

APPENDIX A: DATA  
COLLECTION AND METHODS  
MEMO

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## MEMORANDUM

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<b>Date:</b>	Updated August 11, 2016	<b>TG:</b>	16090.00
<b>To:</b>	Joel Pfundt, City of Kirkland		
<b>From:</b>	Jeanne Acutanza/TranspoGroup Paul Sharman/TranspoGroup		
<b>cc:</b>	Walker Cheng/TranspoGroup Brent Turley/TranspoGroup Deborah Munkberg/3SquareBlocks Angela Ruggeri/City of Kirkland		
<b>Subject:</b>	6th Street Corridor Kirkland – Updated Draft Data Collection/Methods		

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The purpose of this memorandum is to communicate and start assembling a list of data for the 6th Street Corridor Study to create a broad understanding of the transportation context. This memo also outlines the draft methodology for analysis of the corridor. A broad range of data already exists through other providers or projects we have worked on and we will maximize this as much as possible. The data desired for the corridor and the status of acquisition is summarized in **Table 1** and we would like your comments or ideas prior to collecting or assembling the data, specifically on potential use of StreetLight origin destination data. Where data is not currently available we will work with the City on a strategy to either collect the data or consider surrogates for the data.

### Study Limits and Parallel Corridors

For the purposes of the study we are looking to cast a broader net for data collection for a study area (as shown in **Figure 1**) generally bounded by NE 85th Street/Central way to the north, 116th Avenue to the east, Lake Washington Boulevard/Lake Street to the west and SR 520 to the south. Our primary focus will be on **6th Street/108th Avenue** and to a lesser degree the parallel facilities that make up this transportation corridor including:

- 116th Street 85th to Northup Way
- Lake Washington Boulevard SR 520 to Northern Terminus
- Lake Street Southern Terminus to Kirkland Ave
- State Street 68th Street to Kirkland Ave,
- Interstate 405 SR 520 to NE 85th
- Cross Kirkland Corridor 108th Avenue to 85th

We will look at these facilities between Kirkland Way and Northup Way but will focus greater attention and depth of analysis on 6th Street/108th Avenue.

### Study Analysis Years and Time Periods

For the purposes of this study we will focus on PM peak period (identified as the most congested) and will focus on analysis years of 2016 (existing), 2025 (near term) and 2035 (long term). The 2035 horizon year aligns with the City Transportation Master Plan and modeling.

### Data Goals and Measures of Effectiveness

In defining the type and expanse of data to be collected, data collected is intended to support expected performance measures that align with the goals of this study. These goals currently include

- developing a short- and long-term multimodal transportation project, programs,
- strategies to improve existing and anticipated conditions
- align with the goals of the Transportation Master Plan.

Notably, this study requires broad public outreach that will help refine goals. Initial outreach and discussion with staff indicates that measures should address

- movement of people
- operations and access of all modes
- growth
- access
- travel time

If other measures arise from further outreach we will attempt to accommodate with available data or resources.



Figure 1 - Study Area

**Table 1 Data Collection Types**

<b>Data Type</b>	<b>Description</b>	<b>Source</b>	<b>Location (s)</b>	<b>Status</b>
<b>Daily Hourly Traffic Volumes</b>	Most recent (last 5 years) Available 24-hour weekday and weekend directional vehicle counts	City/WSDOT	For all of the corridors and anywhere within the study area	Have daily counts (not directional) for city roads
<b>Peak Hour Turning Movements</b>	Most Recent (last 5 years) Available intersection peak period turning movement counts	City/WSDOT / Bellevue/Consultant	6th Street at: Central Way; Kirkland Avenue; Kirkland Way; 68th Street 108th Avenue at: 68th Street (mentioned above); 60th Street, 53rd Street, NE 39th NE 37th Court; NE38th Place; Northup Way 68th Street at: State Street; 106th Avenue; 108th/ Avenue 6th Street (mentioned above); 110th Avenue; 111th Avenue; 112th Avenue; SB I-405 ramps;	See <b>Figure 2</b> for map of locations where Transpo has previously collected data
<b>Pedestrian and Bicycle Proximity/Connectivity</b>	GIS based travel proximity and access to transport	Consultant		Transpo to Build
<b>Pedestrian Volumes</b>	Most Recent (5 Years) Available Pedestrian use of each corridor <b>Crossing/Crosswalk volumes</b>	City/Consultant	On Arterials and Trails within the study area	Do not have
<b>Bicycle Volumes</b>	Most Recent (5 Years) Available Bicycle Counts along each corridor	City/Consultant	On Arterials and Trails within the study area	Do not have
<b>Transit Routes/Volumes</b>	Routes and Frequency	Metro/ST/Microsoft	Along all corridors within the study area	Requested from KCM Seeking ETC/TDM coordinator Google
<b>Average Vehicle Travel Times &amp; Variability / Seasonality</b>	Available Average vehicle travel times and speeds	INRIX	Along all corridors within the study area	Have INRIX data
<b>Travel Time Variability</b>	Available Metro and ST Vehicle Location	Metro/ST	Along all corridors within the study area	Requested from KCM
<b>Transit Travel Times/Delays</b>	Available Metro and ST Vehicle Location	Metro/ST	Along all corridors within the study area and at stops	Requested from KCM
<b>Transit Passengers</b>	Available Metro and ST Ridership/APC	Metro/ST	Along all corridors within the study area	Requested from KCM
<b>Park and Ride Occupancy/Utilization</b>	Available Historic Park and Ride Occupancy and Utilization	Metro	South Kirkland P & R, NE 70th P & R and Kingsgate P & R	Have P&R Data for Houghton, Kingsgate and S Kirkland P&R Seeking historic data
<b>Park and Ride License Plate</b>	Available Historic Park and Ride License Plate Origins Study 70th, 132nd and S Kirkland P/R	Metro/Streetlight	South Kirkland P & R, NE 70th P & R and Kingsgate P & R	Have P&R Data for Houghton, Kingsgate and S Kirkland P&R
<b>Origins-Destinations</b>	Travel Demand Model O-D and StreetLight O-D	City/Consultant (StreetLight & City Travel Demand Model)	Screenlines (north south and east west)	Have 2013 Model – need to get updated model from City, haven’t ordered Streetlight data yet,

				see below for Streetlight details
<b>Collisions</b>	Most Recent (5 Years) Available Frequency, severity, propensity	City/WSDOT/Bellevue	Along all corridors within the study area	Have Collision Data
<b>Parking</b>	Available On Street Parking Restrictions and occupancy	City/Consultant	Houghton Everest Neighborhoods	Don't have any on-street parking info May need to collect
<b>Travel Demand</b>	Have 2013 Data Banks Looking for latest BKR data	City/Bellevue	Citywide	City to provide data and TAZ files
<b>Other improvements</b>	Improvements planned or programmed within the corridor for the next 5 years including private development that could influence transportation in the study area	City/State/Bellevue	Along all corridors within the study area	Transpo to propose

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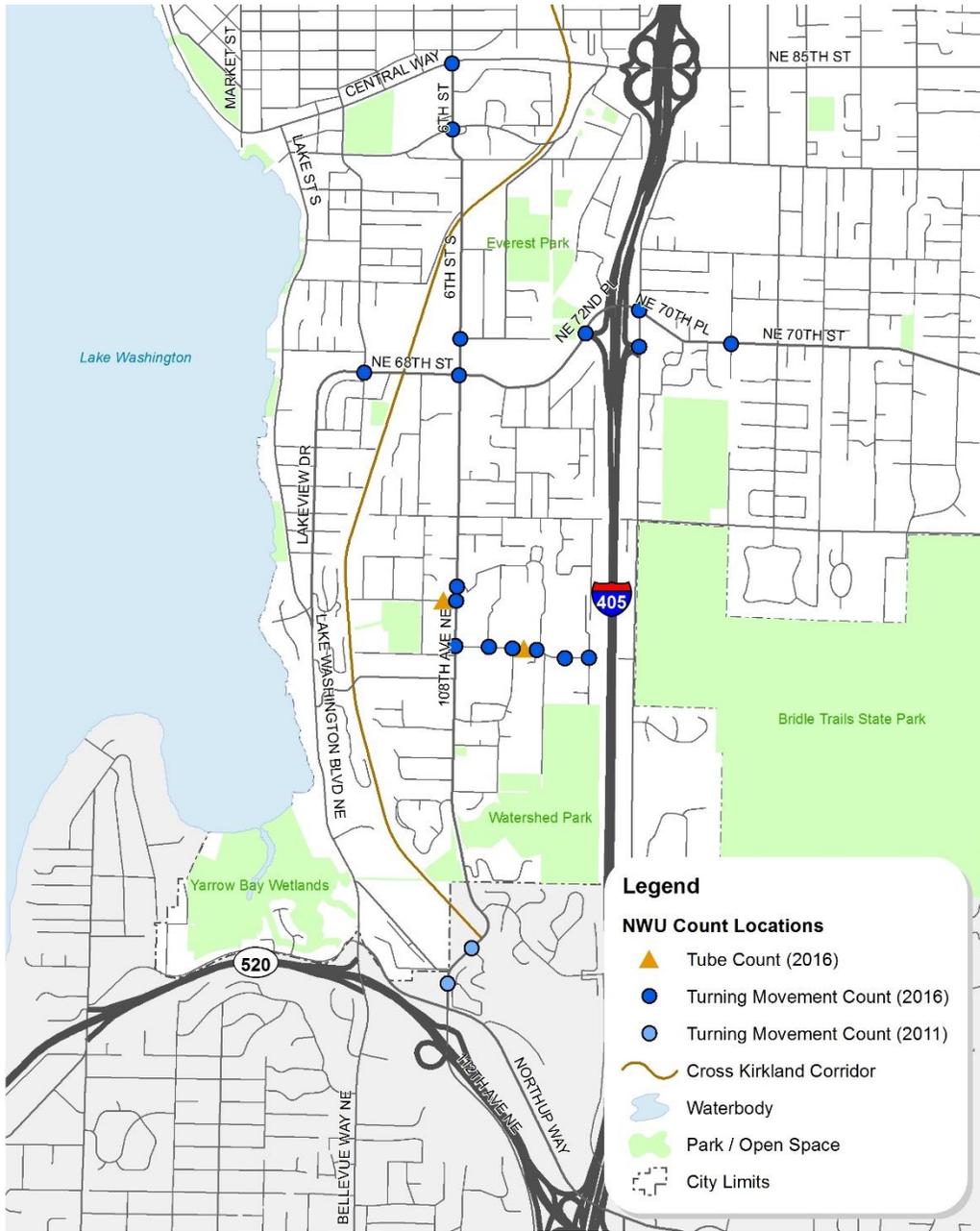


Figure 2 - Data Collection Status

### Streetlight Data Availability

Based on conversations with representatives at Streetlight, it is expected that the data capture rate would be between 3-5% for all vehicles moving within the study area. Capture rates would likely be slightly higher for commercial vehicles. The data would be able to provide a customized set of origin destination pairs for both general purpose and commercial vehicles moving in and out of the study area by any access point of our selection. The figure on the left in **Figure 3**, below, represent the study area boundaries and the customizable “entry points” into the study area, as well as the “middle points” for which vehicles would have to cross in order to be counted in the data set. The right most figure below shows a sample exit point (112th Ave On Ramp to SR 520 WB) and the percent of vehicles that begin at the designated entry point then pass through the middle point and exit at the exit point. In this case, it demonstrates the cut-through traffic that uses 6th Street during the designated time period. The color of the polygons in the figures below represent the relative percentage of trips entering the study area from the entry point, passing through the middle point and then terminating in either the orange or red polygon (orange = 10-35%, red = 35-48%).

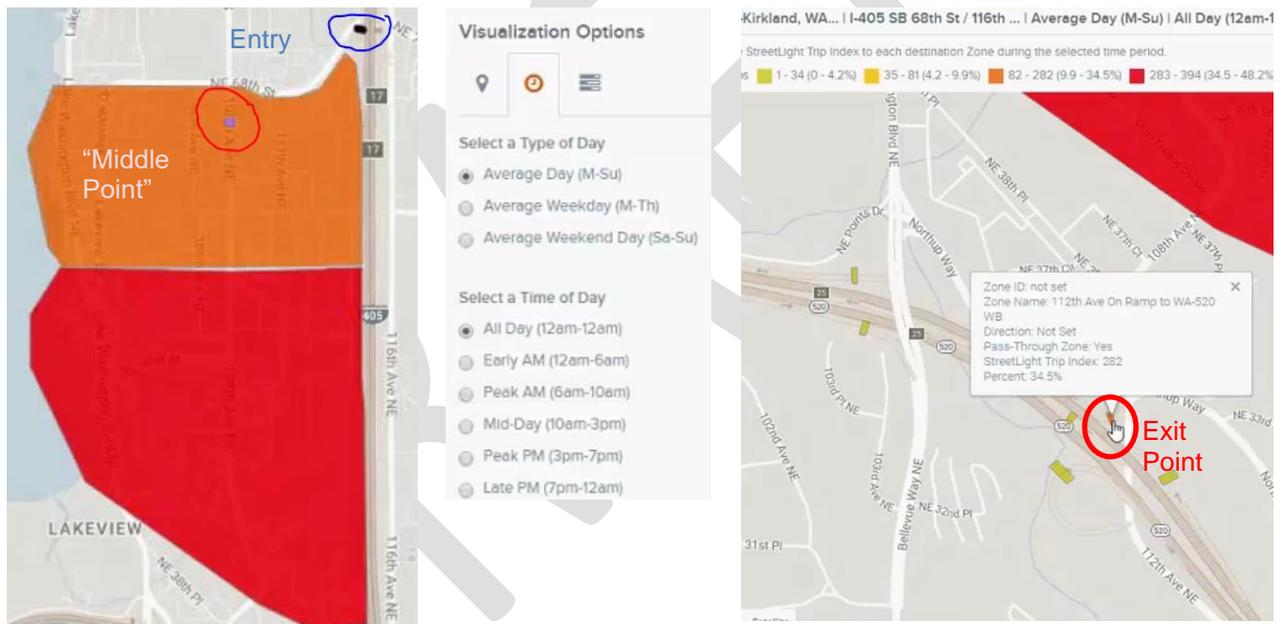


Figure 3 - Sample Streetlight Interface

A map of potential locations (up to 22) for middle and end points is shown in **Figure 4**.

### Methodology

This section outlines methods to support analysis and development of solutions for the 6th Street/108th Avenue Corridor.

### Study Limits

As noted above the analysis will be conducted along the 6th Street /108th Avenue NE corridor between the limits between Northup Way and Kirkland Avenue. Other parallel corridors (Lake Washington Boulevard, 116th Avenue NE and I-405 as well as NE 68th/70th Street from Lake Washington Boulevard to 116th Avenue. The study is also evaluating the Cross Kirkland Corridor, which is currently an interim soft-surface trail.

### Study Years

The study will consider 2016 as the existing conditions and 2035 as the design year. An interim year will be considered as 2025.

### Performance Measures

Performance measures that have been identified by stakeholders are described below

- Movement of people – ability of the corridor to move people efficiently during peak times
- Operations of all modes – level of service in terms of queue, travel time, and level of service
- Access – amount of blocked neighborhood access and access provided
- Travel time – estimated total comparative travel time

### Analysis Tools & Parameters

Tools that will be used to support analysis are assumed to be:

- **Travel Demand Model (EMME)** – Translates land use into trips and traffic. The most recent validated BKR model will be used to evaluate TAZ land use, travel patterns, and growth. Other mid-year analysis will be created from interpolated land use. Additional land use (rezone) will also be analyzed
- **Operations Analysis (Synchro)** – Intersection analysis using existing and projections of afternoon peak traffic volumes, vehicle types, signal timing, and roadway features.
- **Microsimulation (VISSIM)** – Corridor analysis using roadway features, projections of traffic volumes, travel behavior, vehicle characteristics

### Assumed Background Improvements

Table 2 below a base set of background improvements anticipated to be in place in by 2035.

**Table 2 Background**

Elements	Description	Year	
		2025	2035
Signal 9th/6th Street	Installation of new traffic signals	X	X
Signal Kirkland Way/6th Street	Installation of new traffic signals	X	X
Signal 53rd/108th Avenue	Installation of new traffic signals as part of Northwest University	X	X
CKC Permanent Regional Trail	Expansion of the CKC with regional permanent trail	X	X
I-405 Corridor Completion	Completion of the I-405 corridor improvements	X	X
Northwest University	Expansion of the Northwest University Campus	X	X
Kirkland Urban	New mixed use development	X	X
Maximum Density with current zoning	Increase development to meet current permitted zoning	X	X
Houghton Everest Up-zone	Development above zoning	X	X
Light Rail to S Kirkland Park and Ride	Extension of light rail from S. Kirkland park and ride to Issaquah by way of Bellevue		X



Figure 4 - Suggested Data Points for Streetlight Data

# APPENDIX B: LOS DEFINITIONS & WORKSHEETS

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# LOS DEFINITIONS



## Signalized Intersections

Signalized Intersection level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle in experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table B1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* (Transportation Research Board).

delay could mask deficiencies of minor movements. Table B2 shows LOS criteria for unsignalized intersections as described in the *Highway Capacity Manual 2010* (Transportation Research Board).

**Table B1. Level of Service Criteria for Signalized Intersections**

LOS	Avg. Control Delay (sec/veh)	General Description
A	≤10	Free Flow
B	>10-20	Stable Flow (slight delays)
C	>20-35	Stable Flow (acceptable delays)
D	>35-55	Approaching funstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55-80	Unstable flow (intolerable delay)
F <sup>1</sup>	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010*, Transportation Research Board (TRB)

1. If the volume-to-capacity ratio for a lane group exceeds 1.0 LOS F is as-signed to the individual lane group. LOS for overall approach or intersection is determined by the control delay.



## Unsignalized Intersections

LOS criteria can be further reduced into two intersection types: all-way stop and two-way stop control. All-way stop control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low

# APPENDIX C: SURVEY SUMMARY

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# Houghton Everest Neighborhood Center 6<sup>th</sup> Street Corridor

Community Workshop  
November 2, 2016

# Survey Overview

Survey Period: August 22 – October 28  
Citywide Participation Encouraged

◀ Welcome

WELCOME

**Help envision our community's future!!**

Kirkland is asking for your help in planning for the future of the Houghton/Everest Neighborhood Center and the 6th Street Corridor. Help shape our community!

[View Study Area \(Map\)](#) [Begin](#)

The City is striving to enhance the livable, sustainable and connected character of the community through development of an integrated land use and transportation plan for the Houghton/Everest Neighborhood Center and 6th Street Corridor.

**HE 6th**  
• HOUGHTON / EVEREST  
NEIGHBORHOOD CENTER  
• 6TH STREET CORRIDOR

PREFERENCES 2  
STRATEGIES 3  
IMAGE VOTING 4  
STAY INVOLVED 5

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# Survey Outreach



## Electronic Announcements

- Email announcements from City
- Kirkland NextDoor
- KirklandViews

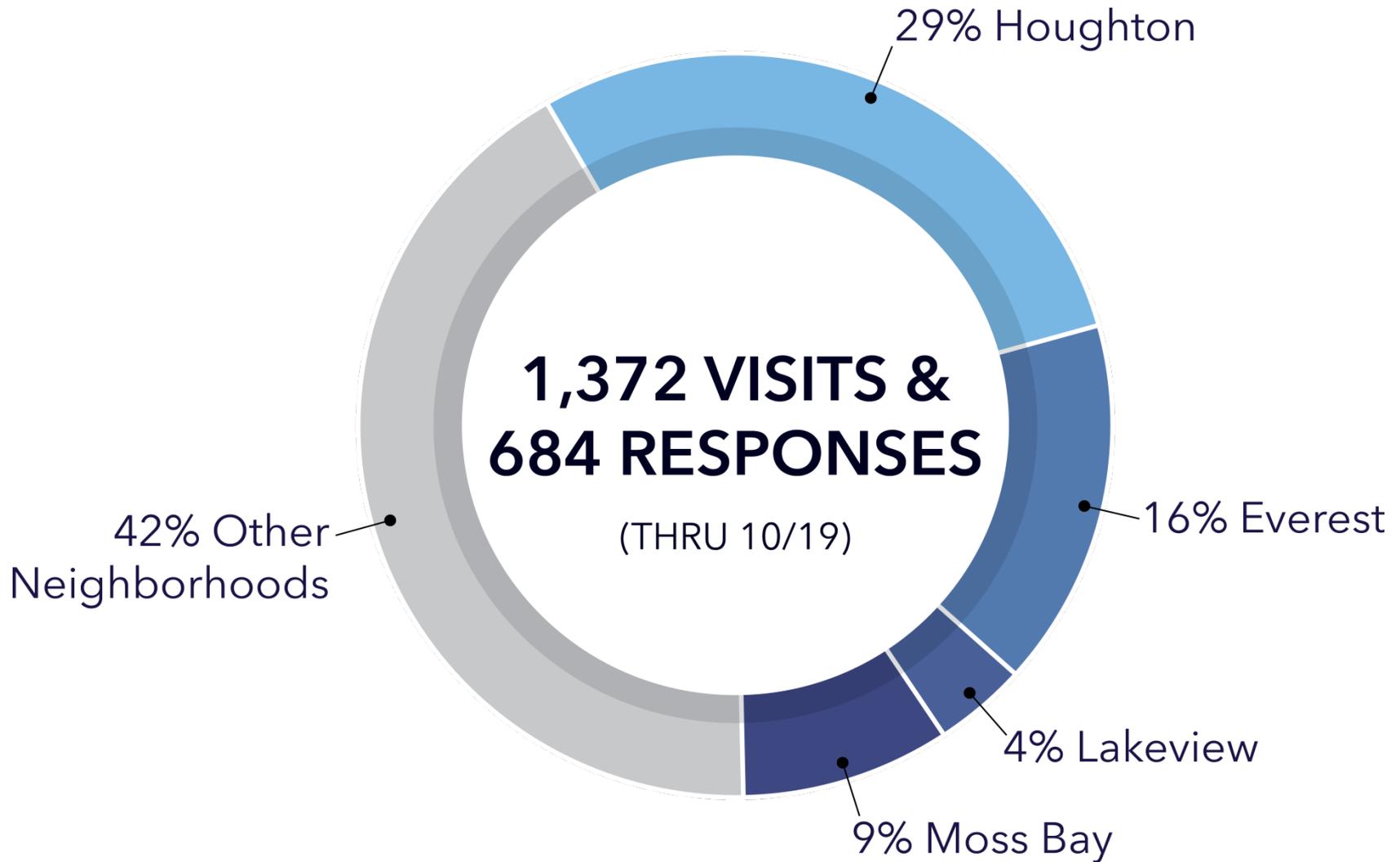
## Informal Outreach

- Local parks, Northwest University, PCC, CKC

## Other

- Neighborhood signs
- Peter Kirk Day Camp
- Posters – locations citywide
- Lakeview PTSA
- 6<sup>th</sup> Street Corridor businesses

# Survey Responses



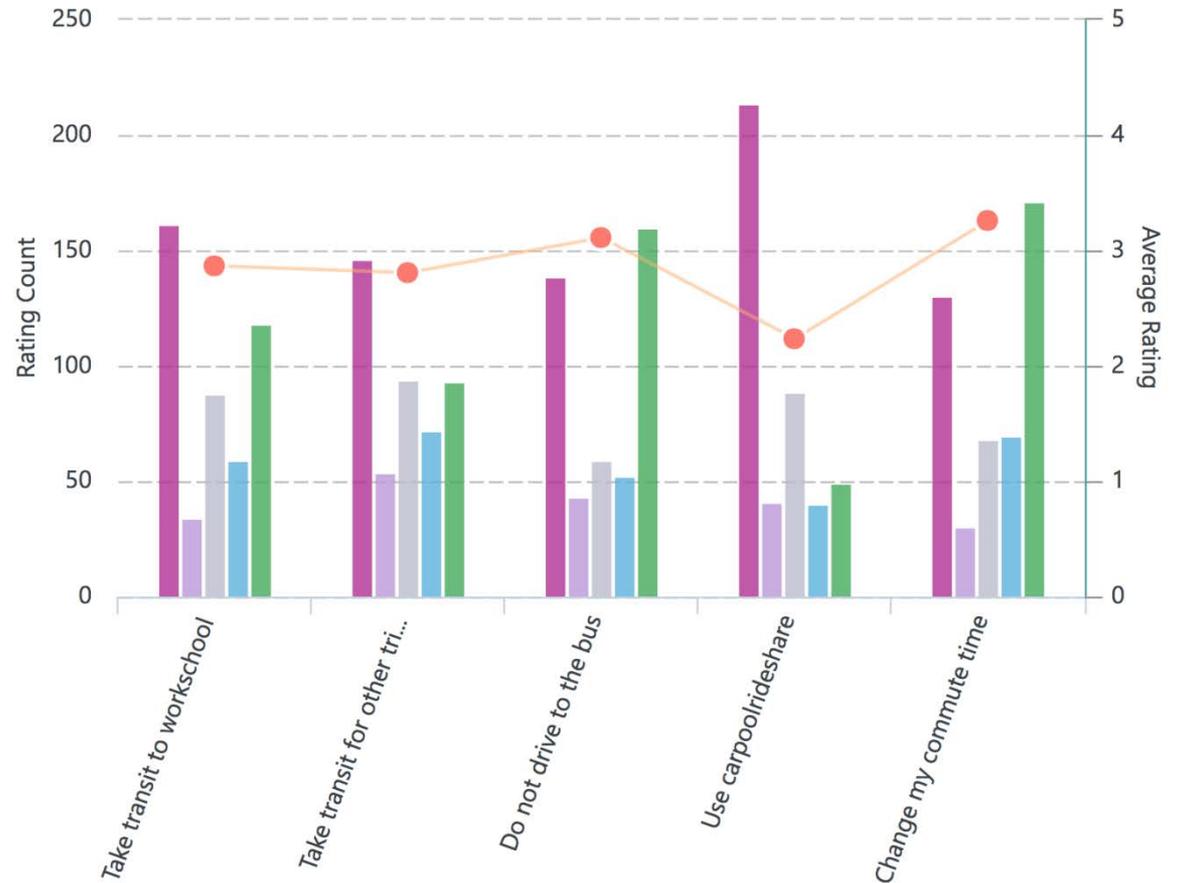
# Neighborhood Preferences

## Areas of Agreement

Development Patterns

Land Use

## Transportation Options



# Neighborhood Preferences

## Mixed Opinions

Circulation Patterns

Corridor Mobility

Transportation Options

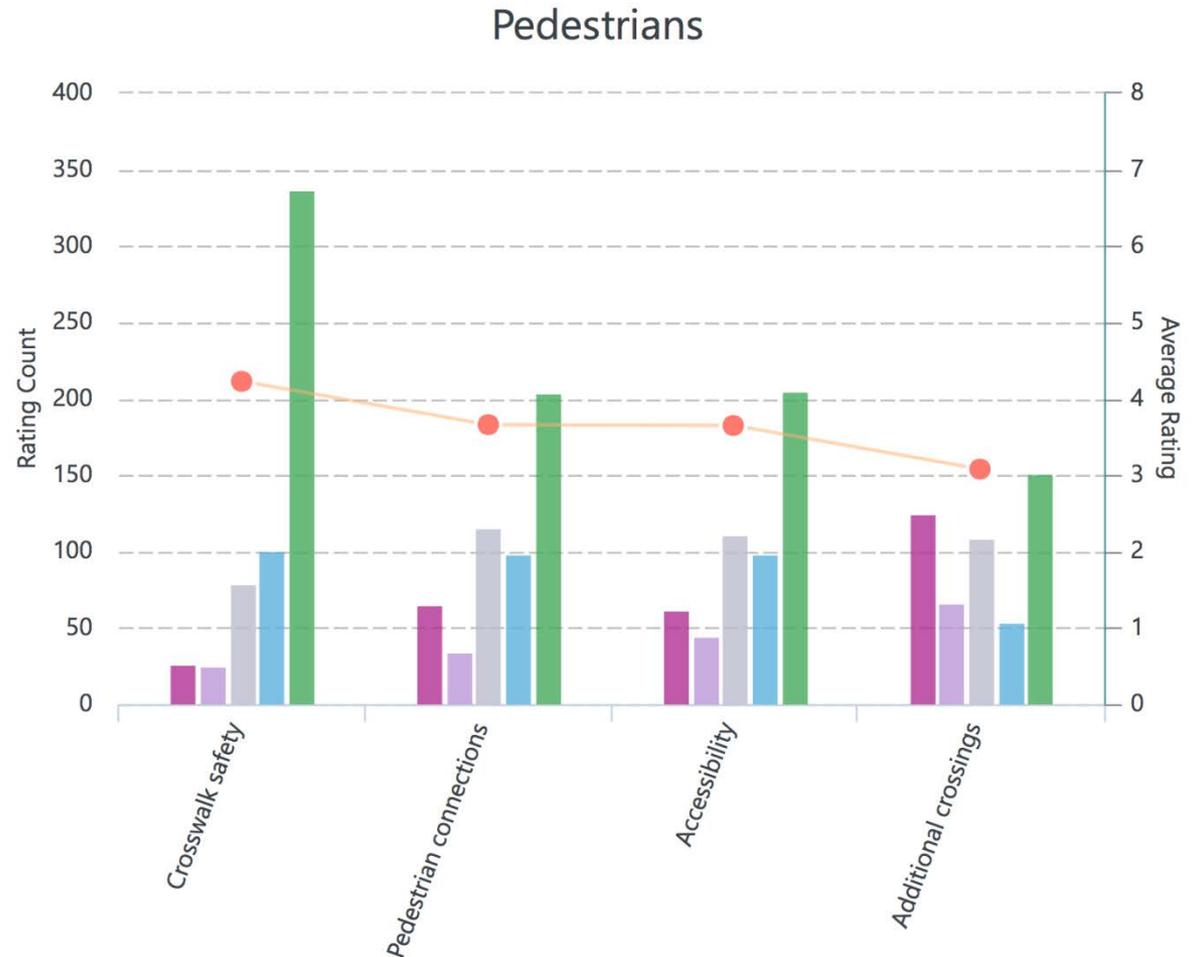


# Transportation Strategies

## Areas of Agreement

Pedestrian Circulation

Improving Transit



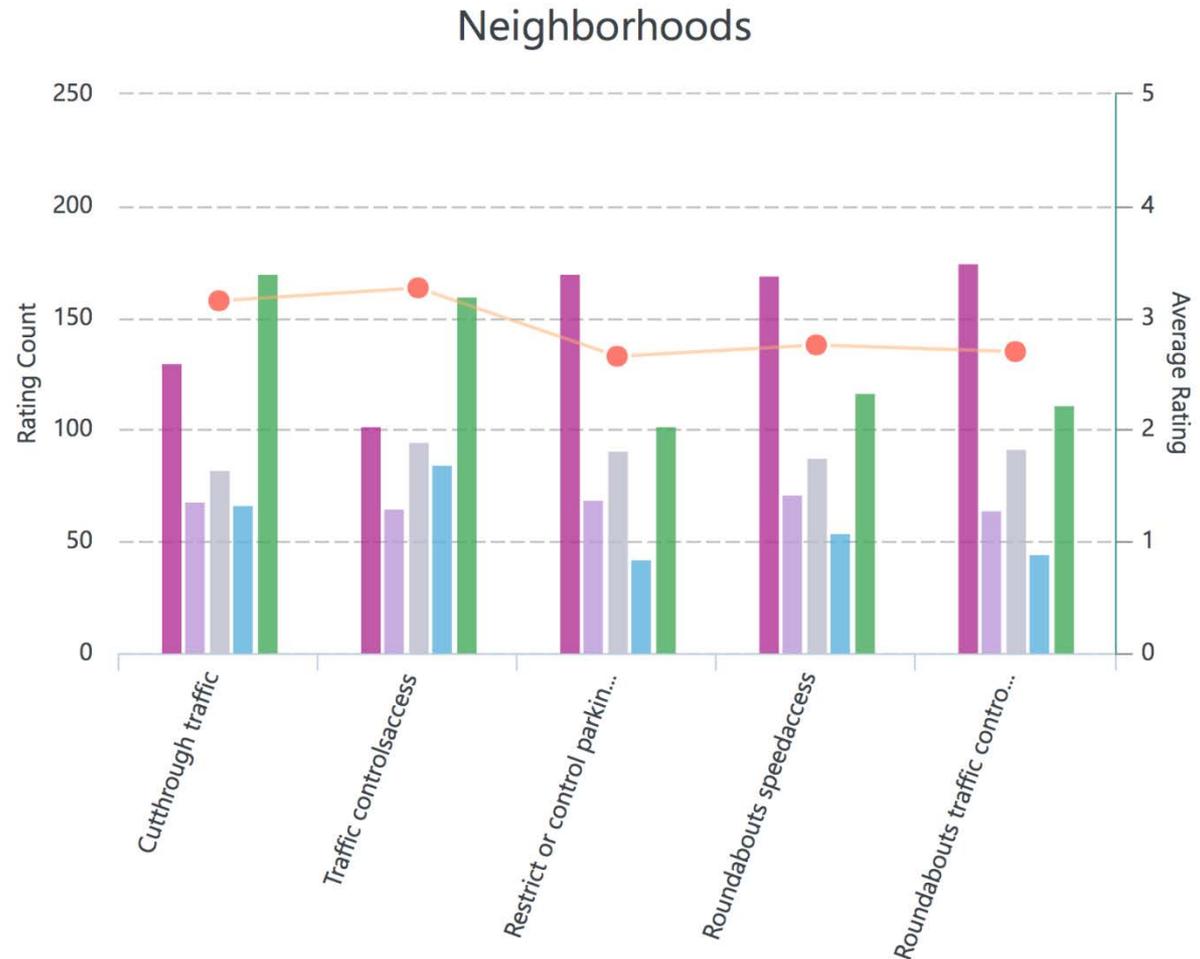
# Transportation Strategies

## Mixed Opinions

Bicycle Circulation

Neighborhood Access

Reducing Congestion

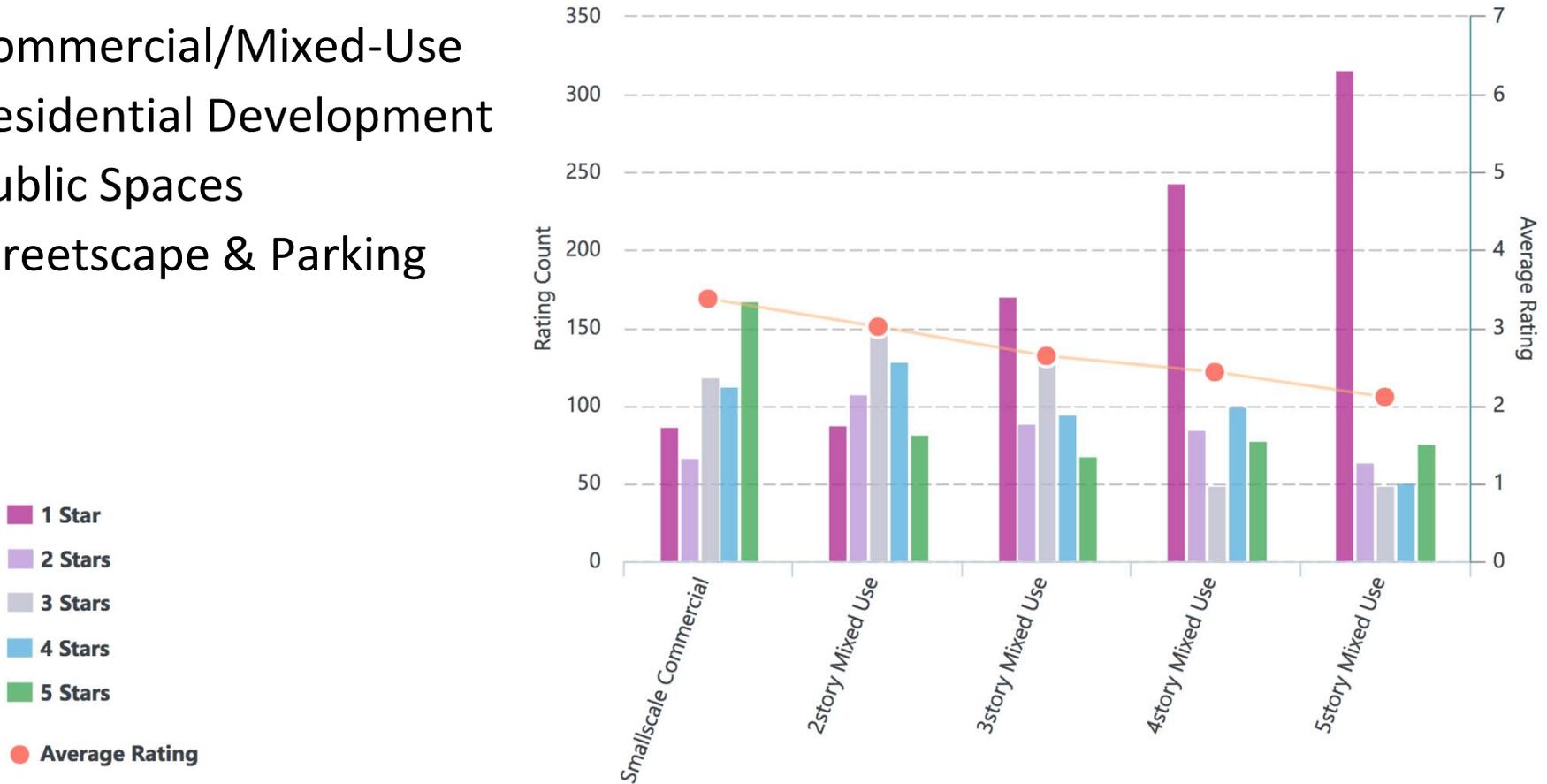


# Image Voting

## Areas of Agreement

- Commercial/Mixed-Use
- Residential Development
- Public Spaces
- Streetscape & Parking

## Commercial Mixed Use

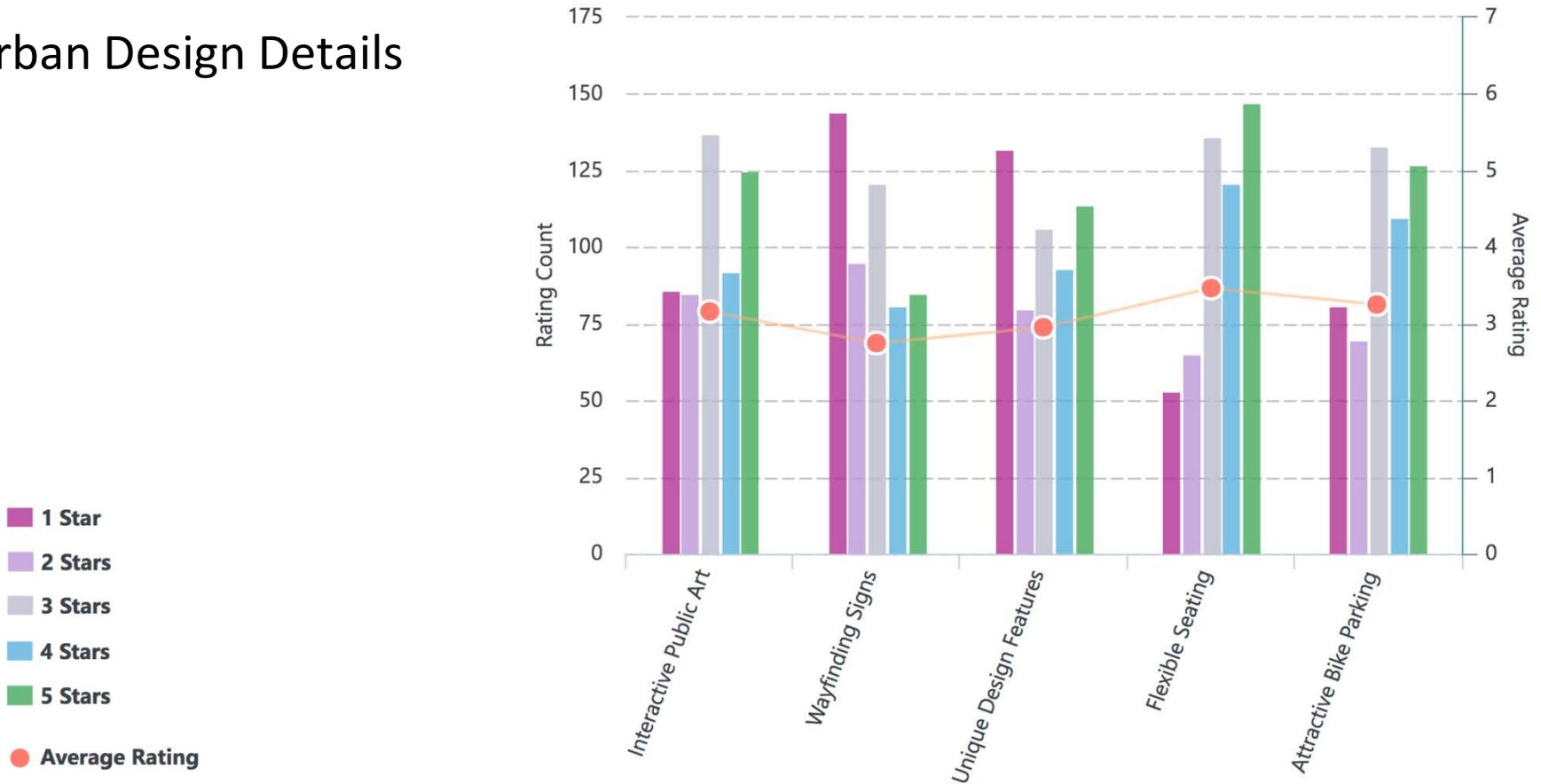


# Image Voting

## Mixed Opinions

### Urban Design Details

#### Urban Design Details



# Next Steps



**Compile survey findings thru October 28**

**Prepare summary report**

**Post materials to the project website**

- Survey findings
- Summary report
- Written comments on each question

# APPENDIX D: SOLUTIONS MEMO

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## MEMORANDUM

<b>Date:</b>	January 23, 2017	<b>TG:</b>	16090.00
<b>To:</b>	Joel Pfundt, City of Kirkland		
<b>From:</b>	Jeanne Acutanza/TranspoGroup Paul Sharman/TranspoGroup		
<b>cc:</b>	Deborah Munkberg/3SquareBlocks Angela Ruggeri/City of Kirkland		
<b>Subject:</b>	6th Street Corridor Kirkland – Potential Solutions evaluation		

The purpose of this memorandum is to summarize the evaluation of potential solutions developed to meet the NE 6th Street/108th Avenue corridor transportation needs. This effort is being conducted in conjunction with a study of the Houghton / Everest Neighborhood Center.

In summary, this list of solutions builds on what we heard, and what we learned through stakeholder outreach to the community and public, an evaluation of data from a wide range of sources, a workshop with City staff, and reviews by the Transportation Commission and Council. The resulting solutions that we will be evaluating are provided in the list attached. The locations of these investments are shown on the figure attached. These solutions will be evaluated against values defined by the community. More details of this effort are provided below.

### Stakeholder Outreach

Outreach for this effort consisted of the following:

- Key stakeholder interviews with neighborhood community organizations
- A broad public survey
- Outreach with agency stakeholders with transportation responsibilities – Metro and Bellevue
- A community workshop that defined issues and key values as well as developed ideas
- Staff workshop of initial ideas
- Review and guidance by the Transportation Commission

### Data collected and analysis conducted

Working with City staff, Transpo assembled data and information from a range of public and private data sources including Kirkland, Metro, WSDOT, PSRC, INRIX, Google, and Streetlight. Transpo also conducted field studies of parking, traffic operations and queueing.

### Potential Solutions

Through stakeholder outreach and understanding of data and analysis, a set of solutions was developed and is attached as **Table 1**. These investments are located throughout the corridor as shown in **Figure 1**. This list of solutions is intended to be practical and achievable and emphasizes community interest. Solutions were identified to promote use of transit as a way to increase the capacity of this corridor, better connect the community especially for pedestrians and bicyclists and improve/enhance safety through better management of access, specifically in the neighborhood center.

### Evaluation and Values

Values were discussed with the public at the community workshop meeting and will be used to evaluate solutions. These values emphasize movement of people, better connection of the community and considering capacity for the future. **Table 1** provides a summary of a draft evaluation of corridor solutions with recommendations on solutions to be carried forward and for discussion with the Transportation Commission.

**Table 1 - NE 6<sup>th</sup> Street Corridor Study Potential Solutions – January 23, 2017**

Numbers	Potential Solution Ideas	Type	Description	Timeline	Cost	Movement of People	Connect Communities	Capacity for the Future	Notes	Recommended
<b>1. 6th Street at Kirkland Way</b>										
<b>1A</b>	Transit Signal Priority Northbound - Peak Hour - Left turn lead lag	Transit	The City is in the process of designing and implementing traffic signals at the intersection of 6th Street and Kirkland Way. Metro’s heavily used route 255 turns northbound left at this intersection and eastbound right. Transit signal priority at this intersection for the Northbound Lefts could provide a short travel time advantage for transit.	1-5 Years	\$\$	2	2	2	Yes, will provide some benefit for transit	6 ✓
<b>1B</b>	Signal Coordination along 6th Street with future increased demand	Vehicles	To better and more efficiently travel along the 6th Street corridor between Central Way and Kirkland Way. Interconnecting the signals (including the signal at 4th) could improve the efficiency, reduce stops and delays.	1-5 years	\$\$	3	1	3	Yes, will improve operations and reduce delay	✓
<b>1C</b>	Crosswalk improvements	Ped	To improve access across 6th Street for pedestrians, put in place RRFB crossing.	1-5 Years	\$	3	3	2	Yes, will enhance safety	✓
<b>2. 9th and Railroad Avenue</b>										
<b>2A</b>	9th and Railroad at Kirkland Way Intersection Safety - Radar Speed - Left turn lane	Vehicles	A safety concern for neighborhoods include sight distance near the existing CKC trestle over Kirkland Way at Railroad Avenue and 9th Street. Radar speed signs may help reduce speeds and improve safety for accessing Kirkland Way. There may be the opportunity to add a westbound left turn pocket at railroad Avenue to improve turning movements.	1-5 Years	\$	1	2	2	Yes, under design	✓
<b>3. CKC for Transit</b>										
<b>3A</b>	BRT on CKC bypass 108th to S Kirkland Park and Ride	Transit	To reduce transit delays incurred on 6th Street and 108th Avenue, especially northbound during PM peak periods, constructing transit lanes within the CKC, similar to the Master Plan. Transit on the CKC, especially in this segment could still connect to local neighborhoods but would dramatically increase overall transit travel times. Construction of this facility would be very expensive including structures over NE 68th Street and development of stations/stop, and take years to implement.	10 + Years	\$\$\$\$	3	3	3	Yes, consistent with the Master Plan and initial phase	✓
<b>3B</b>	Bus Intersection at 6th Street and the CKC	Transit	Another opportunity for transit signal priority would be at the CKC trail intersection on 6th Street. This would require a new signal, removal of on-street parking to give transit a bypass to north bound queues that can be over 200 feet long.	5-10 Years	\$\$\$	2	2	2	Yes, potential first phase of 3A	✓
<b>4. 6th Street at 9th Avenue S</b>										
<b>4A</b>	Re-Assess the installation of traffic signals at 6th Street and 9th	Vehicles / Peds / Bikes / Transit	The City is in the process of designing and constructing a new traffic signal at the intersection of 6th Street and 9th. This signal could provide a shortcut for cut through traffic and may impact the adjacent intersection at NE 68th Street and 108th Avenue. This signal could support redevelopment of adjacent land uses. Deferral and delay of this signal might be helpful as a consideration of future development and rezone consideration.	1-5 Years	\$	1	2	3	Yes, will improve access from Everest Neighborhood	✓

Numbers	Potential Solution Ideas	Type	Description	Timeline	Cost	Movement of People	Connect Communities	Capacity for the Future	Notes	Recommended
<b>5. 70th Street over I-405</b>										
5A	Improve expand 70th Overpass	Vehicular	The existing NE 70th Street Corridor and structure over I-405 is curved, steep and constrained. Better organization and improvements in this corridor, could provide better and protected space for pedestrians and add space for cyclists which does not exist today. There is also a need to improve operations and access for transit and reduce delay for vehicles in the vicinity of I-405.	10+ Years	\$\$\$	3	3	2	Yes, consider as part of BRT planning	✓
5B	BRT Planning near 85th/70th and Park and Ride	Transit	Passage of ST 3 includes development of Bus Rapid Transit on I-405 and potential station development within the freeway right of way near 85th. City transit planning would support coordination and integration with the local street system to most effectively connect these new stations to the local communities and other transit sources.	5-10 Years (Proposed as 2024)	\$	3	3 (add ped connections)	2	Yes, part of a long range look at Transit	✓
<b>6. Houghton Park and Ride</b>										
6A	Houghton Park and Ride lease for private shuttles	Transit	Private shuttles are operating in Kirkland for large employers including Google, Microsoft Connector and most recently Facebook and Amazon. Parking for employees meeting the shuttles currently use the S Kirkland Park and ride and other leased space. With underutilization at the Houghton (7th) park and ride, this space could be leased to these private shuttle operators leaving spaces in South Kirkland Park and Ride to meet Public transit demands.	1-5 Years	\$	3	2	2	Yes, requires coordination with partners	✓
<b>7. 108th Avenue at NE 68th Street</b>										
7A	Transit Signal Priority and queue jump - Left turn lane Transit only - Overhead signs time of day - C-Curb driveway restrictions	Transit	Transit operating on 108th Avenue is delayed with other vehicles. Few signal controlled intersections along the corridor mean fewer opportunities for transit signal priority. An option for implementing signal priority might include utilizing the northbound left-turn lane for transit only (currently 8 buses in the peak hour) as a queue jump (roughly 1000 feet) for transit by restricting turns with C-Curb and implementing a phase for that left turn for transit. To implement this as a changeable by time of day system would require overhead signs and continue to allow driveway access for emergency vehicles. Restricting full access at driveways may be an impact along with less efficient signals for moving vehicles (however moving people may improve). Queues along 108th, which are extensive (over 1 mile long) could become longer. In the future as part of Metro Connects, transit on 108th is assumed to be Rapid/BRT style with more dispersed stops (1/2 mile instead of ¼ mile) Requires accommodations for U-Turns	5-10 years	\$\$	1	2	2	No, limited, if any, benefit for peak period transit and extends queue and restricts access	
7B	Transit Signal Priority for left turns - combines bus and lefts	Transit	A variation of 5A could be to combine left-turning vehicles with transit vehicles.	5-10 years	\$\$	2	2	2	No, limited benefit	
7C	Continue and complete bike lanes	Bikes	Complete the bike lanes along 108th Avenue NE where missing.	1-5 Years	\$	3	3	3	Yes, requires added Right of Way	✓

Numbers	Potential Solution Ideas	Type	Description	Timeline	Cost	Movement of People	Connect Communities	Capacity for the Future	Notes	Recommended
7D	Install "Don't Block the Box" pavement markings at Fire Station Driveway	Vehicles	Install pavement markings that keep the fire station driveway clear of vehicle queues. (Will be included in the City Annual Striping Program)	1-5 Years	\$	1	2	2	Yes, underway	✓
7E	Widen to provide curbside Northbound Transit only lanes	Transit	Widen 108th Avenue to create an extensive Northbound through lanes for transit to bypass queues. May be adjacent to a bike lane and also conflict with high volume of right turns at NE 68th Street	10+	\$\$\$\$	3	1	2	No, impacts neighborhoods	
<b>8. NE 68th Street at 108th Avenue NE (Access)</b>										
8A	Access Management and Multimodal Access on NE 68th Street and 108th. - Median Control - Driveway Consolidation - Wider sidewalks - remove crosswalks - on street parallel parking	Vehicles / Peds / Bikes	Closely spaced driveways and intersections, bike lanes, as well as crosswalks on NE 68th Street results in numerous conflict points between vehicles, pedestrians and bicycles. Access management strategies can include closing or consolidating driveways, using medians to separate conflicting movements and reorganizing development sites to better circulate and organize traffic off of arterial streets. An initial set of strategies could include consolidation of driveways on NE 68th Street, removal of crosswalks, medians for the left turn pocket and wider sidewalks. With redevelopment of the adjacent land uses this option includes widening sidewalks, extending bike lanes and adding on street parking.	5-10 Years	\$\$	3	3	2	Yes, as an interim solution with no development	✓
8C	Access Management - Selectively close driveways	Vehicles / Peds / Bikes	Similar to 8A but without any redevelopment or widening, there could be some access management strategies implemented including closing or consolidating driveways and potentially removing the pedestrian crossing.	1-5 Years	\$	2	3	2	Yes, as an interim solution with no development	✓
8D	Full Bicycle Intersection at 6th/108th	Peds / Bikes	Bicycle lanes are provided on NE 68th Street and 108th Avenue and bicycle use is growing; however, these bicycle lanes do not continue through the intersection of 108th Avenue NE at NE 68th Street. One way to do this would be to create a bicycle intersection that extends bike lanes and protects bike movements. This type of intersection can also promote pedestrian safety with ped bulbs making pedestrians more visible.	5-10	\$\$	2	3	2	Yes, with full development	✓
8E	Green Bike Boxes	Bikes	Similar to 8D, Green Bike Boxes could enhance bike visibility by placing a painted green bike at the front of vehicle queues. This may require widening.	5-10 Years	\$	3	3	2	Yes, improves safety for bicycles	✓
<b>9. CKC Connectivity</b>										
9A	Improved trail access and connection for Bikes	Peds / Bikes	As part of the Interim Trail development of the CKC, the City has developed key connections to the local street system from the trail to neighborhoods. Continuing to enhance some of these facilities as better bike connections would be desirable, for example where the NE 60th Street Corridor connects with the CKC.	5-10 years	\$\$	3	3	3	Yes, improves trail access and encourages bike use	✓

Numbers	Potential Solution Ideas	Type	Description	Timeline	Cost	Movement of People	Connect Communities	Capacity for the Future	Notes	Recommended
<b>10. NE 60th Street Connections</b>										
10A	Enhanced ped and bike access for 60th Neighborhood Greenway	Peds / Bikes	The City of Kirkland Transportation Master Plan includes designation of a system of Neighborhood Greenways. These greenways promote safe, low volume, slow speed roadways to promote use by pedestrians and bicycles. One of these connections is NE 60th Street. This connection could be enhanced and promoted to reduce bicycle conflicts on arterial streets and promote places for less confident bike riders. NE 60th Street as a greenway can be a key connection across I-405 connecting Lake Washington Boulevard to Overlake.	5-10 Years	\$	3	3	3	Yes, consistent with Master Plan and provides safer cycling routes	✓
10B	New East West Connection across I-405 and Connecting to Lakeview	Vehicles / Transit	There is a long extent of 108th Avenue and I-405 with limited east-west vehicle connections. A logical crossing for an East West Connection would be NE 60th Street connecting across I-405 south of the Houghton Park and Ride to Lakeview Drive. This Connection would potentially require new signals at 116th Avenue NE, 108th Avenue NE and Lakeview Drive as well as a new vehicle crossing of the CKC. This may require closure of driveways, and 114th Avenue west of I-405 to accommodate grades.	10 + Years	\$\$\$\$	3	3	1	No, impacts neighborhoods	
<b>11. Signal at NE 53rd (access to NU)</b>										
11A	Signal at 53rd (proposed by NU) Relocate and improve bus stop. Coordinate and adjust crosswalk with Metro	Pedestrian / Transit	As part of expansion and permitting for new development at Northwest University, the University has proposed installation of a traffic signal on 108th Avenue at NE 53rd Street. Design and development of signals at this location is complicated with an offset alignment of NE 53rd and NE 52nd Streets, a protected crosswalk, and a busy transit stop serving the University, Emerson High School and the neighborhood. Installation of traffic signals would be implemented when engineering standards (per MUTCD signal warrants) are met.	1-5 years	\$\$	1	3	3	Yes, part of NU Mitigation not moving forward, but continue to monitor as a future planned project	✓
<b>12. South Kirkland Park and Ride</b>										
12A	Park-and Ride permitting for transit users	Transit / Parking	The South Kirkland Park and Ride is often full. Prioritize park and ride spaces for transit riders through permitting. This could be the simplest strategy to promote transit. There will be different trade-offs.	1-5 Years	\$	2	2	3	Yes, potentially part of Metro Study	✓
12B	Improve Access/Egress from Park and Ride for Buses - Speed/Radar - Pavement Marking	Transit / Parking	Improve site operations by improving egress from the Park and Ride for buses. Metro has studied this and are working with the Cities. A potential solution includes using speed radar and pavement markings to improve sight distance for exiting buses.	1-5 Years	\$	2	2	2	Yes, Metro recommendation	✓
12C	New signal control access Park and Ride Access (City of Bellevue)	Transit / Parking	As congestion increases and it becomes increasingly challenging to access the Park and Ride on 108th Avenue, traffic signals should be considered at the access. This signal would be within the jurisdiction of the City of Bellevue and would be most effective to be interconnected with the adjacent signals on 108th that are part of Bellevue's adaptive signal system. Could be annexed into City of Kirkland.	1-5 Years	\$\$	2	2	2	Yes, future Metro recommendation	✓

Numbers	Potential Solution Ideas	Type	Description	Timeline	Cost	Movement of People	Connect Communities	Capacity for the Future	Notes	Recommended
12D	Improve trail access to Park-and-Ride (On hold)	Transit / Bike / Peds	The Cross Kirkland Corridor (CKC) runs adjacent to the South Kirkland Park and Ride, however there is a grade change and gap that limits access for bikes and peds along the Corridor to using the sidewalks and bike lane on 108th Avenue. As this volume increases access to the adjacent park and ride structured garage would be desirable as a way to more easily access transit. With the passage of Sound Transit 3, there is a planned light rail station at South Kirkland Park and Ride that may include amenities such as bike parking and an elevator. This important connection for bikes and peds from the CKC to the park and ride is important and should be considered in the planning and development of a future rail station.	5-10 Years	\$\$	3	3	3	Future with ST 3	✓
12E	Bike Share/Bike Racks at Park and Ride	Transit / Bikes	With the close proximity of the CKC to park and ride, increased use of bikes to access transit will result in the need for bike parking/racks and the potential desire for shared use bike, especially with an improved connection (12D).	1-5 Years	\$	3	3	2	Yes, potentially incremental implementation or with ST 3	✓
12F	Park and Ride management strategies with real time information	Transit / Bikes	Advances in technology and pilot studies with Sound Transit and Metro to expand real time information on parking occupancy. There are opportunities with transit partners to look for improved management strategies. These strategies can increase efficiency of the facility for moving people through strategies such as permit parking, premium/reservation parking, improved access to Park and Rides using shared use resources such as Bike Share and Car Share or Transportation Network Companies.	1-5 Years	\$\$	3	2	2	Yes, part of Metro Access study	✓
<b>Policies (P) and Education (E)</b>										
P1	Residential Parking Zones to eliminate casual and long term parking (employees)	Parking	Residents have noted that retail employees park off-site and on residential streets. Policy and regulations could discourage this activity through residential parking zones or parking time regulations.	1-5 Years	\$	1	2	1	No, not recommended as parking is available	
P2	On Street parking time limits to reduce park and ride	Transit / Parking	Similar to P1 but issue driven by transit rider parking in neighborhoods.	1-5 Years	\$	1	2	1	No, not recommended as parking is available	
P3	Parking management strategies (shared parking and joint parking) to maximize use. Example: Shared parking of church for market employees.	Parking	For the issues listed in P1 and P2, look for opportunities for shared parking where parking is available for example at Seventh Day Adventist Church where parking is generally used on the weekends only.	1-5 Years	\$	1	2	1	Yes, recommend as part of potential mitigation of development	✓
P4	Trail Oriented Development	Land Use	Development of land use and regulatory policies that support lower parking use through access to regional trails. Including promotion and prioritization of shared use mobility strategies – Car share (car to go), bike share and Transportation Networking Companies (TNCs)	5-10 Years	\$	3	3	2	Yes, recommend as part of potential development	✓
E1	Education Campaign on the value of transit in Kirkland's Mobility Future	Transit	Develop an education campaign to help convey the value of transit in moving people in Kirkland.	1-5 Years	\$	1	3	3	Yes, consistent with City Policy	✓

Numbers	Potential Solution Ideas	Type	Description	Timeline	Cost	Movement of People	Connect Communities	Capacity for the Future	Notes	Recommended
E2	Monitor person movement speed/efficiency	Transit	Develop a performance monitoring system and promote the results to educate the value and benefits of transit in moving people. Develop performance measures, such as person travel times.	1-5 Years	\$	3	2	3	Yes, consistent with City Policy	✓
E3	Greenway promotion of 60th and other connections	Peds / Bikes	Education campaign to promote the use and benefits of the Greenways program including working with neighborhoods, schools, and youth organizations to promote the connectivity and benefits of Greenways using maps, brochures, school education program and other promotions	1-5 Years	\$	1	3	3	Yes, consistent with City Policy	✓

Evaluation Criteria

**Cost Parameters**

\$: <\$1,000,000

\$\$: \$1,000,000-\$5,000,000

\$\$\$: \$5,000,000-\$10,000,000

\$\$\$\$: >\$10,000,000

**Movement of People**

3. Increases throughput of people without impacting operations

2. Increases throughout of people but may impact some operations

1. Does not increase throughput of people

**Connects Communities**

3. Provides a new or improved connectivity for peds and/or bikes

2. Neither impacts nor improves ped/bike connections

1. Negatively impacts connectivity for peds and bikes

**Capacity for the Future**

3. Provides capacity and choices aligned with the Transportation Master Plan

2. Neither conflicts nor aligns with the Transportation Master Plan

1. Conflicts with the Transportation Master Plan

# APPENDIX E: HENC ANALYSIS RESULTS MEMO

DRAFT

## MEMORANDUM

<b>Date:</b>	March 17, 2017	<b>TG:</b>	16090.00
<b>To:</b>	Joel Pfundt, City of Kirkland Angela Ruggeri, City of Kirkland		
<b>From:</b>	Jeanne Acutanza, Josh Steiner, Paul Sharman, Transpo Group		
<b>cc:</b>	Jeff Arango, BERK		
<b>Subject:</b>	Houghton / Everest Neighborhood and 6th Street Corridor - Proposed Land Use Trip Generation Comparison and Methods		

### Purpose and Background

The purpose of this memorandum is to summarize the baseline scenario of development and potential investments against comparative growth scenarios in vehicle trips resulting from proposed land use options in the Houghton / Everest Neighborhood Center. The Houghton / Everest Neighborhood Center is located adjacent to 6th St S/108th Ave NE & NE 68th St intersection in Kirkland, WA. As part of the Houghton / Everest Neighborhood Center and 6th Street Corridor Study, the City of Kirkland is evaluating land use alternatives for the center while evaluating transportation alternatives in the area to serve anticipated growth in vehicle, transit, pedestrian, and bicycle trips.

Two land use scenarios are being studied in comparison to the current 'maximum' land use allowed under the comprehensive plan (2035 Comp Plan Scenario) with maximum height of 30 feet. The two other scenarios are: a modest development scenario with a maximum development height of 35 feet (Modest Change Scenario), and a greater development scenario with a maximum development height of 55 feet (Greater Change Scenario). This memorandum outlines the effects of the Greater Change Scenario against the future baseline scenario of planned growth represented by the 2035 Comp Plan Scenario. These are also reflected against anticipated 2035 land use conditions and anticipated background infrastructure investments. These conditions of an assumed 2035 timeframe with and without growth in the Center are also compared to potential investments that could be in place if this greater development occurred. This memorandum describes the methods applied and results.

### Trip Generation Methodology

Trip generation estimates have been prepared for the project based on trip rates identified using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition (2012). The methodology used in this analysis also accounts for pass-by trips, which are those trips that are attracted to the land use but are not directly generated by the land use. Pass-by trip rates are provided in the ITE *Trip Generation Manual*, 9th Edition (2012) and applies for the PM peak hour of certain land uses, which in this study are ITE 850 Supermarket and ITE 851 Convenience Store.

Trip generation was calculated for the PM peak hour and Daily for each of the development scenarios. Substitutions needed to be made to account for the ITE manual not containing all the same daily land uses as the PM period. These substitutions include replacing ITE 223 Mid-Rise Apartment with ITE 220 Apartment and ITE 936 Coffee/Donut Shop without Drive-Through Window with ITE 932 High-Turnover (Sit Down) Restaurant. Consideration was given to the similarity in land use type when deciding on a land use alternative. ITE also provides rates for the proportion of vehicles entering and exiting the land use during the study period. These rates are

different based on the study period; however, daily rates are not available so a 50%-In/50%-Out split was assumed. This represents a vehicle both entering and exiting the land use each day. Existing (2016) trips are based on volumes in the City’s travel demand model. Existing Zoning (2035) calculated trips were added to the Existing (2016) volumes to arrive at 2035 baseline (Existing Zoning) volumes. Modest and Greater Change are compared to the 2035 baseline.

### Development Land Use

Trip growth was calculated for four land use scenarios provided by BERK Consulting for the proposed development. These scenarios include existing “Existing 2016” conditions, “2035 Current Comp Plan,” “2035 Modest Change,” and “2035 Greater Change,” which represent increases in development building height. The land uses contain a combination of apartments, office space, retail, supermarket, convenience store, and coffee shop land uses. Commercial land uses are consistent between the “Comp Plan,” “Modest,” and “Greater” scenarios, with the difference being the number of total residential dwelling units. Land use by scenario is shown in Table 1 and reflects changes in the number of dwelling units. These are assumed to be multi-family housing above ground level office and retail.

**Table 1. Houghton Everest Neighborhood Land Use**

Scenario	Existing	2035 Comp Plan	2035 Modest Change	2035 Greater Change
			35 ft.	55 ft.
<i>Residential (Dwelling Units)</i>	39	360	574	862
<i>Retail (Square Feet)</i>	105,092	113,480	113,480	113,480
<i>Office (Square Feet)</i>	73,150	122,476	122,476	122,476

### Trip Generation Results for each Land Use Scenario

Trip generation rates for each land use in the Houghton / Everest Neighborhood Center were multiplied by the existing and proposed number of development units to arrive at PM and Daily trips generated for each land use. To create a consistent application of trip generations, ITE trip generation was applied to all cases, even existing. This is appropriate to provide relative comparisons. Table 2 summarizes the resulting net new weekday daily and PM peak hour vehicle trip generation for each scenario.

**Table 2. Trips Generated by Houghton Everest Neighborhood Center by Scenario**

Scenario	Daily	PM Peak Hour
<b>Existing Trips</b>	<b>9,853</b>	<b>677</b>
<b>2035 Comp Plan</b>	<b>12,903</b>	<b>898</b>
Increased Trips	3,050	221
<b>Percent Change over Existing</b>	<b>31%</b>	<b>33%</b>
<b>2035 Modest Change</b>	<b>14,327</b>	<b>982</b>
Increased Trips	1,424	84
<b>Percent Change over Comp Plan</b>	<b>11%</b>	<b>9%</b>
<b>2035 Greater Change</b>	<b>16,730</b>	<b>1,122</b>
Increased Trips	3,827	224
<b>Percent Change over Comp Plan</b>	<b>30%</b>	<b>25%</b>

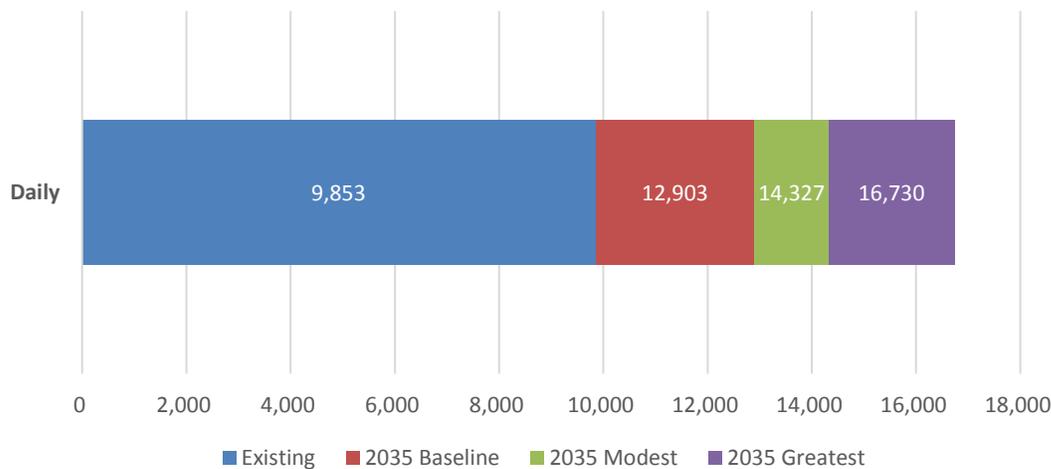
Notes: Vehicle volumes are Total Entering Volume (TEV) which account for vehicles entering the intersection.  
 Existing Zoning (2035) assumes PM peak hour growth rate applied to Existing (2016) volumes.  
 PM Volumes are derived from the City's comprehensive plan model.  
 Daily volumes assume 12% increase over Existing (2016), consistent with average change in PM Peak Hour volumes

More extensive trip generation summaries broken out by specific land uses can be found in **Attachment A**.

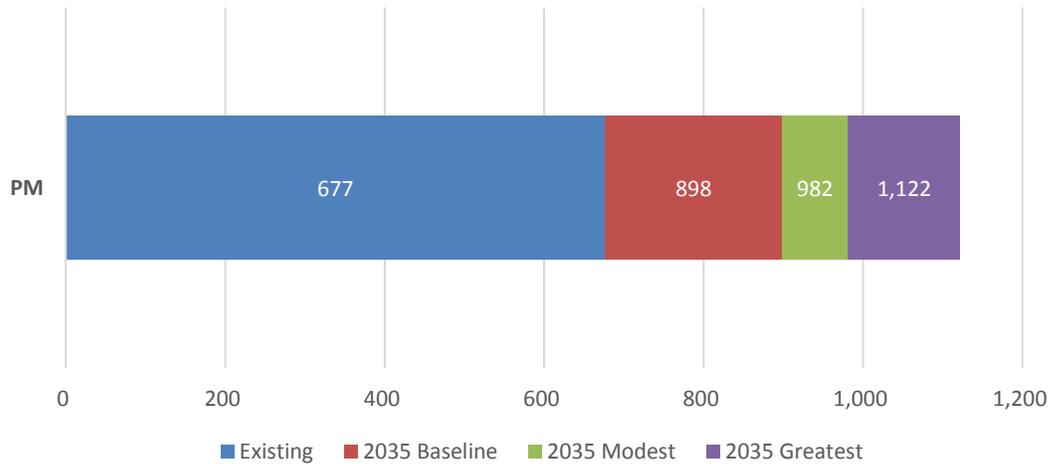
As shown in Table 2, the development is anticipated to generate up to 3,827 new daily trips, and 224 PM peak hour trips in the “Greater” scenario compared to the Existing Comp Plan (2035) scenario. A lesser number of trips are expected to be generated in the “Moderate” scenario.

Figures 1 and 2 highlight the daily and PM peak hour number of trips traveling to and from the development, respectively, by scenario. In future growth scenarios, the baseline growth accounts for the slightly less than half of trip growth between existing and the greatest build scenario.

**Figure 1 - Daily Trips to/from Development**



**Figure 2 - PM Trips to/from Development**



**Impact on Corridor**

In order to understand the relative impact of the trip generated by the development scenarios as compared to the future Comprehensive Plan, we have analyzed the impacts of these development scenarios assuming future infrastructure investments along the 6th / 108th corridor. First we distributed a portion of the increased traffic from future development on to existing operations. It is important to note not all development related trips use this central intersection as other routes are available for trips. It should also be noted that the baseline growth in 2035 assumes development on the site consistent with what is currently approved in the comprehensive plan.

Table 3 compares intersection operations at NE 68th Street & 108th Avenue for Existing, Baseline 2035, Modest Development Scenario and Greatest Development Scenario. Existing intersection level of service is at LOS E, which will grow to LOS F in the future baseline scenario. Future development will further increase the average delay per vehicle to well beyond reasonable intersection operations in all future cases.

**Table 3. NE 68th Street & 108th Ave NE Intersection Operations by Scenario**

Scenario	LOS	Delay (sec/veh)	Worst Movement	Total Entering Vehicles
<i>Existing – 2016</i>	E	62	SB	2,520
<i>Baseline – 2035</i>	F	142	SB	3,855
<i>Modest - 2035</i>	F	148	SB	3,920
<i>Greater Change Development - 2035</i>	F	119*	SB	4,025

Notes: \* Assumes added southbound right turn lane as part of Greater Change option

It is expected that new development in the Houghton Everest Neighborhood Center would also provide an opportunity to improve NE 68th Street Corridor which currently has many conflicting movements and poorly controlled access points. As part of the corridor study improving access to reduce conflicts was studied. Without any major changes or new development, the most that could be done would be to install medians, close driveways and reduce crosswalks. It was assumed that with the “Greater Change” option, additional roadway right of way (up to 80 feet) could be

dedicated and would accommodate extending full bike lanes, adding a median, wider sidewalks and closing driveways while adding a new signal at 106th Avenue NE. A southbound right-turn lane is also assumed as part of the redevelopment in the “Greater Change” option and is reflected in the operations noted in Table 3 above. **Attachment B** includes conceptual images of NE 68th Street currently in 60’ of right of way and with the Greater Change and an 80’ wide right of way.

Corridor travel times were also simulated using VISSIM for future (2035) operations with and without the transit investments (68th Street northbound Business Access and Transit (BAT) lane and 60th Street northbound queue jump). The corridor results are summarized in Table 4.

**Table 4. 6th Street Corridor Future (2035) Operations with and without Transit Investments**

Scenario	GP Northbound Travel Time (minutes)	Transit Northbound Transit Travel Time
<i>Future Baseline</i>	11:32	11:59
<i>Future With Improvements</i>	8:57	9:37
<b>Delta (reduction)</b>	<b>-2:35 (-22%)</b>	<b>-2:22 (-23%)</b>

**Attachment C** provides a concept of this transit signal priority and queue jump for Northbound Transit on 108th Avenue that requires right of way and property acquisition.

### Potential background investments

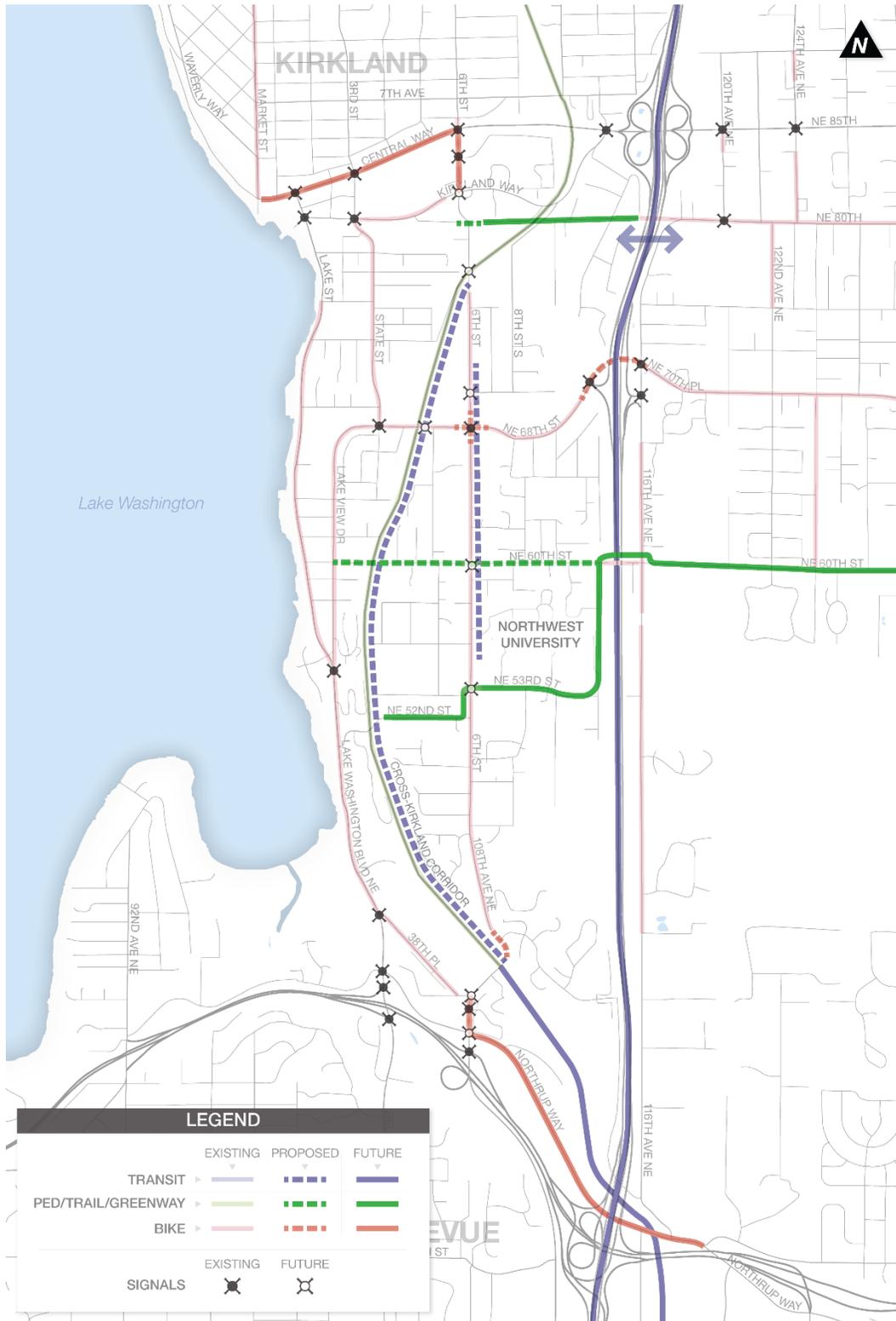
The corridor study is proposing potential solutions that meet community values as developed during a community workshop and feedback throughout the course of this project. These values were described as moving people, connecting communities and accommodating future growth. An initial set of solutions and a preferred set of recommendations is described in a previous memorandum. Table 5 provides a brief summary of the solutions recommended including the improvements on NE 68th Street to improve access (shown in **Attachment B**) and the transit signal priority concept (shown in **Attachment C**).

**Table 5. Potential Infrastructure Investments by Mode**

Transit Improvements	Pedestrian Improvements	Bike Improvements	Vehicular Improvements
<p>1A. Transit Signal Priority at 6th Street and Kirkland Way</p> <p>3A. Bus Rapid Transit on the Cross Kirkland Corridor (CKC)</p> <p>3B. Bus Intersection at 6th Street &amp; CKC</p> <p>5B. Houghton Park and Ride lease for Private Shuttle Use</p> <p>7E. Widen 108th to provide the maximum level of queue jump &amp; install new signal at 60th</p> <p>11A. Install new signal at 53rd and relocate &amp; improve existing bus stop</p> <p>12A. Park and Ride permitting for transit users at S Kirkland Park and Ride</p> <p>12B. Improve Access / Egress from S Kirkland P&amp;R</p> <p>12C. New signal controlled access to S Kirkland P&amp;R</p> <p>12F. Install real time parking occupancy at S Kirkland P&amp;R</p> <p>E1. Education Campaign promoting the value of Transit in Kirkland</p> <p>E2. Monitor Performance (in person throughput) along 6th Street to understand need for transit investment</p>	<p>1C. Crosswalk Improvements at 6th Street &amp; Kirkland Way Intersection</p> <p>9A. Improve CKC trail access (also for bikes), especially at 60th St.</p> <p>12D. Connect the CKC trail to the back of the S Kirkland P&amp;R</p> <p>P4. Develop land use policies promoting "trail oriented development"</p> <p>E3. Greenway promotion of 60th Street as well as other corridors across the city.</p>	<p>7C. Continue and complete Bike Network connections along 108th Ave.</p> <p>8D. Full Bicycle Intersection at 68th St &amp; 108th Ave Ne</p> <p>8E. Install green bike boxes in intersection to allow safer bike left turns</p> <p>10A. Designate 60th St as Neighborhood Greenway</p> <p>12E. Install bike racks or bike share at S Kirkland P&amp;R</p>	<p>1B. Signal Coordination along 6th Street</p> <p>2A. Kirkland Way and Railroad Ave Intersection Improvements</p> <p>4A. Reassess installation of planned signal improvement at 6th Street &amp; 9th Ave</p> <p>5A. Improve and expand 70th Street Overpass</p> <p>7D. Install "don't block the box" pavement markings at Fire Station Exit on 108th</p> <p>8A. Driveway consolidation around 68th St / 108th Ave businesses</p> <p>8C. Reduce business access on 68th &amp; 108th to signalized intersections and install new signal at 106th.</p> <p>P3. Citywide Parking Management strategies such as shared parking and joint parking use.</p>

How these investments improve the transportation network are shown in Figure 3, below. Each color denotes a specific modal priority given to that corridor. Dashed lines represent classifications proposed as a result of this project. The primary proposed network changes include classifying the Cross Kirkland Corridor as a Transit facility, creating a neighborhood greenway on 60th Street, investing in transit improvements along the 6th Street / 108th Ave corridor and finishing bike network connections throughout the 6th Street corridor where they are lacking.

Figure 3 – Proposed Corridor Transportation Network with Improvements



The major transit investment along the 6th Street / 108th Ave corridor is the addition of two northbound transit queue jumps at 60th Street and 68th Street. Conceptual drawings of how these queue jumps would operate are attached in **Attachment B**. In order to understand the benefit provided by these queue jumps, VISSIM was used to simulate travel time savings for transit users with and without transit queue jumps. The results of these simulations are summarized in Table 4.

## Conclusion

Transportation analysis results anticipate increasing traffic volumes, which will impact operations along the 6th Street Corridor into the future. Potential infrastructure investments to meet growth as well as address other objectives such as connecting the community and moving people have a range of trade-offs. Significant forecasted growth in Kirkland's Comprehensive Plan along with anticipated regional growth outside of Kirkland will provide challenges for traffic across the entire 6th Street Corridor. Development in the Houghton / Everest neighborhood center would result in new businesses, residents and amenities in the neighborhood that could bring up to two hundred trips to and from the neighborhood center over current planned growth in the PM peak hour. By investing in multi-modal transportation solutions, especially those that meet the community values, we can help to relieve the new demands on the transportation system. Investing in transit infrastructure along 6th Street / 108th Ave or, in the long term, on the Cross Kirkland Corridor will have the biggest impact on congestion relief and the ability to move more people. Additionally, with further pedestrian and bicycle network improvements we can make the 6th Street / 108th Ave corridor attractive for all users.

## ATTACHMENT A – Trip Generation by Scenario

ATTACHMENT A

**Daily Trip Generation:**

Existing Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	39	<i>Dwelling Units</i>	130	130	259
Office	73,150	<i>ft<sup>2</sup></i>	403	403	807
Retail	61,217	<i>ft<sup>2</sup></i>	1,357	1,357	2,713
Supermarket	39,000	<i>ft<sup>2</sup></i>	1,994	1,994	3,987
Convenience Store	2,400	<i>ft<sup>2</sup></i>	886	886	1,771
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	157	157	315
<i>Retail LU Total</i>	<i>105,092</i>				
<b>Total</b>			<b>4,926</b>	<b>4,926</b>	<b>9,853</b>

**2035 Baseline:**

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	360	<i>Dwelling Units</i>	1,197	1,197	2,394
Office	122,476	<i>ft<sup>2</sup></i>	675	675	1,351
Retail	69,605	<i>ft<sup>2</sup></i>	1,542	1,542	3,085
Supermarket	39,000	<i>ft<sup>2</sup></i>	1,994	1,994	3,987
Convenience Store	2,400	<i>ft<sup>2</sup></i>	886	886	1,771
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	157	157	315
<i>Retail LU Total</i>	<i>113,480</i>				
<b>Total</b>			<b>6,452</b>	<b>6,452</b>	<b>12,903</b>
<i>Growth (2035 - Existing)</i>			1,525	1,525	3,050

**Modest Development:**

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	574	<i>Dwelling Units</i>	1,909	1,909	3,818
Office	122,476	<i>ft<sup>2</sup></i>	675	675	1,351
Retail	69,605	<i>ft<sup>2</sup></i>	1,542	1,542	3,085
Supermarket	39,000	<i>ft<sup>2</sup></i>	1,994	1,994	3,987
Convenience Store	2,400	<i>ft<sup>2</sup></i>	886	886	1,771
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	157	157	315
<i>Retail LU Total</i>	<i>113,480</i>				
<b>Total</b>			<b>7,163</b>	<b>7,163</b>	<b>14,327</b>
<i>Growth (Modest - 2035)</i>			712	712	1,424

**Greatest Development:**

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	862	<i>Dwelling Units</i>	2,868	2,868	5,735
Office	122,476	<i>ft<sup>2</sup></i>	675	675	1,351
Retail	61,217	<i>ft<sup>2</sup></i>	1,357	1,357	2,713
Supermarket	47,388	<i>ft<sup>2</sup></i>	2,422	2,422	4,845
Convenience Store	2,400	<i>ft<sup>2</sup></i>	886	886	1,771
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	157	157	315
<i>Retail LU Total</i>	<i>113,480</i>				
<b>Total</b>			<b>8,365</b>	<b>8,365</b>	<b>16,730</b>
<i>Growth (Greatest - 2035)</i>			1,914	1,914	3,827

**PM Peak Hour Trip Generation:**

Existing Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	39	<i>Dwelling Units</i>	9	6	15
Office	73,150	<i>ft<sup>2</sup></i>	19	90	109
Retail	61,217	<i>ft<sup>2</sup></i>	73	93	166
Supermarket	39,000	<i>ft<sup>2</sup></i>	121	116	237
Convenience Store	2,400	<i>ft<sup>2</sup></i>	25	24	49
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	50	50	101
<i>Retail LU Total</i>	<i>105,092</i>				
<b>Total</b>			<b>296</b>	<b>380</b>	<b>677</b>

**2035 Baseline:**

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	360	<i>Dwelling Units</i>	81	59	140
Office	122,476	<i>ft<sup>2</sup></i>	31	151	182
Retail	69,605	<i>ft<sup>2</sup></i>	83	106	189
Supermarket	39,000	<i>ft<sup>2</sup></i>	121	116	237
Convenience Store	2,400	<i>ft<sup>2</sup></i>	25	24	49
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	50	50	101
<i>Retail LU Total</i>	<i>113,480</i>				
<b>Total</b>			<b>392</b>	<b>506</b>	<b>898</b>
<i>Growth (2035 - Existing)</i>			95	126	221

**Modest Development:**

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	574	<i>Dwelling Units</i>	130	94	224
Office	122,476	<i>ft<sup>2</sup></i>	31	151	182
Retail	69,605	<i>ft<sup>2</sup></i>	83	106	189
Supermarket	39,000	<i>ft<sup>2</sup></i>	121	116	237
Convenience Store	2,400	<i>ft<sup>2</sup></i>	25	24	49
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	50	50	101
<i>Retail LU Total</i>	<i>113,480</i>				
<b>Total</b>			<b>440</b>	<b>542</b>	<b>982</b>
<i>Growth (Modest - 2035)</i>			48	35	83

**Greatest Development:**

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	862	<i>Dwelling Units</i>	195	141	336
Office	122,476	<i>ft<sup>2</sup></i>	31	151	182
Retail	61,217	<i>ft<sup>2</sup></i>	73	93	166
Supermarket	47,388	<i>ft<sup>2</sup></i>	147	141	288
Convenience Store	2,400	<i>ft<sup>2</sup></i>	25	24	49
Coffee Shop	2,475	<i>ft<sup>2</sup></i>	50	50	101
<i>Retail LU Total</i>	<i>113,480</i>				
<b>Total</b>			<b>521</b>	<b>601</b>	<b>1,122</b>
<i>Growth (Greatest - 2035)</i>			130	95	224

30%

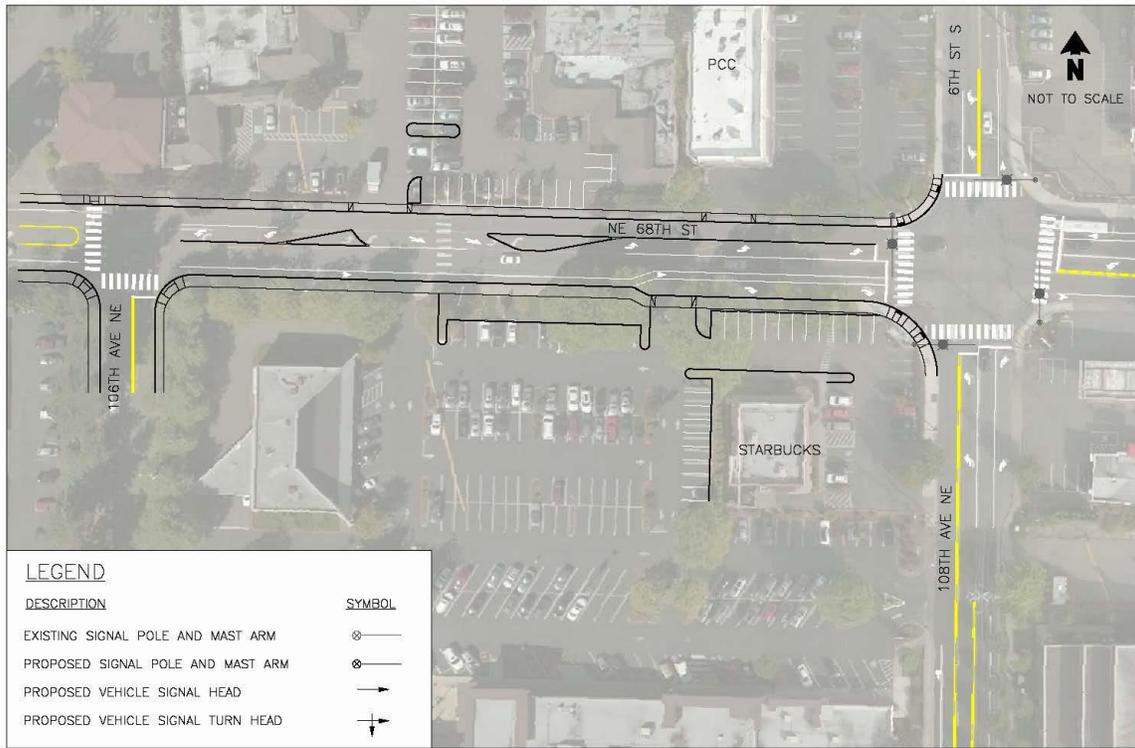
25%

## **ATTACHMENT B – NE 68th Street Concepts for Consolidating Access**

8 A NE 68th Street existing 60' Right of Way

8 C Greater Change and 80' Right of Way

# NE 68th Street Existing 60' Right of Way



## NE 68th St - Improvement Concept A

Kirkland 6th Street Corridor

January 25, 2017

FIGURE 8A



Feb 08, 2017 - 4:46pm trungi M:\16\16090.00 - 6th Street Study\Engineering\CAD\Conceptual\NE 68th St at 108th Ave.dwg Layout: 1 (NO CALLOUTS)



# NE 68th Street Greater Change and 80' Right of Way



## NE 68th St - Improvement Concept C

Kirkland 6th Street Corridor

January 25, 2017

FIGURE



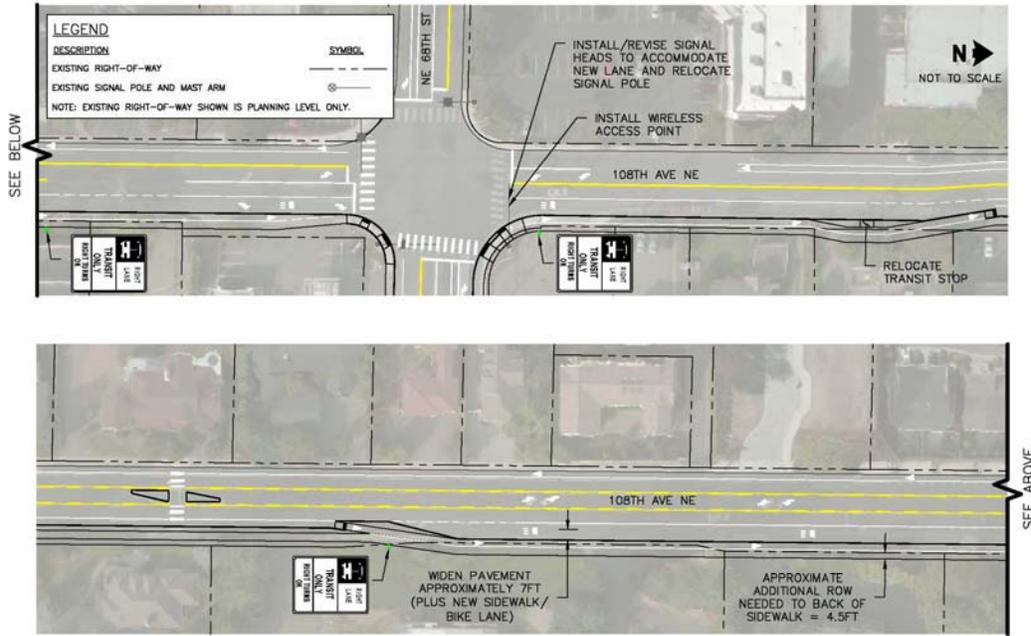
8C

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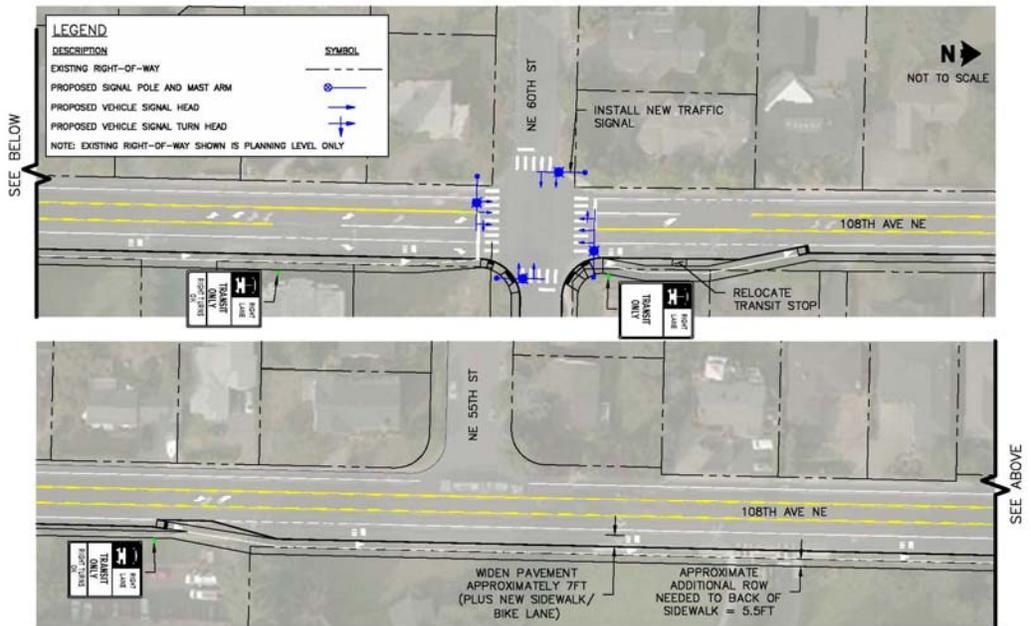


# **ATTACHMENT C – 108th Avenue NE Transit Signal Priority and Queue Jump Concept**

# 108th Avenue Transit Signal Priority & Queue Jump NE 68th to NE 53rd



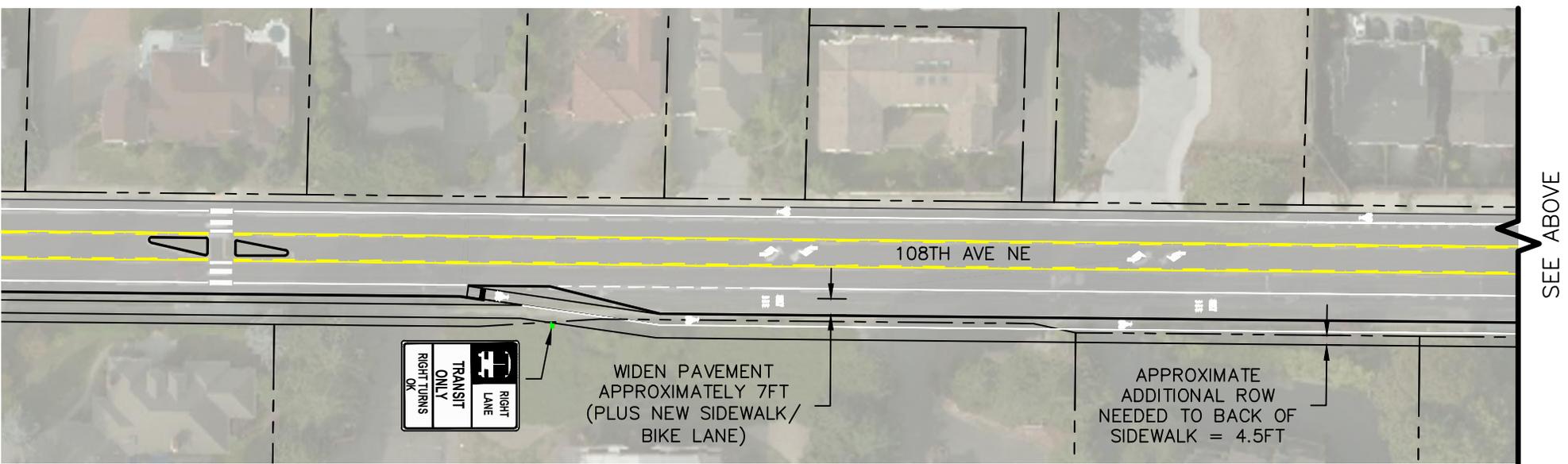
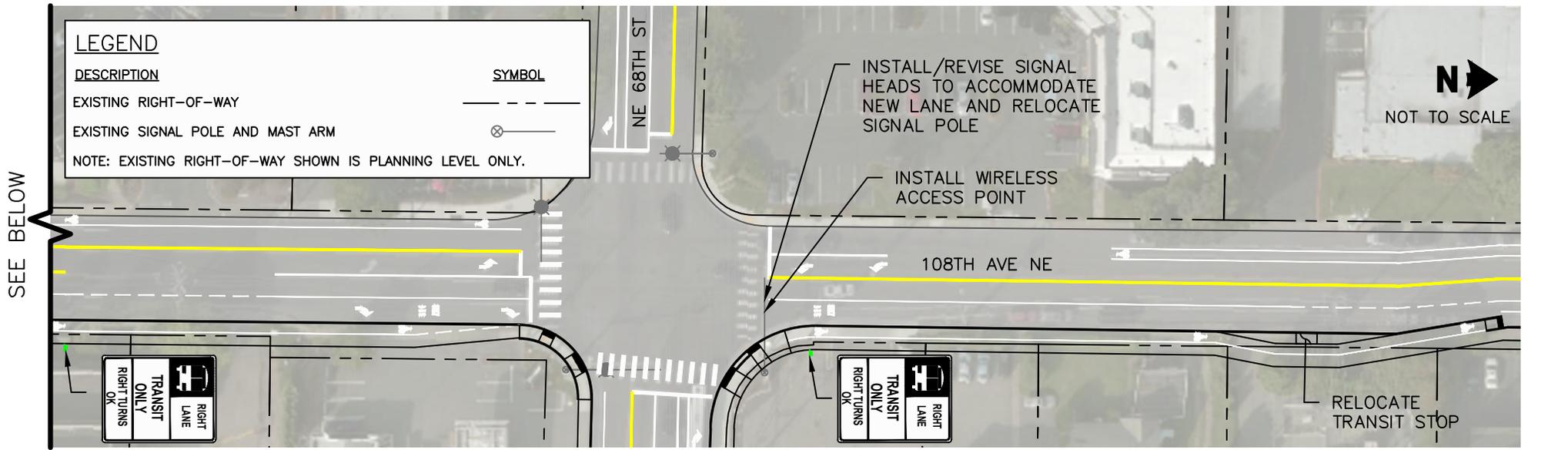
108th Ave NE and NE 68th St - Transit Signal Priority Improvement Concept F February 9, 2017 **FIGURE 7F**  
 Kirkland 6th Street Corridor **transpogroup**



108th Ave NE and NE 60th St - Transit Signal Priority Improvement Concept E February 10, 2017 **FIGURE 7E**  
 Kirkland 6th Street Corridor **transpogroup**

# APPENDIX F: PROJECT PAGES

DRAFT



108th Ave NE and NE 68th St - Transit Signal Priority Improvement Concept E

February 10, 2017

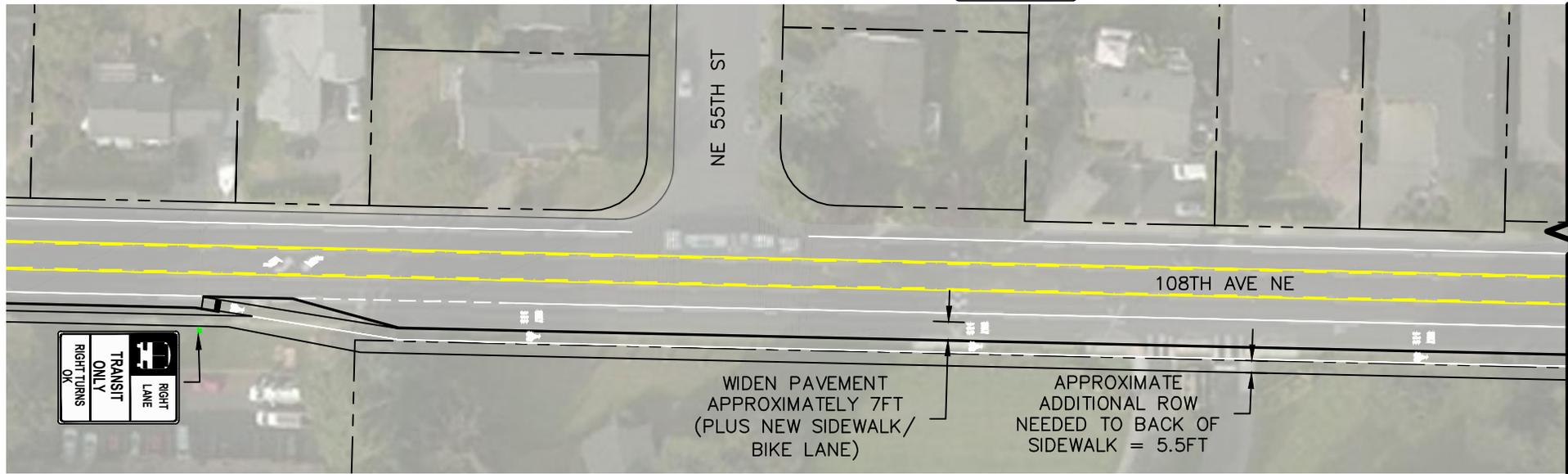
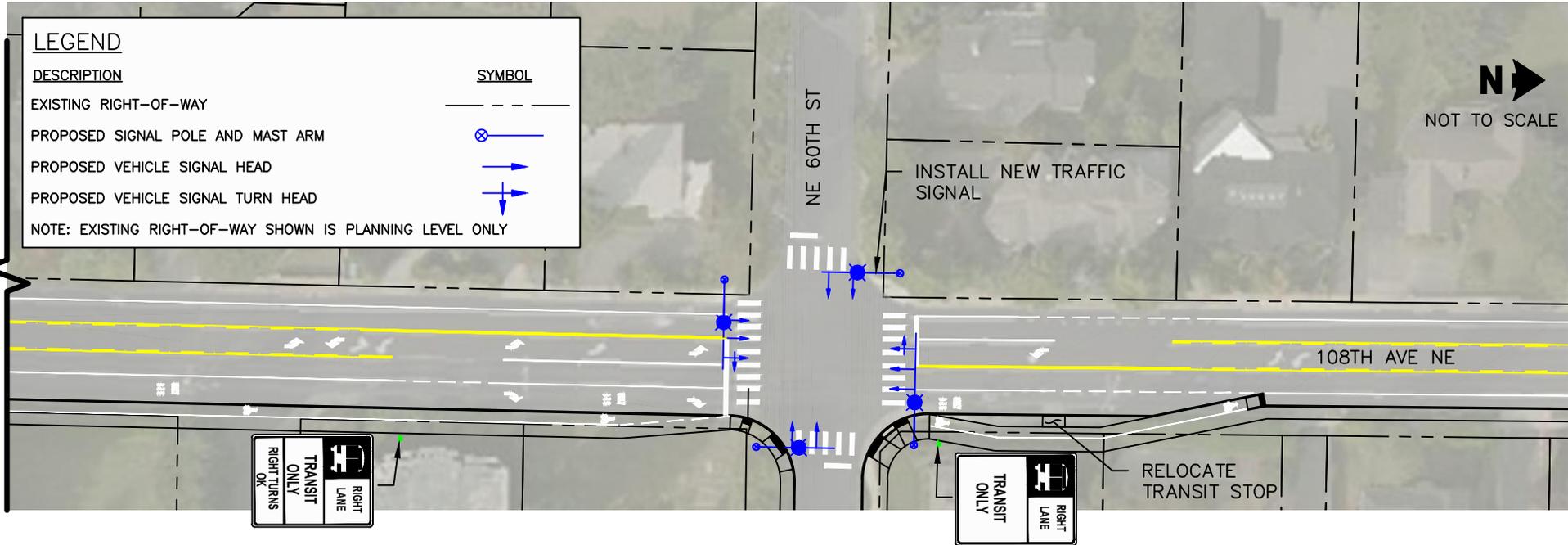
FIGURE

Kirkland 6th Street Corridor



7E

SEE BELOW



SEE ABOVE

# 108th Ave NE and NE 60th St - Transit Signal Priority Improvement Concept E

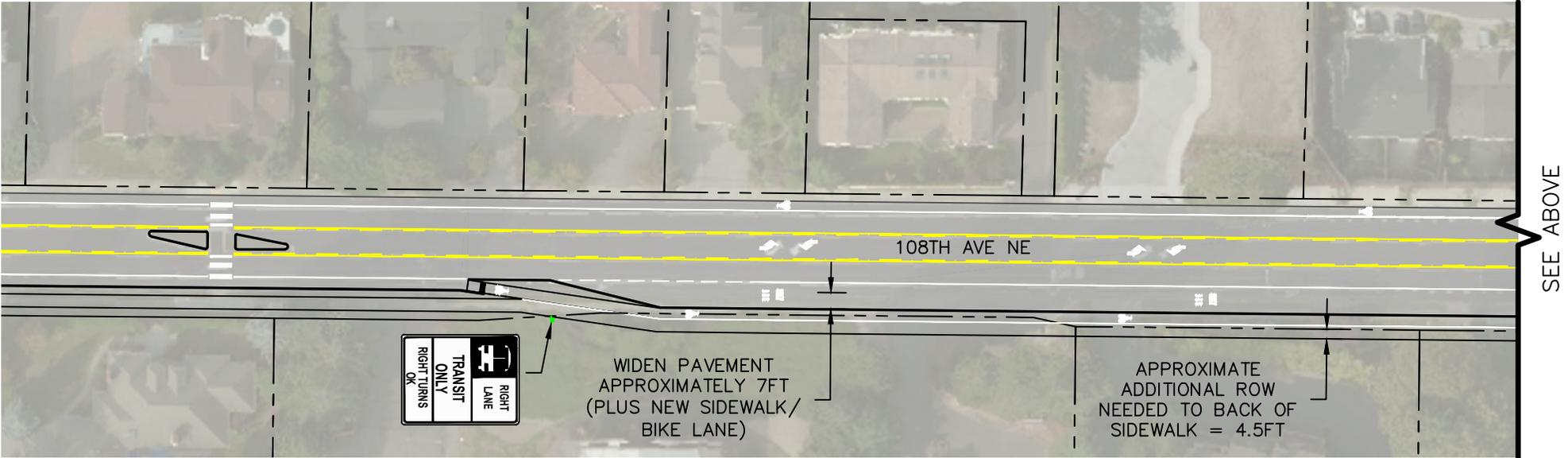
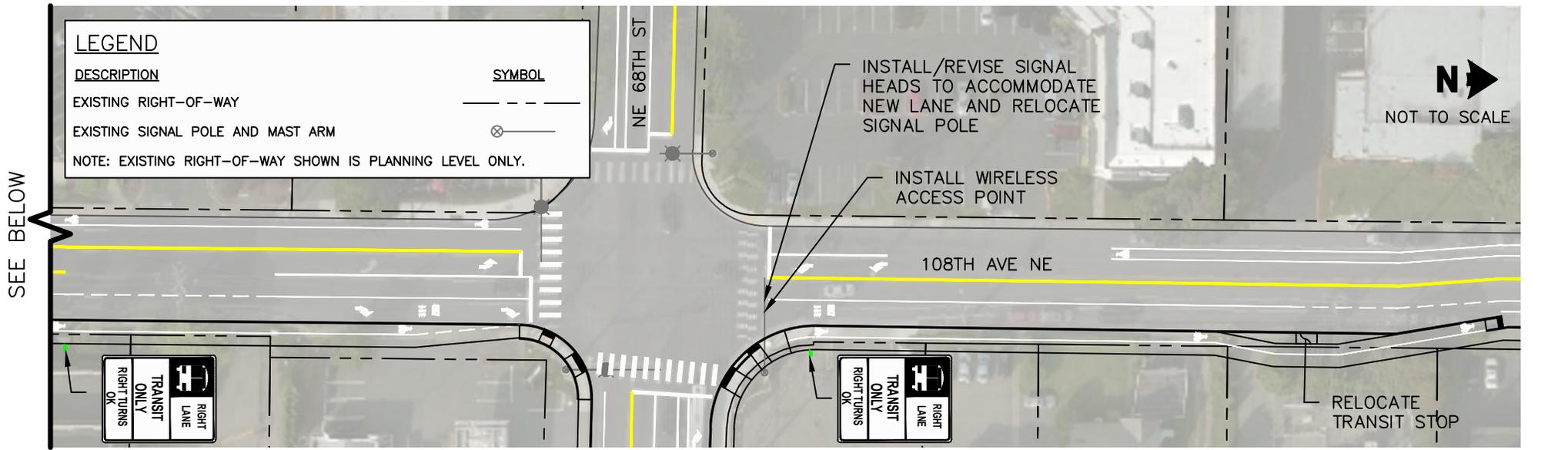
February 10, 2017

FIGURE

Kirkland 6th Street Corridor



# 7E



108th Ave NE and NE 68th St - Transit Signal Priority Improvement Concept F

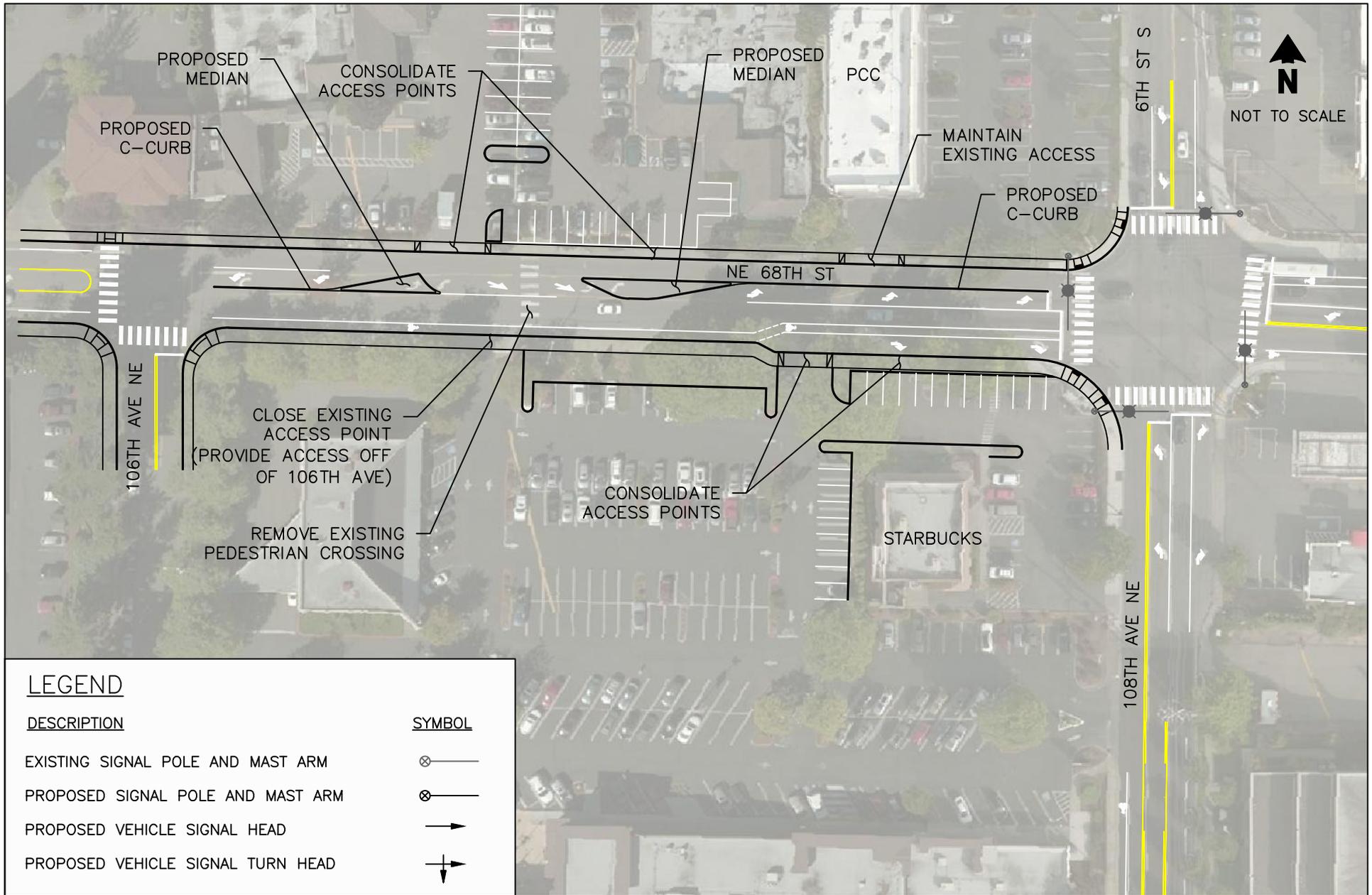
February 9, 2017

FIGURE

Kirkland 6th Street Corridor



7F



# NE 68th St - Improvement Concept A

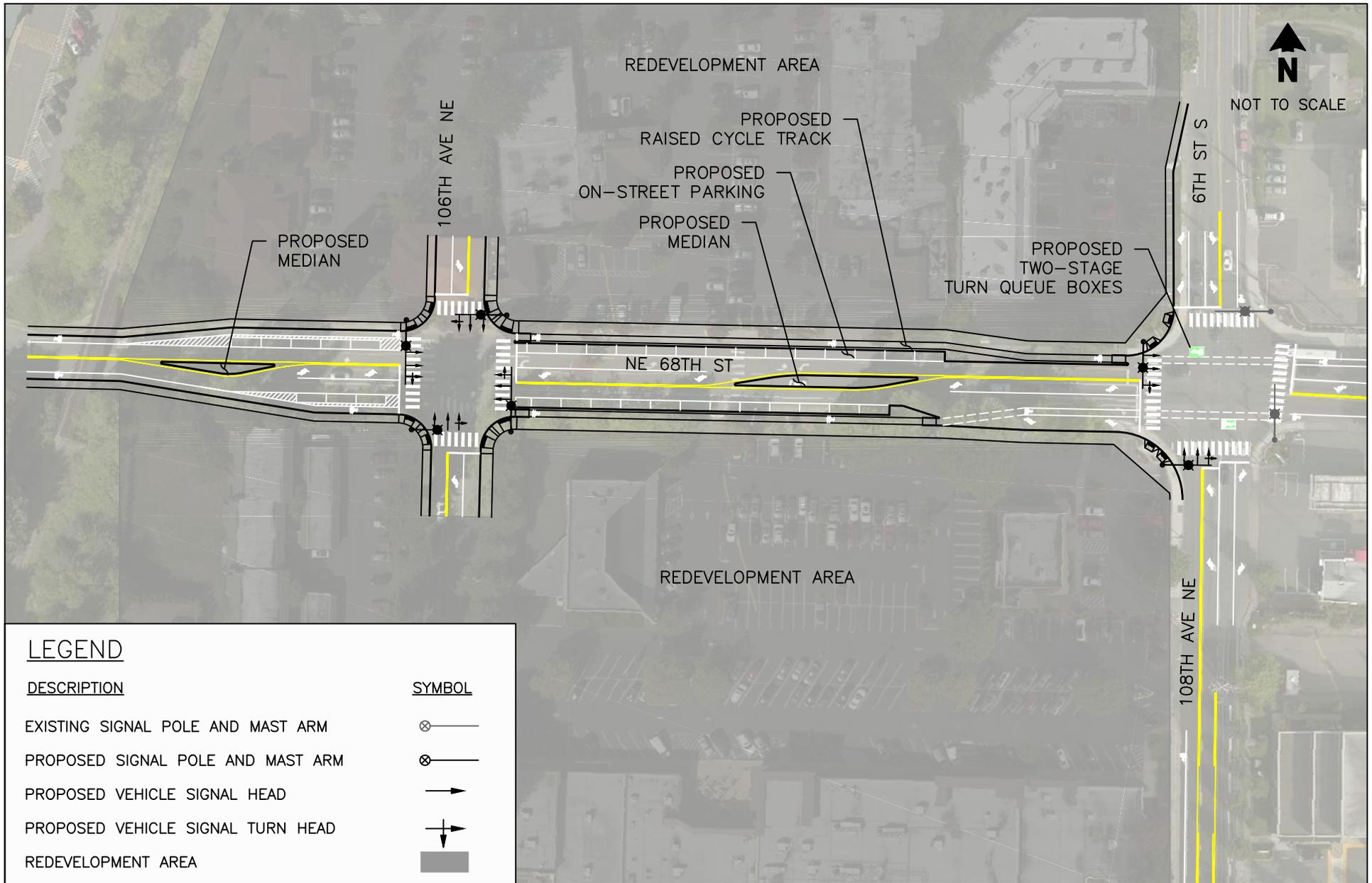
Kirkland 6th Street Corridor

January 25, 2017

FIGURE



**8A**



# NE 68th St - Improvement Concept C

Kirkland 6th Street Corridor

January 25, 2017

FIGURE



8C