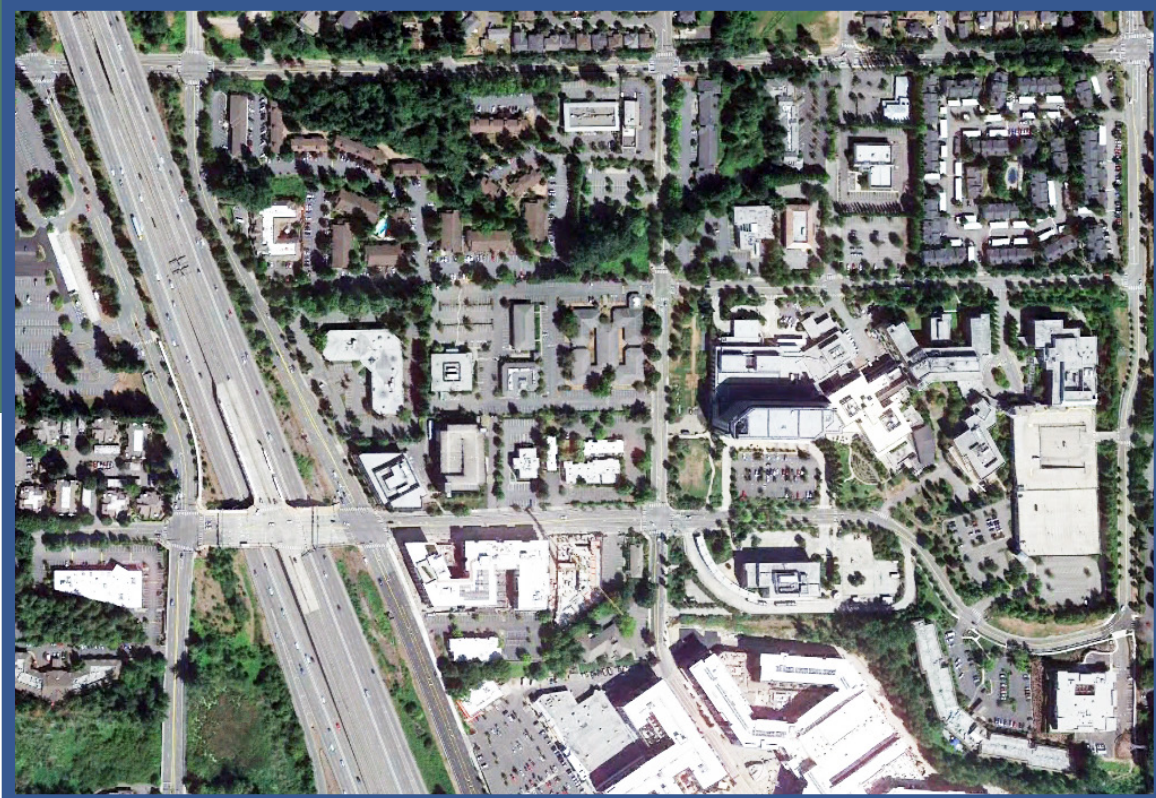




City of Kirkland

# NE 128th Street Multi Modal Corridor Study



April 2022

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# Introduction

The Totem Lake area has been experiencing significant growth over the past several years with new urban high-density development. NE 128th Street is an important multimodal corridor that connects the Kingsgate Park & Ride, I-405 express toll lane ramps and flyer bus stops, Totem Lake Transit Center, and Evergreen Health Medical Center. The Puget Sound Regional Council has designated the Totem Lake area as a Regional Growth Center.

The purpose of this project is to create an attractive, multimodal environment on NE 128th Street and the other study corridors to facilitate transit connections and be an appealing and safe place for people walking, bicycling, driving, and taking transit.

## Study Objectives

The primary objectives of this study include the following:

- Conduct an extensive public involvement process to understand the transportation needs, issues, and ideas of the community.
- Develop a set of improvement projects to enhance safety and the multimodal environment for the NE 128th Street primary study corridor and four secondary study corridors (described on the following page).
- For three potential street extensions, identify the street cross sections, including the number and width of vehicle lanes and the type of pedestrian and bicycle facilities.
- To guide implementation, rank the projects into three priority categories and identify potential funding sources for each project.

## Previous Studies

The Totem Lake area has been the focus of several transportation and land use planning documents written to guide the development of the neighborhood. This study incorporates the concepts from previous efforts, further refines area improvements, and provides the City a plan for implementation. The analysis builds upon the following studies:

- City of Kirkland Transportation Improvement Program (2021)
- Design Guidelines for the Totem Lake Business District (2020)
- Evergreen Health/Totem Lake Traffic Study (2019)
- Kirkland Transit Implementation Plan (2019)
- Totem Lake Urban Center Enhancement & Multimodal Transportation Network Plan (2018)
- Totem Lake Business District Plan (Updated 2015)
- City of Kirkland Transportation Master Plan (2015)

A full list of references to previous studies and plans is provided in **Appendix A**.

## Study Areas

For this analysis, the street network was divided into a primary study corridor, secondary study corridors, and three potential street extensions within the study area that have been identified in the Comprehensive Plan. **Figure 1** shows the study area, study corridors and key destinations.

**Primary Study Corridor:** NE 128th Street between 116th Avenue NE and 120th Avenue NE

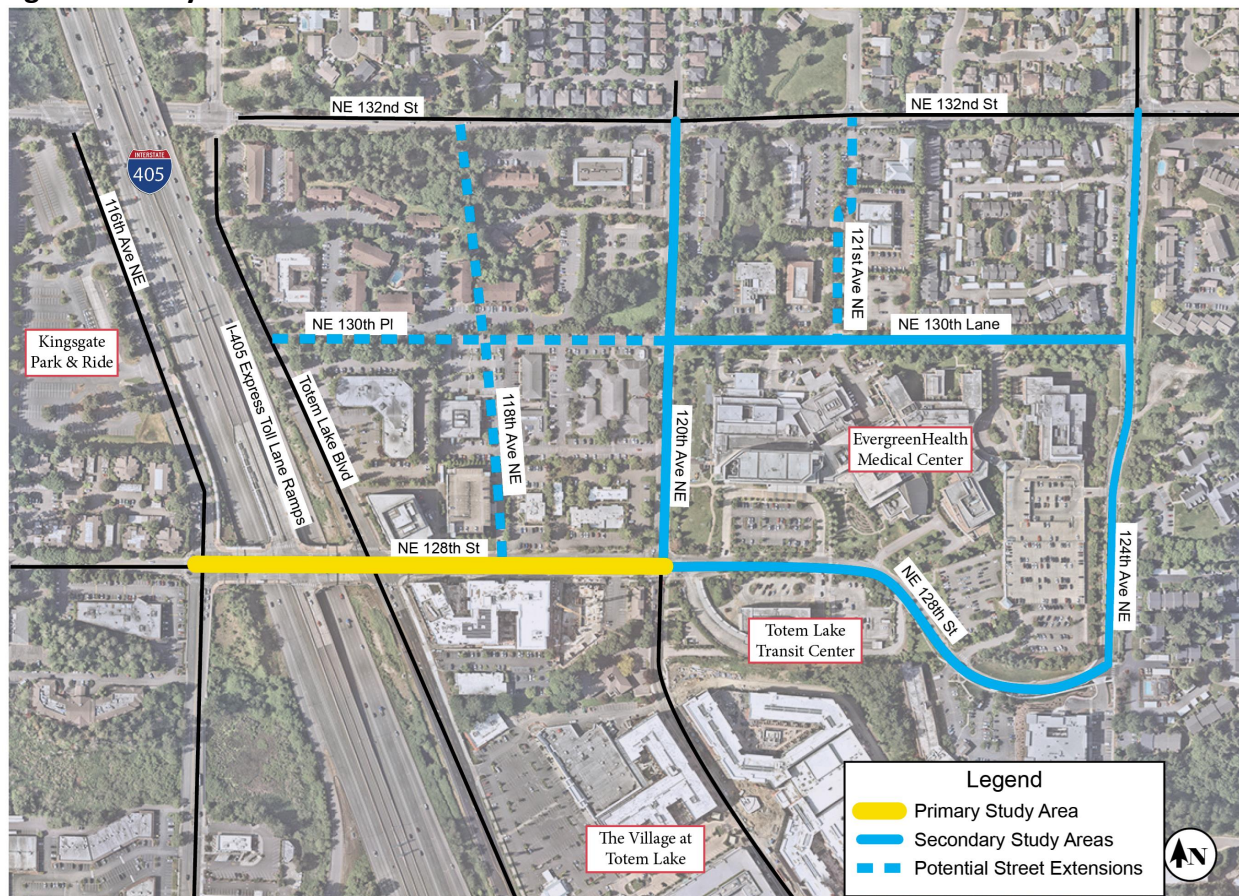
**Secondary Study Corridors:**

- NE 128th Street between 120th Avenue NE and 124th Avenue NE
- NE 130th Lane between 120th Avenue NE and 124th Avenue NE
- 120th Avenue NE between NE 132nd Street and NE 128th Street
- 124th Avenue NE between NE 132nd Street and NE 128th Street

**Potential Street Extensions:**

- NE 130th Place between Totem Lake Boulevard and 120th Avenue NE
- 118th Avenue NE between NE 132nd Street and NE 128th Street
- 121st Avenue NE between NE 132nd Street and NE 130th Lane

**Figure 1. Study Area and Corridors**



## Summary of Transportation Analysis

The study completed the following tasks to analyze transportation conditions and develop multimodal improvements for the study area.

- Review previous transportation and land use plans for the study area.
- Analyze existing transportation conditions for each of the travel modes.
- Analyze 2035 Baseline Conditions, including projects that are planned to be constructed by other agencies.
- Meet with the public and stakeholders to share project findings and receive input on the community's transportation needs, issues and ideas.
- Develop draft multimodal improvements for the primary study corridor, secondary study corridors, and three potential street extensions. This includes developing a preliminary design and cost estimate for improvements to the primary study corridor.
- Meet with the public and stakeholders a second time to share draft multimodal improvements and receive the community's feedback.
- Incorporate public and stakeholder comments and finalize the recommended multimodal improvements.
- Rank the projects into three priority categories and identify potential funding sources.



NE 128 Street, looking east at Totem Lake Boulevard

## Existing Conditions

This section describes the existing transportation conditions along the primary and secondary study corridors for pedestrian, bicycle, transit, and vehicle facilities.

### Pedestrian Facilities

Each of the primary and secondary study corridors include sidewalks on both sides of the street. Along the NE 128th Street primary study corridor, the sidewalks were constructed adjacent to the roadway and the sidewalk area includes trees, light poles, and signs. The newer developments along the south side of NE 128th Street between Totem Lake Boulevard and 120th Avenue NE have widened the sidewalk area with a planter strip buffer and areas for street furniture, plantings, and lighting.



NE 128 Street, looking east towards 120th Avenue NE

The secondary study corridors, with the exception of 120th Avenue NE, typically have 5'-wide sidewalks with a landscaped buffer between the sidewalk and the street. On 120th Avenue NE, the 5' sidewalks are typically placed along the curb, adjacent to the street.

The majority of the marked crosswalks are located at signalized intersections. There are three marked crosswalks that are enhanced with pedestrian-activated flashing beacons, including the crosswalk on 116th Avenue NE at the Kingsgate Park & Ride that has in-pavement flashing beacons.

### Pedestrian Volumes

Pedestrian crossing volumes were assembled from counts collected in August 2019 and October 2019. The highest pedestrian crossing volume occurs at the north leg of the NE 128th Street/I-405 ramps intersection, with 208 people crossing per hour at this location during the afternoon. This location has high pedestrian activity because it provides access to the I-405 flyer bus stops.

Primary connections and destinations for people walking in the area include the Kingsgate Park & Ride, I-405 flyer bus stops, Totem Lake Transit Center, EvergreenHealth Medical Center, and The Village at Totem Lake located south of NE 128th Street.

**Figure 2** shows the pedestrian crossing volumes at each study intersection leg during the afternoon peak hour.

**Figure 2. Existing Pedestrian Crossing Volumes (Afternoon Peak Hour)**



## Bicycle Facilities

The primary study corridor has 5' wide on-street bike lanes in both directions. The secondary study corridors do not include formal bicycle facilities.

At the north end of the study area, NE 132nd Street and the segment of 124th Avenue NE, north of NE 132nd Street have bike lanes in both directions.

Through The Village at Totem Lake, 120th Avenue NE includes raised off-street bike lanes in both directions. These lanes are not clearly delineated and can function as part of the sidewalk area. South of NE 128th Street, Totem Lake Boulevard includes a 10'-wide, shared-use path along the east side of the street.

There are no north-south bicycle facilities to connect the bike lanes on NE 132nd Street and bike lanes on NE 128th Street. South of NE 128th Street, there are short missing segments for the northbound bike lane on 116th Avenue NE and the southbound bike lane on Totem Lake Boulevard. Transportation counts indicate low bicycle ridership along the study corridors due to the limited bike facilities in the area. **Figure 3** shows the existing bike network.

The Totem Lake Enhancement and Multimodal Transportation Network Plan developed a bicycle network vision consisting of existing and future bicycle facilities. The network included bike facilities on all study streets, but did not propose the type of bike facilities on the street.

**Figure 3. Existing Bicycle Facilities**



## Transit Facilities

There are three major transit facilities in the study area.

**Kingsgate Park & Ride** provides 502 parking spaces and it is located along 116th Avenue NE, a short walk to the Totem Lake Freeway Station.

**Totem Lake Freeway Station** has northbound and southbound bus stops at the NE 128th Street and I-405 Interchange. The station is located just north of NE 128th Street, along the northbound and southbound interchange ramps that connect directly to the I-405 Express Toll Lanes.

**Totem Lake Transit Center** provides several bus stops south of NE 128th Street and east of 120th Avenue NE. It is a short walk to the EvergreenHealth Medical Center. Buses exit the Transit Center via the traffic signal at the NE 128th Street/120th Avenue NE intersection.

## Transit Routes

In March 2020, King County Metro expanded transit service as part of the Northeast Mobility Project. This included the restructuring or elimination of some routes, but overall provided an increase in transit service in the area. The COVID-19 pandemic has reduced transit ridership in the region and the transit agencies have temporarily reduced the number of bus routes and buses that serve the study area. A summary of the transit service in the study area before the COVID-19 pandemic is described in **Appendix B**.

Currently, Metro bus routes 225, 255, and 930 provide service along the NE 128th Street primary study corridor. Each of these routes has a stop at the Totem Lake Transit Center.

## Street Network

This section describes the streets that make up the primary study corridor and secondary study corridors. **Figure 4** shows the existing lane channelization and traffic controls at intersections and the speed limits in the study area. Each of the primary and secondary study corridors have a 25 mile per hour speed limit and the majority of the intersections along the corridors are controlled by traffic signals.

### Primary Study Corridor

NE 128th Street between 116th Avenue NE and 120th Street NE is a minor arterial with 2 through lanes in each direction. The segment between 116th Avenue NE and Totem Lake Boulevard provides access to the I-405 express toll lane ramps, has three closely spaced traffic signals, additional turn lanes, and is controlled by the Washington State Department of Transportation (WSDOT).



NE 128 Street, looking west towards I-405 ramps

The segment of NE 128th Street between Totem Lake Boulevard and 120th Avenue NE provides access to medical office buildings on the north side of the street and new retail/multifamily development along the south side of the street. The segment west of 120th Avenue NE does not include a center left turn lane and vehicles must turn left from the through lanes. At the NE 128th Street/Totem Lake Boulevard intersection, the westbound and eastbound left turn movements are restricted to improve traffic operations in the interchange area.

### Secondary Study Areas

**NE 128th Street** between 120th Avenue NE and 124th Avenue NE is a collector arterial with one through lane in each direction. On the north side of the street is the EvergreenHealth Medical Center and along the south side are the EvergreenHealth DeYoung Pavilion, Totem Lake Transit

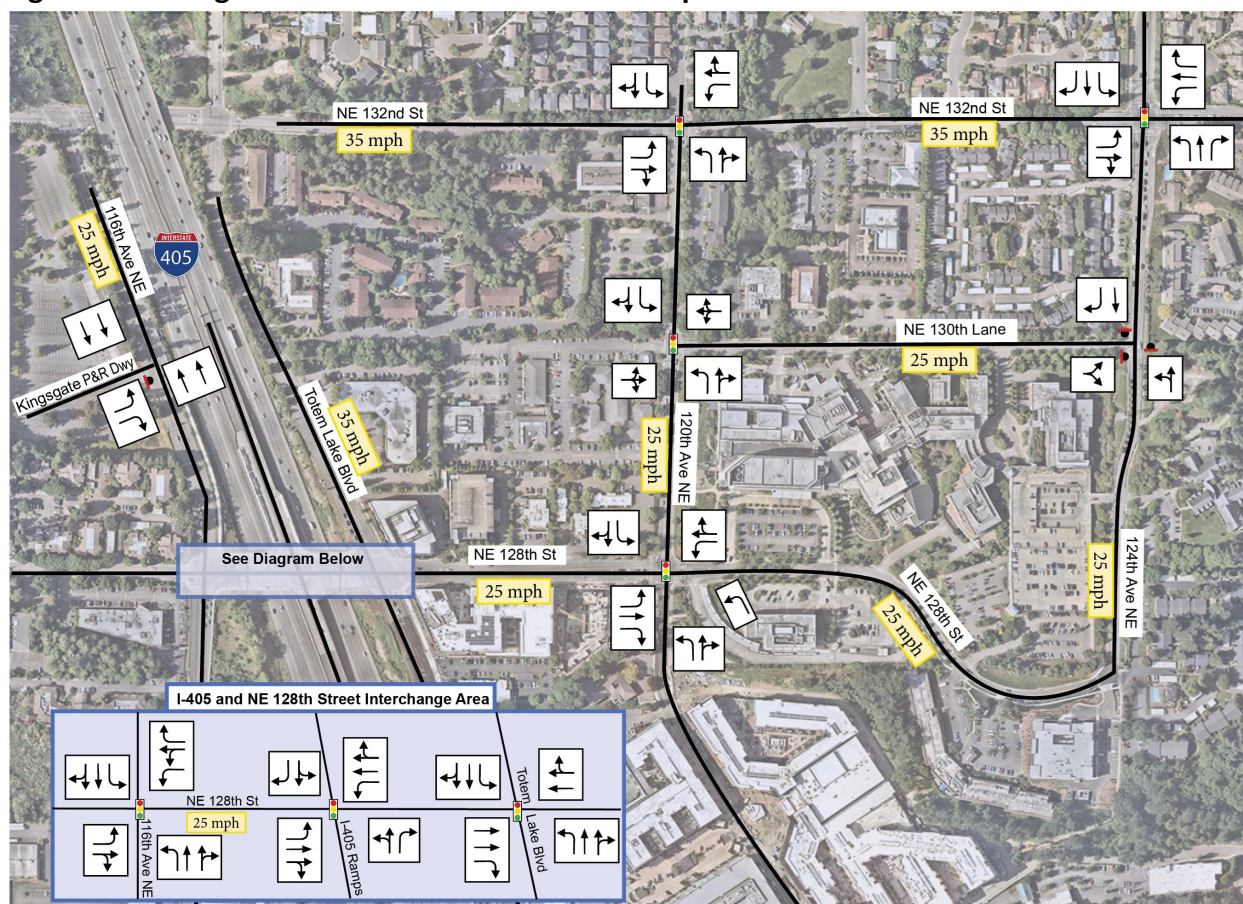
Center, and senior housing facilities. Approaching 124th Avenue NE, there is a steep uphill grade in the eastbound direction.

**NE 130th Lane** between 120th Avenue NE and 124th Avenue NE is a collector arterial with one through lane in each direction and it includes on-street parking along the majority of the street. The emergency entrance to EvergreenHealth Medical Center is located along the south side of the street. The north side of the street has medical office buildings and the Evergreen Heights apartment complex.

**120th Avenue NE** between NE 132nd Street and NE 128th Street is a collector arterial with one through lane in each direction and a center left turn lane. The corridor serves the EvergreenHealth Medical Center and several commercial buildings.

**124th Avenue NE** between NE 132nd Street and NE 128th Street is a local access street with one through travel lane in each direction. North of NE 130th Lane, there are multifamily developments along both sides of the street. South of NE 130th Lane, there are apartments and a hospice facility on the east side of the street and the parking garage for the EvergreenHealth Medical Center is located along the west side of the street.

**Figure 4. Existing Intersection Channelization and Speed Limits**



Intersection counts were collected in October 2019 prior to the COVID-19 pandemic. **Figure 5** shows the morning (AM) and afternoon (PM) hour vehicle volumes at the study intersections. In the study area, the AM peak hour occurs approximately between 7:30 AM and 8:30 AM and the PM peak hour occurs approximately between 4:15 PM and 5:15 PM.

**Figure 5. Existing AM and PM Peak Hour Intersection Vehicle Volumes**



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**Table 1** shows the existing AM and PM peak hour intersection LOS and delay at the study intersections. The PM peak hour typically carries the highest vehicle volumes and experiences the longer delays. All study intersections operate at LOS D or better during both the AM and PM peak hours. The NE 128th Street/120th Avenue NE intersection has a separate signal phase for the Totem Lake Transit Center that adds approximately 20 seconds of delay to the intersection each time a bus exits the Transit Center.

The City of Kirkland has adopted a LOS standard based on the “level of completion” of its 20-year transportation network as identified in the Comprehensive Plan. This performance metric aims to balance the City’s multimodal transportation network with land use development activity, without prioritizing one mode over others. The City has met its “level of completion” standard for the study area.

**Table 1. Existing AM and PM Peak Hour Intersection LOS and Delay (Seconds)**

Intersection	Traffic Control	AM Peak Hour	PM Peak Hour
		LOS (Delay)	LOS (Delay)
Kingsgate Park & Ride/116th Ave NE <sup>1</sup>	Side Street Stop Control	B (12)	B (11)
NE 128th St/116th Ave NE	Signal	D (39)	D (53)
NE 128th St/I-405 Ramps	Signal	B (19)	C (21)
NE 128th St/Totem Lake Blvd	Signal	B (13)	D (41)
NE 128th St/120th Ave NE <sup>2</sup>	Signal	C (33)	D (37)
NE 130th Ln/120th Ave NE	Signal	A (7)	A (8)
NE 132nd St/120th Ave NE	Signal	A (4)	C (20)
NE 130th Ln/124th Ave NE	All-Way Stop	A (9)	B (12)
NE 132nd St/124th Ave NE	Signal	C (35)	D (42)

Note: LOS calculated using HCM 6th Edition methodology.

<sup>1</sup> Side street stop delay is calculated for the worst stop-controlled approach.

<sup>2</sup> Intersection has non-NEMA signal phasing and LOS is reported using Synchro 11 methodology.

## Crash Data Analysis

The study evaluated crash data during the five-year period from 9/1/2015 to 8/31/2020 for the study corridors and intersections. During this time, there were a total of 154 reported crashes with 127 crashes occurring at intersections and 27 crashes occurring at mid-block locations. The NE 128th Street/Totem Lake Boulevard intersection experienced the most crashes with 46 during the five-year period. **Appendix D** describes the five-year crash data for the study intersections and corridors.

## 2035 Baseline Conditions

The study area is expected to continue to experience growth with new businesses and residents moving into the area. This study defines 2035 Baseline Conditions as the 2035 forecasted traffic volumes and the existing street network plus transportation projects that are planned to be completed by other agencies. Baseline Conditions does not include the three potential street extensions.

WSDOT, Sound Transit, and King County Metro are responding to the expected growth and have identified four transportation improvements that will be implemented over the next 13 years. This section describes the transportation projects that will be implemented by other agencies and the 2035 baseline traffic volumes and intersection operations.

## Planned Transportation Projects by Other Agencies

**Figure 6** shows the planned transportation projects that will be constructed by other agencies in the study area.

### Figure 6. Planned Projects by Other Agencies



**I-405 / NE 132nd Street Interchange Project** - WSDOT will construct a new half interchange at NE 132nd Street scheduled to be complete in 2024. The project will add a new southbound off-ramp at the north leg of the NE 132nd Avenue/116th Avenue NE intersection and a new northbound on-ramp at the north leg of the NE 132nd Avenue/Totem Lake Boulevard intersection. Both of these intersections will be reconstructed as multi-lane roundabouts with a non-motorized path through the roundabouts. This half interchange will improve the study area's access to I-405 for trips to and from the north. The project will divert traffic volumes from the I-405 interchanges at both NE 128th Street and NE 124th Street.



Source: WSDOT

**Kingsgate Transit Oriented Development (TOD)** – WSDOT, King County and Sound Transit plan to reconfigure the Kingsgate Park & Ride to construct a parking garage and mixed-use TOD with residential and commercial land uses. This will increase non-motorized and vehicle volumes at the site.

**STRIDE Bus Rapid Transit (BRT)** – Sound Transit will add bus rapid transit service along I-405 between Lynnwood and Burien with bus stops located at the Totem Lake Freeway Station at NE 128th Street. Scheduled to open in 2027, this project will provide high-frequency transit, approximately every 8 minutes, throughout the day in both directions. This new bus service will increase pedestrian and bicycle volumes along NE 128th Street.

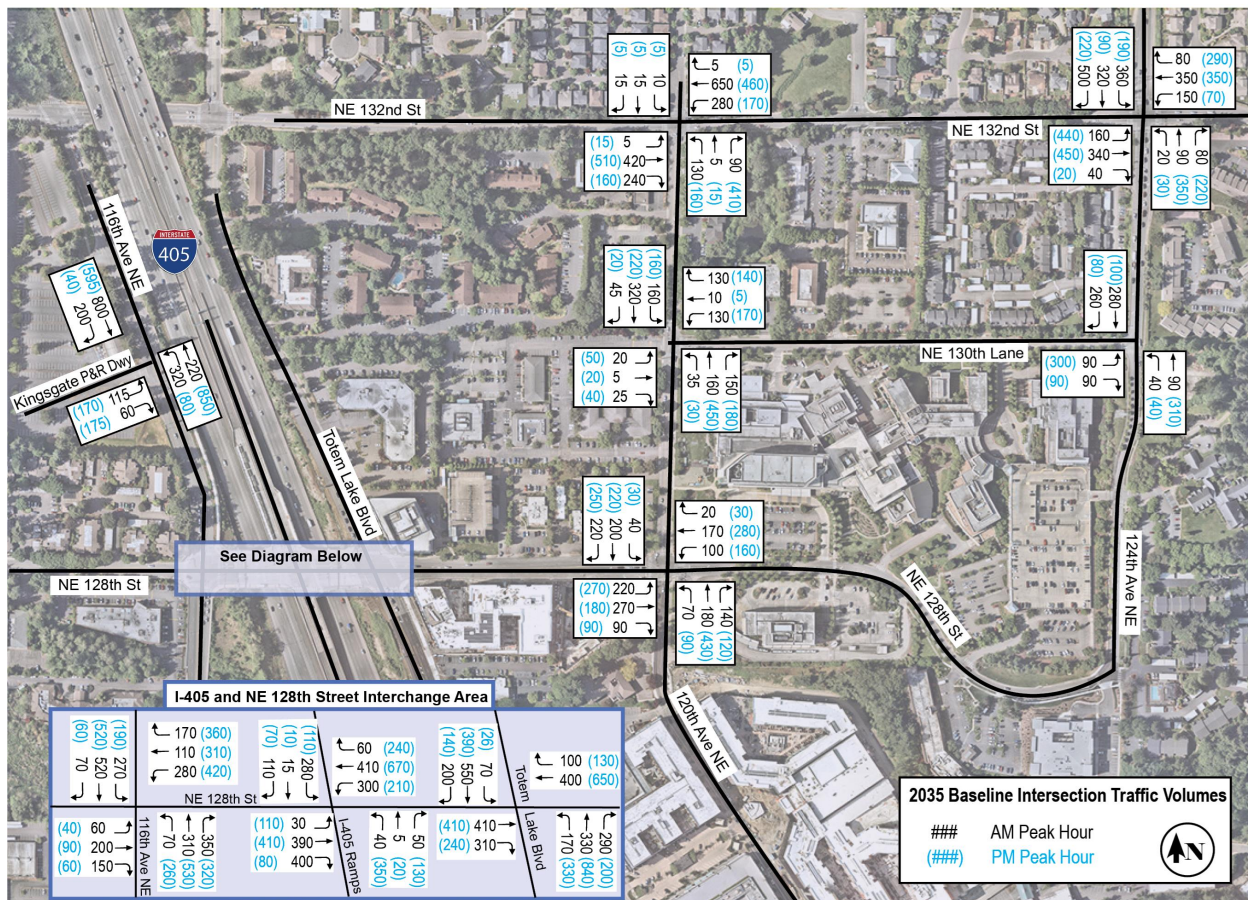
**King County Metro RapidRide K Line** – Metro plans to initiate RapidRide K Line bus service between the Totem Lake Transit Center and the Eastgate Park & Ride lot in Bellevue. This project is not shown on Figure 6 because the specific route alignment has not been determined.

## 2035 Baseline Vehicle Volumes

The Bellevue-Kirkland-Redmond (BKR) travel demand model was used to develop 2035 PM peak hour traffic volumes based on future land use projections and planned transportation facilities. The traffic forecasts for the 2035 AM peak hour were based on growth rates identified for the PM peak hour.

**Figure 7** shows the 2035 AM and PM peak hour vehicle volumes for Baseline Conditions at the study intersections.

### Figure 7. 2035 AM and PM Peak Hour Intersection Volumes



## 2035 Baseline Intersection Operations

Results of the 2035 Baseline Conditions intersection operations analysis found that the NE 128th Street/116th Avenue NE intersection is forecast to operate at LOS E during the 2035 AM and PM peak hours. The NE 128th Street/120th Ave NE intersection is forecast to operate at LOS E during the 2035 PM peak hour. The remaining study intersections operate at LOS D or better during both the 2035 AM and PM peak hours.

As part of the redevelopment of the Kingsgate Park & Ride, the southern driveway at 116th Avenue NE is expected to be converted to traffic signal by 2035.

**Table 2** shows AM and PM peak hour intersection LOS and seconds of delay for existing and 2035 baseline conditions.

**Table 2. Existing and 2035 Baseline Intersection LOS and Delay (Seconds)**

Intersection	Traffic Control	Existing		2035 Baseline	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Kingsgate Park and Ride/116th Ave NE <sup>2</sup>	Stop Sign / Signal (2035)	B (12)	B (11)	C (22)	B (15)
NE 128th St/116th Ave NE	Signal	D (39)	D (53)	E (60)	E (70)
NE 128th St/I-405 Ramps	Signal	B (19)	C (21)	C (30)	C (28)
NE 128th St/Totem Lake Blvd	Signal	B (13)	D (41)	B (16)	D (41)
NE 128th St/120th Ave NE <sup>1</sup>	Signal	C (33)	D (37)	D (46)	E (63)
NE 130th Ln/120th Ave NE	Signal	A (7)	A (8)	A (9)	B (15)
NE 132nd St/120th Ave NE	Signal	A (4)	C (20)	B (11)	C (20)
NE 130th Ln/124th Ave NE	All-Way Stop	A (9)	B (12)	B (11)	C (19)
NE 132nd St/124th Ave NE	Signal	C (35)	D (42)	D (43)	D (48)

Note: LOS calculated using HCM 6th Edition methodology.

<sup>1</sup> Intersection has non-NEMA signal phasing and LOS is reported using Synchro 11 methodology.

<sup>2</sup> Side street stop delay is calculated for the worst stop-controlled approach.

# Stakeholder and Public Input

The project included a detailed public and stakeholder involvement process. Due to the COVID-19 pandemic all the meetings were virtual.

The Project Team used a two-meeting approach for involvement with the public, City of Kirkland Transportation Commission, King County Metro, Sound Transit, and EvergreenHealth Medical Center. At the first meeting, the Project Team shared the project background, goals, and initial findings, and gathered input from the public and stakeholders regarding their transportation-related needs, issues, and ideas for the study area. At the second meeting, the Project Team shared the results of the transportation analysis and the draft recommended improvements and received feedback on the recommended improvements.

This section describes the project webpage, stakeholder meetings, public open houses, and other public meetings related to the project, as well as summarizes the feedback gathered during this outreach process.

## Project Webpage

A project website was developed that provided a project overview, description of the study corridors, project schedule, notification of upcoming events, and links to presentations and videos of the two community meetings.

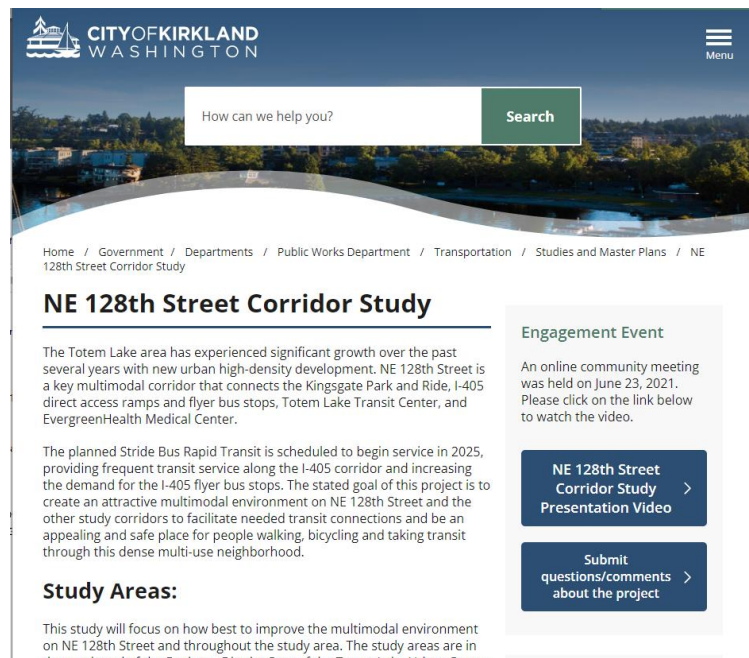
Additionally, there was a form to allow site visitors to submit comments and questions about the project. Information on the website was available for translation into seven additional languages.

## Stakeholder Meetings

The project worked with key stakeholders throughout the project. This included meetings with neighborhood associations, businesses, and relevant government agencies.

### Neighborhood Associations

The Project Team met online with the Evergreen Hill Neighborhood Association (4/21/2021) and Juanita Neighborhood Association (4/26/2021). These meetings included a presentation of the project and initial concepts as well as an opportunity for discussion and feedback.



## EvergreenHealth Medical Center

EvergreenHealth Medical Center is the largest employer in the vicinity of the study area. The Project Team met with EvergreenHealth on two occasions (5/5/2021 and 10/26/2021) to understand their needs and future plans for expansion of the medical center campus and receive feedback on the draft recommended improvements.

## WSDOT

WSDOT participated in bi-weekly meetings with the Project Team to discuss issues and develop multimodal improvements for the NE 128th Street and I-405 interchange (between 116th Avenue NE and Totem Lake Boulevard). Improvements to this segment of NE 128th Street require WSDOT approval.

## King County Metro and Sound Transit

The Project Team met with representatives King County Metro and Sound Transit on two occasions (6/8/2021 and 11/23/2021) to discuss existing operations and system development plans. Future transit service in the study area includes Sound Transit's Stride Bus Rapid Transit (BRT) and King County Metro's RapidRide K Line. The Project Team shared the idea of providing enhanced bus stops on NE 128th Street, west of 120th Avenue NE as an alternative to buses stopping at the Totem Lake Transit Center, which would reduce travel times for select routes. Metro and Sound Transit were potentially open to this idea, but this change would be part of a future bus network redesign.

## Public Open Houses

The project held two online community meetings on 6/23/2021 and 11/9/2021. These meetings were advertised via the project website, email invitations, social media, and flyers posted throughout the study area. Video recordings of the two meetings were posted on the website for public review and comment.



The first meeting presented an overview of the project and its goals and provided the public an opportunity to submit feedback on transportation issues, needs, and ideas via an online survey.

During the second meeting, the Project Team presented the draft recommended improvements and gathered feedback and comments. The meeting included an online discussion, questions and answers session, and an online comment form.

## Other Public Events

The City of Kirkland's Transportation Commission is comprised of 8 volunteers appointed by the City Council who meet regularly and advise the Council regarding transportation topics. The Project Team met twice with the Kirkland Transportation Commission on April 28, 2021 and

October 27, 2021. Both meetings included opportunities for discussion and feedback from the commissioners regarding the initial project findings and the draft recommended improvements.

The Project Team met with the City Council on February 1, 2022 to share project findings and draft recommended improvements, and receive input from Council members.

## Community Input and Feedback

The webpage, presentations, and meetings listed above provided opportunity for comment and feedback at various stages of the project development. Below is a summary of the comments gathered from the community during this process.

- At the three NE 128th Street intersections with 116th Avenue NE, I-405 ramps, and Totem Lake Boulevard, there were pedestrian safety concerns related to the long crosswalk distances and the high number of turning vehicles.
- Comments requested the build out of the bicycle network in the study area, including adding north-south connections between the existing bicycle facilities on NE 132nd Street and NE 128th Street.
- Comments recommended no longer having on-street bike lanes and instead designing bike facilities that can be used by people of all ages and abilities, including bike facilities that are separated from vehicle traffic.
- For the new bike lanes on 120th Avenue NE adjacent to The Village at Totem Lake, comments indicated that the bike lanes were not properly delineated from the adjacent sidewalk and were regularly being used by pedestrians. The comments recommended improving the delineation between the bike lanes and sidewalks.
- For the segment of NE 128th Street between Totem Lake Boulevard and 120th Avenue NE, comments expressed concern that vehicles turning left from NE 128th Street to driveways do not have a center left turn lane.
- The EvergreenHealth Medical Center expressed the desire to add a westbound left turn phase at the NE 128th Street/Totem Lake Boulevard intersection to improve access and circulation. The Project Team worked with WSDOT to evaluate this request and it was not recommended due to property impacts at the northeast corner of this intersection and negative traffic operations impacts to the NE 128th Street and I-405 interchange area.



Northeast corner of the NE 128th Street/  
Totem Lake Boulevard intersection

# Multimodal Improvements

This section describes the criteria used to develop and rank improvement projects, resulting recommended multimodal projects for the primary and secondary study corridors. To guide implementation, the multimodal improvements are divided into three priority groups.

## Criteria to Develop and Rank Projects

The following criteria were used to develop recommended improvement projects and rank the projects into three priority categories.

- Safety – potential to reduce crashes and improve multimodal safety.
- Pedestrian and Bicycle Mobility – connectivity, comfort, and user experience of facilities and crossing treatments.
- Transit Access – non-motorized connections to transit facilities and bus stops.
- Traffic Operations – vehicle access and circulation and ability to accommodate 2035 volumes.
- Public and Stakeholder Input – address comments from the outreach process.
- Vision – consistent with previous plans and studies for the Totem Lake area.
- Property Impacts – how widening for improvements impacts properties and buildings.
- Cost – related to construction, purchase of right of way, and property and environmental restoration.

The Project Team evaluated a wide range of improvements and identified multimodal improvements that best addressed these criteria. For example, roundabouts were evaluated at several intersections, but were not selected due to greater properties and right of way impacts and the higher cost of implementation.

## Recommended Multimodal Improvements

Based on the criteria described above, the Project Team developed a set of 14 improvement projects and placed these projects into three priority groups to guide implementation. **Figure 8** shows the locations of projects. The numbers in squares represent improvements to a corridor segment and the numbers in circles represent intersection improvement projects.

**Figure 8. Multimodal Improvements**



### Priority 1 Projects

- 1 NE 128th Street between Totem Lake Boulevard and 120th Avenue NE:** Maintain the same number of vehicle lanes. Along north side of the street, add a planter strip buffer, raised bike lane, amenity zone, and wider sidewalk. Along south side of the street, add a 2' buffer with pylons to the existing bike lane. The following section includes a more detailed description of the project, including a cross section, preliminary design, and cost estimate.
- 2 NE 128th Street between 116th Avenue NE and Totem Lake Boulevard:** Coordinate with WSDOT to add 2' buffers to existing bike lanes and marked crossings for bikes (crossbikes) with green paint to increase bike lane visibility. From the I-405 ramps to Totem Lake Boulevard, relocate eastbound bike lane to be adjacent to the curb to improve bicycle safety. At the south leg crosswalk of the Totem Lake Boulevard intersection, add a bike signal with a corresponding eastbound right turn restriction. A more detailed description of this project including a preliminary design and cost estimate are included in the next section.
- 3 NE 128th Street/120th Avenue NE Intersection:** For the eastbound left turn, change signal phasing from permissive to protected-permissive with flashing yellow arrow.
- 4 Totem Lake Boulevard/NE 128th Street Intersection:** Implement flashing yellow arrow for northbound left turns to improve safety; monitor traffic operations and collisions, and potentially convert to protected-only left turn phasing.

- 5 **Crosswalk at Kingsgate Park & Ride Driveway/116th Avenue NE Intersection:** Convert in-pavement flashers to a rectangular rapid flashing beacon (RRFB) system. With redevelopment of the Kingsgate Park & Ride to transit-oriented development, this intersection may change to a traffic signal.

### Priority 2 Projects

- 6 **120th Avenue NE between NE 132nd Street and NE 128th Street:** Add raised bike lanes, planter strip buffer, and wider sidewalks.
- 7 **NE 130th Place between 120th Avenue NE and 121st Avenue NE:** Install bike facilities on both sides of the street. Requires removal of four on-street parking spaces.
- 8 **NE 130th Lane/120th Avenue NE Intersection:** Add crosswalk at west leg and lead pedestrian interval phasing to enhance pedestrian safety and mobility.
- 9 **NE 132nd Street/120th Avenue NE Intersection:** Install flashing yellow arrow for left turn signal phases and add lead pedestrian interval phasing.
- 10 **NE 132nd Street/124th Avenue NE Intersection:** The City's Capital Improvement Program includes Project STC 07900 (NE 132nd Street Roadway Improvement Phase III) that would widen NE 132nd Street to add a second eastbound left turn lane. An alternative project would remove the exclusive northbound right turn lane and add bike lanes south of NE 132nd Street. The study recommends monitoring traffic volumes and operations at the intersection and selecting the appropriate alternative. Install leading pedestrian intervals for all crosswalks.
- 11 **NE 130th Lane/124th Avenue NE Intersection:** Install crosswalk at the north leg. Remove southbound right turn lane and replace with either curb bulb and on-street parking or bike lanes if constructed with Project 10.
- 12 **Totem Lake Boulevard between NE 132nd Street and NE 128th Street:** Add shared-use path along east side of the street. Re-channelize the street with one southbound lane, a center two-way left turn lane, and two northbound lanes to improve vehicle safety and access to properties. At NE 130th Place intersection, provide a southbound left turn lane and a refuge lane for westbound left turns (Flying-T intersection treatment). This project could be implemented with the I-405 / NE 132nd Street Interchange Project.

### Priority 3 Projects

These projects will add missing segments of bike lanes, but will have significant cost to widen the roadway, which will likely require reconstructing or adding a retaining wall.

- 13 **Southbound Bike Lane on Totem Lake Boulevard south of NE 128th Street:** Complete missing segment of southbound bike lane just south of the intersection.
- 14 **Northbound Bike Lane on 116th Avenue NE south of NE 128th Street:** Complete missing segment of northbound bike lane just south of the intersection.

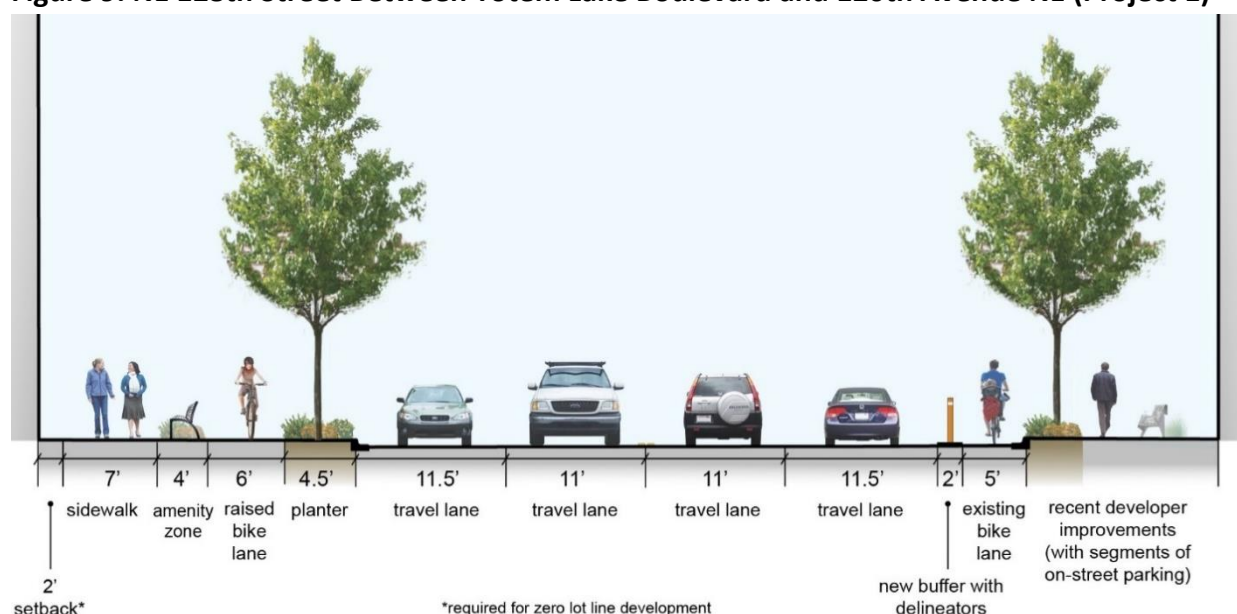
## Primary Study Corridor

This section describes the primary study corridor Projects 1 and 2 in more detail, including providing preliminary designs and cost estimates.

### NE 128th Street between Totem Lake Boulevard and 120th Avenue NE (Project 1)

The north side of this segment of NE 128th Street will be reconstructed to add a 4.5' planter strip buffer, 6' raised bike lane, 4' amenity zone, 7' sidewalk, and an enhanced bus stop. The amenity zone will provide space for benches, bike parking, trash receptacles, secondary landscaping, and separation between the bike lane and sidewalk. **Figure 9** shows the cross section for Project 1.

**Figure 9. NE 128th Street Between Totem Lake Boulevard and 120th Avenue NE (Project 1)**



On the south side of NE 128th Street, recent development frontage improvements maintained the existing on-street bike lanes and constructed planter strip buffers, wider sidewalks, amenity zones, and select locations with on-street parking. This project will add a 2' buffer with pylons to the bike lane to increase separation between vehicles and bikes. The project will relocate the eastbound bus stop farther to the east, and in front of the bus stop the bike lane will ramp up to curb height. This will reduce bus/bike conflicts that result from buses pulling into the bike lane to unload/load and will allow buses to stay in their lane.

To reduce impacts to adjacent properties and right of way, the project will maintain the 4-lane section between Totem Lake Boulevard and just west of 120th Avenue NE. Two lanes in each direction are needed to maintain operations at the I-405 interchange and accommodate the high volume of buses that serve the corridor. Not having a center two-way left turn lane will require left turns from NE 128th Street to continue to use the inside through lane. The study recommends monitoring traffic operations along this segment of NE 128th Street and potentially restricting left turn movements at select locations if needed. **Figure 10** shows the preliminary design for Project 1 on page 25. The cost estimate for Project 1 is \$6,500,000.

## **NE 128th Street between 116th Avenue NE and Totem Lake Boulevard (Project 2)**

The west segment of the primary study corridor is an overpass of I-405 that includes the I-405 ramps and several bus stops. This project will coordinate with WSDOT to narrow vehicle lanes in order to add 2' buffers with pylons to the existing bike lanes. Improvements include adding crossbikes (green pavement markings) to increase bike lane visibility. From the I-405 ramps to Totem Lake Boulevard, the project will relocate the eastbound bike lane to be adjacent to the curb to avoid bicyclists merging between two lanes of vehicle traffic. At the south leg crosswalk of the NE 128th Street/Totem Lake Boulevard intersection, add a protected bike signal phase with a corresponding eastbound right turn restriction (blank-out sign).

At the NE 128th Street/116th Avenue NE intersection, project will add green bike boxes at the westbound approach in front of the shared through-left turn lane and right turn lane and at the northwest corner of the intersection in front of the crosswalk. This will facilitate the westbound through movement and the westbound to southbound left turn movement. As part of the future design process and coordination with WSDOT, these intersection improvements may include a westbound bike signal and protected bike phase with a corresponding westbound right turn restriction (blank-out sign).

The project includes several signal phasing changes to reduce potential conflicts between vehicles and pedestrians/bicyclists. At the I-405 ramps traffic signal, the project will change the eastbound and westbound left turn protected-permissive phasing to not use the permissive phase when a pedestrian call is detected at the corresponding north leg or south leg crosswalk. As part of this study, WSDOT has already implemented lead pedestrian interval (LPI) phasing at the three NE 128th Street traffic signals at 116th Avenue NE, I-405 ramps, and Totem Lake Boulevard. This gives pedestrians and bicyclists a 3 second head start before the vehicle phase starts to better establish themselves in the crosswalk.

**Figure 11** shows the preliminary design for Project 2. The cost estimate for Project 2 is \$500,000.

Figure 10. Preliminary Design for NE 128th Street Between Totem Lake Boulevard and 120th Avenue NE (Project 1)

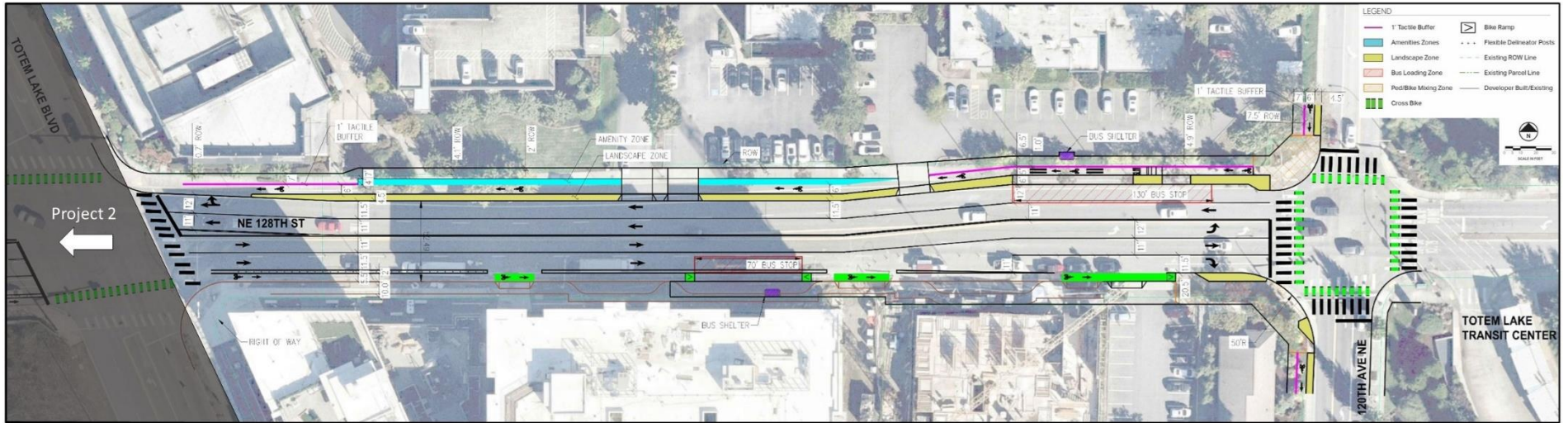
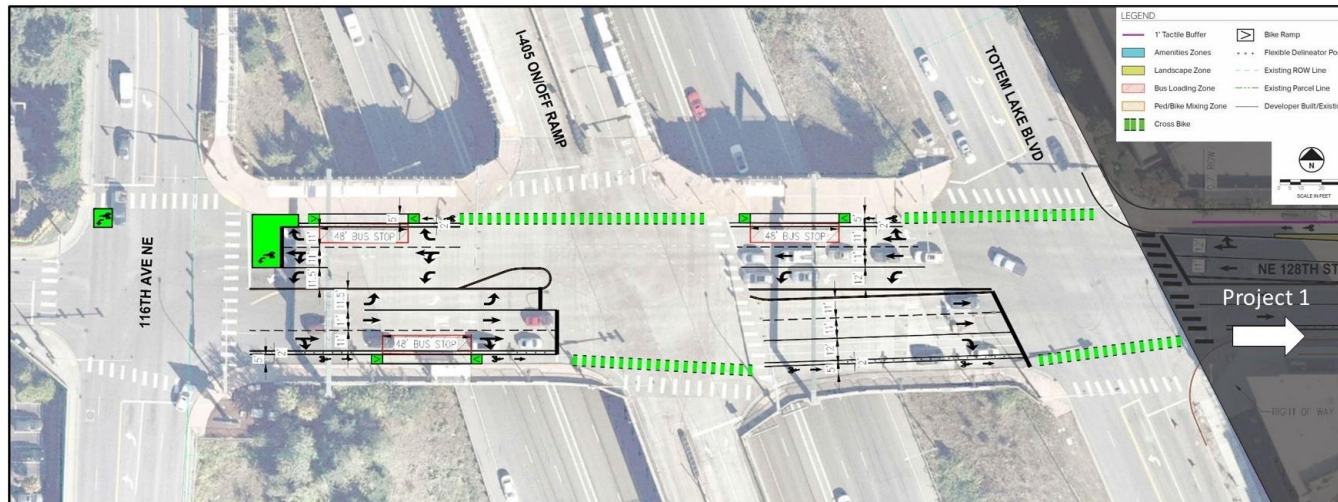


Figure 11. Preliminary Design for NE 128th Street Between 116th Avenue NE and Totem Lake Boulevard (Project 2)



## Secondary Study Corridors

This section describes the secondary study corridors and the recommended improvements in more detail.

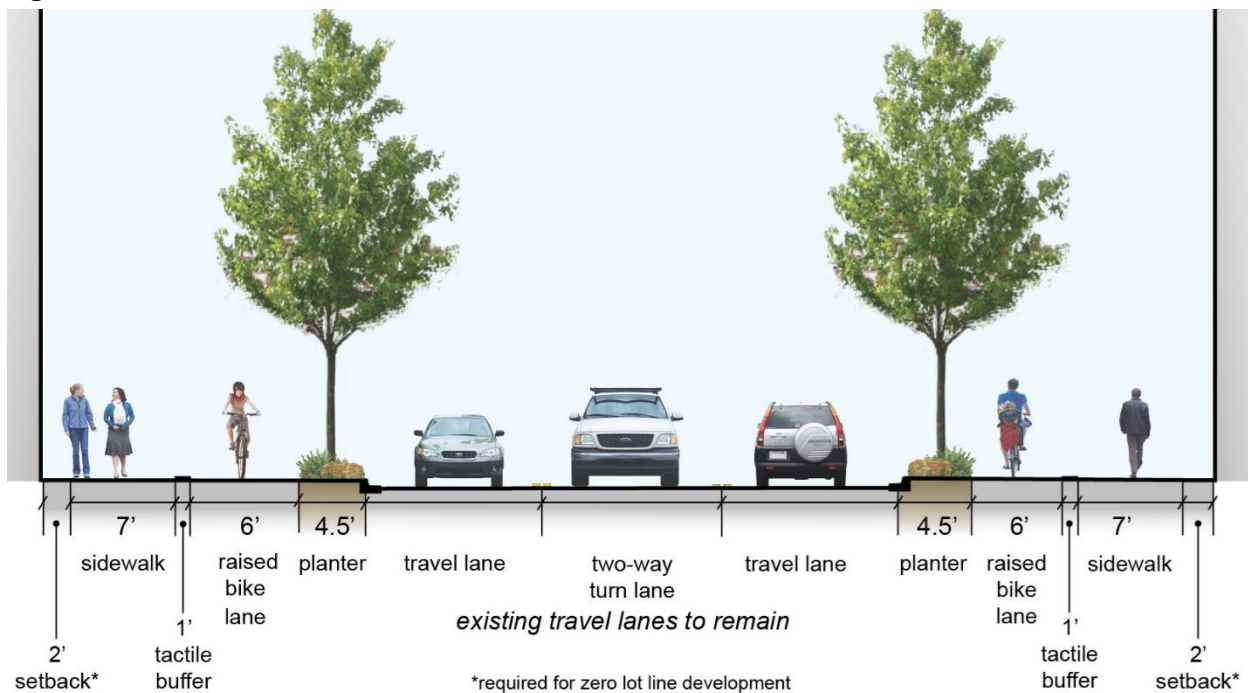
### NE 128th Street between 120th Avenue NE and 124th Avenue NE

This segment of NE 128th Street has been improved with sidewalks on both sides of the street that typically include a planter strip with mature street trees that provide a buffer from vehicle traffic. This study does not recommend reconstructing this corridor to provide bicycle facilities, because widening will impact street trees, properties and right of way. There is a significant hill in the eastbound direction and protected bicycle facilities are recommended on other streets and street extensions that will provide flatter and more direct options through the study area.

### 120th Avenue NE between NE 132nd Street and NE 128th Street

Project 6 will maintain the existing 3-lane street section and reconstruct the NE 120th Street corridor to add 4.5' planter strip buffer, 6' raised bike lanes, 1' buffer, and 7' sidewalk along both sides of the street. The raised bike lanes will extend the existing protected bike lanes south of NE 128th Street, and provide a bicycle connection between the existing facilities on NE 132nd Street and NE 128th Street. **Figure 12** shows the cross section for Project 6. Due to the amount of right of way needed for this project, it will likely be constructed as part of development frontage improvements.

**Figure 12. 120th Avenue NE between NE 132nd Street and NE 128th Street**



### **NE 130th Lane between 120th Avenue NE and 124th Avenue NE**

NE 130th Lane has sidewalks and planter strips with mature street trees and on-street parking that provides pedestrians a buffer from vehicle traffic. Between 120th Avenue NE and the 121st Avenue NE street extension, Project 7 will install either raised bike lanes or on-street bike lanes with a 2' buffer. The on-street bike lane option would only require the removal of four on-street parking spaces. East of 121st Avenue NE, the study recommends maintaining the existing facilities, including the on-street parking along the EvergreenHealth Medical Center.



NE 130th Lane, looking east towards 124th Avenue NE

### **124th Avenue NE between NE 132nd Street and NE 128th Street**

124th Avenue NE has sidewalks along both sides of the street and typically includes a planter strip buffer with street trees. Projects 10 and 11 are intersection improvements that include an option to add northbound and southbound bike lanes between NE 132nd Street and NE 130th Lane. This would extend the existing bike lanes on 124th Avenue NE to the northeast corner of the Evergreen Health Medical Center.

South of NE 130th Lane, the study does not recommend reconstructing this corridor to provide bicycle facilities, because widening will impact street trees, properties, right of way, and require retaining walls due to the grade changes along this segment. Bicycle facilities are recommended on other streets and street extensions that will provide more direct options through the study area.

## Potential Street Extensions

The study evaluated the three street extensions included in the City's Comprehensive Plan with the goal of improving vehicle and nonmotorized circulation and supporting the redevelopment of properties in the study area. **Figure 13** shows the three potential street extensions.

- NE 130th Place between Totem Lake Boulevard and 120th Avenue NE
- 121st Avenue NE between NE 132nd Street and NE 130th Lane
- 118th Avenue NE between NE 132nd Street and NE 128th Street

The street extensions will be constructed as either part of a City project or as a requirement with redevelopment of properties. The study developed recommended cross sections for the street extensions, including vehicle lanes, planter strip buffers, pedestrian and bicycle facilities, and on-street parking if included. This section also forecasts 2035 traffic volumes and traffic operations for the recommended street extensions.

**Figure 13. Potential Street Extensions and Study Corridors**



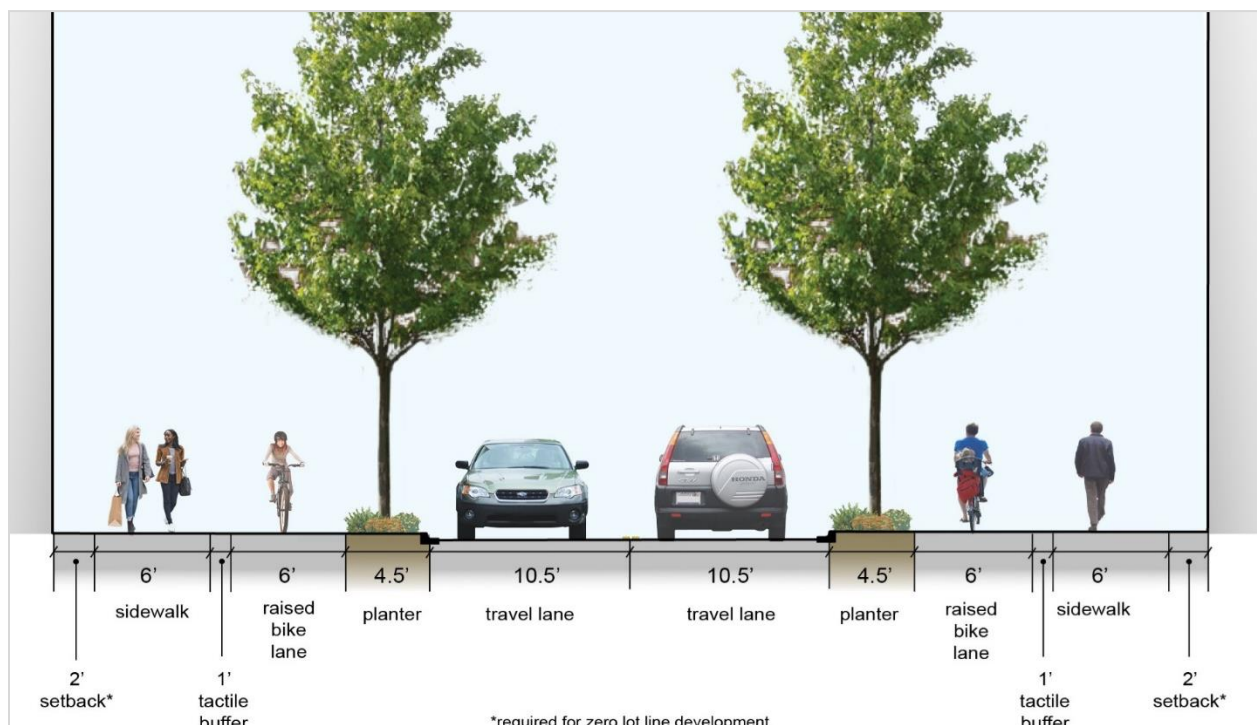
## NE 130th Place Extension

This street extension will create a public street between Totem Lake Boulevard and 120th Avenue NE along the NE 130th Place/Lane alignment. The NE 130th Place extension will be designed as a street with low vehicle speeds. **Figure 14** shows the recommended cross section for the NE 130th Place extension, which includes two 10.5' travel lanes, 4.5' planter strip buffers, 6' raised bike lanes, and 6' sidewalks. A 1' tactile buffer will separate the raised bike lanes and sidewalks. This street extension is primarily expected to service office and residential development and does not include on-street parking.

This street extension will provide a parallel alternative route to NE 128th Street, support redevelopment of properties, and improve access to the EvergreenHealth Medical Center. While this study does not recommend adding the westbound left turn movement at the NE 128th Street/Totem Lake Boulevard intersection, this street extension will provide an alternative route for westbound vehicles to turn left from NE 130th Place and travel southbound on Totem Lake Boulevard. The 130th Place NE extension will provide the most benefit to vehicle circulation of the three street extensions in the study area. For example, this street extension will reduce the demand for left turns along NE 128th Street between Totem Lake Boulevard and 120th Avenue NE.

The recommended improvements for the future NE 130th Place/Totem Lake Boulevard intersection include the westbound approach having a stop sign, a left turn lane, and a right turn lane. The NE 130th Lane/120th Avenue NE intersection already has a traffic signal and this street extension will improve the eastbound intersection approach to have a left turn lane and a shared through-right turn lane.

**Figure 14. NE 130th Place Extension between Totem Lake Boulevard and 120th Avenue NE**

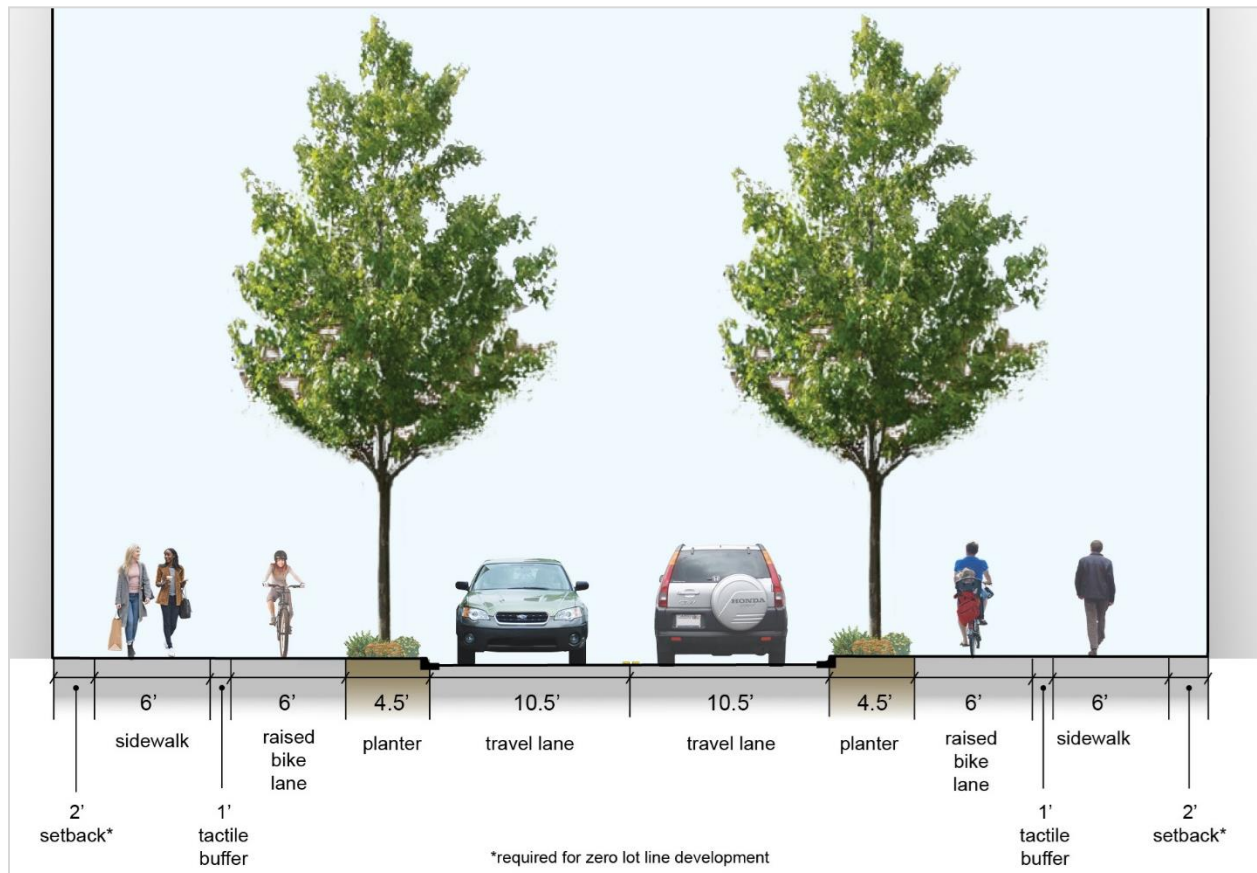


## 121st Avenue NE Extension

The 121st Avenue NE extension will create a public street between NE 132nd Street and NE 130th Lane. This new street extension will improve north-south multimodal circulation and support the redevelopment of properties. The 121st Avenue NE extension is recommended to have the same cross section as the NE 130th Place extension, with two 10.5' travel lanes, 4.5' planter strip buffers, 6' raised bike lanes, 6' sidewalks, and 1' tactile buffers separating the bike lanes and sidewalks. This street extension is primarily expected to service office and residential development and does not include on-street parking. **Figure 15** shows the cross section for the 121st Avenue NE extension.

At the NE 132nd Street/121st Avenue NE intersection, the south leg of this intersection is currently a driveway with a single lane and stop sign control. The City will construct a new Fire Station (#27) at the southeast corner of the NE 132nd Street/121st Ave NE intersection which is expected to include a new traffic signal at the intersection. The recommended improvements for the NE 130th Lane/121st Avenue NE intersection include the southbound approach having a stop sign, a left turn lane, and a right turn lane.

**Figure 15. 121st Avenue NE Extension between NE 132nd Street and NE 130th Lane**



## 118th Avenue NE Extension

The study evaluated a potential street extension between NE 132nd Street and NE 128th Street, and developed separate cross sections for the segment north of NE 130th Place and the segment south of NE 130th Place.

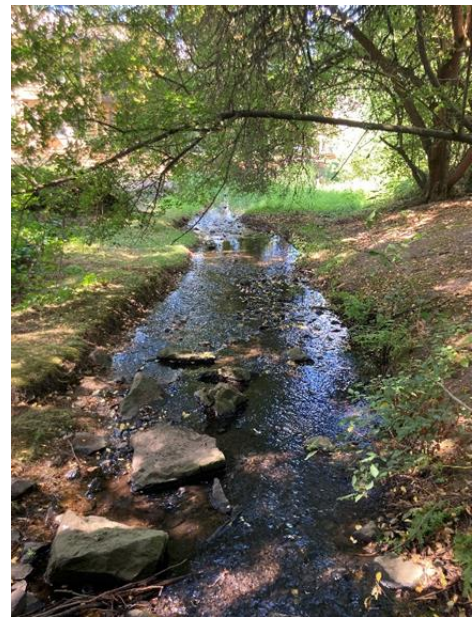
### 118th Avenue NE between NE 132nd Street and NE 130th Place

The northern segment of the 118th Avenue NE extension has a steep slope just south of NE 132nd Street, with approximately 50 feet of elevation change over a length of 150 feet resulting in a grade change of approximately 30 percent. Juanita Creek also crosses the 118th Avenue NE alignment at approximately NE 131st Place. The traffic analysis identified limited benefits to the street network for the northern segment of the 118th Avenue NE street extension between NE 132nd Street and NE 130th Place.



Steep grade south of NE 132nd Street

Due to the steep grades, higher costs for construction, impacts to Juanita Creek, and limited traffic operations benefits, the recommended cross section for this segment is a 12' multi-use trail. **Figure 16** shows the cross section for the segment of 118th Avenue NE between NE 132nd Street and NE 130th Place. A RRFB system is recommended for the non-motorized crossing at NE 132nd Street.



Juanita Creek

**Figure 16. 118th Avenue NE Multi-Use Trail between NE 132nd Street and NE 130th Place**



### 118th Avenue NE between NE 130th Place and NE 128th Street

The 118th Avenue NE extension will create a public street between NE 130th Place and NE 128th Street. This new street extension will improve north-south multimodal circulation, improve vehicle access to properties, and support redevelopment of properties. This short street segment will be designed with slower vehicle speeds and will carry low vehicle volumes.

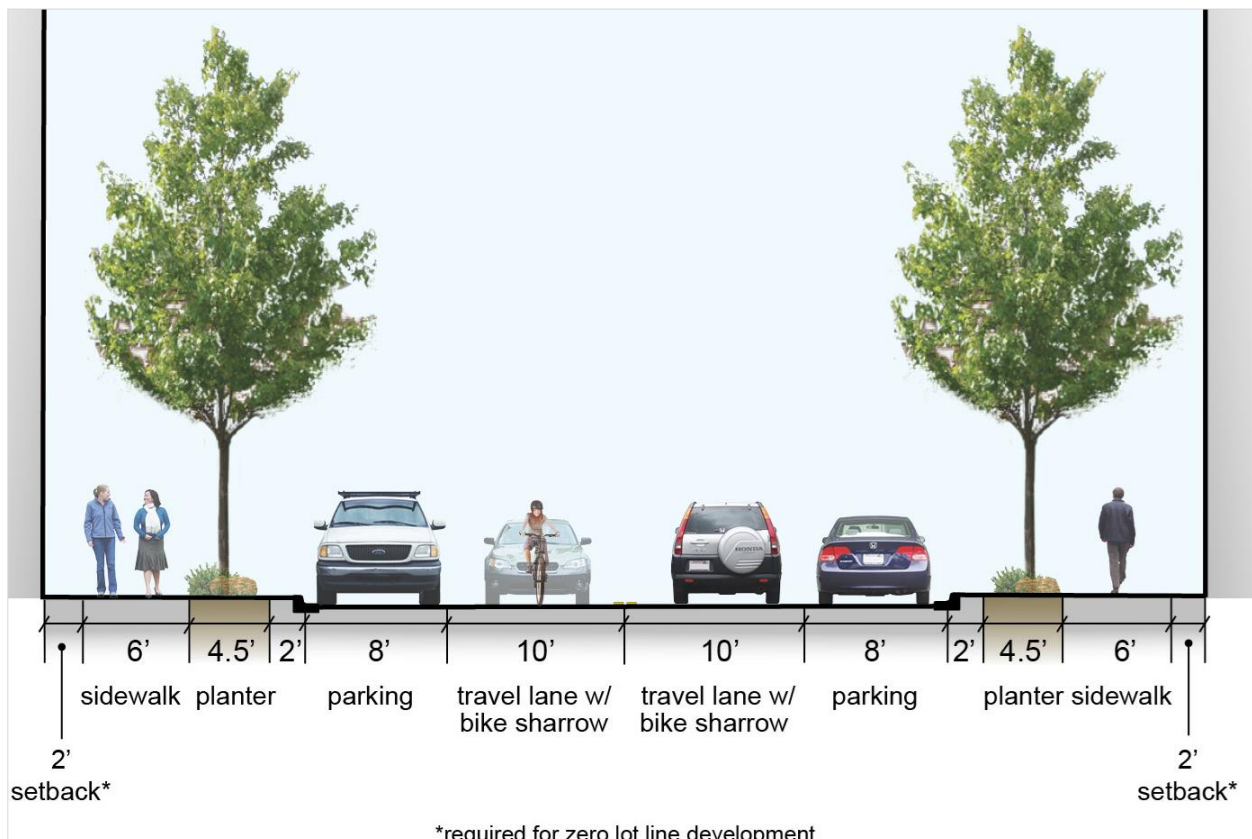
**Figure 17** shows the recommended cross section for southern segment of 118th Avenue NE, which includes two 10' lanes with bicycle sharrows, 8' on-street parking, 2' step out zones at the curb, 4.5' planter strip buffers, and 6' sidewalks. The on-street parking will provide traffic calming and serve retail land uses in the area.

The future intersection of the NE 130th Place extension/118th Avenue NE extension will be a 3-leg intersection with single lane approaches and all-way stop control. The future intersection of NE 128th Street/118th Avenue NE will be a 3-leg intersection with the southbound approach having a stop sign, a left turn lane, and a right turn lane. As the Totem Lake area continues to redevelopment and traffic volumes along NE 128th Street increase, the 118th Avenue NE intersection approach may need to be restricted to right-in and right-out movements.



NE 128th Street at Future 118th Avenue NE

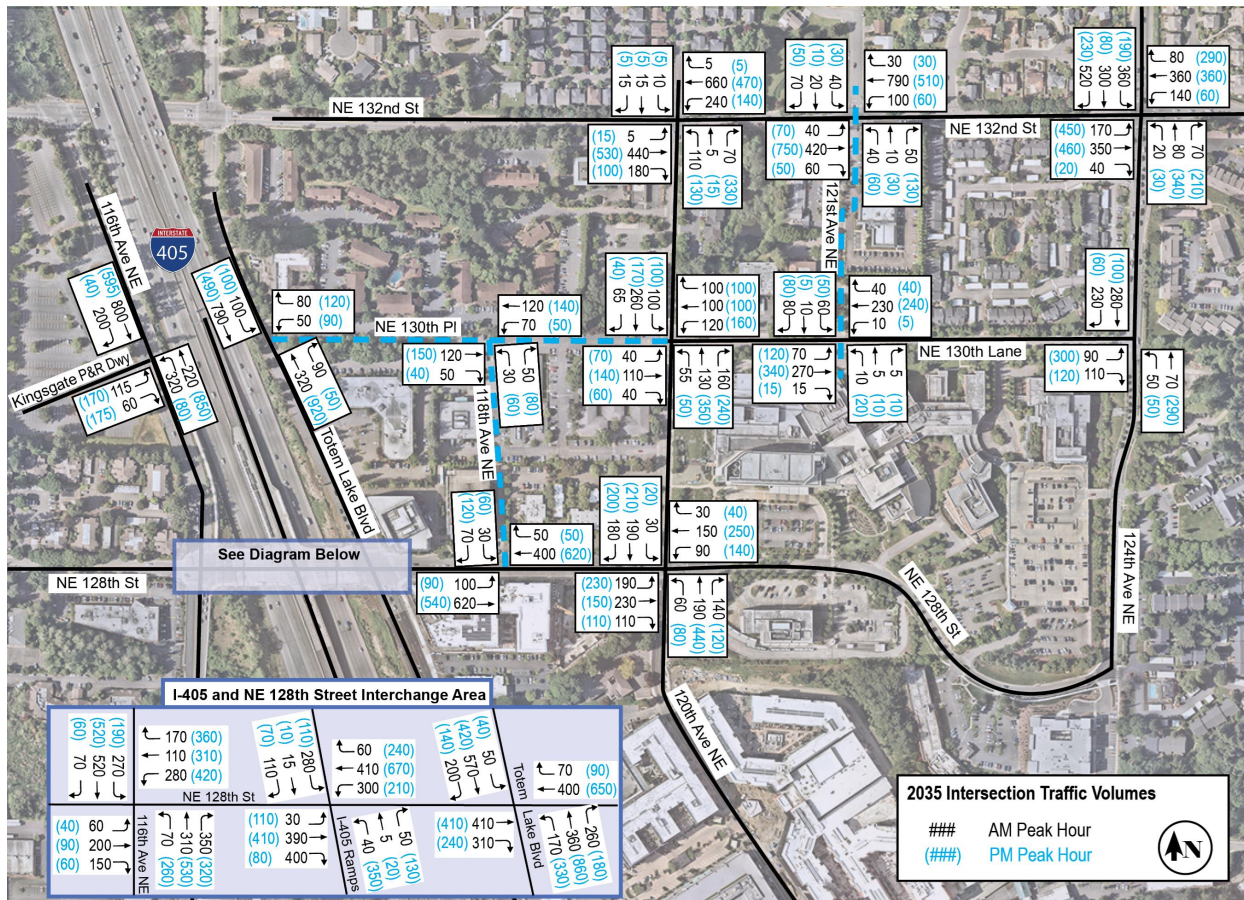
**Figure 17. 118th Avenue NE Extension between NE 130th Place and NE 128th Street**



## 2035 Vehicle Volumes With Street Extensions

The Bellevue-Kirkland-Redmond (BKR) travel demand model was used to develop 2035 PM peak hour traffic volumes for the three street extensions in the study area. The traffic forecasts for the 2035 AM peak hour were based on growth rates identified for the PM peak hour. **Figure 18** shows the 2035 AM and PM peak hour intersection vehicle volumes with the three street extensions of NE 130th Place, 121st Avenue NE, and 118th Avenue NE. The street extensions are forecast to carry low to moderate traffic volumes and will include one travel lane in each direction.

**Figure 18. 2035 AM and PM Peak Hour Intersection Volumes with Street Extensions**



## 2035 Operations For Street Extensions and Multimodal Improvements

The three future street extensions will improve vehicle circulation and result in the same or improved intersection operations for the study intersections. **Table 3** shows the 2035 AM and PM peak hour intersection operations results, comparing conditions with street extensions and conditions with street extensions plus the multimodal improvements. The five future intersections that will be created with the street extensions are listed at the bottom of Table 3. Each of these future intersections are forecast to operate at LOS C or better, except for the NE 130th Place/Totem Lake Boulevard intersection. At this intersection, the westbound stop-controlled approach is forecast to operate at LOS F.

Project 12 will improve traffic operations at the NE 130th Place/Totem Lake Boulevard intersection to LOS C by implementing a Flying-T intersection treatment, which provides a southbound refuge lane for westbound vehicles turning left from NE 130th Place.

At the NE 128th Street/120th Avenue NE intersection, Project 3 is forecast to reduce vehicle delay by changing signal phasing from permissive to protected-permissive.

**Table 3. 2035 Intersection LOS and Delay for Street Extensions and Multimodal Improvements**

Intersection	Traffic Control	2035 With Street Extensions		2035 With Street Extensions and Multimodal Improvements	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Kingsgate P & R/116th Ave NE	Signal	C (22)	B (15)	C (22)	B (15)
NE 128th St/116th Ave NE	Signal	E (60)	E (70)	E (60)	E (70)
NE 128th St/I-405 Ramps	Signal	C (30)	C (28)	C (30)	C (28)
NE 128th St/Totem Lake Blvd	Signal	B (16)	D (37)	B (19)	D (40)
NE 128th St/120th Ave NE <sup>1</sup>	Signal	D (42)	D (54)	D (39)	D (50)
NE 130th Ln/120th Ave NE	Signal	A (9)	B (15)	A (9)	B (15)
NE 132nd St/120th Ave NE	Signal	A (7)	B (19)	A (7)	B (19)
NE 130th Ln/124th Ave NE	All-Way Stop	B (10)	C (17)	A (10)	C (17)
NE 132nd St/124th Ave NE	Signal	D (43)	D (42)	D (43)	D (42)
NE 128th St/118th Ave NE <sup>2</sup>	Stop Sign	C (15)	C (24)	C (15)	C (24)
NE 130th Pl/Totem Lake Blvd <sup>2</sup>	Stop Sign	C (19)	F (108)	C (15)	C (22)
NE 130th Pl/118th Ave NE	All-Way Stop	A (9)	A (9)	A (9)	A (9)
NE 130th Ln/121st Ave NE <sup>2</sup>	Stop Signs	C (18)	C (24)	C (18)	C (24)
NE 132nd St/121st Ave NE	Signal	A (9)	B (12)	A (9)	B (12)

Note: LOS calculated using HCM 6th Edition methodology.

<sup>1</sup> Intersection has non-NEMA signal phasing and LOS is reported using Synchro 11 methodology.

<sup>2</sup> Side street stop delay is calculated for the worst stop-controlled approach.

## Potential Funding Sources

This section summarizes potential funding sources for each project, which are shown in **Table 4**. Potential funding sources include:

- City funds
- Constructed as a requirement for the redevelopment of properties (redevelopment)
- Puget Sound Regional Council grant programs (PSRC)
- Transportation Improvement Board grant programs (TIB)
- WSDOT Pedestrian and Bicycle Grant Program (Ped-Bike)
- WSDOT Highway Safety Improvement Program grant (HSIP)
- Sound Transit system access grant programs (ST)

**Table 4. Potential Funding Sources**

#	Project	Potential Funding Sources
1	NE 128th St between Totem Lake Blvd and 120th Ave NE	Grants (PSRC, TIB, Ped-Bike, ST), redevelopment or City funds.
2	NE 128th St between 116th Ave NE and Totem Lake Blvd	Grants (PSRC, TIB, Ped-Bike, ST), WSDOT or City funds.
3	NE 128th St/120th Ave NE Intersection	HSIP grant, redevelopment, or City funds.
4	Totem Lake Blvd/NE 128th St Intersection	WSDOT or City funds.
5	Crosswalk at Kingsgate Park & Ride Dwy/116th Ave NE Intersection	Grants (TIB, Ped-Bike, HSIP), redevelopment, WSDOT or City funds.
6	120th Ave NE between NE 130th Pl and NE 128th St	Grants (PSRC, TIB), redevelopment or City funds.
7	NE 130th Pl between 120th Ave NE and 121st Ave NE	Grants (PSRC, TIB, Ped-Bike), redevelopment, or City funds.
8	NE 130th Lane/120th Ave NE Intersection	HSIP grant, redevelopment, or City funds.
9	NE 132nd St/120th Ave NE Intersection	HSIP grant, redevelopment, or City funds.
10	NE 132nd St/124th Ave NE Intersection	Grants (TIB, Ped-Bike), redevelopment, or City funds.
11	NE 130th Pl/124th Ave NE Intersection	City funds.
12	Totem Lake Blvd between NE 132nd St and NE 128th St	Grants (PSRC, TIB, Ped-Bike), redevelopment, or City funds.
13	Southbound Bike Lane on Totem Lake Blvd south of NE 128th St	WSDOT or City funds.
14	Northbound Bike Lane on 116th Ave south of NE 128th St	WSDOT or City funds.

# Appendix A: Reference List

## Reference List

- City of Kirkland Transportation Improvement Program (2021-2026), City of Kirkland.
- Design Guidelines for Totem Lake Business District (Adopted 2020), City of Kirkland.
- Evergreen Health/Totem Lake Traffic Study (2019). Prepared by Transportation Solutions, Inc. for the EvergreenHealth Medical Center and City of Kirkland.
- Transit Implementation Plan (2019), City of Kirkland.
- Totem Lake Urban Center Enhancement & Multimodal Transportation Network Plan (2018). Prepared by Alta Planning + Design and PLACE Studio for the City of Kirkland.
- Totem Lake Business District Plan (Updated 2015)
- City of Kirkland Comprehensive Plan (2015), City of Kirkland.
- City of Kirkland Transportation Master Plan (2015), City of Kirkland.
- RapidRide K Line Preliminary Designs (No date). Prepared by KPFF and Nelson/Nygaard for King County Metro

# Appendix B: Transit Service Before COVID-19 Pandemic

**Table B-1. Transit Routes in Study Area**

Route	Time Periods	Frequency	Endpoints	Destinations Served
Metro 225	All-Day, incl. Sat, Sun	30 minutes	Kenmore P & R – Redmond Tech Station	Kingsgate P & R, Totem Lake TC, Overlake, Finn Hill
Metro 239	All-Day, incl. Sat, Sun	30 minutes	UW Bothell/CC – Kirkland TC	Kingsgate P & R, Totem Lake TC, Brickyard P & R
Metro 930 (DART)	Weekday All-Day	30 minutes	Kingsgate P & R – Redmond Town Center	Kingsgate P & R, Totem Lake TC, Willows Road
Metro 252	Weekday Peak	20 minutes	Kingsgate P & R – Downtown Seattle	Kingsgate P & R, Downtown Seattle
Metro 255	All-Day, incl. Sat, Sun	6-10 minutes	Totem Lake TC – University District	Totem Lake TC, Kirkland TC, S. Kirkland P & R, SR-520
Metro 257	Weekday Peak	15-20 minutes	Brickyard P & R – Downtown Seattle	Kingsgate P & R, Evergreen Point Station
Metro 311	Weekday Peak	20 minutes	Woodinville P & R – Downtown Seattle	Totem Lake Freeway Station, Brickyard P & R, Evergreen Point Station
Metro 237/352	Weekday Peak	25 minutes	Woodinville P & R – Bellevue TC	Woodinville P & R, Brickyard P & R, Totem Lake Freeway Station, Houghton Freeway Station, Bellevue TC
Sound Transit 532/ 535	Weekday All-Day, Saturday Hourly	15-20 minutes	Bellevue – Everett Station/ Lynnwood TC	Totem Lake Freeway Station, Totem Lake TC, UW Bothell/ CC, Canyon Park P & R

Sources: [Final Eastside Restructure Map by King County Metro. Changes coming in March 2020.](#) King County Metro, March 2020. [2020 Service Implementation Plan](#), Sound Transit, December 2019

# Appendix C: Intersection Level of Service Criteria

**Table C-1. LOS Criteria for Unsignalized and Signalized Intersections**

Level of Service	Unsignalized Average Delay per Vehicle (seconds)	Signalized Average Delay per Vehicle (seconds)
A	0 to 10	0 to 10
B	10 to 15	10 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	> 50	> 80

Source: 2010 Highway Capacity Manual.

## Appendix D: Crash Data Analysis

**Table D-1** lists the number and type of reported crashes that occurred at study intersections and the intersection collision rate, which is the collisions per million vehicles that enter the intersection over the five-year period.

**Table D-1. Intersection Crash Data (5 Years)**

Location	Rear-End	Side-swipe	Angle	Ped/Bike	Other	5-Year Total	Intersection ADT	Intersection Collision Rate*
NE 128th St/116th Ave NE	3	2	5	0	2	12	24,550	0.27
NE 128th St/I-405 Ramps	4	1	2	2	2	11	19,350	0.31
NE 128th St/Totem Lake Blvd	6	2	34	1	3	46	25,850	0.97
NE 128th St/120th Ave NE	5	3	21	1	3	33	15,230	1.19
NE 130th Ln/120th Ave NE	1	0	1	0	1	3	10,250	0.16
NE 132nd St/120th Ave NE	4	0	6	0	0	10	14,610	0.38
NE 130th Ln/124th Ave NE	0	0	0	0	0	0	7,050	0.00
NE 132nd St/124th Ave NE	4	0	5	0	3	12	22,170	0.30
<b>Totals</b>	<b>27</b>	<b>8</b>	<b>74</b>	<b>4</b>	<b>14</b>	<b>127</b>		

Source: WSDOT data from 3/1/2015 to 2/29/2020.

ADT: Average Daily Traffic

\*Intersection Collision Rate =  $(1,000,000 * \text{total crashes}) / (365 \text{ days} * 5 \text{ years} * \text{ADT})$

The NE 128th Street/Totem Lake Boulevard intersection experienced the most crashes with 46 crashes during the five-year period. Of the 46 collisions, 34 were angle collisions with 16 involving a northbound left turning vehicle and a southbound through vehicle. The northbound left turn movement has permissive-protected signal phasing. The high volume of northbound left turning vehicles and the permissive left turn signal phase are likely contributing factors to these crashes.

The NE 128th Street/120th Avenue NE intersection experienced the second most crashes with 33 crashes in the five-year period. 21 of these crashes were angle crashes, of which 17 crashes occurred when an eastbound left turning vehicle crashed with a vehicle traveling westbound. The high volume of eastbound left turning vehicles and the permissive left turn signal phase are likely a contributing factor in these crashes.

There were five incidents at the study intersections and study corridors (non-intersections) in which a vehicle struck a person walking or biking at an intersection. Each of these involved a

turning vehicle. Four of the five crashes occurred at the two signalized intersections of NE 128th Street/I-405 ramps and NE 128th Street/Totem Lake Boulevard.

- Westbound right turning vehicle crashed with a bicyclist (right hook) at the NE 128th Street/Totem Lake Boulevard intersection (suspected minor injury).
- Westbound right turning vehicle crashed with a person walking across the north leg of the NE 128th Street/Totem Lake Boulevard intersection (possible injury).
- A westbound left-turning bus struck a pedestrian at the south crosswalk of the NE 128th Street/I-405 ramp intersection (suspected minor injury).
- An eastbound left-turning vehicle struck a pedestrian at the north crosswalk of the NE 128th Street/I-405 ramp intersection (suspected minor injury).
- An eastbound vehicle on NE 128th Street, east of 124th Avenue NE turned left into a driveway and struck a bicyclist (suspected serious injury).

There was one crash that resulted in a fatality (a single-vehicle crash near the I-405 ramps).

The analysis also evaluated reported crash data for street segments between intersections for the 5-year period. The NE 128th Street primary study corridor between 116th Avenue NE and 120th Avenue NE experienced the most crashes with 8 sideswipe crashes and 4 angle crashes.

**Table D-2** summarizes the five years of crash data on street segments excluding intersections.

**Table D-2. Street Segment (Non-Intersection) Crash Data (5 Years)**

Location	Segment	Rear-End	Side-swipe	Angle	Ped/Bike	Other	5-Year Total
NE 128th St	116th Ave NE - 120th Ave NE	0	8	4	0	0	12
NE 128th St	120th Ave NE - 124th Ave NE	0	0	4	1	1	6
NE 130th Ln	120th Ave NE - 124th Ave NE	0	0	1	0	2	3
120th Ave NE	NE 132nd St - NE 128th St	3	0	0	0	0	3
124th Ave NE	NE 132nd St - NE 128th St	0	0	0	0	3	3
<b>Totals</b>		<b>3</b>	<b>8</b>	<b>9</b>	<b>1</b>	<b>6</b>	<b>27</b>

Source: WSDOT data from 3/1/2015 to 2/29/2020.