RESOLUTION R-5296

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND ADOPTING THE 6TH STREET CORRIDOR STUDY.

WHEREAS, the City Council approved a 6th Street South/Houghton Business District Corridor Study ("Study") as part of the 2015-2020 Capital Improvement Program update; and

WHEREAS, in July 2016, work began on the Study with the goal of assessing the 6th Street Corridor needs and providing recommended improvements; and

WHEREAS, the study includes the roadway designated as 6th Street, 6th Street South, and 108th Avenue NE between Central Way and the vicinity of Northup Way, at the southern City limits; and

WHEREAS, extensive community outreach was conducted, including a community wide online survey, stakeholder interviews and meetings with the Houghton and Everest Neighborhoods, as well as a community workshop on November 2, 2016; and

WHEREAS, the Transportation Commission was consulted throughout the Study and provided its expertise, review, and recommendations; and

WHEREAS, on November 8, 2017 City Council received a draft Study which included a description of the current corridor context, growth and changes in the corridor, potential solutions, corridor improvements, relationship to land use, and appendices; and

WHEREAS, the comments and direction received from the City Council throughout the Study have been addressed in the final Study; and

WHEREAS, the Study recommendations consist of 24 projects that are grouped by location, including a recommendation to implement high capacity transit on the Cross Kirkland Corridor, and five policy and education initiatives, which offer solutions for transit, bicyclists, pedestrians, vehicles, vehicle parking and land use; and

WHEREAS, the new major projects of the Study have been incorporated into the 2017-2022 Capital Improvement Program and are recommended for incorporation into the Kirkland Transportation Master Plan.

NOW, THEREFORE, be it resolved by the City Council of the City of Kirkland as follows:

Section 1. The 6th Street Corridor Study attached as Exhibit A and incorporated by this reference is adopted.

Passed by majority vote of the Kirkland City Council in open meeting this 6th day of February, 2018.

Signed in authentication thereof this 6th day of February, 2018.

Amy Walen, Mayor

Attest:

Kathi Anderson, City Clerk

R-5296
Exhibit A

CITY OF KIRKLAND

6th Street Corridor

Prepared for The City of Kirkland
Prepared by Transpo Group | www.transpogroup.com

December 2017

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EXECUTIVE SUMMARY

Current Corridor Context

The City of Kirkland's natural north-south orientation relies heavily on north-south corridors, including 6th Street S/108th Avenue NE, Interstate 405 (I-405), and Lake Washington Boulevard NE. The 6th Street Corridor, which extends from Central Way to the South Kirkland Park-and-Ride, and parallel corridors are subject to significant recurring peak congestion. This congestion impacts the livability of the community and ability to address and accommodate future growth.

Growth and Land Use

The City of Kirkland anticipates both population and employment growth in the next decade. Consistent with the state Growth Management Act, the City has adopted Kirkland 2035 and the Transportation Master Plan to address growth and plan for the mobility of people and goods. These plans define the importance of the 6th Street Corridor for all modes of transportation and convey core City values to create a walkable, vibrant, livable, connected, and green community. This corridor study identifies strategies and potential solutions for meeting current and future mobility needs for this essential City corridor.

Developing Solutions

Key tasks for this study included data collection, public outreach, analysis of current and future conditions, analysis of land use options within the Houghton Everest Neighborhood Center, development of potential solutions, and description of recommended solutions with implementation plans. The study included an evaluation of different transportation solutions to meet current and future transportation needs, from education and policies to capital improvements.

Conclusion

The 6th Street Corridor is an important north-south transportation corridor for Kirkland. Peak congestion and includes long queues and delays that are frustrating for auto and transit commuters. For the neighborhoods adjacent to this corridor, the corridor is central to their community and impacts their quality of life. With investments (largely in transit) to help improve regional mobility, the corridor can move people and start to address growth. Investing in pedestrian, and bicycle improvements can also further improve the quality and livability of the corridor.

CURRENT CORRIDOR CONTEXT

Addressing potential improvements to help address City-wide and regional growth needs for mobility requires an in-depth review of the corridor operations including all modes, collecting data and engaging with the community for their perspectives.

By the numbers:

Only 5% of all north/south regional[1] traffic uses the 6th Street Corridor. I-405 carries most regional traffic.

Of the north-south Kirkland local[2] traffic, one third uses the 6th Street Corridor

During the peak period, 74–82% of vehicles using the 6th Street Corridor are accessing homes or jobs in Kirkland. The other trip end may be outside Kirkland.

In 20 years, daily traffic has varied between 10,000 –13,000 vehicles per day

The study area for the 6th Street Corridor Study includes the roadway designated as 6th Street, 6th Street S, and 108th Avenue NE between Central Way and Northup Way. For this report, it is hereinafter defined as the 6th Street Corridor. The corridor is designated as a minor arterial, which runs north-south from Central Way at the north end to Northup Way and the South Kirkland Park-and-Ride in the south. The corridor is bisected by the NE 68th Street/NE 70th Street corridor, which is the only east-west arterial connection along the corridor. The 6th Street corridor provides connections to downtown Kirkland (through the Moss Bay Neighborhood), Lake View Neighborhood, I-405, and SR 520. The Cross Kirkland Corridor (CKC) is directly adjacent to the corridor and provides a valuable north-south alternative connection to the 6th Street Corridor.

The 6th Street Corridor Study was conducted with the Houghton-Everest Neighborhood Center Land Use Study to take advantage of the opportunity to coordinate public outreach regarding transportation improvements. As part of Kirkland 2035 (the City Comprehensive Plan update), a Transportation Master Plan was developed, and its goals and objectives were incorporated into the Transportation Element of the Comprehensive Plan. The goals and objectives of the Transportation Master Plan were used to guide the outcomes of the 6th Street Corridor Study.

Study Limits and Function

Figure 1 illustrates the project corridor, surrounding vicinity, and the parallel corridors. **Figure 2** highlights the 6th Street / 108th Avenue NE corridor and key traffic control. A broad range of data were readily available through the City and other transportation providers. Transpo aimed to maximize this as much as possible. Transpo leveraged existing turning movement count data, bicycle and pedestrian counts on the CKC, and daily volumes on the 6th Street Corridor. Where data did not exist, Transpo collected parking and travel time data, and used StreetLight data to obtain origin-destination data and better understand travel patterns and behavior. StreetLight combines a variety of data sources such as in vehicle GPS sources to better understand travel patterns.

[1] Regional traffic are trips that have no origin or destination in Kirkland.

[2] Local traffic refers to trips with either an origin or destination in Kirkland.

Figure 1 - Study Area

Corridor Characteristics

Within the 2.5 miles of the corridor today, there are 4 traffic signals (or almost 1.5 per mile) and 20 crosswalks (or over 7 per mile). Of these 20 crosswalks, 8 are protected with Rectangular Rapid Flashing Beacons (RRFBs). There are transit stops every ¼ mile.

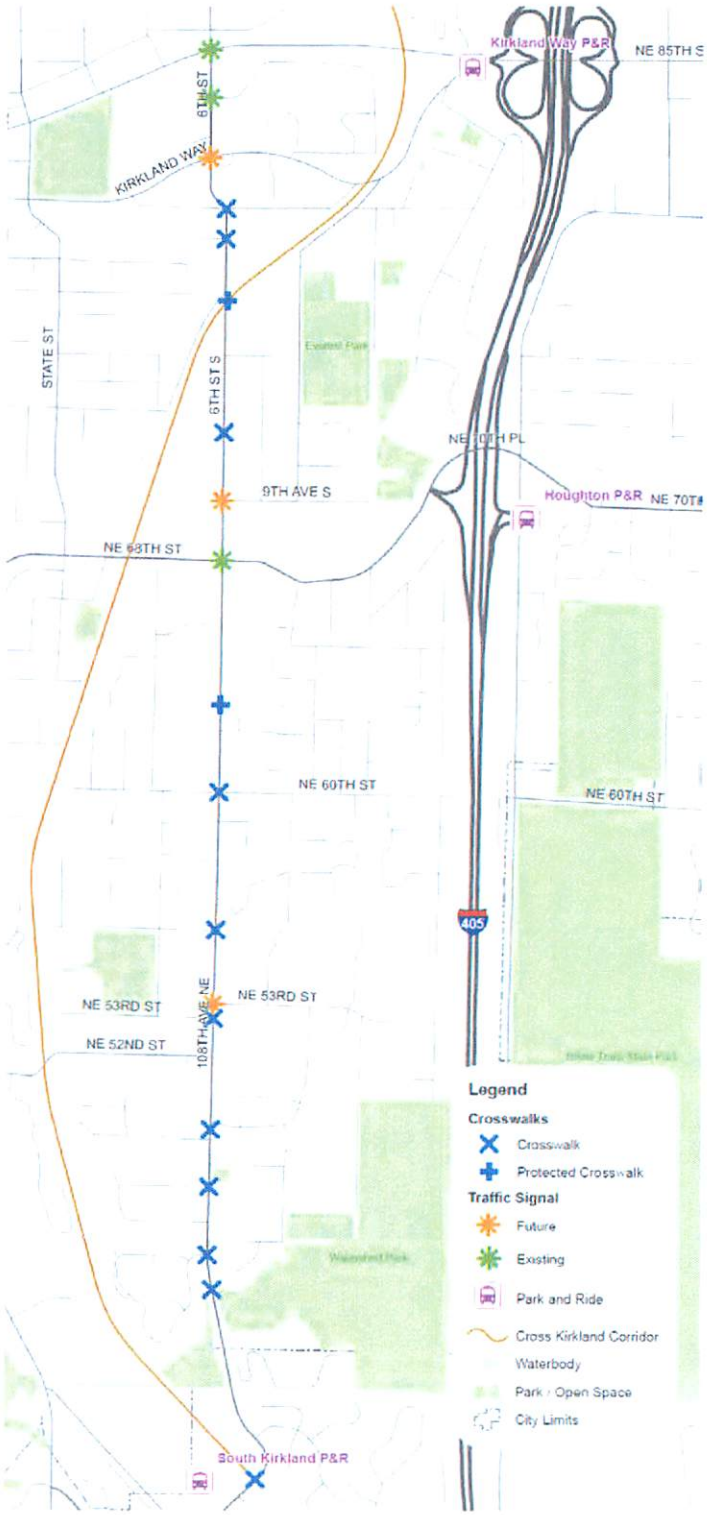


Figure 2 – 6th Street Corridor

Study Limits and Parallel Corridors

For the purposes of the study Transpo cast a broad net to collect data for the study area 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. The primary focus was on 6th Street /108th Avenue and its relationship to the parallel facilities that make up this transportation corridor including:

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

Study Analysis Years and Time Periods

For the purposes of this study, the focus was on PM peak period (identified as the most congested). Analysis was focused on 2016 (existing) and 2035 (long term). The 2035 horizon year aligns with travel demand analysis in the City Transportation Master Plan.

Data Collection

In defining the type and expanse of data to be used for the study, data were collected to support expected performance measures that align with the goals of this study. These goals included

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

Additionally, feedback from the neighborhoods defined perceived transportation problems in the corridor. Data were collected to substantiate and address these comments, including:

- movement of people
- operations and access of all modes
- growth
- access
- travel times
- travel patterns
- queues
- delays
- parking utilization
- auto volumes
- bike volumes
- transit travel times
- transit ridership
- park-and-ride utilization

Other data and information used for this study included information and forecasted growth from the Comprehensive Plan travel demand model, Inrix fused data of vehicle speeds, and vehicle origin-destination data from StreetLight.

Current Corridor Characteristics

There are pedestrian, bicycle, transit, and vehicle transportation systems operating in the 6th Street corridor today.

Pedestrians & Bikes

Since the opening in 2015 of the interim trail on the CKC, pedestrian and bicycle activity has increased not only along the trail but along the corridors connecting to the trail.

Pedestrian facilities, including sidewalks, are present along all major, minor, and collector streets as well as many neighborhood streets. Sidewalks provide an important system for school children and their caregivers while walking to the many schools in the corridor. Sidewalks adjacent to the retail center along NE 68th Street carry high volumes of pedestrians, yet are of minimum width and cannot accommodate walking more than two abreast. Some linkages for pedestrians are provided through or between residential and commercial parcels not along roadways and provide additional pedestrian connections. These include connections to or across the CKC, the Northwest University Campus, the five parks in the study area (Everest Park, Terrace Park, Phyllis A. Needy Park, Carillon Woods, and Watershed Park),

the pedestrian crossing of I-405 at NE 60th Street and adjacent to the fire station linking to NE 66th Place and 5th Avenue S.

Bicycle use within the study area is growing. This could be due in part to the opening of the interim trail on the CKC in 2015 and increasing overall bicycle demand. Automatic bicycle counters were installed along the corridor and counts of pedestrian and bicycles for the month of June in 2016 are shown in **Figure 3**.

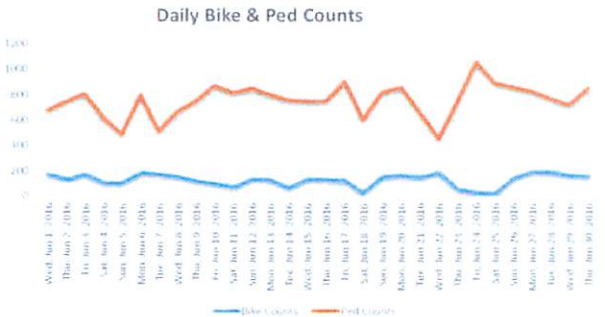


Figure 3 - June 2016 Ped & Bike Counts

Cross Kirkland Corridor
The Transportation Master Plan (TMP) includes the CKC as a regional trail with an existing interim trail. It is envisioned to serve as a multimodal transportation corridor connecting with other segments of the Eastside Rail Corridor and eventually with segments of the regional transportation network. The CKC Master Plan defines objectives for the corridor, including potential high-capacity transit. The CKC Master Plan defines existing and planned locations for access to the CKC.

Bicycle Network
To support bicycling in Kirkland, the TMP defines a Bicycle Network that notes existing bike lanes, recommended bike lanes, and recommended greenways. Greenways are lower-volume, lower-speed roadways that may be more ideal for bicycling for the broader community, including those who are not as comfortable biking.
A list of each type of facility in the study area is listed below:

Existing Bike Lanes
- 6th Street S
- 108th Avenue NE (missing northbound segment near NE 53rd Street/52nd Street)
- Lake Washington Boulevard NE
- Lakeview Drive
- NE 68th Street/NE 70th Street
- Kirkland Way (West of 6th Street)

Recommended Greenways
- NE 60th Street
- NE 52nd Street
- NE 53rd Street

The CKC is an important element of the regional bicycle network. An important connection between the CKC and the SR 520 bike lanes was recently completed along Northup Way in Bellevue.

Transit Service and System

Transit service is an important use for providing mobility along the corridor with Metro and Sound Transit service connecting the City and South Kirkland Park-and-Ride with regional destinations including University of Washington, Downtown Seattle, Bellevue, and Redmond.

Transit Routes
Transit routes using the 6th Street corridor serve Kirkland with connections to Downtown Seattle, University of Washington, and Factoria via Overlake/Redmond/Eastgate/Bellevue College. In addition to these routes, the South Kirkland Park-and-Ride provides additional connections to Bothell/Kenmore, Overlake/Microsoft, and Downtown Bellevue.

Transit routes using the corridor are listed below:

Metro 234/235 – Kenmore/Bothell to downtown Bellevue via Lake Washington Boulevard, with all day service

Metro 245 – Downtown Kirkland to Overlake/Crossroads/Eastgate/Factoria via 6th Street, with all day frequent service

Metro 255 - Totem Lake/Juanita to Downtown Seattle via 6th Street/108th Avenue NE, with all day frequent service

Metro 249 – Microsoft/Overlake/North Bellevue College to Downtown Bellevue via South Kirkland Park-and-Ride, with all day service

Sound Transit 540 – Downtown Kirkland to University of Washington via 6th Street/108th Avenue NE, with all day frequent service

Transit Network

The TMP defines a transit network including a Primary Transit Network and Secondary Transit Network. Within the study area, these routes are classified as part of the Transit Network:

Primary Transit Network

- 6th Street S
- 108th Avenue NE
- NE 85th Street/Central Way
- Kirkland Way
- NE 70th Street (East of 108th Avenue NE)
- 3rd Street

Secondary Transit Network

- Lake Street S
- NE 68th Street (State Street to 108th Avenue NE)
- Lakeview Drive
- Lake Washington Boulevard NE

Transit stops are located every ¼ mile along the corridor; however, almost half of the riders using regional service in the corridor board the bus at the South Kirkland Park-and-Ride. While this park-and-ride was expanded from 596 spaces to 785 spaces in 2015, it remains at capacity (see **Figure 4**). Metro is piloting a program to reserve spaces in park-and-rides for carpoolers. Transit, including private shuttles, Sound Transit's route 540, and Metro's route 255 and 245, all use the corridor and are subject to recurring peak congestion. King County Metro (and Sound Transit) provided Automatic Vehicle Location (AVL) data for the transit routes serving the corridor from an average week in Spring 2016, which can be used to analyze transit system performance including travel time and delay.

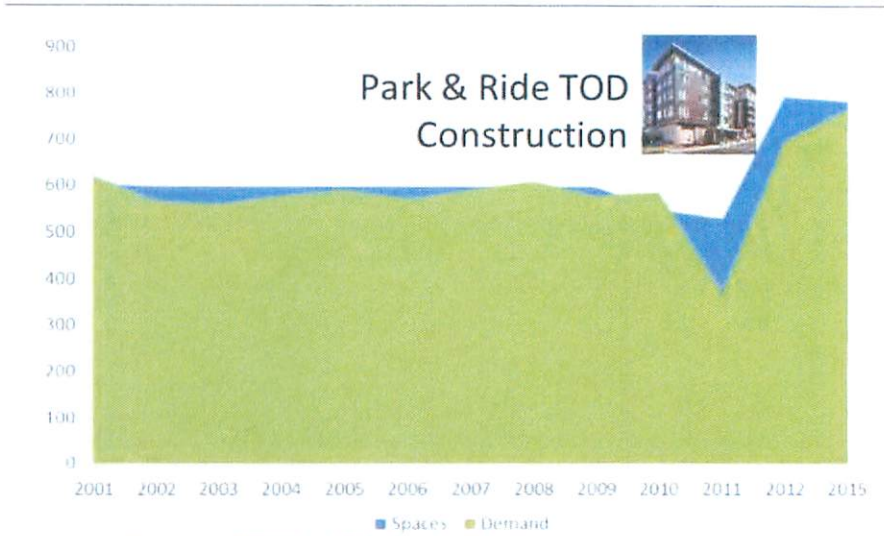


Figure 4 - S Kirkland Park-and-Ride Use

Figure 5 provides a visual display noting where delays occur for all the routes using the corridor. AVL data were provided by King County Metro and Sound Transit for routes in the corridor. Most of the delay is related to passenger boarding and alighting and stopped delay at intersections. As shown, Metro Route 255 accumulates the most delay, including delay in Seattle. Sound Transit Route 540 connects Downtown Kirkland and the University of Washington with less frequent peak service. Metro Route 245 connects Kirkland and Factoria with all day service and half hour headways.

Automatic Passenger Count data from Spring 2016 suggests that nearly half of the bus volumes board and alight at the South Kirkland Park-and-Ride. Private, employer-funded shuttles also use this corridor and serve employers in Seattle as well as Google in Kirkland. Google, which is a Commute Trip Reduction (CTR)-affected site, operates shuttles north for commuters (two in the morning and two in the evening) and south every hour between the Google offices in Kirkland and Seattle.

Figure 6 shows the home locations of license plates observed at the South Kirkland Park-and-Ride for a day Spring 2015. Transit routes serving that park-and-ride are overlaid on the map and suggest that Metro Route 255 and Sound Transit Route 540 pass by many of the homes of people using the park-and-ride. Because transit is delayed on city arterial streets at intersections and during boarding, transit

customers choose to drive to the park-and-ride, adding to arterial congestion, rather than take a bus closer to home. Throughout the corridor, buses stop in-lane to serve bus stops and this blocks general traffic. Private company shuttles from Google, Amazon, and Facebook that provide service for their employees also travel the corridor.

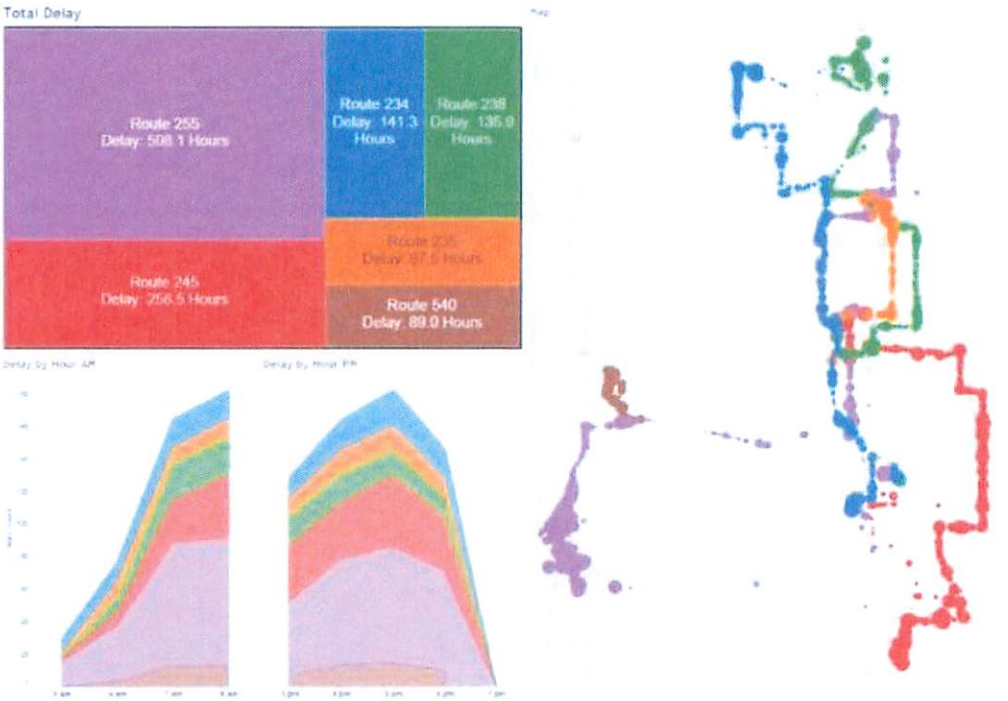


Figure 5 - Transit Delay (Spring 2016)

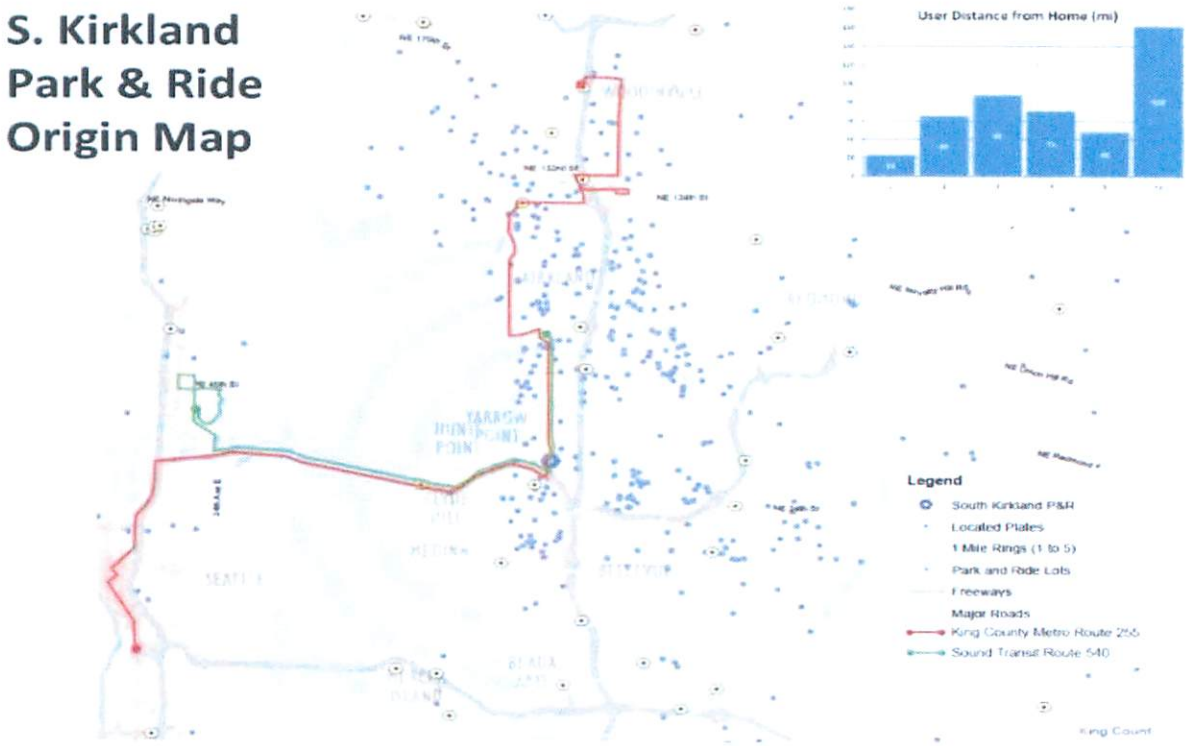


Figure 6 - S Kirkland Park-and-Ride License Plate Origins and Routes (2015)

Vehicle Network

Currently the 6th Street corridor is a key arterial for the City of Kirkland. This corridor connects many neighborhoods and is an important link to the regional transportation system. For much of its roughly 2.5-mile length, the corridor provides two travel lanes, sidewalks, and bicycle lanes. South of NE 68th Street, the corridor includes a two-way center left-turn lane. North of NE 68th Street, the corridor includes some segments with on-street parking and some two-way center left-turn lanes. Mid-block crosswalks are located throughout the corridor with some raised center medians. Many crossings are protected with Rectangular Rapid Flashing Beacons. An example of this type of protection is provided at the CKC interim trail crossing on 6th Street S.

Parallel arterial roadway corridors to the 6th Street corridor include I-405 and Lake Washington Boulevard/Lakeview Drive/State Street. I-405 is a multi-lane interstate with two express toll lanes and three general purpose lanes in each direction. Lake Washington Boulevard is a principal arterial with two lanes in each direction and bike lanes between the southerly city limit and Lakeview Drive, and one lane in each direction and bike lanes and on-street parking north of Lakeview Drive. A relative comparison of volumes for the parallel corridors is provided below in **Figure 7**, which reflects the proportion of daily traffic on the three corridors. Only 5 percent of the over 222,500 daily trips use the 6th Street corridor.

The CKC is also a parallel transportation corridor that currently consists of the interim trail. The CKC Master Plan envisions a multimodal corridor with a regional trail and high-capacity transit linking Kirkland and the region. It utilizes a former rail corridor and is part of a regional trail system. It runs parallel to the 6th Street corridor, crossing it at 5th Place S in the north and crossing 108th Avenue NE near the South Kirkland Park-and-Ride.

Currently, the 6th Street corridor roadway carries between 10,000 and 13,000 vehicles per day. **Figure 8** shows that in the last 17 years, daily volumes have remained relatively constant. The corridor is highly directional, with peak traffic southbound in the morning and northbound in the afternoon.

Street Network

The TMP defines a hierarchy of the roadway network that prioritizes movement of vehicles in contrast to access. It also identifies facilities emphasizing other modes.

Arterial roadways are shown in **Figure 1**. The Functional Classification of Streets within the TMP defines the following classifications within the study area:

State Routes

- I-405 – Interstate

Principal Arterial

- Lake Washington Boulevard
- NE 85th Street/Central Way

Minor Arterial

- 6th Street S / 108th Avenue NE
- Lakeview Drive
- NE 68th Street/NE 70th Street
- Kirkland Way/Kirkland Avenue
- State Street S

Collector

- 9th Avenue S
- 8th Street S/Railroad Avenue
- NE 52nd Street
- NE 53rd Street

Arterials that cross the 6th Street corridor include NE 68th Street/NE 70th Street, Kirkland Way and NE 85th Street/Central Way. These arterials include sidewalks and serve transit. Sidewalks and bike lanes are provided or planned on these arterials and provide connections to other facilities that serve people walking and biking. The arterials crossing the corridor have a single travel lane in each direction with some medians.

Two large land uses in the study area are Northwest University, which is updating its Master Plan, and Google, which opened their second campus building in early 2016. Downtown Kirkland is located at the north end of the corridor, and continues to grow into a dynamic mixed-use center as a result of projects such as Kirkland Urban, an 11.5-acre mixed use development with 650,000 square feet (SF) of office, 225,000 SF of commercial and 300,00 SF of residential. Fire Station 22 is located on 108th Avenue NE just south of the NE 68th Street intersection.

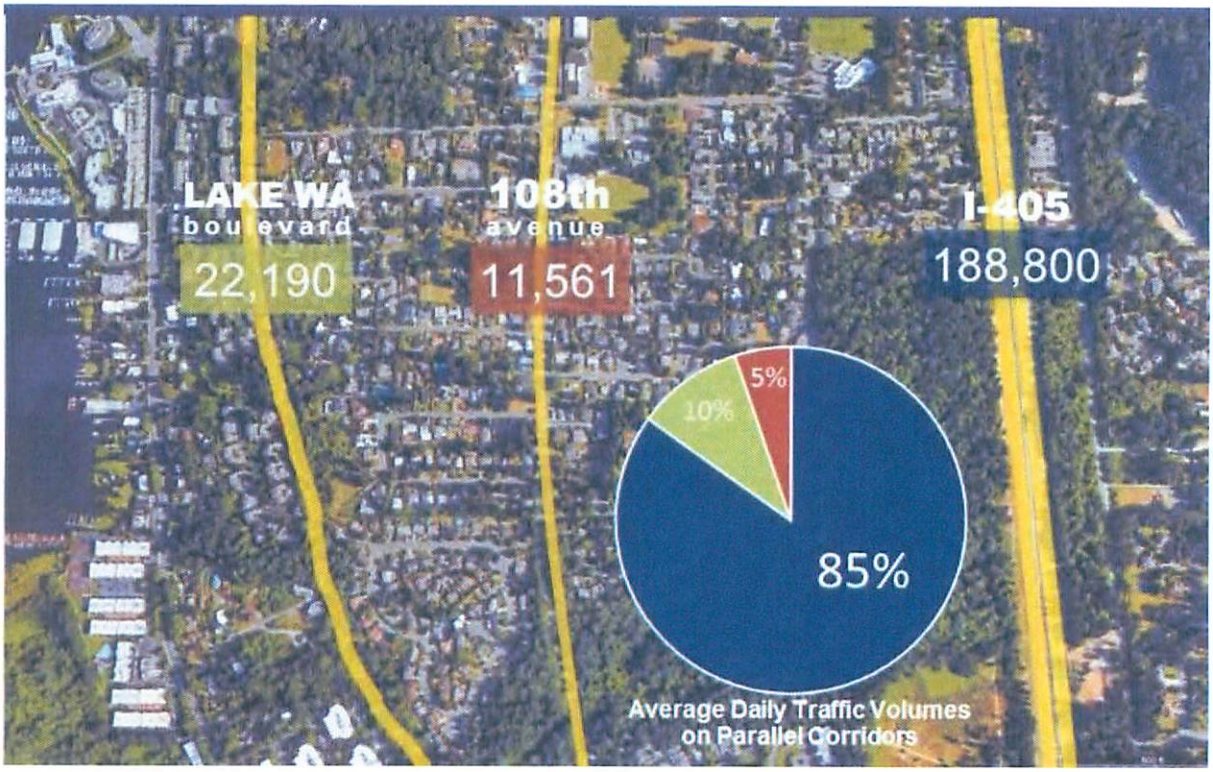


Figure 7 - Parallel Corridor Roadway Volumes

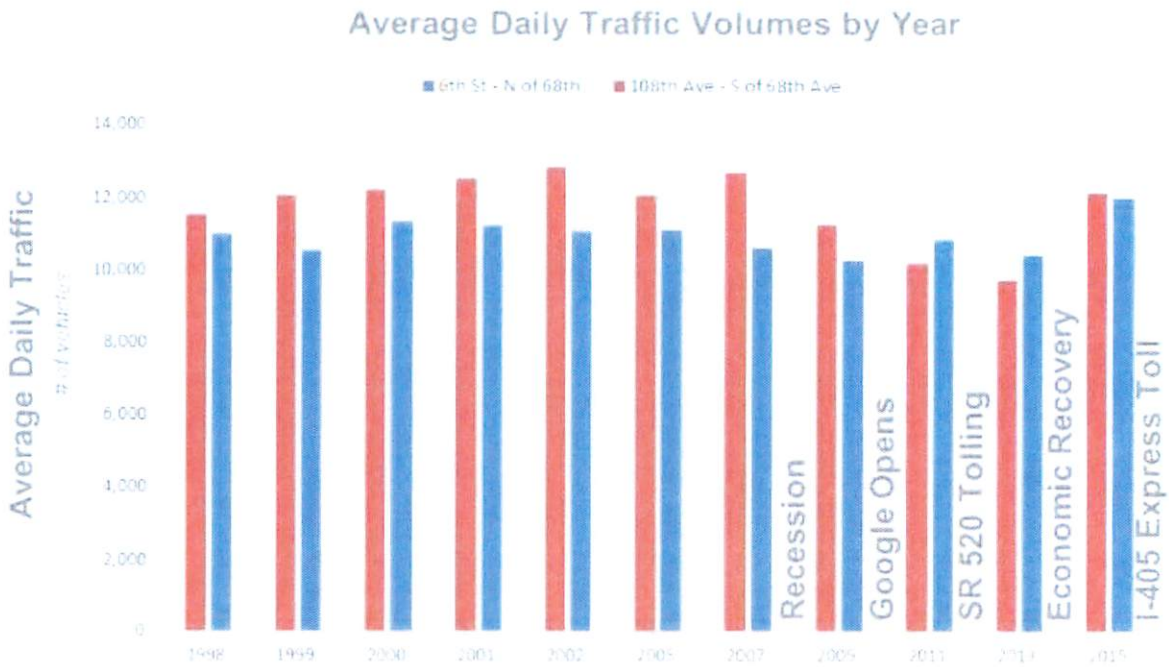


Figure 8 - Daily Volumes Historical Trend

The land use around the 6th Street corridor is integral to the effectiveness of the transportation system. The corridor serves a dynamic mix of existing land uses, including single-family residential, neighborhood retail, commercial, industrial, schools, and a university. Notably, the study area also includes several schools (Emerson, International Community School, Community Elementary School, Lakeview Elementary School, Puget Sound Adventist Academy, Kirkland Children's School, and Northwest University), and the corridor provides important access and circulation for students walking and biking to schools.

The neighborhoods in the 6th Street corridor study area lack a grid of connected local streets. Roadways that do provide secondary circulation and connectivity, specifically 8th Street S in Everest Neighborhood and 106th Avenue in Houghton, have complaints from neighbors of speeding and high volumes. A neighborhood traffic control program works to protect these types of streets from cut-through traffic with traffic calming strategies like speed humps and traffic circles and these strategies have been implemented on both routes and continue to be monitored. Data collected as part of the study did not indicate high use of these two corridors.

The Houghton Everest Neighborhood Center (consisting largely of retail with some office and high density residential) occupies the land surrounding the intersection of NE 68th Street/108th Avenue/6th Street. Access into and out of this center is unorganized and poorly managed. Driveways are close to the intersection creating confusion for drivers with too many decision points or potential conflict points where collisions could occur. Multiple driveways are provided onto the arterials with a midblock crosswalk on NE 68th Street that also creates potential conflict points with pedestrians. The excessive number of potential conflict points from driveways on NE 68th Street and 108th Avenue NE are noted in **Figure 9**. These potential conflicts indicate the potential for vehicle collisions with vehicles, pedestrians, and bicycles. Actual collision history is described in **Figure 12** and does reflect more frequent collisions with pedestrians and bikes on these segments.

Conflicts NE 68th Street

- **55 Vehicle - Vehicle**
- **25 Vehicle - Ped/Bike**

Conflicts 108th Ave NE

- **69 Vehicle - Vehicle**
- **24 Vehicle Ped/Bike Conflicts**

Figure 9 - Corridor Conflict Points

This 2.5-mile long 6th Street corridor currently has very few traffic signals to introduce delay. Congestion typically lasts less than two hours but increases travel time by 15 to 20 minutes as compared to non-peak times.

Afternoon peak northbound queues on the corridor were measured on 108th Avenue NE south of NE 68th Street as 1.25 miles or roughly 250 cars long. Northbound PM Peak period queues on 6th Street south of Kirkland Way has been increasing and been observed to extend as much as 4,000 feet or 160 cars. Extensive queueing lasts for no more than two hours, but during that period, travel times can increase by as much as 15 minutes.

Afternoon peak hour intersection operations were calculated applying methods in the most recent (2010) Highway Capacity Manual. Level of service (LOS) is a qualitative measure used to describe the quality of transportation service provided by a system based on different traffic demands. LOS is used to analyze transportation elements, such as intersections and roadways and is based on performance measures such as vehicle delay. It is reported in levels from A to F with A representing free-flowing conditions and F reflecting very congested or failing conditions. LOS for intersections is described in **Appendix B. Figure 10** provides a summary of existing PM peak hour intersection level of service. As noted in the figure most signal controlled intersections operate poorly, at LOS D–E. The side-street, stop-controlled intersection of 9th Avenue S at 6th Street S currently operates at LOS F due to delays on the side street.

Existing travel behavior was captured using data from a data vendor, StreetLight (www.streetlightdata.com). The StreetLight data are big data fused from a variety of sources and connect signals from vehicles and geolocates them on roadway networks. While these data do not capture every vehicle, they do begin to define patterns in travel by fusing all of the data from several months. In looking at PM peak period data for trips using the corridor, the following pattern emerged: of the PM peak trips using the corridor coming from SR 520 (eastbound from Seattle) and 112th Avenue NE (northbound from Bellevue), 26–38 percent are heading east of I-405, 33–48 percent are heading north of the corridor, and 18–26 percent are accessing I-405. This excludes those trips that have one of their trip ends in the study area. It suggests that much of the traffic using the corridor is destined for Kirkland neighborhoods east and north of the corridor.

108th Avenue NE Typical Queue

Typical Congestion with Transit

Figure 10 – PM Peak Intersection Level of Service

Parking

Through the workshop and neighborhood meetings, parking was identified as being inadequate. Issues related to parking are noted below:

- Parking at the Houghton Everest Neighborhood Center is over capacity and spilling over on to local streets.
- On-street spaces are being used by retail employees at the Houghton Everest Neighborhood Center.
- Parking is occurring on neighborhood streets during the day to access transit (due to crowding at the park-and-ride).
- Parking on neighborhood streets is occurring during the day to access office jobs.

Parking utilization counts were collected on a weekday and indicated parking was adequate. Through a field survey of parking utilization, less than 50 percent of available spaces were occupied in on-street spaces and less than 80 percent in the retail areas with the larger market lots under 60 percent. These are shown in **Figure 11**.

Figure 11 – Study Area Parking Utilization (2016)

Collisions and Safety

Collision data from the City of Kirkland were evaluated for the period from 2012 through 2015. **Figure 12** provides a summary of collisions along the corridor. Over the last three years, there were 97 collisions on the 6th Street corridor between Central Way/NE 85th Street and the southern city limits. Of these, 6 (or 6 percent) involved pedestrians and 2 (or 2 percent) involved bicycles. On NE 68th Street/NE 70th Street between Lakeview Drive and I-405, there were 46 collisions, one of which involved a pedestrian (or 2 percent) and two involved bicycles (or four percent). One of the pedestrian-related collisions occurred in the NE 68th Street mid-block area noted for a high number of potential conflict points, including a mid-block crosswalk. Of the 23 collisions at the intersection of NE 68th Street/108th Avenue NE, 4 collisions involved bicycles or pedestrians. Also at this intersection, 10 collisions (or almost half) were rear ends, typically associated with congestion.

Access management is a strategy that can help reduce collisions

Figure 12 - Safety Data Collection

68th St / 108th Ave intersection

- 23 total collisions
- 12 injuries
- 4 involving a bicycle or pedestrian
- 10 rear-ends

On 6th / 108th Corridor

- 97 total collisions
- 6 pedestrian collisions
- 2 bicycle collisions

NE 68th St

- 46 total collisions
- 1 pedestrian collision
- 2 bicycle collisions

Public Outreach

The City of Kirkland encourages broad and creative opportunities to engage with the community. The outreach for this corridor study was done in coordination with the Houghton Everest Neighborhood Center land use study. Outreach consisted of the following:


Outreach at Everest Neighborhood Picnic

- Key stakeholder interviews with neighborhood community organizations

- Outreach at events like the community picnics (see image)

- Providing information to businesses

- A broad public survey, including outreach at fairs, neighborhood meetings, and through City media.

- Outreach with transportation partners, including King County Metro and City of Bellevue

- A community workshop that defined issues, key values, and potential solutions on November 2, 2016


Status of the project was posted in many places including the CKC

- Signs placed throughout the corridor with information and status updates (see right)

- Staff workshops to develop ideas

- Review and guidance by the Transportation Commission, Planning Commission and Council

Results of the survey, prior to the community workshop, were summarized in a survey report (see **Appendix C**). They suggested that the community was most interested in addressing and "fixing" regional congestion but not expanding the corridor and adding lanes. There was interest in creating livable and walkable community solutions, specifically to address pedestrian circulation.

Observations and Issues Summary

Review of the corridor through data collection and outreach helped frame the overall issues within the 6th Street Corridor as follows:

Peak Periods Traffic Impacts the City and Neighborhood

Peak period/peak direction congestion is a growing problem that is influenced by regional congestion and exacerbated by the lack of a connected grid network. The corridor is constrained by its current capacity, specifically during the PM peak period. Long queues and congestion increases travel times, blocks access to neighborhoods, and impacts emergency response times.

Because roadway widening for general purpose lanes along the corridor would be very costly and extremely disruptive to property owners for vehicle travel lanes, it is not considered to be feasible, at this time, for addressing peak period congestion. As a priority for ***moving more people, regional transit connections were considered a priority***. More cars could be removed from the corridor if more people stayed on the bus north of the South Kirkland Park-and-Ride to get to their homes. For example, moving transit more efficiently to improve speed and reliability is a priority.

The CKC, with the interim trail, is an underutilized regional transportation asset. There are substantial obstacles to expanding the CKC as a transportation corridor, including cost and the concerns from some members of the community.


The CKC and 6th St / 108th Ave are parallel transportation corridors

Protecting the accessibility and enhancing connectivity of the neighborhoods is key to preserving livability of the community.

Arterials adjacent to the retail center have poorly defined and managed access/driveways that contribute to congestion and increase conflict-points, particularly with pedestrians.

There is very ***high interest by the community to improve the walkability of the area***, especially for walking school children. The TMP does not identify any significant gaps in sidewalks in this area, and there are no gaps on the 6th Street Corridor. Some missing sidewalk segments remain on local neighborhood streets. Providing continuous sidewalks would enhance the walkability of the corridor. There is a desire for improved protected pedestrian connections, protected crosswalks, wider sidewalks, fewer conflicts, removal of barriers, and safety enhancements for bicycling.

The interim CKC trail has resulted in increased bicycle use on the corridor as well as on arterial streets connected to the trail. Most arterials include bike lanes; however, there are gaps and lanes don't extend through signal-controlled intersections.

Parking data do not suggest parking is currently a problem on-street or in the retail center; however, ***improving education and management related to parking could improve understanding*** and reduce conflicts

While cut-through traffic was noted from the public, data fused from vehicles using the area (Streetlight) suggested very low use of these routes.

GROWTH AND CHANGES

This section describes growth and future conditions within the identified study area. This includes the adjacent roadway network, planned improvements, future traffic volumes, traffic operations, traffic safety, non-motorized facilities, and transit.

Forecasted Growth

The City's Comprehensive Plan and Transportation Master Plan imagines a future horizon year of 2035 guided by the vision of a walkable, vibrant, livable, connected, and green community. The Puget Sound Region is experiencing tremendous growth. Between 2010 and 2040 the region's population will increase by 35 percent and employment will increase by 57 percent. Within Kirkland, population is anticipated to grow by 13 percent and employment doubling by growing over 117 percent between the years 2010 and 2035. Regionally, investments such as Sound Transit (ST) 2, and ST 3 are being made to expand transit as opposed to widening roads. This aligns with the regions and City goals to promote sustainable transportation choices.

Planned and Programmed Improvements

This study defined data collection and methods in **Appendix A**. Specifically, it defined a future design horizon year of 2035 that aligns with the Comprehensive and Transportation Master Plan. Improvements are identified and planned in the corridor including future traffic signals at the intersections of 9th Avenue S at 6th Street S, Kirkland Way at 6th Street S, and NE 53rd Street at 108th Avenue NE. Other infrastructure improvements in the area include completion of the SR 520 Bridge Replacement and modifications in transit service assumed to be in place with regional investments identified and assumed to be in place by 2035 from the ST 2 and ST 3 plans. Most notably, these include extension of light rail to Bellevue, Overlake and downtown Redmond and BRT on I-405 by 2024. The transit service, largely provided by King County Metro is defined in the 2025 and 2040 METRO CONNECTS service plan that identifies RapidRide service though Kirkland. Beyond 2035, the ST 3 plan includes a light rail line from Kirkland to Issaquah.

While the CKC Master Plan includes expansion with a fully developed regional trail and some form of high capacity transit, there is no current funding identified that would advance these plans. It was assumed in the future that the Interim trail remained in place as a base case. Additionally, King County has developed the Eastside Rail Corridor Master Plan, of which the CKC is a central segment. The County will continue to develop trail segments as funding becomes available.

Land use changes will be consistent with the Comprehensive Plans for Kirkland; however, this study also addressed potential land use options related to the Houghton Everest Neighborhood Center. This analysis is provided in the last section of this report. The City is growing with several new dense, mixed-use commercial, office, and residential developments. Examples of this include Kirkland Urban and development of the Antique Mall site in Downtown Kirkland. The large Totem Lake redevelopment is underway in the north half of the city, outside the study area. Northwest University has also proposed a Master Plan for their campus along the corridor. This 20- year Master Plan is not approved and is still in review; therefore, it was not included in the future development baseline.

Land Use in Houghton Everest Neighborhood

As part of this 6th Street Corridor study, the analysis will also be applied to an area within the corridor to assess potential land use changes in the Houghton Everest Neighborhood Center. These land use changes slightly increase travel demand on the corridor.

The neighborhood center area is shown in **Figure 19** and analyzed in the last section of this report.

The full memo analysis is provided in **Appendix E**.

Traffic Volumes

Comparative growth in PM peak hour growth traffic volumes on the 6th Street Corridor is provided in **Figure 13**. Constraints on the corridor capacity result in limited traffic growth on the corridor, with the most notable peak hour traffic growth on the segment near Northup Way.

Bicycle and Pedestrian Changes

In addition to further development of the CKC to the Master Plan, future expansion of regional trails includes implementing elements of the Eastside Rail Corridor (ERC) and completion of the SR 520 Bridge Replacement with a bike and pedestrian trail connection across Lake Washington from the University of Washington to Redmond.

Transit Service Changes

One of the most dramatic changes that may occur in the region is the investment in transit infrastructure and service. Sound Transit long-range plans ST2 and ST 3 are funded regional transit expansions. In Kirkland, investments include the I-405 Bus Rapid Transit System, and elsewhere light rail extensions to Redmond, Federal Way, and Lynnwood will be in place by 2035. Beyond the 6th Street Corridor Study plan year of 2035, the ST 3 Plan includes extension of light rail between Issaquah and the South Kirkland Park-and-Ride as well as high-capacity transit studies along the CKC/ERC and SR 520.

METRO CONNECTS is a long-range vision of service for the years 2025 and 2040 to meet future transit needs in King County and to integrate with planned and programmed light rail as it expands throughout the region. In Kirkland, METRO CONNECTS includes expansion of RapidRide with frequent service connections for Kirkland from Kingsgate to Eastgate by way of Downtown Bellevue. METRO CONNECTS will require additional resources beyond current King County Metro revenue sources to implement. As such, the service network depicted does not represent a revenue-backed service plan, and refinements to this vision through plan updates and service processes are expected.

Capital Improvements

Recent improvements in the corridor have included new sidewalks on the west side of 6th Street south of 5th Place S to provide an important missing link, and on-street parking. Capital infrastructure investments that are planned or programmed for the corridor include installation of traffic signals at three locations (6th Street S at Kirkland Way, 6th Street S at 9th Avenue S, and 108th Avenue NE at NE 53rd Street), a left-turn pocket on Kirkland Way to Railroad Avenue, and intelligent transportation system (ITS) improvements throughout the city. King County Metro has also discussed the potential need to provide traffic signals at the entrance to the South Kirkland Park-and-Ride on 108th Avenue NE. These new signals will reduce signal spacing along the corridor (currently there are four signal controlled intersections and in the future, there could be seven). With increased signals, it will be important to coordinate the signals to make sure they are optimized and efficient.

As noted in the last section of this report, with development and land use changes in the Houghton Everest Neighborhood Center, there are opportunities for infrastructure investments as part of development approvals. These improvements include but are not limited to:

- Consolidate or close driveways to better manage access as parcels develop.
- Combine parcels and improve internal site circulation to help better manage traffic.
- Contribute right-of-way and make improvements to the intersection of 6th Street S / 108th Avenue NE and NE 68th Street to facilitate better movement of pedestrians, bicycles, transit, and vehicles.
- Contribute right-of-way to consolidate driveways, widen sidewalks, remove mid-block crosswalks, and provide medians to better manage access.
- Install traffic control that accommodates safe signal-controlled pedestrian access across NE 68th Street.
- A new planned signal at 6th Street S at

9th Avenue S could provide additional access to other parcels north of the center.

Emerging Trends

The way transportation and mobility are delivered in the United States is destined to change dramatically due to new trends and technologies. These emerging trends may modify future transportation in ways that are currently not fully understood. These trends and technologies are described below:

Changing travel behavior – Changing travel behavior among millennials (defined as those reaching adulthood in the early 21st century) suggests this generation may be choosing alternatives to driving alone for travel. A study by the University of Michigan Transportation Research Institute indicates that driver licensing for teens and young adults is declining. For example, the number of 19-year-olds with drivers' licenses dropped from 87 percent in 1983 to 69 percent today.[3] Availability of a range of travel choices will support this trend.

Smart Signal Technology – Traffic signal operations and control are being improved through better real-time information, data fusion that improves understanding of travel patterns, and improved operations of traffic signals to better respond to actual traffic patterns and vehicle types. The City of Kirkland has developed an ITS strategy and owns, manages, and operates traffic signals around the City. The City is implementing ITS with traffic signals throughout the city to reduce delays and meet other objectives.

Shared-Use Mobility and Auto Transportation Network Companies – While rideshare programs through transportation network companies (TNCs) like Lyft and Uber and carshare programs like Car2Go, Zipcar, and ReachNow are popular and gaining in popularity, there are limited data related to these programs' impact or effectiveness in reducing drive-alone behavior. Ride hail services like Lyft and Uber are currently available in Kirkland to enhance mobility.

Bike Share – A cycle-share program, Pronto, was implemented in Seattle in 2015 with mixed success. The program, which included memberships for short- and long-term bicycle rental, ended in March 2017. The future of bikeshare is uncertain; however, there is ongoing interest in developing bikeshare programs in the future as the technology improves. Funding has been identified in the Connecting Washington Partners program for additional bike share. A bike share program could be expanded with development of other bike and trail investments such as the CKC an Eastside Rail Corridor.

Autonomous and Semi-Autonomous Vehicles There are projections that in the next 20 years, autonomous vehicles may broadly replace the automobile fleet. Semi- autonomous vehicles are already on the market, assisting drivers and helping avoid crashes. In the future, these vehicles could be completely autonomous and potentially reduce congestion (vehicles are expected to operate safely with reduced distance between vehicles and potentially higher speeds). Autonomous vehicles have been proposed to operate cleanly (potentially electrically), for a variety of vehicle types—buses, trucks, and passenger vehicles—and potentially for shared use, thus further reducing the need for automobile ownership. As the technology evolves, autonomous vehicles may become part of fleets such as transit that deliver people and goods. Space may be needed to accommodate drop-offs and storage.

These emerging trends suggest that transportation resources will become more fluid, and while it is important to preserve facilities for different transportation modes as assets, their use and operation may evolve over time. For example, autonomous vehicles may reduce park-and-ride demand; however, the space may be better used for shared-use and transfers.

Summary

In the corridor, regional and localized land use will increase travel demand; however, there is limited expansion of roadway capacity. Delays and

3 http://www.umtri.umich.edu/what-were-doing/news/more-americans-all-ages-spurning-**drivers**-licenses, 2016.

congestion are likely to increase or extend the peak period. There is significant planned increased investment in transit. This investment in transit aligns with the Comprehensive Plan vision for a more green and sustainable community. Moving transit efficiently, encouraging transit service and flexibility and maintaining investments in transit service will be important for regional mobility.

Within the 6th Street Corridor there are some planned changes to increase local access to the corridor through installation of traffic signals. While new signals create safe and controlled crossings of 6th Street, there could be more improvements to increase the connectedness and livability within and parallel to the corridor.

Within the 2.5 miles of the corridor, there are currently four traffic signals (or <1.5 per mile). In the future this could increase to seven signals, with new signals proposed in the corridor at Kirkland Way, 9th Avenue S, and NE 53rd Street

The corridor has 20 crosswalks (or >seven per mile) today, and of these, eight are protected with signals of rectangular rapid flashing beacons (RRFBs). There are no current plans to increase the number of crosswalks.

There are transit stops every ¼ mile along the corridor. Buses like the Sound Transit Route 540 are express type service and don't serve each stop. In the future this corridor is anticipated to be served by frequent Metro's RapidRide service. The standard stop spacing for Rapid Ride is ½ mile. It is possible that in the future with RapidRide stop frequency could be reduced.

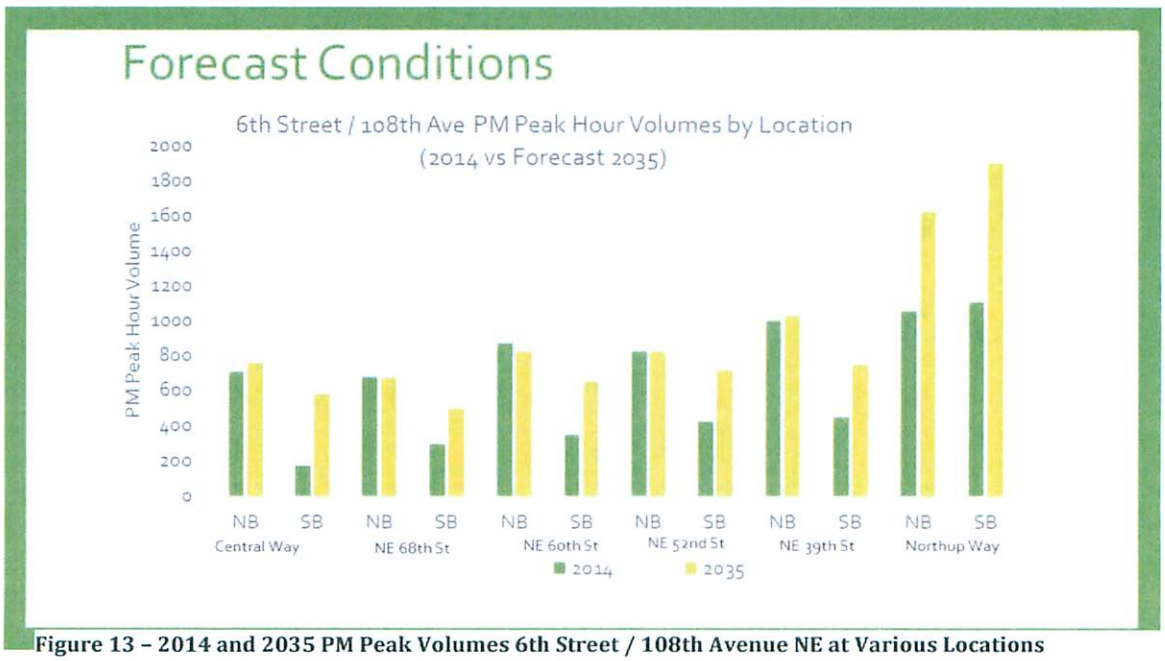


Figure 13 – 2014 and 2035 PM Peak Volumes 6th Street / 108th Avenue NE at Various Locations

POTENTIAL SOLUTIONS

This section describes the development of solutions to address needs in the 6th Street Corridor. Solutions were developed to meet needs according to community values.

Workshop Feedback

Community Workshop November 2, 2016

The corridor study offered numerous opportunities to provide feedback and help define potential solutions. Solutions were developed to address issues and challenges defined in the corridor context setting and review of growth.

Solutions were defined to address bottlenecks throughout the corridor, move transit more efficiently, and improve community connections for all modes.

Community Workshop Developing Solutions November 2, 2016

An initial set of ideas and solutions was developed as part of the November 2, 2016, Community Workshop held at Northwest College. The workshop reviewed initial survey results (as summarized in **Appendix C**) and reviewed the initial baseline and future conditions. While regional congestion was identified as a major challenge, ***most constituents were opposed to widening the corridor beyond its current three-lane configuration***. Roadway capacity recommendations included improving I-405 and connecting NE 60th Street across I-405 for vehicles. Community members worked in small groups to define potential solutions. The workshop also gained feedback about community values and priorities. When asked, the group agreed that the 6th Street Corridor must:

- Be designed to reduce congestion.
- Move people (not just vehicles) efficiently throughout the entire corridor now and into the future.
- Connect community and neighborhood destinations, safely.

Potential Improvements

The solutions raised by community members included improvements to reduce bottlenecks, improve transit, improve connections for pedestrians and bicycles. The initial list of potential improvements identified at the workshop are listed in **Table 1** and keyed to **Figure 14** in the map.

Potential Solutions

Using the list of potential improvements in **Table 1** and shown **Figure 14** as a starting point, a more refined list of potential improvements was developed through stakeholder outreach, data collection, and analysis. The results are shown in **Table 2** and **Figure 14**. These investments are located throughout the corridor. 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.

Feedback

Solutions were discussed with City staff and agency partners to further refine solutions. Solutions were discussed with the Transportation Commission and

City Council and adjusted to best meet values of the community and needs of the City.

Appendix D provides a summary of a draft evaluation of solutions with recommendations on solutions to be carried forward and for discussion with the Transportation Commission.

These solutions were further refined and adjusted to best meet values of the community.

Connection to Values

Solutions were evaluated for their ability to meet the values of the community specifically to:

- Address regional congestion and move people.
- Improve the livability of the community by improving connections within and between the neighborhoods.
- Address the needs of the future.

Figure 14 - Improvement Locations

Table 1. Suggested Corridor Improvements from the November 2, 2016, Community Workshop

Numbers	Potential Solution Ideas	Type
1A	Transit Signal Priority northbound on 6th Street S at Kirkland Way - Peak Hour - Left-turn lead lag	Transit
1B	Signal coordination (Intelligent Transportation System) along 6th Street S between Central Way and Kirkland Way	Operations
2	9th Street S and Railroad at Kirkland Way intersection safety - Radar speed - Westbound left-turn pocket	Safety
3A	High Capacity Transit on CKC bypass 108th Avenue NE to South Kirkland Park-and-Ride	Transit
3B	Bus intersection with queue jump at 6th Street and CKC	Transit
4	Reassess the installation of traffic signals at 6th Street S at 9th Street S	Operations
5A	Improve / expand NE 70th Street overpass to widen and rechannelize for bikes/pedestrians/vehicles	All modes
5B	Bus rapid transit planning near NE 70th Street with park-and-ride	Transit
6A	Lease Houghton Park-and-Ride for private shuttles	Transit
7A	Transit signal priority and queue jump (108th Avenue NE) - Left turn lane for transit only - Overhead signs time of day - C-Curb to restrict driveways	Transit
7B	Transit signal priority for left turns - combines bus and lefts	Transit
8A	Access management and multimodal access on NE 68th Street and 108th Avenue NE - Median control - Driveway consolidation - Wider sidewalks	Roadway Vehicular Pedestrians and Bikes Safety
8B	Access management and multimodal access on NE 68th Street and 108th Avenue NE - New full access signals at 106th Avenue NE - Consolidate driveways - Wider sidewalks and roadway with bike lanes	Roadway Vehicular Pedestrians and Bikes Safety

Table 1. Suggested Corridor Improvements from the November 2, 2016, Community Workshop

Numbers	Potential Solution Ideas	Type
8C	Access management NE 68th Street - Selectively close driveways	Roadway Vehicular Pedestrians and Bikes Safety
8D	Full bicycle intersection at 6th Street /108th Avenue NE	Pedestrians and Bikes
8E	Green bike boxes 6th Street S / 108th Avenue NE	Bikes Safety
9A	Improved CKC access / connection for bikes (at NE 60th Street)	Bike/Pedestrian
10A	Enhanced vehicle access crossing I-405 at NE 60th Street - Grade separation of 114th Avenue NE - new signal NE 60th Street/108th Avenue NE	Vehicles
10B	Enhanced pedestrian and bike access for NE 60th Street creating a greenway	Pedestrians and Bikes Safety
11A	Signal at NE 53rd Street (proposed by Northwest University) Relocate and improve bus stop with and adjust crosswalk with Metro	Pedestrians and Transit
12A	Park-and-ride permitting for transit users (Metro)	Transit
12B	Improve access/egress from park-and-ride for buses (City of Bellevue) - Speed/radar - Pavement marking	Transit
12C	Signal control at South Kirkland Park-and-Ride access (City of Bellevue)	Transit
12D	Improve CKC access to South Kirkland Park-and-Ride and increase bike parking at park-and-ride	Transit and Bikes
P1	Residential parking zones to eliminate casual and long-term parking by retail employees	Parking
P2	On-street parking time limits or management to reduce park-and-ride	Transit / Parking
E1	Education campaign on the value of transit in Kirkland's Mobility Future	Transit
E2	Monitor person movement speed/efficiency	Transit Vehicles
E3	Greenway promotion of NE 60th Street and other connections	Pedestrians and Bikes
E4	Continue to monitor speeding and cut-through traffic	Vehicles

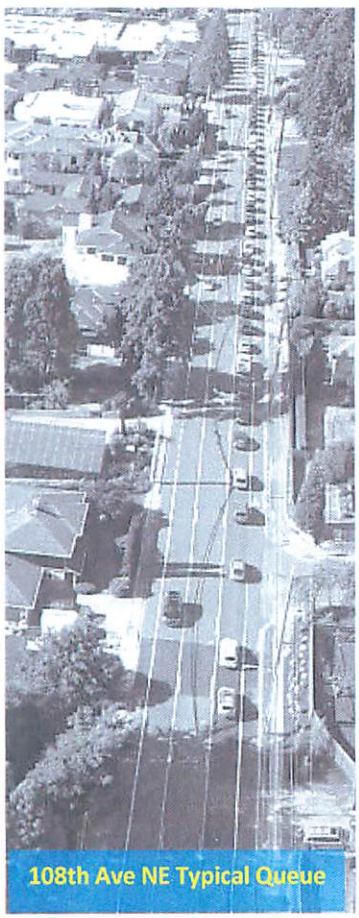
CORRIDOR IMPROVEMENTS

Through community and City feedback, solutions were further refined and adjusted. Some more complex ideas were developed further and are summarized in Appendix F.

Capital Improvements

Concepts were further developed to test their feasibility and effectiveness using traffic operations analysis for some and developing them as concepts for others.

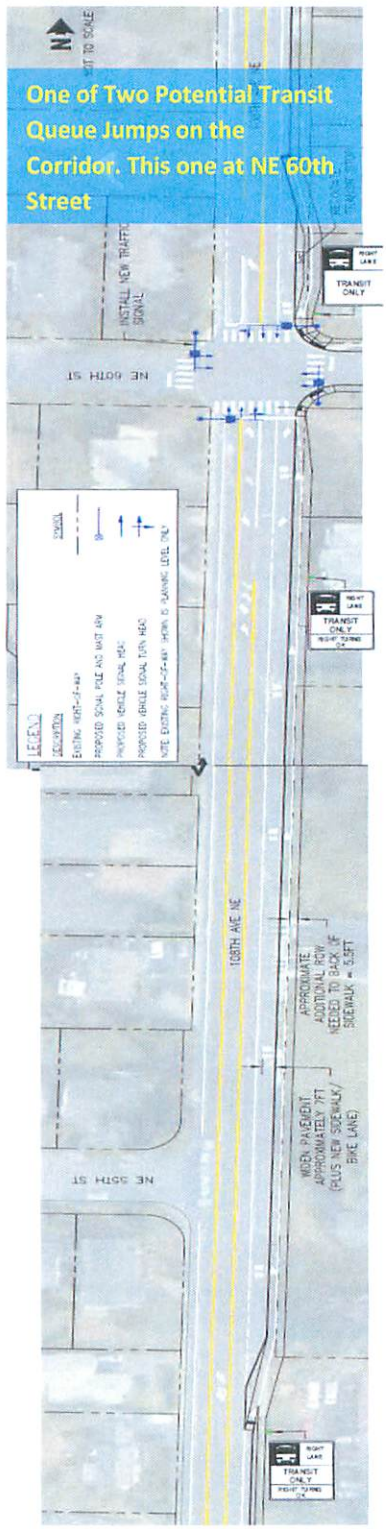
Moving people more effectively through the corridor with transit was an important proposal. Several options for moving transit past long peak period queues in the afternoon were suggested.



108th Ave NE Typical Queue

These transit priority treatments were evaluated using VISSIM a micro-simulation analysis that can measure comparative transit travel time advantages for transit vehicles as compared other automobiles.

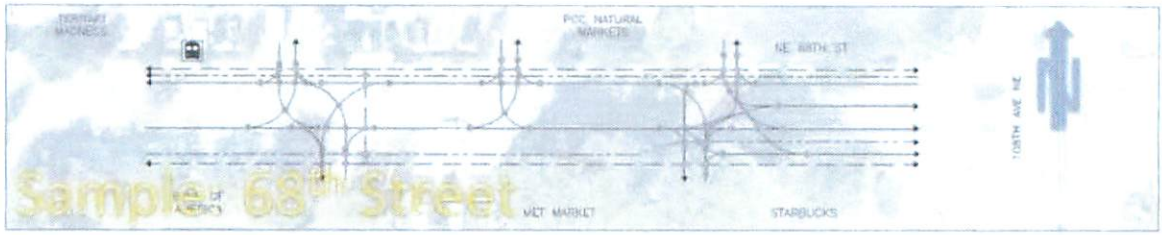
The proposed solution would create two queue jumps at NE 60th Street and NE 68th Street, advancing transit past long queues. Two 1,000-foot-long jumps would result in over 2 minutes of travel time savings for northbound buses. This is a significant savings, especially considering the number of people on each bus.

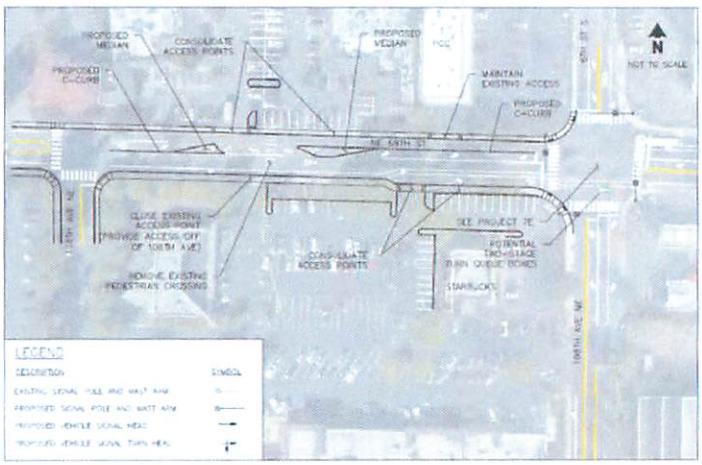


One of Two Potential Transit Queue Jumps on the Corridor. This one at NE 60th Street

This travel time savings is shown in **See Table 5**.

One of these queue jumps is shown left and would include a new traffic signal at NR 60th Street and would relocate bike lanes adjacent to the sidewalk for safety. The other queue jump at NE 68th Street would require modifications at the traffic signal and would relocate bike lanes adjacent to the sidewalk. This solution (7E) is further described in **Appendix F**.





Access management solutions were developed to address potential vehicle and pedestrian conflicts on NE 68th Street. Developing concepts to improve access included considering medians, driveway consolidation and turn restrictions.

For NE 68th Street, extending medians and c-curbs can reduce potential vehicle and pedestrian conflicts. Consolidating driveways could also reduce conflicts; however, this would require willing participation by the property owners. **Appendix F** includes the option below (8A) as well as an option that envisions redevelopment, potential dedication of right-of-way to extend bike lanes and increase sidewalks with greater reduction in potential conflicts (8C).

This list of recommended corridor improvements builds on feedback 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 were agreed to are listed below and are also shown as part of modal (transit, bike, and pedestrian) and total transportation systems on the following maps. These solutions were evaluated against values defined by the community. More detailed explanation of capital projects recommended as part of this effort are provided in **Appendix D**.

Policies

Two policy/strategies were recommended.

P3. Parking management strategies (shared parking and joint parking) to maximize use. Look for opportunities for shared parking where parking is available, for example, at Seventh Day Adventist Church where parking is generally used only on the weekends. A suggested example included shared parking of church for market employees.

P4. Trail-oriented development, which includes development of land use and regulatory policies that support lower parking use through access to regional trails. This includes promotion and prioritization of shared use mobility strategies – car share (car to go), bike share, and TNCs.

Education

Three education strategies were recommended, including:

E1. Developing a campaign to help convey the value of transit in moving people in Kirkland.

E2. Consider performance monitoring and 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.

E3. 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.

E4. Monitor speeding on secondary cut-through streets 8th Street Sand 106th Avenue NE. Potential traffic-calming strategies are posted on the City

website. (http://www.kirklandwa.gov/depart/Public_Works/Transportation_and_Traffic/Traffic_Calming_Devices.htm). New traffic calming strategies continue to emerge

Next Steps

Implementation of these recommended corridor solutions will require additional design, cost estimates, an assessment of right-of-way needs or other impacts, and continued outreach to communities with environmental review. Coordination with agency partners would be required for transit investments and investments affecting state facilities.

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
	1. 6th Street at Kirkland Way		
1A	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 left turns could provide a short travel time advantage for transit.
1B	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 Street) could improve the efficiency and reduce stops and delays.
1C	Crosswalk improvements at Kirkland Avenue	Pedestrian	To improve access across 6th Street for pedestrians, put in place RRFB crossing.
	2. 9th Street S and Railroad Avenue		
2A	9th Street S and Railroad at Kirkland Way Intersection Safety - Radar Speed - Left turn lane **(See concept in Appendix F)**	Vehicles	A safety concern for neighborhoods include sight distance near the existing CKC trestle over Kirkland Way at Railroad Avenue and 9th Street S. 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. Project is included in the City Capital Improvement Plan (CIP).
	3. CKC for Transit		
3A	High Capacity Transit on CKC bypass 108th Avenue NE to South Kirkland Park-and-Ride	Transit	To reduce transit delay incurred on 6th Street and 108th Avenue NE, especially northbound during PM peak periods, constructing transit facilities within the CKC, similar to the CKC Master Plan. Transit on the CKC, especially in the segment between the South Kirkland Park-and-Ride and 6th Street could still connect to local neighborhoods and would dramatically reduce overall transit travel time. When implementing transit on the CKC in the future consider implementation of new technologies including autonomous transit vehicles and an all-electric fleet.

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
3B	Bus Intersection at 6th Street S/5th Place S and the CKC **(see Concept in Appendix F)**	Transit	Transit signal priority at the CKC trail intersection on 6th Street. This would require a new signal, removal of on-street parking, and existing crosswalk with a signal controlled crossing to give transit priority in both north and southbound directions. Realign the 5th Place leg of the intersection to be consistent with future plans for the CKC and realign to be closer to a 90-degree intersection with small curb radii in order to make it more pedestrian and neighborhood friendly. Additionally, consider grade-separation of the CKC by going under the 6th Street S/5th Place S intersection.
4. 6th Street at 9th Avenue S			
4A	Install traffic signals at 6th Street and 9th Street S	Vehicles / Pedestrians / Bikes / Transit	The City is in the process of designing and constructing a new traffic signal at the intersection of 6th Street and 9th Street S. This signal will improve neighborhood access to and from the 6th Street Corridor. This signal could support redevelopment of adjacent land uses. Project is included in City CIP
5. NE 70th Street over I-405			
5A	Improve and expand NE 70th Street 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.
5B	Bus Rapid Transit Planning near NE 85th Street/NE 70th Street 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 NE 85th Street. 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.
6. Houghton Park-and-Ride			
6A	Houghton Park-and-Ride lease for private shuttles	Transit	Private shuttles are operated in Kirkland by large employers including Google, Microsoft Connector, and most recently, Facebook and Amazon. Parking for employees meeting the shuttles currently use the South Kirkland Park-and-Ride and other leased space. With underutilization at the Houghton (7th

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
			Street) 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.
7. 108th Avenue NE at NE 68th Street			
7C	Continue and complete bike lanes	Bikes	Complete the bike lanes along 108th Avenue NE - From Bellevue city limits to NE 41st Street - NB Near NE 53rd/52nd Streets (along the frontage of Emerson High School) - Through NE 68th Street intersection
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.) This was recently completed.
7E	Widen to provide curbside northbound transit-only lanes **(see concept in Appendix F)**	Transit	Widen 108th Avenue NE to create extensive segments of transit lanes to bypass queues. One segment would provide a long northbound queue jump lane for transit at NE 68th Street, and one segment provides a long northbound queue jump lane for transit at NE 60th Street. A new signal would be required at NE 60th Street.
8. NE 68th Street at 108th Avenue NE (Access)			
8A	Access Management - extend curbs - selectively close driveways (assumes no redevelopment) **(see concept in Appendix F)**	Vehicles / Pedestrians / Bikes	Closely spaced driveways and intersections, bike lanes, as well as crosswalks on NE 68th Street result in numerous conflict points between vehicles, pedestrians, and bicycles. As part of development review with redevelopment, access management strategies could include closing all driveways on NE 68th Street and consolidating driveways, using medians to separate conflicting movements, and reorganizing adjacent development sites to better circulate and organize traffic off 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. Without any redevelopment or widening, there could be some access management strategies implemented including extending medians to restrict lefts from driveways, closing or consolidating driveways, and potentially removing the pedestrian crossing.

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
8C	Access Management and Multimodal improvements on NE 68th Street at 108th Avenue NE (assumes re-development) - Median control - Driveway consolidation - Wider sidewalks - Extend bike lanes including Intersection - Consolidate and protect crosswalks - Southbound right-turn lane **(See concept in Appendix F)**	Vehicles / Pedestrians / Bikes	With redevelopment, the number of driveways could be reduced, thus reducing potential conflicts. New traffic control for crosswalks could improve access. A southbound right- turn pocket on 6th Street could improve overall intersection operations. With redevelopment of the adjacent land uses, this option could be developed with widened sidewalks, extending and completing bike lanes, and adding green bike boxes or other features like a full bike intersection through the NE 68th Street/108th Avenue NE intersection and adding a southbound right-turn lane.
9. CKC Connectivity			
9A	Improved trail access and connection for Bikes	Pedestrians / 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, similar to how the NE 60th Street Corridor connects with the CKC.
10. NE 60th Street Connections			
10A	Enhanced pedestrian and bike access for NE 60th Street Neighborhood Greenway at 108th Avenue NE	Pedestrians / 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 for bicycles and promote places for less confident bike riders. NE 60th Street as a greenway can be a key connection across I-405 to connect Lake Washington Boulevard to Overlake. A signal-controlled intersection at 108th Avenue NE is proposed as part of 7E.

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
11. Signal at NE 53rd (access to Northwest University)			
11A	Signal at NE 53rd Street (proposed by Northwest University) Relocate and improve bus stop. Coordinate and adjust crosswalk with Metro.	Pedestrians / 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 NE 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.
12. South Kirkland Park-and-Ride			
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 carpoolers through permitting. This could be the simplest strategy to promote transit. Metro is currently piloting a carpool reservation program at park-and-rides.
12B	Improve access/egress from park-and-ride at NE 38th Place 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 is working with local agencies. A potential solution includes using speed radar and pavement markings to improve sight distance for exiting buses.
12C	New signal control access to Park-and-Ride (City of Bellevue)	Transit / Parking	As congestion increases and it becomes increasingly challenging to access the park-and-ride on 108th Avenue NE, 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 Avenue NE that are part of Bellevue's adaptive signal system. Could be annexed into City of Kirkland.

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
12D	Improve trail access to Park-and-Ride	Transit / Bike / Pedestrians	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 pedestrians along the corridor to using the sidewalks and bike lane on 108th Avenue NE. As this volume increases, access to the adjacent park-and-ride structured garage would be desirable to more easily access transit. With the passage of ST 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 connection from the CKC to the park-and-ride should be considered in the planning and development of a future rail station.
12E	Bike Share/Bike Racks at Park-and-Ride	Transit / Bikes	With the close proximity of the CKC to the 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).
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, and improved access to park-and-rides using shared use resources such as Bike Share and Car Share or Transportation Network Companies.
Policies (P) and Education (E)			
P3	Parking management strategies (shared parking and joint parking) to maximize use.	Parking	Look for opportunities for shared parking where private or public parking is available and consider management strategies.
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 such as car share (car to go), bike share, and TNCs.

Table 2. Recommended Corridor Improvements

#	Solution Ideas	Type	Description
E 1	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.
E 2	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.
E 3	Greenway promotion of NE 60th Street and other connections	Pedestrians / 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 programs, and other promotions

These solutions are organized by investment type below. Listed below are the investments that support **vehicular travel**.

1B. Signal Coordination along 6th Street.

2A. Kirkland Way and Railroad Ave Intersection Improvements.

5A. Improve and expand NE 70th Street Overpass.

7D. Install "don't block the box" pavement markings at Fire Station Exit on 108th Avenue NE.

8A. Driveway consolidation around NE 68th Street / 108th Avenue NE businesses.

8C. Reduce business access on NE 68th Street and 108th Avenue NE to signalized intersections and install new signal at 106th Avenue NE.

P3. Citywide Parking Management strategies such as shared parking and joint parking use.

Below and in **Figure 15** are the investments supporting connectivity for **pedestrians.**

1C. Crosswalk Improvements at 6th Street & Kirkland Way Intersection.

9A. Improve CKC trail access (also for bikes), especially at NE 60th Street.

12D. Connect the CKC trail to the north end of the South Kirkland Park-and-Ride.

P4. Develop land use policies promoting "trail -oriented development."

E3. Greenway promotion of NE 60th Street as well as other corridors across the city.

Below and in **Figure 16** are the investments supporting connectivity for **biking.**

7C. Continue and complete Bike Network connections along 108th Avenue NE.

8D. Full Bicycle Intersection at NE 68th Street and 108th Avenue NE.

8E. Install green bike boxes in intersection to allow safer bike left turns.

10A. Designate NE 60th Street as Neighborhood Greenway.

12E. Install bike racks or bike share at South Kirkland Park-and-Ride.

Listed below and in **Figure 17** are the investments supporting regional mobility and **transit.**

1A. Transit Signal Priority at 6th Street and Kirkland Way.

3A. High Capacity Transit on the CKC.

3B. Bus Intersection at 6th Street and CKC.

5B. Houghton Park-and-Ride lease for private shuttle use.

7E. Widen 108th Avenue NE to provide the maximum level of queue jump & install new signal at NE 60th Street.

11A. Install new signal at NE 53rd Street and relocate and improve existing bus stop.

12A. Park-and-Ride permitting for transit users at South Kirkland Park-and-Ride.

12B. Improve Access / Egress from South Kirkland Park-and-Ride.

12C. New signal controlled access to South Kirkland Park-and-Ride.

12F. Install real time parking occupancy at South Kirkland Park-and-Ride.

E1. Education Campaign promoting the value of transit in Kirkland.

E2. Monitor Performance (in person throughput) along 6th Street to understand need for transit investment.

The cumulative map of solutions is provided in **Figure 18.**

Figure 15 - Pedestrian and Trail Recommendations

Figure 16 - Bike Recommendations

Figure 17 - Transit System Recommendations

Figure 18 – Transportation System Recommendations

RELATIONSHIP TO LAND USE

HOUGHTON EVEREST NEIGHBORHOOD CENTER

This section addresses the transportation effects of changes in land use at the Houghton Everest Neighborhood Center.

Houghton Everest Land Use

This section summarizes the baseline scenario 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 Street S/108th Avenue NE and NE 68th Street intersection in Kirkland (see **Figure 19**). 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 were 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 (1) a modest development scenario with a maximum development height of 35 feet (Modest Change Scenario), and (2) a greater development scenario with a maximum development height of 55 feet (Greater Change Scenario).

These conditions of an assumed 2035 timeframe with and without growth in the Center are also compared with potential investments in the corridor that could be in place. A memorandum describing the trip generation and intersection level of service results is attached. This section summarizes the results and impact of different corridor investments.

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 2035Comp Plan, Modest Change, and Greater Change scenarios, with the difference being the number of total residential dwelling units. Land use by scenario is shown in **Table 3** and reflects changes in the number of dwelling units. These are assumed to be multi-family housing above ground level office and retail.

Table 3. Land Use Comparison

Use	Existing	2035 Comp Plan	Modest Change (35')	Greater Change (55')
Residential (Dwelling Units)	39	360	574	862
Retail (Square Feet)	105,092	113,480	113,480	113,480
Office (Square Feet)	73,150	122,476	122,476	122,476

Trip generation was calculated for the PM peak hour and Daily for each of the development scenarios using the ITE Trip Generation manual assuming the different land use types. As noted in the graphs below in **Figure 20** and **Figure 21**, trips for the daily and PM peak are highest with the Greater Change scenario with the least trips for existing conditions.

Figure 20 - Daily Trips to/from Development

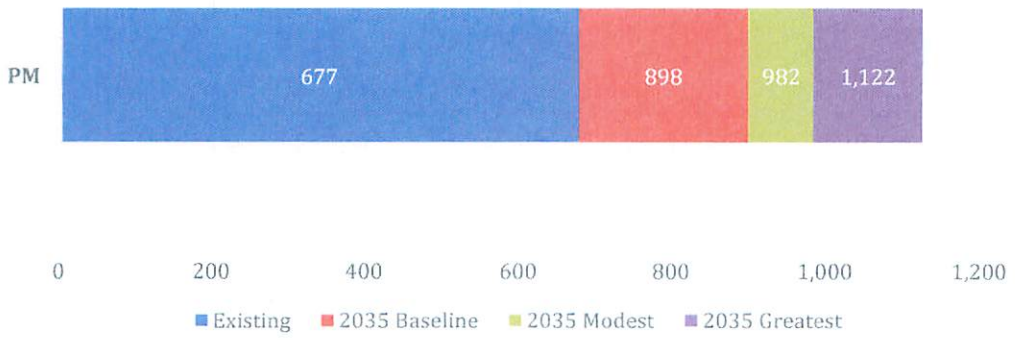


Figure 21 - PM Peak Trips to/from Development

Development Impact

In order to understand the relative impact of the trip generated by the development scenarios as compared to the future Comprehensive Plan, impacts of these development scenarios were analyzed assuming future infrastructure investments along the 6th Street Corridor. A portion of the trips were distributed 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 4 compares intersection operations at NE 68th Street and 108th Avenue NE 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. The Greater Change development assumes an added southbound right-turn lane. This could be added to the intersection in any scenario that assumes redevelopment of the Northwest Corner parcel, as right-of-way is needed for this lane.

Table 4. Operations NE 68th Street /108th Avenue NE Intersection

Scenario	Level of Service	Average Delay in seconds per vehicle	Worst Movement	Total Entering Vehicles
Existing – 2016	E	62	SB	2,520
Baseline – 2035	F	142	SB	*3,855*
Modest - 2035	F	148	SB	*3,920*
Greater Change Development - 2035	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 this 6th Street Corridor Study, improving safety by reducing 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, widening sidewalks, and closing driveways while adding a new signal at 106th Avenue NE. One of the largest operational benefits for vehicular traffic in the corridor would come from a southbound right-turn lane, which could be implemented as part of the redevelopment in the Greater Change option. This is reflected in the operations noted in **Table 4** above. **Appendix E** provides details on the corridor travel times that were also simulated for future (2035) operations with and without the proposed transit investments in the corridor, including transit queue jumps northbound on 6th Street Corridor at NE 68th Street and at NE 60th Street. Details of these queue jumps are provided as option 7E in Appendix F. Travel times with these investments are noted in **Table 5** indicating a travel time benefit for vehicles and transit with these added lanes.

Table 5. 2035 PM Peak Travel Times on the Corridor with Transit Queue jumps at NE 60th Street and NE 68th Street

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

APPENDICES

The following Appendices contain supporting information and memos referenced throughout this 6th Street Corridor Study. The memos served as interim products and supported in the development of this final report.

APPENDICES

The following Appendices contain supporting information and memos referenced throughout the Corridor Study. The memos served as interim products and supported in the development of this final report.

- A: Data Collection and Methods Memo
- B: Level of Service Descriptions
- C: Survey Summary
- D: Solutions Memo
- E: HENC Analysis Results
- F: Project Detail Pages

APPENDIX A: DATA COLLECTION AND METHODS MEMO

transpoGROUP
WHAT TRANSPORTATION CAN BE

MEMORANDUM

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

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 Corridor108th 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

Data Type	Description	Source	Location (s)	Status
Daily Hourly Traffic Volumes	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
Peak Hour Turning Movements	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 **Figure 2** for map of locations where Transpo has previously collected data
Pedestrian and Bicycle Proximity/ Connectivity	GIS based travel proximity and access to transport	Consultant		Transpo to Build
Pedestrian Volumes	Most Recent (5 Years) Available Pedestrian use of each corridor **Crossing/Crosswalk volumes**	City/Consultant	On Arterials and Trails within the study area	Do not have
Bicycle Volumes	Most Recent (5 Years) Available Bicycle Counts along each corridor	City/Consultant	On Arterials and Trails within the study area	Do not have
Transit Routes/Volumes	Routes and Frequency	Metro/ST/**Microsoft**	Along all corridors within the study area	Requested from KCM Seeking ETC/TDM coordinator Google
Average Vehicle Travel Times & Variability / Seasonality	Available Average vehicle travel times and speeds	INRIX	Along all corridors within the study area	Have INRIX data
Travel Time Variability	Available Metro and ST Vehicle Location	Metro/ST	Along all corridors within the study area	Requested from KCM
Transit Travel Times/Delays	Available Metro and ST Vehicle Location	Metro/ST	Along all corridors within the study area and at stops	Requested from KCM
Transit Passengers	Available Metro and ST Ridership/APC	Metro/ST	Along all corridors within the study area	Requested from KCM
Park and Ride Occupancy/ Utilization	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
Park and Ride License Plate	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
Origins-Destinations	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
Collisions	Most Recent (5 Years) Available Frequency, severity, propensity	City/WSDOT/Bellevue	Along all corridors within the study area	Have Collision Data
Parking	Available On Street Parking Restrictions and occupancy	City/Consultant	Houghton Everest Neighborhoods	Don't have any on-street parking info May need to collect
Travel Demand	Have 2013 Data Banks Looking for latest BKR data	City/Bellevue	Citywide	City to provide data and TAZ files
Other improve-ments	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

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

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).

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 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 unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55-80	Unstable flow (intolerable delay)
F[1]	>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.

APPENDIX C: SURVEY SUMMARY

R-5296
Exhibit A

CITY OF KIRKLAND
WASHINGTON

HE6th

- HOUGHTON / EVEREST NEIGHBORHOOD CENTER
- 6TH STREET CORRIDOR

SUMMARY REPORT

Online Survey

Conducted August 22 - October 28, 2016

Contents

I. Introduction

As part of the public outreach process for the Houghton/Everest Neighborhood Center and 6th Street Corridor Project, the City conducted an online survey, using MetroQuest, a digital public engagement software platform. The purpose of this approach was to:

- Engage a large number of participants within the project area and throughout the city;
- Provide a convenient option for interested citizens to provide feedback, opinions and comments; and
- Gain insight into public opinion about the project.

The survey was organized in five parts (referred to in this report as "screens"), included in Attachment 1 and briefly described below:

SCREEN 1
Welcome screen that briefly described the project

SCREEN 2
Asked for neighborhood preferences related to land use, development, and circulation patterns in the neighborhood center and mobility and transportation options along the 6th Street Corridor

SCREEN 3
Asked about preferences for different transportation strategies addressing pedestrians, bicycles, neighborhoods, congestion, and transit

SCREEN 4
Asked for image ratings of commercial and mixed use buildings, residential buildings, public spaces, streetscapes and parking, and urban design details

I. Introduction

SCREEN 5
Provided information about how to stay involved in the planning process and asked demographic questions.

Survey Participation

Survey responses were collected for a 10-week period, from August 22 through October 28, 2016. A total of 753 persons participated in the survey. Over half of the participants came from the neighborhoods that contain or are near to the Neighborhood Center or 6th Street Corridor – Central Houghton, Everest, Lakeview and Moss Bay. Please see the discussion of Screen 5 for additional information about the demographics of survey participants.

Because participation in the survey was self-selected, findings are not statistically significant, but do provide a robust qualitative snapshot of over 750 participants' opinions and preferences during the survey period. The survey represents one element of the City's larger public outreach effort, which includes opportunities to comment on the project website and other public events, including a community workshop, informal open houses, Planning Commission and Transportation Commission meetings and a public hearing with the City Council. Please see the project website (kirklandwa.gov/HE6th) for additional public involvement activities.

To encourage participation in the survey, posters were displayed throughout the neighborhood (above) and calling cards with local images on the reverse were distributed at events and at various locations (below).

II. Survey

The survey structure was created based on the MetroQuest software platform. The software organizes questions according to different "screen types," described by MetroQuest as "...standardized screens that guide participants through the process of learning about the project and providing input." For example, different screen types allow for priority ranking, scenario ranking, image rating, strategy rating, budget allocation, among others. For the purposes of this survey, questions that allowed for strategy rating, neighborhood preferences and image rating were selected as the most useful and informative.

The City worked with the consultant team to develop question content. Draft questions were reviewed and revised for clarity and to capture all potential opinions.

The survey was launched on August 22, 2016. While the outreach focused on the vicinity around the Neighborhood Center and 6th Street Corridor, the City recognized that all neighborhoods use and have an interest in these areas. Therefore, outreach to publicize the survey included specific efforts to promote participation both in project-area neighborhoods and on a citywide basis.

Materials developed to publicize the survey included small "calling cards" with information a link to the survey, posters and handouts with information about the project and inviting comment through the survey, and "fortune tellers" that provided similar information.

II. Survey

The survey was publicized through a variety of methods:

Electronic Notification E-mails were sent to those who requested updates up via the City of Kirkland and the Houghton and Everest neighborhood associations. Emails sent at the beginning of the survey period and prior to the close of the survey.

Blogs Notices were posted on NextDoor and KirklandViews.

Posters with survey information were posted at the Kirkland Library, North Kirkland Community Center, City Hall, and stores and coffee shops throughout the city.

Handouts were provided at the Peter Kirk Day Camp and Lakeview Elementary for children to take home to their families.

In-person Events Staff spent time at Everest, Houghton Beach, and Crestwoods Park, Puget Consumers Co-op, Northwest University and the Cross Kirkland Corridor handing out information about the survey and encouraging people to participate.

To encourage participation in the survey and other events, large informational signs were posted at six locations in the Neighborhood Center.

Flyers were provided to businesses along the 6th Street Corridor.

Informational signs were posted at six locations in the Neighborhood Center with information and links to the survey.

The survey period ended on October 28, 2016. Over the survey period, a total of 1,507 persons visited the website and 753 persons responded to the survey. The number of site visits is an indicator of the success of the publicity and notice for the survey. According to MetroQuest representatives, a typical response rate for their surveys is 45 to 50%, consistent with this survey.

III. Summary & Observations

Preference for small scale development in the Neighborhood Center. In response to image rating questions, the majority of participants rated large-scale development (3 stories and up) more negatively than smaller scale development for both mixed use and residential development. One outlier to this trend is the moderately negative response to the option of continuing existing low-scale development in future neighborhood center development patterns (Question 2A).

Preference for retail, restaurant and other commercial uses in the Neighborhood Center. Participants consistently expressed a preference for more retail and restaurants compared to a general lack of support for housing or office uses in the Neighborhood Center. Preferred uses in the Neighborhood Center include grocery stores, drug stores, restaurants, coffee shops and small neighborhood retail.

Interest and support for public amenities. Most preferred amenities include multi-use wide sidewalks, flexible public plazas, sidewalk café seating, flexible seating and pedestrian focused streets. There is relatively less support of public art, wayfinding signs or unique design features.

Interest and support for pedestrian and bicycle improvements in the 6th Street Corridor. There is general support for increased crosswalk safety, more pedestrian connections, and increased accessibility to pedestrian routes, more bike lanes, bike parking and increased on-street safety for bikes.

Broad concern over PM peak commute congestion and a mix of opinions about solutions. PM peak commute congestion is identified as the most significant mobility concern. However, there is little agreement over what types of improvements should be pursued to increase mobility. There is some support for increased transit service, although participants did not identify increased use of transit as an option that they would use to improve mobility on the corridor.

IV. Detailed Findings

A series of questions on screens 2, 3 and 4 asked participants to rank preferences, concerns, or images in order from least preferred (1 star) to most preferred (5 stars). Responses to each question are compiled in bar charts showing totals for each preference rating and their average. Each chart is accompanied by a brief summary characterizing the overall trends and findings for the question.

All of the survey responses are presented in the same format. The title of the chart corresponds to the survey question. The bars show the number of responses to each rating, from one star (lowest) to five stars (highest), for each question. The average rating for each question is also indicated.

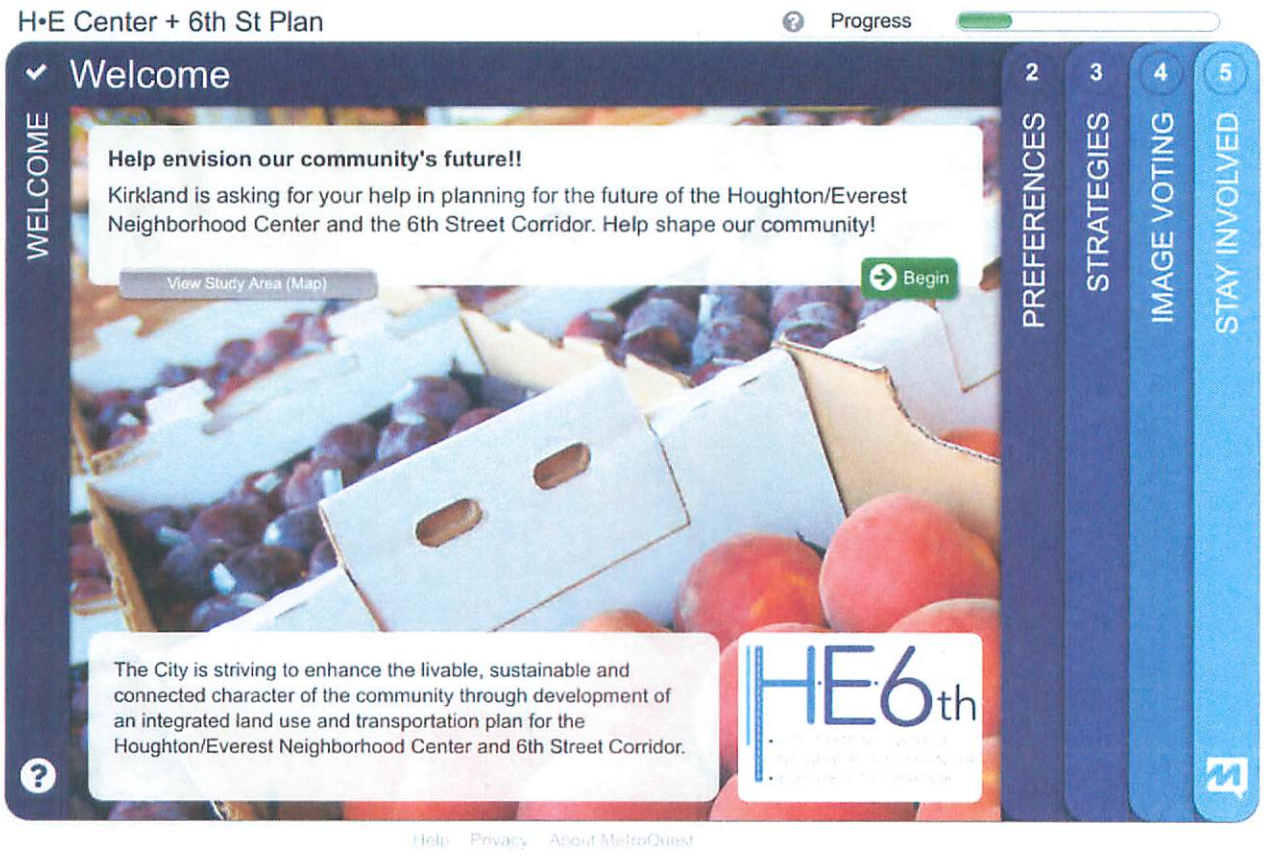
Many of the questions also a field for written comment for respondents to explain their preference rating, identify specific locations, express opinions or otherwise discuss the question. All written comments have been compiled and included as Attachment 2 to this report.

IV. Detailed Findings

SCREEN 1

Welcome

Screen 1 served as a survey overview and did not include any questions.

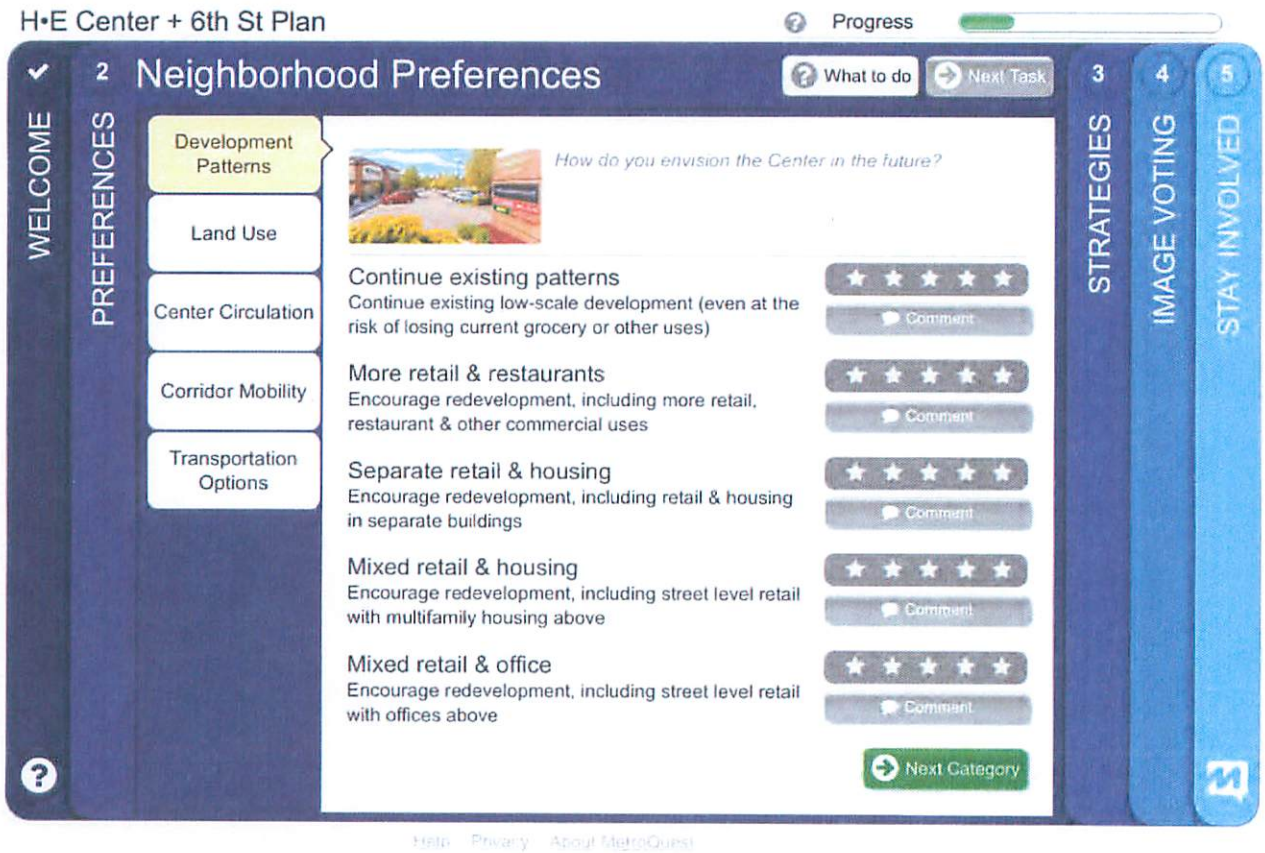


IV. Detailed Findings

SCREEN 2

Neighborhood Preferences

Screen 2 asked for neighborhood preferences related to development patterns, land use, center circulation, corridor mobility and transportation options. Respondents ranked five statements from 1 star (lowest rating) to 5 stars (highest rating).



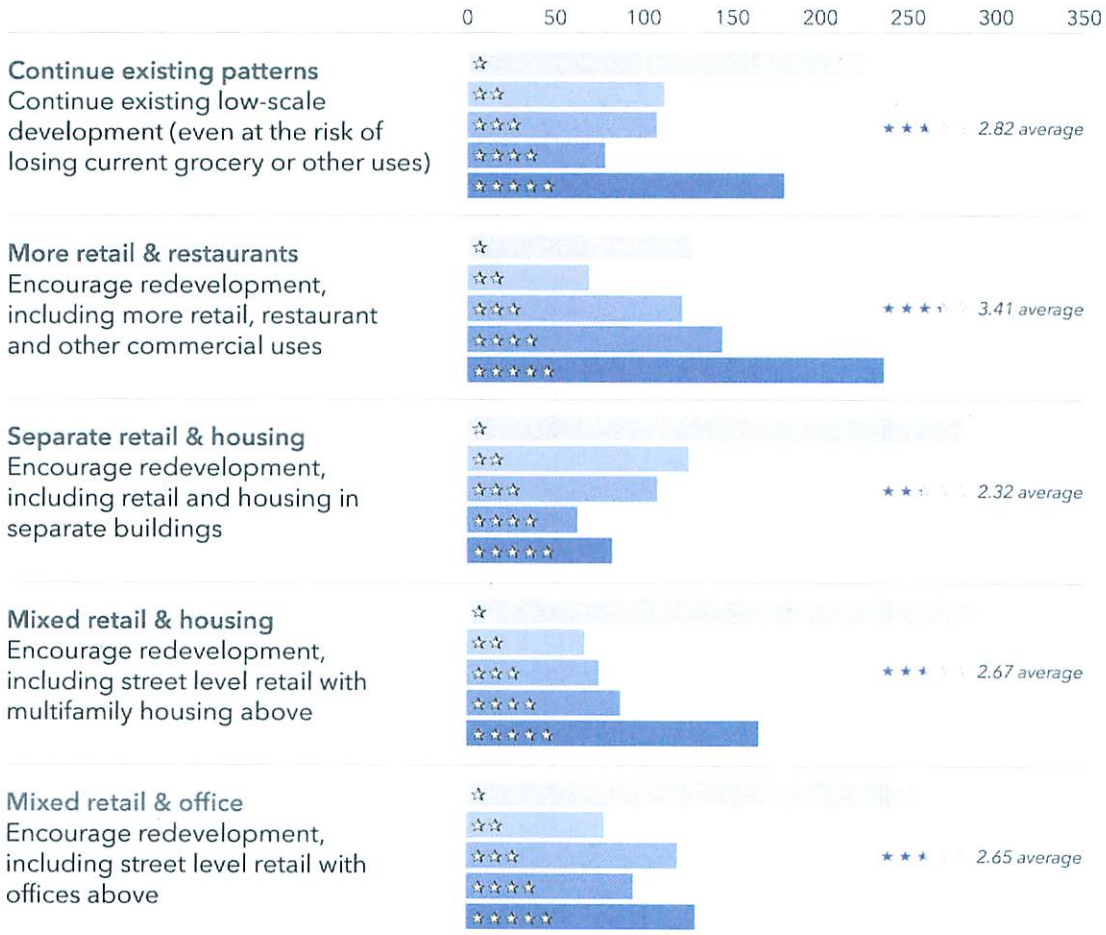
SCREEN 2

Neighborhood Preferences

Five statements ranked from 1 (low) to 5 (high)
Relating to: development patterns ·· land use ·· center circulation ·· corridor mobility ·· transportation options

QUESTION 2A: **DEVELOPMENT PATTERNS**

How do you envision the Center in the future?



FINDINGS

Highest rating Encourage redevelopment, including more retail, restaurant & other commercial uses

Lowest ratings Options proposing a mix of retail and housing or office uses. Lowest average rating for retail and housing in separate buildings

Notes High and low ratings for continue existing patterns and mixed retail and housing. Consistent with responses to Question 2B, which also show high ratings for retail and restaurant uses

SCREEN 2

Neighborhood Preferences

Five statements ranked from 1 (low) to 5 (high)
Relating to: development patterns .. land use .. center circulation .. corridor mobility .. transportation options

QUESTION 2B: **LAND USE**

What uses would you like to see in the Center?

FINDINGS

Highest rating Grocery and drug stores

Other high ratings Restaurants and coffee shops, small neighborhood retail, gathering places

Lowest rating Office spaces

Notes Ratings are consistent with responses to Question 2A, which also show high ratings for retail and restaurant uses

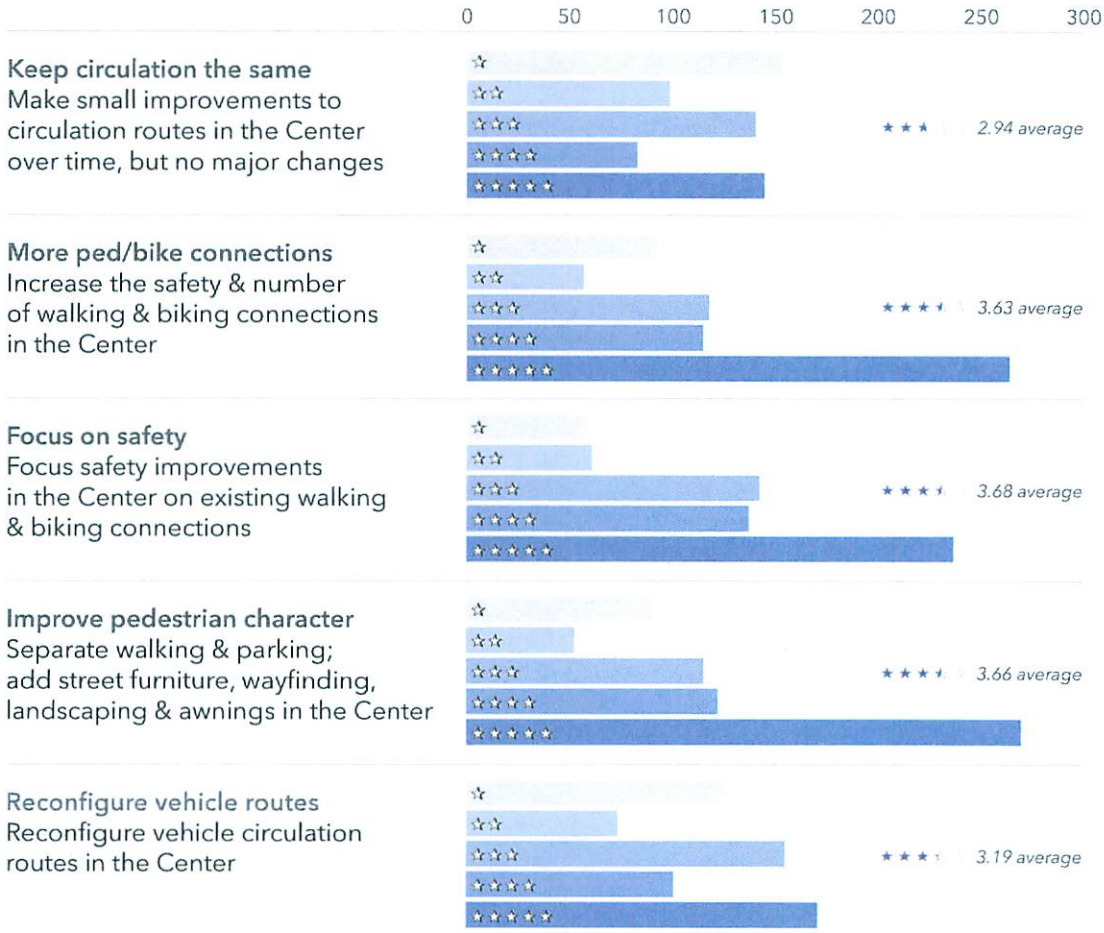
SCREEN 2

Neighborhood Preferences

Five statements ranked from 1 (low) to 5 (high)
Relating to: development patterns · land use · center circulation · corridor mobility · transportation options

QUESTION 2C: **CENTER CIRCULATION**

How would you balance circulation in the Center



FINDINGS

Highest ratings Options that support a focus on safety improvements for existing bicycle and pedestrian improvements, improved pedestrian character, and more pedestrian/bicycle connections

Low ratings Options for keeping circulation the same and reconfiguring vehicle routes See note below

Notes Options for keeping circulation the same and reconfiguring vehicle routes include relatively similar levels of high, low and moderate ratings

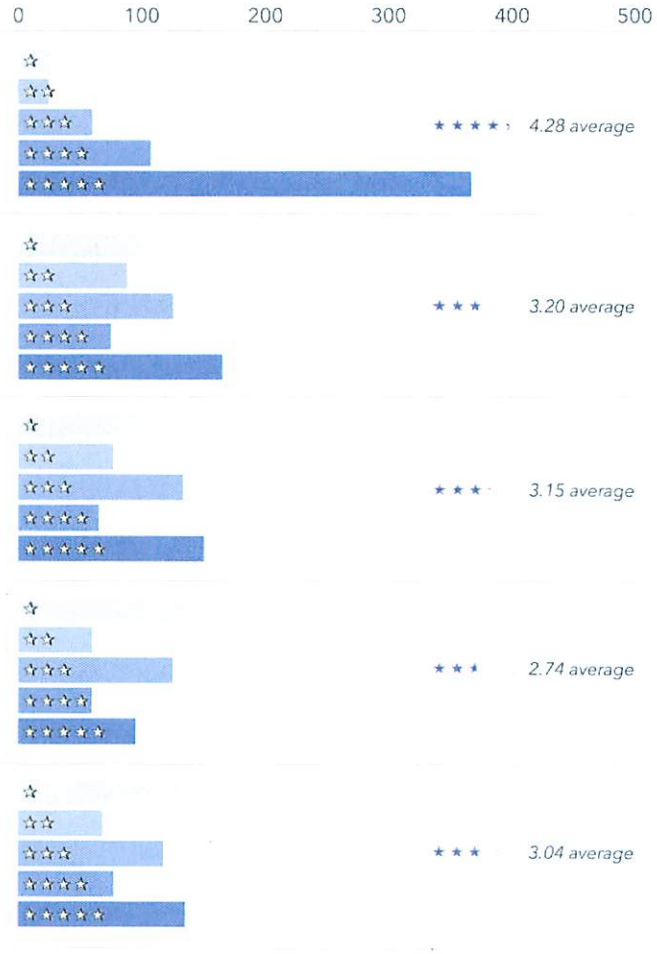
SCREEN 2

Neighborhood Preferences

Five statements ranked from 1 (low) to 5 (high)
Relating to: development patterns .. land use .. center circulation .. corridor mobility .. transportation options

QUESTION 2D: **CORRIDOR MOBILITY**

What are your mobility concerns in the corridor?



FINDINGS

Highest rating By a large margin, pm peak congestion ranked as highest mobility concern along the 6th Street Corridor

Lowest rating Buses for commuting ranked as lowest mobility concern along the 6th Street Corridor

Notes Peak congestion in the am and afternoon were also identified as a concern, although to a much lesser degree than pm peak congestion Walking/biking routes were rated at relatively similar low, moderate and high levels of concern On average, responses to Question 2D show a high concern over pm peak congestion Notably lower averages were given for all of the remaining mobility concerns

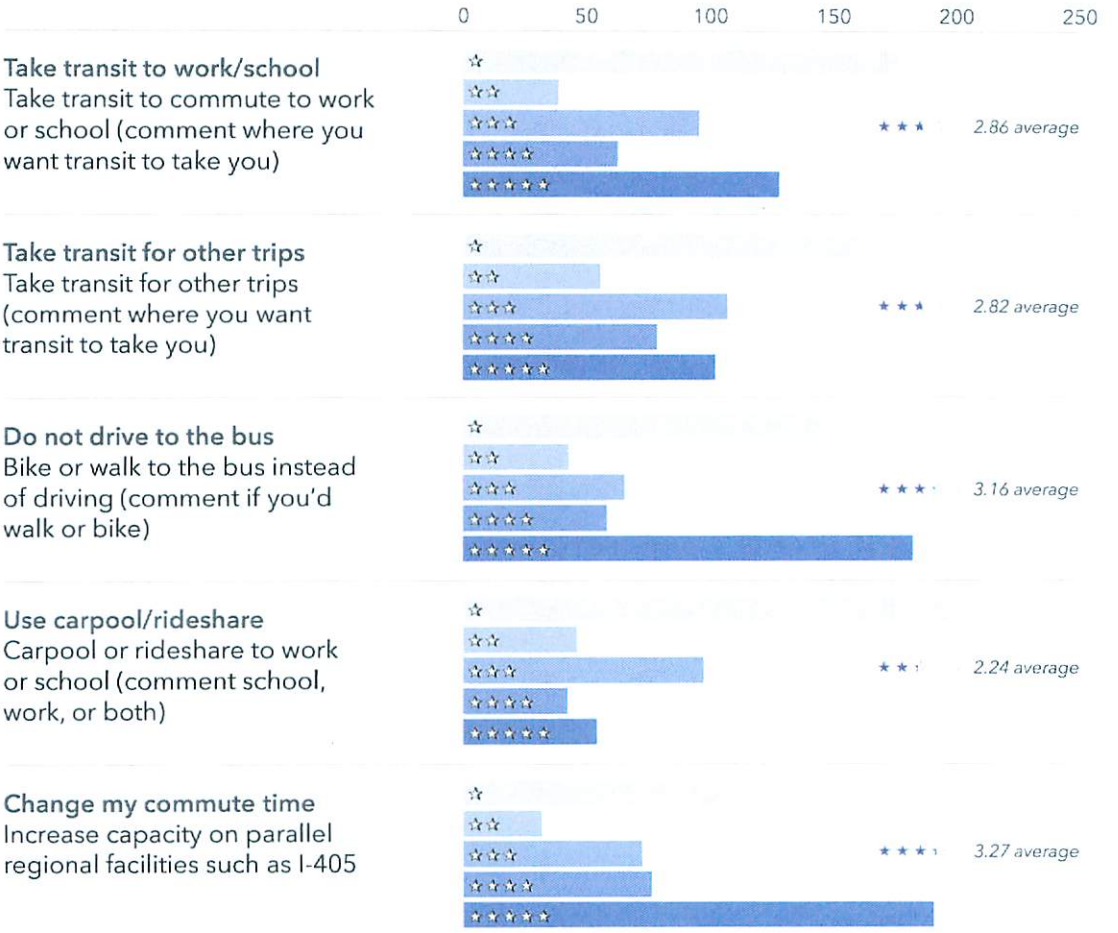
SCREEN 2

Neighborhood Preferences

Five statements ranked from 1 (low) to 5 (high)
Relating to: development patterns .. land use .. center circulation .. corridor mobility .. transportation options

QUESTION 2E: **TRANSPORTATION OPTIONS**

How would you help improve travel in the corridor?



FINDINGS

Highest rating Change my commute time, followed by do not drive to the bus

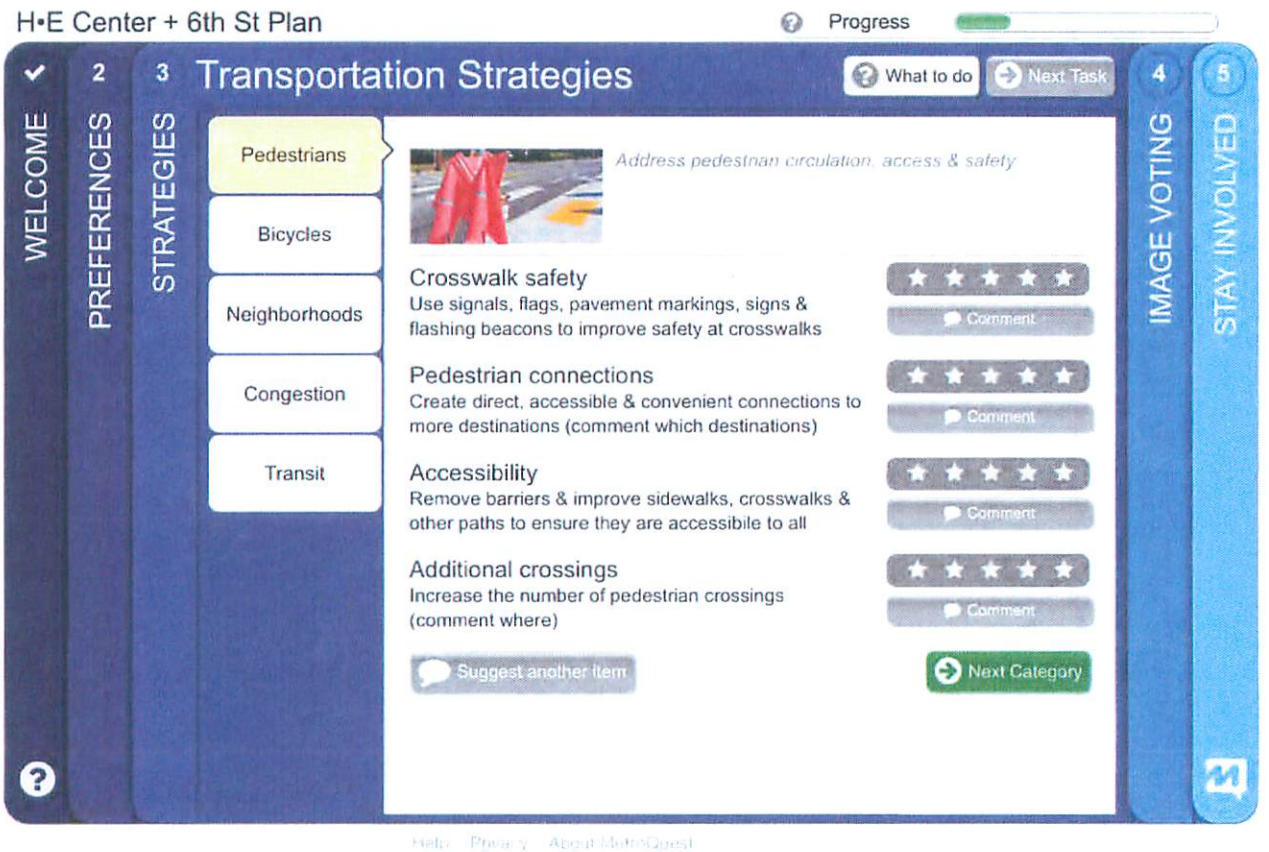
Lowest ratings Use carpool/rideshare, followed by take transit to work/ school and take transit for other trips

Notes Some options, including take transit to work/school, do not drive to the bus, and change my commute time had a relatively similar high and low ratings Overall, the average rating for all options were relatively low, compared to other questions in the survey

SCREEN 3

Transportation Strategies

Screen 3 asked participants to rate a range of different strategies to improve conditions for pedestrians, bicycles, vehicular congestion, transit, and neighborhood access. Respondents ranked five statements from 1 star (lowest rating) to 5 stars (highest rating).



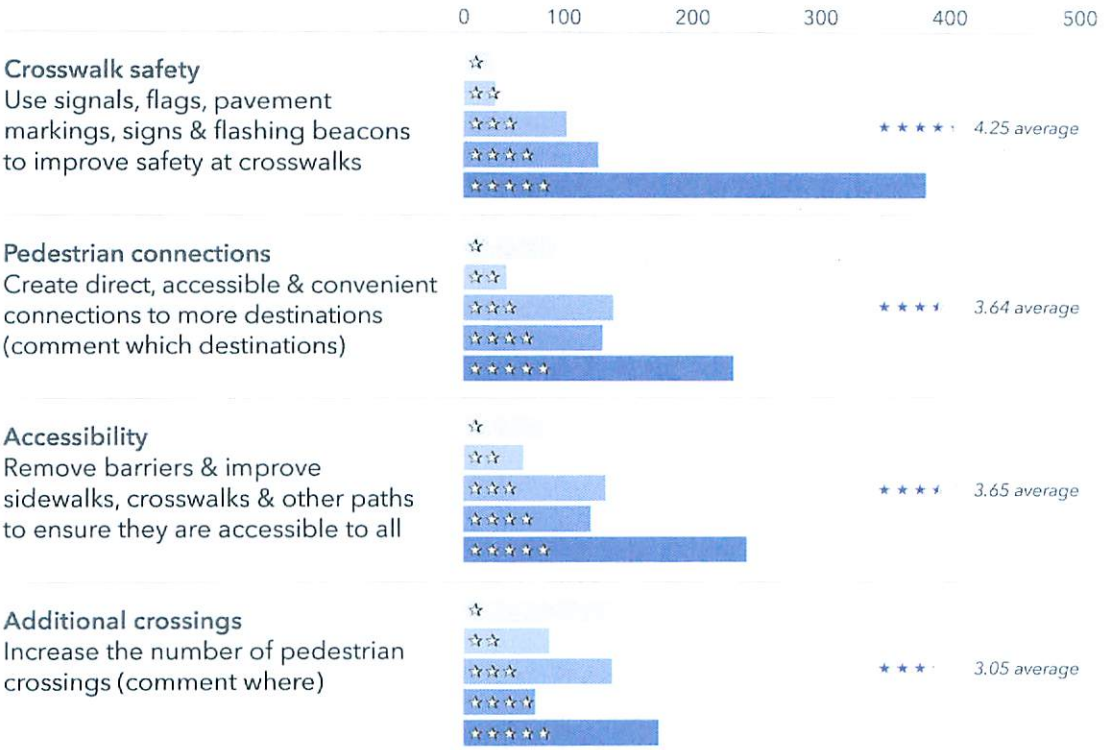
SCREEN 3

Transportation Strategies

Four strategies ranked from 1 (low) to 5 (high)
Relating to improving conditions for: pedestrians ·· bicycles ·· vehicular congestion ·· transit ·· neighborhood access

QUESTION 3A: **PEDESTRIANS**

Address pedestrian circulation, access & safety



FINDINGS

Highest rating Crosswalk safety

Other high ratings Accessibility, pedestrian connections

Lowest rating Additional crossings (though well supported)

Notes Options for this question received the highest ratings overall, relative to other survey questions

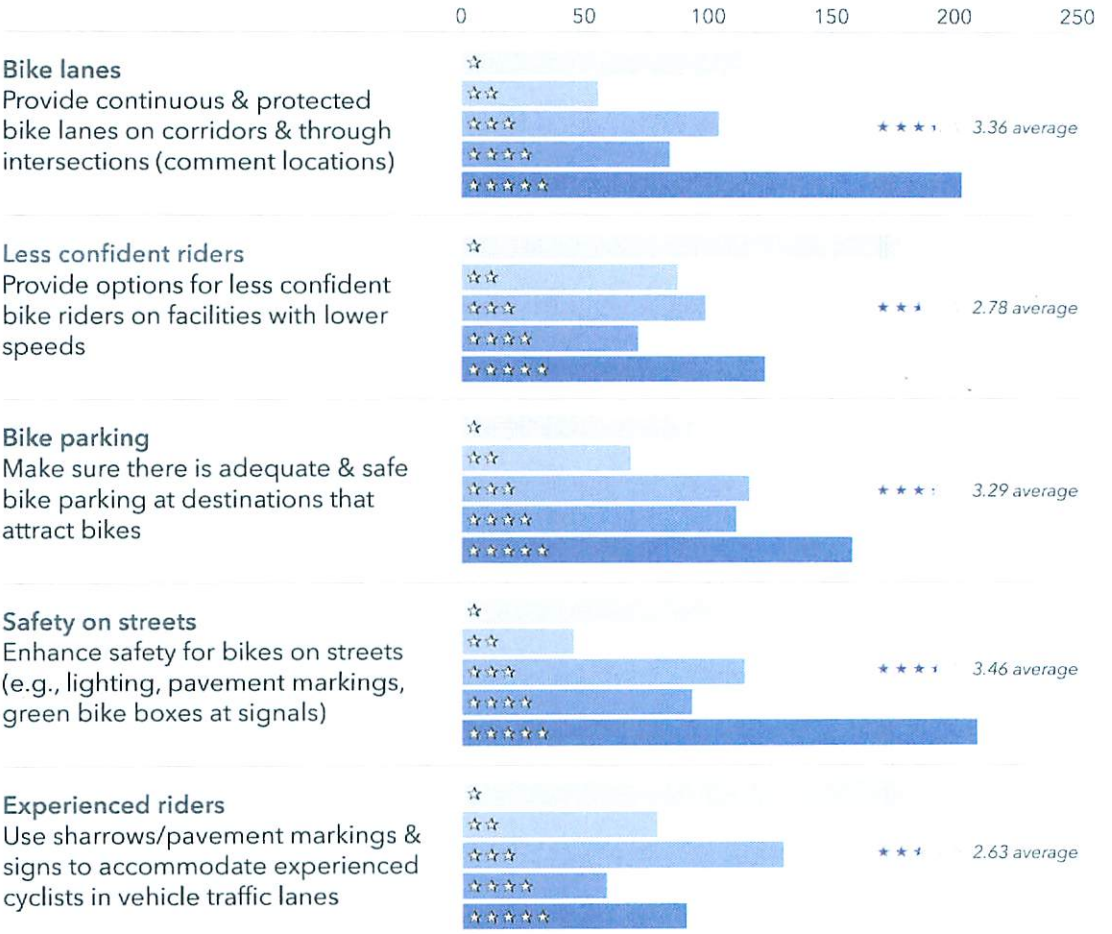
SCREEN 3

Transportation Strategies

Five strategies ranked from 1 (low) to 5 (high)
Relating to improving conditions for: pedestrians · bicycles · vehicular congestion · transit · neighborhood access

QUESTION 3B: **BICYCLES**

Address safety & mobility for bicycles



FINDINGS

Highest ratings Enhance safety on streets, provide continuous and protected bike lanes

Other high rating Provide adequate and safe bike parking

Lowest ratings Accommodate experience cyclists in vehicle traffic lanes, provide options for less confident bike riders

Notes Highest rated options also had a relatively large number of low ratings

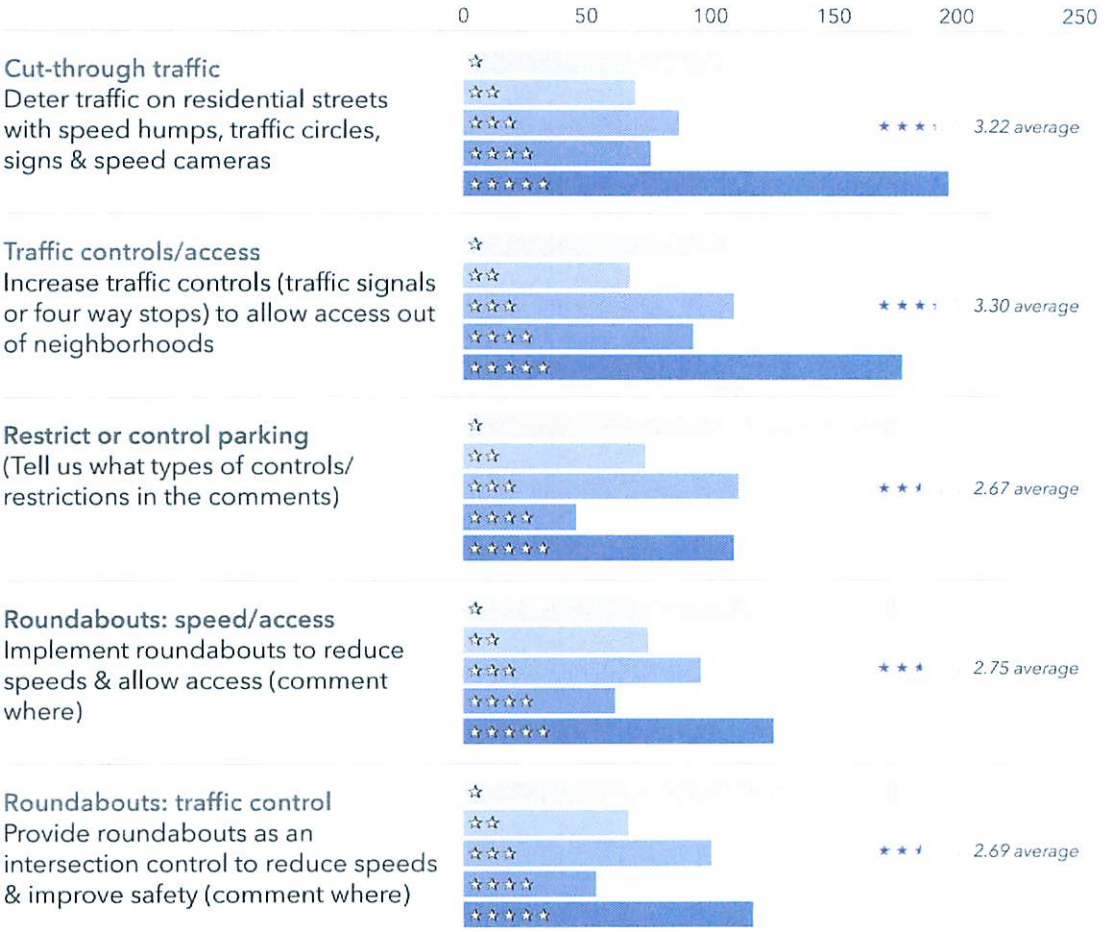
SCREEN 3

Transportation Strategies

Five strategies ranked from 1 (low) to 5 (high)
Relating to improving conditions for: pedestrians · bicycles · vehicular congestion · transit · neighborhood access

QUESTION 3C: **NEIGHBORHOODS**

Provide protection & access for neighborhoods



FINDINGS

Highest ratings Deter cut-through traffic on residential streets, and increase traffic control measures to allow access out of neighborhoods

Lowest ratings Restrict or control parking and both options for roundabouts

Notes All options had a range of relatively high and low ratings

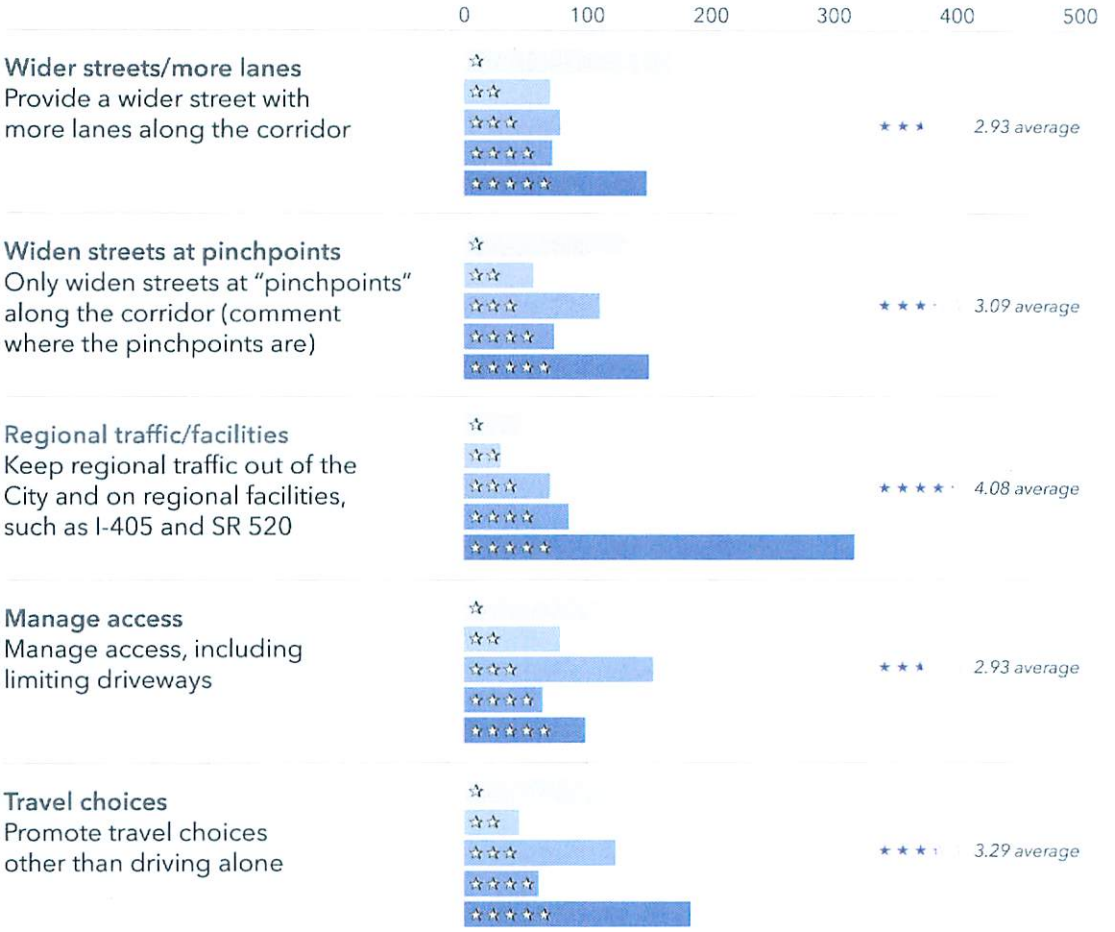
SCREEN 3

Transportation Strategies

Five strategies ranked from 1 (low) to 5 (high)
Relating to improving conditions for: pedestrians .. bicycles .. vehicular congestion .. transit .. neighborhood access

QUESTION 3D: **CONGESTION**

Reduce current & future congestion



FINDINGS

Highest rating Keep regional traffic out of the City and on regional facilities, such as I-405 and SR 520 (by a large margin)

Lowest ratings Options for widening the street either at "pinchpoints" or along the corridor

Notes With the exception of "regional traffic/facilities," responses to options had relatively large numbers of low, moderate and high ratings

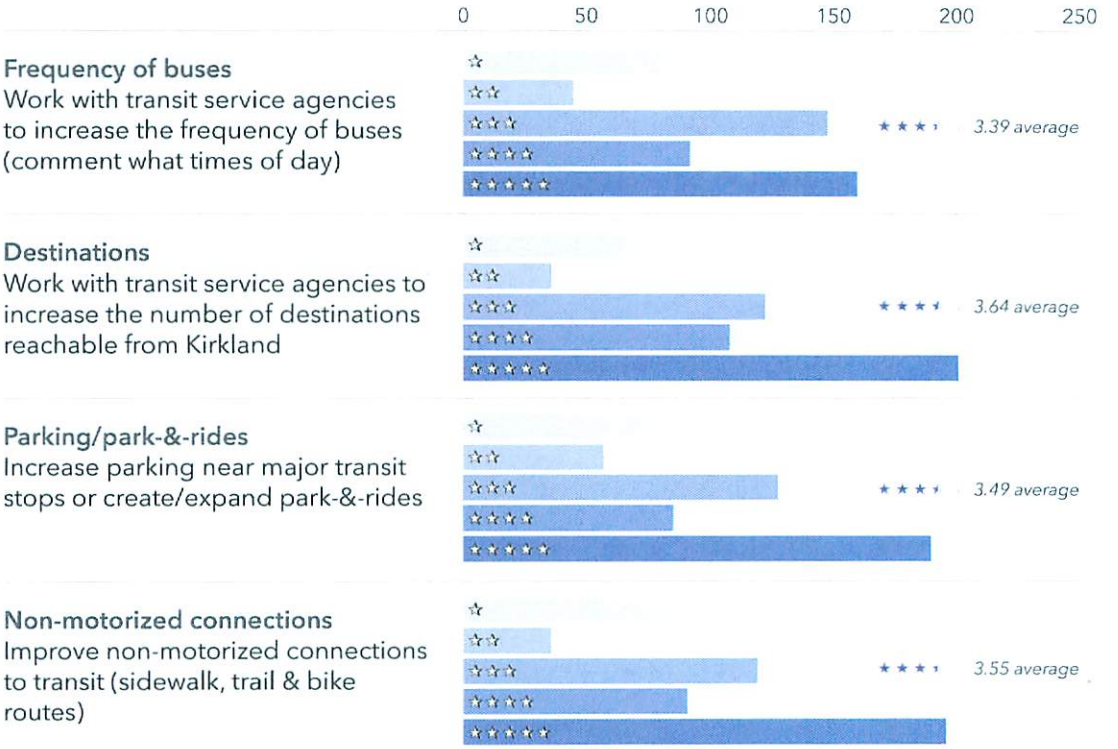
SCREEN 3

Transportation Strategies

Five strategies ranked from 1 (low) to 5 (high)
Relating to improving conditions for: pedestrians .. bicycles .. vehicular congestion .. transit .. neighborhood access

QUESTION 3E: **TRANSIT**

Move people through the corridor with transit



FINDINGS

Highest ratings All options received high ratings, with the highest rating for working with transit agencies to increase destinations from Kirkland

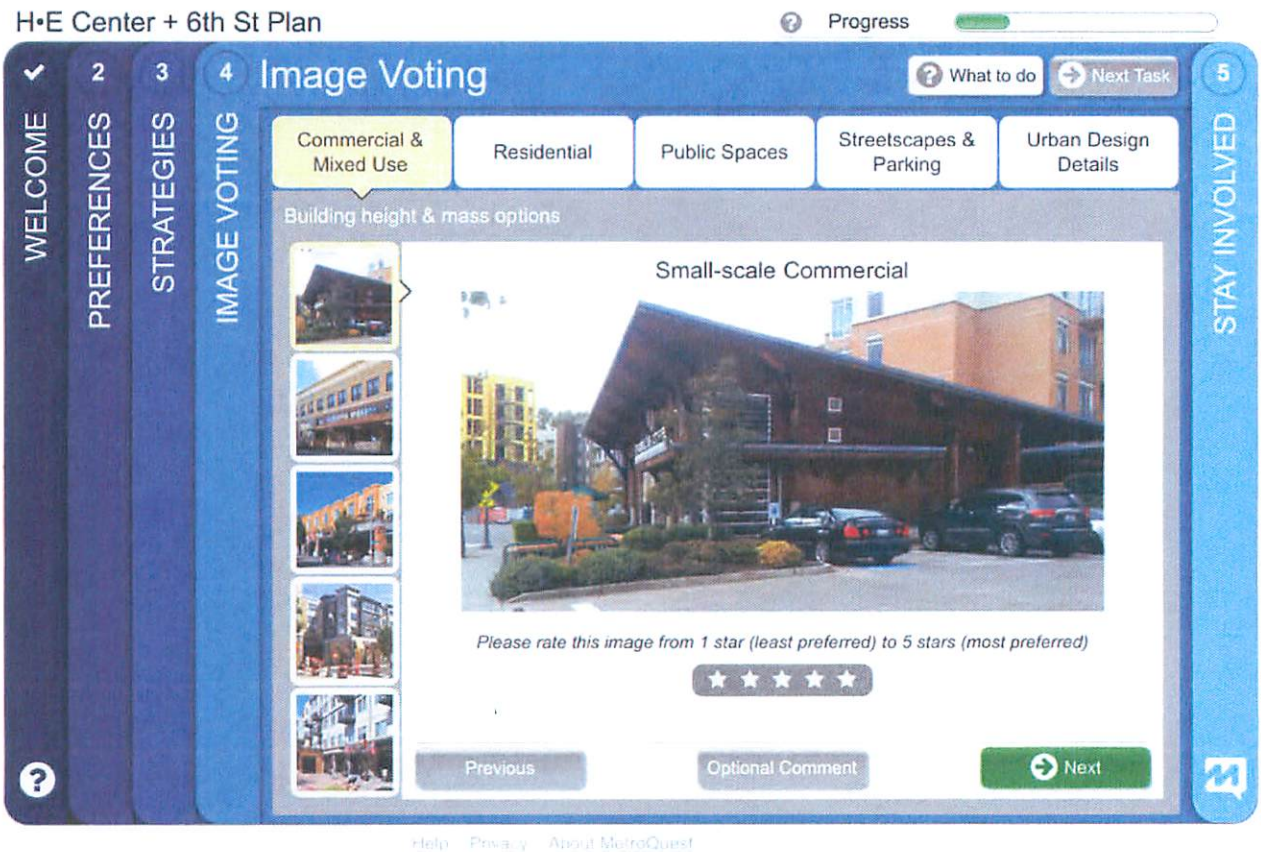
Lowest ratings Although still positive, working with transit agencies to increase bus frequency was rated to lowest among the options

Notes High ratings among all transit options

SCREEN 4

Image Voting

Screen 4 participants were shown images of different types of development, including mixed use, residential, public spaces, streetscapes and urban design details. Respondents ranked five images from 1 star (lowest rating) to 5 stars (highest rating).



SCREEN 4

Image Voting

Five images ranked from 1 (low) to 5 (high)
Relating to types of development, including: mixed use · residential · public spaces · streetscapes · urban design details

QUESTION 4A: **COMMERCIAL AND MIXED USE**

Building height & mass options

FINDINGS

Highest rating Image showing mall scale commercial image

Lowest ratings Images showing larger mixed use developments, specifically the 3-, 4- and 5-story images, by a large margin

Notes The 2-story image received a mix of ratings, with relatively low numbers of high and low ratings and a high-number of moderate ratings Responses to this question are consistent with the responses to Question 4B, which shows a preference for smaller-scale development

SCREEN 4

Image Voting

Five images ranked from 1 (low) to 5 (high)
Relating to types of development, including: mixed use · residential · public spaces · streetscapes · urban design details

QUESTION 4B: **RESIDENTIAL**

Building height & mass options

FINDINGS

Highest rating Images showing 2-story duplexes, although the overall rating was mixed, with an equal number of low, moderate and high ratings

Lowest ratings Images showing larger residential developments, specifically the 3-, 4-, and 5-story images, by a large margin

Notes Overall, there were no clearly positive responses to any of the images shown in this question Responses to this question are consistent with the responses to Question 4B, which shows a preference for smaller-scale development

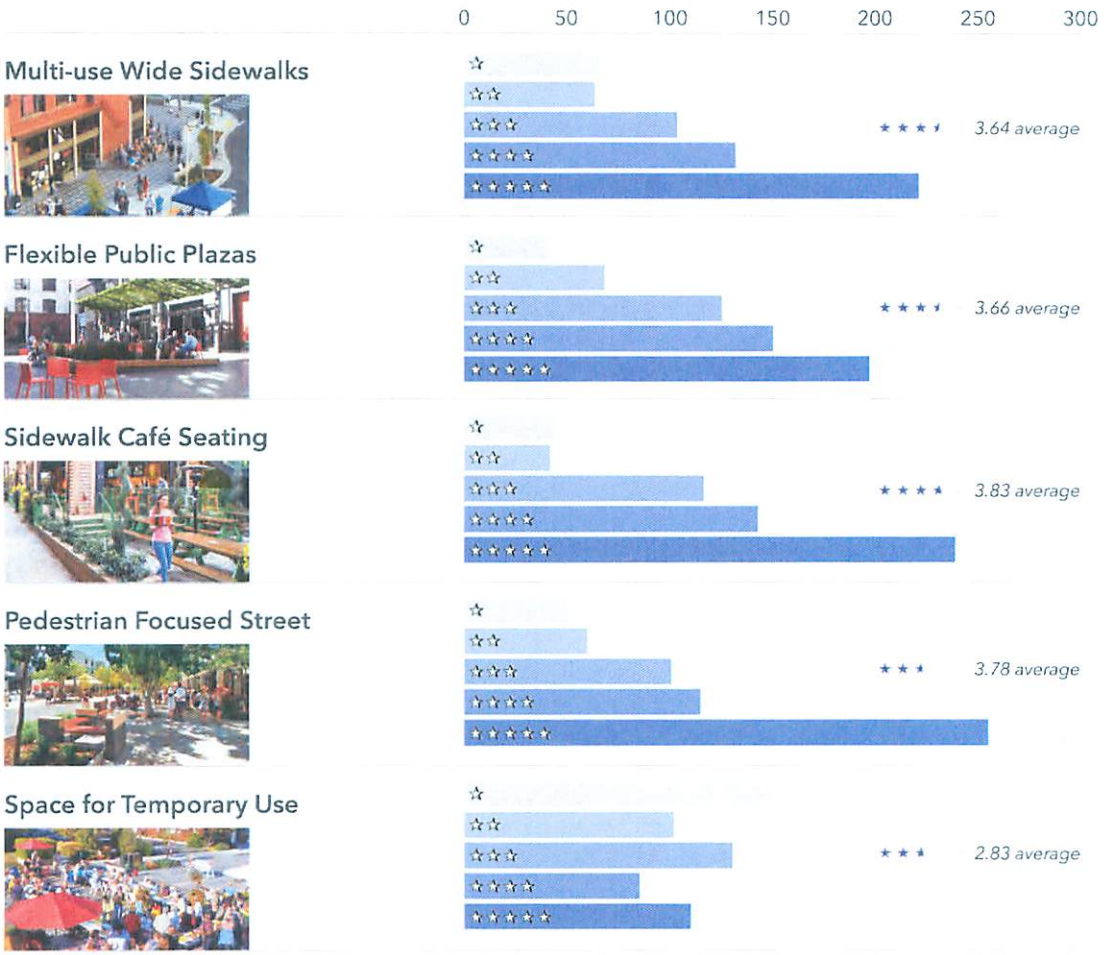
SCREEN 4

Image Voting

Five images ranked from 1 (low) to 5 (high)
Relating to types of development, including: mixed use · residential · public spaces · streetscapes · urban design details

QUESTION 4C: **PUBLIC SPACES**

Physical design & programming options



FINDINGS

Highest ratings Images showing sidewalk café seating and pedestrian-focused street

Other high ratings Images showing flexible public plazas and multi-use wide sidewalks

Lowest rating Image showing space for temporary use

Notes Ratings for these images for generally positive, with only the image for space for temporary use receiving a relatively large number of low ratings

SCREEN 4

Image Voting

Five images ranked from 1 (low) to 5 (high)
Relating to types of development, including: mixed use · residential · public spaces · streetscapes · urban design details

QUESTION 4D: **STREETSCAPES & PARKING**

Streetscape & parking treatment options

FINDINGS

Highest ratings Images showing active streetscapes and ample landscaping

Other high rating Image showing angled parking

Lowest ratings Images showing surface and parallel parking

SCREEN 4

Image Voting

Five images ranked from 1 (low) to 5 (high)
Relating to types of development, including: mixed use · residential · public spaces · streetscapes · urban design details

QUESTION 4E: **URBAN DESIGN DETAILS**

Gateways, signage, public art & design details

FINDINGS

Highest rating Image showing flexible seating

Other high ratings Attractive bike parking and interactive public art

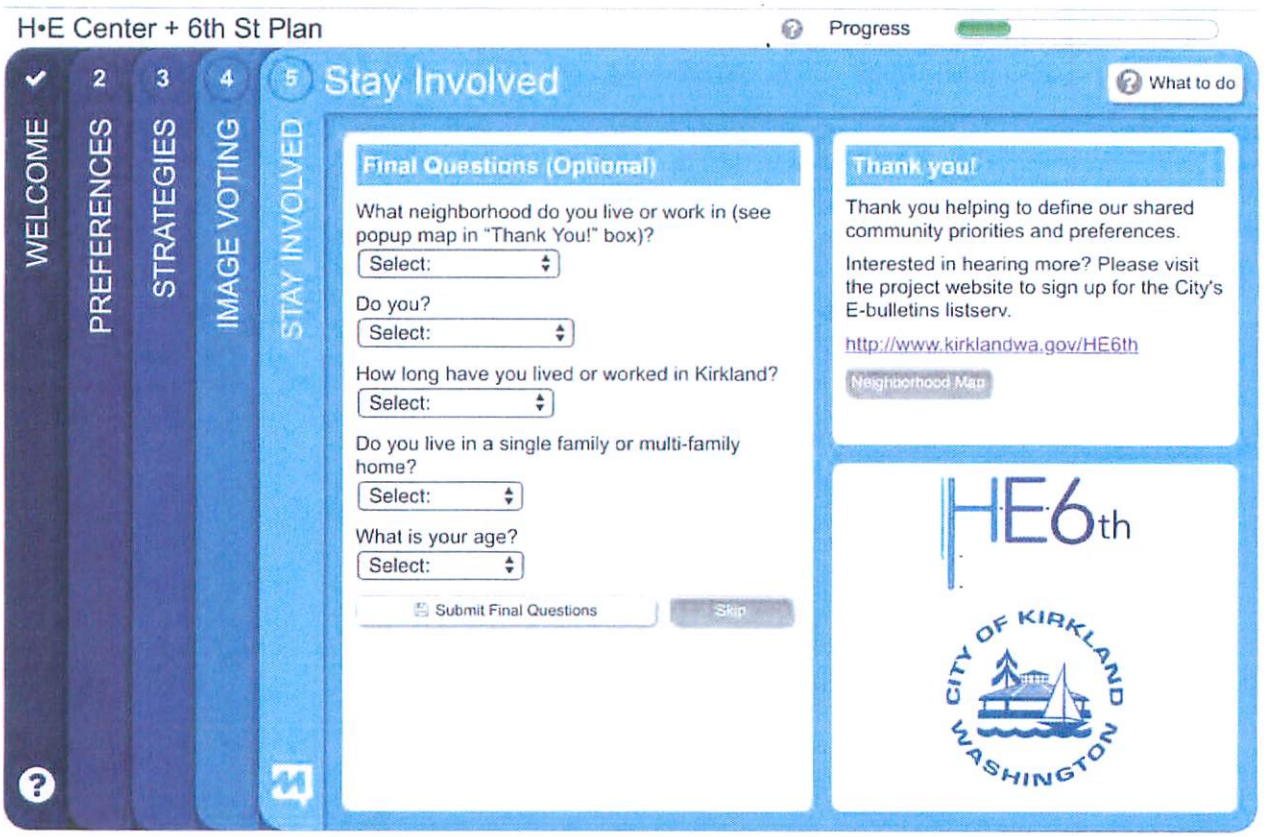
Lowest ratings Wayfinding signs and unique design features

Notes Most images had a mix of ratings, with relatively large numbers of high, moderate and low rated responses

SCREEN 5

Stay Involved

Screen 5 thanked participants for their input, provided a link to the project website and asked a five optional demographic questions–not all participants responded. Questions asked about neighborhood of residence, whether and how long participants had lived or worked in Kirkland, age and whether participants lived in single family or multifamily homes.



SCREEN 5

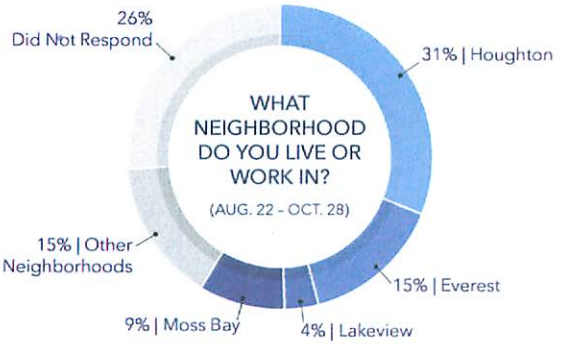
Stay Involved

Optional demographic questions
Relating to: neighborhood .. living or working in Kirkland (status and duration) .. age .. living in single family or multifamily home

All of the Screen 5 questions were identified as optional. Approximately one-quarter of participants elected not to respond, as shown in each of the charts below.

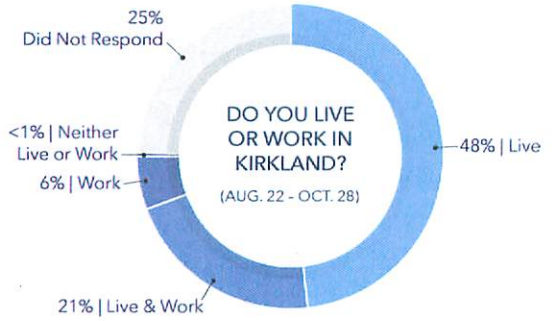
QUESTION 5A

What neighborhood do you live or work in?



QUESTION 5B

Do you live or work in Kirkland?



Note: During the survey period, an effort was made to encourage employees along the 6th Street Corridor to participate, including those at Northwest University.

SCREEN 5

Stay Involved

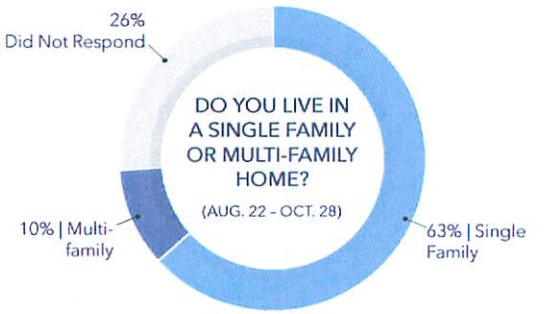
Optional demographic questions
Relating to: neighborhood ·· living or working in Kirkland (status and duration) ·· age ·· living in single family or multifamily home

QUESTION 5C

How long have you lived or worked in Kirkland?

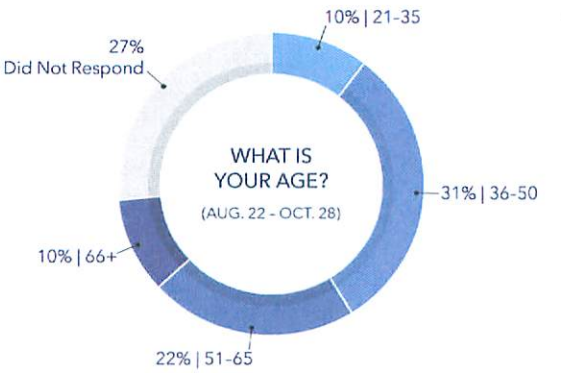
QUESTION 5D

Do you live in a single family or multi-family home?



QUESTION 5E

What is your age?



Attachments

1. Complete text of questions
2. Written comments

APPENDIX D: SOLUTIONS MEMO

transpoGROUP
WHAT TRANSPORTATION CAN BE.

MEMORANDUM

Date:	January 23, 2017	**TG:**	16090.00
To:	Joel Pfundt, City of Kirkland		
From:	Jeanne Acutanza/TranspoGroup Paul Sharman/TranspoGroup		
cc:	Deborah Munkberg/3SquareBlocks Angela Ruggeri/City of Kirkland		
Subject:	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 6th 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
1. 6th Street at Kirkland Way										
1A	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	$$	2	2	2	Yes, will provide some benefit for transit	6 ✓
1B	Signal Coordination along 6th Street with future increased demand	Vehicles	To better and more efficiently travel along the 6th Street corridor between Central Way and Kirkland Way. Interconnecting the signals (including the signal at 4th) could improve the efficiency, reduce stops and delays.	1-5 years	$$	3	1	3	Yes, will improve operations and reduce delay	✓
1C	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	✓
2. 9th and Railroad Avenue										
2A	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	✓
3. CKC for Transit										
3A	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	$$$$	3	3	3	Yes, consistent with the Master Plan and initial phase	✓
3B	Bus Intersection at 6th Street and the CKC	Transit	Another opportunity for transit signal priority would be at the CKC trail intersection on 6th Street. This would require a new signal, removal of on-street parking to give transit a bypass to north bound queues that can be over 200 feet long.	5-10 Years	$$$	2	2	2	Yes, potential first phase of 3A	✓
4. 6th Street at 9th Avenue S										
4A	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
5. 70th Street over I-405										
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	✓
6. Houghton Park and Ride										
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	✓
7. 108th Avenue at NE 68th Street										
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+	$$$$	3	1	2	No, impacts neighborhoods	
8: NE 68th Street at 108th Avenue NE (Access)										
8A	Access Management and Multimodal Access on NE 68th Street and 108th. - Median Control - Driveway Consolidation - Wider sidewalks - remove crosswalks - on street parallel parking	Vehicles / Peds / Bikes	Closely spaced driveways and intersections, bike lanes, as well as crosswalks on NE 68th Street results in numerous conflict points between vehicles, pedestrians and bicycles. Access management strategies can include closing or consolidating driveways, using medians to separate conflicting movements and reorganizing development sites to better circulate and organize traffic off of arterial streets. An initial set of strategies could include consolidation of driveways on NE 68th Street, removal of crosswalks, medians for the left turn pocket and wider sidewalks. With redevelopment of the adjacent land uses this option includes widening sidewalks, extending bike lanes and adding on street parking.	5-10 Years	$$	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	$$	2	3	2	Yes, with full development	✓
8E	Green Bike Boxes	Bikes	Similar to 8D, Green Bike Boxes could enhance bike visibility by placing a painted green bike at the front of vehicle queues. This may require widening.	5-10 Years	$	3	3	2	Yes, improves safety for bicycles	✓
9: CKC Connectivity										
9A	Improved trail access and connection for Bikes	Peds / Bikes	As part of the Interim Trail development of the CKC, the City has developed key connections to the local street system from the trail to neighborhoods. Continuing to enhance some of these facilities as better bike connections would be desirable, for example where the NE 60th Street Corridor connects with the CKC.	5-10 years	$$	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
10. NE 60th Street Connections										
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	$$$$	3	3	1	No, impacts neighborhoods	
11. Signal at NE 53rd (access to NU)										
11A	Signal at 53rd (proposed by NU) Relocate and improve bus stop. Coordinate and adjust crosswalk with Metro	Pedestrian / Transit	As part of expansion and permitting for new development at Northwest University, the University has proposed installation of a traffic signal on 108th Avenue at NE 53rd Street. Design and development of signals at this location is complicated with an offset alignment of NE 53rd and NE 52nd Streets, a protected crosswalk, and a busy transit stop serving the University, Emerson High School and the neighborhood. Installation of traffic signals would be implemented when engineering standards (per MUTCD signal warrants) are met.	1-5 years	$$	1	3	3	Yes, part of NU Mitigation not moving forward, but continue to monitor as a future planned project	✓
12. South Kirkland Park and Ride										
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	✓
			Policies (P) and Education (E)							
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

transpoGROUP
WHAT TRANSPORTATION CAN BE.

MEMORANDUM

Date:	March 17, 2017	**TG:**	16090.00
To:	Joel Pfundt, City of Kirkland Angela Ruggeri, City of Kirkland		
From:	Jeanne Acutanza, Josh Steiner, Paul Sharman, Transpo Group		
cc:	Jeff Arango, BERK		
Subject:	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***

	Existing	2035 Comp Plan	2035 Modest Change	2035 Greater Change
Scenario			**35 ft.**	**55 ft.**
Residential (Dwelling Units)	*39*	*360*	*574*	*862*
Retail (Square Feet)	*105,092*	*113,480*	*113,480*	*113,480*
Office (Square Feet)	*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
Existing Trips	***9,853***	***677***
2035 Comp Plan	***12,903***	***898***
Increased Trips	*3,050*	*221*
Percent Change over Existing	***31%***	***33%***
2035 Modest Change	***14,327***	***982***
Increased Trips	*1,424*	*84*
Percent Change over Comp Plan	***11%***	***9%***
2035 Greater Change	**16,730**	***1,122***
Increased Trips	*3,827*	*224*
Percent Change over Comp Plan	***30%***	***25%***

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

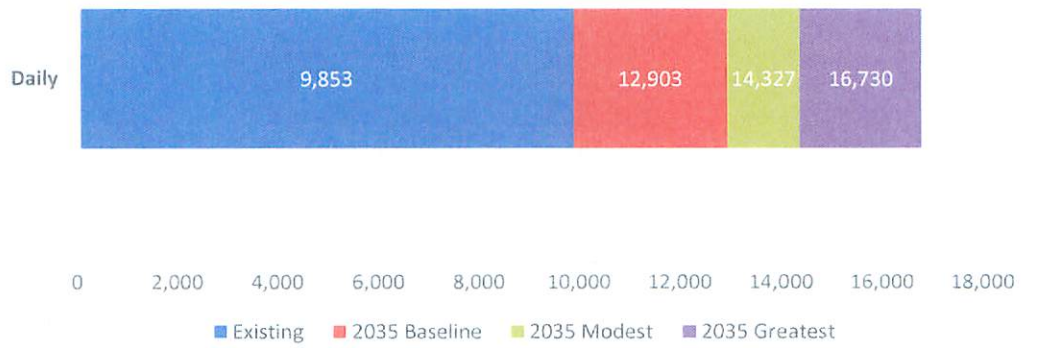
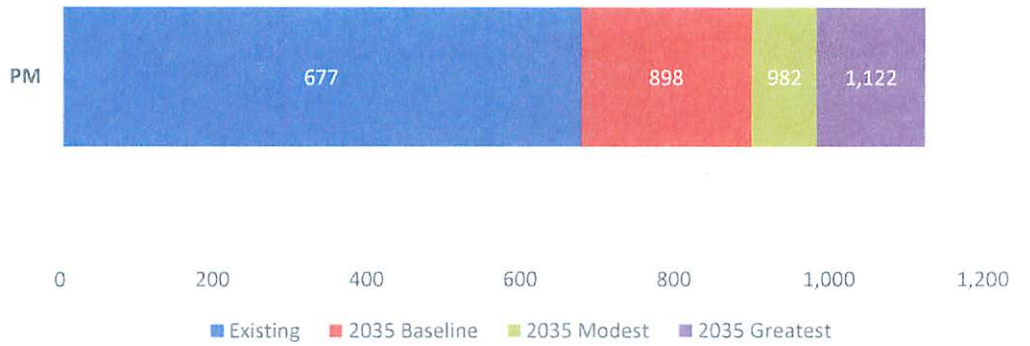


Figure 2 - PM Trips to/from Development



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
Existing – 2016	E	62	SB	2,520
Baseline – 2035	**F**	**142**	*SB*	***3,855***
Modest - 2035	**F**	**148**	*SB*	***3,920***
Greater Change Development - 2035	**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
Future Baseline	11:32	11:59
Future With Improvements	8:57	9:37
Delta (reduction)	**-2:35 (-22%)**	**-2:22 (-23%)**

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

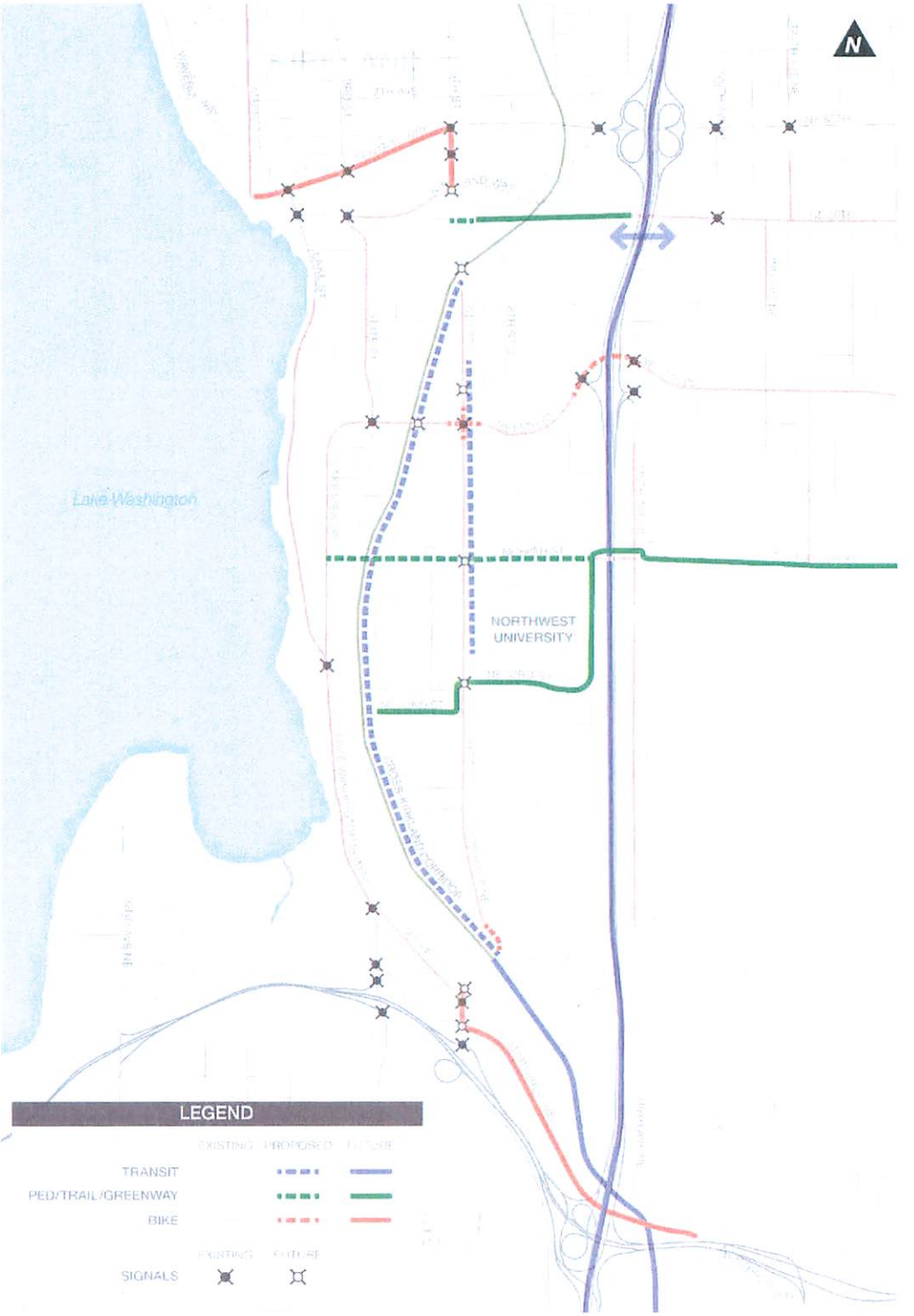
The corridor study is proposing potential solutions that meet community values as developed during a community workshop and feedback throughout the course of this project. These values were described as moving people, connecting communities and accommodating future growth. An initial set of solutions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

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	Dwelling Units	130	130	259
Office	73,150	ft^2	403	403	807
Retail	61,217	ft^2	1,357	1,357	2713
Supermarket	39,000	ft^2	1,994	1,994	3987
Convenience Store	2,400	ft^2	886	886	1771
Coffee Shop	2,475	ft^2	157	157	315
		Total	4,926	4,926	9,853

2035 Baseline:

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	360	Dwelling Units	1,197	1,197	2,394
Office	122,476	ft^2	675	675	1,351
Retail	69,605	ft^2	1,542	1,542	3,085
Supermarket	39,000	ft^2	1,994	1,994	3,987
Convenience Store	2,400	ft^2	886	886	1,771
Coffee Shop	2,475	ft^2	157	157	315
		Total	6,452	6,452	12,903
		Growth (2035 - Existing)	1,525	1,525	3,050
					31%

Modest Development:

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	574	Dwelling Units	1,909	1,909	3,818
Office	122,476	ft^2	675	675	1,351
Retail	69,605	ft^2	1,542	1,542	3,085
Supermarket	39,000	ft^2	1,994	1,994	3,987
Convenience Store	2,400	ft^2	886	886	1,771
Coffee Shop	2,475	ft^2	157	157	315
		Total	7,163	7,163	14,327
		Growth (Modest - 2035)	712	712	1,424
					11%

Greatest Development:

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	862	Dwelling Units	2,868	2,868	5,735
Office	122,476	ft^2	675	675	1,351
Retail	61,217	ft^2	1,357	1,357	2,713
Supermarket	47,388	ft^2	2,422	2,422	4,845
Convenience Store	2,400	ft^2	886	886	1,771
Coffee Shop	2,475	ft^2	157	157	315
		Total	8,365	8,365	16,730
		Growth (Greatest - 2035)	1,914	1,914	3,827
					30%

PM Peak Hour Trip Generation:

Existing

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

2035 Baseline:

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	360	Dwelling Units	81	59	140
Office	122,476	ft^2	31	151	182
Retail	69,605	ft^2	83	106	189
Supermarket	39,000	ft^2	121	116	237
Convenience Store	2,400	ft^2	25	24	49
Coffee Shop	2,475	ft^2	50	50	101
		Total	392	506	898
		Growth (2035 - Existing)	95	126	221
					33%

Modest Development:

Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	574	Dwelling Units	130	94	224
Office	122,476	ft^2	31	151	182
Retail	69,605	ft^2	83	106	189
Supermarket	39,000	ft^2	121	116	237
Convenience Store	2,400	ft^2	25	24	49
Coffee Shop	2,475	ft^2	50	50	101
		Total	440	542	982
		Growth (Modest - 2035)	48	35	83
					9%

Greatest Development:

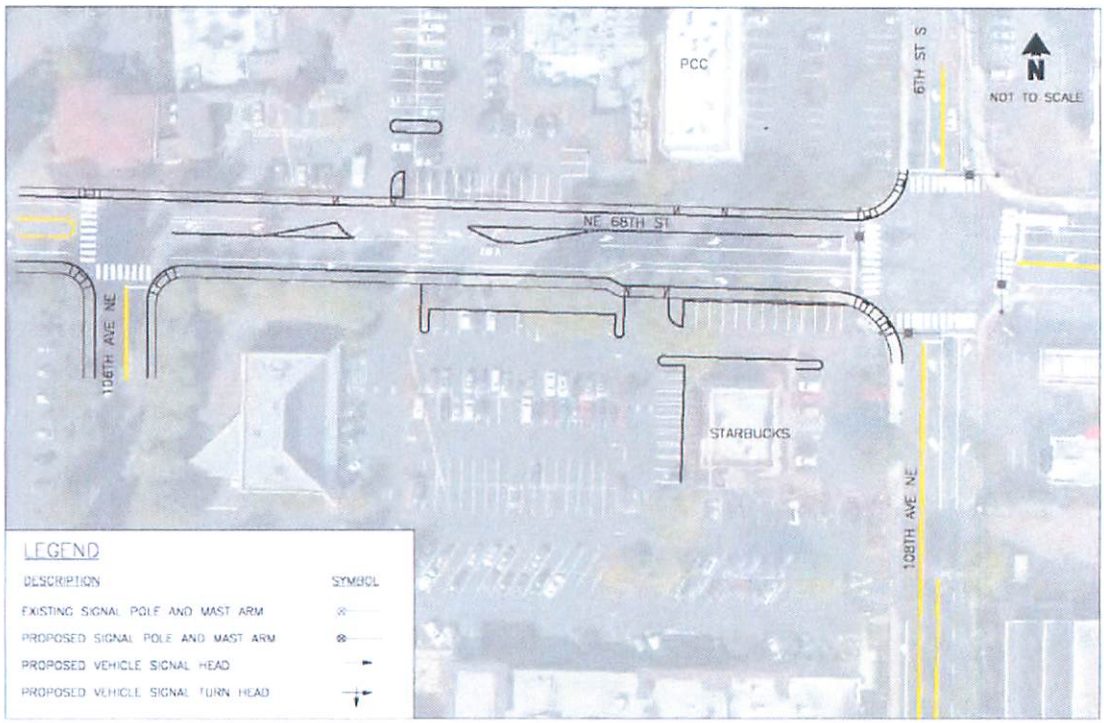
Land Use	Size	Units	Inbound Trips	Outbound Trips	Total Trips
Mid-Rise Apartment	862	Dwelling Units	195	141	336
Office	122,476	ft^2	31	151	182
Retail	61,217	ft^2	73	93	166
Supermarket	47,388	ft^2	147	141	288
Convenience Store	2,400	ft^2	25	24	49
Coffee Shop	2,475	ft^2	50	50	101
		Total	521	601	1,122
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

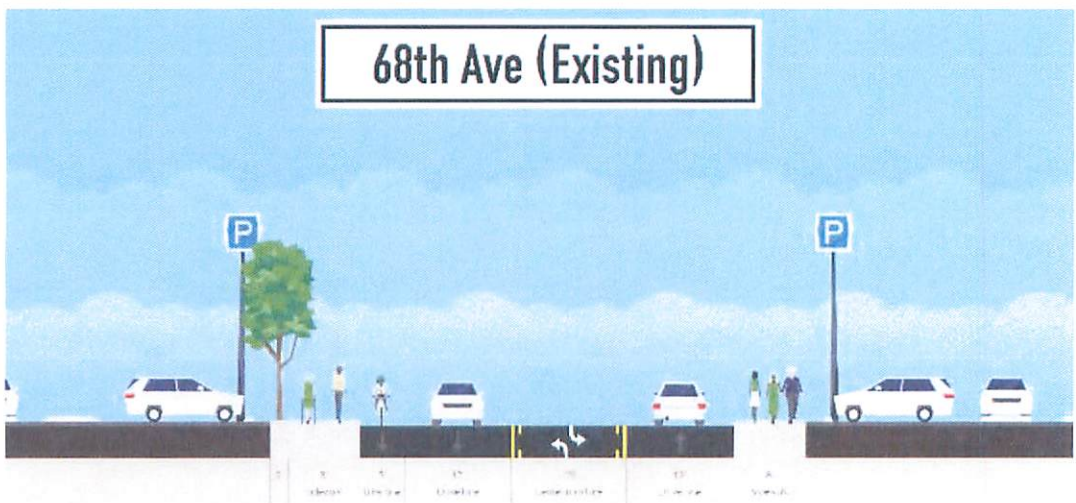
Kirkland 6th Street Corridor

January 25, 2017

FIGURE **8A**

transpogroup

Feb 09, 2017 - 4:46pm trung 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

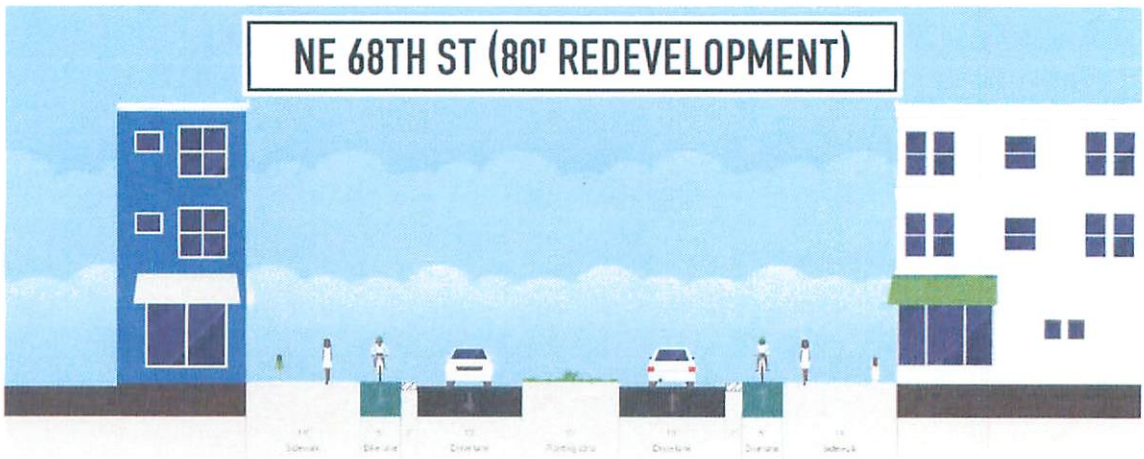
Kirkland 6th Street Corridor

January 25, 2017

FIGURE 8C

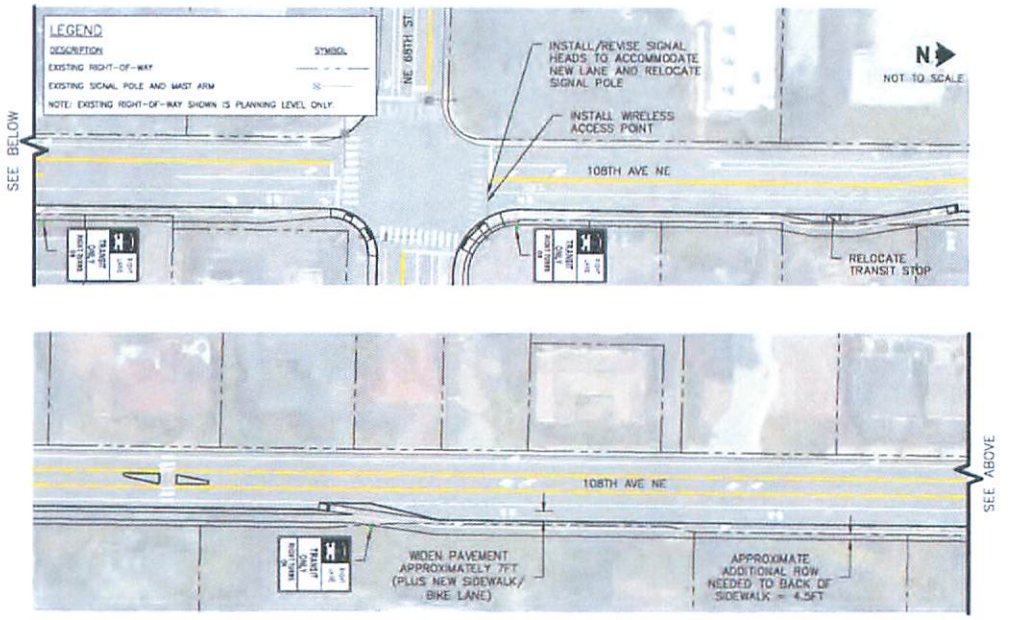
transpogroup
WHAT TRANSPORTATION CAN BE

Feb 09, 2017 - 4:43pm trungl M:\16\16090.00 - 6th Street Study\Engineering\CAD\Conceptual\NE 68th St at 108th Ave.dwg Layout: 3 (NO CALLOUTS)



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

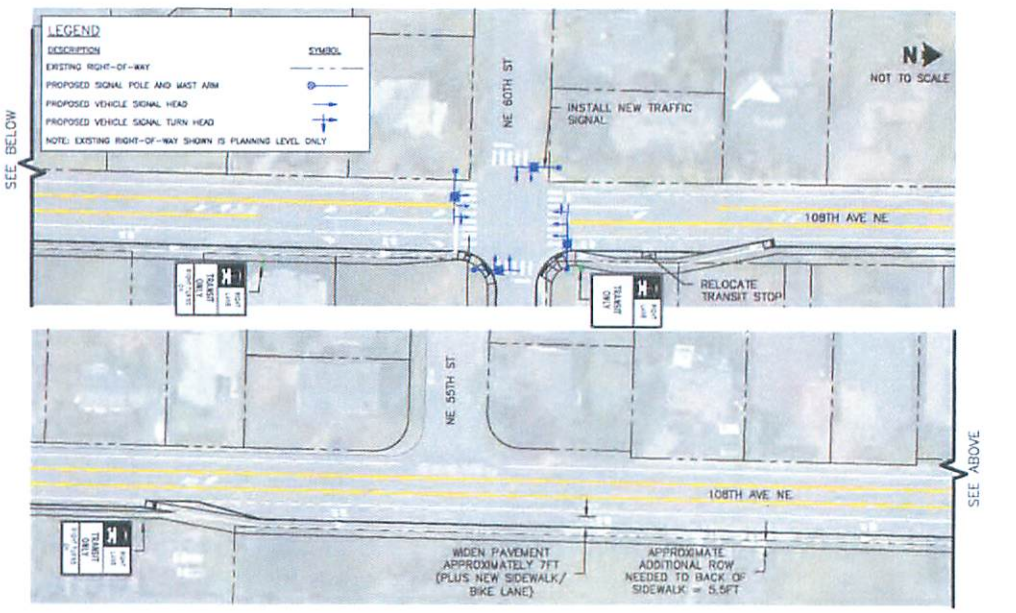
108th Avenue Transit Signal Priority & Queue Jump NE 68th to NE 53rd



108th Ave NE and NE 68th St - Transit Signal Priority Improvement Concept F — February 9, 2017 — FIGURE 7F

Kirkland 6th Street Corridor

transpo



108th Ave NE and NE 60th St - Transit Signal Priority Improvement Concept E — February 10, 2017 — FIGURE 7E

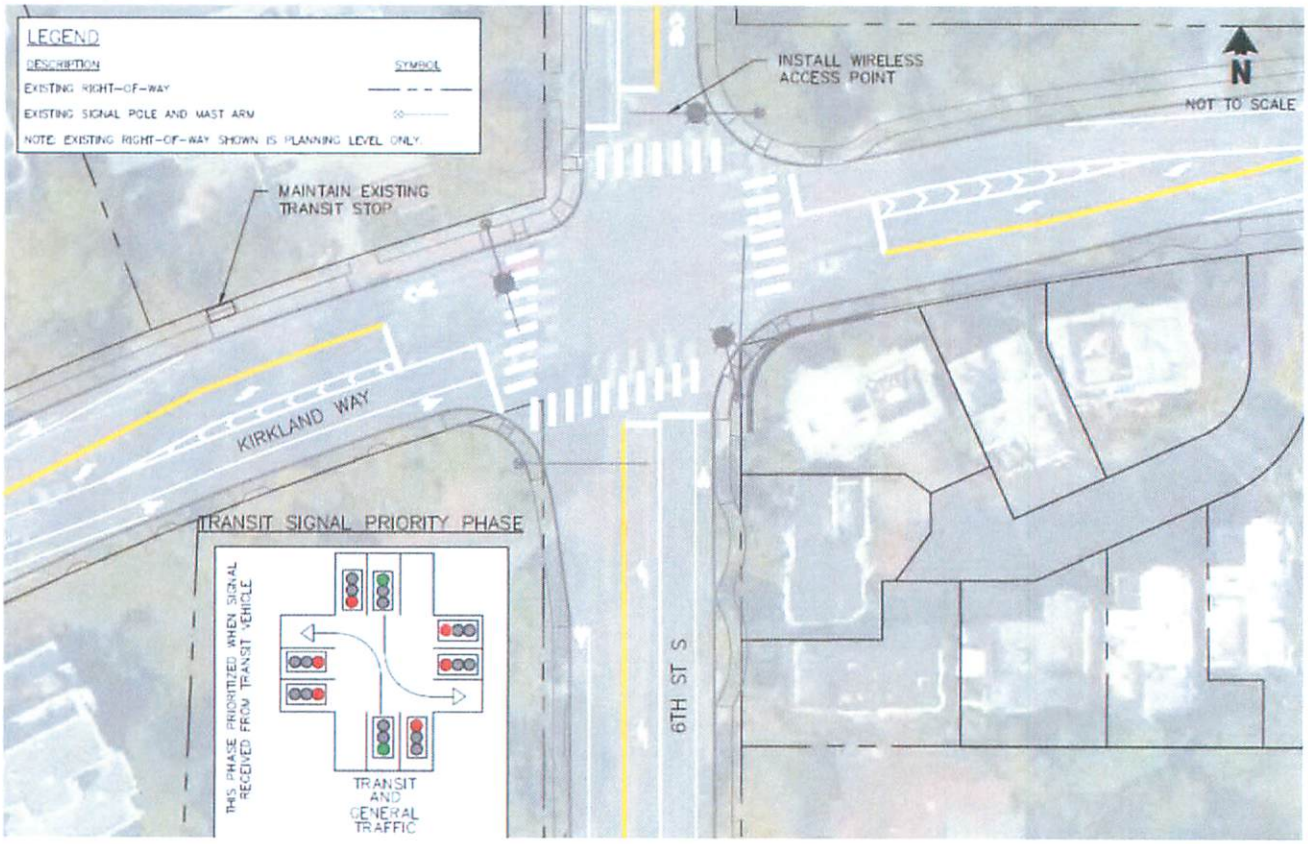
Kirkland 6th Street Corridor

transpo

Feb 10, 2017 - 9:10am melissaw M:\19\18090.00 - 6th Street Study\Engineering\CAD\Conceptual\108th Ave & 68th - 60th st.dwg Layout: 2- 8.5 x 11

APPENDIX F: PROJECT PAGES

Project 1A – 6th Street S/S Kirkland Way Transit Signal Priority



Project Description

The City is in the process of designing and installing traffic signals at the intersection of 6th Street and Kirkland Way. Metro's frequent and heavily used route 255 turns northbound left at this intersection and eastbound right. This is also a future Rapid Ride route. Transit signal priority at this intersection for the northbound left-turns could provide a short travel time advantage for transit.
Benefits: Provides transit travel time advantage

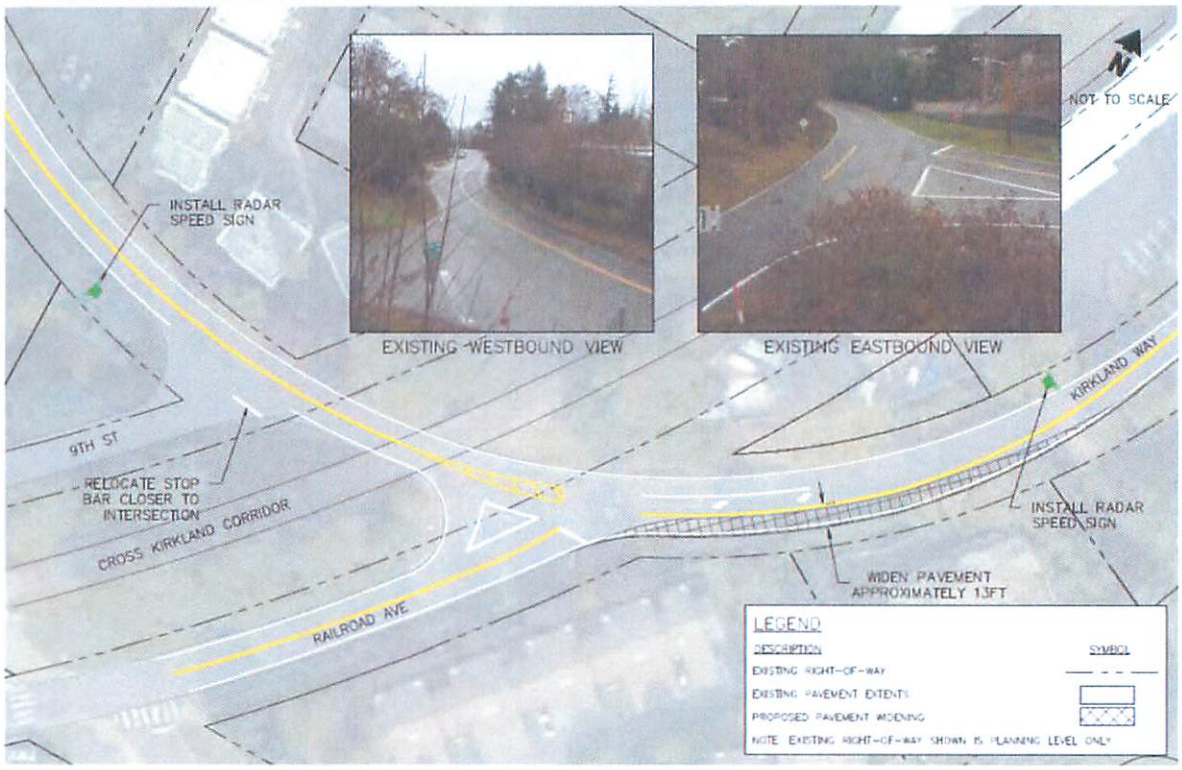
Implementation

Cost Range: $200-$500K

Coordination: Metro & Sound Transit. Review in Transit Plan

Project included in City CIP

Project 2 – Railroad Avenue / Kirkland Way Turn Pocket



Project Description

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 is an opportunity to add a westbound left-turn pocket at railroad Avenue to protect turning movements. Radar speed signs could be implemented to further note speeds.

Benefits: Improves Safety

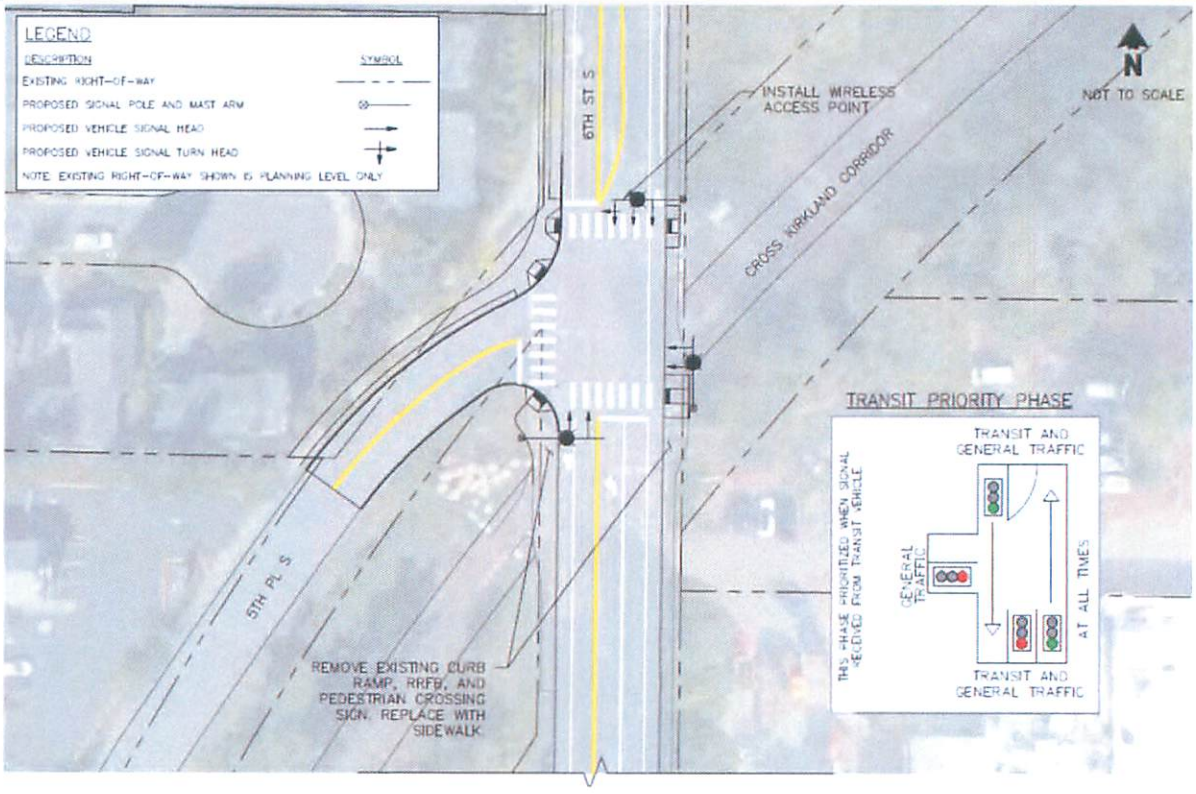
Implementation

Cost Range: $100-150K

Coordination: Neighborhood

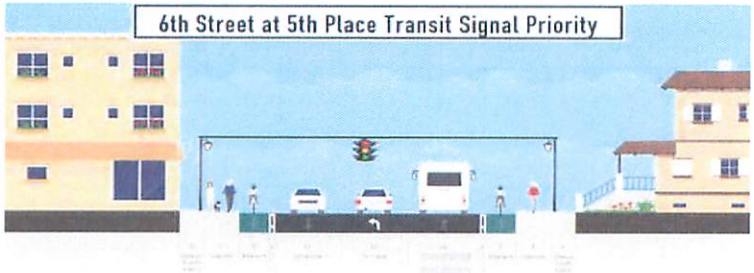
Project included in City CIP

Project 3B – 6th Street S / 5th Place / CKC Transit Signal Priority



Project Description

Another opportunity for transit signal priority and to improve pedestrian, bike and vehicle access is at the CKC trail intersection on 6th Street. Add a new traffic signal, realign 5th Place S, remove existing RRFB crossing, remove parking and either extend green time or advancing a call for transit at the signal.
Benefits: Provides transit travel time advantage, and improved safety and operations.



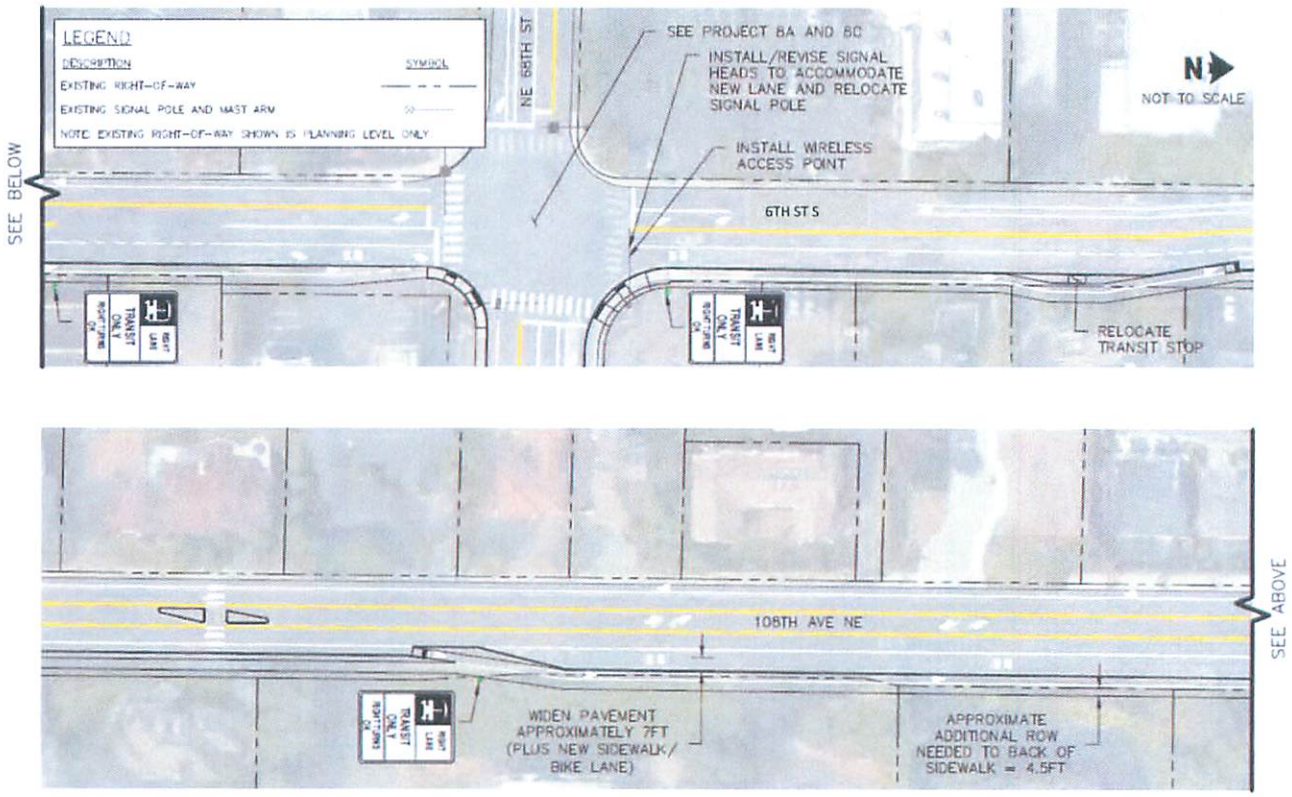
Implementation

Cost Range: $2.5 - 3 M

Coordination:

- Metro & Sound Transit
- On-Street Parking Removal
- Coordinate with Transit Plan

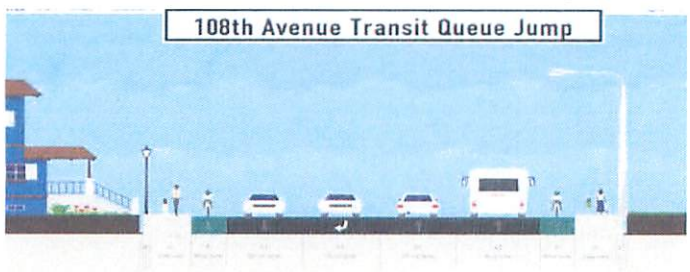
Project 7E Part 1 – 108th Avenue Transit Queue Jumps at 68th St



Project Description

Widen 108th Avenue to create two long (~1,000') Northbound through lanes (queue jump) for transit to bypass queues. May be adjacent to a bike lane and conflict with high volume of right turns at NE 68th Street. Requires widening and property acquisition.

Benefits: Provides transit travel time advantage



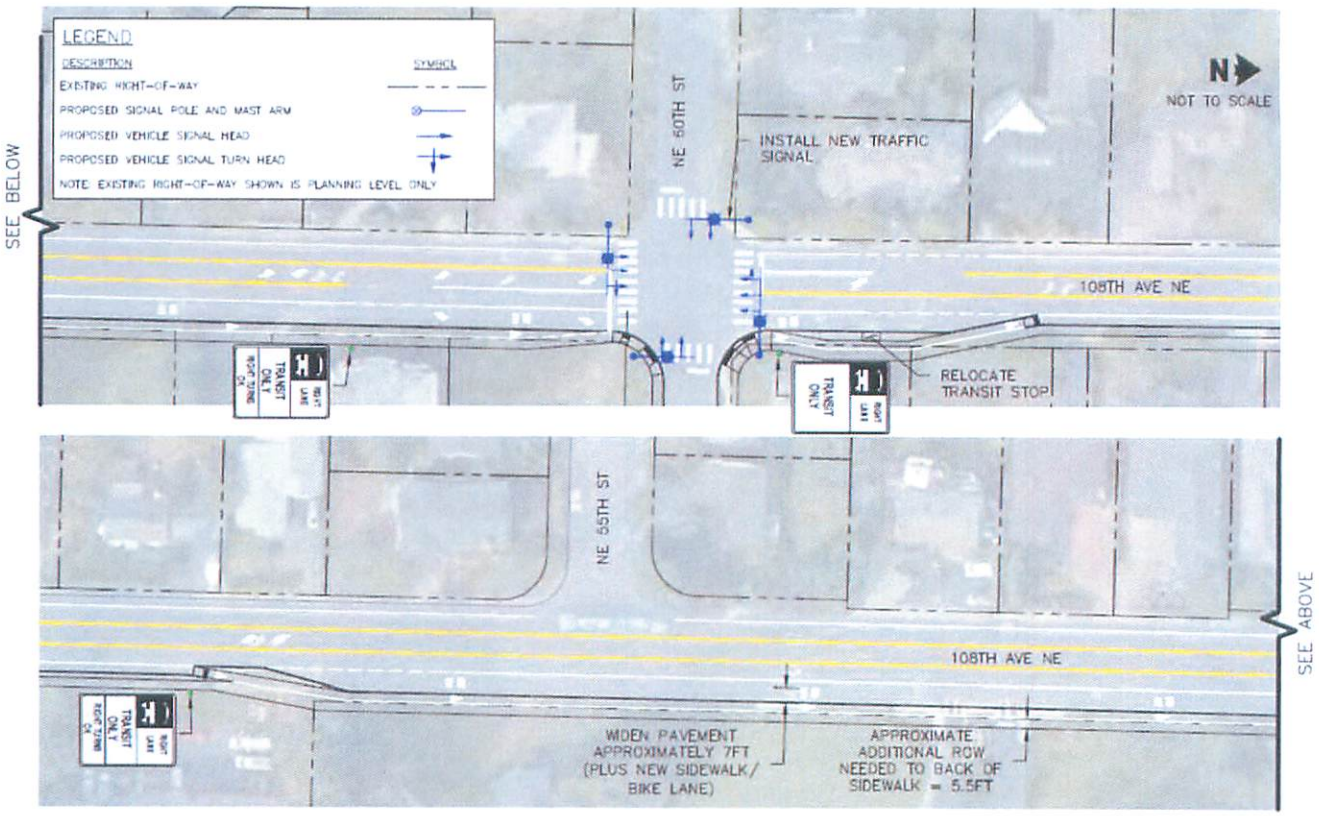
Implementation

Cost Range: $4-6M (does not include ROW)

Coordination:

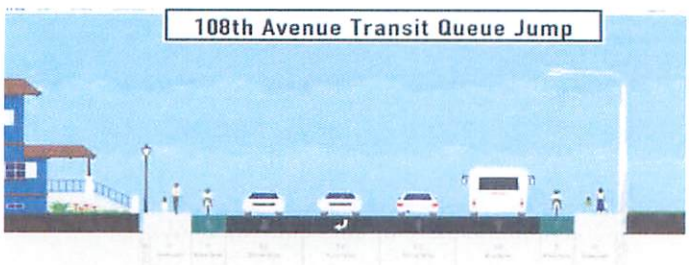
- Metro & Sound Transit
- Utility Relocation
- Property Impacts
- Relocation of Bike Lanes
- Coordinate with City Transit Study

Project 7E Part 2 – 108th Avenue Transit Queue Jump at 60th St



Project Description

Widen 108th Avenue to create two long (~1,000') Northbound through lanes (queue jumps) for transit to bypass queues. May be adjacent to a bike lane. Requires widening and property acquisition. Includes new signal control at NE 60th street replaces protected ped crossing. Remove RRFB Crossing.
Benefits: Provides transit travel time advantage



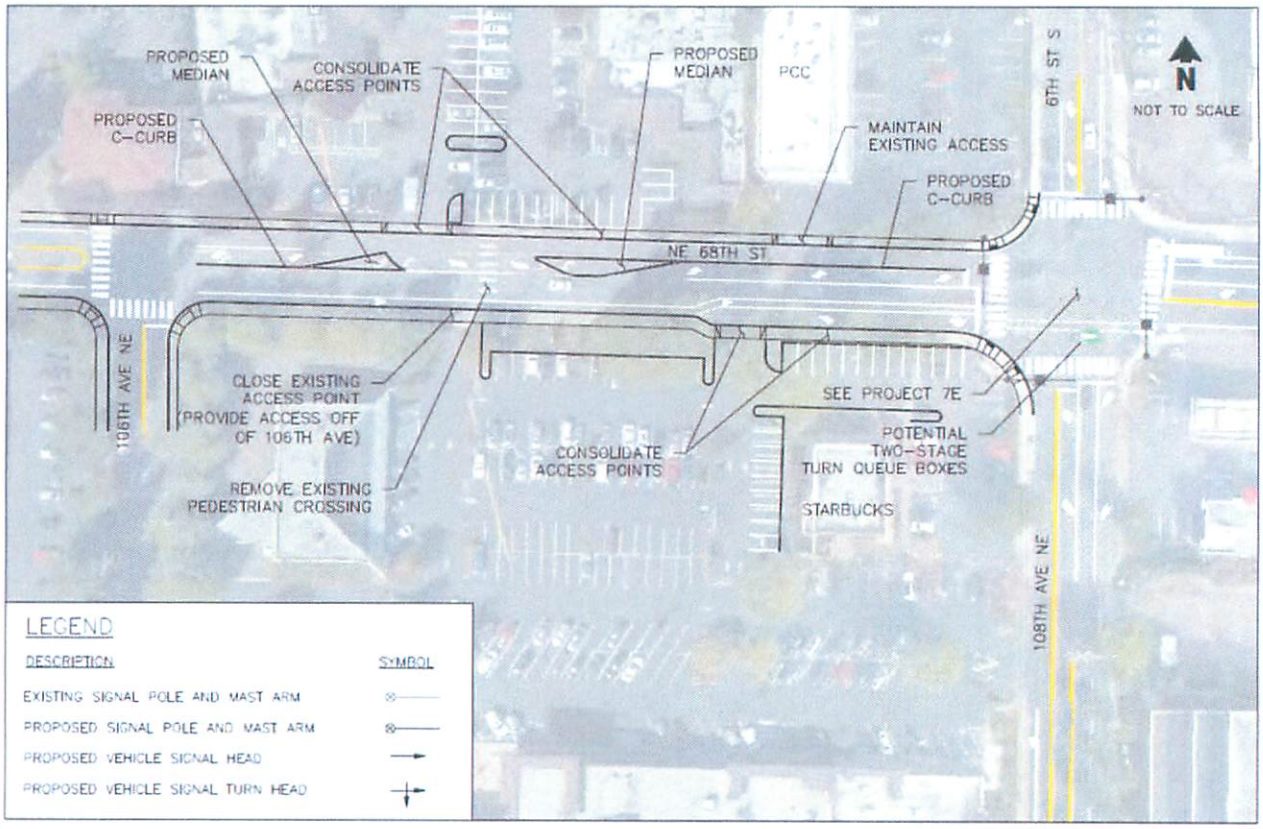
Implementation

Cost Range: $4-6M (does not include ROW)

Coordination:

- Metro & Sound Transit
- Utility Relocation
- Property Impacts
- Relocation of Bike Lanes
- Coordinate with City Transit Study

Project 8A – NE 68th Street Access Management (without redevelopment)



Project Description

Access management strategies could include closing or consolidating driveways, using medians to separate conflicting movements. Within existing right-of-way consolidation of driveways require Property Owner participation. Other improvements include consolidation of crosswalks, new medians and C-Curb. Install Bike Boxes as feasible.

Benefits: Improves Safety

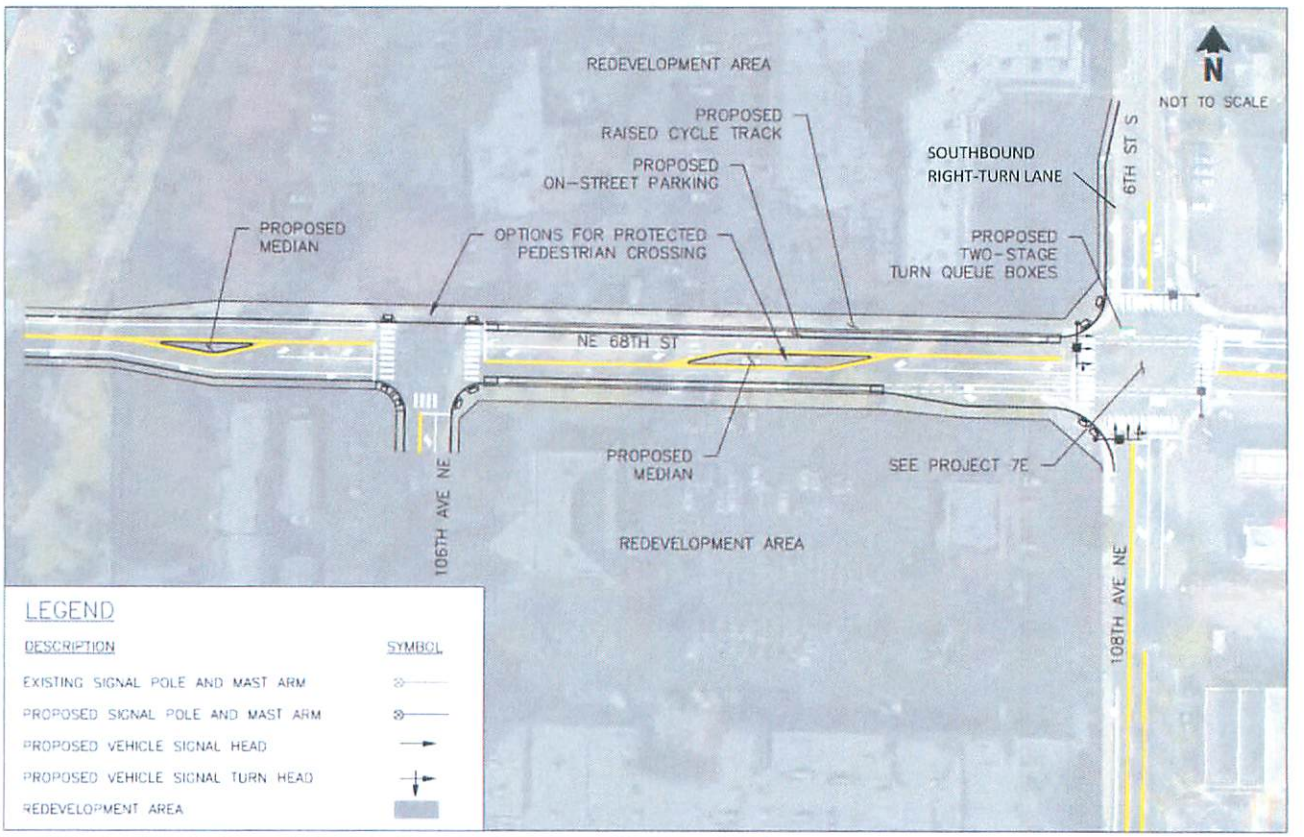
Implementation

Cost Range: TBD

Coordination:

- Neighborhood
- Property Owner Negotiation

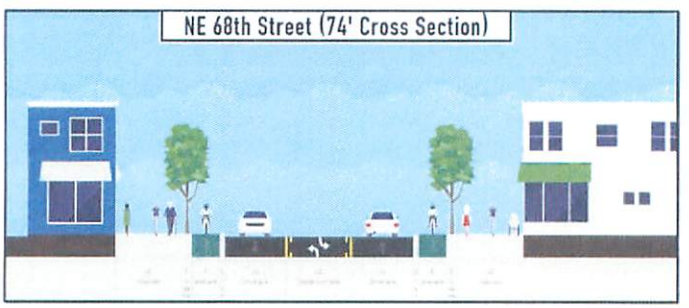
Project 8C – NE 68th Street Intersection Improvements Access Management



Project Description

Access management strategies can reduce conflict points between vehicles, peds and bikes. Add a southbound right-turn pocket, extend bike lanes and add green bike boxes, widen sidewalks and consolidate protected ped crossing. Replace two signal poles to accommodate new intersection layout, including illumination and ITS equipment.

Benefits: Improves safety and operations



Implementation

Cost Range: $3-5M

Coordination: Neighborhood and Property Owners. Additional right of way and potential utility relocations.