

CITY OF KIRKLAND

123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 587-3800

DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

Policy R-33 - Crosswalk Location Evaluation Policy

1. Policy Objectives

The City of Kirkland is committed to implementing a safe, efficient, and inclusive multimodal transportation system. This system includes pedestrian facilities such as crosswalks. This policy establishes evaluation procedures, based on objective criteria, to help identify crosswalk locations that meet basic operational and safety requirements. In addition, this policy identifies appropriate safety enhancements at uncontrolled marked crosswalks based upon roadway geometrics, traffic volumes and speeds, traffic operation conditions and pedestrian crossing demand. Lastly, this policy determines striping requirements for controlled crosswalk locations.

The need, location, and safety enhancements for new crosswalks should be evaluated using engineering judgement. Exceptions to specific conditions in this policy may be considered. Requests for exceptions should be provided in writing and include details of an engineering investigation and documentation of justification for review by City of Kirkland Transportation Staff.

The fact that crosswalk evaluation guidance is presented in this policy does not mean that the City of Kirkland is required to modify or upgrade existing locations to meet current criteria. This policy is intended for use with public and private new construction and significant alterations to the City's existing infrastructure, excluding regular maintenance activities.

2. Standard Practice / Technical Sources

The City of Kirkland follows best practice guidelines for the implementation of pedestrian crossings. The technical sources on which this policy is based include:

- 2.1 Manual of Uniform Traffic Control Devices (MUTCD): The MUTCD is published by the Federal Highway Administration (FHWA). It establishes national standards and guidelines for the implementation of traffic control devices including signs, markings, and traffic signals.
- 2.2 Chapter 20 in the Highway Capacity Manual (HCM): The HCM is published by the Transportation Research Board (TRB). It establishes methodologies to determine the Capacity and Level of Service (LOS) of various types of transportation facilities.
- 2.3 National Cooperative Highway Research Program (NCHRP) 562 – Improving Pedestrian Safety at Unsignalized Crossings. The NCHRP 562 provides recommendations for the selection of pedestrian safety enhancements at uncontrolled marked crosswalks based on pedestrian volumes, street geometry, and prevailing traffic operation conditions such as traffic volumes and speed.
- 2.4 AASHTO (American Association of Highways Transportation Officials) A Policy on Geometric Design for Highways and Streets. This is commonly referred to as AASHTO "Green Book"

and it encompasses the current geometric design and research practice for highways, local streets, and multimodal facilities.

2.5 AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities Second Edition. This guide provides information on the planning, design, and operation of pedestrian facilities along streets and highways.

3. Definitions

- 3.1 Uncontrolled marked crosswalks: These are marked crosswalks located at midblock locations or at intersections and are not controlled by either traffic signals or stop signs. Drivers are required to stop for pedestrians at these facilities. Depending on pedestrian volumes and prevailing traffic/geometric conditions at the crosswalk location, safety enhancements such as those listed in section 4.3 below may be required.
- 3.2 Controlled marked crosswalks: these are marked crosswalks controlled by stop signs or traffic signals.
- 3.3 Controlled unmarked crosswalks: these are crosswalks locations (without crosswalk lines) controlled by stop signs.
- 3.4 Uncontrolled unmarked crosswalk: this refers to the areas intended for pedestrian circulation located on each leg of an intersection. RCW 46.04.160 defines an unmarked crosswalk as “the portion of the roadway between the intersection area and a prolongation or connection of the farthest sidewalk line or in the event there are no sidewalks then between the intersection area and a line ten feet therefrom, except as modified by a marked crosswalk.” RCW 46.61.235 establishes that pedestrians have the right of way whenever crossing at unmarked crosswalks.
- 3.5 School Crosswalks: These are uncontrolled marked crosswalks typically located on school walk routes and at/within the vicinity of school zones. Some school crosswalks may be controlled by crossing guards during school peak periods.

4. New Uncontrolled Marked Crosswalks

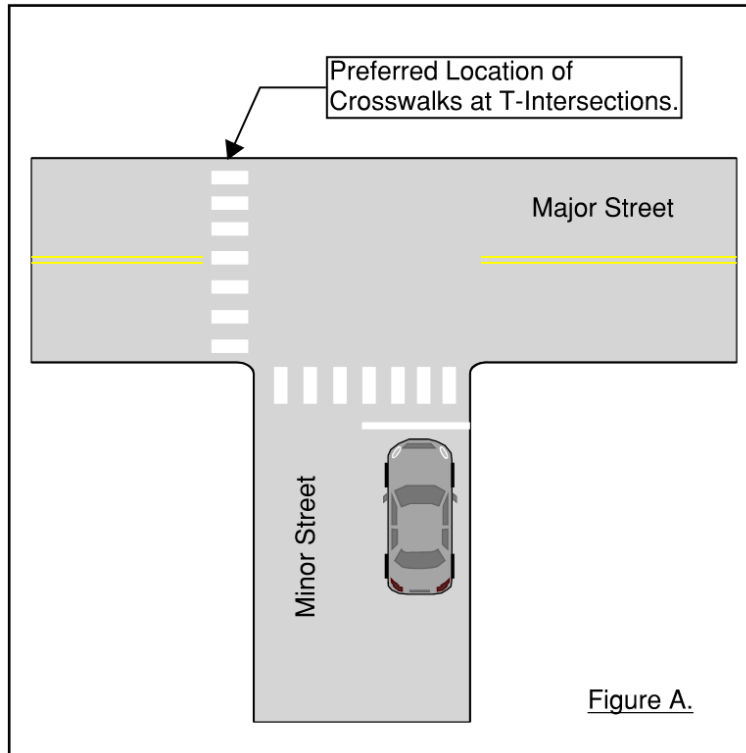
- 4.1. Evaluation Criteria: The following criteria apply to marking uncontrolled crosswalks at midblock locations and/or intersections.
 - 4.1.1 **Stopping Sight Distance (SSD)**. In order to make sure that pedestrians can be seen by oncoming vehicles, uncontrolled crosswalks shall only be marked if available SSD is equal to or greater than the values shown in Table 4.1. These SSD values are from Chapter 3 in AASHTO A Policy Geometric Design of Highways and Streets, 2018 Edition. SSD is based on the posted speed limit or the 85th percentile speed as measured in a recent traffic study, whichever is higher. **Marked crosswalks shall not be installed at locations that do not meet SSD criteria.**

Table 4.1: Stopping Sight Distance Recommended Values

Speed Limit or 85th Percentile Speed (miles per hour)	Stopping Sight Distance (feet)
25	155
30	200
35	250
40	305
45	360

- 4.1.2 Connectivity to Sidewalks, Trails and/or Paved Shoulders/walkways. **Crosswalks should not be marked unless the crosswalks connect to a designated walkway.**
- 4.1.3 Illumination at crosswalks. Lighting analysis is required to identify existing deficiencies and to determine lighting improvements at new crosswalks located at midblock or at intersections. Required lighting level at uncontrolled marked crosswalks is specified in City Policy R-40, Lighting Design Guidelines. **Crosswalks shall not be marked unless lighting requirements are met. Lighting improvements may be required as part of a new marked crosswalk installation.**
- 4.1.4 ADA Compliance. Before locating new crosswalks, appropriate accommodations for accessibility shall be in place, such as curb ramps with compliant landing depth.
- 4.1.5 Proximity to bus stops/other pedestrian generators. Crosswalks should be located so that they provide opportunities to minimize out of direction travel and to channel multiple pedestrian desire lines to a single crossing location to reach destinations such as bus stops, schools, parks, multifamily, mixed-use, or commercial developments.

- 4.1.6 Turning Vehicle Impacts. To reduce the impacts of turning vehicles, new mid-block crosswalks should be located at least 100 ft away from side streets and major (high-volume) driveways. Crosswalks located at or near T-intersections should be offset to the driver's left of the minor street or driveway approach. See Figure A below for clarification.



- 4.1.7 Proximity to signalized intersection: Crosswalks should not be installed within 400 ft of signalized intersections, as measured from the nearest marked crosswalk at the intersection, or less than 200 feet from the opening of a left-turn in advance of a signalized intersection. This is to prevent queue spill-back patterns from blocking the crosswalk or obscuring the view of the crosswalk to oncoming traffic.
- 4.1.8 Proximity to existing uncontrolled marked crosswalks. **Crosswalks should not be installed within 200 ft of an existing uncontrolled marked crosswalk.**
- 4.1.9 Minimum AADT (Average Annual Daily Traffic): uncontrolled marked crosswalks should not be installed on streets carrying less than 3,000 AADT unless serving a transit route, greenway, school walk route, or other location with high pedestrian volumes. In some cases, ADT counts can also be used; however, a seasonal factor may need to be applied due to normal variations of traffic volumes. Coordinate use of ADT volumes with City of Kirkland Transportation Division Staff for approval.
- 4.1.10 Pedestrian volumes. Minimum peak-period pedestrian volume thresholds that need to be met in order to warrant installation of uncontrolled marked crosswalks are depicted in Table 4.2 below. **New crosswalk locations should meet the minimum pedestrian volume thresholds shown in Table 4.2 below.** Pedestrian volumes can be obtained via observed counts or projected pedestrian demand in the case of new developments or induced pedestrian demand.

Table 4.2 Minimum Peak- Period Volumes (*)

Average Pedestrian Hourly Volumes	Period
20 Pedestrian/Hour	One-Hour
18 Pedestrian /Hour	Two-Hour
15 Pedestrian/ Hour	Three-Hour
(*) Minimum Pedestrian Volumes (total of both approaches) Recommended in NCHRP 562	

4.2. Evaluation Procedure

The decision of whether to mark a new crosswalk ultimately lies with City Staff. This evaluation procedure is intended to be used by City staff and design professionals to create a safer crossing environment. The evaluation procedure for new marked crosswalks includes the following steps.

- 4.2.1 Perform a field investigation to determine available SSD and compare it to the required SSD value shown in Table 4.1.
- 4.2.2 Perform a field visit to assess existing conditions including road geometrics, presence of sidewalks/paved walkway, street lighting, pedestrian generators, traffic signals, signs, uncontrolled marked crosswalks, and driveways located within the vicinity of the proposed crosswalk. The results of the assessment will determine if criteria 4.1.2 to 4.1.8 are met.
- 4.2.3 Determine if minimum peak-period pedestrian volume shown in Table 4.2 above is met. Pedestrian counts may need to be performed if recent pedestrian counts are not available (within the last calendar year). Pedestrian counts should be performed in average weather conditions (i.e., no major wind, snow, or ice events).
- 4.2.4 Determine most recent AADT count at the proposed location. The City’s AADT information is publicly available at the links below.

Spreadsheet: <https://www.kirklandwa.gov/Government/Departments/Public-Works-Department/Transportation/Data-and-Resources-Transportation-Division/Traffic-Count-and-Crash-Analysis-Summaries>

Interactive GIS map: <https://experience.arcgis.com/experience/6107b9c27c1b43718e685a73307281c4>

NTCP ADT counts (if approved for use by Transportation Staff):_ <https://kirklandwa.maps.arcgis.com/apps/instant/sidebar/index.html?appid=6b7da228774248bcaa8179ae5dc83329>

- 4.2.5 Use Form in Appendix A to document evaluation results. Installation of new uncontrolled marked crosswalk should only be considered if all the criteria are met. Should the criteria be met only partially, provisions should be made to achieve compliance with said requirements prior to installation, or a documented engineering investigation and design exception shall be submitted to City Transportation Staff for review and approval.
- 4.2.6 Identify required pedestrian safety enhancements using Table 4.3 below. The installation of markings and signs at an uncontrolled crossing location does not necessarily result in vehicles stopping for pedestrians; therefore, depending on the specific roadway and traffic conditions prevailing at the location, additional pedestrian safety enhancements may be required, including traffic control devices such as those listed below.

4.3. **Pedestrian Safety Enhancements for Both Existing and New Crosswalks**

New uncontrolled marked crosswalks shall comply with striping and signage requirements per Parts 2 and 3 in the MUTCD. In addition to the basic striping and signage requirements, pedestrian safety enhancements such as those described below may be required to mitigate the risks associated with the specific characteristics of the location. Table 4.3 identifies appropriate pedestrian safety enhancements based upon the street functional classification, posted speed limit or 85th percentile speed, AADT, and street geometrics. In selecting appropriate improvements, the crash history and specific pedestrian safety needs associated with the crosswalk location should also be considered.

① **Basic MUTCD striping and signage per MUTCD Parts 2 and 3.**

② **Pedestrian Crossing Flags:** These are flags, usually orange, that are held by pedestrians crossing or waiting to cross. The flags are typically stored in sign-mounted holders on both sides of the street. [City of Kirkland Policy R-22](#) establishes specific requirements for installation of pedestrian flags at uncontrolled marked crosswalk locations.

③ **Raised Crosswalks (RC):** These are elevated above the surface of the adjacent travel lanes to increase driver's attention of pedestrians at the crosswalk and slow down approaching vehicles. RCs also function as an extension of the sidewalk, allowing pedestrians to cross at a constant grade without the need of curb ramps. Raised crosswalks are appropriate on local and collector streets with an AADT of less than 4,000 vehicles per day. Because they are similar to speed cushions, installation of raised crosswalks should follow the guidance for "Phase Three" high-intervention traffic calming in the City's [Neighborhood Traffic Control Program Policy R-20](#).

More information can be found at this link:

<https://www.kirklandwa.gov/Government/Departments/Public-Works-Department/Transportation/Getting-Around-Transportation-Division/Neighborhood-Traffic-Control>

④ **Curb Extensions (Bulb-Outs):** Curb extensions provide pedestrian refuge, reduce the

overall street crossing distance, and improve sight distance for both drivers and pedestrians. Only applicable when on-street parking is present. It is preferred that curb extensions be hardscaped concrete curb and sidewalk; however, curb extensions using pavement markings, delineators, and/or other channelization devices may be considered with approval from City Transportation Staff.

⑤ **Advance Stop Bar and Sign:** Advance stop lines are recommended on multi-lane roads to ensure that pedestrians are visible to drivers in all lanes. Per MUTCD, at midblock uncontrolled crossing locations advance stop lines should be placed adjacent to the "Stop Here for Pedestrians" (R1-5b) sign located 20 to 50 ft in advance of the nearest crosswalk edge lines.

⑥ **Pedestrian Median Refuge Islands:** These are treatments that allow pedestrians to cross one direction of travel at a time. They are typically raised above the roadway surface, and in some cases, they are offset so the crossing pedestrians view/face the second direction of street traffic. The AASHTO recommended minimum crossing width is 6 ft, but 8 ft is preferable to accommodate groups of pedestrians and wheeled devices including bicycles.

⑦ **Rectangular Rapid Flashing Beacons (RRFBs):** RRFBs consist of rectangular-shaped yellow indicators with a light-emitting diode (LED) -array-based light source that flashes when activated. They are placed on both side of a crosswalk, under the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing. Refer to [City of Kirkland Policy R-24](#) for more information.

⑧ **High Intensity Activated Crosswalk (HAWK):** A HAWK, also known as a pedestrian hybrid beacon, is a pedestrian activated traffic control device that functions as a traffic signal providing yellow and red indications. [Chapter 4.J in the MUTCD](#) provides guidance for the implementation of HAWKs. The main objective of a HAWK is to stop vehicles to allow pedestrians to cross while also allowing vehicles to proceed as soon as the pedestrians have cleared the roadway. Installation of HAWK signals must be justified based on a traffic engineering study. Pedestrian signals can also be considered in this category for locations with geometric constraints that would render a HAWK signal infeasible based on an engineering study.

	Table 4.3– Safety Enhancements at Uncontrolled Marked Crosswalk Locations (*)									
	AADT ≤ 4,000	4,000 < AADT < 9,000			9,000 ≤ AADT ≤ 15,000			AADT > 15,000		
Street Functional Classification	Local - Collector	Collector – Minor Arterial			Minor – Principal Arterial			Principal Arterial		
Posted Speed Limit or 85 th Percentile Speed (mph), whichever is higher	25 or below	<30	30 - 35	≥35	<30	30 - 35	≥35	<30	30 - 35	≥35
Two Lanes (One lane on each direction, one way street)	① ② ③	① ② ④ ⑦	① ② ④ ⑦	① ② ④ ⑦	① ④ ⑦	① ④ ⑦	① ④ ⑦	① ④ ⑦	① ④ ⑦	① ④ ⑦ ⑧
Three Lanes with Raised Median Island (One lane on each direction plus median in two-way left-turn lane)	NA	① ② ④ ⑤ ⑦	① ② ④ ⑤ ⑦	① ② ④ ⑤ ⑦	① ② ④ ⑤ ⑦	① ② ④ ⑤ ⑦	① ④ ⑤ ⑦	① ④ ⑤ ⑦	① ④ ⑤ ⑦	① ④ ⑤ ⑦ ⑧
Three Lanes without Raised Median (One lane on each direction with two-way left turn, no median)	NA	① ② ④ ⑤ ⑦	① ② ④ ⑤ ⑦	① ② ④ ⑤ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦ ⑧
Four Lanes with Raised Median (Two lanes on each direction with median)	NA	NA	NA	NA	① ④ ⑤ ⑦	① ④ ⑤ ⑦	① ④ ⑤ ⑦ ⑧	① ④ ⑤ ⑦	① ④ ⑤ ⑦ ⑧	① ④ ⑤ ⑦ ⑧
Four Lanes without Raised Median (Two lanes on each direction, no median)	NA	NA	NA	NA	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑦ ⑧	① ④ ⑤ ⑥ ⑦	① ④ ⑤ ⑦ ⑧	① ④ ⑤ ⑥ ⑦ ⑧

(*) Improvements in bold characters and highlighted in yellow are considered optional.

5. Controlled Crosswalk Striping Requirements

- 5.1. Signalized Intersections: Pedestrian crosswalk striping and stop bars are required at signalized intersections and must conform with [City Pre-Approved Plan CK-R.28](#).
- 5.2. All Way Stop: Pedestrian crosswalk striping and stop bars are required at ALL-Way Stop controlled intersections and must conform with [City Pre-Approved Plan CK-R.28](#).
- 5.3. Stop-controlled intersections:
 - 5.3.1 Crosswalk striping and stop bars are required at the stop-controlled approaches on collector streets intersecting arterials.
 - 5.3.2 Crosswalk striping and stop bars are required at the stop-controlled approaches on local streets intersecting arterials.