47 | 60 | 4.2 | | |
| Kirkland_Main-679 | Kirkland_Manholes-299 | 66.63 | Kirkland_Manholes-298 | 56.65 | 96.2 | 10.37 | 8 | PVC | 0.01 | 2,271 | 11 | 16 | 27 | 1.2 | SM10 | |
| Kirkland_Main-680 | Kirkland_Manholes-298 | 56.65 | Kirkland_Manholes-289 | 31.71 | 154.4 | 16.15 | 8 | PVC | 0.01 | 2,834 | 12 | 19 | 31 | 1.1 | SM10 | |
| Kirkland_Main-681 | Kirkland_Manholes-281 | 36.84 | Kirkland_Manholes-280 | 27.37 | 236.3 | 4.01 | 8 | PVC | 0.01 | 1,411 | 3 | 13 | 15 | 1.1 | SM10 | |
| Kirkland_Main-682 | Kirkland_Manholes-752 | 265.45 | Kirkland_Manholes-1559 | 253.89 | 158.5 | 7.29 | 8 | PVC | 0.01 | 1,904 | 28 | 64 | 92 | 4.8 | SM14-Ex-EX68 | |
| Kirkland_Main-683 | Kirkland_Manholes-1561 | 229.17 | Kirkland_Manholes-1562 | 206.57 | 130 | 17.39 | 8 | PVC | 0.01 | 2,940 | 1 | 4 | 6 | 0.2 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-684 | Kirkland_Manholes-1563 | 203.28 | Kirkland_Manholes-1564 | 164.37 | 189.8 | 20.5 | 8 | PVC | 0.01 | 3,192 | 2 | 13 | 15 | 0.5 | | |
| Kirkland_Main-685 | Kirkland_Manholes-1347 | 427.05 | Kirkland_Manholes-1349 | 426.8 | 216.3 | 0.12 | 8 | PVC | 0.01 | 240 | 8 | 17 | 25 | 10.3 | | |
| Kirkland_Main-686 | Kirkland_Manholes-1349 | 426.8 | Kirkland_Manholes-1348 | 423.36 | 47.3 | 7.28 | 8 | PVC | 0.01 | 1,902 | 9 | 21 | 30 | 1.6 | | |
| Kirkland_Main-687 | Kirkland_Manholes-1348 | 423.36 | Kirkland_Manholes-1354 | 421.4 | 318.8 | 0.61 | 8 | PVC | 0.01 | 553 | 10 | 26 | 36 | 6.5 | | |
| Kirkland_Main-688 | Kirkland_Manholes-1352 | 406.36 | Kirkland_Manholes-1903 | 399.77 | 227.2 | 2.9 | 8 | PVC | 0.01 | 1,201 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-689 | Kirkland_Manholes-1353 | 422.52 | Kirkland_Manholes-1354 | 421.4 | 133.4 | 0.84 | 8 | PVC | 0.01 | 646 | 3 | 4 | 7 | 1.1 | | |
| Kirkland_Main-690 | Kirkland_Manholes-1354 | 421.4 | Kirkland_Manholes-1355 | 420.81 | 87.2 | 0.68 | 8 | PVC | 0.01 | 580 | 14 | 34 | 48 | 8.2 | | |
| Kirkland_Main-691 | Kirkland_Manholes-832 | 339.26 | Kirkland_Manholes-794 | 336.64 | 92.4 | 2.84 | 8 | PVC | 0.01 | 1,188 | 4 | 13 | 17 | 1.4 | | |
| Kirkland_Main-692 | Kirkland_Manholes-794 | 336.64 | Kirkland_Manholes-795 | 330.76 | 102.1 | 5.76 | 8 | PVC | 0.01 | 1,692 | 5 | 17 | 22 | 1.3 | | |
| Kirkland_Main-693 | Kirkland_Manholes-795 | 330.76 | Kirkland_Manholes-796 | 329.52 | 188.4 | 0.66 | 8 | PVC | 0.01 | 572 | 6 | 21 | 27 | 4.8 | | |
| Kirkland_Main-694 | Kirkland_Manholes-833 | 205 | Kirkland_Manholes-830 | 198.45 | 115.6 | 5.67 | 8 | PVC | 0.01 | 1,678 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-695 | Kirkland_Manholes-1212 | 307.51 | Kirkland_Manholes-1213 | 300.54 | 162.4 | 4.29 | 6 | Concrete | 0.013 | 522 | 69 | 21 | 90 | 17.3 | | |
| Kirkland_Main-696 | Kirkland_Manholes-1213 | 300.54 | Kirkland_Manholes-2616 | 274.02 | 226.7 | 11.7 | 6 | Concrete | 0.013 | 861 | 69 | 26 | 95 | 11 | | |
| Kirkland_Main-697 | Kirkland_Manholes-515 | 18.45 | Kirkland_Manholes-514 | 18.19 | 122.3 | 0.21 | 12 | PVC | 0.01 | 953 | 38 | 203 | 241 | 25.3 | SM14-Ex-EX37 | |
| Kirkland_Main-698 | Kirkland_Manholes-1186 | 18.89 | Kirkland_Manholes-515 | 18.45 | 232.7 | 0.19 | 12 | PVC | 0.01 | 907 | 37 | 195 | 232 | 25.6 | SM14-Ex-EX37 | |
| Kirkland_Main-699 | Kirkland_Manholes-1185 | 19.29 | Kirkland_Manholes-1186 | 18.89 | 267.9 | 0.15 | 12 | PVC | 0.01 | 803 | 36 | 186 | 222 | 27.6 | SM14-Ex-EX37 | |
| Kirkland_Main-700 | Kirkland_Manholes-2510 | 102.3 | Kirkland_Manholes-2511 | 85.9 | 155.2 | 10.57 | 8 | PVC | 0.01 | 2,292 | 11 | 25 | 36 | 1.6 | SM14-Ex-EX229 | |
| Kirkland_Main-701 | Kirkland_Manholes-2512 | 90.74 | Kirkland_Manholes-2511 | 85.9 | 110.5 | 4.38 | 8 | PVC | 0.01 | 1,475 | 5 | 12 | 17 | 1.1 | SM14-Ex-EX228 | |
| Kirkland_Main-703 | Kirkland_Manholes-2513 | 104.61 | Kirkland_Manholes-2512 | 90.74 | 161.7 | 8.58 | 8 | PVC | 0.01 | 2,065 | 3 | 6 | 9 | 0.5 | SM14-Ex-EX228 | |
| Kirkland_Main-704 | Kirkland_Manholes-1988 | 449.74 | Kirkland_Manholes-1989 | 447.97 | 257 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 4 | 6 | 1 | | |
| Kirkland_Main-705 | Kirkland_Manholes-2008 | 435.7 | Kirkland_Manholes-1993 | 435.41 | 162.8 | 0.18 | 8 | PVC | 0.01 | 298 | 9 | 17 | 26 | 8.7 | | |
| Kirkland_Main-706 | Kirkland_Manholes-2060 | 437.6 | Kirkland_Manholes-2008 | 435.7 | 259.6 | 0.73 | 8 | PVC | 0.01 | 603 | 4 | 4 | 8 | 1.3 | | |
| Kirkland_Main-707 | Kirkland_Manholes-1993 | 435.41 | Kirkland_Manholes-2061 | 434.9 | 121.2 | 0.42 | 8 | PVC | 0.01 | 457 | 9 | 21 | 31 | 6.7 | | |
| Kirkland_Main-708 | Kirkland_Manholes-2061 | 434.9 | Kirkland_Manholes-1994 | 434.42 | 35 | 1.37 | 8 | PVC | 0.01 | 826 | 10 | 26 | 36 | 4.3 | | |
| Kirkland_Main-709 | Kirkland_Manholes-1994 | 434.42 | Kirkland_Manholes-1995 | 433.71 | 121.9 | 0.58 | 8 | PVC | 0.01 | 538 | 11 | 30 | 41 | 7.6 | | |
| Kirkland_Main-710 | Kirkland_Manholes-1995 | 433.71 | Kirkland_Manholes-1996 | 432.86 | 110.9 | 0.77 | 8 | PVC | 0.01 | 617 | 14 | 39 | 52 | 8.5 | | |
| Kirkland_Main-711 | Kirkland_Manholes-1996 | 432.86 | Kirkland_Manholes-1997 | 432.14 | 299.5 | 0.24 | 8 | PVC | 0.01 | 346 | 15 | 43 | 57 | 16.6 | | |
| Kirkland_Main-712 | Kirkland_Manholes-1998 | 432.54 | Kirkland_Manholes-1997 | 432.14 | 196.8 | 0.2 | 8 | PVC | 0.01 | 318 | 2 | 4 | 6 | 1.9 | SM14-Ex-EX211 | |
| Kirkland_Main-713 | Kirkland_Manholes-1997 | 432.14 | Kirkland_Manholes-1999 | 430.91 | 331.2 | 0.37 | 8 | PVC | 0.01 | 430 | 19 | 52 | 70 | 16.4 | SM14-Ex-EX211 | |
| Kirkland_Main-714 | Kirkland_Manholes-2062 | 435.63 | Kirkland_Manholes-1995 | 433.71 | 265.8 | 0.72 | 8 | PVC | 0.01 | 599 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-717 | Kirkland_Manholes-2063 | 422.68 | Kirkland_Manholes-2671 | 399.75 | 265 | 8.65 | 8 | PVC | 0.01 | 2,074 | 24 | 77 | 101 | 4.9 | SM14-Ex-EX209 | |
| Kirkland_Main-718 | Kirkland_Manholes-2066 | 434.49 | Kirkland_Manholes-2059 | 433 | 119.7 | 1.24 | 8 | PVC | 0.01 | 787 | 14 | 4 | 18 | 2.3 | SM14-Ex-EX213 | |
| Kirkland_Main-719 | Kirkland_Manholes-2698 | 186.34 | Kirkland_Manholes-2068 | 163.08 | 368.4 | 6.31 | 8 | PVC | 0.01 | 1,772 | 20 | 64 | 84 | 4.7 | SM14-Ex-EX198 | |
| Kirkland_Main-720 | Kirkland_Manholes-2073 | 208.76 | Kirkland_Manholes-2072 | 202.36 | 249.4 | 2.57 | 8 | PVC | 0.01 | 1,129 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX200 | |
| Kirkland_Main-721 | Kirkland_Manholes-2072 | 202.36 | Kirkland_Manholes-2071 | 194.98 | 377.1 | 1.96 | 8 | PVC | 0.01 | 986 | 7 | 9 | 15 | 1.5 | SM14-Ex-EX200 | |
| Kirkland_Main-722 | Kirkland_Manholes-2071 | 194.98 | Kirkland_Manholes-2070 | 185.96 | 391.2 | 2.31 | 8 | PVC | 0.01 | 1,071 | 10 | 13 | 23 | 2.2 | SM14-Ex-EX200 | |
| Kirkland_Main-723 | Kirkland_Manholes-2070 | 185.96 | Kirkland_Manholes-2069 | 170.43 | 333.6 | 4.65 | 8 | PVC | 0.01 | 1,521 | 14 | 21 | 36 | 2.3 | SM14-Ex-EX200 | |
| Kirkland_Main-724 | Kirkland_Manholes-2082 | 247.37 | Kirkland_Manholes-2083 | 246.89 | 120.8 | 0.4 | 8 | PVC | 0.01 | 447 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-725 | Kirkland_Manholes-2083 | 246.89 | Kirkland_Manholes-658 | 246.8 | 21.8 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 9 | 10 | 2.3 | | |
| Kirkland_Main-727 | Kirkland_Manholes-2077 | 125.7 | Kirkland_Manholes-2078 | 109.29 | 215.7 | 7.61 | 8 | PVC | 0.01 | 1,945 | 36 | 25 | 61 | 3.1 | SM14-Ex-EX195 | |
| Kirkland_Main-728 | Kirkland_Manholes-2076 | 138.89 | Kirkland_Manholes-2077 | 125.7 | 187.9 | 7.02 | 8 | PVC | 0.01 | 1,868 | 32 | 17 | 49 | 2.6 | SM14-Ex-EX195 | |
| Kirkland_Main-729 | Kirkland_Manholes-2075 | 153.92 | Kirkland_Manholes-2076 | 138.89 | 219.4 | 6.85 | 8 | PVC | 0.01 | 1,845 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX195 | |
| Kirkland_Main-731 | Kirkland_Manholes-574 | 110.98 | Kirkland_Manholes-595 | 103.44 | 159.1 | 4.74 | 8 | PVC | 0.01 | 1,535 | 5 | 17 | 21 | 1.4 | SM14-Ex-EX116 | |
| Kirkland_Main-736 | Kirkland_Manholes-1656 | 125.68 | Kirkland_Manholes-1655 | 123.15 | 42 | 6.03 | 8 | PVC | 0.01 | 1,731 | 9 | 8 | 18 | 1 | | |
| Kirkland_Main-737 | Kirkland_Manholes-1655 | 123.15 | Kirkland_Manholes-1657 | 121.13 | 91.5 | 2.21 | 8 | PVC | 0.01 | 1,048 | 10 | 17 | 27 | 2.5 | | |
| Kirkland_Main-738 | Kirkland_Manholes-1658 | 125.68 | Kirkland_Manholes-1657 | 125.55 | 31.5 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 8 | 12 | 2.6 | | Drop Connection |
| Kirkland_Main-739 | Kirkland_Manholes-1657 | 121.13 | Kirkland_Manholes-1659 | 116.52 | 191.7 | 2.41 | 8 | PVC | 0.01 | 1,093 | 14 | 33 | 47 | 4.3 | | |
| Kirkland_Main-740 | Kirkland_Manholes-1659 | 116.52 | Kirkland_Manholes-1660 | 110.77 | 122.6 | 4.69 | 8 | PVC | 0.01 | 1,527 | 33 | 41 | 74 | 4.8 | | |
| Kirkland_Main-741 | Kirkland_Manholes-1660 | 110.77 | Kirkland_Manholes-1662 | 100.46 | 127.6 | 8.08 | 8 | PVC | 0.01 | 2,004 | 33 | 50 | 83 | 4.1 | | |
| Kirkland_Main-742 | Kirkland_Manholes-1663 | 103.65 | Kirkland_Manholes-1661 | 102.19 | 55.6 | 2.62 | 8 | PVC | 0.01 | 1,142 | 4 | 17 | 20 | 1.8 | | |
| Kirkland_Main-743 | Kirkland_Manholes-1661 | 102.19 | Kirkland_Manholes-1662 | 100.46 | 11.1 | 15.62 | 8 | PVC | 0.01 | 2,786 | 4 | 25 | 29 | 1 | | |
| Kirkland_Main-744 | Kirkland_Manholes-1662 | 100.46 | Kirkland_Manholes-1665 | 94.21 | 177.6 | 3.52 | 8 | PVC | 0.01 | 1,322 | 39 | 83 | 121 | 9.2 | | |
| Kirkland_Main-745 | Kirkland_Manholes-1664 | 108.5 | Kirkland_Manholes-1663 | 103.65 | 57.4 | 8.45 | 8 | PVC | 0.01 | 2,049 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX169 | |
| Kirkland_Main-746 | Kirkland_Manholes-1667 | 101.23 | Kirkland_Manholes-1666 | 89.71 | 215.8 | 5.34 | 8 | PVC | 0.01 | 1,629 | 18 | 41 | 59 | 3.6 | | |
| Kirkland_Main-747 | Kirkland_Manholes-1668 | 119.52 | Kirkland_Manholes-1667 | 101.23 | 220.6 | 8.29 | 8 | PVC | 0.01 | 2,030 | 11 | 25 | 36 | 1.8 | | |
| Kirkland_Main-748 | Kirkland_Manholes-1295 | 119.7 | Kirkland_Manholes-572 | 113.73 | 319.3 | 1.87 | 8 | PVC | 0.01 | 964 | 115 | 322 | 437 | 45.4 | SM14-Ex-EX117 | |
| Kirkland_Main-749 | Kirkland_Manholes-1256 | 151.53 | Kirkland_Manholes-1284 | 145.84 | 256.4 | 2.22 | 8 | PVC | 0.01 | 1,050 | 30 | 116 | 145 | 13.9 | SM14-Ex-EX108 | |
| Kirkland_Main-750 | Kirkland_Manholes-1283 | 147.65 | Kirkland_Manholes-1284 | 145.84 | 53.9 | 3.36 | 8 | PVC | 0.01 | 1,292 | 6 | 17 | 22 | 1.7 | SM14-Ex-EX108 | |
| Kirkland_Main-751 | Kirkland_Manholes-1282 | 154.9 | Kirkland_Manholes-1283 | 147.65 | 295.8 | 2.45 | 8 | PVC | 0.01 | 1,104 | 2 | 8 | 11 | 1 | SM14-Ex-EX108 | |
| Kirkland_Main-753 | Kirkland_Manholes-1284 | 145.84 | Kirkland_Manholes-1287 | 140.18 | 314.1 | 1.8 | 8 | PVC | 0.01 | 946 | 38 | 140 | 179 | 18.9 | SM14-Ex-EX105 | |
| Kirkland_Main-755 | Kirkland_Manholes-1285 | 150.78 | Kirkland_Manholes-1286 | 147.03 | 125.8 | 2.98 | 8 | PVC | 0.01 | 1,217 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX109 | |
| Kirkland_Main-756 | Kirkland_Manholes-1286 | 147.03 | Kirkland_Manholes-1287 | 140.18 | 192.2 | 3.56 | 8 | PVC | 0.01 | 1,331 | 5 | 17 | 21 | 1.6 | SM14-Ex-EX109 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-757 | Kirkland_Manholes-1289 | 131.61 | Kirkland_Manholes-1290 | 127.52 | 235.4 | 1.74 | 8 | PVC | 0.01 | 929 | 54 | 182 | 235 | 25.3 | SM14-Ex-EX105 | |
| Kirkland_Main-758 | Kirkland_Manholes-1290 | 127.52 | Kirkland_Manholes-576 | 111.2 | 318.6 | 5.12 | 8 | PVC | 0.01 | 1,596 | 73 | 256 | 329 | 20.6 | SM14-Ex-EX105 | |
| Kirkland_Main-759 | Kirkland_Manholes-1291 | 137.27 | Kirkland_Manholes-1290 | 127.52 | 280.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 17 | 66 | 83 | 6.3 | SM14-Ex-EX111 | |
| Kirkland_Main-760 | Kirkland_Manholes-1261 | 144.57 | Kirkland_Manholes-1291 | 137.27 | 276 | 2.64 | 8 | PVC | 0.01 | 1,147 | 13 | 58 | 71 | 6.2 | SM14-Ex-EX111 | |
| Kirkland_Main-761 | Kirkland_Manholes-1227 | 174.57 | Kirkland_Manholes-584 | 159.38 | 158.7 | 9.57 | 8 | PVC | 0.01 | 2,181 | 36 | 91 | 126 | 5.8 | SM14-Ex-EX96 | |
| Kirkland_Main-762 | Kirkland_Manholes-1238 | 263.26 | Kirkland_Manholes-1298 | 253.38 | 261 | 3.78 | 8 | PVC | 0.01 | 1,372 | 5 | 17 | 22 | 1.6 | SM14-Ex-EX64 | |
| Kirkland_Main-763 | Kirkland_Manholes-1298 | 253.38 | Kirkland_Manholes-1245 | 243.41 | 258.4 | 3.86 | 8 | PVC | 0.01 | 1,385 | 9 | 25 | 34 | 2.4 | SM14-Ex-EX64 | |
| Kirkland_Main-765 | Kirkland_Manholes-1302 | 252.61 | Kirkland_Manholes-1301 | 241.1 | 158.8 | 7.25 | 8 | PVC | 0.01 | 1,898 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX98 | |
| Kirkland_Main-766 | Kirkland_Manholes-1230 | 236.32 | Kirkland_Manholes-1229 | 218.73 | 349.5 | 5.03 | 8 | PVC | 0.01 | 1,582 | 23 | 58 | 81 | 5.1 | SM14-Ex-EX96 | |
| Kirkland_Main-767 | Kirkland_Manholes-1229 | 218.73 | Kirkland_Manholes-1228 | 189.87 | 369 | 7.82 | 8 | PVC | 0.01 | 1,972 | 28 | 66 | 94 | 4.8 | SM14-Ex-EX96 | |
| Kirkland_Main-768 | Kirkland_Manholes-727 | 84.25 | Kirkland_Manholes-728 | 70.86 | 152.9 | 8.76 | 8 | PVC | 0.01 | 2,086 | 185 | 537 | 722 | 34.6 | SM14-Ex-EX117 | |
| Kirkland_Main-769 | Kirkland_Manholes-1407 | 474.89 | Kirkland_Manholes-1406 | 473.57 | 319.1 | 0.41 | 8 | PVC | 0.01 | 453 | 47 | 30 | 77 | 17 | | |
| Kirkland_Main-770 | Kirkland_Manholes-1415 | 475.19 | Kirkland_Manholes-1406 | 473.57 | 245.1 | 0.66 | 8 | PVC | 0.01 | 573 | 42 | 47 | 89 | 15.6 | | |
| Kirkland_Main-771 | Kirkland_Manholes-1408 | 476.13 | Kirkland_Manholes-1407 | 474.89 | 287.1 | 0.43 | 8 | PVC | 0.01 | 463 | 22 | 26 | 48 | 10.4 | | |
| Kirkland_Main-772 | Kirkland_Manholes-1409 | 479.33 | Kirkland_Manholes-1408 | 476.13 | 271.9 | 1.18 | 8 | PVC | 0.01 | 765 | 22 | 21 | 43 | 5.7 | | |
| Kirkland_Main-773 | Kirkland_Manholes-1410 | 479.58 | Kirkland_Manholes-1409 | 479.33 | 219 | 0.11 | 8 | PVC | 0.01 | 238 | 19 | 17 | 36 | 15.2 | | |
| Kirkland_Main-774 | Kirkland_Manholes-1411 | 480.36 | Kirkland_Manholes-1410 | 479.58 | 194.5 | 0.4 | 8 | PVC | 0.01 | 445 | 18 | 13 | 31 | 6.9 | | |
| Kirkland_Main-775 | Kirkland_Manholes-1412 | 483.98 | Kirkland_Manholes-1411 | 480.36 | 100.6 | 3.6 | 8 | PVC | 0.01 | 1,338 | 4 | 4 | 8 | 0.6 | | |
| Kirkland_Main-776 | Kirkland_Manholes-1853 | 276.11 | Kirkland_Manholes-1851 | 275 | 191.4 | 0.58 | 8 | PVC | 0.01 | 537 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-777 | Kirkland_Manholes-1772 | 68.31 | Kirkland_Manholes-2929 | 66.75 | 69.5 | 2.25 | 12 | PVC | 0.01 | 3,115 | 173 | 479 | 651 | 20.9 | SM14-Ex-EX166 | |
| Kirkland_Main-778 | Kirkland_Manholes-2929 | 66.75 | Kirkland_Manholes-729 | 64.46 | 261.6 | 0.88 | 12 | PVC | 0.01 | 1,946 | 173 | 487 | 660 | 33.9 | SM14-Ex-EX166 | |
| Kirkland_Main-780 | Kirkland_Manholes-1413 | 481 | Kirkland_Manholes-1411 | 480.36 | 161.4 | 0.4 | 8 | PVC | 0.01 | 446 | 12 | 4 | 16 | 3.7 | | |
| Kirkland_Main-781 | Kirkland_Manholes-1418 | 477.42 | Kirkland_Manholes-1414 | 476.69 | 182.7 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 17 | 22 | 5 | | |
| Kirkland_Main-782 | Kirkland_Manholes-2078 | 109.29 | Kirkland_Manholes-2079 | 101.7 | 225.4 | 3.37 | 8 | PVC | 0.01 | 1,294 | 42 | 33 | 75 | 5.8 | SM14-Ex-EX195 | |
| Kirkland_Main-783 | Kirkland_Manholes-2079 | 101.7 | Kirkland_Manholes-2080 | 100.3 | 24.2 | 5.79 | 8 | PVC | 0.01 | 1,697 | 44 | 41 | 86 | 5 | | |
| Kirkland_Main-784 | Kirkland_Manholes-2129 | 162.62 | Kirkland_Manholes-2130 | 161.57 | 13 | 8.1 | 12 | PVC | 0.01 | 5,916 | 1 | 9 | 9 | 0.2 | SM14-Ex-EX235 | |
| Kirkland_Main-785 | Kirkland_Manholes-2128 | 162.8 | Kirkland_Manholes-2129 | 162.62 | 31 | 0.58 | 12 | PVC | 0.01 | 1,584 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-786 | Kirkland_Manholes-2127 | 166.38 | Kirkland_Manholes-2130 | 161.57 | 81 | 5.94 | 8 | PVC | 0.01 | 1,718 | 23 | 9 | 32 | 1.8 | SM14-Ex-EX235 | |
| Kirkland_Main-787 | Kirkland_Manholes-2131 | 158.3 | O-32 | 156.08 | 22.1 | 10.06 | 15 | PVC | 0.01 | 11,953 | 828 | 1,636 | 2,464 | 20.6 | SM14-Ex-EX236 | |
| Kirkland_Main-788 | Kirkland_Manholes-2139 | 96.6 | Kirkland_Manholes-2138 | 94.8 | 32.5 | 5.54 | 8 | PVC | 0.01 | 1,659 | 7 | 25 | 32 | 1.9 | | |
| Kirkland_Main-789 | Kirkland_Manholes-2154 | 28.66 | Kirkland_Manholes-2153 | 28.2 | 11.2 | 4.1 | 8 | PVC | 0.01 | 1,428 | 4 | 39 | 43 | 3 | SM14-Ex-EX220 | |
| Kirkland_Main-790 | Kirkland_Manholes-2153 | 28.2 | Kirkland_Manholes-2152 | 27.32 | 8.5 | 10.4 | 8 | PVC | 0.01 | 2,274 | 4 | 46 | 50 | 2.2 | SM14-Ex-EX220 | |
| Kirkland_Main-791 | Kirkland_Manholes-2152 | 27.32 | Kirkland_Manholes-2320 | 18 | 38.7 | 24.05 | 8 | PVC | 0.01 | 3,458 | 4 | 52 | 56 | 1.6 | | |
| Kirkland_Main-792 | Kirkland_Manholes-2151 | 49.81 | Kirkland_Manholes-2154 | 28.66 | 303.9 | 6.96 | 8 | PVC | 0.01 | 1,860 | 4 | 33 | 37 | 2 | SM14-Ex-EX220 | |
| Kirkland_Main-793 | Kirkland_Manholes-2150 | 50.98 | Kirkland_Manholes-2151 | 49.81 | 135.2 | 0.87 | 8 | PVC | 0.01 | 656 | 2 | 26 | 28 | 4.3 | SM14-Ex-EX220 | |
| Kirkland_Main-794 | Kirkland_Manholes-2149 | 76.26 | Kirkland_Manholes-2150 | 50.98 | 227.7 | 11.1 | 8 | PVC | 0.01 | 2,349 | 1 | 20 | 21 | 0.9 | SM14-Ex-EX220 | |
| Kirkland_Main-795 | Kirkland_Manholes-2148 | 77.03 | Kirkland_Manholes-2149 | 76.26 | 100.5 | 0.77 | 8 | PVC | 0.01 | 617 | 0 | 13 | 13 | 2.1 | SM14-Ex-EX220 | |
| Kirkland_Main-796 | Kirkland_Manholes-2147 | 92.38 | Kirkland_Manholes-2148 | 77.03 | 204.1 | 7.52 | 8 | PVC | 0.01 | 1,934 | 0 | 7 | 7 | 0.3 | SM14-Ex-EX220 | |
| Kirkland_Main-800 | Kirkland_Manholes-2158 | 102.11 | Kirkland_Manholes-2157 | 100.18 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 3 | 7 | 9 | 1.5 | | |
| Kirkland_Main-801 | Kirkland_Manholes-2160 | 86.23 | Kirkland_Manholes-2159 | 84.71 | 220.9 | 0.69 | 8 | PVC | 0.01 | 585 | 1 | 7 | 8 | 1.4 | | |
| Kirkland_Main-802 | Kirkland_Manholes-2157 | 100.18 | Kirkland_Manholes-2159 | 84.71 | 251.5 | 6.15 | 8 | PVC | 0.01 | 1,749 | 17 | 52 | 69 | 4 | | |
| Kirkland_Main-804 | Kirkland_Manholes-2134 | 124.65 | Kirkland_Manholes-2135 | 110 | 281.7 | 5.2 | 8 | PVC | 0.01 | 1,608 | 6 | 26 | 32 | 2 | SM14-Ex-EX221 | |
| Kirkland_Main-805 | Kirkland_Manholes-2133 | 139 | Kirkland_Manholes-2134 | 124.65 | 362.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 3 | 20 | 23 | 1.6 | SM14-Ex-EX221 | |
| Kirkland_Main-806 | Kirkland_Manholes-2132 | 159.52 | Kirkland_Manholes-2131 | 158.3 | 73.8 | 1.65 | 15 | PVC | 0.01 | 4,846 | 823 | 1,631 | 2,454 | 50.6 | SM14-Ex-EX236 | |
| Kirkland_Main-807 | Kirkland_Manholes-2126 | 177.6 | Kirkland_Manholes-2127 | 166.38 | 202.1 | 5.55 | 8 | PVC | 0.01 | 1,661 | 23 | 4 | 27 | 1.6 | SM14-Ex-EX235 | |
| Kirkland_Main-808 | Kirkland_Manholes-2125 | 177.39 | Kirkland_Manholes-2132 | 159.52 | 237.1 | 7.54 | 12 | PVC | 0.01 | 5,707 | 803 | 1,601 | 2,404 | 42.1 | | |
| Kirkland_Main-809 | Kirkland_Manholes-2304 | 192.91 | Kirkland_Manholes-2125 | 177.39 | 277.3 | 5.6 | 12 | PVC | 0.01 | 4,918 | 803 | 1,597 | 2,399 | 48.8 | | |
| Kirkland_Main-810 | Kirkland_Manholes-2136 | 110.1 | Kirkland_Manholes-2137 | 107.9 | 254.4 | 0.86 | 10 | PVC | 0.01 | 1,189 | 2 | 8 | 10 | 0.9 | | |
| Kirkland_Main-811 | Kirkland_Manholes-2137 | 107.9 | Kirkland_Manholes-2080 | 100.3 | 293.2 | 2.59 | 10 | PVC | 0.01 | 2,058 | 8 | 17 | 24 | 1.2 | | |
| Kirkland_Main-812 | Kirkland_Manholes-2080 | 100.3 | Kirkland_Manholes-2138 | 94.8 | 252.5 | 2.18 | 10 | PVC | 0.01 | 1,887 | 53 | 66 | 119 | 6.3 | | |
| Kirkland_Main-813 | Kirkland_Manholes-2138 | 94.8 | Kirkland_Manholes-2140 | 88.47 | 239.3 | 2.65 | 10 | PVC | 0.01 | 2,079 | 61 | 99 | 160 | 7.7 | | |
| Kirkland_Main-814 | Kirkland_Manholes-2140 | 88.47 | Kirkland_Manholes-2141 | 73.53 | 356.2 | 4.19 | 10 | PVC | 0.01 | 2,618 | 75 | 165 | 241 | 9.2 | | |
| Kirkland_Main-815 | Kirkland_Manholes-2141 | 73.53 | Kirkland_Manholes-2142 | 68.99 | 196.1 | 2.31 | 10 | PVC | 0.01 | 1,945 | 116 | 215 | 330 | 17 | | |
| Kirkland_Main-816 | Kirkland_Manholes-2142 | 68.99 | Kirkland_Manholes-2143 | 61.9 | 284.3 | 2.49 | 10 | PVC | 0.01 | 2,019 | 129 | 289 | 417 | 20.7 | | |
| Kirkland_Main-817 | Kirkland_Manholes-2876 | 267.92 | Kirkland_Manholes-2877 | 259.41 | 173 | 4.92 | 8 | PVC | 0.01 | 1,564 | 6 | 21 | 28 | 1.8 | | |
| Kirkland_Main-818 | Kirkland_Manholes-2877 | 259.41 | Kirkland_Manholes-625 | 258 | 37.7 | 3.74 | 8 | PVC | 0.01 | 1,364 | 7 | 26 | 33 | 2.4 | | |
| Kirkland_Main-819 | Kirkland_Manholes-2878 | 269.8 | Kirkland_Manholes-2876 | 267.92 | 58 | 3.24 | 8 | PVC | 0.01 | 1,269 | 2 | 9 | 11 | 0.9 | | |
| Kirkland_Main-820 | Kirkland_Manholes-2882 | 274.26 | Kirkland_Manholes-2878 | 269.8 | 141 | 3.16 | 8 | PVC | 0.01 | 1,254 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-821 | Kirkland_Manholes-1801 | 112.29 | Kirkland_Manholes-1802 | 95.68 | 270.4 | 6.14 | 8 | PVC | 0.01 | 1,747 | 86 | 254 | 340 | 19.4 | SM4 | |
| Kirkland_Main-822 | Kirkland_Manholes-1803 | 87.57 | Kirkland_Manholes-1401 | 76.78 | 133.9 | 8.06 | 8 | PVC | 0.01 | 2,002 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX141 | |
| Kirkland_Main-823 | Kirkland_Manholes-1804 | 103.12 | Kirkland_Manholes-1403 | 89.74 | 129.7 | 10.32 | 8 | PVC | 0.01 | 2,265 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX140 | |
| Kirkland_Main-826 | Kirkland_Manholes-1807 | 44.26 | Kirkland_Manholes-1806 | 38.89 | 57.7 | 9.3 | 8 | PVC | 0.01 | 2,150 | 119 | 304 | 422 | 19.6 | SM4 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-827 | Kirkland_Manholes-589 | 126.06 | Kirkland_Manholes-590 | 118.3 | 332.1 | 2.34 | 8 | PVC | 0.01 | 1,078 | 4 | 8 | 12 | 1.1 | SM14-Ex-EX158 | |
| Kirkland_Main-828 | Kirkland_Manholes-1802 | 95.68 | Kirkland_Manholes-1810 | 85.96 | 289.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 95 | 279 | 373 | 28.9 | SM4 | |
| Kirkland_Main-829 | Kirkland_Manholes-1833 | 16.5 | Kirkland_Manholes-1793 | 15.37 | 141.1 | 0.8 | 8 | PVC | 0.01 | 631 | 3 | 13 | 16 | 2.5 | | |
| Kirkland_Main-830 | Kirkland_Manholes-1836 | 11 | Kirkland_Manholes-1791 | 8.2 | 291.3 | 0.96 | 15 | PVC | 0.01 | 3,695 | 495 | 891 | 1,386 | 37.5 | | |
| Kirkland_Main-832 | Kirkland_Manholes-1850 | 19.39 | Kirkland_Manholes-1849 | 16.69 | 373.2 | 0.72 | 8 | PVC | 0.01 | 600 | 5 | 13 | 18 | 3 | SM10 | |
| Kirkland_Main-833 | Kirkland_Manholes-1849 | 16.69 | Kirkland_Manholes-1847 | 16.59 | 254.1 | 0.04 | 8 | PVC | 0.01 | 140 | 6 | 20 | 25 | 18.2 | SM10 | |
| Kirkland_Main-834 | Kirkland_Manholes-1847 | 16.59 | Kirkland_Manholes-1846 | 15.1 | 93.2 | 1.6 | 12 | PVC | 0.01 | 2,628 | 7 | 26 | 33 | 1.2 | SM10 | |
| Kirkland_Main-835 | Kirkland_Manholes-2633 | 278.44 | Kirkland_Manholes-2632 | 276.84 | 129.7 | 1.23 | 8 | PVC | 0.01 | 783 | 4 | 9 | 13 | 1.6 | SM14-Ex-EX295 | |
| Kirkland_Main-837 | Kirkland_Manholes-2605 | 280.73 | Kirkland_Manholes-2633 | 278.44 | 217.9 | 1.05 | 8 | PVC | 0.01 | 723 | 2 | 4 | 7 | 0.9 | SM14-Ex-EX295 | |
| Kirkland_Main-838 | Kirkland_Manholes-2634 | 286.56 | Kirkland_Manholes-2635 | 275.48 | 268.8 | 4.12 | 8 | PVC | 0.01 | 1,431 | 4 | 4 | 8 | 0.6 | SM14-Ex-EX294 | |
| Kirkland_Main-839 | Kirkland_Manholes-2635 | 275.48 | Kirkland_Manholes-2636 | 245.46 | 401.2 | 7.48 | 8 | PVC | 0.01 | 1,929 | 6 | 13 | 19 | 1 | SM14-Ex-EX294 | |
| Kirkland_Main-840 | Kirkland_Manholes-2636 | 245.46 | Kirkland_Manholes-2637 | 187.87 | 397.8 | 14.48 | 8 | PVC | 0.01 | 2,683 | 8 | 17 | 25 | 0.9 | SM14-Ex-EX294 | |
| Kirkland_Main-841 | Kirkland_Manholes-2640 | 93.15 | Kirkland_Manholes-2641 | 88.89 | 86.7 | 4.91 | 8 | PVC | 0.01 | 1,563 | 9 | 19 | 28 | 1.8 | | |
| Kirkland_Main-842 | Kirkland_Manholes-2639 | 115.66 | Kirkland_Manholes-2640 | 93.15 | 98.6 | 22.84 | 8 | PVC | 0.01 | 3,369 | 6 | 12 | 19 | 0.6 | | |
| Kirkland_Main-843 | Kirkland_Manholes-2638 | 117.25 | Kirkland_Manholes-2639 | 115.66 | 47.5 | 3.35 | 8 | PVC | 0.01 | 1,290 | 3 | 6 | 9 | 0.7 | | |
| Kirkland_Main-844 | Kirkland_Manholes-2643 | 117.26 | Kirkland_Manholes-2642 | 102.55 | 182.7 | 8.05 | 8 | PVC | 0.01 | 2,001 | 3 | 6 | 9 | 0.4 | | |
| Kirkland_Main-848 | Kirkland_Manholes-2645 | 79.04 | Kirkland_Manholes-2644 | 74.88 | 115.7 | 3.59 | 8 | PVC | 0.01 | 1,337 | 15 | 37 | 52 | 3.9 | | |
| Kirkland_Main-850 | Kirkland_Manholes-1481 | 462.54 | Kirkland_Manholes-1482 | 457.77 | 84.3 | 5.66 | 8 | PVC | 0.01 | 1,677 | 6 | 21 | 27 | 1.6 | SM14-Ex-EX268 | |
| Kirkland_Main-851 | Kirkland_Manholes-1495 | 496.81 | Kirkland_Manholes-1484 | 495.36 | 362.4 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 6 | 1.3 | | |
| Kirkland_Main-852 | Kirkland_Manholes-1484 | 495.36 | Kirkland_Manholes-1485 | 486.98 | 151.8 | 5.52 | 8 | PVC | 0.01 | 1,657 | 12 | 34 | 46 | 2.8 | | |
| Kirkland_Main-853 | Kirkland_Manholes-1485 | 486.98 | Kirkland_Manholes-1486 | 483.92 | 112.4 | 2.72 | 8 | PVC | 0.01 | 1,163 | 21 | 52 | 73 | 6.2 | | |
| Kirkland_Main-854 | Kirkland_Manholes-1486 | 483.92 | Kirkland_Manholes-1488 | 482.18 | 104.3 | 1.67 | 8 | PVC | 0.01 | 910 | 23 | 56 | 79 | 8.7 | | |
| Kirkland_Main-855 | Kirkland_Manholes-1488 | 482.18 | Kirkland_Manholes-1489 | 480.6 | 353.4 | 0.45 | 8 | PVC | 0.01 | 471 | 28 | 64 | 93 | 19.6 | | |
| Kirkland_Main-856 | Kirkland_Manholes-1487 | 483.25 | Kirkland_Manholes-1488 | 482.18 | 163.9 | 0.65 | 8 | PVC | 0.01 | 570 | 2 | 4 | 7 | 1.2 | | |
| Kirkland_Main-857 | Kirkland_Manholes-1489 | 480.6 | Kirkland_Manholes-2029 | 479.06 | 117.8 | 1.31 | 8 | PVC | 0.01 | 806 | 30 | 69 | 99 | 12.2 | | |
| Kirkland_Main-858 | Kirkland_Manholes-1490 | 499.13 | Kirkland_Manholes-1492 | 491.87 | 290.5 | 2.5 | 8 | PVC | 0.01 | 1,115 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-859 | Kirkland_Manholes-1492 | 491.87 | Kirkland_Manholes-1491 | 489.53 | 101 | 2.32 | 8 | PVC | 0.01 | 1,073 | 5 | 9 | 14 | 1.3 | | |
| Kirkland_Main-860 | Kirkland_Manholes-1491 | 489.53 | Kirkland_Manholes-1485 | 486.98 | 404.5 | 0.63 | 8 | PVC | 0.01 | 560 | 7 | 13 | 20 | 3.6 | | |
| Kirkland_Main-861 | Kirkland_Manholes-1493 | 479.91 | Kirkland_Manholes-2025 | 477 | 402.9 | 0.72 | 8 | PVC | 0.01 | 599 | 8 | 9 | 17 | 2.8 | | |
| Kirkland_Main-862 | Kirkland_Manholes-1494 | 496.1 | Kirkland_Manholes-1484 | 495.36 | 68.3 | 1.08 | 8 | PVC | 0.01 | 734 | 9 | 26 | 35 | 4.8 | | |
| Kirkland_Main-865 | Kirkland_Manholes-2234 | 145.49 | Kirkland_Manholes-2235 | 140.92 | 280.9 | 1.63 | 8 | PVC | 0.01 | 899 | 3 | 7 | 10 | 1.1 | SM14-Ex-EX221 | |
| Kirkland_Main-866 | Kirkland_Manholes-2235 | 140.92 | Kirkland_Manholes-2133 | 139 | 112.7 | 1.7 | 8 | PVC | 0.01 | 920 | 3 | 13 | 16 | 1.8 | SM14-Ex-EX221 | |
| Kirkland_Main-867 | Kirkland_Manholes-2236 | 23.9 | Kirkland_Manholes-2230 | 23.3 | 57.5 | 1.04 | 8 | PVC | 0.01 | 720 | 0 | 7 | 7 | 0.9 | | |
| Kirkland_Main-868 | Kirkland_Manholes-2702 | 256.62 | Kirkland_Manholes-1633 | 254.8 | 313.1 | 0.58 | 8 | PVC | 0.01 | 538 | 7 | 13 | 20 | 3.7 | SM14-Ex-EX204 | |
| Kirkland_Main-869 | Kirkland_Manholes-1634 | 223.49 | Kirkland_Manholes-1635 | 192.35 | 312.2 | 9.97 | 12 | PVC | 0.01 | 6,565 | 366 | 910 | 1,276 | 19.4 | SM7 | |
| Kirkland_Main-870 | Kirkland_Manholes-1635 | 192.35 | Kirkland_Manholes-1638 | 164.94 | 265.5 | 10.33 | 12 | PVC | 0.01 | 6,679 | 368 | 914 | 1,282 | 19.2 | SM7 | |
| Kirkland_Main-871 | Kirkland_Manholes-1636 | 172.84 | Kirkland_Manholes-1637 | 170.82 | 135.8 | 1.49 | 8 | PVC | 0.01 | 860 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-872 | Kirkland_Manholes-1637 | 170.82 | Kirkland_Manholes-1639 | 169.94 | 172.1 | 0.51 | 8 | PVC | 0.01 | 504 | 3 | 9 | 11 | 2.2 | | |
| Kirkland_Main-873 | Kirkland_Manholes-1639 | 169.94 | Kirkland_Manholes-1638 | 164.94 | 235.7 | 2.12 | 8 | PVC | 0.01 | 1,027 | 27 | 103 | 130 | 12.6 | SM14-Ex-EX202 | |
| Kirkland_Main-874 | Kirkland_Manholes-1638 | 164.94 | Kirkland_Manholes-1642 | 158.76 | 65.1 | 9.49 | 12 | PVC | 0.01 | 6,403 | 395 | 1,022 | 1,417 | 22.1 | SM7 | |
| Kirkland_Main-875 | Kirkland_Manholes-1641 | 205.91 | Kirkland_Manholes-1640 | 188.59 | 221.5 | 7.82 | 8 | PVC | 0.01 | 1,971 | 3 | 4 | 7 | 0.4 | SM14-Ex-EX203 | |
| Kirkland_Main-877 | Kirkland_Manholes-1643 | 156.25 | Kirkland_Manholes-1648 | 152.03 | 150 | 2.81 | 8 | PVC | 0.01 | 1,183 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX196 | |
| Kirkland_Main-878 | Kirkland_Manholes-1644 | 159.14 | O-25 | 154.59 | 17.5 | 26 | 8 | PVC | 0.01 | 3,595 | 23 | 60 | 83 | 2.3 | | |
| Kirkland_Main-879 | Kirkland_Manholes-1645 | 171.46 | Kirkland_Manholes-1644 | 159.14 | 257.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 23 | 56 | 79 | 5.1 | | |
| Kirkland_Main-880 | Kirkland_Manholes-1625 | 179.1 | Kirkland_Manholes-1645 | 171.46 | 179.3 | 4.26 | 8 | PVC | 0.01 | 1,455 | 16 | 52 | 67 | 4.6 | | |
| Kirkland_Main-881 | Kirkland_Manholes-1647 | 165.32 | O-24 | 163.59 | 78.9 | 2.18 | 8 | PVC | 0.01 | 1,042 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX175 | |
| Kirkland_Main-882 | Kirkland_Manholes-1676 | 98.96 | Kirkland_Manholes-1677 | 88.12 | 84.8 | 12.79 | 8 | PVC | 0.01 | 2,521 | 27 | 33 | 60 | 2.4 | | |
| Kirkland_Main-883 | Kirkland_Manholes-1678 | 99.76 | Kirkland_Manholes-1676 | 98.96 | 128.1 | 0.62 | 8 | PVC | 0.01 | 557 | 21 | 17 | 38 | 6.8 | | |
| Kirkland_Main-884 | Kirkland_Manholes-1679 | 107.21 | Kirkland_Manholes-1678 | 99.76 | 181.8 | 4.1 | 8 | PVC | 0.01 | 1,427 | 21 | 8 | 29 | 2 | | |
| Kirkland_Main-885 | Kirkland_Manholes-1683 | 75.33 | Kirkland_Manholes-1682 | 74.03 | 148.9 | 0.87 | 8 | PVC | 0.01 | 659 | 4 | 17 | 21 | 3.1 | | |
| Kirkland_Main-886 | Kirkland_Manholes-1682 | 74.03 | Kirkland_Manholes-1681 | 72.36 | 31.7 | 5.27 | 8 | PVC | 0.01 | 1,619 | 5 | 25 | 30 | 1.8 | | |
| Kirkland_Main-887 | Kirkland_Manholes-602 | 90.22 | Kirkland_Manholes-1680 | 83.64 | 138.4 | 4.75 | 8 | PVC | 0.01 | 1,537 | 127 | 400 | 527 | 34.3 | SM5 | |
| Kirkland_Main-888 | Kirkland_Manholes-1680 | 83.64 | Kirkland_Manholes-1681 | 72.36 | 151.4 | 7.45 | 8 | PVC | 0.01 | 1,925 | 129 | 409 | 538 | 27.9 | SM5 | |
| Kirkland_Main-889 | Kirkland_Manholes-600 | 91.95 | Kirkland_Manholes-1687 | 86.12 | 197.8 | 2.95 | 8 | PVC | 0.01 | 1,210 | 151 | 380 | 531 | 43.9 | SM14-Ex-EX117 | |
| Kirkland_Main-890 | Kirkland_Manholes-1788 | 86.3 | Kirkland_Manholes-727 | 84.25 | 363.6 | 0.56 | 8 | PVC | 0.01 | 529 | 25 | 132 | 157 | 29.7 | SM14-Ex-EX167 | |
| Kirkland_Main-891 | Kirkland_Manholes-1686 | 60.42 | Kirkland_Manholes-1685 | 57.24 | 38.9 | 8.17 | 8 | PVC | 0.01 | 2,016 | 1 | 8 | 9 | 0.4 | | |
| Kirkland_Main-892 | Kirkland_Manholes-1681 | 72.36 | Kirkland_Manholes-1685 | 57.24 | 220.4 | 6.86 | 8 | PVC | 0.01 | 1,846 | 135 | 442 | 576 | 31.2 | SM5 | |
| Kirkland_Main-893 | Kirkland_Manholes-1687 | 86.12 | Kirkland_Manholes-727 | 84.25 | 76.5 | 2.45 | 8 | PVC | 0.01 | 1,103 | 159 | 396 | 556 | 50.4 | SM14-Ex-EX117 | |
| Kirkland_Main-894 | Kirkland_Manholes-1688 | 86.4 | Kirkland_Manholes-1687 | 86.26 | 34.9 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 8 | 16 | 3.5 | | Drop Connection |
| Kirkland_Main-895 | Kirkland_Manholes-621 | 70.36 | Kirkland_Manholes-618 | 51.3 | 271.9 | 7.01 | 8 | PVC | 0.01 | 1,867 | 42 | 29 | 71 | 3.8 | SM14-Ex-EX161 | |
| Kirkland_Main-896 | Kirkland_Manholes-617 | 67.92 | Kirkland_Manholes-618 | 51.3 | 164.3 | 10.11 | 8 | PVC | 0.01 | 2,242 | 8 | 17 | 25 | 1.1 | SM14-Ex-EX162 | |
| Kirkland_Main-897 | Kirkland_Manholes-1690 | 47.42 | Kirkland_Manholes-1689 | 43.75 | 38.1 | 9.62 | 8 | PVC | 0.01 | 2,187 | 30 | 17 | 47 | 2.1 | SM14-Ex-EX163 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-898 | Kirkland_Manholes-2864 | 27 | SOUTHBAY_WETWELL | 22 | 7.5 | 67.05 | 8 | PVC | 0.01 | 5,773 | 15 | 33 | 47 | 0.8 | SM14-Ex-EX314 | WW Influent Pipe |
| Kirkland_Main-900 | Kirkland_Manholes-1691 | 49.07 | Kirkland_Manholes-1690 | 47.42 | 170.4 | 0.97 | 8 | PVC | 0.01 | 694 | 29 | 8 | 37 | 5.4 | SM14-Ex-EX163 | |
| Kirkland_Main-901 | Kirkland_Manholes-618 | 51.3 | Kirkland_Manholes-619 | 48.43 | 55.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 51 | 54 | 105 | 6.6 | SM14-Ex-EX161 | |
| Kirkland_Main-902 | Kirkland_Manholes-619 | 48.43 | Kirkland_Manholes-1689 | 43.75 | 128.1 | 3.65 | 8 | PVC | 0.01 | 1,347 | 53 | 78 | 132 | 9.8 | SM14-Ex-EX161 | |
| Kirkland_Main-903 | Kirkland_Manholes-1693 | 36.33 | Kirkland_Manholes-1692 | 35.9 | 53.8 | 0.8 | 8 | PVC | 0.01 | 630 | 5 | 8 | 13 | 2 | | |
| Kirkland_Main-905 | Kirkland_Manholes-1809 | 70.83 | Kirkland_Manholes-1703 | 58 | 295.2 | 4.35 | 8 | PVC | 0.01 | 1,470 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX153 | |
| Kirkland_Main-910 | Kirkland_Manholes-1707 | 126.28 | Kirkland_Manholes-1706 | 124.78 | 10 | 14.96 | 12 | PVC | 0.01 | 8,041 | 26 | 116 | 141 | 1.8 | SM14-Ex-EX196 | |
| Kirkland_Main-911 | Kirkland_Manholes-1710 | 134.24 | Kirkland_Manholes-1709 | 133.97 | 34.7 | 0.78 | 12 | PVC | 0.01 | 1,833 | 20 | 83 | 103 | 5.6 | SM14-Ex-EX196 | |
| Kirkland_Main-912 | Kirkland_Manholes-1708 | 148.34 | Kirkland_Manholes-1709 | 133.97 | 305.2 | 4.71 | 12 | PVC | 0.01 | 4,511 | 3 | 17 | 20 | 0.4 | SM14-Ex-EX197 | |
| Kirkland_Main-913 | Kirkland_Manholes-1709 | 133.97 | Kirkland_Manholes-1707 | 126.28 | 136.1 | 5.65 | 12 | PVC | 0.01 | 4,942 | 25 | 107 | 132 | 2.7 | SM14-Ex-EX196 | |
| Kirkland_Main-914 | Kirkland_Manholes-2281 | 374.95 | Kirkland_Manholes-2263 | 374.13 | 166.2 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 5 | 0.9 | SM14-Ex-EX212 | |
| Kirkland_Main-915 | Kirkland_Manholes-2283 | 405.87 | Kirkland_Manholes-2282 | 401.71 | 113.4 | 3.67 | 8 | PVC | 0.01 | 1,350 | 7 | 21 | 29 | 2.1 | | |
| Kirkland_Main-916 | Kirkland_Manholes-2295 | 415.45 | Kirkland_Manholes-2294 | 370.88 | 306.7 | 14.53 | 8 | PVC | 0.01 | 2,688 | 4 | 9 | 12 | 0.5 | | |
| Kirkland_Main-917 | Kirkland_Manholes-2294 | 370.88 | Kirkland_Manholes-2293 | 362.58 | 254.1 | 3.27 | 8 | PVC | 0.01 | 1,274 | 6 | 13 | 19 | 1.5 | | |
| Kirkland_Main-918 | Kirkland_Manholes-2298 | 374.75 | Kirkland_Manholes-2297 | 358.91 | 231 | 6.86 | 8 | PVC | 0.01 | 1,846 | 6 | 13 | 18 | 1 | SM14-Ex-EX210 | |
| Kirkland_Main-919 | Kirkland_Manholes-2297 | 358.91 | Kirkland_Manholes-2296 | 354.23 | 230.5 | 2.03 | 8 | PVC | 0.01 | 1,005 | 7 | 17 | 25 | 2.4 | SM14-Ex-EX210 | |
| Kirkland_Main-920 | Kirkland_Manholes-2772 | 308.23 | O-3 | 307.9 | 81.9 | 0.4 | 8 | PVC | 0.01 | 446 | 55 | 170 | 225 | 50.4 | | Drop Connection |
| Kirkland_Main-921 | Kirkland_Manholes-2293 | 362.58 | Kirkland_Manholes-2296 | 354.23 | 294.7 | 2.83 | 8 | PVC | 0.01 | 1,187 | 14 | 34 | 48 | 4 | | |
| Kirkland_Main-922 | Kirkland_Manholes-2299 | 342.7 | Kirkland_Manholes-2300 | 337.19 | 153.2 | 3.6 | 8 | PVC | 0.01 | 1,337 | 23 | 60 | 83 | 6.2 | SM14-Ex-EX206 | |
| Kirkland_Main-923 | Kirkland_Manholes-2296 | 354.23 | Kirkland_Manholes-2299 | 342.7 | 146.7 | 7.86 | 8 | PVC | 0.01 | 1,976 | 22 | 56 | 78 | 3.9 | SM14-Ex-EX206 | |
| Kirkland_Main-924 | Kirkland_Manholes-2264 | 383.3 | Kirkland_Manholes-2263 | 374.13 | 85.7 | 10.7 | 8 | PVC | 0.01 | 2,307 | 349 | 764 | 1,113 | 48.3 | SM14-Ex-EX248 | |
| Kirkland_Main-925 | Kirkland_Manholes-2432 | 257.14 | Kirkland_Manholes-2312 | 256.91 | 169.1 | 0.14 | 8 | PVC | 0.01 | 260 | 2 | 4 | 6 | 2.4 | | |
| Kirkland_Main-926 | Kirkland_Manholes-2312 | 256.91 | Kirkland_Manholes-2311 | 256.52 | 196.4 | 0.2 | 8 | PVC | 0.01 | 314 | 6 | 9 | 15 | 4.6 | | |
| Kirkland_Main-927 | Kirkland_Manholes-2282 | 401.71 | Kirkland_Manholes-2264 | 383.3 | 409.8 | 4.49 | 8 | PVC | 0.01 | 1,494 | 349 | 760 | 1,109 | 74.2 | SM14-Ex-EX248 | |
| Kirkland_Main-928 | Kirkland_Manholes-2288 | 423.18 | Kirkland_Manholes-2286 | 420.26 | 97.3 | 3 | 8 | PVC | 0.01 | 1,221 | 3 | 9 | 12 | 1 | | |
| Kirkland_Main-929 | Kirkland_Manholes-2289 | 426.62 | Kirkland_Manholes-2288 | 423.18 | 150.1 | 2.29 | 8 | PVC | 0.01 | 1,067 | 1 | 4 | 6 | 0.5 | | |
| Kirkland_Main-930 | Kirkland_Manholes-2286 | 420.26 | Kirkland_Manholes-2287 | 418.83 | 164.5 | 0.87 | 8 | PVC | 0.01 | 657 | 5 | 13 | 18 | 2.7 | | |
| Kirkland_Main-931 | Kirkland_Manholes-2287 | 418.83 | Kirkland_Manholes-2283 | 405.87 | 87.5 | 14.81 | 8 | PVC | 0.01 | 2,714 | 7 | 17 | 24 | 0.9 | | |
| Kirkland_Main-932 | Kirkland_Manholes-1585 | 238.49 | Kirkland_Manholes-1586 | 212.55 | 318.9 | 8.13 | 8 | PVC | 0.01 | 2,011 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX173 | |
| Kirkland_Main-933 | Kirkland_Manholes-1586 | 212.55 | Kirkland_Manholes-1587 | 210.95 | 268.2 | 0.6 | 8 | PVC | 0.01 | 545 | 3 | 9 | 12 | 2.2 | SM14-Ex-EX173 | |
| Kirkland_Main-934 | Kirkland_Manholes-1589 | 233.01 | Kirkland_Manholes-1587 | 210.95 | 318.8 | 6.92 | 8 | PVC | 0.01 | 1,855 | 84 | 223 | 307 | 16.6 | SM14-Ex-EX171 | |
| Kirkland_Main-935 | Kirkland_Manholes-1587 | 210.95 | Kirkland_Manholes-1603 | 202.22 | 137.6 | 6.34 | 8 | PVC | 0.01 | 1,776 | 92 | 240 | 332 | 18.7 | SM14-Ex-EX172 | |
| Kirkland_Main-936 | Kirkland_Manholes-1588 | 231.21 | Kirkland_Manholes-1587 | 230.56 | 162.2 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 7 | 1.5 | SM14-Ex-EX172 | Drop Connection |
| Kirkland_Main-938 | Kirkland_Manholes-1590 | 241.99 | Kirkland_Manholes-1589 | 233.01 | 173.6 | 5.17 | 8 | PVC | 0.01 | 1,603 | 83 | 219 | 302 | 18.8 | SM14-Ex-EX171 | |
| Kirkland_Main-939 | Kirkland_Manholes-1591 | 253.12 | Kirkland_Manholes-1590 | 241.99 | 399.8 | 2.78 | 8 | PVC | 0.01 | 1,176 | 81 | 215 | 295 | 25.1 | SM14-Ex-EX171 | |
| Kirkland_Main-940 | Kirkland_Manholes-1592 | 255.76 | Kirkland_Manholes-1591 | 253.12 | 306.5 | 0.86 | 8 | PVC | 0.01 | 654 | 77 | 210 | 288 | 43.9 | SM14-Ex-EX124 | |
| Kirkland_Main-942 | Kirkland_Manholes-1593 | 256.67 | Kirkland_Manholes-1592 | 255.76 | 194.7 | 0.47 | 8 | PVC | 0.01 | 482 | 57 | 167 | 224 | 46.6 | SM14-Ex-EX131 | |
| Kirkland_Main-943 | Kirkland_Manholes-1594 | 254.46 | Kirkland_Manholes-1595 | 245.33 | 353 | 2.59 | 8 | PVC | 0.01 | 1,134 | 3 | 4 | 7 | 0.7 | SM14-Ex-EX130 | |
| Kirkland_Main-944 | Kirkland_Manholes-1595 | 245.33 | Kirkland_Manholes-1596 | 228.98 | 200 | 8.17 | 8 | PVC | 0.01 | 2,016 | 5 | 9 | 14 | 0.7 | SM14-Ex-EX130 | |
| Kirkland_Main-945 | Kirkland_Manholes-1596 | 228.98 | Kirkland_Manholes-1597 | 180.84 | 398.5 | 12.08 | 8 | PVC | 0.01 | 2,450 | 7 | 13 | 20 | 0.8 | SM14-Ex-EX130 | |
| Kirkland_Main-946 | Kirkland_Manholes-1601 | 173.67 | Kirkland_Manholes-1598 | 169.75 | 176.3 | 2.22 | 8 | PVC | 0.01 | 1,051 | 74 | 176 | 250 | 23.8 | SM14-Ex-EX121 | |
| Kirkland_Main-947 | Kirkland_Manholes-1599 | 200.11 | Kirkland_Manholes-1598 | 169.75 | 271.2 | 11.19 | 8 | PVC | 0.01 | 2,359 | 4 | 9 | 13 | 0.6 | SM14-Ex-EX170 | |
| Kirkland_Main-948 | Kirkland_Manholes-379 | 279.26 | Kirkland_Manholes-380 | 277.21 | 303.7 | 0.67 | 8 | PVC | 0.01 | 579 | 3 | 9 | 12 | 2.1 | | |
| Kirkland_Main-949 | Kirkland_Manholes-378 | 285.63 | Kirkland_Manholes-379 | 279.26 | 366.8 | 1.74 | 8 | PVC | 0.01 | 929 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-950 | Kirkland_Manholes-377 | 262.82 | Kirkland_Manholes-376 | 239.8 | 319.8 | 7.2 | 8 | PVC | 0.01 | 1,892 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-951 | Kirkland_Manholes-376 | 239.8 | Kirkland_Manholes-375 | 234.87 | 251.6 | 1.96 | 8 | PVC | 0.01 | 987 | 89 | 253 | 342 | 34.7 | | |
| Kirkland_Main-953 | Kirkland_Manholes-382 | 308.23 | Kirkland_Manholes-381 | 307.41 | 91.4 | 0.9 | 8 | PVC | 0.01 | 668 | 3 | 9 | 12 | 1.8 | | |
| Kirkland_Main-954 | Kirkland_Manholes-381 | 307.41 | Kirkland_Manholes-383 | 304.37 | 123.9 | 2.45 | 8 | PVC | 0.01 | 1,104 | 4 | 13 | 17 | 1.5 | | |
| Kirkland_Main-955 | Kirkland_Manholes-383 | 304.37 | Kirkland_Manholes-384 | 296.91 | 253.7 | 2.94 | 8 | PVC | 0.01 | 1,209 | 6 | 17 | 23 | 1.9 | | |
| Kirkland_Main-956 | Kirkland_Manholes-384 | 296.91 | Kirkland_Manholes-424 | 292.81 | 99.3 | 4.13 | 8 | PVC | 0.01 | 1,432 | 7 | 21 | 29 | 2 | | |
| Kirkland_Main-957 | Kirkland_Manholes-873 | 311.45 | Kirkland_Manholes-385 | 303.54 | 299 | 2.65 | 8 | PVC | 0.01 | 1,147 | 2 | 4 | 7 | 0.6 | SM14-Ex-EX33 | |
| Kirkland_Main-958 | Kirkland_Manholes-385 | 303.54 | Kirkland_Manholes-387 | 300.3 | 93.5 | 3.46 | 8 | PVC | 0.01 | 1,312 | 4 | 9 | 12 | 0.9 | SM14-Ex-EX33 | |
| Kirkland_Main-959 | Kirkland_Manholes-386 | 300.85 | Kirkland_Manholes-387 | 300.3 | 138.6 | 0.4 | 8 | PVC | 0.01 | 444 | 3 | 4 | 7 | 1.6 | SM14-Ex-EX33 | |
| Kirkland_Main-960 | Kirkland_Manholes-387 | 300.3 | Kirkland_Manholes-388 | 297.69 | 129.3 | 2.02 | 8 | PVC | 0.01 | 1,002 | 8 | 17 | 26 | 2.6 | SM14-Ex-EX33 | |
| Kirkland_Main-962 | Kirkland_Manholes-2611 | 254.27 | Kirkland_Manholes-2612 | 250.12 | 152.9 | 2.71 | 8 | PVC | 0.01 | 1,162 | 3 | 4 | 8 | 0.7 | SM14-Ex-EX297 | |
| Kirkland_Main-963 | Kirkland_Manholes-1075 | 291.84 | Kirkland_Manholes-1121 | 289.91 | 99 | 1.95 | 8 | PVC | 0.01 | 984 | 61 | 142 | 378 | 38.4 | | |
| Kirkland_Main-964 | Kirkland_Manholes-1121 | 289.91 | Kirkland_Manholes-1068 | 279.38 | 106.4 | 9.89 | 8 | PVC | 0.01 | 2,218 | 62 | 146 | 384 | 17.3 | | |
| Kirkland_Main-966 | Kirkland_Manholes-1105 | 155.49 | Kirkland_Manholes-1052 | 151.4 | 310 | 1.32 | 8 | PVC | 0.01 | 810 | 162 | 312 | 475 | 58.6 | | |
| Kirkland_Main-967 | Kirkland_Manholes-1108 | 160.8 | Kirkland_Manholes-1105 | 155.49 | 333.3 | 1.59 | 8 | PVC | 0.01 | 890 | 11 | 13 | 24 | 2.7 | | |
| Kirkland_Main-968 | Kirkland_Manholes-1104 | 175.28 | Kirkland_Manholes-1106 | 168.9 | 388 | 1.64 | 18 | PVC | 0.01 | 7,859 | 912 | 2,288 | 3,200 | 40.7 | | |
| Kirkland_Main-969 | Kirkland_Manholes-1109 | 162.78 | Kirkland_Manholes-1108 | 160.8 | 303.1 | 0.65 | 8 | PVC | 0.01 | 570 | 2 | 9 | 11 | 1.9 | | |
| Kirkland_Main-970 | Kirkland_Manholes-1110 | 163.51 | Kirkland_Manholes-1109 | 162.78 | 317.4 | 0.23 | 8 | PVC | 0.01 | 338 | 1 | 4 | 6 | 1.7 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-972 | Kirkland_Manholes-1128 | 162.57 | O-7 | 162.29 | 71 | 0.4 | 24 | PVC | 0.01 | 8,346 | 392 | 751 | 1,319 | 15.8 | SM14-Ex-EX4 | |
| Kirkland_Main-973 | Kirkland_Manholes-1127 | 163.92 | Kirkland_Manholes-1128 | 162.57 | 132.6 | 1.02 | 24 | PVC | 0.01 | 13,318 | 391 | 743 | 1,310 | 9.8 | SM14-Ex-EX4 | |
| Kirkland_Main-974 | Kirkland_Manholes-1086 | 198.2 | Kirkland_Manholes-1122 | 184.29 | 391.8 | 3.55 | 8 | PVC | 0.01 | 1,328 | 15 | 52 | 67 | 5 | | |
| Kirkland_Main-975 | Kirkland_Manholes-1122 | 184.29 | Kirkland_Manholes-1123 | 182.63 | 257.7 | 0.64 | 24 | PVC | 0.01 | 10,594 | 277 | 670 | 1,123 | 10.6 | SM14-Ex-EX4 | |
| Kirkland_Main-976 | Kirkland_Manholes-1130 | 185.43 | Kirkland_Manholes-1122 | 185.35 | 20.3 | 0.4 | 12 | PVC | 0.01 | 1,314 | 249 | 614 | 1,039 | 79.1 | SM14-Ex-EX320 | Drop Connection |
| Kirkland_Main-977 | Kirkland_Manholes-1123 | 182.63 | Kirkland_Manholes-1124 | 177.02 | 186.2 | 3.01 | 24 | PVC | 0.01 | 22,913 | 284 | 674 | 1,134 | 4.9 | SM14-Ex-EX4 | |
| Kirkland_Main-978 | Kirkland_Manholes-1124 | 177.02 | Kirkland_Manholes-1125 | 167.88 | 251.4 | 3.64 | 24 | PVC | 0.01 | 25,165 | 353 | 713 | 1,242 | 4.9 | SM14-Ex-EX4 | |
| Kirkland_Main-979 | Kirkland_Manholes-1125 | 167.88 | Kirkland_Manholes-1126 | 164.51 | 134.8 | 2.5 | 24 | PVC | 0.01 | 20,870 | 391 | 734 | 1,301 | 6.2 | SM14-Ex-EX4 | |
| Kirkland_Main-980 | Kirkland_Manholes-2840 | 90.84 | Kirkland_Manholes-2841 | 31.53 | 332.1 | 17.86 | 8 | PVC | 0.01 | 2,980 | 5 | 12 | 18 | 0.6 | SM14-Ex-EX310 | |
| Kirkland_Main-981 | Kirkland_Manholes-2851 | 10.8 | Kirkland_Manholes-2852 | 10.72 | 17.2 | 0.47 | 18 | PVC | 0.01 | 4,181 | 434 | 799 | 1,233 | 29.5 | SM14-Ex-EX289 | |
| Kirkland_Main-982 | Kirkland_Manholes-2853 | 25.84 | Kirkland_Manholes-2852 | 10.72 | 47.1 | 32.11 | 8 | PVC | 0.01 | 3,995 | 1 | 6 | 7 | 0.2 | SM14-Ex-EX289 | |
| Kirkland_Main-983 | Kirkland_Manholes-2852 | 10.72 | KC_Manholes-18 | 10.29 | 84.8 | 0.51 | 18 | PVC | 0.01 | 4,364 | 437 | 811 | 1,248 | 28.6 | SM14-Ex-EX289 | |
| Kirkland_Main-984 | Kirkland_Manholes-2788 | 251.6 | Kirkland_Manholes-2789 | 247.4 | 283.4 | 1.48 | 8 | PVC | 0.01 | 858 | 25 | 99 | 124 | 14.5 | SM14-Ex-EX313 | |
| Kirkland_Main-985 | Kirkland_Manholes-2789 | 247.4 | Kirkland_Manholes-2790 | 235.81 | 170.4 | 6.8 | 8 | PVC | 0.01 | 1,839 | 28 | 103 | 131 | 7.1 | SM14-Ex-EX313 | |
| Kirkland_Main-987 | Kirkland_Manholes-2790 | 235.81 | Kirkland_Manholes-2791 | 226.53 | 127.8 | 7.26 | 8 | PVC | 0.01 | 1,900 | 29 | 107 | 136 | 7.2 | SM14-Ex-EX313 | |
| Kirkland_Main-988 | Kirkland_Manholes-2791 | 226.53 | Kirkland_Manholes-2792 | 199.25 | 298.7 | 9.13 | 8 | PVC | 0.01 | 2,131 | 31 | 112 | 142 | 6.7 | SM14-Ex-EX313 | |
| Kirkland_Main-989 | Kirkland_Manholes-2794 | 201.04 | Kirkland_Manholes-2792 | 199.25 | 290.5 | 0.62 | 8 | PVC | 0.01 | 553 | 4 | 9 | 12 | 2.2 | SM14-Ex-EX312 | |
| Kirkland_Main-991 | Kirkland_Manholes-2795 | 201.42 | Kirkland_Manholes-2794 | 201.04 | 162 | 0.23 | 8 | PVC | 0.01 | 341 | 2 | 4 | 6 | 1.8 | SM14-Ex-EX312 | |
| Kirkland_Main-992 | Kirkland_Manholes-2792 | 199.25 | Kirkland_Manholes-2793 | 190.95 | 116.2 | 7.14 | 8 | PVC | 0.01 | 1,885 | 43 | 124 | 167 | 8.9 | SM14-Ex-EX313 | |
| Kirkland_Main-993 | Kirkland_Manholes-2793 | 190.95 | Kirkland_Manholes-2803 | 158.22 | 135.7 | 24.12 | 8 | PVC | 0.01 | 3,462 | 44 | 129 | 173 | 5 | SM14-Ex-EX313 | |
| Kirkland_Main-994 | Kirkland_Manholes-2842 | 26.9 | Kirkland_Manholes-2850 | 13.3 | 475.2 | 2.86 | 24 | PVC | 0.01 | 22,330 | 588 | 1,245 | 1,905 | 8.5 | SM14-Ex-EX309 | |
| Kirkland_Main-995 | Kirkland_Manholes-2850 | 13.3 | KC_Manholes-18 | 10.29 | 41.7 | 7.21 | 24 | PVC | 0.01 | 35,453 | 591 | 1,252 | 1,914 | 5.4 | SM14-Ex-EX309 | |
| Kirkland_Main-996 | Kirkland_Manholes-2856 | 18.03 | Kirkland_Manholes-2845 | 16.72 | 134.6 | 0.98 | 8 | PVC | 0.01 | 696 | 13 | 14 | 27 | 3.9 | SM14-Ex-EX315 | |
| Kirkland_Main-997 | Kirkland_Manholes-2857 | 19.7 | Kirkland_Manholes-2856 | 18.03 | 135.5 | 1.23 | 8 | PVC | 0.01 | 783 | 13 | 9 | 22 | 2.9 | SM14-Ex-EX315 | |
| Kirkland_Main-998 | Kirkland_Manholes-1928 | 375.97 | Kirkland_Manholes-1929 | 374.67 | 53.7 | 2.42 | 12 | PVC | 0.01 | 3,235 | 225 | 580 | 805 | 24.9 | SM14-Ex-EX205 | |
| Kirkland_Main-999 | Kirkland_Manholes-1929 | 374.67 | Kirkland_Manholes-1579 | 359.44 | 398.3 | 3.82 | 12 | PVC | 0.01 | 4,065 | 269 | 648 | 917 | 22.6 | SM14-Ex-EX205 | |
| Kirkland_Main-1000 | Kirkland_Manholes-1930 | 369.31 | Kirkland_Manholes-1931 | 367.07 | 97.4 | 2.3 | 8 | PVC | 0.01 | 1,069 | 3 | 9 | 12 | 1.1 | | |
| Kirkland_Main-1001 | Kirkland_Manholes-1931 | 367.07 | Kirkland_Manholes-1932 | 360.4 | 233.1 | 2.86 | 8 | PVC | 0.01 | 1,193 | 5 | 13 | 18 | 1.5 | | |
| Kirkland_Main-1003 | Kirkland_Manholes-1932 | 360.4 | Kirkland_Manholes-1954 | 357.36 | 158.2 | 1.92 | 8 | PVC | 0.01 | 977 | 6 | 17 | 23 | 2.3 | | |
| Kirkland_Main-1004 | Kirkland_Manholes-1935 | 274.07 | Kirkland_Manholes-1881 | 267.11 | 156.7 | 4.44 | 8 | PVC | 0.01 | 1,486 | 43 | 90 | 133 | 8.9 | | |
| Kirkland_Main-1005 | Kirkland_Manholes-1951 | 275.06 | Kirkland_Manholes-1935 | 274.07 | 209.5 | 0.47 | 8 | PVC | 0.01 | 485 | 23 | 47 | 70 | 14.4 | | |
| Kirkland_Main-1006 | Kirkland_Manholes-1936 | 301.29 | Kirkland_Manholes-1935 | 274.07 | 237.6 | 11.46 | 8 | PVC | 0.01 | 2,387 | 18 | 39 | 57 | 2.4 | | |
| Kirkland_Main-1007 | Kirkland_Manholes-1933 | 343.68 | Kirkland_Manholes-1934 | 342.88 | 296 | 0.27 | 8 | PVC | 0.01 | 367 | 11 | 34 | 45 | 12.3 | | |
| Kirkland_Main-1008 | Kirkland_Manholes-1954 | 357.36 | Kirkland_Manholes-1934 | 342.88 | 118.8 | 12.19 | 8 | PVC | 0.01 | 2,462 | 7 | 21 | 28 | 1.1 | | |
| Kirkland_Main-1009 | Kirkland_Manholes-1934 | 342.88 | Kirkland_Manholes-1961 | 341.24 | 125.1 | 1.31 | 8 | PVC | 0.01 | 807 | 18 | 60 | 78 | 9.6 | | |
| Kirkland_Main-1010 | Kirkland_Manholes-1938 | 323.43 | Kirkland_Manholes-1936 | 301.29 | 243 | 9.11 | 8 | PVC | 0.01 | 2,128 | 15 | 34 | 50 | 2.3 | | |
| Kirkland_Main-1011 | Kirkland_Manholes-1939 | 324.34 | Kirkland_Manholes-1938 | 323.43 | 100 | 0.91 | 8 | PVC | 0.01 | 673 | 12 | 26 | 38 | 5.6 | | |
| Kirkland_Main-1012 | Kirkland_Manholes-1937 | 332.23 | Kirkland_Manholes-1938 | 323.43 | 194.4 | 4.53 | 8 | PVC | 0.01 | 1,500 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-1013 | Kirkland_Manholes-1940 | 363.18 | Kirkland_Manholes-1941 | 361.64 | 56.6 | 2.72 | 8 | PVC | 0.01 | 1,163 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1014 | Kirkland_Manholes-391 | 302.9 | Kirkland_Manholes-389 | 295.78 | 243.6 | 2.92 | 8 | PVC | 0.01 | 1,205 | 48 | 137 | 186 | 15.4 | SM14-Ex-EX50 | |
| Kirkland_Main-1015 | Kirkland_Manholes-389 | 295.78 | Kirkland_Manholes-393 | 288.03 | 97.8 | 7.93 | 8 | PVC | 0.01 | 1,985 | 60 | 163 | 223 | 11.3 | SM14-Ex-EX50 | |
| Kirkland_Main-1016 | Kirkland_Manholes-393 | 288.03 | Kirkland_Manholes-380 | 277.21 | 135.7 | 7.97 | 8 | PVC | 0.01 | 1,991 | 64 | 172 | 236 | 11.9 | SM14-Ex-EX50 | |
| Kirkland_Main-1017 | Kirkland_Manholes-395 | 253.88 | Kirkland_Manholes-396 | 249.55 | 242.3 | 1.79 | 8 | PVC | 0.01 | 942 | 79 | 223 | 302 | 32.1 | | |
| Kirkland_Main-1018 | Kirkland_Manholes-398 | 254.33 | Kirkland_Manholes-397 | 247.33 | 147.9 | 4.73 | 8 | PVC | 0.01 | 1,534 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1019 | Kirkland_Manholes-396 | 249.55 | Kirkland_Manholes-397 | 247.33 | 240.2 | 0.92 | 8 | PVC | 0.01 | 678 | 84 | 236 | 320 | 47.2 | | |
| Kirkland_Main-1020 | Kirkland_Manholes-394 | 266.89 | Kirkland_Manholes-395 | 253.88 | 150 | 8.67 | 8 | PVC | 0.01 | 2,076 | 74 | 197 | 271 | 13.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1021 | Kirkland_Manholes-380 | 277.21 | Kirkland_Manholes-394 | 266.89 | 136.7 | 7.55 | 8 | PVC | 0.01 | 1,937 | 69 | 185 | 253 | 13.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1022 | Kirkland_Manholes-898 | 306.89 | Kirkland_Manholes-899 | 305.17 | 102.3 | 1.68 | 8 | PVC | 0.01 | 914 | 2 | 9 | 10 | 1.1 | | |
| Kirkland_Main-1023 | Kirkland_Manholes-899 | 305.17 | Kirkland_Manholes-900 | 302.97 | 237.5 | 0.93 | 8 | PVC | 0.01 | 679 | 4 | 13 | 17 | 2.5 | | |
| Kirkland_Main-1024 | Kirkland_Manholes-444 | 92.89 | Kirkland_Manholes-443 | 91.49 | 172.9 | 0.81 | 8 | PVC | 0.01 | 634 | 10 | 45 | 54 | 8.6 | | |
| Kirkland_Main-1025 | Kirkland_Manholes-525 | 156.27 | Kirkland_Manholes-526 | 148.56 | 279.6 | 2.76 | 8 | PVC | 0.01 | 1,171 | 6 | 25 | 31 | 2.6 | SM10 | |
| Kirkland_Main-1027 | Kirkland_Manholes-1198 | 189.72 | Kirkland_Manholes-497 | 188.11 | 129.7 | 1.24 | 8 | PVC | 0.01 | 786 | 21 | 50 | 70 | 9 | SM14-Ex-EX80 | |
| Kirkland_Main-1030 | Kirkland_Manholes-520 | 182.65 | Kirkland_Manholes-519 | 157.09 | 301.6 | 8.48 | 8 | PVC | 0.01 | 2,053 | 6 | 17 | 22 | 1.1 | SM10 | |
| Kirkland_Main-1031 | Kirkland_Manholes-499 | 185.94 | Kirkland_Manholes-523 | 180.21 | 279.4 | 2.05 | 8 | PVC | 0.01 | 1,010 | 30 | 74 | 104 | 10.3 | SM10 | |
| Kirkland_Main-1032 | Kirkland_Manholes-523 | 180.21 | Kirkland_Manholes-522 | 152.47 | 278.9 | 9.95 | 8 | PVC | 0.01 | 2,224 | 33 | 83 | 115 | 5.2 | SM10 | |
| Kirkland_Main-1033 | Kirkland_Manholes-522 | 152.47 | Kirkland_Manholes-521 | 145.96 | 154.4 | 4.22 | 8 | PVC | 0.01 | 1,448 | 35 | 91 | 126 | 8.7 | SM10 | |
| Kirkland_Main-1034 | Kirkland_Manholes-521 | 145.96 | Kirkland_Manholes-518 | 138.7 | 160.6 | 4.52 | 8 | PVC | 0.01 | 1,499 | 37 | 99 | 136 | 9.1 | SM10 | |
| Kirkland_Main-1036 | Kirkland_Manholes-518 | 138.7 | Kirkland_Manholes-1179 | 123.76 | 316.8 | 4.72 | 8 | PVC | 0.01 | 1,531 | 48 | 132 | 180 | 11.8 | SM10 | |
| Kirkland_Main-1037 | Kirkland_Manholes-519 | 157.09 | Kirkland_Manholes-518 | 138.7 | 337.5 | 5.45 | 8 | PVC | 0.01 | 1,646 | 10 | 25 | 35 | 2.1 | SM10 | |
| Kirkland_Main-1041 | Kirkland_Manholes-1235 | 275.6 | Kirkland_Manholes-1233 | 274.4 | 201.2 | 0.6 | 8 | PVC | 0.01 | 545 | 3 | 8 | 11 | 2.1 | | |
| Kirkland_Main-1042 | Kirkland_Manholes-1240 | 250.21 | Kirkland_Manholes-1230 | 236.32 | 226.8 | 6.13 | 8 | PVC | 0.01 | 1,745 | 6 | 8 | 14 | 0.8 | SM14-Ex-EX92 | |
| Kirkland_Main-1043 | Kirkland_Manholes-1243 | 249.45 | Kirkland_Manholes-1242 | 244.28 | 74.2 | 6.97 | 8 | PVC | 0.01 | 1,862 | 2 | 4 | 6 | 0.3 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1044 | Kirkland_Manholes-1206 | 193.92 | Kirkland_Manholes-1149 | 192.13 | 296.5 | 0.6 | 8 | PVC | 0.01 | 548 | 22 | 56 | 78 | 14.3 | SM14-Ex-EX89 | |
| Kirkland_Main-1049 | Kirkland_Manholes-1268 | 189.24 | Kirkland_Manholes-1269 | 174.05 | 110.9 | 13.69 | 8 | PVC | 0.01 | 2,609 | 6 | 17 | 22 | 0.9 | SM14-Ex-EX107 | |
| Kirkland_Main-1050 | Kirkland_Manholes-1269 | 174.05 | Kirkland_Manholes-1259 | 154.8 | 228.2 | 8.43 | 8 | PVC | 0.01 | 2,048 | 7 | 25 | 32 | 1.6 | SM14-Ex-EX107 | |
| Kirkland_Main-1051 | Kirkland_Manholes-1267 | 201.75 | Kirkland_Manholes-1268 | 189.24 | 323.1 | 3.87 | 8 | PVC | 0.01 | 1,387 | 4 | 8 | 13 | 0.9 | SM14-Ex-EX107 | |
| Kirkland_Main-1052 | Kirkland_Manholes-1265 | 168.12 | Kirkland_Manholes-1262 | 156.59 | 138.9 | 8.3 | 8 | PVC | 0.01 | 2,031 | 6 | 25 | 31 | 1.5 | | |
| Kirkland_Main-1053 | Kirkland_Manholes-1497 | 270.45 | Kirkland_Manholes-1499 | 268.92 | 211.1 | 0.72 | 8 | PVC | 0.01 | 600 | 23 | 60 | 83 | 13.8 | | |
| Kirkland_Main-1054 | Kirkland_Manholes-1315 | 270.9 | Kirkland_Manholes-1497 | 270.45 | 108.5 | 0.41 | 8 | PVC | 0.01 | 454 | 21 | 56 | 77 | 16.9 | | |
| Kirkland_Main-1055 | Kirkland_Manholes-704 | 272.37 | Kirkland_Manholes-145 | 271.65 | 145.7 | 0.49 | 8 | PVC | 0.01 | 496 | 17 | 39 | 55 | 11.1 | | |
| Kirkland_Main-1057 | Kirkland_Manholes-1220 | 255.3 | Kirkland_Manholes-1140 | 220.91 | 332.7 | 10.34 | 8 | PVC | 0.01 | 2,267 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX84 | |
| Kirkland_Main-1058 | Kirkland_Manholes-1222 | 248.84 | Kirkland_Manholes-1142 | 218.06 | 350.4 | 8.79 | 8 | PVC | 0.01 | 2,090 | 5 | 8 | 13 | 0.6 | SM14-Ex-EX85 | |
| Kirkland_Main-1059 | Kirkland_Manholes-1140 | 220.91 | Kirkland_Manholes-1142 | 218.06 | 314 | 0.91 | 8 | PVC | 0.01 | 672 | 6 | 17 | 23 | 3.4 | SM4 | |
| Kirkland_Main-1061 | Kirkland_Manholes-1224 | 232.76 | Kirkland_Manholes-500 | 209.24 | 344.5 | 6.83 | 8 | PVC | 0.01 | 1,842 | 3 | 8 | 12 | 0.6 | SM14-Ex-EX87 | |
| Kirkland_Main-1062 | Kirkland_Manholes-1085 | 204.43 | Kirkland_Manholes-1130 | 185.43 | 381.7 | 4.98 | 8 | PVC | 0.01 | 1,573 | 225 | 610 | 1,010 | 64.2 | | |
| Kirkland_Main-1063 | Kirkland_Manholes-1120 | 158.13 | Kirkland_Manholes-712 | 157.06 | 229.6 | 0.47 | 8 | PVC | 0.01 | 481 | 36 | 13 | 48 | 10.1 | SM14-Ex-EX1 | |
| Kirkland_Main-1066 | Kirkland_Manholes-1512 | 281.18 | Kirkland_Manholes-1513 | 263.11 | 227.7 | 7.94 | 8 | PVC | 0.01 | 1,986 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX132 | |
| Kirkland_Main-1067 | Kirkland_Manholes-1161 | 78.67 | Kirkland_Manholes-1162 | 78.51 | 20.6 | 0.78 | 15 | PVC | 0.01 | 3,326 | 110 | 405 | 515 | 15.5 | SM14-Ex-EX77 | |
| Kirkland_Main-1068 | Kirkland_Manholes-1132 | 188.66 | Kirkland_Manholes-1133 | 181.56 | 258.9 | 2.74 | 8 | PVC | 0.01 | 1,168 | 4 | 4 | 8 | 0.7 | SM14-Ex-EX58 | |
| Kirkland_Main-1069 | Kirkland_Manholes-616 | 72.16 | Kirkland_Manholes-617 | 67.92 | 242.5 | 1.75 | 8 | PVC | 0.01 | 932 | 4 | 8 | 13 | 1.4 | SM14-Ex-EX162 | |
| Kirkland_Main-1070 | Kirkland_Manholes-1699 | 108.13 | Kirkland_Manholes-1700 | 106.17 | 216.2 | 0.91 | 8 | PVC | 0.01 | 671 | 1 | 8 | 9 | 1.3 | SM14-Ex-EX150 | |
| Kirkland_Main-1071 | Kirkland_Manholes-1700 | 106.17 | Kirkland_Manholes-1802 | 95.68 | 325.3 | 3.22 | 8 | PVC | 0.01 | 1,266 | 5 | 17 | 22 | 1.7 | SM14-Ex-EX150 | |
| Kirkland_Main-1074 | Kirkland_Manholes-1613 | 87.49 | Kirkland_Manholes-1788 | 86.3 | 197.1 | 0.6 | 8 | PVC | 0.01 | 548 | 24 | 124 | 148 | 27.1 | SM14-Ex-EX167 | |
| Kirkland_Main-1075 | Kirkland_Manholes-1793 | 15.37 | Kirkland_Manholes-1794 | 12.63 | 22.1 | 12.39 | 8 | PVC | 0.01 | 2,482 | 30 | 20 | 50 | 2 | | |
| Kirkland_Main-1076 | Kirkland_Manholes-1795 | 13.3 | Kirkland_Manholes-1794 | 12.63 | 41.9 | 1.6 | 15 | PVC | 0.01 | 4,763 | 443 | 754 | 1,197 | 25.1 | | |
| Kirkland_Main-1077 | Kirkland_Manholes-1789 | 14.67 | Kirkland_Manholes-1790 | 14.6 | 18.2 | 0.38 | 21 | PVC | 0.01 | 5,726 | 436 | 735 | 1,170 | 20.4 | | |
| Kirkland_Main-1078 | Kirkland_Manholes-1790 | 14.6 | Kirkland_Manholes-1792 | 14.49 | 82.9 | 0.13 | 21 | PVC | 0.01 | 3,367 | 436 | 741 | 1,177 | 34.9 | | |
| Kirkland_Main-1079 | Kirkland_Manholes-1791 | 8.2 | PLAZA_WW | 6 | 10.6 | 20.76 | 18 | PVC | 0.01 | 27,925 | 495 | 897 | 1,392 | 5 | SM14-Ex-EX182 | |
| Kirkland_Main-1080 | Kirkland_Manholes-1792 | 14.49 | Kirkland_Manholes-1795 | 13.3 | 199 | 0.6 | 21 | PVC | 0.01 | 7,159 | 437 | 748 | 1,184 | 16.5 | | |
| Kirkland_Main-1081 | Kirkland_Manholes-1800 | 147.89 | Kirkland_Manholes-1799 | 133.76 | 154.6 | 9.14 | 8 | PVC | 0.01 | 2,131 | 3 | 8 | 11 | 0.5 | SM14-Ex-EX146 | |
| Kirkland_Main-1082 | Kirkland_Manholes-1799 | 133.76 | Kirkland_Manholes-1798 | 126.65 | 165.5 | 4.3 | 8 | PVC | 0.01 | 1,461 | 8 | 25 | 33 | 2.2 | SM14-Ex-EX146 | |
| Kirkland_Main-1083 | Kirkland_Manholes-1797 | 142.57 | Kirkland_Manholes-1798 | 126.65 | 291.9 | 5.45 | 8 | PVC | 0.01 | 1,647 | 71 | 196 | 267 | 16.2 | SM4 | |
| Kirkland_Main-1084 | Kirkland_Manholes-1796 | 160.8 | Kirkland_Manholes-1797 | 142.57 | 315.3 | 5.78 | 8 | PVC | 0.01 | 1,695 | 67 | 180 | 247 | 14.5 | SM4 | |
| Kirkland_Main-1085 | Kirkland_Manholes-1798 | 126.65 | Kirkland_Manholes-1801 | 112.29 | 288.6 | 4.97 | 8 | PVC | 0.01 | 1,573 | 80 | 229 | 310 | 19.7 | SM4 | |
| Kirkland_Main-1086 | Kirkland_Manholes-2191 | 134.63 | Kirkland_Manholes-2190 | 132.39 | 117.1 | 1.91 | 8 | PVC | 0.01 | 975 | 5 | 17 | 22 | 2.2 | | |
| Kirkland_Main-1088 | Kirkland_Manholes-2194 | 68 | Kirkland_Manholes-2193 | 64.5 | 142 | 2.47 | 8 | PVC | 0.01 | 1,107 | 1 | 8 | 10 | 0.9 | SM14-Ex-EX187 | |
| Kirkland_Main-1089 | Kirkland_Manholes-2193 | 64.5 | Kirkland_Manholes-2145 | 63.1 | 194.7 | 0.72 | 8 | PVC | 0.01 | 598 | 8 | 41 | 50 | 8.3 | SM14-Ex-EX187 | |
| Kirkland_Main-1091 | Kirkland_Manholes-2187 | 114.37 | Kirkland_Manholes-2185 | 103.23 | 164.5 | 6.77 | 8 | PVC | 0.01 | 1,835 | 8 | 17 | 24 | 1.3 | SM14-Ex-EX188 | |
| Kirkland_Main-1092 | Kirkland_Manholes-2185 | 103.23 | Kirkland_Manholes-2184 | 75.09 | 227 | 12.4 | 8 | PVC | 0.01 | 2,482 | 40 | 66 | 106 | 4.3 | SM14-Ex-EX188 | |
| Kirkland_Main-1093 | Kirkland_Manholes-2184 | 75.09 | Kirkland_Manholes-2144 | 65.5 | 214.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 41 | 74 | 115 | 7.7 | SM14-Ex-EX188 | |
| Kirkland_Main-1094 | Kirkland_Manholes-2199 | 42.12 | Kirkland_Manholes-2201 | 34.26 | 130.3 | 6.03 | 8 | PVC | 0.01 | 1,731 | 55 | 7 | 62 | 3.6 | | |
| Kirkland_Main-1095 | Kirkland_Manholes-2201 | 34.26 | Kirkland_Manholes-2200 | 29.87 | 27.9 | 15.75 | 8 | PVC | 0.01 | 2,798 | 56 | 13 | 69 | 2.4 | | |
| Kirkland_Main-1096 | Kirkland_Manholes-2098 | 53.6 | Kirkland_Manholes-2097 | 45.25 | 198.1 | 4.22 | 8 | PVC | 0.01 | 1,448 | 3 | 7 | 10 | 0.7 | SM14-Ex-EX233 | |
| Kirkland_Main-1097 | Kirkland_Manholes-2195 | 483.44 | Kirkland_Manholes-2196 | 481.85 | 326.8 | 0.49 | 8 | PVC | 0.01 | 492 | 2 | 4 | 6 | 1.2 | | |
| Kirkland_Main-1098 | Kirkland_Manholes-2196 | 481.85 | Kirkland_Manholes-2197 | 480.89 | 188.7 | 0.51 | 8 | PVC | 0.01 | 503 | 3 | 9 | 11 | 2.2 | | |
| Kirkland_Main-1099 | Kirkland_Manholes-2111 | 59.56 | Kirkland_Manholes-2099 | 57.72 | 398 | 0.46 | 12 | PVC | 0.01 | 1,413 | 115 | 198 | 313 | 22.1 | SM14-Ex-EX222 | |
| Kirkland_Main-1100 | Kirkland_Manholes-2100 | 58.67 | Kirkland_Manholes-2099 | 57.72 | 62.5 | 1.52 | 8 | PVC | 0.01 | 869 | 13 | 19 | 31 | 3.6 | SM14-Ex-EX234 | |
| Kirkland_Main-1101 | Kirkland_Manholes-2101 | 73.68 | Kirkland_Manholes-2100 | 58.67 | 124.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 11 | 12 | 24 | 1 | | |
| Kirkland_Main-1102 | Kirkland_Manholes-2102 | 127.52 | Kirkland_Manholes-2101 | 73.68 | 250.6 | 21.48 | 8 | PVC | 0.01 | 3,268 | 6 | 6 | 12 | 0.4 | | |
| Kirkland_Main-1104 | Kirkland_Manholes-2103 | 51.49 | Kirkland_Manholes-2104 | 41.29 | 235.7 | 4.33 | 8 | PVC | 0.01 | 1,467 | 1 | 7 | 8 | 0.5 | SM14-Ex-EX231 | |
| Kirkland_Main-1105 | Kirkland_Manholes-2447 | 28.08 | Kirkland_Manholes-2448 | 25.41 | 138 | 1.94 | 12 | PVC | 0.01 | 2,892 | 2 | 7 | 8 | 0.3 | | |
| Kirkland_Main-1106 | Kirkland_Manholes-2448 | 25.41 | Kirkland_Manholes-2451 | 24.29 | 346.6 | 0.32 | 12 | PVC | 0.01 | 1,182 | 14 | 20 | 34 | 2.9 | | |
| Kirkland_Main-1107 | Kirkland_Manholes-2449 | 27.6 | Kirkland_Manholes-2448 | 25.41 | 29.8 | 7.34 | 8 | PVC | 0.01 | 1,910 | 11 | 7 | 17 | 0.9 | | |
| Kirkland_Main-1108 | Kirkland_Manholes-2450 | 27.97 | Kirkland_Manholes-2451 | 24.29 | 50.3 | 7.31 | 8 | PVC | 0.01 | 1,906 | 2 | 13 | 15 | 0.8 | | |
| Kirkland_Main-1109 | Kirkland_Manholes-2491 | 35.69 | Kirkland_Manholes-2450 | 27.97 | 197.9 | 3.9 | 8 | PVC | 0.01 | 1,393 | 1 | 7 | 8 | 0.6 | SM14-Ex-EX278 | |
| Kirkland_Main-1110 | Kirkland_Manholes-2451 | 24.29 | Kirkland_Manholes-2452 | 24.18 | 330.9 | 0.03 | 12 | PVC | 0.01 | 374 | 17 | 39 | 56 | 15 | | |
| Kirkland_Main-1111 | Kirkland_Manholes-2452 | 24.18 | Kirkland_Manholes-2454 | 23.57 | 255.1 | 0.24 | 12 | PVC | 0.01 | 1,016 | 27 | 59 | 85 | 8.4 | | |
| Kirkland_Main-1112 | Kirkland_Manholes-2453 | 27.74 | Kirkland_Manholes-2452 | 24.18 | 62.2 | 5.72 | 8 | PVC | 0.01 | 1,686 | 9 | 13 | 22 | 1.3 | | |
| Kirkland_Main-1113 | Kirkland_Manholes-2093 | 44.98 | Kirkland_Manholes-2453 | 27.74 | 236.1 | 7.3 | 8 | PVC | 0.01 | 1,905 | 8 | 7 | 14 | 0.8 | SM14-Ex-EX276 | |
| Kirkland_Main-1114 | Kirkland_Manholes-2097 | 45.25 | Kirkland_Manholes-2455 | 44.41 | 209.1 | 0.4 | 8 | PVC | 0.01 | 446 | 13 | 13 | 26 | 5.9 | SM14-Ex-EX233 | Drop Connection |
| Kirkland_Main-1115 | Kirkland_Manholes-2455 | 26.2 | Kirkland_Manholes-2454 | 23.57 | 36.4 | 7.21 | 8 | PVC | 0.01 | 1,893 | 15 | 20 | 35 | 1.8 | SM14-Ex-EX233 | |
| Kirkland_Main-1116 | Kirkland_Manholes-2454 | 23.57 | Kirkland_Manholes-2456 | 21.67 | 413.5 | 0.46 | 12 | PVC | 0.01 | 1,410 | 42 | 85 | 126 | 8.9 | | |
| Kirkland_Main-1117 | Kirkland_Manholes-2457 | 26.27 | Kirkland_Manholes-2456 | 21.67 | 49.5 | 9.28 | 8 | PVC | 0.01 | 2,148 | 9 | 20 | 29 | 1.3 | | |
| Kirkland_Main-1118 | Kirkland_Manholes-2202 | 26.91 | Kirkland_Manholes-2305 | 25.32 | 49.2 | 3.23 | 8 | PVC | 0.01 | 1,266 | 56 | 26 | 82 | 6.5 | | Drop Connection |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1119 | Kirkland_Manholes-2205 | 23.1 | Kirkland_Manholes-2306 | 15.63 | 44.6 | 16.73 | 8 | PVC | 0.01 | 2,884 | 8 | 33 | 40 | 1.4 | | Drop Connection |
| Kirkland_Main-1120 | Kirkland_Manholes-2306 | 15.63 | Kirkland_Manholes-2305 | 15.26 | 357 | 0.1 | 21 | PVC | 0.01 | 2,976 | 291 | 644 | 935 | 31.4 | | |
| Kirkland_Main-1121 | Kirkland_Manholes-2307 | 15.73 | Kirkland_Manholes-2306 | 15.63 | 136.3 | 0.07 | 21 | PVC | 0.01 | 2,504 | 283 | 605 | 888 | 35.4 | | |
| Kirkland_Main-1122 | Kirkland_Manholes-2217 | 22.48 | Kirkland_Manholes-2308 | 22.33 | 38 | 0.4 | 8 | PVC | 0.01 | 446 | 13 | 39 | 52 | 11.6 | | Drop Connection |
| Kirkland_Main-1123 | Kirkland_Manholes-2308 | 15.98 | Kirkland_Manholes-2307 | 15.73 | 271.4 | 0.09 | 21 | PVC | 0.01 | 2,806 | 274 | 598 | 872 | 31.1 | | |
| Kirkland_Main-1124 | Kirkland_Manholes-2309 | 16.24 | Kirkland_Manholes-2308 | 15.98 | 211.8 | 0.12 | 21 | PVC | 0.01 | 3,239 | 259 | 553 | 811 | 25 | | |
| Kirkland_Main-1125 | Kirkland_Manholes-2313 | 16.39 | Kirkland_Manholes-2309 | 16.24 | 162.2 | 0.09 | 21 | PVC | 0.01 | 2,811 | 253 | 546 | 799 | 28.4 | | |
| Kirkland_Main-1126 | Kirkland_Manholes-2314 | 16.65 | Kirkland_Manholes-2313 | 16.39 | 183.4 | 0.14 | 21 | PVC | 0.01 | 3,481 | 236 | 501 | 736 | 21.1 | | |
| Kirkland_Main-1127 | Kirkland_Manholes-2315 | 16.77 | Kirkland_Manholes-2314 | 16.65 | 235.7 | 0.05 | 21 | PVC | 0.01 | 2,086 | 213 | 416 | 629 | 30.2 | | |
| Kirkland_Main-1128 | Kirkland_Manholes-2316 | 17.03 | Kirkland_Manholes-2315 | 16.77 | 315.7 | 0.08 | 21 | PVC | 0.01 | 2,653 | 213 | 410 | 623 | 23.5 | | |
| Kirkland_Main-1129 | Kirkland_Manholes-2317 | 17.2 | Kirkland_Manholes-2316 | 17.03 | 183.4 | 0.09 | 21 | PVC | 0.01 | 2,815 | 202 | 403 | 605 | 21.5 | | |
| Kirkland_Main-1130 | Kirkland_Manholes-2155 | 23.66 | Kirkland_Manholes-2318 | 17.6 | 47.1 | 12.87 | 8 | PVC | 0.01 | 2,530 | 56 | 98 | 154 | 6.1 | | |
| Kirkland_Main-1131 | Kirkland_Manholes-2318 | 17.6 | Kirkland_Manholes-2317 | 17.2 | 364 | 0.11 | 21 | PVC | 0.01 | 3,053 | 193 | 390 | 583 | 19.1 | | |
| Kirkland_Main-1132 | Kirkland_Manholes-2319 | 17.7 | Kirkland_Manholes-2318 | 17.6 | 48.4 | 0.21 | 21 | PVC | 0.01 | 4,200 | 135 | 280 | 414 | 9.9 | | |
| Kirkland_Main-1136 | Kirkland_Manholes-2874 | 209.8 | Kirkland_Manholes-2873 | 208.01 | 164.9 | 1.09 | 8 | PVC | 0.01 | 735 | 0 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1137 | Kirkland_Manholes-2873 | 208.01 | Kirkland_Manholes-2872 | 207.03 | 88.7 | 1.1 | 8 | PVC | 0.01 | 741 | 1 | 9 | 9 | 1.2 | | |
| Kirkland_Main-1138 | Kirkland_Manholes-2872 | 207.03 | Kirkland_Manholes-2871 | 205.15 | 113.5 | 1.66 | 8 | PVC | 0.01 | 907 | 1 | 17 | 18 | 2 | | |
| Kirkland_Main-1139 | Kirkland_Manholes-2871 | 205.15 | Kirkland_Manholes-2869 | 204.84 | 44.2 | 0.7 | 8 | PVC | 0.01 | 591 | 2 | 21 | 23 | 3.9 | | |
| Kirkland_Main-1140 | Kirkland_Manholes-2869 | 204.84 | Kirkland_Manholes-2870 | 201.21 | 123.4 | 2.94 | 18 | PVC | 0.01 | 10,510 | 873 | 2,228 | 3,101 | 29.5 | | |
| Kirkland_Main-1141 | Kirkland_Manholes-2870 | 201.21 | Kirkland_Manholes-1103 | 198.97 | 205 | 1.09 | 18 | PVC | 0.01 | 6,407 | 873 | 2,232 | 3,105 | 48.5 | | |
| Kirkland_Main-1142 | Kirkland_Manholes-2875 | 310.11 | Kirkland_Manholes-898 | 306.89 | 269.8 | 1.19 | 8 | PVC | 0.01 | 770 | 0 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1143 | Kirkland_Manholes-2475 | 210.58 | Kirkland_Manholes-2477 | 189.6 | 360 | 5.83 | 8 | PVC | 0.01 | 1,702 | 3 | 4 | 7 | 0.4 | SM14-Ex-EX241 | |
| Kirkland_Main-1144 | Kirkland_Manholes-2478 | 190.32 | Kirkland_Manholes-2477 | 189.6 | 67.1 | 1.07 | 8 | PVC | 0.01 | 730 | 1 | 4 | 6 | 0.8 | SM14-Ex-EX241 | |
| Kirkland_Main-1145 | Kirkland_Manholes-2477 | 189.6 | Kirkland_Manholes-2479 | 186.26 | 224.2 | 1.49 | 8 | PVC | 0.01 | 861 | 5 | 13 | 18 | 2.1 | SM14-Ex-EX241 | |
| Kirkland_Main-1146 | Kirkland_Manholes-2479 | 186.26 | Kirkland_Manholes-2482 | 184.91 | 81 | 1.67 | 8 | PVC | 0.01 | 910 | 9 | 26 | 35 | 3.8 | | |
| Kirkland_Main-1147 | Kirkland_Manholes-2480 | 187.23 | Kirkland_Manholes-2479 | 186.26 | 143.4 | 0.68 | 8 | PVC | 0.01 | 580 | 3 | 9 | 12 | 2.1 | SM14-Ex-EX241 | |
| Kirkland_Main-1148 | Kirkland_Manholes-2489 | 190.15 | Kirkland_Manholes-2480 | 187.23 | 230.1 | 1.27 | 8 | PVC | 0.01 | 794 | 1 | 4 | 5 | 0.7 | SM14-Ex-EX241 | |
| Kirkland_Main-1149 | Kirkland_Manholes-2481 | 184.88 | Kirkland_Manholes-2490 | 173.27 | 348.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 3 | 4 | 7 | 0.5 | SM14-Ex-EX242 | |
| Kirkland_Main-1150 | Kirkland_Manholes-2482 | 184.91 | Kirkland_Manholes-2483 | 165.54 | 140.6 | 13.78 | 8 | PVC | 0.01 | 2,617 | 11 | 30 | 41 | 1.6 | | |
| Kirkland_Main-1152 | Kirkland_Manholes-2483 | 165.54 | Kirkland_Manholes-2488 | 154.5 | 273.8 | 4.03 | 8 | PVC | 0.01 | 1,416 | 12 | 34 | 47 | 3.3 | | |
| Kirkland_Main-1153 | Kirkland_Manholes-2488 | 154.5 | Kirkland_Manholes-2487 | 153.78 | 111.9 | 0.64 | 8 | PVC | 0.01 | 566 | 14 | 39 | 53 | 9.4 | | |
| Kirkland_Main-1154 | Kirkland_Manholes-2490 | 173.27 | Kirkland_Manholes-2485 | 153.26 | 284.1 | 7.04 | 8 | PVC | 0.01 | 1,871 | 33 | 82 | 115 | 6.1 | SM14-Ex-EX242 | |
| Kirkland_Main-1156 | Kirkland_Manholes-2484 | 189.79 | Kirkland_Manholes-2485 | 153.26 | 364.5 | 10.02 | 8 | PVC | 0.01 | 2,232 | 3 | 4 | 7 | 0.3 | SM14-Ex-EX239 | |
| Kirkland_Main-1157 | Kirkland_Manholes-2487 | 153.78 | Kirkland_Manholes-2486 | 152.49 | 105 | 1.23 | 8 | PVC | 0.01 | 782 | 15 | 43 | 58 | 7.4 | | |
| Kirkland_Main-1158 | Kirkland_Manholes-2485 | 153.26 | Kirkland_Manholes-2486 | 152.49 | 113.6 | 0.68 | 8 | PVC | 0.01 | 580 | 38 | 90 | 128 | 22 | SM14-Ex-EX239 | |
| Kirkland_Main-1159 | Kirkland_Manholes-1429 | 514.5 | Kirkland_Manholes-1427 | 513.21 | 125.2 | 1.03 | 8 | PVC | 0.01 | 715 | 6 | 17 | 23 | 3.2 | | |
| Kirkland_Main-1160 | Kirkland_Manholes-1427 | 513.21 | Kirkland_Manholes-1428 | 512.46 | 129.3 | 0.58 | 8 | PVC | 0.01 | 537 | 9 | 26 | 35 | 6.5 | | |
| Kirkland_Main-1161 | Kirkland_Manholes-1428 | 512.46 | Kirkland_Manholes-1434 | 511.6 | 190.6 | 0.45 | 8 | PVC | 0.01 | 474 | 11 | 30 | 41 | 8.6 | | |
| Kirkland_Main-1162 | Kirkland_Manholes-1430 | 516.64 | Kirkland_Manholes-1429 | 514.5 | 144.2 | 1.48 | 8 | PVC | 0.01 | 859 | 5 | 13 | 17 | 2 | | |
| Kirkland_Main-1164 | Kirkland_Manholes-2175 | 133.14 | Kirkland_Manholes-2174 | 132.67 | 117.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 10 | 2.3 | | |
| Kirkland_Main-1165 | Kirkland_Manholes-2174 | 132.67 | Kirkland_Manholes-2173 | 131.99 | 11.1 | 6.13 | 8 | PVC | 0.01 | 1,745 | 4 | 17 | 20 | 1.2 | | |
| Kirkland_Main-1166 | Kirkland_Manholes-2173 | 131.99 | Kirkland_Manholes-2172 | 130.6 | 348.2 | 0.4 | 8 | PVC | 0.01 | 446 | 27 | 25 | 52 | 11.7 | SM14-Ex-EX192 | Drop Connection |
| Kirkland_Main-1167 | Kirkland_Manholes-2172 | 107.91 | Kirkland_Manholes-2163 | 75.42 | 383.7 | 8.47 | 8 | PVC | 0.01 | 2,052 | 30 | 33 | 63 | 3.1 | SM14-Ex-EX192 | |
| Kirkland_Main-1168 | Kirkland_Manholes-2163 | 75.42 | Kirkland_Manholes-2141 | 73.53 | 47.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 31 | 41 | 72 | 5.1 | | |
| Kirkland_Main-1169 | Kirkland_Manholes-2183 | 146.45 | Kirkland_Manholes-2182 | 136.23 | 145.7 | 7.02 | 8 | PVC | 0.01 | 1,868 | 1 | 8 | 9 | 0.5 | | |
| Kirkland_Main-1170 | Kirkland_Manholes-2182 | 136.23 | Kirkland_Manholes-2181 | 133.52 | 88.2 | 3.07 | 8 | PVC | 0.01 | 1,236 | 2 | 17 | 18 | 1.5 | | |
| Kirkland_Main-1171 | Kirkland_Manholes-2181 | 133.52 | Kirkland_Manholes-2180 | 125.44 | 163.5 | 4.94 | 8 | PVC | 0.01 | 1,567 | 3 | 25 | 28 | 1.8 | | |
| Kirkland_Main-1172 | Kirkland_Manholes-2180 | 125.44 | Kirkland_Manholes-2179 | 120.67 | 330.4 | 1.44 | 8 | PVC | 0.01 | 847 | 6 | 33 | 39 | 4.6 | | |
| Kirkland_Main-1173 | Kirkland_Manholes-2179 | 120.67 | Kirkland_Manholes-2178 | 102.28 | 199.5 | 9.22 | 8 | PVC | 0.01 | 2,140 | 9 | 41 | 51 | 2.4 | | |
| Kirkland_Main-1174 | Kirkland_Manholes-2178 | 102.28 | Kirkland_Manholes-2177 | 75.93 | 214.6 | 12.28 | 8 | PVC | 0.01 | 2,471 | 11 | 50 | 60 | 2.4 | | |
| Kirkland_Main-1175 | Kirkland_Manholes-2177 | 75.93 | Kirkland_Manholes-2176 | 70.83 | 149.4 | 3.41 | 8 | PVC | 0.01 | 1,303 | 11 | 58 | 69 | 5.3 | | |
| Kirkland_Main-1176 | Kirkland_Manholes-2176 | 70.83 | Kirkland_Manholes-2142 | 68.99 | 36.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 12 | 66 | 78 | 4.9 | | |
| Kirkland_Main-1177 | Kirkland_Manholes-2366 | 292.68 | Kirkland_Manholes-2365 | 289.93 | 42.5 | 6.47 | 8 | PVC | 0.01 | 1,794 | 33 | 86 | 119 | 6.7 | SM14-Ex-EX260 | |
| Kirkland_Main-1178 | Kirkland_Manholes-2368 | 290.87 | Kirkland_Manholes-2365 | 289.93 | 48.6 | 1.94 | 8 | PVC | 0.01 | 981 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1179 | Kirkland_Manholes-2372 | 304.48 | Kirkland_Manholes-2371 | 291.2 | 253.9 | 5.23 | 8 | PVC | 0.01 | 1,613 | 19 | 47 | 66 | 4.1 | SM14-Ex-EX257 | |
| Kirkland_Main-1180 | Kirkland_Manholes-2378 | 312.05 | Kirkland_Manholes-2372 | 304.48 | 224.1 | 3.38 | 8 | PVC | 0.01 | 1,296 | 13 | 26 | 39 | 3 | SM14-Ex-EX257 | |
| Kirkland_Main-1181 | Kirkland_Manholes-2373 | 306.85 | Kirkland_Manholes-2372 | 304.48 | 403.1 | 0.59 | 8 | PVC | 0.01 | 541 | 3 | 9 | 12 | 2.2 | SM14-Ex-EX258 | |
| Kirkland_Main-1182 | Kirkland_Manholes-2374 | 307.1 | Kirkland_Manholes-2373 | 306.85 | 109.8 | 0.23 | 8 | PVC | 0.01 | 336 | 2 | 4 | 6 | 1.8 | SM14-Ex-EX258 | |
| Kirkland_Main-1183 | Kirkland_Manholes-2376 | 359.31 | Kirkland_Manholes-2375 | 323.76 | 368.2 | 9.66 | 8 | PVC | 0.01 | 2,191 | 5 | 4 | 10 | 0.4 | SM14-Ex-EX259 | |
| Kirkland_Main-1184 | Kirkland_Manholes-2375 | 323.76 | Kirkland_Manholes-2377 | 320.51 | 173.5 | 1.87 | 8 | PVC | 0.01 | 965 | 7 | 9 | 16 | 1.6 | SM14-Ex-EX259 | |
| Kirkland_Main-1185 | Kirkland_Manholes-2377 | 320.51 | Kirkland_Manholes-2378 | 312.05 | 352.3 | 2.4 | 8 | PVC | 0.01 | 1,093 | 10 | 13 | 22 | 2.1 | SM14-Ex-EX259 | |
| Kirkland_Main-1186 | Kirkland_Manholes-2379 | 312.61 | Kirkland_Manholes-2378 | 312.05 | 23.8 | 2.35 | 8 | PVC | 0.01 | 1,081 | 3 | 9 | 11 | 1 | SM14-Ex-EX257 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1187 | Kirkland_Manholes-2380 | 290.72 | Kirkland_Manholes-2430 | 273.69 | 397.1 | 4.29 | 8 | PVC | 0.01 | 1,460 | 3 | 9 | 12 | 0.8 | SM14-Ex-EX286 | |
| Kirkland_Main-1188 | Kirkland_Manholes-2381 | 293.12 | Kirkland_Manholes-2380 | 290.72 | 144.3 | 1.66 | 8 | PVC | 0.01 | 909 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX286 | |
| Kirkland_Main-1189 | Kirkland_Manholes-2385 | 343.75 | Kirkland_Manholes-2383 | 328.5 | 173.4 | 8.79 | 8 | PVC | 0.01 | 2,091 | 11 | 26 | 37 | 1.8 | SM14-Ex-EX260 | |
| Kirkland_Main-1190 | Kirkland_Manholes-2384 | 330.79 | Kirkland_Manholes-2383 | 328.5 | 64.4 | 3.56 | 8 | PVC | 0.01 | 1,330 | 14 | 34 | 48 | 3.6 | SM14-Ex-EX287 | |
| Kirkland_Main-1191 | Kirkland_Manholes-2395 | 331.59 | Kirkland_Manholes-2384 | 330.79 | 136.8 | 0.58 | 8 | PVC | 0.01 | 539 | 13 | 30 | 43 | 7.9 | SM14-Ex-EX287 | |
| Kirkland_Main-1192 | Kirkland_Manholes-2386 | 373.02 | Kirkland_Manholes-2385 | 343.75 | 310.7 | 9.42 | 8 | PVC | 0.01 | 2,164 | 10 | 21 | 31 | 1.4 | SM14-Ex-EX260 | |
| Kirkland_Main-1193 | Kirkland_Manholes-2387 | 380.46 | Kirkland_Manholes-2386 | 373.02 | 399.9 | 1.86 | 8 | PVC | 0.01 | 962 | 8 | 17 | 25 | 2.6 | SM14-Ex-EX260 | |
| Kirkland_Main-1194 | Kirkland_Manholes-2388 | 388.18 | Kirkland_Manholes-2387 | 380.46 | 279.2 | 2.76 | 8 | PVC | 0.01 | 1,172 | 5 | 13 | 18 | 1.5 | SM14-Ex-EX260 | |
| Kirkland_Main-1195 | Kirkland_Manholes-2533 | 389.33 | Kirkland_Manholes-2388 | 388.18 | 396.1 | 0.29 | 8 | PVC | 0.01 | 380 | 3 | 9 | 11 | 3 | SM14-Ex-EX260 | |
| Kirkland_Main-1196 | Kirkland_Manholes-2389 | 365.8 | Kirkland_Manholes-2390 | 359.58 | 183.8 | 3.38 | 8 | PVC | 0.01 | 1,297 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX287 | |
| Kirkland_Main-1197 | Kirkland_Manholes-2390 | 359.58 | Kirkland_Manholes-2391 | 347.6 | 291 | 4.12 | 8 | PVC | 0.01 | 1,430 | 5 | 9 | 14 | 1 | SM14-Ex-EX287 | |
| Kirkland_Main-1198 | Kirkland_Manholes-2391 | 347.6 | Kirkland_Manholes-2392 | 345.7 | 123.7 | 1.54 | 8 | PVC | 0.01 | 874 | 8 | 13 | 21 | 2.4 | SM14-Ex-EX287 | |
| Kirkland_Main-1199 | Kirkland_Manholes-2392 | 345.7 | Kirkland_Manholes-2393 | 339.78 | 135.6 | 4.36 | 8 | PVC | 0.01 | 1,473 | 9 | 17 | 26 | 1.8 | SM14-Ex-EX287 | |
| Kirkland_Main-1200 | Kirkland_Manholes-2411 | 259.15 | Kirkland_Manholes-2413 | 251.1 | 165.8 | 4.86 | 8 | PVC | 0.01 | 1,554 | 36 | 86 | 122 | 7.8 | | |
| Kirkland_Main-1201 | Kirkland_Manholes-2419 | 203.52 | Kirkland_Manholes-2303 | 195.57 | 329.3 | 2.41 | 12 | PVC | 0.01 | 3,230 | 382 | 627 | 1,009 | 31.2 | SM2 | |
| Kirkland_Main-1202 | Kirkland_Manholes-2418 | 218.73 | Kirkland_Manholes-2419 | 203.52 | 222.4 | 6.84 | 12 | PVC | 0.01 | 5,436 | 372 | 622 | 994 | 18.3 | SM2 | |
| Kirkland_Main-1203 | Kirkland_Manholes-2417 | 230.48 | Kirkland_Manholes-2418 | 218.73 | 175.2 | 6.71 | 12 | PVC | 0.01 | 5,384 | 313 | 455 | 768 | 14.3 | SM2 | |
| Kirkland_Main-1204 | Kirkland_Manholes-2416 | 242.81 | Kirkland_Manholes-2417 | 230.48 | 262.7 | 4.69 | 12 | PVC | 0.01 | 4,503 | 310 | 451 | 761 | 16.9 | SM2 | |
| Kirkland_Main-1205 | Kirkland_Manholes-2420 | 230.11 | Kirkland_Manholes-2418 | 218.73 | 227.2 | 5.01 | 8 | PVC | 0.01 | 1,578 | 58 | 163 | 221 | 14 | SM14-Ex-EX251 | |
| Kirkland_Main-1206 | Kirkland_Manholes-2415 | 247.52 | Kirkland_Manholes-2416 | 242.81 | 265.9 | 1.77 | 12 | PVC | 0.01 | 2,766 | 307 | 446 | 754 | 27.2 | SM2 | |
| Kirkland_Main-1207 | Kirkland_Manholes-2720 | 32.22 | Kirkland_Manholes-2719 | 31.99 | 57.5 | 0.4 | 8 | PVC | 0.01 | 446 | 85 | 6 | 91 | 20.4 | | |
| Kirkland_Main-1208 | Kirkland_Manholes-2414 | 248.96 | Kirkland_Manholes-2415 | 247.52 | 131.3 | 1.1 | 12 | PVC | 0.01 | 2,177 | 306 | 442 | 748 | 34.4 | SM2 | |
| Kirkland_Main-1209 | Kirkland_Manholes-2413 | 251.1 | Kirkland_Manholes-2414 | 248.96 | 118.1 | 1.81 | 12 | PVC | 0.01 | 2,798 | 305 | 438 | 743 | 26.5 | SM2 | |
| Kirkland_Main-1210 | Kirkland_Manholes-2421 | 253.02 | Kirkland_Manholes-2413 | 251.1 | 118.9 | 1.61 | 12 | PVC | 0.01 | 2,641 | 268 | 348 | 616 | 23.3 | SM2 | |
| Kirkland_Main-1211 | Kirkland_Manholes-2422 | 254.09 | Kirkland_Manholes-2421 | 253.02 | 92.9 | 1.15 | 12 | PVC | 0.01 | 2,230 | 264 | 339 | 603 | 27 | SM2 | |
| Kirkland_Main-1212 | Kirkland_Manholes-2424 | 257.66 | Kirkland_Manholes-2422 | 254.09 | 323.2 | 1.1 | 12 | PVC | 0.01 | 2,185 | 263 | 335 | 597 | 27.3 | SM2 | |
| Kirkland_Main-1213 | Kirkland_Manholes-2879 | 68.04 | Kirkland_Manholes-2492 | 55.46 | 56.8 | 22.14 | 8 | PVC | 0.01 | 3,317 | 35 | 43 | 79 | 2.4 | | |
| Kirkland_Main-1214 | Kirkland_Manholes-2091 | 57.76 | Kirkland_Manholes-2090 | 57.52 | 58.9 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 12 | 17 | 3.9 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1215 | Kirkland_Manholes-2094 | 57.58 | Kirkland_Manholes-2090 | 57.44 | 314.4 | 0.04 | 15 | PVC | 0.01 | 795 | 135 | 242 | 377 | 47.4 | SM14-Ex-EX222 | |
| Kirkland_Main-1216 | Kirkland_Manholes-2092 | 79.95 | Kirkland_Manholes-2091 | 79.51 | 110.7 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 6 | 10 | 2.1 | SM14-Ex-EX279 | Drop Connection |
| Kirkland_Main-1218 | Kirkland_Manholes-2095 | 60.47 | Kirkland_Manholes-2094 | 57.58 | 55.7 | 5.18 | 8 | PVC | 0.01 | 1,605 | 5 | 12 | 17 | 1.1 | SM14-Ex-EX277 | |
| Kirkland_Main-1219 | Kirkland_Manholes-2096 | 71.29 | Kirkland_Manholes-2095 | 60.47 | 119 | 9.09 | 8 | PVC | 0.01 | 2,126 | 3 | 6 | 10 | 0.5 | SM14-Ex-EX277 | |
| Kirkland_Main-1220 | Kirkland_Manholes-2099 | 57.72 | Kirkland_Manholes-2094 | 57.58 | 259 | 0.05 | 12 | PVC | 0.01 | 483 | 129 | 223 | 352 | 72.8 | SM14-Ex-EX222 | |
| Kirkland_Main-1223 | Kirkland_Manholes-2614 | 304.78 | Kirkland_Manholes-2615 | 302.07 | 237.1 | 1.14 | 8 | PVC | 0.01 | 754 | 51 | 112 | 163 | 21.6 | SM14-Ex-EX299 | |
| Kirkland_Main-1224 | Kirkland_Manholes-2615 | 302.07 | Kirkland_Manholes-2618 | 301.8 | 67.7 | 0.4 | 8 | PVC | 0.01 | 446 | 52 | 116 | 168 | 37.6 | SM14-Ex-EX299 | Drop Connection |
| Kirkland_Main-1225 | Kirkland_Manholes-2618 | 278.4 | Kirkland_Manholes-2617 | 276.43 | 274.1 | 0.72 | 8 | PVC | 0.01 | 598 | 58 | 129 | 187 | 31.3 | SM2 | |
| Kirkland_Main-1226 | Kirkland_Manholes-2617 | 276.43 | Kirkland_Manholes-2616 | 275.44 | 246.8 | 0.4 | 8 | PVC | 0.01 | 446 | 77 | 133 | 210 | 47.1 | SM2 | Drop Connection |
| Kirkland_Main-1227 | Kirkland_Manholes-2616 | 274.02 | Kirkland_Manholes-2619 | 272.54 | 173.9 | 0.85 | 8 | PVC | 0.01 | 650 | 148 | 163 | 311 | 47.8 | SM2 | |
| Kirkland_Main-1228 | Kirkland_Manholes-2619 | 272.54 | Kirkland_Manholes-2428 | 270.37 | 122.7 | 1.77 | 8 | PVC | 0.01 | 937 | 148 | 167 | 316 | 33.7 | SM2 | |
| Kirkland_Main-1229 | Kirkland_Manholes-407 | 266.31 | Kirkland_Manholes-409 | 264.84 | 123.1 | 1.19 | 8 | PVC | 0.01 | 771 | 3 | 9 | 12 | 1.5 | | |
| Kirkland_Main-1230 | Kirkland_Manholes-409 | 264.84 | Kirkland_Manholes-419 | 263.82 | 78.4 | 1.3 | 8 | PVC | 0.01 | 804 | 5 | 17 | 23 | 2.8 | | |
| Kirkland_Main-1231 | Kirkland_Manholes-411 | 265.96 | Kirkland_Manholes-412 | 253.7 | 218.8 | 5.6 | 8 | PVC | 0.01 | 1,669 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1232 | Kirkland_Manholes-412 | 253.7 | Kirkland_Manholes-413 | 252.76 | 178.3 | 0.53 | 8 | PVC | 0.01 | 512 | 3 | 9 | 11 | 2.2 | | |
| Kirkland_Main-1233 | Kirkland_Manholes-413 | 252.76 | Kirkland_Manholes-414 | 251.5 | 46.6 | 2.7 | 8 | PVC | 0.01 | 1,159 | 4 | 13 | 17 | 1.4 | | |
| Kirkland_Main-1234 | Kirkland_Manholes-414 | 251.5 | Kirkland_Manholes-415 | 250.52 | 65.4 | 1.5 | 8 | PVC | 0.01 | 863 | 4 | 17 | 22 | 2.5 | | |
| Kirkland_Main-1235 | Kirkland_Manholes-415 | 250.52 | Kirkland_Manholes-416 | 248.58 | 58.4 | 3.32 | 8 | PVC | 0.01 | 1,285 | 5 | 21 | 27 | 2.1 | | |
| Kirkland_Main-1236 | Kirkland_Manholes-416 | 248.58 | Kirkland_Manholes-417 | 237.12 | 157.3 | 7.28 | 8 | PVC | 0.01 | 1,903 | 7 | 26 | 33 | 1.7 | | |
| Kirkland_Main-1237 | Kirkland_Manholes-417 | 237.12 | Kirkland_Manholes-2767 | 236.02 | 47.6 | 2.31 | 8 | PVC | 0.01 | 1,071 | 8 | 30 | 38 | 3.5 | | |
| Kirkland_Main-1238 | Kirkland_Manholes-2767 | 236.02 | Kirkland_Manholes-418 | 235.93 | 86.7 | 0.1 | 8 | PVC | 0.01 | 227 | 8 | 34 | 43 | 18.7 | | |
| Kirkland_Main-1239 | Kirkland_Manholes-408 | 267.9 | Kirkland_Manholes-407 | 266.31 | 113.3 | 1.4 | 8 | PVC | 0.01 | 835 | 1 | 4 | 6 | 0.7 | | |
| Kirkland_Main-1240 | Kirkland_Manholes-419 | 263.82 | Kirkland_Manholes-625 | 258 | 200 | 2.91 | 8 | PVC | 0.01 | 1,203 | 7 | 21 | 28 | 2.3 | | |
| Kirkland_Main-1241 | Kirkland_Manholes-420 | 281.46 | Kirkland_Manholes-1071 | 277.81 | 358.8 | 1.02 | 8 | PVC | 0.01 | 711 | 11 | 39 | 50 | 7 | | |
| Kirkland_Main-1242 | Kirkland_Manholes-418 | 235.93 | Kirkland_Manholes-421 | 235.77 | 9.8 | 1.63 | 8 | PVC | 0.01 | 901 | 9 | 39 | 47 | 5.3 | | |
| Kirkland_Main-1243 | Kirkland_Manholes-422 | 235.64 | Kirkland_Manholes-341 | 235.59 | 30.3 | 0.17 | 8 | PVC | 0.01 | 287 | 10 | 47 | 57 | 20 | SM14-Ex-EX49 | |
| Kirkland_Main-1244 | Kirkland_Manholes-421 | 235.77 | Kirkland_Manholes-422 | 235.64 | 135.2 | 0.1 | 8 | PVC | 0.01 | 219 | 10 | 43 | 53 | 24.1 | SM14-Ex-EX49 | |
| Kirkland_Main-1245 | Kirkland_Manholes-423 | 284.5 | Kirkland_Manholes-420 | 281.46 | 237.1 | 1.28 | 8 | PVC | 0.01 | 798 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1246 | Kirkland_Manholes-424 | 292.81 | Kirkland_Manholes-425 | 290.3 | 45.2 | 5.56 | 8 | PVC | 0.01 | 1,662 | 8 | 26 | 34 | 2 | | |
| Kirkland_Main-1247 | Kirkland_Manholes-1846 | 15.1 | Kirkland_Manholes-1845 | 14.95 | 208.8 | 0.07 | 12 | PVC | 0.01 | 557 | 7 | 33 | 39 | 7 | SM10 | |
| Kirkland_Main-1248 | Kirkland_Manholes-1845 | 14.95 | Kirkland_Manholes-1844 | 14.08 | 225.8 | 0.39 | 12 | PVC | 0.01 | 1,290 | 7 | 39 | 46 | 3.6 | SM10 | |
| Kirkland_Main-1249 | Kirkland_Manholes-1844 | 14.08 | Kirkland_Manholes-1843 | 13.9 | 253.8 | 0.07 | 12 | PVC | 0.01 | 554 | 9 | 46 | 55 | 9.9 | SM10 | |
| Kirkland_Main-1250 | Kirkland_Manholes-1843 | 13.9 | Kirkland_Manholes-1842 | 13.84 | 237.6 | 0.03 | 12 | PVC | 0.01 | 330 | 10 | 52 | 62 | 18.8 | SM10 | |
| Kirkland_Main-1251 | Kirkland_Manholes-1842 | 13.84 | Kirkland_Manholes-1841 | 13.3 | 228.3 | 0.24 | 12 | PVC | 0.01 | 1,011 | 11 | 59 | 70 | 6.9 | SM10 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1252 | Kirkland_Manholes-1840 | 12.98 | Kirkland_Manholes-1839 | 12.1 | 208.1 | 0.42 | 12 | PVC | 0.01 | 1,352 | 18 | 72 | 89 | 6.6 | SM10 | |
| Kirkland_Main-1253 | Kirkland_Manholes-1839 | 12.1 | Kirkland_Manholes-1838 | 12 | 159.4 | 0.06 | 12 | PVC | 0.01 | 521 | 18 | 78 | 96 | 18.4 | | |
| Kirkland_Main-1254 | Kirkland_Manholes-1838 | 12 | Kirkland_Manholes-1834 | 11.35 | 218.3 | 0.3 | 12 | PVC | 0.01 | 1,134 | 19 | 85 | 104 | 9.1 | | |
| Kirkland_Main-1255 | Kirkland_Manholes-1841 | 13.3 | Kirkland_Manholes-1840 | 12.98 | 311 | 0.1 | 12 | PVC | 0.01 | 667 | 12 | 65 | 77 | 11.6 | SM10 | |
| Kirkland_Main-1256 | Kirkland_Manholes-1854 | 359.04 | Kirkland_Manholes-1855 | 357.41 | 200.3 | 0.81 | 8 | PVC | 0.01 | 636 | 0 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1257 | Kirkland_Manholes-1855 | 357.41 | Kirkland_Manholes-1856 | 346.8 | 232 | 4.57 | 8 | PVC | 0.01 | 1,508 | 1 | 9 | 9 | 0.6 | | |
| Kirkland_Main-1258 | Kirkland_Manholes-1856 | 346.8 | Kirkland_Manholes-1857 | 344.14 | 121.8 | 2.18 | 8 | PVC | 0.01 | 1,042 | 8 | 13 | 21 | 2 | | |
| Kirkland_Main-1259 | Kirkland_Manholes-1857 | 344.14 | Kirkland_Manholes-1858 | 335.71 | 162.8 | 5.18 | 8 | PVC | 0.01 | 1,605 | 9 | 17 | 26 | 1.6 | | |
| Kirkland_Main-1260 | Kirkland_Manholes-1858 | 335.71 | Kirkland_Manholes-1859 | 326.96 | 255.9 | 3.42 | 8 | PVC | 0.01 | 1,304 | 82 | 124 | 206 | 15.8 | | |
| Kirkland_Main-1261 | Kirkland_Manholes-1963 | 340.77 | Kirkland_Manholes-1858 | 335.71 | 100.1 | 5.06 | 8 | PVC | 0.01 | 1,585 | 70 | 103 | 173 | 10.9 | | |
| Kirkland_Main-1262 | Kirkland_Manholes-1859 | 326.96 | Kirkland_Manholes-1860 | 317.11 | 345 | 2.85 | 8 | PVC | 0.01 | 1,191 | 82 | 129 | 211 | 17.7 | | |
| Kirkland_Main-1263 | Kirkland_Manholes-1860 | 317.11 | Kirkland_Manholes-1861 | 303.96 | 398.6 | 3.3 | 8 | PVC | 0.01 | 1,281 | 83 | 133 | 216 | 16.9 | | |
| Kirkland_Main-1264 | Kirkland_Manholes-1861 | 303.96 | Kirkland_Manholes-1862 | 294.2 | 372.7 | 2.62 | 8 | PVC | 0.01 | 1,141 | 84 | 137 | 221 | 19.4 | | Drop Connection |
| Kirkland_Main-1265 | Kirkland_Manholes-2394 | 354.21 | Kirkland_Manholes-2393 | 339.78 | 142.1 | 10.15 | 8 | PVC | 0.01 | 2,247 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX287 | |
| Kirkland_Main-1266 | Kirkland_Manholes-2393 | 339.78 | Kirkland_Manholes-2395 | 331.59 | 110.8 | 7.39 | 8 | PVC | 0.01 | 1,917 | 12 | 26 | 37 | 2 | SM14-Ex-EX287 | |
| Kirkland_Main-1267 | Kirkland_Manholes-2405 | 418 | Kirkland_Manholes-2397 | 417.95 | 35.5 | 0.14 | 8 | PVC | 0.01 | 265 | 10 | 30 | 40 | 15 | | |
| Kirkland_Main-1268 | Kirkland_Manholes-2397 | 417.95 | Kirkland_Manholes-2398 | 416.84 | 162.8 | 0.68 | 8 | PVC | 0.01 | 582 | 11 | 34 | 45 | 7.7 | SM14-Ex-EX261 | |
| Kirkland_Main-1269 | Kirkland_Manholes-2404 | 419.23 | Kirkland_Manholes-2405 | 418 | 199.9 | 0.62 | 8 | PVC | 0.01 | 553 | 8 | 26 | 33 | 6 | | |
| Kirkland_Main-1270 | Kirkland_Manholes-2399 | 419.47 | Kirkland_Manholes-2404 | 419.23 | 32.8 | 0.73 | 8 | PVC | 0.01 | 603 | 2 | 9 | 10 | 1.7 | | |
| Kirkland_Main-1271 | Kirkland_Manholes-2403 | 420.2 | Kirkland_Manholes-2404 | 419.23 | 274.8 | 0.35 | 8 | PVC | 0.01 | 419 | 5 | 13 | 18 | 4.2 | | |
| Kirkland_Main-1272 | Kirkland_Manholes-2400 | 420.6 | Kirkland_Manholes-2399 | 419.47 | 159 | 0.71 | 8 | PVC | 0.01 | 594 | 1 | 4 | 6 | 0.9 | | |
| Kirkland_Main-1273 | Kirkland_Manholes-2402 | 421.38 | Kirkland_Manholes-2403 | 420.2 | 252.3 | 0.47 | 8 | PVC | 0.01 | 482 | 4 | 9 | 12 | 2.5 | | |
| Kirkland_Main-1274 | Kirkland_Manholes-2401 | 422.6 | Kirkland_Manholes-2402 | 421.38 | 262.8 | 0.46 | 8 | PVC | 0.01 | 480 | 2 | 4 | 7 | 1.4 | | |
| Kirkland_Main-1276 | Kirkland_Manholes-2398 | 416.84 | Kirkland_Manholes-2406 | 412.88 | 316.7 | 1.25 | 8 | PVC | 0.01 | 788 | 13 | 39 | 51 | 6.5 | SM14-Ex-EX261 | |
| Kirkland_Main-1277 | Kirkland_Manholes-2406 | 412.88 | Kirkland_Manholes-2396 | 406.38 | 222.1 | 2.93 | 8 | PVC | 0.01 | 1,206 | 15 | 43 | 58 | 4.8 | SM14-Ex-EX261 | |
| Kirkland_Main-1278 | Kirkland_Manholes-2396 | 406.38 | Kirkland_Manholes-2407 | 403.31 | 84.2 | 3.65 | 8 | PVC | 0.01 | 1,346 | 17 | 47 | 64 | 4.8 | SM14-Ex-EX261 | |
| Kirkland_Main-1279 | Kirkland_Manholes-2408 | 405.44 | Kirkland_Manholes-2409 | 401.93 | 26.6 | 13.2 | 8 | PVC | 0.01 | 2,561 | 1 | 9 | 10 | 0.4 | | |
| Kirkland_Main-1281 | Kirkland_Manholes-2409 | 401.93 | Kirkland_Manholes-2267 | 393.07 | 194.4 | 4.56 | 8 | PVC | 0.01 | 1,505 | 2 | 13 | 15 | 1 | | |
| Kirkland_Main-1282 | Kirkland_Manholes-2412 | 260.78 | Kirkland_Manholes-2411 | 259.15 | 122.6 | 1.33 | 8 | PVC | 0.01 | 813 | 8 | 13 | 21 | 2.6 | | |
| Kirkland_Main-1283 | Kirkland_Manholes-282 | 50.07 | Kirkland_Manholes-281 | 36.84 | 240.3 | 5.51 | 8 | PVC | 0.01 | 1,654 | 2 | 10 | 12 | 0.7 | SM10 | |
| Kirkland_Main-1284 | Kirkland_Manholes-284 | 50.6 | Kirkland_Manholes-282 | 50.07 | 132.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 3 | 3 | 0.8 | | |
| Kirkland_Main-1285 | Kirkland_Manholes-283 | 64.31 | Kirkland_Manholes-282 | 50.07 | 115.4 | 12.34 | 8 | PVC | 0.01 | 2,477 | 2 | 3 | 5 | 0.2 | SM10 | |
| Kirkland_Main-1286 | Kirkland_Manholes-273 | 69.52 | Kirkland_Manholes-247 | 65.14 | 92.5 | 4.74 | 8 | PVC | 0.01 | 1,534 | 67 | 145 | 212 | 13.8 | SM10 | |
| Kirkland_Main-1290 | Kirkland_Manholes-274 | 93.7 | Kirkland_Manholes-271 | 91.78 | 250.2 | 0.77 | 8 | PVC | 0.01 | 618 | 48 | 100 | 148 | 23.9 | SM10 | |
| Kirkland_Main-1292 | Kirkland_Manholes-277 | 72.24 | Kirkland_Manholes-278 | 56.62 | 141.8 | 11.02 | 8 | PVC | 0.01 | 2,340 | 3 | 3 | 6 | 0.3 | SM10 | |
| Kirkland_Main-1293 | Kirkland_Manholes-278 | 56.62 | Kirkland_Manholes-280 | 27.37 | 245.1 | 11.93 | 8 | PVC | 0.01 | 2,436 | 36 | 13 | 49 | 2 | SM10 | |
| Kirkland_Main-1294 | Kirkland_Manholes-276 | 92.16 | Kirkland_Manholes-299 | 66.63 | 263.6 | 9.68 | 8 | PVC | 0.01 | 2,194 | 3 | 6 | 10 | 0.4 | SM10 | |
| Kirkland_Main-1295 | Kirkland_Manholes-267 | 95.34 | Kirkland_Manholes-275 | 94.08 | 184.4 | 0.68 | 8 | PVC | 0.01 | 583 | 45 | 91 | 136 | 23.3 | SM10 | |
| Kirkland_Main-1296 | Kirkland_Manholes-275 | 94.08 | Kirkland_Manholes-274 | 93.7 | 61.9 | 0.61 | 8 | PVC | 0.01 | 553 | 46 | 96 | 142 | 25.6 | SM10 | |
| Kirkland_Main-1297 | Kirkland_Manholes-270 | 94.47 | Kirkland_Manholes-271 | 91.78 | 344.2 | 0.78 | 8 | PVC | 0.01 | 623 | 13 | 31 | 45 | 7.1 | SM10 | |
| Kirkland_Main-1298 | Kirkland_Manholes-269 | 103.08 | Kirkland_Manholes-270 | 94.47 | 190.8 | 4.51 | 8 | PVC | 0.01 | 1,498 | 9 | 27 | 36 | 2.4 | SM10 | |
| Kirkland_Main-1299 | Kirkland_Manholes-268 | 108.82 | Kirkland_Manholes-269 | 103.08 | 133.1 | 4.31 | 8 | PVC | 0.01 | 1,464 | 7 | 22 | 29 | 2 | SM10 | |
| Kirkland_Main-1300 | Kirkland_Manholes-2521 | 363.83 | Kirkland_Manholes-2525 | 348.63 | 167.1 | 9.09 | 8 | PVC | 0.01 | 2,126 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-1301 | Kirkland_Manholes-2519 | 384.75 | Kirkland_Manholes-2522 | 362.4 | 159.7 | 13.99 | 8 | PVC | 0.01 | 2,637 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1302 | Kirkland_Manholes-2522 | 362.4 | Kirkland_Manholes-2523 | 357.31 | 64.3 | 7.92 | 8 | PVC | 0.01 | 1,984 | 2 | 9 | 11 | 0.6 | | |
| Kirkland_Main-1303 | Kirkland_Manholes-2523 | 357.31 | Kirkland_Manholes-2524 | 346.56 | 113.2 | 9.5 | 8 | PVC | 0.01 | 2,173 | 3 | 13 | 17 | 0.8 | | |
| Kirkland_Main-1304 | Kirkland_Manholes-2524 | 346.56 | Kirkland_Manholes-2527 | 340.94 | 187 | 3.01 | 8 | PVC | 0.01 | 1,222 | 41 | 57 | 97 | 8 | | |
| Kirkland_Main-1305 | Kirkland_Manholes-2526 | 336.85 | Kirkland_Manholes-2776 | 334.45 | 375.1 | 0.64 | 8 | PVC | 0.01 | 564 | 55 | 148 | 203 | 36 | | |
| Kirkland_Main-1306 | Kirkland_Manholes-2527 | 340.94 | Kirkland_Manholes-2526 | 336.85 | 509.8 | 0.8 | 8 | PVC | 0.01 | 631 | 54 | 144 | 198 | 31.4 | | |
| Kirkland_Main-1307 | Kirkland_Manholes-2525 | 348.63 | Kirkland_Manholes-2527 | 340.94 | 406 | 1.89 | 8 | PVC | 0.01 | 970 | 13 | 83 | 96 | 9.9 | | |
| Kirkland_Main-1308 | Kirkland_Manholes-2528 | 359.11 | Kirkland_Manholes-2525 | 348.63 | 235.4 | 4.45 | 8 | PVC | 0.01 | 1,488 | 10 | 70 | 80 | 5.4 | | |
| Kirkland_Main-1309 | Kirkland_Manholes-2529 | 365.07 | Kirkland_Manholes-2528 | 362.98 | 40.4 | 5.17 | 8 | PVC | 0.01 | 1,604 | 9 | 65 | 75 | 4.7 | | Drop Connection |
| Kirkland_Main-1310 | Kirkland_Manholes-2531 | 381.45 | Kirkland_Manholes-2529 | 365.07 | 303.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 9 | 61 | 71 | 4.3 | | |
| Kirkland_Main-1311 | Kirkland_Manholes-2530 | 382.12 | Kirkland_Manholes-2531 | 381.45 | 45.8 | 1.46 | 8 | PVC | 0.01 | 853 | 9 | 57 | 66 | 7.8 | | |
| Kirkland_Main-1312 | Kirkland_Manholes-2532 | 395.91 | Kirkland_Manholes-2530 | 382.12 | 311 | 4.43 | 8 | PVC | 0.01 | 1,485 | 8 | 52 | 60 | 4 | | |
| Kirkland_Main-1313 | Kirkland_Manholes-2534 | 391.7 | Kirkland_Manholes-2533 | 389.33 | 214.8 | 1.1 | 8 | PVC | 0.01 | 741 | 1 | 4 | 6 | 0.8 | SM14-Ex-EX260 | |
| Kirkland_Main-1315 | Kirkland_Manholes-2535 | 407.5 | Kirkland_Manholes-2536 | 406.16 | 143.7 | 0.93 | 8 | PVC | 0.01 | 681 | 15 | 4 | 19 | 2.8 | | |
| Kirkland_Main-1316 | Kirkland_Manholes-2536 | 406.16 | Kirkland_Manholes-2537 | 404.02 | 173.1 | 1.24 | 8 | PVC | 0.01 | 784 | 20 | 9 | 29 | 3.6 | | |
| Kirkland_Main-1317 | Kirkland_Manholes-2537 | 404.02 | Kirkland_Manholes-2538 | 403.64 | 31.1 | 1.22 | 8 | PVC | 0.01 | 780 | 20 | 13 | 33 | 4.3 | | |
| Kirkland_Main-1318 | Kirkland_Manholes-2541 | 412.62 | Kirkland_Manholes-2538 | 403.64 | 249.5 | 3.6 | 8 | PVC | 0.01 | 1,338 | 6 | 13 | 19 | 1.4 | SM14-Ex-EX299 | |
| Kirkland_Main-1320 | Kirkland_Manholes-2538 | 403.64 | Kirkland_Manholes-2542 | 402.84 | 199.8 | 0.4 | 8 | PVC | 0.01 | 446 | 28 | 30 | 58 | 13 | SM14-Ex-EX299 | |
| Kirkland_Main-1321 | Kirkland_Manholes-2539 | 420.17 | Kirkland_Manholes-2540 | 419.4 | 116.4 | 0.66 | 8 | PVC | 0.01 | 574 | 3 | 4 | 7 | 1.2 | SM14-Ex-EX299 | |

E-Page 885

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1322 | Kirkland_Manholes-2540 | 419.4 | Kirkland_Manholes-2541 | 412.62 | 255.5 | 2.65 | 8 | PVC | 0.01 | 1,149 | 5 | 9 | 13 | 1.2 | SM14-Ex-EX299 | |
| Kirkland_Main-1324 | Kirkland_Manholes-2542 | 402.84 | Kirkland_Manholes-2547 | 388.67 | 366.3 | 3.87 | 8 | PVC | 0.01 | 1,387 | 29 | 34 | 64 | 4.6 | SM14-Ex-EX299 | |
| Kirkland_Main-1325 | Kirkland_Manholes-2547 | 388.67 | Kirkland_Manholes-2549 | 373.53 | 148.8 | 10.17 | 8 | PVC | 0.01 | 2,249 | 31 | 39 | 69 | 3.1 | SM14-Ex-EX299 | |
| Kirkland_Main-1327 | Kirkland_Manholes-2543 | 398.38 | Kirkland_Manholes-2545 | 394.25 | 263.6 | 1.57 | 8 | PVC | 0.01 | 883 | 4 | 9 | 12 | 1.4 | | |
| Kirkland_Main-1328 | Kirkland_Manholes-2544 | 407.5 | Kirkland_Manholes-2543 | 398.38 | 295.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 2 | 4 | 7 | 0.5 | SM14-Ex-EX308 | |
| Kirkland_Main-1329 | Kirkland_Manholes-2546 | 394.6 | Kirkland_Manholes-2545 | 394.25 | 207.1 | 0.17 | 8 | PVC | 0.01 | 290 | 1 | 4 | 5 | 1.7 | | |
| Kirkland_Main-1330 | Kirkland_Manholes-2545 | 394.25 | Kirkland_Manholes-2548 | 359.75 | 323.6 | 10.66 | 8 | PVC | 0.01 | 2,302 | 9 | 17 | 26 | 1.1 | | |
| Kirkland_Main-1331 | Kirkland_Manholes-2549 | 373.53 | Kirkland_Manholes-2550 | 363.01 | 106.8 | 9.85 | 8 | PVC | 0.01 | 2,213 | 31 | 43 | 74 | 3.4 | SM14-Ex-EX299 | |
| Kirkland_Main-1332 | Kirkland_Manholes-2550 | 363.01 | Kirkland_Manholes-2551 | 350.96 | 184.1 | 6.54 | 8 | PVC | 0.01 | 1,804 | 32 | 47 | 79 | 4.4 | SM14-Ex-EX299 | |
| Kirkland_Main-1333 | Kirkland_Manholes-2551 | 350.96 | Kirkland_Manholes-2552 | 332.83 | 142.8 | 12.69 | 8 | PVC | 0.01 | 2,512 | 49 | 90 | 139 | 5.5 | SM14-Ex-EX299 | |
| Kirkland_Main-1334 | Kirkland_Manholes-2552 | 332.83 | Kirkland_Manholes-2559 | 326.46 | 239.1 | 2.66 | 8 | PVC | 0.01 | 1,151 | 51 | 103 | 154 | 13.4 | SM14-Ex-EX299 | |
| Kirkland_Main-1335 | Kirkland_Manholes-2555 | 336.08 | Kirkland_Manholes-2552 | 332.83 | 311.9 | 1.04 | 8 | PVC | 0.01 | 720 | 2 | 9 | 10 | 1.5 | SM14-Ex-EX322 | |
| Kirkland_Main-1336 | Kirkland_Manholes-2553 | 338.58 | Kirkland_Manholes-2554 | 334.68 | 146 | 2.67 | 8 | PVC | 0.01 | 1,152 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX304 | |
| Kirkland_Main-1337 | Kirkland_Manholes-2892 | 130.3 | Kirkland_Manholes-7 | 127.07 | 138.9 | 2.32 | 8 | PVC | 0.01 | 1,075 | 1 | 1 | 3 | 0.3 | | |
| Kirkland_Main-1338 | Kirkland_Manholes-2554 | 334.68 | Kirkland_Manholes-2558 | 329.23 | 295.9 | 1.84 | 8 | PVC | 0.01 | 957 | 7 | 9 | 16 | 1.7 | SM14-Ex-EX304 | |
| Kirkland_Main-1339 | Kirkland_Manholes-2556 | 339.44 | Kirkland_Manholes-2555 | 336.08 | 338.5 | 0.99 | 8 | PVC | 0.01 | 702 | 1 | 4 | 6 | 0.8 | SM14-Ex-EX322 | |
| Kirkland_Main-1340 | Kirkland_Manholes-2557 | 338.97 | Kirkland_Manholes-2564 | 326.24 | 273.9 | 4.65 | 8 | PVC | 0.01 | 1,520 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX303 | |
| Kirkland_Main-1341 | Kirkland_Manholes-2558 | 329.23 | Kirkland_Manholes-2562 | 315.88 | 275 | 4.86 | 8 | PVC | 0.01 | 1,554 | 8 | 13 | 21 | 1.4 | SM14-Ex-EX304 | |
| Kirkland_Main-1342 | Kirkland_Manholes-2559 | 326.46 | Kirkland_Manholes-2614 | 304.78 | 296.2 | 7.32 | 8 | PVC | 0.01 | 1,907 | 51 | 107 | 158 | 8.3 | SM14-Ex-EX299 | |
| Kirkland_Main-1343 | Kirkland_Manholes-2561 | 358.82 | Kirkland_Manholes-2551 | 350.96 | 208.8 | 3.76 | 8 | PVC | 0.01 | 1,368 | 16 | 39 | 55 | 4 | | |
| Kirkland_Main-1344 | Kirkland_Manholes-2560 | 366.92 | Kirkland_Manholes-2561 | 358.82 | 174.3 | 4.65 | 8 | PVC | 0.01 | 1,520 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1345 | Kirkland_Manholes-2562 | 315.88 | Kirkland_Manholes-2563 | 304.66 | 203.7 | 5.51 | 8 | PVC | 0.01 | 1,655 | 9 | 17 | 27 | 1.6 | SM14-Ex-EX304 | |
| Kirkland_Main-1346 | Kirkland_Manholes-2563 | 304.66 | Kirkland_Manholes-2603 | 296.02 | 227.1 | 3.81 | 8 | PVC | 0.01 | 1,375 | 11 | 21 | 33 | 2.4 | SM14-Ex-EX304 | |
| Kirkland_Main-1347 | Kirkland_Manholes-2564 | 326.24 | Kirkland_Manholes-2565 | 315.02 | 180.1 | 6.23 | 8 | PVC | 0.01 | 1,760 | 2 | 9 | 11 | 0.6 | SM14-Ex-EX303 | |
| Kirkland_Main-1349 | Kirkland_Manholes-2565 | 315.02 | Kirkland_Manholes-2590 | 303.32 | 215.8 | 5.42 | 8 | PVC | 0.01 | 1,642 | 12 | 43 | 55 | 3.3 | SM14-Ex-EX303 | |
| Kirkland_Main-1350 | Kirkland_Manholes-2567 | 316.05 | Kirkland_Manholes-2565 | 315.02 | 200.2 | 0.51 | 8 | PVC | 0.01 | 506 | 9 | 30 | 39 | 7.6 | SM14-Ex-EX307 | |
| Kirkland_Main-1353 | Kirkland_Manholes-2456 | 21.67 | Kirkland_Manholes-2458 | 21.12 | 286.3 | 0.19 | 12 | PVC | 0.01 | 911 | 66 | 111 | 177 | 19.4 | | |
| Kirkland_Main-1354 | Kirkland_Manholes-2104 | 41.29 | Kirkland_Manholes-2457 | 40.34 | 237.1 | 0.4 | 8 | PVC | 0.01 | 446 | 9 | 13 | 22 | 4.8 | SM14-Ex-EX231 | Drop Connection |
| Kirkland_Main-1355 | Kirkland_Manholes-2459 | 25.23 | Kirkland_Manholes-2458 | 21.12 | 57.9 | 7.1 | 8 | PVC | 0.01 | 1,879 | 1 | 13 | 14 | 0.7 | | |
| Kirkland_Main-1356 | Kirkland_Manholes-2458 | 21.12 | Kirkland_Manholes-2460 | 20.42 | 280.8 | 0.25 | 12 | PVC | 0.01 | 1,038 | 78 | 130 | 208 | 20.1 | | |
| Kirkland_Main-1357 | Kirkland_Manholes-2105 | 41.32 | Kirkland_Manholes-2459 | 40.36 | 240.6 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 7 | 7 | 1.6 | SM14-Ex-EX230 | Drop Connection |
| Kirkland_Main-1358 | Kirkland_Manholes-2460 | 20.42 | Kirkland_Manholes-2463 | 19.08 | 286.9 | 0.47 | 12 | PVC | 0.01 | 1,421 | 98 | 163 | 261 | 18.4 | | |
| Kirkland_Main-1359 | Kirkland_Manholes-2461 | 23.27 | Kirkland_Manholes-2460 | 20.42 | 36.9 | 7.72 | 8 | PVC | 0.01 | 1,959 | 10 | 20 | 30 | 1.5 | | |
| Kirkland_Main-1360 | Kirkland_Manholes-2106 | 63.43 | Kirkland_Manholes-2461 | 62.02 | 352 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 13 | 21 | 4.7 | SM14-Ex-EX227 | Drop Connection |
| Kirkland_Main-1361 | Kirkland_Manholes-2462 | 20.98 | Kirkland_Manholes-2460 | 20.42 | 12.7 | 4.42 | 8 | PVC | 0.01 | 1,483 | 10 | 7 | 16 | 1.1 | | |
| Kirkland_Main-1362 | Kirkland_Manholes-2463 | 19.08 | Kirkland_Manholes-2465 | 18.4 | 238.2 | 0.29 | 15 | PVC | 0.01 | 2,014 | 110 | 169 | 279 | 13.9 | | |
| Kirkland_Main-1363 | Kirkland_Manholes-2464 | 24.34 | Kirkland_Manholes-2465 | 24.15 | 46.3 | 0.4 | 8 | PVC | 0.01 | 446 | 15 | 33 | 47 | 10.6 | | Drop Connection |
| Kirkland_Main-1364 | Kirkland_Manholes-2465 | 18.4 | Kirkland_Manholes-2321 | 18.2 | 405.1 | 0.05 | 15 | PVC | 0.01 | 837 | 125 | 208 | 333 | 39.8 | | |
| Kirkland_Main-1365 | Kirkland_Manholes-2466 | 40.06 | Kirkland_Manholes-2464 | 24.34 | 133.9 | 11.74 | 8 | PVC | 0.01 | 2,416 | 14 | 26 | 40 | 1.7 | | |
| Kirkland_Main-1366 | Kirkland_Manholes-754 | 246.56 | Kirkland_Manholes-756 | 236.14 | 59.1 | 17.63 | 8 | PVC | 0.01 | 2,961 | 4 | 9 | 12 | 0.4 | | |
| Kirkland_Main-1367 | Kirkland_Manholes-756 | 236.14 | Kirkland_Manholes-759 | 235.08 | 17.7 | 6 | 8 | PVC | 0.01 | 1,727 | 4 | 13 | 17 | 1 | | |
| Kirkland_Main-1368 | Kirkland_Manholes-759 | 235.08 | Kirkland_Manholes-755 | 223.34 | 72.1 | 16.27 | 8 | PVC | 0.01 | 2,844 | 6 | 17 | 23 | 0.8 | | |
| Kirkland_Main-1369 | Kirkland_Manholes-749 | 322.83 | Kirkland_Manholes-748 | 311.92 | 207.7 | 5.25 | 8 | PVC | 0.01 | 1,616 | 21 | 39 | 59 | 3.7 | SM14-Ex-EX71 | |
| Kirkland_Main-1370 | Kirkland_Manholes-743 | 333.02 | Kirkland_Manholes-749 | 322.83 | 238.3 | 4.28 | 8 | PVC | 0.01 | 1,458 | 18 | 34 | 53 | 3.6 | SM14-Ex-EX71 | |
| Kirkland_Main-1371 | Kirkland_Manholes-742 | 334.85 | Kirkland_Manholes-743 | 333.02 | 278.1 | 0.66 | 8 | PVC | 0.01 | 572 | 12 | 21 | 33 | 5.8 | SM14-Ex-EX71 | |
| Kirkland_Main-1372 | Kirkland_Manholes-744 | 343.43 | Kirkland_Manholes-743 | 333.02 | 155.4 | 6.7 | 8 | PVC | 0.01 | 1,825 | 4 | 9 | 13 | 0.7 | SM14-Ex-EX73 | |
| Kirkland_Main-1373 | Kirkland_Manholes-1551 | 340.04 | Kirkland_Manholes-1548 | 334.13 | 358.9 | 1.65 | 8 | PVC | 0.01 | 905 | 1 | 4 | 6 | 0.6 | SM14-Ex-EX122 | |
| Kirkland_Main-1374 | Kirkland_Manholes-1548 | 334.13 | Kirkland_Manholes-1547 | 314.76 | 165.7 | 11.69 | 8 | PVC | 0.01 | 2,411 | 2 | 9 | 11 | 0.5 | SM14-Ex-EX122 | |
| Kirkland_Main-1375 | Kirkland_Manholes-1554 | 318.87 | Kirkland_Manholes-1547 | 314.76 | 166.1 | 2.48 | 8 | PVC | 0.01 | 1,109 | 4 | 13 | 17 | 1.6 | SM14-Ex-EX122 | |
| Kirkland_Main-1376 | Kirkland_Manholes-1547 | 314.76 | Kirkland_Manholes-1553 | 308.15 | 101.4 | 6.52 | 8 | PVC | 0.01 | 1,800 | 8 | 26 | 34 | 1.9 | SM14-Ex-EX122 | |
| Kirkland_Main-1377 | Kirkland_Manholes-1549 | 335.84 | Kirkland_Manholes-1550 | 330.23 | 147.4 | 3.81 | 8 | PVC | 0.01 | 1,375 | 1 | 4 | 5 | 0.4 | SM14-Ex-EX122 | |
| Kirkland_Main-1378 | Kirkland_Manholes-1550 | 330.23 | Kirkland_Manholes-1554 | 318.87 | 207.3 | 5.48 | 8 | PVC | 0.01 | 1,650 | 2 | 9 | 11 | 0.7 | SM14-Ex-EX122 | |
| Kirkland_Main-1379 | Kirkland_Manholes-741 | 345.43 | Kirkland_Manholes-696 | 340.09 | 318.5 | 1.68 | 8 | PVC | 0.01 | 913 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX74 | |
| Kirkland_Main-1380 | Kirkland_Manholes-696 | 340.09 | Kirkland_Manholes-742 | 334.85 | 242.4 | 2.16 | 8 | PVC | 0.01 | 1,037 | 10 | 17 | 27 | 2.6 | SM14-Ex-EX71 | |
| Kirkland_Main-1381 | Kirkland_Manholes-820 | 351.15 | Kirkland_Manholes-821 | 328.81 | 334.9 | 6.67 | 8 | PVC | 0.01 | 1,821 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX72 | |
| Kirkland_Main-1382 | Kirkland_Manholes-745 | 351.42 | Kirkland_Manholes-744 | 343.43 | 306.7 | 2.6 | 8 | PVC | 0.01 | 1,138 | 3 | 4 | 7 | 0.6 | SM14-Ex-EX73 | |
| Kirkland_Main-1383 | Kirkland_Manholes-821 | 328.81 | Kirkland_Manholes-746 | 326.06 | 200.6 | 1.37 | 8 | PVC | 0.01 | 825 | 3 | 9 | 11 | 1.4 | SM14-Ex-EX72 | |
| Kirkland_Main-1384 | Kirkland_Manholes-746 | 326.06 | Kirkland_Manholes-747 | 319.23 | 281 | 2.43 | 8 | PVC | 0.01 | 1,099 | 4 | 13 | 17 | 1.5 | SM14-Ex-EX72 | |
| Kirkland_Main-1385 | Kirkland_Manholes-747 | 319.23 | Kirkland_Manholes-748 | 311.92 | 331.6 | 2.2 | 8 | PVC | 0.01 | 1,047 | 5 | 17 | 22 | 2.1 | SM14-Ex-EX72 | |
| Kirkland_Main-1386 | Kirkland_Manholes-1562 | 206.57 | Kirkland_Manholes-1563 | 203.28 | 21.7 | 15.13 | 8 | PVC | 0.01 | 2,743 | 2 | 9 | 11 | 0.4 | | |
| Kirkland_Main-1387 | Kirkland_Manholes-1560 | 251.28 | Kirkland_Manholes-455 | 250.45 | 217.9 | 0.38 | 8 | PVC | 0.01 | 435 | 32 | 73 | 105 | 24 | SM14-Ex-EX68 | |
| Kirkland_Main-1388 | Kirkland_Manholes-1559 | 253.89 | Kirkland_Manholes-1560 | 251.28 | 258.2 | 1.01 | 8 | PVC | 0.01 | 709 | 30 | 69 | 99 | 14 | SM14-Ex-EX68 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1389 | Kirkland_Manholes-317 | 146.79 | Kirkland_Manholes-318 | 146.51 | 72.2 | 0.39 | 12 | PVC | 0.01 | 1,298 | 171 | 335 | 506 | 39 | SM14-Ex-EX30 | |
| Kirkland_Main-1390 | Kirkland_Manholes-1052 | 151.4 | Kirkland_Manholes-316 | 147.8 | 353.6 | 1.02 | 8 | PVC | 0.01 | 711 | 170 | 317 | 486 | 68.4 | | |
| Kirkland_Main-1392 | Kirkland_Manholes-264 | 215.3 | Kirkland_Manholes-1099 | 211.44 | 157 | 2.46 | 8 | PVC | 0.01 | 1,105 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1398 | Kirkland_Manholes-836 | 335.7 | Kirkland_Manholes-835 | 335.4 | 62.1 | 0.48 | 8 | PVC | 0.01 | 490 | 16 | 30 | 46 | 9.3 | | |
| Kirkland_Main-1399 | Kirkland_Manholes-835 | 335.4 | Kirkland_Manholes-839 | 334.68 | 84.6 | 0.85 | 8 | PVC | 0.01 | 650 | 18 | 39 | 57 | 8.7 | | |
| Kirkland_Main-1400 | Kirkland_Manholes-837 | 336.53 | Kirkland_Manholes-836 | 335.7 | 248.7 | 0.33 | 8 | PVC | 0.01 | 407 | 14 | 26 | 40 | 9.8 | | |
| Kirkland_Main-1401 | Kirkland_Manholes-838 | 337.31 | Kirkland_Manholes-837 | 336.53 | 120.5 | 0.65 | 8 | PVC | 0.01 | 567 | 10 | 21 | 31 | 5.5 | | |
| Kirkland_Main-1402 | Kirkland_Manholes-840 | 326.85 | Kirkland_Manholes-841 | 325.94 | 71 | 1.28 | 8 | PVC | 0.01 | 798 | 27 | 60 | 87 | 10.9 | | |
| Kirkland_Main-1403 | Kirkland_Manholes-841 | 325.94 | Kirkland_Manholes-842 | 324.88 | 230.1 | 0.46 | 8 | PVC | 0.01 | 479 | 29 | 64 | 93 | 19.5 | | |
| Kirkland_Main-1404 | Kirkland_Manholes-843 | 340.26 | Kirkland_Manholes-842 | 324.88 | 172 | 8.94 | 8 | PVC | 0.01 | 2,108 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-1405 | Kirkland_Manholes-844 | 342.5 | Kirkland_Manholes-845 | 341.21 | 161.2 | 0.8 | 8 | PVC | 0.01 | 631 | 3 | 4 | 7 | 1.1 | | |
| Kirkland_Main-1406 | Kirkland_Manholes-846 | 342.07 | Kirkland_Manholes-845 | 341.21 | 84.3 | 1.02 | 8 | PVC | 0.01 | 712 | 6 | 17 | 24 | 3.3 | | |
| Kirkland_Main-1407 | Kirkland_Manholes-845 | 341.21 | Kirkland_Manholes-850 | 340.39 | 138.4 | 0.59 | 8 | PVC | 0.01 | 543 | 10 | 26 | 36 | 6.6 | | |
| Kirkland_Main-1408 | Kirkland_Manholes-849 | 342.42 | Kirkland_Manholes-846 | 342.07 | 117.3 | 0.3 | 8 | PVC | 0.01 | 385 | 5 | 13 | 18 | 4.8 | | |
| Kirkland_Main-1409 | Kirkland_Manholes-847 | 343.01 | Kirkland_Manholes-849 | 342.42 | 70.3 | 0.84 | 8 | PVC | 0.01 | 646 | 5 | 9 | 13 | 2.1 | | |
| Kirkland_Main-1410 | Kirkland_Manholes-848 | 344.32 | Kirkland_Manholes-847 | 343.01 | 145.5 | 0.9 | 8 | PVC | 0.01 | 669 | 4 | 4 | 9 | 1.3 | | |
| Kirkland_Main-1411 | Kirkland_Manholes-850 | 340.39 | Kirkland_Manholes-851 | 339.16 | 69.3 | 1.78 | 8 | PVC | 0.01 | 941 | 11 | 30 | 41 | 4.3 | | |
| Kirkland_Main-1412 | Kirkland_Manholes-1538 | 302.73 | Kirkland_Manholes-1537 | 302.03 | 362.6 | 0.19 | 8 | PVC | 0.01 | 310 | 9 | 17 | 26 | 8.4 | SM14-Ex-EX124 | |
| Kirkland_Main-1413 | Kirkland_Manholes-1511 | 290.62 | Kirkland_Manholes-1509 | 286.35 | 84.7 | 5.04 | 8 | PVC | 0.01 | 1,583 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1414 | Kirkland_Manholes-1510 | 287.19 | Kirkland_Manholes-1509 | 286.35 | 79 | 1.06 | 8 | PVC | 0.01 | 727 | 1 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1415 | Kirkland_Manholes-1509 | 286.35 | Kirkland_Manholes-1508 | 277.83 | 283.5 | 3.01 | 8 | PVC | 0.01 | 1,222 | 4 | 13 | 17 | 1.4 | | Drop Connection |
| Kirkland_Main-1416 | Kirkland_Manholes-1537 | 302.03 | Kirkland_Manholes-1536 | 298.86 | 351.3 | 0.9 | 8 | PVC | 0.01 | 670 | 13 | 21 | 34 | 5.1 | SM14-Ex-EX124 | |
| Kirkland_Main-1417 | Kirkland_Manholes-762 | 287.2 | Kirkland_Manholes-763 | 274.33 | 165.6 | 7.77 | 8 | PVC | 0.01 | 1,966 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX125 | |
| Kirkland_Main-1418 | Kirkland_Manholes-763 | 274.33 | Kirkland_Manholes-1531 | 265.03 | 234.1 | 3.97 | 8 | PVC | 0.01 | 1,405 | 6 | 9 | 14 | 1 | SM14-Ex-EX125 | |
| Kirkland_Main-1419 | Kirkland_Manholes-1541 | 294.69 | Kirkland_Manholes-1543 | 289 | 216.2 | 2.63 | 8 | PVC | 0.01 | 1,144 | 8 | 17 | 25 | 2.2 | SM14-Ex-EX123 | |
| Kirkland_Main-1420 | Kirkland_Manholes-1536 | 298.86 | Kirkland_Manholes-1518 | 277.88 | 393.1 | 5.34 | 8 | PVC | 0.01 | 1,629 | 14 | 26 | 40 | 2.4 | SM14-Ex-EX124 | |
| Kirkland_Main-1421 | Kirkland_Manholes-1544 | 284.46 | Kirkland_Manholes-1545 | 272.4 | 63.3 | 19.06 | 8 | PVC | 0.01 | 3,078 | 12 | 26 | 37 | 1.2 | SM14-Ex-EX123 | |
| Kirkland_Main-1422 | Kirkland_Manholes-1558 | 160.79 | O-20 | 159.86 | 16.6 | 5.62 | 8 | PVC | 0.01 | 1,671 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1424 | Kirkland_Manholes-1557 | 161.32 | O-21 | 159.86 | 64.6 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 9 | 11 | 1 | | |
| Kirkland_Main-1425 | Kirkland_Manholes-1556 | 178.05 | Kirkland_Manholes-1557 | 161.32 | 76.6 | 21.85 | 8 | PVC | 0.01 | 3,296 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1427 | Kirkland_Manholes-541 | 450.25 | Kirkland_Manholes-542 | 440.69 | 230.2 | 4.15 | 8 | PVC | 0.01 | 1,437 | 19 | 73 | 91 | 6.4 | | |
| Kirkland_Main-1428 | Kirkland_Manholes-542 | 440.69 | Kirkland_Manholes-1978 | 440.32 | 89.3 | 0.41 | 8 | PVC | 0.01 | 454 | 19 | 77 | 96 | 21.3 | | |
| Kirkland_Main-1429 | Kirkland_Manholes-544 | 449.4 | Kirkland_Manholes-543 | 448.24 | 235 | 0.49 | 8 | PVC | 0.01 | 495 | 29 | 73 | 102 | 20.5 | | |
| Kirkland_Main-1430 | Kirkland_Manholes-546 | 452.43 | Kirkland_Manholes-545 | 450.22 | 300.2 | 0.74 | 8 | PVC | 0.01 | 605 | 24 | 64 | 88 | 14.6 | | |
| Kirkland_Main-1431 | Kirkland_Manholes-545 | 450.22 | Kirkland_Manholes-544 | 449.4 | 161.7 | 0.51 | 8 | PVC | 0.01 | 502 | 27 | 69 | 96 | 19 | | |
| Kirkland_Main-1432 | Kirkland_Manholes-547 | 452.62 | Kirkland_Manholes-546 | 452.43 | 162.6 | 0.12 | 8 | PVC | 0.01 | 243 | 21 | 60 | 81 | 33.5 | | |
| Kirkland_Main-1433 | Kirkland_Manholes-548 | 453.36 | Kirkland_Manholes-547 | 452.62 | 135.2 | 0.55 | 8 | PVC | 0.01 | 522 | 20 | 56 | 75 | 14.5 | | |
| Kirkland_Main-1434 | Kirkland_Manholes-549 | 453.9 | Kirkland_Manholes-548 | 453.36 | 128.1 | 0.42 | 8 | PVC | 0.01 | 456 | 16 | 43 | 59 | 12.9 | | |
| Kirkland_Main-1435 | Kirkland_Manholes-552 | 455.6 | Kirkland_Manholes-549 | 453.9 | 177.5 | 0.96 | 8 | PVC | 0.01 | 690 | 16 | 39 | 54 | 7.9 | | |
| Kirkland_Main-1436 | Kirkland_Manholes-550 | 455.89 | Kirkland_Manholes-552 | 455.6 | 183.6 | 0.16 | 8 | PVC | 0.01 | 280 | 1 | 4 | 5 | 1.9 | | |
| Kirkland_Main-1437 | Kirkland_Manholes-551 | 462.06 | Kirkland_Manholes-563 | 461.52 | 194.4 | 0.28 | 8 | PVC | 0.01 | 372 | 5 | 4 | 10 | 2.6 | | |
| Kirkland_Main-1438 | Kirkland_Manholes-553 | 455.61 | Kirkland_Manholes-552 | 455.6 | 92.3 | 0.01 | 8 | PVC | 0.01 | 73 | 14 | 30 | 44 | 59.7 | | |
| Kirkland_Main-1439 | Kirkland_Manholes-554 | 456.45 | Kirkland_Manholes-553 | 455.61 | 88.9 | 0.94 | 8 | PVC | 0.01 | 685 | 13 | 26 | 38 | 5.6 | | |
| Kirkland_Main-1440 | Kirkland_Manholes-558 | 457.55 | Kirkland_Manholes-554 | 456.45 | 287.7 | 0.38 | 8 | PVC | 0.01 | 436 | 9 | 17 | 27 | 6.1 | | |
| Kirkland_Main-1441 | Kirkland_Manholes-557 | 460.23 | Kirkland_Manholes-554 | 456.45 | 194.6 | 1.94 | 8 | PVC | 0.01 | 983 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1442 | Kirkland_Manholes-559 | 467.58 | Kirkland_Manholes-558 | 457.55 | 209.6 | 4.79 | 8 | PVC | 0.01 | 1,542 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-1443 | Kirkland_Manholes-563 | 461.52 | Kirkland_Manholes-558 | 457.55 | 324.2 | 1.22 | 8 | PVC | 0.01 | 780 | 6 | 9 | 15 | 1.9 | | |
| Kirkland_Main-1444 | Kirkland_Manholes-562 | 483.8 | Kirkland_Manholes-560 | 483.4 | 99.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-1445 | Kirkland_Manholes-565 | 468.54 | Kirkland_Manholes-2020 | 468.34 | 312.4 | 0.06 | 12 | PVC | 0.01 | 530 | 118 | 155 | 272 | 51.4 | SM14-2035-DF12 | |
| Kirkland_Main-1446 | Kirkland_Manholes-564 | 469.28 | Kirkland_Manholes-565 | 468.54 | 228 | 0.32 | 10 | PVC | 0.01 | 728 | 117 | 150 | 267 | 36.7 | | |
| Kirkland_Main-1447 | Kirkland_Manholes-567 | 470.28 | Kirkland_Manholes-564 | 469.28 | 324.2 | 0.31 | 10 | PVC | 0.01 | 710 | 98 | 103 | 201 | 28.3 | | |
| Kirkland_Main-1448 | Kirkland_Manholes-3045 | 483.35 | Kirkland_Manholes-2029 | 479.06 | 297.6 | 1.44 | 8 | PVC | 0.01 | 846 | 4 | 9 | 12 | 1.5 | | |
| Kirkland_Main-1449 | Kirkland_Manholes-568 | 471.29 | Kirkland_Manholes-567 | 470.28 | 325 | 0.31 | 10 | PVC | 0.01 | 713 | 97 | 94 | 191 | 26.8 | | |
| Kirkland_Main-1450 | Kirkland_Manholes-569 | 473.29 | Kirkland_Manholes-568 | 471.29 | 178.4 | 1.12 | 10 | PVC | 0.01 | 1,354 | 96 | 90 | 186 | 13.7 | | |
| Kirkland_Main-1451 | Kirkland_Manholes-570 | 473.5 | Kirkland_Manholes-569 | 473.29 | 54.9 | 0.38 | 8 | PVC | 0.01 | 433 | 96 | 86 | 181 | 41.9 | | |
| Kirkland_Main-1452 | Kirkland_Manholes-1406 | 473.57 | Kirkland_Manholes-570 | 473.5 | 288.8 | 0.03 | 12 | PVC | 0.01 | 330 | 89 | 82 | 171 | 51.7 | SM14-Ex-EX275 | |
| Kirkland_Main-1453 | Kirkland_Manholes-571 | 472.91 | Kirkland_Manholes-567 | 470.28 | 172.6 | 1.52 | 8 | PVC | 0.01 | 870 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1454 | Kirkland_Manholes-575 | 113.73 | Kirkland_Manholes-574 | 110.98 | 152.2 | 1.81 | 8 | PVC | 0.01 | 948 | 2 | 8 | 11 | 1.1 | SM14-Ex-EX116 | |
| Kirkland_Main-1455 | Kirkland_Manholes-1665 | 94.21 | Kirkland_Manholes-1666 | 89.71 | 26.9 | 16.73 | 8 | PVC | 0.01 | 2,883 | 39 | 91 | 130 | 4.5 | | |
| Kirkland_Main-1456 | Kirkland_Manholes-957 | 315.92 | Kirkland_Manholes-958 | 300.6 | 184.6 | 8.3 | 8 | PVC | 0.01 | 2,031 | 5 | 21 | 27 | 1.3 | | |
| Kirkland_Main-1457 | Kirkland_Manholes-958 | 300.6 | Kirkland_Manholes-942 | 300.01 | 173 | 0.34 | 8 | PVC | 0.01 | 412 | 7 | 26 | 32 | 7.9 | | |
| Kirkland_Main-1458 | Kirkland_Manholes-960 | 258.67 | Kirkland_Manholes-959 | 252.05 | 190.9 | 3.47 | 8 | PVC | 0.01 | 1,313 | 3 | 4 | 7 | 0.6 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1459 | Kirkland_Manholes-2752 | 253.8 | Kirkland_Manholes-959 | 252.05 | 339.9 | 0.51 | 8 | PVC | 0.01 | 506 | 17 | 36 | 53 | 10.5 | | |
| Kirkland_Main-1460 | Kirkland_Manholes-959 | 252.05 | Kirkland_Manholes-963 | 250.7 | 229 | 0.59 | 8 | PVC | 0.01 | 541 | 23 | 45 | 67 | 12.4 | | |
| Kirkland_Main-1461 | Kirkland_Manholes-961 | 263.75 | Kirkland_Manholes-962 | 249.53 | 185.7 | 7.66 | 8 | PVC | 0.01 | 1,951 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1462 | Kirkland_Manholes-964 | 266.7 | Kirkland_Manholes-963 | 250.7 | 315.2 | 5.08 | 8 | PVC | 0.01 | 1,589 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1463 | Kirkland_Manholes-963 | 250.7 | Kirkland_Manholes-962 | 249.53 | 229.2 | 0.51 | 8 | PVC | 0.01 | 504 | 27 | 54 | 81 | 16 | | |
| Kirkland_Main-1464 | Kirkland_Manholes-962 | 249.53 | Kirkland_Manholes-966 | 247.26 | 381 | 0.59 | 8 | PVC | 0.01 | 544 | 31 | 62 | 93 | 17.1 | | |
| Kirkland_Main-1465 | Kirkland_Manholes-965 | 252.45 | Kirkland_Manholes-966 | 247.26 | 188.4 | 2.75 | 8 | PVC | 0.01 | 1,170 | 3 | 4 | 8 | 0.7 | | |
| Kirkland_Main-1466 | Kirkland_Manholes-966 | 247.26 | Kirkland_Manholes-967 | 246.35 | 132.7 | 0.69 | 8 | PVC | 0.01 | 584 | 36 | 71 | 108 | 18.4 | | |
| Kirkland_Main-1467 | Kirkland_Manholes-968 | 245.61 | Kirkland_Manholes-969 | 239.3 | 150 | 4.21 | 8 | PVC | 0.01 | 1,446 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1468 | Kirkland_Manholes-969 | 239.3 | Kirkland_Manholes-970 | 236.6 | 291.2 | 0.93 | 8 | PVC | 0.01 | 679 | 2 | 9 | 11 | 1.7 | | |
| Kirkland_Main-1469 | Kirkland_Manholes-970 | 236.6 | Kirkland_Manholes-971 | 236.2 | 92.8 | 0.43 | 8 | PVC | 0.01 | 463 | 4 | 13 | 18 | 3.8 | | |
| Kirkland_Main-1470 | Kirkland_Manholes-967 | 246.35 | Kirkland_Manholes-972 | 246.27 | 41.8 | 0.2 | 8 | PVC | 0.01 | 314 | 37 | 76 | 113 | 35.8 | | |
| Kirkland_Main-1471 | Kirkland_Manholes-971 | 236.2 | Kirkland_Manholes-973 | 233.19 | 134.5 | 2.24 | 8 | PVC | 0.01 | 1,055 | 5 | 18 | 23 | 2.2 | SM14-Ex-EX2 | |
| Kirkland_Main-1472 | Kirkland_Manholes-974 | 234.1 | Kirkland_Manholes-973 | 233.19 | 211 | 0.43 | 8 | PVC | 0.01 | 463 | 3 | 9 | 12 | 2.6 | | |
| Kirkland_Main-1473 | Kirkland_Manholes-987 | 239.5 | Kirkland_Manholes-976 | 229.3 | 219.2 | 4.65 | 8 | PVC | 0.01 | 1,521 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1474 | Kirkland_Manholes-975 | 230.2 | Kirkland_Manholes-976 | 229.3 | 22.7 | 3.96 | 8 | PVC | 0.01 | 1,404 | 10 | 36 | 45 | 3.2 | | |
| Kirkland_Main-1475 | Kirkland_Manholes-973 | 233.19 | Kirkland_Manholes-975 | 230.2 | 123.5 | 2.42 | 8 | PVC | 0.01 | 1,097 | 9 | 31 | 40 | 3.7 | | |
| Kirkland_Main-1476 | Kirkland_Manholes-976 | 229.3 | Kirkland_Manholes-977 | 225.95 | 181.2 | 1.85 | 8 | PVC | 0.01 | 959 | 12 | 45 | 57 | 5.9 | | |
| Kirkland_Main-1478 | Kirkland_Manholes-1564 | 164.37 | O-15 | 160 | 18.2 | 24.07 | 8 | PVC | 0.01 | 3,459 | 3 | 17 | 20 | 0.6 | | |
| Kirkland_Main-1479 | Kirkland_Manholes-755 | 223.34 | Kirkland_Manholes-1565 | 218.86 | 20.1 | 22.24 | 8 | PVC | 0.01 | 3,325 | 6 | 21 | 27 | 0.8 | | |
| Kirkland_Main-1480 | Kirkland_Manholes-1567 | 133.87 | Kirkland_Manholes-1566 | 130.52 | 314.6 | 1.06 | 8 | PVC | 0.01 | 728 | 4 | 8 | 13 | 1.7 | SM14-Ex-EX119 | |
| Kirkland_Main-1481 | Kirkland_Manholes-1566 | 130.52 | Kirkland_Manholes-1604 | 117.22 | 313.5 | 4.24 | 8 | PVC | 0.01 | 1,452 | 5 | 17 | 22 | 1.5 | SM14-Ex-EX119 | |
| Kirkland_Main-1482 | Kirkland_Manholes-776 | 207.48 | Kirkland_Manholes-775 | 172.73 | 191.1 | 18.19 | 8 | PVC | 0.01 | 3,007 | 8 | 30 | 38 | 1.3 | | |
| Kirkland_Main-1483 | Kirkland_Manholes-1565 | 218.86 | Kirkland_Manholes-776 | 207.48 | 52.1 | 21.84 | 8 | PVC | 0.01 | 3,295 | 6 | 26 | 32 | 1 | | |
| Kirkland_Main-1484 | Kirkland_Manholes-1263 | 156.98 | Kirkland_Manholes-1262 | 156.59 | 13.2 | 2.96 | 8 | PVC | 0.01 | 1,213 | 1 | 8 | 9 | 0.7 | SM14-Ex-EX111 | |
| Kirkland_Main-1485 | Kirkland_Manholes-1262 | 156.59 | Kirkland_Manholes-1261 | 144.57 | 314.4 | 3.82 | 8 | PVC | 0.01 | 1,379 | 8 | 41 | 50 | 3.6 | SM14-Ex-EX111 | |
| Kirkland_Main-1486 | Kirkland_Manholes-1260 | 164.33 | Kirkland_Manholes-1261 | 144.57 | 293.7 | 6.73 | 8 | PVC | 0.01 | 1,829 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX110 | |
| Kirkland_Main-1488 | Kirkland_Manholes-1259 | 154.8 | Kirkland_Manholes-1258 | 154.28 | 130.3 | 0.4 | 8 | PVC | 0.01 | 445 | 10 | 33 | 43 | 9.6 | SM14-Ex-EX108 | |
| Kirkland_Main-1489 | Kirkland_Manholes-1258 | 154.28 | Kirkland_Manholes-1257 | 152.6 | 347 | 0.48 | 8 | PVC | 0.01 | 491 | 20 | 66 | 86 | 17.5 | SM14-Ex-EX108 | |
| Kirkland_Main-1490 | Kirkland_Manholes-1257 | 152.6 | Kirkland_Manholes-1256 | 151.53 | 24 | 4.46 | 8 | PVC | 0.01 | 1,489 | 22 | 74 | 96 | 6.4 | SM14-Ex-EX108 | |
| Kirkland_Main-1494 | Kirkland_Manholes-2467 | 42.59 | Kirkland_Manholes-2466 | 40.06 | 76.4 | 3.31 | 8 | PVC | 0.01 | 1,283 | 11 | 20 | 30 | 2.4 | | |
| Kirkland_Main-1495 | Kirkland_Manholes-2469 | 49.1 | Kirkland_Manholes-2467 | 42.59 | 138.2 | 4.71 | 8 | PVC | 0.01 | 1,530 | 9 | 13 | 22 | 1.4 | | |
| Kirkland_Main-1496 | Kirkland_Manholes-2468 | 49.98 | Kirkland_Manholes-2469 | 49.48 | 124.2 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 7 | 15 | 3.3 | | Drop Connection |
| Kirkland_Main-1498 | Kirkland_Manholes-2470 | 236.6 | Kirkland_Manholes-2472 | 223.64 | 225 | 5.76 | 8 | PVC | 0.01 | 1,692 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX282 | |
| Kirkland_Main-1499 | Kirkland_Manholes-2472 | 223.64 | Kirkland_Manholes-2473 | 222.78 | 215.8 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 13 | 18 | 4 | SM14-Ex-EX282 | Drop Connection |
| Kirkland_Main-1500 | Kirkland_Manholes-2473 | 207.49 | Kirkland_Manholes-2474 | 188.45 | 212.3 | 8.97 | 8 | PVC | 0.01 | 2,111 | 8 | 17 | 25 | 1.2 | SM14-Ex-EX282 | |
| Kirkland_Main-1501 | Kirkland_Manholes-2471 | 234.47 | Kirkland_Manholes-2472 | 223.64 | 364.1 | 2.97 | 8 | PVC | 0.01 | 1,216 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX283 | |
| Kirkland_Main-1502 | Kirkland_Manholes-2474 | 188.45 | Kirkland_Manholes-2476 | 187.5 | 225.3 | 0.42 | 8 | PVC | 0.01 | 458 | 10 | 26 | 36 | 7.8 | SM14-Ex-EX282 | |
| Kirkland_Main-1505 | Kirkland_Manholes-2492 | 55.46 | Kirkland_Manholes-2666 | 55.28 | 147.8 | 0.12 | 18 | PVC | 0.01 | 2,139 | 182 | 322 | 504 | 23.6 | SM14-Ex-EX222 | |
| Kirkland_Main-1506 | Kirkland_Manholes-2088 | 57.39 | Kirkland_Manholes-2492 | 55.46 | 144 | 1.34 | 18 | PVC | 0.01 | 7,094 | 144 | 272 | 417 | 5.9 | SM14-Ex-EX222 | |
| Kirkland_Main-1507 | Kirkland_Manholes-2090 | 57.44 | Kirkland_Manholes-2088 | 57.39 | 370.9 | 0.01 | 18 | PVC | 0.01 | 712 | 142 | 260 | 402 | 56.5 | SM14-Ex-EX222 | |
| Kirkland_Main-1508 | Kirkland_Manholes-2089 | 58.23 | Kirkland_Manholes-2088 | 57.39 | 14.1 | 5.97 | 8 | PVC | 0.01 | 1,723 | 1 | 6 | 7 | 0.4 | | |
| Kirkland_Main-1509 | Kirkland_Manholes-2620 | 281.06 | Kirkland_Manholes-2618 | 278.4 | 382.5 | 0.7 | 8 | PVC | 0.01 | 588 | 3 | 9 | 11 | 1.9 | SM14-Ex-EX299 | |
| Kirkland_Main-1510 | Kirkland_Manholes-2604 | 283.17 | Kirkland_Manholes-2620 | 281.06 | 375.6 | 0.56 | 8 | PVC | 0.01 | 528 | 1 | 4 | 5 | 1 | SM14-Ex-EX299 | |
| Kirkland_Main-1512 | Kirkland_Manholes-2621 | 277.53 | Kirkland_Manholes-2433 | 276.88 | 161.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | SM14-Ex-EX244 | Drop Connection |
| Kirkland_Main-1513 | Kirkland_Manholes-2623 | 277.98 | Kirkland_Manholes-2622 | 271.8 | 433.3 | 1.43 | 8 | PVC | 0.01 | 842 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1514 | Kirkland_Manholes-2622 | 271.8 | Kirkland_Manholes-2625 | 260.54 | 221.9 | 5.07 | 8 | PVC | 0.01 | 1,588 | 2 | 9 | 11 | 0.7 | SM14-Ex-EX281 | |
| Kirkland_Main-1515 | Kirkland_Manholes-2624 | 276.22 | Kirkland_Manholes-2635 | 275.48 | 185.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.2 | SM14-Ex-EX294 | |
| Kirkland_Main-1516 | Kirkland_Manholes-2625 | 260.54 | Kirkland_Manholes-2626 | 246.92 | 188.3 | 7.23 | 8 | PVC | 0.01 | 1,896 | 3 | 13 | 16 | 0.8 | SM14-Ex-EX281 | |
| Kirkland_Main-1517 | Kirkland_Manholes-2626 | 246.92 | Kirkland_Manholes-2627 | 215.5 | 237.8 | 13.21 | 8 | PVC | 0.01 | 2,563 | 4 | 17 | 21 | 0.8 | SM14-Ex-EX281 | |
| Kirkland_Main-1518 | Kirkland_Manholes-2627 | 215.5 | Kirkland_Manholes-2628 | 186 | 220.8 | 13.36 | 8 | PVC | 0.01 | 2,577 | 6 | 21 | 28 | 1.1 | SM14-Ex-EX281 | |
| Kirkland_Main-1519 | Kirkland_Manholes-2476 | 187.5 | Kirkland_Manholes-2628 | 186 | 397.3 | 0.38 | 8 | PVC | 0.01 | 433 | 13 | 30 | 43 | 9.9 | SM14-Ex-EX282 | |
| Kirkland_Main-1520 | Kirkland_Manholes-2606 | 272.98 | Kirkland_Manholes-2607 | 264.34 | 256.6 | 3.37 | 8 | PVC | 0.01 | 1,294 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX298 | |
| Kirkland_Main-1521 | Kirkland_Manholes-2607 | 264.34 | Kirkland_Manholes-2608 | 229.39 | 401.2 | 8.71 | 8 | PVC | 0.01 | 2,081 | 6 | 9 | 15 | 0.7 | SM14-Ex-EX298 | Drop Connection |
| Kirkland_Main-1522 | Kirkland_Manholes-2608 | 227.04 | Kirkland_Manholes-2600 | 217.97 | 170.3 | 5.33 | 8 | PVC | 0.01 | 1,627 | 8 | 13 | 20 | 1.3 | SM14-Ex-EX298 | |
| Kirkland_Main-1523 | Kirkland_Manholes-2630 | 232.51 | Kirkland_Manholes-2629 | 172.55 | 421 | 14.24 | 8 | PVC | 0.01 | 2,661 | 12 | 21 | 34 | 1.3 | SM14-Ex-EX295 | |
| Kirkland_Main-1524 | Kirkland_Manholes-1219 | 264.33 | Kirkland_Manholes-1139 | 247.37 | 248 | 6.84 | 8 | PVC | 0.01 | 1,844 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX80 | |
| Kirkland_Main-1525 | Kirkland_Manholes-1139 | 247.37 | Kirkland_Manholes-1138 | 221.13 | 248.6 | 10.56 | 8 | PVC | 0.01 | 2,291 | 4 | 17 | 20 | 0.9 | SM14-Ex-EX80 | |
| Kirkland_Main-1526 | Kirkland_Manholes-1138 | 221.13 | Kirkland_Manholes-1141 | 204.1 | 177.9 | 9.57 | 8 | PVC | 0.01 | 2,181 | 5 | 25 | 30 | 1.4 | SM14-Ex-EX80 | |
| Kirkland_Main-1527 | Kirkland_Manholes-1152 | 135.47 | Kirkland_Manholes-1811 | 129.72 | 351.2 | 1.64 | 8 | PVC | 0.01 | 902 | 21 | 74 | 95 | 10.5 | SM10 | |
| Kirkland_Main-1528 | Kirkland_Manholes-1153 | 137.55 | Kirkland_Manholes-1154 | 131.73 | 270.2 | 2.15 | 8 | PVC | 0.01 | 1,035 | 3 | 8 | 11 | 1 | SM10 | |
| Kirkland_Main-1529 | Kirkland_Manholes-1154 | 131.73 | Kirkland_Manholes-1155 | 122.09 | 288.9 | 3.34 | 8 | PVC | 0.01 | 1,288 | 4 | 17 | 20 | 1.6 | SM10 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1530 | Kirkland_Manholes-1155 | 122.09 | Kirkland_Manholes-1156 | 108.19 | 328.7 | 4.23 | 8 | PVC | 0.01 | 1,450 | 6 | 25 | 30 | 2.1 | SM10 | |
| Kirkland_Main-1531 | Kirkland_Manholes-1156 | 108.19 | Kirkland_Manholes-1157 | 99.29 | 118.4 | 7.51 | 8 | PVC | 0.01 | 1,933 | 8 | 33 | 41 | 2.1 | SM10 | |
| Kirkland_Main-1532 | Kirkland_Manholes-1157 | 99.29 | Kirkland_Manholes-1159 | 82.66 | 203.9 | 8.16 | 8 | PVC | 0.01 | 2,014 | 15 | 66 | 81 | 4 | SM10 | |
| Kirkland_Main-1533 | Kirkland_Manholes-1159 | 82.66 | Kirkland_Manholes-1160 | 77.11 | 29.4 | 18.89 | 8 | PVC | 0.01 | 3,064 | 17 | 74 | 91 | 3 | | |
| Kirkland_Main-1534 | Kirkland_Manholes-1158 | 124.93 | Kirkland_Manholes-1157 | 99.29 | 160.8 | 15.95 | 8 | PVC | 0.01 | 2,816 | 6 | 25 | 31 | 1.1 | SM10 | |
| Kirkland_Main-1535 | Kirkland_Manholes-1162 | 78.51 | Kirkland_Manholes-1160 | 77.11 | 390.4 | 0.36 | 15 | PVC | 0.01 | 2,257 | 112 | 421 | 883 | 39.1 | | |
| Kirkland_Main-1536 | Kirkland_Manholes-1179 | 123.76 | Kirkland_Manholes-1163 | 96.51 | 315 | 8.65 | 8 | PVC | 0.01 | 2,074 | 59 | 165 | 224 | 10.8 | SM10 | |
| Kirkland_Main-1537 | Kirkland_Manholes-1163 | 96.51 | Kirkland_Manholes-1161 | 78.67 | 122.8 | 14.53 | 8 | PVC | 0.01 | 2,687 | 71 | 223 | 294 | 10.9 | SM14-Ex-EX77 | |
| Kirkland_Main-1538 | Kirkland_Manholes-1164 | 119.66 | Kirkland_Manholes-1163 | 96.51 | 338.6 | 6.84 | 8 | PVC | 0.01 | 1,844 | 11 | 50 | 60 | 3.3 | SM10 | |
| Kirkland_Main-1539 | Kirkland_Manholes-1165 | 133.24 | Kirkland_Manholes-1164 | 119.66 | 224 | 6.06 | 8 | PVC | 0.01 | 1,736 | 9 | 41 | 51 | 2.9 | SM10 | |
| Kirkland_Main-1540 | Kirkland_Manholes-1166 | 151.97 | Kirkland_Manholes-1165 | 133.24 | 158.7 | 11.8 | 8 | PVC | 0.01 | 2,422 | 2 | 8 | 10 | 0.4 | SM10 | |
| Kirkland_Main-1541 | Kirkland_Manholes-1167 | 140.51 | Kirkland_Manholes-1165 | 133.24 | 127.8 | 5.69 | 8 | PVC | 0.01 | 1,681 | 7 | 25 | 32 | 1.9 | SM10 | |
| Kirkland_Main-1542 | Kirkland_Manholes-1168 | 149.52 | Kirkland_Manholes-1167 | 140.51 | 328.4 | 2.74 | 8 | PVC | 0.01 | 1,168 | 5 | 17 | 21 | 1.8 | SM10 | |
| Kirkland_Main-1543 | Kirkland_Manholes-1169 | 156.83 | Kirkland_Manholes-1168 | 149.52 | 316.3 | 2.31 | 8 | PVC | 0.01 | 1,072 | 2 | 8 | 10 | 1 | SM10 | |
| Kirkland_Main-1544 | Kirkland_Manholes-662 | 248.07 | Kirkland_Manholes-651 | 247.63 | 225.4 | 0.2 | 18 | PVC | 0.01 | 2,708 | 392 | 1,095 | 1,486 | 54.9 | SM14-2035-DF9 | |
| Kirkland_Main-1545 | Kirkland_Manholes-653 | 238.2 | Kirkland_Manholes-639 | 237.89 | 305.4 | 0.1 | 21 | PVC | 0.01 | 2,946 | 282 | 515 | 797 | 27.1 | | |
| Kirkland_Main-1546 | Kirkland_Manholes-654 | 239.59 | Kirkland_Manholes-653 | 238.2 | 298.1 | 0.47 | 21 | PVC | 0.01 | 6,313 | 281 | 511 | 792 | 12.5 | | |
| Kirkland_Main-1547 | Kirkland_Manholes-655 | 240 | Kirkland_Manholes-654 | 239.59 | 255.9 | 0.16 | 21 | PVC | 0.01 | 3,700 | 279 | 507 | 786 | 21.2 | | Drop Connection |
| Kirkland_Main-1548 | Kirkland_Manholes-1574 | 241.8 | Kirkland_Manholes-657 | 241.69 | 265.5 | 0.04 | 21 | PVC | 0.01 | 1,882 | 277 | 494 | 770 | 40.9 | | |
| Kirkland_Main-1549 | Kirkland_Manholes-657 | 241.69 | Kirkland_Manholes-656 | 240.1 | 132.5 | 1.2 | 21 | PVC | 0.01 | 10,129 | 277 | 498 | 775 | 7.7 | | |
| Kirkland_Main-1550 | Kirkland_Manholes-656 | 240.1 | Kirkland_Manholes-655 | 240 | 131.8 | 0.08 | 21 | PVC | 0.01 | 2,546 | 278 | 502 | 780 | 30.6 | | Drop Connection |
| Kirkland_Main-1551 | Kirkland_Manholes-658 | 246.8 | Kirkland_Manholes-659 | 246.11 | 66.6 | 1.04 | 8 | PVC | 0.01 | 718 | 2 | 13 | 15 | 2.1 | | |
| Kirkland_Main-1552 | Kirkland_Manholes-660 | 246.84 | Kirkland_Manholes-659 | 246.11 | 57.6 | 1.27 | 8 | PVC | 0.01 | 793 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-1553 | Kirkland_Manholes-659 | 246.11 | Kirkland_Manholes-661 | 245.17 | 89.4 | 1.05 | 8 | PVC | 0.01 | 723 | 5 | 21 | 27 | 3.7 | | |
| Kirkland_Main-1554 | Kirkland_Manholes-651 | 247.63 | Kirkland_Manholes-645 | 243.42 | 262.6 | 1.6 | 18 | PVC | 0.01 | 7,761 | 393 | 1,099 | 1,492 | 19.2 | SM14-2035-DF9 | |
| Kirkland_Main-1555 | Kirkland_Manholes-652 | 251.94 | Kirkland_Manholes-662 | 248.07 | 324.4 | 1.19 | 18 | PVC | 0.01 | 6,694 | 391 | 1,090 | 1,482 | 22.1 | SM14-2035-DF9 | |
| Kirkland_Main-1556 | Kirkland_Manholes-664 | 268.55 | Kirkland_Manholes-663 | 252.67 | 383.8 | 4.14 | 8 | PVC | 0.01 | 1,434 | 2 | 4 | 7 | 0.5 | | |
| Kirkland_Main-1557 | Kirkland_Manholes-663 | 252.67 | Kirkland_Manholes-652 | 251.94 | 362.7 | 0.2 | 18 | PVC | 0.01 | 2,750 | 390 | 1,086 | 1,476 | 53.7 | SM14-2035-DF9 | |
| Kirkland_Main-1558 | Kirkland_Manholes-666 | 254.95 | Kirkland_Manholes-665 | 253.2 | 321.8 | 0.54 | 15 | PVC | 0.01 | 2,780 | 344 | 970 | 1,314 | 47.3 | | |
| Kirkland_Main-1559 | Kirkland_Manholes-665 | 253.2 | Kirkland_Manholes-663 | 252.67 | 360.1 | 0.15 | 18 | PVC | 0.01 | 2,351 | 384 | 1,077 | 1,462 | 62.2 | SM14-Ex-EX135 | |
| Kirkland_Main-1560 | Kirkland_Manholes-668 | 260.28 | Kirkland_Manholes-667 | 256.8 | 251.1 | 1.39 | 8 | PVC | 0.01 | 830 | 4 | 4 | 9 | 1 | | |
| Kirkland_Main-1561 | Kirkland_Manholes-667 | 256.8 | Kirkland_Manholes-665 | 253.2 | 386.9 | 0.93 | 8 | PVC | 0.01 | 680 | 38 | 103 | 141 | 20.7 | | |
| Kirkland_Main-1562 | Kirkland_Manholes-669 | 262.97 | Kirkland_Manholes-667 | 256.8 | 300.6 | 2.05 | 8 | PVC | 0.01 | 1,010 | 31 | 94 | 126 | 12.4 | | |
| Kirkland_Main-1563 | Kirkland_Manholes-671 | 267.47 | Kirkland_Manholes-670 | 264.24 | 114.1 | 2.83 | 8 | PVC | 0.01 | 1,186 | 10 | 26 | 36 | 3 | | |
| Kirkland_Main-1564 | Kirkland_Manholes-672 | 266.2 | Kirkland_Manholes-670 | 264.24 | 209.3 | 0.94 | 8 | PVC | 0.01 | 682 | 20 | 60 | 80 | 11.7 | | |
| Kirkland_Main-1565 | Kirkland_Manholes-670 | 264.24 | Kirkland_Manholes-669 | 262.97 | 88.5 | 1.43 | 8 | PVC | 0.01 | 844 | 30 | 90 | 120 | 14.2 | | |
| Kirkland_Main-1567 | Kirkland_Manholes-676 | 280.09 | Kirkland_Manholes-674 | 276.15 | 217.6 | 1.81 | 8 | PVC | 0.01 | 949 | 3 | 4 | 8 | 0.8 | | |
| Kirkland_Main-1568 | Kirkland_Manholes-674 | 276.15 | Kirkland_Manholes-675 | 275.52 | 20.5 | 3.07 | 8 | PVC | 0.01 | 1,235 | 8 | 17 | 25 | 2 | | |
| Kirkland_Main-1569 | Kirkland_Manholes-673 | 281.46 | Kirkland_Manholes-674 | 276.15 | 196.8 | 2.7 | 8 | PVC | 0.01 | 1,158 | 3 | 9 | 11 | 1 | | |
| Kirkland_Main-1570 | Kirkland_Manholes-675 | 275.52 | Kirkland_Manholes-671 | 267.47 | 256.7 | 3.14 | 8 | PVC | 0.01 | 1,249 | 8 | 21 | 30 | 2.4 | | |
| Kirkland_Main-1571 | Kirkland_Manholes-677 | 287.02 | Kirkland_Manholes-673 | 281.46 | 185.8 | 2.99 | 8 | PVC | 0.01 | 1,220 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1572 | Kirkland_Manholes-1728 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 120.1 | 0.95 | 12 | PVC | 0.01 | 2,026 | 98 | 58 | 156 | 7.7 | | |
| Kirkland_Main-1573 | Kirkland_Manholes-1727 | 26.48 | Kirkland_Manholes-1728 | 26.2 | 59.2 | 0.47 | 8 | PVC | 0.01 | 485 | 61 | 33 | 94 | 19.5 | | |
| Kirkland_Main-1574 | Kirkland_Manholes-1724 | 26.68 | Kirkland_Manholes-1727 | 26.48 | 122.2 | 0.16 | 8 | PVC | 0.01 | 285 | 61 | 25 | 85 | 30 | | |
| Kirkland_Main-1575 | Kirkland_Manholes-1725 | 28.56 | Kirkland_Manholes-1724 | 26.68 | 150.5 | 1.25 | 8 | PVC | 0.01 | 788 | 40 | 17 | 57 | 7.2 | | |
| Kirkland_Main-1576 | Kirkland_Manholes-1726 | 29.93 | Kirkland_Manholes-1725 | 28.56 | 57.1 | 2.4 | 8 | PVC | 0.01 | 1,092 | 24 | 8 | 32 | 2.9 | | |
| Kirkland_Main-1577 | Kirkland_Manholes-1650 | 145.43 | Kirkland_Manholes-1711 | 136.47 | 206.1 | 4.35 | 12 | PVC | 0.01 | 4,335 | 15 | 66 | 81 | 1.9 | SM14-Ex-EX196 | |
| Kirkland_Main-1578 | Kirkland_Manholes-1751 | 37.07 | Kirkland_Manholes-1750 | 33.34 | 26 | 14.35 | 8 | PVC | 0.01 | 2,670 | 1 | 8 | 9 | 0.3 | SM14-Ex-EX164 | |
| Kirkland_Main-1580 | Kirkland_Manholes-2722 | 21 | Kirkland_Manholes-3100 | 18.3 | 194.6 | 1.39 | 12 | PVC | 0.01 | 2,449 | 111 | 62 | 173 | 7.1 | SM14-Ex-EX289 | |
| Kirkland_Main-1585 | Kirkland_Manholes-1750 | 33.34 | Kirkland_Manholes-1749 | 32.74 | 150.9 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 17 | 19 | 4.3 | | Drop Connection |
| Kirkland_Main-1586 | Kirkland_Manholes-1749 | 30.51 | Kirkland_Manholes-1745 | 27.57 | 191.8 | 1.53 | 8 | PVC | 0.01 | 873 | 4 | 25 | 28 | 3.2 | | |
| Kirkland_Main-1587 | Kirkland_Manholes-1744 | 27.68 | Kirkland_Manholes-1745 | 27.57 | 23.9 | 0.46 | 8 | PVC | 0.01 | 479 | 1 | 8 | 9 | 1.9 | | |
| Kirkland_Main-1588 | Kirkland_Manholes-1955 | 335.45 | Kirkland_Manholes-1958 | 324.88 | 118.1 | 8.95 | 8 | PVC | 0.01 | 2,109 | 11 | 13 | 23 | 1.1 | | |
| Kirkland_Main-1589 | Kirkland_Manholes-1958 | 324.88 | Kirkland_Manholes-1939 | 324.34 | 135.7 | 0.4 | 8 | PVC | 0.01 | 446 | 11 | 21 | 33 | 7.3 | | |
| Kirkland_Main-1590 | Kirkland_Manholes-1959 | 325.55 | Kirkland_Manholes-1958 | 324.88 | 167.8 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 5 | 1 | | |
| Kirkland_Main-1591 | Kirkland_Manholes-1960 | 312.18 | Kirkland_Manholes-1892 | 301.26 | 279 | 3.91 | 8 | PVC | 0.01 | 1,395 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1592 | Kirkland_Manholes-1962 | 345.61 | Kirkland_Manholes-1961 | 341.24 | 157.8 | 2.77 | 8 | PVC | 0.01 | 1,173 | 15 | 4 | 19 | 1.7 | | |
| Kirkland_Main-1593 | Kirkland_Manholes-1961 | 341.24 | Kirkland_Manholes-1964 | 341.08 | 188.7 | 0.08 | 8 | PVC | 0.01 | 205 | 34 | 69 | 102 | 49.9 | | |
| Kirkland_Main-1594 | Kirkland_Manholes-1964 | 341.08 | Kirkland_Manholes-1963 | 340.77 | 13.1 | 2.37 | 8 | PVC | 0.01 | 1,085 | 69 | 99 | 168 | 15.5 | | |
| Kirkland_Main-1595 | Kirkland_Manholes-1965 | 345.05 | Kirkland_Manholes-1964 | 341.08 | 103.3 | 3.84 | 8 | PVC | 0.01 | 1,382 | 35 | 26 | 61 | 4.4 | | |
| Kirkland_Main-1596 | Kirkland_Manholes-1967 | 421.47 | Kirkland_Manholes-1966 | 418.21 | 134.2 | 2.43 | 8 | PVC | 0.01 | 1,099 | 54 | 167 | 221 | 20.1 | SM14-Ex-EX216 | |
| Kirkland_Main-1597 | Kirkland_Manholes-1968 | 421.67 | Kirkland_Manholes-1967 | 421.47 | 23.9 | 0.84 | 8 | PVC | 0.01 | 646 | 53 | 163 | 216 | 33.4 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1598 | Kirkland_Manholes-1969 | 423.5 | Kirkland_Manholes-1968 | 421.67 | 353.5 | 0.52 | 8 | PVC | 0.01 | 507 | 50 | 159 | 209 | 41.2 | | |
| Kirkland_Main-1599 | Kirkland_Manholes-1970 | 425.5 | Kirkland_Manholes-1969 | 423.5 | 200.6 | 1 | 8 | PVC | 0.01 | 704 | 6 | 17 | 23 | 3.3 | | |
| Kirkland_Main-1600 | Kirkland_Manholes-1974 | 432 | Kirkland_Manholes-1969 | 423.5 | 272.7 | 3.12 | 8 | PVC | 0.01 | 1,245 | 42 | 137 | 180 | 14.4 | | |
| Kirkland_Main-1601 | Kirkland_Manholes-1971 | 425.8 | Kirkland_Manholes-1970 | 425.5 | 74.8 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 13 | 17 | 3.9 | | |
| Kirkland_Main-1602 | Kirkland_Manholes-1972 | 426.31 | Kirkland_Manholes-1971 | 425.8 | 127.8 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 12 | 2.6 | | |
| Kirkland_Main-1603 | Kirkland_Manholes-1973 | 430.86 | Kirkland_Manholes-1972 | 426.31 | 87.6 | 5.19 | 8 | PVC | 0.01 | 1,607 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1604 | Kirkland_Manholes-2631 | 265.77 | Kirkland_Manholes-2630 | 232.51 | 349 | 9.53 | 8 | PVC | 0.01 | 2,176 | 8 | 17 | 25 | 1.1 | SM14-Ex-EX295 | |
| Kirkland_Main-1605 | Kirkland_Manholes-2632 | 276.84 | Kirkland_Manholes-2631 | 265.77 | 241.2 | 4.59 | 8 | PVC | 0.01 | 1,510 | 5 | 13 | 18 | 1.2 | SM14-Ex-EX295 | |
| Kirkland_Main-1606 | Kirkland_Manholes-2649 | 147.51 | Kirkland_Manholes-2648 | 144.73 | 165.5 | 1.68 | 8 | PVC | 0.01 | 914 | 5 | 12 | 17 | 1.9 | | |
| Kirkland_Main-1607 | Kirkland_Manholes-2648 | 144.73 | Kirkland_Manholes-2647 | 132.46 | 109.5 | 11.21 | 8 | PVC | 0.01 | 2,360 | 7 | 19 | 25 | 1.1 | | |
| Kirkland_Main-1608 | Kirkland_Manholes-2647 | 132.46 | Kirkland_Manholes-2646 | 96.97 | 134.3 | 26.42 | 8 | PVC | 0.01 | 3,624 | 9 | 25 | 34 | 0.9 | | |
| Kirkland_Main-1609 | Kirkland_Manholes-2646 | 96.97 | Kirkland_Manholes-2645 | 79.04 | 111.3 | 16.11 | 8 | PVC | 0.01 | 2,830 | 12 | 31 | 43 | 1.5 | | |
| Kirkland_Main-1610 | Kirkland_Manholes-2650 | 148.19 | Kirkland_Manholes-2649 | 147.51 | 170.3 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 9 | 1.9 | | |
| Kirkland_Main-1611 | Kirkland_Manholes-2651 | 121.43 | Kirkland_Manholes-2652 | 57.18 | 251.5 | 25.55 | 8 | PVC | 0.01 | 3,564 | 3 | 6 | 10 | 0.3 | SM14-Ex-EX292 | |
| Kirkland_Main-1612 | Kirkland_Manholes-2654 | 54.76 | Kirkland_Manholes-2657 | 43.64 | 394.5 | 2.82 | 8 | PVC | 0.01 | 1,184 | 8 | 25 | 33 | 2.8 | SM14-Ex-EX291 | |
| Kirkland_Main-1613 | Kirkland_Manholes-2653 | 56.99 | Kirkland_Manholes-2654 | 54.76 | 13.8 | 16.21 | 8 | PVC | 0.01 | 2,839 | 7 | 19 | 26 | 0.9 | SM14-Ex-EX292 | |
| Kirkland_Main-1614 | Kirkland_Manholes-2652 | 57.18 | Kirkland_Manholes-2653 | 56.99 | 47.7 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 12 | 18 | 4.1 | SM14-Ex-EX292 | |
| Kirkland_Main-1615 | Kirkland_Manholes-2657 | 43.64 | Kirkland_Manholes-2656 | 33.93 | 250 | 3.88 | 8 | PVC | 0.01 | 1,389 | 11 | 31 | 41 | 3 | SM14-Ex-EX291 | |
| Kirkland_Main-1616 | Kirkland_Manholes-2655 | 44.22 | Kirkland_Manholes-2656 | 33.93 | 73.2 | 14.06 | 8 | PVC | 0.01 | 2,644 | 29 | 81 | 110 | 4.2 | SM14-Ex-EX293 | |
| Kirkland_Main-1617 | Kirkland_Manholes-2656 | 33.93 | Kirkland_Manholes-2658 | 29.62 | 118.6 | 3.63 | 8 | PVC | 0.01 | 1,344 | 41 | 118 | 159 | 11.8 | SM14-Ex-EX291 | |
| Kirkland_Main-1618 | Kirkland_Manholes-2658 | 29.62 | Kirkland_Manholes-2659 | 28.05 | 312.8 | 0.5 | 8 | PVC | 0.01 | 500 | 42 | 124 | 166 | 33.3 | SM14-Ex-EX291 | |
| Kirkland_Main-1619 | Kirkland_Manholes-2659 | 28.05 | Kirkland_Manholes-2660 | 26.87 | 281 | 0.42 | 8 | PVC | 0.01 | 457 | 45 | 130 | 175 | 38.3 | SM14-Ex-EX291 | |
| Kirkland_Main-1624 | Kirkland_Manholes-2726 | 12.39 | Kirkland_Manholes-2662 | 11.52 | 172.8 | 0.5 | 18 | PVC | 0.01 | 4,349 | 371 | 607 | 978 | 22.5 | SM14-Ex-EX289 | |
| Kirkland_Main-1625 | Kirkland_Manholes-2666 | 55.28 | Kirkland_Manholes-2667 | 55.1 | 203.4 | 0.09 | 18 | PVC | 0.01 | 1,823 | 184 | 328 | 512 | 28.1 | SM14-Ex-EX222 | |
| Kirkland_Main-1626 | Kirkland_Manholes-2667 | 55.1 | Kirkland_Manholes-2665 | 53.92 | 196.9 | 0.6 | 18 | PVC | 0.01 | 4,744 | 185 | 334 | 519 | 10.9 | SM14-Ex-EX222 | |
| Kirkland_Main-1627 | Kirkland_Manholes-2665 | 53.92 | Kirkland_Manholes-3102 | 53.77 | 398.5 | 0.04 | 18 | PVC | 0.01 | 1,189 | 186 | 341 | 526 | 44.3 | SM14-Ex-EX222 | |
| Kirkland_Main-1629 | Kirkland_Manholes-2203 | 62.94 | Kirkland_Manholes-3102 | 53.77 | 55.2 | 16.62 | 8 | PVC | 0.01 | 2,874 | 25 | 62 | 87 | 3 | SM14-Ex-EX290 | |
| Kirkland_Main-1633 | Kirkland_Manholes-3101 | 52.44 | Kirkland_Manholes-2663 | 50.64 | 51.5 | 3.5 | 18 | PVC | 0.01 | 11,462 | 221 | 440 | 661 | 5.8 | SM14-Ex-EX222 | |
| Kirkland_Main-1634 | Kirkland_Manholes-250 | 115.74 | Kirkland_Manholes-268 | 108.82 | 144.1 | 4.8 | 8 | PVC | 0.01 | 1,545 | 5 | 18 | 23 | 1.5 | SM10 | |
| Kirkland_Main-1635 | Kirkland_Manholes-309 | 140.9 | Kirkland_Manholes-308 | 114.39 | 431.7 | 6.14 | 8 | PVC | 0.01 | 1,747 | 3 | 9 | 12 | 0.7 | SM10 | |
| Kirkland_Main-1636 | Kirkland_Manholes-308 | 114.39 | Kirkland_Manholes-307 | 105.6 | 319 | 2.76 | 8 | PVC | 0.01 | 1,170 | 8 | 27 | 34 | 2.9 | SM10 | |
| Kirkland_Main-1637 | Kirkland_Manholes-494 | 135.66 | Kirkland_Manholes-307 | 105.6 | 436.1 | 6.89 | 8 | PVC | 0.01 | 1,851 | 3 | 9 | 12 | 0.7 | SM10 | |
| Kirkland_Main-1638 | Kirkland_Manholes-241 | 14.7 | Kirkland_Manholes-2765 | 13.19 | 59.4 | 2.54 | 18 | PVC | 0.01 | 9,768 | 494 | 1,174 | 1,668 | 17.1 | SM3 | |
| Kirkland_Main-1639 | Kirkland_Manholes-240 | 17.1 | Kirkland_Manholes-2765 | 13.19 | 342.3 | 1.14 | 12 | PVC | 0.01 | 2,222 | 192 | 439 | 932 | 41.9 | SM14-Ex-EX42 | |
| Kirkland_Main-1640 | Kirkland_Manholes-239 | 27.77 | Kirkland_Manholes-240 | 17.1 | 321.9 | 3.31 | 12 | PVC | 0.01 | 3,784 | 191 | 435 | 927 | 24.5 | SM14-Ex-EX42 | |
| Kirkland_Main-1641 | Kirkland_Manholes-243 | 37.12 | Kirkland_Manholes-239 | 27.77 | 158.7 | 5.89 | 12 | PVC | 0.01 | 5,046 | 189 | 426 | 916 | 18.2 | SM14-Ex-EX38 | |
| Kirkland_Main-1642 | Kirkland_Manholes-244 | 47.57 | Kirkland_Manholes-243 | 46.95 | 154.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 186 | 421 | 909 | 69.1 | SM14-Ex-EX38 | Drop Connection |
| Kirkland_Main-1643 | Kirkland_Manholes-246 | 58 | Kirkland_Manholes-244 | 47.57 | 272.3 | 3.83 | 8 | PVC | 0.01 | 1,380 | 186 | 417 | 904 | 65.5 | SM14-Ex-EX38 | |
| Kirkland_Main-1645 | Kirkland_Manholes-901 | 304.32 | Kirkland_Manholes-900 | 302.97 | 52 | 2.59 | 8 | PVC | 0.01 | 1,135 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-1646 | Kirkland_Manholes-902 | 304.94 | Kirkland_Manholes-900 | 302.97 | 236.8 | 0.83 | 8 | PVC | 0.01 | 643 | 1 | 4 | 5 | 0.8 | | |
| Kirkland_Main-1647 | Kirkland_Manholes-900 | 302.97 | Kirkland_Manholes-904 | 289.03 | 425.5 | 3.28 | 8 | PVC | 0.01 | 1,276 | 7 | 26 | 33 | 2.6 | | |
| Kirkland_Main-1648 | Kirkland_Manholes-903 | 290.15 | Kirkland_Manholes-904 | 289.03 | 62.2 | 1.8 | 8 | PVC | 0.01 | 946 | 20 | 64 | 85 | 9 | | |
| Kirkland_Main-1649 | Kirkland_Manholes-904 | 289.03 | Kirkland_Manholes-905 | 283.61 | 138.2 | 3.92 | 8 | PVC | 0.01 | 1,396 | 28 | 94 | 123 | 8.8 | | |
| Kirkland_Main-1650 | Kirkland_Manholes-905 | 283.61 | Kirkland_Manholes-912 | 277.93 | 121.5 | 4.68 | 8 | PVC | 0.01 | 1,525 | 29 | 99 | 128 | 8.4 | | |
| Kirkland_Main-1651 | Kirkland_Manholes-906 | 293.01 | Kirkland_Manholes-907 | 291.52 | 150.3 | 0.99 | 8 | PVC | 0.01 | 702 | 10 | 43 | 53 | 7.5 | | |
| Kirkland_Main-1652 | Kirkland_Manholes-907 | 291.52 | Kirkland_Manholes-908 | 290.53 | 109.9 | 0.9 | 8 | PVC | 0.01 | 669 | 11 | 47 | 59 | 8.8 | | |
| Kirkland_Main-1653 | Kirkland_Manholes-908 | 290.53 | Kirkland_Manholes-903 | 290.15 | 324 | 0.12 | 8 | PVC | 0.01 | 241 | 18 | 60 | 78 | 32.4 | | |
| Kirkland_Main-1654 | Kirkland_Manholes-910 | 293.95 | Kirkland_Manholes-908 | 290.53 | 193.3 | 1.77 | 8 | PVC | 0.01 | 938 | 6 | 9 | 14 | 1.5 | | |
| Kirkland_Main-1655 | Kirkland_Manholes-909 | 297.88 | Kirkland_Manholes-910 | 293.95 | 188.4 | 2.09 | 8 | PVC | 0.01 | 1,018 | 4 | 4 | 8 | 0.8 | | |
| Kirkland_Main-1656 | Kirkland_Manholes-911 | 279.8 | Kirkland_Manholes-912 | 277.93 | 207.2 | 0.9 | 8 | PVC | 0.01 | 670 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-1657 | Kirkland_Manholes-912 | 277.93 | Kirkland_Manholes-913 | 274.64 | 100.2 | 3.28 | 8 | PVC | 0.01 | 1,277 | 33 | 107 | 140 | 11 | | |
| Kirkland_Main-1658 | Kirkland_Manholes-913 | 274.64 | Kirkland_Manholes-917 | 265.16 | 288.9 | 3.28 | 8 | PVC | 0.01 | 1,277 | 35 | 112 | 146 | 11.5 | | |
| Kirkland_Main-1659 | Kirkland_Manholes-890 | 280.21 | Kirkland_Manholes-914 | 274.6 | 210.2 | 2.67 | 8 | PVC | 0.01 | 1,152 | 46 | 124 | 170 | 14.8 | | |
| Kirkland_Main-1660 | Kirkland_Manholes-914 | 274.6 | Kirkland_Manholes-915 | 272.06 | 86.6 | 2.93 | 8 | PVC | 0.01 | 1,207 | 50 | 137 | 187 | 15.5 | | |
| Kirkland_Main-1661 | Kirkland_Manholes-915 | 272.06 | Kirkland_Manholes-916 | 270.65 | 45.7 | 3.08 | 8 | PVC | 0.01 | 1,238 | 51 | 142 | 193 | 15.5 | | |
| Kirkland_Main-1662 | Kirkland_Manholes-627 | 275.98 | Kirkland_Manholes-914 | 274.6 | 212.1 | 0.65 | 8 | PVC | 0.01 | 569 | 3 | 9 | 12 | 2.1 | | |
| Kirkland_Main-1663 | Kirkland_Manholes-916 | 270.65 | Kirkland_Manholes-917 | 265.16 | 154.3 | 3.56 | 8 | PVC | 0.01 | 1,330 | 52 | 146 | 198 | 14.9 | | |
| Kirkland_Main-1664 | Kirkland_Manholes-917 | 265.16 | Kirkland_Manholes-918 | 264.4 | 332.4 | 0.23 | 12 | PVC | 0.01 | 994 | 88 | 266 | 354 | 35.6 | SM14-Ex-EX136 | |
| Kirkland_Main-1665 | Kirkland_Manholes-918 | 264.4 | Kirkland_Manholes-919 | 263.89 | 50.1 | 1.02 | 12 | PVC | 0.01 | 2,097 | 89 | 270 | 359 | 17.1 | SM14-Ex-EX136 | |
| Kirkland_Main-1666 | Kirkland_Manholes-919 | 263.89 | Kirkland_Manholes-920 | 263.16 | 175.4 | 0.42 | 12 | PVC | 0.01 | 1,341 | 90 | 275 | 365 | 27.2 | SM14-Ex-EX136 | |
| Kirkland_Main-1667 | Kirkland_Manholes-687 | 264 | Kirkland_Manholes-921 | 262.87 | 223.9 | 0.5 | 8 | PVC | 0.01 | 501 | 5 | 13 | 18 | 3.6 | | |
| Kirkland_Main-1668 | Kirkland_Manholes-920 | 263.16 | Kirkland_Manholes-921 | 262.87 | 116.1 | 0.25 | 12 | PVC | 0.01 | 1,039 | 91 | 279 | 370 | 35.6 | SM14-Ex-EX136 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1669 | Kirkland_Manholes-2064 | 426.84 | Kirkland_Manholes-2670 | 399.73 | 295.3 | 9.18 | 8 | PVC | 0.01 | 2,136 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1670 | Kirkland_Manholes-921 | 262.87 | Kirkland_Manholes-940 | 262.57 | 126.3 | 0.24 | 12 | PVC | 0.01 | 1,013 | 96 | 296 | 393 | 38.8 | SM14-Ex-EX136 | |
| Kirkland_Main-1671 | Kirkland_Manholes-940 | 262.57 | Kirkland_Manholes-939 | 261.56 | 302.2 | 0.33 | 12 | PVC | 0.01 | 1,200 | 101 | 300 | 401 | 33.4 | SM14-Ex-EX136 | |
| Kirkland_Main-1672 | Kirkland_Manholes-939 | 261.56 | Kirkland_Manholes-938 | 261.15 | 139.9 | 0.29 | 12 | PVC | 0.01 | 1,125 | 102 | 305 | 407 | 36.1 | SM14-Ex-EX136 | Drop Connection |
| Kirkland_Main-1673 | Kirkland_Manholes-925 | 289.69 | Kirkland_Manholes-924 | 268.15 | 361.6 | 5.96 | 8 | PVC | 0.01 | 1,721 | 22 | 64 | 86 | 5 | | |
| Kirkland_Main-1674 | Kirkland_Manholes-924 | 268.15 | Kirkland_Manholes-923 | 268.09 | 97.9 | 0.06 | 15 | PVC | 0.01 | 933 | 199 | 528 | 727 | 77.9 | SM14-Ex-EX138 | |
| Kirkland_Main-1675 | Kirkland_Manholes-922 | 269.99 | Kirkland_Manholes-923 | 268.09 | 235 | 0.81 | 8 | PVC | 0.01 | 634 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-1676 | Kirkland_Manholes-923 | 268.09 | Kirkland_Manholes-929 | 267.98 | 60 | 0.18 | 15 | PVC | 0.01 | 1,614 | 201 | 537 | 737 | 45.7 | SM14-2035-DF10 | |
| Kirkland_Main-1678 | Kirkland_Manholes-927 | 307.71 | Kirkland_Manholes-926 | 302.74 | 56.6 | 8.77 | 8 | PVC | 0.01 | 2,089 | 8 | 9 | 16 | 0.8 | | |
| Kirkland_Main-1679 | Kirkland_Manholes-926 | 302.74 | Kirkland_Manholes-925 | 289.69 | 296 | 4.41 | 8 | PVC | 0.01 | 1,481 | 21 | 60 | 81 | 5.5 | | |
| Kirkland_Main-1680 | Kirkland_Manholes-928 | 294.43 | Kirkland_Manholes-930 | 277.33 | 346.1 | 4.94 | 8 | PVC | 0.01 | 1,567 | 3 | 4 | 8 | 0.5 | | |
| Kirkland_Main-1681 | Kirkland_Manholes-930 | 277.33 | Kirkland_Manholes-929 | 267.98 | 33.8 | 27.65 | 8 | PVC | 0.01 | 3,707 | 5 | 9 | 13 | 0.4 | | |
| Kirkland_Main-1682 | Kirkland_Manholes-933 | 269.3 | Kirkland_Manholes-932 | 267 | 200 | 1.15 | 8 | PVC | 0.01 | 756 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-1683 | Kirkland_Manholes-929 | 267.98 | Kirkland_Manholes-931 | 267.3 | 153.6 | 0.44 | 12 | PVC | 0.01 | 1,383 | 206 | 549 | 756 | 54.6 | | |
| Kirkland_Main-1684 | Kirkland_Manholes-931 | 267.3 | Kirkland_Manholes-932 | 267 | 103.9 | 0.29 | 12 | PVC | 0.01 | 1,117 | 207 | 554 | 761 | 68.1 | | |
| Kirkland_Main-1685 | Kirkland_Manholes-932 | 267 | Kirkland_Manholes-934 | 266.31 | 201.7 | 0.34 | 12 | PVC | 0.01 | 1,216 | 211 | 562 | 773 | 63.6 | | |
| Kirkland_Main-1686 | Kirkland_Manholes-950 | 293.99 | Kirkland_Manholes-934 | 266.31 | 270.7 | 10.22 | 8 | PVC | 0.01 | 2,254 | 12 | 34 | 46 | 2 | | |
| Kirkland_Main-1688 | Kirkland_Manholes-934 | 266.31 | Kirkland_Manholes-935 | 265.1 | 223.8 | 0.54 | 12 | PVC | 0.01 | 1,529 | 224 | 601 | 825 | 54 | | |
| Kirkland_Main-1689 | Kirkland_Manholes-937 | 264.43 | Kirkland_Manholes-938 | 264.12 | 49.3 | 0.62 | 12 | PVC | 0.01 | 1,641 | 238 | 657 | 895 | 54.6 | | Drop Connection |
| Kirkland_Main-1690 | Kirkland_Manholes-936 | 264.57 | Kirkland_Manholes-937 | 264.43 | 21.7 | 0.66 | 12 | PVC | 0.01 | 1,686 | 227 | 610 | 836 | 49.6 | | |
| Kirkland_Main-1691 | Kirkland_Manholes-935 | 265.1 | Kirkland_Manholes-936 | 264.57 | 71.3 | 0.74 | 12 | PVC | 0.01 | 1,788 | 226 | 605 | 832 | 46.5 | | |
| Kirkland_Main-1692 | Kirkland_Manholes-938 | 257.09 | Kirkland_Manholes-666 | 254.95 | 392.8 | 0.55 | 15 | PVC | 0.01 | 2,784 | 341 | 966 | 1,307 | 47 | | |
| Kirkland_Main-1693 | Kirkland_Manholes-941 | 287.52 | Kirkland_Manholes-937 | 264.43 | 281.4 | 8.21 | 8 | PVC | 0.01 | 2,020 | 11 | 43 | 54 | 2.7 | | |
| Kirkland_Main-1694 | Kirkland_Manholes-942 | 300.01 | Kirkland_Manholes-941 | 287.52 | 399.1 | 3.13 | 8 | PVC | 0.01 | 1,247 | 10 | 39 | 48 | 3.9 | | |
| Kirkland_Main-1695 | Kirkland_Manholes-943 | 306.11 | Kirkland_Manholes-944 | 304.9 | 190.1 | 0.64 | 8 | PVC | 0.01 | 563 | 2 | 4 | 6 | 1 | SM14-Ex-EX137 | |
| Kirkland_Main-1696 | Kirkland_Manholes-946 | 335.98 | Kirkland_Manholes-945 | 330.63 | 152.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1697 | Kirkland_Manholes-945 | 330.63 | Kirkland_Manholes-944 | 304.9 | 238 | 10.81 | 8 | PVC | 0.01 | 2,318 | 3 | 9 | 12 | 0.5 | | |
| Kirkland_Main-1698 | Kirkland_Manholes-947 | 299.2 | Kirkland_Manholes-948 | 296.38 | 132 | 2.14 | 8 | PVC | 0.01 | 1,031 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX137 | |
| Kirkland_Main-1699 | Kirkland_Manholes-944 | 304.9 | Kirkland_Manholes-948 | 296.38 | 218.3 | 3.9 | 8 | PVC | 0.01 | 1,393 | 6 | 17 | 23 | 1.7 | SM14-Ex-EX137 | |
| Kirkland_Main-1701 | Kirkland_Manholes-949 | 295.21 | Kirkland_Manholes-950 | 293.99 | 49 | 2.49 | 8 | PVC | 0.01 | 1,112 | 10 | 30 | 40 | 3.6 | | |
| Kirkland_Main-1702 | Kirkland_Manholes-948 | 296.38 | Kirkland_Manholes-949 | 295.21 | 143.9 | 0.81 | 8 | PVC | 0.01 | 636 | 9 | 26 | 35 | 5.5 | SM14-Ex-EX137 | |
| Kirkland_Main-1703 | Kirkland_Manholes-951 | 321.2 | Kirkland_Manholes-942 | 300.01 | 232.8 | 9.1 | 8 | PVC | 0.01 | 2,127 | 2 | 9 | 11 | 0.5 | | |
| Kirkland_Main-1704 | Kirkland_Manholes-952 | 325.62 | Kirkland_Manholes-951 | 321.2 | 323.7 | 1.37 | 8 | PVC | 0.01 | 824 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-1705 | Kirkland_Manholes-953 | 318.51 | Kirkland_Manholes-954 | 318.45 | 75.8 | 0.08 | 8 | PVC | 0.01 | 198 | 1 | 4 | 6 | 2.8 | | |
| Kirkland_Main-1706 | Kirkland_Manholes-954 | 318.45 | Kirkland_Manholes-955 | 318.15 | 133.7 | 0.22 | 8 | PVC | 0.01 | 334 | 2 | 9 | 11 | 3.2 | | |
| Kirkland_Main-1707 | Kirkland_Manholes-1546 | 284.43 | Kirkland_Manholes-1545 | 272.4 | 160.7 | 7.49 | 8 | PVC | 0.01 | 1,929 | 12 | 43 | 55 | 2.9 | SM14-Ex-EX121 | |
| Kirkland_Main-1708 | Kirkland_Manholes-750 | 289.43 | Kirkland_Manholes-1546 | 284.43 | 152.8 | 3.27 | 8 | PVC | 0.01 | 1,275 | 3 | 9 | 12 | 0.9 | SM14-Ex-EX121 | |
| Kirkland_Main-1709 | Kirkland_Manholes-1553 | 308.15 | Kirkland_Manholes-1546 | 284.43 | 340 | 6.98 | 8 | PVC | 0.01 | 1,862 | 8 | 30 | 39 | 2.1 | SM14-Ex-EX122 | |
| Kirkland_Main-1710 | Kirkland_Manholes-751 | 298.52 | Kirkland_Manholes-750 | 289.43 | 402.2 | 2.26 | 8 | PVC | 0.01 | 1,060 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX121 | |
| Kirkland_Main-1711 | Kirkland_Manholes-748 | 311.92 | Kirkland_Manholes-752 | 265.45 | 362.2 | 12.83 | 8 | PVC | 0.01 | 2,525 | 26 | 60 | 86 | 3.4 | SM14-Ex-EX71 | |
| Kirkland_Main-1712 | Kirkland_Manholes-753 | 247.15 | Kirkland_Manholes-754 | 246.56 | 209.3 | 0.28 | 8 | PVC | 0.01 | 374 | 3 | 4 | 7 | 1.9 | | |
| Kirkland_Main-1713 | Kirkland_Manholes-1355 | 420.81 | Kirkland_Manholes-1357 | 417.32 | 183.1 | 1.91 | 8 | PVC | 0.01 | 973 | 16 | 39 | 54 | 5.6 | | |
| Kirkland_Main-1714 | Kirkland_Manholes-1356 | 418.13 | Kirkland_Manholes-1357 | 417.32 | 41.8 | 1.94 | 8 | PVC | 0.01 | 981 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX180 | |
| Kirkland_Main-1715 | Kirkland_Manholes-1357 | 417.32 | Kirkland_Manholes-1358 | 410.38 | 295.5 | 2.35 | 8 | PVC | 0.01 | 1,080 | 19 | 47 | 66 | 6.1 | SM14-Ex-EX180 | |
| Kirkland_Main-1716 | Kirkland_Manholes-1358 | 410.38 | Kirkland_Manholes-1359 | 407.6 | 322.3 | 0.86 | 8 | PVC | 0.01 | 655 | 21 | 52 | 72 | 11 | SM14-Ex-EX180 | |
| Kirkland_Main-1717 | Kirkland_Manholes-1359 | 407.6 | Kirkland_Manholes-1364 | 404.91 | 317.2 | 0.85 | 8 | PVC | 0.01 | 649 | 23 | 56 | 79 | 12.2 | SM14-Ex-EX180 | |
| Kirkland_Main-1718 | Kirkland_Manholes-1360 | 392.45 | Kirkland_Manholes-1361 | 390.34 | 26.4 | 7.99 | 8 | PVC | 0.01 | 1,993 | 11 | 21 | 32 | 1.6 | SM14-Ex-EX179 | |
| Kirkland_Main-1719 | Kirkland_Manholes-1361 | 390.34 | Kirkland_Manholes-1371 | 389.7 | 160.2 | 0.4 | 8 | PVC | 0.01 | 446 | 36 | 86 | 122 | 27.3 | | Drop Connection |
| Kirkland_Main-1720 | Kirkland_Manholes-1365 | 376.9 | Kirkland_Manholes-1371 | 376.15 | 121.9 | 0.62 | 8 | PVC | 0.01 | 553 | 57 | 90 | 147 | 26.6 | | |
| Kirkland_Main-1721 | Kirkland_Manholes-1366 | 377.95 | Kirkland_Manholes-1365 | 376.9 | 166.8 | 0.63 | 8 | PVC | 0.01 | 559 | 57 | 86 | 142 | 25.5 | | |
| Kirkland_Main-1722 | Kirkland_Manholes-1364 | 404.91 | Kirkland_Manholes-1361 | 390.34 | 354.3 | 4.11 | 8 | PVC | 0.01 | 1,430 | 25 | 60 | 85 | 6 | SM14-Ex-EX180 | |
| Kirkland_Main-1723 | Kirkland_Manholes-1362 | 399.37 | Kirkland_Manholes-1360 | 392.45 | 312.9 | 2.21 | 8 | PVC | 0.01 | 1,049 | 7 | 17 | 24 | 2.3 | SM14-Ex-EX179 | |
| Kirkland_Main-1724 | Kirkland_Manholes-1363 | 403.55 | Kirkland_Manholes-1362 | 399.37 | 238 | 1.76 | 8 | PVC | 0.01 | 934 | 5 | 13 | 18 | 1.9 | SM14-Ex-EX179 | |
| Kirkland_Main-1726 | Kirkland_Manholes-1367 | 392.51 | Kirkland_Manholes-1906 | 388.2 | 267.7 | 1.61 | 8 | PVC | 0.01 | 895 | 9 | 4 | 13 | 1.5 | | |
| Kirkland_Main-1727 | Kirkland_Manholes-1368 | 393.26 | Kirkland_Manholes-1369 | 387.01 | 105.4 | 5.93 | 8 | PVC | 0.01 | 1,717 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX178 | |
| Kirkland_Main-1728 | Kirkland_Manholes-1369 | 387.01 | Kirkland_Manholes-1370 | 385.7 | 133.5 | 0.98 | 8 | PVC | 0.01 | 698 | 2 | 9 | 10 | 1.5 | SM14-Ex-EX178 | |
| Kirkland_Main-1729 | Kirkland_Manholes-1370 | 385.7 | Kirkland_Manholes-1371 | 376.15 | 179.2 | 5.33 | 8 | PVC | 0.01 | 1,628 | 2 | 13 | 15 | 0.9 | SM14-Ex-EX178 | |
| Kirkland_Main-1730 | Kirkland_Manholes-534 | 432.55 | Kirkland_Manholes-1372 | 427.9 | 355.1 | 1.31 | 8 | PVC | 0.01 | 807 | 75 | 150 | 226 | 28 | SM14-Ex-EX218 | |
| Kirkland_Main-1731 | Kirkland_Manholes-560 | 483.4 | Kirkland_Manholes-561 | 481.3 | 94.5 | 2.22 | 8 | PVC | 0.01 | 1,051 | 4 | 9 | 12 | 1.2 | | |
| Kirkland_Main-1733 | Kirkland_Manholes-561 | 481.3 | Kirkland_Manholes-1374 | 479.93 | 141.7 | 0.97 | 8 | PVC | 0.01 | 693 | 5 | 13 | 18 | 2.6 | | |
| Kirkland_Main-1734 | Kirkland_Manholes-1376 | 483.23 | Kirkland_Manholes-1375 | 479.6 | 272.8 | 1.33 | 8 | PVC | 0.01 | 813 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-1735 | Kirkland_Manholes-1375 | 479.6 | Kirkland_Manholes-1377 | 478.89 | 93.1 | 0.76 | 8 | PVC | 0.01 | 616 | 9 | 26 | 35 | 5.7 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1736 | Kirkland_Manholes-1377 | 478.89 | Kirkland_Manholes-1378 | 472.9 | 259 | 2.31 | 8 | PVC | 0.01 | 1,072 | 11 | 30 | 41 | 3.9 | | |
| Kirkland_Main-1737 | Kirkland_Manholes-1378 | 472.9 | Kirkland_Manholes-1379 | 471.21 | 302 | 0.56 | 8 | PVC | 0.01 | 527 | 15 | 34 | 50 | 9.4 | | |
| Kirkland_Main-1738 | Kirkland_Manholes-1374 | 479.93 | Kirkland_Manholes-1375 | 479.6 | 219.3 | 0.15 | 8 | PVC | 0.01 | 274 | 6 | 17 | 23 | 8.4 | | |
| Kirkland_Main-1739 | Kirkland_Manholes-1379 | 471.21 | Kirkland_Manholes-564 | 469.28 | 271.7 | 0.71 | 8 | PVC | 0.01 | 594 | 17 | 39 | 55 | 9.3 | | |
| Kirkland_Main-1740 | Kirkland_Manholes-340 | 235.81 | Kirkland_Manholes-341 | 235.59 | 47.2 | 0.47 | 8 | PVC | 0.01 | 482 | 29 | 86 | 115 | 23.8 | | |
| Kirkland_Main-1741 | Kirkland_Manholes-341 | 235.59 | Kirkland_Manholes-342 | 234.97 | 31.7 | 1.95 | 8 | PVC | 0.01 | 986 | 39 | 137 | 176 | 17.9 | SM14-Ex-EX49 | |
| Kirkland_Main-1742 | Kirkland_Manholes-342 | 234.97 | Kirkland_Manholes-351 | 234.93 | 111.2 | 0.04 | 12 | PVC | 0.01 | 394 | 39 | 142 | 181 | 45.9 | SM14-Ex-EX49 | |
| Kirkland_Main-1743 | Kirkland_Manholes-345 | 279.43 | Kirkland_Manholes-344 | 279.2 | 57.3 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 9 | 15 | 3.3 | | |
| Kirkland_Main-1744 | Kirkland_Manholes-344 | 279.2 | Kirkland_Manholes-346 | 254.2 | 328.7 | 7.61 | 8 | PVC | 0.01 | 1,944 | 8 | 13 | 21 | 1.1 | | |
| Kirkland_Main-1745 | Kirkland_Manholes-346 | 254.2 | Kirkland_Manholes-347 | 250.02 | 240.3 | 1.74 | 8 | PVC | 0.01 | 930 | 10 | 17 | 27 | 2.9 | | |
| Kirkland_Main-1746 | Kirkland_Manholes-348 | 251.65 | Kirkland_Manholes-347 | 250.02 | 50.6 | 3.22 | 8 | PVC | 0.01 | 1,266 | 2 | 4 | 7 | 0.5 | | |
| Kirkland_Main-1747 | Kirkland_Manholes-347 | 250.02 | Kirkland_Manholes-349 | 238.18 | 204.7 | 5.78 | 8 | PVC | 0.01 | 1,695 | 14 | 26 | 39 | 2.3 | | |
| Kirkland_Main-1748 | Kirkland_Manholes-349 | 238.18 | Kirkland_Manholes-350 | 235.63 | 111.7 | 2.28 | 8 | PVC | 0.01 | 1,065 | 15 | 30 | 45 | 4.2 | | |
| Kirkland_Main-1749 | Kirkland_Manholes-1666 | 89.71 | Kirkland_Manholes-1673 | 84.18 | 111.9 | 4.94 | 8 | PVC | 0.01 | 1,568 | 60 | 149 | 209 | 13.3 | | |
| Kirkland_Main-1750 | Kirkland_Manholes-1672 | 91.63 | Kirkland_Manholes-1666 | 89.71 | 163.9 | 1.17 | 8 | PVC | 0.01 | 763 | 2 | 8 | 10 | 1.3 | | |
| Kirkland_Main-1751 | Kirkland_Manholes-1671 | 101.9 | Kirkland_Manholes-1667 | 101.23 | 167.6 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 8 | 15 | 3.3 | | |
| Kirkland_Main-1752 | Kirkland_Manholes-1669 | 132.92 | Kirkland_Manholes-1668 | 119.52 | 315.3 | 4.25 | 8 | PVC | 0.01 | 1,454 | 4 | 8 | 13 | 0.9 | | |
| Kirkland_Main-1753 | Kirkland_Manholes-1670 | 121.1 | Kirkland_Manholes-1668 | 119.52 | 161.1 | 0.98 | 8 | PVC | 0.01 | 698 | 4 | 8 | 12 | 1.7 | | |
| Kirkland_Main-1754 | Kirkland_Manholes-1673 | 84.18 | Kirkland_Manholes-1674 | 78.95 | 158.5 | 3.3 | 8 | PVC | 0.01 | 1,281 | 61 | 157 | 218 | 17 | | |
| Kirkland_Main-1755 | Kirkland_Manholes-1677 | 88.12 | Kirkland_Manholes-1674 | 87.91 | 51.7 | 0.4 | 8 | PVC | 0.01 | 446 | 27 | 41 | 69 | 15.4 | | Drop Connection |
| Kirkland_Main-1756 | Kirkland_Manholes-1675 | 105.24 | Kirkland_Manholes-1676 | 98.96 | 116.6 | 5.39 | 8 | PVC | 0.01 | 1,636 | 5 | 8 | 13 | 0.8 | | |
| Kirkland_Main-1757 | Kirkland_Manholes-859 | 309.2 | Kirkland_Manholes-865 | 308.29 | 290.7 | 0.31 | 8 | PVC | 0.01 | 394 | 27 | 82 | 108 | 27.5 | SM14-Ex-EX51 | |
| Kirkland_Main-1758 | Kirkland_Manholes-860 | 317.71 | Kirkland_Manholes-859 | 309.2 | 202.9 | 4.19 | 8 | PVC | 0.01 | 1,444 | 22 | 73 | 95 | 6.6 | SM14-Ex-EX52 | |
| Kirkland_Main-1759 | Kirkland_Manholes-861 | 327.02 | Kirkland_Manholes-860 | 317.71 | 236.9 | 3.93 | 8 | PVC | 0.01 | 1,398 | 20 | 69 | 88 | 6.3 | SM14-Ex-EX52 | |
| Kirkland_Main-1760 | Kirkland_Manholes-856 | 333.21 | Kirkland_Manholes-861 | 327.02 | 162.2 | 3.82 | 8 | PVC | 0.01 | 1,377 | 18 | 64 | 82 | 6 | SM14-Ex-EX52 | |
| Kirkland_Main-1761 | Kirkland_Manholes-862 | 335.56 | Kirkland_Manholes-856 | 333.21 | 185.2 | 1.27 | 8 | PVC | 0.01 | 794 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX53 | |
| Kirkland_Main-1762 | Kirkland_Manholes-2254 | 240.28 | Kirkland_Manholes-2253 | 239.74 | 205.7 | 0.26 | 8 | PVC | 0.01 | 361 | 0 | 4 | 5 | 1.3 | SM14-Ex-EX247 | |
| Kirkland_Main-1763 | Kirkland_Manholes-863 | 341.24 | Kirkland_Manholes-864 | 334.74 | 171.5 | 3.79 | 8 | PVC | 0.01 | 1,373 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX50 | |
| Kirkland_Main-1764 | Kirkland_Manholes-864 | 334.74 | Kirkland_Manholes-865 | 308.29 | 391.4 | 6.76 | 8 | PVC | 0.01 | 1,833 | 4 | 9 | 13 | 0.7 | SM14-Ex-EX50 | |
| Kirkland_Main-1765 | Kirkland_Manholes-866 | 314.35 | Kirkland_Manholes-865 | 308.29 | 226.5 | 2.68 | 8 | PVC | 0.01 | 1,153 | 10 | 30 | 40 | 3.5 | SM14-Ex-EX35 | |
| Kirkland_Main-1766 | Kirkland_Manholes-865 | 308.29 | Kirkland_Manholes-392 | 305 | 233.2 | 1.41 | 8 | PVC | 0.01 | 837 | 43 | 124 | 168 | 20.1 | SM14-Ex-EX50 | |
| Kirkland_Main-1767 | Kirkland_Manholes-867 | 319 | Kirkland_Manholes-866 | 314.35 | 119.3 | 3.9 | 8 | PVC | 0.01 | 1,392 | 8 | 26 | 34 | 2.4 | SM14-Ex-EX35 | |
| Kirkland_Main-1768 | Kirkland_Manholes-868 | 321.84 | Kirkland_Manholes-867 | 319 | 90.7 | 3.13 | 8 | PVC | 0.01 | 1,247 | 7 | 21 | 29 | 2.3 | SM14-Ex-EX35 | |
| Kirkland_Main-1769 | Kirkland_Manholes-869 | 325.94 | Kirkland_Manholes-868 | 321.84 | 101.3 | 4.05 | 8 | PVC | 0.01 | 1,418 | 6 | 17 | 23 | 1.7 | SM14-Ex-EX35 | |
| Kirkland_Main-1770 | Kirkland_Manholes-870 | 327.4 | Kirkland_Manholes-869 | 325.94 | 99.3 | 1.47 | 8 | PVC | 0.01 | 855 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX35 | |
| Kirkland_Main-1771 | Kirkland_Manholes-871 | 340.54 | Kirkland_Manholes-872 | 339.98 | 74.2 | 0.75 | 8 | PVC | 0.01 | 612 | 1 | 4 | 6 | 0.9 | SM14-Ex-EX35 | |
| Kirkland_Main-1772 | Kirkland_Manholes-872 | 339.98 | Kirkland_Manholes-869 | 325.94 | 265.2 | 5.29 | 8 | PVC | 0.01 | 1,622 | 3 | 9 | 12 | 0.7 | SM14-Ex-EX35 | |
| Kirkland_Main-1773 | Kirkland_Manholes-874 | 310.68 | Kirkland_Manholes-382 | 308.23 | 108.1 | 2.27 | 8 | PVC | 0.01 | 1,062 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-1774 | Kirkland_Manholes-875 | 310.4 | Kirkland_Manholes-1073 | 302.05 | 254.5 | 3.28 | 8 | PVC | 0.01 | 1,277 | 3 | 4 | 8 | 0.6 | | |
| Kirkland_Main-1775 | Kirkland_Manholes-2900 | 302.3 | Kirkland_Manholes-876 | 301.25 | 160.8 | 0.65 | 8 | PVC | 0.01 | 570 | 12 | 43 | 55 | 9.7 | | |
| Kirkland_Main-1776 | Kirkland_Manholes-876 | 301.25 | Kirkland_Manholes-337 | 291.09 | 336.8 | 3.02 | 8 | PVC | 0.01 | 1,225 | 18 | 64 | 83 | 6.8 | | |
| Kirkland_Main-1777 | Kirkland_Manholes-877 | 295.2 | Kirkland_Manholes-884 | 291.06 | 114.3 | 3.62 | 8 | PVC | 0.01 | 1,342 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1778 | Kirkland_Manholes-884 | 291.06 | Kirkland_Manholes-881 | 290.87 | 47 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 13 | 17 | 3.9 | | |
| Kirkland_Main-1779 | Kirkland_Manholes-705 | 293.8 | Kirkland_Manholes-884 | 291.06 | 213.2 | 1.29 | 8 | PVC | 0.01 | 800 | 2 | 4 | 7 | 0.8 | | |
| Kirkland_Main-1780 | Kirkland_Manholes-881 | 290.87 | Kirkland_Manholes-885 | 286.75 | 194.6 | 2.12 | 8 | PVC | 0.01 | 1,026 | 21 | 64 | 86 | 8.3 | | |
| Kirkland_Main-1781 | Kirkland_Manholes-880 | 294.11 | Kirkland_Manholes-881 | 290.87 | 199.3 | 1.63 | 8 | PVC | 0.01 | 899 | 16 | 47 | 63 | 7 | | |
| Kirkland_Main-1782 | Kirkland_Manholes-879 | 310.92 | Kirkland_Manholes-880 | 294.11 | 360 | 4.67 | 8 | PVC | 0.01 | 1,524 | 14 | 43 | 57 | 3.8 | | |
| Kirkland_Main-1783 | Kirkland_Manholes-878 | 325.66 | Kirkland_Manholes-879 | 310.92 | 320.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 12 | 39 | 50 | 3.3 | | |
| Kirkland_Main-1784 | Kirkland_Manholes-886 | 291.6 | Kirkland_Manholes-885 | 286.75 | 178.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 5 | 13 | 18 | 1.6 | | |
| Kirkland_Main-1785 | Kirkland_Manholes-887 | 294.74 | Kirkland_Manholes-886 | 291.6 | 177.9 | 1.77 | 8 | PVC | 0.01 | 937 | 4 | 9 | 13 | 1.3 | | |
| Kirkland_Main-1786 | Kirkland_Manholes-888 | 307.6 | Kirkland_Manholes-887 | 294.74 | 260 | 4.95 | 8 | PVC | 0.01 | 1,568 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1788 | Kirkland_Manholes-885 | 286.75 | Kirkland_Manholes-889 | 285.3 | 34.9 | 4.16 | 8 | PVC | 0.01 | 1,437 | 27 | 82 | 109 | 7.6 | | |
| Kirkland_Main-1789 | Kirkland_Manholes-336 | 286.9 | Kirkland_Manholes-889 | 285.3 | 212.5 | 0.75 | 8 | PVC | 0.01 | 612 | 2 | 4 | 7 | 1.1 | | |
| Kirkland_Main-1790 | Kirkland_Manholes-889 | 285.3 | Kirkland_Manholes-890 | 280.21 | 299.8 | 1.7 | 8 | PVC | 0.01 | 919 | 31 | 90 | 121 | 13.2 | | |
| Kirkland_Main-1791 | Kirkland_Manholes-891 | 282.85 | Kirkland_Manholes-890 | 280.21 | 269.2 | 0.98 | 8 | PVC | 0.01 | 698 | 13 | 30 | 43 | 6.2 | | |
| Kirkland_Main-1792 | Kirkland_Manholes-892 | 286 | Kirkland_Manholes-891 | 282.85 | 80.7 | 3.9 | 8 | PVC | 0.01 | 1,393 | 11 | 26 | 36 | 2.6 | | |
| Kirkland_Main-1793 | Kirkland_Manholes-895 | 303.91 | Kirkland_Manholes-896 | 303.5 | 71 | 0.58 | 8 | PVC | 0.01 | 536 | 1 | 4 | 6 | 1 | | |
| Kirkland_Main-1794 | Kirkland_Manholes-896 | 303.5 | Kirkland_Manholes-893 | 293.25 | 259.5 | 3.95 | 8 | PVC | 0.01 | 1,401 | 5 | 13 | 18 | 1.3 | | |
| Kirkland_Main-1795 | Kirkland_Manholes-894 | 293.53 | Kirkland_Manholes-893 | 293.25 | 69.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | |
| Kirkland_Main-1796 | Kirkland_Manholes-893 | 293.25 | Kirkland_Manholes-892 | 286 | 208.9 | 3.47 | 8 | PVC | 0.01 | 1,314 | 8 | 21 | 30 | 2.3 | | |
| Kirkland_Main-1797 | Kirkland_Manholes-897 | 317.07 | Kirkland_Manholes-896 | 303.5 | 263.1 | 5.16 | 8 | PVC | 0.01 | 1,601 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1798 | Kirkland_Manholes-955 | 318.15 | Kirkland_Manholes-956 | 317.42 | 90.2 | 0.81 | 8 | PVC | 0.01 | 634 | 2 | 13 | 15 | 2.4 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1799 | Kirkland_Manholes-956 | 317.42 | Kirkland_Manholes-957 | 315.92 | 143.6 | 1.04 | 8 | PVC | 0.01 | 720 | 4 | 17 | 21 | 2.9 | | |
| Kirkland_Main-1800 | Kirkland_Manholes-1294 | 129.1 | Kirkland_Manholes-1295 | 119.7 | 303.2 | 3.1 | 8 | PVC | 0.01 | 1,242 | 4 | 8 | 13 | 1 | SM14-Ex-EX115 | |
| Kirkland_Main-1801 | Kirkland_Manholes-1296 | 129.32 | Kirkland_Manholes-1295 | 119.7 | 314.4 | 3.06 | 8 | PVC | 0.01 | 1,233 | 93 | 297 | 390 | 31.7 | SM6 | |
| Kirkland_Main-1802 | Kirkland_Manholes-1301 | 241.1 | Kirkland_Manholes-1300 | 221.25 | 201.1 | 9.87 | 8 | PVC | 0.01 | 2,215 | 5 | 17 | 21 | 1 | SM14-Ex-EX98 | |
| Kirkland_Main-1803 | Kirkland_Manholes-1299 | 227.62 | Kirkland_Manholes-1300 | 221.25 | 159.1 | 4 | 8 | PVC | 0.01 | 1,411 | 3 | 8 | 11 | 0.8 | SM14-Ex-EX101 | |
| Kirkland_Main-1804 | Kirkland_Manholes-1300 | 221.25 | Kirkland_Manholes-1250 | 210.15 | 248.6 | 4.47 | 8 | PVC | 0.01 | 1,490 | 9 | 33 | 42 | 2.8 | SM14-Ex-EX101 | |
| Kirkland_Main-1805 | Kirkland_Manholes-1303 | 126.2 | Kirkland_Manholes-1295 | 119.7 | 386.9 | 1.68 | 8 | PVC | 0.01 | 914 | 4 | 8 | 12 | 1.3 | SM14-Ex-EX115 | |
| Kirkland_Main-1806 | Kirkland_Manholes-1304 | 180.12 | Kirkland_Manholes-1258 | 154.28 | 295.6 | 8.74 | 8 | PVC | 0.01 | 2,084 | 8 | 25 | 33 | 1.6 | SM14-Ex-EX106 | |
| Kirkland_Main-1807 | Kirkland_Manholes-1306 | 225.07 | Kirkland_Manholes-227 | 223.31 | 140.1 | 1.26 | 8 | PVC | 0.01 | 790 | 9 | 27 | 36 | 4.5 | | |
| Kirkland_Main-1808 | Kirkland_Manholes-1309 | 233.16 | Kirkland_Manholes-1308 | 229.72 | 344.3 | 1 | 8 | PVC | 0.01 | 705 | 2 | 8 | 10 | 1.4 | | |
| Kirkland_Main-1809 | Kirkland_Manholes-1308 | 229.72 | Kirkland_Manholes-1307 | 211.15 | 175.8 | 10.56 | 8 | PVC | 0.01 | 2,292 | 6 | 17 | 22 | 1 | | |
| Kirkland_Main-1810 | Kirkland_Manholes-1307 | 211.15 | Kirkland_Manholes-1252 | 181.71 | 226.9 | 12.97 | 8 | PVC | 0.01 | 2,540 | 10 | 25 | 34 | 1.4 | SM14-Ex-EX100 | |
| Kirkland_Main-1812 | Kirkland_Manholes-1275 | 185.58 | Kirkland_Manholes-1276 | 172.95 | 322.8 | 3.91 | 8 | PVC | 0.01 | 1,395 | 3 | 8 | 12 | 0.8 | | |
| Kirkland_Main-1813 | Kirkland_Manholes-1279 | 163.99 | Kirkland_Manholes-1278 | 160.09 | 249.2 | 1.56 | 8 | PVC | 0.01 | 882 | 7 | 25 | 32 | 3.6 | SM14-Ex-EX103 | |
| Kirkland_Main-1814 | Kirkland_Manholes-1597 | 180.84 | Kirkland_Manholes-1601 | 173.67 | 138.4 | 5.18 | 8 | PVC | 0.01 | 1,605 | 73 | 172 | 245 | 15.3 | SM14-Ex-EX121 | |
| Kirkland_Main-1815 | Kirkland_Manholes-1603 | 202.22 | Kirkland_Manholes-1602 | 196.74 | 63.2 | 8.68 | 8 | PVC | 0.01 | 2,077 | 92 | 245 | 337 | 16.2 | SM14-Ex-EX172 | |
| Kirkland_Main-1817 | Kirkland_Manholes-1570 | 121.83 | Kirkland_Manholes-1604 | 117.22 | 301 | 1.53 | 8 | PVC | 0.01 | 872 | 5 | 8 | 13 | 1.5 | SM14-Ex-EX120 | |
| Kirkland_Main-1818 | Kirkland_Manholes-1604 | 117.22 | Kirkland_Manholes-1608 | 108.38 | 320.2 | 2.76 | 8 | PVC | 0.01 | 1,171 | 12 | 50 | 62 | 5.3 | SM14-Ex-EX119 | |
| Kirkland_Main-1823 | Kirkland_Manholes-1607 | 115.82 | Kirkland_Manholes-1608 | 108.38 | 281.1 | 2.65 | 8 | PVC | 0.01 | 1,147 | 3 | 8 | 11 | 1 | | |
| Kirkland_Main-1824 | Kirkland_Manholes-1608 | 108.38 | Kirkland_Manholes-1609 | 99.56 | 224.5 | 3.93 | 8 | PVC | 0.01 | 1,397 | 16 | 66 | 82 | 5.8 | SM14-Ex-EX119 | |
| Kirkland_Main-1825 | Kirkland_Manholes-1609 | 99.56 | Kirkland_Manholes-1610 | 98.61 | 103.1 | 0.92 | 8 | PVC | 0.01 | 677 | 17 | 74 | 91 | 13.4 | SM14-Ex-EX119 | |
| Kirkland_Main-1826 | Kirkland_Manholes-1615 | 109.23 | Kirkland_Manholes-1610 | 98.61 | 252.9 | 4.2 | 8 | PVC | 0.01 | 1,445 | 5 | 17 | 21 | 1.5 | | |
| Kirkland_Main-1827 | Kirkland_Manholes-1610 | 98.61 | Kirkland_Manholes-1611 | 98.01 | 137.6 | 0.44 | 8 | PVC | 0.01 | 466 | 22 | 99 | 121 | 26.1 | SM14-Ex-EX160 | |
| Kirkland_Main-1828 | Kirkland_Manholes-1611 | 98.01 | Kirkland_Manholes-1614 | 91.09 | 116.4 | 5.94 | 8 | PVC | 0.01 | 1,719 | 23 | 107 | 130 | 7.6 | SM14-Ex-EX167 | |
| Kirkland_Main-1830 | Kirkland_Manholes-350 | 235.63 | Kirkland_Manholes-351 | 234.93 | 99 | 0.71 | 8 | PVC | 0.01 | 593 | 17 | 34 | 51 | 8.6 | | |
| Kirkland_Main-1831 | Kirkland_Manholes-351 | 234.93 | Kirkland_Manholes-352 | 234.2 | 197.8 | 0.37 | 8 | PVC | 0.01 | 428 | 57 | 180 | 237 | 55.3 | | |
| Kirkland_Main-1832 | Kirkland_Manholes-353 | 237.24 | Kirkland_Manholes-352 | 234.2 | 58.3 | 5.21 | 8 | PVC | 0.01 | 1,609 | 1 | 9 | 10 | 0.6 | | |
| Kirkland_Main-1833 | Kirkland_Manholes-354 | 240.05 | Kirkland_Manholes-353 | 237.24 | 111.3 | 2.52 | 8 | PVC | 0.01 | 1,120 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1834 | Kirkland_Manholes-355 | 245.23 | Kirkland_Manholes-357 | 224.18 | 289.7 | 7.27 | 8 | PVC | 0.01 | 1,901 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-1835 | Kirkland_Manholes-357 | 224.18 | Kirkland_Manholes-356 | 218.57 | 38.2 | 14.7 | 8 | PVC | 0.01 | 2,703 | 3 | 9 | 12 | 0.4 | | |
| Kirkland_Main-1836 | Kirkland_Manholes-356 | 218.57 | Kirkland_Manholes-358 | 217.4 | 168.8 | 0.69 | 21 | PVC | 0.01 | 7,697 | 832 | 2,082 | 2,914 | 37.9 | | |
| Kirkland_Main-1837 | Kirkland_Manholes-358 | 217.4 | Kirkland_Manholes-362 | 216.81 | 209.2 | 0.28 | 21 | PVC | 0.01 | 4,910 | 832 | 2,086 | 2,919 | 59.4 | | |
| Kirkland_Main-1838 | Kirkland_Manholes-365 | 215.67 | Kirkland_Manholes-366 | 214.9 | 145.3 | 0.53 | 8 | PVC | 0.01 | 513 | 1 | 4 | 6 | 1.1 | | |
| Kirkland_Main-1839 | Kirkland_Manholes-366 | 214.9 | Kirkland_Manholes-367 | 213.02 | 57.5 | 3.27 | 8 | PVC | 0.01 | 1,275 | 2 | 9 | 11 | 0.8 | | |
| Kirkland_Main-1840 | Kirkland_Manholes-364 | 215.51 | Kirkland_Manholes-367 | 213.02 | 231.6 | 1.07 | 18 | PVC | 0.01 | 6,354 | 850 | 2,146 | 2,996 | 47.1 | | |
| Kirkland_Main-1841 | Kirkland_Manholes-363 | 216.4 | Kirkland_Manholes-3048 | 215.92 | 195.5 | 0.25 | 21 | PVC | 0.01 | 4,581 | 840 | 2,108 | 2,948 | 64.3 | | |
| Kirkland_Main-1842 | Kirkland_Manholes-361 | 216.74 | Kirkland_Manholes-363 | 216.4 | 169.2 | 0.2 | 21 | PVC | 0.01 | 4,140 | 839 | 2,103 | 2,943 | 71.1 | | |
| Kirkland_Main-1843 | Kirkland_Manholes-359 | 233.48 | Kirkland_Manholes-360 | 230.84 | 309.4 | 0.85 | 8 | PVC | 0.01 | 651 | 3 | 4 | 8 | 1.2 | | |
| Kirkland_Main-1844 | Kirkland_Manholes-360 | 230.84 | Kirkland_Manholes-361 | 216.74 | 103.8 | 13.58 | 8 | PVC | 0.01 | 2,599 | 5 | 9 | 14 | 0.5 | | |
| Kirkland_Main-1845 | Kirkland_Manholes-400 | 274.94 | Kirkland_Manholes-399 | 268.35 | 106.2 | 6.21 | 8 | PVC | 0.01 | 1,757 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1846 | Kirkland_Manholes-399 | 268.35 | Kirkland_Manholes-394 | 266.89 | 274.5 | 0.53 | 8 | PVC | 0.01 | 514 | 4 | 9 | 12 | 2.4 | | |
| Kirkland_Main-1847 | Kirkland_Manholes-405 | 259.21 | Kirkland_Manholes-404 | 259.2 | 31.6 | 0.03 | 8 | PVC | 0.01 | 125 | 0 | 4 | 5 | 3.7 | | |
| Kirkland_Main-1848 | Kirkland_Manholes-404 | 259.2 | Kirkland_Manholes-403 | 257.79 | 99.7 | 1.41 | 8 | PVC | 0.01 | 839 | 1 | 9 | 10 | 1.2 | | |
| Kirkland_Main-1849 | Kirkland_Manholes-403 | 257.79 | Kirkland_Manholes-402 | 257.52 | 55.3 | 0.49 | 8 | PVC | 0.01 | 493 | 2 | 13 | 15 | 3 | | |
| Kirkland_Main-1850 | Kirkland_Manholes-402 | 257.52 | Kirkland_Manholes-401 | 256.8 | 97.3 | 0.74 | 8 | PVC | 0.01 | 607 | 3 | 17 | 20 | 3.3 | | |
| Kirkland_Main-1851 | Kirkland_Manholes-401 | 256.8 | Kirkland_Manholes-395 | 253.88 | 284.1 | 1.03 | 8 | PVC | 0.01 | 715 | 4 | 21 | 26 | 3.6 | | |
| Kirkland_Main-1852 | Kirkland_Manholes-406 | 288.66 | Kirkland_Manholes-393 | 288.03 | 160.6 | 0.39 | 8 | PVC | 0.01 | 442 | 3 | 4 | 7 | 1.6 | | |
| Kirkland_Main-1853 | Kirkland_Manholes-410 | 278.41 | Kirkland_Manholes-409 | 264.84 | 185.6 | 7.31 | 8 | PVC | 0.01 | 1,906 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1854 | Kirkland_Manholes-425 | 290.3 | Kirkland_Manholes-420 | 281.46 | 112.7 | 7.84 | 8 | PVC | 0.01 | 1,974 | 9 | 30 | 39 | 2 | | |
| Kirkland_Main-1855 | Kirkland_Manholes-370 | 206.64 | Kirkland_Manholes-2869 | 204.84 | 75.1 | 2.4 | 18 | PVC | 0.01 | 9,487 | 870 | 2,202 | 3,072 | 32.4 | | |
| Kirkland_Main-1856 | Kirkland_Manholes-436 | 58.61 | Kirkland_Manholes-437 | 58.56 | 24.6 | 0.22 | 15 | PVC | 0.01 | 1,769 | 326 | 674 | 1,000 | 56.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1857 | Kirkland_Manholes-437 | 58.56 | Kirkland_Manholes-188 | 58.06 | 273 | 0.18 | 15 | PVC | 0.01 | 1,613 | 332 | 687 | 1,019 | 63.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1858 | Kirkland_Manholes-450 | 130.07 | Kirkland_Manholes-448 | 127.19 | 147.1 | 1.96 | 8 | PVC | 0.01 | 987 | 8 | 18 | 26 | 2.6 | | |
| Kirkland_Main-1859 | Kirkland_Manholes-448 | 127.19 | Kirkland_Manholes-449 | 124.43 | 143 | 1.93 | 8 | PVC | 0.01 | 979 | 8 | 22 | 30 | 3.1 | | |
| Kirkland_Main-1860 | Kirkland_Manholes-449 | 124.43 | Kirkland_Manholes-446 | 123.86 | 143.4 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 27 | 35 | 7.9 | | Drop Connection |
| Kirkland_Main-1861 | Kirkland_Manholes-447 | 95.3 | Kirkland_Manholes-446 | 94.25 | 125.1 | 0.84 | 8 | PVC | 0.01 | 646 | 0 | 4 | 5 | 0.7 | | |
| Kirkland_Main-1862 | Kirkland_Manholes-445 | 128.4 | Kirkland_Manholes-444 | 92.89 | 173.2 | 20.5 | 8 | PVC | 0.01 | 3,192 | 0 | 4 | 5 | 0.1 | | |
| Kirkland_Main-1863 | Kirkland_Manholes-446 | 94.25 | Kirkland_Manholes-444 | 92.89 | 143.2 | 0.95 | 8 | PVC | 0.01 | 687 | 9 | 36 | 45 | 6.5 | | |
| Kirkland_Main-1864 | Kirkland_Manholes-1522 | 291.35 | Kirkland_Manholes-145 | 271.65 | 161.3 | 12.21 | 8 | PVC | 0.01 | 2,464 | 3 | 9 | 12 | 0.5 | | |
| Kirkland_Main-1865 | Kirkland_Manholes-145 | 271.65 | Kirkland_Manholes-1315 | 270.9 | 108.1 | 0.69 | 8 | PVC | 0.01 | 587 | 20 | 52 | 72 | 12.2 | | |
| Kirkland_Main-1866 | Kirkland_Manholes-1314 | 312.02 | Kirkland_Manholes-1522 | 291.35 | 177.8 | 11.62 | 8 | PVC | 0.01 | 2,404 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1867 | Kirkland_Manholes-1515 | 261.7 | Kirkland_Manholes-1516 | 259.7 | 167.2 | 1.2 | 8 | PVC | 0.01 | 771 | 50 | 159 | 209 | 27.1 | SM14-Ex-EX131 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1868 | Kirkland_Manholes-1516 | 259.7 | Kirkland_Manholes-1593 | 256.67 | 397.6 | 0.76 | 8 | PVC | 0.01 | 615 | 54 | 163 | 217 | 35.3 | SM14-Ex-EX131 | |
| Kirkland_Main-1869 | Kirkland_Manholes-1520 | 262.79 | Kirkland_Manholes-1517 | 262.15 | 299 | 0.21 | 8 | PVC | 0.01 | 326 | 2 | 4 | 6 | 2 | SM14-Ex-EX129 | |
| Kirkland_Main-1870 | Kirkland_Manholes-1518 | 277.88 | Kirkland_Manholes-1517 | 262.15 | 157.4 | 10 | 8 | PVC | 0.01 | 2,229 | 16 | 30 | 46 | 2.1 | SM14-Ex-EX124 | |
| Kirkland_Main-1871 | Kirkland_Manholes-1517 | 262.15 | Kirkland_Manholes-1592 | 255.76 | 316.1 | 2.02 | 8 | PVC | 0.01 | 1,002 | 20 | 39 | 58 | 5.8 | SM14-Ex-EX124 | |
| Kirkland_Main-1872 | Kirkland_Manholes-1519 | 265 | Kirkland_Manholes-1521 | 258.62 | 235.2 | 2.71 | 8 | PVC | 0.01 | 1,161 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX128 | |
| Kirkland_Main-1873 | Kirkland_Manholes-1521 | 258.62 | Kirkland_Manholes-1524 | 207.32 | 404.3 | 12.69 | 8 | PVC | 0.01 | 2,512 | 3 | 9 | 12 | 0.5 | SM14-Ex-EX128 | |
| Kirkland_Main-1874 | Kirkland_Manholes-1552 | 337.73 | Kirkland_Manholes-761 | 326.09 | 158.4 | 7.35 | 8 | PVC | 0.01 | 1,911 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX124 | |
| Kirkland_Main-1875 | Kirkland_Manholes-761 | 326.09 | Kirkland_Manholes-760 | 311.91 | 217.3 | 6.53 | 8 | PVC | 0.01 | 1,801 | 6 | 9 | 14 | 0.8 | SM14-Ex-EX124 | |
| Kirkland_Main-1876 | Kirkland_Manholes-760 | 311.91 | Kirkland_Manholes-1538 | 302.73 | 273.6 | 3.36 | 8 | PVC | 0.01 | 1,292 | 8 | 13 | 21 | 1.6 | SM14-Ex-EX124 | |
| Kirkland_Main-1877 | Kirkland_Manholes-1542 | 314.5 | Kirkland_Manholes-1541 | 294.69 | 208.5 | 9.5 | 8 | PVC | 0.01 | 2,173 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX123 | |
| Kirkland_Main-1878 | Kirkland_Manholes-1540 | 296.8 | Kirkland_Manholes-1541 | 294.69 | 76 | 2.78 | 8 | PVC | 0.01 | 1,175 | 5 | 9 | 13 | 1.1 | SM14-Ex-EX123 | |
| Kirkland_Main-1879 | Kirkland_Manholes-1539 | 301.51 | Kirkland_Manholes-1540 | 296.8 | 362.1 | 1.3 | 8 | PVC | 0.01 | 804 | 4 | 4 | 8 | 1 | SM14-Ex-EX123 | |
| Kirkland_Main-1880 | Kirkland_Manholes-1523 | 194.94 | Kirkland_Manholes-1597 | 180.84 | 315.7 | 4.47 | 8 | PVC | 0.01 | 1,490 | 63 | 155 | 217 | 14.6 | SM14-Ex-EX121 | |
| Kirkland_Main-1881 | Kirkland_Manholes-1524 | 207.32 | Kirkland_Manholes-1523 | 194.94 | 95.1 | 13.01 | 8 | PVC | 0.01 | 2,543 | 5 | 13 | 18 | 0.7 | SM14-Ex-EX128 | |
| Kirkland_Main-1882 | Kirkland_Manholes-1528 | 217.87 | Kirkland_Manholes-1523 | 194.94 | 317.2 | 7.23 | 8 | PVC | 0.01 | 1,896 | 56 | 137 | 194 | 10.2 | SM14-Ex-EX121 | |
| Kirkland_Main-1883 | Kirkland_Manholes-1525 | 281.6 | Kirkland_Manholes-1526 | 273.99 | 396.4 | 1.92 | 8 | PVC | 0.01 | 977 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX127 | |
| Kirkland_Main-1884 | Kirkland_Manholes-1526 | 273.99 | Kirkland_Manholes-1527 | 258.94 | 183.5 | 8.2 | 8 | PVC | 0.01 | 2,019 | 4 | 9 | 12 | 0.6 | SM14-Ex-EX127 | |
| Kirkland_Main-1885 | Kirkland_Manholes-1527 | 258.94 | Kirkland_Manholes-1528 | 217.87 | 397.7 | 10.33 | 8 | PVC | 0.01 | 2,266 | 6 | 13 | 19 | 0.8 | SM14-Ex-EX127 | |
| Kirkland_Main-1886 | Kirkland_Manholes-1535 | 304.79 | Kirkland_Manholes-1534 | 301.8 | 155.7 | 1.92 | 8 | PVC | 0.01 | 977 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX126 | |
| Kirkland_Main-1887 | Kirkland_Manholes-1534 | 301.8 | Kirkland_Manholes-1533 | 294.07 | 244.9 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 9 | 11 | 0.8 | SM14-Ex-EX126 | |
| Kirkland_Main-1888 | Kirkland_Manholes-775 | 172.73 | KC_Manholes-5 | 169.15 | 345.4 | 1.04 | 8 | PVC | 0.01 | 718 | 9 | 34 | 43 | 6 | | |
| Kirkland_Main-1889 | Kirkland_Manholes-774 | 192.94 | KC_Manholes-5 | 169.15 | 221.2 | 10.75 | 8 | PVC | 0.01 | 2,312 | 4 | 9 | 12 | 0.5 | | |
| Kirkland_Main-1890 | Kirkland_Manholes-773 | 227.51 | Kirkland_Manholes-774 | 192.94 | 170.2 | 20.31 | 8 | PVC | 0.01 | 3,177 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1891 | Kirkland_Manholes-772 | 214.68 | Kirkland_Manholes-771 | 213.99 | 63.9 | 1.08 | 8 | PVC | 0.01 | 733 | 1 | 4 | 6 | 0.8 | | |
| Kirkland_Main-1892 | Kirkland_Manholes-443 | 91.49 | Kirkland_Manholes-442 | 83.66 | 233.7 | 3.35 | 8 | PVC | 0.01 | 1,291 | 52 | 49 | 101 | 7.8 | | |
| Kirkland_Main-1893 | Kirkland_Manholes-442 | 83.66 | Kirkland_Manholes-441 | 83.38 | 212.8 | 0.13 | 8 | PVC | 0.01 | 256 | 52 | 54 | 106 | 41.3 | | |
| Kirkland_Main-1894 | Kirkland_Manholes-441 | 83.38 | Kirkland_Manholes-433 | 80.24 | 108 | 2.91 | 8 | PVC | 0.01 | 1,202 | 52 | 58 | 110 | 9.2 | | |
| Kirkland_Main-1895 | Kirkland_Manholes-432 | 97.11 | Kirkland_Manholes-433 | 80.24 | 205.7 | 8.2 | 12 | PVC | 0.01 | 5,954 | 184 | 375 | 559 | 9.4 | SM14-Ex-EX30 | |
| Kirkland_Main-1896 | Kirkland_Manholes-426 | 144.6 | Kirkland_Manholes-427 | 143.58 | 254.5 | 0.4 | 12 | PVC | 0.01 | 1,315 | 176 | 348 | 524 | 39.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1897 | Kirkland_Manholes-427 | 143.58 | Kirkland_Manholes-428 | 141.37 | 251.3 | 0.88 | 12 | PVC | 0.01 | 1,950 | 183 | 353 | 535 | 27.5 | SM14-Ex-EX30 | |
| Kirkland_Main-1898 | Kirkland_Manholes-428 | 141.37 | Kirkland_Manholes-429 | 138.12 | 320.6 | 1.01 | 12 | PVC | 0.01 | 2,093 | 183 | 357 | 540 | 25.8 | SM14-Ex-EX30 | |
| Kirkland_Main-1899 | Kirkland_Manholes-429 | 138.12 | Kirkland_Manholes-430 | 132.21 | 248.9 | 2.37 | 12 | PVC | 0.01 | 3,203 | 183 | 361 | 545 | 17 | SM14-Ex-EX30 | |
| Kirkland_Main-1900 | Kirkland_Manholes-430 | 132.21 | Kirkland_Manholes-431 | 114.37 | 310.4 | 5.75 | 12 | PVC | 0.01 | 4,983 | 184 | 366 | 550 | 11 | SM14-Ex-EX30 | |
| Kirkland_Main-1901 | Kirkland_Manholes-431 | 114.37 | Kirkland_Manholes-432 | 97.11 | 290.4 | 5.94 | 12 | PVC | 0.01 | 5,068 | 184 | 370 | 555 | 10.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1902 | Kirkland_Manholes-433 | 80.24 | Kirkland_Manholes-434 | 74.08 | 187.9 | 3.28 | 12 | PVC | 0.01 | 3,764 | 237 | 437 | 675 | 17.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1903 | Kirkland_Manholes-434 | 74.08 | Kirkland_Manholes-435 | 64.4 | 325.2 | 2.98 | 12 | PVC | 0.01 | 3,586 | 237 | 442 | 679 | 18.9 | SM14-Ex-EX30 | |
| Kirkland_Main-1904 | Kirkland_Manholes-439 | 82.56 | Kirkland_Manholes-438 | 74.46 | 270.1 | 3 | 8 | PVC | 0.01 | 1,221 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-1905 | Kirkland_Manholes-438 | 74.46 | Kirkland_Manholes-435 | 64.4 | 260.6 | 3.86 | 8 | PVC | 0.01 | 1,385 | 87 | 223 | 310 | 22.4 | SM14-Ex-EX31 | |
| Kirkland_Main-1906 | Kirkland_Manholes-435 | 64.4 | Kirkland_Manholes-436 | 58.61 | 312.5 | 1.85 | 12 | PVC | 0.01 | 2,828 | 325 | 669 | 995 | 35.2 | SM14-Ex-EX30 | |
| Kirkland_Main-1907 | Kirkland_Manholes-1018 | 179.75 | Kirkland_Manholes-451 | 173.02 | 146.6 | 4.59 | 8 | PVC | 0.01 | 1,511 | 75 | 179 | 253 | 16.8 | SM14-Ex-EX31 | |
| Kirkland_Main-1908 | Kirkland_Manholes-453 | 159.42 | Kirkland_Manholes-454 | 126.39 | 122.9 | 26.88 | 8 | PVC | 0.01 | 3,655 | 78 | 192 | 270 | 7.4 | SM14-Ex-EX31 | |
| Kirkland_Main-1909 | Kirkland_Manholes-440 | 131.78 | Kirkland_Manholes-454 | 126.39 | 361.7 | 1.49 | 8 | PVC | 0.01 | 861 | 7 | 18 | 25 | 2.9 | SM14-Ex-EX31 | |
| Kirkland_Main-1910 | Kirkland_Manholes-1026 | 149.27 | Kirkland_Manholes-440 | 131.78 | 156.8 | 11.16 | 8 | PVC | 0.01 | 2,355 | 7 | 13 | 20 | 0.8 | | |
| Kirkland_Main-1911 | Kirkland_Manholes-451 | 173.02 | Kirkland_Manholes-452 | 170.49 | 70.2 | 3.6 | 8 | PVC | 0.01 | 1,339 | 76 | 183 | 259 | 19.3 | SM14-Ex-EX31 | |
| Kirkland_Main-1912 | Kirkland_Manholes-452 | 170.49 | Kirkland_Manholes-453 | 159.42 | 88.9 | 12.45 | 8 | PVC | 0.01 | 2,488 | 76 | 187 | 264 | 10.6 | SM14-Ex-EX31 | |
| Kirkland_Main-1913 | Kirkland_Manholes-454 | 126.39 | Kirkland_Manholes-438 | 74.46 | 305.4 | 17.01 | 8 | PVC | 0.01 | 2,907 | 87 | 214 | 301 | 10.3 | SM14-Ex-EX31 | |
| Kirkland_Main-1914 | Kirkland_Manholes-484 | 295.92 | Kirkland_Manholes-483 | 294.22 | 69.9 | 2.43 | 8 | PVC | 0.01 | 1,098 | 2 | 4 | 7 | 0.6 | | |
| Kirkland_Main-1915 | Kirkland_Manholes-483 | 294.22 | Kirkland_Manholes-482 | 293.97 | 63.5 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 11 | 2.5 | | |
| Kirkland_Main-1916 | Kirkland_Manholes-481 | 300.21 | Kirkland_Manholes-482 | 293.97 | 44.6 | 13.98 | 8 | PVC | 0.01 | 2,636 | 11 | 43 | 54 | 2 | | |
| Kirkland_Main-1917 | Kirkland_Manholes-477 | 317.64 | Kirkland_Manholes-481 | 300.21 | 198.9 | 8.76 | 8 | PVC | 0.01 | 2,087 | 10 | 39 | 49 | 2.3 | | |
| Kirkland_Main-1918 | Kirkland_Manholes-478 | 318.91 | Kirkland_Manholes-477 | 317.64 | 130.7 | 0.97 | 8 | PVC | 0.01 | 695 | 8 | 34 | 43 | 6.1 | | |
| Kirkland_Main-1919 | Kirkland_Manholes-479 | 328.09 | Kirkland_Manholes-478 | 318.91 | 81.5 | 11.27 | 8 | PVC | 0.01 | 2,367 | 8 | 30 | 38 | 1.6 | | |
| Kirkland_Main-1920 | Kirkland_Manholes-476 | 330.32 | Kirkland_Manholes-475 | 322.42 | 166.4 | 4.75 | 8 | PVC | 0.01 | 1,536 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-1921 | Kirkland_Manholes-475 | 322.42 | Kirkland_Manholes-473 | 288.65 | 238.6 | 14.15 | 8 | PVC | 0.01 | 2,653 | 4 | 9 | 12 | 0.5 | | |
| Kirkland_Main-1922 | Kirkland_Manholes-474 | 290.07 | Kirkland_Manholes-473 | 288.65 | 187.1 | 0.76 | 8 | PVC | 0.01 | 614 | 3 | 4 | 7 | 1.2 | | |
| Kirkland_Main-1923 | Kirkland_Manholes-473 | 288.65 | Kirkland_Manholes-468 | 238.51 | 297.1 | 16.88 | 8 | PVC | 0.01 | 2,896 | 7 | 17 | 25 | 0.8 | | |
| Kirkland_Main-1924 | Kirkland_Manholes-468 | 238.51 | Kirkland_Manholes-462 | 219.91 | 120.9 | 15.39 | 8 | PVC | 0.01 | 2,766 | 8 | 21 | 30 | 1.1 | | |
| Kirkland_Main-1925 | Kirkland_Manholes-463 | 227.23 | Kirkland_Manholes-462 | 219.91 | 71.2 | 10.28 | 8 | PVC | 0.01 | 2,261 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-1926 | Kirkland_Manholes-464 | 254.44 | Kirkland_Manholes-463 | 227.23 | 171 | 15.91 | 8 | PVC | 0.01 | 2,812 | 2 | 4 | 7 | 0.2 | | |
| Kirkland_Main-1927 | Kirkland_Manholes-462 | 219.91 | Kirkland_Manholes-465 | 166.54 | 349.5 | 15.27 | 8 | PVC | 0.01 | 2,755 | 11 | 34 | 46 | 1.7 | | |
| Kirkland_Main-1928 | Kirkland_Manholes-465 | 166.54 | Kirkland_Manholes-466 | 159.47 | 196.4 | 3.6 | 8 | PVC | 0.01 | 1,338 | 12 | 39 | 51 | 3.8 | | |
| Kirkland_Main-1929 | Kirkland_Manholes-467 | 166.95 | Kirkland_Manholes-466 | 159.47 | 59.4 | 12.59 | 8 | PVC | 0.01 | 2,502 | 7 | 17 | 24 | 0.9 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1930 | Kirkland_Manholes-469 | 217.48 | Kirkland_Manholes-470 | 207.2 | 162.3 | 6.34 | 8 | PVC | 0.01 | 1,775 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-1931 | Kirkland_Manholes-471 | 208.89 | Kirkland_Manholes-470 | 207.2 | 106.2 | 1.59 | 8 | PVC | 0.01 | 889 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-1932 | Kirkland_Manholes-470 | 207.2 | Kirkland_Manholes-472 | 192.62 | 137.7 | 10.59 | 8 | PVC | 0.01 | 2,294 | 3 | 13 | 16 | 0.7 | | |
| Kirkland_Main-1934 | Kirkland_Manholes-489 | 206.41 | Kirkland_Manholes-467 | 166.95 | 178.4 | 22.12 | 8 | PVC | 0.01 | 3,316 | 6 | 13 | 19 | 0.6 | | |
| Kirkland_Main-1935 | Kirkland_Manholes-491 | 317.17 | Kirkland_Manholes-492 | 300.1 | 240.7 | 7.09 | 8 | PVC | 0.01 | 1,878 | 4 | 9 | 12 | 0.7 | | |
| Kirkland_Main-1936 | Kirkland_Manholes-492 | 300.1 | Kirkland_Manholes-778 | 273.49 | 272.5 | 9.76 | 8 | PVC | 0.01 | 2,203 | 5 | 13 | 18 | 0.8 | | |
| Kirkland_Main-1937 | Kirkland_Manholes-778 | 273.49 | Kirkland_Manholes-783 | 251.91 | 166.5 | 12.96 | 8 | PVC | 0.01 | 2,539 | 6 | 17 | 23 | 0.9 | | |
| Kirkland_Main-1938 | Kirkland_Manholes-783 | 251.91 | Kirkland_Manholes-782 | 245.67 | 36.9 | 16.9 | 8 | PVC | 0.01 | 2,898 | 26 | 99 | 125 | 4.3 | | |
| Kirkland_Main-1939 | Kirkland_Manholes-779 | 276.61 | Kirkland_Manholes-486 | 260.65 | 97.8 | 16.33 | 8 | PVC | 0.01 | 2,849 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-1940 | Kirkland_Manholes-486 | 260.65 | Kirkland_Manholes-487 | 257.38 | 130.2 | 2.51 | 8 | PVC | 0.01 | 1,117 | 19 | 73 | 92 | 8.2 | | |
| Kirkland_Main-1942 | Kirkland_Manholes-487 | 257.38 | Kirkland_Manholes-783 | 251.91 | 251.1 | 2.18 | 8 | PVC | 0.01 | 1,041 | 20 | 77 | 97 | 9.3 | | |
| Kirkland_Main-1943 | Kirkland_Manholes-781 | 270.16 | Kirkland_Manholes-782 | 245.67 | 162 | 15.11 | 8 | PVC | 0.01 | 2,741 | 3 | 9 | 12 | 0.4 | | |
| Kirkland_Main-1944 | Kirkland_Manholes-780 | 304.33 | Kirkland_Manholes-781 | 270.16 | 338 | 10.11 | 8 | PVC | 0.01 | 2,242 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-1945 | Kirkland_Manholes-782 | 245.67 | Kirkland_Manholes-785 | 203.06 | 217.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 30 | 112 | 141 | 4.5 | | |
| Kirkland_Main-1946 | Kirkland_Manholes-785 | 203.06 | Kirkland_Manholes-784 | 186.93 | 82.2 | 19.62 | 8 | PVC | 0.01 | 3,123 | 31 | 116 | 147 | 4.7 | | |
| Kirkland_Main-1947 | Kirkland_Manholes-784 | 186.93 | Kirkland_Manholes-786 | 173.41 | 68.9 | 19.64 | 8 | PVC | 0.01 | 3,124 | 87 | 283 | 371 | 11.9 | | |
| Kirkland_Main-1948 | Kirkland_Manholes-789 | 234.78 | Kirkland_Manholes-788 | 234.04 | 150 | 0.49 | 8 | PVC | 0.01 | 495 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-1949 | Kirkland_Manholes-788 | 234.04 | Kirkland_Manholes-787 | 233.49 | 110.1 | 0.5 | 8 | PVC | 0.01 | 498 | 2 | 9 | 10 | 2.1 | | |
| Kirkland_Main-1950 | Kirkland_Manholes-787 | 233.49 | Kirkland_Manholes-790 | 227.7 | 106.2 | 5.45 | 8 | PVC | 0.01 | 1,646 | 3 | 13 | 16 | 1 | | |
| Kirkland_Main-1951 | Kirkland_Manholes-485 | 265.21 | Kirkland_Manholes-486 | 260.65 | 233.3 | 1.95 | 8 | PVC | 0.01 | 986 | 17 | 64 | 81 | 8.2 | | |
| Kirkland_Main-1952 | Kirkland_Manholes-490 | 279.75 | Kirkland_Manholes-485 | 265.21 | 234 | 6.21 | 8 | PVC | 0.01 | 1,758 | 15 | 60 | 75 | 4.3 | | |
| Kirkland_Main-1953 | Kirkland_Manholes-482 | 293.97 | Kirkland_Manholes-490 | 279.75 | 98.3 | 14.47 | 8 | PVC | 0.01 | 2,682 | 14 | 56 | 70 | 2.6 | | |
| Kirkland_Main-1954 | Kirkland_Manholes-791 | 327.42 | Kirkland_Manholes-491 | 317.17 | 287.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 2 | 4 | 6 | 0.5 | SM14-Ex-EX47 | |
| Kirkland_Main-1955 | Kirkland_Manholes-796 | 329.52 | Kirkland_Manholes-479 | 328.09 | 60.4 | 2.37 | 8 | PVC | 0.01 | 1,085 | 7 | 26 | 32 | 3 | | |
| Kirkland_Main-1956 | Kirkland_Manholes-802 | 309.62 | Kirkland_Manholes-801 | 301.38 | 220.6 | 3.74 | 8 | PVC | 0.01 | 1,363 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-1957 | Kirkland_Manholes-801 | 301.38 | Kirkland_Manholes-800 | 299.84 | 122.4 | 1.26 | 8 | PVC | 0.01 | 791 | 4 | 9 | 13 | 1.6 | | |
| Kirkland_Main-1958 | Kirkland_Manholes-800 | 299.84 | Kirkland_Manholes-799 | 299.17 | 200.4 | 0.33 | 8 | PVC | 0.01 | 408 | 6 | 13 | 18 | 4.5 | | |
| Kirkland_Main-1960 | Kirkland_Manholes-797 | 330.09 | Kirkland_Manholes-798 | 328.4 | 134 | 1.26 | 8 | PVC | 0.01 | 792 | 1 | 4 | 6 | 0.7 | | |
| Kirkland_Main-1961 | Kirkland_Manholes-798 | 328.4 | Kirkland_Manholes-799 | 299.17 | 250.4 | 11.67 | 8 | PVC | 0.01 | 2,409 | 3 | 9 | 12 | 0.5 | | |
| Kirkland_Main-1962 | Kirkland_Manholes-799 | 299.17 | Kirkland_Manholes-803 | 278.64 | 308 | 6.67 | 8 | PVC | 0.01 | 1,820 | 10 | 26 | 36 | 2 | | |
| Kirkland_Main-1963 | Kirkland_Manholes-805 | 300.26 | Kirkland_Manholes-806 | 295.73 | 104.4 | 4.34 | 8 | PVC | 0.01 | 1,468 | 9 | 26 | 35 | 2.4 | | |
| Kirkland_Main-1964 | Kirkland_Manholes-806 | 295.73 | Kirkland_Manholes-804 | 284.1 | 194.3 | 5.99 | 8 | PVC | 0.01 | 1,725 | 10 | 30 | 40 | 2.3 | | |
| Kirkland_Main-1965 | Kirkland_Manholes-807 | 300.8 | Kirkland_Manholes-805 | 300.26 | 78.9 | 0.68 | 8 | PVC | 0.01 | 583 | 8 | 21 | 30 | 5.1 | | |
| Kirkland_Main-1966 | Kirkland_Manholes-819 | 270.84 | Kirkland_Manholes-818 | 259.9 | 158.1 | 6.92 | 8 | PVC | 0.01 | 1,854 | 1 | 4 | 6 | 0.3 | | |
| Kirkland_Main-1967 | Kirkland_Manholes-818 | 259.9 | Kirkland_Manholes-816 | 252.1 | 223.2 | 3.49 | 8 | PVC | 0.01 | 1,318 | 4 | 9 | 12 | 0.9 | | |
| Kirkland_Main-1968 | Kirkland_Manholes-816 | 252.1 | Kirkland_Manholes-815 | 248.52 | 125.8 | 2.85 | 8 | PVC | 0.01 | 1,190 | 5 | 13 | 18 | 1.5 | | |
| Kirkland_Main-1969 | Kirkland_Manholes-817 | 249.75 | Kirkland_Manholes-815 | 248.52 | 170.1 | 0.72 | 8 | PVC | 0.01 | 600 | 2 | 4 | 7 | 1.1 | | |
| Kirkland_Main-1970 | Kirkland_Manholes-814 | 224.81 | Kirkland_Manholes-813 | 224.1 | 119.5 | 0.59 | 8 | PVC | 0.01 | 543 | 45 | 137 | 183 | 33.6 | | |
| Kirkland_Main-1971 | Kirkland_Manholes-813 | 224.1 | Kirkland_Manholes-811 | 220.71 | 283.2 | 1.2 | 8 | PVC | 0.01 | 771 | 48 | 142 | 189 | 24.5 | | |
| Kirkland_Main-1972 | Kirkland_Manholes-810 | 231.27 | Kirkland_Manholes-811 | 220.71 | 86.4 | 12.23 | 8 | PVC | 0.01 | 2,465 | 6 | 13 | 18 | 0.7 | | |
| Kirkland_Main-1973 | Kirkland_Manholes-811 | 220.71 | Kirkland_Manholes-812 | 219.12 | 123.9 | 1.28 | 8 | PVC | 0.01 | 799 | 54 | 159 | 213 | 26.7 | | |
| Kirkland_Main-1974 | Kirkland_Manholes-809 | 238.49 | Kirkland_Manholes-810 | 231.27 | 197.7 | 3.65 | 8 | PVC | 0.01 | 1,347 | 4 | 9 | 13 | 0.9 | | |
| Kirkland_Main-1975 | Kirkland_Manholes-808 | 239.21 | Kirkland_Manholes-809 | 238.5 | 177.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 7 | 1.5 | | Drop Connection |
| Kirkland_Main-1976 | Kirkland_Manholes-812 | 219.12 | Kirkland_Manholes-784 | 186.93 | 281.2 | 11.45 | 8 | PVC | 0.01 | 2,385 | 56 | 163 | 219 | 9.2 | | |
| Kirkland_Main-1977 | Kirkland_Manholes-822 | 337.49 | Kirkland_Manholes-823 | 321.62 | 170.9 | 9.29 | 8 | PVC | 0.01 | 2,149 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX69 | |
| Kirkland_Main-1978 | Kirkland_Manholes-823 | 321.62 | Kirkland_Manholes-824 | 311.58 | 159.2 | 6.3 | 8 | PVC | 0.01 | 1,770 | 3 | 9 | 11 | 0.6 | SM14-Ex-EX69 | |
| Kirkland_Main-1979 | Kirkland_Manholes-824 | 311.58 | Kirkland_Manholes-825 | 285.55 | 131.7 | 19.76 | 8 | PVC | 0.01 | 3,134 | 3 | 13 | 16 | 0.5 | SM14-Ex-EX69 | |
| Kirkland_Main-1980 | Kirkland_Manholes-825 | 285.55 | Kirkland_Manholes-826 | 282.55 | 56.8 | 5.29 | 8 | PVC | 0.01 | 1,621 | 5 | 26 | 31 | 1.9 | SM14-Ex-EX69 | |
| Kirkland_Main-1981 | Kirkland_Manholes-827 | 295.62 | Kirkland_Manholes-828 | 285.89 | 94.5 | 10.29 | 8 | PVC | 0.01 | 2,262 | 1 | 4 | 5 | 0.2 | SM14-Ex-EX69 | |
| Kirkland_Main-1982 | Kirkland_Manholes-826 | 282.55 | Kirkland_Manholes-456 | 263.04 | 178.8 | 10.91 | 8 | PVC | 0.01 | 2,329 | 6 | 30 | 36 | 1.5 | SM14-Ex-EX69 | |
| Kirkland_Main-1983 | Kirkland_Manholes-828 | 285.89 | Kirkland_Manholes-825 | 285.55 | 69 | 0.49 | 8 | PVC | 0.01 | 495 | 2 | 9 | 10 | 2.1 | SM14-Ex-EX69 | |
| Kirkland_Main-1984 | Kirkland_Manholes-790 | 227.7 | Kirkland_Manholes-830 | 198.45 | 91.3 | 32.05 | 8 | PVC | 0.01 | 3,991 | 4 | 17 | 21 | 0.5 | | Slope verified in as-builts |
| Kirkland_Main-1985 | Kirkland_Manholes-830 | 198.45 | Kirkland_Manholes-831 | 192.6 | 15.9 | 36.68 | 8 | PVC | 0.01 | 4,270 | 6 | 26 | 32 | 0.7 | | Slope verified in as-builts |
| Kirkland_Main-1986 | Kirkland_Manholes-831 | 192.6 | Kirkland_Manholes-786 | 173.41 | 171.2 | 11.21 | 8 | PVC | 0.01 | 2,360 | 7 | 30 | 37 | 1.5 | SM14-Ex-EX46 | |
| Kirkland_Main-1987 | Kirkland_Manholes-461 | 269.91 | Kirkland_Manholes-460 | 268.13 | 121.9 | 1.46 | 8 | PVC | 0.01 | 852 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX68 | |
| Kirkland_Main-1988 | Kirkland_Manholes-460 | 268.13 | Kirkland_Manholes-456 | 263.04 | 170.9 | 2.98 | 8 | PVC | 0.01 | 1,217 | 3 | 9 | 11 | 0.9 | SM14-Ex-EX68 | |
| Kirkland_Main-1989 | Kirkland_Manholes-455 | 250.45 | Kirkland_Manholes-457 | 235.02 | 148.1 | 10.42 | 8 | PVC | 0.01 | 2,276 | 42 | 120 | 162 | 7.1 | SM14-Ex-EX67 | |
| Kirkland_Main-1990 | Kirkland_Manholes-457 | 235.02 | Kirkland_Manholes-458 | 212.1 | 153.1 | 14.97 | 8 | PVC | 0.01 | 2,728 | 43 | 129 | 172 | 6.3 | SM14-Ex-EX67 | |
| Kirkland_Main-1991 | Kirkland_Manholes-459 | 247.75 | Kirkland_Manholes-457 | 235.02 | 263.1 | 4.84 | 8 | PVC | 0.01 | 1,551 | 1 | 4 | 5 | 0.3 | SM14-Ex-EX67 | |
| Kirkland_Main-1992 | Kirkland_Manholes-456 | 263.04 | Kirkland_Manholes-455 | 262.36 | 18.8 | 3.61 | 8 | PVC | 0.01 | 1,339 | 9 | 43 | 52 | 3.9 | SM14-Ex-EX68 | Drop Connection |
| Kirkland_Main-1993 | Kirkland_Manholes-792 | 342.6 | Kirkland_Manholes-832 | 339.26 | 96.2 | 3.47 | 8 | PVC | 0.01 | 1,314 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX70 | |
| Kirkland_Main-1994 | Kirkland_Manholes-793 | 339.56 | Kirkland_Manholes-832 | 339.26 | 76 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 7 | 1.5 | SM14-Ex-EX70 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-1997 | Kirkland_Manholes-988 | 238.57 | Kirkland_Manholes-989 | 235.68 | 166.4 | 1.74 | 8 | PVC | 0.01 | 929 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-1998 | Kirkland_Manholes-989 | 235.68 | Kirkland_Manholes-990 | 231.8 | 65.1 | 5.96 | 8 | PVC | 0.01 | 1,721 | 3 | 9 | 12 | 0.7 | | |
| Kirkland_Main-1999 | Kirkland_Manholes-990 | 231.8 | Kirkland_Manholes-991 | 230.6 | 208.7 | 0.57 | 8 | PVC | 0.01 | 535 | 5 | 13 | 18 | 3.4 | | |
| Kirkland_Main-2000 | Kirkland_Manholes-992 | 230.9 | Kirkland_Manholes-991 | 230.6 | 22.8 | 1.32 | 8 | PVC | 0.01 | 809 | 1 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2001 | Kirkland_Manholes-991 | 230.6 | Kirkland_Manholes-993 | 229.29 | 112.3 | 1.17 | 8 | PVC | 0.01 | 762 | 7 | 22 | 29 | 3.8 | | |
| Kirkland_Main-2002 | Kirkland_Manholes-993 | 229.29 | Kirkland_Manholes-994 | 224.8 | 89 | 5.04 | 8 | PVC | 0.01 | 1,583 | 8 | 27 | 34 | 2.2 | | |
| Kirkland_Main-2003 | Kirkland_Manholes-996 | 225.97 | Kirkland_Manholes-994 | 224.8 | 53 | 2.21 | 8 | PVC | 0.01 | 1,047 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2004 | Kirkland_Manholes-994 | 224.8 | Kirkland_Manholes-995 | 224.6 | 50 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 36 | 44 | 9.9 | | |
| Kirkland_Main-2005 | Kirkland_Manholes-995 | 224.6 | Kirkland_Manholes-997 | 222.3 | 221.9 | 1.04 | 8 | PVC | 0.01 | 718 | 10 | 40 | 50 | 7 | | |
| Kirkland_Main-2006 | Kirkland_Manholes-997 | 222.3 | Kirkland_Manholes-998 | 220.4 | 187.6 | 1.01 | 8 | PVC | 0.01 | 710 | 11 | 45 | 55 | 7.8 | | |
| Kirkland_Main-2007 | Kirkland_Manholes-998 | 220.4 | Kirkland_Manholes-980 | 219.4 | 152.8 | 0.65 | 8 | PVC | 0.01 | 570 | 11 | 49 | 60 | 10.5 | | |
| Kirkland_Main-2008 | Kirkland_Manholes-980 | 219.4 | Kirkland_Manholes-981 | 218.7 | 155.5 | 0.45 | 8 | PVC | 0.01 | 473 | 31 | 120 | 151 | 32 | | |
| Kirkland_Main-2009 | Kirkland_Manholes-981 | 218.7 | Kirkland_Manholes-982 | 217.59 | 190.8 | 0.58 | 8 | PVC | 0.01 | 538 | 43 | 125 | 168 | 31.2 | | |
| Kirkland_Main-2010 | Kirkland_Manholes-982 | 217.59 | Kirkland_Manholes-983 | 215.91 | 138.4 | 1.21 | 8 | PVC | 0.01 | 777 | 50 | 129 | 179 | 23 | | |
| Kirkland_Main-2011 | Kirkland_Manholes-983 | 215.91 | Kirkland_Manholes-984 | 210.71 | 282.7 | 1.84 | 8 | PVC | 0.01 | 956 | 51 | 134 | 185 | 19.3 | | |
| Kirkland_Main-2012 | Kirkland_Manholes-984 | 210.71 | Kirkland_Manholes-985 | 205.92 | 47.8 | 10.03 | 8 | PVC | 0.01 | 2,232 | 54 | 138 | 192 | 8.6 | | |
| Kirkland_Main-2013 | Kirkland_Manholes-1001 | 230.61 | Kirkland_Manholes-1020 | 226.4 | 192.3 | 2.19 | 8 | PVC | 0.01 | 1,043 | 43 | 94 | 136 | 13.1 | | |
| Kirkland_Main-2014 | Kirkland_Manholes-1000 | 240.25 | Kirkland_Manholes-1001 | 230.61 | 249.9 | 3.86 | 8 | PVC | 0.01 | 1,385 | 41 | 89 | 130 | 9.4 | | |
| Kirkland_Main-2015 | Kirkland_Manholes-999 | 246.1 | Kirkland_Manholes-1000 | 240.25 | 246.4 | 2.37 | 8 | PVC | 0.01 | 1,086 | 39 | 85 | 123 | 11.4 | | |
| Kirkland_Main-2016 | Kirkland_Manholes-972 | 246.27 | Kirkland_Manholes-999 | 246.1 | 109.4 | 0.16 | 8 | PVC | 0.01 | 278 | 37 | 80 | 118 | 42.4 | | |
| Kirkland_Main-2017 | Kirkland_Manholes-1002 | 227.29 | Kirkland_Manholes-1003 | 219.05 | 401.3 | 2.05 | 8 | PVC | 0.01 | 1,010 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2018 | Kirkland_Manholes-1003 | 219.05 | Kirkland_Manholes-1004 | 214.11 | 181.5 | 2.72 | 8 | PVC | 0.01 | 1,163 | 5 | 9 | 14 | 1.2 | | |
| Kirkland_Main-2019 | Kirkland_Manholes-1006 | 216.58 | Kirkland_Manholes-1007 | 215.09 | 213.6 | 0.7 | 8 | PVC | 0.01 | 589 | 5 | 9 | 14 | 2.3 | | |
| Kirkland_Main-2020 | Kirkland_Manholes-1005 | 223.06 | Kirkland_Manholes-1006 | 216.58 | 398.8 | 1.63 | 8 | PVC | 0.01 | 899 | 2 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2023 | Kirkland_Manholes-1007 | 215.09 | Kirkland_Manholes-1004 | 214.11 | 335.8 | 0.29 | 8 | PVC | 0.01 | 381 | 8 | 13 | 21 | 5.5 | | |
| Kirkland_Main-2024 | Kirkland_Manholes-1012 | 211.42 | Kirkland_Manholes-1013 | 197.72 | 100.9 | 13.58 | 8 | PVC | 0.01 | 2,598 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-2025 | Kirkland_Manholes-1013 | 197.72 | Kirkland_Manholes-1014 | 187.16 | 124 | 8.52 | 8 | PVC | 0.01 | 2,057 | 4 | 9 | 12 | 0.6 | | |
| Kirkland_Main-2026 | Kirkland_Manholes-1014 | 187.16 | Kirkland_Manholes-1015 | 186.96 | 99 | 0.2 | 8 | PVC | 0.01 | 317 | 4 | 13 | 18 | 5.6 | | |
| Kirkland_Main-2027 | Kirkland_Manholes-1015 | 186.96 | Kirkland_Manholes-1016 | 185.35 | 120.5 | 1.34 | 8 | PVC | 0.01 | 815 | 7 | 18 | 25 | 3 | | |
| Kirkland_Main-2028 | Kirkland_Manholes-1016 | 185.35 | Kirkland_Manholes-1036 | 185.26 | 143 | 0.06 | 8 | PVC | 0.01 | 174 | 9 | 22 | 31 | 18.1 | | |
| Kirkland_Main-2029 | Kirkland_Manholes-1036 | 185.26 | Kirkland_Manholes-1030 | 184.08 | 404.9 | 0.29 | 10 | PVC | 0.01 | 690 | 10 | 27 | 37 | 5.3 | | |
| Kirkland_Main-2030 | Kirkland_Manholes-1030 | 184.08 | Kirkland_Manholes-1031 | 183.18 | 286.1 | 0.31 | 10 | PVC | 0.01 | 717 | 14 | 31 | 45 | 6.3 | | |
| Kirkland_Main-2031 | Kirkland_Manholes-1034 | 183.86 | Kirkland_Manholes-1031 | 183.18 | 169 | 0.4 | 8 | PVC | 0.01 | 445 | 3 | 4 | 7 | 1.7 | | |
| Kirkland_Main-2032 | Kirkland_Manholes-1031 | 183.18 | Kirkland_Manholes-1035 | 182.7 | 151.6 | 0.32 | 8 | PVC | 0.01 | 397 | 18 | 40 | 58 | 14.7 | | |
| Kirkland_Main-2033 | Kirkland_Manholes-1032 | 177.81 | Kirkland_Manholes-1033 | 173.21 | 285.6 | 1.61 | 8 | PVC | 0.01 | 895 | 5 | 9 | 13 | 1.5 | | |
| Kirkland_Main-2034 | Kirkland_Manholes-1004 | 214.11 | Kirkland_Manholes-1028 | 212.78 | 233.9 | 0.57 | 8 | PVC | 0.01 | 532 | 13 | 27 | 40 | 7.5 | | |
| Kirkland_Main-2035 | Kirkland_Manholes-1009 | 214.27 | Kirkland_Manholes-1008 | 211.28 | 293.5 | 1.02 | 8 | PVC | 0.01 | 712 | 3 | 4 | 7 | 1 | SM14-Ex-EX19 | |
| Kirkland_Main-2036 | Kirkland_Manholes-1028 | 212.78 | Kirkland_Manholes-1008 | 211.28 | 261 | 0.57 | 8 | PVC | 0.01 | 534 | 14 | 31 | 45 | 8.4 | SM14-Ex-EX19 | |
| Kirkland_Main-2037 | Kirkland_Manholes-1008 | 211.28 | Kirkland_Manholes-1029 | 210.29 | 108.6 | 0.91 | 8 | PVC | 0.01 | 673 | 16 | 40 | 57 | 8.4 | SM14-Ex-EX19 | |
| Kirkland_Main-2038 | Kirkland_Manholes-1029 | 210.29 | Kirkland_Manholes-1010 | 207.69 | 265.5 | 0.98 | 8 | PVC | 0.01 | 698 | 17 | 45 | 61 | 8.8 | SM14-Ex-EX19 | |
| Kirkland_Main-2039 | Kirkland_Manholes-1010 | 207.69 | Kirkland_Manholes-1017 | 205.5 | 77.5 | 2.83 | 8 | PVC | 0.01 | 1,186 | 17 | 49 | 66 | 5.6 | SM14-Ex-EX19 | |
| Kirkland_Main-2040 | Kirkland_Manholes-1022 | 213.66 | Kirkland_Manholes-1023 | 207.88 | 245.2 | 2.36 | 8 | PVC | 0.01 | 1,083 | 52 | 116 | 168 | 15.5 | SM14-Ex-EX18 | |
| Kirkland_Main-2041 | Kirkland_Manholes-1023 | 207.88 | Kirkland_Manholes-1017 | 205.5 | 153 | 1.56 | 8 | PVC | 0.01 | 879 | 55 | 120 | 175 | 19.9 | SM14-Ex-EX18 | |
| Kirkland_Main-2042 | Kirkland_Manholes-1017 | 205.5 | Kirkland_Manholes-1018 | 179.75 | 288.9 | 8.91 | 8 | PVC | 0.01 | 2,105 | 73 | 174 | 247 | 11.7 | SM14-Ex-EX31 | |
| Kirkland_Main-2043 | Kirkland_Manholes-1025 | 183.2 | Kirkland_Manholes-1026 | 149.27 | 241.9 | 14.02 | 8 | PVC | 0.01 | 2,640 | 4 | 4 | 8 | 0.3 | | |
| Kirkland_Main-2044 | Kirkland_Manholes-1027 | 150.87 | Kirkland_Manholes-1026 | 149.27 | 180 | 0.89 | 8 | PVC | 0.01 | 665 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-2045 | Kirkland_Manholes-1021 | 230.72 | Kirkland_Manholes-1020 | 230.54 | 45.4 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 9 | 13 | 2.8 | SM14-Ex-EX18 | Drop Connection |
| Kirkland_Main-2046 | Kirkland_Manholes-1020 | 226.4 | Kirkland_Manholes-1019 | 216.75 | 175.1 | 5.51 | 8 | PVC | 0.01 | 1,655 | 48 | 107 | 155 | 9.4 | SM14-Ex-EX18 | |
| Kirkland_Main-2047 | Kirkland_Manholes-1019 | 216.75 | Kirkland_Manholes-1022 | 213.66 | 284.9 | 1.08 | 8 | PVC | 0.01 | 734 | 50 | 112 | 162 | 22 | SM14-Ex-EX18 | |
| Kirkland_Main-2050 | Kirkland_Manholes-1037 | 180.8 | Kirkland_Manholes-1032 | 177.81 | 192.3 | 1.56 | 8 | PVC | 0.01 | 879 | 3 | 4 | 7 | 0.8 | | |
| Kirkland_Main-2051 | Kirkland_Manholes-1041 | 211.62 | Kirkland_Manholes-1040 | 211.16 | 115.7 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 7 | 1.5 | | |
| Kirkland_Main-2052 | Kirkland_Manholes-1040 | 211.16 | Kirkland_Manholes-1039 | 191.93 | 181.5 | 10.59 | 8 | PVC | 0.01 | 2,295 | 4 | 9 | 13 | 0.5 | | |
| Kirkland_Main-2053 | Kirkland_Manholes-1039 | 191.93 | Kirkland_Manholes-1038 | 180.54 | 235.3 | 4.84 | 8 | PVC | 0.01 | 1,551 | 6 | 13 | 19 | 1.2 | | |
| Kirkland_Main-2054 | Kirkland_Manholes-1038 | 180.54 | Kirkland_Manholes-1042 | 180.42 | 296.4 | 0.04 | 12 | PVC | 0.01 | 413 | 35 | 85 | 120 | 29.1 | SM14-2035-DF6 | |
| Kirkland_Main-2055 | Kirkland_Manholes-1045 | 212.56 | Kirkland_Manholes-1044 | 190.19 | 362.7 | 6.17 | 8 | PVC | 0.01 | 1,751 | 4 | 4 | 8 | 0.5 | | |
| Kirkland_Main-2056 | Kirkland_Manholes-1044 | 190.19 | Kirkland_Manholes-1043 | 180.32 | 106.1 | 9.3 | 8 | PVC | 0.01 | 2,151 | 5 | 9 | 14 | 0.7 | | |
| Kirkland_Main-2057 | Kirkland_Manholes-1042 | 180.42 | Kirkland_Manholes-1043 | 180.32 | 14.1 | 0.71 | 8 | PVC | 0.01 | 594 | 36 | 89 | 125 | 21.1 | | |
| Kirkland_Main-2058 | Kirkland_Manholes-1051 | 183.74 | Kirkland_Manholes-1050 | 181.82 | 166.3 | 1.15 | 8 | PVC | 0.01 | 758 | 89 | 152 | 240 | 31.7 | | |
| Kirkland_Main-2059 | Kirkland_Manholes-1050 | 181.82 | Kirkland_Manholes-1049 | 169.63 | 230.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 97 | 156 | 253 | 15.6 | | |
| Kirkland_Main-2060 | Kirkland_Manholes-1049 | 169.63 | Kirkland_Manholes-1048 | 168.86 | 245.7 | 0.31 | 8 | PVC | 0.01 | 395 | 97 | 161 | 258 | 65.4 | | |
| Kirkland_Main-2061 | Kirkland_Manholes-986 | 204.38 | Kirkland_Manholes-1051 | 183.74 | 288.7 | 7.15 | 8 | PVC | 0.01 | 1,885 | 87 | 147 | 234 | 12.4 | | |
| Kirkland_Main-2062 | Kirkland_Manholes-1048 | 168.86 | Kirkland_Manholes-1047 | 166.5 | 308.6 | 0.76 | 8 | PVC | 0.01 | 617 | 105 | 165 | 270 | 43.7 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2063 | Kirkland_Manholes-1047 | 166.5 | Kirkland_Manholes-1046 | 162.86 | 368.8 | 0.99 | 8 | PVC | 0.01 | 700 | 105 | 170 | 274 | 39.2 | | |
| Kirkland_Main-2064 | Kirkland_Manholes-1053 | 228.57 | Kirkland_Manholes-1089 | 214.64 | 105.1 | 13.25 | 8 | PVC | 0.01 | 2,566 | 4 | 34 | 38 | 1.5 | | |
| Kirkland_Main-2065 | Kirkland_Manholes-1054 | 235.88 | Kirkland_Manholes-1053 | 228.57 | 61.2 | 11.95 | 8 | PVC | 0.01 | 2,437 | 3 | 30 | 33 | 1.4 | | |
| Kirkland_Main-2066 | Kirkland_Manholes-1062 | 265.12 | Kirkland_Manholes-1055 | 254.27 | 156.2 | 6.95 | 8 | PVC | 0.01 | 1,858 | 8 | 21 | 30 | 1.6 | | |
| Kirkland_Main-2067 | Kirkland_Manholes-1063 | 275.15 | Kirkland_Manholes-1062 | 265.12 | 144.2 | 6.96 | 8 | PVC | 0.01 | 1,860 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2068 | Kirkland_Manholes-1064 | 278.57 | Kirkland_Manholes-1062 | 265.12 | 154.9 | 8.68 | 8 | PVC | 0.01 | 2,078 | 6 | 13 | 19 | 0.9 | | |
| Kirkland_Main-2069 | Kirkland_Manholes-1055 | 254.27 | Kirkland_Manholes-1056 | 242.38 | 224 | 5.31 | 8 | PVC | 0.01 | 1,625 | 9 | 26 | 35 | 2.2 | | |
| Kirkland_Main-2070 | Kirkland_Manholes-1056 | 242.38 | Kirkland_Manholes-1057 | 237.15 | 108.2 | 4.83 | 8 | PVC | 0.01 | 1,550 | 11 | 30 | 41 | 2.7 | | |
| Kirkland_Main-2071 | Kirkland_Manholes-1057 | 237.15 | Kirkland_Manholes-1058 | 224.96 | 136.1 | 8.96 | 8 | PVC | 0.01 | 2,110 | 16 | 47 | 63 | 3 | | |
| Kirkland_Main-2072 | Kirkland_Manholes-1059 | 243.26 | Kirkland_Manholes-1057 | 237.15 | 201.9 | 3.03 | 8 | PVC | 0.01 | 1,227 | 4 | 13 | 17 | 1.4 | | |
| Kirkland_Main-2073 | Kirkland_Manholes-1061 | 271.51 | Kirkland_Manholes-1060 | 252.96 | 148.5 | 12.49 | 8 | PVC | 0.01 | 2,492 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2074 | Kirkland_Manholes-1060 | 252.96 | Kirkland_Manholes-1059 | 243.26 | 83.7 | 11.58 | 8 | PVC | 0.01 | 2,400 | 3 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2075 | Kirkland_Manholes-1103 | 198.97 | Kirkland_Manholes-1101 | 197.04 | 31 | 6.23 | 18 | PVC | 0.01 | 15,303 | 873 | 2,237 | 3,110 | 20.3 | | |
| Kirkland_Main-2076 | Kirkland_Manholes-1102 | 199.75 | Kirkland_Manholes-1101 | 197.04 | 30.1 | 8.99 | 8 | PVC | 0.01 | 2,114 | 6 | 43 | 49 | 2.3 | | |
| Kirkland_Main-2077 | Kirkland_Manholes-1100 | 201.72 | Kirkland_Manholes-1102 | 199.75 | 337.5 | 0.58 | 8 | PVC | 0.01 | 539 | 5 | 39 | 43 | 8 | | |
| Kirkland_Main-2078 | Kirkland_Manholes-1093 | 203.29 | Kirkland_Manholes-1100 | 201.72 | 272.4 | 0.58 | 8 | PVC | 0.01 | 535 | 3 | 34 | 37 | 7 | | |
| Kirkland_Main-2079 | Kirkland_Manholes-1095 | 206.07 | Kirkland_Manholes-1094 | 204.22 | 102 | 1.81 | 8 | PVC | 0.01 | 950 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2080 | Kirkland_Manholes-1094 | 204.22 | Kirkland_Manholes-1093 | 203.29 | 43.7 | 2.13 | 8 | PVC | 0.01 | 1,028 | 1 | 9 | 10 | 0.9 | | |
| Kirkland_Main-2081 | Kirkland_Manholes-1096 | 204.27 | Kirkland_Manholes-1093 | 203.29 | 162.1 | 0.6 | 8 | PVC | 0.01 | 548 | 2 | 21 | 23 | 4.2 | | |
| Kirkland_Main-2082 | Kirkland_Manholes-1098 | 205.6 | Kirkland_Manholes-1097 | 204.86 | 78.1 | 0.95 | 8 | PVC | 0.01 | 686 | 0 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2083 | Kirkland_Manholes-1097 | 204.86 | Kirkland_Manholes-1096 | 204.27 | 167.5 | 0.35 | 8 | PVC | 0.01 | 418 | 1 | 17 | 18 | 4.4 | | |
| Kirkland_Main-2084 | Kirkland_Manholes-1099 | 211.44 | Kirkland_Manholes-1097 | 204.86 | 308.5 | 2.13 | 8 | PVC | 0.01 | 1,030 | 1 | 9 | 9 | 0.9 | | |
| Kirkland_Main-2085 | Kirkland_Manholes-1079 | 238.18 | Kirkland_Manholes-1080 | 229.14 | 134.4 | 6.73 | 8 | PVC | 0.01 | 1,829 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2086 | Kirkland_Manholes-1080 | 229.14 | Kirkland_Manholes-1081 | 226.1 | 255.6 | 1.19 | 8 | PVC | 0.01 | 769 | 97 | 279 | 376 | 48.9 | | |
| Kirkland_Main-2087 | Kirkland_Manholes-1082 | 233.35 | Kirkland_Manholes-1081 | 226.1 | 142.6 | 5.08 | 8 | PVC | 0.01 | 1,590 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2088 | Kirkland_Manholes-1081 | 226.1 | Kirkland_Manholes-1070 | 224.89 | 260.5 | 0.46 | 12 | PVC | 0.01 | 1,417 | 99 | 288 | 387 | 27.3 | SM14-2035-DF7 | |
| Kirkland_Main-2089 | Kirkland_Manholes-1069 | 247.48 | Kirkland_Manholes-1070 | 224.89 | 321.6 | 7.02 | 8 | PVC | 0.01 | 1,869 | 93 | 245 | 514 | 27.5 | | |
| Kirkland_Main-2090 | Kirkland_Manholes-1067 | 259.57 | Kirkland_Manholes-1069 | 247.48 | 126 | 9.6 | 8 | PVC | 0.01 | 2,184 | 86 | 228 | 490 | 22.4 | | |
| Kirkland_Main-2091 | Kirkland_Manholes-1071 | 277.81 | Kirkland_Manholes-1067 | 259.57 | 242.2 | 7.53 | 8 | PVC | 0.01 | 1,935 | 21 | 64 | 86 | 4.4 | | |
| Kirkland_Main-2092 | Kirkland_Manholes-1072 | 288.83 | Kirkland_Manholes-1071 | 277.81 | 139.9 | 7.88 | 8 | PVC | 0.01 | 1,979 | 10 | 21 | 31 | 1.6 | | |
| Kirkland_Main-2093 | Kirkland_Manholes-1077 | 252.59 | Kirkland_Manholes-1069 | 247.48 | 346.5 | 1.47 | 8 | PVC | 0.01 | 856 | 5 | 13 | 18 | 2.1 | | |
| Kirkland_Main-2094 | Kirkland_Manholes-1078 | 305.14 | Kirkland_Manholes-1073 | 302.05 | 162.4 | 1.9 | 8 | PVC | 0.01 | 973 | 4 | 9 | 12 | 1.3 | | |
| Kirkland_Main-2095 | Kirkland_Manholes-1073 | 302.05 | Kirkland_Manholes-1072 | 288.83 | 375.1 | 3.52 | 8 | PVC | 0.01 | 1,324 | 8 | 17 | 25 | 1.9 | | |
| Kirkland_Main-2096 | Kirkland_Manholes-1074 | 295.05 | Kirkland_Manholes-1075 | 291.84 | 155.4 | 2.07 | 8 | PVC | 0.01 | 1,013 | 59 | 137 | 372 | 36.7 | | |
| Kirkland_Main-2097 | Kirkland_Manholes-1076 | 298.68 | Kirkland_Manholes-1074 | 295.05 | 108.2 | 3.36 | 8 | PVC | 0.01 | 1,291 | 58 | 133 | 367 | 28.4 | | |
| Kirkland_Main-2098 | Kirkland_Manholes-1068 | 279.38 | Kirkland_Manholes-1066 | 278.91 | 39.6 | 1.19 | 8 | PVC | 0.01 | 768 | 62 | 150 | 389 | 50.6 | | |
| Kirkland_Main-2099 | Kirkland_Manholes-1066 | 278.91 | Kirkland_Manholes-1065 | 260.88 | 143.1 | 12.6 | 8 | PVC | 0.01 | 2,502 | 63 | 155 | 394 | 15.7 | | |
| Kirkland_Main-2100 | Kirkland_Manholes-1065 | 260.88 | Kirkland_Manholes-1067 | 259.57 | 130 | 1.01 | 8 | PVC | 0.01 | 708 | 64 | 159 | 399 | 56.3 | | |
| Kirkland_Main-2101 | Kirkland_Manholes-1090 | 254.86 | Kirkland_Manholes-1091 | 251.69 | 82.2 | 3.86 | 8 | PVC | 0.01 | 1,385 | 2 | 17 | 20 | 1.4 | | |
| Kirkland_Main-2102 | Kirkland_Manholes-1091 | 251.69 | Kirkland_Manholes-1092 | 246.51 | 140.9 | 3.68 | 8 | PVC | 0.01 | 1,352 | 3 | 21 | 24 | 1.8 | | |
| Kirkland_Main-2103 | Kirkland_Manholes-1092 | 246.51 | Kirkland_Manholes-1054 | 235.88 | 141.8 | 7.5 | 8 | PVC | 0.01 | 1,931 | 3 | 26 | 29 | 1.5 | | |
| Kirkland_Main-2104 | Kirkland_Manholes-1089 | 214.64 | Kirkland_Manholes-1086 | 198.2 | 276 | 5.96 | 8 | PVC | 0.01 | 1,721 | 4 | 39 | 43 | 2.5 | | |
| Kirkland_Main-2105 | Kirkland_Manholes-1088 | 203.98 | Kirkland_Manholes-1087 | 203.79 | 103.7 | 0.19 | 8 | PVC | 0.01 | 306 | 5 | 4 | 10 | 3.2 | | |
| Kirkland_Main-2106 | Kirkland_Manholes-1087 | 203.79 | Kirkland_Manholes-1086 | 198.2 | 55.1 | 10.14 | 8 | PVC | 0.01 | 2,245 | 6 | 9 | 14 | 0.6 | | |
| Kirkland_Main-2107 | Kirkland_Manholes-1070 | 224.89 | Kirkland_Manholes-1083 | 220.88 | 227.5 | 1.76 | 12 | PVC | 0.01 | 2,760 | 193 | 537 | 906 | 32.8 | SM14-Ex-EX321 | |
| Kirkland_Main-2108 | Kirkland_Manholes-2996 | 220.63 | Kirkland_Manholes-1084 | 206.2 | 323.5 | 4.46 | 8 | PVC | 0.01 | 1,489 | 205 | 549 | 930 | 62.5 | | |
| Kirkland_Main-2109 | Kirkland_Manholes-1058 | 224.96 | Kirkland_Manholes-1084 | 206.2 | 342.8 | 5.47 | 8 | PVC | 0.01 | 1,649 | 17 | 52 | 69 | 4.2 | | |
| Kirkland_Main-2110 | Kirkland_Manholes-1084 | 206.2 | Kirkland_Manholes-1085 | 204.43 | 46.9 | 3.78 | 8 | PVC | 0.01 | 1,370 | 223 | 605 | 1,005 | 73.3 | | |
| Kirkland_Main-2111 | Kirkland_Manholes-1101 | 197.04 | Kirkland_Manholes-1104 | 196.79 | 207.5 | 0.12 | 24 | PVC | 0.01 | 4,572 | 880 | 2,284 | 3,163 | 69.2 | SM14-Ex-EX22 | |
| Kirkland_Main-2112 | Kirkland_Manholes-1112 | 179.44 | Kirkland_Manholes-1124 | 177.02 | 214.1 | 1.13 | 15 | PVC | 0.01 | 4,007 | 68 | 34 | 103 | 2.6 | | |
| Kirkland_Main-2113 | Kirkland_Manholes-1113 | 180.6 | Kirkland_Manholes-1112 | 179.44 | 131.8 | 0.88 | 15 | PVC | 0.01 | 3,535 | 59 | 26 | 84 | 2.4 | | |
| Kirkland_Main-2114 | Kirkland_Manholes-1117 | 196.58 | Kirkland_Manholes-1115 | 186.39 | 163.3 | 6.24 | 15 | PVC | 0.01 | 9,416 | 22 | 13 | 35 | 0.4 | | |
| Kirkland_Main-2115 | Kirkland_Manholes-1116 | 180.36 | Kirkland_Manholes-1112 | 179.44 | 120 | 0.77 | 8 | PVC | 0.01 | 617 | 4 | 4 | 8 | 1.3 | | |
| Kirkland_Main-2116 | Kirkland_Manholes-1119 | 159.49 | Kirkland_Manholes-1120 | 158.13 | 217.8 | 0.62 | 8 | PVC | 0.01 | 557 | 31 | 6 | 37 | 6.7 | | |
| Kirkland_Main-2117 | Kirkland_Manholes-1126 | 164.51 | Kirkland_Manholes-1127 | 163.92 | 310.2 | 0.19 | 24 | PVC | 0.01 | 5,757 | 391 | 738 | 1,305 | 22.7 | SM14-Ex-EX4 | |
| Kirkland_Main-2118 | Kirkland_Manholes-1134 | 223.76 | Kirkland_Manholes-1131 | 191.56 | 280.1 | 11.49 | 8 | PVC | 0.01 | 2,390 | 15 | 24 | 40 | 1.7 | SM14-Ex-EX63 | |
| Kirkland_Main-2119 | Kirkland_Manholes-1137 | 231.81 | Kirkland_Manholes-1135 | 210.01 | 166.8 | 13.07 | 8 | PVC | 0.01 | 2,549 | 2 | 4 | 7 | 0.3 | SM14-Ex-EX81 | |
| Kirkland_Main-2120 | Kirkland_Manholes-1135 | 210.01 | Kirkland_Manholes-1131 | 191.56 | 334.9 | 5.51 | 8 | PVC | 0.01 | 1,655 | 3 | 13 | 17 | 1 | SM14-Ex-EX81 | |
| Kirkland_Main-2121 | Kirkland_Manholes-1136 | 213.62 | Kirkland_Manholes-1135 | 210.01 | 85.6 | 4.22 | 8 | PVC | 0.01 | 1,448 | 0 | 4 | 5 | 0.3 | SM14-Ex-EX81 | |
| Kirkland_Main-2122 | Kirkland_Manholes-680 | 257.67 | Kirkland_Manholes-679 | 257.45 | 31.1 | 0.71 | 8 | PVC | 0.01 | 593 | 24 | 26 | 50 | 8.4 | | |
| Kirkland_Main-2123 | Kirkland_Manholes-679 | 257.45 | Kirkland_Manholes-681 | 256.89 | 146.9 | 0.38 | 8 | PVC | 0.01 | 435 | 26 | 34 | 60 | 13.8 | | |
| Kirkland_Main-2124 | Kirkland_Manholes-678 | 266.88 | Kirkland_Manholes-679 | 257.45 | 86.2 | 10.93 | 8 | PVC | 0.01 | 2,331 | 1 | 4 | 5 | 0.2 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2125 | Kirkland_Manholes-682 | 258.64 | Kirkland_Manholes-680 | 257.67 | 223 | 0.44 | 8 | PVC | 0.01 | 465 | 3 | 21 | 24 | 5.2 | | |
| Kirkland_Main-2126 | Kirkland_Manholes-685 | 255.36 | Kirkland_Manholes-1888 | 254.12 | 288.3 | 0.43 | 8 | PVC | 0.01 | 462 | 28 | 47 | 76 | 16.4 | | |
| Kirkland_Main-2127 | Kirkland_Manholes-684 | 256.25 | Kirkland_Manholes-685 | 255.36 | 200.3 | 0.44 | 8 | PVC | 0.01 | 469 | 26 | 43 | 69 | 14.8 | | |
| Kirkland_Main-2128 | Kirkland_Manholes-1740 | 35.99 | Kirkland_Manholes-1743 | 28.04 | 156.8 | 5.07 | 10 | PVC | 0.01 | 2,878 | 369 | 561 | 931 | 32.3 | | |
| Kirkland_Main-2129 | Kirkland_Manholes-1757 | 18.99 | Kirkland_Manholes-1756 | 15.01 | 53.7 | 7.42 | 8 | PVC | 0.01 | 1,920 | 6 | 7 | 12 | 0.6 | SM14-Ex-EX183 | |
| Kirkland_Main-2130 | Kirkland_Manholes-1756 | 15.01 | Kirkland_Manholes-1758 | 14.89 | 54.1 | 0.21 | 12 | PVC | 0.01 | 959 | 65 | 20 | 85 | 8.9 | SM14-Ex-EX183 | |
| Kirkland_Main-2131 | Kirkland_Manholes-1758 | 14.89 | Kirkland_Manholes-1759 | 14.76 | 60.8 | 0.23 | 12 | PVC | 0.01 | 991 | 69 | 26 | 95 | 9.6 | SM14-Ex-EX183 | |
| Kirkland_Main-2132 | Kirkland_Manholes-1759 | 14.76 | Kirkland_Manholes-1789 | 14.67 | 38.9 | 0.21 | 12 | PVC | 0.01 | 957 | 69 | 33 | 102 | 10.6 | SM14-Ex-EX183 | |
| Kirkland_Main-2133 | Kirkland_Manholes-2067 | 19 | Kirkland_Manholes-1756 | 15.01 | 217.5 | 1.84 | 12 | PVC | 0.01 | 2,816 | 52 | 7 | 59 | 2.1 | SM14-Ex-EX183 | |
| Kirkland_Main-2134 | Kirkland_Manholes-2305 | 15.26 | Kirkland_Manholes-1755 | 15.12 | 124.7 | 0.11 | 21 | PVC | 0.01 | 3,097 | 352 | 676 | 1,028 | 33.2 | | |
| Kirkland_Main-2135 | Kirkland_Manholes-1755 | 15.12 | Kirkland_Manholes-1753 | 14.83 | 381.1 | 0.08 | 21 | PVC | 0.01 | 2,550 | 353 | 683 | 1,035 | 40.6 | | |
| Kirkland_Main-2136 | Kirkland_Manholes-1753 | 14.83 | Kirkland_Manholes-1754 | 14.75 | 34.9 | 0.23 | 21 | PVC | 0.01 | 4,426 | 359 | 689 | 1,048 | 23.7 | | |
| Kirkland_Main-2137 | Kirkland_Manholes-1754 | 14.75 | Kirkland_Manholes-1789 | 14.67 | 165.1 | 0.05 | 21 | PVC | 0.01 | 2,035 | 366 | 696 | 1,062 | 52.2 | | |
| Kirkland_Main-2138 | Kirkland_Manholes-1692 | 35.9 | Kirkland_Manholes-736 | 28.45 | 107.1 | 6.96 | 8 | PVC | 0.01 | 1,860 | 98 | 272 | 370 | 19.9 | SM14-Ex-EX96 | |
| Kirkland_Main-2139 | Kirkland_Manholes-1694 | 44.12 | Kirkland_Manholes-1692 | 35.9 | 116.3 | 7.07 | 8 | PVC | 0.01 | 1,874 | 93 | 256 | 348 | 18.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2140 | Kirkland_Manholes-1701 | 49.81 | Kirkland_Manholes-1694 | 44.12 | 274.3 | 2.07 | 8 | PVC | 0.01 | 1,016 | 10 | 17 | 26 | 2.6 | SM14-Ex-EX152 | |
| Kirkland_Main-2141 | Kirkland_Manholes-1702 | 82.31 | Kirkland_Manholes-1701 | 49.81 | 296.4 | 10.96 | 8 | PVC | 0.01 | 2,335 | 2 | 8 | 10 | 0.4 | SM14-Ex-EX152 | |
| Kirkland_Main-2142 | Kirkland_Manholes-1698 | 89.68 | Kirkland_Manholes-1697 | 68.77 | 247.3 | 8.45 | 8 | PVC | 0.01 | 2,050 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX151 | |
| Kirkland_Main-2143 | Kirkland_Manholes-1697 | 68.77 | Kirkland_Manholes-1696 | 58.41 | 181 | 5.72 | 8 | PVC | 0.01 | 1,687 | 9 | 17 | 26 | 1.5 | SM14-Ex-EX151 | |
| Kirkland_Main-2144 | Kirkland_Manholes-614 | 87.89 | Kirkland_Manholes-1696 | 58.41 | 277.2 | 10.64 | 8 | PVC | 0.01 | 2,299 | 67 | 198 | 265 | 11.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2145 | Kirkland_Manholes-2025 | 477 | Kirkland_Manholes-2024 | 470.6 | 42.9 | 14.92 | 8 | PVC | 0.01 | 2,724 | 10 | 13 | 23 | 0.8 | | |
| Kirkland_Main-2146 | Kirkland_Manholes-2024 | 470.6 | Kirkland_Manholes-2023 | 466.76 | 120.1 | 3.2 | 8 | PVC | 0.01 | 1,261 | 11 | 17 | 28 | 2.2 | | |
| Kirkland_Main-2147 | Kirkland_Manholes-2019 | 467.83 | Kirkland_Manholes-2022 | 466 | 273.9 | 0.67 | 10 | PVC | 0.01 | 1,045 | 161 | 266 | 427 | 40.9 | | |
| Kirkland_Main-2148 | Kirkland_Manholes-2028 | 481.27 | Kirkland_Manholes-2026 | 474.59 | 90.6 | 7.37 | 8 | PVC | 0.01 | 1,914 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2149 | Kirkland_Manholes-2029 | 479.06 | Kirkland_Manholes-2027 | 477.1 | 283.3 | 0.69 | 8 | PVC | 0.01 | 586 | 35 | 82 | 117 | 19.9 | | |
| Kirkland_Main-2150 | Kirkland_Manholes-2027 | 477.1 | Kirkland_Manholes-2026 | 474.59 | 76.4 | 3.29 | 8 | PVC | 0.01 | 1,278 | 37 | 86 | 123 | 9.6 | | |
| Kirkland_Main-2151 | Kirkland_Manholes-2026 | 474.59 | Kirkland_Manholes-2021 | 473.17 | 135.7 | 1.05 | 8 | PVC | 0.01 | 721 | 39 | 94 | 134 | 18.6 | | |
| Kirkland_Main-2152 | Kirkland_Manholes-2033 | 462.47 | Kirkland_Manholes-2034 | 462.21 | 16.1 | 1.61 | 8 | PVC | 0.01 | 896 | 1 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2153 | Kirkland_Manholes-2034 | 462.21 | Kirkland_Manholes-2032 | 461.07 | 176.2 | 0.65 | 8 | PVC | 0.01 | 567 | 2 | 9 | 11 | 1.9 | | Drop Connection |
| Kirkland_Main-2154 | Kirkland_Manholes-2031 | 464.09 | Kirkland_Manholes-2032 | 458.97 | 79 | 6.48 | 8 | PVC | 0.01 | 1,795 | 178 | 305 | 483 | 26.9 | SM14-Ex-EX264 | |
| Kirkland_Main-2155 | Kirkland_Manholes-2030 | 465.11 | Kirkland_Manholes-2031 | 464.09 | 197.9 | 0.52 | 10 | PVC | 0.01 | 918 | 177 | 300 | 478 | 52 | | |
| Kirkland_Main-2156 | Kirkland_Manholes-2022 | 466 | Kirkland_Manholes-2030 | 465.11 | 389.3 | 0.23 | 10 | PVC | 0.01 | 611 | 174 | 292 | 466 | 76.2 | | |
| Kirkland_Main-2157 | Kirkland_Manholes-2035 | 454.4 | Kirkland_Manholes-2036 | 452.58 | 173.2 | 1.05 | 8 | PVC | 0.01 | 723 | 183 | 322 | 505 | 69.9 | SM14-Ex-EX264 | |
| Kirkland_Main-2158 | Kirkland_Manholes-2032 | 458.97 | Kirkland_Manholes-2035 | 454.4 | 196.5 | 2.33 | 8 | PVC | 0.01 | 1,075 | 182 | 318 | 499 | 46.5 | SM14-Ex-EX264 | |
| Kirkland_Main-2159 | Kirkland_Manholes-2039 | 480.14 | Kirkland_Manholes-2040 | 475.69 | 137 | 3.25 | 8 | PVC | 0.01 | 1,271 | 7 | 9 | 15 | 1.2 | SM14-Ex-EX266 | |
| Kirkland_Main-2160 | Kirkland_Manholes-2038 | 484.4 | Kirkland_Manholes-2039 | 480.14 | 188.8 | 2.26 | 8 | PVC | 0.01 | 1,059 | 2 | 4 | 6 | 0.6 | SM14-Ex-EX266 | |
| Kirkland_Main-2161 | Kirkland_Manholes-2040 | 475.69 | Kirkland_Manholes-2037 | 465.67 | 362.6 | 2.76 | 8 | PVC | 0.01 | 1,172 | 9 | 13 | 22 | 1.9 | SM14-Ex-EX266 | |
| Kirkland_Main-2162 | Kirkland_Manholes-2672 | 373.35 | Kirkland_Manholes-2674 | 354.77 | 247.9 | 7.5 | 8 | PVC | 0.01 | 1,930 | 26 | 86 | 112 | 5.8 | SM14-Ex-EX209 | |
| Kirkland_Main-2163 | Kirkland_Manholes-2671 | 399.75 | Kirkland_Manholes-2672 | 373.35 | 240.8 | 10.97 | 8 | PVC | 0.01 | 2,335 | 25 | 82 | 107 | 4.6 | SM14-Ex-EX209 | |
| Kirkland_Main-2164 | Kirkland_Manholes-2674 | 354.77 | Kirkland_Manholes-2300 | 337.19 | 208.1 | 8.45 | 8 | PVC | 0.01 | 2,049 | 28 | 90 | 118 | 5.7 | SM14-Ex-EX209 | |
| Kirkland_Main-2165 | Kirkland_Manholes-2678 | 335.2 | Kirkland_Manholes-2681 | 334.86 | 198.8 | 0.17 | 12 | PVC | 0.01 | 860 | 61 | 180 | 241 | 28 | SM14-Ex-EX206 | |
| Kirkland_Main-2166 | Kirkland_Manholes-2680 | 361.93 | Kirkland_Manholes-2678 | 335.2 | 358.9 | 7.45 | 8 | PVC | 0.01 | 1,924 | 4 | 4 | 8 | 0.4 | | |
| Kirkland_Main-2167 | Kirkland_Manholes-2677 | 336.2 | Kirkland_Manholes-2678 | 335.2 | 208.7 | 0.48 | 12 | PVC | 0.01 | 1,439 | 56 | 172 | 228 | 15.8 | SM14-Ex-EX206 | |
| Kirkland_Main-2168 | Kirkland_Manholes-2676 | 336.73 | Kirkland_Manholes-2677 | 336.2 | 133.1 | 0.4 | 12 | PVC | 0.01 | 1,317 | 56 | 167 | 223 | 17 | SM14-Ex-EX206 | |
| Kirkland_Main-2169 | Kirkland_Manholes-2675 | 350.82 | Kirkland_Manholes-2676 | 336.73 | 223.6 | 6.3 | 8 | PVC | 0.01 | 1,770 | 4 | 9 | 13 | 0.7 | SM14-Ex-EX208 | |
| Kirkland_Main-2170 | Kirkland_Manholes-2300 | 337.19 | Kirkland_Manholes-2676 | 336.73 | 113.6 | 0.4 | 12 | PVC | 0.01 | 1,317 | 50 | 155 | 205 | 15.6 | SM14-Ex-EX206 | |
| Kirkland_Main-2171 | Kirkland_Manholes-2697 | 234.26 | Kirkland_Manholes-2245 | 234.09 | 42.8 | 0.4 | 8 | PVC | 0.01 | 444 | 2 | 4 | 6 | 1.5 | | |
| Kirkland_Main-2173 | Kirkland_Manholes-2682 | 228.77 | Kirkland_Manholes-2685 | 228.01 | 128.4 | 0.59 | 8 | PVC | 0.01 | 542 | 6 | 13 | 19 | 3.5 | SM14-Ex-EX201 | |
| Kirkland_Main-2174 | Kirkland_Manholes-2683 | 239.58 | Kirkland_Manholes-2682 | 228.77 | 368.9 | 2.93 | 8 | PVC | 0.01 | 1,207 | 4 | 9 | 12 | 1 | | |
| Kirkland_Main-2175 | Kirkland_Manholes-2684 | 244.68 | Kirkland_Manholes-2683 | 239.58 | 150.1 | 3.4 | 8 | PVC | 0.01 | 1,300 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2176 | Kirkland_Manholes-2685 | 228.01 | Kirkland_Manholes-2686 | 221.84 | 249.2 | 2.48 | 8 | PVC | 0.01 | 1,109 | 7 | 17 | 24 | 2.2 | SM14-Ex-EX201 | |
| Kirkland_Main-2177 | Kirkland_Manholes-2311 | 256.52 | Kirkland_Manholes-2310 | 256 | 129.9 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 13 | 21 | 4.8 | | |
| Kirkland_Main-2178 | Kirkland_Manholes-2688 | 231.59 | Kirkland_Manholes-2687 | 227.79 | 162.1 | 2.34 | 8 | PVC | 0.01 | 1,080 | 4 | 9 | 13 | 1.2 | | |
| Kirkland_Main-2179 | Kirkland_Manholes-2687 | 227.79 | Kirkland_Manholes-2686 | 221.84 | 261.7 | 2.27 | 8 | PVC | 0.01 | 1,063 | 6 | 13 | 18 | 1.7 | | |
| Kirkland_Main-2180 | Kirkland_Manholes-2689 | 235.04 | Kirkland_Manholes-2688 | 231.59 | 174.6 | 1.98 | 8 | PVC | 0.01 | 991 | 2 | 4 | 7 | 0.7 | | |
| Kirkland_Main-2184 | Kirkland_Manholes-2691 | 211.09 | Kirkland_Manholes-2692 | 205.03 | 238.4 | 2.54 | 8 | PVC | 0.01 | 1,124 | 16 | 43 | 59 | 5.3 | SM14-Ex-EX201 | |
| Kirkland_Main-2185 | Kirkland_Manholes-2692 | 205.03 | Kirkland_Manholes-2693 | 198.67 | 215 | 2.96 | 8 | PVC | 0.01 | 1,213 | 18 | 47 | 65 | 5.3 | SM14-Ex-EX201 | |
| Kirkland_Main-2186 | Kirkland_Manholes-2693 | 198.67 | Kirkland_Manholes-2694 | 189.1 | 61.3 | 15.61 | 8 | PVC | 0.01 | 2,785 | 18 | 52 | 70 | 2.5 | SM14-Ex-EX201 | |
| Kirkland_Main-2187 | Kirkland_Manholes-2695 | 190.38 | Kirkland_Manholes-2694 | 189.1 | 280.3 | 0.46 | 8 | PVC | 0.01 | 476 | 0 | 4 | 5 | 1 | SM14-Ex-EX201 | |
| Kirkland_Main-2188 | Kirkland_Manholes-2694 | 189.1 | Kirkland_Manholes-2698 | 186.34 | 272.4 | 1.01 | 8 | PVC | 0.01 | 710 | 19 | 60 | 79 | 11.2 | SM14-Ex-EX198 | |
| Kirkland_Main-2189 | Kirkland_Manholes-2701 | 219.11 | Kirkland_Manholes-2700 | 212.52 | 304.2 | 2.17 | 8 | PVC | 0.01 | 1,038 | 15 | 60 | 75 | 7.2 | | |
| Kirkland_Main-2190 | Kirkland_Manholes-2700 | 212.52 | Kirkland_Manholes-2699 | 190.07 | 286.1 | 7.85 | 8 | PVC | 0.01 | 1,975 | 17 | 64 | 81 | 4.1 | SM14-Ex-EX202 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2191 | Kirkland_Manholes-2699 | 190.07 | Kirkland_Manholes-2696 | 172.94 | 342.2 | 5.01 | 8 | PVC | 0.01 | 1,578 | 17 | 69 | 86 | 5.5 | SM14-Ex-EX202 | |
| Kirkland_Main-2192 | Kirkland_Manholes-2706 | 252.55 | Kirkland_Manholes-2704 | 250.11 | 196.5 | 1.24 | 8 | PVC | 0.01 | 786 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-2193 | Kirkland_Manholes-2704 | 250.11 | Kirkland_Manholes-2705 | 234.07 | 107.2 | 14.96 | 8 | PVC | 0.01 | 2,727 | 12 | 52 | 63 | 2.3 | | |
| Kirkland_Main-2194 | Kirkland_Manholes-2705 | 234.07 | Kirkland_Manholes-2701 | 219.11 | 291.8 | 5.13 | 8 | PVC | 0.01 | 1,596 | 14 | 56 | 70 | 4.4 | | |
| Kirkland_Main-2195 | Kirkland_Manholes-2710 | 293.33 | Kirkland_Manholes-2709 | 292.14 | 31.4 | 3.79 | 8 | PVC | 0.01 | 1,373 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2197 | Kirkland_Manholes-501 | 145.5 | Kirkland_Manholes-502 | 134.98 | 294 | 3.58 | 8 | PVC | 0.01 | 1,334 | 2 | 8 | 10 | 0.8 | SM10 | |
| Kirkland_Main-2198 | Kirkland_Manholes-502 | 134.98 | Kirkland_Manholes-1158 | 124.93 | 261.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 5 | 17 | 21 | 1.5 | SM10 | |
| Kirkland_Main-2199 | Kirkland_Manholes-1178 | 142.08 | Kirkland_Manholes-1179 | 123.76 | 339.2 | 5.4 | 8 | PVC | 0.01 | 1,639 | 8 | 25 | 33 | 2 | SM10 | |
| Kirkland_Main-2200 | Kirkland_Manholes-1177 | 164.29 | Kirkland_Manholes-1178 | 142.08 | 352.7 | 6.3 | 8 | PVC | 0.01 | 1,769 | 5 | 17 | 21 | 1.2 | SM10 | |
| Kirkland_Main-2201 | Kirkland_Manholes-1176 | 174.14 | Kirkland_Manholes-1177 | 164.29 | 198.1 | 4.97 | 8 | PVC | 0.01 | 1,572 | 2 | 8 | 10 | 0.6 | SM10 | |
| Kirkland_Main-2202 | Kirkland_Manholes-1174 | 178.7 | Kirkland_Manholes-1173 | 177.85 | 211.5 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 8 | 11 | 2.4 | SM10 | Drop Connection |
| Kirkland_Main-2203 | Kirkland_Manholes-1175 | 174.04 | Kirkland_Manholes-1173 | 166.52 | 399.1 | 1.88 | 8 | PVC | 0.01 | 968 | 3 | 8 | 11 | 1.1 | SM10 | |
| Kirkland_Main-2204 | Kirkland_Manholes-1173 | 166.52 | Kirkland_Manholes-1172 | 164.12 | 183.3 | 1.31 | 8 | PVC | 0.01 | 807 | 9 | 25 | 34 | 4.2 | SM10 | |
| Kirkland_Main-2205 | Kirkland_Manholes-1172 | 164.12 | Kirkland_Manholes-1171 | 160.49 | 157.6 | 2.3 | 8 | PVC | 0.01 | 1,070 | 11 | 33 | 44 | 4.1 | SM14-Ex-EX79 | |
| Kirkland_Main-2206 | Kirkland_Manholes-2890 | 82 | Kirkland_Manholes-1162 | 78.51 | 88.5 | 3.95 | 8 | PVC | 0.01 | 1,400 | 1 | 8 | 359 | 25.7 | SM14-Ex-EX77 | |
| Kirkland_Main-2207 | Kirkland_Manholes-514 | 18.19 | Kirkland_Manholes-2958 | 17.19 | 133.7 | 0.75 | 8 | PVC | 0.01 | 610 | 38 | 212 | 250 | 41 | SM14-Ex-EX37 | |
| Kirkland_Main-2208 | Kirkland_Manholes-493 | 145.66 | Kirkland_Manholes-3107 | 127.14 | 403.7 | 4.59 | 8 | PVC | 0.01 | 1,510 | 3 | 8 | 11 | 0.7 | SM10 | |
| Kirkland_Main-2209 | Kirkland_Manholes-496 | 188.94 | Kirkland_Manholes-495 | 169.48 | 399.8 | 4.87 | 8 | PVC | 0.01 | 1,555 | 2 | 8 | 11 | 0.7 | SM10 | |
| Kirkland_Main-2210 | Kirkland_Manholes-497 | 188.11 | Kirkland_Manholes-499 | 185.94 | 314.9 | 0.69 | 8 | PVC | 0.01 | 585 | 22 | 58 | 80 | 13.7 | SM10 | |
| Kirkland_Main-2211 | Kirkland_Manholes-498 | 190.16 | Kirkland_Manholes-499 | 185.94 | 340.1 | 1.24 | 8 | PVC | 0.01 | 785 | 4 | 8 | 12 | 1.6 | SM10 | |
| Kirkland_Main-2213 | Kirkland_Manholes-510 | 78.8 | Kirkland_Manholes-509 | 76.43 | 10.6 | 22.33 | 15 | PVC | 0.01 | 17,810 | 9 | 41 | 50 | 0.3 | | |
| Kirkland_Main-2214 | Kirkland_Manholes-513 | 81.7 | Kirkland_Manholes-512 | 79.85 | 46 | 4.02 | 12 | PVC | 0.01 | 4,168 | 35 | 157 | 192 | 4.6 | SM14-Ex-EX76 | |
| Kirkland_Main-2215 | Kirkland_Manholes-1825 | 112.27 | Kirkland_Manholes-508 | 102 | 349.6 | 2.94 | 8 | PVC | 0.01 | 1,208 | 6 | 17 | 22 | 1.8 | SM10 | |
| Kirkland_Main-2216 | Kirkland_Manholes-508 | 102 | Kirkland_Manholes-507 | 100.47 | 381.8 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 25 | 33 | 7.3 | SM10 | Drop Connection |
| Kirkland_Main-2217 | Kirkland_Manholes-507 | 85.74 | Kirkland_Manholes-506 | 75.41 | 39.4 | 26.19 | 8 | PVC | 0.01 | 3,608 | 9 | 33 | 42 | 1.2 | | |
| Kirkland_Main-2218 | Kirkland_Manholes-506 | 75.41 | Kirkland_Manholes-505 | 74.06 | 314 | 0.43 | 15 | PVC | 0.01 | 2,471 | 149 | 594 | 1,093 | 44.2 | | |
| Kirkland_Main-2221 | Kirkland_Manholes-505 | 74.06 | Kirkland_Manholes-1824 | 72.16 | 261.9 | 0.73 | 15 | PVC | 0.01 | 3,210 | 150 | 603 | 1,103 | 34.4 | | |
| Kirkland_Main-2222 | Kirkland_Manholes-509 | 76.43 | Kirkland_Manholes-506 | 75.41 | 337.6 | 0.3 | 15 | PVC | 0.01 | 2,072 | 139 | 553 | 1,043 | 50.3 | | |
| Kirkland_Main-2224 | Kirkland_Manholes-1160 | 77.11 | Kirkland_Manholes-509 | 76.43 | 266.4 | 0.26 | 15 | PVC | 0.01 | 1,904 | 130 | 504 | 984 | 51.7 | | |
| Kirkland_Main-2225 | Kirkland_Manholes-511 | 79.24 | Kirkland_Manholes-1161 | 78.67 | 198.1 | 0.29 | 15 | PVC | 0.01 | 2,022 | 38 | 173 | 211 | 10.4 | | |
| Kirkland_Main-2226 | Kirkland_Manholes-512 | 79.85 | Kirkland_Manholes-511 | 79.24 | 306.1 | 0.2 | 15 | PVC | 0.01 | 1,683 | 37 | 165 | 202 | 12 | | |
| Kirkland_Main-2228 | Kirkland_Manholes-1533 | 294.07 | Kirkland_Manholes-1532 | 269.21 | 121 | 20.55 | 8 | PVC | 0.01 | 3,196 | 3 | 13 | 16 | 0.5 | SM14-Ex-EX126 | |
| Kirkland_Main-2229 | Kirkland_Manholes-1532 | 269.21 | Kirkland_Manholes-1531 | 265.03 | 88.5 | 4.72 | 8 | PVC | 0.01 | 1,532 | 4 | 17 | 21 | 1.4 | SM14-Ex-EX126 | |
| Kirkland_Main-2230 | Kirkland_Manholes-1211 | 186.99 | Kirkland_Manholes-1197 | 181.82 | 133.6 | 3.87 | 8 | | 0.012 | 1,156 | 6 | 33 | 39 | 3.4 | | |
| Kirkland_Main-2231 | Kirkland_Manholes-1531 | 265.03 | Kirkland_Manholes-1530 | 229.92 | 439.6 | 7.99 | 8 | PVC | 0.01 | 1,992 | 13 | 30 | 43 | 2.2 | SM14-Ex-EX125 | |
| Kirkland_Main-2232 | Kirkland_Manholes-1530 | 229.92 | Kirkland_Manholes-1529 | 223.45 | 269.7 | 2.4 | 8 | PVC | 0.01 | 1,092 | 46 | 116 | 162 | 14.8 | SM14-Ex-EX121 | |
| Kirkland_Main-2233 | Kirkland_Manholes-1529 | 223.45 | Kirkland_Manholes-1528 | 217.87 | 160.3 | 3.48 | 8 | PVC | 0.01 | 1,316 | 49 | 120 | 169 | 12.8 | SM14-Ex-EX121 | |
| Kirkland_Main-2235 | Kirkland_Manholes-1249 | 223.25 | Kirkland_Manholes-1250 | 210.15 | 250.9 | 5.22 | 8 | PVC | 0.01 | 1,611 | 25 | 99 | 124 | 7.7 | SM14-Ex-EX65 | |
| Kirkland_Main-2236 | Kirkland_Manholes-1246 | 238.47 | Kirkland_Manholes-1247 | 236.99 | 105.6 | 1.4 | 8 | PVC | 0.01 | 835 | 17 | 58 | 75 | 9 | SM14-Ex-EX65 | |
| Kirkland_Main-2237 | Kirkland_Manholes-1248 | 254.12 | Kirkland_Manholes-1247 | 236.99 | 222.2 | 7.71 | 8 | PVC | 0.01 | 1,958 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX97 | |
| Kirkland_Main-2238 | Kirkland_Manholes-1245 | 243.41 | Kirkland_Manholes-1246 | 238.47 | 272.7 | 1.81 | 8 | PVC | 0.01 | 949 | 15 | 50 | 64 | 6.8 | SM14-Ex-EX65 | |
| Kirkland_Main-2239 | Kirkland_Manholes-1244 | 254.14 | Kirkland_Manholes-1245 | 243.41 | 231.8 | 4.63 | 8 | PVC | 0.01 | 1,517 | 2 | 8 | 11 | 0.7 | SM14-Ex-EX65 | |
| Kirkland_Main-2240 | Kirkland_Manholes-1242 | 244.28 | Kirkland_Manholes-208 | 241.09 | 154 | 2.07 | 8 | PVC | 0.01 | 1,015 | 3 | 9 | 12 | 1.2 | SM14-Ex-EX61 | |
| Kirkland_Main-2241 | Kirkland_Manholes-1237 | 263.8 | Kirkland_Manholes-1236 | 256.67 | 250.6 | 2.84 | 8 | PVC | 0.01 | 1,189 | 1 | 4 | 6 | 0.5 | SM14-Ex-EX60 | |
| Kirkland_Main-2242 | Kirkland_Manholes-1239 | 270.66 | Kirkland_Manholes-1238 | 263.26 | 225.6 | 3.28 | 8 | PVC | 0.01 | 1,277 | 4 | 8 | 12 | 1 | SM14-Ex-EX95 | |
| Kirkland_Main-2244 | Kirkland_Manholes-1234 | 275.2 | Kirkland_Manholes-1233 | 274.4 | 31.3 | 2.55 | 8 | PVC | 0.01 | 1,127 | 2 | 8 | 10 | 0.9 | SM14-Ex-EX96 | |
| Kirkland_Main-2245 | Kirkland_Manholes-1233 | 274.4 | Kirkland_Manholes-1232 | 271.55 | 317 | 0.9 | 8 | PVC | 0.01 | 669 | 8 | 25 | 33 | 4.9 | SM14-Ex-EX96 | |
| Kirkland_Main-2246 | Kirkland_Manholes-1232 | 271.55 | Kirkland_Manholes-1231 | 254.08 | 347.6 | 5.03 | 8 | PVC | 0.01 | 1,581 | 11 | 33 | 44 | 2.8 | SM14-Ex-EX96 | |
| Kirkland_Main-2247 | Kirkland_Manholes-1231 | 254.08 | Kirkland_Manholes-1230 | 236.32 | 352.2 | 5.04 | 8 | PVC | 0.01 | 1,583 | 16 | 41 | 58 | 3.6 | SM14-Ex-EX96 | |
| Kirkland_Main-2248 | Kirkland_Manholes-1414 | 476.69 | Kirkland_Manholes-1415 | 475.19 | 382.9 | 0.39 | 8 | PVC | 0.01 | 441 | 5 | 21 | 27 | 6.1 | | |
| Kirkland_Main-2249 | Kirkland_Manholes-1416 | 475.58 | Kirkland_Manholes-1415 | 475.19 | 141 | 0.28 | 8 | PVC | 0.01 | 371 | 7 | 21 | 28 | 7.6 | | |
| Kirkland_Main-2250 | Kirkland_Manholes-1417 | 477.64 | Kirkland_Manholes-1416 | 475.58 | 44.3 | 4.65 | 8 | PVC | 0.01 | 1,521 | 5 | 17 | 23 | 1.5 | | |
| Kirkland_Main-2251 | Kirkland_Manholes-1419 | 480.31 | Kirkland_Manholes-1418 | 477.42 | 188.2 | 1.54 | 8 | PVC | 0.01 | 874 | 5 | 13 | 18 | 2 | | |
| Kirkland_Main-2252 | Kirkland_Manholes-1420 | 487.42 | Kirkland_Manholes-1419 | 480.31 | 251.4 | 2.83 | 8 | PVC | 0.01 | 1,186 | 4 | 9 | 12 | 1 | | |
| Kirkland_Main-2253 | Kirkland_Manholes-1421 | 490.08 | Kirkland_Manholes-1420 | 487.42 | 280.7 | 0.95 | 8 | PVC | 0.01 | 686 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2255 | Kirkland_Manholes-1422 | 436.01 | Kirkland_Manholes-1423 | 431.09 | 115.7 | 4.25 | 8 | PVC | 0.01 | 1,454 | 4 | 4 | 9 | 0.6 | | |
| Kirkland_Main-2256 | Kirkland_Manholes-1423 | 431.09 | Kirkland_Manholes-1424 | 424.73 | 75.1 | 8.47 | 8 | PVC | 0.01 | 2,052 | 6 | 9 | 15 | 0.7 | | |
| Kirkland_Main-2257 | Kirkland_Manholes-1424 | 424.73 | Kirkland_Manholes-1425 | 416.33 | 120.8 | 6.95 | 8 | PVC | 0.01 | 1,859 | 7 | 13 | 20 | 1.1 | | |
| Kirkland_Main-2258 | Kirkland_Manholes-1425 | 416.33 | Kirkland_Manholes-2514 | 400.04 | 156.3 | 10.42 | 8 | PVC | 0.01 | 2,276 | 9 | 17 | 26 | 1.2 | | |
| Kirkland_Main-2260 | Kirkland_Manholes-1426 | 513.73 | Kirkland_Manholes-1427 | 513.21 | 150.6 | 0.34 | 8 | PVC | 0.01 | 413 | 3 | 4 | 7 | 1.7 | | |
| Kirkland_Main-2261 | Kirkland_Manholes-2186 | 104.5 | Kirkland_Manholes-2185 | 103.23 | 40.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 27 | 41 | 68 | 5.4 | | |
| Kirkland_Main-2262 | Kirkland_Manholes-2188 | 116.01 | Kirkland_Manholes-2187 | 114.37 | 29.7 | 5.52 | 8 | PVC | 0.01 | 1,657 | 1 | 8 | 9 | 0.6 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2263 | Kirkland_Manholes-2192 | 135.5 | Kirkland_Manholes-2191 | 134.63 | 54 | 1.61 | 8 | PVC | 0.01 | 895 | 1 | 8 | 9 | 1 | | |
| Kirkland_Main-2265 | Kirkland_Manholes-2120 | 156.16 | O-33 | 155.88 | 68.2 | 0.41 | 8 | PVC | 0.01 | 452 | 3 | 4 | 7 | 1.6 | | |
| Kirkland_Main-2266 | Kirkland_Manholes-2121 | 179.17 | Kirkland_Manholes-2122 | 169.1 | 148.2 | 6.79 | 8 | PVC | 0.01 | 1,838 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX238 | |
| Kirkland_Main-2267 | Kirkland_Manholes-2122 | 169.1 | Kirkland_Manholes-2123 | 164.83 | 234.6 | 1.82 | 8 | PVC | 0.01 | 951 | 3 | 9 | 12 | 1.2 | SM14-Ex-EX238 | |
| Kirkland_Main-2268 | Kirkland_Manholes-2200 | 29.87 | Kirkland_Manholes-2202 | 26.91 | 11.2 | 26.5 | 8 | PVC | 0.01 | 3,629 | 56 | 20 | 75 | 2.1 | | Slope confirmed by as-builts |
| Kirkland_Main-2270 | Kirkland_Manholes-2209 | 69.6 | Kirkland_Manholes-2206 | 66.42 | 347.3 | 0.92 | 8 | PVC | 0.01 | 675 | 2 | 8 | 10 | 1.5 | SM8 | |
| Kirkland_Main-2271 | Kirkland_Manholes-2208 | 66.31 | Kirkland_Manholes-2207 | 65.6 | 145.2 | 0.49 | 8 | PVC | 0.01 | 493 | 1 | 7 | 7 | 1.4 | SM14-Ex-EX189 | Drop Connection |
| Kirkland_Main-2272 | Kirkland_Manholes-2216 | 56.6 | Kirkland_Manholes-2217 | 22.48 | 221.2 | 15.42 | 8 | PVC | 0.01 | 2,769 | 6 | 33 | 38 | 1.4 | | |
| Kirkland_Main-2273 | Kirkland_Manholes-2215 | 67.8 | Kirkland_Manholes-2214 | 67.15 | 122.4 | 0.53 | 8 | PVC | 0.01 | 514 | 2 | 7 | 9 | 1.7 | | |
| Kirkland_Main-2274 | Kirkland_Manholes-2214 | 67.15 | Kirkland_Manholes-2213 | 66.3 | 36.8 | 2.31 | 8 | PVC | 0.01 | 1,071 | 2 | 13 | 15 | 1.4 | | |
| Kirkland_Main-2275 | Kirkland_Manholes-2213 | 66.3 | Kirkland_Manholes-2216 | 56.6 | 199.9 | 4.85 | 8 | PVC | 0.01 | 1,553 | 4 | 26 | 30 | 1.9 | | |
| Kirkland_Main-2276 | Kirkland_Manholes-2212 | 72.13 | Kirkland_Manholes-2213 | 66.3 | 100 | 5.83 | 8 | PVC | 0.01 | 1,702 | 2 | 7 | 8 | 0.5 | SM14-Ex-EX190 | |
| Kirkland_Main-2278 | Kirkland_Manholes-2124 | 217.78 | Kirkland_Manholes-2303 | 195.57 | 353.2 | 6.29 | 12 | PVC | 0.01 | 5,212 | 418 | 957 | 1,375 | 26.4 | SM14-Ex-EX248 | |
| Kirkland_Main-2280 | Kirkland_Manholes-1463 | 498.43 | Kirkland_Manholes-1464 | 490.77 | 337.1 | 2.27 | 8 | PVC | 0.01 | 1,063 | 8 | 17 | 25 | 2.3 | SM14-Ex-EX271 | |
| Kirkland_Main-2281 | Kirkland_Manholes-1465 | 496.7 | Kirkland_Manholes-1464 | 490.77 | 350 | 1.69 | 8 | PVC | 0.01 | 917 | 9 | 13 | 22 | 2.4 | SM14-Ex-EX272 | |
| Kirkland_Main-2282 | Kirkland_Manholes-1464 | 490.77 | Kirkland_Manholes-1469 | 490.09 | 171.1 | 0.4 | 8 | PVC | 0.01 | 446 | 19 | 34 | 53 | 11.9 | SM14-Ex-EX271 | |
| Kirkland_Main-2283 | Kirkland_Manholes-1466 | 501.75 | Kirkland_Manholes-1465 | 496.7 | 399.1 | 1.27 | 8 | PVC | 0.01 | 793 | 5 | 9 | 14 | 1.7 | SM14-Ex-EX272 | |
| Kirkland_Main-2284 | Kirkland_Manholes-1467 | 507 | Kirkland_Manholes-1466 | 501.75 | 336.1 | 1.56 | 8 | PVC | 0.01 | 881 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX272 | |
| Kirkland_Main-2285 | Kirkland_Manholes-1470 | 502.07 | Kirkland_Manholes-1475 | 484.92 | 351.8 | 4.88 | 8 | PVC | 0.01 | 1,557 | 1 | 4 | 6 | 0.4 | SM14-Ex-EX268 | |
| Kirkland_Main-2286 | Kirkland_Manholes-1471 | 502.1 | Kirkland_Manholes-1472 | 489.92 | 152.5 | 7.99 | 8 | PVC | 0.01 | 1,993 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX267 | |
| Kirkland_Main-2287 | Kirkland_Manholes-1472 | 489.92 | Kirkland_Manholes-1473 | 489.3 | 149.9 | 0.41 | 8 | PVC | 0.01 | 453 | 4 | 9 | 12 | 2.7 | SM14-Ex-EX267 | |
| Kirkland_Main-2288 | Kirkland_Manholes-1473 | 489.3 | Kirkland_Manholes-1474 | 483.04 | 397.5 | 1.57 | 8 | PVC | 0.01 | 885 | 6 | 13 | 18 | 2.1 | SM14-Ex-EX267 | |
| Kirkland_Main-2289 | Kirkland_Manholes-1474 | 483.04 | Kirkland_Manholes-1478 | 480.02 | 383.8 | 0.79 | 8 | PVC | 0.01 | 625 | 8 | 17 | 25 | 4 | SM14-Ex-EX267 | |
| Kirkland_Main-2290 | Kirkland_Manholes-1475 | 484.92 | Kirkland_Manholes-1476 | 483.18 | 394.8 | 0.44 | 8 | PVC | 0.01 | 468 | 3 | 9 | 11 | 2.4 | SM14-Ex-EX268 | |
| Kirkland_Main-2291 | Kirkland_Manholes-1476 | 483.18 | Kirkland_Manholes-1477 | 477.36 | 143.4 | 4.06 | 8 | PVC | 0.01 | 1,421 | 4 | 13 | 17 | 1.2 | SM14-Ex-EX268 | |
| Kirkland_Main-2292 | Kirkland_Manholes-1477 | 477.36 | Kirkland_Manholes-1481 | 462.54 | 116.7 | 12.7 | 8 | PVC | 0.01 | 2,512 | 5 | 17 | 22 | 0.9 | SM14-Ex-EX268 | |
| Kirkland_Main-2293 | Kirkland_Manholes-1478 | 480.02 | Kirkland_Manholes-1479 | 473.98 | 182.8 | 3.3 | 8 | PVC | 0.01 | 1,282 | 10 | 21 | 32 | 2.5 | SM14-Ex-EX267 | |
| Kirkland_Main-2294 | Kirkland_Manholes-1479 | 473.98 | Kirkland_Manholes-1483 | 455.88 | 188.4 | 9.61 | 8 | PVC | 0.01 | 2,185 | 11 | 26 | 37 | 1.7 | SM14-Ex-EX267 | |
| Kirkland_Main-2295 | Kirkland_Manholes-1482 | 457.77 | Kirkland_Manholes-1483 | 455.88 | 220.6 | 0.86 | 8 | PVC | 0.01 | 653 | 90 | 262 | 351 | 53.9 | SM14-Ex-EX214 | |
| Kirkland_Main-2296 | Kirkland_Manholes-1483 | 455.88 | Kirkland_Manholes-2042 | 455.6 | 242 | 0.12 | 12 | PVC | 0.01 | 707 | 102 | 292 | 394 | 55.7 | SM14-Ex-EX214 | |
| Kirkland_Main-2297 | Kirkland_Manholes-1480 | 465.84 | Kirkland_Manholes-1482 | 457.77 | 216.4 | 3.73 | 8 | PVC | 0.01 | 1,362 | 83 | 236 | 320 | 23.5 | SM14-Ex-EX214 | |
| Kirkland_Main-2298 | Kirkland_Manholes-2162 | 123.07 | Kirkland_Manholes-2139 | 96.6 | 399.7 | 6.62 | 8 | PVC | 0.01 | 1,814 | 6 | 17 | 22 | 1.2 | SM14-Ex-EX194 | |
| Kirkland_Main-2299 | Kirkland_Manholes-2161 | 148.95 | Kirkland_Manholes-2162 | 123.07 | 410.6 | 6.3 | 8 | PVC | 0.01 | 1,770 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX194 | |
| Kirkland_Main-2300 | Kirkland_Manholes-2239 | 125.2 | Kirkland_Manholes-2238 | 92.13 | 326.8 | 10.12 | 8 | PVC | 0.01 | 2,243 | 3 | 6 | 9 | 0.4 | SM14-Ex-EX224 | |
| Kirkland_Main-2301 | Kirkland_Manholes-2241 | 73.4 | Kirkland_Manholes-2240 | 69.07 | 226.1 | 1.92 | 8 | PVC | 0.01 | 976 | 2 | 7 | 8 | 0.9 | | |
| Kirkland_Main-2302 | Kirkland_Manholes-2159 | 84.71 | Kirkland_Manholes-2240 | 69.07 | 248.4 | 6.3 | 8 | PVC | 0.01 | 1,769 | 22 | 65 | 87 | 4.9 | | |
| Kirkland_Main-2303 | Kirkland_Manholes-2243 | 51.95 | Kirkland_Manholes-2244 | 43.69 | 203.1 | 4.07 | 8 | PVC | 0.01 | 1,422 | 2 | 7 | 9 | 0.6 | | |
| Kirkland_Main-2304 | Kirkland_Manholes-2240 | 69.07 | Kirkland_Manholes-2244 | 43.69 | 271.1 | 9.36 | 8 | PVC | 0.01 | 2,157 | 26 | 78 | 104 | 4.8 | | |
| Kirkland_Main-2305 | Kirkland_Manholes-2244 | 43.69 | Kirkland_Manholes-2155 | 42.84 | 213.7 | 0.4 | 8 | PVC | 0.01 | 446 | 32 | 91 | 123 | 27.5 | | Drop Connection |
| Kirkland_Main-2306 | Kirkland_Manholes-2494 | 170.93 | Kirkland_Manholes-2132 | 159.52 | 411.9 | 2.77 | 8 | PVC | 0.01 | 1,173 | 20 | 26 | 46 | 3.9 | SM14-Ex-EX236 | |
| Kirkland_Main-2307 | Kirkland_Manholes-2242 | 36.17 | Kirkland_Manholes-2317 | 17.2 | 251 | 7.56 | 8 | PVC | 0.01 | 1,938 | 2 | 7 | 8 | 0.4 | SM14-Ex-EX191 | |
| Kirkland_Main-2308 | Kirkland_Manholes-2229 | 22.53 | Kirkland_Manholes-2313 | 22.37 | 40.9 | 0.4 | 8 | PVC | 0.01 | 446 | 18 | 39 | 57 | 12.7 | | Drop Connection |
| Kirkland_Main-2309 | Kirkland_Manholes-2228 | 23.08 | Kirkland_Manholes-2314 | 22.81 | 66.4 | 0.4 | 8 | PVC | 0.01 | 446 | 22 | 78 | 100 | 22.4 | | Drop Connection |
| Kirkland_Main-2311 | Kirkland_Manholes-2257 | 348.17 | Kirkland_Manholes-2256 | 329.88 | 184.1 | 9.94 | 8 | PVC | 0.01 | 2,222 | 1 | 4 | 6 | 0.3 | SM14-Ex-EX254 | |
| Kirkland_Main-2312 | Kirkland_Manholes-2267 | 393.07 | Kirkland_Manholes-2266 | 392.8 | 100.8 | 0.27 | 8 | PVC | 0.01 | 365 | 4 | 17 | 21 | 5.9 | | |
| Kirkland_Main-2313 | Kirkland_Manholes-2715 | 29.78 | Kirkland_Manholes-2716 | 29.3 | 129 | 0.37 | 12 | PVC | 0.01 | 1,268 | 87 | 19 | 105 | 8.3 | | |
| Kirkland_Main-2314 | Kirkland_Manholes-2716 | 29.3 | Kirkland_Manholes-2717 | 21.61 | 141.2 | 5.45 | 12 | PVC | 0.01 | 4,851 | 88 | 25 | 113 | 2.3 | | |
| Kirkland_Main-2315 | Kirkland_Manholes-2717 | 21.61 | Kirkland_Manholes-2718 | 21.4 | 363.5 | 0.06 | 12 | PVC | 0.01 | 500 | 89 | 31 | 120 | 24 | | |
| Kirkland_Main-2316 | Kirkland_Manholes-2052 | 419.8 | Kirkland_Manholes-2280 | 418.85 | 171.1 | 0.56 | 8 | PVC | 0.01 | 525 | 1 | 4 | 6 | 1.1 | SM14-Ex-EX262 | |
| Kirkland_Main-2317 | Kirkland_Manholes-2280 | 418.85 | Kirkland_Manholes-2279 | 418 | 153.8 | 0.55 | 8 | PVC | 0.01 | 524 | 3 | 9 | 11 | 2.2 | SM14-Ex-EX262 | |
| Kirkland_Main-2318 | Kirkland_Manholes-2274 | 417.36 | Kirkland_Manholes-2273 | 414.69 | 101.2 | 2.64 | 8 | PVC | 0.01 | 1,145 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-2319 | Kirkland_Manholes-2279 | 418 | Kirkland_Manholes-2268 | 401.9 | 291.9 | 5.52 | 8 | PVC | 0.01 | 1,656 | 4 | 13 | 17 | 1 | SM14-Ex-EX262 | |
| Kirkland_Main-2320 | Kirkland_Manholes-2268 | 401.9 | Kirkland_Manholes-2269 | 398.2 | 115.6 | 3.2 | 8 | PVC | 0.01 | 1,262 | 23 | 69 | 92 | 7.3 | SM14-Ex-EX261 | |
| Kirkland_Main-2321 | Kirkland_Manholes-2270 | 403.21 | Kirkland_Manholes-2269 | 398.2 | 107.6 | 4.66 | 8 | PVC | 0.01 | 1,521 | 8 | 39 | 46 | 3.1 | | |
| Kirkland_Main-2322 | Kirkland_Manholes-2273 | 414.69 | Kirkland_Manholes-2272 | 410.23 | 107.4 | 4.15 | 8 | PVC | 0.01 | 1,437 | 3 | 9 | 11 | 0.8 | | |
| Kirkland_Main-2323 | Kirkland_Manholes-2272 | 410.23 | Kirkland_Manholes-2271 | 405.49 | 51.3 | 9.24 | 8 | PVC | 0.01 | 2,143 | 3 | 13 | 16 | 0.7 | | |
| Kirkland_Main-2324 | Kirkland_Manholes-2271 | 405.49 | Kirkland_Manholes-2270 | 403.21 | 91.2 | 2.5 | 8 | PVC | 0.01 | 1,115 | 7 | 34 | 42 | 3.7 | | |
| Kirkland_Main-2325 | Kirkland_Manholes-2276 | 410.45 | Kirkland_Manholes-2277 | 408.15 | 110.4 | 2.08 | 8 | PVC | 0.01 | 1,017 | 2 | 9 | 11 | 1.1 | | |
| Kirkland_Main-2326 | Kirkland_Manholes-2277 | 408.15 | Kirkland_Manholes-2278 | 406.74 | 80.9 | 1.74 | 8 | PVC | 0.01 | 931 | 3 | 13 | 16 | 1.7 | | |
| Kirkland_Main-2327 | Kirkland_Manholes-1228 | 189.87 | Kirkland_Manholes-1227 | 174.57 | 207.5 | 7.37 | 8 | PVC | 0.01 | 1,915 | 31 | 74 | 105 | 5.5 | SM14-Ex-EX96 | |
| Kirkland_Main-2329 | Kirkland_Manholes-1226 | 185.47 | Kirkland_Manholes-1227 | 174.57 | 349.3 | 3.12 | 8 | PVC | 0.01 | 1,245 | 3 | 8 | 12 | 0.9 | SM14-Ex-EX93 | |
| Kirkland_Main-2333 | Kirkland_Manholes-1209 | 251.94 | Kirkland_Manholes-1208 | 237.71 | 314.7 | 4.52 | 8 | PVC | 0.01 | 1,499 | 13 | 31 | 45 | 3 | SM14-Ex-EX90 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2335 | Kirkland_Manholes-1210 | 257.02 | Kirkland_Manholes-1209 | 251.94 | 317.5 | 1.6 | 8 | PVC | 0.01 | 892 | 10 | 23 | 33 | 3.7 | SM14-Ex-EX90 | |
| Kirkland_Main-2341 | Kirkland_Manholes-1214 | 261.31 | Kirkland_Manholes-1215 | 243.02 | 404.6 | 4.52 | 8 | PVC | 0.01 | 1,499 | 7 | 11 | 18 | 1.2 | SM14-Ex-EX90 | |
| Kirkland_Main-2342 | Kirkland_Manholes-1241 | 267.65 | Kirkland_Manholes-1215 | 243.02 | 241.5 | 10.2 | 8 | PVC | 0.01 | 2,252 | 4 | 4 | 8 | 0.4 | SM14-Ex-EX63 | |
| Kirkland_Main-2343 | Kirkland_Manholes-1215 | 243.02 | Kirkland_Manholes-1134 | 223.76 | 275.3 | 7 | 8 | PVC | 0.01 | 1,865 | 12 | 20 | 32 | 1.7 | SM14-Ex-EX63 | |
| Kirkland_Main-2344 | Kirkland_Manholes-1217 | 232.97 | Kirkland_Manholes-1218 | 220.85 | 252.7 | 4.8 | 8 | PVC | 0.01 | 1,544 | 2 | 4 | 6 | 0.4 | SM14-Ex-EX59 | |
| Kirkland_Main-2345 | Kirkland_Manholes-1270 | 246.8 | Kirkland_Manholes-1245 | 243.41 | 285.9 | 1.19 | 8 | PVC | 0.01 | 768 | 2 | 8 | 10 | 1.3 | SM14-Ex-EX64 | |
| Kirkland_Main-2348 | Kirkland_Manholes-1276 | 172.95 | Kirkland_Manholes-1279 | 163.99 | 169.3 | 5.29 | 8 | PVC | 0.01 | 1,622 | 6 | 17 | 22 | 1.4 | | |
| Kirkland_Main-2349 | Kirkland_Manholes-1569 | 157.57 | Kirkland_Manholes-1293 | 152.35 | 333.3 | 1.57 | 8 | PVC | 0.01 | 882 | 5 | 8 | 14 | 1.5 | SM14-Ex-EX113 | |
| Kirkland_Main-2350 | Kirkland_Manholes-1293 | 152.35 | Kirkland_Manholes-1292 | 148.28 | 368.4 | 1.1 | 8 | PVC | 0.01 | 741 | 10 | 17 | 26 | 3.6 | SM14-Ex-EX113 | |
| Kirkland_Main-2351 | Kirkland_Manholes-1568 | 145.18 | Kirkland_Manholes-1297 | 132.74 | 335 | 3.71 | 8 | PVC | 0.01 | 1,359 | 3 | 8 | 12 | 0.9 | SM14-Ex-EX114 | |
| Kirkland_Main-2352 | Kirkland_Manholes-1297 | 132.74 | Kirkland_Manholes-1296 | 129.32 | 308.3 | 1.11 | 8 | PVC | 0.01 | 743 | 6 | 17 | 22 | 3 | SM14-Ex-EX114 | |
| Kirkland_Main-2353 | Kirkland_Manholes-1281 | 154.69 | Kirkland_Manholes-1292 | 148.28 | 310.6 | 2.06 | 8 | PVC | 0.01 | 1,013 | 72 | 248 | 320 | 31.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2354 | Kirkland_Manholes-1292 | 148.28 | Kirkland_Manholes-1296 | 129.32 | 322 | 5.89 | 8 | PVC | 0.01 | 1,711 | 85 | 272 | 357 | 20.9 | SM14-Ex-EX102 | |
| Kirkland_Main-2357 | Kirkland_Manholes-1266 | 188.85 | Kirkland_Manholes-1264 | 172.1 | 141.2 | 11.87 | 8 | PVC | 0.01 | 2,429 | 2 | 8 | 10 | 0.4 | | |
| Kirkland_Main-2358 | Kirkland_Manholes-1264 | 172.1 | Kirkland_Manholes-1265 | 168.12 | 70.1 | 5.67 | 8 | PVC | 0.01 | 1,679 | 3 | 17 | 19 | 1.1 | | |
| Kirkland_Main-2363 | Kirkland_Manholes-1273 | 182.86 | Kirkland_Manholes-1274 | 175.64 | 151.8 | 4.76 | 8 | PVC | 0.01 | 1,538 | 7 | 25 | 32 | 2.1 | | |
| Kirkland_Main-2364 | Kirkland_Manholes-1252 | 181.71 | Kirkland_Manholes-1277 | 163.83 | 245.6 | 7.28 | 8 | PVC | 0.01 | 1,902 | 57 | 190 | 247 | 13 | SM14-Ex-EX101 | |
| Kirkland_Main-2365 | Kirkland_Manholes-1277 | 163.83 | Kirkland_Manholes-1278 | 160.09 | 110.9 | 3.37 | 8 | PVC | 0.01 | 1,295 | 59 | 198 | 257 | 19.8 | SM14-Ex-EX102 | |
| Kirkland_Main-2366 | Kirkland_Manholes-1278 | 160.09 | Kirkland_Manholes-1280 | 156.25 | 144.5 | 2.66 | 8 | PVC | 0.01 | 1,149 | 67 | 231 | 298 | 25.9 | SM14-Ex-EX102 | |
| Kirkland_Main-2367 | Kirkland_Manholes-1280 | 156.25 | Kirkland_Manholes-1281 | 154.69 | 317.7 | 0.49 | 8 | PVC | 0.01 | 494 | 70 | 239 | 309 | 62.6 | SM14-Ex-EX102 | |
| Kirkland_Main-2369 | Kirkland_Manholes-1311 | 230.66 | Kirkland_Manholes-1312 | 230.27 | 96.9 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 5 | 1.1 | | |
| Kirkland_Main-2370 | Kirkland_Manholes-1313 | 230.7 | Kirkland_Manholes-1312 | 230.27 | 76.5 | 0.56 | 8 | PVC | 0.01 | 528 | 5 | 13 | 18 | 3.5 | | |
| Kirkland_Main-2371 | Kirkland_Manholes-1312 | 230.27 | Kirkland_Manholes-1306 | 225.07 | 369.5 | 1.41 | 8 | PVC | 0.01 | 836 | 6 | 22 | 28 | 3.4 | | |
| Kirkland_Main-2372 | Kirkland_Manholes-1513 | 263.11 | Kirkland_Manholes-1515 | 261.7 | 138 | 1.02 | 8 | PVC | 0.01 | 713 | 50 | 155 | 204 | 28.6 | SM14-Ex-EX131 | |
| Kirkland_Main-2373 | Kirkland_Manholes-1508 | 264.2 | Kirkland_Manholes-1514 | 263.47 | 179.7 | 0.41 | 8 | PVC | 0.01 | 450 | 46 | 142 | 187 | 41.6 | SM14-Ex-EX131 | |
| Kirkland_Main-2374 | Kirkland_Manholes-1684 | 76.22 | Kirkland_Manholes-1683 | 75.33 | 41.4 | 2.15 | 8 | PVC | 0.01 | 1,034 | 4 | 8 | 12 | 1.1 | | |
| Kirkland_Main-2375 | Kirkland_Manholes-1851 | 275 | Kirkland_Manholes-1316 | 272.4 | 254.5 | 1.02 | 8 | PVC | 0.01 | 713 | 2 | 9 | 11 | 1.6 | | |
| Kirkland_Main-2376 | Kirkland_Manholes-1317 | 271.64 | Kirkland_Manholes-924 | 268.15 | 334 | 1.04 | 12 | PVC | 0.01 | 2,125 | 176 | 459 | 635 | 29.9 | | |
| Kirkland_Main-2377 | Kirkland_Manholes-2984 | 277.63 | Kirkland_Manholes-1317 | 271.64 | 132.6 | 4.52 | 10 | PVC | 0.01 | 2,717 | 167 | 404 | 571 | 21 | | |
| Kirkland_Main-2378 | Kirkland_Manholes-1371 | 376.15 | Kirkland_Manholes-3081 | 373.55 | 185 | 1.41 | 8 | PVC | 0.01 | 836 | 98 | 193 | 291 | 34.9 | | |
| Kirkland_Main-2379 | Kirkland_Manholes-1319 | 372.4 | Kirkland_Manholes-1318 | 358.26 | 123 | 11.5 | 8 | PVC | 0.01 | 2,391 | 102 | 206 | 308 | 12.9 | | |
| Kirkland_Main-2380 | Kirkland_Manholes-1318 | 358.26 | Kirkland_Manholes-1320 | 342.61 | 140.9 | 11.1 | 10 | PVC | 0.01 | 4,260 | 102 | 210 | 313 | 7.3 | | |
| Kirkland_Main-2381 | Kirkland_Manholes-1320 | 342.61 | Kirkland_Manholes-1326 | 321.42 | 151.5 | 13.98 | 10 | PVC | 0.01 | 4,780 | 139 | 283 | 422 | 8.8 | | |
| Kirkland_Main-2382 | Kirkland_Manholes-1514 | 263.47 | Kirkland_Manholes-1513 | 263.11 | 127.9 | 0.28 | 8 | PVC | 0.01 | 374 | 47 | 146 | 193 | 51.6 | SM14-Ex-EX131 | |
| Kirkland_Main-2383 | Kirkland_Manholes-1507 | 265.94 | Kirkland_Manholes-1508 | 264.2 | 288.2 | 0.6 | 8 | PVC | 0.01 | 547 | 40 | 124 | 165 | 30.1 | SM14-Ex-EX131 | |
| Kirkland_Main-2384 | Kirkland_Manholes-1322 | 342.78 | Kirkland_Manholes-1320 | 342.61 | 36.2 | 0.47 | 8 | PVC | 0.01 | 483 | 35 | 69 | 104 | 21.6 | | |
| Kirkland_Main-2385 | Kirkland_Manholes-1321 | 355.4 | Kirkland_Manholes-1322 | 342.78 | 269.6 | 4.68 | 8 | PVC | 0.01 | 1,525 | 34 | 64 | 99 | 6.5 | | |
| Kirkland_Main-2386 | Kirkland_Manholes-1335 | 367.98 | Kirkland_Manholes-1321 | 355.4 | 137.9 | 9.12 | 8 | PVC | 0.01 | 2,129 | 32 | 60 | 92 | 4.3 | | |
| Kirkland_Main-2387 | Kirkland_Manholes-1323 | 332.91 | Kirkland_Manholes-1324 | 332.34 | 49.4 | 1.15 | 8 | PVC | 0.01 | 757 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2388 | Kirkland_Manholes-1324 | 332.34 | Kirkland_Manholes-1325 | 323.2 | 121 | 7.55 | 8 | PVC | 0.01 | 1,938 | 3 | 9 | 11 | 0.6 | | |
| Kirkland_Main-2389 | Kirkland_Manholes-1325 | 323.2 | Kirkland_Manholes-1326 | 321.42 | 174.1 | 1.02 | 8 | PVC | 0.01 | 713 | 4 | 13 | 17 | 2.4 | | |
| Kirkland_Main-2390 | Kirkland_Manholes-1326 | 321.42 | Kirkland_Manholes-1339 | 314.87 | 128.9 | 5.08 | 10 | PVC | 0.01 | 2,880 | 146 | 313 | 460 | 16 | | |
| Kirkland_Main-2391 | Kirkland_Manholes-1337 | 323.9 | Kirkland_Manholes-1326 | 321.42 | 30.5 | 8.12 | 8 | PVC | 0.01 | 2,009 | 3 | 13 | 16 | 0.8 | | |
| Kirkland_Main-2392 | Kirkland_Manholes-1327 | 326.71 | Kirkland_Manholes-1337 | 323.9 | 27.1 | 10.37 | 8 | PVC | 0.01 | 2,271 | 2 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2393 | Kirkland_Manholes-1328 | 394.1 | Kirkland_Manholes-1329 | 393.5 | 241.8 | 0.25 | 8 | PVC | 0.01 | 351 | 8 | 30 | 38 | 10.8 | | |
| Kirkland_Main-2394 | Kirkland_Manholes-1329 | 393.5 | Kirkland_Manholes-1330 | 392.47 | 187.9 | 0.55 | 8 | PVC | 0.01 | 522 | 10 | 34 | 44 | 8.4 | | |
| Kirkland_Main-2395 | Kirkland_Manholes-1330 | 392.47 | Kirkland_Manholes-1332 | 391.73 | 102.7 | 0.72 | 8 | PVC | 0.01 | 597 | 10 | 39 | 49 | 8.2 | | |
| Kirkland_Main-2396 | Kirkland_Manholes-1332 | 391.73 | Kirkland_Manholes-1333 | 390.44 | 145.6 | 0.89 | 8 | PVC | 0.01 | 664 | 29 | 47 | 76 | 11.5 | SM14-Ex-EX177 | Drop Connection |
| Kirkland_Main-2397 | Kirkland_Manholes-1331 | 393.51 | Kirkland_Manholes-1332 | 391.73 | 79.5 | 2.24 | 8 | PVC | 0.01 | 1,054 | 1 | 4 | 5 | 0.5 | SM14-Ex-EX177 | |
| Kirkland_Main-2398 | Kirkland_Manholes-1333 | 387.1 | Kirkland_Manholes-1334 | 373.64 | 147.7 | 9.12 | 8 | PVC | 0.01 | 2,129 | 30 | 52 | 82 | 3.8 | | |
| Kirkland_Main-2399 | Kirkland_Manholes-1334 | 373.64 | Kirkland_Manholes-1335 | 367.98 | 202.7 | 2.79 | 8 | PVC | 0.01 | 1,178 | 31 | 56 | 87 | 7.4 | | |
| Kirkland_Main-2400 | Kirkland_Manholes-1336 | 341.09 | Kirkland_Manholes-1327 | 326.71 | 166.6 | 8.63 | 8 | PVC | 0.01 | 2,071 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2401 | Kirkland_Manholes-1338 | 316.17 | Kirkland_Manholes-1339 | 314.87 | 207.4 | 0.63 | 8 | PVC | 0.01 | 557 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-2402 | Kirkland_Manholes-1339 | 314.87 | Kirkland_Manholes-1342 | 287.41 | 238.7 | 11.5 | 10 | PVC | 0.01 | 4,335 | 149 | 322 | 471 | 10.9 | | Drop Connection |
| Kirkland_Main-2403 | Kirkland_Manholes-1345 | 289.73 | Kirkland_Manholes-1344 | 287.44 | 243.6 | 0.94 | 8 | PVC | 0.01 | 684 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2404 | Kirkland_Manholes-1344 | 287.44 | Kirkland_Manholes-1343 | 283.8 | 35.3 | 10.32 | 8 | PVC | 0.01 | 2,265 | 3 | 9 | 12 | 0.5 | | |
| Kirkland_Main-2405 | Kirkland_Manholes-1343 | 283.8 | Kirkland_Manholes-1342 | 283.15 | 24.6 | 2.63 | 8 | PVC | 0.01 | 1,144 | 3 | 13 | 16 | 1.4 | | |
| Kirkland_Main-2406 | Kirkland_Manholes-1340 | 293.32 | Kirkland_Manholes-1342 | 293.12 | 51.1 | 0.4 | 8 | PVC | 0.01 | 446 | 15 | 60 | 75 | 16.7 | | Drop Connection |
| Kirkland_Main-2407 | Kirkland_Manholes-1341 | 299.38 | Kirkland_Manholes-1340 | 293.32 | 143.1 | 4.24 | 8 | PVC | 0.01 | 1,451 | 13 | 56 | 69 | 4.8 | | |
| Kirkland_Main-2408 | Kirkland_Manholes-1346 | 416.9 | Kirkland_Manholes-1351 | 414.82 | 383.4 | 0.54 | 8 | PVC | 0.01 | 519 | 1 | 4 | 5 | 0.9 | SM14-Ex-EX181 | |
| Kirkland_Main-2409 | Kirkland_Manholes-1351 | 414.82 | Kirkland_Manholes-1350 | 414.2 | 207.6 | 0.3 | 12 | PVC | 0.01 | 1,136 | 92 | 193 | 285 | 25.1 | SM14-Ex-EX215 | |
| Kirkland_Main-2410 | Kirkland_Manholes-1350 | 414.2 | Kirkland_Manholes-1917 | 413.2 | 125.7 | 0.8 | 12 | PVC | 0.01 | 1,854 | 95 | 202 | 297 | 16 | SM14-Ex-EX215 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2411 | Kirkland_Manholes-1373 | 425.99 | Kirkland_Manholes-1350 | 414.2 | 373.4 | 3.16 | 8 | PVC | 0.01 | 1,253 | 2 | 4 | 7 | 0.5 | SM14-Ex-EX217 | |
| Kirkland_Main-2412 | Kirkland_Manholes-612 | 119.17 | Kirkland_Manholes-613 | 104.8 | 247.7 | 5.8 | 8 | PVC | 0.01 | 1,698 | 2 | 8 | 10 | 0.6 | SM14-Ex-EX149 | |
| Kirkland_Main-2413 | Kirkland_Manholes-613 | 104.8 | Kirkland_Manholes-614 | 87.89 | 231.1 | 7.32 | 8 | PVC | 0.01 | 1,907 | 5 | 17 | 21 | 1.1 | SM14-Ex-EX149 | |
| Kirkland_Main-2414 | Kirkland_Manholes-609 | 139.22 | Kirkland_Manholes-1799 | 133.76 | 308.5 | 1.77 | 8 | PVC | 0.01 | 938 | 3 | 8 | 11 | 1.2 | SM14-Ex-EX146 | |
| Kirkland_Main-2417 | Kirkland_Manholes-611 | 126.2 | Kirkland_Manholes-610 | 123.3 | 146.2 | 1.98 | 8 | PVC | 0.01 | 993 | 1 | 8 | 10 | 1 | SM14-Ex-EX148 | |
| Kirkland_Main-2418 | Kirkland_Manholes-610 | 123.3 | Kirkland_Manholes-1801 | 112.29 | 320.9 | 3.43 | 8 | PVC | 0.01 | 1,306 | 4 | 17 | 21 | 1.6 | SM14-Ex-EX148 | |
| Kirkland_Main-2420 | Kirkland_Manholes-585 | 162.05 | Kirkland_Manholes-1797 | 142.57 | 517.3 | 3.77 | 8 | PVC | 0.01 | 1,368 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX144 | |
| Kirkland_Main-2424 | Kirkland_Manholes-582 | 179.11 | Kirkland_Manholes-583 | 174.24 | 247.1 | 1.97 | 8 | PVC | 0.01 | 990 | 2 | 8 | 11 | 1.1 | SM14-Ex-EX91 | |
| Kirkland_Main-2425 | Kirkland_Manholes-583 | 174.24 | Kirkland_Manholes-1796 | 160.8 | 295.1 | 4.55 | 8 | PVC | 0.01 | 1,505 | 5 | 17 | 21 | 1.4 | SM14-Ex-EX91 | |
| Kirkland_Main-2426 | Kirkland_Manholes-586 | 156.07 | Kirkland_Manholes-587 | 133.23 | 320.6 | 7.12 | 8 | PVC | 0.01 | 1,882 | 2 | 8 | 10 | 0.5 | SM14-Ex-EX145 | |
| Kirkland_Main-2427 | Kirkland_Manholes-587 | 133.23 | Kirkland_Manholes-588 | 128.35 | 150.1 | 3.25 | 8 | PVC | 0.01 | 1,271 | 5 | 17 | 22 | 1.7 | SM14-Ex-EX145 | |
| Kirkland_Main-2428 | Kirkland_Manholes-580 | 147.12 | Kirkland_Manholes-588 | 128.35 | 316.6 | 5.93 | 8 | PVC | 0.01 | 1,717 | 42 | 116 | 157 | 9.2 | SM14-Ex-EX96 | |
| Kirkland_Main-2430 | Kirkland_Manholes-581 | 170.5 | Kirkland_Manholes-580 | 147.12 | 349.2 | 6.7 | 8 | PVC | 0.01 | 1,824 | 3 | 8 | 11 | 0.6 | SM14-Ex-EX94 | |
| Kirkland_Main-2431 | Kirkland_Manholes-588 | 128.35 | Kirkland_Manholes-606 | 111.69 | 288.6 | 5.77 | 8 | PVC | 0.01 | 1,694 | 49 | 140 | 189 | 11.1 | SM14-Ex-EX96 | |
| Kirkland_Main-2432 | Kirkland_Manholes-1506 | 266.15 | Kirkland_Manholes-1507 | 265.94 | 137.9 | 0.15 | 8 | PVC | 0.01 | 275 | 40 | 120 | 160 | 58.1 | | |
| Kirkland_Main-2433 | Kirkland_Manholes-605 | 109.94 | Kirkland_Manholes-604 | 92.41 | 437.3 | 4.01 | 8 | PVC | 0.01 | 1,412 | 8 | 8 | 16 | 1.2 | SM14-Ex-EX160 | |
| Kirkland_Main-2434 | Kirkland_Manholes-590 | 118.3 | Kirkland_Manholes-591 | 102.05 | 327.5 | 4.96 | 8 | PVC | 0.01 | 1,571 | 7 | 17 | 23 | 1.5 | SM14-Ex-EX158 | |
| Kirkland_Main-2435 | Kirkland_Manholes-591 | 102.05 | Kirkland_Manholes-592 | 96.93 | 331.1 | 1.55 | 8 | PVC | 0.01 | 877 | 11 | 25 | 36 | 4.1 | SM14-Ex-EX158 | |
| Kirkland_Main-2436 | Kirkland_Manholes-592 | 96.93 | Kirkland_Manholes-602 | 90.22 | 292.3 | 2.3 | 8 | PVC | 0.01 | 1,068 | 110 | 372 | 482 | 45.1 | SM5 | |
| Kirkland_Main-2437 | Kirkland_Manholes-597 | 99.4 | Kirkland_Manholes-592 | 96.93 | 306.8 | 0.8 | 8 | PVC | 0.01 | 633 | 12 | 41 | 53 | 8.4 | SM14-Ex-EX158 | |
| Kirkland_Main-2438 | Kirkland_Manholes-1612 | 97.3 | Kirkland_Manholes-599 | 92.8 | 301.8 | 1.49 | 8 | PVC | 0.01 | 861 | 1 | 8 | 9 | 1.1 | SM14-Ex-EX160 | |
| Kirkland_Main-2440 | Kirkland_Manholes-573 | 132.21 | Kirkland_Manholes-572 | 113.73 | 388 | 4.76 | 8 | PVC | 0.01 | 1,539 | 5 | 8 | 13 | 0.8 | SM14-Ex-EX118 | |
| Kirkland_Main-2441 | Kirkland_Manholes-572 | 113.73 | Kirkland_Manholes-596 | 110.91 | 307.7 | 0.92 | 8 | PVC | 0.01 | 675 | 123 | 338 | 461 | 68.4 | SM14-Ex-EX117 | |
| Kirkland_Main-2442 | Kirkland_Manholes-595 | 103.44 | Kirkland_Manholes-597 | 99.4 | 155.7 | 2.6 | 8 | PVC | 0.01 | 1,136 | 9 | 33 | 42 | 3.7 | SM14-Ex-EX116 | |
| Kirkland_Main-2443 | Kirkland_Manholes-576 | 111.2 | Kirkland_Manholes-593 | 103.61 | 155.5 | 4.88 | 8 | PVC | 0.01 | 1,558 | 84 | 289 | 373 | 24 | SM5 | |
| Kirkland_Main-2444 | Kirkland_Manholes-593 | 103.61 | Kirkland_Manholes-592 | 96.93 | 157.1 | 4.25 | 8 | PVC | 0.01 | 1,454 | 86 | 297 | 383 | 26.4 | SM5 | |
| Kirkland_Main-2445 | Kirkland_Manholes-577 | 113.69 | Kirkland_Manholes-576 | 111.2 | 334.4 | 0.74 | 8 | PVC | 0.01 | 608 | 10 | 25 | 35 | 5.7 | SM14-Ex-EX112 | |
| Kirkland_Main-2446 | Kirkland_Manholes-578 | 130.09 | Kirkland_Manholes-577 | 113.69 | 328.9 | 4.99 | 8 | PVC | 0.01 | 1,574 | 6 | 17 | 22 | 1.4 | SM14-Ex-EX112 | |
| Kirkland_Main-2447 | Kirkland_Manholes-2065 | 431.1 | Kirkland_Manholes-2295 | 415.45 | 308.4 | 5.07 | 8 | PVC | 0.01 | 1,588 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2448 | Kirkland_Manholes-579 | 148.3 | Kirkland_Manholes-578 | 130.09 | 329.4 | 5.53 | 8 | PVC | 0.01 | 1,658 | 3 | 8 | 11 | 0.7 | SM14-Ex-EX112 | |
| Kirkland_Main-2449 | Kirkland_Manholes-584 | 159.38 | Kirkland_Manholes-580 | 147.12 | 165.2 | 7.42 | 8 | PVC | 0.01 | 1,921 | 37 | 99 | 136 | 7.1 | SM14-Ex-EX96 | |
| Kirkland_Main-2450 | Kirkland_Manholes-615 | 97.62 | Kirkland_Manholes-614 | 87.89 | 329.8 | 2.95 | 8 | PVC | 0.01 | 1,211 | 2 | 8 | 10 | 0.8 | SM14-Ex-EX149 | |
| Kirkland_Main-2451 | Kirkland_Manholes-604 | 92.41 | Kirkland_Manholes-621 | 70.36 | 291.4 | 7.57 | 8 | PVC | 0.01 | 1,940 | 13 | 21 | 34 | 1.7 | SM14-Ex-EX161 | |
| Kirkland_Main-2452 | Kirkland_Manholes-626 | 276.72 | Kirkland_Manholes-627 | 275.98 | 244.8 | 0.3 | 8 | PVC | 0.01 | 388 | 2 | 4 | 6 | 1.5 | | |
| Kirkland_Main-2453 | Kirkland_Manholes-628 | 242.79 | Kirkland_Manholes-629 | 242.12 | 61.5 | 1.09 | 8 | PVC | 0.01 | 736 | 49 | 150 | 199 | 27.1 | | |
| Kirkland_Main-2454 | Kirkland_Manholes-629 | 242.12 | Kirkland_Manholes-630 | 239.43 | 331.8 | 0.81 | 8 | PVC | 0.01 | 635 | 51 | 155 | 206 | 32.4 | | |
| Kirkland_Main-2455 | Kirkland_Manholes-648 | 244.79 | Kirkland_Manholes-628 | 242.79 | 365.8 | 0.55 | 8 | PVC | 0.01 | 521 | 48 | 146 | 194 | 37.2 | | |
| Kirkland_Main-2456 | Kirkland_Manholes-631 | 237.5 | Kirkland_Manholes-632 | 237.32 | 36.6 | 0.5 | 8 | PVC | 0.01 | 498 | 53 | 163 | 216 | 43.4 | | Updated Per As-Builts (Drop Connection) |
| Kirkland_Main-2457 | Kirkland_Manholes-630 | 239.43 | Kirkland_Manholes-631 | 237.5 | 158.9 | 1.21 | 8 | PVC | 0.01 | 777 | 52 | 159 | 211 | 27.2 | | |
| Kirkland_Main-2458 | Kirkland_Manholes-633 | 234.78 | Kirkland_Manholes-634 | 228.12 | 123.4 | 5.4 | 21 | PVC | 0.01 | 21,481 | 703 | 1,666 | 2,368 | 11 | | |
| Kirkland_Main-2459 | Kirkland_Manholes-635 | 248.49 | Kirkland_Manholes-634 | 228.12 | 181.8 | 11.21 | 8 | PVC | 0.01 | 2,360 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2460 | Kirkland_Manholes-634 | 228.12 | Kirkland_Manholes-632 | 228 | 216.6 | 0.06 | 24 | PVC | 0.01 | 3,107 | 705 | 1,674 | 2,379 | 76.6 | SM14-Ex-EX75 | |
| Kirkland_Main-2461 | Kirkland_Manholes-632 | 228 | Kirkland_Manholes-636 | 227 | 153.6 | 0.65 | 21 | PVC | 0.01 | 7,460 | 759 | 1,842 | 2,600 | 34.9 | | |
| Kirkland_Main-2462 | Kirkland_Manholes-636 | 227 | Kirkland_Manholes-335 | 225.11 | 273.2 | 0.69 | 21 | PVC | 0.01 | 7,690 | 759 | 1,846 | 2,605 | 33.9 | | |
| Kirkland_Main-2466 | Kirkland_Manholes-640 | 237.92 | Kirkland_Manholes-639 | 237.89 | 31.5 | 0.1 | 24 | PVC | 0.01 | 4,072 | 411 | 1,133 | 1,544 | 37.9 | SM14-2035-DF8 | |
| Kirkland_Main-2467 | Kirkland_Manholes-639 | 237.89 | Kirkland_Manholes-638 | 236.51 | 242.7 | 0.57 | 21 | PVC | 0.01 | 6,971 | 693 | 1,653 | 2,346 | 33.7 | | |
| Kirkland_Main-2468 | Kirkland_Manholes-647 | 246.6 | Kirkland_Manholes-646 | 244.32 | 287.5 | 0.79 | 8 | PVC | 0.01 | 628 | 6 | 4 | 11 | 1.7 | | |
| Kirkland_Main-2469 | Kirkland_Manholes-646 | 244.32 | Kirkland_Manholes-645 | 243.42 | 85.6 | 1.05 | 8 | PVC | 0.01 | 723 | 7 | 9 | 16 | 2.2 | | |
| Kirkland_Main-2470 | Kirkland_Manholes-644 | 249.23 | Kirkland_Manholes-643 | 242.32 | 131.1 | 5.27 | 8 | PVC | 0.01 | 1,619 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2471 | Kirkland_Manholes-645 | 243.42 | Kirkland_Manholes-643 | 242.32 | 253.7 | 0.43 | 18 | PVC | 0.01 | 4,035 | 402 | 1,112 | 1,514 | 37.5 | | |
| Kirkland_Main-2472 | Kirkland_Manholes-643 | 242.32 | Kirkland_Manholes-642 | 242.1 | 113.5 | 0.19 | 18 | PVC | 0.01 | 2,698 | 406 | 1,120 | 1,526 | 56.6 | | |
| Kirkland_Main-2473 | Kirkland_Manholes-642 | 242.1 | Kirkland_Manholes-641 | 241.26 | 301.1 | 0.28 | 18 | PVC | 0.01 | 3,237 | 408 | 1,125 | 1,533 | 47.4 | | |
| Kirkland_Main-2474 | Kirkland_Manholes-641 | 241.26 | Kirkland_Manholes-640 | 237.92 | 280 | 1.19 | 18 | PVC | 0.01 | 6,693 | 410 | 1,129 | 1,539 | 23 | | |
| Kirkland_Main-2475 | Kirkland_Manholes-650 | 246.28 | Kirkland_Manholes-649 | 244.91 | 253.4 | 0.54 | 8 | PVC | 0.01 | 518 | 38 | 112 | 150 | 28.9 | | |
| Kirkland_Main-2476 | Kirkland_Manholes-661 | 245.17 | Kirkland_Manholes-648 | 244.79 | 204.2 | 0.19 | 8 | PVC | 0.01 | 304 | 7 | 26 | 32 | 10.6 | | |
| Kirkland_Main-2477 | Kirkland_Manholes-649 | 244.91 | Kirkland_Manholes-648 | 244.79 | 14.5 | 0.83 | 8 | PVC | 0.01 | 641 | 41 | 116 | 156 | 24.4 | | |
| Kirkland_Main-2478 | Kirkland_Manholes-681 | 256.89 | Kirkland_Manholes-684 | 256.25 | 143.5 | 0.45 | 8 | PVC | 0.01 | 473 | 26 | 39 | 65 | 13.7 | | |
| Kirkland_Main-2479 | Kirkland_Manholes-683 | 268.99 | Kirkland_Manholes-682 | 258.64 | 128.7 | 8.04 | 8 | PVC | 0.01 | 1,999 | 0 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2480 | Kirkland_Manholes-689 | 265.38 | Kirkland_Manholes-688 | 264.8 | 145.1 | 0.4 | 8 | PVC | 0.01 | 445 | 1 | 4 | 5 | 1.2 | | |
| Kirkland_Main-2481 | Kirkland_Manholes-688 | 264.8 | Kirkland_Manholes-687 | 264 | 200.3 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 11 | 2.6 | | |
| Kirkland_Main-2482 | Kirkland_Manholes-695 | 344.34 | Kirkland_Manholes-696 | 340.09 | 297.3 | 1.43 | 8 | PVC | 0.01 | 843 | 6 | 9 | 14 | 1.7 | SM14-Ex-EX74 | |
| Kirkland_Main-2483 | Kirkland_Manholes-829 | 344.99 | Kirkland_Manholes-695 | 344.34 | 301.8 | 0.22 | 8 | PVC | 0.01 | 327 | 2 | 4 | 7 | 2 | SM14-Ex-EX74 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2484 | Kirkland_Manholes-694 | 328.94 | Kirkland_Manholes-693 | 302.3 | 232.9 | 11.44 | 8 | PVC | 0.01 | 2,384 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2485 | Kirkland_Manholes-691 | 306.23 | Kirkland_Manholes-693 | 302.3 | 272.1 | 1.44 | 8 | PVC | 0.01 | 847 | 4 | 9 | 12 | 1.5 | | |
| Kirkland_Main-2486 | Kirkland_Manholes-692 | 325.47 | Kirkland_Manholes-691 | 306.23 | 258.4 | 7.45 | 8 | PVC | 0.01 | 1,924 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2487 | Kirkland_Manholes-693 | 302.3 | Kirkland_Manholes-807 | 300.8 | 136 | 1.1 | 8 | PVC | 0.01 | 741 | 8 | 17 | 25 | 3.4 | | |
| Kirkland_Main-2488 | Kirkland_Manholes-690 | 274.25 | Kirkland_Manholes-701 | 273.2 | 290.3 | 0.36 | 8 | PVC | 0.01 | 424 | 5 | 13 | 18 | 4.3 | | |
| Kirkland_Main-2489 | Kirkland_Manholes-699 | 288.54 | Kirkland_Manholes-701 | 273.2 | 288.8 | 5.31 | 8 | PVC | 0.01 | 1,625 | 4 | 9 | 13 | 0.8 | | |
| Kirkland_Main-2490 | Kirkland_Manholes-698 | 313.56 | Kirkland_Manholes-699 | 288.54 | 182.5 | 13.71 | 8 | PVC | 0.01 | 2,611 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-2492 | Kirkland_Manholes-697 | 318.15 | Kirkland_Manholes-700 | 302.48 | 274.3 | 5.71 | 8 | PVC | 0.01 | 1,685 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2493 | Kirkland_Manholes-700 | 302.48 | Kirkland_Manholes-690 | 274.25 | 242.5 | 11.64 | 8 | PVC | 0.01 | 2,405 | 4 | 9 | 13 | 0.5 | | |
| Kirkland_Main-2494 | Kirkland_Manholes-703 | 275.12 | Kirkland_Manholes-704 | 272.37 | 210.2 | 1.31 | 8 | PVC | 0.01 | 806 | 2 | 4 | 6 | 0.8 | | |
| Kirkland_Main-2495 | Kirkland_Manholes-702 | 273 | Kirkland_Manholes-704 | 272.37 | 144.8 | 0.44 | 8 | PVC | 0.01 | 465 | 13 | 30 | 43 | 9.2 | | |
| Kirkland_Main-2496 | Kirkland_Manholes-701 | 273.2 | Kirkland_Manholes-702 | 273 | 143.3 | 0.14 | 8 | PVC | 0.01 | 263 | 11 | 26 | 37 | 14 | | |
| Kirkland_Main-2497 | Kirkland_Manholes-723 | 131.03 | O-42 | 125.22 | 186.8 | 3.11 | 12 | PVC | 0.01 | 3,666 | 356 | 132 | 489 | 13.3 | SM14-2021-DF2 | |
| Kirkland_Main-2498 | Kirkland_Manholes-722 | 137.76 | Kirkland_Manholes-723 | 131.03 | 91.1 | 7.39 | 12 | PVC | 0.01 | 5,651 | 353 | 126 | 479 | 8.5 | SM14-2021-DF2 | |
| Kirkland_Main-2499 | Kirkland_Manholes-721 | 142.27 | Kirkland_Manholes-722 | 137.76 | 93.1 | 4.84 | 12 | PVC | 0.01 | 4,574 | 348 | 120 | 468 | 10.2 | SM14-2021-DF2 | |
| Kirkland_Main-2500 | Kirkland_Manholes-720 | 147.09 | Kirkland_Manholes-721 | 142.27 | 318.3 | 1.51 | 12 | PVC | 0.01 | 2,558 | 346 | 113 | 459 | 17.9 | SM14-2021-DF2 | |
| Kirkland_Main-2501 | Kirkland_Manholes-719 | 148.45 | Kirkland_Manholes-720 | 147.09 | 142.4 | 0.95 | 12 | PVC | 0.01 | 2,031 | 343 | 107 | 450 | 22.2 | SM14-2021-DF2 | |
| Kirkland_Main-2502 | Kirkland_Manholes-717 | 151.36 | Kirkland_Manholes-718 | 150.12 | 225.4 | 0.55 | 12 | PVC | 0.01 | 1,542 | 330 | 82 | 412 | 26.7 | SM14-2035-DF5 | |
| Kirkland_Main-2503 | Kirkland_Manholes-716 | 152.58 | Kirkland_Manholes-717 | 151.36 | 272.7 | 0.45 | 12 | PVC | 0.01 | 1,390 | 327 | 76 | 403 | 29 | SM14-2035-DF5 | |
| Kirkland_Main-2504 | Kirkland_Manholes-725 | 154.45 | Kirkland_Manholes-716 | 152.58 | 174.3 | 1.07 | 8 | PVC | 0.01 | 730 | 309 | 50 | 359 | 49.2 | | |
| Kirkland_Main-2505 | Kirkland_Manholes-726 | 155.56 | Kirkland_Manholes-725 | 154.45 | 157.9 | 0.7 | 8 | PVC | 0.01 | 591 | 306 | 44 | 351 | 59.3 | | |
| Kirkland_Main-2506 | Kirkland_Manholes-713 | 156.49 | Kirkland_Manholes-726 | 155.56 | 219 | 0.43 | 8 | PVC | 0.01 | 460 | 287 | 38 | 325 | 70.6 | | |
| Kirkland_Main-2507 | Kirkland_Manholes-712 | 157.06 | Kirkland_Manholes-713 | 156.49 | 30.1 | 1.89 | 8 | PVC | 0.01 | 971 | 285 | 32 | 316 | 32.6 | | |
| Kirkland_Main-2508 | Kirkland_Manholes-714 | 170.75 | Kirkland_Manholes-712 | 157.06 | 209.3 | 6.54 | 8 | PVC | 0.01 | 1,803 | 246 | 13 | 259 | 14.4 | | |
| Kirkland_Main-2509 | Kirkland_Manholes-715 | 181.7 | Kirkland_Manholes-714 | 170.75 | 155 | 7.07 | 8 | PVC | 0.01 | 1,874 | 3 | 6 | 9 | 0.5 | | |
| Kirkland_Main-2510 | Kirkland_Manholes-1398 | 27.8 | Kirkland_Manholes-1397 | 27.53 | 119.5 | 0.23 | 30 | PVC | 0.01 | 11,376 | 245 | 1,015 | 3,011 | 26.5 | SM14-Ex-EX154 | |
| Kirkland_Main-2511 | Kirkland_Manholes-1397 | 27.53 | Kirkland_Manholes-1396 | 27.46 | 145.3 | 0.05 | 30 | PVC | 0.01 | 5,139 | 246 | 1,024 | 3,020 | 58.8 | SM14-Ex-EX154 | |
| Kirkland_Main-2512 | Kirkland_Manholes-1399 | 44.47 | Kirkland_Manholes-1398 | 27.8 | 324.1 | 5.14 | 12 | PVC | 0.01 | 4,715 | 241 | 1,007 | 1,598 | 33.9 | SM14-Ex-EX143 | |
| Kirkland_Main-2513 | Kirkland_Manholes-1400 | 61.37 | Kirkland_Manholes-1399 | 44.47 | 267.9 | 6.31 | 12 | PVC | 0.01 | 5,221 | 238 | 999 | 1,588 | 30.4 | SM14-Ex-EX143 | |
| Kirkland_Main-2514 | Kirkland_Manholes-1401 | 76.78 | Kirkland_Manholes-1400 | 61.37 | 289.6 | 5.32 | 8 | | 0.012 | 1,355 | 62 | 281 | 343 | 25.3 | | |
| Kirkland_Main-2515 | Kirkland_Manholes-1402 | 82.36 | Kirkland_Manholes-1401 | 76.78 | 122 | 4.57 | 8 | | 0.012 | 1,257 | 59 | 264 | 323 | 25.7 | | |
| Kirkland_Main-2516 | Kirkland_Manholes-711 | 219.85 | Kirkland_Manholes-710 | 219.11 | 65.7 | 1.13 | 8 | PVC | 0.01 | 748 | 11 | 9 | 19 | 2.6 | | |
| Kirkland_Main-2517 | Kirkland_Manholes-710 | 219.11 | Kirkland_Manholes-709 | 218.2 | 118.5 | 0.77 | 8 | PVC | 0.01 | 618 | 11 | 13 | 24 | 3.9 | | |
| Kirkland_Main-2518 | Kirkland_Manholes-709 | 218.2 | Kirkland_Manholes-707 | 216.1 | 262.1 | 0.8 | 8 | PVC | 0.01 | 631 | 11 | 17 | 29 | 4.5 | | |
| Kirkland_Main-2519 | Kirkland_Manholes-708 | 217.66 | Kirkland_Manholes-707 | 216.1 | 74 | 2.11 | 8 | PVC | 0.01 | 1,024 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2520 | Kirkland_Manholes-707 | 216.1 | Kirkland_Manholes-706 | 215.57 | 102.1 | 0.52 | 8 | PVC | 0.01 | 508 | 12 | 26 | 38 | 7.4 | | |
| Kirkland_Main-2521 | Kirkland_Manholes-706 | 215.57 | Kirkland_Manholes-369 | 208.86 | 103.2 | 6.5 | 8 | PVC | 0.01 | 1,798 | 12 | 30 | 42 | 2.4 | | |
| Kirkland_Main-2522 | Kirkland_Manholes-1403 | 89.74 | Kirkland_Manholes-1402 | 82.36 | 156.6 | 4.71 | 8 | | 0.012 | 1,276 | 50 | 239 | 289 | 22.7 | | |
| Kirkland_Main-2523 | Kirkland_Manholes-1805 | 101.51 | Kirkland_Manholes-1403 | 89.74 | 269.7 | 4.36 | 8 | | 0.012 | 1,227 | 47 | 223 | 270 | 22 | | |
| Kirkland_Main-2524 | Kirkland_Manholes-1404 | 117.83 | Kirkland_Manholes-1805 | 101.51 | 279.3 | 5.84 | 8 | | 0.012 | 1,420 | 15 | 91 | 106 | 7.4 | | |
| Kirkland_Main-2525 | Kirkland_Manholes-1405 | 132.7 | Kirkland_Manholes-1404 | 117.83 | 317.4 | 4.68 | 8 | | 0.012 | 1,272 | 14 | 83 | 97 | 7.6 | | |
| Kirkland_Main-2526 | Kirkland_Manholes-1396 | 27.46 | Kirkland_Manholes-1395 | 27.24 | 179.5 | 0.12 | 30 | PVC | 0.01 | 8,435 | 370 | 1,352 | 3,473 | 41.2 | SM14-Ex-EX154 | |
| Kirkland_Main-2527 | Kirkland_Manholes-1395 | 27.24 | Kirkland_Manholes-739 | 26.87 | 399 | 0.09 | 30 | PVC | 0.01 | 7,287 | 372 | 1,360 | 3,484 | 47.8 | SM14-Ex-EX154 | |
| Kirkland_Main-2528 | Kirkland_Manholes-739 | 26.87 | Kirkland_Manholes-738 | 25.89 | 300.8 | 0.33 | 24 | PVC | 0.01 | 7,534 | 373 | 1,369 | 3,493 | 46.4 | | |
| Kirkland_Main-2532 | Kirkland_Manholes-738 | 25.89 | MH 05-714 | 25.01 | 257 | 0.34 | 24 | PVC | 0.01 | 7,724 | 399 | 1,418 | 3,568 | 46.2 | | Updated per as-built drawings |
| Kirkland_Main-2533 | Kirkland_Manholes-736 | 28.45 | Kirkland_Manholes-735 | 25.17 | 30.7 | 10.68 | 8 | PVC | 0.01 | 2,304 | 99 | 281 | 379 | 16.5 | | |
| Kirkland_Main-2534 | Kirkland_Manholes-735 | 25.17 | MH 05-714 | 25.01 | 98.1 | 0.16 | 24 | PVC | 0.01 | 5,330 | 1,163 | 2,056 | 3,219 | 60.4 | | Updated per as-built drawings |
| Kirkland_Main-2535 | Kirkland_Manholes-1705 | 33.28 | Kirkland_Manholes-757 | 27.8 | 142.4 | 3.85 | 8 | PVC | 0.01 | 1,383 | 20 | 33 | 53 | 3.8 | | |
| Kirkland_Main-2536 | Kirkland_Manholes-757 | 27.8 | Kirkland_Manholes-738 | 25.89 | 24.1 | 7.91 | 8 | PVC | 0.01 | 1,983 | 26 | 41 | 67 | 3.4 | | |
| Kirkland_Main-2537 | Kirkland_Manholes-734 | 25.7 | Kirkland_Manholes-735 | 25.17 | 249.9 | 0.21 | 24 | PVC | 0.01 | 6,079 | 1,064 | 1,767 | 2,830 | 46.6 | | |
| Kirkland_Main-2538 | Kirkland_Manholes-732 | 47.45 | Kirkland_Manholes-733 | 35.72 | 350.8 | 3.34 | 18 | PVC | 0.01 | 11,207 | 657 | 1,531 | 2,189 | 19.5 | | |
| Kirkland_Main-2539 | Kirkland_Manholes-731 | 53.54 | Kirkland_Manholes-732 | 47.45 | 265.7 | 2.29 | 18 | PVC | 0.01 | 9,278 | 561 | 1,523 | 2,085 | 22.5 | | |
| Kirkland_Main-2540 | Kirkland_Manholes-729 | 64.46 | Kirkland_Manholes-730 | 57.26 | 336.6 | 2.14 | 12 | PVC | 0.01 | 3,040 | 174 | 495 | 669 | 22 | | |
| Kirkland_Main-2541 | Kirkland_Manholes-730 | 57.26 | Kirkland_Manholes-731 | 53.54 | 101.9 | 3.65 | 18 | PVC | 0.01 | 11,709 | 425 | 1,057 | 1,481 | 12.7 | | |
| Kirkland_Main-2542 | Kirkland_Manholes-1436 | 518.03 | Kirkland_Manholes-1430 | 516.64 | 170 | 0.82 | 8 | PVC | 0.01 | 638 | 3 | 9 | 12 | 1.9 | | |
| Kirkland_Main-2543 | Kirkland_Manholes-1434 | 511.6 | Kirkland_Manholes-1431 | 510.8 | 175 | 0.46 | 8 | PVC | 0.01 | 477 | 15 | 34 | 50 | 10.4 | | |
| Kirkland_Main-2544 | Kirkland_Manholes-1431 | 510.8 | Kirkland_Manholes-1432 | 510.04 | 163.2 | 0.47 | 8 | PVC | 0.01 | 481 | 16 | 39 | 54 | 11.3 | | |
| Kirkland_Main-2545 | Kirkland_Manholes-1432 | 510.04 | Kirkland_Manholes-1433 | 509.55 | 97.9 | 0.5 | 8 | PVC | 0.01 | 499 | 17 | 43 | 60 | 12 | | |
| Kirkland_Main-2546 | Kirkland_Manholes-1433 | 509.55 | Kirkland_Manholes-1437 | 508.69 | 186 | 0.46 | 8 | PVC | 0.01 | 480 | 18 | 47 | 66 | 13.7 | | |
| Kirkland_Main-2547 | Kirkland_Manholes-1435 | 519.8 | Kirkland_Manholes-1436 | 518.03 | 159.8 | 1.11 | 8 | PVC | 0.01 | 742 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-2548 | Kirkland_Manholes-1437 | 508.69 | Kirkland_Manholes-1438 | 507.49 | 258.4 | 0.46 | 8 | PVC | 0.01 | 480 | 20 | 52 | 72 | 14.9 | | |
| Kirkland_Main-2549 | Kirkland_Manholes-1438 | 507.49 | Kirkland_Manholes-1444 | 505.53 | 236.5 | 0.83 | 8 | PVC | 0.01 | 642 | 28 | 77 | 105 | 16.4 | SM14-Ex-EX269 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2550 | Kirkland_Manholes-1439 | 508.99 | Kirkland_Manholes-1438 | 507.49 | 261.3 | 0.57 | 8 | PVC | 0.01 | 534 | 7 | 21 | 29 | 5.4 | SM14-Ex-EX269 | |
| Kirkland_Main-2551 | Kirkland_Manholes-1441 | 509.69 | Kirkland_Manholes-1440 | 509.16 | 212.6 | 0.25 | 8 | PVC | 0.01 | 352 | 6 | 13 | 19 | 5.4 | SM14-Ex-EX269 | |
| Kirkland_Main-2552 | Kirkland_Manholes-1440 | 509.16 | Kirkland_Manholes-1439 | 508.99 | 378 | 0.04 | 8 | PVC | 0.01 | 150 | 7 | 17 | 24 | 15.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2554 | Kirkland_Manholes-1449 | 498.19 | Kirkland_Manholes-1450 | 496.32 | 291.2 | 0.64 | 8 | PVC | 0.01 | 565 | 39 | 137 | 177 | 31.3 | SM14-Ex-EX269 | |
| Kirkland_Main-2555 | Kirkland_Manholes-1450 | 496.32 | Kirkland_Manholes-1451 | 492.05 | 400.8 | 1.07 | 8 | PVC | 0.01 | 728 | 43 | 142 | 184 | 25.3 | SM14-Ex-EX269 | |
| Kirkland_Main-2556 | Kirkland_Manholes-1448 | 502.55 | Kirkland_Manholes-1449 | 498.19 | 186.7 | 2.34 | 8 | PVC | 0.01 | 1,078 | 38 | 133 | 171 | 15.9 | SM14-Ex-EX269 | |
| Kirkland_Main-2557 | Kirkland_Manholes-1447 | 503.26 | Kirkland_Manholes-1448 | 502.55 | 401.7 | 0.18 | 8 | PVC | 0.01 | 296 | 36 | 129 | 164 | 55.5 | SM14-Ex-EX269 | |
| Kirkland_Main-2558 | Kirkland_Manholes-2976 | 503.85 | Kirkland_Manholes-1447 | 503.26 | 210.4 | 0.28 | 8 | PVC | 0.01 | 373 | 35 | 124 | 159 | 42.6 | SM14-Ex-EX269 | |
| Kirkland_Main-2559 | Kirkland_Manholes-1444 | 505.53 | Kirkland_Manholes-1446 | 505.51 | 95.2 | 0.02 | 12 | PVC | 0.01 | 301 | 29 | 90 | 119 | 39.5 | SM14-Ex-EX269 | |
| Kirkland_Main-2560 | Kirkland_Manholes-1446 | 505.51 | Kirkland_Manholes-1445 | 504.92 | 12.7 | 4.66 | 8 | PVC | 0.01 | 1,523 | 29 | 94 | 124 | 8.1 | SM14-Ex-EX269 | |
| Kirkland_Main-2561 | Kirkland_Manholes-1442 | 510.02 | Kirkland_Manholes-1443 | 506.8 | 138.1 | 2.33 | 8 | PVC | 0.01 | 1,077 | 0 | 4 | 5 | 0.4 | SM14-Ex-EX274 | |
| Kirkland_Main-2562 | Kirkland_Manholes-1443 | 506.8 | Kirkland_Manholes-1444 | 505.53 | 203.3 | 0.62 | 8 | PVC | 0.01 | 557 | 1 | 9 | 9 | 1.7 | SM14-Ex-EX274 | |
| Kirkland_Main-2563 | Kirkland_Manholes-1451 | 492.05 | Kirkland_Manholes-1452 | 486.6 | 321.3 | 1.7 | 8 | PVC | 0.01 | 918 | 45 | 146 | 191 | 20.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2564 | Kirkland_Manholes-1452 | 486.6 | Kirkland_Manholes-1459 | 479.42 | 322.1 | 2.23 | 8 | PVC | 0.01 | 1,053 | 48 | 150 | 198 | 18.8 | SM14-Ex-EX269 | |
| Kirkland_Main-2565 | Kirkland_Manholes-1453 | 500.71 | Kirkland_Manholes-1454 | 499.21 | 284.8 | 0.53 | 8 | PVC | 0.01 | 512 | 2 | 4 | 6 | 1.2 | SM14-Ex-EX270 | |
| Kirkland_Main-2566 | Kirkland_Manholes-1454 | 499.21 | Kirkland_Manholes-1455 | 496 | 348.8 | 0.92 | 8 | PVC | 0.01 | 676 | 4 | 9 | 13 | 1.9 | SM14-Ex-EX270 | |
| Kirkland_Main-2567 | Kirkland_Manholes-1455 | 496 | Kirkland_Manholes-1456 | 494.83 | 99.7 | 1.17 | 8 | PVC | 0.01 | 764 | 6 | 13 | 19 | 2.5 | SM14-Ex-EX270 | |
| Kirkland_Main-2568 | Kirkland_Manholes-1456 | 494.83 | Kirkland_Manholes-1457 | 481.56 | 320 | 4.15 | 8 | PVC | 0.01 | 1,436 | 8 | 17 | 25 | 1.7 | SM14-Ex-EX270 | |
| Kirkland_Main-2569 | Kirkland_Manholes-1461 | 483.24 | Kirkland_Manholes-1457 | 482.02 | 293.4 | 0.42 | 8 | PVC | 0.01 | 455 | 26 | 52 | 77 | 17 | SM14-Ex-EX214 | Drop Connection |
| Kirkland_Main-2570 | Kirkland_Manholes-1457 | 481.56 | Kirkland_Manholes-1458 | 481.15 | 103.4 | 0.4 | 8 | PVC | 0.01 | 444 | 35 | 73 | 108 | 24.3 | SM14-Ex-EX214 | |
| Kirkland_Main-2571 | Kirkland_Manholes-1458 | 481.15 | Kirkland_Manholes-1459 | 479.42 | 259.2 | 0.67 | 8 | PVC | 0.01 | 576 | 35 | 77 | 113 | 19.5 | SM14-Ex-EX214 | |
| Kirkland_Main-2572 | Kirkland_Manholes-1459 | 479.42 | Kirkland_Manholes-1480 | 465.84 | 411.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 83 | 232 | 315 | 24.6 | SM14-Ex-EX214 | |
| Kirkland_Main-2573 | Kirkland_Manholes-1460 | 490.4 | Kirkland_Manholes-1461 | 483.24 | 392 | 1.83 | 8 | PVC | 0.01 | 953 | 4 | 4 | 9 | 0.9 | SM14-Ex-EX214 | |
| Kirkland_Main-2574 | Kirkland_Manholes-1469 | 490.09 | Kirkland_Manholes-1461 | 483.24 | 144.8 | 4.73 | 8 | PVC | 0.01 | 1,534 | 21 | 39 | 60 | 3.9 | SM14-Ex-EX271 | |
| Kirkland_Main-2575 | Kirkland_Manholes-608 | 134.68 | Kirkland_Manholes-607 | 127.97 | 148.5 | 4.52 | 8 | PVC | 0.01 | 1,499 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX147 | |
| Kirkland_Main-2576 | Kirkland_Manholes-607 | 127.97 | Kirkland_Manholes-606 | 111.69 | 332.5 | 4.9 | 8 | PVC | 0.01 | 1,560 | 5 | 17 | 22 | 1.4 | SM14-Ex-EX147 | |
| Kirkland_Main-2578 | Kirkland_Manholes-3035 | 266.43 | Kirkland_Manholes-1506 | 266.15 | 125.7 | 0.22 | 8 | PVC | 0.01 | 333 | 39 | 116 | 155 | 46.6 | | |
| Kirkland_Main-2579 | Kirkland_Manholes-1504 | 267.51 | Kirkland_Manholes-1505 | 267 | 104.1 | 0.49 | 8 | PVC | 0.01 | 493 | 31 | 90 | 121 | 24.6 | | |
| Kirkland_Main-2580 | Kirkland_Manholes-1503 | 273.94 | Kirkland_Manholes-1504 | 267.51 | 44 | 14.62 | 8 | PVC | 0.01 | 2,696 | 1 | 9 | 10 | 0.4 | | |
| Kirkland_Main-2581 | Kirkland_Manholes-1502 | 279.47 | Kirkland_Manholes-1503 | 273.94 | 90.7 | 6.09 | 8 | PVC | 0.01 | 1,741 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2582 | Kirkland_Manholes-1501 | 267.93 | Kirkland_Manholes-1504 | 267.51 | 165.4 | 0.25 | 8 | PVC | 0.01 | 355 | 29 | 77 | 106 | 29.9 | | |
| Kirkland_Main-2583 | Kirkland_Manholes-2255 | 245.88 | Kirkland_Manholes-2253 | 239.74 | 232.2 | 2.64 | 8 | PVC | 0.01 | 1,146 | 34 | 4 | 38 | 3.3 | SM14-Ex-EX247 | |
| Kirkland_Main-2584 | Kirkland_Manholes-1499 | 268.92 | Kirkland_Manholes-1501 | 267.93 | 240 | 0.41 | 8 | PVC | 0.01 | 453 | 27 | 73 | 100 | 22.1 | | |
| Kirkland_Main-2585 | Kirkland_Manholes-1500 | 287.29 | Kirkland_Manholes-1498 | 284.32 | 146.8 | 2.02 | 8 | PVC | 0.01 | 1,003 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2587 | Kirkland_Manholes-1498 | 284.32 | Kirkland_Manholes-1499 | 268.92 | 127.3 | 12.1 | 8 | PVC | 0.01 | 2,452 | 2 | 9 | 11 | 0.4 | | |
| Kirkland_Main-2588 | Kirkland_Manholes-771 | 213.99 | Kirkland_Manholes-777 | 184.25 | 152.4 | 19.51 | 8 | PVC | 0.01 | 3,115 | 3 | 9 | 12 | 0.4 | | |
| Kirkland_Main-2589 | Kirkland_Manholes-777 | 184.25 | KC_Manholes-6 | 163.9 | 254 | 8.01 | 8 | PVC | 0.01 | 1,995 | 6 | 13 | 19 | 1 | | |
| Kirkland_Main-2590 | KC_Manholes-5 | 169.15 | KC_Manholes-6 | 163.9 | 285.7 | 1.84 | 8 | PVC | 0.01 | 956 | 14 | 47 | 61 | 6.4 | | |
| Kirkland_Main-2591 | KC_Manholes-6 | 163.9 | O-17 | 159.86 | 90.8 | 4.45 | 8 | PVC | 0.01 | 1,487 | 22 | 64 | 86 | 5.8 | | |
| Kirkland_Main-2592 | Kirkland_Manholes-766 | 182.72 | Kirkland_Manholes-1555 | 164.48 | 325.6 | 5.6 | 8 | PVC | 0.01 | 1,669 | 3 | 9 | 12 | 0.7 | | |
| Kirkland_Main-2593 | Kirkland_Manholes-1555 | 164.48 | O-18 | 159.86 | 33.3 | 13.89 | 8 | PVC | 0.01 | 2,628 | 5 | 13 | 18 | 0.7 | | |
| Kirkland_Main-2594 | Kirkland_Manholes-767 | 210.01 | Kirkland_Manholes-766 | 182.72 | 125.5 | 21.75 | 8 | PVC | 0.01 | 3,288 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2595 | Kirkland_Manholes-765 | 257.59 | Kirkland_Manholes-764 | 244.77 | 266.3 | 4.81 | 8 | PVC | 0.01 | 1,547 | 28 | 77 | 105 | 6.8 | SM14-Ex-EX121 | |
| Kirkland_Main-2596 | Kirkland_Manholes-764 | 244.77 | Kirkland_Manholes-1530 | 229.92 | 292.5 | 5.08 | 8 | PVC | 0.01 | 1,589 | 30 | 82 | 112 | 7 | SM14-Ex-EX121 | |
| Kirkland_Main-2597 | Kirkland_Manholes-770 | 166.93 | Kirkland_Manholes-769 | 165.1 | 146.5 | 1.25 | 8 | PVC | 0.01 | 788 | 2 | 9 | 10 | 1.3 | | |
| Kirkland_Main-2598 | Kirkland_Manholes-769 | 165.1 | Kirkland_Manholes-768 | 159.83 | 42.8 | 12.31 | 8 | PVC | 0.01 | 2,474 | 4 | 17 | 22 | 0.9 | | |
| Kirkland_Main-2599 | Kirkland_Manholes-768 | 159.83 | O-19 | 156.57 | 65.3 | 5 | 8 | PVC | 0.01 | 1,577 | 5 | 21 | 27 | 1.7 | | |
| Kirkland_Main-2600 | Kirkland_Manholes-1600 | 216.22 | Kirkland_Manholes-1599 | 200.11 | 155.5 | 10.36 | 8 | PVC | 0.01 | 2,269 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX170 | |
| Kirkland_Main-2601 | Kirkland_Manholes-1614 | 91.09 | Kirkland_Manholes-1613 | 87.49 | 157.9 | 2.28 | 8 | PVC | 0.01 | 1,065 | 24 | 116 | 139 | 13.1 | SM14-Ex-EX167 | |
| Kirkland_Main-2602 | Kirkland_Manholes-1616 | 135.79 | Kirkland_Manholes-1615 | 109.23 | 291.4 | 9.11 | 8 | PVC | 0.01 | 2,128 | 3 | 8 | 12 | 0.6 | | |
| Kirkland_Main-2603 | Kirkland_Manholes-1617 | 246.15 | Kirkland_Manholes-1630 | 217.96 | 377.4 | 7.47 | 8 | PVC | 0.01 | 1,927 | 1 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2604 | Kirkland_Manholes-1618 | 259.44 | Kirkland_Manholes-1619 | 255.5 | 286.6 | 1.37 | 8 | PVC | 0.01 | 827 | 2 | 4 | 6 | 0.7 | SM14-Ex-EX176 | |
| Kirkland_Main-2605 | Kirkland_Manholes-1619 | 255.5 | Kirkland_Manholes-1622 | 253.11 | 371.5 | 0.64 | 8 | PVC | 0.01 | 565 | 4 | 9 | 13 | 2.3 | SM14-Ex-EX176 | |
| Kirkland_Main-2607 | Kirkland_Manholes-1620 | 234.07 | Kirkland_Manholes-1621 | 227.94 | 53.2 | 11.53 | 8 | PVC | 0.01 | 2,394 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-2608 | Kirkland_Manholes-1621 | 227.94 | Kirkland_Manholes-1631 | 193.59 | 278.6 | 12.33 | 8 | PVC | 0.01 | 2,476 | 4 | 9 | 12 | 0.5 | | |
| Kirkland_Main-2609 | Kirkland_Manholes-1623 | 294.92 | Kirkland_Manholes-1622 | 253.11 | 447.9 | 9.33 | 12 | PVC | 0.01 | 6,351 | 344 | 871 | 1,215 | 19.1 | SM7 | |
| Kirkland_Main-2610 | Kirkland_Manholes-1633 | 254.8 | Kirkland_Manholes-1622 | 253.11 | 303.2 | 0.56 | 8 | PVC | 0.01 | 526 | 10 | 17 | 28 | 5.2 | SM14-Ex-EX204 | |
| Kirkland_Main-2611 | Kirkland_Manholes-1626 | 191.61 | Kirkland_Manholes-1624 | 183.67 | 177.3 | 4.48 | 8 | PVC | 0.01 | 1,492 | 10 | 26 | 36 | 2.4 | | |
| Kirkland_Main-2615 | Kirkland_Manholes-1829 | 64.39 | Kirkland_Manholes-1830 | 64.02 | 316.5 | 0.12 | 18 | PVC | 0.01 | 2,096 | 173 | 702 | 1,226 | 58.5 | SM14-Ex-EX142 | |
| Kirkland_Main-2616 | Kirkland_Manholes-1830 | 64.02 | Kirkland_Manholes-1400 | 61.37 | 81.5 | 3.25 | 18 | PVC | 0.01 | 11,049 | 174 | 710 | 1,235 | 11.2 | SM14-Ex-EX142 | |
| Kirkland_Main-2617 | Kirkland_Manholes-1828 | 65.79 | Kirkland_Manholes-1829 | 64.39 | 312.6 | 0.45 | 18 | PVC | 0.01 | 4,102 | 172 | 693 | 1,216 | 29.6 | SM14-2035-DF11 | |
| Kirkland_Main-2618 | Kirkland_Manholes-1827 | 69.3 | Kirkland_Manholes-2994 | 67.86 | 357.5 | 0.4 | 15 | PVC | 0.01 | 2,392 | 165 | 660 | 1,176 | 49.2 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2619 | Kirkland_Manholes-1826 | 70.81 | Kirkland_Manholes-1827 | 69.3 | 214.2 | 0.71 | 15 | PVC | 0.01 | 3,165 | 163 | 652 | 1,165 | 36.8 | | |
| Kirkland_Main-2620 | Kirkland_Manholes-1824 | 72.16 | Kirkland_Manholes-1826 | 70.81 | 200.6 | 0.67 | 15 | PVC | 0.01 | 3,092 | 162 | 644 | 1,156 | 37.4 | | |
| Kirkland_Main-2621 | Kirkland_Manholes-1823 | 74.67 | Kirkland_Manholes-1824 | 72.16 | 26.9 | 9.32 | 8 | PVC | 0.01 | 2,153 | 11 | 33 | 44 | 2 | SM10 | |
| Kirkland_Main-2622 | Kirkland_Manholes-1822 | 87.17 | Kirkland_Manholes-1823 | 74.67 | 362.6 | 3.45 | 8 | PVC | 0.01 | 1,309 | 8 | 25 | 33 | 2.5 | SM10 | |
| Kirkland_Main-2623 | Kirkland_Manholes-1821 | 94.43 | Kirkland_Manholes-1822 | 87.17 | 350 | 2.07 | 8 | PVC | 0.01 | 1,015 | 6 | 17 | 22 | 2.2 | SM10 | |
| Kirkland_Main-2624 | Kirkland_Manholes-1820 | 95.81 | Kirkland_Manholes-1821 | 94.43 | 359.9 | 0.38 | 8 | PVC | 0.01 | 437 | 3 | 8 | 11 | 2.5 | SM10 | |
| Kirkland_Main-2625 | Kirkland_Manholes-1819 | 89.53 | Kirkland_Manholes-1402 | 82.36 | 241.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 9 | 17 | 25 | 2.1 | SM10 | |
| Kirkland_Main-2626 | Kirkland_Manholes-1818 | 98.86 | Kirkland_Manholes-1819 | 89.53 | 204 | 4.57 | 8 | PVC | 0.01 | 1,508 | 6 | 8 | 15 | 1 | SM10 | |
| Kirkland_Main-2628 | Kirkland_Manholes-1811 | 129.72 | Kirkland_Manholes-1812 | 126.33 | 178.5 | 1.9 | 8 | PVC | 0.01 | 972 | 23 | 83 | 106 | 10.9 | SM10 | |
| Kirkland_Main-2629 | Kirkland_Manholes-1812 | 126.33 | Kirkland_Manholes-1813 | 123.92 | 54.8 | 4.4 | 8 | PVC | 0.01 | 1,479 | 24 | 91 | 115 | 7.8 | SM14-Ex-EX139 | |
| Kirkland_Main-2630 | Kirkland_Manholes-1813 | 123.92 | Kirkland_Manholes-1814 | 117.44 | 111.3 | 5.82 | 8 | PVC | 0.01 | 1,701 | 26 | 99 | 125 | 7.3 | SM14-Ex-EX139 | |
| Kirkland_Main-2631 | Kirkland_Manholes-1814 | 117.44 | Kirkland_Manholes-1817 | 109.22 | 155.5 | 5.28 | 8 | PVC | 0.01 | 1,621 | 29 | 116 | 145 | 8.9 | SM10 | |
| Kirkland_Main-2632 | Kirkland_Manholes-1815 | 130.16 | Kirkland_Manholes-1814 | 117.44 | 475.8 | 2.67 | 8 | PVC | 0.01 | 1,153 | 3 | 8 | 11 | 0.9 | SM10 | |
| Kirkland_Main-2633 | Kirkland_Manholes-1816 | 115.31 | Kirkland_Manholes-1825 | 112.27 | 360.1 | 0.84 | 8 | PVC | 0.01 | 648 | 4 | 8 | 12 | 1.9 | SM10 | |
| Kirkland_Main-2634 | Kirkland_Manholes-1817 | 109.22 | Kirkland_Manholes-1805 | 101.51 | 328.6 | 2.35 | 8 | PVC | 0.01 | 1,080 | 30 | 124 | 154 | 14.3 | SM10 | |
| Kirkland_Main-2635 | Kirkland_Manholes-1831 | 166.9 | Kirkland_Manholes-1190 | 151.12 | 137.2 | 11.5 | 8 | PVC | 0.01 | 2,391 | 2 | 8 | 10 | 0.4 | SM14-Ex-EX83 | |
| Kirkland_Main-2636 | Kirkland_Manholes-1837 | 12.2 | Kirkland_Manholes-1836 | 11 | 9.3 | 12.92 | 12 | PVC | 0.01 | 7,473 | 473 | 787 | 1,260 | 16.9 | | |
| Kirkland_Main-2637 | Kirkland_Manholes-1834 | 11.35 | Kirkland_Manholes-1835 | 11.1 | 27.9 | 0.9 | 12 | PVC | 0.01 | 1,967 | 19 | 91 | 110 | 5.6 | | |
| Kirkland_Main-2638 | Kirkland_Manholes-1835 | 11.1 | Kirkland_Manholes-1836 | 11 | 9.8 | 1.02 | 12 | PVC | 0.01 | 2,099 | 19 | 98 | 117 | 5.6 | | |
| Kirkland_Main-2639 | Kirkland_Manholes-1832 | 17.68 | Kirkland_Manholes-1833 | 16.5 | 43.9 | 2.69 | 8 | PVC | 0.01 | 1,155 | 3 | 7 | 9 | 0.8 | | |
| Kirkland_Main-2640 | Kirkland_Manholes-1794 | 12.63 | Kirkland_Manholes-1837 | 12.2 | 128.1 | 0.34 | 15 | PVC | 0.01 | 2,183 | 473 | 780 | 1,253 | 57.4 | | |
| Kirkland_Main-2641 | Kirkland_Manholes-2679 | 83.65 | Kirkland_Manholes-2880 | 81.72 | 80.2 | 2.41 | 8 | PVC | 0.01 | 1,094 | 1 | 6 | 7 | 0.7 | | |
| Kirkland_Main-2642 | Kirkland_Manholes-2880 | 81.72 | Kirkland_Manholes-2879 | 68.04 | 76.6 | 17.86 | 8 | PVC | 0.01 | 2,979 | 33 | 31 | 64 | 2.2 | | |
| Kirkland_Main-2644 | Kirkland_Manholes-2885 | 165.69 | Kirkland_Manholes-1111 | 165.6 | 145.4 | 0.06 | 8 | PVC | 0.01 | 175 | 0 | 4 | 5 | 2.6 | SM14-Ex-EX9 | |
| Kirkland_Main-2658 | Kirkland_Manholes-480 | 484.34 | Kirkland_Manholes-1493 | 479.91 | 224.4 | 1.97 | 8 | PVC | 0.01 | 991 | 4 | 4 | 8 | 0.8 | | |
| Kirkland_Main-2659 | Kirkland_Manholes-3042 | 194.23 | Kirkland_Manholes-2474 | 188.45 | 173.4 | 3.33 | 8 | PVC | 0.01 | 1,287 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-2663 | Kirkland_Manholes-2886 | 151 | Kirkland_Manholes-252 | 142.57 | 290.9 | 2.9 | 8 | PVC | 0.01 | 1,200 | 0 | 4 | 5 | 0.4 | SM14-Ex-EX40 | |
| Kirkland_Main-2666 | Kirkland_Manholes-2887 | 302.33 | Kirkland_Manholes-2888 | 290.53 | 197 | 5.99 | 8 | PVC | 0.01 | 1,725 | 8 | 17 | 25 | 1.5 | | |
| Kirkland_Main-2667 | Kirkland_Manholes-1181 | 120.04 | Kirkland_Manholes-2889 | 83.33 | 400.3 | 9.17 | 8 | PVC | 0.01 | 2,135 | 3 | 9 | 12 | 0.6 | SM10 | |
| Kirkland_Main-2668 | Kirkland_Manholes-2889 | 83.33 | Kirkland_Manholes-305 | 74.69 | 164.1 | 5.26 | 8 | PVC | 0.01 | 1,618 | 6 | 18 | 24 | 1.5 | SM10 | |
| Kirkland_Main-2670 | Kirkland_Manholes-1624 | 183.67 | Kirkland_Manholes-1625 | 179.1 | 84.9 | 5.38 | 8 | PVC | 0.01 | 1,636 | 10 | 30 | 41 | 2.5 | | |
| Kirkland_Main-2671 | Kirkland_Manholes-1632 | 181.73 | Kirkland_Manholes-1625 | 179.1 | 96.8 | 2.72 | 8 | PVC | 0.01 | 1,162 | 5 | 17 | 22 | 1.9 | | |
| Kirkland_Main-2672 | Kirkland_Manholes-1627 | 199.21 | Kirkland_Manholes-1626 | 191.61 | 142.7 | 5.33 | 8 | PVC | 0.01 | 1,627 | 10 | 21 | 31 | 1.9 | | |
| Kirkland_Main-2673 | Kirkland_Manholes-1628 | 203.71 | Kirkland_Manholes-1627 | 199.21 | 47.7 | 9.43 | 8 | PVC | 0.01 | 2,165 | 9 | 17 | 26 | 1.2 | | |
| Kirkland_Main-2674 | Kirkland_Manholes-1629 | 216.45 | Kirkland_Manholes-1628 | 203.71 | 87.7 | 14.52 | 8 | PVC | 0.01 | 2,687 | 8 | 13 | 21 | 0.8 | | |
| Kirkland_Main-2675 | Kirkland_Manholes-1630 | 217.96 | Kirkland_Manholes-1629 | 216.45 | 15.3 | 9.86 | 8 | PVC | 0.01 | 2,214 | 2 | 9 | 11 | 0.5 | | |
| Kirkland_Main-2676 | Kirkland_Manholes-1631 | 193.59 | Kirkland_Manholes-1632 | 181.73 | 96.1 | 12.34 | 8 | PVC | 0.01 | 2,477 | 4 | 13 | 17 | 0.7 | | |
| Kirkland_Main-2677 | Kirkland_Manholes-1712 | 141.37 | Kirkland_Manholes-1706 | 124.78 | 325.1 | 5.1 | 8 | PVC | 0.01 | 1,593 | 2 | 8 | 10 | 0.7 | SM14-Ex-EX166 | |
| Kirkland_Main-2678 | Kirkland_Manholes-1716 | 100.64 | Kirkland_Manholes-1715 | 96.61 | 119 | 3.39 | 8 | PVC | 0.01 | 1,298 | 18 | 8 | 26 | 2 | | |
| Kirkland_Main-2679 | Kirkland_Manholes-1715 | 96.61 | Kirkland_Manholes-1714 | 94.78 | 31.8 | 5.76 | 8 | PVC | 0.01 | 1,692 | 18 | 17 | 35 | 2.1 | | |
| Kirkland_Main-2680 | Kirkland_Manholes-1713 | 108.19 | Kirkland_Manholes-1714 | 94.78 | 126.8 | 10.57 | 8 | PVC | 0.01 | 2,293 | 10 | 8 | 19 | 0.8 | SM14-Ex-EX186 | |
| Kirkland_Main-2681 | Kirkland_Manholes-1714 | 94.78 | Kirkland_Manholes-1717 | 58.55 | 387.3 | 9.35 | 8 | PVC | 0.01 | 2,156 | 29 | 33 | 62 | 2.9 | SM14-Ex-EX186 | |
| Kirkland_Main-2685 | Kirkland_Manholes-1720 | 51.16 | Kirkland_Manholes-1722 | 47.26 | 30.1 | 12.97 | 8 | PVC | 0.01 | 2,539 | 46 | 25 | 70 | 2.8 | | |
| Kirkland_Main-2686 | Kirkland_Manholes-1721 | 54.75 | Kirkland_Manholes-1720 | 51.16 | 58.7 | 6.12 | 8 | PVC | 0.01 | 1,744 | 45 | 17 | 62 | 3.5 | SM14-Ex-EX185 | |
| Kirkland_Main-2687 | Kirkland_Manholes-1723 | 62.26 | Kirkland_Manholes-1721 | 54.75 | 207.5 | 3.62 | 8 | PVC | 0.01 | 1,341 | 42 | 8 | 50 | 3.7 | SM14-Ex-EX185 | |
| Kirkland_Main-2688 | Kirkland_Manholes-1711 | 136.47 | Kirkland_Manholes-1710 | 134.24 | 160.1 | 1.39 | 12 | PVC | 0.01 | 2,453 | 18 | 74 | 92 | 3.8 | SM14-Ex-EX196 | |
| Kirkland_Main-2689 | Kirkland_Manholes-1734 | 24.57 | Kirkland_Manholes-1737 | 24.2 | 117 | 0.32 | 12 | PVC | 0.01 | 1,169 | 173 | 132 | 305 | 26.1 | | |
| Kirkland_Main-2690 | Kirkland_Manholes-1735 | 26.22 | Kirkland_Manholes-1734 | 24.57 | 115.4 | 1.43 | 12 | PVC | 0.01 | 2,488 | 52 | 25 | 76 | 3.1 | | |
| Kirkland_Main-2691 | Kirkland_Manholes-1729 | 25.06 | Kirkland_Manholes-1734 | 24.57 | 158.2 | 0.31 | 12 | PVC | 0.01 | 1,157 | 121 | 99 | 220 | 19 | | |
| Kirkland_Main-2692 | Kirkland_Manholes-1730 | 26.2 | Kirkland_Manholes-1729 | 25.06 | 35.3 | 3.23 | 8 | PVC | 0.01 | 1,268 | 22 | 33 | 55 | 4.4 | | |
| Kirkland_Main-2693 | Kirkland_Manholes-1731 | 27.35 | Kirkland_Manholes-1730 | 26.2 | 207.2 | 0.55 | 8 | PVC | 0.01 | 525 | 17 | 25 | 42 | 8 | | |
| Kirkland_Main-2694 | Kirkland_Manholes-1732 | 28.2 | Kirkland_Manholes-1731 | 27.35 | 54.4 | 1.56 | 8 | PVC | 0.01 | 882 | 8 | 17 | 25 | 2.8 | SM14-Ex-EX156 | |
| Kirkland_Main-2695 | Kirkland_Manholes-1733 | 28.74 | Kirkland_Manholes-1732 | 28.2 | 66.1 | 0.82 | 8 | PVC | 0.01 | 637 | 8 | 8 | 16 | 2.5 | SM14-Ex-EX156 | |
| Kirkland_Main-2696 | Kirkland_Manholes-1743 | 28.04 | Kirkland_Manholes-1746 | 27.54 | 238.6 | 0.21 | 15 | PVC | 0.01 | 1,725 | 370 | 570 | 940 | 54.5 | SM14-Ex-EX157 | |
| Kirkland_Main-2697 | Kirkland_Manholes-1746 | 27.54 | MH_Selection_06-13-2016-4 | 25.37 | 27.6 | 7.87 | 15 | PVC | 0.01 | 10,571 | 375 | 619 | 995 | 9.4 | SM14-Ex-EX157 | Updated per as-built drawings |
| Kirkland_Main-2700 | Kirkland_Manholes-1745 | 27.57 | Kirkland_Manholes-1746 | 27.54 | 73.9 | 0.04 | 8 | PVC | 0.01 | 142 | 5 | 41 | 46 | 32.5 | | |
| Kirkland_Main-2702 | Kirkland_Manholes-1737 | 24.2 | MH_Selection_06-13-2016-5 | 24.55 | 145.6 | -0.24 | 12 | PVC | 0.01 | 1,019 | 185 | 140 | 325 | 31.9 | | Updated per as-built drawings |
| Kirkland_Main-2703 | Kirkland_Manholes-1736 | 26.69 | Kirkland_Manholes-1735 | 26.22 | 88.6 | 0.53 | 8 | PVC | 0.01 | 513 | 51 | 17 | 67 | 13.1 | | |
| Kirkland_Main-2704 | Kirkland_Manholes-1752 | 27.81 | Kirkland_Manholes-1736 | 26.69 | 254.8 | 0.44 | 8 | PVC | 0.01 | 467 | 5 | 8 | 13 | 2.8 | | |
| Kirkland_Main-2705 | Kirkland_Manholes-1765 | 114.35 | Kirkland_Manholes-1764 | 112.57 | 108.8 | 1.64 | 8 | PVC | 0.01 | 902 | 3 | 8 | 11 | 1.2 | | |
| Kirkland_Main-2706 | Kirkland_Manholes-1764 | 112.57 | Kirkland_Manholes-1763 | 111.41 | 74.1 | 1.57 | 8 | PVC | 0.01 | 882 | 9 | 17 | 26 | 2.9 | | |
| Kirkland_Main-2707 | Kirkland_Manholes-1763 | 111.41 | Kirkland_Manholes-1761 | 99.41 | 212.2 | 5.65 | 10 | PVC | 0.01 | 3,040 | 18 | 58 | 76 | 2.5 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2708 | Kirkland_Manholes-1761 | 99.41 | Kirkland_Manholes-1762 | 98.88 | 52.5 | 1.01 | 12 | PVC | 0.01 | 2,089 | 49 | 198 | 247 | 11.8 | SM14-Ex-EX166 | |
| Kirkland_Main-2709 | Kirkland_Manholes-1706 | 124.78 | Kirkland_Manholes-1761 | 99.41 | 406.8 | 6.24 | 12 | PVC | 0.01 | 5,191 | 30 | 132 | 162 | 3.1 | SM14-Ex-EX166 | |
| Kirkland_Main-2710 | Kirkland_Manholes-1766 | 113.7 | Kirkland_Manholes-1763 | 111.41 | 43.4 | 5.28 | 8 | PVC | 0.01 | 1,620 | 8 | 33 | 41 | 2.6 | SM14-Ex-EX168 | |
| Kirkland_Main-2711 | Kirkland_Manholes-1767 | 122.16 | Kirkland_Manholes-1766 | 113.7 | 181 | 4.67 | 8 | PVC | 0.01 | 1,524 | 8 | 25 | 32 | 2.1 | SM14-Ex-EX168 | |
| Kirkland_Main-2712 | Kirkland_Manholes-1674 | 78.95 | Kirkland_Manholes-1774 | 71.66 | 398 | 1.83 | 8 | PVC | 0.01 | 954 | 90 | 206 | 296 | 31.1 | | |
| Kirkland_Main-2713 | Kirkland_Manholes-1774 | 71.66 | Kirkland_Manholes-1773 | 69.68 | 129.9 | 1.52 | 8 | PVC | 0.01 | 871 | 93 | 215 | 307 | 35.3 | | |
| Kirkland_Main-2714 | Kirkland_Manholes-1773 | 69.68 | Kirkland_Manholes-1772 | 68.31 | 220 | 0.62 | 8 | PVC | 0.01 | 556 | 101 | 223 | 324 | 58.3 | | |
| Kirkland_Main-2715 | Kirkland_Manholes-1768 | 72.13 | Kirkland_Manholes-1772 | 68.31 | 229.6 | 1.66 | 12 | PVC | 0.01 | 2,680 | 71 | 248 | 318 | 11.9 | SM14-Ex-EX166 | |
| Kirkland_Main-2716 | Kirkland_Manholes-1775 | 102.05 | Kirkland_Manholes-1771 | 101.91 | 35.5 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 8 | 14 | 3.2 | | Drop Connection |
| Kirkland_Main-2717 | Kirkland_Manholes-1771 | 99.82 | Kirkland_Manholes-1770 | 99.51 | 78 | 0.4 | 8 | PVC | 0.01 | 446 | 8 | 17 | 25 | 5.5 | | Drop Connection |
| Kirkland_Main-2718 | Kirkland_Manholes-1770 | 92.14 | Kirkland_Manholes-1769 | 80.52 | 165 | 7.04 | 8 | PVC | 0.01 | 1,871 | 10 | 25 | 34 | 1.8 | | |
| Kirkland_Main-2719 | Kirkland_Manholes-1769 | 80.52 | Kirkland_Manholes-1768 | 72.13 | 44.6 | 18.83 | 8 | PVC | 0.01 | 3,059 | 10 | 33 | 43 | 1.4 | | |
| Kirkland_Main-2720 | Kirkland_Manholes-1762 | 98.88 | Kirkland_Manholes-1768 | 72.13 | 281.2 | 9.51 | 12 | PVC | 0.01 | 6,412 | 50 | 206 | 256 | 4 | SM14-Ex-EX166 | |
| Kirkland_Main-2721 | Kirkland_Manholes-1742 | 45.09 | Kirkland_Manholes-1740 | 35.99 | 141.8 | 6.42 | 10 | PVC | 0.01 | 3,238 | 283 | 479 | 761 | 23.5 | | |
| Kirkland_Main-2722 | Kirkland_Manholes-1741 | 41.4 | Kirkland_Manholes-1740 | 35.99 | 19.3 | 27.98 | 8 | PVC | 0.01 | 3,729 | 86 | 74 | 160 | 4.3 | | |
| Kirkland_Main-2723 | Kirkland_Manholes-1722 | 47.26 | Kirkland_Manholes-1742 | 45.09 | 91 | 2.38 | 12 | PVC | 0.01 | 3,210 | 282 | 471 | 752 | 23.4 | | |
| Kirkland_Main-2724 | Kirkland_Manholes-1760 | 56.49 | Kirkland_Manholes-1722 | 47.26 | 220.7 | 4.18 | 10 | PVC | 0.01 | 2,614 | 235 | 438 | 673 | 25.7 | | |
| Kirkland_Main-2725 | Kirkland_Manholes-2143 | 61.9 | Kirkland_Manholes-1760 | 56.49 | 198.1 | 2.73 | 10 | PVC | 0.01 | 2,112 | 219 | 429 | 648 | 30.7 | | |
| Kirkland_Main-2726 | Kirkland_Manholes-1738 | 34.54 | Kirkland_Manholes-1728 | 26.2 | 233.5 | 3.57 | 8 | PVC | 0.01 | 1,333 | 36 | 17 | 52 | 3.9 | SM14-Ex-EX184 | |
| Kirkland_Main-2727 | Kirkland_Manholes-1739 | 35.68 | Kirkland_Manholes-1738 | 34.54 | 39.2 | 2.91 | 8 | PVC | 0.01 | 1,202 | 1 | 8 | 9 | 0.7 | SM14-Ex-EX184 | |
| Kirkland_Main-2730 | Kirkland_Manholes-1783 | 44.54 | Kirkland_Manholes-1784 | 44.07 | 47.4 | 1 | 8 | PVC | 0.01 | 705 | 79 | 66 | 145 | 20.6 | | |
| Kirkland_Main-2731 | Kirkland_Manholes-1786 | 41.21 | Kirkland_Manholes-733 | 35.72 | 39.3 | 13.98 | 10 | PVC | 0.01 | 4,780 | 313 | 99 | 412 | 8.6 | | |
| Kirkland_Main-2732 | Kirkland_Manholes-1787 | 42.06 | Kirkland_Manholes-1786 | 41.21 | 134.7 | 0.63 | 10 | PVC | 0.01 | 1,016 | 313 | 91 | 404 | 39.7 | | |
| Kirkland_Main-2733 | Kirkland_Manholes-1785 | 42.96 | Kirkland_Manholes-1787 | 42.06 | 131.8 | 0.68 | 10 | PVC | 0.01 | 1,056 | 311 | 83 | 394 | 37.3 | | |
| Kirkland_Main-2734 | Kirkland_Manholes-1920 | 409.24 | Kirkland_Manholes-2925 | 409 | 89.7 | 0.27 | 12 | PVC | 0.01 | 1,075 | 159 | 395 | 553 | 51.5 | SM14-Ex-EX215 | |
| Kirkland_Main-2735 | Kirkland_Manholes-2925 | 409 | Kirkland_Manholes-1921 | 405.86 | 161.9 | 1.94 | 8 | PVC | 0.01 | 982 | 160 | 399 | 559 | 56.9 | SM14-Ex-EX215 | |
| Kirkland_Main-2736 | Kirkland_Manholes-1784 | 44.07 | Kirkland_Manholes-1785 | 42.96 | 150 | 0.74 | 10 | PVC | 0.01 | 1,100 | 310 | 74 | 385 | 35 | | |
| Kirkland_Main-2737 | Kirkland_Manholes-1782 | 44.9 | Kirkland_Manholes-1783 | 44.54 | 88.3 | 0.4 | 8 | PVC | 0.01 | 446 | 78 | 58 | 136 | 30.5 | | |
| Kirkland_Main-2738 | Kirkland_Manholes-1781 | 45.04 | Kirkland_Manholes-1782 | 44.9 | 34.7 | 0.4 | 8 | PVC | 0.01 | 446 | 78 | 50 | 127 | 28.5 | | |
| Kirkland_Main-2739 | Kirkland_Manholes-1777 | 45.35 | Kirkland_Manholes-1781 | 45.04 | 78.1 | 0.4 | 8 | PVC | 0.01 | 446 | 77 | 41 | 118 | 26.5 | | |
| Kirkland_Main-2740 | Kirkland_Manholes-1779 | 45.97 | Kirkland_Manholes-1778 | 45.85 | 28.6 | 0.4 | 8 | PVC | 0.01 | 446 | 7 | 17 | 23 | 5.3 | | |
| Kirkland_Main-2741 | Kirkland_Manholes-1778 | 45.85 | Kirkland_Manholes-1777 | 45.35 | 126.1 | 0.4 | 8 | PVC | 0.01 | 446 | 72 | 25 | 97 | 21.8 | | |
| Kirkland_Main-2742 | Kirkland_Manholes-1780 | 57.25 | Kirkland_Manholes-1779 | 45.97 | 252.4 | 4.47 | 8 | PVC | 0.01 | 1,491 | 6 | 8 | 15 | 1 | | |
| Kirkland_Main-2743 | Kirkland_Manholes-1776 | 46.25 | Kirkland_Manholes-1777 | 45.35 | 244.9 | 0.37 | 8 | PVC | 0.01 | 428 | 4 | 8 | 12 | 2.8 | | |
| Kirkland_Main-2745 | Kirkland_Manholes-1696 | 58.41 | Kirkland_Manholes-1695 | 51.29 | 146.7 | 4.85 | 8 | PVC | 0.01 | 1,553 | 77 | 223 | 300 | 19.3 | SM14-Ex-EX96 | |
| Kirkland_Main-2746 | Kirkland_Manholes-1695 | 51.29 | Kirkland_Manholes-1694 | 44.12 | 135.5 | 5.29 | 8 | PVC | 0.01 | 1,622 | 82 | 231 | 313 | 19.3 | SM14-Ex-EX96 | |
| Kirkland_Main-2748 | Kirkland_Manholes-2107 | 69.19 | Kirkland_Manholes-2106 | 63.43 | 225 | 2.56 | 8 | PVC | 0.01 | 1,128 | 2 | 7 | 9 | 0.8 | SM14-Ex-EX227 | |
| Kirkland_Main-2749 | Kirkland_Manholes-2108 | 68.46 | Kirkland_Manholes-2109 | 59.77 | 298.6 | 2.91 | 8 | PVC | 0.01 | 1,203 | 86 | 149 | 235 | 19.5 | SM14-Ex-EX222 | |
| Kirkland_Main-2750 | Kirkland_Manholes-2119 | 72.3 | Kirkland_Manholes-2108 | 68.46 | 400.8 | 0.96 | 8 | PVC | 0.01 | 690 | 66 | 99 | 165 | 23.9 | SM14-Ex-EX222 | |
| Kirkland_Main-2751 | Kirkland_Manholes-2511 | 85.9 | Kirkland_Manholes-2108 | 85.31 | 148.4 | 0.4 | 8 | PVC | 0.01 | 446 | 19 | 43 | 63 | 14 | SM14-Ex-EX229 | Drop Connection |
| Kirkland_Main-2752 | Kirkland_Manholes-2109 | 59.77 | Kirkland_Manholes-2111 | 59.56 | 305.5 | 0.07 | 12 | PVC | 0.01 | 545 | 91 | 155 | 245 | 45 | SM14-Ex-EX222 | |
| Kirkland_Main-2753 | Kirkland_Manholes-2110 | 60.2 | Kirkland_Manholes-2111 | 59.56 | 55.5 | 1.15 | 8 | PVC | 0.01 | 757 | 21 | 37 | 58 | 7.7 | SM14-Ex-EX232 | |
| Kirkland_Main-2754 | Kirkland_Manholes-2112 | 88.66 | Kirkland_Manholes-2110 | 60.2 | 228.7 | 12.44 | 8 | PVC | 0.01 | 2,487 | 20 | 31 | 50 | 2 | SM14-Ex-EX232 | |
| Kirkland_Main-2755 | Kirkland_Manholes-2115 | 91.85 | Kirkland_Manholes-2112 | 88.66 | 62.8 | 5.08 | 8 | PVC | 0.01 | 1,589 | 14 | 25 | 38 | 2.4 | SM14-Ex-EX232 | |
| Kirkland_Main-2756 | Kirkland_Manholes-2113 | 121.3 | Kirkland_Manholes-2115 | 91.85 | 150.4 | 19.59 | 8 | PVC | 0.01 | 3,120 | 7 | 12 | 20 | 0.6 | SM14-Ex-EX232 | |
| Kirkland_Main-2757 | Kirkland_Manholes-2114 | 121.77 | Kirkland_Manholes-2113 | 121.3 | 207.4 | 0.23 | 8 | PVC | 0.01 | 336 | 5 | 6 | 11 | 3.2 | | |
| Kirkland_Main-2758 | Kirkland_Manholes-2116 | 91.9 | Kirkland_Manholes-2115 | 91.85 | 279.7 | 0.02 | 8 | PVC | 0.01 | 94 | 5 | 6 | 11 | 11.5 | SM14-Ex-EX232 | |
| Kirkland_Main-2759 | Kirkland_Manholes-2146 | 75.22 | Kirkland_Manholes-2117 | 74.65 | 143.2 | 0.4 | 8 | PVC | 0.01 | 446 | 48 | 87 | 135 | 30.2 | SM14-Ex-EX222 | Drop Connection |
| Kirkland_Main-2760 | Kirkland_Manholes-2117 | 73.78 | Kirkland_Manholes-2119 | 72.3 | 427.2 | 0.35 | 8 | PVC | 0.01 | 415 | 49 | 93 | 142 | 34.3 | SM14-Ex-EX222 | |
| Kirkland_Main-2761 | Kirkland_Manholes-2445 | 191.11 | Kirkland_Manholes-2490 | 173.27 | 210.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 28 | 73 | 101 | 4.9 | SM14-Ex-EX243 | |
| Kirkland_Main-2763 | Kirkland_Manholes-2446 | 217.36 | Kirkland_Manholes-2444 | 199.73 | 226.7 | 7.78 | 8 | PVC | 0.01 | 1,966 | 5 | 13 | 18 | 0.9 | SM14-Ex-EX245 | |
| Kirkland_Main-2765 | Kirkland_Manholes-1862 | 286.87 | Kirkland_Manholes-1863 | 286.75 | 31.1 | 0.4 | 8 | PVC | 0.01 | 446 | 84 | 142 | 226 | 50.6 | | Drop Connection |
| Kirkland_Main-2766 | Kirkland_Manholes-1863 | 286.33 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 3.06 | 8 | PVC | 0.01 | 1,233 | 85 | 146 | 231 | 18.7 | | |
| Kirkland_Main-2767 | Kirkland_Manholes-1864 | 285.22 | Kirkland_Manholes-1866 | 277.54 | 215.1 | 3.57 | 8 | PVC | 0.01 | 1,332 | 91 | 159 | 250 | 18.7 | | |
| Kirkland_Main-2768 | Kirkland_Manholes-1865 | 285.61 | Kirkland_Manholes-1864 | 285.22 | 36.3 | 1.07 | 8 | PVC | 0.01 | 731 | 6 | 9 | 14 | 2 | | |
| Kirkland_Main-2769 | Kirkland_Manholes-2770 | 287.2 | Kirkland_Manholes-1865 | 285.61 | 339.1 | 0.47 | 8 | PVC | 0.01 | 483 | 5 | 4 | 9 | 1.9 | | |
| Kirkland_Main-2770 | Kirkland_Manholes-1871 | 279.1 | Kirkland_Manholes-1866 | 277.54 | 120.2 | 1.3 | 8 | PVC | 0.01 | 803 | 6 | 30 | 36 | 4.4 | | |
| Kirkland_Main-2771 | Kirkland_Manholes-1866 | 277.54 | Kirkland_Manholes-1867 | 276.54 | 31.1 | 3.22 | 8 | PVC | 0.01 | 1,264 | 97 | 193 | 290 | 23 | | |
| Kirkland_Main-2772 | Kirkland_Manholes-1867 | 276.54 | Kirkland_Manholes-1868 | 257.42 | 267.6 | 7.15 | 8 | PVC | 0.01 | 1,885 | 98 | 197 | 295 | 15.7 | | |
| Kirkland_Main-2773 | Kirkland_Manholes-1868 | 257.42 | Kirkland_Manholes-1888 | 254.12 | 73.1 | 4.51 | 10 | PVC | 0.01 | 2,715 | 157 | 283 | 440 | 16.2 | | |
| Kirkland_Main-2774 | Kirkland_Manholes-1887 | 260.26 | Kirkland_Manholes-1868 | 257.42 | 270 | 1.05 | 8 | PVC | 0.01 | 723 | 58 | 82 | 140 | 19.3 | | |
| Kirkland_Main-2775 | Kirkland_Manholes-1869 | 292.56 | Kirkland_Manholes-1870 | 286.99 | 206.4 | 2.7 | 8 | PVC | 0.01 | 1,158 | 3 | 4 | 8 | 0.7 | | |

## 2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2776 | Kirkland_Manholes-1870 | 286.99 | Kirkland_Manholes-1871 | 279.1 | 130.7 | 6.04 | 8 | PVC | 0.01 | 1,732 | 4 | 9 | 12 | 0.7 | | |
| Kirkland_Main-2777 | Kirkland_Manholes-1872 | 282.33 | Kirkland_Manholes-1871 | 279.1 | 27.4 | 11.77 | 8 | PVC | 0.01 | 2,419 | 2 | 17 | 19 | 0.8 | | |
| Kirkland_Main-2778 | Kirkland_Manholes-1896 | 286.15 | Kirkland_Manholes-1872 | 282.33 | 252.6 | 1.51 | 8 | PVC | 0.01 | 867 | 1 | 13 | 14 | 1.6 | | |
| Kirkland_Main-2779 | Kirkland_Manholes-1895 | 288.31 | Kirkland_Manholes-1896 | 286.15 | 156.7 | 1.38 | 8 | PVC | 0.01 | 828 | 1 | 9 | 9 | 1.1 | | |
| Kirkland_Main-2781 | Kirkland_Manholes-1894 | 292.07 | Kirkland_Manholes-1895 | 288.31 | 37.7 | 9.98 | 8 | PVC | 0.01 | 2,227 | 0 | 4 | 5 | 0.2 | | |
| Kirkland_Main-2785 | Kirkland_Manholes-1893 | 314.62 | Kirkland_Manholes-1892 | 301.26 | 174.3 | 7.66 | 8 | PVC | 0.01 | 1,952 | 27 | 34 | 62 | 3.2 | | |
| Kirkland_Main-2786 | Kirkland_Manholes-1892 | 301.26 | Kirkland_Manholes-1882 | 297.55 | 110.1 | 3.37 | 8 | PVC | 0.01 | 1,294 | 31 | 43 | 74 | 5.7 | | |
| Kirkland_Main-2787 | Kirkland_Manholes-1882 | 297.55 | Kirkland_Manholes-1885 | 271.65 | 301.6 | 8.59 | 8 | PVC | 0.01 | 2,066 | 38 | 47 | 85 | 4.1 | | |
| Kirkland_Main-2788 | Kirkland_Manholes-1883 | 295.15 | Kirkland_Manholes-1885 | 271.65 | 83.7 | 28.09 | 8 | PVC | 0.01 | 3,737 | 11 | 21 | 32 | 0.9 | | |
| Kirkland_Main-2789 | Kirkland_Manholes-1889 | 296.4 | Kirkland_Manholes-1883 | 295.15 | 155.2 | 0.81 | 8 | PVC | 0.01 | 633 | 10 | 17 | 27 | 4.3 | | |
| Kirkland_Main-2790 | Kirkland_Manholes-1884 | 299.38 | Kirkland_Manholes-1889 | 296.4 | 51.3 | 5.81 | 8 | PVC | 0.01 | 1,699 | 6 | 13 | 19 | 1.1 | | |
| Kirkland_Main-2791 | Kirkland_Manholes-1891 | 305.89 | Kirkland_Manholes-1890 | 303.36 | 105.7 | 2.39 | 8 | PVC | 0.01 | 1,091 | 4 | 4 | 8 | 0.8 | | |
| Kirkland_Main-2792 | Kirkland_Manholes-1890 | 303.36 | Kirkland_Manholes-1884 | 299.38 | 71.4 | 5.58 | 8 | PVC | 0.01 | 1,665 | 5 | 9 | 14 | 0.8 | | |
| Kirkland_Main-2793 | Kirkland_Manholes-1885 | 271.65 | Kirkland_Manholes-1886 | 262.12 | 238.5 | 4 | 8 | PVC | 0.01 | 1,409 | 56 | 73 | 129 | 9.2 | | |
| Kirkland_Main-2794 | Kirkland_Manholes-1886 | 262.12 | Kirkland_Manholes-1887 | 260.26 | 298.4 | 0.62 | 8 | PVC | 0.01 | 557 | 57 | 77 | 134 | 24 | | |
| Kirkland_Main-2795 | Kirkland_Manholes-1888 | 254.12 | Kirkland_Manholes-1897 | 245.38 | 209.5 | 4.17 | 8 | PVC | 0.01 | 1,440 | 185 | 335 | 520 | 36.1 | | |
| Kirkland_Main-2796 | Kirkland_Manholes-1877 | 246.77 | Kirkland_Manholes-1873 | 243.35 | 391.2 | 0.87 | 8 | PVC | 0.01 | 659 | 75 | 129 | 203 | 30.9 | | |
| Kirkland_Main-2797 | Kirkland_Manholes-1873 | 243.35 | Kirkland_Manholes-1874 | 243.32 | 295.9 | 0.01 | 24 | PVC | 0.01 | 1,329 | 261 | 472 | 733 | 55.1 | SM14-Ex-EX134 | |
| Kirkland_Main-2798 | Kirkland_Manholes-1875 | 249.18 | Kirkland_Manholes-1876 | 247.77 | 111.8 | 1.26 | 8 | PVC | 0.01 | 792 | 26 | 4 | 30 | 3.8 | | |
| Kirkland_Main-2799 | Kirkland_Manholes-1876 | 247.77 | Kirkland_Manholes-1877 | 246.77 | 320.2 | 0.31 | 8 | PVC | 0.01 | 394 | 27 | 17 | 44 | 11.1 | | |
| Kirkland_Main-2800 | Kirkland_Manholes-1878 | 249.88 | Kirkland_Manholes-1877 | 246.77 | 242.5 | 1.28 | 8 | PVC | 0.01 | 798 | 47 | 107 | 155 | 19.4 | | |
| Kirkland_Main-2801 | Kirkland_Manholes-1874 | 243.32 | Kirkland_Manholes-1571 | 242.76 | 271.1 | 0.21 | 15 | PVC | 0.01 | 1,713 | 261 | 476 | 738 | 43.1 | | |
| Kirkland_Main-2802 | Kirkland_Manholes-1881 | 267.11 | Kirkland_Manholes-1879 | 258.08 | 239.4 | 3.77 | 8 | PVC | 0.01 | 1,369 | 44 | 94 | 138 | 10.1 | | |
| Kirkland_Main-2803 | Kirkland_Manholes-1880 | 260.03 | Kirkland_Manholes-1879 | 258.08 | 143.3 | 1.36 | 8 | PVC | 0.01 | 822 | 3 | 4 | 7 | 0.9 | | |
| Kirkland_Main-2805 | Kirkland_Manholes-1879 | 258.08 | Kirkland_Manholes-1878 | 249.88 | 231.7 | 3.54 | 8 | PVC | 0.01 | 1,326 | 47 | 103 | 150 | 11.3 | | |
| Kirkland_Main-2806 | Kirkland_Manholes-1897 | 245.38 | Kirkland_Manholes-1873 | 243.35 | 282.6 | 0.72 | 10 | PVC | 0.01 | 1,084 | 186 | 339 | 525 | 48.4 | | |
| Kirkland_Main-2807 | Kirkland_Manholes-1902 | 406.33 | Kirkland_Manholes-1899 | 405.32 | 253.1 | 0.4 | 8 | PVC | 0.01 | 447 | 2 | 4 | 6 | 1.3 | | |
| Kirkland_Main-2808 | Kirkland_Manholes-1899 | 405.32 | Kirkland_Manholes-1898 | 404.75 | 141.4 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 9 | 11 | 2.5 | | |
| Kirkland_Main-2809 | Kirkland_Manholes-1898 | 404.75 | Kirkland_Manholes-1900 | 402.51 | 135.8 | 1.65 | 8 | PVC | 0.01 | 905 | 4 | 13 | 17 | 1.9 | | |
| Kirkland_Main-2810 | Kirkland_Manholes-1900 | 402.51 | Kirkland_Manholes-1901 | 396.95 | 219.6 | 2.53 | 8 | PVC | 0.01 | 1,122 | 6 | 17 | 23 | 2.1 | | |
| Kirkland_Main-2811 | Kirkland_Manholes-1901 | 396.95 | Kirkland_Manholes-1905 | 395.5 | 142.8 | 1.02 | 8 | PVC | 0.01 | 711 | 7 | 21 | 29 | 4 | | |
| Kirkland_Main-2812 | Kirkland_Manholes-1903 | 399.77 | Kirkland_Manholes-1904 | 399.67 | 107.5 | 0.09 | 8 | PVC | 0.01 | 215 | 6 | 13 | 19 | 8.6 | | |
| Kirkland_Main-2813 | Kirkland_Manholes-1904 | 399.67 | Kirkland_Manholes-1905 | 395.5 | 126.3 | 3.3 | 8 | PVC | 0.01 | 1,281 | 7 | 17 | 24 | 1.9 | | |
| Kirkland_Main-2814 | Kirkland_Manholes-2220 | 93.99 | Kirkland_Manholes-2219 | 92.24 | 194.8 | 0.9 | 8 | PVC | 0.01 | 668 | 1 | 7 | 8 | 1.1 | | |
| Kirkland_Main-2815 | Kirkland_Manholes-2219 | 92.24 | Kirkland_Manholes-2218 | 82.71 | 300.9 | 3.17 | 8 | PVC | 0.01 | 1,255 | 4 | 13 | 17 | 1.3 | | |
| Kirkland_Main-2824 | Kirkland_Manholes-2222 | 72.19 | Kirkland_Manholes-2221 | 60.29 | 232.5 | 5.12 | 8 | PVC | 0.01 | 1,595 | 4 | 20 | 24 | 1.5 | | |
| Kirkland_Main-2825 | Kirkland_Manholes-2223 | 75.05 | Kirkland_Manholes-2222 | 72.19 | 181.6 | 1.58 | 8 | PVC | 0.01 | 885 | 2 | 13 | 15 | 1.7 | | |
| Kirkland_Main-2826 | Kirkland_Manholes-2224 | 76.4 | Kirkland_Manholes-2223 | 75.05 | 210.4 | 0.64 | 8 | PVC | 0.01 | 565 | 1 | 7 | 8 | 1.3 | | |
| Kirkland_Main-2829 | Kirkland_Manholes-2233 | 60.15 | Kirkland_Manholes-2232 | 48.59 | 76.7 | 15.07 | 8 | PVC | 0.01 | 2,737 | 16 | 7 | 23 | 0.8 | | |
| Kirkland_Main-2830 | Kirkland_Manholes-2232 | 48.59 | Kirkland_Manholes-2231 | 25.71 | 219.7 | 10.42 | 8 | PVC | 0.01 | 2,275 | 17 | 13 | 30 | 1.3 | | |
| Kirkland_Main-2831 | Kirkland_Manholes-2231 | 25.71 | Kirkland_Manholes-2230 | 23.3 | 56.5 | 4.26 | 8 | PVC | 0.01 | 1,456 | 17 | 20 | 37 | 2.5 | | |
| Kirkland_Main-2832 | Kirkland_Manholes-2230 | 23.3 | Kirkland_Manholes-2229 | 22.53 | 34.1 | 2.26 | 8 | PVC | 0.01 | 1,060 | 17 | 33 | 50 | 4.7 | | |
| Kirkland_Main-2833 | Kirkland_Manholes-2210 | 47.75 | Kirkland_Manholes-2205 | 23.1 | 33.9 | 72.62 | 8 | PVC | 0.01 | 6,008 | 8 | 26 | 34 | 0.6 | SM14-Ex-EX189 | Slope verified in as-builts |
| Kirkland_Main-2834 | Kirkland_Manholes-2211 | 51.73 | Kirkland_Manholes-2210 | 47.75 | 86.6 | 4.6 | 8 | PVC | 0.01 | 1,512 | 7 | 20 | 27 | 1.8 | | |
| Kirkland_Main-2835 | Kirkland_Manholes-2207 | 54.13 | Kirkland_Manholes-2211 | 51.73 | 163.6 | 1.47 | 8 | PVC | 0.01 | 854 | 1 | 13 | 14 | 1.6 | | |
| Kirkland_Main-2836 | Kirkland_Manholes-2206 | 66.42 | Kirkland_Manholes-2198 | 65.46 | 282.2 | 0.34 | 8 | PVC | 0.01 | 411 | 3 | 17 | 20 | 4.7 | SM8 | |
| Kirkland_Main-2837 | Kirkland_Manholes-2198 | 65.46 | Kirkland_Manholes-2193 | 64.5 | 239.8 | 0.4 | 8 | PVC | 0.01 | 446 | 6 | 25 | 30 | 6.8 | SM14-Ex-EX187 | |
| Kirkland_Main-2839 | Kirkland_Manholes-2084 | 179.07 | Kirkland_Manholes-2069 | 170.43 | 427.7 | 2.02 | 12 | PVC | 0.01 | 2,954 | 76 | 77 | 153 | 5.2 | SM14-Ex-EX199 | |
| Kirkland_Main-2840 | Kirkland_Manholes-2085 | 183.55 | Kirkland_Manholes-2084 | 179.07 | 426.7 | 1.05 | 12 | PVC | 0.01 | 2,130 | 75 | 73 | 148 | 7 | SM14-Ex-EX199 | |
| Kirkland_Main-2841 | Kirkland_Manholes-2086 | 187.61 | Kirkland_Manholes-2085 | 183.55 | 445.4 | 0.91 | 12 | PVC | 0.01 | 1,985 | 73 | 69 | 142 | 7.1 | SM1 | |
| Kirkland_Main-2842 | Kirkland_Manholes-2074 | 213.49 | Kirkland_Manholes-2086 | 187.61 | 333.1 | 7.77 | 8 | PVC | 0.01 | 1,965 | 55 | 56 | 111 | 5.6 | SM14-Ex-EX246 | |
| Kirkland_Main-2843 | Kirkland_Manholes-2087 | 189.64 | Kirkland_Manholes-2086 | 187.61 | 250.4 | 0.81 | 12 | PVC | 0.01 | 1,872 | 9 | 9 | 18 | 1 | SM1 | |
| Kirkland_Main-2844 | Kirkland_Manholes-2301 | 194.13 | Kirkland_Manholes-2087 | 189.64 | 258.5 | 1.74 | 12 | PVC | 0.01 | 2,740 | 1 | 4 | 5 | 0.2 | SM1 | |
| Kirkland_Main-2845 | Kirkland_Manholes-2838 | 108.96 | Kirkland_Manholes-2837 | 104.37 | 77.8 | 5.9 | 8 | PVC | 0.01 | 1,712 | 7 | 6 | 13 | 0.8 | | |
| Kirkland_Main-2846 | Kirkland_Manholes-2837 | 104.37 | Kirkland_Manholes-2836 | 60.97 | 275.8 | 15.74 | 8 | PVC | 0.01 | 2,797 | 8 | 12 | 21 | 0.7 | | |
| Kirkland_Main-2847 | Kirkland_Manholes-2834 | 37.62 | Kirkland_Manholes-2849 | 29.21 | 55.8 | 15.07 | 12 | PVC | 0.01 | 8,071 | 60 | 130 | 190 | 2.4 | SM14-Ex-EX316 | |
| Kirkland_Main-2848 | Kirkland_Manholes-2833 | 29.99 | Kirkland_Manholes-2849 | 29.21 | 264.4 | 0.3 | 18 | PVC | 0.01 | 3,329 | 512 | 1,078 | 1,662 | 49.9 | SM14-Ex-EX309 | |
| Kirkland_Main-2849 | Kirkland_Manholes-2849 | 29.21 | Kirkland_Manholes-2848 | 28.9 | 205.9 | 0.15 | 24 | PVC | 0.01 | 5,112 | 573 | 1,215 | 1,859 | 36.4 | SM14-Ex-EX309 | Drop Connection |
| Kirkland_Main-2850 | Kirkland_Manholes-2848 | 27.55 | Kirkland_Manholes-2842 | 26.9 | 429.8 | 0.15 | 24 | PVC | 0.01 | 5,133 | 579 | 1,221 | 1,871 | 36.4 | SM14-Ex-EX309 | |
| Kirkland_Main-2851 | Kirkland_Manholes-1941 | 361.64 | Kirkland_Manholes-1942 | 350.59 | 169 | 6.54 | 8 | PVC | 0.01 | 1,803 | 3 | 9 | 12 | 0.6 | | |
| Kirkland_Main-2852 | Kirkland_Manholes-1943 | 356.18 | Kirkland_Manholes-1942 | 350.59 | 121.8 | 4.59 | 8 | PVC | 0.01 | 1,511 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2853 | Kirkland_Manholes-1942 | 350.59 | Kirkland_Manholes-1577 | 341.43 | 212 | 4.32 | 8 | PVC | 0.01 | 1,465 | 4 | 17 | 21 | 1.5 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2854 | Kirkland_Manholes-1944 | 388.13 | Kirkland_Manholes-1945 | 370.88 | 207.3 | 8.32 | 8 | PVC | 0.01 | 2,034 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2855 | Kirkland_Manholes-1945 | 370.88 | Kirkland_Manholes-1946 | 363.75 | 185.3 | 3.85 | 8 | PVC | 0.01 | 1,383 | 2 | 9 | 11 | 0.8 | | |
| Kirkland_Main-2856 | Kirkland_Manholes-1946 | 363.75 | Kirkland_Manholes-1947 | 358.01 | 122.1 | 4.7 | 8 | PVC | 0.01 | 1,529 | 3 | 13 | 16 | 1.1 | | |
| Kirkland_Main-2857 | Kirkland_Manholes-1947 | 358.01 | Kirkland_Manholes-1948 | 350.2 | 125.9 | 6.2 | 8 | PVC | 0.01 | 1,756 | 4 | 17 | 21 | 1.2 | | |
| Kirkland_Main-2858 | Kirkland_Manholes-1949 | 352.67 | Kirkland_Manholes-1948 | 350.2 | 274.7 | 0.9 | 8 | PVC | 0.01 | 669 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-2859 | Kirkland_Manholes-1948 | 350.2 | Kirkland_Manholes-1950 | 344.53 | 121.4 | 4.67 | 8 | PVC | 0.01 | 1,524 | 8 | 26 | 34 | 2.2 | | |
| Kirkland_Main-2860 | Kirkland_Manholes-1950 | 344.53 | Kirkland_Manholes-1893 | 314.62 | 313.2 | 9.55 | 8 | PVC | 0.01 | 2,179 | 10 | 30 | 40 | 1.8 | | |
| Kirkland_Main-2861 | Kirkland_Manholes-1952 | 275.36 | Kirkland_Manholes-1951 | 275.06 | 208.2 | 0.14 | 8 | PVC | 0.01 | 268 | 7 | 43 | 50 | 18.8 | | |
| Kirkland_Main-2862 | Kirkland_Manholes-1953 | 290.71 | Kirkland_Manholes-1952 | 275.36 | 336.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 7 | 39 | 46 | 3 | | |
| Kirkland_Main-2863 | Kirkland_Manholes-1957 | 343.4 | Kirkland_Manholes-1956 | 335.87 | 142.5 | 5.28 | 8 | PVC | 0.01 | 1,620 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-2864 | Kirkland_Manholes-1956 | 335.87 | Kirkland_Manholes-1955 | 335.45 | 105.5 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 9 | 9 | 2.1 | | |
| Kirkland_Main-2865 | Kirkland_Manholes-1975 | 436.73 | Kirkland_Manholes-1974 | 432 | 247.5 | 1.91 | 8 | PVC | 0.01 | 975 | 40 | 133 | 173 | 17.7 | | |
| Kirkland_Main-2866 | Kirkland_Manholes-1976 | 440.77 | Kirkland_Manholes-1975 | 436.73 | 231.1 | 1.75 | 8 | PVC | 0.01 | 932 | 16 | 43 | 59 | 6.3 | | |
| Kirkland_Main-2867 | Kirkland_Manholes-1978 | 440.32 | Kirkland_Manholes-1975 | 436.73 | 342.8 | 1.05 | 8 | PVC | 0.01 | 721 | 23 | 86 | 108 | 15 | | |
| Kirkland_Main-2868 | Kirkland_Manholes-1977 | 454.61 | Kirkland_Manholes-1976 | 440.77 | 262.5 | 5.27 | 8 | PVC | 0.01 | 1,619 | 11 | 34 | 45 | 2.8 | | |
| Kirkland_Main-2869 | Kirkland_Manholes-1980 | 464.9 | Kirkland_Manholes-1977 | 454.61 | 328.6 | 3.13 | 8 | PVC | 0.01 | 1,248 | 8 | 26 | 33 | 2.7 | | |
| Kirkland_Main-2870 | Kirkland_Manholes-1979 | 446.84 | Kirkland_Manholes-1978 | 440.32 | 179.3 | 3.64 | 8 | PVC | 0.01 | 1,345 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-2871 | Kirkland_Manholes-1984 | 465.6 | Kirkland_Manholes-1980 | 464.9 | 159.8 | 0.44 | 8 | PVC | 0.01 | 467 | 5 | 17 | 23 | 4.8 | | |
| Kirkland_Main-2872 | Kirkland_Manholes-1982 | 470.94 | Kirkland_Manholes-1980 | 464.9 | 329.7 | 1.83 | 8 | PVC | 0.01 | 954 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2873 | Kirkland_Manholes-1985 | 470.88 | Kirkland_Manholes-1981 | 467.1 | 204.6 | 1.85 | 8 | PVC | 0.01 | 958 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-2874 | Kirkland_Manholes-1986 | 467.24 | Kirkland_Manholes-1981 | 467.1 | 144.7 | 0.1 | 8 | PVC | 0.01 | 219 | 1 | 4 | 5 | 2.3 | | |
| Kirkland_Main-2875 | Kirkland_Manholes-1983 | 469.93 | Kirkland_Manholes-2019 | 467.83 | 75.8 | 2.77 | 8 | PVC | 0.01 | 1,174 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-2876 | Kirkland_Manholes-1981 | 467.1 | Kirkland_Manholes-1984 | 465.6 | 153 | 0.98 | 8 | PVC | 0.01 | 698 | 4 | 13 | 16 | 2.4 | | |
| Kirkland_Main-2877 | Kirkland_Manholes-1987 | 443.37 | Kirkland_Manholes-1976 | 440.77 | 252.9 | 1.03 | 8 | PVC | 0.01 | 715 | 2 | 4 | 6 | 0.9 | | |
| Kirkland_Main-2878 | Kirkland_Manholes-2002 | 429.3 | Kirkland_Manholes-2000 | 426.18 | 243.7 | 1.28 | 8 | PVC | 0.01 | 798 | 2 | 9 | 10 | 1.3 | SM14-Ex-EX209 | |
| Kirkland_Main-2879 | Kirkland_Manholes-2000 | 426.18 | Kirkland_Manholes-2001 | 424.5 | 24.1 | 6.98 | 8 | PVC | 0.01 | 1,863 | 23 | 69 | 91 | 4.9 | SM14-Ex-EX209 | |
| Kirkland_Main-2880 | Kirkland_Manholes-1999 | 430.91 | Kirkland_Manholes-2000 | 426.18 | 304.8 | 1.55 | 8 | PVC | 0.01 | 878 | 21 | 56 | 77 | 8.7 | SM14-Ex-EX211 | |
| Kirkland_Main-2881 | Kirkland_Manholes-2001 | 424.5 | Kirkland_Manholes-2063 | 422.68 | 357.6 | 0.51 | 8 | PVC | 0.01 | 503 | 23 | 73 | 96 | 19.1 | SM14-Ex-EX209 | |
| Kirkland_Main-2882 | Kirkland_Manholes-2003 | 431.01 | Kirkland_Manholes-2002 | 429.3 | 155.3 | 1.1 | 8 | PVC | 0.01 | 740 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-2883 | Kirkland_Manholes-2015 | 418.27 | Kirkland_Manholes-2014 | 416.63 | 83.6 | 1.96 | 8 | PVC | 0.01 | 988 | 38 | 94 | 132 | 13.4 | | |
| Kirkland_Main-2884 | Kirkland_Manholes-2014 | 416.63 | Kirkland_Manholes-2013 | 413.74 | 146.6 | 1.97 | 8 | PVC | 0.01 | 990 | 39 | 99 | 138 | 13.9 | | |
| Kirkland_Main-2886 | Kirkland_Manholes-2010 | 424.43 | Kirkland_Manholes-2016 | 421.46 | 333.6 | 0.89 | 8 | PVC | 0.01 | 665 | 33 | 86 | 119 | 17.9 | | |
| Kirkland_Main-2887 | Kirkland_Manholes-2016 | 421.46 | Kirkland_Manholes-2015 | 418.27 | 330.4 | 0.97 | 8 | PVC | 0.01 | 693 | 36 | 90 | 126 | 18.2 | | |
| Kirkland_Main-2889 | Kirkland_Manholes-2021 | 473.17 | Kirkland_Manholes-2020 | 468.34 | 27.5 | 17.56 | 8 | PVC | 0.01 | 2,954 | 41 | 99 | 139 | 4.7 | | |
| Kirkland_Main-2890 | Kirkland_Manholes-2020 | 468.34 | Kirkland_Manholes-2019 | 467.83 | 127.5 | 0.4 | 10 | PVC | 0.01 | 809 | 159 | 258 | 417 | 51.5 | | |
| Kirkland_Main-2891 | Kirkland_Manholes-2023 | 466.76 | Kirkland_Manholes-2022 | 466 | 41.6 | 1.83 | 8 | PVC | 0.01 | 953 | 12 | 21 | 33 | 3.5 | | |
| Kirkland_Main-2892 | Kirkland_Manholes-2037 | 465.67 | Kirkland_Manholes-2036 | 452.58 | 367.2 | 3.57 | 8 | PVC | 0.01 | 1,331 | 12 | 17 | 29 | 2.2 | SM14-Ex-EX266 | |
| Kirkland_Main-2893 | Kirkland_Manholes-2041 | 465.42 | Kirkland_Manholes-2042 | 455.6 | 502.4 | 1.95 | 8 | PVC | 0.01 | 986 | 3 | 4 | 7 | 0.7 | SM14-Ex-EX265 | |
| Kirkland_Main-2894 | Kirkland_Manholes-2042 | 455.6 | Kirkland_Manholes-2043 | 454.68 | 150.3 | 0.61 | 12 | PVC | 0.01 | 1,626 | 106 | 300 | 407 | 25 | SM14-Ex-EX214 | |
| Kirkland_Main-2895 | Kirkland_Manholes-2044 | 435.14 | Kirkland_Manholes-2045 | 432.5 | 20.8 | 12.67 | 12 | PVC | 0.01 | 7,399 | 110 | 309 | 419 | 5.7 | SM14-Ex-EX214 | |
| Kirkland_Main-2896 | Kirkland_Manholes-2043 | 454.68 | Kirkland_Manholes-2044 | 435.14 | 356.2 | 5.49 | 12 | PVC | 0.01 | 4,869 | 108 | 305 | 412 | 8.5 | SM14-Ex-EX214 | |
| Kirkland_Main-2897 | Kirkland_Manholes-2046 | 437.24 | Kirkland_Manholes-2045 | 432.5 | 199.5 | 2.38 | 10 | PVC | 0.01 | 1,970 | 203 | 365 | 568 | 28.8 | | |
| Kirkland_Main-2898 | Kirkland_Manholes-2047 | 441.15 | Kirkland_Manholes-2046 | 437.24 | 49.2 | 7.95 | 10 | PVC | 0.01 | 3,605 | 202 | 361 | 562 | 15.6 | | |
| Kirkland_Main-2899 | Kirkland_Manholes-2048 | 442.51 | Kirkland_Manholes-2047 | 441.15 | 76.6 | 1.77 | 8 | PVC | 0.01 | 939 | 201 | 356 | 557 | 59.3 | SM14-Ex-EX264 | |
| Kirkland_Main-2900 | Kirkland_Manholes-2049 | 454.48 | Kirkland_Manholes-2050 | 439.64 | 163.1 | 9.1 | 8 | PVC | 0.01 | 2,126 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX263 | |
| Kirkland_Main-2901 | Kirkland_Manholes-2050 | 439.64 | Kirkland_Manholes-2051 | 434.18 | 313 | 1.74 | 8 | PVC | 0.01 | 931 | 4 | 9 | 13 | 1.4 | SM14-Ex-EX263 | |
| Kirkland_Main-2902 | Kirkland_Manholes-2051 | 434.18 | Kirkland_Manholes-2054 | 429.73 | 307.2 | 1.45 | 8 | PVC | 0.01 | 849 | 6 | 13 | 19 | 2.3 | SM14-Ex-EX263 | |
| Kirkland_Main-2903 | Kirkland_Manholes-2053 | 424.91 | Kirkland_Manholes-2285 | 419.89 | 165.8 | 3.03 | 8 | PVC | 0.01 | 1,227 | 1 | 4 | 6 | 0.5 | SM14-Ex-EX248 | |
| Kirkland_Main-2904 | Kirkland_Manholes-2054 | 429.73 | Kirkland_Manholes-2055 | 427.92 | 21.3 | 8.48 | 8 | PVC | 0.01 | 2,053 | 7 | 17 | 25 | 1.2 | | |
| Kirkland_Main-2905 | Kirkland_Manholes-3044 | 18.06 | Kirkland_Manholes-2736 | 17.76 | 69.7 | 0.43 | 18 | PVC | 0.01 | 4,020 | 337 | 526 | 863 | 21.5 | SM14-Ex-EX289 | |
| Kirkland_Main-2906 | Kirkland_Manholes-2045 | 432.5 | Kirkland_Manholes-2055 | 427.92 | 351.4 | 1.3 | 10 | PVC | 0.01 | 1,460 | 314 | 678 | 992 | 68 | | |
| Kirkland_Main-2907 | Kirkland_Manholes-2057 | 422.6 | Kirkland_Manholes-2056 | 422.2 | 14.4 | 2.79 | 10 | PVC | 0.01 | 2,134 | 337 | 717 | 1,054 | 49.4 | | |
| Kirkland_Main-2908 | Kirkland_Manholes-1848 | 462 | Kirkland_Manholes-1216 | 443.89 | 186.3 | 9.72 | 8 | PVC | 0.01 | 2,198 | 3 | 4 | 7 | 0.3 | | |
| Kirkland_Main-2909 | Kirkland_Manholes-2056 | 422.2 | Kirkland_Manholes-2285 | 419.89 | 62.2 | 3.71 | 8 | PVC | 0.01 | 1,359 | 338 | 721 | 1,059 | 77.9 | | |
| Kirkland_Main-2910 | Kirkland_Manholes-2058 | 427.27 | Kirkland_Manholes-2057 | 422.6 | 119.2 | 3.92 | 10 | PVC | 0.01 | 2,531 | 336 | 713 | 1,049 | 41.4 | | |
| Kirkland_Main-2911 | Kirkland_Manholes-2055 | 427.92 | Kirkland_Manholes-2058 | 427.27 | 53.1 | 1.22 | 10 | PVC | 0.01 | 1,414 | 322 | 700 | 1,021 | 72.2 | | |
| Kirkland_Main-2912 | Kirkland_Manholes-2059 | 433 | Kirkland_Manholes-2058 | 427.27 | 231.2 | 2.48 | 8 | PVC | 0.01 | 1,110 | 14 | 9 | 23 | 2.1 | SM14-Ex-EX213 | |
| Kirkland_Main-2913 | Kirkland_Manholes-3082 | 428.49 | Kirkland_Manholes-1992 | 427.27 | 187.8 | 0.65 | 8 | PVC | 0.01 | 568 | 4 | 9 | 13 | 2.3 | | |
| Kirkland_Main-2914 | Kirkland_Manholes-1992 | 427.27 | Kirkland_Manholes-2009 | 426.97 | 143.6 | 0.21 | 8 | PVC | 0.01 | 322 | 20 | 52 | 72 | 22.2 | | |
| Kirkland_Main-2915 | Kirkland_Manholes-1991 | 431.18 | Kirkland_Manholes-1992 | 427.27 | 327 | 1.2 | 8 | PVC | 0.01 | 771 | 15 | 39 | 54 | 7 | | |
| Kirkland_Main-2916 | Kirkland_Manholes-2004 | 427.75 | Kirkland_Manholes-2010 | 424.43 | 322.6 | 1.03 | 8 | PVC | 0.01 | 715 | 9 | 26 | 34 | 4.8 | | |
| Kirkland_Main-2917 | Kirkland_Manholes-2007 | 429.08 | Kirkland_Manholes-2004 | 427.75 | 98.7 | 1.35 | 8 | PVC | 0.01 | 819 | 8 | 21 | 30 | 3.6 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2918 | Kirkland_Manholes-2260 | 285.07 | Kirkland_Manholes-2259 | 272.05 | 278.2 | 4.68 | 12 | PVC | 0.01 | 4,497 | 394 | 923 | 1,317 | 29.3 | SM14-Ex-EX248 | |
| Kirkland_Main-2919 | Kirkland_Manholes-2259 | 272.05 | Kirkland_Manholes-2258 | 263.77 | 196.6 | 4.21 | 12 | PVC | 0.01 | 4,266 | 400 | 932 | 1,332 | 31.2 | SM14-Ex-EX248 | |
| Kirkland_Main-2920 | Kirkland_Manholes-2323 | 247.45 | Kirkland_Manholes-2324 | 245.37 | 33.9 | 6.13 | 8 | PVC | 0.01 | 1,746 | 50 | 142 | 192 | 11 | | |
| Kirkland_Main-2921 | Kirkland_Manholes-2322 | 259.98 | Kirkland_Manholes-2323 | 247.45 | 184.9 | 6.78 | 8 | PVC | 0.01 | 1,836 | 49 | 137 | 186 | 10.1 | SM14-Ex-EX252 | |
| Kirkland_Main-2922 | Kirkland_Manholes-2325 | 246.61 | Kirkland_Manholes-2324 | 245.37 | 131.1 | 0.95 | 8 | PVC | 0.01 | 686 | 6 | 13 | 19 | 2.8 | | |
| Kirkland_Main-2923 | Kirkland_Manholes-2329 | 258.36 | Kirkland_Manholes-2325 | 246.61 | 302.7 | 3.88 | 8 | PVC | 0.01 | 1,389 | 4 | 9 | 13 | 0.9 | | |
| Kirkland_Main-2924 | Kirkland_Manholes-2328 | 273.89 | Kirkland_Manholes-2329 | 258.36 | 228.5 | 6.8 | 8 | PVC | 0.01 | 1,838 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-2925 | Kirkland_Manholes-2339 | 347.35 | Kirkland_Manholes-2337 | 345.83 | 131 | 1.16 | 8 | PVC | 0.01 | 760 | 4 | 9 | 12 | 1.6 | SM14-Ex-EX256 | |
| Kirkland_Main-2926 | Kirkland_Manholes-2337 | 345.83 | Kirkland_Manholes-2338 | 328.54 | 114.6 | 15.08 | 8 | PVC | 0.01 | 2,738 | 6 | 13 | 19 | 0.7 | SM14-Ex-EX256 | |
| Kirkland_Main-2927 | Kirkland_Manholes-2334 | 313.34 | Kirkland_Manholes-2333 | 308.81 | 129.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 34 | 82 | 116 | 8.8 | SM14-Ex-EX252 | |
| Kirkland_Main-2928 | Kirkland_Manholes-2333 | 308.81 | Kirkland_Manholes-2332 | 296.43 | 179.4 | 6.9 | 8 | PVC | 0.01 | 1,852 | 35 | 86 | 121 | 6.5 | SM14-Ex-EX252 | |
| Kirkland_Main-2929 | Kirkland_Manholes-2332 | 296.43 | Kirkland_Manholes-2331 | 295.51 | 98.1 | 0.94 | 8 | PVC | 0.01 | 683 | 38 | 94 | 132 | 19.4 | SM14-Ex-EX252 | |
| Kirkland_Main-2930 | Kirkland_Manholes-2718 | 21.4 | Kirkland_Manholes-2721 | 21.2 | 187 | 0.11 | 12 | PVC | 0.01 | 680 | 90 | 37 | 127 | 18.8 | SM14-Ex-EX289 | |
| Kirkland_Main-2931 | Kirkland_Manholes-2331 | 295.51 | Kirkland_Manholes-2330 | 295.18 | 115.3 | 0.29 | 8 | PVC | 0.01 | 377 | 39 | 99 | 137 | 36.4 | SM14-Ex-EX252 | |
| Kirkland_Main-2932 | Kirkland_Manholes-2327 | 280.44 | Kirkland_Manholes-2326 | 264.71 | 213.4 | 7.37 | 8 | PVC | 0.01 | 1,914 | 45 | 129 | 174 | 9.1 | SM14-Ex-EX252 | |
| Kirkland_Main-2933 | Kirkland_Manholes-2326 | 264.71 | Kirkland_Manholes-2322 | 259.98 | 165.9 | 2.85 | 8 | PVC | 0.01 | 1,190 | 47 | 133 | 180 | 15.1 | SM14-Ex-EX252 | |
| Kirkland_Main-2935 | Kirkland_Manholes-2342 | 370.03 | Kirkland_Manholes-2339 | 347.35 | 229.4 | 9.89 | 8 | PVC | 0.01 | 2,217 | 3 | 4 | 7 | 0.3 | SM14-Ex-EX256 | |
| Kirkland_Main-2936 | Kirkland_Manholes-2340 | 335.99 | Kirkland_Manholes-2379 | 312.61 | 331.3 | 7.06 | 8 | PVC | 0.01 | 1,873 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX257 | |
| Kirkland_Main-2937 | Kirkland_Manholes-2338 | 328.54 | Kirkland_Manholes-2341 | 327.28 | 253.7 | 0.5 | 8 | PVC | 0.01 | 497 | 8 | 17 | 26 | 5.2 | SM14-Ex-EX256 | |
| Kirkland_Main-2938 | Kirkland_Manholes-2341 | 327.28 | Kirkland_Manholes-2335 | 323.22 | 289.5 | 1.4 | 8 | PVC | 0.01 | 835 | 12 | 26 | 38 | 4.5 | SM14-Ex-EX256 | |
| Kirkland_Main-2939 | Kirkland_Manholes-2336 | 342.09 | Kirkland_Manholes-2341 | 327.28 | 137.3 | 10.78 | 8 | PVC | 0.01 | 2,315 | 2 | 4 | 7 | 0.3 | SM14-Ex-EX256 | Drop Connection |
| Kirkland_Main-2940 | Kirkland_Manholes-2349 | 361.19 | Kirkland_Manholes-2335 | 323.22 | 315.1 | 12.05 | 8 | PVC | 0.01 | 2,448 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX252 | |
| Kirkland_Main-2941 | Kirkland_Manholes-2335 | 323.22 | Kirkland_Manholes-2334 | 323.19 | 8.2 | 0.4 | 8 | PVC | 0.01 | 446 | 15 | 34 | 49 | 11 | SM14-Ex-EX252 | Drop Connection |
| Kirkland_Main-2942 | Kirkland_Manholes-2343 | 315.2 | Kirkland_Manholes-2348 | 314.6 | 208.7 | 0.29 | 8 | PVC | 0.01 | 378 | 17 | 39 | 56 | 14.8 | SM14-Ex-EX254 | |
| Kirkland_Main-2944 | Kirkland_Manholes-2915 | 422.99 | Kirkland_Manholes-2916 | 416.17 | 267.2 | 2.55 | 8 | PVC | 0.01 | 1,126 | 7 | 17 | 24 | 2.2 | | |
| Kirkland_Main-2945 | Kirkland_Manholes-2916 | 416.17 | Kirkland_Manholes-2936 | 415.17 | 403.5 | 0.25 | 8 | PVC | 0.01 | 351 | 11 | 26 | 37 | 10.4 | | |
| Kirkland_Main-2946 | Kirkland_Manholes-2917 | 449.84 | Kirkland_Manholes-2918 | 440.81 | 194.6 | 4.64 | 8 | PVC | 0.01 | 1,519 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-2947 | Kirkland_Manholes-2918 | 440.81 | Kirkland_Manholes-2919 | 429.45 | 198.9 | 5.71 | 8 | PVC | 0.01 | 1,685 | 4 | 9 | 12 | 0.7 | | |
| Kirkland_Main-2948 | Kirkland_Manholes-2919 | 429.45 | Kirkland_Manholes-2915 | 422.99 | 217.1 | 2.98 | 8 | PVC | 0.01 | 1,216 | 6 | 13 | 19 | 1.5 | | |
| Kirkland_Main-2949 | Kirkland_Manholes-2922 | 91.28 | Kirkland_Manholes-2921 | 73.76 | 147.5 | 11.88 | 8 | PVC | 0.01 | 2,430 | 5 | 13 | 18 | 0.8 | | |
| Kirkland_Main-2951 | Kirkland_Manholes-2923 | 92.6 | Kirkland_Manholes-2922 | 91.28 | 84.5 | 1.56 | 8 | PVC | 0.01 | 881 | 1 | 4 | 6 | 0.7 | | |
| Kirkland_Main-2952 | Kirkland_Manholes-2924 | 104.01 | Kirkland_Manholes-2922 | 91.28 | 265 | 4.8 | 8 | PVC | 0.01 | 1,545 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-2953 | Kirkland_Manholes-2423 | 267.38 | Kirkland_Manholes-2421 | 253.02 | 328.6 | 4.37 | 8 | PVC | 0.01 | 1,474 | 4 | 4 | 8 | 0.5 | | |
| Kirkland_Main-2954 | Kirkland_Manholes-2429 | 273.52 | Kirkland_Manholes-2424 | 257.66 | 398.8 | 3.98 | 8 | PVC | 0.01 | 1,406 | 40 | 103 | 143 | 10.2 | SM14-Ex-EX260 | |
| Kirkland_Main-2955 | Kirkland_Manholes-2425 | 261.07 | Kirkland_Manholes-2424 | 257.66 | 270.7 | 1.26 | 12 | PVC | 0.01 | 2,333 | 220 | 228 | 448 | 19.2 | SM2 | |
| Kirkland_Main-2956 | Kirkland_Manholes-2426 | 264.11 | Kirkland_Manholes-2425 | 261.07 | 237.2 | 1.28 | 12 | PVC | 0.01 | 2,353 | 212 | 206 | 418 | 17.8 | SM2 | |
| Kirkland_Main-2957 | Kirkland_Manholes-2430 | 273.69 | Kirkland_Manholes-2425 | 261.07 | 254.1 | 4.97 | 8 | PVC | 0.01 | 1,571 | 7 | 17 | 24 | 1.5 | SM14-Ex-EX286 | |
| Kirkland_Main-2958 | Kirkland_Manholes-2427 | 267.5 | Kirkland_Manholes-2426 | 266.42 | 268.8 | 0.4 | 12 | PVC | 0.01 | 1,315 | 211 | 202 | 412 | 31.4 | SM2 | Drop Connection |
| Kirkland_Main-2959 | Kirkland_Manholes-2428 | 270.37 | Kirkland_Manholes-2427 | 267.5 | 310.1 | 0.93 | 8 | PVC | 0.01 | 678 | 149 | 172 | 321 | 47.3 | SM2 | |
| Kirkland_Main-2960 | Kirkland_Manholes-2431 | 277.03 | Kirkland_Manholes-2430 | 273.69 | 201.8 | 1.66 | 8 | PVC | 0.01 | 907 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-2961 | Kirkland_Manholes-2433 | 263.87 | Kirkland_Manholes-2434 | 245.33 | 172.7 | 10.73 | 8 | PVC | 0.01 | 2,310 | 4 | 9 | 12 | 0.5 | SM14-Ex-EX244 | |
| Kirkland_Main-2962 | Kirkland_Manholes-2434 | 245.33 | Kirkland_Manholes-2437 | 244.43 | 228.6 | 0.39 | 8 | PVC | 0.01 | 442 | 6 | 13 | 19 | 4.3 | SM14-Ex-EX244 | |
| Kirkland_Main-2963 | Kirkland_Manholes-2437 | 244.43 | Kirkland_Manholes-2436 | 225.88 | 256.7 | 7.23 | 8 | PVC | 0.01 | 1,895 | 8 | 17 | 26 | 1.3 | SM14-Ex-EX244 | |
| Kirkland_Main-2964 | Kirkland_Manholes-2514 | 400.04 | Kirkland_Manholes-2517 | 387 | 217.1 | 6.01 | 8 | PVC | 0.01 | 1,728 | 10 | 22 | 32 | 1.9 | | |
| Kirkland_Main-2965 | Kirkland_Manholes-2515 | 393.7 | Kirkland_Manholes-2516 | 391.18 | 190.1 | 1.33 | 8 | PVC | 0.01 | 812 | 4 | 4 | 9 | 1.1 | | |
| Kirkland_Main-2966 | Kirkland_Manholes-2516 | 391.18 | Kirkland_Manholes-2517 | 387 | 163.7 | 2.55 | 8 | PVC | 0.01 | 1,127 | 6 | 9 | 15 | 1.3 | | |
| Kirkland_Main-2967 | Kirkland_Manholes-2517 | 387 | Kirkland_Manholes-2518 | 378.45 | 142.8 | 5.99 | 8 | PVC | 0.01 | 1,725 | 17 | 35 | 52 | 3 | | |
| Kirkland_Main-2968 | Kirkland_Manholes-2518 | 378.45 | Kirkland_Manholes-2524 | 346.56 | 373.5 | 8.54 | 8 | PVC | 0.01 | 2,060 | 36 | 39 | 75 | 3.7 | | |
| Kirkland_Main-2969 | Kirkland_Manholes-2520 | 374.03 | Kirkland_Manholes-2521 | 363.83 | 98.2 | 10.38 | 8 | PVC | 0.01 | 2,272 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-2970 | Kirkland_Manholes-2435 | 226.37 | Kirkland_Manholes-2436 | 225.88 | 121.8 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 7 | 1.5 | SM14-Ex-EX285 | |
| Kirkland_Main-2971 | Kirkland_Manholes-2436 | 225.88 | Kirkland_Manholes-2438 | 209.72 | 279.9 | 5.77 | 8 | PVC | 0.01 | 1,694 | 12 | 26 | 37 | 2.2 | SM14-Ex-EX244 | |
| Kirkland_Main-2972 | Kirkland_Manholes-2438 | 209.72 | Kirkland_Manholes-2441 | 205.09 | 260.5 | 1.78 | 8 | PVC | 0.01 | 940 | 18 | 39 | 56 | 6 | SM14-Ex-EX244 | |
| Kirkland_Main-2973 | Kirkland_Manholes-2439 | 217.92 | Kirkland_Manholes-2438 | 209.72 | 117.3 | 6.99 | 8 | PVC | 0.01 | 1,864 | 4 | 9 | 12 | 0.7 | SM14-Ex-EX284 | |
| Kirkland_Main-2974 | Kirkland_Manholes-2440 | 242.45 | Kirkland_Manholes-2439 | 217.92 | 136.9 | 17.92 | 8 | PVC | 0.01 | 2,985 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX284 | |
| Kirkland_Main-2975 | Kirkland_Manholes-2441 | 205.09 | Kirkland_Manholes-2442 | 204.35 | 67.9 | 1.09 | 8 | PVC | 0.01 | 736 | 19 | 43 | 62 | 8.4 | SM14-Ex-EX244 | |
| Kirkland_Main-2977 | Kirkland_Manholes-2992 | 396.35 | Kirkland_Manholes-2991 | 395.79 | 171.2 | 0.33 | 8 | PVC | 0.01 | 403 | 4 | 21 | 26 | 6.4 | | |
| Kirkland_Main-2978 | Kirkland_Manholes-2991 | 395.79 | Kirkland_Manholes-1328 | 394.1 | 142.6 | 1.18 | 8 | PVC | 0.01 | 767 | 5 | 26 | 30 | 4 | | |
| Kirkland_Main-2979 | Kirkland_Manholes-2737 | 259.86 | Kirkland_Manholes-2310 | 256 | 91.2 | 4.23 | 8 | PVC | 0.01 | 1,451 | 6 | 9 | 15 | 1 | | |
| Kirkland_Main-2980 | Kirkland_Manholes-2442 | 204.35 | Kirkland_Manholes-2443 | 200 | 192.1 | 2.26 | 8 | PVC | 0.01 | 1,061 | 20 | 47 | 67 | 6.3 | SM14-Ex-EX244 | |
| Kirkland_Main-2981 | Kirkland_Manholes-2444 | 199.73 | Kirkland_Manholes-2445 | 191.11 | 277 | 3.11 | 8 | PVC | 0.01 | 1,244 | 26 | 69 | 95 | 7.6 | SM14-Ex-EX244 | |
| Kirkland_Main-2982 | Kirkland_Manholes-2443 | 200 | Kirkland_Manholes-2444 | 199.73 | 20.4 | 1.32 | 8 | PVC | 0.01 | 810 | 21 | 52 | 72 | 8.9 | SM14-Ex-EX244 | |
| Kirkland_Main-2983 | Kirkland_Manholes-2668 | 18.29 | Kirkland_Manholes-2318 | 17.6 | 53.6 | 1.29 | 8 | PVC | 0.01 | 800 | 2 | 7 | 8 | 1 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-2984 | Kirkland_Manholes-2320 | 18 | Kirkland_Manholes-2319 | 17.7 | 261.8 | 0.11 | 21 | PVC | 0.01 | 3,129 | 135 | 273 | 408 | 13 | | |
| Kirkland_Main-2985 | Kirkland_Manholes-2321 | 18.2 | Kirkland_Manholes-2320 | 18 | 193.7 | 0.1 | 21 | PVC | 0.01 | 2,971 | 128 | 215 | 342 | 11.5 | | |
| Kirkland_Main-2986 | Kirkland_Manholes-2303 | 195.57 | Kirkland_Manholes-2302 | 194.37 | 30.3 | 3.96 | 12 | PVC | 0.01 | 4,136 | 800 | 1,588 | 2,389 | 57.7 | SM2 | |
| Kirkland_Main-2987 | Kirkland_Manholes-2302 | 194.37 | Kirkland_Manholes-2304 | 192.91 | 51.2 | 2.85 | 12 | PVC | 0.01 | 3,510 | 801 | 1,593 | 2,393 | 68.2 | | |
| Kirkland_Main-2988 | Kirkland_Manholes-2285 | 419.89 | Kirkland_Manholes-2284 | 417.52 | 64.2 | 3.69 | 8 | PVC | 0.01 | 1,355 | 340 | 730 | 1,069 | 78.9 | SM14-Ex-EX248 | |
| Kirkland_Main-2989 | Kirkland_Manholes-2284 | 417.52 | Kirkland_Manholes-2282 | 401.71 | 231.8 | 6.82 | 8 | PVC | 0.01 | 1,841 | 340 | 734 | 1,075 | 58.4 | SM14-Ex-EX248 | |
| Kirkland_Main-2990 | Kirkland_Manholes-2263 | 374.13 | Kirkland_Manholes-2262 | 311.78 | 761.4 | 8.19 | 8 | PVC | 0.01 | 2,018 | 386 | 910 | 1,296 | 64.2 | SM14-Ex-EX248 | |
| Kirkland_Main-2991 | Kirkland_Manholes-2669 | 379.65 | Kirkland_Manholes-2290 | 372.36 | 83.4 | 8.74 | 8 | PVC | 0.01 | 2,084 | 5 | 4 | 9 | 0.5 | | |
| Kirkland_Main-2992 | Kirkland_Manholes-2290 | 372.36 | Kirkland_Manholes-2291 | 367.48 | 64.2 | 7.6 | 8 | PVC | 0.01 | 1,944 | 6 | 9 | 14 | 0.7 | | |
| Kirkland_Main-2993 | Kirkland_Manholes-2291 | 367.48 | Kirkland_Manholes-2292 | 366.54 | 71.9 | 1.31 | 8 | PVC | 0.01 | 806 | 6 | 13 | 19 | 2.4 | | |
| Kirkland_Main-2994 | Kirkland_Manholes-2292 | 366.54 | Kirkland_Manholes-2293 | 362.58 | 154 | 2.57 | 8 | PVC | 0.01 | 1,131 | 7 | 17 | 24 | 2.1 | | |
| Kirkland_Main-2995 | Kirkland_Manholes-2670 | 399.73 | Kirkland_Manholes-2298 | 382.52 | 120.1 | 14.33 | 8 | PVC | 0.01 | 2,669 | 4 | 9 | 12 | 0.5 | | Drop Connection |
| Kirkland_Main-2997 | Kirkland_Manholes-2673 | 372.3 | Kirkland_Manholes-2675 | 350.82 | 245.7 | 8.74 | 8 | PVC | 0.01 | 2,084 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX208 | |
| Kirkland_Main-2998 | Kirkland_Manholes-2709 | 292.14 | Kirkland_Manholes-2708 | 281.32 | 58.6 | 18.46 | 8 | PVC | 0.01 | 3,029 | 3 | 17 | 21 | 0.7 | | |
| Kirkland_Main-2999 | Kirkland_Manholes-2708 | 281.32 | Kirkland_Manholes-2707 | 271.62 | 125.5 | 7.73 | 8 | PVC | 0.01 | 1,960 | 4 | 21 | 25 | 1.3 | | |
| Kirkland_Main-3000 | Kirkland_Manholes-2711 | 316.09 | Kirkland_Manholes-2709 | 292.14 | 170 | 14.09 | 8 | PVC | 0.01 | 2,647 | 3 | 9 | 11 | 0.4 | | |
| Kirkland_Main-3001 | Kirkland_Manholes-2707 | 271.62 | Kirkland_Manholes-2704 | 250.11 | 214 | 10.05 | 8 | PVC | 0.01 | 2,235 | 5 | 26 | 30 | 1.4 | | |
| Kirkland_Main-3002 | Kirkland_Manholes-2703 | 250.19 | Kirkland_Manholes-2704 | 250.11 | 401.9 | 0.02 | 8 | PVC | 0.01 | 99 | 6 | 17 | 23 | 23.6 | | |
| Kirkland_Main-3003 | Kirkland_Manholes-2712 | 326.54 | Kirkland_Manholes-2711 | 316.09 | 154.3 | 6.77 | 8 | PVC | 0.01 | 1,835 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3005 | Kirkland_Manholes-2714 | 316.79 | Kirkland_Manholes-2713 | 280.32 | 397.8 | 9.17 | 8 | PVC | 0.01 | 2,135 | 3 | 4 | 7 | 0.3 | SM14-Ex-EX204 | |
| Kirkland_Main-3006 | Kirkland_Manholes-2713 | 280.32 | Kirkland_Manholes-2702 | 256.62 | 323.4 | 7.33 | 8 | PVC | 0.01 | 1,909 | 6 | 9 | 14 | 0.7 | SM14-Ex-EX204 | |
| Kirkland_Main-3008 | Kirkland_Manholes-2721 | 21.2 | Kirkland_Manholes-2722 | 21 | 44.5 | 0.45 | 12 | PVC | 0.01 | 1,394 | 94 | 43 | 137 | 9.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3009 | Kirkland_Manholes-2724 | 25.33 | Kirkland_Manholes-2723 | 21.5 | 122.9 | 3.12 | 8 | PVC | 0.01 | 1,245 | 13 | 6 | 20 | 1.6 | SM14-Ex-EX288 | |
| Kirkland_Main-3010 | Kirkland_Manholes-2723 | 21.5 | Kirkland_Manholes-2722 | 21 | 70.9 | 0.7 | 8 | PVC | 0.01 | 592 | 16 | 12 | 29 | 4.8 | SM14-Ex-EX288 | |
| Kirkland_Main-3011 | Kirkland_Manholes-2727 | 13 | Kirkland_Manholes-2726 | 12.39 | 121.7 | 0.5 | 18 | PVC | 0.01 | 4,339 | 368 | 601 | 968 | 22.3 | SM14-Ex-EX289 | |
| Kirkland_Main-3012 | Kirkland_Manholes-2729 | 13.77 | Kirkland_Manholes-2727 | 13 | 208.7 | 0.37 | 18 | PVC | 0.01 | 3,723 | 365 | 594 | 959 | 25.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3013 | Kirkland_Manholes-2730 | 14.43 | Kirkland_Manholes-2728 | 13.83 | 161.6 | 0.37 | 18 | PVC | 0.01 | 3,734 | 361 | 582 | 943 | 25.3 | SM14-Ex-EX289 | |
| Kirkland_Main-3014 | Kirkland_Manholes-2728 | 13.83 | Kirkland_Manholes-2729 | 13.77 | 16.5 | 0.36 | 18 | PVC | 0.01 | 3,696 | 364 | 588 | 952 | 25.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3015 | Kirkland_Manholes-2731 | 15.6 | Kirkland_Manholes-2977 | 14.89 | 193.8 | 0.37 | 18 | PVC | 0.01 | 3,709 | 356 | 564 | 919 | 24.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3016 | Kirkland_Manholes-2732 | 15.71 | Kirkland_Manholes-2731 | 15.6 | 29.6 | 0.37 | 18 | PVC | 0.01 | 3,738 | 353 | 557 | 910 | 24.3 | SM14-Ex-EX289 | |
| Kirkland_Main-3017 | Kirkland_Manholes-2733 | 16.02 | Kirkland_Manholes-2732 | 15.71 | 84.3 | 0.37 | 18 | PVC | 0.01 | 3,716 | 348 | 551 | 899 | 24.2 | SM14-Ex-EX289 | |
| Kirkland_Main-3018 | Kirkland_Manholes-2735 | 16.81 | Kirkland_Manholes-2733 | 16.02 | 214.5 | 0.37 | 18 | PVC | 0.01 | 3,719 | 346 | 545 | 891 | 24 | SM14-Ex-EX289 | |
| Kirkland_Main-3019 | Kirkland_Manholes-2734 | 17.15 | Kirkland_Manholes-2735 | 16.81 | 92.8 | 0.37 | 18 | PVC | 0.01 | 3,710 | 343 | 539 | 882 | 23.8 | SM14-Ex-EX289 | |
| Kirkland_Main-3020 | Kirkland_Manholes-2736 | 17.76 | Kirkland_Manholes-2734 | 17.15 | 164.5 | 0.37 | 18 | PVC | 0.01 | 3,733 | 342 | 533 | 875 | 23.4 | SM14-Ex-EX289 | |
| Kirkland_Main-3021 | Kirkland_Manholes-2741 | 83.04 | Kirkland_Manholes-2739 | 73.09 | 180.1 | 5.53 | 8 | PVC | 0.01 | 1,657 | 10 | 19 | 28 | 1.7 | | |
| Kirkland_Main-3022 | Kirkland_Manholes-2740 | 73.45 | Kirkland_Manholes-2739 | 73.09 | 167.3 | 0.22 | 8 | PVC | 0.01 | 327 | 1 | 6 | 7 | 2.2 | | |
| Kirkland_Main-3023 | Kirkland_Manholes-2739 | 73.09 | Kirkland_Manholes-2203 | 62.94 | 47.2 | 21.5 | 8 | PVC | 0.01 | 3,269 | 24 | 56 | 80 | 2.4 | | |
| Kirkland_Main-3024 | Kirkland_Manholes-2744 | 119.06 | Kirkland_Manholes-2739 | 73.09 | 200.2 | 22.96 | 8 | PVC | 0.01 | 3,378 | 12 | 25 | 37 | 1.1 | | |
| Kirkland_Main-3025 | Kirkland_Manholes-2745 | 129.7 | Kirkland_Manholes-2744 | 119.06 | 80.2 | 13.27 | 8 | PVC | 0.01 | 2,569 | 1 | 6 | 7 | 0.3 | | |
| Kirkland_Main-3026 | Kirkland_Manholes-2746 | 121.99 | Kirkland_Manholes-2744 | 119.06 | 88.8 | 3.3 | 8 | PVC | 0.01 | 1,280 | 2 | 12 | 15 | 1.1 | | |
| Kirkland_Main-3027 | Kirkland_Manholes-2747 | 133.27 | Kirkland_Manholes-2746 | 121.99 | 59.4 | 19 | 8 | PVC | 0.01 | 3,073 | 1 | 6 | 7 | 0.2 | | |
| Kirkland_Main-3028 | Kirkland_Manholes-2742 | 91.54 | Kirkland_Manholes-2741 | 83.04 | 69.2 | 12.29 | 8 | PVC | 0.01 | 2,471 | 8 | 12 | 21 | 0.8 | | |
| Kirkland_Main-3029 | Kirkland_Manholes-2743 | 92.6 | Kirkland_Manholes-2742 | 91.54 | 64.4 | 1.65 | 8 | PVC | 0.01 | 904 | 7 | 6 | 13 | 1.5 | | |
| Kirkland_Main-3030 | Kirkland_Manholes-2748 | 105.07 | Kirkland_Manholes-2749 | 94.38 | 144.8 | 7.38 | 8 | PVC | 0.01 | 1,916 | 1 | 6 | 7 | 0.4 | | |
| Kirkland_Main-3031 | Kirkland_Manholes-2749 | 94.38 | Kirkland_Manholes-2880 | 81.72 | 189.8 | 6.67 | 8 | PVC | 0.01 | 1,821 | 31 | 19 | 50 | 2.7 | | |
| Kirkland_Main-3032 | Kirkland_Manholes-2756 | 10.03 | Kirkland_Manholes-2754 | 9.95 | 319.1 | 0.03 | 36 | PVC | 0.01 | 6,161 | 783 | 1,925 | 3,009 | 48.8 | SM14-Ex-EX10 | |
| Kirkland_Main-3033 | Kirkland_Manholes-2757 | 10.95 | Kirkland_Manholes-2756 | 10.03 | 146.2 | 0.63 | 36 | PVC | 0.01 | 30,867 | 783 | 1,921 | 3,005 | 9.7 | SM14-Ex-EX10 | |
| Kirkland_Main-3036 | Kirkland_Manholes-2765 | 13.19 | Kirkland_Manholes-2763 | 13.15 | 315.8 | 0.01 | 36 | PVC | 0.01 | 4,380 | 686 | 1,617 | 2,605 | 59.5 | SM14-Ex-EX10 | |
| Kirkland_Main-3037 | Kirkland_Manholes-2766 | 361.12 | Kirkland_Manholes-2548 | 359.75 | 342.1 | 0.4 | 8 | PVC | 0.01 | 446 | 1 | 4 | 6 | 1.2 | | |
| Kirkland_Main-3038 | Kirkland_Manholes-397 | 247.33 | Kirkland_Manholes-376 | 239.8 | 215.8 | 3.49 | 8 | PVC | 0.01 | 1,317 | 86 | 245 | 331 | 25.1 | | |
| Kirkland_Main-3039 | Kirkland_Manholes-2769 | 260.32 | Kirkland_Manholes-1077 | 252.59 | 364.2 | 2.12 | 8 | PVC | 0.01 | 1,027 | 4 | 9 | 12 | 1.2 | | |
| Kirkland_Main-3044 | Kirkland_Manholes-2275 | 411.72 | Kirkland_Manholes-2276 | 410.45 | 52.8 | 2.4 | 8 | PVC | 0.01 | 1,093 | 1 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3045 | Kirkland_Manholes-2771 | 320.53 | Kirkland_Manholes-2772 | 308.23 | 258.2 | 4.76 | 8 | PVC | 0.01 | 1,539 | 55 | 166 | 220 | 14.3 | | |
| Kirkland_Main-3046 | Kirkland_Manholes-2776 | 334.45 | Kirkland_Manholes-2775 | 332.7 | 391.2 | 0.45 | 8 | PVC | 0.01 | 472 | 55 | 153 | 207 | 44 | | |
| Kirkland_Main-3047 | Kirkland_Manholes-2775 | 332.7 | Kirkland_Manholes-2774 | 330.08 | 382.8 | 0.68 | 8 | PVC | 0.01 | 583 | 55 | 157 | 212 | 36.3 | | |
| Kirkland_Main-3048 | Kirkland_Manholes-2774 | 330.08 | Kirkland_Manholes-2771 | 320.53 | 310.5 | 3.08 | 8 | PVC | 0.01 | 1,237 | 55 | 162 | 216 | 17.5 | | |
| Kirkland_Main-3049 | Kirkland_Manholes-2782 | 326.16 | Kirkland_Manholes-2781 | 293.52 | 273.1 | 11.95 | 8 | PVC | 0.01 | 2,438 | 0 | 3 | 3 | 0.1 | | |
| Kirkland_Main-3050 | Kirkland_Manholes-2781 | 293.52 | Kirkland_Manholes-2780 | 291.73 | 199 | 0.9 | 8 | PVC | 0.01 | 669 | 22 | 5 | 27 | 4.1 | | |
| Kirkland_Main-3051 | Kirkland_Manholes-2780 | 291.73 | Kirkland_Manholes-2779 | 288.37 | 73 | 4.6 | 8 | PVC | 0.01 | 1,512 | 22 | 8 | 30 | 2 | | |
| Kirkland_Main-3052 | Kirkland_Manholes-2779 | 288.37 | Kirkland_Manholes-2778 | 255.64 | 255.5 | 12.81 | 8 | PVC | 0.01 | 2,524 | 22 | 11 | 33 | 1.3 | | |
| Kirkland_Main-3053 | Kirkland_Manholes-2777 | 256.44 | Kirkland_Manholes-2778 | 255.64 | 115.8 | 0.69 | 8 | PVC | 0.01 | 586 | 0 | 3 | 3 | 0.5 | | |
| Kirkland_Main-3054 | Kirkland_Manholes-2785 | 259.34 | Kirkland_Manholes-2786 | 258.1 | 92.6 | 1.34 | 8 | PVC | 0.01 | 816 | 13 | 52 | 64 | 7.9 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3055 | Kirkland_Manholes-2784 | 262.56 | Kirkland_Manholes-2785 | 259.34 | 108.2 | 2.97 | 8 | PVC | 0.01 | 1,216 | 11 | 47 | 59 | 4.8 | | |
| Kirkland_Main-3057 | Kirkland_Manholes-2787 | 252.17 | Kirkland_Manholes-2788 | 251.6 | 73 | 0.78 | 8 | PVC | 0.01 | 623 | 24 | 94 | 118 | 19 | SM14-Ex-EX313 | |
| Kirkland_Main-3059 | Kirkland_Manholes-2798 | 192.18 | Kirkland_Manholes-2797 | 190.87 | 110.6 | 1.18 | 8 | PVC | 0.01 | 767 | 2 | 4 | 6 | 0.8 | SM14-Ex-EX296 | |
| Kirkland_Main-3060 | Kirkland_Manholes-2797 | 190.87 | Kirkland_Manholes-2796 | 185.45 | 211.8 | 2.56 | 8 | PVC | 0.01 | 1,128 | 7 | 17 | 25 | 2.2 | SM14-Ex-EX296 | |
| Kirkland_Main-3061 | Kirkland_Manholes-2799 | 233.81 | Kirkland_Manholes-2800 | 221.07 | 125.6 | 10.15 | 8 | PVC | 0.01 | 2,246 | 2 | 4 | 6 | 0.3 | SM14-Ex-EX302 | |
| Kirkland_Main-3062 | Kirkland_Manholes-2800 | 221.07 | Kirkland_Manholes-2797 | 190.87 | 260 | 11.62 | 8 | PVC | 0.01 | 2,403 | 3 | 9 | 12 | 0.5 | SM14-Ex-EX302 | |
| Kirkland_Main-3063 | Kirkland_Manholes-2802 | 238.36 | O-39 | 228.33 | 111.4 | 9 | 8 | PVC | 0.01 | 2,116 | 22 | 22 | 44 | 2.1 | | |
| Kirkland_Main-3064 | Kirkland_Manholes-2810 | 44.75 | Kirkland_Manholes-2809 | 44.5 | 62.2 | 0.4 | 8 | PVC | 0.01 | 446 | 42 | 93 | 135 | 30.4 | SM14-Ex-EX316 | Drop Connection |
| Kirkland_Main-3065 | Kirkland_Manholes-2808 | 55.6 | Kirkland_Manholes-2807 | 47.79 | 63.2 | 12.36 | 8 | PVC | 0.01 | 2,479 | 2 | 12 | 15 | 0.6 | SM14-Ex-EX317 | |
| Kirkland_Main-3066 | Kirkland_Manholes-2807 | 47.79 | Kirkland_Manholes-2810 | 44.75 | 258.6 | 1.18 | 8 | PVC | 0.01 | 764 | 16 | 81 | 96 | 12.6 | SM14-Ex-EX316 | |
| Kirkland_Main-3067 | Kirkland_Manholes-2806 | 53.14 | Kirkland_Manholes-2807 | 47.79 | 321.9 | 1.66 | 8 | PVC | 0.01 | 909 | 11 | 62 | 73 | 8.1 | SM14-Ex-EX316 | |
| Kirkland_Main-3068 | Kirkland_Manholes-2805 | 68.41 | Kirkland_Manholes-2806 | 53.14 | 319.8 | 4.78 | 8 | PVC | 0.01 | 1,541 | 10 | 56 | 66 | 4.3 | SM14-Ex-EX316 | |
| Kirkland_Main-3069 | Kirkland_Manholes-2811 | 70.36 | Kirkland_Manholes-2808 | 55.6 | 132.6 | 11.13 | 8 | PVC | 0.01 | 2,353 | 1 | 6 | 7 | 0.3 | SM14-Ex-EX317 | |
| Kirkland_Main-3070 | Kirkland_Manholes-2814 | 79.68 | Kirkland_Manholes-2805 | 68.41 | 70.6 | 15.96 | 8 | PVC | 0.01 | 2,817 | 1 | 6 | 7 | 0.3 | SM14-Ex-EX318 | |
| Kirkland_Main-3071 | Kirkland_Manholes-2815 | 71.41 | Kirkland_Manholes-2805 | 68.41 | 115.4 | 2.6 | 8 | PVC | 0.01 | 1,137 | 3 | 19 | 22 | 1.9 | SM14-Ex-EX318 | |
| Kirkland_Main-3072 | Kirkland_Manholes-2812 | 81.42 | Kirkland_Manholes-2815 | 71.41 | 284.3 | 3.52 | 8 | PVC | 0.01 | 1,323 | 2 | 12 | 15 | 1.1 | SM14-Ex-EX318 | |
| Kirkland_Main-3073 | Kirkland_Manholes-2813 | 84.17 | Kirkland_Manholes-2812 | 81.42 | 272.3 | 1.01 | 8 | PVC | 0.01 | 709 | 1 | 6 | 7 | 1 | SM14-Ex-EX318 | |
| Kirkland_Main-3074 | Kirkland_Manholes-2816 | 45.4 | Kirkland_Manholes-2810 | 44.75 | 163.3 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 6 | 8 | 1.9 | | |
| Kirkland_Main-3075 | Kirkland_Manholes-2822 | 57.68 | Kirkland_Manholes-2821 | 56.89 | 105.9 | 0.75 | 8 | PVC | 0.01 | 609 | 34 | 6 | 40 | 6.6 | | |
| Kirkland_Main-3076 | Kirkland_Manholes-2821 | 56.89 | Kirkland_Manholes-2820 | 55.04 | 95.1 | 1.94 | 8 | PVC | 0.01 | 983 | 36 | 12 | 49 | 4.9 | | |
| Kirkland_Main-3077 | Kirkland_Manholes-2820 | 55.04 | Kirkland_Manholes-2819 | 48.42 | 258.4 | 2.56 | 8 | PVC | 0.01 | 1,128 | 40 | 19 | 58 | 5.2 | | |
| Kirkland_Main-3078 | Kirkland_Manholes-2819 | 48.42 | Kirkland_Manholes-2817 | 44.74 | 95 | 3.87 | 8 | PVC | 0.01 | 1,388 | 41 | 25 | 66 | 4.7 | | |
| Kirkland_Main-3079 | Kirkland_Manholes-2818 | 48.57 | Kirkland_Manholes-2817 | 44.74 | 127 | 3.01 | 8 | PVC | 0.01 | 1,224 | 4 | 6 | 10 | 0.8 | | |
| Kirkland_Main-3080 | Kirkland_Manholes-2817 | 44.74 | Kirkland_Manholes-2823 | 34.33 | 329.7 | 3.16 | 8 | PVC | 0.01 | 1,253 | 47 | 37 | 84 | 6.7 | | |
| Kirkland_Main-3081 | Kirkland_Manholes-2827 | 39.5 | Kirkland_Manholes-2826 | 38.6 | 407 | 0.22 | 15 | PVC | 0.01 | 1,768 | 241 | 590 | 831 | 47 | SM14-Ex-EX319 | Drop Connection |
| Kirkland_Main-3082 | Kirkland_Manholes-2826 | 36.35 | Kirkland_Manholes-2823 | 34.33 | 324.1 | 0.62 | 15 | PVC | 0.01 | 2,973 | 251 | 596 | 847 | 28.5 | SM14-Ex-EX319 | |
| Kirkland_Main-3083 | Kirkland_Manholes-2823 | 34.33 | Kirkland_Manholes-2824 | 33.64 | 78.4 | 0.88 | 15 | PVC | 0.01 | 3,537 | 299 | 640 | 938 | 26.5 | SM14-Ex-EX319 | |
| Kirkland_Main-3084 | Kirkland_Manholes-2824 | 33.64 | Kirkland_Manholes-2825 | 33 | 93.6 | 0.69 | 15 | PVC | 0.01 | 3,124 | 300 | 646 | 946 | 30.3 | SM14-Ex-EX319 | |
| Kirkland_Main-3085 | Kirkland_Manholes-2830 | 52.24 | Kirkland_Manholes-2831 | 43.6 | 77.9 | 11.1 | 8 | PVC | 0.01 | 2,349 | 7 | 6 | 85 | 3.6 | | |
| Kirkland_Main-3088 | Kirkland_Manholes-2831 | 43.6 | Kirkland_Manholes-2829 | 40.2 | 467.6 | 0.73 | 12 | PVC | 0.01 | 1,772 | 167 | 402 | 640 | 36.1 | SM14-Ex-EX309 | |
| Kirkland_Main-3089 | Kirkland_Manholes-2825 | 33 | Kirkland_Manholes-2832 | 30.86 | 94.7 | 2.26 | 15 | PVC | 0.01 | 5,664 | 301 | 652 | 953 | 16.8 | SM14-Ex-EX319 | |
| Kirkland_Main-3090 | Kirkland_Manholes-2829 | 40.2 | Kirkland_Manholes-2832 | 30.86 | 260.5 | 3.59 | 12 | PVC | 0.01 | 3,936 | 167 | 408 | 647 | 16.4 | SM14-Ex-EX309 | |
| Kirkland_Main-3091 | Kirkland_Manholes-2828 | 34.38 | Kirkland_Manholes-2832 | 30.86 | 239.8 | 1.47 | 8 | PVC | 0.01 | 854 | 39 | 6 | 45 | 5.3 | | |
| Kirkland_Main-3092 | Kirkland_Manholes-2832 | 30.86 | Kirkland_Manholes-2833 | 29.99 | 303.3 | 0.29 | 18 | PVC | 0.01 | 3,283 | 509 | 1,072 | 1,652 | 50.3 | SM14-Ex-EX309 | |
| Kirkland_Main-3093 | Kirkland_Manholes-2839 | 98.83 | Kirkland_Manholes-2840 | 90.84 | 75.4 | 10.6 | 8 | PVC | 0.01 | 2,295 | 3 | 6 | 9 | 0.4 | | |
| Kirkland_Main-3094 | Kirkland_Manholes-2841 | 31.53 | Kirkland_Manholes-2842 | 26.9 | 41.3 | 11.2 | 8 | PVC | 0.01 | 2,360 | 8 | 19 | 27 | 1.1 | SM14-Ex-EX310 | |
| Kirkland_Main-3095 | Kirkland_Manholes-2843 | 16.05 | YARROW POINT_WETWELL | 6 | 32.1 | 31.31 | 8 | PVC | 0.01 | 3,945 | 13 | 47 | 60 | 1.5 | SM14-Ex-EX315 | |
| Kirkland_Main-3096 | Kirkland_Manholes-2847 | 24.39 | Kirkland_Manholes-2854 | 20.28 | 103.2 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 5 | 5 | 0.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3097 | Kirkland_Manholes-2854 | 20.28 | Kirkland_Manholes-2855 | 19.82 | 135 | 0.34 | 8 | PVC | 0.01 | 411 | 0 | 9 | 9 | 2.3 | SM14-Ex-EX315 | |
| Kirkland_Main-3098 | Kirkland_Manholes-2855 | 19.82 | Kirkland_Manholes-2846 | 17.72 | 172.2 | 1.22 | 8 | PVC | 0.01 | 779 | 0 | 14 | 14 | 1.8 | SM14-Ex-EX315 | |
| Kirkland_Main-3099 | Kirkland_Manholes-2846 | 17.72 | Kirkland_Manholes-2843 | 16.05 | 133.2 | 1.25 | 8 | PVC | 0.01 | 790 | 0 | 19 | 19 | 2.4 | SM14-Ex-EX315 | |
| Kirkland_Main-3100 | Kirkland_Manholes-2845 | 16.72 | Kirkland_Manholes-2843 | 16.05 | 68.4 | 0.97 | 8 | PVC | 0.01 | 696 | 13 | 19 | 32 | 4.6 | SM14-Ex-EX315 | |
| Kirkland_Main-3102 | Kirkland_Manholes-2844 | 27.14 | Kirkland_Manholes-2843 | 26.59 | 137.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 5 | 5 | 1.1 | SM14-Ex-EX315 | Drop Connection |
| Kirkland_Main-3104 | Kirkland_Manholes-2809 | 42.91 | Kirkland_Manholes-2834 | 37.62 | 317.9 | 1.66 | 8 | PVC | 0.01 | 910 | 47 | 99 | 146 | 16 | SM14-Ex-EX316 | |
| Kirkland_Main-3105 | Kirkland_Manholes-2836 | 60.97 | Kirkland_Manholes-2835 | 50.93 | 162.4 | 6.18 | 8 | PVC | 0.01 | 1,753 | 11 | 19 | 29 | 1.7 | | |
| Kirkland_Main-3106 | Kirkland_Manholes-2835 | 50.93 | Kirkland_Manholes-2834 | 37.62 | 47.5 | 28.02 | 8 | PVC | 0.01 | 3,732 | 12 | 25 | 36 | 1 | | |
| Kirkland_Main-3108 | Kirkland_Manholes-2862 | 89.88 | Kirkland_Manholes-2863 | 49.4 | 272.9 | 14.83 | 8 | PVC | 0.01 | 2,716 | 8 | 12 | 20 | 0.7 | | |
| Kirkland_Main-3109 | Kirkland_Manholes-2861 | 109.7 | Kirkland_Manholes-2862 | 89.88 | 239.2 | 8.29 | 8 | PVC | 0.01 | 2,030 | 5 | 8 | 13 | 0.7 | | |
| Kirkland_Main-3110 | Kirkland_Manholes-2860 | 120.82 | Kirkland_Manholes-2861 | 109.7 | 223.4 | 4.98 | 8 | PVC | 0.01 | 1,573 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3115 | Kirkland_Manholes-2883 | 268.55 | Kirkland_Manholes-2876 | 267.92 | 60.1 | 1.05 | 8 | PVC | 0.01 | 722 | 2 | 9 | 11 | 1.5 | | |
| Kirkland_Main-3116 | Kirkland_Manholes-2884 | 269.34 | Kirkland_Manholes-2883 | 268.55 | 63.9 | 1.24 | 8 | PVC | 0.01 | 784 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3118 | Kirkland_Manholes-2548 | 359.75 | Kirkland_Manholes-2891 | 359.09 | 165.1 | 0.4 | 8 | PVC | 0.01 | 448 | 12 | 26 | 38 | 8.4 | | |
| Kirkland_Main-3119 | Kirkland_Manholes-2891 | 359.09 | Kirkland_Manholes-2561 | 358.82 | 66.3 | 0.4 | 8 | PVC | 0.01 | 446 | 13 | 30 | 43 | 9.6 | | |
| Kirkland_Main-3121 | Kirkland_Manholes-2893 | 432.24 | Kirkland_Manholes-1991 | 431.18 | 280.1 | 0.38 | 8 | PVC | 0.01 | 434 | 3 | 4 | 7 | 1.7 | | |
| Kirkland_Main-3122 | Kirkland_Manholes-2894 | 306.1 | Kirkland_Manholes-2895 | 306 | 25.4 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 17 | 22 | 4.9 | | |
| Kirkland_Main-3123 | Kirkland_Manholes-2895 | 306 | Kirkland_Manholes-2896 | 304.88 | 150.3 | 0.75 | 8 | PVC | 0.01 | 609 | 5 | 21 | 27 | 4.4 | | |
| Kirkland_Main-3124 | Kirkland_Manholes-2896 | 304.88 | Kirkland_Manholes-2897 | 303.8 | 169.5 | 0.64 | 8 | PVC | 0.01 | 563 | 7 | 26 | 32 | 5.7 | | |
| Kirkland_Main-3125 | Kirkland_Manholes-2898 | 307.58 | Kirkland_Manholes-2897 | 303.8 | 40 | 9.44 | 8 | PVC | 0.01 | 2,166 | 1 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3126 | Kirkland_Manholes-2897 | 303.8 | Kirkland_Manholes-2899 | 303.26 | 125.6 | 0.43 | 8 | PVC | 0.01 | 462 | 9 | 34 | 43 | 9.4 | | |
| Kirkland_Main-3127 | Kirkland_Manholes-2899 | 303.26 | Kirkland_Manholes-2900 | 302.3 | 244.9 | 0.39 | 8 | PVC | 0.01 | 441 | 11 | 39 | 49 | 11.2 | | |
| Kirkland_Main-3128 | Kirkland_Manholes-882 | 297.25 | Kirkland_Manholes-345 | 279.43 | 305.8 | 5.83 | 8 | PVC | 0.01 | 1,702 | 4 | 4 | 9 | 0.5 | | |
| Kirkland_Main-3129 | Kirkland_Manholes-2901 | 294.77 | Kirkland_Manholes-883 | 294.42 | 87 | 0.4 | 8 | PVC | 0.01 | 446 | 3 | 17 | 20 | 4.4 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3130 | Kirkland_Manholes-883 | 294.42 | Kirkland_Manholes-906 | 293.01 | 64.9 | 2.17 | 8 | PVC | 0.01 | 1,039 | 9 | 39 | 47 | 4.6 | | |
| Kirkland_Main-3131 | Kirkland_Manholes-2902 | 301.02 | Kirkland_Manholes-883 | 294.42 | 322.3 | 2.05 | 8 | PVC | 0.01 | 1,009 | 6 | 17 | 23 | 2.3 | | |
| Kirkland_Main-3132 | Kirkland_Manholes-2903 | 301.35 | Kirkland_Manholes-2902 | 301.02 | 151.1 | 0.22 | 8 | PVC | 0.01 | 329 | 4 | 13 | 17 | 5.2 | | |
| Kirkland_Main-3133 | Kirkland_Manholes-2905 | 302.8 | Kirkland_Manholes-2904 | 301.39 | 65.9 | 2.14 | 8 | PVC | 0.01 | 1,031 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-3134 | Kirkland_Manholes-2904 | 301.39 | Kirkland_Manholes-2903 | 301.35 | 153.8 | 0.03 | 8 | PVC | 0.01 | 114 | 3 | 9 | 11 | 9.8 | | |
| Kirkland_Main-3135 | Kirkland_Manholes-2913 | 474.42 | Kirkland_Manholes-1391 | 471.35 | 128.8 | 2.38 | 8 | PVC | 0.01 | 1,088 | 2 | 9 | 11 | 1 | | |
| Kirkland_Main-3136 | Kirkland_Manholes-2906 | 405.37 | Kirkland_Manholes-2907 | 402.62 | 299.9 | 0.92 | 8 | PVC | 0.01 | 675 | 6 | 39 | 45 | 6.7 | | |
| Kirkland_Main-3137 | Kirkland_Manholes-2907 | 402.62 | Kirkland_Manholes-2908 | 397.79 | 295.5 | 1.63 | 8 | PVC | 0.01 | 901 | 7 | 44 | 51 | 5.6 | | |
| Kirkland_Main-3138 | Kirkland_Manholes-2908 | 397.79 | Kirkland_Manholes-2532 | 395.91 | 85.9 | 2.19 | 8 | PVC | 0.01 | 1,043 | 7 | 48 | 55 | 5.3 | | |
| Kirkland_Main-3139 | Kirkland_Manholes-2910 | 412.56 | Kirkland_Manholes-2017 | 412 | 24.7 | 2.27 | 8 | PVC | 0.01 | 1,062 | 9 | 17 | 26 | 2.5 | | |
| Kirkland_Main-3140 | Kirkland_Manholes-2911 | 414.42 | Kirkland_Manholes-2910 | 412.56 | 288.8 | 0.64 | 8 | PVC | 0.01 | 566 | 8 | 13 | 21 | 3.6 | | |
| Kirkland_Main-3141 | Kirkland_Manholes-2909 | 423.03 | Kirkland_Manholes-2912 | 418.07 | 296 | 1.68 | 8 | PVC | 0.01 | 913 | 2 | 4 | 7 | 0.7 | | |
| Kirkland_Main-3142 | Kirkland_Manholes-2912 | 418.07 | Kirkland_Manholes-2911 | 414.42 | 285.6 | 1.28 | 8 | PVC | 0.01 | 797 | 5 | 9 | 14 | 1.7 | | |
| Kirkland_Main-3143 | Kirkland_Manholes-2914 | 478.18 | Kirkland_Manholes-2913 | 474.42 | 305.5 | 1.23 | 8 | PVC | 0.01 | 782 | 1 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3144 | Kirkland_Manholes-2036 | 452.58 | Kirkland_Manholes-1216 | 443.89 | 347.4 | 2.5 | 8 | PVC | 0.01 | 1,115 | 196 | 343 | 540 | 48.4 | SM14-Ex-EX264 | |
| Kirkland_Main-3145 | Kirkland_Manholes-1216 | 443.89 | Kirkland_Manholes-2048 | 442.51 | 28.4 | 4.86 | 8 | PVC | 0.01 | 1,554 | 200 | 352 | 552 | 35.5 | SM14-Ex-EX264 | |
| Kirkland_Main-3146 | Kirkland_Manholes-1719 | 46.02 | Kirkland_Manholes-2935 | 44.9 | 241.2 | 0.46 | 8 | PVC | 0.01 | 480 | 84 | 58 | 142 | 29.6 | SM14-Ex-EX165 | |
| Kirkland_Main-3147 | Kirkland_Manholes-2935 | 44.9 | Kirkland_Manholes-1741 | 41.4 | 292.3 | 1.2 | 8 | PVC | 0.01 | 772 | 85 | 66 | 151 | 19.6 | SM14-Ex-EX165 | |
| Kirkland_Main-3150 | Kirkland_Manholes-733 | 35.72 | Kirkland_Manholes-758 | 27.19 | 290.4 | 2.94 | 18 | PVC | 0.01 | 10,503 | 1,058 | 1,750 | 2,809 | 26.7 | | |
| Kirkland_Main-3151 | Kirkland_Manholes-758 | 27.19 | Kirkland_Manholes-734 | 25.7 | 118.9 | 1.25 | 18 | PVC | 0.01 | 6,865 | 1,059 | 1,758 | 2,817 | 41 | | |
| Kirkland_Main-3152 | Kirkland_Manholes-1689 | 43.75 | Kirkland_Manholes-2927 | 38.62 | 107.6 | 4.77 | 8 | PVC | 0.01 | 1,540 | 86 | 103 | 189 | 12.3 | SM14-Ex-EX161 | |
| Kirkland_Main-3153 | Kirkland_Manholes-2927 | 38.62 | Kirkland_Manholes-733 | 35.72 | 20.9 | 13.88 | 8 | PVC | 0.01 | 2,627 | 87 | 111 | 198 | 7.5 | | |
| Kirkland_Main-3154 | Kirkland_Manholes-2928 | 60.36 | Kirkland_Manholes-730 | 57.26 | 71.9 | 4.31 | 18 | PVC | 0.01 | 12,722 | 218 | 553 | 772 | 6.1 | | |
| Kirkland_Main-3155 | Kirkland_Manholes-1372 | 427.9 | Kirkland_Manholes-2936 | 415.17 | 236.6 | 5.38 | 8 | PVC | 0.01 | 1,635 | 78 | 155 | 233 | 14.2 | SM14-Ex-EX218 | |
| Kirkland_Main-3156 | Kirkland_Manholes-2936 | 415.17 | Kirkland_Manholes-1351 | 415.08 | 21.5 | 0.4 | 8 | PVC | 0.01 | 446 | 90 | 185 | 275 | 61.7 | | Drop Connection |
| Kirkland_Main-3157 | Kirkland_Manholes-2937 | 243.36 | Kirkland_Manholes-2938 | 237.72 | 156 | 3.61 | 8 | PVC | 0.01 | 1,340 | 3 | 4 | 8 | 0.6 | | |
| Kirkland_Main-3158 | Kirkland_Manholes-2938 | 237.72 | Kirkland_Manholes-1313 | 237.26 | 115.6 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 9 | 13 | 3 | | Drop Connection |
| Kirkland_Main-3159 | Kirkland_Manholes-2939 | 317.33 | Kirkland_Manholes-2887 | 302.33 | 186.7 | 8.03 | 8 | PVC | 0.01 | 1,999 | 7 | 13 | 19 | 1 | | |
| Kirkland_Main-3161 | Kirkland_Manholes-2940 | 472.26 | Kirkland_Manholes-564 | 469.28 | 203.6 | 1.46 | 8 | PVC | 0.01 | 853 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3162 | Kirkland_Manholes-2943 | 249.65 | Kirkland_Manholes-1876 | 247.77 | 195.1 | 0.96 | 8 | PVC | 0.01 | 692 | 1 | 9 | 9 | 1.3 | | |
| Kirkland_Main-3163 | Kirkland_Manholes-2947 | 393.38 | Kirkland_Manholes-2946 | 380.26 | 237.2 | 5.53 | 8 | PVC | 0.01 | 1,658 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3164 | Kirkland_Manholes-2946 | 380.26 | Kirkland_Manholes-2945 | 367.86 | 240.8 | 5.15 | 8 | PVC | 0.01 | 1,600 | 9 | 21 | 31 | 1.9 | | |
| Kirkland_Main-3165 | Kirkland_Manholes-2945 | 367.86 | Kirkland_Manholes-2948 | 345.5 | 368 | 6.08 | 8 | PVC | 0.01 | 1,738 | 10 | 26 | 36 | 2 | | |
| Kirkland_Main-3166 | Kirkland_Manholes-2948 | 345.5 | Kirkland_Manholes-1933 | 343.68 | 135.8 | 1.34 | 8 | PVC | 0.01 | 816 | 10 | 30 | 40 | 4.9 | | |
| Kirkland_Main-3167 | Kirkland_Manholes-2171 | 166.42 | Kirkland_Manholes-1107 | 164.79 | 299.5 | 0.54 | 8 | PVC | 0.01 | 520 | 0 | 4 | 5 | 0.9 | SM14-Ex-EX21 | |
| Kirkland_Main-3168 | Kirkland_Manholes-2942 | 127.29 | Kirkland_Manholes-2941 | 110.18 | 161.6 | 10.59 | 8 | PVC | 0.01 | 2,294 | 4 | 4 | 8 | 0.3 | | |
| Kirkland_Main-3169 | Kirkland_Manholes-80 | 110.33 | Kirkland_Manholes-2941 | 110.18 | 10 | 1.51 | 8 | PVC | 0.01 | 866 | 3 | 4 | 8 | 0.9 | | |
| Kirkland_Main-3170 | Kirkland_Manholes-2941 | 110.18 | Kirkland_Manholes-144 | 88.96 | 389.8 | 5.44 | 8 | PVC | 0.01 | 1,645 | 7 | 13 | 21 | 1.2 | | |
| Kirkland_Main-3171 | Kirkland_Manholes-2949 | 387.42 | Kirkland_Manholes-2946 | 380.26 | 393.8 | 1.82 | 8 | PVC | 0.01 | 951 | 5 | 13 | 18 | 1.9 | | |
| Kirkland_Main-3172 | Kirkland_Manholes-2950 | 396.31 | Kirkland_Manholes-2949 | 387.42 | 98.6 | 9.02 | 8 | PVC | 0.01 | 2,117 | 4 | 9 | 13 | 0.6 | | |
| Kirkland_Main-3173 | Kirkland_Manholes-2951 | 398.98 | Kirkland_Manholes-2950 | 396.31 | 142 | 1.88 | 8 | PVC | 0.01 | 967 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3174 | Kirkland_Manholes-2952 | 137.34 | Kirkland_Manholes-2509 | 126.48 | 113.7 | 9.55 | 8 | PVC | 0.01 | 2,179 | 3 | 6 | 9 | 0.4 | | |
| Kirkland_Main-3175 | Kirkland_Manholes-1035 | 182.7 | Kirkland_Manholes-2955 | 181.46 | 188.6 | 0.66 | 8 | PVC | 0.01 | 572 | 23 | 54 | 77 | 13.4 | | |
| Kirkland_Main-3176 | Kirkland_Manholes-2955 | 181.46 | Kirkland_Manholes-1038 | 180.54 | 146.6 | 0.63 | 8 | PVC | 0.01 | 559 | 28 | 67 | 95 | 17.1 | | |
| Kirkland_Main-3177 | Kirkland_Manholes-2954 | 183.8 | Kirkland_Manholes-2953 | 182.9 | 158.6 | 0.57 | 8 | PVC | 0.01 | 531 | 2 | 4 | 6 | 1.2 | | |
| Kirkland_Main-3178 | Kirkland_Manholes-2953 | 182.9 | Kirkland_Manholes-2955 | 181.46 | 297.7 | 0.48 | 8 | PVC | 0.01 | 490 | 4 | 9 | 13 | 2.6 | | |
| Kirkland_Main-3179 | Kirkland_Manholes-2956 | 306.62 | Kirkland_Manholes-876 | 301.25 | 262.2 | 2.05 | 8 | PVC | 0.01 | 1,009 | 6 | 17 | 23 | 2.3 | | |
| Kirkland_Main-3180 | Kirkland_Manholes-2958 | 17.19 | WAVERLY_WETWELL | 0 | 45.5 | 37.82 | 12 | PVC | 0.01 | 12,784 | 48 | 283 | 331 | 2.6 | | WW Influent Pipe |
| Kirkland_Main-3181 | Kirkland_Manholes-1622 | 253.11 | Kirkland_Manholes-528 | 238.38 | 149.4 | 9.86 | 12 | PVC | 0.01 | 6,527 | 361 | 901 | 1,263 | 19.3 | SM7 | |
| Kirkland_Main-3182 | Kirkland_Manholes-528 | 238.38 | Kirkland_Manholes-1634 | 223.49 | 152.1 | 9.79 | 12 | PVC | 0.01 | 6,504 | 364 | 906 | 1,270 | 19.5 | SM7 | |
| Kirkland_Main-3183 | Kirkland_Manholes-2971 | 508.46 | Kirkland_Manholes-2972 | 508.32 | 249.3 | 0.06 | 8 | PVC | 0.01 | 167 | 0 | 4 | 5 | 2.8 | | |
| Kirkland_Main-3185 | Kirkland_Manholes-2960 | 235.09 | Kirkland_Manholes-334 | 218.68 | 321.1 | 5.11 | 8 | PVC | 0.01 | 1,594 | 3 | 4 | 7 | 0.5 | | |
| Kirkland_Main-3186 | Kirkland_Manholes-2961 | 466.63 | Kirkland_Manholes-2030 | 465.11 | 267.6 | 0.57 | 8 | PVC | 0.01 | 531 | 2 | 4 | 6 | 1.2 | | |
| Kirkland_Main-3187 | Kirkland_Manholes-2963 | 352.22 | Kirkland_Manholes-2962 | 351.81 | 165.5 | 0.25 | 8 | PVC | 0.01 | 351 | 2 | 4 | 6 | 1.7 | | |
| Kirkland_Main-3188 | Kirkland_Manholes-2962 | 351.81 | Kirkland_Manholes-2566 | 326.34 | 167.8 | 15.18 | 8 | PVC | 0.01 | 2,747 | 6 | 21 | 28 | 1 | | |
| Kirkland_Main-3189 | Kirkland_Manholes-2966 | 369.29 | Kirkland_Manholes-2965 | 368.34 | 79.6 | 1.19 | 8 | PVC | 0.01 | 770 | 11 | 4 | 16 | 2 | | |
| Kirkland_Main-3190 | Kirkland_Manholes-2965 | 368.34 | Kirkland_Manholes-2964 | 368.18 | 12 | 1.33 | 8 | PVC | 0.01 | 814 | 17 | 9 | 26 | 3.1 | | |
| Kirkland_Main-3191 | Kirkland_Manholes-2964 | 368.18 | Kirkland_Manholes-1916 | 361.73 | 249.5 | 2.59 | 8 | PVC | 0.01 | 1,134 | 18 | 13 | 31 | 2.7 | | |
| Kirkland_Main-3193 | Kirkland_Manholes-2967 | 87.15 | Kirkland_Manholes-2969 | 78.32 | 80.7 | 10.94 | 8 | PVC | 0.01 | 2,332 | 1 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3194 | Kirkland_Manholes-2968 | 78.98 | Kirkland_Manholes-2969 | 78.32 | 100.1 | 0.66 | 8 | PVC | 0.01 | 573 | 2 | 4 | 6 | 1.1 | | |
| Kirkland_Main-3195 | Kirkland_Manholes-2969 | 78.32 | Kirkland_Manholes-2970 | 61.2 | 152.9 | 11.2 | 8 | PVC | 0.01 | 2,359 | 4 | 13 | 18 | 0.7 | | |
| Kirkland_Main-3196 | Kirkland_Manholes-2970 | 61.2 | Kirkland_Manholes-200 | 55.31 | 178.6 | 3.3 | 8 | PVC | 0.01 | 1,280 | 5 | 18 | 23 | 1.8 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3197 | Kirkland_Manholes-1445 | 504.92 | Kirkland_Manholes-2976 | 503.85 | 186.4 | 0.57 | 8 | PVC | 0.01 | 534 | 30 | 99 | 129 | 24.1 | SM14-Ex-EX269 | |
| Kirkland_Main-3198 | Kirkland_Manholes-2972 | 508.32 | Kirkland_Manholes-2973 | 507.01 | 144.1 | 0.91 | 8 | PVC | 0.01 | 672 | 1 | 9 | 9 | 1.4 | | |
| Kirkland_Main-3199 | Kirkland_Manholes-2974 | 507.07 | Kirkland_Manholes-2973 | 507.01 | 168.1 | 0.04 | 8 | PVC | 0.01 | 133 | 0 | 4 | 5 | 3.5 | | |
| Kirkland_Main-3200 | Kirkland_Manholes-2973 | 507.01 | Kirkland_Manholes-2975 | 506.8 | 151.1 | 0.14 | 8 | PVC | 0.01 | 263 | 3 | 17 | 20 | 7.7 | | |
| Kirkland_Main-3201 | Kirkland_Manholes-2975 | 506.8 | Kirkland_Manholes-2976 | 503.85 | 22 | 13.39 | 8 | PVC | 0.01 | 2,579 | 3 | 21 | 25 | 1 | | |
| Kirkland_Main-3202 | Kirkland_Manholes-2978 | 14.63 | Kirkland_Manholes-2730 | 14.43 | 56 | 0.36 | 18 | PVC | 0.01 | 3,662 | 359 | 576 | 935 | 25.5 | SM14-Ex-EX289 | |
| Kirkland_Main-3203 | Kirkland_Manholes-2977 | 14.89 | Kirkland_Manholes-2978 | 14.63 | 69.2 | 0.38 | 18 | PVC | 0.01 | 3,758 | 358 | 570 | 927 | 24.7 | SM14-Ex-EX289 | |
| Kirkland_Main-3204 | Kirkland_Manholes-2979 | 372.62 | Kirkland_Manholes-2980 | 359.59 | 69.3 | 18.82 | 8 | PVC | 0.01 | 3,058 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3205 | Kirkland_Manholes-2980 | 359.59 | Kirkland_Manholes-2981 | 355.43 | 97.4 | 4.27 | 8 | PVC | 0.01 | 1,457 | 3 | 9 | 12 | 0.8 | | |
| Kirkland_Main-3206 | Kirkland_Manholes-2981 | 355.43 | Kirkland_Manholes-2962 | 351.81 | 43.7 | 8.28 | 8 | PVC | 0.01 | 2,029 | 4 | 13 | 17 | 0.8 | | |
| Kirkland_Main-3207 | Kirkland_Manholes-2982 | 168 | Kirkland_Manholes-770 | 166.93 | 80.1 | 1.34 | 8 | PVC | 0.01 | 815 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3208 | Kirkland_Manholes-2983 | 235.2 | Kirkland_Manholes-974 | 234.1 | 148.8 | 0.74 | 8 | PVC | 0.01 | 606 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-3209 | Kirkland_Manholes-1342 | 283.15 | Kirkland_Manholes-2984 | 277.63 | 191.2 | 2.89 | 10 | PVC | 0.01 | 2,172 | 167 | 399 | 566 | 26.1 | | |
| Kirkland_Main-3210 | Kirkland_Manholes-2985 | 155.7 | Kirkland_Manholes-1648 | 152.03 | 36.5 | 10.07 | 8 | PVC | 0.01 | 2,237 | 5 | 17 | 21 | 0.9 | | |
| Kirkland_Main-3211 | Kirkland_Manholes-2986 | 155.86 | Kirkland_Manholes-2985 | 155.7 | 122.4 | 0.13 | 8 | PVC | 0.01 | 255 | 4 | 8 | 12 | 4.7 | | |
| Kirkland_Main-3213 | Kirkland_Manholes-2987 | 213 | Kirkland_Manholes-2988 | 212.12 | 123.5 | 0.71 | 8 | PVC | 0.01 | 595 | 4 | 4 | 9 | 1.4 | | |
| Kirkland_Main-3214 | Kirkland_Manholes-2988 | 212.12 | Kirkland_Manholes-2989 | 210.69 | 118.1 | 1.21 | 8 | PVC | 0.01 | 776 | 6 | 9 | 15 | 1.9 | | |
| Kirkland_Main-3215 | Kirkland_Manholes-2989 | 210.69 | Kirkland_Manholes-61 | 205.17 | 54.3 | 10.16 | 8 | PVC | 0.01 | 2,247 | 6 | 13 | 20 | 0.9 | | |
| Kirkland_Main-3216 | Kirkland_Manholes-2990 | 239.73 | Kirkland_Manholes-1021 | 230.72 | 366.4 | 2.46 | 8 | PVC | 0.01 | 1,106 | 3 | 4 | 7 | 0.7 | | |
| Kirkland_Main-3217 | Kirkland_Manholes-2993 | 335.98 | Kirkland_Manholes-2939 | 317.33 | 213.5 | 8.74 | 8 | PVC | 0.01 | 2,084 | 5 | 9 | 14 | 0.6 | | |
| Kirkland_Main-3218 | Kirkland_Manholes-1083 | 220.88 | Kirkland_Manholes-2996 | 220.63 | 31.5 | 0.79 | 12 | PVC | 0.01 | 1,851 | 194 | 541 | 911 | 49.2 | SM14-Ex-EX321 | |
| Kirkland_Main-3219 | Kirkland_Manholes-2995 | 224.98 | Kirkland_Manholes-2996 | 220.63 | 134.4 | 3.24 | 8 | PVC | 0.01 | 1,269 | 11 | 4 | 15 | 1.2 | | |
| Kirkland_Main-3220 | Kirkland_Manholes-2997 | 482.7 | Kirkland_Manholes-2998 | 482.02 | 242.2 | 0.28 | 8 | PVC | 0.01 | 374 | 1 | 4 | 6 | 1.5 | | |
| Kirkland_Main-3221 | Kirkland_Manholes-2998 | 482.02 | Kirkland_Manholes-555 | 477.96 | 81.6 | 4.97 | 8 | PVC | 0.01 | 1,572 | 3 | 9 | 11 | 0.7 | | |
| Kirkland_Main-3222 | Kirkland_Manholes-2999 | 479.74 | Kirkland_Manholes-3000 | 475.69 | 102.7 | 3.94 | 8 | PVC | 0.01 | 1,400 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3223 | Kirkland_Manholes-3000 | 475.69 | Kirkland_Manholes-3001 | 471.99 | 137.1 | 2.7 | 8 | PVC | 0.01 | 1,158 | 2 | 9 | 11 | 0.9 | | |
| Kirkland_Main-3224 | Kirkland_Manholes-3001 | 471.99 | Kirkland_Manholes-3002 | 466.73 | 134.5 | 3.91 | 8 | PVC | 0.01 | 1,394 | 3 | 13 | 16 | 1.1 | | |
| Kirkland_Main-3225 | Kirkland_Manholes-3002 | 466.73 | Kirkland_Manholes-3003 | 466.06 | 37 | 1.81 | 8 | PVC | 0.01 | 949 | 4 | 17 | 21 | 2.2 | | |
| Kirkland_Main-3226 | Kirkland_Manholes-3003 | 466.06 | Kirkland_Manholes-3004 | 465.24 | 79.1 | 1.04 | 8 | PVC | 0.01 | 718 | 4 | 21 | 25 | 3.6 | | |
| Kirkland_Main-3227 | Kirkland_Manholes-3004 | 465.24 | Kirkland_Manholes-3005 | 459.83 | 119.2 | 4.54 | 8 | PVC | 0.01 | 1,502 | 5 | 26 | 31 | 2.1 | | |
| Kirkland_Main-3228 | Kirkland_Manholes-3005 | 459.83 | Kirkland_Manholes-3006 | 456.1 | 91.8 | 4.07 | 8 | PVC | 0.01 | 1,422 | 6 | 30 | 36 | 2.5 | | |
| Kirkland_Main-3229 | Kirkland_Manholes-3007 | 456.9 | Kirkland_Manholes-3008 | 447.1 | 310.3 | 3.16 | 8 | PVC | 0.01 | 1,253 | 4 | 9 | 12 | 1 | | |
| Kirkland_Main-3230 | Kirkland_Manholes-3009 | 452.69 | Kirkland_Manholes-3008 | 447.1 | 238.1 | 2.35 | 8 | PVC | 0.01 | 1,080 | 1 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3231 | Kirkland_Manholes-3008 | 447.1 | Kirkland_Manholes-1990 | 439.8 | 282 | 2.59 | 8 | PVC | 0.01 | 1,134 | 7 | 17 | 24 | 2.1 | | |
| Kirkland_Main-3232 | Kirkland_Manholes-3010 | 442.64 | Kirkland_Manholes-3011 | 434.12 | 219.9 | 3.87 | 8 | PVC | 0.01 | 1,388 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3233 | Kirkland_Manholes-3011 | 434.12 | Kirkland_Manholes-2005 | 431.24 | 367.7 | 0.78 | 8 | PVC | 0.01 | 624 | 2 | 9 | 11 | 1.8 | | |
| Kirkland_Main-3234 | Kirkland_Manholes-2005 | 431.24 | Kirkland_Manholes-2006 | 430.4 | 270.9 | 0.31 | 8 | PVC | 0.01 | 393 | 3 | 13 | 16 | 4.2 | | |
| Kirkland_Main-3235 | Kirkland_Manholes-2006 | 430.4 | Kirkland_Manholes-2007 | 429.08 | 284.1 | 0.46 | 8 | PVC | 0.01 | 481 | 6 | 17 | 23 | 4.8 | | |
| Kirkland_Main-3236 | Kirkland_Manholes-3012 | 424.86 | Kirkland_Manholes-2011 | 417.75 | 388.4 | 1.83 | 8 | PVC | 0.01 | 954 | 2 | 4 | 6 | 0.6 | | |
| Kirkland_Main-3237 | Kirkland_Manholes-3014 | 470 | Kirkland_Manholes-3013 | 459.93 | 193.2 | 5.21 | 8 | PVC | 0.01 | 1,610 | 1 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3238 | Kirkland_Manholes-3013 | 459.93 | Kirkland_Manholes-548 | 453.36 | 230.6 | 2.85 | 8 | PVC | 0.01 | 1,190 | 3 | 9 | 12 | 1 | | |
| Kirkland_Main-3239 | Kirkland_Manholes-3020 | 302.86 | Kirkland_Manholes-1341 | 299.38 | 98.7 | 3.52 | 8 | PVC | 0.01 | 1,324 | 12 | 52 | 64 | 4.8 | | |
| Kirkland_Main-3240 | Kirkland_Manholes-3019 | 303.35 | Kirkland_Manholes-3020 | 302.86 | 19.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 12 | 47 | 59 | 5.3 | | |
| Kirkland_Main-3241 | Kirkland_Manholes-3021 | 303.74 | Kirkland_Manholes-3019 | 303.35 | 54.4 | 0.72 | 8 | PVC | 0.01 | 597 | 12 | 43 | 54 | 9.1 | | |
| Kirkland_Main-3242 | Kirkland_Manholes-3022 | 311.69 | Kirkland_Manholes-3021 | 303.74 | 55.5 | 14.32 | 8 | PVC | 0.01 | 2,668 | 1 | 4 | 5 | 0.2 | | |
| Kirkland_Main-3243 | Kirkland_Manholes-3023 | 312.84 | Kirkland_Manholes-3021 | 303.74 | 71.1 | 12.8 | 8 | PVC | 0.01 | 2,523 | 10 | 34 | 45 | 1.8 | | |
| Kirkland_Main-3244 | Kirkland_Manholes-3018 | 329.19 | Kirkland_Manholes-3023 | 312.84 | 105.9 | 15.45 | 8 | PVC | 0.01 | 2,771 | 10 | 30 | 40 | 1.4 | | |
| Kirkland_Main-3245 | Kirkland_Manholes-3017 | 343.42 | Kirkland_Manholes-3018 | 329.19 | 180.7 | 7.87 | 8 | PVC | 0.01 | 1,978 | 9 | 26 | 35 | 1.7 | | |
| Kirkland_Main-3246 | Kirkland_Manholes-3015 | 371.23 | Kirkland_Manholes-3017 | 343.42 | 160.4 | 17.33 | 8 | PVC | 0.01 | 2,935 | 7 | 21 | 29 | 1 | | |
| Kirkland_Main-3247 | Kirkland_Manholes-3016 | 372.66 | Kirkland_Manholes-3015 | 371.23 | 122.5 | 1.17 | 8 | PVC | 0.01 | 762 | 6 | 17 | 23 | 3 | | |
| Kirkland_Main-3248 | Kirkland_Manholes-3024 | 372.77 | Kirkland_Manholes-1930 | 369.31 | 206.2 | 1.68 | 8 | PVC | 0.01 | 913 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3250 | Kirkland_Manholes-3025 | 189.5 | Kirkland_Manholes-3026 | 186.45 | 198.2 | 1.54 | 8 | PVC | 0.01 | 875 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3251 | Kirkland_Manholes-3026 | 186.45 | Kirkland_Manholes-1035 | 182.7 | 331 | 1.13 | 8 | PVC | 0.01 | 750 | 3 | 9 | 12 | 1.6 | | |
| Kirkland_Main-3252 | Kirkland_Manholes-3028 | 332.75 | Kirkland_Manholes-1582 | 332.21 | 111.6 | 0.48 | 12 | PVC | 0.01 | 1,446 | 66 | 193 | 259 | 17.9 | SM14-Ex-EX206 | |
| Kirkland_Main-3253 | Kirkland_Manholes-3027 | 333.49 | Kirkland_Manholes-3028 | 332.75 | 24.2 | 3.06 | 8 | PVC | 0.01 | 1,233 | 4 | 4 | 8 | 0.7 | | |
| Kirkland_Main-3257 | Kirkland_Manholes-3031 | 384.74 | Kirkland_Manholes-1926 | 383.42 | 23.1 | 5.72 | 12 | PVC | 0.01 | 4,970 | 224 | 567 | 791 | 15.9 | | |
| Kirkland_Main-3258 | Kirkland_Manholes-1 | 73.25 | Kirkland_Manholes-21 | 62.08 | 92.5 | 12.08 | 8 | PVC | 0.01 | 2,451 | 10 | 22 | 32 | 1.3 | | |
| Kirkland_Main-3259 | Kirkland_Manholes-20 | 65.72 | Kirkland_Manholes-21 | 62.08 | 153.9 | 2.36 | 8 | PVC | 0.01 | 1,084 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3260 | Kirkland_Manholes-3070 | 330.73 | Kirkland_Manholes-927 | 307.71 | 144.8 | 15.9 | 8 | PVC | 0.01 | 2,811 | 7 | 4 | 11 | 0.4 | | |
| Kirkland_Main-3261 | Kirkland_Manholes-3078 | 370.92 | Kirkland_Manholes-3077 | 366.14 | 136.6 | 3.5 | 8 | PVC | 0.01 | 1,319 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3262 | Kirkland_Manholes-3077 | 366.14 | Kirkland_Manholes-3076 | 363.7 | 26.9 | 9.07 | 8 | PVC | 0.01 | 2,124 | 2 | 9 | 10 | 0.5 | | |
| Kirkland_Main-3263 | Kirkland_Manholes-3076 | 363.7 | Kirkland_Manholes-3075 | 343.97 | 114.4 | 17.24 | 8 | PVC | 0.01 | 2,928 | 2 | 13 | 15 | 0.5 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3264 | Kirkland_Manholes-3075 | 343.97 | Kirkland_Manholes-3079 | 316.42 | 161.6 | 17.05 | 8 | PVC | 0.01 | 2,911 | 3 | 17 | 20 | 0.7 | | |
| Kirkland_Main-3265 | Kirkland_Manholes-3079 | 316.42 | Kirkland_Manholes-3074 | 303.68 | 195.1 | 6.53 | 8 | PVC | 0.01 | 1,802 | 4 | 21 | 25 | 1.4 | | |
| Kirkland_Main-3266 | Kirkland_Manholes-3074 | 303.68 | Kirkland_Manholes-3073 | 289.21 | 131.6 | 10.99 | 8 | PVC | 0.01 | 2,337 | 4 | 26 | 30 | 1.3 | | |
| Kirkland_Main-3267 | Kirkland_Manholes-3073 | 289.21 | Kirkland_Manholes-3072 | 273.11 | 354 | 4.55 | 8 | PVC | 0.01 | 1,504 | 5 | 30 | 35 | 2.3 | | |
| Kirkland_Main-3268 | Kirkland_Manholes-3072 | 273.11 | Kirkland_Manholes-3071 | 273.04 | 17.1 | 0.4 | 8 | PVC | 0.01 | 445 | 5 | 34 | 40 | 8.9 | | |
| Kirkland_Main-3269 | Kirkland_Manholes-3071 | 273.04 | Kirkland_Manholes-1317 | 271.64 | 20.2 | 6.94 | 8 | PVC | 0.01 | 1,858 | 6 | 39 | 44 | 2.4 | | |
| Kirkland_Main-3270 | Kirkland_Manholes-3081 | 373.55 | Kirkland_Manholes-1319 | 372.4 | 30.4 | 3.78 | 8 | PVC | 0.01 | 1,371 | 99 | 202 | 301 | 21.9 | | |
| Kirkland_Main-3271 | Kirkland_Manholes-3080 | 382.34 | Kirkland_Manholes-3081 | 377.27 | 187.3 | 2.71 | 8 | PVC | 0.01 | 1,160 | 0 | 4 | 5 | 0.4 | | Drop Connection |
| Kirkland_Main-3272 | Kirkland_Manholes-3083 | 435.32 | Kirkland_Manholes-3082 | 428.49 | 311.8 | 2.19 | 8 | PVC | 0.01 | 1,044 | 2 | 4 | 7 | 0.6 | | |
| Kirkland_Main-3273 | Kirkland_Manholes-3084 | 333.87 | Kirkland_Manholes-3085 | 329.83 | 142 | 2.85 | 8 | PVC | 0.01 | 1,189 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3274 | Kirkland_Manholes-3085 | 329.83 | Kirkland_Manholes-3086 | 304.85 | 242 | 10.32 | 12 | PVC | 0.01 | 6,678 | 1 | 9 | 10 | 0.1 | | |
| Kirkland_Main-3275 | Kirkland_Manholes-3086 | 304.85 | Kirkland_Manholes-3087 | 296.66 | 149.5 | 5.48 | 12 | PVC | 0.01 | 4,865 | 5 | 13 | 18 | 0.4 | | |
| Kirkland_Main-3276 | Kirkland_Manholes-3087 | 296.66 | Kirkland_Manholes-3088 | 288.51 | 213.4 | 3.82 | 8 | Concrete | 0.013 | 1,060 | 5 | 17 | 22 | 2.1 | | |
| Kirkland_Main-3277 | Kirkland_Manholes-3088 | 288.51 | Kirkland_Manholes-3089 | 268.55 | 207 | 9.64 | 8 | Concrete | 0.013 | 1,684 | 5 | 21 | 27 | 1.6 | | |
| Kirkland_Main-3278 | Kirkland_Manholes-3089 | 268.55 | Kirkland_Manholes-2427 | 267.5 | 263 | 0.4 | 8 | Concrete | 0.013 | 343 | 59 | 26 | 85 | 24.8 | | |
| Kirkland_Main-3279 | Kirkland_Manholes-2197 | 480.89 | Kirkland_Manholes-1417 | 477.64 | 213.1 | 1.52 | 8 | PVC | 0.01 | 871 | 4 | 13 | 17 | 1.9 | | |
| Kirkland_Main-3280 | Kirkland_Manholes-3090 | 416.74 | Kirkland_Manholes-2916 | 416.17 | 246 | 0.23 | 8 | PVC | 0.01 | 339 | 2 | 4 | 6 | 1.8 | | |
| Kirkland_Main-3281 | Kirkland_Manholes-3092 | 96.93 | Kirkland_Manholes-173 | 34.1 | 219.6 | 28.61 | 8 | PVC | 0.01 | 3,771 | 3 | 9 | 12 | 0.3 | | |
| Kirkland_Main-3282 | Kirkland_Manholes-3091 | 115.12 | Kirkland_Manholes-3092 | 96.93 | 129.4 | 14.06 | 8 | PVC | 0.01 | 2,644 | 2 | 4 | 6 | 0.2 | | |
| Kirkland_Main-3283 | Kirkland_Manholes-3093 | 117.97 | Kirkland_Manholes-3094 | 63.71 | 388.1 | 13.98 | 8 | PVC | 0.01 | 2,636 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-3284 | Kirkland_Manholes-3094 | 63.71 | Kirkland_Manholes-437 | 58.56 | 159.5 | 3.23 | 8 | PVC | 0.01 | 1,267 | 5 | 9 | 14 | 1.1 | | |
| Kirkland_Main-3285 | Kirkland_Manholes-3095 | 195.85 | Kirkland_Manholes-2070 | 185.96 | 195.6 | 5.06 | 8 | PVC | 0.01 | 1,585 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3287 | Kirkland_Manholes-205 | 228.15 | Kirkland_Manholes-3096 | 204.91 | 232.4 | 10 | 8 | PVC | 0.01 | 2,229 | 19 | 36 | 54 | 2.4 | SM14-Ex-EX57 | |
| Kirkland_Main-3288 | Kirkland_Manholes-3096 | 204.91 | Kirkland_Manholes-234 | 184.45 | 273.4 | 7.48 | 8 | PVC | 0.01 | 1,929 | 25 | 49 | 75 | 3.9 | SM14-Ex-EX57 | |
| Kirkland_Main-3289 | Kirkland_Manholes-1218 | 220.85 | Kirkland_Manholes-3096 | 204.91 | 278.6 | 5.72 | 8 | PVC | 0.01 | 1,686 | 5 | 9 | 14 | 0.8 | SM14-Ex-EX59 | |
| Kirkland_Main-3290 | Kirkland_Manholes-3097 | 172.14 | Kirkland_Manholes-1639 | 169.94 | 87.4 | 2.52 | 8 | PVC | 0.01 | 1,119 | 23 | 90 | 114 | 10.2 | SM14-Ex-EX202 | |
| Kirkland_Main-3291 | Kirkland_Manholes-3098 | 172.34 | Kirkland_Manholes-3097 | 172.14 | 17.4 | 1.15 | 8 | PVC | 0.01 | 757 | 23 | 86 | 108 | 14.3 | SM14-Ex-EX202 | |
| Kirkland_Main-3292 | Kirkland_Manholes-1640 | 188.59 | Kirkland_Manholes-3098 | 174.29 | 160.1 | 8.93 | 8 | PVC | 0.01 | 2,107 | 4 | 9 | 13 | 0.6 | SM14-Ex-EX203 | Drop Connection |
| Kirkland_Main-3293 | Kirkland_Manholes-2696 | 172.94 | Kirkland_Manholes-3098 | 172.34 | 33 | 1.82 | 8 | PVC | 0.01 | 951 | 18 | 73 | 91 | 9.5 | SM14-Ex-EX202 | |
| Kirkland_Main-3294 | Kirkland_Manholes-3099 | 77.83 | Kirkland_Manholes-2204 | 53 | 99.4 | 24.97 | 8 | PVC | 0.01 | 3,523 | 5 | 12 | 18 | 0.5 | | |
| Kirkland_Main-3295 | Kirkland_Manholes-2725 | 97.33 | Kirkland_Manholes-3099 | 77.83 | 158.8 | 12.28 | 8 | PVC | 0.01 | 2,470 | 3 | 6 | 9 | 0.4 | | |
| Kirkland_Main-3296 | Kirkland_Manholes-2663 | 50.64 | Kirkland_Manholes-3043 | 37.72 | 98.7 | 13.08 | 12 | PVC | 0.01 | 7,519 | 222 | 446 | 668 | 8.9 | | |
| Kirkland_Main-3297 | Kirkland_Manholes-3043 | 37.72 | Kirkland_Manholes-3044 | 18.06 | 181 | 10.86 | 12 | PVC | 0.01 | 6,850 | 223 | 452 | 675 | 9.9 | | |
| Kirkland_Main-3298 | Kirkland_Manholes-3106 | 117 | Kirkland_Manholes-3105 | 116.05 | 61.3 | 1.55 | 8 | PVC | 0.01 | 877 | 23 | 91 | 114 | 13 | SM10 | |
| Kirkland_Main-3299 | Kirkland_Manholes-3107 | 127.14 | Kirkland_Manholes-3106 | 117 | 167.2 | 6.07 | 8 | | 0.012 | 1,447 | 22 | 83 | 104 | 7.2 | SM10 | |
| Kirkland_Main-3300 | Kirkland_Manholes-1180 | 118.31 | Kirkland_Manholes-3108 | 104.6 | 196.1 | 6.99 | 8 | PVC | 0.01 | 1,864 | 2 | 8 | 10 | 0.5 | SM10 | |
| Kirkland_Main-3301 | Kirkland_Manholes-3103 | 113.84 | Kirkland_Manholes-3109 | 110.43 | 345.5 | 0.99 | 12 | PVC | 0.01 | 2,065 | 29 | 124 | 153 | 7.4 | SM10 | |
| Kirkland_Main-3302 | Kirkland_Manholes-3109 | 110.43 | Kirkland_Manholes-3108 | 104.6 | 85.9 | 6.79 | 8 | PVC | 0.01 | 1,837 | 31 | 132 | 163 | 8.9 | SM10 | |
| Kirkland_Main-3303 | Kirkland_Manholes-3108 | 104.6 | Kirkland_Manholes-513 | 81.7 | 198.3 | 11.55 | 8 | PVC | 0.01 | 2,396 | 33 | 149 | 182 | 7.6 | SM10 | |
| Kirkland_Main-3305 | Kirkland_Manholes-3105 | 116.05 | Kirkland_Manholes-3104 | 114.41 | 128.6 | 1.28 | 8 | PVC | 0.01 | 796 | 25 | 99 | 124 | 15.6 | SM10 | |
| Kirkland_Main-3306 | Kirkland_Manholes-3110 | 73.01 | Kirkland_Manholes-306 | 19.99 | 234 | 22.66 | 8 | PVC | 0.01 | 3,356 | 27 | 106 | 133 | 4 | SM10 | |
| Kirkland_Main-3307 | Kirkland_Manholes-305 | 74.69 | Kirkland_Manholes-3110 | 73.01 | 8.3 | 20.21 | 8 | PVC | 0.01 | 3,169 | 26 | 97 | 123 | 3.9 | SM10 | |
| Kirkland_Main-3308 | Kirkland_Manholes-3114 | 174.9 | Kirkland_Manholes-3113 | 173.48 | 159.7 | 0.89 | 8 | PVC | 0.01 | 665 | 36 | 4 | 41 | 6.1 | | |
| Kirkland_Main-3309 | Kirkland_Manholes-3113 | 173.48 | Kirkland_Manholes-3112 | 173.15 | 82.5 | 0.4 | 8 | PVC | 0.01 | 446 | 37 | 9 | 45 | 10.2 | | |
| Kirkland_Main-3310 | Kirkland_Manholes-3112 | 173.15 | Kirkland_Manholes-3111 | 170.05 | 248.7 | 1.25 | 8 | PVC | 0.01 | 787 | 37 | 13 | 50 | 6.4 | | |
| Kirkland_Main-3311 | Kirkland_Manholes-3111 | 170.05 | Kirkland_Manholes-1125 | 167.88 | 64.7 | 3.36 | 8 | PVC | 0.01 | 1,292 | 37 | 17 | 55 | 4.2 | | |
| Kirkland_Main-3314 | Kirkland_Manholes-3116 | 330.46 | Kirkland_Manholes-2933 | 328.79 | 108.5 | 1.54 | 8 | PVC | 0.01 | 875 | 2 | 4 | 6 | 0.7 | | |
| Kirkland_Main-3315 | Kirkland_Manholes-3117 | 134.38 | Kirkland_Manholes-161 | 132.09 | 173.7 | 1.32 | 8 | PVC | 0.01 | 809 | 4 | 4 | 8 | 1 | | |
| Kirkland_Main-3316 | Kirkland_Manholes-3118 | 331.75 | Kirkland_Manholes-2934 | 330.48 | 196.7 | 0.65 | 8 | PVC | 0.01 | 567 | 1 | 4 | 6 | 1 | | |
| Kirkland_Main-3317 | Kirkland_Manholes-3119 | 327.7 | Kirkland_Manholes-2932 | 327.56 | 161.9 | 0.09 | 8 | PVC | 0.01 | 207 | 7 | 21 | 28 | 13.6 | | |
| Kirkland_Main-3318 | Kirkland_Manholes-2933 | 328.79 | Kirkland_Manholes-3119 | 327.7 | 135.5 | 0.8 | 8 | PVC | 0.01 | 632 | 3 | 9 | 12 | 1.9 | | |
| Kirkland_Main-3319 | Kirkland_Manholes-2934 | 330.48 | Kirkland_Manholes-3119 | 327.7 | 250.4 | 1.11 | 8 | PVC | 0.01 | 743 | 3 | 9 | 11 | 1.5 | | |
| Kirkland_Main-3320 | Kirkland_Manholes-839 | 334.68 | Kirkland_Manholes-3121 | 329.59 | 187.8 | 2.71 | 8 | PVC | 0.01 | 1,161 | 20 | 43 | 63 | 5.4 | | |
| Kirkland_Main-3321 | Kirkland_Manholes-3120 | 345 | Kirkland_Manholes-3121 | 344.79 | 53.6 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 4 | 6 | 1.4 | | Drop Connection |
| Kirkland_Main-3322 | Kirkland_Manholes-3121 | 329.59 | Kirkland_Manholes-3122 | 329.14 | 65.3 | 0.69 | 8 | PVC | 0.01 | 585 | 22 | 52 | 74 | 12.6 | | |
| Kirkland_Main-3323 | Kirkland_Manholes-3122 | 329.14 | Kirkland_Manholes-840 | 326.85 | 337.3 | 0.68 | 8 | PVC | 0.01 | 581 | 25 | 56 | 81 | 13.9 | | |
| Kirkland_Main-3326 | Kirkland_Manholes-3123 | 227.69 | Kirkland_Manholes-2497 | 194.88 | 329.5 | 9.96 | 8 | PVC | 0.01 | 2,225 | 8 | 4 | 12 | 0.6 | SM14-Ex-EX236 | |
| Kirkland_Main-3332 | Kirkland_Manholes-3125 | 215.03 | Kirkland_Manholes-3124 | 203.5 | 175.2 | 6.58 | 8 | PVC | 0.01 | 1,809 | 1 | 4 | 6 | 0.3 | SM14-Ex-EX20 | |
| Kirkland_Main-3333 | Kirkland_Manholes-3124 | 203.5 | Kirkland_Manholes-3126 | 177.5 | 261.8 | 9.93 | 8 | PVC | 0.01 | 2,222 | 2 | 9 | 11 | 0.5 | SM14-Ex-EX20 | |
| Kirkland_Main-3336 | Kirkland_Manholes-3006 | 456.1 | Kirkland_Manholes-539 | 454.38 | 165.4 | 1.04 | 8 | PVC | 0.01 | 719 | 7 | 34 | 41 | 5.7 | | |
| Kirkland_Main-3337 | Kirkland_Manholes-555 | 477.96 | Kirkland_Manholes-535 | 472.49 | 159.7 | 3.43 | 8 | PVC | 0.01 | 1,305 | 4 | 13 | 17 | 1.3 | | |
| Kirkland_Main-3338 | Kirkland_Manholes-2509 | 126.48 | Kirkland_Manholes-2508 | 120.01 | 60.3 | 10.73 | 8 | PVC | 0.01 | 2,309 | 5 | 12 | 17 | 0.8 | SM14-Ex-EX229 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3339 | Kirkland_Manholes-2566 | 326.34 | Kirkland_Manholes-2567 | 316.05 | 133.4 | 7.71 | 8 | PVC | 0.01 | 1,958 | 7 | 26 | 33 | 1.7 | SM14-Ex-EX307 | |
| Kirkland_Main-3340 | Kirkland_Manholes-728 | 70.86 | Kirkland_Manholes-2928 | 60.36 | 293.8 | 3.57 | 18 | PVC | 0.01 | 11,586 | 186 | 545 | 731 | 6.3 | | |
| Kirkland_Main-3341 | Kirkland_Manholes-3127 | 324.33 | Kirkland_Manholes-3128 | 323.94 | 81.4 | 0.48 | 8 | PVC | 0.01 | 488 | 1 | 4 | 5 | 1 | SM14-Ex-EX54 | |
| Kirkland_Main-3344 | Kirkland_Manholes-3129 | 308.71 | Kirkland_Manholes-2956 | 306.62 | 67.6 | 3.09 | 8 | PVC | 0.01 | 1,240 | 4 | 13 | 17 | 1.4 | | |
| Kirkland_Main-3345 | Kirkland_Manholes-3130 | 70.51 | Kirkland_Manholes-3131 | 61.63 | 403.3 | 2.2 | 8 | PVC | 0.01 | 1,046 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3346 | Kirkland_Manholes-3131 | 61.63 | Kirkland_Manholes-201 | 56.98 | 404.6 | 1.15 | 8 | PVC | 0.01 | 756 | 1 | 9 | 10 | 1.3 | | |
| Kirkland_Main-3347 | Kirkland_Manholes-3132 | 514.05 | Kirkland_Manholes-3133 | 512.61 | 110 | 1.31 | 8 | PVC | 0.01 | 807 | 1 | 4 | 5 | 0.6 | | |
| Kirkland_Main-3348 | Kirkland_Manholes-3133 | 512.61 | Kirkland_Manholes-1441 | 509.69 | 156.4 | 1.87 | 8 | PVC | 0.01 | 963 | 1 | 9 | 10 | 1 | | |
| Kirkland_Main-3349 | Kirkland_Manholes-3134 | 66.29 | Kirkland_Manholes-1828 | 65.79 | 294 | 0.17 | 18 | PVC | 0.01 | 2,528 | 170 | 685 | 1,206 | 47.7 | SM14-2035-DF11 | |
| Kirkland_Main-3350 | Kirkland_Manholes-2994 | 67.86 | Kirkland_Manholes-3135 | 66.49 | 13.6 | 10.06 | 15 | PVC | 0.01 | 11,957 | 168 | 669 | 1,187 | 9.9 | | |
| Kirkland_Main-3351 | Kirkland_Manholes-3135 | 66.49 | Kirkland_Manholes-3134 | 66.29 | 136.2 | 0.15 | 18 | PVC | 0.01 | 2,374 | 168 | 677 | 1,196 | 50.4 | SM14-2035-DF11 | |
| Kirkland_Main-3353 | Kirkland_Manholes-3137 | 192.8 | Kirkland_Manholes-1304 | 180.12 | 128.3 | 9.88 | 8 | PVC | 0.01 | 2,216 | 6 | 17 | 22 | 1 | SM14-Ex-EX106 | |
| Kirkland_Main-3354 | Kirkland_Manholes-1305 | 222.35 | Kirkland_Manholes-3137 | 192.8 | 245.9 | 12.02 | 8 | PVC | 0.01 | 2,444 | 4 | 8 | 12 | 0.5 | SM14-Ex-EX106 | |
| Kirkland_Main-3356 | Kirkland_Manholes-3138 | 280.24 | Kirkland_Manholes-672 | 266.2 | 264 | 5.32 | 8 | PVC | 0.01 | 1,626 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3357 | Kirkland_Manholes-3139 | 191.69 | Kirkland_Manholes-769 | 165.1 | 236 | 11.27 | 8 | PVC | 0.01 | 2,367 | 2 | 4 | 7 | 0.3 | | |
| Kirkland_Main-3358 | Kirkland_Manholes-3140 | 184.54 | Kirkland_Manholes-520 | 182.65 | 320.9 | 0.59 | 8 | PVC | 0.01 | 541 | 3 | 8 | 11 | 2.1 | SM10 | |
| Kirkland_Main-3359 | Kirkland_Manholes-526 | 148.56 | Kirkland_Manholes-3141 | 141.49 | 317.3 | 2.23 | 8 | PVC | 0.01 | 1,052 | 7 | 33 | 40 | 3.8 | SM10 | |
| Kirkland_Main-3360 | Kirkland_Manholes-3141 | 141.49 | Kirkland_Manholes-3107 | 127.14 | 314.8 | 4.56 | 8 | PVC | 0.01 | 1,505 | 17 | 66 | 83 | 5.5 | SM10 | |
| Kirkland_Main-3361 | Kirkland_Manholes-495 | 169.48 | Kirkland_Manholes-3142 | 153.62 | 319.4 | 4.97 | 8 | PVC | 0.01 | 1,571 | 6 | 17 | 22 | 1.4 | SM10 | |
| Kirkland_Main-3362 | Kirkland_Manholes-3142 | 153.62 | Kirkland_Manholes-3141 | 141.49 | 269.1 | 4.51 | 8 | PVC | 0.01 | 1,497 | 9 | 25 | 33 | 2.2 | SM10 | |
| Kirkland_Main-3366 | Kirkland_Manholes-3148 | 304.94 | Kirkland_Manholes-3147 | 292.59 | 197.5 | 6.25 | 8 | PVC | 0.01 | 1,763 | 3 | 4 | 7 | 0.4 | | |
| Kirkland_Main-3367 | Kirkland_Manholes-3147 | 292.59 | Kirkland_Manholes-3146 | 290.48 | 68.4 | 3.08 | 8 | PVC | 0.01 | 1,238 | 3 | 9 | 12 | 0.9 | | |
| Kirkland_Main-3368 | Kirkland_Manholes-3146 | 290.48 | Kirkland_Manholes-3145 | 283.25 | 74.7 | 9.68 | 8 | PVC | 0.01 | 2,194 | 3 | 13 | 16 | 0.7 | | |
| Kirkland_Main-3369 | Kirkland_Manholes-3149 | 279.32 | Kirkland_Manholes-672 | 266.2 | 331.7 | 3.96 | 8 | PVC | 0.01 | 1,402 | 16 | 52 | 68 | 4.8 | | |
| Kirkland_Main-3370 | Kirkland_Manholes-2888 | 290.53 | Kirkland_Manholes-3149 | 279.32 | 39.9 | 28.13 | 8 | PVC | 0.01 | 3,739 | 9 | 21 | 31 | 0.8 | | |
| Kirkland_Main-3371 | Kirkland_Manholes-3145 | 283.25 | Kirkland_Manholes-3149 | 279.32 | 272.6 | 1.44 | 8 | PVC | 0.01 | 847 | 6 | 26 | 32 | 3.8 | | |
| Kirkland_Main-3372 | Kirkland_Manholes-1382 | 428.64 | Kirkland_Manholes-3150 | 427.16 | 302.5 | 0.49 | 8 | PVC | 0.01 | 493 | 5 | 9 | 13 | 2.7 | | |
| Kirkland_Main-3373 | Kirkland_Manholes-3150 | 427.16 | Kirkland_Manholes-1347 | 427.05 | 67.8 | 0.16 | 8 | PVC | 0.01 | 284 | 7 | 13 | 20 | 6.9 | | |
| Kirkland_Main-3375 | Kirkland_Manholes-2803 | 158.22 | Kirkland_Manholes-3151 | 154.6 | 93.3 | 3.88 | 8 | PVC | 0.01 | 1,389 | 44 | 133 | 177 | 12.8 | SM14-Ex-EX313 | |
| Kirkland_Main-3376 | Kirkland_Manholes-2609 | 193.8 | Kirkland_Manholes-3152 | 172.55 | 189.8 | 11.2 | 8 | PVC | 0.01 | 2,359 | 2 | 9 | 10 | 0.4 | | |
| Kirkland_Main-3377 | Kirkland_Manholes-3154 | 166.6 | Kirkland_Manholes-3153 | 166.34 | 271.7 | 0.1 | 8 | PVC | 0.01 | 218 | 27 | 60 | 88 | 40.1 | SM14-Ex-EX294 | |
| Kirkland_Main-3378 | Kirkland_Manholes-2629 | 172.55 | Kirkland_Manholes-3154 | 166.6 | 85 | 7 | 8 | PVC | 0.01 | 1,865 | 14 | 26 | 40 | 2.2 | SM14-Ex-EX295 | |
| Kirkland_Main-3379 | Kirkland_Manholes-3155 | 166.88 | Kirkland_Manholes-3154 | 166.6 | 37.7 | 0.74 | 8 | PVC | 0.01 | 607 | 12 | 30 | 42 | 6.9 | SM14-Ex-EX294 | |
| Kirkland_Main-3380 | Kirkland_Manholes-2637 | 187.87 | Kirkland_Manholes-3156 | 168.61 | 186.4 | 10.33 | 8 | PVC | 0.01 | 2,267 | 11 | 21 | 33 | 1.4 | SM14-Ex-EX294 | |
| Kirkland_Main-3381 | Kirkland_Manholes-3156 | 168.61 | Kirkland_Manholes-3155 | 166.88 | 387 | 0.45 | 8 | PVC | 0.01 | 471 | 11 | 26 | 37 | 7.9 | SM14-Ex-EX294 | |
| Kirkland_Main-3382 | Kirkland_Manholes-3153 | 166.34 | O-37 | 146.26 | 92.7 | 21.67 | 8 | PVC | 0.01 | 3,282 | 120 | 305 | 424 | 12.9 | SM14-Ex-EX294 | |
| Kirkland_Main-3383 | Kirkland_Manholes-3157 | 158.55 | O-36 | 147.51 | 94.1 | 11.73 | 8 | PVC | 0.01 | 2,415 | 24 | 69 | 93 | 3.8 | SM14-Ex-EX281 | |
| Kirkland_Main-3384 | Kirkland_Manholes-3158 | 172.29 | Kirkland_Manholes-3157 | 158.55 | 121.1 | 11.35 | 8 | PVC | 0.01 | 2,375 | 2 | 4 | 6 | 0.2 | SM14-Ex-EX281 | |
| Kirkland_Main-3385 | Kirkland_Manholes-2628 | 186 | Kirkland_Manholes-3159 | 168.84 | 190.6 | 9 | 8 | PVC | 0.01 | 2,115 | 20 | 56 | 76 | 3.6 | SM14-Ex-EX281 | |
| Kirkland_Main-3386 | Kirkland_Manholes-3159 | 168.84 | Kirkland_Manholes-3157 | 158.55 | 57.7 | 17.84 | 8 | PVC | 0.01 | 2,978 | 22 | 60 | 82 | 2.7 | SM14-Ex-EX281 | Drop Connection |
| Kirkland_Main-3387 | Kirkland_Manholes-2601 | 228.74 | Kirkland_Manholes-3160 | 174.95 | 323 | 16.65 | 8 | PVC | 0.01 | 2,877 | 49 | 137 | 186 | 6.5 | SM14-Ex-EX299 | |
| Kirkland_Main-3388 | Kirkland_Manholes-2796 | 185.45 | Kirkland_Manholes-3161 | 177.36 | 230.8 | 3.5 | 8 | PVC | 0.01 | 1,320 | 9 | 21 | 30 | 2.3 | SM14-Ex-EX296 | |
| Kirkland_Main-3389 | Kirkland_Manholes-2599 | 217.5 | Kirkland_Manholes-3161 | 177.36 | 310.3 | 12.94 | 8 | PVC | 0.01 | 2,536 | 6 | 17 | 23 | 0.9 | SM14-Ex-EX301 | |
| Kirkland_Main-3390 | Kirkland_Manholes-3162 | 175.71 | Kirkland_Manholes-3160 | 174.95 | 166.9 | 0.46 | 8 | PVC | 0.01 | 476 | 17 | 47 | 64 | 13.4 | SM14-Ex-EX296 | |
| Kirkland_Main-3391 | Kirkland_Manholes-3161 | 177.36 | Kirkland_Manholes-3162 | 175.71 | 336.3 | 0.49 | 8 | PVC | 0.01 | 494 | 16 | 43 | 59 | 11.9 | SM14-Ex-EX296 | |
| Kirkland_Main-3392 | Kirkland_Manholes-3160 | 174.95 | Kirkland_Manholes-3163 | 173.85 | 309.7 | 0.36 | 8 | PVC | 0.01 | 420 | 67 | 189 | 256 | 61 | SM14-Ex-EX296 | |
| Kirkland_Main-3393 | Kirkland_Manholes-3163 | 173.85 | Kirkland_Manholes-3152 | 172.55 | 286.2 | 0.45 | 8 | PVC | 0.01 | 475 | 79 | 210 | 289 | 60.9 | SM14-Ex-EX296 | |
| Kirkland_Main-3394 | Kirkland_Manholes-2600 | 217.97 | Kirkland_Manholes-3163 | 173.85 | 279.5 | 15.78 | 8 | PVC | 0.01 | 2,801 | 10 | 17 | 27 | 1 | SM14-Ex-EX298 | |
| Kirkland_Main-3395 | Kirkland_Manholes-3152 | 172.55 | Kirkland_Manholes-3164 | 171.21 | 150.7 | 0.89 | 8 | PVC | 0.01 | 665 | 82 | 223 | 305 | 45.8 | SM14-Ex-EX296 | |
| Kirkland_Main-3397 | Kirkland_Manholes-3164 | 171.21 | Kirkland_Manholes-3153 | 166.34 | 136.7 | 3.56 | 8 | PVC | 0.01 | 1,331 | 91 | 240 | 331 | 24.9 | SM14-Ex-EX296 | |
| Kirkland_Main-3398 | Kirkland_Manholes-2123 | 164.83 | Kirkland_Manholes-3165 | 156.79 | 188.1 | 4.27 | 8 | PVC | 0.01 | 1,457 | 5 | 13 | 18 | 1.2 | SM14-Ex-EX238 | |
| Kirkland_Main-3399 | Kirkland_Manholes-2493 | 157.85 | Kirkland_Manholes-3165 | 156.79 | 186.1 | 0.57 | 8 | PVC | 0.01 | 532 | 1 | 4 | 6 | 1 | SM14-Ex-EX237 | |
| Kirkland_Main-3400 | Kirkland_Manholes-3165 | 156.79 | O-34 | 148.75 | 44.4 | 18.12 | 8 | PVC | 0.01 | 3,001 | 7 | 21 | 28 | 0.9 | SM14-Ex-EX238 | |
| Kirkland_Main-3401 | Kirkland_Manholes-3151 | 154.6 | O-38 | 150 | 83 | 5.54 | 12 | PVC | 0.01 | 4,894 | 44 | 137 | 182 | 3.7 | SM14-Ex-EX313 | |
| Kirkland_Main-3402 | Kirkland_Manholes-3166 | 161.38 | Kirkland_Manholes-3167 | 157.21 | 249.9 | 1.67 | 6 | Concrete | 0.013 | 325 | 10 | 13 | 23 | 7 | | |
| Kirkland_Main-3403 | Kirkland_Manholes-3167 | 157.21 | O-30 | 156.87 | 20.3 | 1.67 | 6 | Concrete | 0.013 | 326 | 10 | 17 | 27 | 8.4 | | Drop Connection |
| Kirkland_Main-3404 | Kirkland_Manholes-2068 | 163.08 | O-43 | 162.02 | 20.5 | 5.16 | 8 | PVC | 0.01 | 1,602 | 20 | 69 | 89 | 5.5 | SM14-Ex-EX198 | |
| Kirkland_Main-3405 | Kirkland_Manholes-2069 | 170.43 | Kirkland_Manholes-3168 | 162.8 | 388.5 | 1.96 | 8 | PVC | 0.01 | 988 | 93 | 103 | 196 | 19.9 | SM14-Ex-EX199 | |
| Kirkland_Main-3406 | Kirkland_Manholes-3168 | 162.8 | O-29 | 162.02 | 22.8 | 3.42 | 8 | PVC | 0.01 | 1,305 | 95 | 107 | 203 | 15.5 | SM14-Ex-EX199 | |
| Kirkland_Main-3407 | Kirkland_Manholes-3169 | 153.32 | Kirkland_Manholes-1708 | 148.34 | 451.5 | 1.1 | 12 | PVC | 0.01 | 2,183 | 1 | 8 | 9 | 0.4 | SM14-Ex-EX197 | |
| Kirkland_Main-3408 | Kirkland_Manholes-3170 | 175.74 | O-28 | 173.9 | 72.2 | 2.55 | 8 | PVC | 0.01 | 1,125 | 0 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3409 | Kirkland_Manholes-1642 | 158.76 | O-27 | 153.59 | 147.5 | 3.5 | 12 | PVC | 0.01 | 3,891 | 395 | 1,026 | 1,421 | 36.5 | SM7 | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3410 | Kirkland_Manholes-1646 | 177.66 | O-23 | 163.59 | 79.6 | 17.67 | 8 | PVC | 0.01 | 2,963 | 0 | 4 | 5 | 0.2 | SM14-Ex-EX174 | |
| Kirkland_Main-3411 | Kirkland_Manholes-1602 | 196.74 | Kirkland_Manholes-3171 | 164.9 | 343.8 | 9.26 | 8 | PVC | 0.01 | 2,146 | 103 | 258 | 361 | 16.8 | SM14-Ex-EX172 | |
| Kirkland_Main-3412 | Kirkland_Manholes-3171 | 164.9 | O-22 | 163.59 | 29 | 4.51 | 12 | PVC | 0.01 | 4,416 | 184 | 455 | 639 | 14.5 | SM14-Ex-EX121 | |
| Kirkland_Main-3413 | Kirkland_Manholes-3172 | 165.73 | Kirkland_Manholes-3171 | 164.9 | 49.5 | 1.68 | 8 | PVC | 0.01 | 913 | 80 | 193 | 273 | 30 | SM14-Ex-EX121 | |
| Kirkland_Main-3414 | Kirkland_Manholes-1598 | 169.75 | Kirkland_Manholes-3172 | 165.73 | 259.8 | 1.55 | 8 | PVC | 0.01 | 877 | 80 | 189 | 269 | 30.7 | SM14-Ex-EX121 | |
| Kirkland_Main-3415 | Kirkland_Manholes-3173 | 155.95 | O-16 | 154.93 | 82 | 1.24 | 8 | PVC | 0.01 | 787 | 11 | 41 | 52 | 6.6 | | |
| Kirkland_Main-3416 | Kirkland_Manholes-1274 | 175.64 | Kirkland_Manholes-3173 | 155.95 | 196.1 | 10.04 | 8 | PVC | 0.01 | 2,234 | 10 | 33 | 43 | 1.9 | | |
| Kirkland_Main-3417 | Kirkland_Manholes-458 | 212.1 | O-14 | 173.22 | 270.2 | 14.39 | 8 | PVC | 0.01 | 2,674 | 45 | 133 | 178 | 6.6 | SM14-Ex-EX67 | |
| Kirkland_Main-3418 | Kirkland_Manholes-3174 | 172.82 | O-13 | 166.72 | 27.1 | 22.51 | 8 | PVC | 0.01 | 3,345 | 4 | 21 | 25 | 0.8 | | |
| Kirkland_Main-3419 | Kirkland_Manholes-472 | 192.62 | Kirkland_Manholes-3174 | 172.82 | 71.3 | 27.75 | 8 | PVC | 0.01 | 3,714 | 4 | 17 | 21 | 0.6 | | |
| Kirkland_Main-3420 | Kirkland_Manholes-466 | 159.47 | O-12 | 159.29 | 18.7 | 0.96 | 8 | PVC | 0.01 | 691 | 19 | 60 | 79 | 11.5 | SM14-Ex-EX45 | |
| Kirkland_Main-3421 | Kirkland_Manholes-786 | 173.41 | O-11 | 153.37 | 102.1 | 19.63 | 8 | PVC | 0.01 | 3,124 | 94 | 318 | 412 | 13.2 | | |
| Kirkland_Main-3422 | Kirkland_Manholes-3175 | 156.47 | Kirkland_Manholes-1105 | 155.49 | 245.4 | 0.4 | 12 | PVC | 0.01 | 1,315 | 151 | 295 | 445 | 33.9 | SM14-2021-DF3 | |
| Kirkland_Main-3424 | Kirkland_Manholes-3176 | 350.9 | Kirkland_Manholes-2993 | 335.98 | 232.3 | 6.42 | 8 | PVC | 0.01 | 1,787 | 2 | 4 | 7 | 0.4 | | |
| Kirkland_Main-3425 | Kirkland_Manholes-3183 | 400.11 | Kirkland_Manholes-3182 | 398.7 | 286.4 | 0.49 | 8 | PVC | 0.01 | 495 | 0 | 4 | 5 | 0.9 | | |
| Kirkland_Main-3426 | Kirkland_Manholes-3182 | 398.7 | Kirkland_Manholes-3181 | 397.83 | 157.2 | 0.55 | 8 | PVC | 0.01 | 525 | 1 | 9 | 9 | 1.8 | | |
| Kirkland_Main-3427 | Kirkland_Manholes-3181 | 397.83 | Kirkland_Manholes-3180 | 396.32 | 304.9 | 0.5 | 8 | PVC | 0.01 | 496 | 1 | 13 | 14 | 2.9 | | |
| Kirkland_Main-3428 | Kirkland_Manholes-3177 | 399.25 | Kirkland_Manholes-3178 | 398.25 | 237 | 0.42 | 8 | PVC | 0.01 | 458 | 1 | 9 | 9 | 2 | | |
| Kirkland_Main-3429 | Kirkland_Manholes-3178 | 398.25 | Kirkland_Manholes-3179 | 397.18 | 174.5 | 0.61 | 8 | PVC | 0.01 | 552 | 1 | 13 | 14 | 2.5 | | |
| Kirkland_Main-3430 | Kirkland_Manholes-3179 | 397.18 | Kirkland_Manholes-3180 | 396.32 | 145.5 | 0.59 | 8 | PVC | 0.01 | 542 | 1 | 17 | 18 | 3.4 | | |
| Kirkland_Main-3431 | Kirkland_Manholes-3180 | 396.32 | Kirkland_Manholes-3186 | 394.01 | 374.3 | 0.62 | 8 | PVC | 0.01 | 554 | 3 | 34 | 38 | 6.8 | SM14-Ex-EX207 | |
| Kirkland_Main-3432 | Kirkland_Manholes-3186 | 394.01 | Kirkland_Manholes-3187 | 393.39 | 93.6 | 0.66 | 8 | PVC | 0.01 | 574 | 4 | 39 | 43 | 7.4 | SM14-Ex-EX207 | |
| Kirkland_Main-3433 | Kirkland_Manholes-3187 | 393.39 | Kirkland_Manholes-3188 | 392.16 | 246.3 | 0.5 | 8 | PVC | 0.01 | 498 | 4 | 43 | 47 | 9.5 | | |
| Kirkland_Main-3434 | Kirkland_Manholes-3185 | 403.06 | Kirkland_Manholes-3184 | 397.63 | 317.3 | 1.71 | 8 | PVC | 0.01 | 922 | 0 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3435 | Kirkland_Manholes-3184 | 397.63 | Kirkland_Manholes-3189 | 393.42 | 318.2 | 1.32 | 8 | PVC | 0.01 | 811 | 38 | 9 | 46 | 5.7 | | |
| Kirkland_Main-3436 | Kirkland_Manholes-3189 | 393.42 | Kirkland_Manholes-3188 | 392.16 | 76.3 | 1.65 | 8 | PVC | 0.01 | 906 | 38 | 17 | 55 | 6.1 | | |
| Kirkland_Main-3437 | Kirkland_Manholes-3188 | 392.16 | Kirkland_Manholes-1929 | 374.67 | 305.2 | 5.73 | 8 | PVC | 0.01 | 1,688 | 43 | 64 | 107 | 6.3 | | |
| Kirkland_Main-3438 | Kirkland_Manholes-3192 | 307.27 | Kirkland_Manholes-3191 | 306.22 | 126.1 | 0.84 | 8 | PVC | 0.01 | 644 | 2 | 4 | 6 | 1 | | |
| Kirkland_Main-3439 | Kirkland_Manholes-3191 | 306.22 | Kirkland_Manholes-2894 | 306.1 | 28.9 | 0.4 | 8 | PVC | 0.01 | 446 | 4 | 13 | 17 | 3.8 | | |
| Kirkland_Main-3440 | Kirkland_Manholes-3190 | 323.62 | Kirkland_Manholes-3191 | 306.22 | 169.1 | 10.29 | 8 | PVC | 0.01 | 2,262 | 2 | 4 | 6 | 0.3 | | |
| Kirkland_Main-3441 | Kirkland_Manholes-620 | 55.37 | Kirkland_Manholes-3193 | 49.78 | 279.6 | 2 | 8 | PVC | 0.01 | 997 | 1 | 8 | 9 | 0.9 | | |
| Kirkland_Main-3442 | Kirkland_Manholes-3193 | 49.78 | Kirkland_Manholes-619 | 48.43 | 193 | 0.7 | 8 | PVC | 0.01 | 590 | 2 | 17 | 18 | 3.1 | | |
| Kirkland_Main-3443 | Kirkland_Manholes-1685 | 57.24 | Kirkland_Manholes-731 | 53.54 | 120.6 | 3.07 | 12 | PVC | 0.01 | 3,640 | 136 | 458 | 594 | 16.3 | SM5 | |
| Kirkland_Main-3444 | Kirkland_Manholes-1852 | 284.97 | Kirkland_Manholes-3145 | 283.25 | 105.1 | 1.64 | 8 | PVC | 0.01 | 902 | 2 | 9 | 10 | 1.2 | | |
| Kirkland_Main-3445 | Kirkland_Manholes-2130 | 161.57 | O-31 | 156.67 | 31.5 | 15.55 | 8 | PVC | 0.01 | 2,780 | 25 | 26 | 51 | 1.8 | SM14-Ex-EX235 | |
| Kirkland_Main-3446 | Kirkland_Manholes-3195 | 259.3 | Kirkland_Manholes-682 | 258.64 | 178.4 | 0.37 | 8 | PVC | 0.01 | 429 | 2 | 13 | 15 | 3.5 | | |
| Kirkland_Main-3447 | Kirkland_Manholes-686 | 272.79 | Kirkland_Manholes-3195 | 262.73 | 170.3 | 5.91 | 8 | PVC | 0.01 | 1,714 | 1 | 4 | 5 | 0.3 | | Drop Connection |
| Kirkland_Main-3448 | Kirkland_Manholes-3194 | 260.3 | Kirkland_Manholes-3195 | 259.3 | 92.2 | 1.08 | 8 | PVC | 0.01 | 733 | 1 | 4 | 5 | 0.7 | | |
| Kirkland_Main-3450 | Kirkland_Manholes-3198 | 69.13 | Kirkland_Manholes-2805 | 68.41 | 178.9 | 0.4 | 8 | PVC | 0.01 | 446 | 5 | 25 | 29 | 6.6 | | |
| Kirkland_Main-3451 | Kirkland_Manholes-3197 | 131.57 | Kirkland_Manholes-3196 | 122.5 | 306.9 | 2.96 | 8 | PVC | 0.01 | 1,212 | 2 | 8 | 11 | 0.9 | SM10 | |
| Kirkland_Main-3453 | Kirkland_Manholes-2804 | 82.15 | Kirkland_Manholes-3198 | 69.13 | 175.8 | 7.41 | 8 | PVC | 0.01 | 1,919 | 1 | 6 | 7 | 0.4 | | |
| Kirkland_Main-3454 | Kirkland_Manholes-3200 | 88.54 | Kirkland_Manholes-3199 | 84.4 | 128.7 | 3.22 | 8 | PVC | 0.01 | 1,264 | 1 | 6 | 7 | 0.6 | | |
| Kirkland_Main-3455 | Kirkland_Manholes-3199 | 84.4 | Kirkland_Manholes-3198 | 69.13 | 210.2 | 7.27 | 8 | PVC | 0.01 | 1,900 | 2 | 12 | 15 | 0.8 | | |
| Kirkland_Main-3456 | Kirkland_Manholes-2778 | 255.64 | Kirkland_Manholes-3201 | 243.59 | 148 | 8.14 | 8 | PVC | 0.01 | 2,012 | 22 | 16 | 38 | 1.9 | | |
| Kirkland_Main-3457 | Kirkland_Manholes-3201 | 243.59 | Kirkland_Manholes-2802 | 238.36 | 22.3 | 23.44 | 8 | PVC | 0.01 | 3,414 | 22 | 19 | 41 | 1.2 | | |
| Kirkland_Main-3458 | Kirkland_Manholes-2641 | 88.89 | Kirkland_Manholes-3202 | 66.61 | 82.1 | 27.14 | 8 | PVC | 0.01 | 3,673 | 10 | 25 | 35 | 1 | | |
| Kirkland_Main-3459 | Kirkland_Manholes-3202 | 66.61 | Kirkland_Manholes-3203 | 49.55 | 127.5 | 13.38 | 8 | PVC | 0.01 | 2,579 | 12 | 31 | 43 | 1.7 | | |
| Kirkland_Main-3461 | Kirkland_Manholes-3204 | 163.55 | Kirkland_Manholes-2130 | 161.57 | 74.1 | 2.67 | 8 | PVC | 0.01 | 1,153 | 1 | 4 | 5 | 0.5 | | |
| Kirkland_Main-3462 | Kirkland_Manholes-3205 | 293.32 | Kirkland_Manholes-1852 | 284.97 | 245.2 | 3.41 | 8 | PVC | 0.01 | 1,301 | 1 | 4 | 5 | 0.4 | | |
| Kirkland_Main-3463 | Kirkland_Manholes-3206 | 505.9 | Kirkland_Manholes-3207 | 502.85 | 330.6 | 0.92 | 8 | PVC | 0.01 | 677 | 3 | 4 | 7 | 1 | | |
| Kirkland_Main-3464 | Kirkland_Manholes-3207 | 502.85 | Kirkland_Manholes-3208 | 497.69 | 398.8 | 1.29 | 8 | PVC | 0.01 | 802 | 6 | 9 | 14 | 1.8 | | |
| Kirkland_Main-3465 | Kirkland_Manholes-3208 | 497.69 | Kirkland_Manholes-3209 | 497.22 | 90.8 | 0.52 | 8 | PVC | 0.01 | 507 | 7 | 13 | 20 | 3.9 | | |
| Kirkland_Main-3466 | Kirkland_Manholes-3209 | 497.22 | Kirkland_Manholes-3210 | 496.11 | 223.1 | 0.5 | 8 | PVC | 0.01 | 497 | 7 | 17 | 24 | 4.9 | | |
| Kirkland_Main-3467 | Kirkland_Manholes-3210 | 496.11 | Kirkland_Manholes-1494 | 496.1 | 92 | 0.01 | 8 | PVC | 0.01 | 74 | 8 | 21 | 30 | 40.2 | | |
| Kirkland_Main-3468 | Kirkland_Manholes-3212 | 420.94 | Kirkland_Manholes-3213 | 419.82 | 168.4 | 0.66 | 8 | PVC | 0.01 | 575 | 1 | 4 | 5 | 0.9 | | |
| Kirkland_Main-3469 | Kirkland_Manholes-3213 | 419.82 | Kirkland_Manholes-3214 | 418.95 | 128.5 | 0.68 | 8 | PVC | 0.01 | 580 | 2 | 9 | 10 | 1.8 | | |
| Kirkland_Main-3470 | Kirkland_Manholes-3211 | 420.5 | Kirkland_Manholes-3214 | 418.95 | 223.1 | 0.69 | 8 | PVC | 0.01 | 588 | 1 | 4 | 6 | 0.9 | | |
| Kirkland_Main-3471 | Kirkland_Manholes-3214 | 418.95 | Kirkland_Manholes-3215 | 418.25 | 213.6 | 0.33 | 8 | PVC | 0.01 | 404 | 3 | 17 | 20 | 5 | | |
| Kirkland_Main-3472 | Kirkland_Manholes-3215 | 418.25 | Kirkland_Manholes-3216 | 416.2 | 334.1 | 0.61 | 8 | PVC | 0.01 | 552 | 3 | 22 | 25 | 4.5 | | |
| Kirkland_Main-3473 | Kirkland_Manholes-3216 | 416.2 | Kirkland_Manholes-3217 | 414.96 | 329.2 | 0.38 | 8 | PVC | 0.01 | 433 | 4 | 26 | 30 | 6.9 | | |
| Kirkland_Main-3474 | Kirkland_Manholes-3217 | 414.96 | Kirkland_Manholes-3218 | 412.9 | 114.1 | 1.81 | 8 | PVC | 0.01 | 947 | 5 | 31 | 35 | 3.7 | | |
| Kirkland_Main-3475 | Kirkland_Manholes-3218 | 412.9 | Kirkland_Manholes-2906 | 405.37 | 172.8 | 4.36 | 8 | PVC | 0.01 | 1,472 | 5 | 35 | 40 | 2.7 | | |

2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pipe Capacity Table

| Label | Upstream Node | Upstream Invert Elevation (ft) | Downstream Node | Downstream Invert Elevation (ft) | Length (ft) | Slope (%) | Diameter (in) | Material | Manning's n | Design Capacity (gpm) | Domestic Flow (gpm) | I/I Flow (gpm) | Total Flow (gpm) | Percent Full (%) | CIP No. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kirkland_Main-3476 | Kirkland_Manholes-718 | 150.12 | Kirkland_Manholes-3219 | 149.17 | 95.4 | 1 | 12 | PVC | 0.01 | 2,074 | 333 | 88 | 421 | 20.3 | SM14-2035-DF5 | |
| Kirkland_Main-3477 | Kirkland_Manholes-3219 | 149.17 | Kirkland_Manholes-3220 | 148.71 | 120.2 | 0.38 | 12 | PVC | 0.01 | 1,286 | 335 | 95 | 430 | 33.4 | SM14-2021-DF2 | |
| Kirkland_Main-3478 | Kirkland_Manholes-3220 | 148.71 | Kirkland_Manholes-719 | 148.45 | 82.3 | 0.32 | 12 | PVC | 0.01 | 1,168 | 338 | 101 | 438 | 37.5 | SM14-2021-DF2 | |
| Kirkland_Main-3479 | Kirkland_Manholes-3221 | 407.29 | Kirkland_Manholes-3222 | 405.15 | 69.7 | 3.07 | 8 | PVC | 0.01 | 1,235 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3480 | Kirkland_Manholes-3222 | 405.15 | Kirkland_Manholes-1363 | 403.55 | 104.8 | 1.53 | 8 | PVC | 0.01 | 871 | 3 | 9 | 12 | 1.4 | | |
| Kirkland_Main-3481 | Kirkland_Manholes-3223 | 405.2 | Kirkland_Manholes-3224 | 400.94 | 146.9 | 2.9 | 8 | PVC | 0.01 | 1,201 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3482 | Kirkland_Manholes-3225 | 409.6 | Kirkland_Manholes-3224 | 400.94 | 369 | 2.35 | 8 | PVC | 0.01 | 1,080 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3483 | Kirkland_Manholes-3224 | 400.94 | Kirkland_Manholes-3226 | 396.71 | 176 | 2.4 | 8 | PVC | 0.01 | 1,093 | 4 | 13 | 17 | 1.5 | | |
| Kirkland_Main-3484 | Kirkland_Manholes-3226 | 396.71 | Kirkland_Manholes-2992 | 396.35 | 10.8 | 3.34 | 8 | PVC | 0.01 | 1,289 | 4 | 17 | 21 | 1.6 | | |
| Kirkland_Main-3485 | Kirkland_Manholes-3227 | 308.86 | Kirkland_Manholes-3228 | 299.55 | 189.6 | 4.91 | 8 | PVC | 0.01 | 1,562 | 1 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3486 | Kirkland_Manholes-3228 | 299.55 | Kirkland_Manholes-3229 | 296.76 | 44.7 | 6.24 | 8 | PVC | 0.01 | 1,761 | 1 | 9 | 10 | 0.6 | | |
| Kirkland_Main-3487 | Kirkland_Manholes-3229 | 296.76 | Kirkland_Manholes-2901 | 294.77 | 63.1 | 3.16 | 8 | PVC | 0.01 | 1,252 | 2 | 13 | 14 | 1.2 | | |
| Kirkland_Main-3488 | Kirkland_Manholes-3230 | 157.83 | Kirkland_Manholes-3231 | 156.85 | 192.6 | 0.51 | 8 | PVC | 0.01 | 503 | 3 | 6 | 9 | 1.8 | | |
| Kirkland_Main-3489 | Kirkland_Manholes-3231 | 156.85 | Kirkland_Manholes-3232 | 156.12 | 91 | 0.8 | 8 | PVC | 0.01 | 632 | 13 | 13 | 26 | 4.1 | | |
| Kirkland_Main-3490 | Kirkland_Manholes-3232 | 156.12 | Kirkland_Manholes-716 | 152.58 | 36.4 | 9.73 | 8 | PVC | 0.01 | 2,199 | 16 | 19 | 35 | 1.6 | | |
| Kirkland_Main-3492 | Kirkland_Manholes-3233 | 197.29 | Kirkland_Manholes-1117 | 196.58 | 41.1 | 1.73 | 15 | PVC | 0.01 | 4,957 | 19 | 4 | 23 | 0.5 | | |
| Kirkland_Main-3493 | Kirkland_Manholes-3235 | 436.7 | Kirkland_Manholes-2008 | 435.7 | 179.8 | 0.56 | 8 | PVC | 0.01 | 526 | 4 | 9 | 12 | 2.4 | | |
| Kirkland_Main-3494 | Kirkland_Manholes-3234 | 236.42 | Kirkland_Manholes-1249 | 223.25 | 243.5 | 5.41 | 8 | PVC | 0.01 | 1,640 | 24 | 91 | 115 | 7 | SM14-Ex-EX65 | |
| Kirkland_Main-3495 | Kirkland_Manholes-1247 | 236.99 | Kirkland_Manholes-3234 | 236.42 | 76.3 | 0.75 | 8 | PVC | 0.01 | 609 | 20 | 74 | 95 | 15.6 | SM14-Ex-EX65 | |
| Kirkland_Main-3496 | Kirkland_Manholes-3237 | 442.96 | Kirkland_Manholes-3235 | 436.7 | 126.7 | 4.94 | 8 | PVC | 0.01 | 1,567 | 2 | 4 | 6 | 0.4 | | |
| Kirkland_Main-3497 | Kirkland_Manholes-3242 | 314.11 | Kirkland_Manholes-3243 | 305.45 | 217.3 | 3.98 | 8 | PVC | 0.01 | 1,407 | 0 | 4 | 5 | 0.3 | | |
| Kirkland_Main-3498 | Kirkland_Manholes-3243 | 305.45 | Kirkland_Manholes-2372 | 304.48 | 24.4 | 3.99 | 8 | PVC | 0.01 | 1,408 | 1 | 9 | 9 | 0.7 | | |
| Kirkland_Main-3499 | Kirkland_Manholes-3241 | 300.47 | Kirkland_Manholes-3240 | 289.24 | 289.6 | 3.88 | 8 | PVC | 0.01 | 1,388 | 2 | 4 | 6 | 0.5 | | |
| Kirkland_Main-3500 | Kirkland_Manholes-3240 | 289.24 | Kirkland_Manholes-3239 | 288.78 | 114.9 | 0.4 | 8 | PVC | 0.01 | 446 | 2 | 9 | 11 | 2.5 | | |
| Kirkland_Main-3501 | Kirkland_Manholes-3239 | 288.78 | Kirkland_Manholes-3238 | 285.43 | 95.5 | 3.51 | 8 | PVC | 0.01 | 1,321 | 3 | 13 | 16 | 1.2 | | |
| Kirkland_Main-3502 | Kirkland_Manholes-263 | 292.03 | Kirkland_Manholes-3238 | 285.43 | 114.2 | 5.78 | 8 | PVC | 0.01 | 1,695 | 41 | 107 | 148 | 8.7 | SM14-Ex-EX252 | |
| Kirkland_Main-3503 | Kirkland_Manholes-3238 | 285.43 | Kirkland_Manholes-2327 | 280.44 | 83.6 | 5.97 | 8 | PVC | 0.01 | 1,722 | 45 | 124 | 169 | 9.8 | SM14-Ex-EX252 | |
| Kirkland_Main-3505 | Kirkland_Manholes-3236 | 241.89 | Kirkland_Manholes-3234 | 236.42 | 154.2 | 3.55 | 8 | PVC | 0.01 | 1,328 | 2 | 8 | 11 | 0.8 | | |
| Kirkland_Main-3506 | Kirkland_Manholes-2486 | 152.49 | O-35 | 152.05 | 116.8 | 0.38 | 8 | PVC | 0.01 | 433 | 54 | 137 | 191 | 44.2 | SM14-Ex-EX239 | |
| Other_System_Main-6 | MH-320 | 399.28 | Kirkland_Manholes-3177 | 399.25 | 69.1 | 0.04 | 6 | PVC | 0.01 | 64 | 0 | 4 | 5 | 7.2 | | |
| Other_System_Main-7 | MH-317 | 393.56 | Kirkland_Manholes-3189 | 393.42 | 34.5 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 5 | 1 | | |
| Other_System_Main-8 | MH-326 | 162.67 | MH-323 | 161.73 | 233.9 | 0.4 | 8 | PVC | 0.01 | 446 | 0 | 4 | 5 | 1 | | |
| Other_System_Main-9 | MH-323 | 161.73 | Kirkland_Manholes-3166 | 161.38 | 88.4 | 0.4 | 6 | PVC | 0.01 | 207 | 9 | 9 | 18 | 8.7 | | |
| SS_Main_Selection_06-13-2016-1 | MH 05-714 | 24.7 | MH_Selection_06-13-2016-2 | 24.58 | 51.6 | 0.23 | 30 | Ductile Iron | 0.012 | 9,616 | 1,562 | 3,474 | 6,787 | 70.6 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-11 | MH_Selection_06-13-2016-4 | 21.4 | MH_Selection_06-13-2016-10 | 20.85 | 62.6 | 0.88 | 48 | Concrete | 0.013 | 60,432 | 1,938 | 4,093 | 7,782 | 12.9 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-12 | MH_Selection_06-13-2016-10 | 20.85 | MH_Selection_06-13-2016-11 | 20.7 | 78.4 | 0.19 | 48 | Concrete | 0.013 | 28,192 | 1,938 | 4,093 | 7,782 | 27.6 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-2 | MH_Selection_06-13-2016-3 | 22.2 | MH_Selection_06-13-2016-4 | 21.4 | 166.2 | 0.48 | 48 | Concrete | 0.013 | 44,726 | 1,562 | 3,474 | 6,787 | 15.2 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-3 | MH_Selection_06-13-2016-2 | 24.22 | MH_Selection_06-13-2016-6 | 24.16 | 7.3 | 0.82 | 30 | Ductile Iron | 0.012 | 18,021 | 1,562 | 3,474 | 6,787 | 37.7 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-4 | MH_Selection_06-13-2016-6 | 24.16 | MH_Selection_06-13-2016-7 | 23.6 | 28.1 | 1.99 | 30 | Ductile Iron | 0.012 | 28,152 | 1,562 | 3,474 | 6,787 | 24.1 | SM9 | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-5 | MH_Selection_06-13-2016-7 | 23.5 | MH_Selection_06-13-2016-8 | 22.81 | 32.8 | 2.11 | 48 | Concrete | 0.013 | 93,567 | 1,562 | 3,474 | 6,787 | 7.3 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-6 | MH_Selection_06-13-2016-8 | 22.81 | MH_Selection_06-13-2016-9 | 22.44 | 14.9 | 2.49 | 48 | Concrete | 0.013 | 101,749 | 1,562 | 3,474 | 6,787 | 6.7 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-7 | MH_Selection_06-13-2016-9 | 22.44 | MH_Selection_06-13-2016-3 | 22.2 | 69.4 | 0.35 | 48 | Concrete | 0.013 | 37,907 | 1,562 | 3,474 | 6,787 | 17.9 | | Updated per as-built drawings |
| SS_Main_Selection_06-13-2016-9 | MH_Selection_06-13-2016-5 | 24.55 | MH_Selection_06-13-2016-11 | 23.6 | 12.8 | 7.44 | 12 | PVC | 0.013 | 4,360.77 | 184.51 | 140.349 | 324.857 | 7.4 | | Updated per as-built drawings |

## 2035 (20-year) with Proposed Improvements - Peak Hour Flow - Pump Table

| Label | Status | Pump Definition | Pumped Flow (gpm) | Pump Head (ft) | Notes |
|---|---|---|---|---|---|
| PLAZA_PUMP | On | LAKE PLAZA-Prop 1,400gpm | 1,400 | 48.2 | |
| ROSEPT_PUMP | On | ROSE PT LANE | 301 | 65.8 | |
| SOUTHBAY_PUMP | On | SOUTH BAY | 180 | 190.0 | |
| TREND_PUMP | On | TREND | 176 | 25.0 | |
| WAVERLY_PUMP | On | WAVERLY PARK-Prop 350gpm | 350 | 116.1 | |
| YARROWBAYII_PUMP | On | YARROW POINT | 72 | 45.8 | |

## 2035 (20-year) with Proposed Improvements - Peak Hour Flow - Wet Well Table

| Label | Ground Elevation (ft) | Maximum Elevation (ft) | Initial Elevation (ft) | Minimum Elevation (ft) | Base Elevation (ft) | Flow In (gpm) | Flow Out (gpm) | Net Flow In (gpm) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| PLAZA_WW | 21.95 | 10 | 6.5 | 2 | 0 | 1,392 | 1,400 | -8 | |
| ROSEPT_WETWELL | 28.91 | 28 | 12 | 11 | 10 | 152 | 301 | -149 | |
| SOUTHBAY_WETWELL | 42.96 | 26.5 | 25 | 24 | 22 | 47 | 180 | -133 | |
| TREND_WETWELL | 340.3 | 330 | 330 | 321.5 | 317.75 | 109 | 176 | -67 | |
| WAVERLY_WETWELL | 27 | 10 | 2 | 1 | 0 | 331 | 350 | -19 | |
| YARROW POINT_WETWELL | 32.18 | 20 | 8 | 6 | 6 | 60 | 72 | -12 | |

# APPENDIX H

## List of Known Industrial Wastewater Producers and Authorization Letters and Permits

**THIS PAGE INTENTIONALLY LEFT BLANK**

| Name | Investigator | Sewer Provider | Customer Type | Address | City | Zip Code | Permit # | Effective Date | Expiration Date | Permit Type | Period of Wastewater Production | Permitted Discharge Flow Limits | Permitted Discharge Quality Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84th Rose Terrace LLC Construction Project | Despina Strong | City of Kirkland | Construction Dewatering | 12802 NE 84th Street | Kirkland | 98003 | 40055-01 | 24-Oct-16 | 23-Oct-18 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |
| Absolute GM LLC | Todd Growing | City of Kirkland | General Type | 11809 NE 116th Street | Kirkland | 98034 | 400314-01 | 27-Jun-16 | | No Control Document Required | No Control Document Required | | |
| AquaTactics LLC (aka Aqua Life Veterinary Services LLC) | Peggy Rice | Northshore Utility District | Laboratory | 12015 115th Avenue NE, Suite 120 | Kirkland | 98034 | 400292-01 | 07-Mar-16 | | No Control Document Required | Not in City's Sewer Service Area | | |
| Astronics AES Corporation | Dave Haberman | City of Kirkland | Manufacturing - Misc. | 12950 Willows Road NE | Kirkland | 98034 | 400160-01 | 14-Aug-14 | | No Control Document Required | No Control Document Required | | |
| Big Mountain Express Enterprises - Hultquist Homes - Ridge at Finn Hill | Lydia Eng | Northshore Utility District | Construction Dewatering | NE 145th Street and 81st Avenue NE | Kirkland | 98034 | 11782-01 | 03-Aug-17 | 03-Nov-17 | Letter of Authorization | Not in City's Sewer Service Area | | |
| DTSJ Holdings, LLC - Chick-fil-A Construction Project | Despina Strong | City of Kirkland | Construction Dewatering | 12026 NE 124th Street | Kirkland | 98034 | 40091-01 | 02-Feb-17 | 01-Feb-19 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |
| Dibble Engineers - Market Street Construction Project | Ryan Salem | City of Kirkland | Construction Dewatering | 1029 Market Street | Kirkland | 98033 | 11778-01 | 17-Jul-17 | 16-Jul-19 | Letter of Authorization | Temporary (Contstruction) | Max. Instantaneous = 100 gpm<br>Max. Daily = 18,000 gpd | See Page 1 of Letter |
| Dynamic Harvest | Peggy Rice | City of Kirkland | Cannabis Grower | 13513 NE 126th Place, Suite B | Kirkland | 98034 | 400304-01 | 11-May-16 | | No Control Document Required | No Control Document Required | | |
| East West Quality Home LLC Construction Project | Despina Strong | Northshore Utility District | Construction Dewatering | 11610 80th Avenue NE | Kirkland | 98033 | 40066-01 | 08-Nov-16 | 07-Nov-18 | GLA-Construction | Not in City's Sewer Service Area | | |
| Eastside Preparatory School - Schuchart Corporation - TALI Hall Construction Project | Despina Strong | City of Kirkland | Construction Dewatering | 10613 NE 38th Place | Kirkland | 98033 | 40114-01 | 31-Jul-17 | 30-Jul-19 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |
| Eastside Subaru - Kirkland Automotive Holdings | Peggy Rice | City of Kirkland | Wash Pad | 11803 Northeast 116th Street | Kirkland | 98034 | 400342-01 | 10-Nov-16 | | No Control Document Required | No Control Document Required | | |
| Evergreen Health | Lydia Eng | Northshore Utility District | Hospital | 12040 NE 128th Street | Kirkland | 98034 | 703-04 | 02-Aug-17 | 01-Aug-22 | Minor Discharge Authorization | Not in City's Sewer Service Area | | |
| Float Rubicon | Peggy Rice | City of Kirkland | General Type | 9715 NE 119th Way | Kirkland | 98034 | 101152-01 | 10-Mar-17 | | No Control Document Required | No Control Document Required | | |
| Fractal LLC | Ryan Salem | City of Kirkland | General Type | 13625 NE 126th Place, Suite 400 | Kirkland | 98034 | 400299-01 | 06-Apr-16 | | No Control Document Required | No Control Document Required | | |
| Havlik's Radiator Service Inc. | Ryan Salem | City of Kirkland | Radiator Repair | 11851 124th Avenue NE | Kirkland | 98034 | 11699-01 | 01-Jun-16 | 31-May-21 | Letter of Authorization | Long-term | Max. Daily = 300 gpd | See Pages 1 through 2 of Letter |
| Hy Kitchen Cabinet & Stone Inc. | Dave Haberman | City of Kirkland | General Type | 11251 120th Avenue NE, Suite 146 | Kirkland | 98033 | 400049-01 | 03-Jul-13 | | No Control Document Required | No Control Document Required | | |
| King County SWD - Houghton Transfer Station | Ryan Salem | City of Kirkland | Solid Waste - Transfer Facility | 11724 NE 60th Street | Kirkland | 98033 | 4423-01 | 01-Aug-17 | 31-Jul-22 | Major Discharge Authorization | Long-term | Max. Daily = 78,000 gpd<br>Max. Month Average = 25,000 gpd | See Pages 6 through 8 of Permit |
| Kirkland Main Street, LP - Park Lane Mixed-Use Apartments Construction Project | Despina Strong | City of Kirkland | Construction Dewatering | 207 Park Lane | Kirkland | 98033 | 40032-01 | 29-Jul-16 | 28-Jul-18 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |
| Kirkland, City of - Lake Washington Blvd. Crossing Enhancement Construction Project | Despina Strong | City of Kirkland | Construction Dewatering | 3781 Lake Washington Blvd | Kirkland | 98033 | 40016-01 | 15-Apr-16 | 14-Apr-18 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |
| Kirkland, City of - Storm/Sewer Decant Station | Todd Growing | City of Kirkland | Decant Station | 904 8th Street | Kirkland | 98033-6189 | 4131-03 | 28-Aug-17 | 27-Aug-22 | Major Discharge Authorization | Long-term | Max. Daily at Final MH Catch Basin = 13,000 gpd<br>Max. Daily at Vault 3 = 1,500 gpd | See Pages 5 through 7 of Permit |
| Maelstrom Brewing LLC | Ryan Salem | City of Kirkland | Food Processing - Brewery | 11014 120th Avenue NE | Kirkland | 98033 | 400378-01 | 25-Jul-17 | | No Control Document Required | No Control Document Required | | |
| Overlake Oil Inc. | Lydia Eng | City of Kirkland | Fueling Facility | 1021 Eighth Street | Kirkland | 98033 | 400315-01 | 12-Jul-16 | | No Control Document Required | No Control Document Required | | |
| PPN Ventures LP - Cubes Self Storage | Despina Strong | City of Kirkland | Construction Dewatering | 615 Seventh Avenue | Kirkland | 98033 | 40056-01 | 25-Oct-16 | 24-Oct-18 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |
| Pillar Properties - 11 Main Street South Footing Drains | Peggy Rice | Northshore Utility District | Groundwater Remediation | 11 Main Street South | Kirkland | 98033 | 4414-01 | 20-Mar-17 | 19-Mar-22 | Major Discharge Authorization | Not in City's Sewer Service Area | | |
| Puget Sound Developers Services | Dana Heinz | City of Kirkland | General Type | 733 126th Avenue NE | Kirkland | 98033 | 400045-01 | 28-May-13 | | No Control Document Required | No Control Document Required | | |
| Quality Finishing | Dana Heinz | Northshore Utility District | Metal Finishing - CFR 433 | 12704 NE 124th Street, Suite 42 | Kirkland | 98034 | 9708-02 | 05-Feb-15 | 04-Feb-20 | Zero Discharge (Categorical) | Not in City's Sewer Service Area | | |
| Silicon Designs Inc. - Kirkland | Ryan Salem | Northshore Utility District | Electronic Components | 13905 NE 128th Street | Kirkland | 98034 | 7914-01 | 15-Apr-15 | 30-Jun-18 | Permit | Not in City's Sewer Service Area | | |
| Toll Brothers Inc. - Kirkland Compound Construction Project | Ryan Salem | City of Kirkland | Construction Dewatering | 11808 NE 70th Street | Kirkland | 98033 | 11732-01 | 15-Nov-16 | 14-Nov-18 | Letter of Authorization | Temporary (Contstruction) | Max. Instantaneous = 50 gpm<br>Max. Daily = 25,000 gpd | See Page 1 of Letter |
| Village at Totem Lake - Bldg. D | Greg Newborn | Northshore Utility District | General Type | 12632 Totem Lake Blvd | Kirkland | 98034 | 400385-01 | 20-Sep-17 | | No Control Document Required | Not in City's Sewer Service Area | | |
| Village at Totem Lake, LLC | Greg Newborn | Northshore Utility District | General Type | 12660 Totem Lake Blvd | Kirkland | 98034 | 400334-01 | 21-Sep-16 | | No Control Document Required | Not in City's Sewer Service Area | | |
| Western Pneumatic Tube Company LLC | Dave Haberman | City of Kirkland | Metal Finishing - CFR 433 | 835 Sixth Street S | Kirkland | 98033 | 7604-05 | 31-Dec-15 | 30-Dec-20 | Permit | Long-term | Max. Daily at Discharge Pipe = 7,980 gpd<br>Max. Daily at Spigot on Silver Recovery Unit = 20 gpd | See Pages 7 through 8 of Permit |
| Windward Wendy LLC Construction Project | Despina Strong | City of Kirkland | Construction Dewatering | 301 Fourth Avenue | Kirkland | 98033 | 40131-01 | 01-Oct-17 | 30-Sep-19 | GLA-Construction | Temporary (Contstruction) | Max. Instantaneous = 200 gpm<br>Max. Daily = 25,000 gpd | See Page 2 of Letter |

**King County**
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

October 20, 2016

Wei Zhang
84th Rose Terrace LLC
1800 136th Place NE, Suite 100
Bellevue, WA 98005

General Letter of Authorization – Construction: # 40055-01 for 84th Rose Terrace LLC Construction Project to Discharge to the King County Sanitary Sewer

Dear Mr. Wei Zhang: 12802 NE 84th St

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the 84th Rose Terrace LLC Construction Project. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from October 24, 2016, through October 23, 2018, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.
This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

**Discharge Limitations**

| **Parameter** | **Limitation** |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar fats, Oil & Grease (FOG) | 100 mg/L |
| pH Minimum | 5.5 s.u. |
| pH Maximum | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

## Monitoring Requirements

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

## Records Management

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records.

All records required must be available for review by KCIW and must be kept through the completion of the project.

---

[1] The settleable solids field test by Imhoff cone must be performed as follows:
- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[2].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 $gpm/ft^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates[3].

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

---

[2] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

[3] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $800. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Strong

Despina Strong
Industrial Waste Program Manager

Enclosure

cc: Katy Coleman/Greg Neumann, City Of Kirkland

King County
Wastewater Treatment Division
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
206-477-5300 Fax 206-263-3001
TTY Relay: 711

February 7, 2017

Michael O. Moore
DTSJ Holdings, LLC
422 Bayview Blvd.
Newport, WA 99156

General Letter of Authorization – Construction: # 40091-01 for DTSJ Holdings, LLC – Chick-fil-A Construction Project to Discharge to the King County Sanitary Sewer

Dear Mr. Michael O. Moore:

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the DTSJ Holdings, LLC - Chick-fil-A Construction Project located at 12026 NE 124th Street, Kirkland, WA 98034. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from February 2, 2017, through February 1, 2019, or the duration of this project, whichever comes first. It is the permittee’s responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.
This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

## Discharge Limitations

| Parameter | Limitation |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar Fats, Oil & Grease (FOG) | 100 mg/L |
| Instantaneous Minimum pH[1] | 5.0 s.u. |
| Daily Minimum pH[2] | 5.5 s.u. |
| Maximum pH | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

[1] The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0.

[2] The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

## Monitoring Requirements

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

## Records Management

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project.

[1] The settleable solids field test by Imhoff cone must be performed as follows:
- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[1].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 $gpm/ft^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates[2].

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

---

[1] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

[2] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $800. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Despina Strong
Industrial Waste Program Manager

cc: Katy Coleman, City of Kirkland

King County
Wastewater Treatment Division
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
206-477-5300 Fax 206-263-3001
TTY Relay: 711

January 30, 2017

Michael O. Moore
DTSJ Holdings, LLC
422 Bayview Blvd
Newport, WA 99156

General Letter of Authorization – Construction: # 40091-01 for DTSJ Holdings, LLC - Chick-fil-A Construction Project to Discharge to the King County Sanitary Sewer

Dear Mr. Michael O. Moore:

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the DTSJ Holdings, LLC - Chick-fil-A Construction Project located at 12106 NE 124th Street, Kirkland, WA 98034. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from February 2, 2017, through February 1, 2019, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

**General Conditions**

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.
This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

**Discharge Limitations**

| Parameter | Limitation |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar fats, Oil & Grease (FOG) | 100 mg/L |
| pH Minimum | 5.5 s.u. |
| pH Maximum | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

## Monitoring Requirements

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

## Records Management

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project.

[1] The settleable solids field test by Imhoff cone must be performed as follows:

- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[2].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 $gpm/ft^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates[3].

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

---

[2] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

[3] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $800. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Strong

Despina Strong
Industrial Waste Program Manager

Enclosure

cc: Katy Coleman, City of Kirkland

King County

Wastewater Treatment Division
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
206-477-5300 Fax 206-263-3001
TTY Relay: 711

July 13, 2017

Robb A. Dibble
Dibble Engineers
1029 Market Street
Kirkland, WA 98033

Letter of Authorization 11778-01 to Discharge to the Sanitary Sewer

Dear Mr. Dibble:

The King County Industrial Waste Program (KCIW) has reviewed your request to discharge construction dewatering to the sanitary sewer from the Dibble Engineers - Market Street Construction Project located at 1029 Market Street, Kirkland, Washington. In accordance with King County Code 28.84.060, KCIW grants approval for the discharge of up to 18,000 gallons per day from July 17, 2017, through July 16, 2019, provided that you meet the discharge limitations, special conditions, and monitoring requirements listed below.

## Discharge Limitations

| | |
|---|---|
| Discharge rate | 100 gallons per minute (gpm) |
| Maximum daily discharge volume | 18,000 gallons per day (gpd) |
| Settleable solids (by Imhoff cone) | 7.0 mL/L |
| Benzene | 0.07 mg/L |
| Toluene | 1.4 mg/L |
| Ethylbenzene | 1.7 mg/L |
| Total xylenes | 2.2 mg/L |
| Nonpolar fats, oils, and grease (FOG) | 100 mg/L |
| Instantaneous minimum pH[1] | 5.0 s.u. |
| Daily minimum pH[2] | 5.5 s.u. |
| pH maximum | 12.0 s.u. |

[1] The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0.

[2] The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

There shall be no odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, or unusual color. If you exceed any of the discharge limits, you must stop discharging and notify KCIW by calling 206-477-5300.

**Special Conditions**

1. The discharge shall not cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW and City of Kirkland representatives reserve the authority to request that discharge to the sewer be stopped.

2. This document permits the discharge of limited amounts of construction dewatering from the construction site into the sanitary sewer. Wastes or contaminants from sources other than permitted herein shall not be discharged to the sanitary sewer without prior approval from KCIW.

3. The contractor shall implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the wastewater must be pumped to an appropriately sized settling tank prior to entering the sewer system.

4. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

5. A totalizing, non-resettable flow meter shall be installed on the discharge pipe from the wastewater treatment system to the approved point of discharge.

6. Discharge point is an existing side sewer cleanout or as otherwise designated by City of Kirkland representatives.

7. Wastewater monitoring logs containing the results of the required field monitoring specified below must be maintained on site and must be available for review at reasonable times by authorized representatives of KCIW.

8. A copy of this discharge approval shall be on site at all times for review and reference.

**Monitoring Requirements**

You shall conduct the following self-monitoring requirements for this authorization:

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |
| pH | Daily | Hand-held meter |

[1]The settleable solids field test by Imhoff cone must be performed as follows:

- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Records Management**

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records. All records required must be available for review by KCIW and must be kept through the completion of the project.

If you propose to increase the volume of your discharge or change the type or quantities of substances discharged, you must contact KCIW at least 60 days before making these changes.

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $950. King County will send you an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call me at 206-477-5476 or email me at ryan.salem@kingcounty.gov. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.

Sincerely,

Ryan Salem
Compliance Investigator

Enclosure

cc: Joshua Pantzke, City of Kirkland

**King County**
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

July 25, 2017

Bob Baldwin
Eastside Preparatory School
10613 Ne 38th Pl.
Kirkland,WA 98033

General Letter of Authorization - Construction: # 40114-01 for Eastside Preparatory School - Schuchart Corporation - TALI Hall Construction Project to Discharge to the King County Sanitary Sewer

Dear Mr. Bob Baldwin:

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the Eastside Preparatory School - Schuchart Corporation - TALI Hall Construction Project located at 10613 NE 38th Place, Kirkland, WA 98033. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from July 31, 2017, through July 30, 2019, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.
This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

**Discharge Limitations**

| **Parameter** | **Limitation** |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar Fats, Oil & Grease (FOG) | 100 mg/L |
| Instantaneous Minimum pH[1] | 5.0 s.u. |
| Daily Minimum pH[2] | 5.5 s.u. |
| Maximum pH | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

[1] The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0.

[2] The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

**Monitoring Requirements**

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

**Records Management**

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project.

---

[1] The settleable solids field test by Imhoff cone must be performed as follows:
- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[1].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 gpm/ft$^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates[2].

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

---

[1] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

[2] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $800. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Strong

Despina Strong
Industrial Waste Program Manager

cc: Greg Neumann, City of Kirkland

King County

**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

May 16, 2016

Eric Jerochim
Havlik's Radiator Service Inc.
11851 124th Ave. NE
Kirkland, WA 98034

Letter of Authorization 11699-01 to Discharge to the Sanitary Sewer

Dear Mr. Jerochim:

The King County Industrial Waste Program (KCIW) has reviewed your May 26, 2015, application requesting authorization to discharge wastewater from the radiator repair operation at Havlik's Radiator Service Inc. located at 11851 124th Avenue Northeast, Kirkland, Washington, to the sanitary sewer. In accordance with King County Code 28.84.060 (available at: www.kingcounty.gov/council/legislation/kc_code.aspx), KCIW grants approval for the discharge of up to 300 gallons per day from June 1, 2016, through May 31, 2021, provided that you meet the discharge limitations, special conditions, monitoring and reporting requirements listed below.

## Discharge Limitations

The industrial user shall not discharge wastes, which exceed the following limitations:

| Heavy Metals & Cyanide | Daily Maximum ppm (mg/L)[1] |
|---|---|
| Arsenic | 4.0 |
| Cadmium | 0.6 |
| Chromium | 5.0 |
| Copper | 8.0 |
| Lead | 4.0 |
| Mercury | 0.2 |
| Nickel | 5.0 |
| Silver | 3.0 |
| Zinc | 10.0 |
| Cyanide | 3.0 |

[1] The daily maximum is violated whenever any sample exceeds the limitation.

| Fats, Oils, & Grease | Average of 3 grabs (mg/L)[1] |
|---|---|
| Nonpolar FOG | 100 |

There shall be no odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity. The discharge must remain translucent. If you exceed any of the discharge limits, you must stop discharging and notify KCIW by calling 206-477-5300.

**Special Conditions**

A) All wastewater generated from the radiator rinse station and wastewater that has collected in the sump shall pass through the treatment system before discharge to the sanitary sewer system.

B) The treatment system shall be maintained and operated so that wastewater meets King County Local Limits.

C) All solids shall be disposed of in compliance with all applicable federal and state regulations.

D) All records of disposal shall be maintained on site for at least three years.

If you propose to increase the volume of your discharge or change the type or quantities of substances discharged, you must contact KCIW at least 60 days before making these changes.

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $750. King County will send an invoice for this amount.

[1] The limit for nonpolar FOG is violated when the arithmetic mean of the concentration of three grab samples, taken no more frequently than at five minute intervals, or when the results of a composite sample exceed the limitation.

If you have any questions about this authorization or your wastewater discharge, please call me at 206-477-5476 or email me at Ryan.Salem@kingcounty.gov. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.Thank you for helping to support our mission to protect public health and enhance the environment.

Sincerely,

Ryan Salem
Compliance Investigator

cc: Bobbi Wallace, City of Kirkland

**King County**
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

June 2, 2017

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Pat McLaughlin
King County SWD
201 South Jackson St., Suite 700
Seattle, WA 98104

Issuance of Wastewater Discharge Authorization No. 4423-01 to King County Solid Waste Division - Houghton Transfer Station

Dear Mr. McLaughlin:

The King County Industrial Waste Program (KCIW) has reviewed your application to discharge industrial wastewater to the sewer system from the King County Solid Waste Division (KCSWD) – Houghton Transfer Station facility located at 11724 NE 60th Street, Kirkland, Washington, and has issued the enclosed Major Discharge Authorization. The enclosed Discharge Authorization No. 4423-01 supersedes and cancels Permit No. 7879-01, effective August 1, 2017.

KCIW has downgraded your facility from a Permit to a Major Discharge Authorization as you have made structural upgrades to your treatement system to address dissolved sulfide issues. In addition:

- Your facility is not subject to categorical pretreatment regulations.
- The average daily discharge volume each month averages less than 20,145 gallons per day which does not exceed 25,000 gallons per day.
- Discharges from your facility do not have a reasonable potential to harm the publicly owned treatment works.

This authorization permits you to discharge limited amounts of industrial wastewater into King County's sewer system in accordance with the effluent limitations and other requirements and conditions set forth in the document and the regulations outlined in King County Code 28.84.060 (enclosed). As long as you maintain compliance with regulations and do not change the nature and volume of your discharge, KCIW will not require you to apply for an industrial wastewater discharge permit, a type of approval that would result in additional requirements and increased fees.

If you propose to increase the volume of your discharge or change the type or quantities of substances discharged, you must contact KCIW at least 60 days before making these changes.

King County Code 28.84 authorizes a fee for each Major Discharge Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Major Discharge Authorization is $2750. King County will send you an invoice for this amount.

If you have any questions about this discharge authorization or your wastewater discharge, please call me at 206-477-5476 or email me at Ryan.Salem@kingcounty.gov. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Ryan Salem
Compliance Investigator

Enclosures

cc: Greg Neumann, City of Kirkland

King County

**MAJOR DISCHARGE AUTHORIZATION**
King County Industrial Waste Program
201 S. Jackson Street, Suite 513
Seattle, WA 98104-3855

**NUMBER 4423-01**

for

# King County SWD - Houghton Transfer Station

**Facility address:** 11724 NE 60th Street
Kirkland, WA 98033

**Mailing address:** 201 South Jackson St., Suite 700
Seattle, WA 98104

**Phone:** 206-477-4501

**Emergency (24-hour) phone:** 206-477-4466

**Industry type:** Solid Waste Transfer Facility

**SIC code:** 4953 **EPA Id. No.:** NA

**Discharge to:** South Treatment Plant

*Note: This authorization is valid only for the specific discharges shown below:

**Discharge process:** Wastewater generated by solid waste transfer facility

**Effective date:** August 1, 2017
**Expiration date:** July 31, 2022

## DESCRIPTION OF SAMPLE SITES AND DISCHARGE VOLUMES

| Sample Site No. | Description | Maximum Daily Discharge Volume (gallons per day) | Maximum Average Daily Dishcharge Volume per Month (gallons per day) |
|---|---|---|---|
| **A30501** | Lift Station Wet Well | 78,000 | 25,000 |

Permission is hereby granted to discharge industrial wastewater from the above-identified facility into the King County sewer system in accordance with the effluent limitations and monitoring requirements set forth in this authorization.

If the industrial user wishes to continue to discharge after the expiration date, an application must be filed for re-issuance of this discharge authorization at least 90 days prior to the expiration date. For information concerning this King County Discharge Authorization, please call Industrial Waste Compliance Investigator Ryan Salem at 206-477-5476.

**24-HOUR EMERGENCY NOTIFICATION**
**South Treatment Plant: 206-263-1760**
**Washington State Department of Ecology: 425-649-7000**

## SPECIAL CONDITIONS

### A. Screening Level for Soluble Sulfide

1. Discharges that exceed the soluble sulfide screening level of 0.1 milligrams per liter (mg/L) have the potential to cause occupational health hazards in the sewage collection system or indicate that treatment has not been sufficient enough to remove hazardous waste characteristics.

2. Determination of the soluble sulfide concentration using an approved field test kit is acceptable.

3. For each exceedance of the screening level the permittee shall:

   a. Take immediate action to stop the exceedance and notify KCIW within 24 hours of learning of the exceedance

   b. Collect a sample and submit new data to KCIW within 14 days of becoming aware of the exceedance (or the next time discharge occurs if greater than 14 days)

   c. Submit a written report within 14 days of learning of the exceedance (14-Day Report)

   d. The report should explain the cause of the exceedance and corrective actions taken to respond to the sulfide exceedance and ensure ongoing compliance

4. The following conditions apply whenever KCIW monitoring or the permittee's self-monitoring results exceed the screening level for three out of four consecutive sampling events:

   a. The permittee shall submit a plan indicating the steps that will be taken to ensure that discharges do not exceed screening levels.

   b. This plan shall be submitted within 30 days from the third measurement indicating that the discharge exceeded the screening level, and indicate the steps that will be taken to reduce soluble sulfide concentrations so that they remain consistently below screening levels within 60 days.

5. If the submitted plan (required in Item 4) does not result in continued compliance with the screening limit, KCIW may require further action, which may include performing atmospheric hydrogen sulfide monitoring at a manhole designated by KCIW to assess for compliance with the King County local discharge limit of 10.0 parts per million, and/or establishing a soluble sulfide limit.

B. **Sample Site**

For safety concerns, the permittee and King County Industrial Waste Program (KCIW) sampling personnel will have the option of collecting samples from the KCIW sample site A30501 (the location identified in the permit as "discharge from lift station wet well") or collect samples at a manhole located in an adjacent parking lot northeast of the transfer station.

C. KCSWD must maintain the aeration system in the lift station wet well so that effluent does not exceed the screening level for dissolved sulfide. The aeration system shall be inspected weekly to ensure it is functioning properly.

D. KCSWD shall maintain records relating to all permitted discharges to the King County sewerage system including routine maintenance, waste disposal dates, manifests, self-monitoring reports, analytical lab results, field test results and flow records.

E. All records required by the permit shall be available for review at reasonable times by authorized representatives of KCIW.

F. Records of all such testing shall be retained for a period of three years unless litigation or the direction of KCIW requires an extension of that time.

## SELF-MONITORING REQUIREMENTS

A. The following self-monitoring requirements shall be met for this discharge authorization:

| Sample Site No. | Parameter | Sample Type | Frequency |
|---|---|---|---|
| A30501 | Arsenic, Total | Grab | Quarterly |
| | Cadmium, Total | Grab | Quarterly |
| | Chromium, Total | Grab | Quarterly |
| | Copper, Total | Grab | Quarterly |
| | Lead, Total | Grab | Quarterly |
| | Nickel, Total | Grab | Quarterly |
| | Silver, Total | Grab | Quarterly |
| | Zinc, Total | Grab | Quarterly |
| | Nonpolar fats, oils, and grease | 3 Grabs | Quarterly |
| | Dissolved Sulfide | Grab (field) | Quarterly |
| | pH | Grab (field) | Quarterly |
| | Discharge Rate | Continuous | Quarterly |
| | Total Monthly Flow | Continuous | Monthly |
| | Settleable solids | Grab (by Imhoff cone) | Only if operating criteria are exceeded |
| | Explosivity | Meter reading | Only if operating criteria are exceeded |

B. The settleable solids field test by Imhoff cone must be performed as follows:

1. Fill Imhoff cone to one-liter mark with well-mixed sample
2. Allow 45 minutes to settle
3. Gently stir sides of cone with a rod or by spinning; settle 15 minutes longer
4. Record volume of settleable matter in the cone as mL/L

C. The three nonpolar fats, oils, and grease (FOG) grab samples shall be of equal volume, collected at least five minutes apart, and analyzed separately. When using U.S. Environmental Protection Agency approved protocols specified in 40 CFR Part 136, the individual grab samples may be composited (at the laboratory) prior to analysis. The result of the composite sample or the average of the concentrations of the three grab samples may be reported as Total FOG unless the value is 100 mg/L or greater, in which case the concentration of nonpolar FOG must be reported.

D. If a violation of any discharge limits or operating criteria is detected in monitoring, you shall notify KCIW immediately upon receipt of analytical data.

E. A self-monitoring report shall be filed with KCIW no later than the 15th day of the time period following the sample collection (i.e., the 15th day of the following month for monthly, weekly, daily samples; the 15th day of the following quarter for quarterly samples). If no discharge takes place during any monitoring period, it shall be noted on the report.

F. All self-monitoring data submitted to KCIW, which required a laboratory analysis, must have been performed by a laboratory accredited by the Washington State Department of Ecology for each parameter tested, using procedures approved by 40 CFR 136. This does not apply to field measurements performed by the industrial user such as pH, temperature, flow, atmospheric hydrogen sulfide, total dissolved sulfides, total settleable solids by Imhoff cone, or process control information.

G. All sampling data collected by the permittee and analyzed using procedures approved by 40 CFR 136 or approved alternatives shall be submitted to KCIW whether required as part of this authorization or done voluntarily by the permittee.

H. Self-monitoring reports shall be signed by an authorized representative of the industrial user. The authorized representative of the industrial user is defined as:

1. The president, secretary, treasurer, or a vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation

2. The manager of one or more manufacturing, production, or operating facilities, but only if the manager:

    a. Is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiate and direct other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations
    b. Can ensure that the necessary systems are established or actions taken to gather complete and accurate information for control mechanism requirements and knowledgeable of King County reporting requirements
    c. Has been assigned or delegated the authority to sign documents, in accordance with corporate procedures

3. A general partner or proprietor if the industrial user is a partnership or proprietorship, respectively

4. A director or highest official appointed or designated to oversee the operation and performance of the industry if the industrial user is a government agency

5. The individuals described in one through four above may designate an authorized representative if:

    a. The authorization is submitted to King County in writing.
    b. The authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company or agency.

# GENERAL DISCHARGE LIMITATIONS

## Operating criteria

There shall be no odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity. The discharge must remain translucent. If any of the discharge limits are exceeded, you must stop discharging and notify KCIW at 206-477-5300.

## Corrosive substances

| Limits | |
|---|---|
| Maximum: | pH 12.0 (s.u.) |
| Instantaneous minimum: | pH 5.0 (s.u.) |
| Daily minimum: | pH 5.5 (s.u.) |

The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0. The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

Discharges of more than 50 gallons per day of caustic solutions equivalent to more than 5 percent NaOH by weight or greater than pH 12.0 are prohibited unless authorized by KCIW and subject to special conditions to protect worker safety, the collection system, and treatment works.

## Fats, oils, and grease

Discharge of FOG shall not result in significant accumulations that either alone or in combination with other wastes are capable of obstructing flow or interfere with the operation or performance of sewer works or treatment facilities.

Dischargers of polar FOG (oil and grease from animal and/or vegetable origin) shall minimize free-floating polar FOG. Dischargers may not add emulsifying agents exclusively for the purpose of emulsifying free-floating FOG.

Nonpolar FOG limit: 100 mg/L

The limit for nonpolar FOG is violated when the arithmetic mean of the concentration of three grab samples, taken no more frequently than at five minute intervals, or when the results of a composite sample exceed the limitation.

## Flammable or explosive materials

No person shall discharge any pollutant, as defined in 40 CFR 403.5, that creates a fire or explosion hazard in any sewer or treatment works, including, but not limited to, waste streams with a closed cup flashpoint of less than 140° Fahrenheit or 60° Centigrade using the test methods specified in 40 CFR 261.21.

At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than 5 percent nor any single reading be more than 10 percent of the lower explosive limit (LEL) of the meter.

Pollutants subject to this prohibition include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides, and any other substances that King County, the fire department, Washington State, or the U.S. Environmental Protection Agency has notified the user are a fire hazard or a hazard to the system.

| **Petroleum Compounds** | **Maximum Concentration ppm (mg/L)** |
|---|---|
| Benzene | 0.07 |
| Ethylbenzene | 1.7 |
| Toluene | 1.4 |
| Total xylenes | 2.2 |

## Heavy metals/cyanide

The industrial user shall not discharge wastes, which exceed the following limitations:

| **Heavy Metals & Cyanide** | **Instantaneous Maximum ppm (mg/L)[1]** | **Daily Average ppm (mg/L)[2]** |
|---|---|---|
| Arsenic | 4.0 | 1.0 |
| Cadmium | 0.6 | 0.5 |
| Chromium | 5.0 | 2.75 |
| Copper | 8.0 | 3.0 |
| Lead | 4.0 | 2.0 |
| Mercury | 0.2 | 0.1 |
| Nickel | 5.0 | 2.5 |
| Silver | 3.0 | 1.0 |
| Zinc | 10.0 | 5.0 |
| Cyanide | 3.0 | 2.0 |

[1] The instantaneous maximum is violated whenever the concentration of any sample, including a grab within a series used to calculate daily average concentrations, exceeds the limitation.

[2] The daily average limit is violated: a) for a continuous flow system when a composite sample consisting of four or more consecutive samples collected during a 24-hour period over intervals of 15 minutes or greater exceeds the limitation, or b) for a batch system when any sample exceeds the limitation. A composite sample is defined as at least four grab samples of equal volume taken throughout the processing day from a well-mixed final effluent chamber, and analyzed as a single sample.

## High temperature

The industrial user shall not discharge material with a temperature in excess of 65° C (150° F).

## Hydrogen sulfide

Atmospheric hydrogen sulfide: 10.0 ppm
(As measured at a monitoring manhole designated by KCIW)

Soluble sulfide limits may be established on a case-by-case basis depending upon volume of discharge and conditions in the receiving sewer, including oxygen content and existing sulfide concentrations.

## Organic compounds

No person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public or private sewer or treatment works in a quantity that may cause worker health and safety problems.

Organic pollutants subject to this restriction include, but are not limited to: Any organic pollutants compound listed in 40 CFR Section 433.11 (e) (total toxic organics [TTO] definition), acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), and xylenes.

## Settleable solids

Settleable solids concentrations: 7.0 ml/L

## GENERAL CONDITIONS

A. All requirements of King County Code pertaining to the discharge of wastes into the municipal sewer system are hereby made a condition of this discharge authorization.

B. The industrial discharger shall implement measures to prevent accidental spills or discharges of prohibited substances to the municipal sewer system. Such measures include, but are not limited to, secondary containment of chemicals and wastes, elimination of connections to the municipal sewer system, and spill response equipment.

C. Any facility changes, which will result in a change in the character or volume of the pollutants discharged to the municipal sewer system, must be reported to your KCIW representative. Any facility changes that will cause the violation of the effluent limitations specified herein will not be allowed.

D. In the event the permittee is unable to comply with any of the conditions of this discharge authorization because of breakdown of equipment or facilities, an accident caused by human error, negligence, or any other cause, such as an act of nature the company shall:

1. Take immediate action to stop, contain, and clean up the unauthorized discharges and correct the problem.
2. Immediately notify KCIW and, if after 5 p.m. weekdays and on weekends, call the emergency King County treatment plant phone number on Page 1 so steps can be taken to prevent damage to the sewer system.
3. Submit a written report within 14 days of the event (*14-Day Report*) describing the breakdown, the actual quantity and quality of resulting waste discharged, corrective action taken, and the steps taken to prevent recurrence.

E. Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this discharge authorization or the resulting liability for failure to comply.

F. The permittee shall, at all reasonable times, allow authorized representatives of KCIW to enter that portion of the premises where an effluent source or disposal system is located or in which any records are required to be kept under the terms and conditions of this authorization.

G. Nothing in this discharge authorization shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including discharge into waters of the state. Any such discharge is subject to regulation and enforcement action by the Washington State Department of Ecology.

H. This discharge authorization does not authorize discharge after its expiration date. If the permittee wishes to continue to discharge after the expiration date, an application must be filed for reissuance of this discharge authorization at least 90 days prior to the expiration date. If the permittee submits its reapplication in the time specified herein, the permittee shall be deemed to have an effective wastewater discharge authorization until KCIW issues or denies the new wastewater discharge authorization. If the permittee fails to file its reapplication in the time period specified herein, the permittee will be deemed to be discharging without authorization.

Compliance Investigator: ______________________ Date: June 2, 2017
Ryan Salem

King County
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

July 25, 2016

Scott Brewer
Kirkland Main Street, LP
600 108th Ave. NE, Suite 1010
Bellevue, WA 98004

General Letter of Authorization – Construction: # 40032-01 for Kirkland Main Street, LP - Park Lane Mixed-Use Apartments Construction Project to Discharge to the King County Sanitary Sewer

Dear Mr. Scott Brewer:

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the Kirkland Main Street, LP - Park Lane Mixed-Use Apartments Construction Project. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from July 29, 2016 through July 28, 2018, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.

This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

## Discharge Limitations

| Parameter | Limitation |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar fats, Oil & Grease (FOG) | 100 mg/L |
| pH Minimum | 5.5 s.u. |
| pH Maximum | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

## Monitoring Requirements

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

[1] The settleable solids field test by Imhoff cone must be performed as follows:
- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

## Records Management

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project.

## Special Conditions

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[1].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 gpm/ft$^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates.[1]

   [1] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

[1] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $950. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

DStrong

Despina Strong
Industrial Waste Program Manager

Enclosure

cc: Katy Coleman, City Of Kirkland

King County

Wastewater Treatment Division
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
206-477-5300 Fax 206-263-3001
TTY Relay: 711

April 15, 2016

Greg Neumann
City of Kirkland
123 5th Ave.
Kirkland, WA 98033

Letter of Authorization 40016-01 to Discharge to the Sanitary Sewer

Dear Mr. Neumann:

In accordance with King County Code 28.84.060, the King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the City of Kirkland - Cochran Springs/Lake Washington Boulevard Crossing Enhancement Construction Project. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from April 15, 2016 through April 14, 2018, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate
- Site conditions indicate potential for chemical contamination
- Substantial changes in the quality of the discharged water
- Discharge of wastes or contaminants from sources other than those permitted herein

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

**Discharge Limitations**

| **Parameter** | **Limitation** |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar fats, Oil & Grease (FOG) | 100 mg/L |
| pH Minimum | 5.5 s.u. |
| pH Maximum | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code)
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

**Monitoring Requirements**

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

[1] The settleable solids field test by Imhoff cone must be performed as follows:

- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

**Records Management**

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[1].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 gpm/$ft^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates.[1]

   [1] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.

[1] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

- At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
- Maximum sediment accumulation (level of sedimentation tank water column): $\leq$ 25%

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $750. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Strong

Despina Strong
Industrial Waste Program Manager

cc: Katy Coleman

King County
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

August 9, 2017

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Joshua Pantzke
City of Kirkland
123 Fifth Avenue
Kirkland, WA 98033

Issuance of Wastewater Discharge Authorization No. 4131-03 to City of Kirkland - Storm/Sewer Decant Station

Dear Mr. Pantzke:

The King County Industrial Waste Program (KCIW) has reviewed your application to discharge industrial wastewater to the sewer system from the City of Kirkland - Storm/Sewer Decant Station facility located at 1030 Eighth Street, Kirkland, Washington, and has issued the enclosed Major Discharge Authorization. The enclosed Discharge Authorization No. 4131-03 supersedes and cancels Discharge Authorization No. 4131-02, effective August 28, 2017.

This authorization permits you to discharge limited amounts of industrial wastewater into King County's sewer system in accordance with the effluent limitations and other requirements and conditions set forth in the document and the regulations outlined in King County Code 28.84.060 (enclosed). As long as you maintain compliance with regulations and do not change the nature and volume of your discharge, KCIW will not require you to apply for an industrial wastewater discharge permit, a type of approval that would result in additional requirements and increased fees.

The main changes to this permit are:

1. Added a second sampling site (A20582) for the Vault 3 discharge
2. Added a special condition to evaluate flow metering devices and implement the installation or use of flow metering devices

If you propose to increase the volume of your discharge or change the type or quantities of substances discharged, you must contact KCIW at least 60 days before making these changes.

King County Code 28.84 authorizes a fee for each Major Discharge Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Major Discharge Authorization is $2750. King County will send you an invoice for this amount.

If you have any questions about this discharge authorization or your wastewater discharge, please call me at 206-477-5426 or email me at todd.gowing@kingcounty.gov. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Stacy for Todd Gowing

Todd Gowing
Compliance Investigator

Enclosures

King County

**MAJOR DISCHARGE AUTHORIZATION**
King County Industrial Waste Program
201 S. Jackson Street, Suite 513
Seattle, WA 98104-3855

**NUMBER 4131-03**

for

# City of Kirkland - Storm/Sewer Decant Station

**Facility address:** 908 8th Street
Kirkland, WA 98033

**Mailing address:** 123 Fifth Avenue
Kirkland, WA 98033-6189

**Phone:** 425-587-3917

**Emergency (24-hour) phone:** 425-559-3131

**Industry type:** Decant Station

**SIC code:** 9199 **EPA Id. No.:** NA
**Discharge to:** South Treatment Plant

*Note: This authorization is valid only for the specific discharges shown below:

**Discharge process:** Wastewater generated by decant station operation

**Effective date:** August 28, 2017
**Expiration date:** August 27, 2022

## DESCRIPTION OF SAMPLE SITES AND DISCHARGE VOLUMES

| Sample Site No. | Description | Maximum Volume (gallons per day) | |
|---|---|---|---|
| | | Industrial | Total |
| **A2058** | Catch basin @ final MH | 13,000 | 13,000 |
| **A20582** | Vault 3 OWS | 1,500 | 1,500 |

Permission is hereby granted to discharge industrial wastewater from the above-identified facility into the King County sewer system in accordance with the effluent limitations and monitoring requirements set forth in this authorization.

If the industrial user wishes to continue to discharge after the expiration date, an application must be filed for re-issuance of this discharge authorization at least 90 days prior to the expiration date. For information concerning this King County Discharge Authorization, please call Industrial Waste Compliance Investigator Todd Gowing at 206-477-5426.

**24-HOUR EMERGENCY NOTIFICATION**
**South Treatment Plant: 206-263-1760**
**Washington State Department of Ecology: 425-649-7000**

## SPECIAL CONDITIONS

A. This authorization permits the discharge of limited volume of treated solids decant wastewater from vactor trucks used in the cleaning and maintenance of catch basins, storm drain lines, sewer lines, and pothole activities. Wastes or contaminants from sources other than permitted herein shall not be discharged to the sanitary sewer without prior King County approval.

B. For self-monitoring sampling requirements, the City of Kirkland shall only collect compliance samples when wastewater is physically discharging from the last chamber of the final detention vault and oil/water separator to the sanitary sewer.

C. The City of Kirkland shall properly operate and maintain the decant facility to ensure that the discharge complies with the King County discharge limits specified in this discharge authorization.

D. All oils and solids collected from the final detention vault and oil/water separator unit shall be removed for disposal at an approved site and shall not be allowed to enter the sanitary sewer system.

E. The City of Kirkland shall record the estimated decant volume associated with each vactor truck batch discharge into the final detention vault and oil/water separator. Daily discharge volume and settleable solids records shall be maintained on site and available for King County review for three years following collection.

F. By no later than **October 31, 2017**, the City of Kirkland must submit, for King County review and approval, a report that evealuates the installation, repair, or update to effluent flow meters for both sample sites A2058 and A20582. The report shall include a timeline for the change away from estimates of discharge volume to the use of effluent flow meters. The proposed timeling must not exceed 90 days after King County approval.

## SELF-MONITORING REQUIREMENTS

A. The following self-monitoring requirements shall be met for this discharge authorization:

| Sample Site No. | Parameter | Sample Type | Frequency |
|---|---|---|---|
| A2058 & A20582 | Copper, Total | Grab | Quarterly |
| | Lead, Total | Grab | Quarterly |
| | Zinc, Total | Grab | Quarterly |
| | Settleable Solids | Grab | Monthly |
| | pH | Grab | Quarterly |
| | Non-Polar Fats, Oils and Grease (FOG) | 3 Grabs | Quarterly |
| | Discharge Volume | Truck volume estimates / Meter[1] | Daily |
| | Total Monthly Flow | Truck volume estimates / Meter | Report Quarterly |
| | Maximum Daily Discharge Volume | Truck volume estimates / Meter | Report Quarterly |
| | | | |
| | Hydrogen sulfide | Meter reading | Only if operating criteria for rotten egg odor are exceeded |
| | Explosivity | Meter reading | Only if operating criteria for visible sheen or odor of solvent/gasoline are exceeded |

B. The settleable solids field test by Imhoff cone must be performed as follows:

1. Fill Imhoff cone to one-liter mark with well-mixed sample
2. Allow 45 minutes to settle
3. Gently stir sides of cone with a rod or by spinning; settle 15 minutes longer
4. Record volume of settleable matter in the cone as mL/L

C. The three nonpolar fats, oils, and grease (FOG) grab samples shall be of equal volume, collected at least five minutes apart, and analyzed separately. When using U.S. Environmental Protection Agency approved protocols specified in 40 CFR Part 136, the individual grab samples may be composited (at the laboratory) prior to analysis. The result of the composite sample or the average of the concentrations of the three grab samples may be reported as Total FOG unless the value is 100 mg/L or greater, in which case the concentration of nonpolar FOG must be reported.

D. If a violation of any discharge limits or operating criteria is detected in monitoring, you shall notify KCIW immediately upon receipt of analytical data.

E. A self-monitoring report shall be filed with KCIW no later than the 15th day of the time period following the sample collection (i.e., the 15th day of the following month for monthly,

[1] See Special Condition F

weekly, daily samples; the 15th day of the following quarter for quarterly samples). If no discharge takes place during any monitoring period, it shall be noted on the report.

F. All self-monitoring data submitted to KCIW, which required a laboratory analysis, must have been performed by a laboratory accredited by the Washington State Department of Ecology for each parameter tested, using procedures approved by 40 CFR 136. This does not apply to field measurements performed by the industrial user such as pH, temperature, flow, atmospheric hydrogen sulfide, total dissolved sulfides, total settleable solids by Imhoff cone, or process control information.

G. All sampling data collected by the permittee and analyzed using procedures approved by 40 CFR 136 or approved alternatives shall be submitted to KCIW whether required as part of this authorization or done voluntarily by the permittee.

H. Self-monitoring reports shall be signed by an authorized representative of the industrial user. The authorized representative of the industrial user is defined as:

1. The president, secretary, treasurer, or a vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation

2. The manager of one or more manufacturing, production, or operating facilities, but only if the manager:

    a. Is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiate and direct other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations
    b. Can ensure that the necessary systems are established or actions taken to gather complete and accurate information for control mechanism requirements and knowledgeable of King County reporting requirements
    c. Has been assigned or delegated the authority to sign documents, in accordance with corporate procedures

3. A general partner or proprietor if the industrial user is a partnership or proprietorship, respectively

4. A director or highest official appointed or designated to oversee the operation and performance of the industry if the industrial user is a government agency

5. The individuals described in one through four above may designate an authorized representative if:

    a. The authorization is submitted to King County in writing.
    b. The authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company or agency.

# GENERAL DISCHARGE LIMITATIONS

## Operating criteria

There shall be no odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity. You must collect additional monitoring samples in accordance with Part A of the Self-Monitoring Requirements if you observe any of the preceding conditions. If any of the discharge limits are exceeded, you must stop discharging and notify KCIW at 206-477-5300. Any additional monitoring samples collected in accordance with Part A of the Self-Monitoring Requirements must be submitted to King County on your self-monitoring report. Failure to collect additional samples in accordance with Part A will result in a violation of your permit conditions and result in potential enforcement action.

## Corrosive substances

| Limits | |
|---|---|
| Maximum: | pH 12.0 (s.u.) |
| Instantaneous minimum: | pH 5.0 (s.u.) |
| Daily minimum: | pH 5.5 (s.u.) |

The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0. The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

Discharges of more than 50 gallons per day of caustic solutions equivalent to more than 5 percent NaOH by weight or greater than pH 12.0 are prohibited unless authorized by KCIW and subject to special conditions to protect worker safety, the collection system, and treatment works.

## Fats, oils, and grease

Discharge of FOG shall not result in significant accumulations that either alone or in combination with other wastes are capable of obstructing flow or interfere with the operation or performance of sewer works or treatment facilities.

Dischargers of polar FOG (oil and grease from animal and/or vegetable origin) shall minimize free-floating polar FOG. Dischargers may not add emulsifying agents exclusively for the purpose of emulsifying free-floating FOG.

Nonpolar FOG limit: 100 mg/L

The limit for nonpolar FOG is violated when the arithmetic mean of the concentration of three grab samples, taken no more frequently than at five minute intervals, or when the results of a composite sample exceed the limitation.

**Flammable or explosive materials**

No person shall discharge any pollutant, as defined in 40 CFR 403.5, that creates a fire or explosion hazard in any sewer or treatment works, including, but not limited to, waste streams with a closed cup flashpoint of less than 140° Fahrenheit or 60° Centigrade using the test methods specified in 40 CFR 261.21.

At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than 5 percent nor any single reading be more than 10 percent of the lower explosive limit (LEL) of the meter.

Pollutants subject to this prohibition include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides, and any other substances that King County, the fire department, Washington State, or the U.S. Environmental Protection Agency has notified the user are a fire hazard or a hazard to the system.

| Petroleum Compounds | Maximum Concentration ppm (mg/L) |
|---|---|
| Benzene | 0.07 |
| Ethylbenzene | 1.7 |
| Toluene | 1.4 |
| Total xylenes | 2.2 |

**Heavy metals/cyanide**

The industrial user shall not discharge wastes, which exceed the following limitations:

| Heavy Metals & Cyanide | Instantaneous Maximum ppm (mg/L)[1] | Daily Average ppm (mg/L)[2] |
|---|---|---|
| Arsenic | 4.0 | 1.0 |
| Cadmium | 0.6 | 0.5 |
| Chromium | 5.0 | 2.75 |
| Copper | 8.0 | 3.0 |
| Lead | 4.0 | 2.0 |
| Mercury | 0.2 | 0.1 |
| Nickel | 5.0 | 2.5 |
| Silver | 3.0 | 1.0 |
| Zinc | 10.0 | 5.0 |
| Cyanide | 3.0 | 2.0 |

[1] The instantaneous maximum is violated whenever the concentration of any sample, including a grab within a series used to calculate daily average concentrations, exceeds the limitation.

[2] The daily average limit is violated: a) for a continuous flow system when a composite sample consisting of four or more consecutive samples collected during a 24-hour period over intervals of 15 minutes or greater exceeds the limitation, or b) for a batch system when any sample exceeds the limitation. A composite sample is defined as at least four grab samples of equal volume taken throughout the processing day from a well-mixed final effluent chamber, and analyzed as a single sample.

**High temperature**

The industrial user shall not discharge material with a temperature in excess of 65° C (150° F).

**Hydrogen sulfide**

Atmospheric hydrogen sulfide: 10.0 ppm
(As measured at a monitoring manhole designated by KCIW)

Soluble sulfide limits may be established on a case-by-case basis depending upon volume of discharge and conditions in the receiving sewer, including oxygen content and existing sulfide concentrations.

**Organic compounds**

No person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public or private sewer or treatment works in a quantity that may cause worker health and safety problems.

Organic pollutants subject to this restriction include, but are not limited to: Any organic pollutants compound listed in 40 CFR Section 433.11 (e) (total toxic organics [TTO] definition), acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), and xylenes.

**Settleable solids**

Settleable solids concentrations: 7.0 ml/L

## GENERAL CONDITIONS

A. All requirements of King County Code pertaining to the discharge of wastes into the municipal sewer system are hereby made a condition of this discharge authorization.

B. The industrial discharger shall implement measures to prevent accidental spills or discharges of prohibited substances to the municipal sewer system. Such measures include, but are not limited to, secondary containment of chemicals and wastes, elimination of connections to the municipal sewer system, and spill response equipment.

C. Any facility changes, which will result in a change in the character or volume of the pollutants discharged to the municipal sewer system, must be reported to your KCIW representative. Any facility changes that will cause the violation of the effluent limitations specified herein will not be allowed.

D. In the event the permittee is unable to comply with any of the conditions of this discharge authorization because of breakdown of equipment or facilities, an accident caused by human error, negligence, or any other cause, such as an act of nature the company shall:

1. Take immediate action to stop, contain, and clean up the unauthorized discharges and correct the problem.
2. Immediately notify KCIW and, if after 5 p.m. weekdays and on weekends, call the emergency King County treatment plant phone number on Page 1 so steps can be taken to prevent damage to the sewer system.
3. Submit a written report within 14 days of the event (*14-Day Report*) describing the breakdown, the actual quantity and quality of resulting waste discharged, corrective action taken, and the steps taken to prevent recurrence.

E. Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this discharge authorization or the resulting liability for failure to comply.

F. The permittee shall, at all reasonable times, allow authorized representatives of KCIW to enter that portion of the premises where an effluent source or disposal system is located or in which any records are required to be kept under the terms and conditions of this authorization.

G. Nothing in this discharge authorization shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including discharge into waters of the state. Any such discharge is subject to regulation and enforcement action by the Washington State Department of Ecology.

H. This discharge authorization does not authorize discharge after its expiration date. If the permittee wishes to continue to discharge after the expiration date, an application must be filed for reissuance of this discharge authorization at least 90 days prior to the expiration date. If the permittee submits its reapplication in the time specified herein, the permittee shall be deemed to have an effective wastewater discharge authorization until KCIW issues or denies the new wastewater discharge authorization. If the permittee fails to file its reapplication in the time period specified herein, the permittee will be deemed to be discharging without authorization.

Compliance Investigator: ______________________ Date: August 9, 2017
Todd Gowing

King County
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

October 21, 2016

David Pruin
PPN Ventures LP
950 North 72nd St., Suite 100
Seattle, WA 98103

General Letter of Authorization – Construction: # 40056-01 for PPN Ventures LP – Cubes Self Storage to Discharge to the King County Sanitary Sewer

Dear Mr. David Pruin: 615 7TH Ave

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the Cubes Self Storage - Kirkland. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from October 25, 2015, through October 24, 2016, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.
This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

**Discharge Limitations**

| **Parameter** | **Limitation** |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar fats, Oil & Grease (FOG) | 100 mg/L |
| pH Minimum | 5.5 s.u. |
| pH Maximum | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

**Monitoring Requirements**

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

**Records Management**

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records.

All records required must be available for review by KCIW and must be kept through the completion of the project.

---

[1] The settleable solids field test by Imhoff cone must be performed as follows:

- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[2].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 gpm/ft$^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates[3].

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

---

[2] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

[3] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $800. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Despina Strong
Industrial Waste Program Manager

Enclosure

cc: Katy Coleman, City Of Kirkland

King County
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

November 7, 2016

Erin Hopkins
Toll Brothers Inc.
9720 NE 120th Place, Suite 100
Kirkland, WA 98034

Letter of Authorization 11732-01 to Discharge to the Sanitary Sewer

Dear Ms. Hopkins:

The King County Industrial Waste Program (KCIW) has reviewed your request to discharge construction dewatering to the sanitary sewer from the Toll Brothers Inc. - Kirkland Compound construction project located at 11808 NE 70th Street, Kirkland, Washington. In accordance with King County Code 28.84.060 (available at: www.kingcounty.gov/council/legislation/kc_code.aspx), KCIW grants approval for the discharge of up to 25,000 gallons per day for relief only from November 15, 2016, through November 14, 2018, provided that:

- If you have not already done so, you must obtain the required approval from City of Kirkland before discharging to allow for permitting of a connection to the sanitary sewer and assessment of sewer charges. Please call Greg Neumann, 425-587-3910, to obtain required approval.
- You meet the discharge limitations, special conditions, monitoring and reporting requirements listed below.

**Discharge Limitations**

| | |
|---|---|
| Discharge rate | 50 gallons per minute (gpm) |
| Maximum daily discharge volume | 25,000 gallons per day (gpd) for relief only |
| Settleable solids (by Imhoff cone) | 7.0 mL/L |
| Benzene | 0.07 mg/L |
| Toluene | 1.4 mg/L |
| Ethylbenzene | 1.7 mg/L |
| Total xylenes | 2.2 mg/L |
| Nonpolar fats, oils, and grease (FOG) | 100 mg/L |
| pH minimum | 5.5 s.u. |
| pH maximum | 12.0 s.u. |

There shall be no odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity. The discharge must remain translucent. If you exceed any of the discharge limits, you must stop discharging and notify KCIW by calling 206-477-5300.

**Special Conditions**

1. The discharge shall not cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW and City of Kirkland representatives reserve the authority to request that discharge to the sewer be stopped.

2. Discharge of stormwater to the sanitary sewer is authorized for relief only. Relief may be exercised during emergencies to prevent loss of life and property, and when discharging would result in a violation of the stormwater construction general permit. Relief may not be exercised to compensate for an inadequate stormwater treatment system, improper operation and maintenance of the stormwater treatment system, or delays in obtaining a stormwater construction general permit caused by the permittee.

3. Should the permittee exercises their relief option, they shall provide a report, within 14 days of initial discharge, discussing the cause of the discharge to King County sewer, the proposed date the discharge will cease, and corrective actions to ensure the facility stays in compliance with their stormwater construction general permit.

4. This document permits the discharge of limited amounts of construction dewatering from the construction site for relief only into the sanitary sewer. Wastes or contaminants from sources other than permitted herein shall not be discharged to the sanitary sewer without prior approval from KCIW.

5. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

6. A totalizing, non-resettable flow meter shall be installed on the discharge pipe from the wastewater treatment system to the approved point of discharge.

7. Discharge point is manhole # SSMH 3241 or as otherwise designated by City of Kirkland representatives.

8. Wastewater monitoring logs containing the results of the required field monitoring specified below must be maintained on site and must be available for review at reasonable times by authorized representatives of KCIW.

9. A copy of this discharge approval shall be on site at all times for review and reference.

10. This discharge approval is being issued with the understanding that no known soil or groundwater contamination is present on site. The permit holder is responsible for contacting KCIW should site conditions indicate potential for contamination.

**Monitoring Requirements**

You shall conduct the following self-monitoring requirements for this authorization:

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |
| Turbidity | Daily | Hand-held meter |

[1]The settleable solids field test by Imhoff cone must be performed as follows:

- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Records Management**

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project

If you propose to increase the volume of your discharge or change the type or quantities of substances discharged, you must contact KCIW at least 60 days before making these changes.

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $950. King County will send you an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call me at 206-477-5476 or email me at Ryan.Salem@kingcounty.gov. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Ryan Salem
Compliance Investigator

Enclosure

cc: Greg Neumann, City of Kirkland

December 18, 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Nels Hartshorn
Western Pneumatic Tube Company LLC
835 6th St. S.
Kirkland, WA 98033

Issuance of Renewed Wastewater Discharge Permit No. 7604-05 to Western Pneumatic Tube Company LLC by the King County Department of Natural Resources and Parks

Dear Mr. Hartshorn:

The King County Industrial Waste Program (KCIW) has reviewed and processed your application for issuance of an industrial wastewater discharge permit in accordance with Chapter 90.48 RCW as Amended, Public Law 92-500, and King County Code 28.84.060.

The enclosed issued Permit No. 7604-05 covers the wastewater discharge from the Western Pneumatic Tube Company LLC operation located at 835 Sixth Street South, Kirkland, Washington. All discharges from this facility, and actions and reports relating thereto, shall be in accordance with the terms and conditions of this permit.

The enclosed Permit No. 7604-05 supersedes and cancels Permit No. 7604-04 effective December 31, 2015.

King County Code 28.84 authorizes a fee for each Permit issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Permit is $4,505. King County will send an invoice for this amount.

The main changes to this renewed permit is a change from being catagorized under 40 CFR 433 PSES (Pretreatment Standards Existing Source) to 40 CFR PSNS (Pretreatment Standards New Source). This change results in a lower discharge limit for cadmium. In addition, special conditions were removed that were no longer needed and a special condition requiring annual calibration of flow meter was added.

If you have any questions about this permit or your wastewater discharge, please call Dave Haberman at 206-477-5465, or email him at dave.haberman@kingcounty.gov. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Despina Strong
Program Manager

Enclosures

cc: Doug Knutson, Washington State Department of Ecology
Katy Coleman, City of Kirkland
Kristin Painter, King County
Ericka Jones, King County

Permit No.: 7604-05
Issuance Date: December 18, 2015
Effective Date: December 31, 2015
Expiration Date: December 30, 2020

King County

# WASTE DISCHARGE PERMIT

Department of Natural Resources and Parks
Industrial Waste Program
201 S. Jackson Street, Suite 513
Seattle, WA 98104-3855

In accordance with the provisions of Chapter 90.48 RCW as amended,
Public Law 92-500, and King County Code 28.84.060,
a Waste Discharge Permit is issued to:

## Western Pneumatic Tube Company LLC

| | |
|---|---|
| Facility location: | 835 Sixth St. S.<br>Kirkland, WA 98033 |
| Business hours phone: | 425-822-8271 |
| Emergency (24-hour) phone: | 425-822-8271 |
| Mailing address: | 835 Sixth St. S.<br>Kirkland, WA 98033 |

Permission is hereby granted to discharge industrial wastewater from the above-identified facility into the King County sewerage system in accordance with the effluent limitations and monitoring requirements set forth in this permit.

This permit is based on information provided in the permit application, which together with the following conditions and requirements are considered part of the permit. All requirements and ordinances of King County pertaining to the discharge of wastes into the King County sewerage system are hereby made a condition of this permit. All discharges and activities authorized herein shall be consistent with the terms and conditions of this permit.

This permit is not transferable without authorization from the King County Industrial Waste Program (KCIW). Failure to provide advance notice of a transfer renders this waste discharge permit voidable on the date of facility transfer.

By ___________________________________
Despina Strong, Industrial Waste Program Manager

# TABLE OF CONTENTS

# S1. EMERGENCY CONTACTS

**KING COUNTY**

| | |
|---|---|
| Industrial Waste Program (8 a.m. – 5 p.m., weekdays): | 206-477-5300 |
| Dave Haberman, Industrial Waste Compliance Investigator: | 206-477-5465 |
| Despina Strong, Industrial Waste Program Manager: | 206-477-5444 |

**Your emergency contact after 5 p.m. weekdays and on weekends is:**

| | |
|---|---|
| South Treatment Plant: | 206-263-1760 |

**If unable to reach anyone at this number call:**

| | |
|---|---|
| West Point Treatment Plant: | 206-263-3801 |

**WASHINGTON STATE DEPARTMENT OF ECOLOGY**

| | |
|---|---|
| 24-Hour emergency spill phone number: | 425-649-7000 |

# S2. PERMIT SUMMARY AND COMPANY IDENTIFICATION

## A. Summary Information

The following industrial waste discharge sites have been identified for this facility:

| *Sample Site No.* | *Limit Type* | *Daily Maximum Discharge Volume (gpd)* | *Description* |
|---|---|---|---|
| **A20061** | 433 PSNS | 7,980 | Tap on the discharge pipe |
| **A20063** | King County Local Limits | 20 | Spigot on silver recovery unit |

Effluent limitations and self-monitoring requirements for this sample site are detailed in S4.A of this permit.

## B. Reports

| *Report Name* | *Section(s)* | *Due Date* |
|---|---|---|
| Monthly self-monitoring reports | S4.A | 15th day of each month |
| 90-Day Compliance Report | S11 | Submit with next permit application |
| TTO Pretreatment Baseline Report or Solvent Management Plan | S12.B & S12.C | Submit with next permit application |
| TTO Certification and Solvent Management Plan Update | S12.D & S12.E | June 30 and December 31 each year |
| 14-Day Report: Discharge or permit violation | S4.D | Within 14 days after a discharge or permit violation becomes known |
| 5-Day Report: Slug discharge or spill | S6.A | Within five days after a slug discharge or spill |
| Hazardous waste discharge notification | S6.D | For all other wastes, within 90 days after waste is identified through RCRA |
| Washington State Department of Ecology Dangerous Waste Reports | S6.D | As requested by KCIW |
| Installation/Upgrade of Pretreatment System Report | S6.C | Prior to installation or upgrade |
| Slug/Spill Control Plan | S6.B | As requested by King County |
| Compliance with Best Management Practices (BMPs) | S3 | As requested by King County |

## C. Major Changes in the Renewed Permit

This renewed permit contains the following major changes since last issuance:

1. The limit type for site A20061 was changed from 40 CFR 433 PSES to 40 CFR 433 PSNS.

2. Removed special conditions that were no longer needed and added standard special condition requiring annual calibration of flow meter.

## D. Company Identification

| | |
|---|---|
| SIC Code Nos.: | 3498/3317 |
| Hazardous Waste Generator No.: | WAD009251323 |
| Industry Type: | Metal Finishing - CFR 433 PSNS |

# S3. SPECIAL CONDITIONS OR COMPLIANCE SCHEDULE

## A. Flow Meter Calibration

At least annually, Western Pneumatic Tube Company LLC shall verify the calibration of the flow meter used to calculate the discharge volume from the industrial wastewater treatment system. Meter calibration records must be maintained on site for a minimum of three years.

# S4. EFFLUENT LIMITATIONS & SELF-MONITORING REQUIREMENTS

## A. Effluent Limitations and Self-Monitoring Requirements:

1. The permittee shall comply with the following discharge limits and monitor its discharges to the King County sewerage system as specified below.

| ***Sample Site No.*** | ***Limit Type*** | ***Sample Site Description*** |
|---|---|---|
| A20061 | 433 PSNS | Tap on the discharge pipe |

| ***Parameter*** | ***Daily Average (mg/L)*** | ***Instantaneous Maximum (mg/L)*** | ***Maximum Monthly Average (mg/L)*** | ***Maximum Loading[1] (lbs/day)*** | ***Sampling Frequency*** | ***Sample Type*** |
|---|---|---|---|---|---|---|
| Arsenic, Total[2] | 1.0 | 4.0 | NA | 0.07 | NA | NA |
| Cadmium, Total | 0.11 | 0.6 | 0.07 | 0.01 | NA | NA |
| Chromium, Total | 2.75 | 5.0 | 1.71 | 0.18 | Monthly | Composite[3] |
| Copper, Total | 3.0 | 8.0 | 2.07 | 0.20 | NA | NA |
| Lead, Total | 0.69 | 4.0 | 0.43 | 0.05 | NA | NA |
| Mercury, Total | 0.1 | 0.2 | NA | 0.01 | NA | NA |
| Nickel, Total | 2.5 | 5.0 | 2.38 | 0.17 | Monthly | Composite |
| Silver, Total | 0.43 | 3.0 | 0.24 | 0.03 | NA | NA |
| Zinc, Total | 2.61 | 10.0 | 1.48 | 0.17 | NA | NA |
| Cyanide, Total | 1.2 | NA | 0.65 | NA | NA | NA |
| Cyanide, Amenable | 0.86 | 3.0 | 0.32 | NA | NA | NA |
| Nonpolar FOG | 100 | NA | NA | NA | NA | NA |
| Total Toxic Organics | 2.13 | NA | NA | NA | NA | NA |

| ***pH (s.u.)*** | ***Daily Minimum*** | ***Minimum*** | ***Maximum*** | Each batch | Grab |
|---|---|---|---|---|---|
| | 5.5 | 5.0 | 12.0 | | |

| ***Daily Maximum Discharge Volume (gpd)*** | ***Industrial*** | ***Other[4]*** | ***Total*** | Continuous | In-line meter |
|---|---|---|---|---|---|
| | 7,980 | 0 | 7,980 | | |

[1] Applicable poundage limit for each parameter equals the daily average concentration in mg/L, multiplied by the flow in million gallons per day, multiplied by 8.34. A maximum loading of 0.01 is listed whenever the calculated poundage limit is 0.01 or less.

[2] For the determination of total metals (which are equivalent to total recoverable metals) the sample is not filtered before processing.

[3] Flow proportional sampling is required for this site, see S4.A.6.a.ii.

**A. Effluent Limitations and Self-Monitoring Requirements (continued):**

2. The permittee shall comply with the following discharge limits and monitor its discharges to the King County sewerage system as specified below.

| ***Sample Site No.*** | ***Limit Type*** | ***Sample Site Description*** | | | |
|---|---|---|---|---|---|
| A20063 | King County Local Limits | Spigot on silver recovery unit | | | |
| | | | | | |
| ***Parameter*** | ***Daily Average (mg/L)*** | ***Instantaneous Maximum (mg/L)*** | ***Maximum Loading[1] (lbs/day)*** | ***Sampling Frequency*** | ***Sample Type*** |
| Arsenic, Total[2] | 1.0 | 4.0 | 0.01 | NA | NA |
| Cadmium, Total | 0.5 | 0.6 | 0.01 | NA | NA |
| Chromium, Total | 2.75 | 5.0 | 0.01 | NA | NA |
| Copper, Total | 3.0 | 8.0 | 0.01 | NA | NA |
| Lead, Total | 2.0 | 4.0 | 0.01 | NA | NA |
| Mercury, Total | 0.1 | 0.2 | 0.01 | NA | NA |
| Nickel, Total | 2.5 | 5.0 | 0.01 | NA | NA |
| Silver, Total | 1.0 | 3.0 | 0.01 | NA | NA |
| Zinc, Total | 5.0 | 10.0 | 0.01 | NA | NA |
| Cyanide, Amenable | 2.0 | 3.0 | NA | NA | NA |
| Nonpolar FOG | 100 | NA | NA | NA | NA |
| | | | | | |
| ***pH (s.u.)*** | ***Daily Minimum*** 5.5 | ***Minimum*** 5.0 | ***Maximum*** 12.0 | NA | NA |
| | | | | | |
| ***Daily Maximum Discharge Volume (gpd)*** | ***Industrial*** 20 | ***Other[3]*** 0 | ***Total*** 20 | NA | Estimate |

[1] Applicable poundage limit for each parameter equals the daily average concentration in mg/L, multiplied by the flow in million gallons per day, multiplied by 8.34. A maximum loading of 0.01 is listed whenever the calculated poundage limit is 0.01 or less.

[2] For the determination of total metals (which are equivalent to total recoverable metals) the sample is not filtered before processing.

3. A self-monitoring report of all required and nonrequired sampling must be filed no later than the 15th day of the time period following the reporting period (i.e., the 15th day of the following month for monthly reports; January 15, April 15, July 15, and October 15 for quarterly reports; January 15 and July 15 for semiannual reports; and January 15 for annual reports). The permittee shall use the KCIW self-monitoring form to submit results unless an alternate form is approved by KCIW. If no discharge has occurred during the sampling period, the report shall be submitted notifying KCIW that no discharge has occurred.

4. The total volume discharged for any processing day shall be calculated by reading the volume passing through meter number 44398538 or shall be estimated using another KCIW approved method. The total volume for each processing day on which metal samples are collected shall be reported on self-monitoring reports. The total monthly discharge volume shall be reported on self-monitoring reports.

5. Volume and waste type from all batch discharges shall be recorded on the self-monitoring form.

6. For self-monitoring, the permittee shall collect composite samples in accordance with the following methods:

    a. Heavy metals and organics parameters (other than volatile organics):

        i. If time-proportioned composite sampling is authorized, a composite sample shall consist of four or more grab samples of equal volume collected at least 15 minutes apart and no more than two hours apart throughout the processing day from a well-mixed effluent chamber.

        ii. A flow-proportioned composite sample shall mean a sample composed of grab samples collected continuously or discretely, by hand or machine, in proportion to the flow at the time of collection or to the total flow since collection of the previous grab sample. The grab sample volume or frequency of grab collection may be varied in proportion to flow.

    b. A cyanide composite sample shall consist of four grab samples of equal volume collected at least 15 minutes apart and no more than two hours apart from a well-mixed effluent chamber. Each aliquot shall be collected, treated, and preserved in the field in accordance with 40 CFR 136 and 403 appendix E. Treated aliquots may be collected into a single container and analyzed as one sample.

c. For volatile organic analysis (VOA), a composite sample shall consist of four grab samples of equal volume collected at least 15 minutes apart and no more than two hours apart from a well-mixed effluent chamber. Each aliquot shall be collected and preserved in the field in accordance with 40 CFR 136. The individual grab samples may be composited (at the laboratory) prior to analysis.

d. The three nonpolar fats, oils, and grease (FOG) grab samples shall be of equal volume, collected at least five minutes apart, and analyzed separately. When using U.S. EPA approved protocols specified in 40 CFR Part 136, the individual grab samples may be composited (at the laboratory) prior to analysis. The result of the composite sample or the average of the concentrations of the three grab samples may be reported as Total FOG unless the value is 100 mg/L or greater, in which case the concentration of nonpolar FOG must be reported.

e. For situations where the only discharge for the 24-hour period is of short duration (e.g., batch discharge), resulting in the inability to collect composite samples that meet the definitions described in Number 5.a-c above, the permittee shall collect grab samples every 15 minutes during the duration of the discharge. Regardless of the number of aliquots making up this sample, it will be used to evaluate compliance with daily average limits.

7. Discharges of greater than pH 12 are prohibited unless the permittee obtains written approval (email is sufficient) from KCIW prior to discharge and is subject to special conditions to protect worker safety, the collection system and treatment works.

8. Should an automatic pH recording system fail (if required by permit or compliance order), the permittee shall manually check the pH at least four times per hour. Any discharge without a pH record shall be considered a violation of this permit.

**B.** **Nonrequired Self-Monitoring**

All sampling data collected by the permittee and analyzed using procedures approved by 40 CFR 136 or approved alternatives shall be submitted to KCIW whether required as part of this permit or done voluntarily by the permittee.

**C.** **Violation Criteria**

1. Wastewater from regulated processes shall comply with the effluent limitations prior to dilution with other wastewaters unless a fixed alternative

discharge limit is approved by KCIW. (See Section S8.C.4 for further information about dilution.)

2. A review of any violation will include consideration of testing accuracy prior to enforcement action.

3. The more restrictive limitation (concentration or mass) shall prevail for determining violations.

4. Daily average and maximum monthly average limits apply to composite samples and to grab samples from short-term batch discharges.

5. Instantaneous maximum limits apply to grab samples, with the exception of grab samples from short-term batch discharges.

6. The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5. The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

7. The limit for nonpolar FOG (mineral origin) is violated when the arithmetic mean of the concentration of three grab samples (taken no more frequently than in five minute intervals), or when the result of a composite sample exceeds 100 mg/L.

**D. <u>Response when Violations are Detected</u>**

1. When monitoring data shows a violation, the permittee shall:

   a. Take immediate action to stop the violation and notify KCIW within 24 hours of learning of the violation.

   b. Collect a sample and submit new data to KCIW within 14 days of becoming aware of the violation.

   c. Submit a written report within 14 days of learning of the violation (*14-Day Report*). The report should explain the cause of the violation and corrective actions taken to respond to the violation and ensure ongoing compliance.

2. In the event the permittee is unable to comply with any of the conditions of this permit because of a breakdown of equipment or facilities, an accident

caused by human error, negligence, or any other cause, such as an act of nature, the permittee shall:

a. Take immediate action to stop, contain, and clean up the unauthorized discharges and correct the problem.

b. Immediately notify KCIW and, if after 5 p.m. weekdays and on weekends, call the emergency King County treatment plant phone number in Section S1 so steps can be taken to prevent damage to the sewerage system.

c. Submit a written report within 14 days of the event (*14-Day Report*) describing the breakdown, the actual quantity and quality of resulting waste discharged, corrective action taken, and the steps taken to prevent a recurrence.

3. Whenever an effluent check shows a pH violation, as defined in King County Code 28.84.060.N “Violations,” the permittee shall take immediate steps to bring the discharge back into compliance. If this is not possible, the permittee shall cease discharge.

4. Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or the resulting liability for failure to comply.

## E. Limitations Applicable to All Sites

1. General

The permittee’s discharge shall not interfere with the operation of the King County sewerage system, cause King County to exceed its NPDES permit limits, or endanger local utility or King County sewer workers.

The permittee’s discharge shall not violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge. (See Section 28.84.060.D-F of King County Code.)

Prohibitions previously referenced include, but are not limited to, substances causing fire or explosion hazard, flow obstruction, excess oxygen demand, and toxic vapors.

Limitations listed in Section S4 include, but are not limited to, restrictions on settleable solids, organic compounds, hydrogen sulfide, and polar FOG.

2. Organic compounds

   No person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public or private sewer or treatment works in a quantity that may cause acute worker health and safety problems.

   Organic pollutants subject to this restriction include, but are not limited to any organic compound listed in 40 CFR 433.11 (e) Total Toxic Organics (TTO) definition, acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), and xylenes.

   Dischargers are required to implement good "housekeeping" and best management practices in order to prevent the discharge of a concentrated form of any of the preceding organic pollutants.

**F. Responsibility for Compliance**

It is the responsibility of the permittee to ensure that all effluent limitations of this permit are met whether or not self-monitoring for the parameter is required.

## S5. SAMPLE SITE ACCESS AND IDENTIFICATION

**A.** Unobstructed access to sample sites shall be available to authorized KCIW personnel during normal operating hours. The permittee shall be responsible for providing alternate sample sites in the event of obstruction of access or upon evidence of tampering with the monitoring equipment.

**B.** The permittee shall allow KCIW to permanently label the sample sites used to collect wastewater samples.

**C.** The permittee shall, at all reasonable times, allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, “Inspection and Sampling of Industrial Users.”

# S6. NOTIFICATION REQUIREMENTS

## A. Spills and Slug Discharges

1. The permittee shall notify KCIW immediately in the event of a spill or slug discharge to the sanitary sewer. A written report regarding the cause of the spill and/or slug discharge shall be submitted to KCIW within five days of the date of occurrence. The report should explain the cause of the violation and corrective actions taken to respond to the violation and ensure ongoing compliance. (See Section S8.B for spill and slug discharge control procedures.)

2. Following a spill and/or slug discharge, KCIW may require the submission or modification of a spill/slug control plan.

## B. Changes in Discharge Characteristics

The permittee shall inform KCIW prior to any facility or manufacturing changes that will result in:

1. Introduction of new wastewater pollutants

2. Significant alteration in the volume (greater than 20 percent increase from permit application) or character of the pollutants discharged to the King County sewerage system

3. Discharge of waste streams not listed in the permit application

4. Addition of a new point of discharge or a new chemical, process, product, manufacturing line, or waste processing activity

5. Changes in the potential for spill or slug discharges

No change shall be made until plans have been approved and either written permission or a new or modified permit has been received. In no case are any changes permitted that will cause violation of the effluent limitations specified herein.

## C. Installation/Upgrade of Pretreatment System

A Professional Engineer's report per WAC 173-240 must be approved prior to installation or upgrade of pretreatment system.

## D. Hazardous Wastes

1. Within 180 days following commencement of discharge or permit issuance, whichever is later, the permittee must notify KCIW, the U.S. EPA, and the Washington State Department of Ecology of any discharge of a listed or characteristic RCRA hazardous waste. Identifying the listed or characteristic RCRA hazardous wastes on the permittee's wastewater discharge permit application serves as notice to KCIW. This is a one-time notification requirement. The contents of the notification may vary according to the quantity of waste discharged. (See "Notification of the Discharge of Hazardous Wastes" in King County Code 28.84.060.)

2. Whenever the U.S. EPA publishes new RCRA rules identifying additional hazardous wastes or new characteristics of hazardous wastes, the permittee must notify KCIW, the U.S. EPA, and the Washington State Department of Ecology if any of these wastes are discharged to the King County sewerage system. Notification must occur within 90 days of the effective date of the published regulation.

## E. Continuing Discharge after Permit Expiration Date

This permit does not authorize discharge after its expiration date. If the permittee wishes to continue discharge after the expiration date, an application must be filed for reissuance of this permit at least 180 days prior to the expiration date. If the permittee submits its re-application in the time specified herein, the permittee shall be deemed to have an effective waste discharge permit or authorization until KCIW issues or denies the new waste discharge permit. If the permittee fails to file its re-application in the time period specified herein, the permittee will be deemed to be discharging without a discharge permit after the current permit's expiration date.

# S7. MONITORING AND RECORD KEEPING

## A. Record Keeping and Retention

1. The permittee shall maintain records relating to all permitted discharges to the King County sewerage system including routine maintenance, waste disposal dates, manifests, self-monitoring reports, analytical lab results, pH monitoring records, and flow records.

2. All records required by the permit shall be available for review at reasonable times by authorized representatives of KCIW.

3. Records of all such testing shall be retained for a period of three years unless litigation or the direction of KCIW requires an extension of that time.

## B. Recording of Results

For each measurement or sample taken to comply with this permit, the permittee shall record the following information:

1. Date, exact place, and time of sampling

2. Dates the analyses were performed

3. Person who performed the analyses

4. Analytical techniques or methods used

5. Results of all analyses

## C. Representative Sampling

Samples and measurements taken to meet the requirements of this condition shall be representative of the volume and nature of the monitored discharge.

## D. Test Procedures

All analyses shall be performed in accordance with procedures established by the administrator of the U.S. EPA pursuant to Section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the U.S. EPA administrator, and/or KCIW. In all cases, except total dissolved sulfide, the detection limit shall be well below the discharge limit. Where 40 CFR Part 136 does not include a sampling or analytical technique for the pollutant in question, sampling and analysis shall be performed in accordance with the procedures set forth in the U.S. EPA publication entitled *Sampling and Analysis Procedures for Screening of Industrial Effluents or Priority Pollutants*, April 1977 or *Standard Methods*, latest edition and amendments thereto, or with any other sampling and analytical procedures approved by the U.S. EPA.

**E. Lab Accreditation**

All self-monitoring data submitted to KCIW that required a laboratory analysis must have been performed by a laboratory accredited by the Washington State Department of Ecology for each parameter tested. This does not apply to field measurements performed by the permittee such as pH, temperature, flow, atmospheric hydrogen sulfide, total dissolved sulfides, settleable solids by Imhoff cone, or process control information.

**F. Falsifying Information**

The act of knowingly falsifying, tampering with, or knowingly rendering inaccurate any monitoring device, report, or method required pursuant to the federal pretreatment standards, King County Code 28.84.060, or special conditions of this permit shall constitute a violation of this permit, and shall be subject to the legal remedies available under “Revocation of Permit or Authorization” and “Penalties and Enforcements” in King County Code 28.84.060.

**G. Toxicity Testing**

If KCIW is required by the Washington State Department of Ecology to determine the source of a pattern of acute toxicity pursuant to its treatment plant NPDES permit, the permittee may be required to test its effluent for toxicity according to procedures to be determined by KCIW.

**H. Signatory Requirements for Industrial User Reports**

Any report required by this permit shall meet the signatory and certification requirements listed in King County Code 28.84.060 and King County Code 28.82.

# S8. OPERATIONS AND MAINTENANCE

The permittee shall use waste preventative practices to reduce or eliminate contaminant loading to the King County sewerage system. These practices shall include proper chemical storage, spill prevention and notification, and maintenance and operation of any required pretreatment equipment.

## A. Chemical Storage

Chemical solutions, solid chemicals, waste materials, oils, and solvents shall be stored in a manner that will prevent the entry of these materials into the King County sewerage system.

1. Non-compatible chemicals shall be segregated and securely stored in separate containment areas that prevent mixing of incompatible or reactive materials.

2. The permittee shall install shut-off devices to all drains in any hazardous waste storage areas.

3. Chemicals shall be dispensed only in roofed and bermed areas that eliminate potential spills to the King County sewerage system.

4. All empty barrels that have not been cleaned (steam-cleaned or triple-rinsed) shall be adequately stoppered and stored in an upright position.

5. Process tanks shall be located in a bermed, roofed, secured area capable of containing 110 percent of the volume of the largest tank. The permittee shall ensure that process solutions are used and stored in such a manner as to minimize spills of concentrated solutions to the sanitary sewer.

## B. Spill or Slug Discharge Control Procedures (See Section S6.A)

1. In the event of a concentrated solution spill such as a tank failure, the permittee shall not discharge any spilled solution to the metropolitan sewer system unless laboratory test results indicate that the substance meets the conditions of this permit and the permittee receives approval from KCIW.

2. Concentrated waste or spilled chemicals that do not meet, or are not treated to meet, the discharge conditions of this permit shall be transported off site for disposal at a facility approved by the Washington State Department of Ecology or appropriate county health department.

3. The permittee shall maintain and inspect all process solution tanks on a regular basis. Any leaks shall be repaired promptly.

4. The permittee shall use spill prevention practices to preclude the discharge of liquids, solids, or gases which by reason of their nature or quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion.

5. All process tanks and chemical storage containers shall be accurately labeled. Emergency phone numbers of King County, the fire department, the permittee's 24-hour corporate contact, and Washington State Department of Ecology shall be posted at all sites that KCIW requires.

6. The permittee shall ensure that concentrated waste from process tank filters and other equipment is prevented from entering the sanitary sewer unless it is treated to meet the discharge conditions of this permit.

7. The permittee shall maintain and use product recovery options such as drag-out rinses for each plating bath or process as required to meet the discharge conditions of this permit. Recovered materials shall not be discharged to the sanitary sewer unless they are treated to meet the discharge conditions of this permit.

## C. Pretreatment Equipment Maintenance and Operations

1. All pretreatment systems used to bring the permittee's discharge into compliance with King County's discharge limitations shall be maintained continuously in satisfactory and effective operations by the permittee at the permittee's expense, and shall be subject to periodic inspections by authorized KCIW personnel. These systems shall be attended at all times during discharge to the King County sewerage system. In the event that such equipment fails, the permittee must notify KCIW immediately and take spill prevention precautions.

2. The permittee shall not initiate construction or modification of a pretreatment system prior to receiving KCIW approval of plans and specifications per WAC 173-240. In addition, KCIW may require an engineering report and an operations and maintenance manual.

3. KCIW shall be contacted before the beginning of any limited experimental modifications or new equipment testing that could reasonably be expected to affect effluent quality or quantity. This experimental work shall proceed only after securing written approval from KCIW and following the permittee's adherence to any applicable special conditions.

4. The effluent limitations specified in this permit are to be met by treatment of the wastes for pollutant removal. The use of municipal water, groundwater, seawater, stormwater, or other materials, including waste products, for the purpose of diluting a waste to achieve those limitations is prohibited.

5. The permittee shall adequately maintain and efficiently operate all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

## D. Water/Sewer Meter Requirements

The permittee shall obtain or maintain access to a water or sewer meter that can provide accurate information regarding industrial process wastewater and cooling water discharge to the sewer. Another method of volume determination may be used only upon approval by KCIW.

## E. Solid Waste

1. The permittee shall handle and dispose of all solid waste material (as defined in WAC 173-304-100) not otherwise authorized by this permit in such a manner as to prevent its entry into the King County sewerage system.

2. All covers, screening devices, sumps, hoppers, conveyors, and other facilities provided for the recovery and handling of solid wastes are to be maintained in an efficient operating condition.

## F. Stormwater

Stormwater, surface water, groundwater, and roof runoff shall be excluded, except where specifically authorized by this permit or King County Code 28.84.060, from the King County sewerage system.

# S9. GENERAL CONDITIONS

**A.** The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Whenever the permittee refuses to take corrective action or continues the violating condition, the imposition of civil penalties including fines up to $10,000 for each violation per day and/or termination of this permit may result. Termination of this permit may require disposal of the industrial waste in some manner other than into the public sewer, private sewer, or side sewer tributary to the King County sewerage system at the expense of the person holding the permit. Any person causing damage to a public sewer or treatment facility by discharges in violation of the terms and conditions of this permit shall be liable for any such damage incurred by King County as a result of such damage or discharge. Where criminal enforcement action is considered in a particular case, that case may be referred to state or federal authorities.

**B.** The diversion or bypass of any discharge from any pretreatment facility utilized by the permittee to maintain compliance with the terms of this permit is prohibited except where unavoidable to prevent loss of life or severe property damage. The procedure outlined in Section S4.D shall be followed in case of such a diversion or bypass.

**C.** After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its terms for those causes cited in King County Code 28.84.060.

**D.** If a toxic standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the federal Clean Water Act for a toxic pollutant, which is present in the discharge authorized herein, and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, this permit will be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee shall be so notified. Section 307(a) requires that the administrator of the U.S. EPA shall promulgate effluent standards (or prohibitions) for toxic pollutants that he or she has listed as such.

**E.** Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

**F.** All requirements and ordinances of the U.S. EPA and the Washington State Department of Ecology pertaining to hazardous and toxic wastes, disposal facilities, and discharge of wastes into the King County sewerage system, are hereby made a condition of this permit.

# S10. WASHINGTON STATE DEPARTMENT OF ECOLOGY CONDITIONS

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

Upon issuance of this permit, the permittee assumes the responsibility to abide by the following environmental requirements and any other appropriate regulations stipulated by the Department of Ecology. **The Department of Ecology retains authority to enforce these permit conditions (RCW 70.105 and RCW 90.48).**

## A. Conditions to Protect Ground and Surface Waters

1. Contaminated waters or wastes shall not be discharged to state waters.

2. Boiler blow down and water shall not be discharged to state waters.

3. Solid chemicals, chemical solutions, waste materials, oils, and solvents shall be stored in a manner that will prevent the entry of these materials into state, ground, or surface waters, and in a manner that will prevent spillage by overfilling, tipping, or rupture.

4. The permittee shall handle and dispose of all solid waste material in such a manner as to not cause any adverse effect on ground or surface water quality.

5. Filtered solids or sludge shall be stored in such a manner that drainage from this material is prevented from either draining across public rights-of-way or entering the local storm drain system or the groundwater.

6. No emulsifiers or dispersants are to be used on waters of the state without approval from the Department of Ecology.

7. If corrosive processing solutions are used, the processing/plating floor shall be sealed with corrosion resistant material that prevents leakage. This coating shall be repaired or replaced as needed.

Questions regarding the implementation of conditions outlined in Section S10 should be directed to the regulatory authority, the Washington State Department of Ecology, at 425-649-7000 (Northwest Regional Office, 3190 160th Avenue SE, Bellevue, Washington 98008-5452).

## S11. 90-DAY REPORT REQUIREMENTS

In order to comply with 40 CFR 403, the general pretreatment regulations, the permittee shall submit the following information no later than 90 days after the commencement of discharge. For permit renewals, the permittee shall submit the following information with the application for renewal. This information along with your permit application will serve as the 90-Day Report for heavy metal compliance and the Total Toxic Organics (TTO) Baseline Report.

**A.** Your statement indicating whether the discharge limits in Section S4, "Effluent Limitations and Self-Monitoring Requirements," of this permit are being met on a consistent basis, and if not, what additional operations, maintenance, or pretreatment efforts are necessary to bring your regulated discharge into compliance.

**B.** Your statement establishing the shortest reasonable time schedule for making any necessary changes to enable your discharge to be in consistent compliance with the discharge standards. (The schedule must include milestone dates for interim improvements or any other key actions, which will demonstrate that satisfactory progress is being sustained.)

**C.** Pertinent engineering drawings for pretreatment systems you presently have and/or plan to install, along with operations and maintenance information pertinent to attainment of your discharge limits (if applicable).

**D.** Your TTO Baseline Report and Solvent Management Plan (where applicable). See Section S12.

**E.** An analysis of a representative sample of wastewater from the permittee's effluent for cadmium, chromium, copper, nickel, lead, zinc, and cyanide. See 40 CFR 403.12. A minimum of four grab samples must be used for cyanide. For metals the sample shall be a 24-hour flow-proportioned composite. If the permittee can show that flow proportioning is infeasible, time composites consisting of a minimum of four grab samples may be used.

**F.** Notification analysis of routine batch discharges, which:

1. Lists the tanks that are routinely discharged with or without treatment
2. Lists frequency and volume of the batch discharge from each tank
3. Lists results from cadmium, chromium, copper, nickel, lead, and zinc testing of a representative sample from each routine batch discharge. The representative sample shall consist of grab samples collected at the beginning, middle, and end of each discharge.

**G.** Your Washington State Hazardous Waste Generator number.

# S12. TTO DEFINITION AND REPORTING REQUIREMENTS

## A. TTO Definition (from 40 CFR 413.02 and 433.11)

TTO shall mean total toxic organics, which is the summation of all quantifiable values greater than 0.01 milligrams per liter for the following toxic organics:

Acenaphthene
Acrolein
Acrylonitrile
Benzene
Benzidine
Carbon tetrachloride (tetrachloromethane)
Chlorobenzene
1,2,4-trichlorobenzene
Hexachlorobenzene
1,2-dichloroethane
1,1,1-trichloroethane
Hexachloroethane
1,1-dichloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
Chloroethane
Bis (2-chloroethyl) ether
2-chloroethyl vinyl ether (mixed)
2-chloronapthalene
2,4,6-trichlorophenol
Parachlorometa cresol
Chloroform (trichloromethane)
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3-dichlorobenzidine
1,1-dichloroethylene
1,2-trans-dichloroethylene
2,4-dichlorophenol
1,2-dichloropropane
1,3-dichloropropylene (1,3-dichloropropene)
2,4-dimethylphenol
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
Ethylbenzene
Fluoranthene
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether

Bis (2-chloroisopropyl) ether
Bis (2-chloroethoxy) methane
Methylene chloride (dichloromethane)
Methyl chloride (chloromethane)
Methyl bromide (bromomethane)
Bromoform (tribromomethane)
Dichlorobromomethane
Chlorodibromomethane
Hexachlorobutadiene
Hexachlorocyclopentadiene
Isophorone
Naphthalene
Nitrobenzene
2-nitrophenol
4-nitrophenol
2,4-dinitrophenol
4,6-dinitro-o-cresol
N-nitrosodimethylamine
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
Pentachlorophenol
Phenol
Bis (2-ethylhexyl) phthalate
Butyl benzyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Diethyl phthalate
Dimethyl phthalate
1,2-benzanthracene (benzo(a)anthracene)
Benzo(a)pyrene (3,4-benzopyrene)
3,4-Benzofluoranthene (benzo(b)fluoranthene)
11,12-benzofluoranthene (benzo k) fluoranthene)
Chrysene
Acenaphthylene
Anthracene
1,12-benzoperylene (benzo(ghi)perylene)
Fluorene
Phenanthrene
1,2,5,6-dibenzanthracene (dibenzo(a,h)anthracene)
Indeno (1,2,3-cd) pyrene) (2,3-o-phenylene pyrene)
Pyrene
Tetrachloroethylene
Toluene
Trichloroethylene
Vinyl Chloride (chloroethylene)
Aldrin
Dieldrin
Chlordane (technical mixture and metabolites)

4,4-DDT
4,4-DDE (p,p-DDX)
4,4-DDD (p,p-TDE)
Alpha-endosulfan
Beta-endosulfan
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
(BHC-hexachlorocyclohexane)
  Alpha-BHC
  Beta-BHC
  Gamma-BHC
  Delta-BHC
Polychlorinated biphenyls (PCB)
  PCB-1242 (Aroclor 1242)
  PCB-1254 (Aroclor 1254)
  PCB-1221 (Aroclor 1221)
  PCB-1232 (Aroclor 1232)
  PCB-1248 (Aroclor 1248)
  PCB-1260 (Aroclor 1260)
  PCB-1016 (Aroclor 1016)
Toxaphene
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)

**B. <u>Requirements for TTO Baseline Report</u>**
(to be included in 90-Day Report)

1. A statement certifying that the permittee does not use any chemical listed in the definition of TTO (as stated in 40 CFR 413.02 or 433.11) in any area that drains to the sanitary sewer.
   OR
2. An analysis of the permittee's effluent for those chemicals used in the permittee's facility that are listed in the definition of TTO.
   OR
3. An analysis of the permittee's effluent for TTO as defined in 40 CFR 413.02 or 433.11.

**C. <u>Requirements for Solvent Management Plan</u>**

Required as part of the 90-Day Report for companies that choose to certify that they do not discharge TTOs in lieu of performing laboratory analyses.

Your Solvent Management Plan must include:

1. Which TTOs are used

2. Method of disposal, i.e., reclamation, contract hauling, or incineration

3. Procedures that are used to ensure that TTOs do not routinely spill or leak into the wastewater

Where applicable, the following reports are due each June 30 and December 31.

**D. Requirements for Semiannual Updates of Solvent Management Plan**

List any changes to the last plan on file or state there are no changes to the plan.

**E. Biannual TTO Monitoring Requirements**

1. Choose 1, 2, or 3 from the requirements for TTO Baseline Report.

2. If you choose certification use the language below.

CERTIFICATION LANGUAGE FOR TTO REPORT

In lieu of submitting monitoring results, the permittee may make the following certification statement:

> "Based on my inquiry of the person or persons directly responsible for my managing compliance with the permit limitation (or pretreatment standard) for total toxic organics (TTO), I certify that, to the best of my knowledge and belief, no dumping of concentrated toxic organics into the wastewaters has occurred since filing of the last discharge monitoring report. I further certify that this facility is implementing the toxic organic management plan submitted to the permitting (or control) authority.
>
> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that a qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

King County

# Industrial Waste Program
# Company Fact Sheet

December 18, 2015

## COMPANY INFORMATION

**Company/Agency name:** Western Pneumatic Tube Company LLC
**Facility address:** 835 Sixth St. S.
Kirkland, WA 98033
**Mailing address:** 835 Sixth St. S.
Kirkland, WA 98033
**Treatment plant:** South Treatment Plant
**Corp. contact & phone:** Nels Hartshorn, 425-822-8271
**Site contact & phone:** Alan Haake, 425-822-8271
**Company/Agency type:** Metal Finishing - CFR 433 PSNS
**Days operating:** 270
**SIC number:** 3498/3317
**EPA ID number:** WAD009251323
**Compliance investigator:** Dave Haberman

## PERMIT INFORMATION

**Permit number:** 7604-05
**Effective date:** **December 31, 2015**
**Expiration date:** **December 30, 2020**

**Description of sample sites, limit types, and discharge volumes:**

| Sample Site No. | Description | Limit Type | Maximum Discharge Volume (gallons per day) |
|---|---|---|---|
| A20061 | Tap on the discharge pipe | 433 PSNS | 7,980 |
| A20063 | Spigot on silver recovery unit | King County Local Limits | 20 |

| | |
|---|---|
| Total industrial discharge volume (gpd) (add all sites) | 8,000 |

## MONITORING FEE PARAMETER

| Sample Site No. | Fee Type |
|---|---|
| A2006 | Heavy Metals Fee Parameter (ICR) |

## PERMIT PROCESSING

Permit number: 7604-05

| Action | Date |
|---|---|
| Application due | July 3, 2015 |
| Application received | July 6, 2015 |
| Application sent to local sewer agency | July 21, 2015 |
| Inspection date | October 8, 2015 |
| Final publication date | November 2, 1990 |
| Published volume | 8,000 gallons per day |
| Draft issued | November 19, 2015 |
| Final issued | December 18, 2015 |

## COMMENTS

**Nature of Business**
Western Pneumatic Tube Company LLC (WPTCo) manufactures welded tubing made from stainless steels, nickel alloys, aluminum alloys, and titanium alloys. The facility receives raw material in coils and/or sheets then mills, bends, welds, and shapes tubes for a variety of industries (e.g., aircraft, space, irrigation, nuclear energy, solar energy, and chemical and food processing).

**Sources of Wastewater**
Pickling Process: Some tubes are heat treated in a gas furnace that leaves black soot on the tube. The soot is then removed from the tubes through the pickling process. Wastewater is generated through this process by immersion of tubes in tanks of potassium permanganate, and/or pickle acid (nitric acid and hydrofluoric acid) and a post-pickling rinse tank.

X-Ray Film Development: WPTCo has a quality control lab where tubes are checked for flaws. The wastewater and waste developer are discharged to the sewer. The waste fixer is treated and silver is reclaimed with three silver recovery cartridges in series prior to discharge to the sewer. The system is maintained quarterly by an outside vendor and records of maintenance are kept on site. A new sample site (A20063) was created for this discharge in 2010.

Roof cleaning washwater: WPTCo pressure washes the roof and gutters of the building on a quarterly basis to help maintain compliance with their stormwater permit. This water is captured in a catch basin on their property and manual pumped into a private manhole on site. The volume is limited to approximately 700 gallons per event and sample results for metals and organics are below King County local discharge limits. This water does not go through a regulated sample site and is not monitored.

Condensate from air sparging system: WPTCo has installed ground monitoring wells that extract vapors from the ground below the vapor degreaser which formally used trichloroethylene. Sample results for total metals and organics were taken of the condensate. The sample results were evaluated and King County determined that the condensate meets King County screening limits without treatment and approves of this discharge. The volume of condensate is estimated to be less than 10 gallons a year. The discharge does not pass through the categorical treatment system and discharges into the sanitary sewer below the vapor degreaser.

**Treatment System**

Pickling Process: The wash down water contains residues from the pickling process. Rinse water is re-circulated out of rinse tank to limit the amount of fresh water used. All wash down water is contained in a 16,000-gallon sump beneath the floor grating and is pumped as needed (typically once or twice a day) during operation to a holding tank. The wash water and any reject acid from the acid regeneration system are pumped to the treatment tank where hexavalent chromium is chemically altered to trivalent chromium by the addition of iron sulfate. The pH is then adjusted to a range of 7.0-12.0 s.u. by adding sodium hydroxide and heavy metals are precipitated out through the addition of flocculants. The discharge is decanted by opening a valve on the tank allowing the discharge through sample site A20061.

After treatment and discharge, the remaining waste in the treatment tank is pumped to a sludge settling tank for further settling. A filter press removes the sludge and excess filter press water is discharged back to the floor sump. Decant water from this tank is also discharged through the sample site (A20061).

Before the effluent meter, there is an in-line filter to help prevent particles from damaging or interfering with the effluent meter. This filter is cleaned periodically, at least monthly. It was installed in 1990 when the effluent meter was put in. WPTCo does not want to remove the filter and is aware that the compliance sample site is before this filter. King County is aware of this added measure to ensure the effluent meter functions properly and WPTCo understands point of compliance is before the filter.

X-Ray Film Development: The fixer wastewater is treated and silver reclaimed with three silver recovery cartridges in series which are monitored and maintained by a third party. The facility has converted more than half of the wet film processing to digital and hopes to phase out the wet film processing but at this time, a few customers still require film x-ray processing. This site was assigned a sample site (A20063) and included in the permit in 2010.

**Compliance History**

WPTCo received the Gold Award in 2010, Silver Award in 2011, and Gold Award in 2012, 2013, and 2014. They received a Silver Award in 2011 due to a low pH discharge violation. The violation was caused by an employee leaving a valve open on the spent acid storage tank after transferring acid into the treatment tank. This resulted in approximately 10-50 gallons of untreated acid being discharged. WPTCo implemented a new acid transfer procedure and re-trained employees on the procedure.

**Trends in Discharge of Pollutants of Concern**

The graphs at the end of this fact sheet show both King County and self-monitoring data for chromium, nickel, daily discharge volumes, and pH levels for the last five years. Other than the low pH discharge violation in 2011, the pH is consistently above 6.5 and below 12.0. This variance in pH is within the normal range for batch discharges.

The maximum daily discharge is consistently above 3,000 gallons per day (gpd) and below 7,980 gpd except for a low production day in January 2011 and a higher than normal production day in April of 2012 where the discharge was above the published volume of 8,000 gpd but within allowable tolerance of 20% for a one time exceedance.

The data from both King County monitoring and self-monitoring samples for pollutants of concern, chromium and nickel are consistently in compliance with discharge limits. The graph of WPTCo's self-monitoring for nickel shows a time period in 2012 to 2013 where the concentrations were consistently at 0.5 mg/L, which was due to an increased laboratory reporting detection limit when the laboratory needed to dilute samples because of interferences attributed to sodium levels. The source of the sodium was likely the salts from the potassium permanganate bath and/or the sodium hydroxide used to adjust the pH. Since the 0.5 mg/L detection limit is acceptable for the parameter and this event occurred over a relatively short time period, no further investigation was conducted..

**Slug and/or Spill Control Plan**

WPTCo has large quantities of chemicals on site and is required to have a Slug/Spill Control plan. An updated Slug/Spill Control plan was received November 16, 2015, and is sufficient.

**Self-Monitoring Requirements**

The company collects monthly composite samples for chrome and nickel. The pH is recorded for each batch discharged. Daily flow and total monthly flow is recorded. The discharge volumes pass through an effluent meter.

**King County Compliance Monitoring Program**

King County Industrial Waste collects flow proportional composite metal samples semi-annually, grab pH semi-annually, composite (2) CN semi-annually, composite (2) VOA annually and composite BNA's quinquennially.

**Monitoring Methods**

Physical samples: Composite flow-proportional samples are collected for metals. VOA's and CN are composites of multiple garb samples

pH monitoring: A pH meter is used to measure the grab pH sample

Flow monitoring: Effluent meter

**Special Conditions**

There is a new special condition for annual flow meter calibration which is standard for companies that use effluent meters to measure flow.

**Limit Calculations**
WPTCo conducts chemical etching (passivating) of stainless steel, titanium, and nickel base alloy tubes and is regulated under CFR 433 PSNS Metal Finishing Point Source Category, Subpart A., section.17 Pretreatment Standards for New Sources (PSNS). In 1990, WPTCo submitted a request to KCIW to install a system for reclaiming and recycling the pickling acid previously disposed of as hazardous waste. This resulted in the submittal of a new engineering report and WPTCo was directed to re-publish in 1990 and issued a new permit (No. 7604-01) replacing the previous permit No. 7109. However, WPTCo was inadvertently permitted as 433 PSES since 1990 and will now be as 433 PSNS. Using the guidance provided by the U.S. Environmental Protection Agency (EPA) Memo dated September 28, 2006, titled "New Source Dates for Direct and Indirect Dischargers" EPA clarifies what constitutes a New Source. The term "source" means any building, structure, facility, or installation from which there is or may be a discharge of pollutants which commenced after the new source date. In this case, the new source date for indirect dischargers classified under CFR 433 Metal Finishing Subpart A was published on August 31, 1982, and the changes made at the facility with the installation of the pickling acid recovery system occurred in 1990, thus warranting the change from 433 PSES to 433 PSNS.

**Changes since the Last Permit**
The changes described above result in a change to the daily and monthly average discharge limits for cadmium from 0.5 mg/L to 0.11 mg/L (daily), and the monthly average discharge limit from 0.26 mg/L to 0.07 mg/L. A review of sample results from King County sampling and WPTCo's sampling was done and the results are all non-detect for cadmium. WPTCo was informed of this new change on October 19, 2015.

The roof cleaning wash water and the vapor degreaser extraction well condensate have been added to the fact sheet but not included in the permit as discharge locators because the infrequent discharge, low discharge volumes and because the discharges meet King County local limits without treatment and are not from a categorical process.

<u>Removed Special Condition S3.A, Notification Requirement:</u> This special condition required WPTCo to sample and record pH, volume, date of discharge, and report to King County if the non-contact cooling water from the acid regeneration system was discharged. The company reduced the acid processing temperature, so this special condition is no longer applicable. The special condition to follow best management practices for the x-ray silver recovery process was also removed because the company has an outside vendor maintain the system for compliance and the maintenance records are kept on site for review as needed.

**Comments**

<u>Publication</u>: Not applicable, company published in 1990.

<u>First draft</u>: No comments received from the component agency.

WPTCo submitted the following corrections and comments to King County via email November 25, 2015:

Correction No. 1- The fact sheet listed PSES in one location and not PSNS, this was corrected.

Correction No. 2- Section S11 referenced Section S3 and should have referenced Section S4, this was corrected.

Comments- A few minor changes to some of the language in the fact sheet were also made . In addition the company had several questions about permit conditions which were answered via an email to the company on December 3, 2015.

**Safety**
Inspectors are required to wear safety shoes and eye protection.

King County
**Wastewater Treatment Division**
Industrial Waste Program
Department of Natural Resources and Parks
201 South Jackson Street, Suite 513
Seattle, WA 98104-3855
**206-477-5300** Fax 206-263-3001
TTY Relay: 711

September 29, 2017

Jim Tosti
Windward Wendy LLC
805 Kirkland Ave., Suite 200
Kirkland, WA 98033

General Letter of Authorization – Construction: # 40131-01 for Windward Wendy LLC Construction Project to Discharge to the King County Sanitary Sewer

Dear Mr. Tosti:

In accordance with King County Code 28.84.060, King County Industrial Waste Program (KCIW) authorizes the discharge of construction dewatering/process wastewater to the King County sanitary sewer from the Windward Wendy LLC construction project located at 301 Fourth Avenue, Kirkland, WA 98033. This project is required to meet all the limitations, monitoring requirements, and other conditions specified in this authorization.

This authorization is the only KCIW authorization that will be issued for the project identified in your application. This authorization is issued for the maximum duration of two years. It is valid from October 1, 2017, through September 30, 2019, or the duration of this project, whichever comes first. It is the permittee's responsibility to notify KCIW of project closure or any changes with this project.

This authorization alone does not allow you to discharge to the sanitary sewer. You must contact the local sewer agency to obtain approval along with a discharge location before discharging to the sanitary sewer. Wastewater from this project must be discharged to/at the location(s) specified by the local sewer agency. The local sewer agency will assess sewer charges, set flow rate restrictions and may impose additional requirements.

## General Conditions

All discharges and activities approved by this authorization shall be consistent with King County Code 28.84.060 and the terms and conditions outlined in this authorization. A copy of this discharge approval, as well as required daily monitoring records, shall be on site and available for review and reference by KCIW or local sewer agency representatives.
This authorization to discharge is based on your agreement and signed application.

This authorization permits the discharge of up to 25,000 gallons per day (gpd) of construction dewatering from the construction site into the sanitary sewer. Discharging pollutants more frequently or in higher concentrations or quantity than authorized in this letter is a violation of the terms and conditions of this authorization. You must contact KCIW in advance and receive authorization before making changes beyond the terms and conditions of this authorization. Examples of changes include:

- Construction dewatering volume above 25,000 gpd.
- Site's surface area generates contaminated stormwater that exceeds one acre in aggregate.
- Site conditions indicate potential for chemical contamination.
- Substantial changes in the quality of the discharged water.
- Discharge of wastes or contaminants from sources other than those permitted herein.

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Washington State Department of Ecology.

You must allow authorized representatives of KCIW to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

You must install an accessible sampling spigot on the discharge pipe from the last treatment unit of the wastewater treatment system. The sample site shall be representative of all industrial waste streams discharged to the sewer from this project. Each sample site shall be accessible to KCIW representatives when discharge to the sewer is occurring.

You must install a totalizing, non-resettable flow meter on all permitted discharge pipes to the sewer or as approved by your local sewer agency. The meters shall account for all industrial waste streams discharged to the sewer from this site.

**Discharge Limitations**

| Parameter | Limitation |
|---|---|
| Instantaneous maximum discharge rate | To be determined by local sewer agency. Not to exceed 200 gallons per minute or the sedimentation tank flow restriction, whichever is more stringent. |
| Maximum daily discharge volume | 25,000 gpd |
| Settleable solids | 7.0 mL/L |
| Nonpolar Fats, Oil & Grease (FOG) | 100 mg/L |
| Instantaneous Minimum pH[1] | 5.0 s.u. |
| Daily Minimum pH[2] | 5.5 s.u. |
| Maximum pH | 12 s.u. |
| Soluble Sulfides (Screening Level) | 0.1 mg/L |

[1] The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0.

[2] The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

The water being discharged will not do the following:

- Violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge (see Section 28.84.060.D-F of the King County Code).
- Contain the odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.
- Cause hydraulic overloading conditions of the sewerage conveyance system. During periods of peak hydraulic loading, KCIW or local sewer agency representatives reserve the authority to request that discharge to the sewer be stopped.

You must stop discharging and notify KCIW, by phone at 206-477-5300 or email at info.KCIW@kingcounty.gov, if you exceed any of the discharge limits, or notice odor of solvent, gasoline, or hydrogen sulfide (rotten egg odor), oil sheen, unusual color, or visible turbidity.

## Monitoring Requirements

You shall conduct the following self-monitoring requirements for this authorization.

| Parameter | Frequency | Sample Type/Method |
|---|---|---|
| Discharge volume | Daily | In-line flow meter |
| Discharge rate | Daily | In-line flow meter |
| Settleable solids | Daily | Grab by Imhoff cone[1] |

All tests, measurements and analyses shall be performed in accordance with procedures established by the administrator of the U.S. Environmental Protection Agency (EPA) pursuant to section 304(g) of the federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA administrator, and/or KCIW.

## Records Management

You will maintain records relating to all permitted discharges to the King County sewerage system including but not limited to routine maintenance, waste disposal dates, manifests, any analytical lab results, monitoring records, and flow records

All records required must be available for review by KCIW and must be kept through the completion of the project.

[1] The settleable solids field test by Imhoff cone must be performed as follows:
- Fill cone to one-liter mark with well-mixed sample.
- Allow 45 minutes to settle.
- Gently stir sides of cone with a rod or by spinning. Settle 15 minutes longer.
- Record volume of settleable matter in the cone as mL/L.

**Special Conditions**

You must implement erosion control best management practices to minimize the amount of solids discharged to the sanitary sewer system. As a minimum precaution, the construction dewatering must be pumped to an appropriately sized settling tank prior to entering the sewer system.

The authorization to discharge is based on your agreement and signed application to comply with the minimum standards outlined in *Minimum Standards for Rectangular Sedimentation Tank Design and Technical memorandum* found on county's webpage[1].

The following two sedimentation tank options may be used, depending on site conditions and project requirements:

1. Rectangular Sedimentation Tank (Flow-Through Discharge)

   The minimum required standards for the flow-through system are:

   - Minimum hydraulic retention time: ≥ 90 minutes
   - Minimum length-to-width ratio (length : width): ≥ 4:1
   - Maximum overflow rate (gallons-per-minute per square foot of surface area): ≤ 1.0 $gpm/ft^2$
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%
   - Requirement to add additional sedimentation tanks in parallel for higher flow rates[2].

2. Circular Sedimentation Tank (Batch Discharge):

   At some smaller construction sites, process wastewater is produced intermittently. The minimum required standards for batch discharge area as follows:

   - Minimum 5,000 gallon circular tank, which can accommodate a maximum of five batch discharges per day.
   - At least one hour of quiescent (undisturbed) settling must occur in the tank prior to discharge. During this settling time, no additional process wastewater can be added to the sedimentation tank.
   - Maximum sediment accumulation (level of sedimentation tank water column): ≤ 25%

---

[1] http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/GettingDischargeApproval/Construction/Sedimentation_tanks.aspx.

[2] Example: At 200 gpm flow, to meet the Minimum hydraulic retention time of ≥ 90 minutes, you need a minimum of 18,000 gallons rectangular tank (18,000 gal / 200 gal/min = 90 minute hydraulic retention time). Correspondingly, at 100-gpm flow, you need a 9,000-gallon tank, and at 65 gpm, the tank volume shall be 5850 gallons. If gravity discharge from the tank is not possible, the effective volume of the tank needs to be reduced to the level of the pump intake and under no circumstances can the pump intake be lower than one-half (1/2) of the tank height.

The permittee shall properly operate and maintain all wastewater treatment units to ensure compliance with established discharge limits. Solids accumulation in tanks used for solids settling shall not exceed 25 percent of the tank's working hydraulic capacity. Each tank's working hydraulic capacity is based on the water column height as measured from the bottom of the tank to either the invert elevation of the tank's outlet pipe (gravity discharges) or discharge pump intake (pumped discharges).

**General Information**

King County Code 28.84 authorizes a fee for each Letter of Authorization issued by the King County Department of Natural Resources and Parks. The current fee for issuance of a Letter of Authorization is $800. King County will send an invoice for this amount.

If you have any questions about this authorization or your construction dewatering discharge, please call us at 206-477-5300, or email us at info.KCIW@kingcounty.gov. You may also visit our program's Internet pages at www.kingcounty.gov/industrialwaste.

Thank you for helping support our mission to protect public health and enhance the environment.

Sincerely,

Dana H

Dana Heinz
Industrial Waste Compliance Investigator

cc: Dan Wachtler, Wachtler Marshall Inc.
Josh Pantze, City of Kirkland

# APPENDIX I

## List of Potential Reclaimed Water Users

**THIS PAGE INTENTIONALLY LEFT BLANK**

# Utility Billing

## Top 20 Water Users

Sort By: CONSUMPTION

Date Range: 01/01/16 - 12/31/16

| Rank | Account No | Name | Service Address | Rate | Consumption |
|---|---|---|---|---|---|
| 001 | 4200 | SKINNER MGMT COMPANY | 1000 CARILLON PT | WC5 | 9,884.00 |
| 002 | 12535 | PORTSMITH CONDOMINIUMS | 108 2ND AVE S | WM5 | 8,167.00 |
| 003 | 49367 | HOTEL KIRKLAND LLC | 220 KIRKLAND AVE | WC5 | 7,080.00 |
| 004 | 30664 | LAKE WASHINGTON SCHOOL DISTRICT (IRR) | 12033 NE 80TH ST | RHI | 6,837.00 |
| 005 | 50063 | GSIC FORBES CREEK REIT INC APTS | 10707 111TH CT NE | WM3 | 6,402.00 |
| 006 | 13373 | CASCADE MEDICAL INVESTORS LTD | 10101 NE 120TH ST | WC4 | 6,326.00 |
| 007 | 21741 | SSR WESTERN MTF/TERA APARTMENT | 558 CENTRAL WAY | WM5 | 6,103.00 |
| 008 | 49632 | SRMKII LLC | 451 7TH AVE S | WC5 | 5,792.00 |
| 009 | 5551 | COSTCO WHOLESALE CORP | 8629 120TH AVE NE | RC4 | 5,112.00 |
| 010 | 14829 | LOCHSHIRE CONDO ASSN | 12330 NE 92ND LN | RM6 | 4,955.00 |
| 011 | 47982 | KIRKLAND CROSSINGS LLC | 10715 NE 37TH CT | WM6 | 4,659.00 |
| 012 | 7576 | PLUM COURT ASSOC | 451 4TH AVE S | WM4 | 4,405.00 |
| 013 | 25293 | BOULEVARD | 375 KIRKLAND AVE | WM6 | 4,353.00 |
| 014 | 13386 | SAFEWAY INC #1142 | 12519 NE 85TH ST | RC3 | 4,294.00 |
| 015 | 46204 | TOTEM LAKE HOLDINGS LLC | 12321 120TH PL NE | RC3 | 4,144.00 |
| 016 | 26804 | 128 STATE STREET LLC | 128 STATE ST S | WM6 | 4,069.00 |
| 017 | 25683 | KIRKLAND CENTRAL COA | 211 KIRKLAND AVE | WM6 | 4,061.00 |
| 018 | 4394 | LA QUINTA MOTOR INN #676 | 10530 NORTHUP WAY | WC6 | 4,014.00 |
| 019 | 46531 | ESSEX PORTFOLIO LP | 12340 NE 115TH PL | RM5 | 3,801.00 |
| 020 | 25813 | LMJ ENTERPRISES | 11845 NE 85TH ST | RHI | 3,801.00 |

# Utility Billing

## Top 10 Irrigation Users

Display Top: 10

Sort By: CONSUMPTION

Date Range: 01/01/16 - 12/31/16

| Rank | Account No | Name | Service Address | Rate | Consumption | Type |
|---|---|---|---|---|---|---|
| 001 | 30664 | LAKE WASHINGTON SCHOOL DISTRICT (IRR) | 12033 NE 80TH ST | RHI | 6,837.00 | IRR COM |
| 002 | 25813 | LMJ ENTERPRISES | 11845 NE 85TH ST | RHI | 3,801.00 | IRR COM |
| 003 | 12930 | NORTHWEST UNIVERSITY | 11220 NE 53RD ST | WSM | 3,091.00 | IRR COM |
| 004 | 6148 | CITY OF KIRKLAND-PARKS MNTC | 202 3RD ST | WSM | 3,038.00 | IRR COM |
| 005 | 23940 | LINBROOK BLDGS LLC | 10520 NE 38TH PL | WSM | 2,948.00 | IRR COM |
| 006 | 50045 | GSIC FORBES CREEK REIT INC APT (SP | 10815 115TH CT NE | IRRmtf | 2,941.00 | IRR MTF |
| 007 | 8429 | CITY OF KIRKLAND PARKS MAINT | 1818 6TH ST | WSM | 2,804.00 | IRR COM |
| 008 | 5912 | CITY OF KIRKLAND PARKS MAINT | 202 3RD ST | WSM | 2,651.00 | IRR COM |
| 009 | 50052 | GSIC FORBES CREEK REIT INC APTS | 10919 113TH CT NE | IRRmtf | 2,608.00 | IRR MTF |
| 010 | 2818 | CITY OF KIRKLAND PARKS MAINT | 500 8TH ST S | WSM | 2,440.00 | IRR COM |

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX J

## Public Agency Review Correspondence

**THIS PAGE INTENTIONALLY LEFT BLANK**

**Kenny Gomez**

**From:** Ken McDowell <kmcdowell@woodinvillewater.com>
**Sent:** Wednesday, September 20, 2017 9:56 AM
**To:** Kenny Gomez
**Subject:** RE: City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

Kenny,

I would have to see what you write first. As there is no reference to WWD in the entire document there should be something in the Executive Summary section, Existing Sewer Facilities Section, and the Adjacent Sewer Systems section. If there is discussion about franchise agreements in the document, we have one in place with the City. I assume the reason we were not mentioned is because we were not part of the City the last time the plan was compiled. Seeing how we are such a small portion of your service area it is easy to understand how it happened. If you have any other questions, please let me know.

Thanks,
KMcD

---

**From:** Kenny Gomez [mailto:kgomez@rh2.com]
**Sent:** Wednesday, September 20, 2017 9:38 AM
**To:** Ken McDowell <kmcdowell@woodinvillewater.com>
**Cc:** Joshua Pantzke <JPantzke@kirklandwa.gov>
**Subject:** RE: City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

Thanks Ken. We will get your comments incorporated into the plan.

Should we be anticipating any other comments from the District?

Thanks,
Kenny Gomez, PE
P: 425.951.5416
C: 425.471.9324

---

**From:** Ken McDowell [mailto:kmcdowell@woodinvillewater.com]
**Sent:** Monday, September 18, 2017 1:24 PM
**To:** Kenny Gomez <kgomez@rh2.com>
**Subject:** RE: City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

Kenny,

I have taken a quick review of your plan and do not see any mention of the Woodinville Water District anywhere in the document. The District provides water to 1,961 residences in your City limits and also serves sewer to 126 residential homes and 1 commercial account. Granted, this isn't a significant amount, but regardless, should be mentioned. If you have any questions, please let me know.

Thanks,
KMcD

**From:** Kenny Gomez [mailto:kgomez@rh2.com]
**Sent:** Friday, September 15, 2017 3:55 PM
**To:** Ken McDowell <kmcdowell@woodinvillewater.com>
**Cc:** Joshua Pantzke <JPantzke@kirklandwa.gov>
**Subject:** City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

Good Afternoon Ken,

Please see attached for a copy of the letter that is being mailed to you regarding review of the City of Kirkland's General Sewer Plan.

If you have any questions, please contact me at (425) 951-5416.

Hope you have a great weekend!

Thanks,

Kenny Gomez, PE | **RH2 Engineering**
Project Engineer
22722 29th Drive SE, Suite 210
Bothell, WA 98021
P: 425.951.5416
kgomez@rh2.com
www.rh2.com

**Kenny Gomez**

**From:** Scott Thomasson <STHOMASSON@REDMOND.GOV>
**Sent:** Tuesday, October 17, 2017 11:13 AM
**To:** Kenny Gomez; Jeff Thompson
**Cc:** Joshua Pantzke
**Subject:** RE: City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

I Have Jeff Thompson taking a look at this. One issue he asked about is what should the plan say about service areas of Kirkland that will flow into Redmond and service areas of Redmond that will flow into Kirkland. This plan should be the basis of the interlocal agreement that would need to be put into place for Redmond to serve Kirkland's pump station at 132nd.

---

**From:** Kenny Gomez [mailto:kgomez@rh2.com]
**Sent:** Tuesday, October 17, 2017 11:06 AM
**To:** Scott Thomasson <STHOMASSON@REDMOND.GOV>
**Cc:** Joshua Pantzke <JPantzke@kirklandwa.gov>
**Subject:** RE: City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

Hi Scott,

I just wanted to check in with you.

Do you anticipate having any review comments for the City of Kirkland's General Sewer Plan?

Thanks,
Kenny Gomez, PE
P: 425.951.5416
C: 425.471.9324

---

**From:** Kenny Gomez
**Sent:** Friday, September 15, 2017 3:55 PM
**To:** 'sthomasson@redmond.gov' <sthomasson@redmond.gov>
**Cc:** 'Joshua Pantzke' <JPantzke@kirklandwa.gov>
**Subject:** City of Kirkland - General Sewer Plan - Adjacent Purveyor Review

Good Afternoon Scott,

Please see attached for a copy of the letter that is being mailed to you regarding review of the City of Kirkland's General Sewer Plan.

If you have any questions, please contact me at (425) 951-5416.

Hope you have a great weekend!

Thanks,
Kenny Gomez, PE | **RH2 Engineering**
Project Engineer
22722 29th Drive SE, Suite 210

## Kenny Gomez

**From:** Kenny Gomez
**Sent:** Thursday, November 02, 2017 9:38 AM
**To:** 'DLane@bellevuewa.gov'
**Cc:** TKomada@bellevuewa.gov; 'Joshua Pantzke'
**Subject:** RE: Kirkland General Sewer Plan Comments

Good Morning Doug,

Please see below for responses.

Let me know if there are any further comments.

Thanks,
Kenny Gomez, PE
P: 425.951.5416
C: 425.471.9324

---

**From:** DLane@bellevuewa.gov [mailto:DLane@bellevuewa.gov]
**Sent:** Thursday, October 26, 2017 10:27 AM
**To:** Kenny Gomez <kgomez@rh2.com>
**Cc:** TKomada@bellevuewa.gov
**Subject:** Kirkland General Sewer Plan Comments

Hi Kenny:

Here are my comments on Kirkland's General Sewer Plan. Sorry this is so late – I was out on vacation. I'm copying Tatsu Komada in case he might have any other comments.

- Page ES-7: The sewered area and the calculation of gpad for Yarrow Bay basin in Table ES-7 might need to include upstream areas in Bellevue (Basin 6), if the meter used to estimate I&I is located downstream at King County's pump station. (Disregard if meter was upstream of joint-use pipe and only measured Kirkland flows.) Our Basin 6 polygon in GIS is 586 acres; it's sewered generally but includes 90+ acres of I-405 and SR-520 ROW (I would estimate 490 sewered acres, though it depends on how/what you count).
    - The peak hour I/I for the Bellevue portion of Yarrow Bay is shown in Table ES-8 along with the other peak hour I/I values. It was not shown in Table ES-7 since this information was derived from Bellevue's WW System Plan.
- My understanding is there was some history of surcharges or backups along Lake Washington Blvd related to lack of capacity at King County's Yarrow Bay Lift Station. Should that be mentioned? Disregard if it is already.
    - I will dig into this further to confirm the surcharges at King County's Yarrow Bay Lift Station when we receive the County's comments. This surcharge is not mentioned at this time. However, the sewer mains upstream of the lift stations were identified as having insufficient capacity for peak hour flow at this time.
- Page 4-11: We had a proposal to re-develop a church with multi-family housing in Basin 6 (will flow to Yarrow Bay Pump Station. We estimate an increase of roughly 20 gpm to peak flow going into Kirkland at the Points Drive intertie west of Bellevue Way/ Lake WA Blvd. I doubt Bellevue's Planning Department assumed this site would redevelop like that, so I would add that above and beyond the future projections of 380 (2021) and 400 (2036).

- My understanding is the developer is not continuing to pursue this development which was why it was not included in the projections. In addition, the projections can be reevaluated when the improvements projects are being designed.

Thanks

Douglas Lane, PE
Water & Sewer Systems Senior Engineer
City of Bellevue
(425)452-6865
dlane@bellevuewa.gov

**Kenny Gomez**

**From:** Hirschey, Steve <Steve.Hirschey@kingcounty.gov>
**Sent:** Friday, December 01, 2017 2:19 PM
**To:** Kenny Gomez
**Subject:** Administrative Appeal Process Must Now Be Offered for Required Septic-to-Sewer Conversions

Ken – here is a follow-up to my our brief conversation just now. This maybe an issue the City wants to proactively address with some language/policy in the wastewater plan. This is not a county issue, given the City does not serve in unincorporated areas (at least as far as I can tell). Steve

http://mrsc.org/Home/Stay-Informed/MRSC-Insight/September-2015/Administrative-Appeal-Process-Must-Now-Be-Offered.aspx

Steve Hirschey
King County Utilities Technical Review Committee
206.477.5387

# Administrative Appeal Process Must Now Be Offered for Required Septic-to-Sewer Conversions

September 8, 2015 by John W. Carpita, PE
Category: Utilities

After several years in the making, the legislature passed a new law, ESB 5871, governing septic-to-sewer conversions, which AWC calls a "middle ground" between the needs of local governments and property owners. Effective July 24, 2015, cities, towns, and counties are now required to offer an administrative appeals process when septic repair or replacement of existing single family systems is denied by the local health department and sewer hookup is required. What is unusual about this new law is that it requires one type of local jurisdiction - a city, town, or county - to hear appeals from decisions made by another type of local jurisdiction - a local health department of health district.

On-site septic systems, or on-site sewage systems, are the most common method of wastewater treatment for homes, commercial establishments, and other places that are not connected to a public sanitary sewer system. An on-site sewage system consists of a network of pipes, a septic tank, and a drain field, and provides subsurface soil treatment and dispersal of sewage.

Many cities, towns, and counties have an ordinance or resolution requiring connection to a public sewer system upon the failure of an on-site septic system. The septic installers association argued that these regulations sometimes forced unfair financial burdens onto homeowners due to the cost of hooking up to sewer systems. This new law gives single-family homeowners an outlet for appeal when a request to repair or replace their existing on-site system is denied solely because of a local law, regulation, or ordinance requiring connection to a public sewer system. Local jurisdictions may use existing administrative appeals processes if the legislative body of the local jurisdiction or an administrative hearings officer presides over that process.

The administrative appeals process must, at a minimum, consider:

- Whether it is cost-prohibitive to require the owner to connect to the public sewer system.

- The public health or environmental impacts from allowing the replacement or repair of the septic system, particularly on surface water and groundwater.
- The impacts on public sewer system performance or financing from the replacement or repair of the septic system.
- If there are financial assistance programs or latecomer agreements available to the owner by the town, city, county, or state.

If, after the appeals process, the jurisdiction determines that the owner still must connect to the public sewer system, the owner may, in complying with the determination and subject to approval of appropriate permits, select and hire contractors to perform the necessary work to connect to the public sewer system at the owner's expense. Unless otherwise required by law, a determination by a local jurisdiction on this issue is not subject to further appeal.

## About John W. Carpita, PE

Public Works Consultant John is MRSC's resource for engineering design, purchasing and bidding issues, contract document preparation, construction contract issues, local improvement districts, sewer, water, storm drainage and solid waste issues, as well as resource conservation. He's a registered professional engineer and has had a widely varied 42-year career as a consultant, county engineer, city engineer and project manager.
VIEW ALL POSTS BY JOHN W. CARPITA, PE

## Comments

0 comments on Administrative Appeal Process Must Now Be Offered for Required Septic-to-Sewer Conversions

Blog post currently doesn't have any comments.

**Kenny Gomez**

**From:** Hirschey, Steve <Steve.Hirschey@kingcounty.gov>
**Sent:** Friday, December 15, 2017 4:21 PM
**To:** Kenny Gomez
**Cc:** DLane@bellevuewa.gov
**Subject:** RE: Kirkland General Sewer Plan Comments

Hi Kenny – in response to your email/Doug's comment, I offer the following:

The surcharge and backup at the Yarrow Bay pump station has been related to power reliability issues. The pump station has dual feed from PSE but both feeds have failed in the past leading to backups and surcharging. We have an emergency generator onsite now to address power reliability.

Secondly, the Wastewater Treatment Division recently assessed the three raw sewage pumps at Yarrow Bay Pump Station. One result of that assessment is that the pumps will be replaced in order to improve operations performance at the station. The pump station and force main are also identified in WTD's Conveyance System Improvement Plan for a full upgrade including capacity improvements. That project is expected to be initiated in the next 4-8 years. Thanks.

Steve Hirschey
King County Utilities Technical Review Committee
206.477.5387

---

From: Kenny Gomez [mailto:kgomez@rh2.com]
Sent: Thursday, December 14, 2017 4:54 PM
To: Hirschey, Steve
Subject: FW: Kirkland General Sewer Plan Comments

Hi Steve,

I am working with the City of Kirkland to address the review comments by the County and adjacent purveyors regarding the City's General Sewer Plan.

I am hoping you could provide some information regarding one of the review comments received from the City of Bellevue.

One review comment by the City of Bellevue (also highlighted below) is there is a lack of capacity at King County's Yarrow Bay Lift Station that is partially responsible for surcharges or backups along Lake Washington Blvd.

Can you please verify if there is currently a lack of capacity at King County's Yarrow Bay Lift Station?

Please call if there are any questions.

Thank you,
Kenny Gomez, PE
P: 425.951.5416
C: 425.471.9324

**From:** DLane@bellevuewa.gov [mailto:DLane@bellevuewa.gov]
**Sent:** Thursday, October 26, 2017 10:27 AM
**To:** Kenny Gomez <kgomez@rh2.com>
**Cc:** TKomada@bellevuewa.gov
**Subject:** Kirkland General Sewer Plan Comments

Hi Kenny:

Here are my comments on Kirkland's General Sewer Plan. Sorry this is so late – I was out on vacation. I'm copying Tatsu Komada in case he might have any other comments.

- Page ES-7: The sewered area and the calculation of gpad for Yarrow Bay basin in Table ES-7 might need to include upstream areas in Bellevue (Basin 6), if the meter used to estimate I&I is located downstream at King County's pump station. (Disregard if meter was upstream of joint-use pipe and only measured Kirkland flows.) Our Basin 6 polygon in GIS is 586 acres; it's sewered generally but includes 90+ acres of I-405 and SR-520 ROW (I would estimate 490 sewered acres, though it depends on how/what you count).
- My understanding is there was some history of surcharges or backups along Lake Washington Blvd related to lack of capacity at King County's Yarrow Bay Lift Station. Should that be mentioned? Disregard if it is already.
- Page 4-11: We had a proposal to re-develop a church with multi-family housing in Basin 6 (will flow to Yarrow Bay Pump Station. We estimate an increase of roughly 20 gpm to peak flow going into Kirkland at the Points Drive intertie west of Bellevue Way/ Lake WA Blvd. I doubt Bellevue's Planning Department assumed this site would redevelop like that, so I would add that above and beyond the future projections of 380 (2021) and 400 (2036).

Thanks

Douglas Lane, PE
Water & Sewer Systems Senior Engineer
City of Bellevue
(425)452-6865
dlane@bellevuewa.gov

King County

**Utilities Technical Review Committee**
Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 503
Seattle, WA 98104-3855
www.kingcounty.gov

RECEIVED BOTHELL
RH2 ENGINEERING INC.
JOB NO:

DEC 23 2017

ROUTE TO: KG
FILE:

December 19, 2017

Mr. Josh Pantzke
City of Kirkland
915 8th Street
Kirkland WA 98033

Dear Mr. Pantzke;

The City of Kirkland (City) submitted a City of Kirkland General Sewer Plan, August 2017 Agency Review Draft (Plan) in September of 2017 to King County. This letter is a review of the Plan pursuant to King County Code (K.C.C.) 28.84. The criteria for review are listed in K.C.C. 28.84.050(D)(3) and include the review of design and construction standards and standard specifications, review of ordinances and resolutions, and that comprehensive sewer plans are prepared and approved subject to the requirements defined in K.C.C. 13.24, and by reference, chapter 173-240 Washington Administrative Code (WAC).

In reviewing the draft Plan, the Utilities Technical Review Committee (UTRC) found that it is largely consistent with the County's comprehensive plan and code. Following is a list of the additional information necessary before we can make a recommendation for approval of the City's final Plan. We request the final Plan include:

1. Updated reference to the current King County Comprehensive Plan last updated in December 2016;

2. A list of all establishments producing industrial wastewater, the quantity of wastewater and periods of production, and the character of the industrial wastewater insofar as it may affect the sewer system or treatment plant. Consideration should be given to future industrial expansion, if any. Attached is a list of the known Industrial Waste Discharge permits for establishments within the City that King County has on record;

3. A description of opportunities for reclaimed water use as required under RCW 90.48.112. To facilitate the assessment, the Washington State Department of Ecology has published guidance material on their website, or alternatively, the King County Reclaimed Water Checklist is available online here: http://www.kingcounty.gov/~/media/environment/dnrp/documents/WaterReclamationChecklist12_2011.ashx?la=en

4. Provide an evaluation of the impact of future water conservation efforts on wastewater flows;

5. Provide a final, dated and signed State Environmental Policy Act checklist and determination for this action; and

6. The resolution adopting the final Plan by the City.

Our review of the design and construction standards, standard specifications, ordinances and resolutions from the City raised no issues of concern.

King County is pleased to see the draft plan acknowledges Inflow and Infiltration (I/I) as a problem for sewer collection systems and the City is proposing an I/I study.

King County, along with the cities and sewer districts that deliver wastewater to the regional system, is evaluating concepts for I/I reduction. Sewer and side sewer standards, inspection practices, and private side sewer programs are specific types of concepts that are being explored. King County appreciates the City of Kirkland's involvement in this process. Some results are currently available. Recommendations from the evaluation are expected in 2018. The City's General Sewer Plan is one opportunity to position your ongoing work directly to the I/I evaluation results and recommendations.

The General Sewer Plan proposes an I/I Study in the future to identify areas of its system with significant I/I and cost-effective improvements that could be implemented to reduce I/I in the City sewer system. When developing the specific scope for the study, we would encourage you to include a private side sewer component that may:

- use specific recommendations from the regional I/I effort;
- expand the information available on the status of I/I in private side sewers through video inspections, flow monitoring or other approaches; and
- develop an ongoing private side sewer program.

The General Sewer Plan describes several sewer main replacement projects as part of the City's capital improvement plan. As part of the regional I/I effort, it was found that some cities and sewer districts use sewer main replacements as an opportunity to also replace private side sewers and as part of a private side sewer program. Due to the high I/I flow rates in portions of the City's sewer system, we would encourage the City to consider such tools to reduce I/I.

Other opportunities to integrate future 2017/2018 regional I/I recommendations include updates to I/I and side sewer policies, standards, and design criteria, and updates to ongoing programs such as staff training programs, inspection programs and /I reduction programs.

For further information on the I/I program results and recommendations, please contact Steve Tolzman with the King County Wastewater Treatment Division, at 206.477.5459 or steve.tolzman@kingcounty.gov.

The City submitted the Plan to the Washington State Department of Ecology (Ecology) for its review and approval. We would like to see the City's responses to Ecology's comments as well as the comments and responses to comments provided by any other entities.

The Director of the Department of Natural Resources will make the approval decision on the City's Plan given the City is a component agency of the regional system with no sewer service in unincorporated King County. The Director's final action on the Plan will constitute King County's approval of the Plan.

If you have any questions or concerns on information or findings in the letter, please do not hesitate to call me at 206-477-5387, or my colleague, Mark Lampard, in our Wastewater Treatment Division, at 206-477-5414.

Sincerely,

Stephen Hirschey
Chair, Utilities Technical Review Committee

cc Mr. Shawn McKone, Water Quality Program, Washington State Department of Ecology
Mr. Kenny Gomez, RH2 Engineering, Inc.

Enclosure

| Name | Investigator | | Customer Type | Address | | | Permit # | Effective Date | Expiration | Permit Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 84th Rose Terrace LLC Construction Project | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 12802 NE 84TH STREET | KIRKLAND | 98003 | 40055-01 | 24-Oct-16 | 23-Oct-18 | GLA-CONSTRUCTION |
| Absolute GM LLC | TODD GOWING | CITY OF KIRKLAND | GENERAL TYPE | 11809 NE 116TH STREET | KIRKLAND | 98034 | 400314-01 | 27-Jun-16 | | NO CONTROL DOCUMENT REQUIRED |
| AquaTactics LLC (fka Aqua Life Veterinary Services LLC) | PEGGY RICE | NORTHSHORE UTILITY DISTRI( | LABORATORY | 12015 115TH AVENUE NE, SUITE 120 | KIRKLAND | 98034 | 400292-01 | 7-Mar-16 | | NO CONTROL DOCUMENT REQUIRED |
| Astronics AES Corp. | DAVE HABERMAN | CITY OF KIRKLAND | MANUFACTURING-MISC | 12950 WILLOWS ROAD NE | KIRKLAND | 98034 | 400160-01 | 14-Aug-14 | | NO CONTROL DOCUMENT REQUIRED |
| Big Mountain Enterprises - Hultquist Homes - Ridge at Finn Hill | LYDIA ENG | NORTHSHORE UTILITY DISTRI( | CONSTRUCTION DEWATERING | NE 145TH STREET AND 81ST AVENUE N | KIRKLAND | 98034 | 11782-01 | 3-Aug-17 | 3-Nov-17 | LETTER OF AUTHORIZATION |
| DTSJ Holdings, LLC - Chick-fil-A Construction Project | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 12026 NE 124TH STREET | KIRKLAND | 98034 | 40091-01 | 2-Feb-17 | 1-Feb-19 | GLA-CONSTRUCTION |
| Dibble Engineers - Market Street Construction Project | RYAN SALEM | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 1029 MARKET STREET | KIRKLAND | 98033 | 11778-01 | 17-Jul-17 | 16-Jul-19 | LETTER OF AUTHORIZATION |
| Dynamic Harvest | PEGGY RICE | CITY OF KIRKLAND | Cannabis Grower | 13513 NE 126TH PLACE, SUITE B | KIRKLAND | 98034 | 400304-01 | 11-May-16 | | NO CONTROL DOCUMENT REQUIRED |
| East West Quality Home LLC Construction Project | DESPINA STRONG | NORTHSHORE UTILITY DISTRI( | CONSTRUCTION DEWATERING | 11610 80TH AVENUE NE | KIRKLAND | 98033 | 40066-01 | 8-Nov-16 | 7-Nov-18 | GLA-CONSTRUCTION |
| Eastside Preparatory School - Schuchart Corporation - TALI Hal | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 10613 NE 38TH PLACE | KIRKLAND | 98033 | 40114-01 | 31-Jul-17 | 30-Jul-19 | GLA-CONSTRUCTION |
| Eastside Subaru - Kirkland Automotive Holdings | PEGGY RICE | CITY OF KIRKLAND | Wash Pad | 11803 NORTHEAST 116TH STREET | KIRKLAND | 98034 | 400342-01 | 10-Nov-16 | | NO CONTROL DOCUMENT REQUIRED |
| Evergreen Health | LYDIA ENG | NORTHSHORE UTILITY DISTRI( | HOSPITAL | 12040 NE 128TH STREET | KIRKLAND | 98034 | 703-04 | 2-Aug-17 | 1-Aug-22 | MINOR DISCHARGE AUTHORIZATION |
| Float Rubicon | PEGGY RICE | CITY OF KIRKLAND | GENERAL TYPE | 9715 NE 119TH WAY | KIRKLAND | 98034 | 101152-01 | 10-Mar-17 | | NO CONTROL DOCUMENT REQUIRED |
| Fractal LLC | RYAN SALEM | CITY OF KIRKLAND | GENERAL TYPE | 13625 NE 126TH PLACE, SUITE 400 | KIRKLAND | 98034 | 400299-01 | 6-Apr-16 | | NO CONTROL DOCUMENT REQUIRED |
| Havlik's Radiator Service Inc. | RYAN SALEM | CITY OF KIRKLAND | RADIATOR REPAIR | 11851 124TH AVENUE NE | KIRKLAND | 98034 | 11699-01 | 1-Jun-16 | 31-May-21 | LETTER OF AUTHORIZATION |
| Hy Kitchen Cabinet & Stone Inc. | DAVE HABERMAN | CITY OF KIRKLAND | GENERAL TYPE | 11251 120TH AVENUE NE, SUITE 146 | KIRKLAND | 98033 | 400049-01 | 3-Jul-13 | | NO CONTROL DOCUMENT REQUIRED |
| King County SWD - Houghton Transfer Station | RYAN SALEM | CITY OF KIRKLAND | SOLID WASTE - TRANSFER FAC | 11724 NE 60TH STREET | KIRKLAND | 98033 | 4423-01 | 1-Aug-17 | 31-Jul-22 | MAJOR DISCHARGE AUTHORIZATION |
| Kirkland Main Street, LP - Park Lane Mixed-Use Apartments Co | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 207 PARK LANE | KIRKLAND | 98033 | 40032-01 | 29-Jul-16 | 28-Jul-18 | GLA-CONSTRUCTION |
| Kirkland, City of - Lake Washington Blvd. Crossing Enhancemer | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 3781 LAKE WASHINGTON BLVD | KIRKLAND | 98033 | 40016-01 | 15-Apr-16 | 14-Apr-18 | GLA-CONSTRUCTION |
| Kirkland, City of - Storm/Sewer Decant Station | TODD GOWING | CITY OF KIRKLAND | DECANT STATION | 904 8TH STREET | KIRKLAND | 98033-618 | 4131-03 | 28-Aug-17 | 27-Aug-22 | MAJOR DISCHARGE AUTHORIZATION |
| Maelstrom Brewing LLC | RYAN SALEM | CITY OF KIRKLAND | FOOD PROCESSING-BREWERY | 11014 120TH AVENUE NE | KIRKLAND | 98033 | 400378-01 | 25-Jul-17 | | NO CONTROL DOCUMENT REQUIRED |
| Overlake Oil Inc. | LYDIA ENG | CITY OF KIRKLAND | FUELING FACILITY | 1021 EIGHTH ST. | KIRKLAND | 98033 | 400315-01 | 12-Jul-16 | | NO CONTROL DOCUMENT REQUIRED |
| PPN Ventures LP - Cubes Self Storage | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 615 SEVENTH AVENUE | KIRKLAND | 98033 | 40056-01 | 25-Oct-16 | 24-Oct-18 | GLA-CONSTRUCTION |
| Pillar Properties - 11 Main Street South Footing Drains | PEGGY RICE | NORTHSHORE UTILITY DISTRI( | GROUNDWATER REMEDIATION - | 11 MAIN STREET SOUTH | KIRKLAND | 98033 | 4414-01 | 20-Mar-17 | 19-Mar-22 | MAJOR DISCHARGE AUTHORIZATION |
| Puget Sound Developers Services | DANA HEINZ | CITY OF KIRKLAND | GENERAL TYPE | 733 126TH AVENUE NE | KIRKLAND | 98033 | 400045-01 | 28-May-13 | | NO CONTROL DOCUMENT REQUIRED |
| Quality Finishing | DANA HEINZ | NORTHSHORE UTILITY DISTRI( | METAL FINISHING - CFR 433 | 12704 NE 124TH STREET, SUITE 42 | KIRKLAND | 98034 | 9708-02 | 5-Feb-15 | 4-Feb-20 | ZERO DISCHARGE (CATEGORICAL) |
| Silicon Designs Inc. - Kirkland | RYAN SALEM | NORTHSHORE UTILITY DISTRI( | ELECTRONIC COMPONENTS - CFR | 13905 NE 128TH STREET | KIRKLAND | 98034 | 7914-01 | 15-Apr-15 | 30-Jun-18 | PERMIT |
| Toll Brothers Inc. - Kirkland Compound Construction Project | RYAN SALEM | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 11808 NE 70TH STREET | KIRKLAND | 98033 | 11732-01 | 15-Nov-16 | 14-Nov-18 | LETTER OF AUTHORIZATION |
| Village at Totem Lake - Bldg. D | GREG NEWBORN | NORTHSHORE UTILITY DISTRI( | GENERAL TYPE | 12632 TOTEM LAKE BLVD | KIRKLAND | 98034 | 400385-01 | 20-Sep-17 | | NO CONTROL DOCUMENT REQUIRED |
| Village at Totem Lake, LLC | GREG NEWBORN | NORTHSHORE UTILITY DISTRI( | GENERAL TYPE | 12660 TOTEM LAKE BLVD | KIRKLAND | 98034 | 400334-01 | 21-Sep-16 | | NO CONTROL DOCUMENT REQUIRED |
| Western Pneumatic Tube Company LLC | DAVE HABERMAN | CITY OF KIRKLAND | METAL FINISHING - CFR 433 | 835 SIXTH STREET S. | KIRKLAND | 98033 | 7604-05 | 31-Dec-15 | 30-Dec-20 | PERMIT |
| Windward Wendy LLC Construction Project | DESPINA STRONG | CITY OF KIRKLAND | CONSTRUCTION DEWATERING | 301 FOURTH AVENUE | KIRKLAND | 98033 | 40131-01 | 1-Oct-17 | 30-Sep-19 | GLA-CONSTRUCTION |

**Stephanie Perkins**

**From:** Joshua Pantzke <JPantzke@kirklandwa.gov>
**Sent:** January 3, 2018 2:21 PM
**To:** Kenny Gomez
**Subject:** FW: Reclaimed Water Feasibility Study - Data Request

We could include the information collected from the request below to address KC's comment #3 in their review letter.

*Josh Pantzke*
Utility Manager
City of Kirkland, Department of Public Works
Maintenance Center
P: 425-587-3917 C: 425-559-3131 E: jpantzke@kirklandwa.gov

---

**From:** Paula Anderson [mailto:panderson@cascadewater.org]
**Sent:** Tuesday, December 19, 2017 11:41 AM
**To:** Kathy Brown; Joshua Pantzke; Kyle Butler; Sarah Ogier; mchaw@bellevuewa.gov; Scott Thomasson; Linda E. De Boldt
**Cc:** Ed Cebron; Ray Hoffman; Chuck Clarke; jeff.hansen@hdrinc.om; jacque.klug@kingcounty.gov
**Subject:** Reclaimed Water Feasibility Study - Data Request

Cascade is partnered with King County and Woodinville WD to evaluate reclaimed water feasibility in and near the Sammamish Valley Corridor. We have vaguely defined a service area consisting of areas north of 520, east of 132$^{nd}$ Avenue, and west of the Bear Creek valley. The study will further define this.

The consultant is now starting, and has requested the following information from the retail water utilities: Bellevue, Kirkland, Redmond (and Woodinville). We would appreciate your timely response and assistance on providing this data.

1. List of 20 largest water customer accounts for 2016 (based on total annual consumption). [Note: This should be for the largest individual metered locations. E.g., a specific school, not the entire school district as a customer.] In addition, for each of these accounts:
   a. Monthly or bimonthly billing data (consumption) for each customer, for 2014-2016 (to the extent available).
   b. Location of each (address or mapped location).
2. If the utility has a separate irrigation customer class and the highest 10 irrigation accounts for 2016 are not all included in the above "top 20" list, provide the list of additional top irrigation accounts so that in total the largest 10 irrigation accounts are captured. (I.e., the point is to identify the top 10 irrigation accounts, even if they don't all fall within the overall top 20 customer account list in #1.)
   a. Monthly or bimonthly billing data for these accounts.
   b. Location of each.
3. GIS layers depicting current zoning and land use (as applicable to future growth/development).
4. GIS layers for wellhead protection areas (I believe this really only applies to Redmond, unless Bellevue has prepared WHPP areas for any emergency wells).
5. Contacts at each City/utility that HDR can reach out to discuss future development/growth patterns.

Please send the information directly to Jeff Hansen at HDR (email info below) and CC me and Ed Cebron at Cascade.

Thank you!
Paula Anderson

Cascade Water Alliance

Jeff Hansen, PE
**D** 360.570.4410 **M** 360.970.9752

Jeff.hansen@hdrinc.com

## Stephanie Perkins

**From:** Joshua Pantzke <JPantzke@kirklandwa.gov>
**Sent:** January 3, 2018 2:24 PM
**To:** Kenny Gomez
**Subject:** FW: Reclaimed Water Feasibility Study - Data Request
**Attachments:** Top 25 Consumption Top 10 Irrigation 2016.xls

Data attached.

*Josh Pantzke*
Utility Manager
City of Kirkland, Department of Public Works
Maintenance Center
P: 425-587-3917 C: 425-559-3131 E: jpantzke@kirklandwa.gov

---

**From:** Jay Gewin
**Sent:** Wednesday, December 27, 2017 5:04 PM
**To:** Joshua Pantzke
**Subject:** RE: Reclaimed Water Feasibility Study - Data Request

Hi Josh,

How does this look?

Jay Gewin
*Customer Accounts Supervisor*
*City of Kirkland*
425-587-3144

---

**From:** Joshua Pantzke
**Sent:** Tuesday, December 26, 2017 10:44 AM
**To:** Jay Gewin <jgewin@kirklandwa.gov>
**Subject:** FW: Reclaimed Water Feasibility Study - Data Request

Jay,

Can you gather the information highlighted in yellow below for me, please? An excel spreadsheet would be great but whatever is easiest, they don't specify the format.  Would you be able to complete this in the next week?

Thank you

Josh

*Josh Pantzke*
Utility Manager
City of Kirkland, Department of Public Works
Maintenance Center
P: 425-587-3917 C: 425-559-3131 E: jpantzke@kirklandwa.gov

**From:** Paula Anderson [mailto:panderson@cascadewater.org]
**Sent:** Tuesday, December 19, 2017 11:41 AM
**To:** Kathy Brown; Joshua Pantzke; Kyle Butler; Sarah Ogier; mchaw@bellevuewa.gov; Scott Thomasson; Linda E. De Boldt
**Cc:** Ed Cebron; Ray Hoffman; Chuck Clarke; jeff.hansen@hdrinc.om; jacque.klug@kingcounty.gov
**Subject:** Reclaimed Water Feasibility Study - Data Request

Cascade is partnered with King County and Woodinville WD to evaluate reclaimed water feasibility in and near the Sammamish Valley Corridor. We have vaguely defined a service area consisting of areas north of 520, east of 132nd Avenue, and west of the Bear Creek valley. The study will further define this.

The consultant is now starting, and has requested the following information from the retail water utilities: Bellevue, Kirkland, Redmond (and Woodinville). We would appreciate your timely response and assistance on providing this data.

1. List of 20 largest water customer accounts for 2016 (based on total annual consumption). [Note: This should be for the largest individual metered locations. E.g., a specific school, not the entire school district as a customer.] In addition, for each of these accounts:
    a. Monthly or bimonthly billing data (consumption) for each customer, for 2014-2016 (to the extent available).
    b. Location of each (address or mapped location).
2. If the utility has a separate irrigation customer class and the highest 10 irrigation accounts for 2016 are not all included in the above "top 20" list, provide the list of additional top irrigation accounts so that in total the largest 10 irrigation accounts are captured. (I.e., the point is to identify the top 10 irrigation accounts, even if they don't all fall within the overall top 20 customer account list in #1.)
    a. Monthly or bimonthly billing data for these accounts.
    b. Location of each.
3. GIS layers depicting current zoning and land use (as applicable to future growth/development).
4. GIS layers for wellhead protection areas (I believe this really only applies to Redmond, unless Bellevue has prepared WHPP areas for any emergency wells).
5. Contacts at each City/utility that HDR can reach out to discuss future development/growth patterns.

Please send the information directly to Jeff Hansen at HDR (email info below) and CC me and Ed Cebron at Cascade.

Thank you!
Paula Anderson
Cascade Water Alliance

Jeff Hansen, PE
**D** 360.570.4410 **M** 360.970.9752

Jeff.hansen@hdrinc.com

# Utility Billing

## Top Users Report

User: aremon
Display Top: 10
Print By: CYCLE
Sort By: CONSUMPTION
Service: 1
Billing Cycle: (All)
Date Range: 01/01/16 - 12/31/16

| Account No | Name | Service Address | Rate | Consumption | |
|---|---|---|---|---|---|
| 30664 | LAKE WASHINGTON SCHOOL DISTRICT (II | 12033 NE 80TH ST | RHI | 6,837.00 | IRR COM |
| 25813 | LMJ ENTERPRISES | 11845 NE 85TH ST | RHI | 3,801.00 | IRR COM |
| 12930 | NORTHWEST UNIVERSITY | 11220 NE 53RD ST | WSM | 3,091.00 | IRR COM |
| 6148 | CITY OF KIRKLAND-PARKS MNTC | 202 3RD ST | WSM | 3,038.00 | IRR COM |
| 23940 | LINBROOK BLDGS LLC | 10520 NE 38TH PL | WSM | 2,948.00 | IRR COM |
| 50045 | GSIC FORBES CREEK REIT INC APT (SP | 10815 115TH CT NE | IRRmtf | 2,941.00 | IRR MTF |
| 8429 | CITY OF KIRKLAND PARKS MAINT | 1818 6TH ST | WSM | 2,804.00 | IRR COM |
| 5912 | CITY OF KIRKLAND PARKS MAINT | 202 3RD ST | WSM | 2,651.00 | IRR COM |
| 50052 | GSIC FORBES CREEK REIT INC APTS | 10919 113TH CT NE | IRRmtf | 2,608.00 | IRR MTF |
| 2818 | CITY OF KIRKLAND PARKS MAINT | 500 8TH ST S | WSM | 2,440.00 | IRR COM |

## Stephanie Perkins

| | |
|---|---|
| **From:** | McKone, Shawn (ECY) <SHMC461@ECY.WA.GOV> |
| **Sent:** | July 31, 2018 10:24 AM |
| **To:** | KBrown@kirklandwa.gov |
| **Cc:** | Joshua Pantzke; Kenny Gomez; Hirschey, Steve |
| **Subject:** | City of Kirkland Draft General Sewer Plan |
| **Attachments:** | Kirkland 2018 Sewer Comp Plan - Ecology Review.xlsx |

Ms. Brown,

On May 10, 2018, RH2 Engineers submitted a draft general sewer plan on the City of Kirkland's behalf for Ecology's review. We have completed our review and are providing the attached comments. Please make necessary revisions to the plan prior to submitting the final version for approval.

I am happy to meet with you or your staff and consultants at any time to discuss the comments. Please don't hesitate to let me know if any additional information is needed.

Best regards,
Shawn

**Shawn McKone, P.E.**
Municipal Facility Manager
Washington Department of Ecology |NWRO, Water Quality Program |3190 160th Ave. SE | Bellevue, WA 98008-5452
(425) 649-7037 | shawn.mckone@ecy.wa.gov

# City of Kirkland General Sewer Plan - Review Comment/Response Form

**Review Phase:** Draft
**Contact:** Kenny Gomez, PE, RH2 Engineering

**Reviewed By:** Shawn McKone, PE
**Comment Date:** 7/31/2018

| No. | Dwg. Sheet No. / Spec. & Page No. | Sector / Paragraph No. | Comment | Reviewer last name | Response | Responder | Reviewer Check Off | Implementation Date | Implementation Initials |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Page 2-4 | Lift Stations | The lift station general description states that the city performed drawdown tests at each lift station. Please provide more detail on how tests were conducted. In particular, please verify that testing was done on each individual pump to determine their individual capacities. | McKone | **New Text -** The City performed additional drawdown tests in 2018. Tests were performed on each pump individually and with two pumps in operation at the lift station. The measurements and results from these tests can be found in Appendix E.<br><br>Tables 2-2 and 4-9 and corresponding text were updated with the new lift station pump capacities. | *City (Pantzke), and RH2 (Gomez)* | | | |
| 2 | Page 2-4 | Lift Stations, Table 2-2 | The table shows that the pump capacities for the Yarrow Bay II and Waverly Park lift stations are substantially lower than the rated design capacities. Has any investigation been done to determine why actual capacity is lower than design? Please discuss any known factors that contribute to actual flow rates being lower than the design capacity. | McKone | See response to Comment No. 1.<br><br>**New Text -** As shown in Table 2-2, the drawdown pump tests performed by the City at this lift station indicate the current capacity of each pump is less than the design capacity. The lower pumping rates have not been investigated by the City yet. The lower pumping rates could be due to a number of reasons including, but not limited to, the difference in the pump intake and discharge elevations constructed being greater than what was designed, pump impellors becoming worn, or a restriction or buildup of material in the force main. The City will continue to monitor these pumps and may further investigate this manner if it develops into an issue for this lift station. | *City (Pantzke), and RH2 (Gomez)* | | | |
| 3 | Page 2-4 | Lift Stations, Table 2-2 | The table shows that the Lake Plaza lift station has a design and draw down test capacity of 750 gpm and a firm capacity of 1,300 gpm. Ecology assumes the firm capacity for this station is with two of the station's three pumps in operation. If so, shouldn't the firm capacity be 1,500 gpm (2x750)? If there are factors that reduce the station's overall capacity with two pumps operating in tandem, please discuss them in the narrative for the station on page 2-6. | McKone | See response to Comment No. 1.<br><br>**New Text -** The drawdown pump tests performed by the City at Lake Plaza Lift Station indicate each pump running individually has a capacity of 801 gpm and the firm capacity of this lift station with two pumps in operation is 1,157 gpm, as provided in Table 2-2. The capacity of this lift station with two pumps in operation is not twice of what it is with one pump in operation because all three of the lift station pumps discharge through the same force main and the friction losses in this force main increase exponentially as the flow rate increases with two pumps in operation. | *City (Pantzke), and RH2 (Gomez)* | | | |

| No. | Dwg. Sheet No. / Spec. & Page No. | Sector / Paragraph No. | Comment | Reviewer last name | Response | Responder | Reviewer Check Off | Implementation Date | Implementation Initials |
|---|---|---|---|---|---|---|---|---|---|
| 4 | Page 2-5 | Rose Point Lift Station | The text notes that the Rose Point Lift Station has a constructed overflow to Lake Washington. Please provide more detail about this overflow, including a more exact description of the discharge location and a summary of past discharges from the station. Any overflows from this lift station would be considered an unpermitted discharge to waters of the state. Were all past discharges reported to Ecology? The text also notes that "a replacement...is currently being designed and is anticipated to be constructed in 2017". Ecology does not have a record of reviewing or approving engineering documents for this replacement. WAC 173-240-030(5) specifically requires Ecology review and approval for any lift station that includes constructed overflows or bypasses. Please discuss the status of design/construction of the new lift station. Also discuss how the City plans to comply with the document submittal requirement cited above and describe how the proposed design will eliminate the unpermitted discharge (or potential to discharge) to Lake Washington. | McKone | **New Text -** The station's overflow system discharges to Lake Washington by Kiwanis Park near the water surface level. The overflow pipe was plugged with a mechanical plug from within the lift station wetwell in July 2018. The City has no known history of overflows occurring at Rose Point Lift Station in the last decade.<br><br>**New Text -** A replacement for the Rose Point Lift Station is currently being designed, which is 90 percent complete, and is anticipated to have construction completed in 2019. The proposed lift station includes decommission of the station's overflow system.<br><br>**New Text -** The existing wetwell will be utilized as emergency offline storage for the proposed lift station. | *City (Pantzke)* | | | |
| 5 | Page 2-7 | Wastewater Treatment and Disposal Facilities | Please include relevant detail for the service agreement with King County DNRP that impact the flow of wastewater to their system for treatment. Details may include committed capacity at the South plant for the City, any regulation of flow rates into the East Interceptor or other DNRP facilities, and any other requirements that limit or regulate the City's ability to send sewage flow to DNRP. | McKone | **New Text -** The City's current agreement with the County (Appendix B) does not include any details regarding committed capacity for the City or regulation of flow rates discharged by the City. The City last renewed its agreement in 2014. However, the County is in process of updating its service agreements with its wholesale sewer customers. The City anticipates it will likely renew its service agreement with the County during the County's current effort to renew contracts. | *City (Pantzke)* | | | |
| 6 | Page 2-7 | Telemetry and Supervisory Control | Please include a brief discussion regarding network security for the SCADA system. While it is not necessary to include any information that may compromise the integrity of the system's security, the plan should include a general discussion about practices and protocols in place to prevent malicious access. | McKone | **New Text -** The City is in process of implementing a SCADA hardware and software replacement program. As part of process, The City's data backup protocol has been updated. The City now has a dedicated off-site server, which is used to store the backup data. Only a secured VPN connection is used to access the City's SCADA system remotely. | *City (Pantzke)* | | | |
| 7 | Page 2-8 | Industrial Wastewater Facilities/ Characterization | It is unclear why Western Pneumatic is specifically called out in this text. The county-issued pretreatment permit for this facility is included in Appendix H and it is included in the facilities list in that appendix. The Industrial Stormwater Permit cited in the text is not necessarily relevant to the "general sewer plan" unless that stormwater flow ends up in the sewage collection system. Please clarify. | McKone | References to the Industrial Stormwater Permit and Western Pneumatic were removed from the Chapter. | *RH2 (Gomez)* | | | |

| No. | Dwg. Sheet No. / Spec. & Page No. | Sector / Paragraph No. | Comment | Reviewer last name | Response | Responder | Reviewer Check Off | Implementation Date | Implementation Initials |
|---|---|---|---|---|---|---|---|---|---|
| 8 | Page 2-9 | Northshore Utility District | The text states that "the City and Northshore were working on a mutual agreement to have Northshore assume ownership of the NE 124th Street sewer drainage basin". Please identify the basin(s) impacted by this transfer using basin numbers shown in figure 2-4. Also, please highlight the basin(s) in figure 2-4 to clearly show the areas involved. What is the status of this transfer? | McKone | **New Text -** This agreement was completed in 2017. Minor Sewer Drainage Basin No. 32 was the only basin transferred to Northshore as part of this agreement; shown in Figure 2-4.<br><br>Transfer of service area agreement added to Appendix B.<br><br>Figure 2-4 (Sewer Drainage Basins), all other figures, and several updates to the chapters and appendices have been made to remove information regarding the City's NE 124th Street Sewer Drainage Basin since it is no longer part of the City's wastewater system. | *City (Pantzke), and RH2 (Gomez)* | | | |
| 9 | Page 2-10 | Water System | Please expand the water system discussion to clarify whether there are any public or private wells within the sewer service area. Also provide a brief discussion about the proximity of the identified major water facilities to key wastewater facilities. The focus of this section should be on identifying where wastewater facilities may have a potential to conflict with or impact drinking water facilities or supplies for the city or neighboring jurisdictions. Please also include a map showing the location of key water facilities (see WAC 173-240-050(d)(vii) and 050(j)). | McKone | Figure 2-6 (Existing Water and Sewer Systems) has been added.<br><br>**New Text -** None of the City's wastewater facilities are located adjacent to major drinking water facilities for the City or adjacent drinking water purveyors. As a result of this separation, the City's wastewater facilities are unlikely to conflict with or impact the drinking water facilities or supplies for the City or neighboring purveyors.<br><br>**New Text -** The City is not aware of any active public springs or wells within the City limits. However, there are a number of private wells adjacent to the City's sewer service area, as shown in Figure 2-6. | *City (Pantzke), and RH2 (Gomez)* | | | |

| No. | Dwg. Sheet No. / Spec. & Page No. | Sector / Paragraph No. | Comment | Reviewer last name | Response | Responder | Reviewer Check Off | Implementation Date | Implementation Initials |
|---|---|---|---|---|---|---|---|---|---|
| 10 | Page 4-10 | Projected wastewater flow rate - assumptions, 7th bullet | The method for projecting the future peak I/I is not clear. Page 4-9 discusses that the figures of 600 gpad (year 2021) and 2,000 gpad (year 2035) are the assumed future I/I rates for new construction in currently unsewered basins. The bullet point implies that these values are being added to the existing measured peak hour I/I rate for each basin. This would seem result in an overestimate of future I/I rates. Since only portions of each basin are currently unsewered, the future I/I impact should be proportional to the fraction of the full basin that is new versus existing. It also doesn't seem to assume any reductions due to I/I corrections in the existing systems. Please clarify the approach for projecting future I/I. Since Table 4-8 shows I/I from each basin in units of gpm, does the projection method first convert the per-acre I/I rates to per-minute rates based on that total sewered and unsewered areas in each basin? | McKone | The text regarding the method for projecting the future peak I/I has been modified to be clearer.<br><br>**New Text -** The projected additional I/I flow rates of 600 gpad (for 2021) and 2,000 gpad (for 2035) for new construction were multiplied by the area of the potentially sewered areas (which are currently unsewered) in each basin to estimate the additional I/I flow for 2021 and 2035, respectively. The total projected total peak hour I/I flows for each basin were estimated by adding the projected additional I/I flow for new construction to the existing total peak hour I/I flow for that basin. The total peak hour I/I flow for each scenario was converted from gallons per day (gpd) to gallons per minute (gpm).<br><br>For the purposes of this GSP, it was assumed the existing I/I flow rates would not further degrade over time in the City's exsting sewer system, and that the City's staff would perform maintenance on the City's sewer system in a manner that would prevent further degradation of the existing sewer system.<br><br>**New Text -** In addition, the results of improvement projects to correct I/I in an existing sewer system can be highly variable in effectiveness for I/I reduction and are difficult to predict. | *RH2 (Gomez)* | | | |
| 11 | Page 4-12 | Projected wastewater flow rate - modeling | The paragraph below table 4-9 suggests that some of the gravity mains may have enough storage capacity to accommodate some of the 20-year peak I/I flow. Does the city's current system modeling evaluate hydraulic grade lines for the collection system under peak flow conditions? Has the modeling verified this assumption? Will use of the gravity system for peak I/I storage result in any unacceptable surcharging? | McKone | The sentence of this paragraph regarding potential additional storage was removed. The City will not rely on this unknown possibility unless it is confirmed. | *City (Pantzke)* | | | |

| No. | Dwg. Sheet No. / Spec. & Page No. | Sector / Paragraph No. | Comment | Reviewer last name | Response | Responder | Reviewer Check Off | Implementation Date | Implementation Initials |
|---|---|---|---|---|---|---|---|---|---|
| 12 | Chapter 5 | SSO Response | Please include discussion of policies and procedures for responding to sewer overflows. Include details about notification procedures (who is notified along with when and how they are notified) as well as general actions the field crew will take in response to overflows. Does the City notify Ecology of SSOs? Are appropriate stormwater utilities notified if a SSO enters a storm drain? | McKone | **New Text -** The City encourages all employees to call the City Response Team at 425-581-3900 24 hours a day if they notice a pipe leak of any kind. This includes sewer overflows and even drinking water leaks. The City's procedure for responding to pipe leaks includes the City employee or City Response Team to calling Ecology's Northwest Office at 425-649-7000 and report the pipe leak to the Environmental Report Tracking System (ERTS), even for drinking water leaks.<br><br>**New Text -** When responding to a sewer overflow, City procedure is for field staff to determine the best practices to evaluate the situation and implement those practices as appropriate to prevent further contamination. This includes, but is not limited to, using vactor trucks to clean up leaks and clean out blockages, roadway cleanup, sandbagging, and providing emergency power when appropriate. | *City (Pantzke)* | | | |
| 13 | Page 5-2 | Regulations | While the city's activities related to conveyance of domestic sewage discussed in this general sewer plan do not require NPDES permit coverage, the city must maintain NPDES permit coverage under the Phase II Municipal Stormwater General Permit (MSGP). The MSGP contains requirements that do relate to this plan, such as illicit connections of sanitary sewer to stormwater systems, or direct inflow of stormwater systems into the sanitary system. It should also be noted that any SSO that may reach surface water or groundwater is considered an unpermitted discharge to waters of the state under state law. | McKone | Noted; see responses to Comment Nos. 4 and 12. | *City (Pantzke)* | | | |
| 14 | Page 5-4 | Gravity Sewer Design Criteria | Please identify the minimum slope and minimum flow velocity to be achieved for new gravity sewers. | McKone | **New Text -** All new gravity sewers shall be designed to have a minimum velocity of 2.0 feet per second when flowing full.<br><br>**New Text -** All new gravity sewers shall be designed with a minimum slope according to what is listed in Table C1-1 of Ecology's Criteria for Sewage Works Design (e.g. a minimum slope of 0.40 feet per 100 feet for 8-inch diameter gravity sewer). | *RH2 (Gomez)* | | | |

| No. | Dwg. Sheet No. / Spec. & Page No. | Sector / Paragraph No. | Comment | Reviewer last name | Response | Responder | Reviewer Check Off | Implementation Date | Implementation Initials |
|---|---|---|---|---|---|---|---|---|---|
| 15 | Page 8-8 | Preventive Maintenance - Sewer Collection System | The maintenance schedule beginning at the bottom of page 8-8 lists a "daily" frequency for video inspection of sewer mains. Please verify frequency. This statement could be read to imply that each main is video inspected daily, which is unlikely the case. Annual or semi-annual seems more typical with more frequent or less frequent possible based on pipe-specific characteristics. | McKone | **New Text -** Every 1 to 6 Months, Depending on History of Maintenance in Area - Inspect, rod, and clean sewer lines with known root intrusion and/or FOG problems. Sewer lines included in these additional "hot spot" cleaning activities are selected based on historical maintenance logs, operator experience, and sewer main video inspection results.<br><br>**New Text -** Every 5 Years - Video inspect all sewer mains. Routine sewer main maintenance and repairs based on video inspections. | *City (Pantzke)* | | | |
| 16 | Page 8-9 | Preventive Maintenance - Engine Generator Sets | What is the typical frequency for exercising the generators? Are generators exercised under load? | McKone | **New Text -**The generators are exercised weekly under load. | *City (Pantzke)* | | | |
| 17 | Page 9-6 | Government Programs, Department of Ecology | The Centennial and Federal 319 programs mentioned are unlikely sources for the City. The Centennial fund is dedicated for grants to hardship communities for wastewater facility construction projects along with grants for non-point source projects. The Federal 319 program is exclusively for non-point source activities. The SRF fund is the most applicable to the City and can be used for construction projects along with planning and design projects. Planning could include financing a detailed I/I evaluation that includes flow monitoring, smoke testing, video inspections, and other assessments as well as developing and examining potential corrective actions. | McKone | References to the Centennial and Federal 319 programs were removed from the Chapter. | *City (Pantzke)* | | | |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000*
*711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341*

February 21, 2019

Kathy Brown
Public Works Director
City of Kirkland
123 5th Avenue
Kirkland, WA 98033

RE: **City of Kirkland General Sewer Plan – December 2018**

Dear Kathy Brown:

The Department of Ecology (Ecology) has reviewed the City of Kirkland's General Sewer Plan, dated December 2018. Pursuant to RCW 90.48.110 and WAC 173-240-030, Ecology hereby approves this General Sewer Plan. A copy of the General Sewer Plan (with Ecology's approval stamp) is enclosed for your records.

Sewage facilities within the planning area boundary must be constructed according to the approved General Sewer Plan or amendments thereto. Engineering reports and plans and specifications for sewer lines extensions, including pump stations, need not be submitted for approval. In the following situations Ecology approval is necessary for sewer line extensions prior to construction:

- The proposed sewers or pump stations involve installation of overflows or bypasses.
- The proposed sewers or pump stations discharge to an overloaded treatment, collection, or disposal facility.

If you have any questions concerning this approval, please contact Shawn McKone at (425) 649-7037 or shmc461@ecy.wa.gov.

Sincerely,

Rachel McCrea

Rachel McCrea
Water Quality Section Manager
Northwest Regional Office

e-cc: Steve Hirschey, King County Utility Technical Review Committee
Josh Pantzke, Utility Manager, City of Kirkland
Kenny Gomez, Project Engineer, RH2 Engineering

Enclosure: Copy of Approved Plan

# APPENDIX K

## Public Review and City Adoption (Forthcoming)

THIS PAGE INTENTIONALLY LEFT BLANK

PUBLICATION SUMMARY
OF ORDINANCE NO. O-4696

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF KIRKLAND ADOPTING THE KIRKLAND GENERAL SEWER PLAN.

SECTION 1. Adopts the December 2018, City of Kirkland General Sewer Plan as the comprehensive sewer system plan for the Kirkland sewer service area.

SECTION 2. Amends Kirkland Municipal Code Section 15.44.020 adopting the general sewer system plan by reference.

SECTION 3. Provides a severability clause for the ordinance.

SECTION 4. Authorizes publication of the ordinance by summary, which summary is approved by the City Council pursuant to Section 1.08.017 Kirkland Municipal Code and establishes the effective date as five days after publication of summary.

The full text of this Ordinance will be mailed without charge to any person upon request made to the City Clerk for the City of Kirkland. The Ordinance was passed by the Kirkland City Council at its meeting on the _____ day of ______________________, 2019.

I certify that the foregoing is a summary of Ordinance O-4696 approved by the Kirkland City Council for summary publication.

_________________________________
Kathi Anderson, City Clerk