

## Appendix H

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# **Northeast Recycling and Transfer Station Project**

## **Transportation Technical Report**

Final

January 24, 2024

King County Department of Natural Resources and Parks,  
Solid Waste Division





## Northeast Recycling and Transfer Station Project E00633E19

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## **Appendices**

Appendix A: Transportation Methods and Assumptions Memorandum

Appendix B: Turning Movement Volumes

Appendix C: Synchro and Sidra Reports





## Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AADT	annual average daily traffic
AWSC	all-way stop control
BAT	business access and transit
BNSF	Burlington Northern-Sante Fe (Railroad)
BRT	bus rapid transit
CIP	Capital Improvement Plan
County	King County
DART	Dial-a-Ride Transit
EIS	Environmental Impact Statement
HCM	Highway Capacity Manual
HSM	Highway Safety Manual
LOS	level of service
Metro	King County Metro Transit
MEV	million entering vehicles
MRW	moderate risk waste
NERTS	Northeast Recycling and Transfer Station Project
OWSC	one-way stop control
PCE	passenger car equivalent
PSRC	Puget Sound Regional Council
RAB	roundabout
RRFB	rectangular rapid flashing beacon
RTS	Recycling and Transfer Station
SEPA	State Environmental Policy Act
SWD	Solid Waste Division
TBD	to be determined
TRB	Transportation Research Board
v/c	volume to capacity ratio
vpd	vehicles per day
WSDOT	Washington State Department of Transportation



# Executive Summary

## Purpose and Need

The King County Department of Natural Resources and Parks, Solid Waste Division (SWD), operates a system of eight transfer stations, two drop box facilities, and one regional landfill in King County, Washington (the County). The County's 2019 Comprehensive Solid Waste Management Plan (King County 2019), which was adopted by 24 cities and approved by the Washington State Department of Ecology (Ecology), identified the need for a new transfer station to replace the aging Houghton Transfer Station. The almost 60-year-old Houghton Transfer Station is one of the busiest in terms of tonnage and transactions, yet it is undersized and lacks capacity for the type of recycling and moderate risk waste disposal services that are increasingly in demand. The new recycling and transfer station (RTS), which will be called the Northeast Recycling and Transfer Station (NERTS), is proposed to be located in the northeastern part of King County. This document analyzes the potential transportation impacts of a new NERTS for the alternatives under consideration.

## Alternatives

The County is considering two action alternatives (Alternatives 1 and 2) in addition to the No Action Alternative for the NERTS, as follows:

- No Action Alternative – A new recycling and transfer station would not be sited in northeastern King County. The existing Houghton Transfer Station at 11721 NE 60th Street in Kirkland would continue to be operated.
- Alternative 1 – Current Site: The existing Houghton Transfer Station property at 11724 NE 60th Street in Kirkland. Two options exist at the Alternative 1 project site:
  - Alternative 1A – A facility constructed after the existing transfer station building is closed and demolished
  - Alternative 1B – A facility constructed while the existing transfer station building is open and operating, and then the existing transfer station building would be closed and repurposed or replaced after the new station is open
- Alternative 2 – Woodinville Site: A site composed of six properties in the 15000 block of Woodinville-Redmond Road NE in Woodinville

## Summary of Findings

This transportation analysis evaluated the proposed action alternatives to determine any potential short-term and long-term environmental impacts for the opening year (2029) and horizon year (2040) for the following transportation elements: roadway network, arterial and local street operations, active transportation facilities, transit facilities, safety, and freight mobility and access.

Both action alternatives are expected to have minimal long-term impacts to all of the transportation elements. The key findings for each transportation element are summarized below:

- Roadway Network: Under the action alternatives, the existing roadway network would not require any modifications and would remain the same as the No Action Alternative.
- Arterials and Local Street Operations: While action alternatives are expected to generate increased traffic volumes, all study intersections are expected to operate similar to the No Action Alternative. During construction, the increased truck volume is minimal and is expected to cause little to no impacts to traffic operations.
- Active Transportation Facilities: Under the action alternatives, the existing active transportation facilities would not be modified or impacted compared with the No Action Alternative.
- Transit Facilities: Under the action alternatives, the existing transit service would remain the same as the No Action Alternative.

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- **Safety:** While traffic volumes are expected to increase under the future year conditions, safety conditions are anticipated to be similar to the No Action Alternative.
- **Freight Mobility and Access:** With Action Alternative 1, County transit truck volumes are expected to remain the same as with the existing Houghton Transfer Station and not impact overall truck volumes in the study area. Under Action Alternative 2, County transit truck volumes will increase truck volumes in the study area slightly but are not expected to impact operations in the study area.

# **1. Introduction and Project Description**

King County Department of Natural Resources and Parks, Solid Waste Division (SWD), is proposing to site, design, and build a modern transfer station in northeastern King County (the County) to meet the region's growing demand for environmentally responsible waste management services. The new station will replace the aging Houghton Transfer Station in Kirkland, which has been in service since the mid-1960s and is unable to offer the space and functionality to provide the recycling services customers increasingly need and want. The Transportation Technical Report, prepared in support of an environmental impact statement (EIS) being prepared by the County as required by the Washington State Environmental Policy Act (SEPA), addresses potential transportation impacts associated with the No Action Alternative and the proposed action alternatives.

The construction and operation of the action alternatives and the on-going operations associated with the no action alternatives will utilize the surrounding transportation network. This assessment describes the traffic operations in the area of the proposed alternatives for the new Northeast Recycling and Transfer Station (NERTS) and evaluates potential impacts that may result from the No Action Alternative and from the construction and operation of two potential action alternatives for a new transfer station (Alternative 1 in Kirkland and Alternative 2 in Woodinville, Washington) (see Figure 1-1). This assessment has been assembled to aid in EIS decision-making.

## **1.1. Project Description**

The new NERTS facility will include an enclosed solid waste transfer and processing area, enclosed solid waste compactor units, a recycling collection and sorting area, employee facility, scale house and weigh station, fueling station, space for on-site customer queuing, and possible moderate-risk waste disposal for products from homes and small qualifying businesses.

The new facility would be designed and constructed to meet today's building and environmental standards and standards for service, operational efficiency, and customer and employee safety. The facility would provide improved recycling services to meet the County's environmental goals, and waste would be cost-effectively compacted for efficient transport. The facility would also have space for waste storage in the event of a major regional disaster and sufficient off-street queuing space for private and commercial vehicles.

## **1.2. Project Alternatives**

### **1.2.1. No Action Alternative**

The existing Houghton Transfer Station is located at 11724 NE 60th Street in Kirkland on parcel 1759701890. The site is bordered to the north, east, and west by single family homes and to the south by Bridle Trails State Park. Under the No Action Alternative, the SWD would not site a new station in northeastern King County (Figure 1-2). The SWD would continue to operate the existing Houghton Transfer Station. If a new transfer station were not built, the existing transfer station would continue to offer limited recycling services for as long as it operates, and services would not be modernized or expanded to accommodate a growing population and industry changes. The facility would not be enclosed to control noise and odors. Waste would continue to not be compacted, which affects the number of transit trucks and trailers that use the Houghton Transfer Station, and there would not be space for waste storage in the event of a major regional disaster. The existing site is 8.4 acres. Access to the site is from NE 160th Street.

The existing facility is not enclosed, so it does not control noise nor odors. In 2022, the Houghton Transfer Station received two odor complaints on SWD's customer service line.

The Houghton Transfer Station was built to codes before King County established sustainability goals for building development. The existing station does not include green building and sustainable design features that are part of the two action alternatives.



Figure 1-1. Vicinity Map of the Northeast Recycling and Transfer Station Project Alternatives

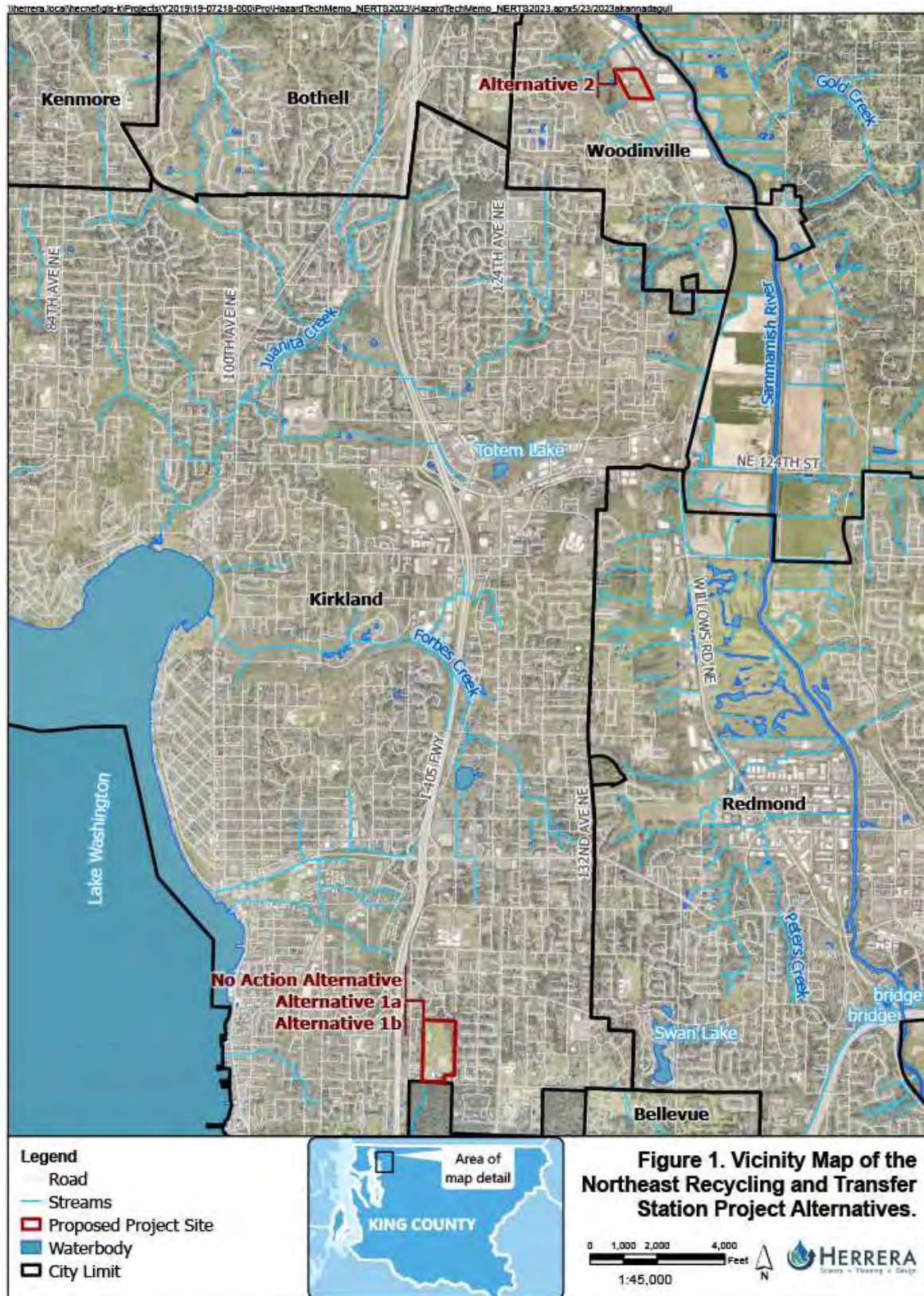






Figure 1-2. No Action Alternative





### 1.2.2. Features Common to All Action Alternatives

The new facility would be built to modern industry and green building standards. The addition of compactors to reduce the volume of garbage before it is hauled to the landfill or other disposal facility could reduce the total number of transfer hauling trips to and from the new station by nearly a third, thus reducing the cost of operations and traffic impacts (King County 2019). In addition, modern transfer stations are built as fully enclosed buildings, resulting in reduced external dust, noise, odor, and litter. The new transfer station would offer sufficient queuing space for customers and storage space for waste, including expanded dedicated areas for recycling services. All action alternatives would include the following physical elements (except where noted):

- Scale house and scales
- Enclosed transfer building for waste handling, sorting, and processing, with separate areas for commercial and self-haul drop-off, and odor control technologies
- Enclosed waste compactors
- Recycling and material staging areas
- Administration and staff area
- Station perimeter fence
- Moderate Risk Waste (MRW) collection building (Alternative 2 only)
- A “To Be Determined” building to house additional private recycling or reuse operators or other service providers
- Roadways for customers and SWD vehicles
- Outdoor parking for full and empty waste transfer trailers
- Stormwater management
- Wastewater management
- Landscaping.

#### 1.2.2.1. Building Features

The approximate footprint of the building area would be between 80,000 square feet and 125,000 square feet. Buffers between the active area of the station and neighboring uses would be appropriately sized and designed to reduce or eliminate impacts.

The height of the new station would depend on site conditions and city building codes. The distance from the main tipping floor down to the compactor(s) would be approximately 20 feet and may be partially below grade. The height from the main tipping floor to the highest point of the roof would be approximately 50 feet – which is the distance required for commercial garbage trucks to tip without hitting the overhead misting, fire sprinkler, ventilation, and other systems. The overall height of the new station would be approximately 70 feet above the lowest level. Buildings, parking areas, and roadways at the new transfer station would result in up to four to 8.5 acres of impervious surfaces.

The new transfer station will target the highest green building standards possible at each site, under King County’s Green Building and Sustainable Development ordinance and King County Code Title 18 Environmental Sustainability Programs.

#### 1.2.2.2. Elements of Operation

The facility is anticipated to open for business in 2029 following a construction period of approximately 30 months. The following measures are anticipated during operations for the health and safety of customers, employees, and neighbors:

- The transfer building will be fully enclosed except for the entry/exit points, thus reducing off-site noise, odor, and dust.
- The facility will provide expanded recycling, accepting source-separated materials from self-haul customers:
  - Commingled recyclables (curbside mix of paper, cardboard, tin, aluminum, plastic containers, glass bottles and jars)
  - Cardboard
  - Household sharps
  - Mixed yard and food waste
  - Clean wood
  - Plastic film
  - Expanded polystyrene (Styrofoam)
  - Scrap metal
  - Mercury lighting (fluorescent tubes and compact fluorescent bulbs)
  - Large appliances (refrigerant and non-refrigerant)
  - Small appliances (anything with a cord)
  - Additional recyclables, depending on the alternative selected, which may include bicycles and bicycle parts, CD/DVD/VCR players, rigid plastics, textiles, mattresses, carpet, gypsum wallboard, aggregates (bricks, pavers, porcelain sinks and toilets), asphalt shingles and other construction and demolition waste; and other materials targeted for diversion from disposal.
- A mechanical exhaust ventilation system will be incorporated into the transfer station building for odor and dust control.
- A misting system will be installed in the transfer building for odor and dust control.
- Fully loaded transfer trailers will be removed from the station in the order they are filled.
- Transfer trailers will be fully enclosed, and doors and door-seals will be maintained to reduce the potential for odor, spills, and litter leaving the building.
- Efficient on-site traffic flows will minimize vehicle queuing, thus reducing emissions.
- The station will be cleaned on a regular basis.

#### 1.2.2.3. Alternative 1

The site for Alternative 1 is located at 11724 NE 60th Street in Kirkland, at the existing Houghton Transfer Station location. The site is bordered to the north, east, and west by single family homes and to the south by Bridle Trails State Park. Alternative 1 has two options:

- Alternative 1A – a facility constructed after the existing transfer station building is closed and demolished (Figure 1-3)
- Alternative 1B – a facility constructed while the existing transfer station building is open and operating, and which will then be closed and repurposed or replaced after the new station is open (Figure 1-4).

Alternative 1A includes removal of the existing transfer station building prior to construction of the new station and inclusion of a “to-be-determined (TBD)” facility to house future private recycling or reuse operations or service providers; Alternative 1A does not provide for a MRW collection facility. The proposed potential site development area for Alternative 1A is about 10 acres. Expanded recycling services would be provided with Alternative 1A.

Alternative 1B retains the existing transfer station building during construction of the new station, and then closes and repurposes or replaces the existing station after the new station is open. While a future use has not been determined, the repurposed or replaced facility could house future private recycling or reuse operations or service providers. Alternative 1B does not provide for a MRW collection facility. The proposed potential site development area for Alternative 1B is about 12.75 acres. Expanded recycling services would be provided with Alternative 1B.

The area to the north of the existing transfer station is the site of a closed landfill that is owned and maintained by King County. Both Alternative 1A and Alternative 1B may include removal of some existing waste in the development footprint to accommodate construction of new facilities.

#### **1.2.2.4. Alternative 2**

The site for Alternative 2 is located at 15801 Woodinville-Redmond Road Northeast in Woodinville on parcels 1526059086, 5711600010, 5711600020, 5711600030, 1526059094, and 1526059095. The proposed site is 12.9 acres, with an area of about 8 to 10.9 acres available for development (Figure 1-5). The site is bordered to the north, south, and east by commercial and light industrial uses. To the west is a sloped greenspace, an abandoned Burlington Northern-Santa Fe Railroad (BNSF) rail line, and residential properties. Access to the Woodinville site is from Woodinville-Redmond Road Northeast. The site is currently used for commercial uses including construction, portable toilet rental, manufacturing, and automotive businesses, which would be relocated. A portion of the site is vacant and undeveloped. Expanded recycling services would be provided with Alternative 2.

Alternative 2 offers service for collection of MRW, which would be stored in specialized containers on site. MRW includes hazardous waste generated by households and small businesses. Where the SWD currently provides MRW service, the following materials are accepted: pesticides, glues and adhesives, antifreeze, aerosols, automotive products, fuels, rechargeable batteries, button batteries, pool and spa chemicals, oil-based paints, hobby chemicals, mercury devices, thinners and solvents, fluorescent bulbs, toxic cleaning products, fuel cylinders (under five gallons), lithium batteries, and alkaline batteries. Individual loads are limited to 50 gallons and containers greater than five gallons are generally not accepted.





Figure 1-3. Alternative 1A

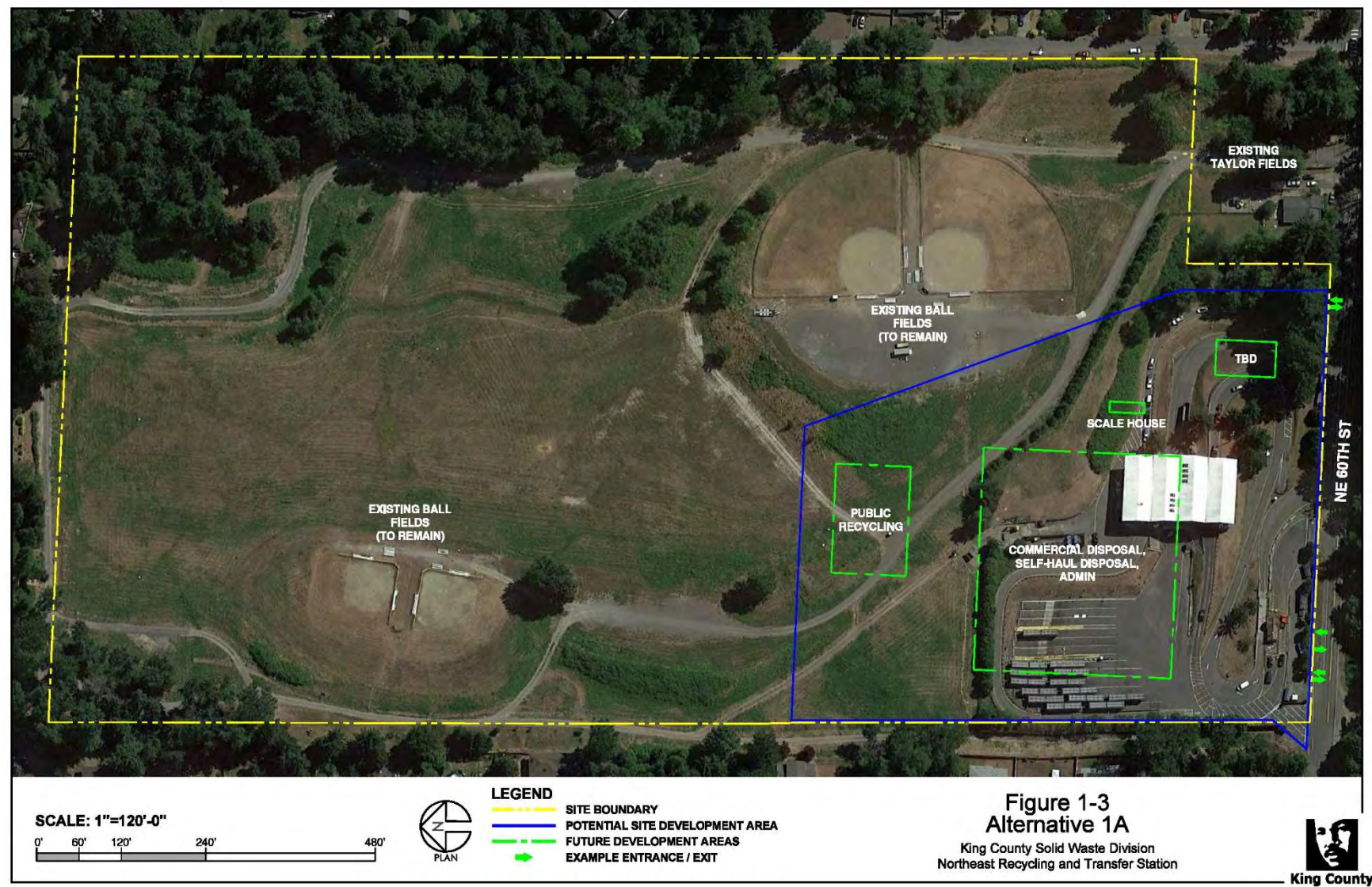






Figure 1-4. Alternative 1B

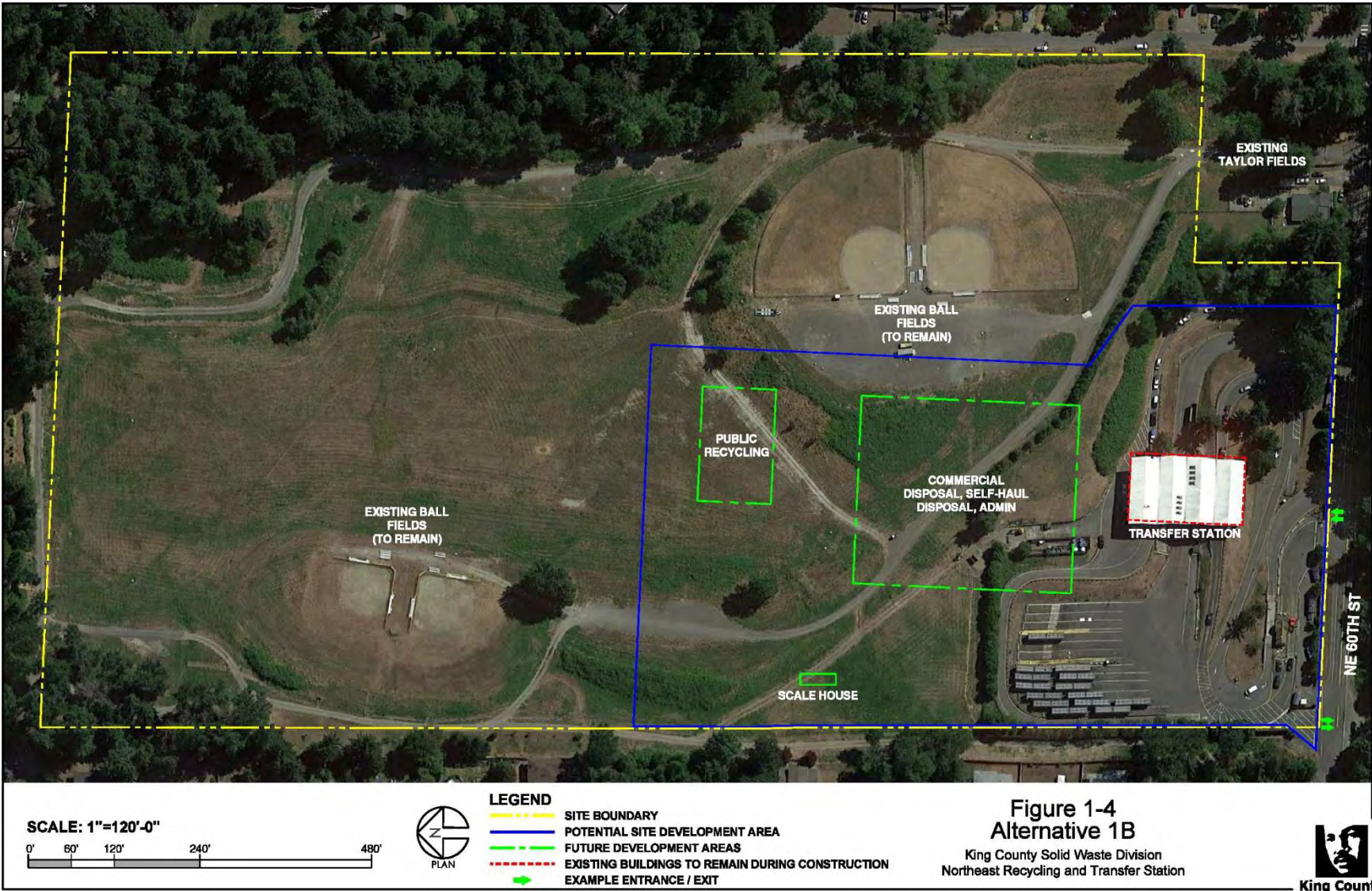






Figure 1-5. Alternative 2





### **1.3. Construction Methods for the Action Alternatives**

Design of the new NERTS facility has not been initiated at this time. However, it is anticipated that the action alternatives would require general earthwork and other activities to prepare the site for construction of facility buildings and associated functions. These activities may include, but not be limited to, soil excavation, soil filling, site grading, pile driving, utility trenching, waste excavation, modification or installation of environmental controls, installation of underground utilities, and installation of drainage systems. Each of these activities would utilize appropriate construction equipment for the desired function. King County will require the design to minimize soil disturbance as to the extent feasible.

### **1.4. Transportation Elements**

The analysis of the transportation system considered a number of elements: roadway network, arterial and local street operations, active transportation facilities, transit facilities, safety, and freight and mobility access.

This technical report discusses each transportation element individually. The discussion of each element covers the affect environment for the existing year (2023) and the expected short- and long-term environmental impacts for the year of opening (2029) and the horizon year (2040), including potential mitigation. The future year analyses will compare the No Action Alternative and the action alternatives.

In addition to this introduction, this report includes the following sections:

- Section 2, Methodology and Assumptions: Summarizes the analysis methods and associated assumptions used to assess the alternatives in this report.
- Section 3, Affected Environment: Discusses existing transportation conditions.
- Section 4, Transportation Impacts: Describes the anticipated impacts for each study area in terms of:
  - Roadway network.
  - Arterial and local street operations.
  - Active transportation facilities.
  - Transit facilities.
  - Safety.
  - Freight mobility and access.
  - Impacts from construction activities.
- Section 5, Avoidance and Minimization of Impacts.
- Section 6, Indirect and Cumulative Impacts.
- Section 7, Potential Mitigation Measures.
- Section 8, References: Lists the sources used in preparing this report.
- Appendix A: Transportation Methods and Assumptions Memorandum
- Appendix B: Turning Movement Volumes
- Appendix C: Synchro and Sidra Reports



## 2. Methodology and Assumptions

The methodology and assumptions used for the NERTS Draft EIS to analyze the transportation impacts of the NERTS were compiled in the Northeast Recycling and Transfer Station Transportation Technical Analysis Methodology and Assumptions, which is provided in Appendix A of this technical report. That report summarizes the following information:

- Agency guidelines and regulations regarding the transportation analysis.
- Data collected for the analysis and sources, such as traffic volumes, active transportation facilities, crash data, and transit facilities.
- Transportation analysis methodology, including relevant definitions, and procedures for local and arterial traffic analysis, intersection operational analysis, and safety assessments.
- Methods for background traffic forecasting and project trip forecasting.
- Methods for assessing impacts related to active transportation facilities, transit facilities, freight, and construction.

### 2.1. Data Sources and Collection

The data used in the transportation analysis were collected from several different sources:

- Intersection turning movement counts and 24-hour tube counts were collected at the study intersections and key locations within the study areas, respectively, between fall 2022 and spring 2023.
- Signal timing information was obtained from the applicable jurisdiction agencies, including the City of Kirkland, City of Woodinville, and Washington State Department of Transportation (WSDOT).
- The Puget Sound Regional Council (PSRC) SoundCast travel demand models were used to forecast future No Action and action alternative volumes (PSRC 2023).
- Additional existing conditions data for active transportation facilities, transit, freight, etc. crash data; planned projects; and other future condition assumptions were collected from the applicable agencies, including but not limited to King County, City of Kirkland, City of Woodinville, WSDOT, Community Transit, and Sound Transit. This included GIS data, Comprehensive Plans, Transportation Master Plans, Capital Improvement Programs, and more.

### 2.2. Selection of the Study Area

There are two study areas for this transportation analysis, one that pertains to each Action Alternative. The cities of Kirkland and Woodinville assess traffic impacts based on intersection operation concurrency standards (i.e., level of service and delay). Therefore, the study areas are defined as the study intersections adjacent to the project site in each area that are most likely to experience volume impacts as a result of the proposed project.

The Kirkland study area for Alternative 1 is made up of 5 study intersections adjacent to the existing Houghton Transfer Station site, generally bound by I-405 (and associated ramps) to the west, 120th Avenue NE to the east, NE 60th Street to the south, and NE 70th Street to the north. While there are two options for Alternative 1, the transportation analysis and study area are the same for both options, with the exception of the construction analysis. Figure 2-1 shows the Alternative 1 study area for the key transportation study elements.

The Woodinville study area for Alternative 2 is made up of 12 study intersections adjacent to the proposed project site on Woodinville-Redmond Road NE, generally bound by SR 522 (and associated ramps) to the north, NE 124th Street to the south, and along Woodinville-Redmond Road NE and SR 202. Figure 2-2 shows the Alternative 2 study area for the key transportation study elements.

Additionally, Alternative 1 will not affect the Woodinville study area and Alternative 2 will not affect the Kirkland study area, apart from a decrease in volume due to the removal of the existing Houghton facility.

### **2.3. Analysis of Impacts**

Affected Environment, Section 3, describes the existing conditions in the study area for each site. Transportation Impacts, Section 4, identifies potential sources and types of impacts to the transportation system and the severity of those potential impacts compared with the No Action Alternative. The roadway and traffic operational impacts will be assessed for the year of opening (2029) as well as the design year (2040). All other transportation impacts will be assessed for the 2040 design year.



Figure 2-1. Kirkland Study Area – Alternative 1



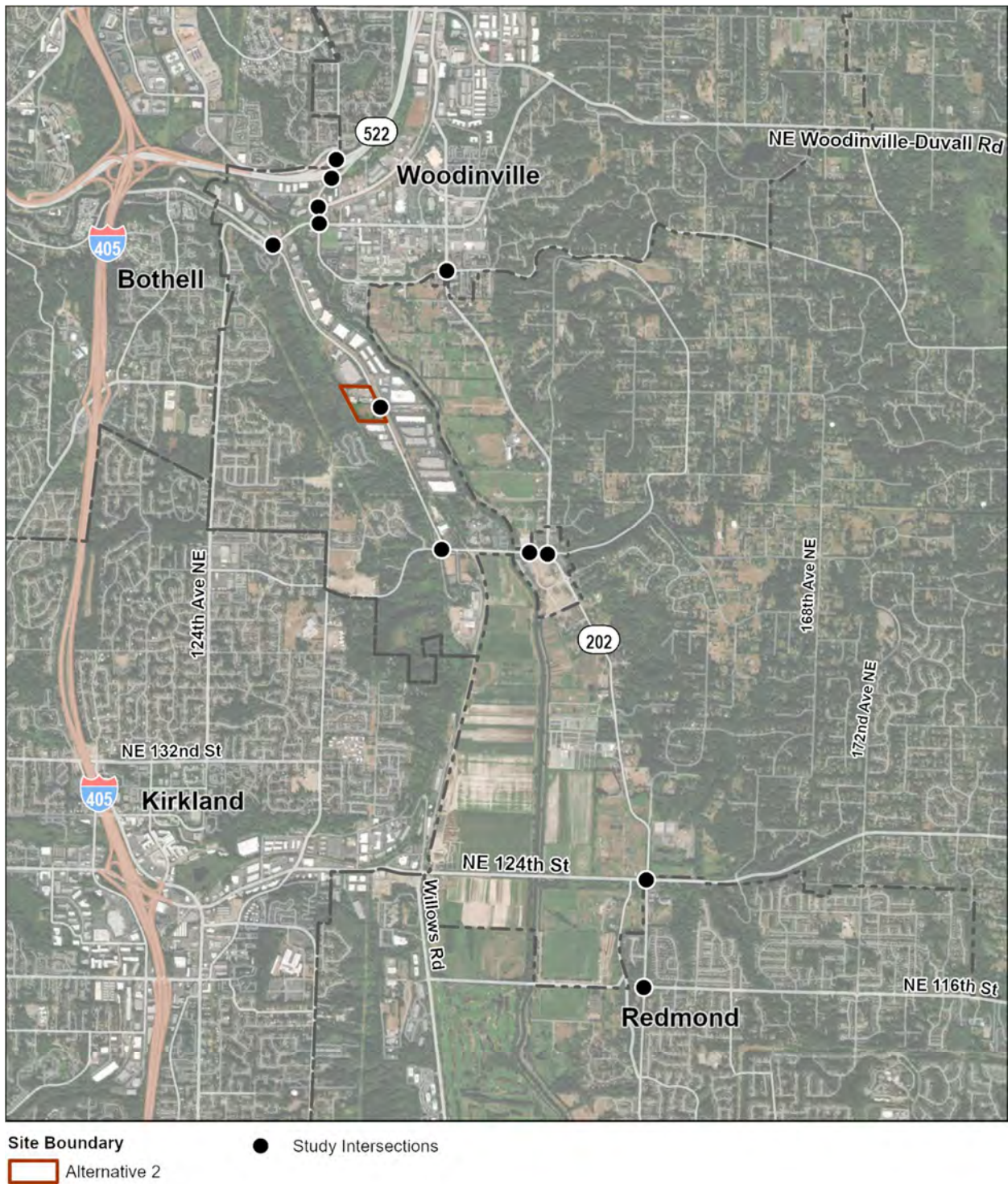
Site Boundary  
Alternative 1

● Study Intersections

0 250 500 Feet  
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Figure 2-2. Woodinville Study Area – Alternative 2



### 3. Affected Environment

This section discusses the affected environment for the transportation analysis. It describes the existing transportation facilities, service types, and conditions in the study areas, including:

- Roadway network (intersections, traffic volumes, and operations).
- Active transportation facilities.
- Transit.
- Safety.
- Freight.

#### 3.1. Roadway Network

This section describes the existing conditions for arterials and local roadway facilities within each transportation study area. Turning movement volumes for the existing weekday and Saturday, AM, and PM peak hours are included in Appendix B. Operational conditions associated with special events are also described in this section.

##### 3.1.1. Kirkland Study Area

The local street network and classifications in the Kirkland study area include minor arterials and collectors, which are summarized in Table 3-1 and Figure 3-1. Annual average daily traffic (AADT) on the minor arterial and collectors in the Kirkland study area range from 2,500 to 17,500 vehicles per day (vpd). The existing Houghton Recycling and Transfer Station is accessed from NE 60th Street, which is classified as a collector. Access to I-405 is provided via 116th Avenue NE and NE 72nd Place.

**Table 3-1. Existing Local Roadway Facilities – Kirkland**

Roadway	Classification	Number of Lanes	Speed Limit (mph)	AADT (vehicles per day)	Bike Lanes	Sidewalk
116th Avenue NE	Collector	2	35	13,700	Yes	Partial
NE 70th Street/NE 72nd Place	Minor Arterial	2	30	17,500	Partial	Yes
NE 60th Street	Collector	2	25	2,500	No	Partial

Source: City of Kirkland (2023); WSDOT (2023b); WSDOT (2023c).

AADT = annual average daily traffic.

The Kirkland study area includes five study intersections, including three signalized intersections, one all-way stop control (AWSC) intersection, and one one-way stop control (OWSC) intersection. Table 3-2 summarizes the traffic control and regulating jurisdiction for each intersection in the Kirkland study area.

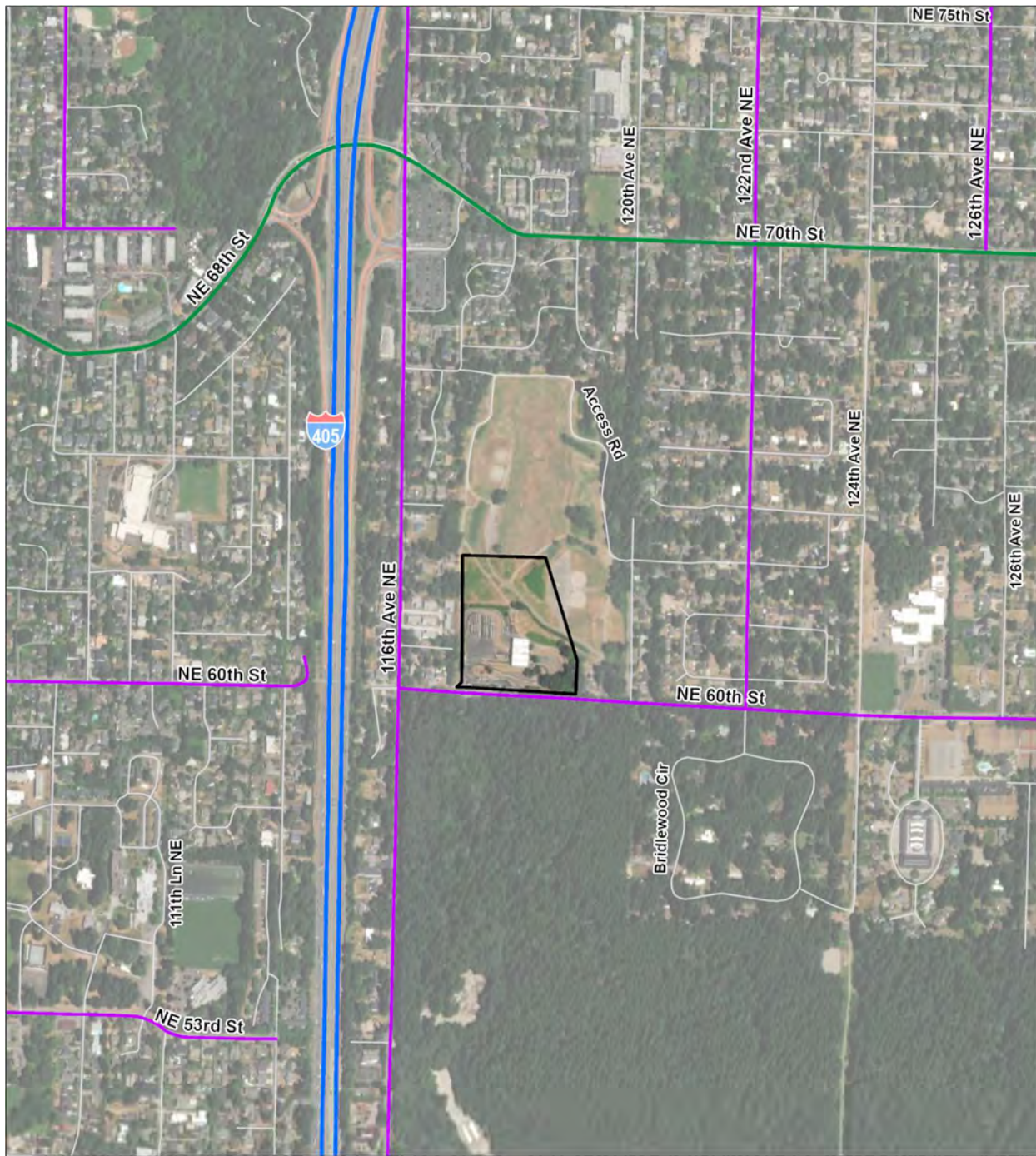
**Table 3-2. Kirkland Study Area Intersections**

ID	Intersection	Traffic Control	Jurisdiction
101	116th Avenue NE and I-405 Northbound Ramps	Signal	WSDOT
102	116th Avenue NE and NE 70th Place	Signal	WSDOT
103	NE 68th Street and I-405 Southbound Ramps	Signal	WSDOT
104	NE 60th Street and 116th Avenue NE	AWSC	Kirkland
105	NE 60th Street and Site Driveway	OWSC	Kirkland

WSDOT = Washington State Department of transportation; AWSC = all-way stop control; OWSC = one-way stop control.



Figure 3-1. Existing Local Roadway Facilities – Kirkland



**Roadway Functional Class**

- Interstate
- Minor Arterial
- Collector
- Neighborhood Access

**Site Boundary**

- Alternative 1

0 250 500 Feet  
1:11,000  
N

### 3.1.2. Woodinville Study Area

Table 3-3 and Figure 3-2 summarize the local street network and classifications in the Woodinville study area. The street network and classifications in the Woodinville study area include principal and minor arterials. The site for Alternative 2 is accessed from Woodinville-Redmond Road NE, a principal arterial roadway and state route. AADT on the principal and minor arterials in the Woodinville study area range from 8,800 to 27,600 vpd. All of these roadways are part of SR 202. Access to SR 522 is provided via 131st Avenue NE.

**Table 3-3. Existing Local Roadway Facilities – Woodinville**

Roadway	Classification	Number of Lanes	Speed Limit (mph)	AADT (vehicles per day)	Bike Lanes	Sidewalk
131st Avenue NE (SR 202)	Principal Arterial	4	35	27,600	No	Yes
NE 175th Street (SR 202)	Principal Arterial	4	35	18,000	Yes	Yes
Woodinville-Redmond Road NE (SR 202) – NE 175th Street to NE 145th Street	Principal Arterial	2	40	7,700-10,400	No	Partial
NE 145th Street (SR 202)	Principal Arterial	2	35	8,800	Shared-Use Path	Shared-Use Path
Woodinville-Redmond Road NE (SR 202) – NE 145th Street to NE 116th Street	Minor Arterial	2	40	17,400	No	No

Source: WSDOT (2023b).

AADT = average annual daily traffic.

The Woodinville study area included twelve intersections, including eight signalized intersections, two OWSC intersections, and two roundabouts. The two roundabouts are located on State Route 202 and are subject to WSDOT standards. Table 3-4 summarizes the traffic control and regulating jurisdiction for each intersection in the Woodinville study area.

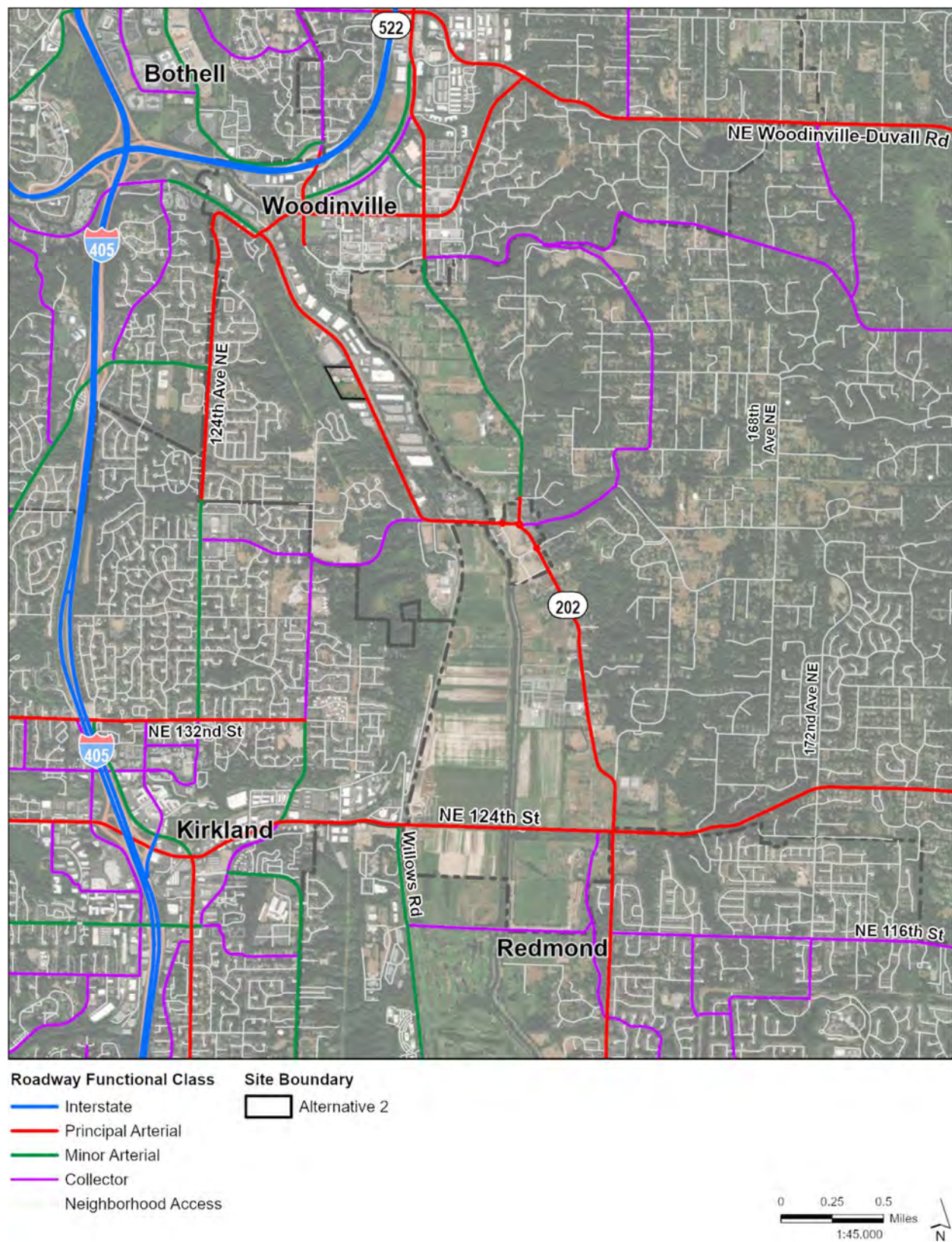
**Table 3-4. Woodinville Study Area Intersections**

ID	Intersection	Traffic Control	Jurisdiction
201	SR 522 Westbound Ramps and 131st Avenue NE	Signal	WSDOT
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	WSDOT
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	WSDOT
204	NE 175th Street and 131st Avenue NE	Signal	WSDOT
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	WSDOT
206	140th Avenue NE and NE 171st Street	Signal	Woodinville
207	Woodinville-Redmond Road NE and NE 145th Street	OWSC	WSDOT
208	Village Road and NE 145th Street	Roundabout	WSDOT
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	Roundabout	WSDOT
210	Woodinville-Redmond Road and NE 124th Street	Signal	WSDOT
211	NE 116th Street and Woodinville-Redmond Road	Signal	WSDOT
212	Woodinville-Redmond Road and Site Driveway	OWSC	Woodinville

WSDOT = Washington State Department of Transportation; OWSC = one-way stop control.



Figure 3-2. Existing Local Roadway Facilities – Woodinville



## 3.2. Arterial and Local Street Operations

This section describes the existing conditions intersection operations for the study intersections within each transportation study area. The reports from the existing operational analysis are included in Appendix C.

### 3.2.1. Intersection Operations and Level of Service Standards

Key intersections in the study area were analyzed to understand their operating conditions. All intersections identified in each study area were analyzed for the weekday and Saturday AM and PM peak hours.

Traffic operations are commonly measured using the level of service (LOS) method, which is defined in terms of average intersection delay on a scale ranging from A to F depending on the delay conditions at the intersection. LOS A represents the best conditions with minimal delay, and LOS F represents the worst conditions with severe congestion. Two factors determine delay: (1) the capacity of the intersection as defined by the number of lanes, traffic volumes, lane widths, pedestrian volumes, and other features; and (2) signal timing. Capacity, delay, and LOS are calculated for each traffic movement or group of traffic movements at an intersection. The weighted average delay across all traffic movements determines the overall LOS for a signalized intersection.

The LOS at unsignalized intersections that are stop controlled on one or two approaches is also defined in terms of delay but only for the worst stop-controlled approach, which is typically the minor street. For unsignalized intersections that are stop controlled on each approach, the average intersection delay is reported. The delay thresholds are lowered for stop-controlled intersections because driver behavior considerations make delays at stop-controlled intersections more onerous. For example, at signalized intersections, drivers may relax during the red interval while waiting for the green interval, but drivers on the stopped approach of a stop-controlled intersection must remain attentive to identifying acceptable gaps in traffic. Table 3-5 summarizes the criteria used to define LOS.

**Table 3-5. Average Control Delay Used in Level of Service**

LOS <sup>1</sup>	Signalized/Roundabout Intersections (seconds per vehicle)	Unsignalized Intersections (seconds per vehicle)	Traffic Flow Characteristics (seconds per vehicle)
A	< 10	< 10	Virtually free flow; completely unimpeded
B	> 10 and < 20	> 10 and < 15	Stable flow with slight delays; less freedom to maneuver
C	> 20 and < 35	> 15 and < 25	Stable flow with delays; less freedom to maneuver
D	> 35 and < 55	> 25 and < 35	High density but stable flow
E	> 55 and < 80	> 35 and < 50	Operating conditions at or near capacity; unstable flow
F	> 80	> 50	Forced flow; breakdown conditions

Source: Transportation Research Board (2016).

LOS = level of service.

<sup>1</sup> The LOS criteria are based on control delay, which includes initial deceleration delay, final deceleration delay, stopped delay, and queue move-up time.

Intersections are considered failing when they do not operate at or better than the agency's intersection LOS standard. Failing LOS standards indicate that vehicles incur substantial delay and vehicle queueing is evident. Table 3-6 summarizes the LOS standards, or lowest acceptable LOS threshold, for each affected jurisdiction. For ramp terminal intersections, the WSDOT LOS standard was assumed because those intersections are within WSDOT jurisdiction. Additionally, for roundabouts, the primary measure of effectiveness is volume to capacity ratio (v/c) instead of LOS alone.

**Table 3-6. Intersection LOS Standard for Affected Jurisdictions**

Agency/Jurisdiction	Level of Service Standard
Washington State Department of Transportation (WSDOT)	Level of Service (LOS) D for highways of statewide significance (HSS) LOS E/mitigated for regionally significant state highways (non-HSS) v/c < 0.9 for roundabouts (each lane group)
City of Kirkland	LOS D
City of Woodinville	LOS E for signalized intersections (not including state highways)

Sources: City of Woodinville (2013); City of Kirkland (2022), WSDOT (2014).

### 3.2.2. Kirkland Study Area

#### 3.2.2.1. Weekday Analysis

The existing weekday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 3-7 and Figure 3-3. In the AM and PM peak hours, all study area intersections operate at or better than the LOS standards for the intersection.

**Table 3-7. 2023 Existing Weekday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak		PM Peak	
				LOS	Delay (seconds)	LOS	Delay (seconds)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	C	24.2	D	45.7
102	116th Avenue NE and NE 70th Place	Signal	D	D	37.4	C	24.9
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	D	40.6	C	34.2
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	9.6	B	11.3
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	9.0	A	9.1

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

#### 3.2.2.2. Saturday Analysis

The existing Saturday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 3-8 and Figure 3-4. In the AM and PM peak hours, all study area intersections operate at or better than the standards for the intersection.



**Table 3-8. 2023 Existing Saturday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak		PM Peak	
				LOS	Delay (seconds)	LOS	Delay (seconds)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	B	17.2	C	21.0
102	116th Avenue NE and NE 70th Place	Signal	D	C	20.6	C	22.4
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	C	31.7	C	28.9
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	8.0	A	8.4
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	8.9	A	9.0

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

Figure 3-3. Existing AM and PM Weekday LOS – Kirkland





Figure 3-4. Existing AM and PM Saturday LOS – Kirkland



### 3.2.3. Woodinville Study Area

#### 3.2.3.1. Weekday Analysis

The existing weekday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 3-9 and Figure 3-5. In the AM peak hour, one intersection fails to meet the standards for the roadway at NE 175th Street and 131st Avenue NE. In the PM peak hour, two intersections fail to meet the standards for the roadway at Little Bear Creek Parkway and 131st Street NE, and 140th Avenue NE and NE 171st Street.

**Table 3-9. 2023 Existing Weekday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak			PM Peak		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE	Signal	D	D	39.0	-	C	33.6	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	C	26.4	-	B	16.8	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	B	12.4	-	F	117.9	-
204	NE 175th Street and 131st Avenue NE	Signal	E	F	111.8	-	E	77.0	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	D	51.4	-	D	41.2	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	32.8	-	F	81.1	-
207	Woodinville-Redmond Road NE and NE 145th Street	OWSC <sup>1</sup>	E	B	10.6	-	B	11.4	-
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.6	0.27	A	5.1	0.31
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	5.6	0.46	A	6.8	0.46
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	C	32.8	-	E	63.8	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	16.6	-	C	21.4	-
212	Woodinville-Redmond Road and Site Driveway	OWSC <sup>1</sup>	E	-	-	-	-	-	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9 even if the LOS is better than D.

#### 3.2.3.2. Saturday Analysis

The existing weekday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 3-10 and Figure 3-6. In the AM peak hour, all study area intersections operate at or better than the standards for the roadway. In the PM peak hour, one intersection fails to meet the standards for the roadway at the SR 522 eastbound ramps and 131st Avenue NE.

**Table 3-10. 2023 Existing Saturday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak			PM Peak		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE	Signal	D	C	27.4	-	C	30.3	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	B	14.4	-	E	64.7	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	C	24.3	-	C	33.9	-
204	NE 175th Street and 131st Avenue NE	Signal	E	E	57.1	-	E	78.9	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	C	26.0	-	C	30.4	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	26.7	-	C	34.0	-
207	Woodinville-Redmond Road NE and NE 145th Street	OWSC <sup>1</sup>	E	A	9.6	-	B	10.2	-
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.0	0.20	A	5.3	0.34
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	4.0	0.20	A	6.0	0.36
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	C	21.3	-	C	27.1	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	11.4	-	B	14.5	-
212	Woodinville-Redmond Road and Site Driveway	OWSC <sup>1</sup>	E	-	-	-	-	-	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9 even if the LOS is better than D.



Figure 3-5. 2023 Existing Weekday LOS – Woodinville

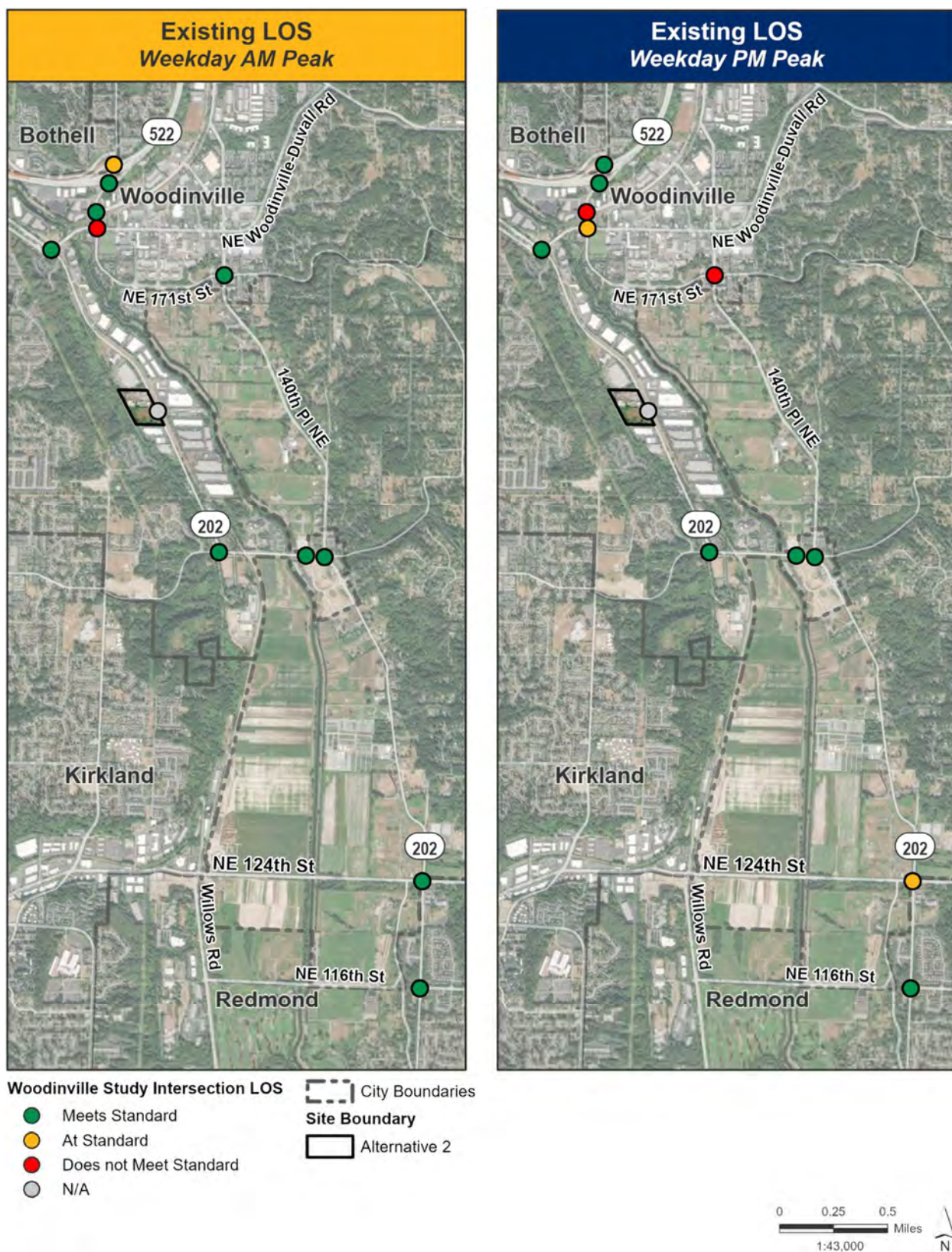
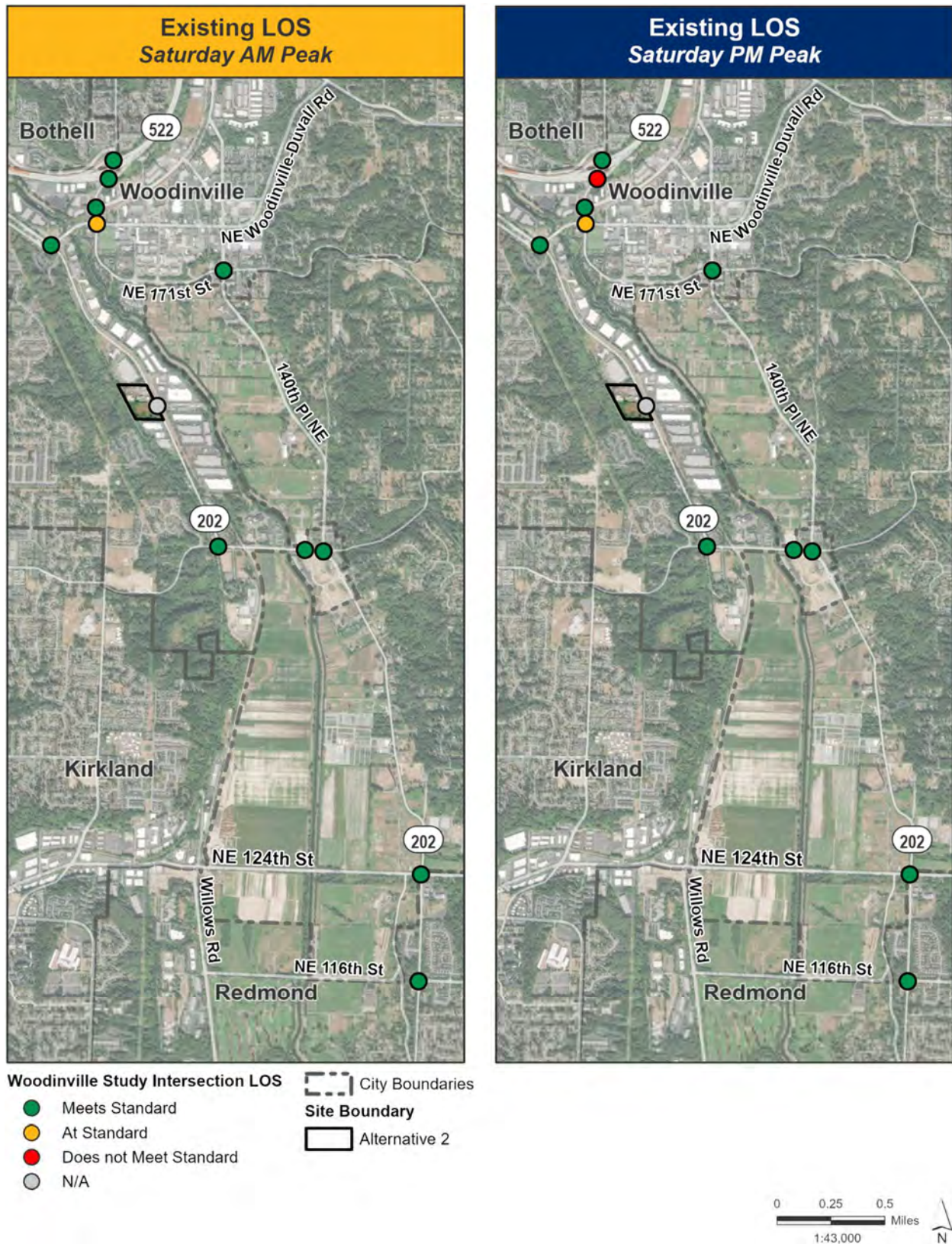




Figure 3-6. 2023 Existing Saturday LOS – Woodinville



### **3.2.3.3. Special Events**

As noted in the NERTS Transportation Technical Analysis Methodology and Assumptions, which is provided in Appendix A of this technical report Section 4.8 Special Event Analysis – Woodinville, a special event analysis was considered in Woodinville due to the common occurrence of concerts and other large events that create an influx of people within the city and specifically the study area. After counts were collected, however, the volumes before and during events were lower than the nonevent counts collected. Therefore, since the nonevent volumes represent a worst-case scenario, the special event conditions would be within the envelope of impacts already being analyzed and a separate special event analysis is not needed for the existing or future conditions. Appendix A has more details regarding this assessment.

## **3.3. Active Transportation Facilities**

This section describes the existing active transportation facilities within the study areas, including pedestrian, bicycle, trails, and equestrian facilities, as applicable. Active transportation facilities were inventoried on all primary roadways in the study areas, including streets classified as arterials (principal, major, or minor) and collectors.

### **3.3.1. Kirkland Study Area**

Existing active transportation facilities in the Kirkland study area are shown in Figure 3-7. On 116th Avenue NE, sidewalks are provided on both sides of the street between NE 70th Place and NE 67th Street, one side between NE 67th Street and NE 61st Court, and again on both sides between NE 61st Court and NE 60th Street. Sidewalks are provided on both sides of NE 70th Place within the study area. A sidewalk is provided on the north side of NE 60th Street in the study area.

Bicycle lanes exist on 116th Avenue NE within the study area as well as along NE 70th Place east of 116th Avenue NE but not to the west. No bicycle facilities are provided along NE 60th Street within the study area. Other bicycle facilities adjacent to the study area are also shown on Figure 3-7, including buffered bike lanes and sharrows. A buffered bike lane is a bicycle lane that also includes a lateral separation between the bicycle lane and the travel or parking lane. A sharrow indicates facilities where bicyclists share the road with motorists.

In addition to the pedestrian and bicycle facilities in the area, Bridle Trails State Park is a 482-acre park situated in the southern portion of the study area, south of the existing Houghton Recycling and Transfer Station. While the park's primary purpose is to provide horseback riding facilities, there are over 28 miles of well-maintained trails in the park, some of which are also accessible by pedestrians. This provides additional active transportation facilities for those walking, running, and hiking. Bicycles are not allowed in Bridle Trails State Park.

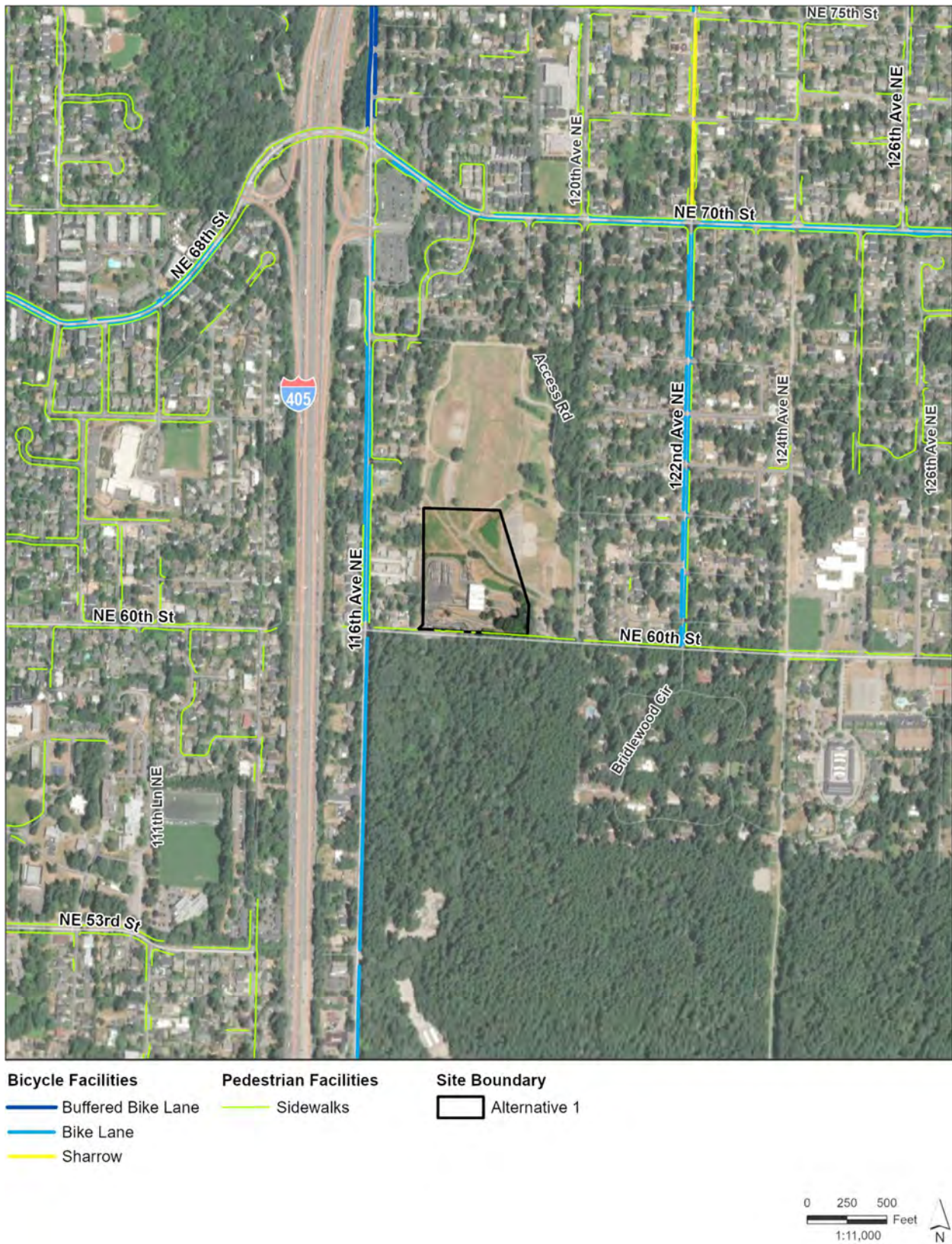
Bridle Trails State Park may not serve as a primary transportation path for the majority of residents due to its emphasis on equestrian activities; however, it adds to the wider active transportation network by offering accessible green spaces for active transportation activities. Marked midblock crossings across NE 60th Street that provide access to Bridle Trails State Park are located at:

- Power Line Trail at 124th Avenue NE, adjacent to Benjamin Franklin Elementary School.
- Between 124th Avenue NE and 125th Lane NE.
- 128th Avenue NE.
- Approximately 500 feet east of 128th Avenue NE.

Bridle Trails State Park also connects to the Bridle Crest Trail further east, at NE 60th Street and 132nd Avenue NE.



Figure 3-7. Existing Active Transportation Facilities – Kirkland



### **3.3.2. Woodinville Study Area**

Existing active transportation facilities in the Woodinville study area are shown in Figure 3-8. Sidewalks are provided on both sides of 131st Avenue NE and NE 175th Street in the study area. Woodinville-Redmond Road NE between NE 175th Street and NE 145th Street generally does not have sidewalks on either side of the road; however, there are short sections of sidewalks provided along some parcels along the corridor. Most of these are along the south portion of the corridor, but these do not connect all properties and generally only run for up to about 750 feet.

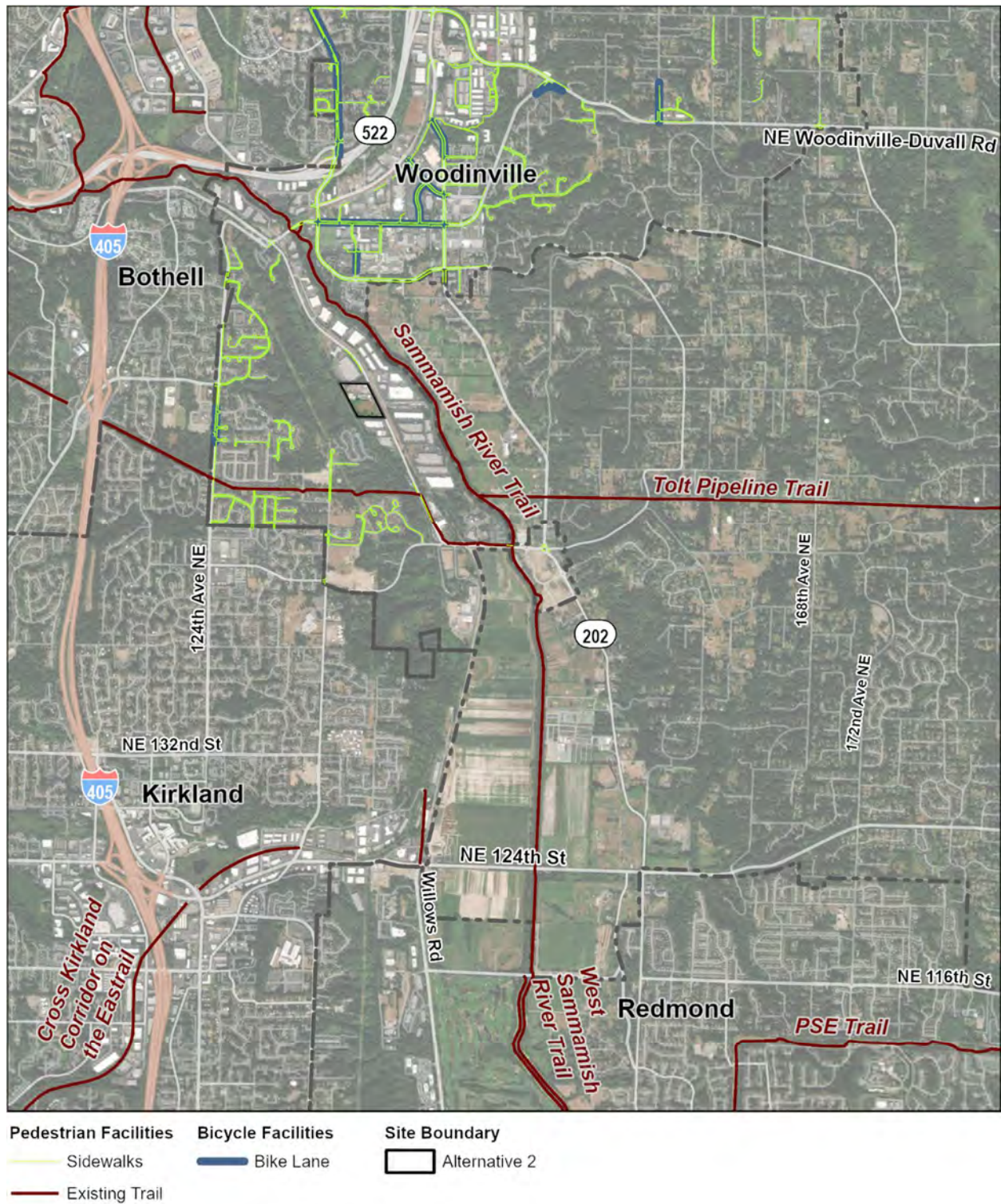
Sidewalks are provided on both sides of NE 145th Street through the Woodinville-Redmond Road NE/148th Avenue NE roundabout and continuing south along Woodinville-Redmond Road NE until NE 143rd Street. No sidewalks are provided on Woodinville-Redmond Road NE south of NE 143rd Street through NE 116th Street at the southern end of the study area, except for at the intersection of Woodinville-Redmond Road NE and NE 124th Street.

Bicycle lanes are only provided in the study area along NE 175th Street, the shared-use path along NE 145th Street, and through the roundabouts at NE 145th Street and Village Road and at NE 145th Street and Woodinville-Redmond Road NE/148th Avenue NE.

A shared-use path runs along NE 145th Street up to Village Road, with a signalized crossing connecting the Eastrail Trail to the south to the future continuation of the Eastrail Trail to the north as well as the Sammamish River Trail to the east. The Sammamish River Trail is a 10-mile multiuse trail that parallels the Sammamish River between Bothell and Marymoor Park in Redmond.



Figure 3-8. Existing Active Transportation Facilities – Woodinville



### 3.4. Transit Facilities

This section describes the existing regional and local transit facilities and services within the transportation study areas. King County Metro Transit (Metro), Sound Transit, and Community Transit provide bus service in the study areas, with local and regional fixed route service to transit centers, park-and-ride facilities, and bus stops. All information is current as of the March 2023 service change.

#### 3.4.1. Kirkland Study Area

Metro provides all day, frequent all day, and peak only bus service via seven routes in the Kirkland study area. Table 3-11 summarizes the route number, service type, and routing for each route in the Kirkland study area. Figure 3-9 shows the fixed route transit services provided in the study area. Five Metro routes, two Sound Transit routes, and one Community Transit route travel along I-405 but do not serve the Kirkland study area. Bus stops are located on NE 60th Street, 68th Street, NE 70th Place, NE 72nd Place, NE 80th Street, 116th Avenue NE, 120th Avenue NE, and 132nd Street. There are no transit centers or park and rides in the Kirkland study area. The former Houghton park and ride that was located at NE 70th Street and 116th Avenue NE was closed in March 2023, due to low utilization.

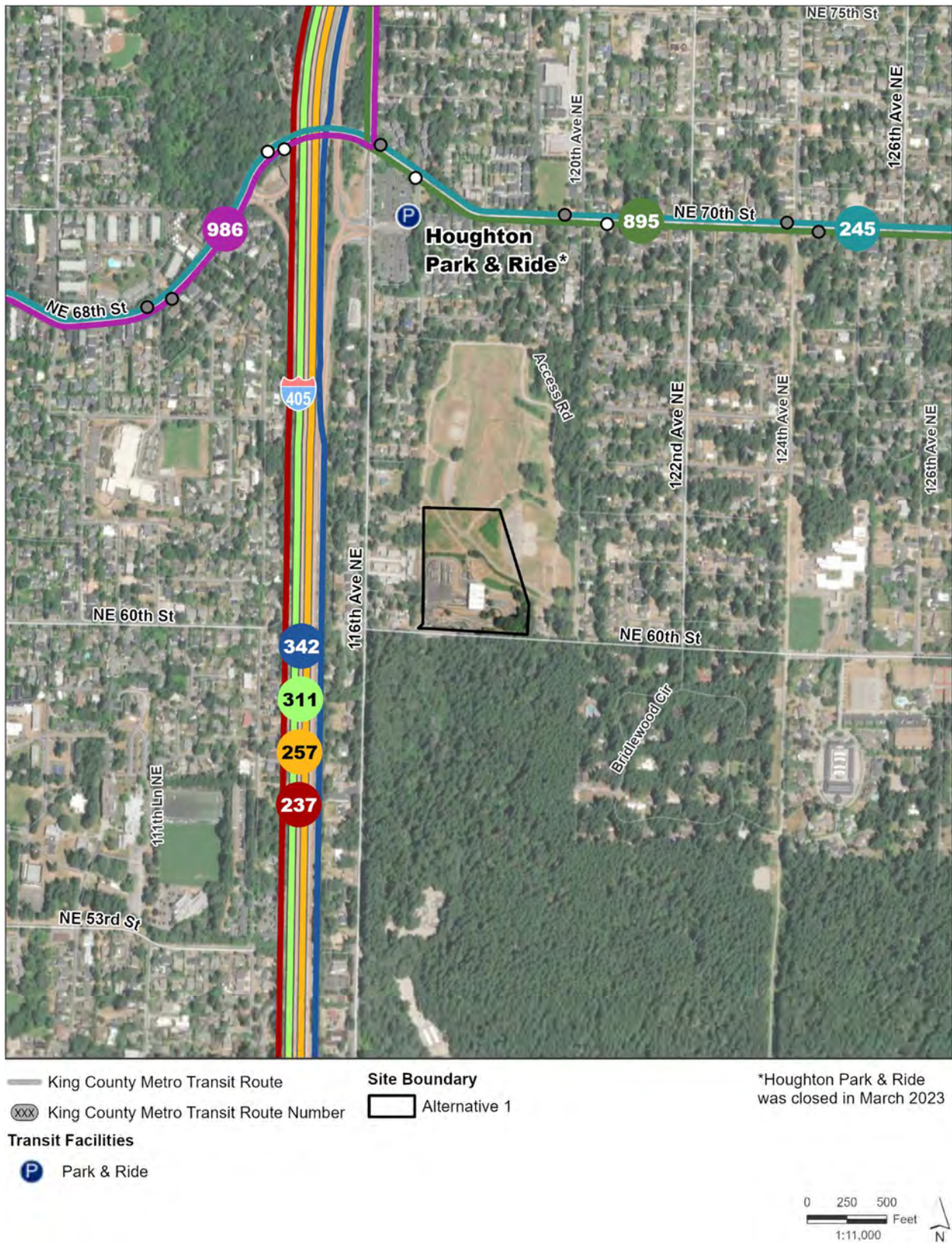
**Table 3-11. Kirkland Study Area Existing Transit Service**

Service Provider	Route	Service Type	Routing
King County Metro Transit	225	All Day	Kenmore, Kingsgate, Totem Lake, Redmond, Overlake
King County Metro Transit	239	All Day	Kirkland, Rose Hill, Totem Lake, Brickyard Park and Ride, Bothell
King County Metro Transit	245	Frequent All Day	Kirkland, Houghton, Overlake, Crossroads, Bellevue College, Eastgate, Factoria
King County Metro Transit	250	Frequent All Day	Avondale, Bear Creek Park and Ride, Redmond, Kirkland, Bellevue
King County Metro Transit	893	Peak Only	Lake Washington High School, Forbes Creek, Kirkland, Rose Hill
King County Metro Transit	895	Peak Only	Lake Washington High School, Overlake, NW Lake Sammamish
King County Metro Transit	986	Peak Only	University Preparatory Academy, Lakeside School, Kirkland, South Kirkland Park and Ride, Clyde Hill Yarrow Point Station, Evergreen Point Station, Montlake, Ravenna, Haller Lake

Sources: King County Metro Transit (2023); Sound Transit (2023), Community Transit (2023).



Figure 3-9. Existing Transit Service and Facilities – Kirkland



### 3.4.2. Woodinville Study Area

In the Woodinville study area, Metro provides three all-day routes, two peak only bus routes, and one Dial-a-Ride Transit (DART) route. Community Transit provides one peak only route and Sound Transit provides one all day express bus service route. Two Metro routes and two Sound Transit routes travel along I-405 but do not serve the Woodinville study area.

Bus stops are located on SR 522, Brickyard Road NE, NE Woodinville Drive, 119th Avenue NE, 124th Avenue NE, 131st Avenue NE, 138th Place NE, 140th Place NE, NE 132nd Street, NE 144th Street, NE 160th Street, NE 175th Street, NE 178th Place, and NE 179th Place. The Woodinville Park and Ride, located at NE 178th Street and 140th Avenue NE, has 438 parking spaces and is served by Metro Routes 231, 237, 311 and Sound Transit Route 522.

Table 3-12 summarizes the route number, service type, and routing for each route in the Kirkland study area. Figure 3-10 shows the fixed route transit services and bus stops provided in the study area, as well as the Woodinville Park and Ride.

**Table 3-12. Woodinville Study Area Existing Transit Service**

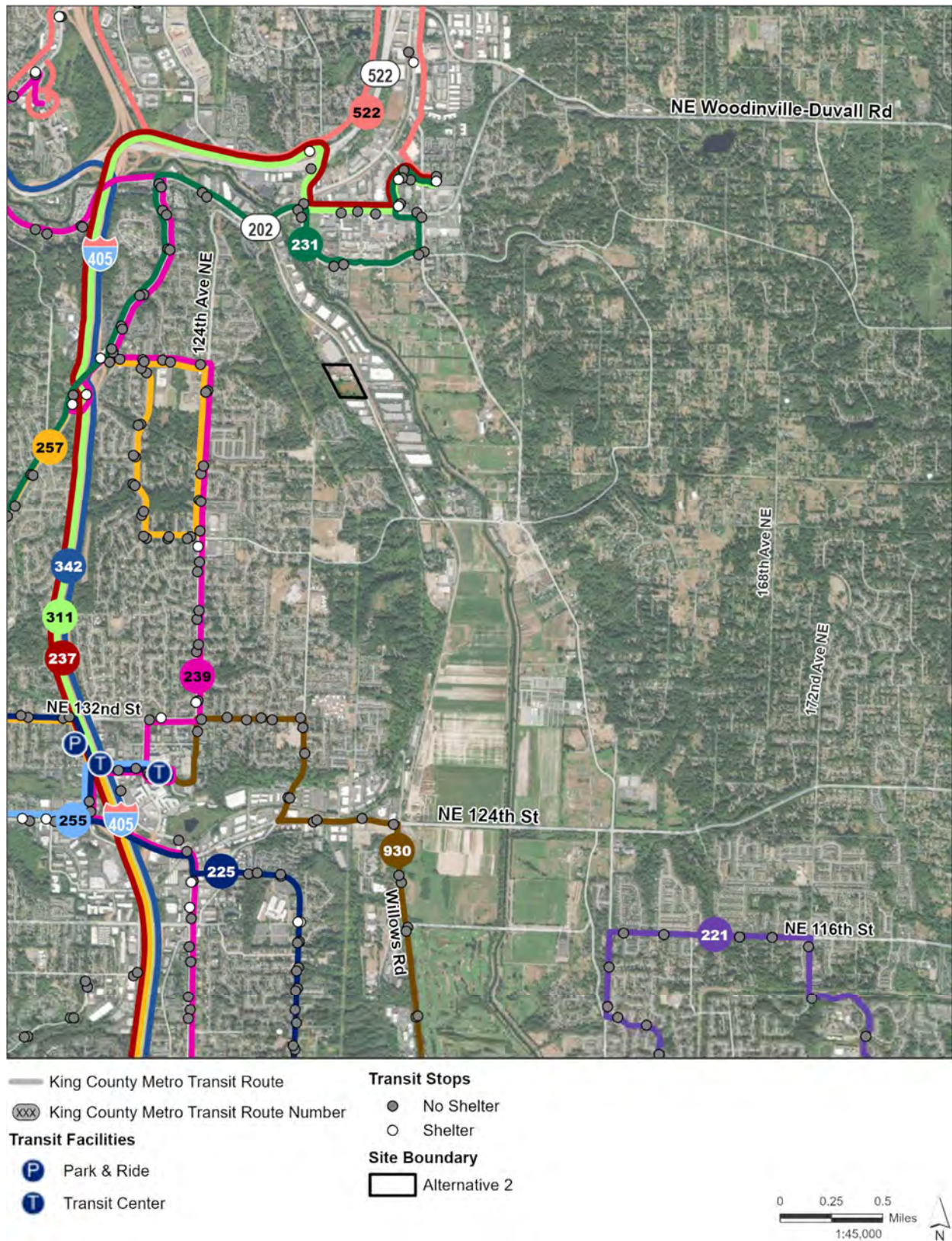
Service Provider	Route	Service Type	Routing
King County Metro Transit	225	All Day	Kenmore, Kingsgate, Totem Lake, Redmond, Overlake
King County Metro Transit	231	All Day	Bothell, Woodinville, Brickyard, Juanita, Kirkland
King County Metro Transit	237	Peak-Only	Woodinville, Brickyard Park and Ride, Totem Lake, Houghton, Bellevue
King County Metro Transit	239	All Day	Kirkland, Rose Hill, Totem Lake, Brickyard Park and Ride, Bothell
King County Metro Transit	311	Peak Only	Woodinville, Totem Lake Station, Yarrow Point Station, Evergreen Point Station, Downtown Seattle
King County Metro Transit	930	DART	Kingsgate Park and Ride, Totem Lake Transit Center, Willows Road Redmond Transit Center, Redmond Town Center
Community Transit	424	Peak Only	Snohomish, Monroe, Woodinville, Totem Lake, Evergreen Point Station, Downtown Seattle
Sound Transit	522	All Day Express Bus	Woodinville, Bothell, Kenmore, Lake City, Roosevelt Station

Sources: King County Metro (2023); Sound Transit (2023), Community Transit (2023).

DART = Dial-a-Ride Transit.



Figure 3-10. Existing Transit Service and Facilities – Woodinville



### 3.5. Safety

This section describes the existing safety conditions within each transportation study area in terms of observed crash history for all modes.

#### 3.5.1. Kirkland Study Area

Crash data records for crashes within the Kirkland study area were collected from WSDOT for the most recent 5-year period between 2018 and 2022. During this study period, 75 crashes occurred within the Kirkland study area (see Figure 3-11). The majority of crashes (84%) occurred at the intersections within the study area as opposed to segments. No fatal crashes and only one serious injury crash occurred in the study area during this period. Additionally, three pedestrian-involved crashes and no bicyclist-involved crashes occurred during the study period as shown in Figure 3-12. No equestrian crashes were identified during this period. Table 3-13 summarizes the study area crashes by location type and severity.

**Table 3-13. Existing Kirkland Study Area Crashes by Severity (2018-2022)**

Location	2018-2022 Crash Frequency by Severity					
	Fatal	Serious Injury	Minor Injury	Possible Injury	No Injury	Total
Intersections	0	1	3	13	46	63
Segments	0	0	5	4	3	12
<b>Total</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>17</b>	<b>49</b>	<b>75</b>

Source: WSDOT (2023a).

Observed and critical crash rates were calculated for the study area intersections as the number of crashes per million entering vehicles (MEV). Table 3-14 shows the crash frequencies, entering volumes, and observed and critical crash rates for the study intersections. No crashes occurred at or near the existing site driveway, so this location was not included in the summary.

**Table 3-14. Existing Kirkland Study Area Crash Rates (2018-2022)**

Intersection	AADT (entering volume, vpd)	2018-2022 Crash Frequency				Observed Crash Rate (crashes/MEV)	Critical Crash Rate (crashes/MEV) <sup>1</sup>
		Fatal	Injury	No Injury	Total		
I-405 Southbound Ramps and NE 68th Street/NE 72nd Place	18,400	0	4	10	14	0.42	0.80
116th Avenue NE and NE 70th Street	21,500	0	10	23	33	<b>0.84</b>	0.78
I-405 Northbound Ramps and 116th Avenue NE	14,700	0	1	11	13	0.48	0.82
116th Avenue NE and NE 60th Street	7,300	0	2	2	4	0.30	0.94

Source: WSDOT (2023a).

AADT = annual average daily traffic; vpd = vehicles per day; MEV = million entering vehicles.

<sup>1</sup> Critical crash rate calculated using Highway Safety Manual (HSM) equation 4-11 (AASHTO 2014).

None of the intersections had an observed crash rate of greater than one crash per MEV. One study intersection, 116th Avenue NE and NE 70th Street, had an observed crash rate greater than the critical crash rate. This intersection also had the highest number of crashes (33) of the five study intersections. The majority of these crashes (64%) were angle crashes, almost all of which occurred along NE 70th Street/NE 72nd Place where the left-turn phasing is protected-permissive.



Figure 3-11. Kirkland Study Area Total Crashes by Severity (2017-2021)

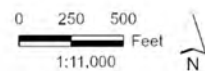


All Crashes (2017-2021)

- Suspected Serious Injury
- Suspected Minor Injury
- Possible Injury
- No Apparent Injury

Site Boundary

- Alternative 1







### 3.5.2. Woodinville Study Area

Crash data records for crashes within the Woodinville study area were collected from WSDOT for the most recent 5-year period between 2018 and 2022. During this study period, 416 crashes occurred within the Woodinville study area (see Figure 3-13). The majority of crashes (55%) occurred at the intersections within the study area as opposed to segments. One fatal crash and ten serious injury crashes occurred in the study area during this period, none of which involved a pedestrian or bicyclist. There were no pedestrian-involved crashes, and three bicyclist-involved crashes occurred during the study period as shown in Figure 3-14. Table 3-15 summarizes the study area crashes by location type and severity.

**Table 3-15. Existing Woodinville Study Area Crashes by Severity (2018-2022)**

Location	2018-2022 Crash Frequency by Severity					
	Fatal	Serious Injury	Minor Injury	Possible Injury	No Injury	Total
Intersections	1	2	8	39	173	223
Segments	0	7	7	35	144	193
<b>Total</b>	<b>1</b>	<b>10</b>	<b>23</b>	<b>91</b>	<b>366</b>	<b>416</b>

Source: WSDOT (2023a).

Observed and critical crash rates were calculated for the study area intersections as the number of crashes per million entering vehicles (MEV). Table 3-16 shows the crash frequencies, entering volumes, and observed and critical crash rates for the study intersections. The future site driveway was not included in the intersection crash summary.

**Table 3-16. Existing Woodinville Study Area Crash Rates (2018-2022)**

Intersection	ADT (entering volume, vpd)	2018-2022 Crash Frequency				Observed Crash Rate (crashes/MEV)	Critical Crash Rate (crashes/MEV) <sup>1</sup>
		Fatal	Injury	No Injury	Total		
131st Avenue NE and SR 522 Westbound Ramps	32,900	0	3	16	19	0.32	0.56
131st Avenue NE and SR 522 Eastbound Ramps	47,050	0	5	23	28	0.33	0.54
131st Avenue NE and Little Bear Creek Parkway	31,800	0	7	20	27	0.47	0.57
131st Avenue NE and NE 175th Street	33,150	0	6	18	24	0.40	0.56
Woodinville-Redmond Road NE/SR 202 and NE 175th Street	19,900	0	2	7	9	0.25	0.61
Woodinville-Redmond Road NE/SR 202 and NE 145th Street	15,300	0	4	2	6	0.21	0.64
NE 145th Street and Village Road	8,800	0	1	4	5	0.31	0.71
NE 145th Street and Woodinville-Redmond Road NE/SR 202/148th Avenue NE	22,300	0	5	37	42	<b>1.03</b>	0.60
Woodinville-Redmond Road NE/SR 202 and NE 124th Street	35,450	1	10	23	34	0.53	0.56
Woodinville-Redmond Road NE/SR 202 and NE 116th Street	19,450	0	1	6	7	0.20	0.61
NE 171st Street and 140th Place/Avenue NE	26,150	0	5	17	22	0.46	0.58

Source: WSDOT (2023a).

AADT = annual average daily traffic; vpd = vehicles per day; MEV = million entering vehicles.

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Intersection	ADT (entering volume, vpd)	2018-2022 Crash Frequency				Observed Crash Rate (crashes/MEV)	Critical Crash Rate (crashes/MEV) <sup>1</sup>
		Fatal	Injury	No Injury	Total		

<sup>1</sup> Critical crash rate calculated using Highway Safety Manual (HSM) equation 4-11 (AASHTO 2014).

One study intersection, NE 145th Street and Woodinville-Redmond Road/SR 202/148th Avenue NE, had an observed crash rate greater than one crash per MEV and greater than the critical crash rate. This intersection also had the highest number of crashes (42) of the twelve study intersections (analysis did not include the future site driveway). Over 69% of these crashes were entering-at-an-angle crashes associated with entering the roundabout.



Figure 3-13. Woodinville Study Area Total Crashes by Severity (2017-2021)

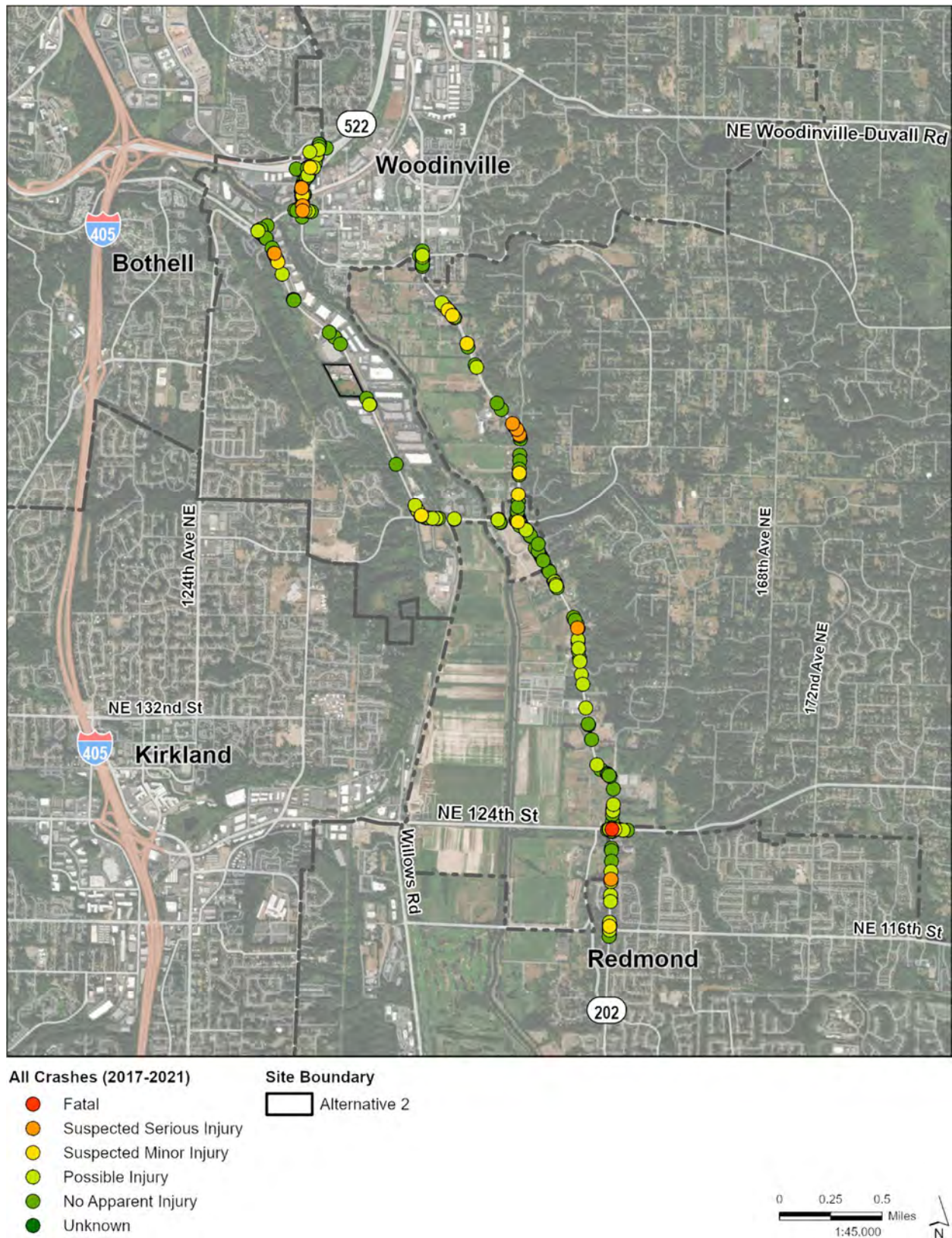
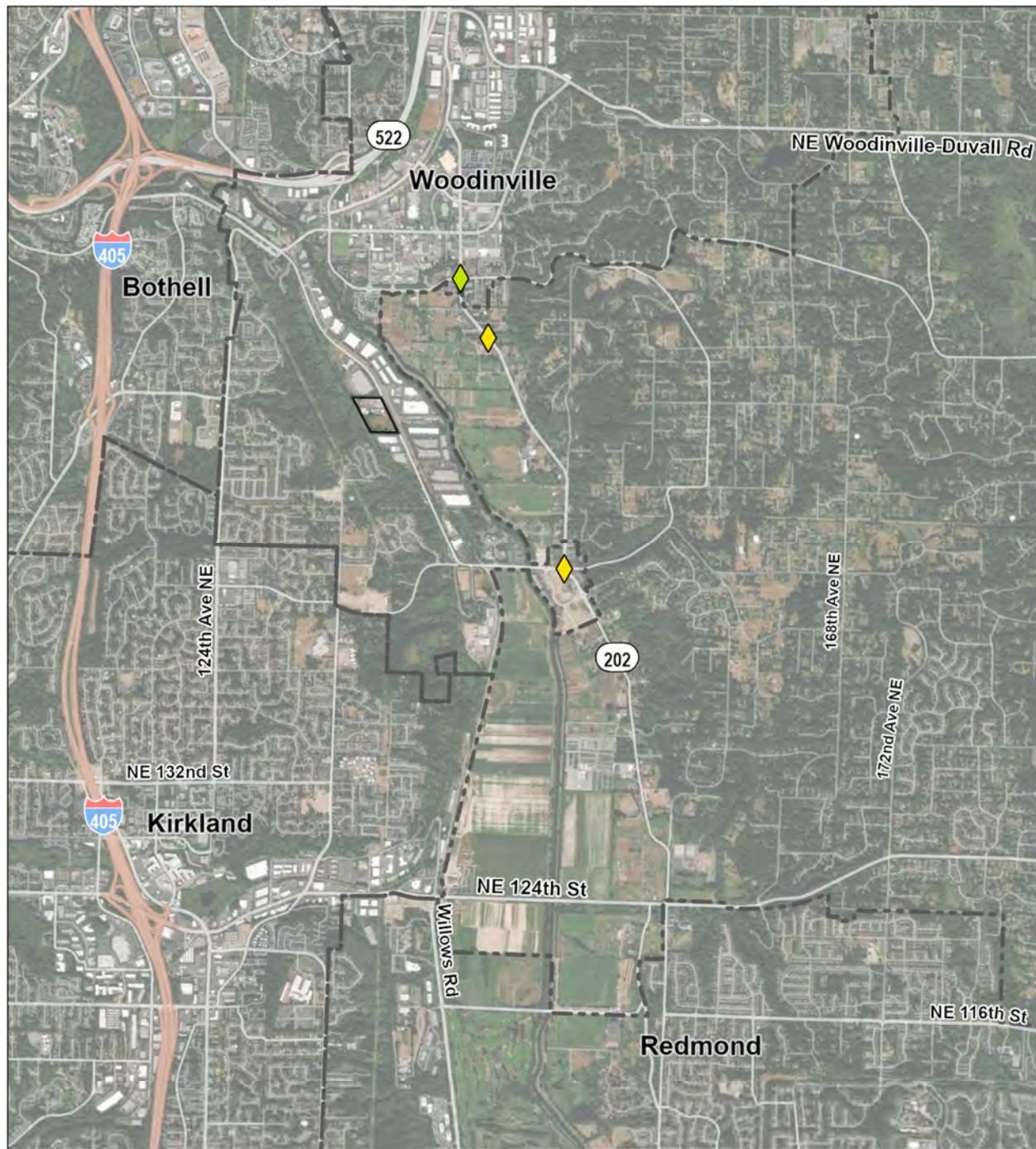




Figure 3-14. Woodinville Study Area Pedestrian- and Bicyclist-Involved Crashes (2017-2021)

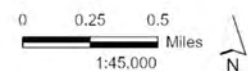


Active Transportation Crashes (2017-2021)      Site Boundary

Yellow Diamond      Suspected Minor Injury (Bicyclist)

Green Diamond      Possible Injury (Bicyclist)

Black Outline      Alternative 2



### 3.6. Freight Mobility and Access

Freeways, arterials, and local streets are important to moving freight and goods in the study area. Freight is transported only via the roadway network in the study area; no other transportation modes provide freight movement.

WSDOT has designated roadways as freight routes that are classified based on the amount of annual tonnage that is transported along a road in a particular year. This classification system is called the Freight Goods Transportation System. The classifications range from roadways that carry more than 20,000 tons in 60 days to more than 10 million tons annually, as summarized in Table 3-17.

**Table 3-17. Freight Goods Transportation System Classification**

<b>Freight Goods Transportation System Classification</b>	<b>Annual Gross Tonnage</b>
T-1	Over 10,000,000
T-2	4,000,000 to 10,000,000
T-3	300,000 to 4,000,000
T-4	100,000 to 300,000
T-5	Over 20,000 in 60 days

Source: WSDOT (2023).

#### 3.6.1. Kirkland Study Area

In the Kirkland study area, I-405 is the only designated freight route. It is classified as a T-1 route and shown on Figure 3-15.

Up to 25 County transit trucks arrive and depart from the existing Houghton Transfer station every day.



Figure 3-15. Kirkland Study Area Existing Freight Routes and Classifications

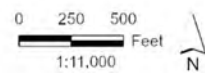


Freight and Goods Transportation System (FGTS) Class

— T-1 - More than 10 million tons per year

Site Boundary

□ Alternative 1



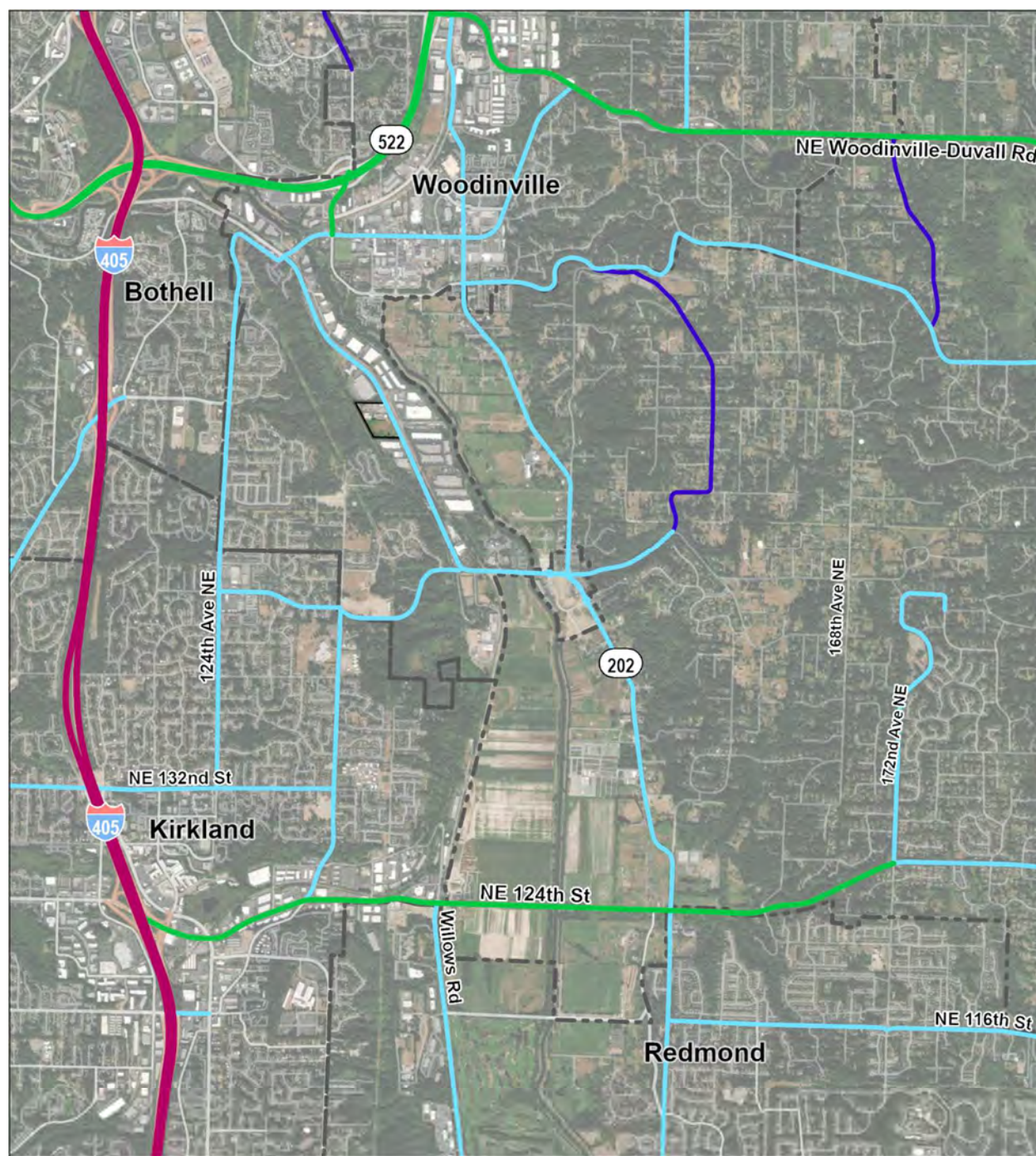


### **3.6.2. Woodinville Study Area**

Designated freight routes in the Woodinville study area are shown on Figure 3-16. They include:

- I-405: T-1 route
- SR 522: T-2 route
- Woodinville-Redmond Road: T-3 route
- Woodinville-Duvall Road: T-3 route
- 124th Avenue NE: T-3 route
- 131st Avenue NE: T-2 route
- 132nd Avenue NE: T-3 route
- 140th Place NE: T-3 route
- NE 144th Street: T-3 route
- NE 171st Street: T-3 route
- NE 173rd Place: T-3 route
- NE 175th Street: T-3 route

Figure 3-16. Woodinville Study Area Existing Freight Routes and Classifications



Freight and Goods Transportation System (FGTS) Class	Site Boundary
T-1 - More than 10 million tons per year	Alternative 2
T-2 - 4 million to 10 million tons per year	
T-3 - 300,000 to 4 million tons per year	
T-4 - 100,000 to 300,000 tons per year	



## 4. Transportation Impacts

This section discusses impacts associated with the No Action Alternative and the action alternatives. It includes assessment of impacts to the roadway network and traffic operations for both the year of opening (2029) and the horizon year (2040). Impacts to all other aspects of the transportation network were assessed for the horizon year only.

### 4.1. No Action Alternative

Under the No Action Alternative, the SWD would not site a new station in northeastern King County and impacts to transportation from construction or operation of a new station would not occur. The SWD would continue to operate the existing Houghton Transfer Station, which has outlived its useful life and lacks capacity for the type of recycling and hazardous waste collection services that are increasingly in demand, and for the growing northeast community. Traffic volumes associated with its operation are expected to increase as the service area population grows.

#### 4.1.1. Roadway Network

##### 4.1.1.1. Traffic Volumes

Future (2029 and 2040) No Action volumes at the study intersections in both study areas were forecast using the PSRC SoundCast travel demand models. The methods and assumptions memorandum in Appendix A provides more details regarding the forecasting and post-processing approach.

Turning movement volumes for the 2029 and 2040 No Action weekday and Saturday conditions for the AM and PM peak hours are included in Appendix B. Generally, traffic volumes are forecast to increase throughout the study area between existing conditions and the 2029 and 2040 AM and PM peak hours.

##### 4.1.1.2. Kirkland Study Area Background Projects

No improvements are planned by the City of Kirkland that would alter the roadway network and intersections in the study area for the No Action Alternative (City of Kirkland 2020).

##### 4.1.1.3. Woodinville Study Area Background Projects

The City of Woodinville 2023-2028 Capital Improvement Plan (CIP) identifies several planned roadway improvements in the vicinity of the Woodinville study area, some of which would be funded by the City of Woodinville, as well as those partially or fully funded by private development (City of Woodinville 2022). Projects include:

- Widening SR 202/131st Avenue NE from SR 522 under the Eastside Rail Corridor trestle to NE 175th Street.
- Convert the existing stop-controlled intersection at SR 202 and NE 145th Street to a two-lane roundabout. The project will include sidewalks along all approaches and within the roundabout.
- New roundabout at the intersection of 138th Avenue NE and NE 171st Street.
- New signal at 132nd Avenue NE and NE 143rd Street to replace existing stop-controlled intersection.
- Intersection realignment and signal installation at 132nd Avenue NE and NE 143rd Street. The project includes realigning the east leg of 143rd to remove an existing offset.
- Extend 133rd Avenue NE from NE 175th Street to Woodinville Snohomish Road.
- Extend 133rd Avenue NE from Woodinville Snohomish Road to Little Bear Creek Parkway.

#### 4.1.2. Arterial and Local Street Operations

This section describes the future No Action intersection operations for the study intersections within each transportation study area. The reports from the No Action operational analysis are included in Appendix C.

##### 4.1.2.1. Kirkland Study Area

##### *Weekday Analysis*

The 2029 No Action Alternative weekday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-1 and Figure 4-1. In the AM and PM peak hours, all intersections operate at or better than the standards for the roadway.

**Table 4-1. 2029 No Action Alternative Weekday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak		PM Peak	
				LOS	Delay (seconds)	LOS	Delay (seconds)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	C	26.6	D	41.0
102	116th Avenue NE and NE 70th Place	Signal	D	C	31.9	C	21.4
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	D	45.0	C	29.7
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	9.5	B	11.2
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	9.0	A	9.1

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

The No Action Alternative 2040 weekday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-2 and Figure 4-2. In the AM and PM peak hours, all intersections operate at or better than the standards for the roadway.

**Table 4-2. 2040 No Action Alternative Weekday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak		PM Peak	
				LOS	Delay (seconds)	LOS	Delay (seconds)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	C	30.2	D	44.7
102	116th Avenue NE and NE 70th Place	Signal	D	C	33.4	C	26.7
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	D	48.3	D	37.8
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	9.9	B	11.4
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	9.0	A	9.1

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

### Saturday Analysis

The No Action Alternative 2029 Saturday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-3 and Figure 4-3. In the AM and PM peak hours, all study area intersections operate at or better than the standards for the roadway.

**Table 4-3. 2029 No Action Alternative Saturday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak		PM Peak	
				LOS	Delay (seconds)	LOS	Delay (seconds)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	B	14.8	B	19.2
102	116th Avenue NE and NE 70th Place	Signal	D	B	18.5	C	22.3
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	B	18.8	C	28.7
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	7.5	A	8.5
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	8.7	A	9.0

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

The No Action Alternative 2040 Saturday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-4 and Figure 4-4. In the AM and PM peak hours, all study area intersections operate at or better than the standards for the roadway.

**Table 4-4. 2040 No Action Alternative Saturday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak		PM Peak	
				LOS	Delay (seconds)	LOS	Delay (seconds)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	B	17.1	C	20.9
102	116th Avenue NE and NE 70th Place	Signal	D	B	19.4	C	24.1
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	B	19.3	D	35.9
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	7.7	A	8.8
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	8.7	A	9.0

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.



Figure 4-1. 2029 No Action Alternative AM and PM Weekday LOS – Kirkland





Figure 4-2. 2040 No Action Alternative AM and PM Weekday LOS – Kirkland





Figure 4-3. 2029 No Action Alternative AM and PM Saturday LOS – Kirkland





Figure 4-4. 2040 No Action Alternative AM and PM Saturday LOS – Kirkland





#### 4.1.2.2. Woodinville Study Area

##### Weekday Analysis

The No Action Alternative 2029 weekday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-5 and Figure 4-5. In the AM peak hour, one intersection at NE 175th Street and 131st Avenue NE fails to meet the standards for the roadway. In the PM peak hour, one intersection at Little Bear Creek Parkway and 131st Avenue NE fails to meet the standards for the roadway.

**Table 4-5. 2029 No Action Alternative Weekday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak			PM Peak		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	D	41.4	-	B	19.7	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	B	15.8	-	F	>120	-
204	NE 175th Street and 131st Avenue NE	Signal	E	F	>120	-	E	75.0	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	E	61.7	-	E	66.6	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	31.2	-	E	71.3	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	8.0	0.37	A	9.3	0.68
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.8	0.29	A	5.2	0.33
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	5.6	0.44	A	6.4	0.42
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	D	35.8	-	E	61.4	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	15.6	-	B	19.4	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	-	-	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.

The No Action Alternative 2040 weekday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-6 and Figure 4-6. In the AM peak hour, two intersections fail to meet the standards for the roadway at NE 175th Street and 131st Avenue NE, and Woodinville-Redmond Road NE and NE 175th Street. In the PM peak hour, two intersections fail to meet the standards for the roadway at Little Bear Creek Parkway and 131st Avenue NE and Woodinville-Redmond Road NE and NE 175th Street.

**Table 4-6. 2040 No Action Alternative Weekday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak			PM Peak		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	D	40.7	-	C	22.4	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	B	16.6	-	F	>120	-
204	NE 175th Street and 131st Avenue NE	Signal	E	F	>120	-	E	74.9	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	F	88.2	-	F	106.6	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	30.8	-	E	73.0	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	8.1	0.38	B	10.5	0.76
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.8	0.29	A	5.6	0.38
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	5.7	0.45	A	6.8	0.44
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	D	37.6	-	E	69.3	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	15.8	-	C	23.4	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	-	-	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.

### Saturday Analysis

The No Action Alternative 2029 Saturday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-7 and Figure 4-7. In the AM peak hour, all study area intersections operate at or better than the standards for the roadway. In the PM peak hour, one intersection fails to meet the standards for the roadway at the SR 522 eastbound ramps and 131st Avenue NE.

**Table 4-7. 2029 No Action Alternative Saturday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak			PM Peak		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	B	13.6	-	E	79.8	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	C	24.8	-	D	35.7	-
204	NE 175th Street and 131st Avenue NE	Signal	E	D	48.7	-	E	77.5	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	C	27.5	-	D	39.5	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	26.7	-	C	34.1	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	7.1	0.24	A	6.9	0.41
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.1	0.21	A	5.8	0.38
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	3.7	0.16	A	5.8	0.33
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	C	20.5	-	C	26.9	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	11.0	-	B	14.0	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	-	-	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.

The No Action Alternative 2040 Saturday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-8 and Figure 4-8. In the AM peak hour, all study area intersections operate at or better than the standards for the roadway. In the PM peak hour, one intersection fails to meet the standards for the roadway at the SR 522 eastbound ramps and 131st Avenue NE.

**Table 4-8. 2040 No Action Alternative Saturday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak			PM Peak		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	B	14.1	-	F	100.2	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	C	26.3	-	D	37.2	-
204	NE 175th Street and 131st Avenue NE	Signal	E	D	44.3	-	E	73.2	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	C	35.0	-	D	47.8	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	26.3	-	D	35.3	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	7.2	0.28	A	7.1	0.45
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.2	0.23	A	6.2	0.42
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	3.9	0.17	A	6.1	0.34
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	C	21.6	-	C	28.8	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	11.2	-	B	15.3	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	-	-	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.



Figure 4-5. 2029 No Action Alternative AM and PM Weekday LOS – Woodinville

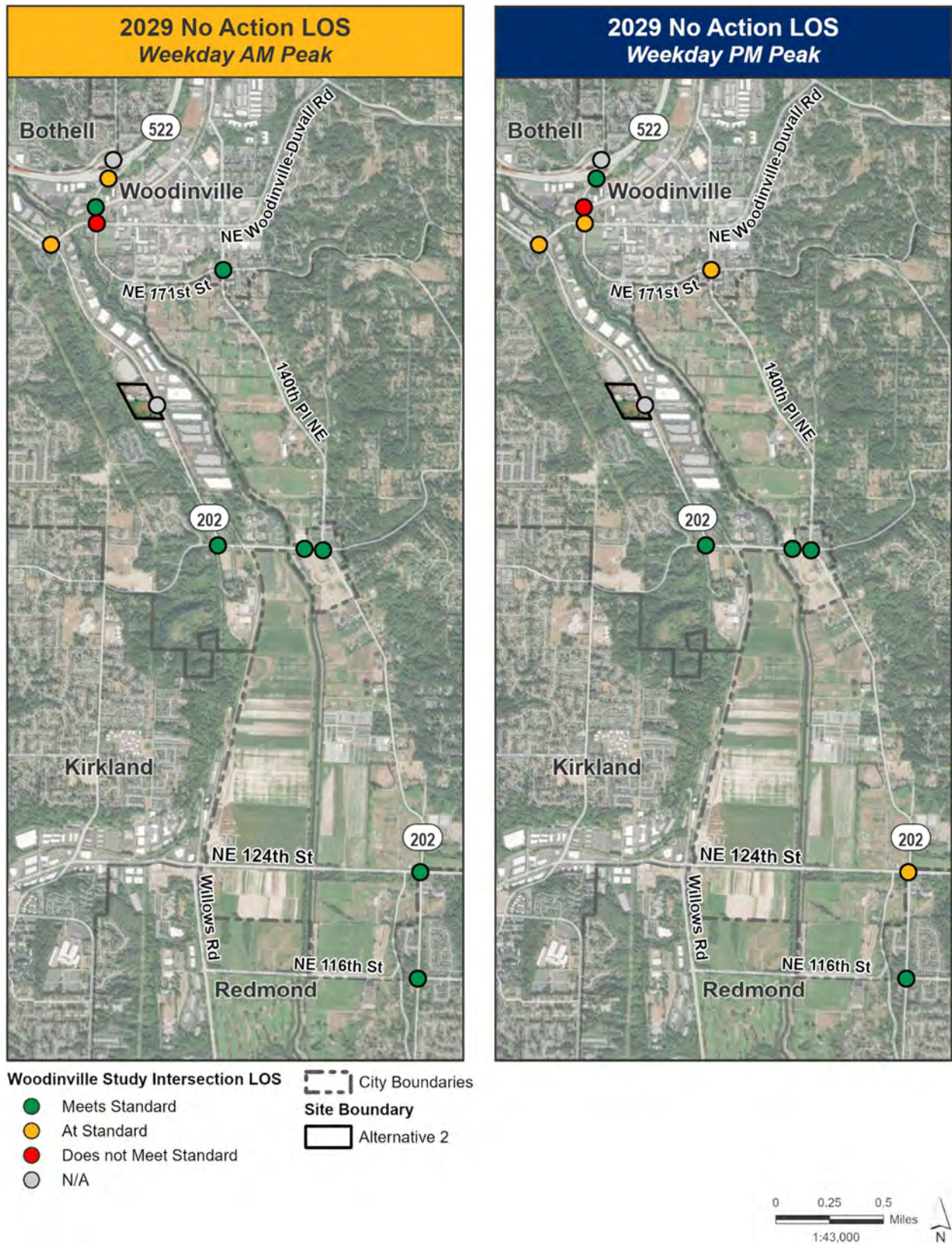




Figure 4-6. 2040 No Action Alternative AM and PM Weekday LOS – Woodinville

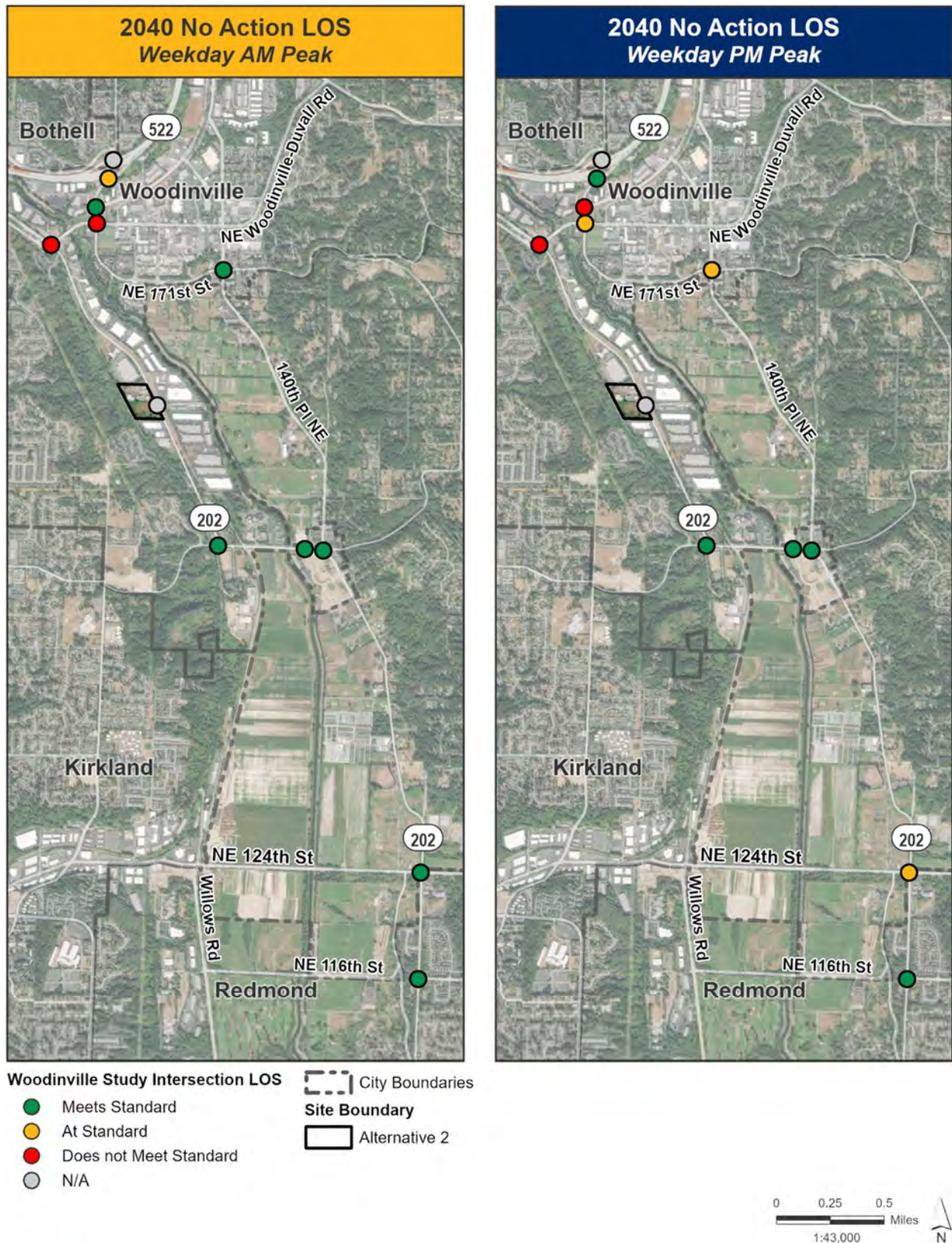




Figure 4-7. 2029 No Action Alternative AM and PM Saturday LOS – Woodinville

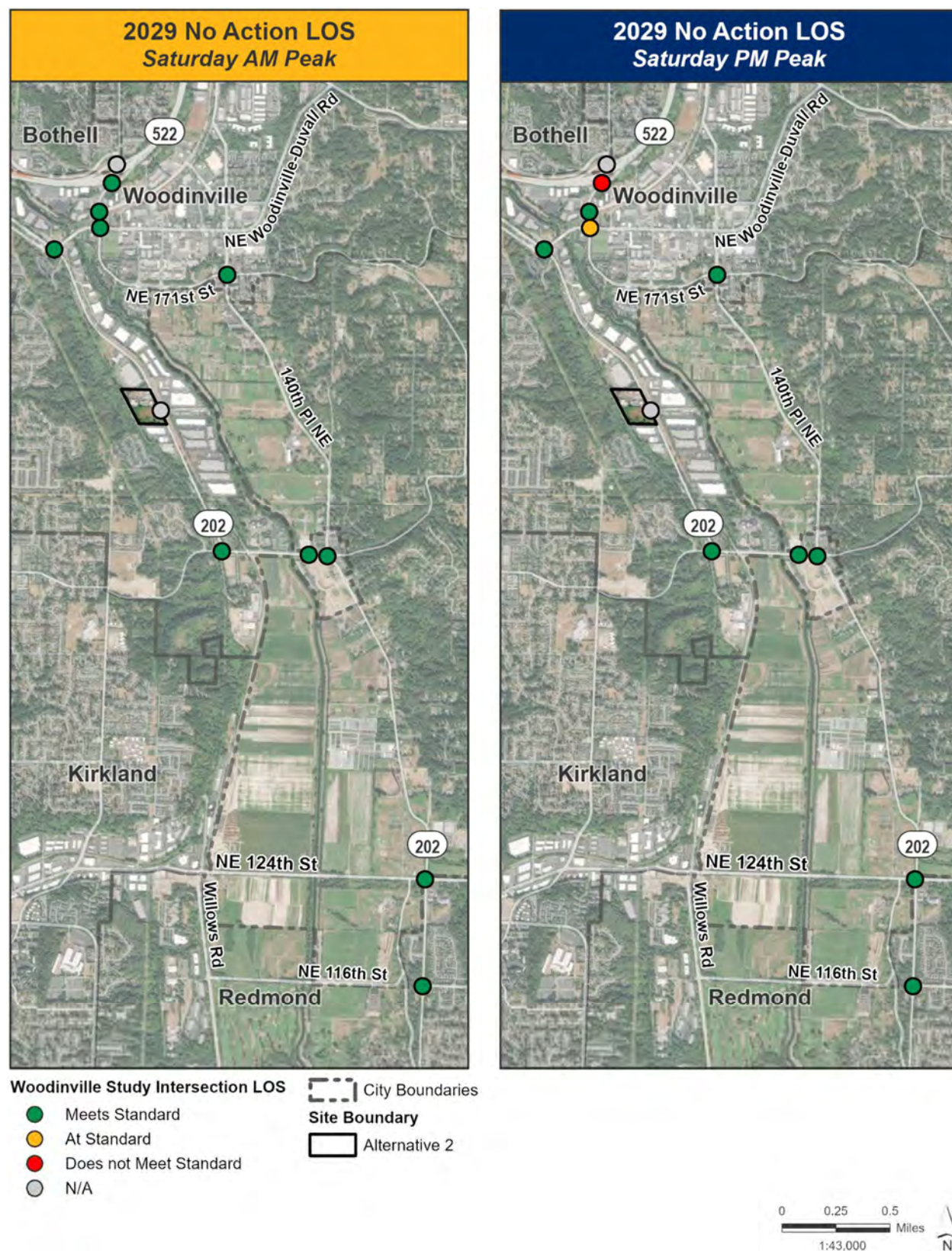
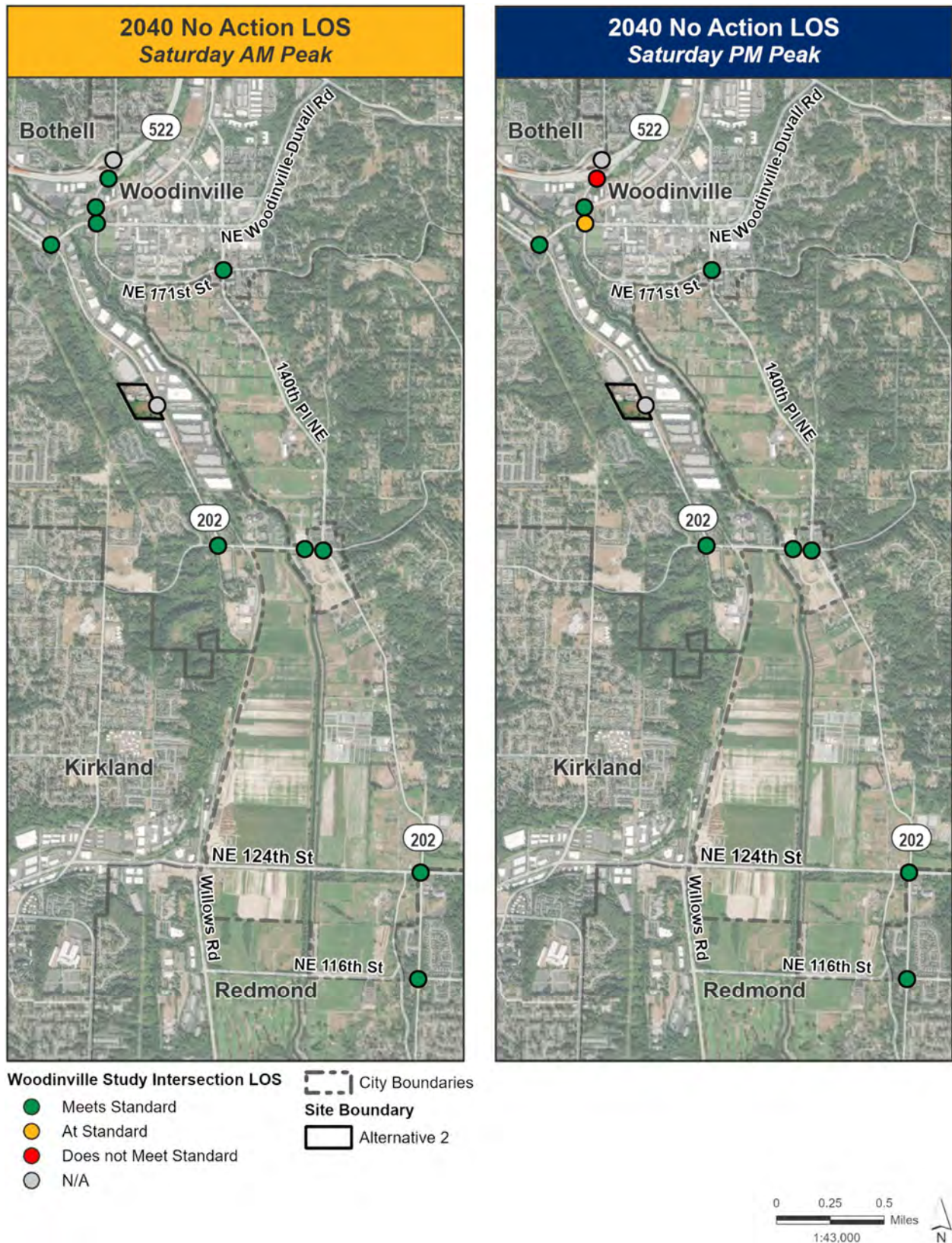




Figure 4-8. 2040 No Action Alternative AM and PM Saturday LOS – Woodinville





#### **4.1.3. Active Transportation Facilities**

##### **4.1.3.1. Kirkland Study Area**

In the No Action Alternative, no existing active transportation facilities would be modified or new active transportation facilities developed in the Kirkland study area (City of Kirkland 2020).

##### **4.1.3.2. Woodinville Study Area**

In the No Action Alternative, the Woodinville connection of the Eastrail Regional Trail Project will convert the existing historic railroad line that runs along the east side of Woodinville-Redmond Road NE between NE 145th Street and NE 175th Street to a multi-use trail with construction to begin in 2027. Additional active transportation facilities identified in the 2023-2028 CIP (City of Woodinville 2022) that would be developed in the Woodinville study area include:

- Add 2,000 feet of curb, gutter, sidewalk, and a bike lane to provide a pedestrian connection between the West Ridge neighborhood and downtown Woodinville. It would also add sidewalk and a bike lane to the east side and shift the road to the west.
- Add 1,700 feet of curb, gutter, sidewalk, and a bike lane along the north side of Winery Road between NE 143rd Place/137th Place NE and 138th Way NE.
- Install a rectangular rapid flashing beacon (RRFB) at the 14900 block of Woodinville-Redmond Road and 124th Avenue NE, north of NE 149th Street for Tolt Pipeline Trail users.
- Add 1,400 feet of curb, gutter, sidewalk, and bike lane along the east side of 124th Avenue NE between NE 165th Street and NE 171st Place.
- Add 2,800 linear feet of curb, gutter, sidewalk, and a bike lane along the west side of NE Woodinville Duvall Road Sidewalk from Woodinville Park and Ride to NE North Woodinville Way.
- Add streetlights along NE 181st Place from 140th Avenue NE to 142nd Avenue NE.
- Replace an existing RRFB on 140th Avenue NE with a HAWK Signal.
- Extend 133rd Avenue NE from NE 175th Street to Woodinville Snohomish Road.
- Extend 133rd Avenue NE from Woodinville Snohomish Road to Little Bear Creek Parkway.

#### **4.1.4. Transit Facilities**

##### **4.1.4.1. Kirkland Study Area**

In the No Action Alternative, Metro's fixed route bus service in the Kirkland study area would remain the same. Metro's long-range plan, Metro Connects, does not identify any new frequent or express bus service in the study area (KCM 2021). Metro Connects identifies the potential to implement modified local fixed-route and/or new flexible services to improve mobility and provide connections to the regional transit network and its intent to work with communities to determine the best options for them; thus, new transit service could be provided in the study area subject to future coordination among the City of Kirkland and Metro.

In the No Action Alternative, Sound Transit will provide bus rapid transit (BRT) service along I-405 between Lynnwood and Bellevue. Known as the Stride S2 Line, it will connect communities along I-405 and SR 518 from Lynnwood to Bellevue. Buses will run every 10 minutes and will connect to Link light rail at Lynnwood and Bellevue as well as other transit services provided by Sound Transit, Community Transit, and King County Metro Transit. It will pass through the Kirkland study area but will not include a station or service in the study area.

##### **4.1.4.2. Woodinville Study Area**

Metro's vision for future transit service in the Woodinville study area is described in Metro Connects. In the No Action Alternative, Metro would provide a new express bus service connection between

Woodinville and Duval via NE Woodinville-Duvall Road. Metro's RapidRide K Line will provide BRT service connecting Totem Lake with Eastgate via Bellevue. This project will include new transit only or business access and transit (BAT) lanes on existing or new right-of-way along 15% of the proposed routing to maintain high transit travel speeds; major intersection investments at six to eight intersections to improve traffic flow, transit reliability, and increased transit speeds; new transit signal priority at more than 70% of the signalized intersections along the route; and upgraded passenger amenities with better information and passenger safety to facilitate greater transit use. It will also remove barriers of existing use at 28 RapidRide stations, 18 enhanced RapidRide stops, and 6 standard RapidRide stops. This project will connect the two Regional Growth Centers, Totem Lake and Bellevue, along with other jobs and amenities in downtown Kirkland, the Kirkland Google campus, Bellevue College, and Eastgate. It will also increase access to other regional transit services, including the I-405 BRT at NE 128th Street and Link light rail in downtown Bellevue. This project would also make use of the new Bellevue College Connector, which would improve access to Bellevue College and enhance bicycle and pedestrian access. The northern terminus of the K Line at Totem Lake and the alignment along 124th Avenue NE between the northern terminus and NE 116th Street is located in the Woodinville study area.

In the No Action Alternative, Sound Transit will provide BRT service via its S3 Stride Line along SR 522 between Shoreline and Bothell and via its S2 Stride Line I-405 between Lynnwood and Bellevue. The S3 Stride Line will serve Lake Washington communities from Shoreline and Seattle to Bothell along SR 522. The project will connect riders to Link light rail at Shoreline South/148th at the corridor's western end. The Stride S2 and S3 Lines will connect at the SR 522/I-405 transit hub in the Woodinville study area, with transit service provided by Sound Transit, Community Transit, and King County Metro Transit.

In their 2011 Long Range Plan, Community Transit notes the importance of coordinating its services along the I-5 and I-405 corridors with Sound Transit, supplementing Sound Transit's regional bus network with commute services to downtown Seattle and the University of Washington. The plan notes that Community Transit services will be adjusted to feed Link services at the proposed Lynnwood and Mountlake Terrace stations, likely eliminating most express services into the Seattle area. The 2011 Long Range Plan was prepared prior to identification of the Stride S2 and S3 corridors and does not reference integration with Sound Transit's BRT service (Community Transit 2011). At the time of this report, Community Transit was preparing an update to its Long Range Plan. The Planning Context Summary for the Long Range Plan update notes implementation of Stride service on I-405 as a relevant factor for consideration as part of the plan update but does not describe specific route changes that would be made as part of the integration (Community Transit 2022). Sound Transit's online description of the Stride S3 Line identifies that the S2 and S3 Lines will connect with Community Transit service at the SR 522/I-405 transit hub.

#### **4.1.5. Safety**

##### **4.1.5.1. Kirkland Study Area**

As traffic volumes increase, it is possible to see an increase in the potential for crashes in those areas. Background traffic volumes in the study area are expected to increase in 2029 and 2040 over the existing conditions (Figure 3-11). Therefore, there is potential for increased crashes within the Kirkland study area under the No Action conditions.

##### **4.1.5.2. Woodinville Study Area**

As traffic volumes increase, it is possible to see an increase in the potential for crashes in those areas. Background traffic and active transportation volumes in the study area are expected to increase in 2029 and 2040 over the existing conditions (Figure 3-13). Therefore, there is potential for increased crashes within the Woodinville study area under the No Action conditions.

#### **4.1.6. Freight Mobility and Access**

##### **4.1.6.1. Kirkland Study Area**

Under the No Action Alternative, the SWD would continue to operate the existing Houghton Transfer Station, which has outlived its useful life and lacks capacity for the type of recycling and MRW collection services that are increasingly in demand, and for the growing northeast community. Truck trips associated with its operation in the No Action Alternative are expected to increase to an average of 33 transfer truck trailer trips per day. This is an increase of one additional trip during the peak hours (5 peak hour truck trips). Freight traffic is expected to be affected similarly to general-purpose traffic in the Kirkland study area. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections with increased congestion.

##### **4.1.6.2. Woodinville Study Area**

Under the No Action Alternative, freight traffic is expected to be affected similarly to general-purpose traffic in the Woodinville study area. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections with increased congestion resulting from local and regional growth.

#### **4.2. Action Alternatives**

##### **4.2.1. Roadway Network**

###### **4.2.1.1. Impact Thresholds and Traffic Volumes**

Traffic impacts were determined for arterials and local streets by comparing the overall intersection LOS for the No Action Alternative and the action alternatives. Impacts would occur if the action alternatives would result in traffic operations performing below the acceptable LOS when the intersection or roadway segment would operate at or above the acceptable LOS under the No Action Alternative.

As discussed under the No Action Alternative, traffic volumes are forecast to increase throughout the study area during the 2029 and 2040 AM and PM peak hours as a result of planned population and employment growth by the local jurisdictions. Turning movement volumes for the 2029 and 2040 action alternatives weekday and Saturday conditions for the AM and PM peak hours are included in Appendix B

To develop traffic volumes for the action alternatives, the forecasted project trips (including self-haul, commercial, and trucks) were layered on top of the No Action volumes. For Alternative 1 in Kirkland, since the future NERTS will replace the existing Houghton Recycling and Transfer Station, the increase in project trips for the future, larger facility was determined and added to the No Action volumes to avoid double counting. For Alternative 2 in Woodinville, project trips were added directly to the No Action volumes.

###### **4.2.1.2. Alternative 1 – Kirkland**

Under Action Alternative 2, the roadway network in the Kirkland study area would be the same as the No Action Alternative. This action alternative would not require modifications to the existing roadway network, nor would it preclude development of any of the planned improvements.

###### **4.2.1.3. Alternative 2 – Woodinville**

Under Action Alternative 2, the roadway network in the Woodinville study area would be the same as the No Action Alternative. This action alternative would not require modifications to the existing roadway network, nor would it preclude development of any of the planned improvements.



#### 4.2.2. Arterial and Local Street Operations

This section describes the future action alternatives intersection operations for the study intersections within each transportation study area. The reports from the action operational analyses are included in Appendix C.

##### 4.2.2.1. Alternative 1 – Kirkland

Five intersections were analyzed for the Kirkland study area for Alternative 1 in the horizon years of 2029 and 2040, including three signalized intersections, one AWSC intersection, and one OWSC intersection. While Alternative 1B may have additional construction truck volumes in 2029 over Alternative 1A due to the demolition of the existing transfer station, it was determined that the additional construction traffic (fewer than five trucks) would have minimal impacts on the traffic operations and the results would be the same.

##### *Weekday Analysis*

The Alternative 1 2029 weekday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-9 and Figure 4-9. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 1. In the AM and PM peak hours, all intersections operate at or better than the standards for the roadway in Alternative 1.

**Table 4-9. 2029 Alternative 1 Weekday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak				PM Peak			
				2029 No Action		2029 Action		2029 No Action		2029 Action	
				LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	C	26.6	C	26.8	D	41.0	D	42.0
102	116th Avenue NE and NE 70th Place	Signal	D	C	31.9	C	32.9	C	21.4	C	24.6
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	D	45.0	D	50.9	C	29.7	C	32.7
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	9.5	A	9.8	B	11.2	B	11.5
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	9.0	A	9.1	A	9.1	A	9.2

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

The Alternative 1 2040 weekday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-10 and Figure 4-10. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the

roadway standards under Alternative 1. In the AM and PM peak hours, all intersections operate at or better than the standards for the roadway in Alternative 1.

**Table 4-10. 2040 Alternative 1 Weekday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak				PM Peak			
				2040 No Action		2040 Action		2040 No Action		2040 Action	
				LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
101	116th Avenue NE and I-405 Northbound Ramps <sup>3</sup>	Signal	D	C	30.2	C	30.2	D	44.7	D	44.8
102	116th Avenue NE and NE 70th Place	Signal	D	C	33.4	C	34.5	C	26.7	C	27.5
103	NE 68th Street and I-405 Southbound Ramps <sup>4</sup>	Signal	D	D	48.3	D	53.9	D	37.8	D	41.5
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	9.9	B	10.2	B	11.4	B	11.7
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	9.0	A	9.1	A	9.1	A	9.3

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>3</sup> Intersection signal timings were optimized for the 2040 No Action Alternative and action alternatives in the PM peak hour.

<sup>4</sup> Intersection signal timings were optimized for the 2040 No Action Alternative and action alternatives in the AM peak hour.

### Saturday Analysis

The Alternative 1 2029 Saturday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-11 and Figure 4-11. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 1. In the AM and PM peak hours, all study area intersections operate at or better than the standards for the roadway in Alternative 1.

**Table 4-11. 2029 Alternative 1 Saturday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak				PM Peak			
				2029 No Action		2029 Action		2029 No Action		2029 Action	
				LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	B	14.8	B	14.8	B	19.2	B	19.2
102	116th Avenue NE and NE 70th Place	Signal	D	B	18.5	B	19.0	C	22.3	C	23.0
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	B	18.8	C	20.3	C	28.7	C	34.5
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	7.5	A	7.7	A	8.5	A	8.7
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	8.7	A	9.0	A	9.0	A	9.2

ID	Intersection	Traffic Control	LOS Standard	AM Peak				PM Peak			
				2029 No Action		2029 Action		2029 No Action		2029 Action	
				LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

The Alternative 1 2040 Saturday AM and PM peak hour LOS and delay for the Kirkland study area intersections are shown in Table 4-12 and Figure 4-12. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 1. In the AM and PM peak hours, all study area intersections operate at or better than the standards for the roadway in Alternative 1.

**Table 4-12. 2040 Alternative 1 Saturday Intersection Level of Service and Delay – Kirkland**

ID	Intersection	Traffic Control	LOS Standard	AM Peak				PM Peak			
				2040 No Action		2040 Action		2040 No Action		2040 Action	
				LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
101	116th Avenue NE and I-405 Northbound Ramps	Signal	D	B	17.1	B	17.3	C	20.9	C	21.0
102	116th Avenue NE and NE 70th Place	Signal	D	B	19.4	B	19.9	C	24.1	C	24.9
103	NE 68th Street and I-405 Southbound Ramps	Signal	D	B	19.3	C	21.2	D	35.9	D	43.1
104	NE 60th Street and 116th Avenue NE	AWSC <sup>1</sup>	D	A	7.7	A	7.9	A	8.8	A	9.1
105	NE 60th Street and Site Driveway	OWSC <sup>2</sup>	D	A	8.7	A	9.0	A	9.0	A	9.2

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; AWSC = all-way stop control; OWSC = one-way stop control.

<sup>1</sup> For AWSC intersections, LOS is reported as an average delay of all of the movements, much like a signalized intersection.

<sup>2</sup> For OWSC intersections, LOS is reported for the worst movement.

Figure 4-9. 2029 Action Alternative 1 AM and PM Weekday LOS – Kirkland





Figure 4-10. 2040 Action Alternative 1 AM and PM Weekday LOS – Kirkland





Figure 4-11. 2029 Action Alternative 1 AM and PM Saturday LOS – Kirkland





Figure 4-12. 2040 Alternative 1 AM and PM Saturday LOS – Kirkland



#### **4.2.2.2. Alternative 2 – Woodinville**

Twelve intersections, including the proposed site driveway, were analyzed for the Woodinville study area for Alternative 2 in the horizon years of 2029 and 2040. These include eight signalized intersections, two OWSC intersections, and two roundabouts.

##### ***Weekday Analysis***

The Alternative 2 2029 weekday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-13 and Figure 4-13. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 2. In the AM peak hour, one intersection fails to meet the standards for the roadway at NE 175th Street and 131st Avenue NE in Alternative 2. In the PM peak hour, one intersection fails to meet the standards for the roadway at Little Bear Creek Parkway and 131st Avenue NE in Alternative 2.

All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 2. In the AM peak hour, one intersection fails to meet the standards for the roadway at NE 175th Street and 131st Avenue NE in Alternative 2. In the PM peak hour, one intersection fails to meet the standards for the roadway at Little Bear Creek Parkway and 131st Avenue NE in Alternative 2.

The Alternative 2 2040 weekday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-14 and Figure 4-14. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 2. In the AM peak hour, two intersections, NE 175th Street and 131st Avenue NE, and Woodinville-Redmond Road NE and NE 175th Street, fail to meet the standards for the roadway in Alternative 2. In the PM peak hour, two intersections, Little Bear Creek Parkway and 131st Street Avenue NE, and Woodinville-Redmond Road NE and NE 145th Street, fail to meet the standards for the roadway in Alternative 2.

##### ***Saturday Analysis***

The Alternative 2 2029 Saturday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-15 and Figure 4-15. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 2. In the AM peak hour, all study area intersections operate at or better than the standards for the roadway in Alternative 2. In the PM peak hour, one intersection fails to meet the standards for the roadway at the SR 522 eastbound ramps and 131st Avenue NE in Alternative 2.

The Alternative 2 2040 Saturday AM and PM peak hour LOS and delay for the Woodinville study area intersections are shown in Table 4-16 and Figure 4-16. All intersections expected to meet the roadway standards under the No Action Alternative during the AM and PM peak hours would also meet the roadway standards under Alternative 2. In the AM peak hour, all study area intersections operate at or better than the standards for the roadway in Alternative 2. In the PM peak hour, one intersection fails to meet the standards for the roadway at the SR 522 eastbound ramps and 131st Avenue NE in Alternative 2.



**Table 4-13. 2029 Alternative 2 Weekday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak						PM Peak					
				2029 No Action			2029 Action			2029 No Action			2029 Action		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	D	41.4	-	D	41.0	-	B	19.7	-	B	19.7	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	B	15.8	-	B	15.6	-	F	>120	-	F	>120	-
204	NE 175th Street and 131st Avenue NE	Signal	E	F	>120	-	F	>120	-	E	75.0	-	E	78.4	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	E	61.7	-	E	74.5	-	E	66.6	-	E	70.2	-
206	140th Avenue NE/ NE 171st Street	Signal	E	C	31.2	-	C	31.1	-	E	71.3	-	E	71.1	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	8.0	0.37	A	8.1	0.40	A	9.3	0.68	A	9.9	0.72
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.8	0.29	A	4.9	0.31	A	5.2	0.33	A	5.3	0.35
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	5.6	0.44	A	5.7	0.45	A	6.4	0.42	A	6.5	0.43
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	D	35.8	-	D	37.0	-	E	61.4	-	E	64.1	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	15.6	-	B	15.8	-	B	19.4	-	C	20.1	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	B	14.7	-	-	-	-	C	16.6	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.

**Table 4-14. 2040 Alternative 2 Weekday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak						PM Peak					
				2040 No Action			2040 Action			2040 No Action			2040 Action		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE	Signal	D	-	-	-	-	-	-	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	D	40.7	-	D	40.3	-	C	22.4	-	C	22.4	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	B	16.6	-	B	16.5	-	F	>120	-	F	>120	-
204	NE 175th Street and 131st Avenue NE	Signal	E	F	>120	-	F	>120	-	E	74.9	-	E	77.7	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	F	88.2	-	F	103.5	-	F	106.6	-	F	110.4	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	30.8	-	C	30.7	-	E	73.0	-	E	72.8	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	8.1	0.38	A	8.2	0.41	B	10.5	0.76	B	11.6	0.80
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.8	0.29	A	4.7	0.31	A	5.6	0.38	A	5.8	0.39
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	5.7	0.45	A	5.8	0.45	A	6.8	0.44	A	6.9	0.45
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	D	37.6	-	D	39.0	-	E	69.3	-	E	72.0	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	15.8	-	B	16.0	-	C	23.4	-	C	24.4	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	C	15.3	-	-	-	-	C	19.0	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.

**Table 4-15. 2029 Alternative 2 Saturday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak						PM Peak					
				2029 No Action			2029 Action			2029 No Action			2029 Action		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	B	13.6	-	B	13.4	-	E	79.3	-	E	78.7	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	C	24.8	-	C	24.5	-	D	35.7	-	D	35.7	-
204	NE 175th Street and 131st Avenue NE	Signal	E	D	48.7	-	D	42.1	-	E	77.5	-	E	76.5	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	C	27.5	-	C	29.1	-	D	39.5	-	D	44.1	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	26.7	-	C	26.5	-	C	34.1	-	C	34.0	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	7.1	0.24	A	7.2	0.28	A	6.9	0.41	A	7.1	0.44
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.1	0.21	A	4.3	0.23	A	5.8	0.38	A	6.0	0.40
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	3.7	0.16	A	3.8	0.16	A	5.8	0.33	A	6.0	0.34
210	Woodinville-Redmond Road/NE 124th Street	Signal	E	C	20.5	-	C	21.0	-	C	26.9	-	C	27.7	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	11.0	-	B	11.2	-	B	14.0	-	B	14.1	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	B	11.9	-	-	-	-	C	15.1	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.



**Table 4-16. 2040 Alternative 2 Saturday Intersection Level of Service and Delay – Woodinville**

ID	Intersection	Traffic Control	LOS Standard	AM Peak						PM Peak					
				2040 No Action			2040 Action			2040 No Action			2040 Action		
				LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c	LOS	Delay (seconds)	v/c
201	SR 522 Westbound Ramps and 131st Avenue NE <sup>3</sup>	-	D	-	-	-	-	-	-	-	-	-	-	-	-
202	SR 522 Eastbound Ramps and 131st Avenue NE	Signal	D	B	14.1	-	B	13.9	-	F	100.2	-	F	98.8	-
203	Little Bear Creek Parkway and 131st Avenue NE	Signal	E	C	26.3	-	C	26.0	-	D	37.2	-	D	37.3	-
204	NE 175th Street and 131st Avenue NE	Signal	E	D	44.3	-	D	44.9	-	E	73.2	-	E	72.8	-
205	Woodinville-Redmond Road NE and NE 175th Street	Signal	E	C	35.0	-	D	36.6	-	D	47.8	-	D	54.5	-
206	140th Avenue NE/NE 171st Street	Signal	E	C	26.3	-	C	26.1	-	D	35.3	-	D	35.2	-
207	Woodinville-Redmond Road NE and NE 145th Street	RAB <sup>4</sup>	E	A	7.2	0.28	A	7.3	0.32	A	7.1	0.45	A	7.3	0.48
208	Village Road and NE 145th Street	RAB	D <sup>2</sup>	A	4.2	0.23	A	4.4	0.25	A	6.2	0.42	A	6.4	0.44
209	148th Avenue NE/Woodinville-Redmond Road NE and NE 145th Street	RAB	D <sup>2</sup>	A	3.9	0.17	A	3.9	0.17	A	6.1	0.34	A	6.2	0.35
210	Woodinville-Redmond Road/ NE 124th Street	Signal	E	C	21.6	-	C	22.1	-	C	28.8	-	C	29.9	-
211	NE 116th Street and Woodinville-Redmond Road	Signal	E	B	11.2	-	B	11.4	-	B	15.3	-	B	15.5	-
212	Woodinville-Redmond Road and Site Driveway <sup>5</sup>	OWSC <sup>1</sup>	E	-	-	-	B	12.9	-	-	-	-	C	16.6	-

Results are based on Highway Capacity Manual (HCM) 6 methodology where available. Otherwise, HCM 2000 methodology was reported (TRB 2000; 2016).

Intersection delay is measured by average seconds of delay per vehicle.

LOS = level of service; v/c = volume to capacity ratio; OWSC = one-way stop control; RAB = roundabout.

<sup>1</sup> For OWSC intersections, LOS is reported for the worst movement.

<sup>2</sup> For roundabouts, the v/c for each lane group is the primary controlling measure of effectiveness. Roundabouts will be considered failing if the v/c > 0.9.

<sup>3</sup> In the No Action Alternative, all movements at this intersection are free.

<sup>4</sup> In the No Action Alternative, this intersection is converted to a roundabout.

<sup>5</sup> In the No Action Alternative, this intersection does not exist.

Figure 4-13. 2029 Alternative 2 AM and PM Weekday LOS – Woodinville

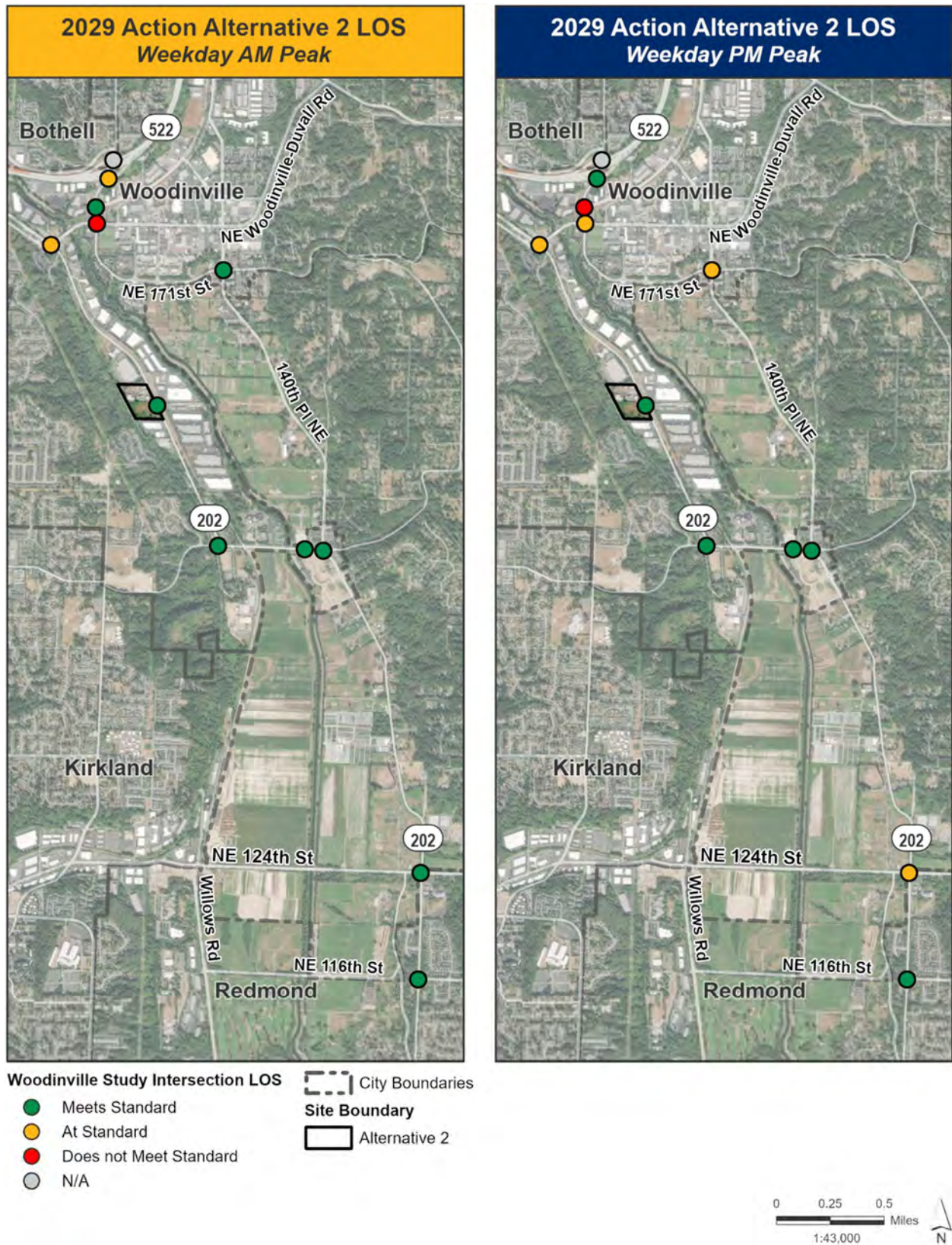




Figure 4-14. 2040 Alternative 2 AM and PM Weekday LOS – Woodinville





Figure 4-15. 2029 Alternative 2 AM and PM Saturday LOS – Woodinville

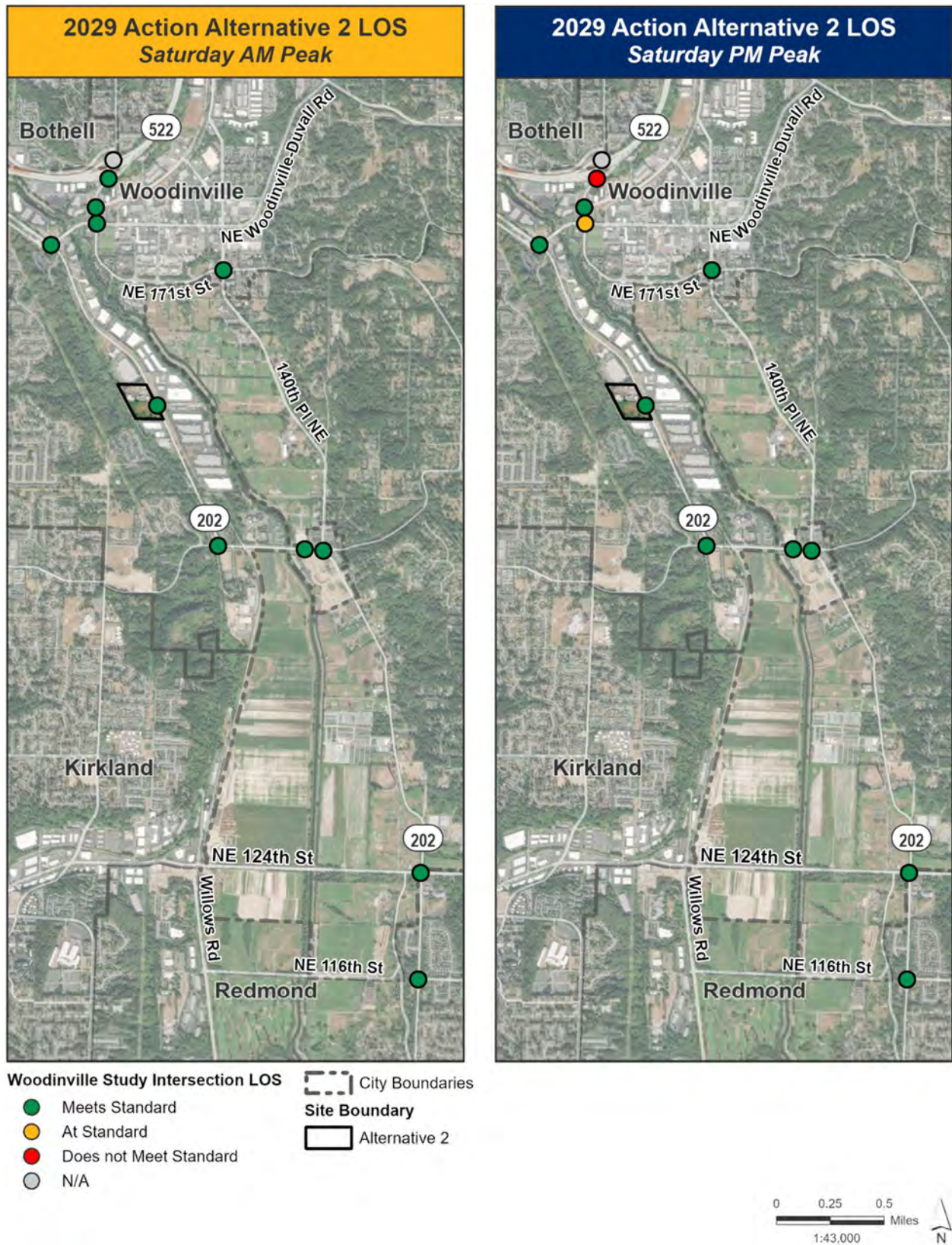
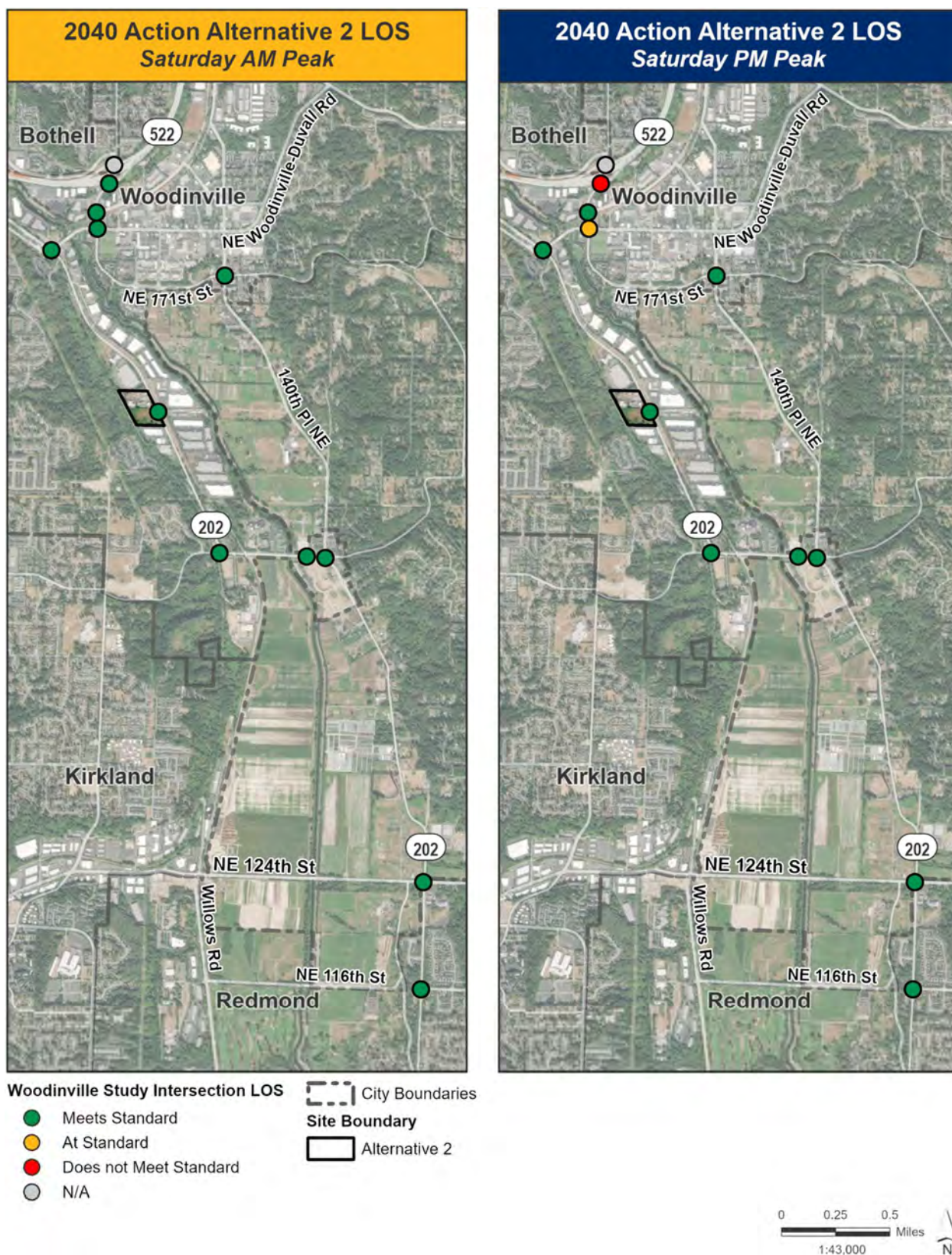




Figure 4-16. 2040 Alternative 2 AM and PM Saturday LOS – Woodinville



#### **4.2.3. Active Transportation Facilities**

##### **4.2.3.1. Alternative 1 – Kirkland**

Under Action Alternative 1, existing active transportation facilities in the Kirkland study area would not be modified. No active transportation facilities are planned in the study area.

##### **4.2.3.2. Alternative 2 – Woodinville**

Under Action Alternative 2, existing active transportation facilities in the Woodinville study area would not be modified. Planned active transportation facilities would not be precluded by the project.

#### **4.2.4. Transit Facilities**

##### **4.2.4.1. Alternative 1 – Kirkland**

Under Action Alternative 1, planned bus service in the Kirkland study area would be the same as the No Action Alternative. Additional bus service levels or rerouting to the transfer station would not be required. Transit service would experience higher levels of delay (approximately 6 seconds on weekdays and up to 8 seconds on Saturdays) at the following intersections, similar to general purpose traffic:

- NE 68th Street and I-405 Southbound Ramps
- NE 60th Street and 116th Avenue NE
- NE 60th Street and Site Driveway

##### **4.2.4.2. Alternative 2 – Woodinville**

Under Action Alternative 2, planned bus service in the Woodinville study area would be the same as the No Action Alternative. Additional bus service levels or rerouting to the transfer station would not be required. Transit service would experience higher levels of delay (approximately 15 seconds on weekdays and up to 7 seconds on Saturdays) at the following intersections, similar to general purpose traffic:

- SR 522 Westbound Ramps and 131st Avenue NE
- SR 522 Eastbound Ramps and 131st Avenue NE
- Little Bear Creek Parkway and 131st Avenue NE
- NE 175th Street and 131st Avenue NE
- Woodinville-Redmond Road NE and NE 175th Street

#### **4.2.5. Safety**

##### **4.2.5.1. Alternative 1 – Kirkland**

As with the No Action Alternative, background traffic volumes are expected to increase for 2029 and 2040 over the existing volumes. Additionally, the new site would generate just over 500 vehicles per day on weekdays and weekends. The existing Houghton Transfer Station is at the same location as the proposed facility and currently serves 250 to 350 vehicles per day on weekdays and weekends; the proposed facility would add 150 to 50 additional vehicles per day. This equates to an increase of less than 5% of the existing daily volume in this area. Therefore, it is likely to have a negligible impact on vehicular and active transportation safety within the study area and would be anticipated to remain similar to the No Action conditions.

#### **4.2.5.2. Alternative 2 – Woodinville**

As with the No Action Alternative, background traffic volumes are expected to increase for 2029 and 2040 over the existing volumes. Additionally, the new site would generate just over 500 vehicles per day on weekdays and weekends. This equates to an increase of less than 7% of the existing daily volumes in this area. Therefore, this is likely to have little to no impact on vehicle crashes and may slightly increase exposure for pedestrians and bicyclists. However, since it is likely that the majority of pedestrian and bicyclist traffic traveling north and south through the study area utilizes the Eastrail Trail or the Sammamish River Trail, the impact from the volume increases is likely to be minimal and similar to the No Action Alternative for most locations in the study area.

The trail and pedestrian crossing across NE 145th Street and the roundabouts near NE 145th Street and Woodinville-Redmond Road NE/148th Avenue NE are the most likely places where there could be additional conflicts for active transportation users due to increased active transportation activity. However, the trail crossing is already signalized with additional signing and a refuge area, and the roundabouts include marked and signed crosswalks along with lower speed limits, which significantly help with visibility and reaction time. Additionally, while the Eastrail Trail Project would be constructed near the project site, it would be on the east side of Woodinville-Redmond Road NE, opposite from the NERTS site, and would not create any potential conflicts with users of the trail and those accessing the NERTS facility.

#### **4.2.6. Freight Mobility and Access**

##### **4.2.6.1. Alternative 1 – Kirkland**

Action Alternative 1 would decrease truck traffic in the Kirkland study area compared with the No Action Alternative. Truck volumes would decrease from 33 transfer trailers per day to 25 transfer trailers per day, with approximately 4 transfer trailer trips each during the AM and PM peak hours. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

##### **4.2.6.2. Alternative 2 – Woodinville**

Action Alternative 2 would increase truck traffic in the Woodinville study area compared with the No Action Alternative. There would be 25 new truck trips from transfer trailers added per day, with approximately 4 transfer trailer trips each during the AM and PM peak hours. Freight would experience the same levels of delay as general-purpose traffic on roadways and at intersections throughout the study area.

#### **4.3. Impacts from Construction**

All of the action alternatives would require some preparatory demolition activities and earthwork that would generate truck trips. Material delivery and general construction vehicle activity would also contribute to construction-related traffic. As most of this activity would occur during import and export of material to and from the site during site preparation, the estimated volumes of truck traffic presented in the following sections focus on that early period of peak construction traffic to present the worst-case scenario.

Impacts associated with construction truck activities were calculated by assigning a passenger car equivalent (PCE) to each truck trip. The PCE factor converts the number of trucks to an estimated number of passenger cars. The HCM recommends a range of PCE factors for trucks of 1.1 to 2.5.

For the purposes of this analysis, it was assumed that all export and import material would be transported to and from the site in dump trucks with trailers that have a capacity of 20 cubic yards. Given their size and slower operating speeds, trucks were assigned a PCE value of 2.5, meaning 1 construction truck is equivalent to 2.5 passenger cars. Using a factor of 2.5 for this analysis provides a reasonable impact estimate for the size and weight of the trucks and allows for an equal comparison across alternatives. The PCE factor was calculated for both inbound and outbound trips.



#### 4.3.1. Alternative 1 – Kirkland

Two development scenario options are assumed for the Alternative 1 NERTS site. One (Alternative 1A) would construct the facility after the existing transfer station building is closed and demolished. The other option (Alternative 1B) would construct the facility while the existing transfer station building is open and operating. The existing transfer station building would then be closed and repurposed or replaced after the new station is open.

Both would require demolition of existing structures, export of building debris and excavated material, and import of in-place fill material, but these may occur at different points of construction. To provide a conservative estimate of construction activity, the development scenarios assume no reuse of on-site material, although reuse is possible. The construction impact area for Alternative 1 is assumed to be the same as the transportation study area for this site.

##### 4.3.1.1. Estimation of Construction Truck Traffic

Site preparation work is expected to last approximately 6 to 9 months, assuming 12-hour workdays 6 days per week. All export and import material would be transported to and from the site in dump trucks with trailers with an assumed capacity of 20 cubic yards. Export activity would result in approximately 9 to 14 truck trips per day, and import activity would result in approximately 8 to 11 truck trips per day. Table 4-17 summarizes the quantity of export and import material estimated for development of Alternative 1, the associated truck trips, and the estimated durations of work.

**Table 4-17. Truck Activity Associated with Site Preparation for Alternative 1**

Export Material (cubic yards)	Export Total Truck Trips per Day	Export Total Project Truck Trips	Import In-Place (cubic yards)	Import Total Truck Trips per Day	Import Total Project Truck Trips	Site Preparation Duration
40,625	9-14	2,035	33,185	8-11	1,660	6-9 months

##### 4.3.1.2. Potential Construction Access and Truck Haul Routes

Construction access for Alternative 1 would be provided from NE 60th Street at the location of the existing Houghton Transfer Station. Trucks would access northbound and southbound I-405 at the NE 70th Street interchange via NE 60th Street and 116th Avenue NE.

##### 4.3.1.3. Changes to Traffic Volumes

Trucks would traverse the haul routes during the entirety of the 12-hour daily construction period, including to and from the site during AM and PM peak periods. As described in Section 4.3.1.1, this equates to approximately 9 to 14 round trips per day associated with export and 8 to 11 round trips per day associated with import. With up to 25 truck trips distributed evenly during the daily construction period, the average number of truck trips per hour would be 2 to 3.

Each truck round trip includes an outbound and inbound segment, resulting in 63 PCE daily trips in the study area associated with export activity (25 truck trips x 2.5 PCE).

To estimate traffic operation impacts, the truck trips are assumed to be distributed evenly throughout the daily construction period and are based on the ability of the yard and receiving facility to process the trucks.<sup>1</sup> The 2.5 PCE factor is applied to the truck volume to estimate the number of new trips that would need to be accommodated along the truck routes. Table 4-18 summarizes the number of peak hour trucks and associated PCEs for each construction scenario.

<sup>1</sup> Irregularity or bunching at the beginning and end of the day is possible.

**Table 4-18. Hourly Truck Activity Associated with Alternative 1 Development Approaches**

Hourly Trucks Export	Hourly Trucks Import	Hourly Trucks Total	Passenger Car Equivalent
1-2	1	2-3	5-8

The PCEs shown in Table 4-18 would be distributed with half exiting the site and half entering the site during the peak hour. The haul routes would be located on state facilities, including I-405, as well as several collector and arterial streets, including NE 60th Street and 116th Avenue NE. Because the construction staging, origin of import material, and destination for export material are unknown at this time, the volumes forecast on each roadway segment represent the highest possible volumes for all daily construction activity. A single potential roadway identified as a haul route could be used for all daily truck trips, or the total daily volumes could be distributed among multiple roadways.

The estimated daily truck PCE trips associated with site preparation would represent up to 5% of existing single-direction traffic on collector and arterial roadways. Estimated daily truck PCE trips would represent up to 1.3% of the existing single-direction AADT for all state facilities, with the highest percentages at on- and off-ramps. Table 4-19 summarizes AADT on streets that are part of the haul routes as well as the estimated truck trips as a percentage of AADT.

**Table 4-19. Estimated Hourly Truck Activity for Alternative 1 Compared with Existing AADT**

Intersection/Roadway Segment	Existing AADT (both directions) <sup>1</sup>	Existing AADT (single direction) <sup>1</sup>	Daily Truck Trips as a Percentage of Single-Direction AADT
116th Avenue NE	6,000-13,700	3,000-6,850	<1%
NE 70th Street	17,500	8,750	<1%
NE 60th Street	2,500	1,250	5%
122nd Avenue NE	3,600-4,800	1,800-2,400	2.6-3.5%
I-405: NE 34th Street	175,900	87,950	<1%
I-405 Northbound On-Ramp from NE 70th Street/116th Avenue NE	N/A	6,500	<1%
I-405 Northbound Off-Ramp to NE 70th Street/116th Avenue NE	N/A	6,000	<1%
I-405 Southbound Off-Ramp to NE 68th Street/NE 72nd Place	N/A	6,000	<1%
I-405 Southbound On-Ramp from NE 68th Street/NE 72nd Place	N/A	5,000	1.3%

Sources: WSDOT Traffic Count Database System (2023b); City of Kirkland Average Annual Daily Traffic Viewer (2022).

<sup>1</sup> WSDOT and the City of Kirkland report annual average daily trips (AADT) for roadways. Where roadways are bidirectional, the AADT reported reflects both directions. Single-direction volumes were determined by dividing bidirectional volumes in two.

While additional truck trips may occur throughout the entire construction period, the greatest concentration is expected to be during the site preparation period. Because this site preparation truck traffic is not expected to impact traffic operations in the study area, it is expected that any other truck traffic associated with construction would be less and also not likely to impact traffic operations.

#### 4.3.1.4. Impacts to Property Access

Impacts to property access for sites in the vicinity of the Alternative 1 site would be minimal. Trucks entering or exiting the site are not expected to block driveways along the haul routes. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours.

#### 4.3.1.5. Impacts to Transit

During construction of Alternative 1, transit service is unlikely to be impacted. No buses travel along NE 60th Street or 116th Avenue NE, the primary haul routes to access I-405. Buses do travel along NE 70th Street/NE 72nd Place as well as on I-405, but these are unlikely to be impacted by construction activities.

#### 4.3.1.6. Impacts to Nonmotorized Facilities

It is likely that pedestrian and bicycle facilities on the north side of NE 60th Street would be impacted during construction and may experience closures to allow truck access to the site.

#### 4.3.2. Alternative 2 – Woodinville

Only one development scenario is assumed for the Alternative 2 NERTS site. The development scenario would require demolition of existing structures, export of building debris and excavated material, and import of in-place fill material. To provide a conservative estimate of construction activity, the development scenarios assume no reuse of on-site material, although reuse is possible. The construction impact area for Alternative 2 is assumed to be the same as the transportation study area for this site.

##### 4.3.2.1. Estimation of Construction Truck Traffic

Site preparation work is expected to last approximately 6 to 9 months, assuming 12-hour workdays 6 days per week. All export and import material would be transported to and from the site in dump trucks with trailers with an assumed capacity of 20 cubic yards. Export activity would result in approximately 14 to 20 truck trips per day, and import activity would result in approximately 3 to 4 truck trips per day. Table 4-20 summarizes the quantity of export and import material estimated for development of Alternative 2, the associated truck trips, and the estimated durations of work.

**Table 4-20. Truck Activity Associated with Site Preparation for Alternative 2**

Export Material (cubic yards)	Export Total Truck Trips per Day	Export Total Project Truck Trips	Import In-Place (cubic yards)	Import Total Truck Trips per Day	Import Total Project Truck Trips	Site Preparation Duration
61,750	14-20	3,100	12,450	3-4	625	6-9 months

##### 4.3.2.2. Potential Construction Access and Truck Haul Routes

Construction access for Alternative 2 would be provided from Woodinville-Redmond Road NE at the site driveway, located at approximately SR 202 milepost 1.45. Trucks would access eastbound and westbound SR 522 at the 132nd Avenue NE interchange via Woodinville-Redmond Road NE, NE 175th Street, and 131st Avenue NE/132nd Avenue NE.

##### 4.3.2.3. Changes to Traffic Volumes

Trucks would traverse the haul routes during the entirety of the 12-hour daily construction period, including to and from the site during AM and PM peak periods. As described in Section 4.3.2.1, this equates to approximately 14 to 20 round trips per day associated with export and 3 to 4 round trips per day associated with import. With up to 24 truck trips distributed evenly during the daily construction period, the average number of truck trips per hour would be 2 to 3.

Each truck round trip includes an outbound and inbound segment, resulting in 63 PCE daily trips in the study area associated with export activity (25 truck trips x 2.5 PCE).



To estimate traffic operation impacts, the truck trips are assumed to be distributed evenly throughout the daily construction period and are based on the ability of the yard and receiving facility to process the trucks.<sup>2</sup> The 2.5 PCE factor is applied to the truck volume to estimate the number of new trips that would need to be accommodated along the truck routes. Table 4-21 summarizes the number of peak hour trucks and associated PCEs for each construction scenario.

**Table 4-21. Hourly Truck Activity Associated with Alternative 2 Development Approach**

Hourly Trucks Export	Hourly Trucks Import	Hourly Trucks Total	Passenger Car Equivalent
1-2	1	2-3	5-8

The PCEs shown in Table 4-21 would be distributed with half exiting the site and half entering the site during the peak hour. The haul routes would be located on state facilities, including SR 522 and SR 202, as well as several collector and arterial streets, including 131st Avenue NE/132nd Avenue NE and NE 175th Street. Because the construction staging, origin of import material, and destination for export material are unknown at this time, the volumes forecast on each roadway segment represent the highest possible volumes for all daily construction activity. A single potential roadway identified as a haul route could be used for all daily truck trips, or the total daily volumes could be distributed among multiple roadways.

The estimated daily truck PCE trips associated with site preparation would represent up to 0.7% of existing single-direction traffic on collector and arterial roadways. Estimated daily truck PCE trips would represent up to 1.2% of the existing single-direction AADT for all state facilities, with the highest percentages at on- and off-ramps. Table 4-22 summarizes AADT on streets that are part of the haul routes as well as the estimated truck trips as a percentage of AADT.

**Table 4-22. Estimated Hourly Truck Activity for Alternative 2 Compared with Existing AADT**

Intersection/Roadway Segment	Existing AADT (both directions) <sup>1</sup>	Existing AADT (single direction) <sup>1</sup>	Daily Truck Trips as a Percentage of Single-Direction AADT
132nd Avenue NE	27,600	13,800	<1%
131st Avenue NE	39,500	19,750	<1%
NE 175th Street	18,000	9,000	<1%
SR 202/Woodinville-Redmond Road NE: NE 145th Street to NE 175th Street	10,400	5,200	1.2%
SR 522: West of 132nd Avenue NE	94,600	47,300	<1%
SR 522 Westbound On-Ramp from 132nd Avenue NE	N/A	13,700	<1%
SR 522 Westbound Off-Ramp to 132nd Avenue NE	N/A	5,200	1.2%
SR 522 Eastbound On-Ramp from 132nd Avenue NE	N/A	5,200	1.2%
SR 522 Eastbound Off-Ramp to 132nd Avenue NE	N/A	13,500	<1%

Sources: WSDOT Traffic Count Database System (2023b).

AADT = average annual daily traffic.

<sup>1</sup> WSDOT reports the annual average daily trips (AADT) for roadways. Where roadways are bidirectional, the AADT reported reflects both directions. Single-direction volumes were determined by dividing bidirectional volumes in two.

While additional truck trips may occur throughout the entire construction period, the greatest concentration is expected to be during the site preparation period. Because this site preparation truck traffic is not expected to impact traffic operations in the study area, it is expected that any other truck traffic associated with construction would be less and also not likely to impact traffic operations.

<sup>2</sup> Irregularity or bunching at the beginning and end of the day is possible.

#### **4.3.2.4. Impacts to Property Access**

Impacts to property access for sites in the vicinity of the Alternative 2 site would be minimal. Trucks entering or exiting the site are not expected to block driveways along the haul routes. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours.

#### **4.3.2.5. Impacts to Transit**

During construction of Alternative 2, transit service is unlikely to be impacted. No buses travel along Woodinville-Redmond Road NE north of the project site, the primary portion of the haul route to access SR 522. Buses do travel along NE 175th Street and 131st Avenue NE/132nd Avenue NE as well as on SR 522, but these are unlikely to be impacted by construction activities.

#### **4.3.2.6. Impacts to Nonmotorized Facilities**

No pedestrian facilities currently exist or are currently planned to be added along Woodinville-Redmond Road NE adjacent to the Alternative 2 project site, so no impact to pedestrians is expected. One exception is the Eastrail Trail Project that will convert the existing rail line on the east side of Woodinville-Redmond Road NE to a multi-use path. However, this is on the opposite side of roadway from the NERTS site, so no impacts are expected. Bicycles using the shoulder on Woodinville-Redmond Road NE may be impacted during construction and experience closures to allow truck access to the site.





## 5. Avoidance and Minimization of Impacts

For all action alternatives, a construction transportation management plan addressing site access, traffic control, hauling routes, impacts to transit, construction employee parking, impacts to local businesses, and pedestrian and bicycle control in the area would be prepared per City of Kirkland or City of Woodinville requirements and in coordination with WSDOT as applicable. If driveway closures are required, access to these properties would be maintained to the extent practical. If access to a business could not be maintained during construction, the specific construction activity would be reviewed to determine whether it could occur during non-business hours or whether the parking and users of this access could be accommodated at an alternative location. Any properties temporarily impacted during construction would be restored as closely as possible to their previous condition.

Other avoidance and minimization measures could include:

- Install advance warning signs and highly visible construction barriers and use flaggers where needed.
- Clearly sign and provide reasonable detour routes when cross streets are closed – for vehicles and active transportation users.
- Use tools such as print, radio, posted signs, websites, and email to communicate information regarding street closures, hours of construction, business access, and parking impacts.
- Coordinate with transit providers to post advance notice signs prior to construction when bus stops need to be temporarily relocated or closed.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays where practical.



## **6. Indirect and Cumulative Impacts**

### **6.1. Indirect Impacts**

Indirect impacts are reasonably foreseeable impacts that could occur as a result of an action at some future time and in areas beyond the action's direct impacts. As an example, indirect impacts often relate to additional changes in land use that could occur beyond those changes immediately caused by a development's construction and operation, which could result in a change to overall traffic patterns. The NERTS action alternatives are not expected to cause future land use changes beyond their respective sites, which could otherwise result in indirect impacts to transportation. Therefore, the construction and operation of the action alternatives would not result in indirect impacts.

### **6.2. Cumulative Impacts**

Cumulative impacts are the impact on the environment which results from the incremental impact of the action when added to the impacts of other past, present, and reasonably foreseeable future actions. The transportation access analysis presented in the previous sections reflects conditions with assumed growth between existing conditions, opening year (2029), and design year (2040). The traffic growth assumptions also reflect changes in background traffic volumes that are projected in the traffic forecasts for each study area. Additionally, none of the identified background projects or other known or reasonably foreseeable developments in the vicinity of the proposed site alternatives are expected to have construction periods that coincide with the construction of the NERTS facility, except possibly the Woodinville connection of the Eastrail Trail Project. This is expected to be a minor impact, however, due to the low number of anticipated construction vehicle traffic volumes. As a result, the traffic analyses reflect the cumulative impacts of the NERTS project, other planned and programmed developments, and associated increases in traffic within the study areas for each action alternative. The proposed action, when considered with past and reasonably foreseeable future transportation projects, would contribute to minor cumulative impacts on transportation facilities in the project area.





## 7. Potential Mitigation Measures

NERTS is not anticipated to result in long-term operational impacts to freight, transit, active transportation, parking, or safety. Therefore, no mitigation is proposed for those transportation elements.

Traffic impacts are determined for arterials and local streets by comparing the overall intersection operations (LOS or v/c ratios) for the No Action Alternative and the action alternatives against the agency operational standards (Table 3-6). Mitigation could be required for study intersections that meet agency performance standards under the No Action Alternative but operate below agency performance standards under the action alternatives.

Under the action alternatives, all intersections operate similar to the No Action Alternative; therefore, no mitigation improvements are anticipated in Alternative 1A or Alternative 1B for the Kirkland study area or in Alternative 2 for the Woodinville study area for the arterial and local street operations analysis for the horizon years of 2029 and 2040. Additionally, only minor construction impacts are expected for both action alternatives and do not require mitigation. However, additional mitigation could be added as part of the project to reduce delays or increase safety, including:

- Installation of a signal at the NE 60th Street and 116th Avenue NE intersection
- Installation of speed feedback signs at locations along NE 60th Street and 116th Avenue NE. These are shown to have the potential to lower speeds and improve safety.
- Extension of the northbound right-turn pocket of the Woodinville-Redmond Road NE and NE 175th Street intersection.



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# **Appendix A: Transportation Methods and Assumptions Memorandum**



**Memo Subject:** NERTS – TASK 900 Transportation Methods and Assumptions  
**To:** King County  
**From:** Jacobs  
**Prepared By:** Parametrix  
**Date:** June 6, 2023  
**Project Number:** 1033498 (SWD), D3379200 (Jacobs)

## 1. Introduction

This memorandum describes the methods and assumptions to prepare the transportation element of the Northeast Recycling Transfer Station (NERTS) Environmental Impact Statement (EIS). The transportation analysis will identify and evaluate the changes related to the NERTS site location alternatives for the following:

- Traffic operations of roadway facilities
- Non-motorized facilities
- Transit facilities
- Safety
- Freight mobility and access

## 2. Relevant Plans, Policies, and Coordination

This transportation analysis will be consistent with the following guidelines and policies:

- Washington State Department of Transportation (WSDOT) Synchro and SimTraffic Protocol (2018)
- City of Kirkland Transportation Plan and Capital Improvement Program
- City of Woodinville Transportation Plan and Capital Improvement Program
- Level of Service Standards for the City of Kirkland – Policy R-38 Transportation Impact Analysis Review (2022)
- Level of Service Standards for the City of Woodinville – Transportation Infrastructure Standards and Specifications (2013)
- Washington State Highways (Revised Code of Washington [RCW] 47.06.140(2))
- Washington Transportation Plan, Phase 2—Implementation 2017–2040 (2019)
- WSDOT Design Manual (2014)
- WSDOT Traffic Manual M 51-02 (2021)
- Transportation Research Board Highway Capacity Manual (2010, 2016)
- AASHTO Highway Safety Manual (2010)
- WSDOT Sidra Policy Settings (2021)
- Puget Sound Regional Council (PSRC), VISION 2040 (PSRC 2014)

### 3. Transportation Study Areas and Study Intersections

There are two transportation study areas which are located in Woodinville and Kirkland. The transportation analysis will include evaluation measures that consider local street impacts in proximity to the proposed project site alternatives within these study areas. The arterial and local street analysis will focus on locations assumed to be most likely affected by the project alternatives. The intersections that will be analyzed are those directly affected by the addition of the NERTS site, such as by a change in channelization, signal control, or traffic volumes.

#### 3.1 Kirkland Study Area – Alternative 1

The first study area is located in southeast Kirkland, WA, at the current site of the Houghton Recycling and Transfer Station (see Figure 1). There is a sub-alternative for the Kirkland site that would change the location of the facility within the lot, but as this would not change access to the site, the transportation analysis is assumed to be the same for both. The Kirkland study area will include four intersections in total along 116th Avenue NE, NE 70th Street, and NE 60th Street. These intersections were adjacent to the project site and/or had a calculated proportional share impact (as defined by the Kirkland's Traffic Impact Analysis Review guidelines) greater than 1%. Table 1 and Figure 1 show the Kirkland site alternative study intersections.

**Table 1. Kirkland Site Alternative 1 Study Intersections**

ID	Intersection	Traffic Control	Jurisdiction
101	116th Avenue NE & I-405 NB Ramps	Signal	WSDOT
102	116th Avenue NE & NE 70th Place	Signal	WSDOT
103	NE 68th Street & I-405 SB Ramps	Signal	WSDOT
104	NE 60th Street & 116th Avenue NE	AWSC	Kirkland
105	NE 60th Street & Site Driveway	OWSC	Kirkland



Figure 1. Kirkland Site Alternative 1 – Study Intersections



Site Boundary  
Alternative 1

● Study Intersections



### 3.2 Woodinville Study Area – Alternative 2

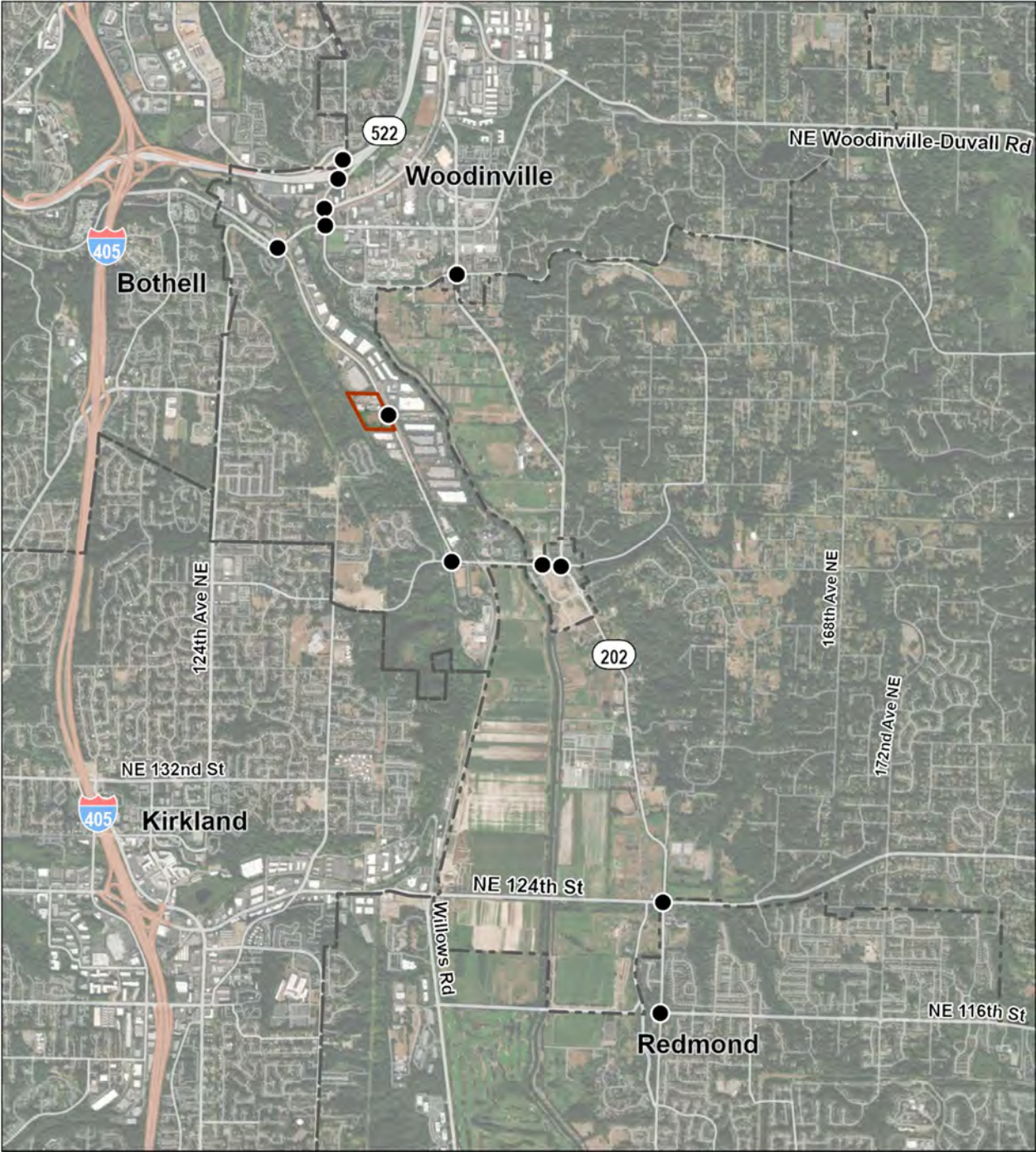
The second study area is located in the West Valley District of Woodinville, WA (see Figure 2). The Woodinville study area will include 11 intersections in total along the 131st Avenue NE, NE 175th Street, Redmond-Woodinville Road NE, and NE 145th Street. Woodinville study intersections were identified as intersections where 10 or more project trips would be added during one or both peak hours. Table 2 and Figure 2 show the study intersections for the Woodinville site.

**Table 2. Woodinville Site Alternative 2 Study Intersections**

ID	Intersection	Traffic Control	Jurisdiction
201	SR 522 WB Ramps & 131st Avenue NE	Signal	WSDOT
202	SR 522 EB Ramps & 131st Avenue NE	Signal	WSDOT
203	Little Bear Creek Parkway & 131st Avenue NE	Signal	WSDOT
204	NE 175th Street & 131st Avenue NE	Signal	WSDOT
205	Redmond-Woodinville Road NE & NE 175th Street	Signal	WSDOT
206	140th Avenue NE & NE 171st Street	Signal	Woodinville
207	Redmond-Woodinville Road NE & NE 145th Street	OWSC	WSDOT
208	Village Road & NE 145th Street	Roundabout	WSDOT
209	148th Avenue NE/Redmond-Woodinville Road NE & NE 145th Street	Roundabout	WSDOT
210	Redmond-Woodinville Road & NE 124th Street	Signal	WSDOT
211	NE 116th Street & Redmond-Woodinville Road	Signal	WSDOT
212	Redmond-Woodinville Road NE & Site Driveway	OWSC	Woodinville



Figure 2. Woodinville Site Alternative 2 – Study Intersections



Site Boundary  
Alternative 2

● Study Intersections



## **4. Intersection Traffic Operations Analysis**

### **4.1 Analysis Conditions**

#### **4.1.1 Analysis Years**

The transportation analysis will evaluate traffic operations for three analysis years and conditions:

- 2023 Existing
- 2029 Construction/Year of Opening
- 2040 Design Year

The existing year, serving as a basis of analysis, is 2023. Traffic data was collected during the fall of 2022 and spring of 2023 to support the existing year analysis and was adjusted to 2023. The future design year is assumed to be 2040 as this was identified as the design year for the analysis (per King County's selected design criteria for the NERTS) and it is consistent with the future forecasted transaction information provided by King County and the PSRC travel demand model. The 2040 analysis will also include the evaluation of a No Action alternative. The NERTS is expected to open in 2029, therefore this will serve as the year of opening for the project.

#### **4.1.2 Time Periods**

For each of the analysis years and alternatives, intersection operations will be analyzed for the worst peak hour within the morning and afternoon peak periods for both weekdays and Saturdays. Saturday was chosen as the representative weekend day as Saturday volumes were higher than Sunday volumes for both study areas. Based on the intersection volume data collected, the intersection analysis peak hours will be:

- Weekday:
  - AM Peak Hour: 7:45 a.m. to 8:45 a.m.
  - PM Peak Hour: 4:45 p.m. to 5:45 p.m.
- Saturday:
  - AM Peak Hour: 9:00 a.m. to 10:00 a.m.
  - PM Peak Hour: 2:15 p.m. to 3:15 p.m.

### **4.2 Data Collection**

Intersection data required for local arterial analysis were collected between October 2022 and April 2023. Data included intersection turning movements volumes in addition to 24-hour volume tube counts. Collected traffic volumes will be rounded to the nearest five for each intersection movement value for analysis.

The following key data were collected:

- Peak-period weekday intersection turning movement counts were collected on Tuesday, October 20th, 2022 for twelve intersections and Thursday May 18th, 2023 for three intersections. Two-hour counts were collected during the morning peak between 7:30 a.m. and 9:30 a.m. and during the afternoon peak between 4:00 p.m. and 6:00 p.m. The 2022 counts were grown to 2023 (by 1%) to be conservative and maintain a consistent existing year.
- Peak-period Saturday intersection turning movement counts were collected on a Saturday April 1, 2023 for twelve intersections and on Saturday May 20, 2023 for three intersections. Two-hour counts were collected during the morning peak between 8:00 a.m. and 10:00 a.m. and three-hour counts were collected during the afternoon peak between 1:00 p.m. and 4:00 p.m.
- 24-hour tube counts were collected to provide segment volume and speed data for a week between March 29th and April 4, 2023 at five locations within the study areas and between May 18th to May



24th 2023 for the Redmond-Woodinville Rd NE tube located halfway between NE 124th St & NE 116th St (see Table 3).

- Intersection counts included truck volumes, bicycle volumes, and pedestrian volumes.
- Intersection signal timing and phasing information was collected from the applicable jurisdiction for all signalized intersections.

**Table 3. Volume Tube Count Locations**

ID	Location	Jurisdiction
1	116th Ave NE at NE 66th St	City of Kirkland
2	NE 60th St west of 120th Ave NE	City of Kirkland
3	Redmond-Woodinville Rd NE approximately halfway in between NE 145th St and NE 175th St	City of Woodinville
4	NE 145th St east of the Willows Lodge driveway	City of Woodinville
5	Redmond-Woodinville Rd NE/SR 202 north of NE 140th St	City of Woodinville
6	Redmond-Woodinville Rd NE approximately halfway in between NE 124th St & NE 116th St	City of Redmond
7	NE 175th St approximately halfway in between Redmond-Woodinville Rd & 131st Ave NE	City of Woodinville

#### 4.3 Travel Demand Forecasting and Post-Processing

The 2030 and 2040 PSRC travel demand models will be used for this analysis. The most recent published Local Targets land use version from PSRC will be used for the land use assumptions. This land use is assumed to be consistent with the and 2040 horizon forecast year. PSRC has also developed land use conditions for various years between the existing and forecast year, therefore the land use conditions for 2030 will be used for the 2029 year of opening.

Traffic forecasting for an operational study is achieved by taking the predicted travel demand volumes from the PSRC models and post-processing them by using the National Cooperative Highway Research Program (NCHRP) 765 – Analytical Travel Forecasting Approaches for Project-Level Planning and Design Methodology. This allows the translation of raw traffic volumes and model volumes to be converted into future forecast volumes which are more suitable for planning, operational studies, and design of new facilities. Post-processed forecast volumes will be used for the analysis of the 2029 opening year and 2040 design year No Action alternatives. Project trips will be distributed across the network on top of these volumes to develop the volumes for the Action alternatives.

Volume imbalances between intersections will be addressed through manual adjustments of individual turning movements, or through balancing mid-block access points. Volumes will be rounded to the nearest five for each intersection movement value.

#### 4.4 Background Project Assumptions

All environmentally approved and funded projects in the study area that are included in relevant local, regional, and state plans are assumed for the construction/year of opening and design years. These projects are summarized in Table 4.

**Table 4. Projects Included in Future Conditions**

<b>Project</b>	<b>Description</b>	<b>Analysis Condition</b>
Totem Lake to Eastgate RapidRide (K Line)	Construct a new RapidRide line connecting Totem Lake to Eastgate via Bellevue. This project would improve the attractiveness of transit between two regional growth centers and include the following elements: New transit only or BAT lanes on existing or new right of way along 15% of the proposed routing to maintain high transit travel speeds; Major intersection investments at 6-8 intersections to improve traffic flow, transit reliability and increase transit speeds; New transit signal priority at more than 70% of the signalized intersections along the route; upgraded passenger amenities with better information and passenger safety to facilitate greater transit use and remove barriers of existing use by building 28 RapidRide station, 18 Enhanced RapidRide stops, and 6 standard RapidRide stops. This project will connect the two Regional Growth Centers, Totem Lake and Bellevue, along with other jobs and amenities in downtown Kirkland, the Kirkland Google campus, Bellevue College and Eastgate. It also increases access to other regional transit services including the I-405 BRT at NE 128th ST and Link Light Rail in downtown Bellevue. This project would also make use of the new Bellevue College Connector which would improve access to Bellevue College and enhance bicycle and pedestrian access.	2040  (Completion Year of 2036)
I-405 BRT (S2 Stride Line)	Sound Transit will provide BRT service along I-405 between Lynnwood and Bellevue. Known as the Stride S2 Line, it will connect communities along I-405 and SR 518 from Lynnwood to Bellevue. Buses will run every 10 minutes and will connect to Link light rail at Lynnwood and Bellevue, as well as other transit services provided by Sound Transit, Community Transit and King County Metro.	2029 & 2040  (Completion Year of 2028)
NE 145th Street and SR 522 Bus Rapid Transit (S3 Stride Line)	This project establishes Bus Rapid Transit (BRT) from the Link station at I-5 and Northeast 145th Street to UW Bothell, with service continuing at lower frequencies to Woodinville. On Northeast 145th Street, this project includes transit priority spot treatments to facilitate BRT movement through corridor bottlenecks. On SR 522 the majority of the corridor through Lake Forest Park, Kenmore and Bothell will feature Business Access Transit (BAT) lanes, with transit-supportive enhancements on arterials from downtown Bothell to UW Bothell. This project includes nine pairs of stations with additional parking (of +/- 300 spaces each) at Lake Forest Park, Kenmore and Bothell, and an expanded transit center at UW Bothell	2029 & 2040  (Completion Year of 2027)
SR 202 Widening & Trestle Replacement	Complete all phases of widening 131st Avenue NE from SR 522 under the Eastside Rail Corridor trestle to NE 175th Street to improve traffic flow. This project will further the Council priority of addressing transportation challenges, specifically capacity issues with congestion relief and additional traffic capacity improvements. The intersection of 131 <sup>st</sup> Avenue NE and SR 522 WB ramps is assumed to be unsignalized.	2029 & 2040  (Completion Year of 2025)
Woodinville-Redmond Road at NE 145th Street Intersection	This project will install a roundabout at the stop-controlled intersection of Woodinville Redmond Rd (SR202) and NE 145th St. Roundabouts improve operational performance, increase intersection capacity, and improve driver, bicyclist, and pedestrian safety.	2029 & 2040  (Completion Year of 2026)
Roundabout - 138th Ave NE at 171st	This project will install a roundabout at the to be constructed intersection of 138th Ave NE and NE 171st St. Roundabouts improve.	2029 & 2040

Project	Description	Analysis Condition
	operational performance, increase intersection capacity, and improve driver, bicyclist, and pedestrian safety.	(Completion Year of 2024)
Signalization - 132nd at 143rd	This project will improve the intersection at 132nd Ave NE and NE 143rd St by installing a traffic signal to replace the stop-controlled intersection. A signal will improve operational performance, increase driver and pedestrian safety, and improve intersection capacity	2029 & 2040 (Completion Year of 2028)
Intersection Realignment - 132nd at 143rd	This project will improve the intersection at 132nd Ave NE and NE 143rd St by installing a traffic signal and realigning the east leg of 143 <sup>rd</sup> to remove an existing offset. The realignment will improve operational performance, increase driver and pedestrian safety, and improve intersection capacity.	2029 & 2040 (Completion Year of 2024)
133rd Grid Road Extension from NE 175th Street to Woodinville Snohomish Road	This project allows for extending 133rd Ave NE from NE 175th St to Woodinville Snohomish Rd. The extension will require intersection improvements at NE 175th St.	2029 & 2040 (Completion Year of 2023)
133rd Grid Road Extension from Woodinville Snohomish Road to Little Bear Creek Parkway Intersections	This project allows for extending 133rd Ave NE from Woodinville Snohomish Rd to Little Bear Creek Parkway. The extension will require construction of two new intersections at Little Bear Creek Parkway and Woodinville Snohomish Rd	2029 & 2040 (Completion Year of 2025)
Eastrail Regional Trail Project	This project converts the existing historic railroad line that runs along the east side of Redmond-Woodinville Road NE between NE 145th Street and NE 175th Street to a multi-use trail with construction to begin in 2027.	2029 & 2040 (Undetermined Completion Year)
West Ridge - Downtown Connection	This project adds 2000 feet of curb, gutter, sidewalk and bike lane to provide a pedestrian connection between the West Ridge neighborhood and Downtown Woodinville. Add sidewalk/bike lane to the east side, & shift the road to the west. Includes 2 options: sidewalk on one side and sidewalks on both sides.	2029 & 2040 (Undetermined Completion Year)
Winery Hill Pedestrian Walking Path	This project adds 1700 feet of curb, gutter, sidewalk, and bike lane along the north side of Winery Road between NE 143rd Pl/137th Pl NE to 138th Way NE. This project will connect to the proposed Woodinville Townhomes developer frontage improvements on Winery Road between 132nd Ave NE and 137th Pl NE.	2029 & 2040 (Undetermined Completion Year)
W-R Pedestrian Safety Improvements - RRFB	This project will install a Rectangular Rapid Flashing Beacon (RRFB) at the 14900 block of Woodinville-Redmond Road and 124th Ave NE, north of NE 149th St for Tolt Pipeline Trail users. RRFBs are user-actuated amber LEDs that are shown to increase driver yielding behavior at crosswalks significantly when supplementing standard pedestrian crossing warning signs and markings.	2029 & 2040 (Completion Year of 2026)
124th Ave NE Sidewalk from 171st Pl to 160th	This multimodal project improves pedestrian safety, adds a bicycle lane, and fills in a missing link between existing sidewalks. The project will add 1400 feet of curb, gutter, sidewalk and bike lane along the east side of 124th Ave NE between NE 165th St and NE 171st Place.	2029 & 2040 (Completion Year of 2024)

Project	Description	Analysis Condition
NE Woodinville-Duvall Road Sidewalk Construction	This multimodal project improves pedestrian safety, adds a bicycle lane, and fills in a missing link between existing sidewalks. The project will add 2,800 linear feet of curb, gutter, sidewalk & bike lane along the west side of NE Woodinville Duvall Road Sidewalk from Woodinville Park and Ride to NE North Woodinville Way.	2029 & 2040  (Undetermined Completion Year)
Street Lights along NE 181st Place	This project will improve safety by adding streetlights along NE 181st Place from 140th Ave NE to 142nd Ave NE.	2029 & 2040  (Completion Year 2025)
HAWK Signal to replace RRFB on 140th Ave NE	This project will replace an existing Rectangular Rapid Flashing Beacon (RRFB) on 140th Ave NE with a HAWK Signal. The HAWK system is a user activated red light that requires drivers stop when the crosswalk is in use by pedestrians.	2029 & 2040  (Completion Year 2026)

#### 4.5 Project Trip Forecasting and Distribution

Projected hourly peak hour trips for the Houghton Recycling Transfer Station in the future were calculated using annual tonnage projections in the future based on actual commercial and self-haul transaction data from a representative month in 2019. For more information on annual tonnage projections, please refer to the Northeast Recycling and Transfer Station project Facility Program Document.

Commercial activities were based on weekday (Monday through Friday) transactions, with weekend commercial activity assumed to be negligible. Self-haul activity peaked highest in the weekend but still occurred on weekdays.

The assignment for these projected trips was developed using actual transaction data with relevant zip code data. Analysis was done to cross-reference potential routes to access each project site from these given zip codes and ultimately developed into an assignment percentage.

#### 4.6 Software and Tools

Synchro version 11 will be primarily used to provide quantitative data (e.g., intersection LOS, delays, queue lengths, etc.) for the study intersections using the Highway Capacity Manual (HCM) 6th edition methodology. However, for intersections with U-turns or other unique characteristics that HCM 6 cannot accommodate, the HCM 2000 methodology will be used, which is also a well-established and reliable approach. Sidra (version 9) will be used to model roundabouts. The analysis will follow WSDOT's Synchro and SimTraffic Protocol for Synchro and WSDOT's Sidra Policy Settings for Sidra.

#### 4.7 Agency Performance Standards

Table 5 summarizes the level of service standards for the applicable agencies and/or jurisdictions for this project.

**Table 5. Intersection LOS Standards for Affected Jurisdictions**

Agency/Jurisdiction	LOS Standard
Washington State Department of Transportation (WSDOT)	LOS D for intersections along highways of state-wide significance (HSS) LOS E/mitigated for intersections along regionally significant state highways (non-HSS) v/c < 0.9 for roundabouts (each lane group)



Agency/Jurisdiction	LOS Standard
City of Kirkland	LOS D for unsignalized intersections
City of Woodinville	LOS E for signalized intersections (not including state highways)

Sources: City of Woodinville (2013), City of Kirkland (2022), WSDOT (2014a)

#### 4.8 Special Event Analysis – Woodinville

Woodinville is home to a series of larger special events in the vicinity of the proposed project site, particularly during the summer months. These include the summer concert series at Chateau Ste Michelle, the Woodinville Chamber summer concert series, winery events, weddings, and other large events that occur in the area. Since the Chateau Ste Michelle concerts are frequent throughout the summer and well-attended, attracting up to 4,500 attendees for each concert, this was chosen as a representative event for the special event analysis (Ste Michelle Wine Estates 2023).

In order to ensure that the peak volume in the area was captured, 24-hour tube counts were collected at the same locations outlined in Table 3 for the four concerts that occurred on July 1, 2, 8, and 9, 2023. The total volumes for the first two concerts were noticeably lower, likely due to the holiday weekend (Fourth of July), so the data from the following weekend was used. Both concerts began at 7pm with gates open at 5pm.

Two of the count locations, ID 3 and 4 (Redmond-Woodinville Rd NE approximately halfway in between NE 145th St and NE 175th St, and NE 145th St east of the Willows Lodge driveway, respectively), were the key locations as these are located on either side of the Chateau Ste Michelle driveway, as well as many of the additional parking lots where concertgoers park, including the concert shuttle parking lot and the rideshare pickup/drop off lot. These locations are likely to experience the largest impact due to the concerts and capture the largest concentration of volume in the area due to these events.

Table 6 summarizes the event and non-event tube count hourly volumes for these two key count locations.

**Table 6. Event and Non-Event Hourly Tube Count Volumes**

Tube Count Location	Hour	Hourly Volumes – Event		Hourly Volumes – Non-Event	
		Saturday	Sunday	Weekday	Saturday
Redmond-Woodinville Rd NE (near Black Raven Brewing)	2:00 PM	745	637	683	671
	3:00 PM	698	661	955	<b>682</b>
	4:00 PM	682	<b>664</b>	953	603
	5:00 PM	<b>773</b>	635	<b>1,035</b>	580
	6:00 PM	532	444	657	437
	7:00 PM	423	302	525	374
	8:00 PM	326	296	361	243
NE 145th St (east of the Willows Lodge driveway)	2:00 PM	<b>1,043</b>	<b>862</b>	696	907
	3:00 PM	882	783	1,036	<b>918</b>
	4:00 PM	865	747	1,017	827
	5:00 PM	831	765	<b>1,156</b>	812
	6:00 PM	753	525	697	586

Tube Count Location	Hour	Hourly Volumes – Event		Hourly Volumes – Non-Event	
		<i>Saturday</i>	<i>Sunday</i>	<i>Weekday</i>	<i>Saturday</i>
	7:00 PM	525	383	626	439
	8:00 PM	412	309	391	287

Note: Bolded values indicate the PM peak hour volume for each day and location. Grey cells indicate the maximum hourly volumes.

Though the peak hours are not necessarily occurring at the exact same hour of the day, the non-event weekday and Saturday analyses have higher peak hour volumes than the event peak volumes. This suggests that the background volume in the study area is inherently a little lower during concerts and similar events, likely due to event awareness and other drivers modifying their trips and behaviors to avoid the area. Because the non-event volumes would result in a more conservative traffic analysis, a separate special event analysis for the Woodinville study area was deemed not necessary as the impacts would be less than the non-event conditions.

## 5. Non-Motorized

Existing and planned pedestrian, bicycle, and equestrian facilities will be inventoried within each study area. A qualitative assessment of the project's impact on existing and future proposed pedestrian, bicycle, and equestrian facilities, as applicable, will be performed.

## 6. Transit

Existing transit information will be collected from local transit agencies and/or King County and compiled. This will include information on transit routes that provide service within the study areas in addition to the location of transit stops. A qualitative assessment of any potential impacts to transit will be performed for the Action Alternatives.

## 7. Safety

The most recent 5 years of crash data (2018-2022) will be collected from WSDOT for the study intersections and corridors within the study areas. The crash data will be reviewed and summarized to represent the existing conditions of the study areas, including total crashes, fatal and serious injury crashes, crash types, and pedestrian and bicycle related crashes.

For the future Action Alternatives, a qualitative assessment of the potential impacts the project may have on vehicular and nonmotorized safety will be conducted. As applicable, this will include a consideration of changes in conflict points/exposure, volumes, and facilities. Sight distance for the new site access will also be evaluated.

## 8. Freight

The WSDOT Freight and Goods Transportation System (FGTS) will be used to identify the key freight routes within and serving the study areas. A qualitative assessment of impacts to freight will also be considered for the future Action Alternatives. Existing and project truck volumes will be factored into the operations analysis and it is expected that impacts to freight will be consistent with the overall operational impacts identified.

## 9. References

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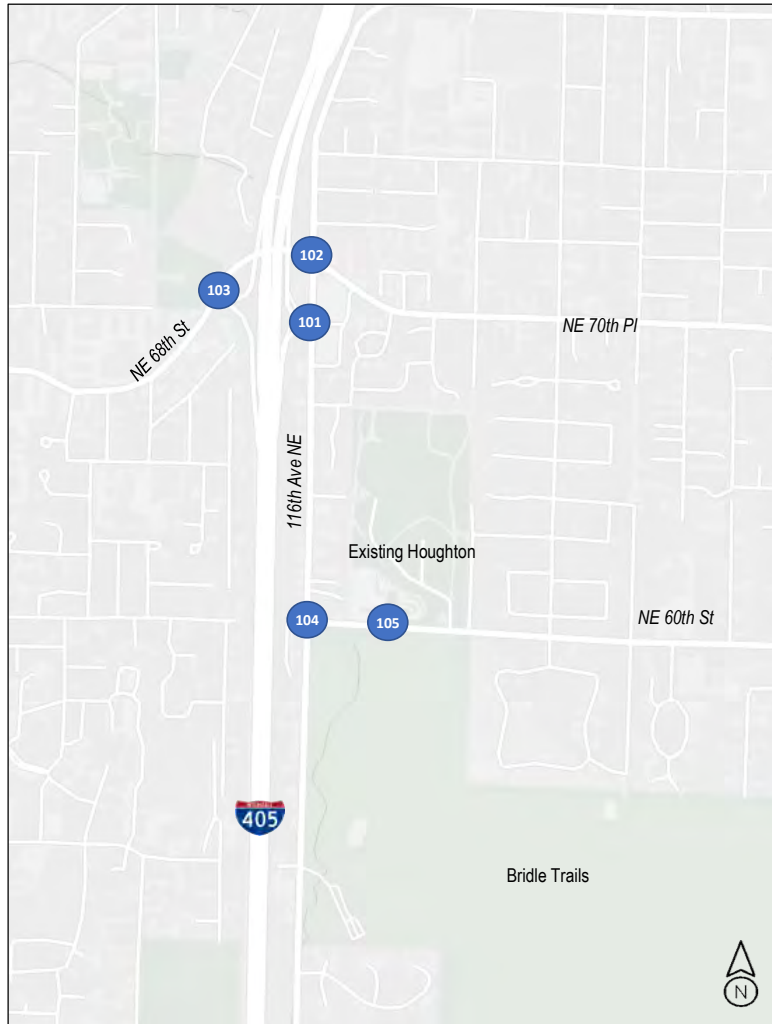




## **Appendix B: Turning Movement Volumes**



## 2023 Existing Weekday AM Peak Hour Traffic Volumes - Kirkland Study Area

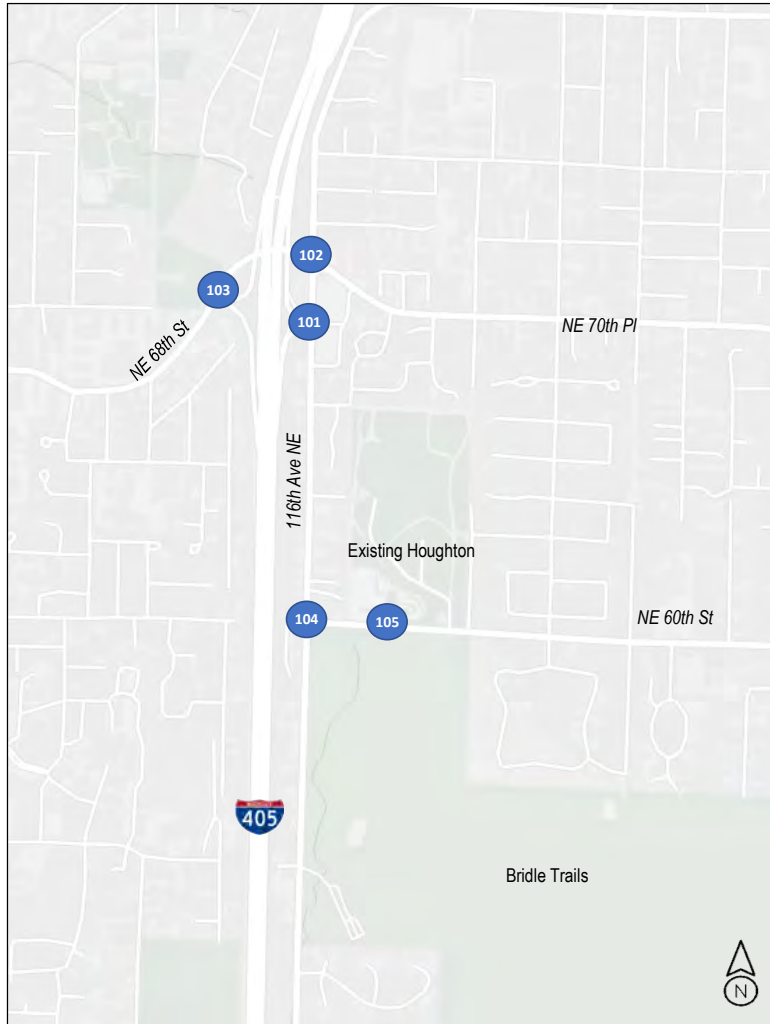


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
	<p>116th Ave NE</p> <p>I-405 NB Ramps</p> <p>Houghton P&amp;R</p> <p>116th Ave NE</p> <p>Volumes: 325, 255, 0, 300, 0, 55, 5, 0, 0, 95, 75, 0</p>		<p>116th Ave NE</p> <p>NE 72nd Pl</p> <p>NE 70th Pl</p> <p>116th Ave NE</p> <p>Volumes: 200, 135, 25, 160, 340, 305, 15, 360, 140, 185, 80, 115</p>
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
	<p>NE 68th St</p> <p>NE 72nd Pl</p> <p>I-405 SB Ramps</p> <p>Volumes: 490, 255, 455, 125, 300, 350</p>		<p>116th Ave NE</p> <p>NE 60th St</p> <p>NE 60th St</p> <p>116th Ave NE</p> <p>Volumes: 40, 0, 70, 0, 0, 0, 5, 210, 60, 0, 110, 35</p>
105	NE 60th St & Site Driveway		
	<p>Houghton RTS</p> <p>NE 60th St</p> <p>NE 60th St</p> <p>Volumes: 40, 5, 50, 45, 5, 70</p>		

## 2023 Existing Weekday PM Peak Hour Traffic Volumes - Kirkland Study Area



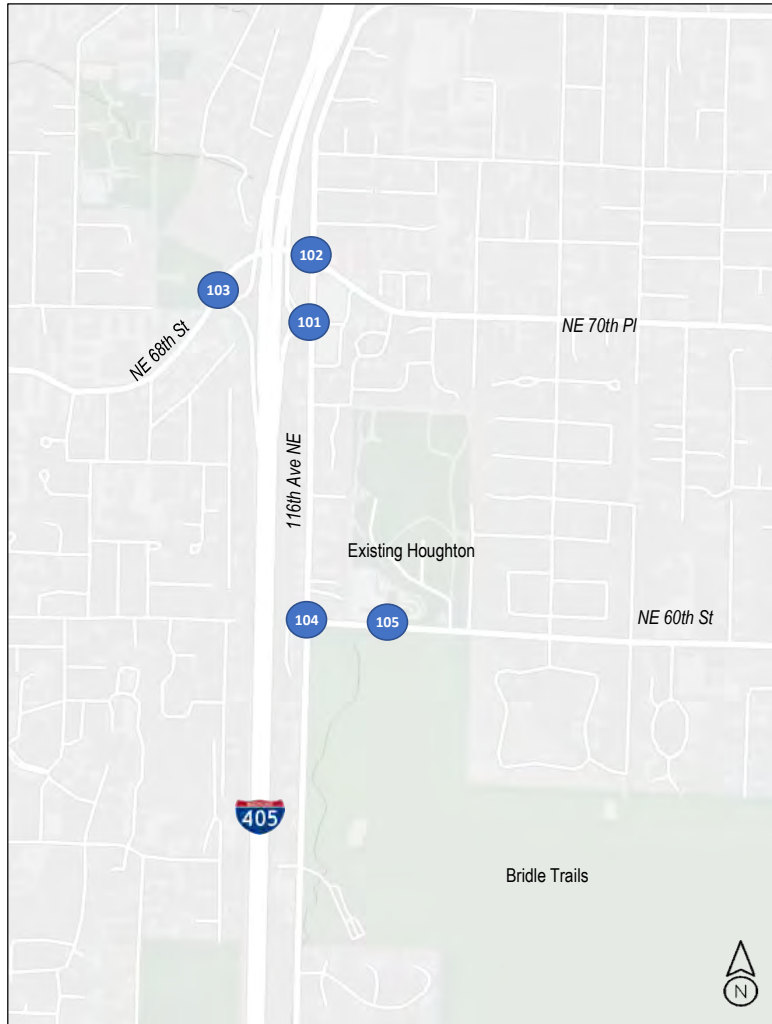
### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	
	<p>116th Ave NE</p> <p>I-405 NB Ramps</p> <p>Houghton P&amp;R</p> <p>116th Ave NE</p> <p>405 160 0</p> <p>375 0 55</p> <p>5 0 0</p> <p>240 225 0</p>	<p>116th Ave NE</p> <p>NE 72nd Pl</p> <p>NE 70th Pl</p> <p>116th Ave NE</p> <p>130 65 10</p> <p>185 370 340</p> <p>15 265 160</p> <p>170 240 195</p>	
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	
	<p>NE 68th St</p> <p>NE 72nd Pl</p> <p>I-405 SB Ramps</p> <p>NE 68th St</p> <p>655 165</p> <p>370 195</p> <p>210 240</p>	<p>116th Ave NE</p> <p>NE 60th St</p> <p>116th Ave NE</p> <p>5 100 70</p> <p>5 5 0</p> <p>75 0 60</p> <p>0 345 65</p>	
105	NE 60th St & Site Driveway		
	<p>NE 60th St</p> <p>NE 60th St</p> <p>Houghton RTS</p> <p>NE 60th St</p> <p>50 5</p> <p>40 100</p> <p>5 85</p>		



## 2023 Existing Saturday AM Peak Hour Traffic Volumes - Kirkland Study Area

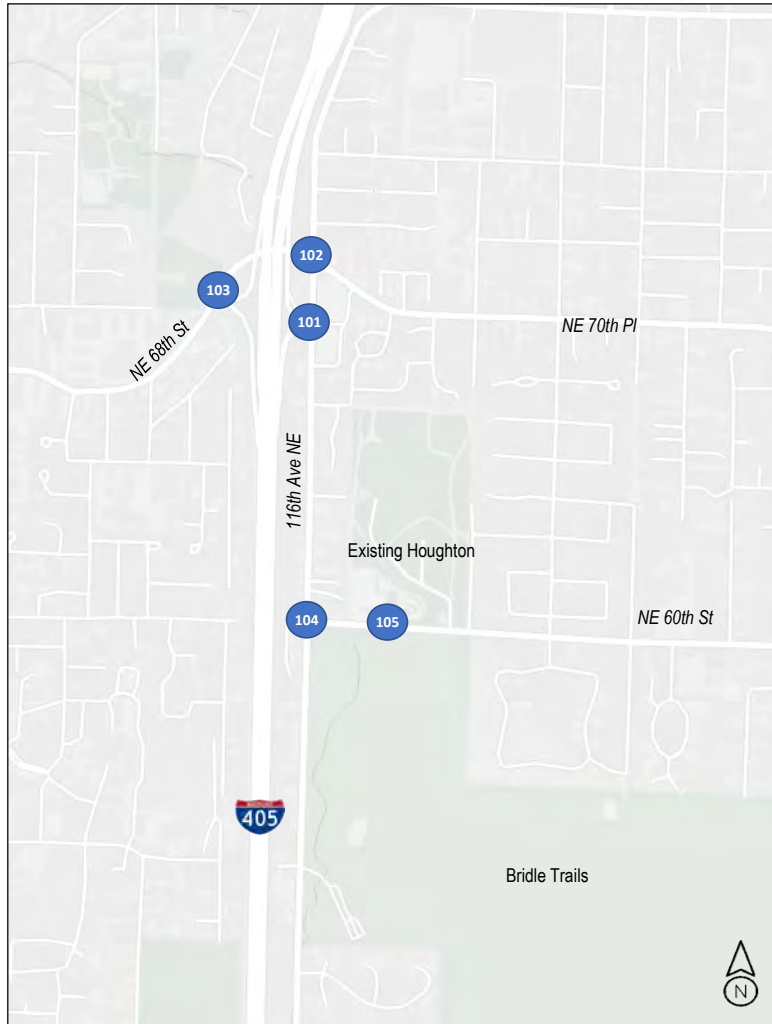


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> </div>
<b>105</b> NE 60th St & Site Driveway <div> </div>	

## 2023 Existing Saturday PM Peak Hour Traffic Volumes - Kirkland Study Area

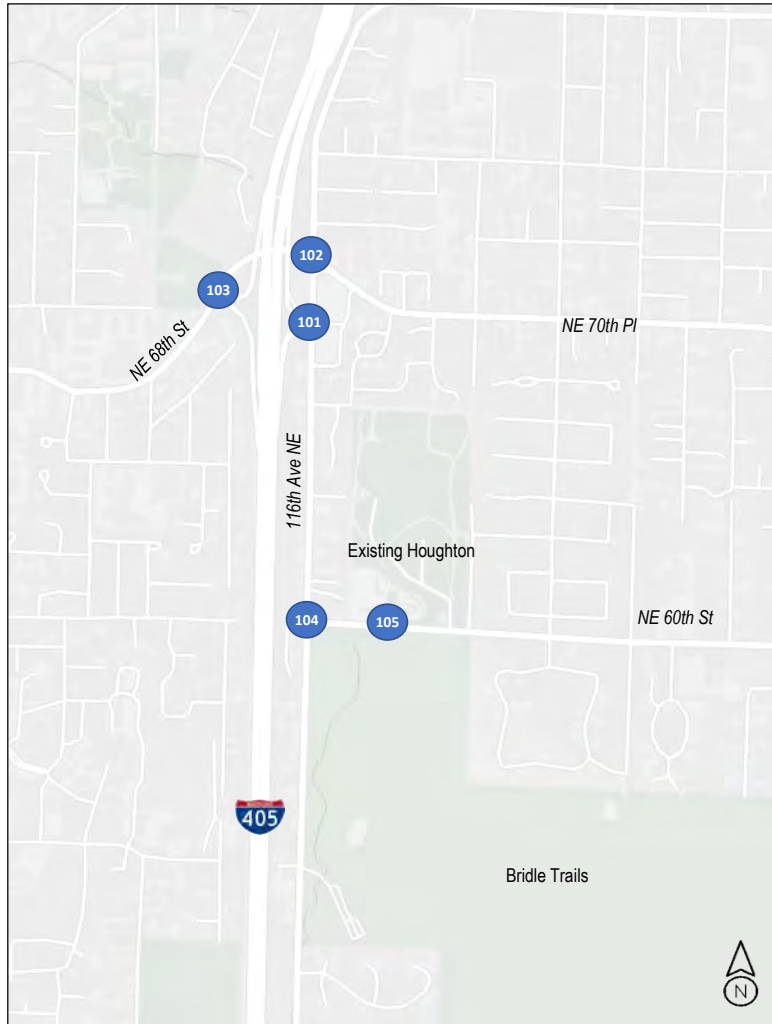


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> <p>116th Ave NE</p> <p>285 135 0</p> <p>340 0 65</p> <p>100 100 0</p> <p>I-405 NB Ramps</p> <p>Houghton P&amp;R</p> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> <p>116th Ave NE</p> <p>140 70 5</p> <p>80 260 215</p> <p>160 145 135</p> <p>NE 72nd Pl</p> <p>NE 70th Pl</p> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> <p>NE 68th St</p> <p>380 120</p> <p>165 175</p> <p>NE 72nd Pl</p> <p>I-405 SB Ramps</p> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> <p>116th Ave NE</p> <p>0 115 60</p> <p>0 0 0</p> <p>0 115 45</p> <p>NE 60th St</p> <p>STOP</p> </div>
<b>105</b> NE 60th St & Site Driveway <div> <p>NE 60th St</p> <p>55 10</p> <p>45 60</p> <p>Houghton RTS</p> <p>NE 60th St</p> </div>	

## 2029 No Action Weekday AM Peak Hour Traffic Volumes - Kirkland Study Area

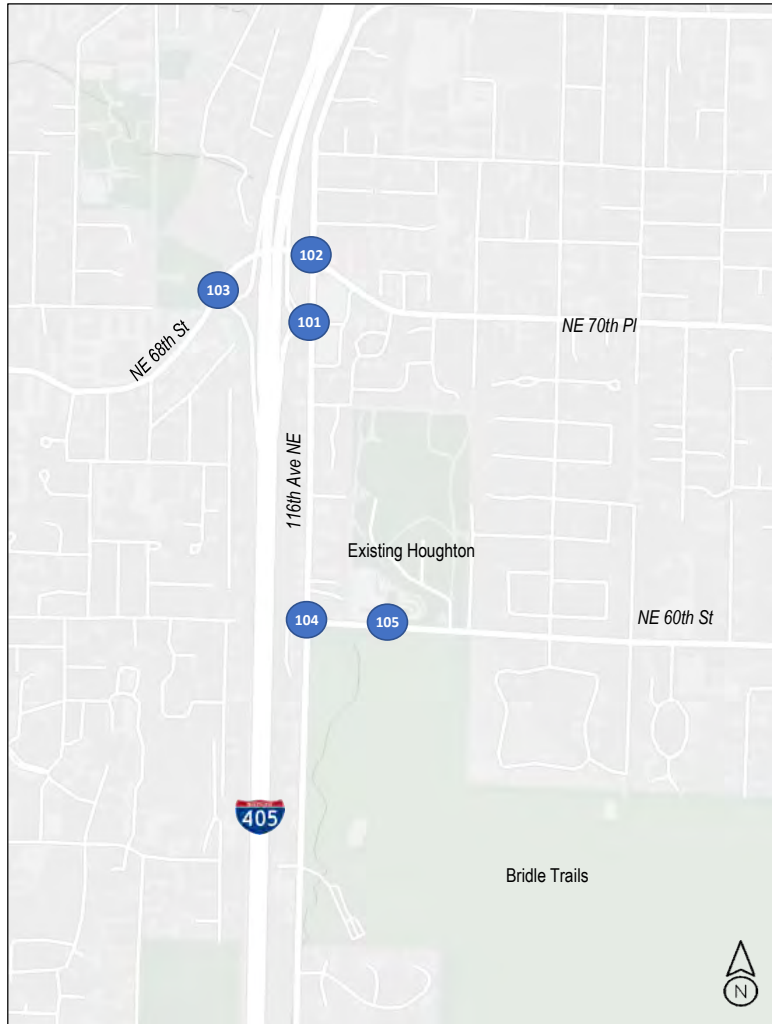


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	
	<p>116th Ave NE</p> <p>I-405 NB Ramps</p> <p>Houghton P&amp;R</p> <p>116th Ave NE</p> <p>335 255 0</p> <p>315</p> <p>0</p> <p>55</p> <p>5</p> <p>0</p> <p>0</p> <p>125 80 0</p>	<p>116th Ave NE</p> <p>NE 70th Pl</p> <p>116th Ave NE</p> <p>210 145 25</p> <p>160</p> <p>365</p> <p>305</p> <p>15</p> <p>380</p> <p>140</p> <p>200 80 120</p>	
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	
	<p>NE 68th St</p> <p>NE 72nd Pl</p> <p>I-405 SB Ramps</p> <p>525</p> <p>265</p> <p>475</p> <p>140</p> <p>300 355</p>	<p>NE 60th St</p> <p>116th Ave NE</p> <p>NE 60th St</p> <p>10 220 60</p> <p>0</p> <p>0</p> <p>0</p> <p>45</p> <p>0</p> <p>70</p> <p>0 140 40</p>	
105	NE 60th St & Site Driveway		
	<p>NE 60th St</p> <p>Site Driveway</p> <p>NE 60th St</p> <p>40 5</p> <p>50</p> <p>50</p> <p>5</p> <p>75</p>		

## 2029 No Action Weekday PM Peak Hour Traffic Volumes - Kirkland Study Area



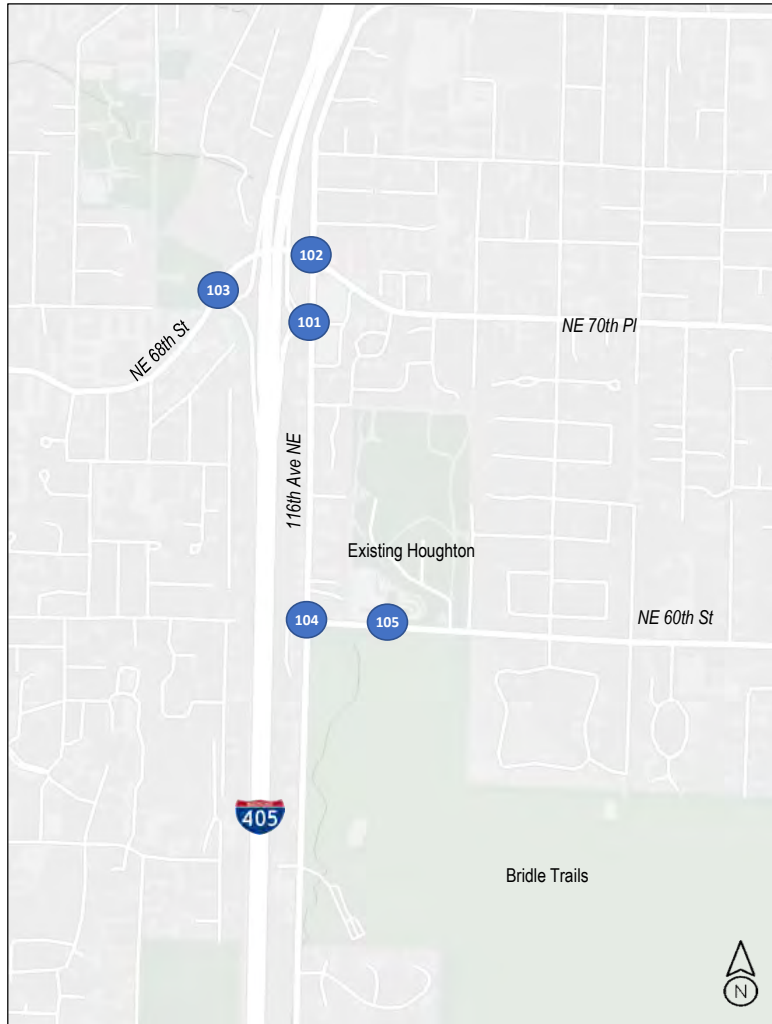
### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
105	NE 60th St & Site Driveway		



## 2029 No Action Saturday AM Peak Hour Traffic Volumes - Kirkland Study Area

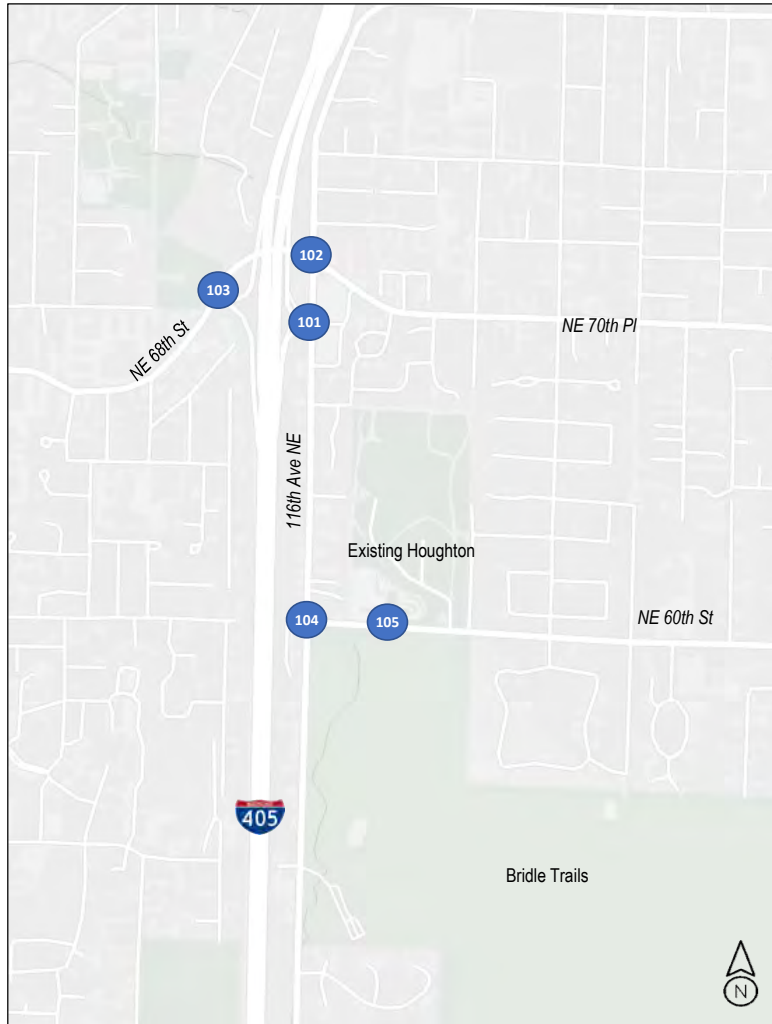


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<p><b>101</b> 116th Ave NE &amp; I-405 NB Ramps</p>	<p><b>102</b> 116th Ave NE &amp; NE 70th Pl/NE 72nd Pl</p>
<p><b>103</b> NE 68th St/NE 72nd Pl &amp; I-405 SB Ramps</p>	<p><b>104</b> NE 60th St &amp; 116th Ave NE</p>
<p><b>105</b> NE 60th St &amp; Site Driveway</p>	

## 2029 No Action Saturday PM Peak Hour Traffic Volumes - Kirkland Study Area

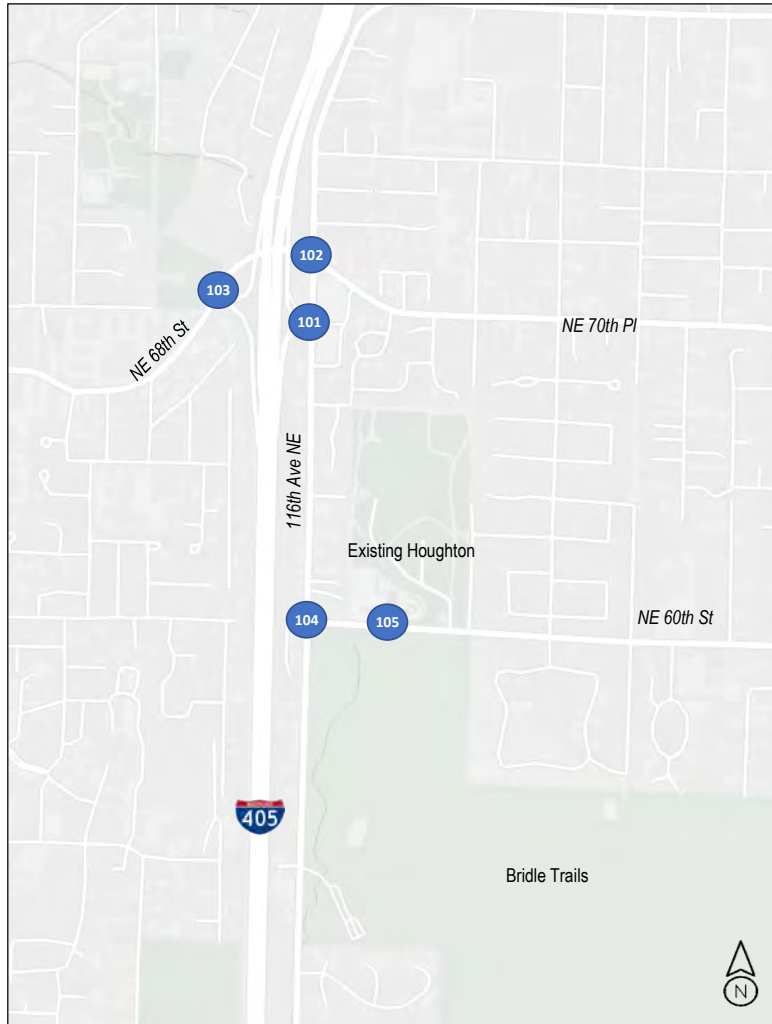


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> <p>Diagram showing traffic flows and volumes for intersection 101. Volumes: 290 (left turn), 135 (through), 0 (right turn) from I-405 NB Ramps; 360 (right turn), 0 (through), 65 (left turn) to I-405 NB Ramps; 0 (left turn), 0 (through), 0 (right turn) to Houghton P&amp;R; 100 (left turn), 105 (through), 0 (right turn) from Houghton P&amp;R.</p> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> <p>Diagram showing traffic flows and volumes for intersection 102. Volumes: 145 (left turn), 70 (through), 5 (right turn) from NE 72nd Pl; 85 (right turn), 280 (through), 220 (left turn) to NE 72nd Pl; 10 (left turn), 340 (through), 135 (right turn) from NE 70th Pl; 170 (left turn), 155 (through), 140 (right turn) to NE 70th Pl.</p> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> <p>Diagram showing traffic flows and volumes for intersection 103. Volumes: 365 (left turn), 290 (right turn) from NE 72nd Pl; 410 (through), 130 (left turn) to NE 68th St; 175 (left turn), 175 (right turn) to I-405 SB Ramps.</p> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> <p>Diagram showing traffic flows and volumes for intersection 104. Volumes: 0 (left turn), 120 (through), 60 (right turn) from NE 60th St; 0 (left turn), 0 (through), 0 (right turn) to NE 60th St; 65 (left turn), 0 (through), 45 (right turn) from 116th Ave NE; 0 (left turn), 130 (through), 60 (right turn) to 116th Ave NE.</p> </div>
<b>105</b> NE 60th St & Site Driveway <div> <p>Diagram showing traffic flows and volumes for intersection 105. Volumes: 55 (left turn), 10 (right turn) from NE 60th St; 45 (right turn), 75 (through) to NE 60th St; 10 (left turn), 55 (right turn) from Houghton RTS.</p> </div>	

## 2029 Action Alternative 1 Weekday AM Peak Hour Traffic Volumes - Kirkland Study Area

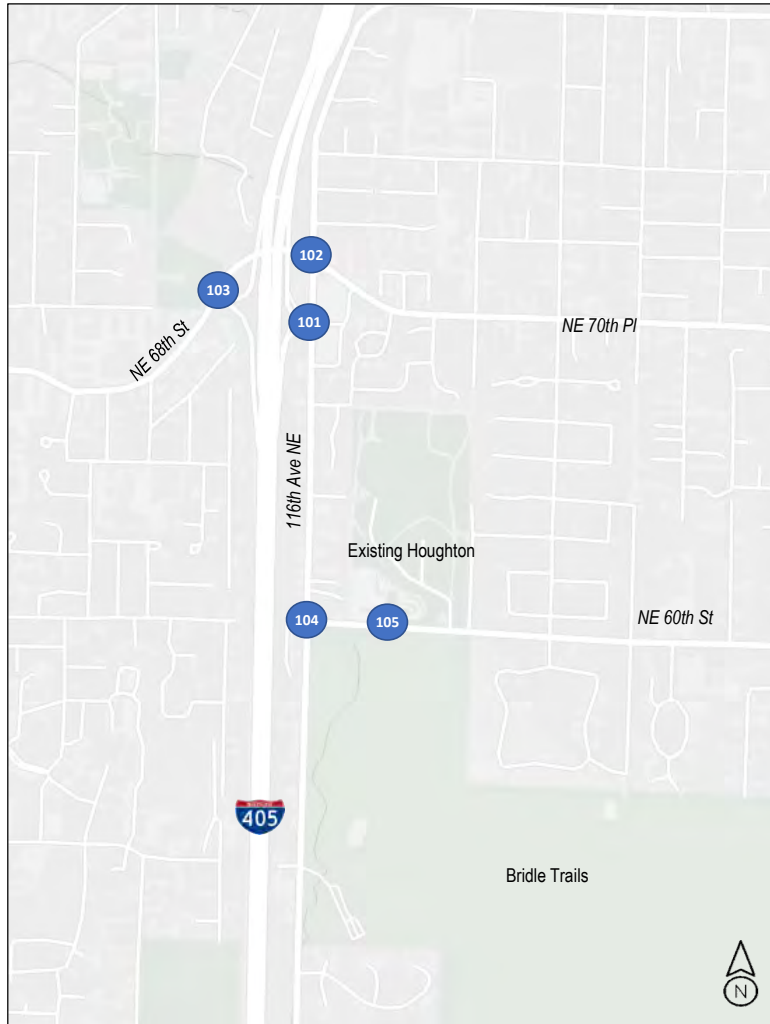


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
	<p>116th Ave NE</p> <p>I-405 NB Ramps</p> <p>Houghton P&amp;R</p> <p>116th Ave NE</p>		<p>116th Ave NE</p> <p>NE 72nd Pl</p> <p>NE 70th Pl</p> <p>116th Ave NE</p>
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
	<p>NE 68th St</p> <p>NE 72nd Pl</p> <p>I-405 SB Ramps</p>		<p>116th Ave NE</p> <p>NE 60th St</p> <p>116th Ave NE</p>
105	NE 60th St & Site Driveway		
	<p>Houghton RTS</p> <p>NE 60th St</p>		

## 2029 Action Alternative 1 Weekday PM Peak Hour Traffic Volumes - Kirkland Study Area



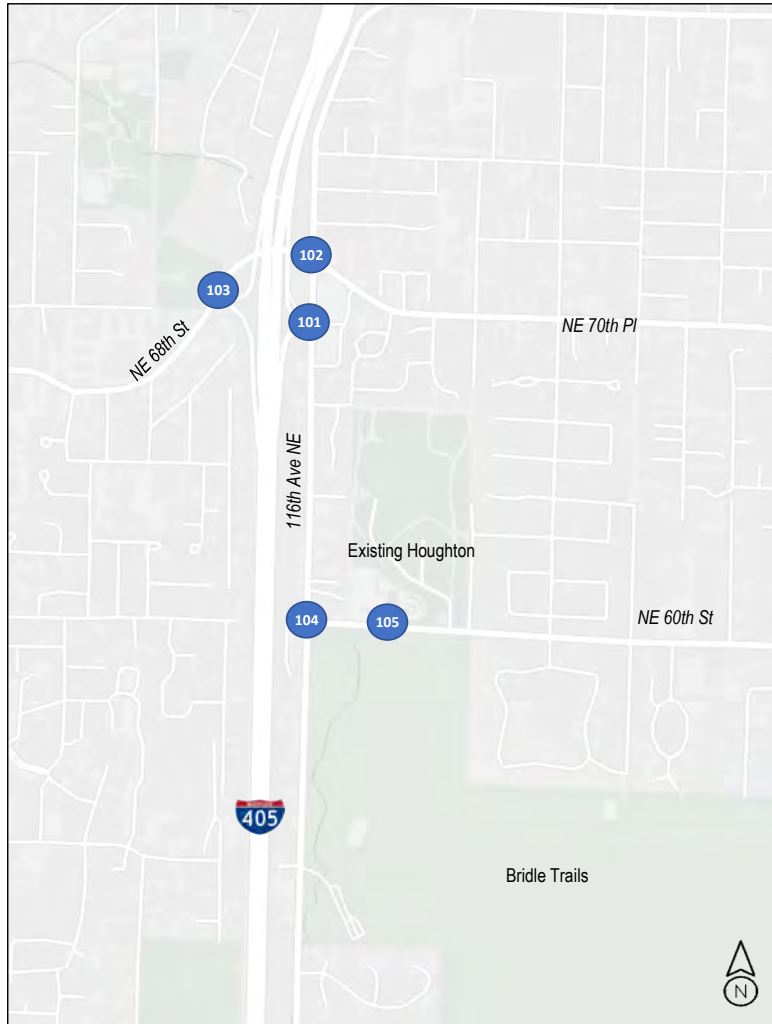
### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> <p>NE 70th Pl</p> <p>I-405 NB Ramps</p> <p>116th Ave NE</p> <p>116th Ave NE</p> <p>Houghton P&amp;R</p> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> <p>NE 70th Pl</p> <p>NE 72nd Pl</p> <p>116th Ave NE</p> <p>116th Ave NE</p> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> <p>NE 72nd Pl</p> <p>NE 68th St</p> <p>I-405 SB Ramps</p> <p>116th Ave NE</p> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> <p>NE 60th St</p> <p>NE 60th St</p> <p>116th Ave NE</p> <p>116th Ave NE</p> </div>
<b>105</b> NE 60th St & Site Driveway <div> <p>NE 60th St</p> <p>NE 60th St</p> <p>Site Driveway</p> <p>Houghton RTS</p> </div>	



## 2029 Action Alternative 1 Saturday AM Peak Hour Traffic Volumes - Kirkland Study Area

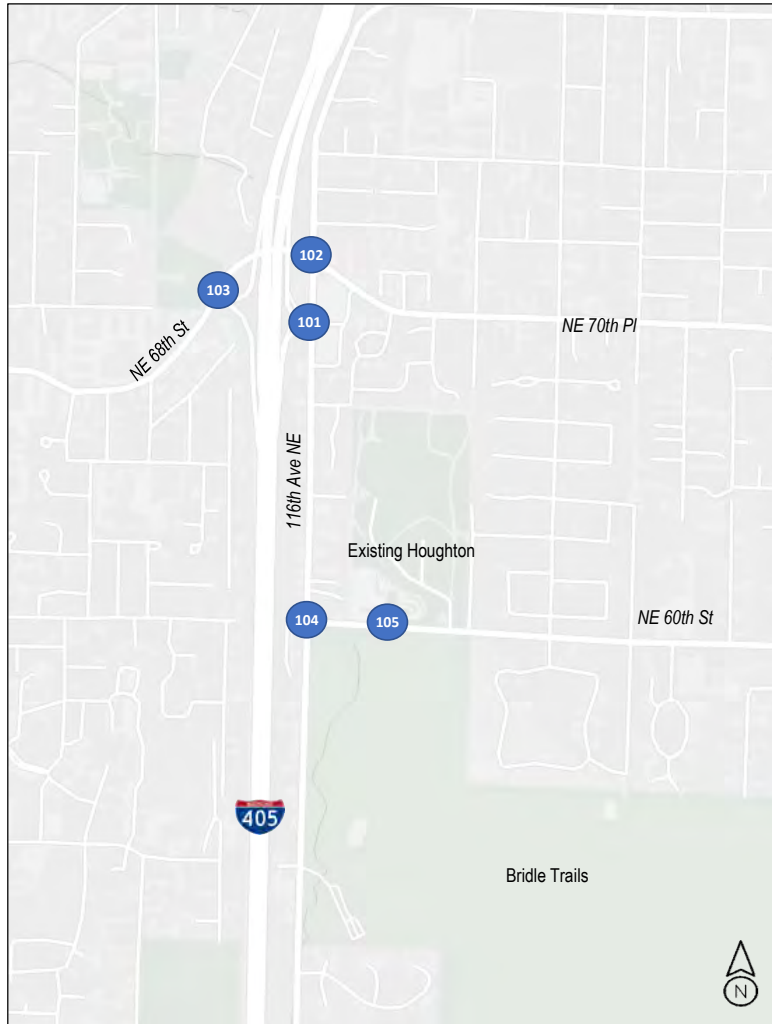


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
<p>235 118 0 I-405 NB Ramps 290 0 40 45 88 0</p>		<p>115 55 5 NE 72nd Pl 80 215 189 134 115 129</p>	
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
<p>231 263 NE 68th St 311 115 135 173</p>		<p>68 0 21 NE 60th St 0 0 0 0 60 31</p>	
105	NE 60th St & Site Driveway		
<p>76 13 NE 60th St 86 23</p>			

## 2029 Action Alternative 1 Saturday PM Peak Hour Traffic Volumes - Kirkland Study Area

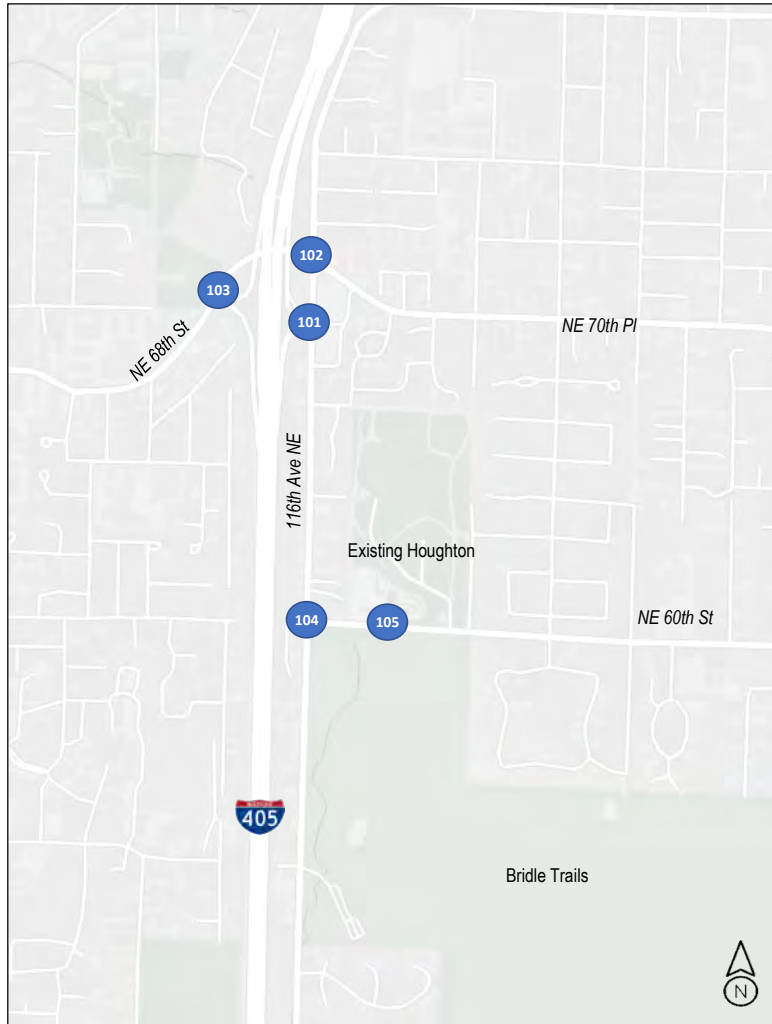


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> <p>Diagram 101: 116th Ave NE &amp; I-405 NB Ramps. Signalized intersection. Volumes: 290 (left turn), 158 (through), 0 (right turn) from I-405 NB Ramps; 360 (right turn), 0 (through), 70 (left turn) to I-405 NB Ramps; 0 (left turn), 0 (through), 0 (right turn) from Houghton P&amp;R; 105 (left turn), 128 (through), 0 (right turn) to Houghton P&amp;R.</p> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> <p>Diagram 102: 116th Ave NE &amp; NE 70th Pl/NE 72nd Pl. Signalized intersection. Volumes: 145 (left turn), 70 (through), 5 (right turn) from NE 72nd Pl; 85 (right turn), 280 (through), 239 (left turn) to NE 72nd Pl; 10 (left turn), 340 (through), 139 (right turn) from NE 70th Pl; 189 (left turn), 155 (through), 144 (right turn) to NE 70th Pl.</p> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> <p>Diagram 103: NE 68th St/NE 72nd Pl &amp; I-405 SB Ramps. Signalized intersection. Volumes: 366 (left turn), 308 (right turn) from NE 72nd Pl; 411 (right turn), 130 (left turn) to NE 72nd Pl; 175 (left turn), 193 (right turn) from I-405 SB Ramps.</p> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> <p>Diagram 104: NE 60th St &amp; 116th Ave NE. Stop-controlled approach. Volumes: 0 (left turn), 120 (through), 88 (right turn) from NE 60th St; 0 (right turn), 0 (through), 0 (left turn) to NE 60th St; 93 (left turn), 0 (through), 46 (right turn) from 116th Ave NE; 0 (left turn), 130 (through), 61 (right turn) to 116th Ave NE.</p> </div>
<b>105</b> NE 60th St & Site Driveway <div> <p>Diagram 105: NE 60th St &amp; Site Driveway. Stop-controlled approach. Volumes: 86 (left turn), 13 (right turn) from NE 60th St; 76 (right turn), 73 (left turn) to NE 60th St; 13 (left turn), 53 (right turn) from Houghton RTS.</p> </div>	

## 2040 No Action Weekday AM Peak Hour Traffic Volumes - Kirkland Study Area

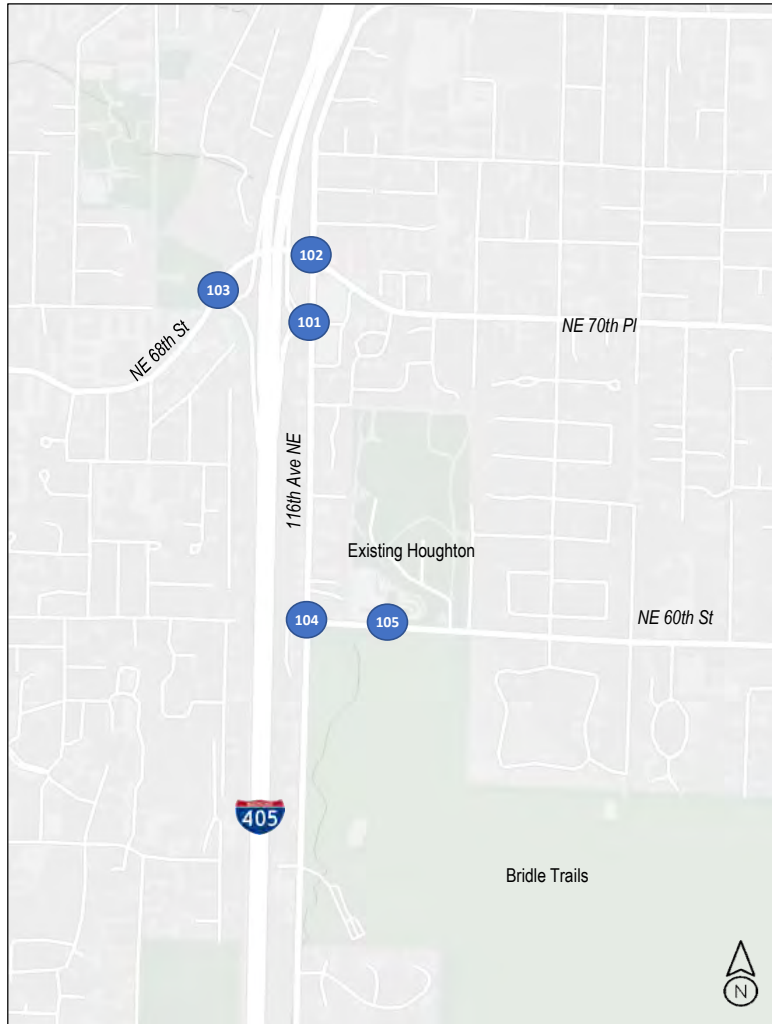


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
	<p>116th Ave NE</p> <p>I-405 NB Ramps</p> <p>Houghton P&amp;R</p> <p>116th Ave NE</p>		<p>116th Ave NE</p> <p>NE 72nd Pl</p> <p>NE 70th Pl</p> <p>116th Ave NE</p>
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
	<p>NE 68th St</p> <p>NE 72nd Pl</p> <p>I-405 SB Ramps</p>		<p>116th Ave NE</p> <p>NE 60th St</p> <p>116th Ave NE</p>
105	NE 60th St & Site Driveway		
	<p>Houghton RTS</p> <p>NE 60th St</p>		

## 2040 No Action Weekday PM Peak Hour Traffic Volumes - Kirkland Study Area



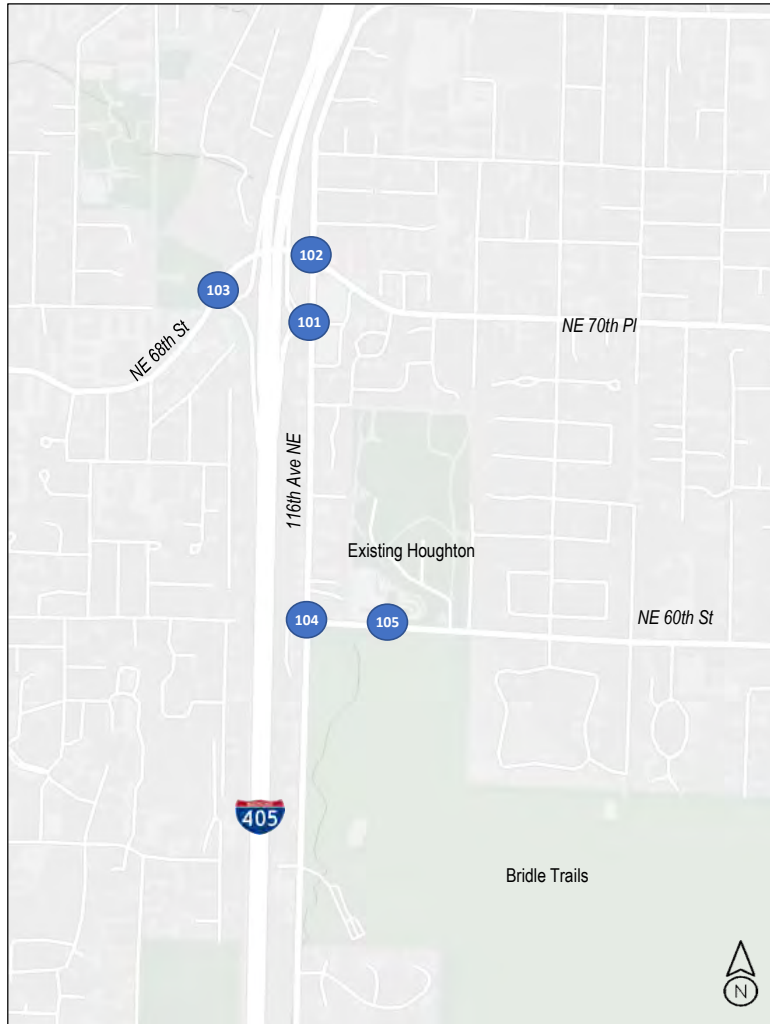
### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
<p>Diagram 101: 116th Ave NE &amp; I-405 NB Ramps. Traffic volumes: 480 (left), 175 (down), 0 (right) for I-405 NB Ramps; 5 (up), 0 (left), 0 (down) for Houghton P&amp;R; 380 (up), 0 (right), 55 (down) for 116th Ave NE.</p>		<p>Diagram 102: 116th Ave NE &amp; NE 70th Pl/NE 72nd Pl. Traffic volumes: 135 (left), 115 (down), 15 (right) for NE 72nd Pl; 20 (up), 300 (left), 180 (down) for NE 70th Pl; 185 (up), 455 (right), 360 (down) for 116th Ave NE.</p>	
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
<p>Diagram 103: NE 68th St/NE 72nd Pl &amp; I-405 SB Ramps. Traffic volumes: 400 (left), 205 (down) for NE 72nd Pl; 730 (right), 170 (down) for NE 68th St; 265 (left), 270 (right) for I-405 SB Ramps.</p>		<p>Diagram 104: NE 60th St &amp; 116th Ave NE. Traffic volumes: 5 (left), 110 (down), 75 (right) for NE 60th St; 80 (up), 0 (left), 65 (down) for 116th Ave NE; 10 (up), 5 (right), 0 (down) for NE 60th St.</p>	
105	NE 60th St & Site Driveway		
<p>Diagram 105: NE 60th St &amp; Site Driveway. Traffic volumes: 50 (left), 5 (right) for NE 60th St; 40 (up), 105 (right) for Site Driveway; 5 (up), 95 (left) for NE 60th St.</p>			



## 2040 No Action Saturday AM Peak Hour Traffic Volumes - Kirkland Study Area

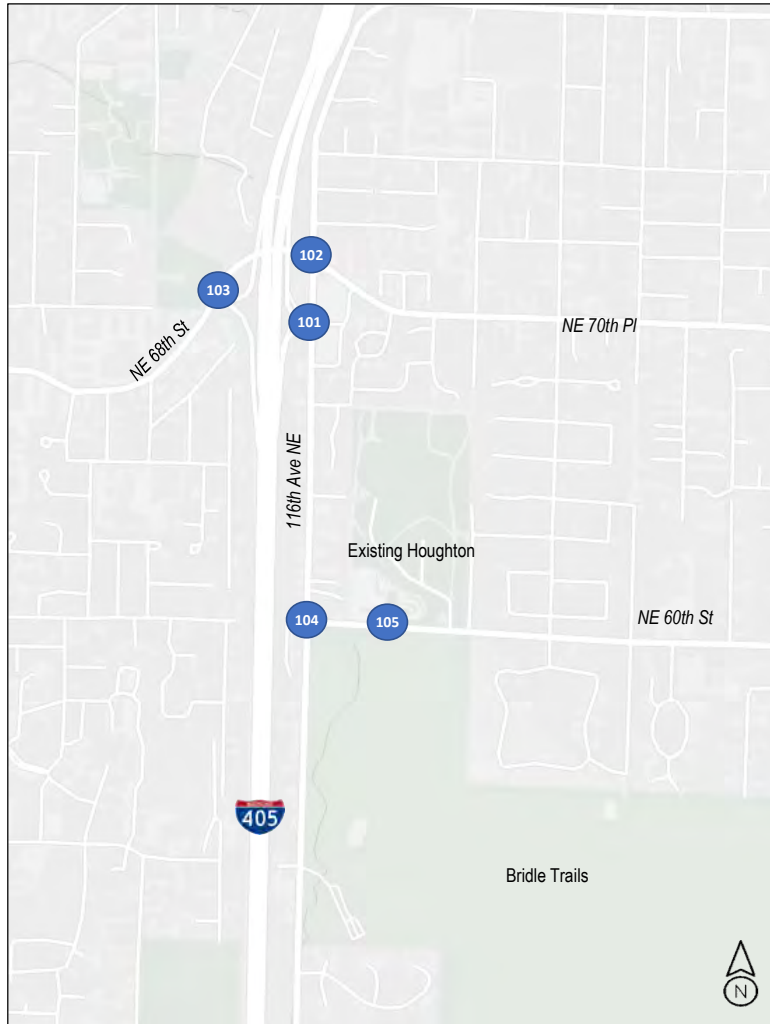


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> </div>
<b>105</b> NE 60th St & Site Driveway <div> </div>	

## 2040 No Action Saturday PM Peak Hour Traffic Volumes - Kirkland Study Area

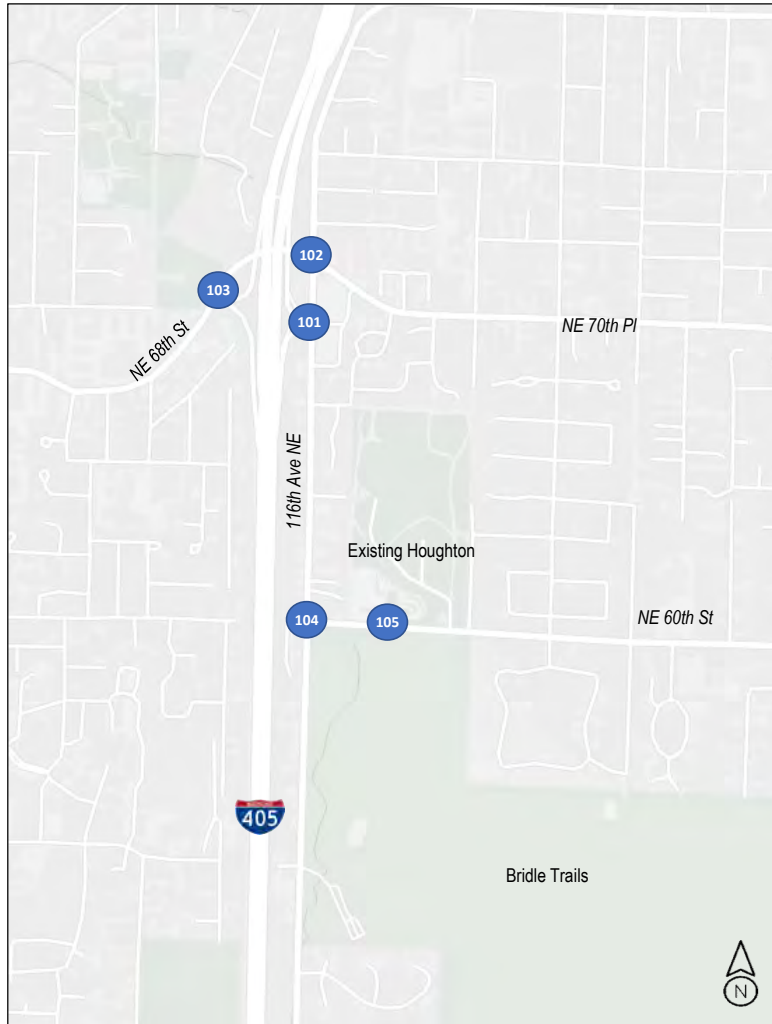


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> <p>Diagram 101: 116th Ave NE &amp; I-405 NB Ramps. Signalized intersection. Volumes: 345 (left turn), 150 (through), 0 (right turn) from I-405 NB Ramps; 360 (right turn), 0 (through), 65 (left turn) to I-405 NB Ramps. 116th Ave NE: 0 (left turn), 0 (through), 0 (right turn) to Houghton P&amp;R; 120 (left turn), 110 (through), 0 (right turn) from Houghton P&amp;R.</p> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> <p>Diagram 102: 116th Ave NE &amp; NE 70th Pl/NE 72nd Pl. Signalized intersection. Volumes: 155 (left turn), 90 (through), 10 (right turn) from NE 72nd Pl; 95 (right turn), 325 (through), 255 (left turn) to NE 72nd Pl. 116th Ave NE: 15 (left turn), 360 (through), 150 (right turn) to NE 70th Pl; 170 (left turn), 155 (through), 145 (right turn) from NE 70th Pl.</p> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> <p>Diagram 103: NE 68th St/NE 72nd Pl &amp; I-405 SB Ramps. Signalized intersection. Volumes: 395 (left turn), 290 (right turn) from NE 72nd Pl; 475 (through), 130 (left turn) to NE 68th St. I-405 SB Ramps: 215 (left turn), 200 (right turn) to NE 72nd Pl.</p> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> <p>Diagram 104: NE 60th St &amp; 116th Ave NE. Stop-controlled approach at NE 60th St. Volumes: 0 (left turn), 145 (through), 60 (right turn) from NE 60th St; 0 (right turn), 0 (through), 0 (left turn) to NE 60th St. 116th Ave NE: 65 (left turn), 0 (through), 45 (right turn) to NE 60th St; 0 (left turn), 165 (through), 60 (right turn) from NE 60th St.</p> </div>
<b>105</b> NE 60th St & Site Driveway <div> <p>Diagram 105: NE 60th St &amp; Site Driveway. Stop-controlled approach at NE 60th St. Volumes: 55 (left turn), 10 (right turn) from NE 60th St; 45 (right turn), 75 (through) to NE 60th St. Houghton RTS: 10 (left turn), 55 (right turn) to NE 60th St.</p> </div>	

## 2040 Action Alternative 1 Weekday AM Peak Hour Traffic Volumes - Kirkland Study Area

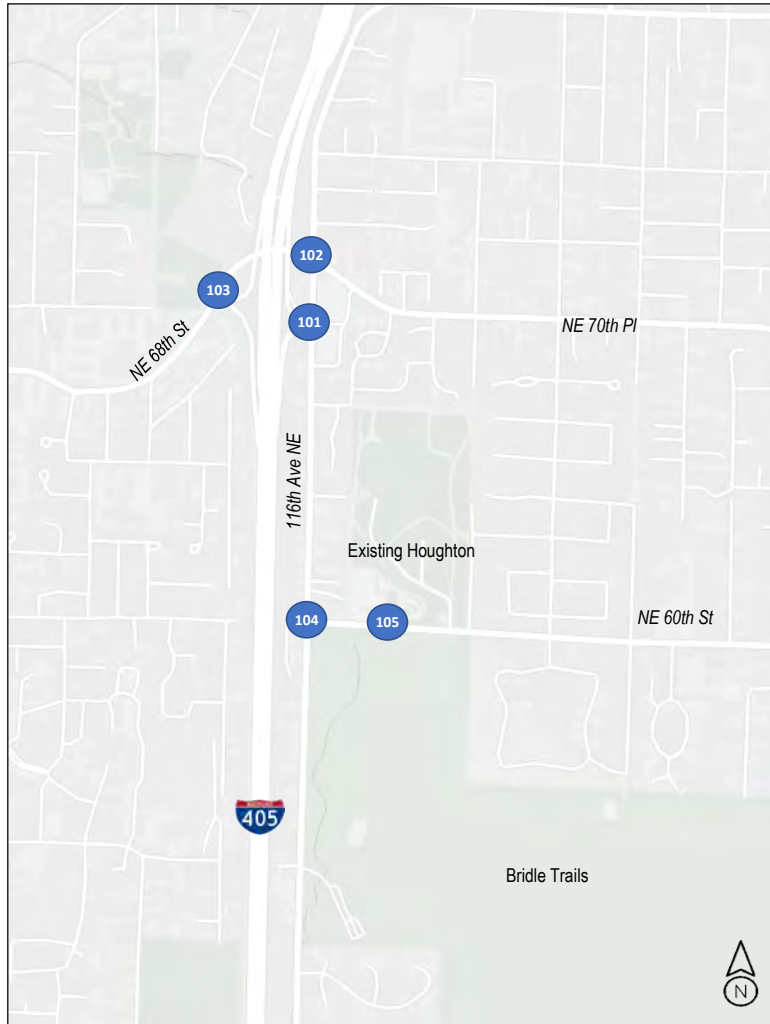


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> </div>
<b>105</b> NE 60th St & Site Driveway <div> </div>	

## 2040 Action Alternative 1 Weekday PM Peak Hour Traffic Volumes - Kirkland Study Area



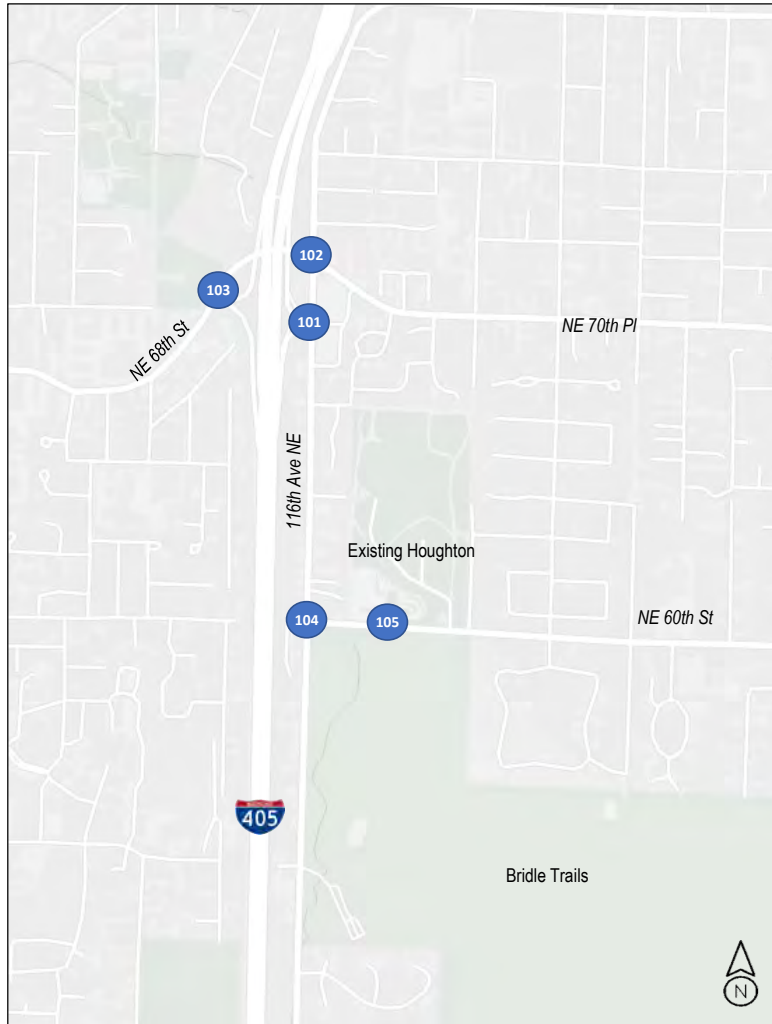
### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> <div> <div>480</div> <div>194</div> <div>0</div> </div> <div> <div>←</div> <div>↓</div> <div>↶</div> </div> <div> <div>I-405 NB Ramps</div> <div>380</div> <div>0</div> <div>58</div> </div> <div> <div>↗</div> <div>→</div> <div>↘</div> </div> <div> <div>116th Ave NE</div> <div>116th Ave NE</div> </div> <div> <div>↶</div> <div>↷</div> <div>↸</div> </div> <div> <div>5</div> <div>0</div> <div>0</div> </div> <div> <div>↶</div> <div>↷</div> <div>↸</div> </div> <div> <div>Houghton P&amp;R</div> <div>278</div> <div>259</div> <div>0</div> </div> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> <div> <div>135</div> <div>115</div> <div>15</div> </div> <div> <div>←</div> <div>↓</div> <div>↶</div> </div> <div> <div>NE 72nd Pl</div> <div>185</div> <div>455</div> <div>376</div> </div> <div> <div>↗</div> <div>→</div> <div>↘</div> </div> <div> <div>116th Ave NE</div> <div>116th Ave NE</div> </div> <div> <div>↶</div> <div>↷</div> <div>↸</div> </div> <div> <div>20</div> <div>300</div> <div>183</div> </div> <div> <div>↶</div> <div>↷</div> <div>↸</div> </div> <div> <div>NE 70th Pl</div> <div>186</div> <div>240</div> <div>218</div> </div> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> <div> <div>←</div> <div>↶</div> </div> <div> <div>400</div> <div>221</div> </div> <div> <div>NE 72nd Pl</div> <div>265</div> <div>286</div> </div> <div> <div>↗</div> <div>↘</div> </div> <div> <div>NE 68th St</div> <div>730</div> <div>170</div> </div> <div> <div>I-405 SB Ramps</div> </div> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> <div> <div>5</div> <div>110</div> <div>97</div> </div> <div> <div>←</div> <div>↓</div> <div>↶</div> </div> <div> <div>NE 60th St</div> <div>10</div> <div>5</div> <div>0</div> </div> <div> <div>↗</div> <div>→</div> <div>↘</div> </div> <div> <div>116th Ave NE</div> <div>116th Ave NE</div> </div> <div> <div>↶</div> <div>↷</div> <div>↸</div> </div> <div> <div>102</div> <div>0</div> <div>65</div> </div> <div> <div>↶</div> <div>↷</div> <div>↸</div> </div> <div> <div>NE 60th St</div> <div>0</div> <div>370</div> <div>65</div> </div> </div>
<b>105</b> NE 60th St & Site Driveway <div> <div> <div>70</div> <div>7</div> </div> <div> <div>←</div> <div>↶</div> </div> <div> <div>NE 60th St</div> <div>60</div> <div>107</div> </div> <div> <div>↗</div> <div>→</div> </div> <div> <div>Houghton RTS</div> </div> </div>	



## 2040 Action Alternative 1 Saturday AM Peak Hour Traffic Volumes - Kirkland Study Area

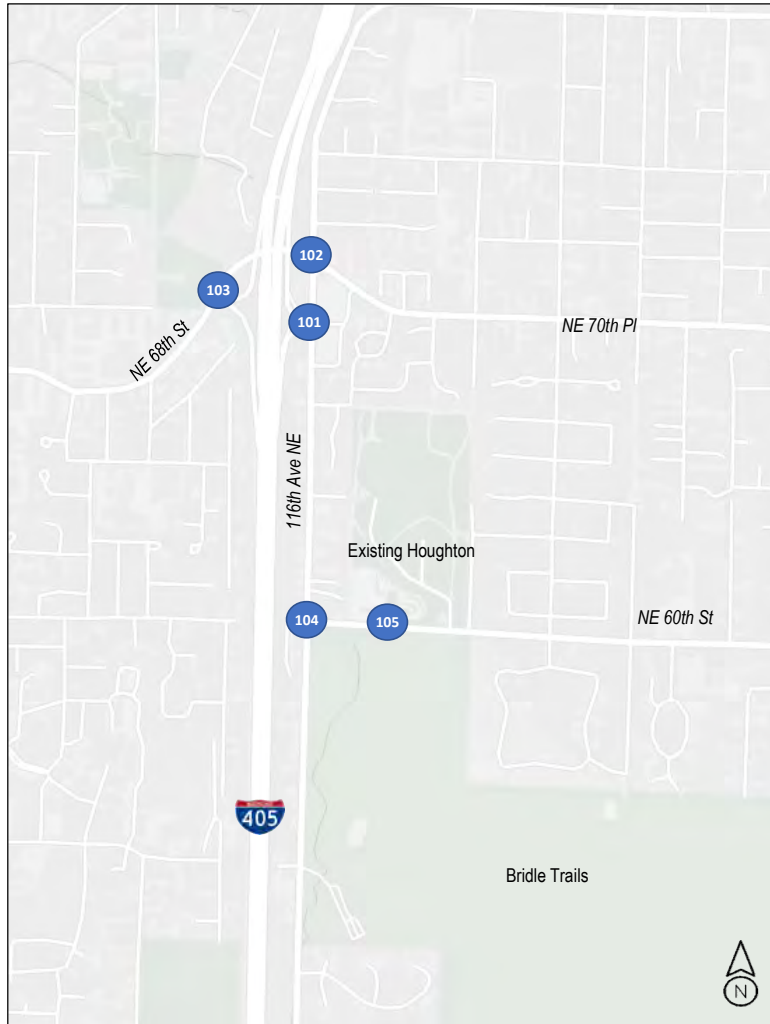


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

<b>101</b> 116th Ave NE & I-405 NB Ramps <div> </div>	<b>102</b> 116th Ave NE & NE 70th Pl/NE 72nd Pl <div> </div>
<b>103</b> NE 68th St/NE 72nd Pl & I-405 SB Ramps <div> </div>	<b>104</b> NE 60th St & 116th Ave NE <div> </div>
<b>105</b> NE 60th St & Site Driveway <div> </div>	

## 2040 Action Alternative 1 Saturday PM Peak Hour Traffic Volumes - Kirkland Study Area

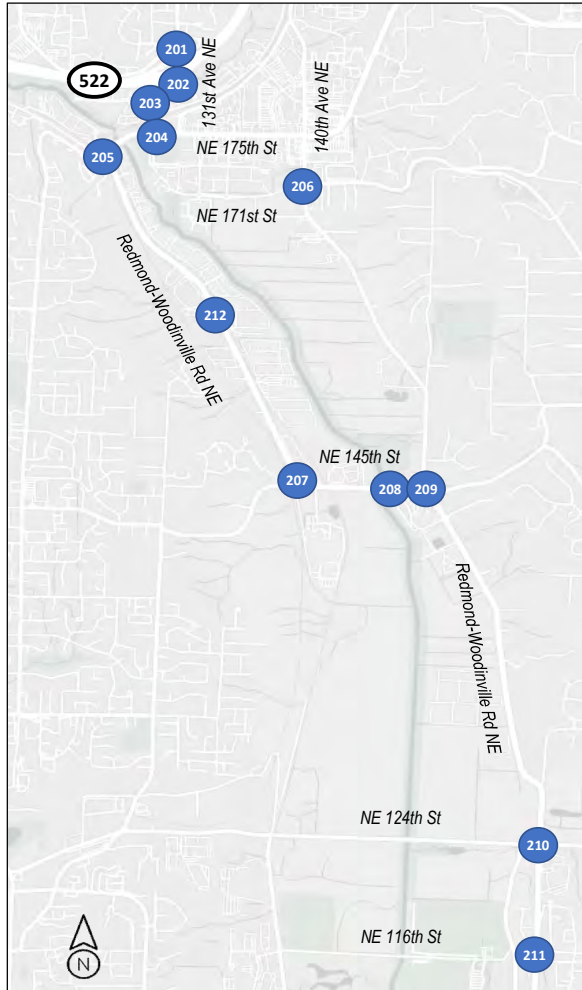


### Legend

- 10X Intersection Number
- Signalized Intersection
- Stop-Controlled Approach

101	116th Ave NE & I-405 NB Ramps	102	116th Ave NE & NE 70th Pl/NE 72nd Pl
103	NE 68th St/NE 72nd Pl & I-405 SB Ramps	104	NE 60th St & 116th Ave NE
105	NE 60th St & Site Driveway		

## 2023 Existing Weekday AM Peak Hour Traffic Volumes - Woodinville Study Area

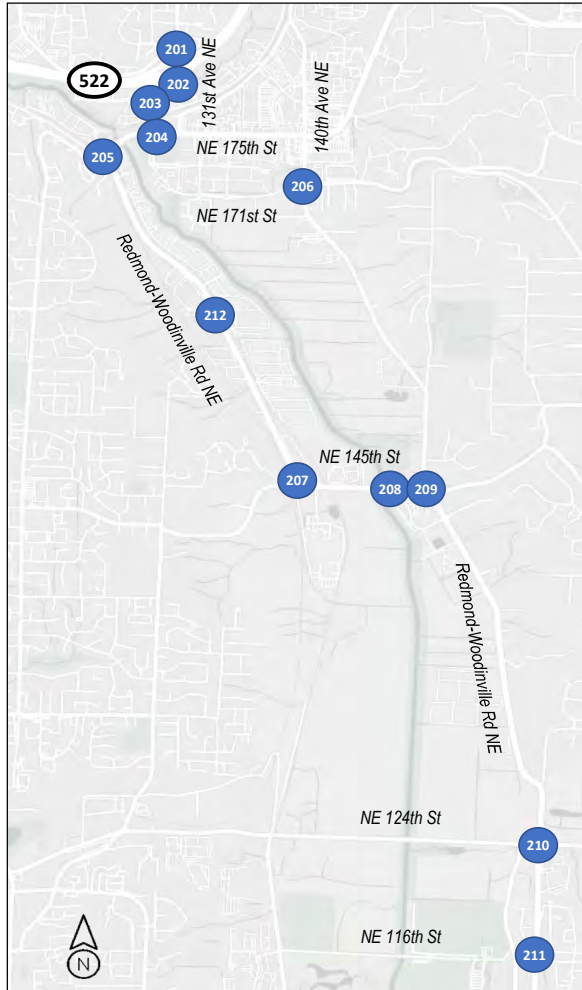


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 

## 2023 Existing Weekday PM Peak Hour Traffic Volumes - Woodinville Study Area



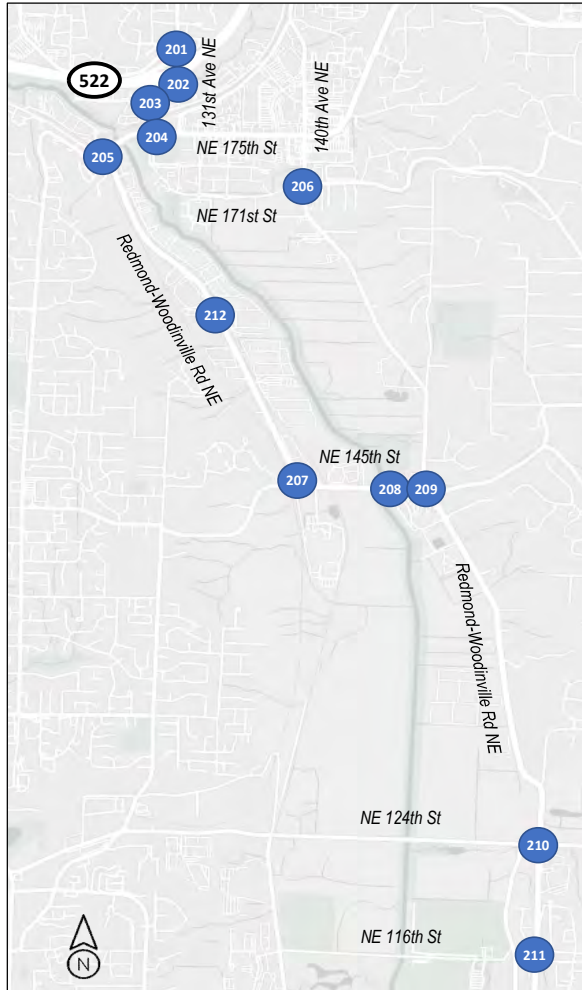
### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 



## 2023 Existing Saturday AM Peak Hour Traffic Volumes - Woodinville Study Area

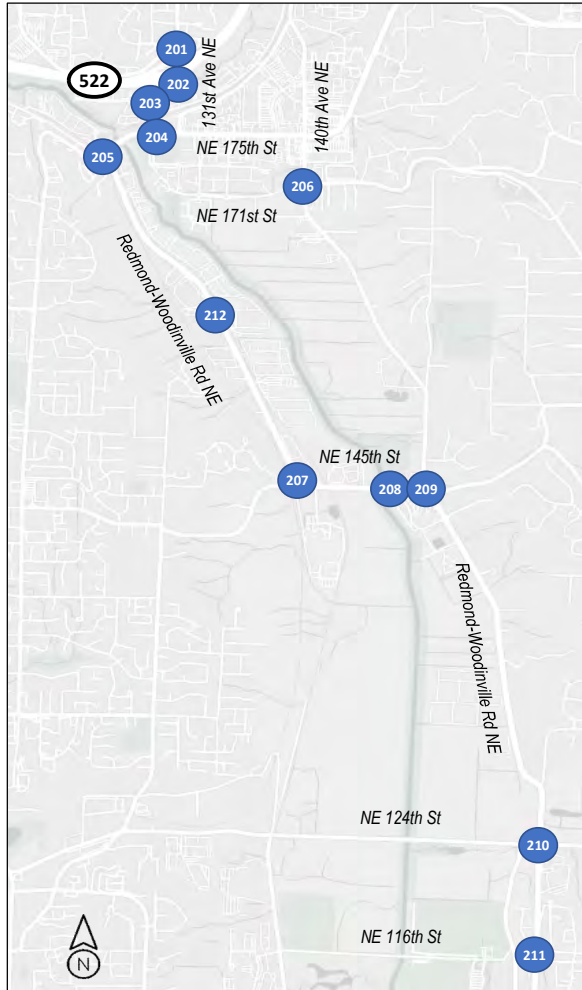


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 

## 2023 Existing Saturday PM Peak Hour Traffic Volumes - Woodinville Study Area

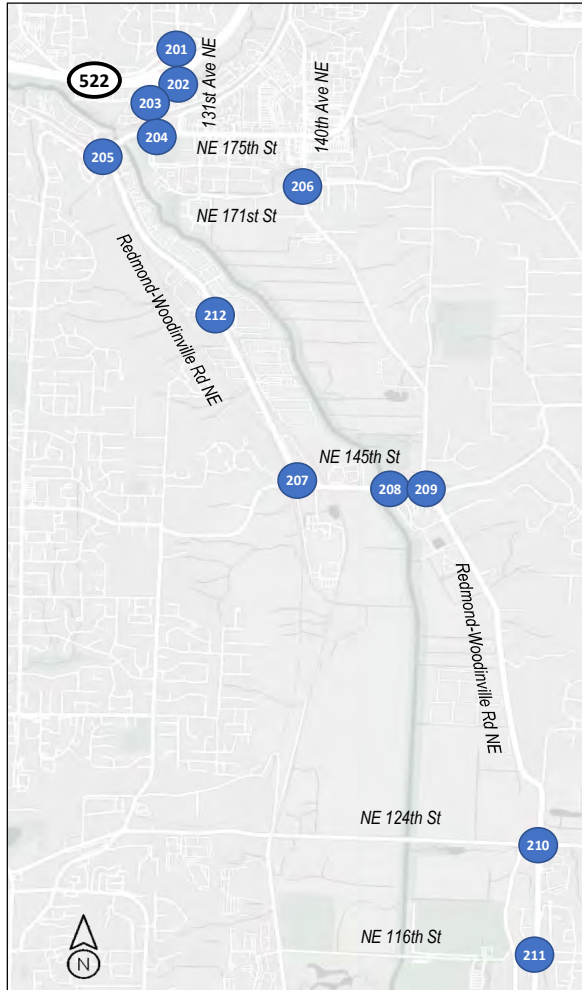


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 

# 2029 No Action Weekday AM Peak Hour Traffic Volumes - Woodinville Study Area

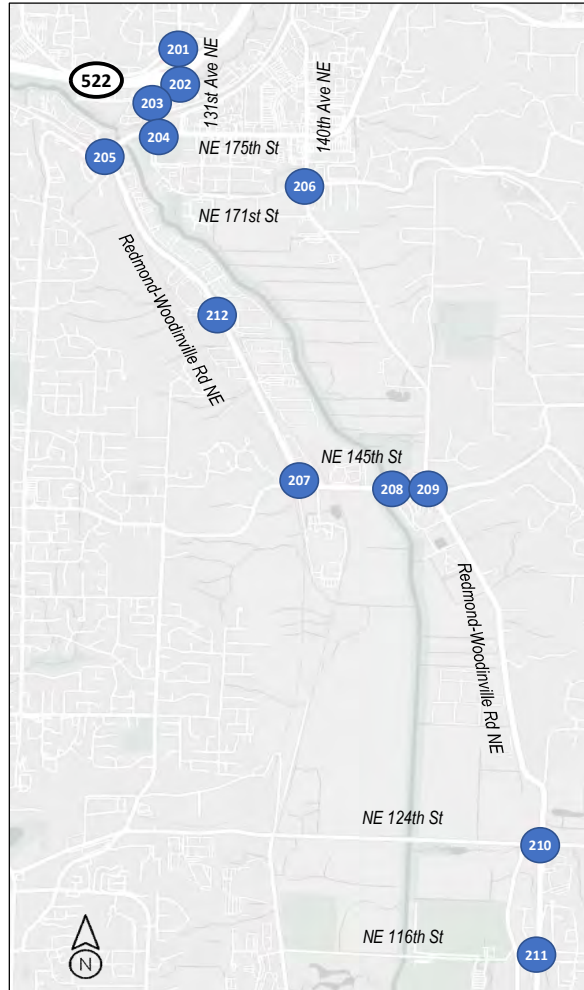


## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 

# 2029 No Action Weekday PM Peak Hour Traffic Volumes - Woodinville Study Area



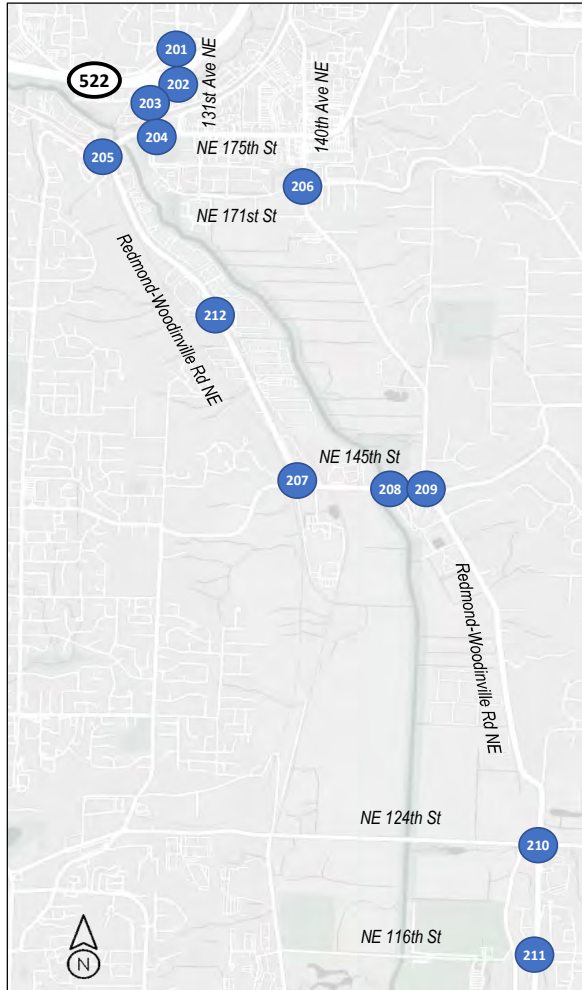
## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 



# 2029 No Action Saturday AM Peak Hour Traffic Volumes - Woodinville Study Area

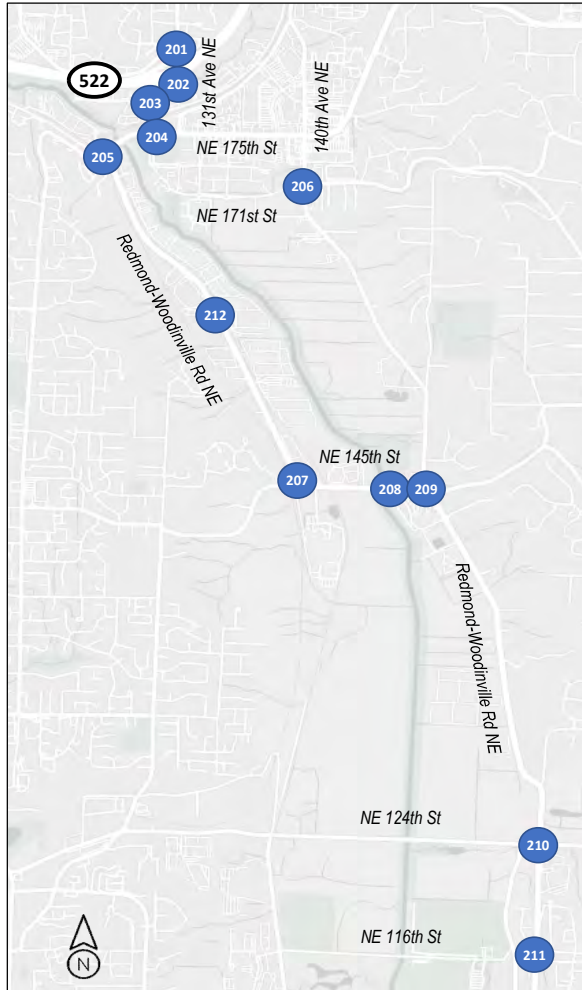


## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 

# 2029 No Action Saturday PM Peak Hour Traffic Volumes - Woodinville Study Area

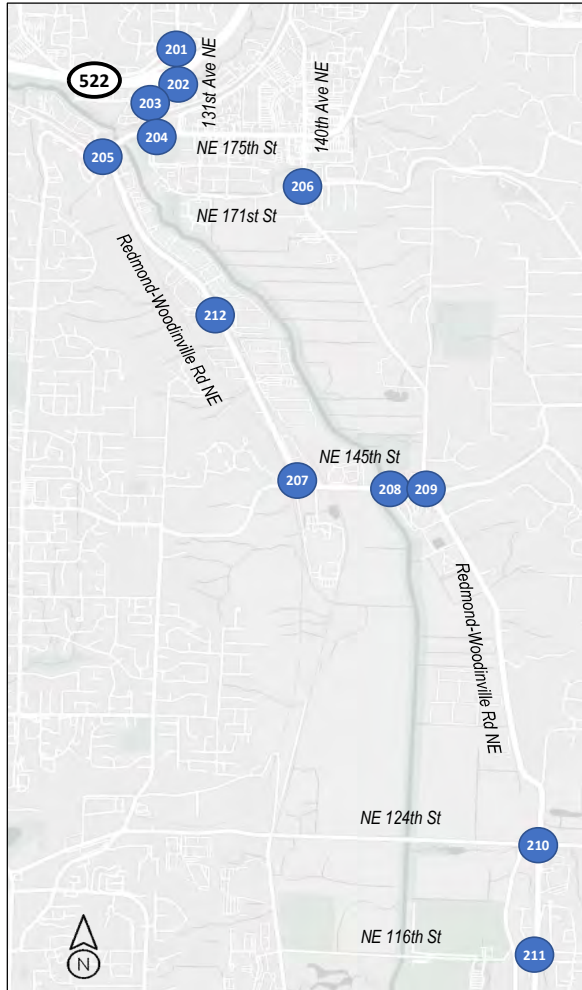


## Legend





- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

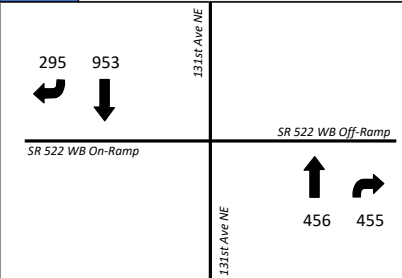
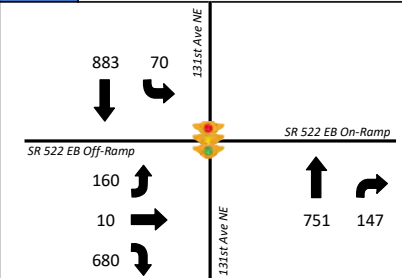
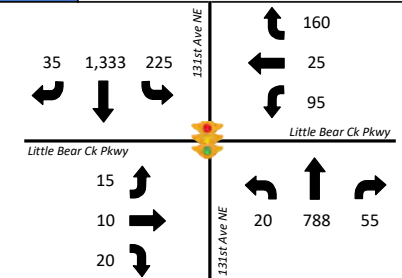
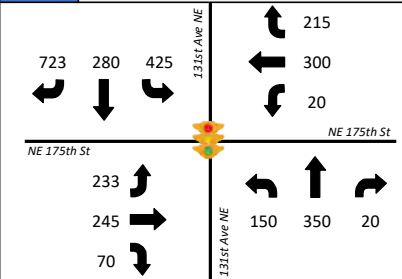
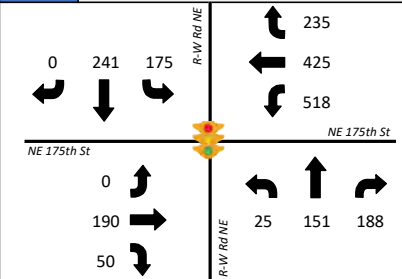
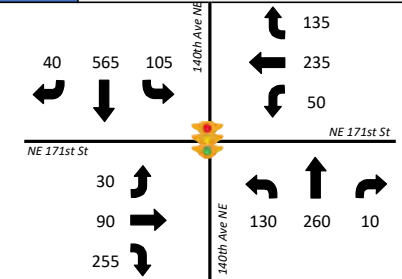
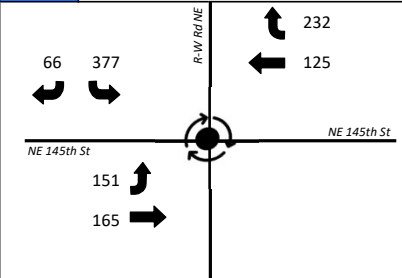
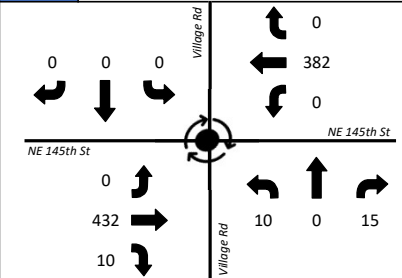
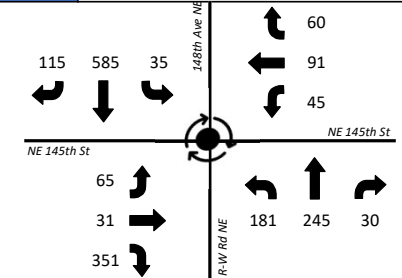
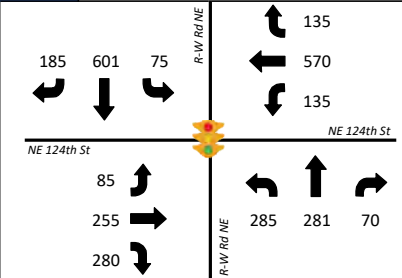
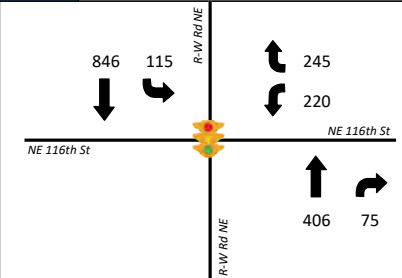
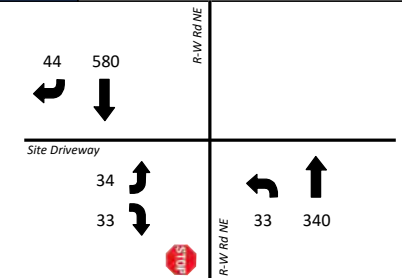
<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
<b>204</b> NE 175th St & 131st Ave NE 	<b>205</b> Redmond-Woodinville Rd NE & NE 175th St 	<b>206</b> 140th Ave NE & NE 171st St 
<b>207</b> Redmond-Woodinville Rd NE & NE 145th St 	<b>208</b> NE 145th St & Village Rd 	<b>209</b> NE 145th St & 148th Ave NE/R-W Rd NE 
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# 2029 Action Alternative 2 Weekday AM Peak Hour Traffic Volumes - Woodinville Study Area

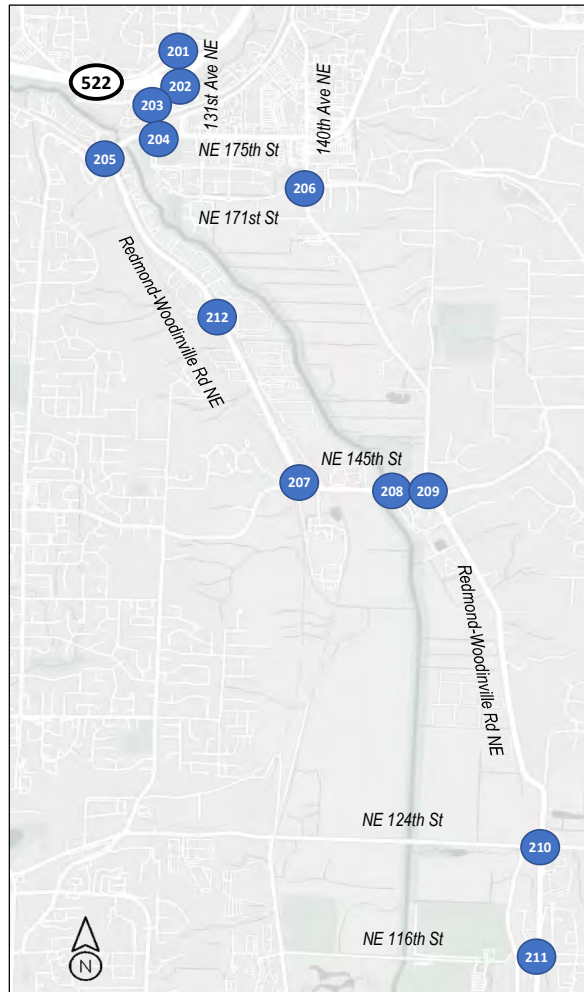


## Legend

-  Intersection Number
-  Signalized Intersection
-  Stop-Controlled Approach
-  Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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<b>210</b> Redmond-Woodinville Rd NE & NE 124th St 	<b>211</b> Redmond-Woodinville Rd NE & NE 116th St 	<b>212</b> Redmond-Woodinville Rd NE & Site Driveway 

# 2029 Action Alternative 2 Weekday PM Peak Hour Traffic Volumes - Woodinville Study Area



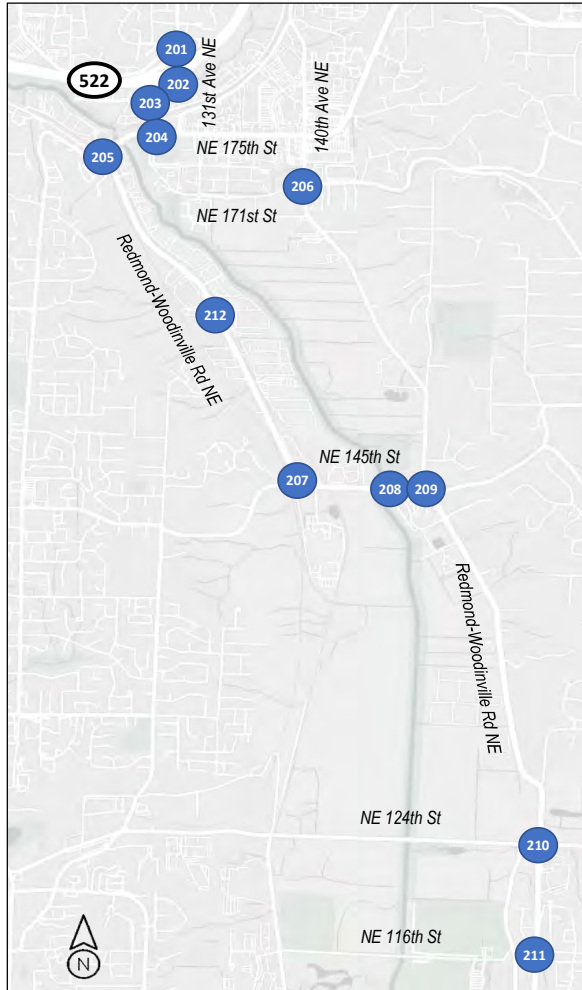
## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2029 Action Alternative 2 Saturday AM Peak Hour Traffic Volumes - Woodinville Study Area

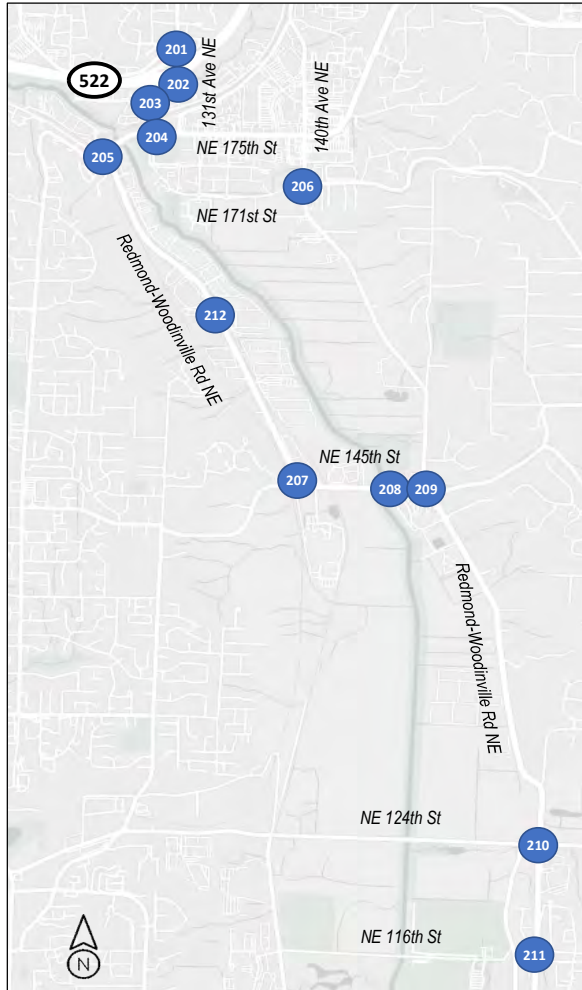


## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2029 Action Alternative 2 Saturday PM Peak Hour Traffic Volumes - Woodinville Study Area

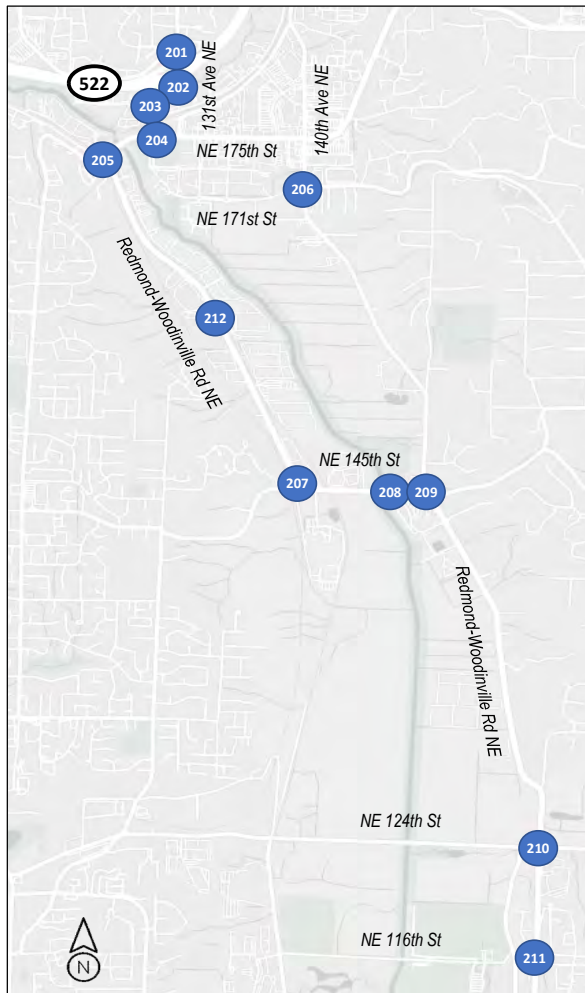


## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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## 2040 No Action Weekday AM Peak Hour Traffic Volumes - Woodinville Study Area

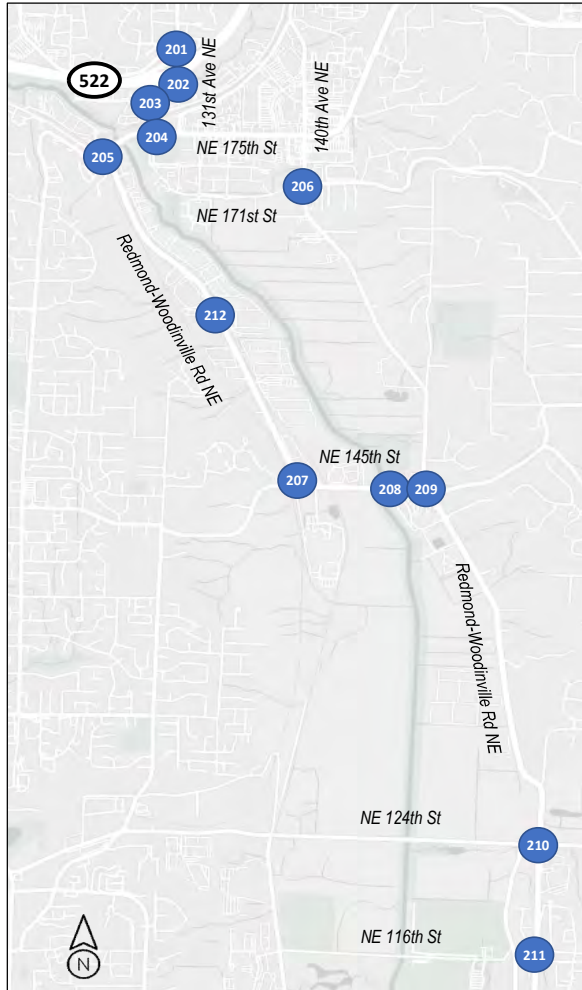


### Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2040 No Action Weekday PM Peak Hour Traffic Volumes - Woodinville Study Area



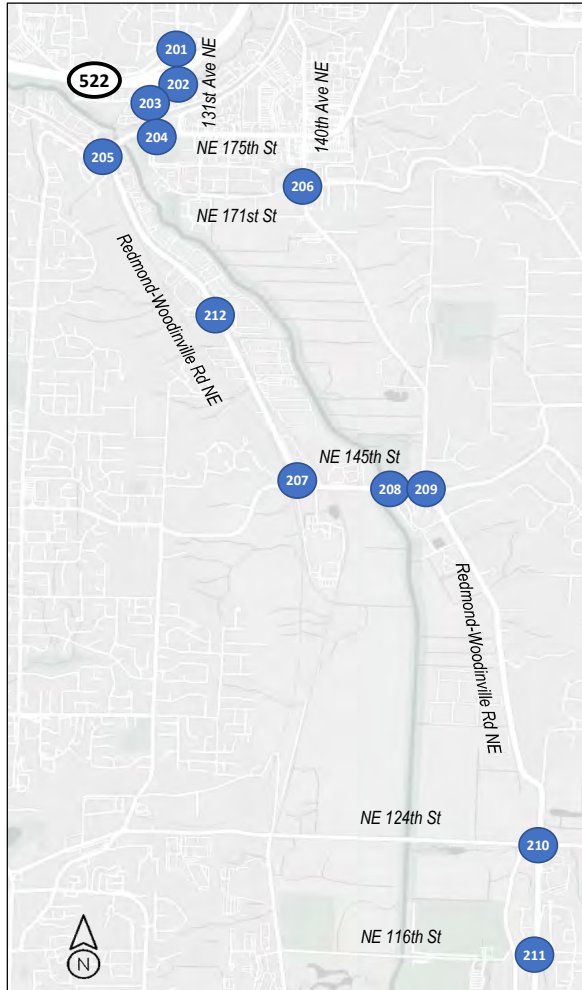
## Legend

- Intersection Number
- Signalized Intersection
- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2040 No Action Saturday AM Peak Hour Traffic Volumes - Woodinville Study Area

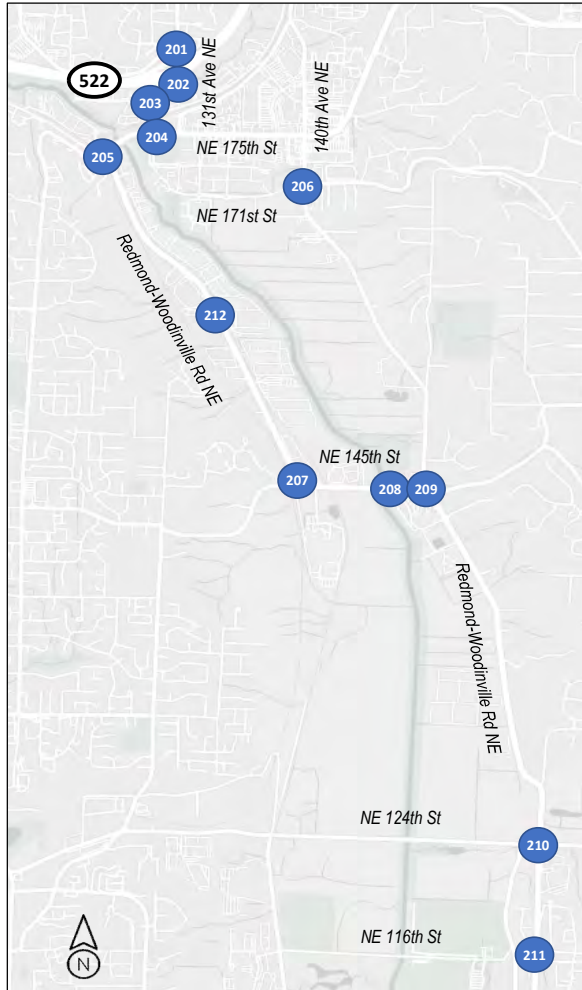


## Legend

- Intersection Number
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- Stop-Controlled Approach
- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2040 No Action Saturday PM Peak Hour Traffic Volumes - Woodinville Study Area

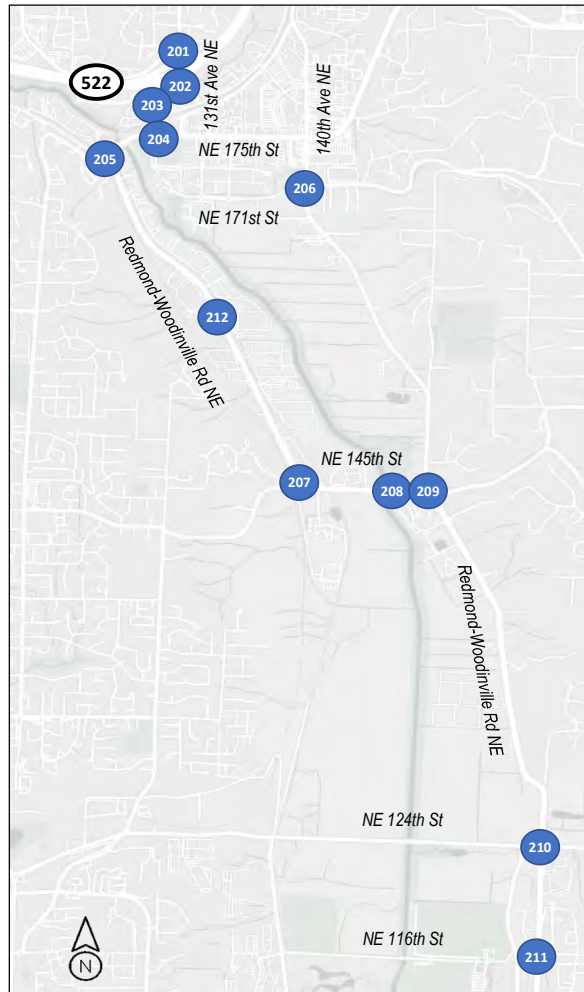


## Legend





- Intersection Number
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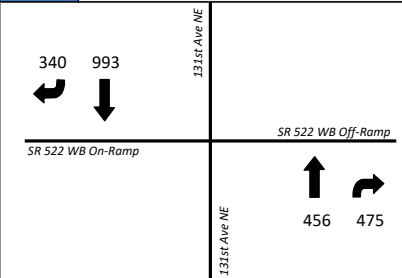
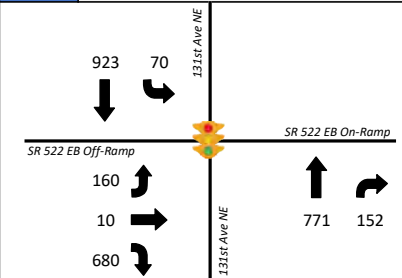
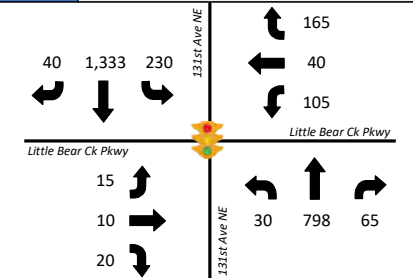
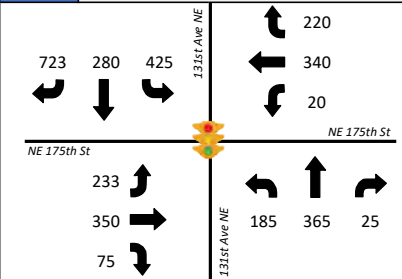
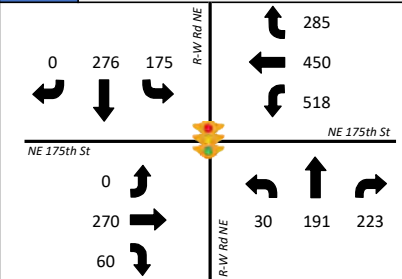
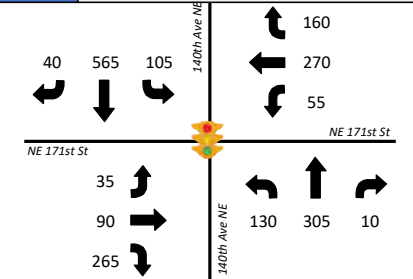
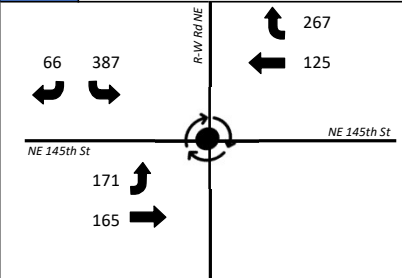
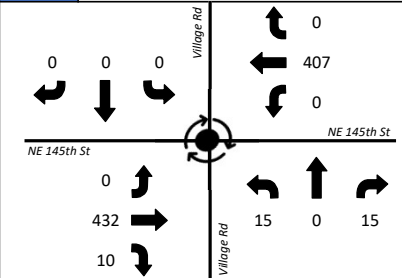
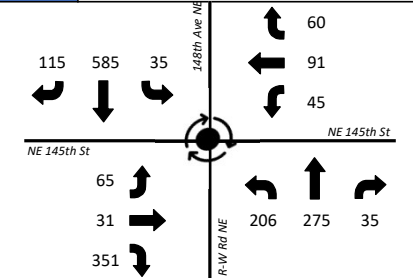
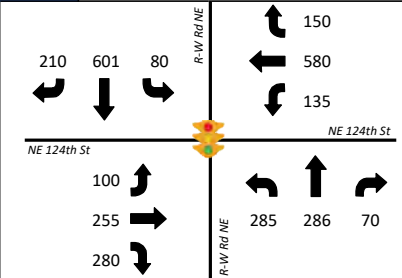
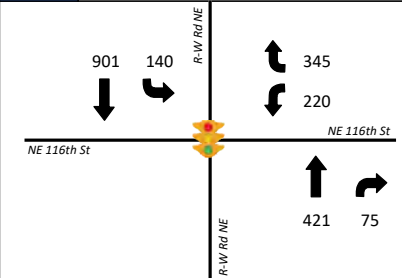
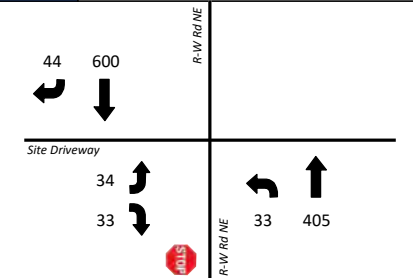
<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2040 Action Alternative 2 Weekday AM Peak Hour Traffic Volumes - Woodinville Study Area

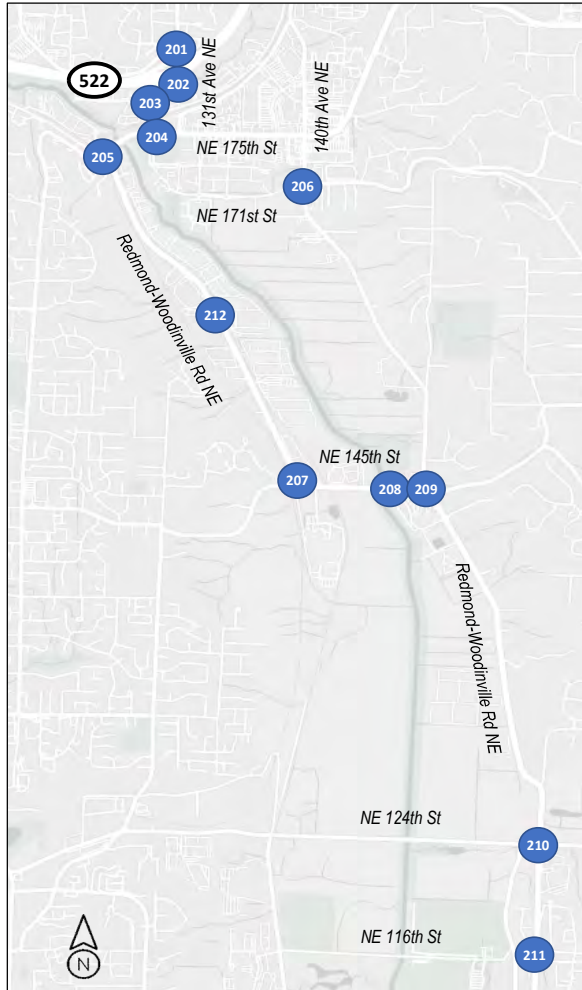


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-  Intersection Number
-  Signalized Intersection
-  Stop-Controlled Approach
-  Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2040 Action Alternative 2 Weekday PM Peak Hour Traffic Volumes - Woodinville Study Area



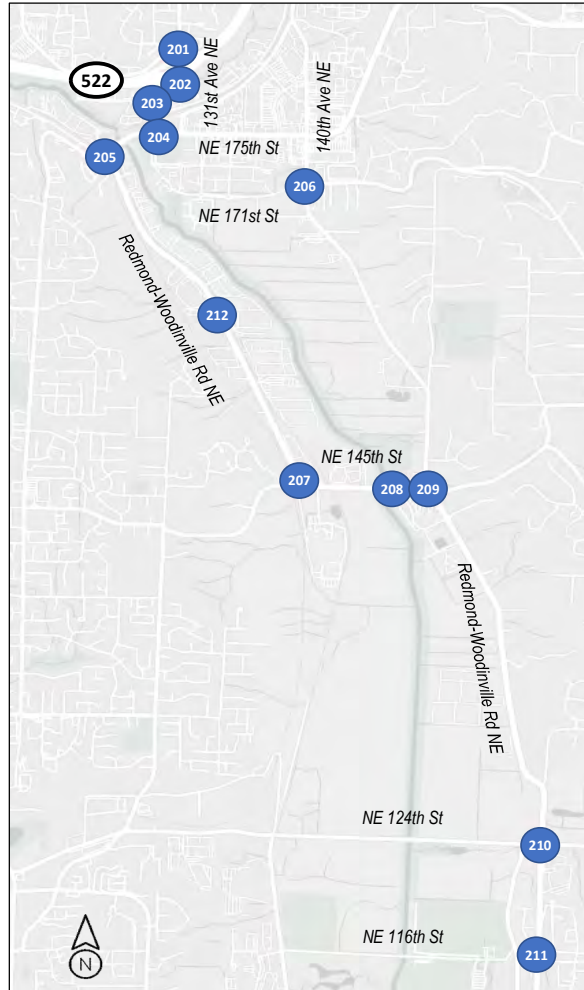
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- Roundabout

<b>201</b> SR 522 WB Ramps & 131st Ave NE	<b>202</b> SR 522 EB Ramps & 131st Ave NE	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE
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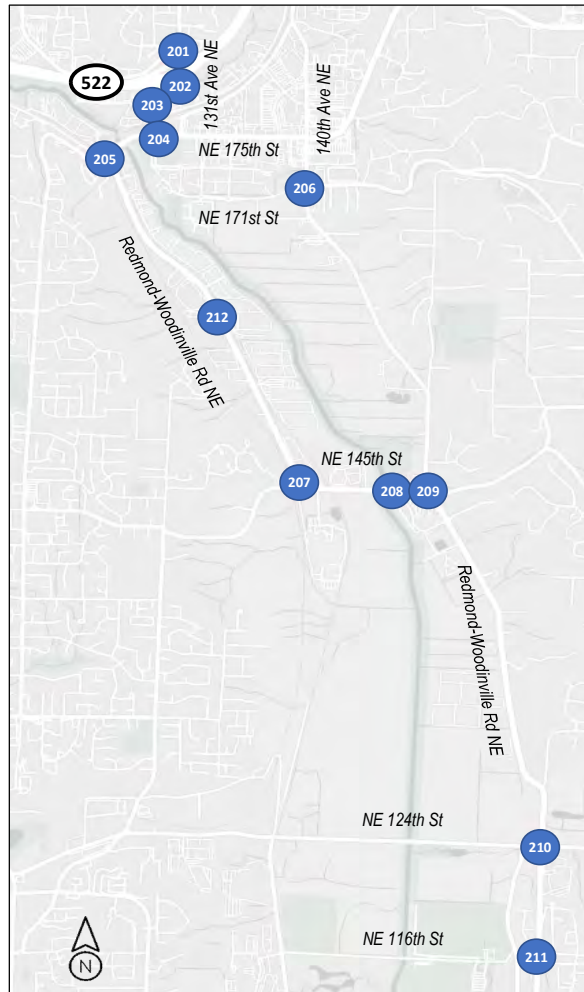


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<b>201</b> SR 522 WB Ramps & 131st Ave NE 	<b>202</b> SR 522 EB Ramps & 131st Ave NE 	<b>203</b> Little Bear Creek Pkwy & 131st Ave NE 
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# 2040 Action Alternative 2 Saturday PM Peak Hour Traffic Volumes - Woodinville Study Area



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