City of Kenmore

City of Kenmore - 18120 68th Avenue NE - P.O. Box 82607 - Kenmore, WA 98028
Phone: 425-398-8900 - Fax: 425-481-3236 - E-mail: cityhall@kenmorewa.gov

Planning Commission Meeting

ON-SITE

Tuesday, November 1, 2022 - 7 PM

In addition, we try to provide access to the meeting virtually:

ZOOM LINK:

https://kenmorewa-gov.zoom.us/j/89398648618

Or Telephone: Dial US:
+12532158782,,89398648618#
Callers please dial *9 to Raise/Lower Hand
Webinar ID: 893 9864 8618

Technical Difficulties - If the virtual component of the meeting disconnects, and we cannot resolve technical difficulties to reconnect the virtual component, the in-person meeting will continue at City Hall if there is a quorum of the body to conduct business.

1. CALL TO ORDER

2. PUBLIC COMMENTS

This is an opportunity to express your views on issues that are important to you and to the community. Please email comments to Rita Moreno at rmoreno@kenmorewa.gov by 5:00 p.m. on Tuesday, November 1, 2022. All comments received will be forwarded to the Planning Commission for consideration. In a hybrid meeting, we will hear from our onsite guests first, followed by our virtual guests. You also may use the "raise hand" feature in Zoom during the Public Comment portion of the meeting or call in at the number listed above. A 3-minute comment limit applies.

3. APPROVAL OF MINUTES

October 18, 2022 Meeting Minutes

4. AGENDA ITEMS

Transportation Element
Staff Memo
Transportation Element DRAFT 2022 1101
Kenmore_Appendix D1 DRAFT 2022 1101
Kenmore_Appendix D2 DRAFT 2022 1101

Transit-Oriented Development (TOD) Regulations
Staff Memo
Attachment 1 - Public Comments
Attachment 2 - TOD aerial

Attachment 3 -Draft TOD Regulations
Attachment 4 - Draft Zoning Map Excerpt

5. ADJOURNMENT

6. UPCOMING MEETINGS:

November 15, 2022, 7:00 p.m.

City of Kenmore
Planning Commission Meeting
October 18, 2022, @ 7:00 p.m.

Planning Commission Members – In Attendance (the meeting was held onsite and virtually using the Zoom online platform)

Dwight Thompson, Chair
Mike Vanderlinde, Vice Chair
Tracy Banaszynski
Nathan Loutsis
Christiana Matthews
Mariel Torres Mehdipour
Derek Wyckoff

Staff

Debbie Bent, Community Development Director
Lauri Anderson, Principal Planner
Mike Stanger, ARCH
Rita Moreno, Administrative Assistant/ Recreation Coordinator
Sammie Roeun, Permit and Administrative Specialist (Surface Water)

1. CALL TO ORDER

The meeting was called to order by Chair Thompson at 7:04 p.m.

2. PUBLIC COMMENTS

John Hendrickson – Spoke on land use and protection of the character single family neighborhoods.

Brian Houten – Spoke on challenges of housing. Sidewalks, crosswalks, safety, parking. Lack of parking and crosswalks.

Elizabeth Mooney – Would like to see the process slow down and would also like to see people come in to participate in the planning commission process.

Marcia Fisher – Public input is important and spoke of Lakepoint and the value of that property. Would like to see it used more as a focal point for Kenmore.

Scott Inslee – Feels like citizens are not being heard by Planning Commission and Council. Would like to know what the result is when the council and commission has no responses.

Stacey Valenzuela – Spoke on affordable housing and climate action plan. Would like to see the Commission to continue to protect Heron rookery, wetlands, and tress.

Christopher Olson – Thanked the Commissioners and staff for listening and trusts the decisions that are being made. Also, would like to see progress made on the parking in Kenmore. Would like to see parking minimums reduced or abolished. Spoke on missing middle housing and single-family housing zoning.

3. APPROVAL OF MINUTES

September 20, 2022 and October 4, 2022 Meeting minutes were approved by unanimous consent

4. Public Hearing on Transit Oriented Development Regulations

A Motion to extend 3 min public comment to 4 mins was made by Chair Thompson and seconded by Commissioner Loutsis. Staff gave a brief presentation on Transit-Oriented Development (TOD)

Public Hearing Comments

Brian Houten – spoke of need to plan for the future without impacting current residents.

Mark Carpenter – expressed concern, not wanting to live in Ballard or Capitol Hill with increased density. Occupants will own cars. The proposal on NE 80th is a giant box. King County is losing population so no need for this. Opposed to the change. Townhomes would be better.

Elizabeth Mooney – spoke about slowing down the process. Supports heron rookery protections. Wary of fee-in-lieu. Concerned that parking enforcement will be needed. Shouldn't put affordable housing in path of asphalt fumes.

Marcia Fisher – Kenmore doesn't have an economic base so people must drive. The bus takes too long, with many transfers. Where do Kenmore residents

work? Are those workers served by transit? Transit systems aren't centralized—the lake makes it difficult.

Jon-Paul Mickle – Not enough parking. All new development will exacerbate street parking. Projects for seniors also need parking. Need space for small businesses, not housing. 85' height limit will block views.

Christopher Olson – Cost to construct a parking space is about $60,000. If people want lots of parking, they could move elsewhere. Should emphasize mixed use. Wants more plazas, greenspaces, recovery of environmental areas. Shouldn't have to drive to the transit station. For transit to work, must have higher density.

Stacey Valenzuela – Support 25% affordable housing. Do not allow fee-in-lieu. Height may be too tall. Should have lower heights around Swamp Creek. Don't create the UR zone; keep previous TOD rules. May be a while before transit comes to Kenmore.

Jon Howard – The proposal at 17715 80th Avenue NE is for a 6 story TOD development. Current neighborhood is townhomes. Neighborhood has limited sidewalks and no crosswalks. Should only allow TOD directly along Bothell Way.

Scott Inslee – TOD will go all the way to Finn Hill. Not enough parking. This proposal is to expand the tax base.

Alicia Kelly– Don't put apartments at 17715 80th Avenue NE. There are 600 new homes on 80th—lots of traffic. Renters will have cars and use parking spots on the neighboring condo properties. There is no street parking. There are school bus stops on 80th.

Colleen Anderson – spoke about not having enough parking Downtown. People farther from the core won't have services. Need additional infrastructure. Want firm requirement for affordable housing.

James Olson – More parking encourages more people to drive and makes it dangerous to walk or bike. Kenmore can't remain unchanged.

Annie Matthews – Can walk to store; takes buses to Seattle. Tall buildings will impact her as she works from home. There will be noise from construction; sun will be blocked. Parking reduction is unrealistic.

Corey Holder – Not opposed to TOD, but no confidence that infrastructure will be distributed equitably. Loss of street parking conflicts with these plans. Is there a

commercial/retail requirement on the ground floor? How is TOD going to impact the neighbors?

Kimberley Taylor – Read Comprehensive Plan materials. Concerned about environmental protection, good neighborhoods, compatible building types. How does the proposed project fit with these goals? New building will tower over its tallest neighbor.

5. ADJOURNMENT

Chair Thompson adjourned the meeting at 8:58 PM

_____
Planning Commission
Approved by Planning Commission on: _____

City Of Kenmore, Washington

Memorandum

Date: November 1, 2022

To: Planning Commission

From: John Vicente, P.E., P.M.P., City Engineer

Regarding: Transportation Element

At your November 1 meeting, the Planning Commission will continue discussion of the draft Transportation Element (see Attachment 1). This meeting will include review of the responses to questions and edits discussed at the September 6 meeting as well as presentation of new material associated with future projects that will be needed to achieve the vision described in the draft Transportation Element. The Planning Commission is scheduled to review the final draft Transportation Element and transportation component of the Capital Facilities Plan on January 17, 2023, with a public hearing scheduled for February 21, 2023.

Changes to the draft Transportation Element that reflect responses to Commissioner feedback provided at the September 6 meeting are shown in Attachment 1 in ~~strikeout~~/underline/highlight format. Many of the figures were updated and these titles are highlighted to call attention to these changes. Edits to the draft are summarized by section below.

Document-wide edits

- Added sources to all maps
- Change “Squire’s Landing” to “ƛ' a Xw a d i s”
- Minor grammatical edits/formatting (these do not show as track changes)

Introduction

- Added language addressing the impacts of transportation on climate change

Existing Conditions

- Added language describing the PM peak period and that it varies by location. This is described in greater detail in Appendix D-1 (Attachment 2).
- Updated Figure T-5, which includes existing Pedestrian Volumes at select intersections. We revisited our methodology and the data and confirmed the pedestrian counts shown are during 2-hr “PM Peak” timeframes, which vary within the range of 3pm to 7pm. This aligns with direction provided when the methodology described in Appendix D-1 was prepared, which accounted for school pick up/drop off times where applicable. The label for this figure and T-6 (which shows Bicycle Volumes) map was updated to state “PM Peak” instead.
- Included a brief statement describing Metro’s Community Ride service.
- Provided a definition of the Freight and Goods Transportation system.
- Provided additional Level of Service definitions information.

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- Added new language regarding Level of Service in the Kenmore Countywide Growth Center which reinforces the City's prioritization of bicycle and pedestrian mobility in this area.
- Added definitions for crash severity.

Goals, Policies and Objectives

- Added language addressing the environmental impacts of the transportation system and direction to be more proactive regarding minimizing impacts in Policies T-1.2.1, T-2.1.4, T-3.6.1, and Figure T-14.
- Added new policy language regarding Level of Service in the Kenmore Countywide Growth Center (Policy T-1.4.1) to reinforce the City's prioritization of bicycle and pedestrian mobility in this area and deleted Policy T-1.4.2
- Added a new policy about regional planning for SR 522 (Policy T-2.2.4).
- Added new policy language regarding vehicle charging on publicly owned property (Policy T-3.5.2).
- Added a new Objective (7.3) and updated language in Goal 7 to emphasize collaboration with historically underrepresented community groups when planning and developing transportation improvements.

Future Transportation System

- Updated Figure T-16 to show roadway typologies only (it previously showed the Tolt Pipeline trail and was inconsistent with the preceding text).
- Updated Figures T-17 and T-18 to show the entirety of the planned Tolt Pipeline Trail, rather than distinguish between existing and planned, since this is the vision for the future Pedestrian and Bicycle Priority networks. As noted in the figures, the routing around Wallace Swamp Creek Park will be determined at a future time, consistent with direction received from the City Council during development of the Pedestrian Facilities Plan. Additionally, Figure T-17 was updated to change the pedestrian LOS on NE 145th Street from green to yellow and the segment of NE 205th Street from 75th Avenue NE to 80th Avenue NE was included at the yellow standard.

Two additional questions/comments were included as part of the September 6 discussion. Responses to these are as follows:

- Per Commissioner Vanderlinde's request, the project team revisited the data in the crash severity map Figure (T-12) and confirmed that it includes crashes with bike and pedestrians. The team reviewed the cluster of crashes depicted on (Figure T-13) at SR 522 and NE 175th Street near 73rd Avenue NE which included a total of 5 pedestrian crashes (3 on SR 522 and 2 on NE 175th Street). No changes to the element in response to this question.
- In response to Commissioner Loutsis's questions about preparing a new goal for water based transportation, the project team researched several different cities' plans to see how they address this issue. In general, policies for this type of transportation are strongly tied to the land use plan. Because Kenmore envisions a waterfront developed with residential, office, and commercial uses, industrial transportation, such as barge traffic or service to a port, is in direct conflict with this vision. Furthermore, Kenmore is not planning to be a regional, intermodal transportation hub thus a broader plan for private transportation seems in conflict

with the land use vision. For these reasons, the project team does not recommend an additional goal or policy language associated with water based transportation.

The draft Transportation Element includes new content that describes the forecast performance of the transportation network, including updated narrative describing traffic forecasts and two new figures (T-20 and T-21). The forecasts for future performance of the traffic network indicates that no new transportation improvements will be needed to accommodate future automobile volumes and maintain the City's adopted levels of service (LOS), including the recommended threshold for the Kenmore Countywide Growth Center. The exception to this pertains to intersections along SR 522. The LOS for these intersections (LOS D) is established by the Washington State Department of Transportation (WSDOT). Several of these intersections are forecast to operate at LOS E, which would be consistent with the City's standard for this roadway category. Because the performance of these intersections is strongly influenced by regional growth and the needed improvements to address the LOS failure would be of a magnitude that they would conflict with the City's vision for downtown Kenmore, the element does not identify planned improvements at these locations. To address this, a new policy (T-2.2.4) has been added, as well as supporting text in the Freight and Auto subsection of the Future Transportation System section.

The remaining two sections have not been discussed at the Planning Commission and were previously included in the draft Transportation Element with placeholder language. The Near Term and Long Term Capital Projects section has been revised to provide an updated narrative regarding capital projects. Table T-10 in this section summarizes the planned 6- and 20-year projects that have been identified to achieve the vision outlined in the draft element. Projects include those to improve safety, nonmotorized mobility, and water quality. The prioritization for projects included in the Pavement Preservation Plan, ADA Transition Plan and Pedestrian Facilities Plan will determine the order of implementation within those programs. Several of these projects have cost estimates already prepared while several are still under development. All costs estimates will be completed prior to the January 17 Planning Commission meeting, at which time the transportation component of Capital Facilities Plan is scheduled for review. As noted previously, there are no projects included that are needed for the City to maintain its adopted LOS standards.

The Implementation Strategies section remains largely the same. Upon completion of the cost estimates for all projects identified in Table T-10, Table T-11 will be updated accordingly.

In addition to the revised draft Transportation Element, two new technical appendices are attached to this memo. Appendix D-1 (see Attachment 2) describes the methodology used to perform the traffic modeling, including detailed modeling outputs showing forecast performance at select intersections. Appendix D-2 summarizes the process to distribute planned household and employment growth throughout the City, which was used as part of the travel demand modeling effort.

Staff recommends the Planning Commission continue discussion of the revised and new sections of the draft Transportation Element at the November 1 meeting and continue discussion at the January 17 meeting if needed.

Attachments

Attachment 1: Revised Transportation Element
Attachment 2: Revised Appendix D-1
Attachment 3: Revised Appendix D-2

4. Transportation Element

TRANSPORTATION ELEMENT

INTRODUCTION

Since its incorporation in 1998, the City of Kenmore has continuously made investments that enhance its position as a vibrant community in which to live, work, and play. New civic facilities in downtown and multimodal transportation facilities throughout the City have been key contributors to the City's vitality. Building on previous improvements, this Transportation Element aims to support the vision of Kenmore as a high-capacity transit community with an activated, thriving downtown, as described in the Land Use Element. It also describes a network that supports travel by walking, biking, and riding transit throughout Kenmore, in addition to supporting adequate mobility when traveling by car in Kenmore through 2044. The Element supports the City's Diversity, Equity, and Inclusion Policy, adopted in 2020, to allocate resources in areas with historically disadvantaged communities. Recognizing that vehicle emissions are Washington State's largest contributor to greenhouse gases, ~~The~~ the Element ~~also~~ reflects the goals and policies described in Kenmore's Climate Action Plan (CAP), emphasizing a shift to transportation modes and technologies that reduced vehicle emissions.

Purpose

The purpose of the Transportation Element is to describe the City's vision for a safe, balanced, and efficient multi-modal transportation system that supports the Land Use element. The Transportation Element includes goals, policies, and objectives for maintenance and development of Kenmore's transportation system. It also identifies future transportation investments needed to realize the city's vision for multi-modal mobility within Kenmore. The Transportation Element informs the development of the Capital Improvement Program (CIP) by identifying the types of projects the City should undertake to support future transportation needs in the 6- and 20-year horizons. The plan also evaluates how these projects coincide with the City's financial resources.

This Transportation Element includes the following sections:

- ***Existing Conditions***: Describes conditions for all travel modes in the existing transportation system. This section also identifies current challenges and trends that will affect Kenmore's transportation network in the future.
- ***Goals, Objectives, and Policies***: Explains Kenmore's vision for transportation and the goals that serve as the basis for the Transportation Element.
- ***Future Transportation System***: Describes the City's layered transportation network concept to create a complete, multimodal transportation network in Kenmore. This section also establishes the City's level of service (LOS) standards.
- ***Near Term and Long Term Capital Projects:*** Provides near-term and long-range project lists based on the community values expressed in the transportation goals and layered network.
- ***Implementation Strategies***: Evaluates Kenmore's financial conditions over the next 20 years and provides guidance on plan implementation.

Regional Context

The Transportation Element sets a framework for understanding, prioritizing, measuring, and creating a transportation network to help Kenmore achieve its land use vision. Kenmore's regional setting, shown in **Figure T-1**, is important. Nestled on the north shore of Lake Washington, the City forms the northern edge of King County and is bisected by State Route 522 (SR 522), a Highway of Statewide Significance. Given this strategic location, transportation conditions in the City are strongly influenced by pass-through traffic travelling between Seattle and east side cities, as well as growth in Snohomish County. The Kenmore Air Harbor provides connections to additional regional destinations, such as the Olympic Peninsula, the San Juan Islands, and British Columbia. The City must coordinate its transportation planning with a variety of jurisdictions, including neighboring cities, King County (including King County Metro), Sound Transit, the Puget Sound Regional Council (PSRC), and the Washington State Department of Transportation (WSDOT).

Figure T-1: City of Kenmore and Surrounding Area

Growth Management Act (GMA)

The State's Growth Management Act (GMA) of 1990 requires communities to prepare a transportation plan consistent with the City's Land Use Element. Specific GMA requirements for the Transportation Element include addressing:

- Land use assumptions used in estimating travel
- Estimated traffic impacts to state-owned transportation facilities resulting from growth
- Future transportation facilities and services needs, including those for air, water, and ground transportation
- LOS standards for arterials, state highways, and transit routes
- Specific actions and requirements for bringing locally owned transportation facilities and services into compliance with established LOS standards
- Forecasts of future traffic based on the adopted land use plan
- State and local system needs to meet current and future demands
- Financing capability to judge needs against probable resources
- A multiyear financing plan based on needs, which will serve as the basis for the City's six-year transportation program
- Strategies to address issues if probable funding falls short of meeting identified needs
- Intergovernmental coordination efforts
- Demand-management strategies
- Bicycle and pedestrian improvements

This Transportation Element addresses the required transportation components of the GMA.

VISION 2050

PSRC is the region's metropolitan planning organization. Comprising cities, towns, counties, ports, tribes, transit agencies, and major employers, PSRC sets regional growth policies for King, Pierce, Snohomish, and Kitsap Counties. Adopted in 2020, VISION 2050, establishes the long term goals for growth management, economic, and transportation issues. This Transportation Element is consistent with the VISION 2050 priorities.

VISION 2050 identifies several key goals for transportation in the region:

- **Maintenance, Management, and Safety** – Maintain, preserve, and operate the existing transportation system in a safe and usable state.
- **Support the Growth Strategy** – Support the regional growth strategy by focusing on connecting centers with a highly efficient multimodal transportation network.
- **Greater Options, Mobility, and Access** – Invest in transportation systems that offer greater options, mobility, and access in support of the regional growth strategy.

Countywide Planning Policies (CPPs)

The Regional Growth Strategy identifies a network of walkable, compact, and transit-oriented communities, including the City of Kenmore, that are the focus of urban development. The Regional Growth Strategy envisions an efficient, multimodal transportation system that provides various options for moving people and goods into and among centers.

The overarching transportation goal in the Countywide Planning Policies (CPPs) is that "the region is well served by an integrated, multimodal transportation system that supports the regional vision for growth, efficiently moves people and goods, and is environmentally and functionally sustainable over the long term". The CPPs support the transportation vision in the Regional Growth Strategy with policies focused on:

- Supporting Growth – focusing on serving the region with a transportation system that furthers the Regional Growth Strategy;
- Mobility – addressing the full range of travel modes necessary to move people and goods efficiently within the region and beyond; and
- System Operations – encompassing the design, maintenance, and operation of the transportation system to provide for safety, efficiency, and sustainability.

Other Plans

WSDOT controls SR 522, which runs east-west through Kenmore. As such, the City coordinates with WSDOT and neighboring communities regarding impacts to and needed investments on SR 522.

Sound Transit provides regional, high capacity transit service throughout the Puget Sound via Link light rail, Sounder commuter rail, and ST Express bus service. Sound Transit is currently advancing the capital and service investments included in the ST2 and ST3 ballot measures approved in 2008 and 2016, respectively. The ST2 ballot measure included funding for the Lynnwood Link light rail extension, planned for completion in 2024. The Shoreline South/148th Street and Shoreline North/185th Street stations will be the closest light rail stations to Kenmore, providing nearby access for Kenmore residents wishing to ride transit to destinations throughout the Puget Sound region. Sound Transit's Stride bus rapid transit (BRT) service on SR 522 was funded by the ST3 ballot measure. Planned for implementation in 2026, Stride will provide high-capacity transit service directly in Kenmore, providing residents with a direct connection to light rail in Shoreline and Stride service on I-405.

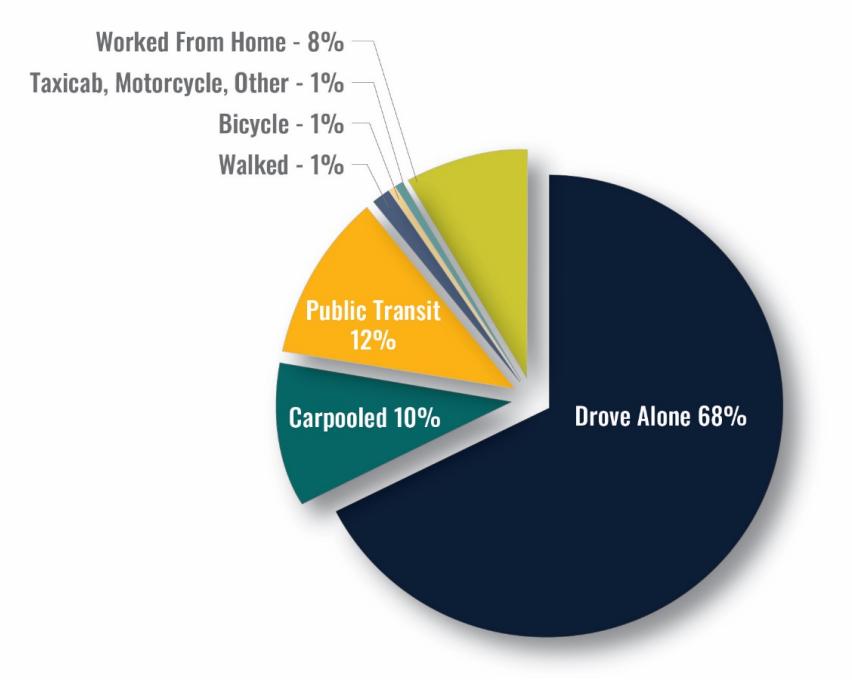
Metro Connects is King County Metro's (Metro's) 30-year vision for mobility. It is a long-range service and capital vision that describes planned future service networks and the capital investments needed to support those networks. The plan envisions multimodal connections to the places people want to go with safe and secure operations and facilities for passengers, employees, and communities. Metro Connects emphasizes Metro's core values of safety, equity, and sustainability, incorporates the recommendations of the King County Metro Mobility Framework, and aligns with Metro's Strategic Plan for Public Transportation and its Service Guidelines. The service networks envision changes to Kenmore's transit services, particularly in relation to the implementation of Sound Transit's investments in the regional HCT system.

EXISTING CONDITIONS

Transportation Network Overview

Kenmore's transportation network accommodates many modes of travel, including walking, bicycling, public transit, driving, and flying. Vehicular travel for commuting to work, which generally occurs during the morning and evening peak when traffic volumes are highest, is the primary choice for many travelers in and around Kenmore, as shown in the Census journey-to-work data (see **Figure T-2**). ~~City streets form the backbone of the transportation framework with roadways shaping how residents and visitors experience Kenmore.~~ The peak volumes for vehicles, pedestrians, bicyclists, and transit can occur during different times by location. For example, areas near schools are influenced by the start and end of classes, resulting in increased pedestrians and vehicles volumes during these times.

Figure T-2: Commute Mode to Work



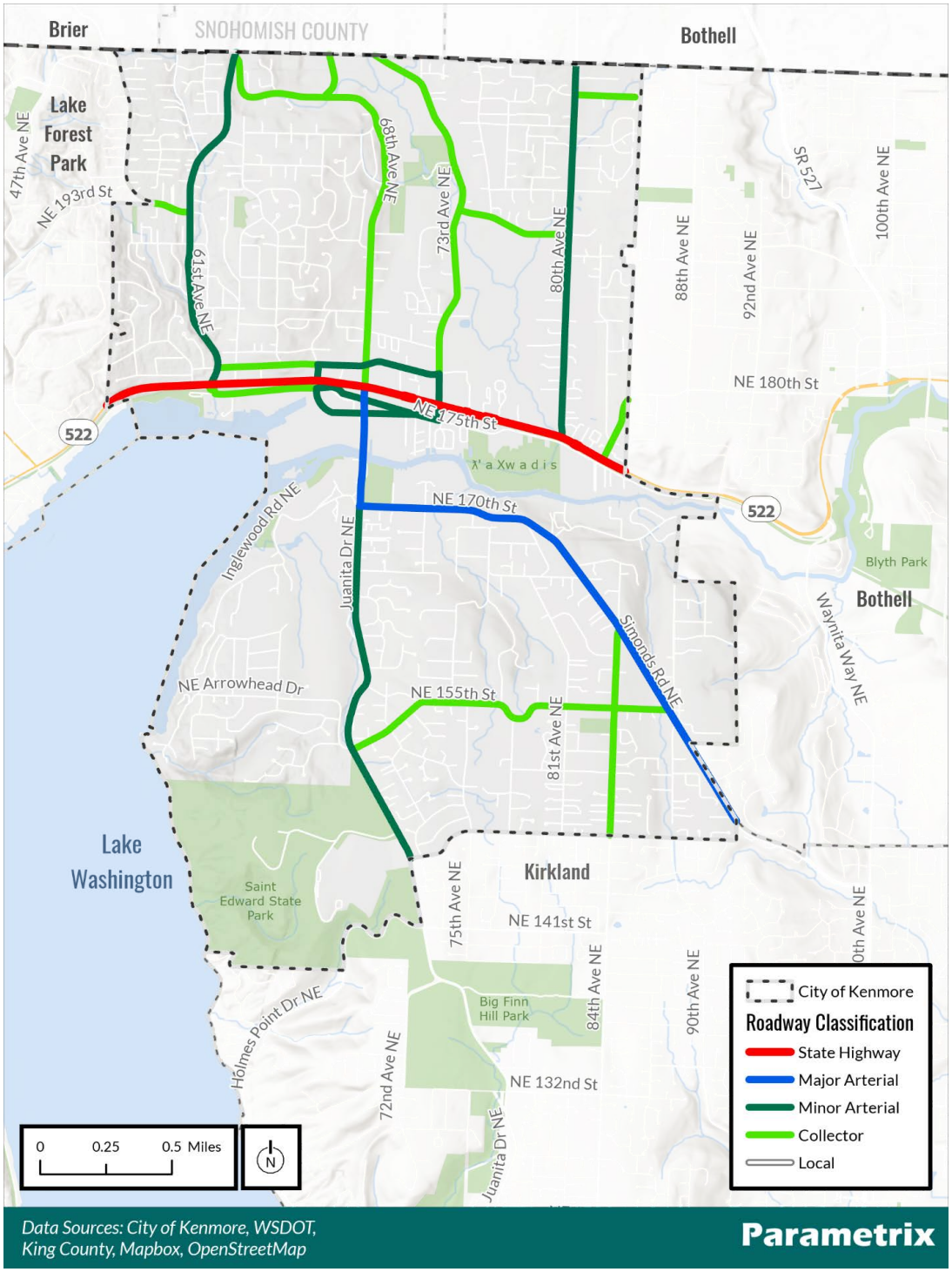
Source: American Community Survey 2019 5-Year Journey to Work Data

City streets form the backbone of the transportation framework with roadways shaping how residents and visitors experience Kenmore. The City of Kenmore currently classifies its roadways into major arterials, minor arterials, collectors, and local streets, as shown in **Table T-1** and displayed in **Figure T-3**. Examples of each roadway type and the intended uses served are described in **Table T-1**.

Table T-1. Functional Classification of Roadways

Roadway Type	Description / Purpose	Example
Major Arterial	A roadway that serves through trips and connects Kenmore with the rest of the area.	• Simonds Road NE • 68th Avenue NE (SR 522 to NE 170th Street)
Minor Arterial	Minor arterial streets provide inter-neighborhood connections and serve both local and through trips.	• 61st Avenue NE • NE 181st Street (65th Avenue NE to 73rd Avenue NE) • Juanita Drive NE
Collectors	Collectors distribute trips between local streets and arterials and serve as transition roadways to or from residential areas.	• 68th Avenue NE (north of SR 522) • 73rd Avenue NE • NE 153rd Place
Local	Local streets provide circulation and access within residential neighborhoods.	• 62nd Avenue NE • NE 150th Street

Figure T-3: Roadway Functional Classification

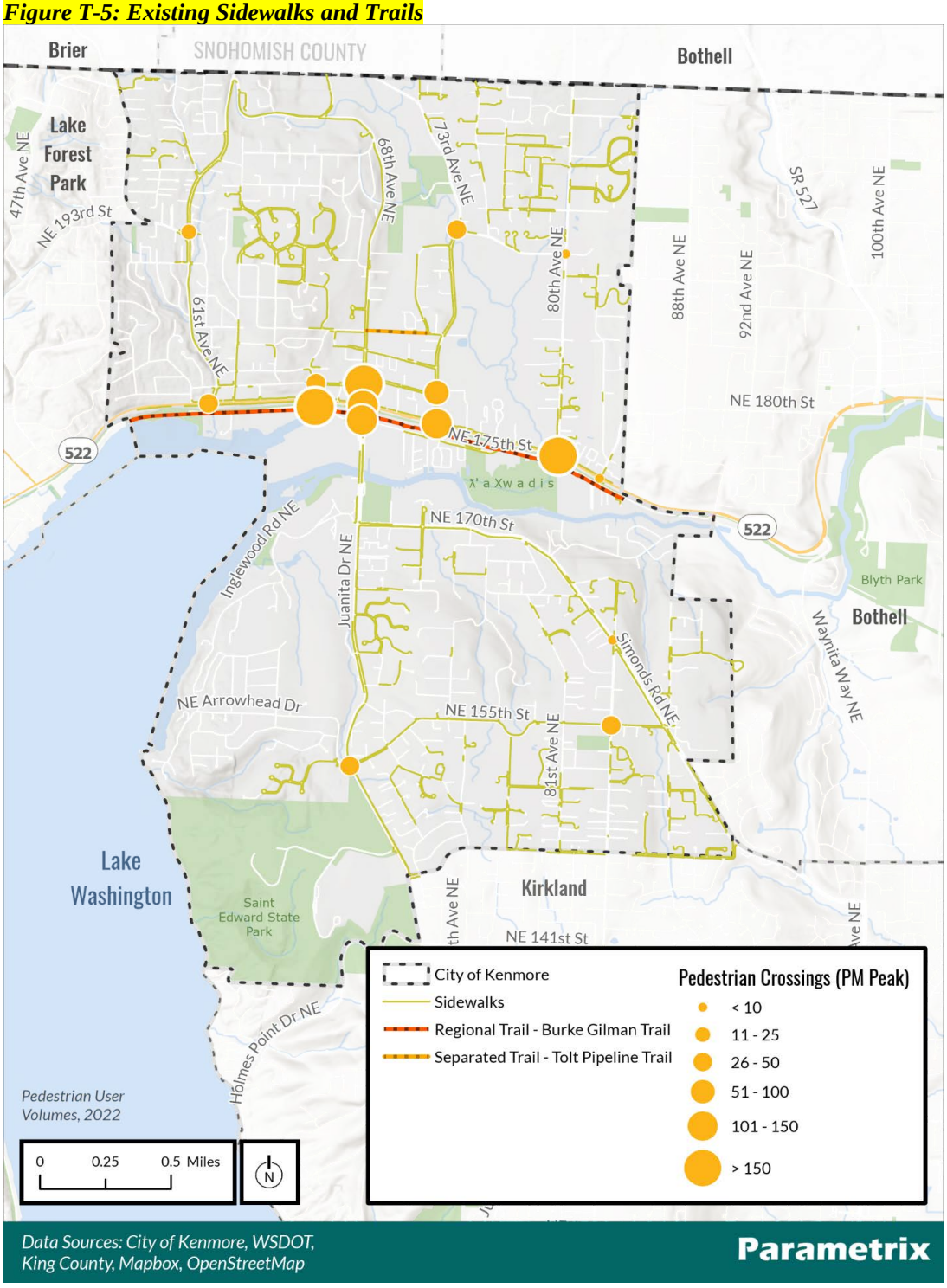


There are approximately 45 linear miles of concrete sidewalks and 120 marked crosswalks in the City, but sidewalks are still absent from many streets. On quiet residential streets, sidewalks may not be necessary; however, Kenmore has a number of arterials connecting residents from their homes to commercial areas, employment centers, schools, and transit stops that lack adequate pedestrian facilities.

Figure T-4 displays different types of existing pedestrian infrastructure in Kenmore. **Figure T-5** shows where existing sidewalks and trails are located, ~~spatially as well as the number of pedestrians that were observed on each facility in January 2022~~ as well as average pedestrian volumes (2022) at key intersections during the 2-hour evening peak for vehicular traffic.

Figure T-4: Existing Sidewalks, Shoulders, and Pedestrian Crossings

Figure T-5: Existing Sidewalks and Trails



Kenmore hosts a section of the Burke-Gilman Trail, a regional multi-use trail that connects residents to Seattle and other area cities. However, for many Kenmore residents, connecting from home to the Burke-Gilman Trail or other non-motorized facilities can be challenging due to the topography and curvilinear streets in parts of the city. SR 522 and 68th Avenue NE / Juanita Drive NE create additional barriers to bicycling in Kenmore due to their high traffic volumes and difficult crossings. **Figure T-6** presents Kenmore's existing bicycle facilities, ~~as well as the number of cyclists counted at key locations in January 2022.~~as well as average bicyclist volumes (2022) at key intersections during the 2-hour evening peak for vehicular traffic.

Figure T-6: Existing Bicycle Facilities and Volumes

Many Kenmore residents and employees use public transit for trips around and outside of the City. Public transit in Kenmore consists of fixed-route and dial-a-ride bus service provided by Metro and Sound Transit. Metro also provides on-demand, point-to-point transportation between south Kenmore, North Kirkland, and downtown Bothell. The Northshore Senior Center also provides door-to-door shuttle service to many of its patrons.

Figure T-7 and **Table T-2** display the Spring 2019 transit routes serving Kenmore, average daily boardings at each stop, and park and ride utilization. These volumes reflect a high level of bus ridership in the City, particularly on routes that serve SR 522. SR 522 and the corridor south of SR 522 currently served by Route 225 (previously served by Routes 234 and 244) have been designated as high capacity transit lines by PSRC. The Kenmore Park and Ride and the park and ride at the Vine Church, both located on SR 522, were 100 and 96 percent full, respectively, on an average weekday. As shown, there was no service in the City north of SR 522/NE 181st Street.

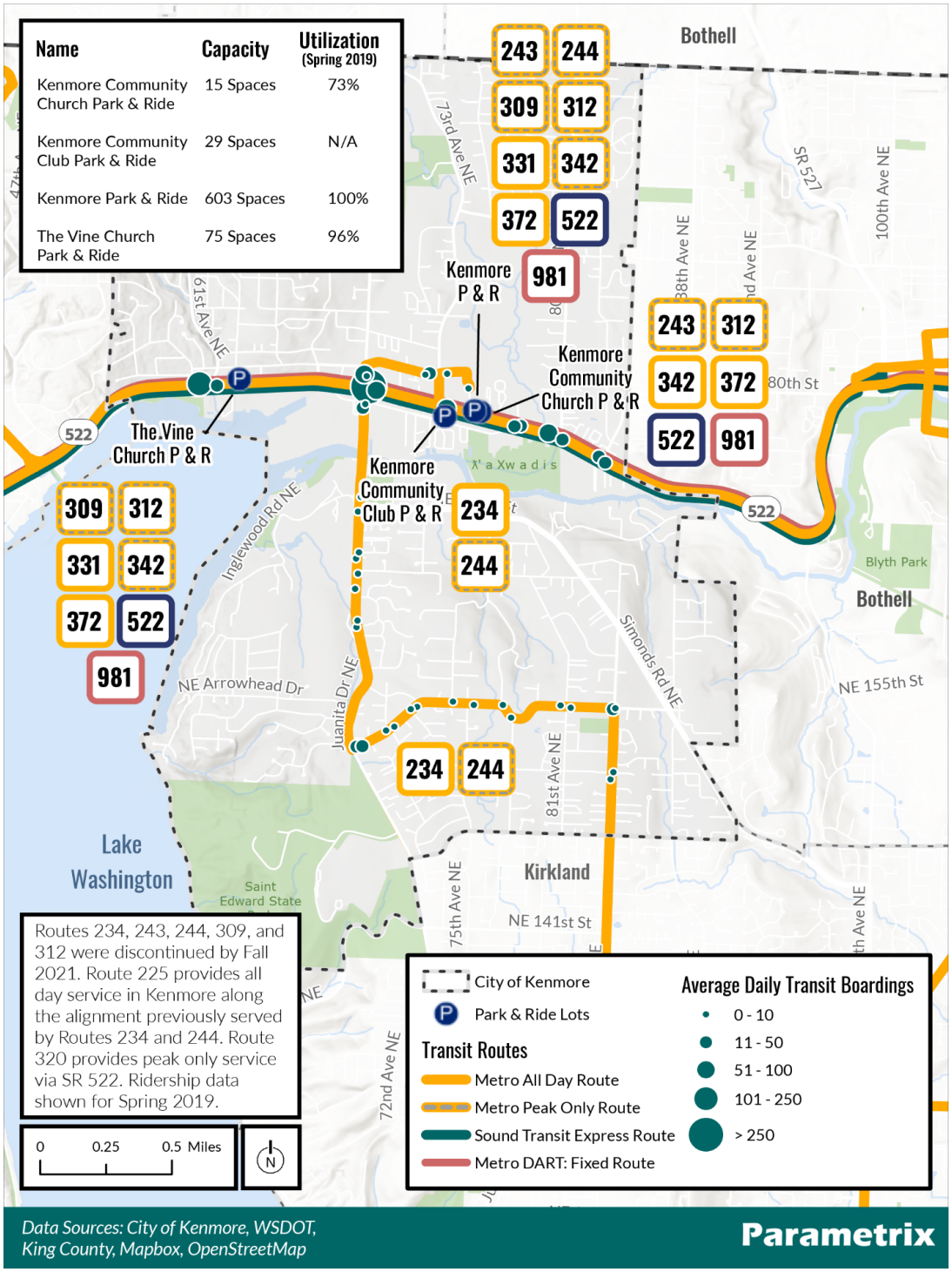
Transit ridership declined dramatically throughout the Puget Sound region during the COVID-19 pandemic. Metro and Sound Transit reduced service levels across their networks, including the elimination of several routes in Kenmore. Additionally, both transit agencies restructured several routes that serve the city in conjunction with the opening of the North Link light rail extension in October 2021. Sound Transit Route 522, which previously provided service between Woodinville and downtown Seattle, was revised to serve the Roosevelt Link station. This change required riders to transfer to light rail to continue to downtown Seattle. A new peak only route, Route 320, was created, providing service connecting Kenmore to the Northgate Link station, South Lake Union, and downtown Seattle. Additionally, a new leased park and ride was opened at the Kenmore Community Club. Fall 2021 ridership in Kenmore is summarized in **Table T-2.**

Table T-2. Bus Service in Kenmore

Route	Service Type	2019 Average Daily Weekday Spring Boardings	2021 Average Daily Weekday Fall Boardings
225	All Day	N/A	100
234	All Day	249	N/A
243	Peak Only	1	N/A
244	Peak Only	28	N/A
309	Peak Only	110	N/A
312	Peak Only	440	N/A
320	Peak Only	N/A	21
331	All Day	98	72
342	Peak Only	36	8
372	All Day	527	204
522	All Day	680	154
981	DART	1	2

Source: King County Metro

Figure T-7: Existing Transit Routes, Facilities, and Boardings (2019)



Washington State's Freight and Goods Transportation System (FGTS) classifies the state's freight corridors by modes based on annual freight tonnage moved through truck, rail and waterway freight corridors. Goods movement in Kenmore runs predominantly along the City's major arterials of 68th Avenue, NE 170th Street, Simonds Road NE, and SR 522, ~~as shown in **Figure T-8.**~~ Because 68th Avenue provides the only Sammamish River crossing option in Kenmore, this roadway plays a particularly important role in facilitating commerce. FGTS classified routes in the City of Kenmore are shown in **Figure T-8**.

Beyond these primary routes, delivery vehicles use many other streets to reach their final destination. For example, NE 175th Street sees a fair amount of freight traffic due to the nature of the surrounding land uses it serves. Additionally, a wide array of freight companies provide deliveries to residents and businesses using all types of roadways, including local streets.

Figure T-8: Truck Routes

4. Transportation Element

Most Kenmore residents (about 68 percent) choose motor vehicles as their primary mode of transportation to work. Moreover, many more non-resident travelers pass through the City on SR 522 / 68th Avenue / Juanita Drive / Simonds Road. Severe congestion during peak hours illustrates this issue with many intersections experiencing long delays (see **Figure T-9**).

Analysis of Kenmore's congestion for motorists is based on the traffic counts collected in January 2022. Since March 2020, traffic volumes have decreased in response to COVID-19 related initiatives. As future traffic volumes are built from forecasting from baseline conditions, the goal is to model an existing 2022 baseline condition that best reflects overall trends from the past several years. Overestimating volumes can lead to future forecasts that may be too high, potentially leading to infrastructure that is overbuilt for future conditions. Conversely, underestimating baseline conditions could lead to future forecasts that may be too low, leading to infrastructure that would be potentially underbuilt for future conditions.

To monitor changes in travel volumes related to the COVID pandemic, the City of Kenmore collected weekly travel data between May 2020 and August 2021. The data shows as of August 2021, the annual average daily traffic volumes in 2021 were 7 percent lower than 2019 volumes. Therefore, to be conservative, traffic counts collected in January 2022 for this analysis were adjusted upward by 7 percent.

To understand the level of congestion experienced during the evening commute, 19 intersections were evaluated based on their ability to accommodate PM peak hour demand in their existing configuration (number of lanes, traffic control, etc.). Based on this analysis, intersections were scored into one of six LOS categories that describe their operations in terms of vehicle delay. **Table T-3** describes the LOS definitions laid out in the Highway Capacity Manual 6th Edition (Transportation Research Board, 2016), which is the methodology currently applied to Kenmore's transportation network.

Table T-3. Level of Service Definitions

Level of Service	Description	Average Control Delay at (seconds per vehicle)	
		Signalized/Roundabout Intersections	Unsignalized Intersections
A	Free-flowing conditions.	< 10	< 10
B	Stable operating conditions.	> 10 and < 20	> 10 and < 15
C	Stable operating conditions, but individual motorists are affected by the interaction with other motorists.	> 20 and < 35	> 15 and < 25
D	High density of motorists, but stable flow.	> 35 and < 55	> 25 and < 35
E	Near-capacity operations, with speeds reduced to a low but uniform speed.	> 55 and < 80	> 35 and < 50
F	Over capacity, with delays.	> 80	> 50

The City's LOS policy sets the following standards for its roadways:

- Major Arterials – LOS E or better
- Minor Arterials and collectors – LOS D or better
- Local roads – LOS C or better
- Roadways in Kenmore Countywide Growth Center
    - Signalized intersections shall operate at LOS F or better and not exceed 100 seconds of average total vehicle delay of all movements
    - Unsignalized intersections shall operate at LOS F or better on the minor street approach until a signal warrant is met using the current version of the Manual for Uniform Traffic Control Devices

It should be noted that as a highway of statewide significance, SR 522 is exempted from the City's LOS standards.

Figure T-9 shows weekday traffic volumes and **Figure T-10** shows the calculated LOS at each of the 19 intersections. As the figures show, Kenmore's major arterials see high traffic volumes and lower levels of service. Detailed reports of LOS are available in **Appendix D-1**.

Figure T-9: Auto Average Daily Volumes

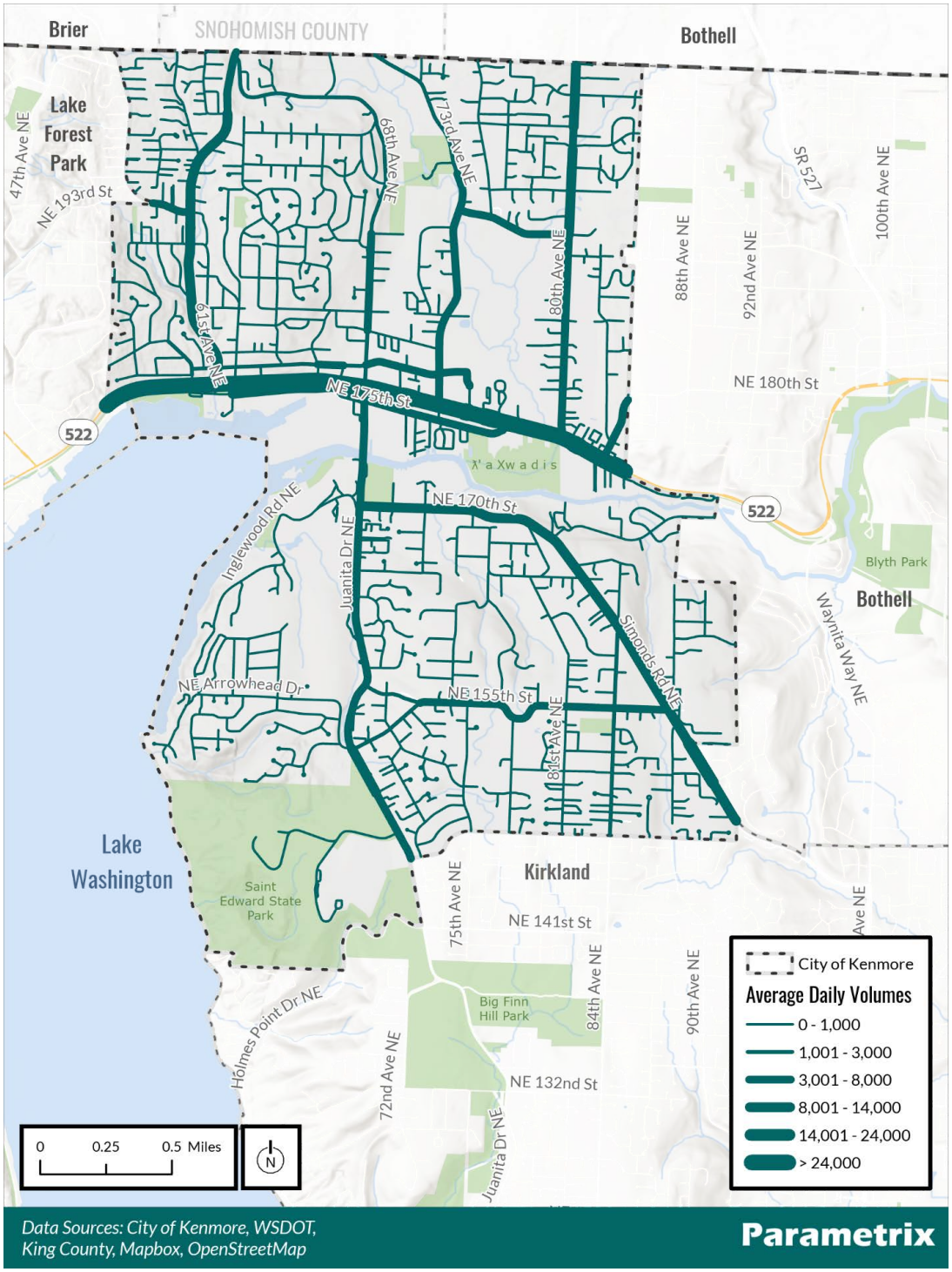
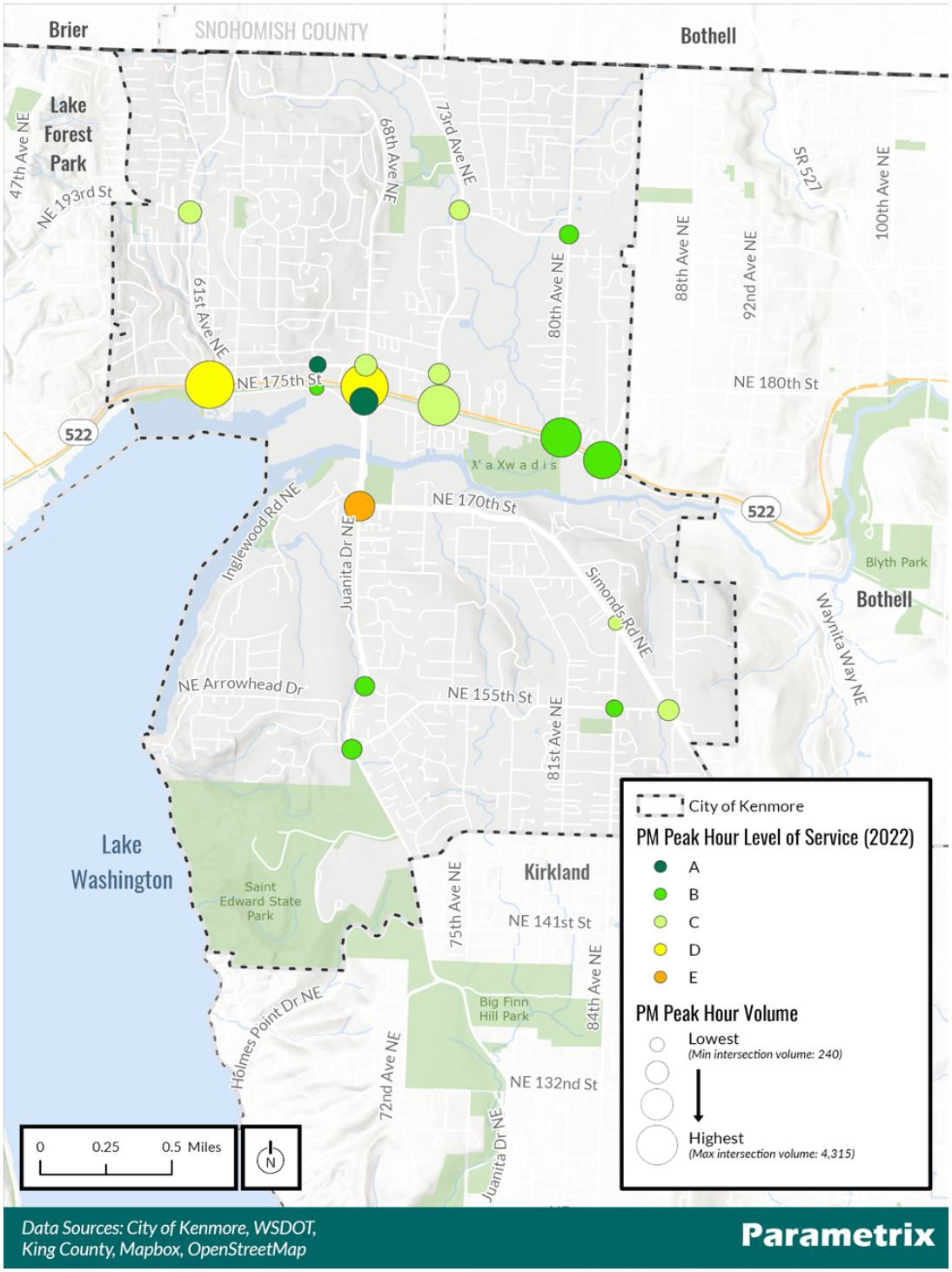


Figure T-10: Auto Level of Service and Volumes



Current Challenges and Observations

The City of Kenmore has several important challenges to face as it prepares for future growth and the development of its downtown core. Although Kenmore continues to invest in its multimodal transportation system, motor vehicle travel dominates the City's transportation framework currently and many travelers view Kenmore as a "pass-through town." Kenmore is planning to be a walkable, bikeable, high-capacity transit community with a vibrant downtown and addressing the following transportation challenges will be a key to the City's success:

- Safety and comfort, especially for pedestrians and bicyclists
- Transit availability and access to high capacity transit
- Limited connectivity for all users

Bicycle and Pedestrian Safety

Since 2017, Kenmore has experienced nearly 175 traffic collisions per year. Of the 871 collisions in Kenmore from January 2017 to August 2021, 325 occurred on SR 522 and 207 occurred on the 68th Avenue / Juanita Drive corridor – 61 percent of the total city-wide.

Highlighting this issue, the period from Winter 2017 through Summer 2021 saw 41 crashes that involved vehicles hitting pedestrians and bicyclists, including one pedestrian fatality. **Figures~~ T-11 and, T-12 , and T-13~~** displays traffic crashes for all modes within the City, ~~.~~Figure T-12~~3~~ shows~~,~~ injury ~~crash~~ severity~~,~~ and Figure T-13 shows ~~for~~ crashes involving bicycles and pedestrians~~, respectively,~~ over a five-year period spanning 2017-2021.

Crash severity is categorized by WSDOT into the following five categories:

- Fatal Injury: Any injury that results in death within 30 days after the motor vehicle crash in which the injury occurred.
- Suspected Serious Injury: Any injury other than fatal which results in one or more of the following: Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood; broken or distorted extremity (arm or leg); crush injuries; suspected skull, chest or abdominal injury other than bruises or minor lacerations; significant burns (second and third degree burns over 10 percent or more of the body); or unconsciousness when taken from the crash scene.
- Suspected Minor Injury: Any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).
- Possible Injury: Any injury reported or claimed which is not a fatal injury, suspected by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.
- No Apparent Injury: Situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury and the person does not report any change in normal function.

Figure T-11: Crash Density

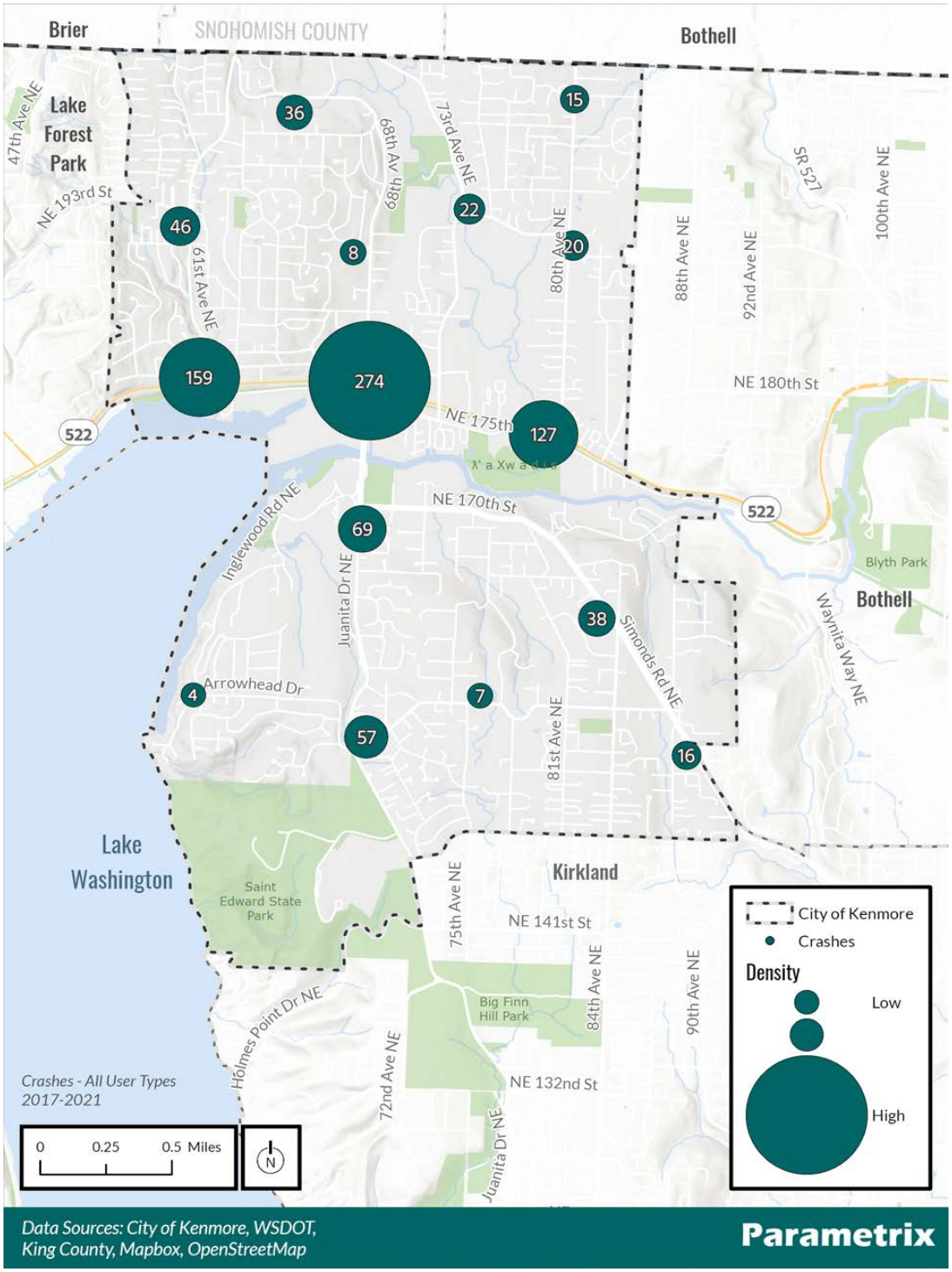


Figure T-12: Crash Severity

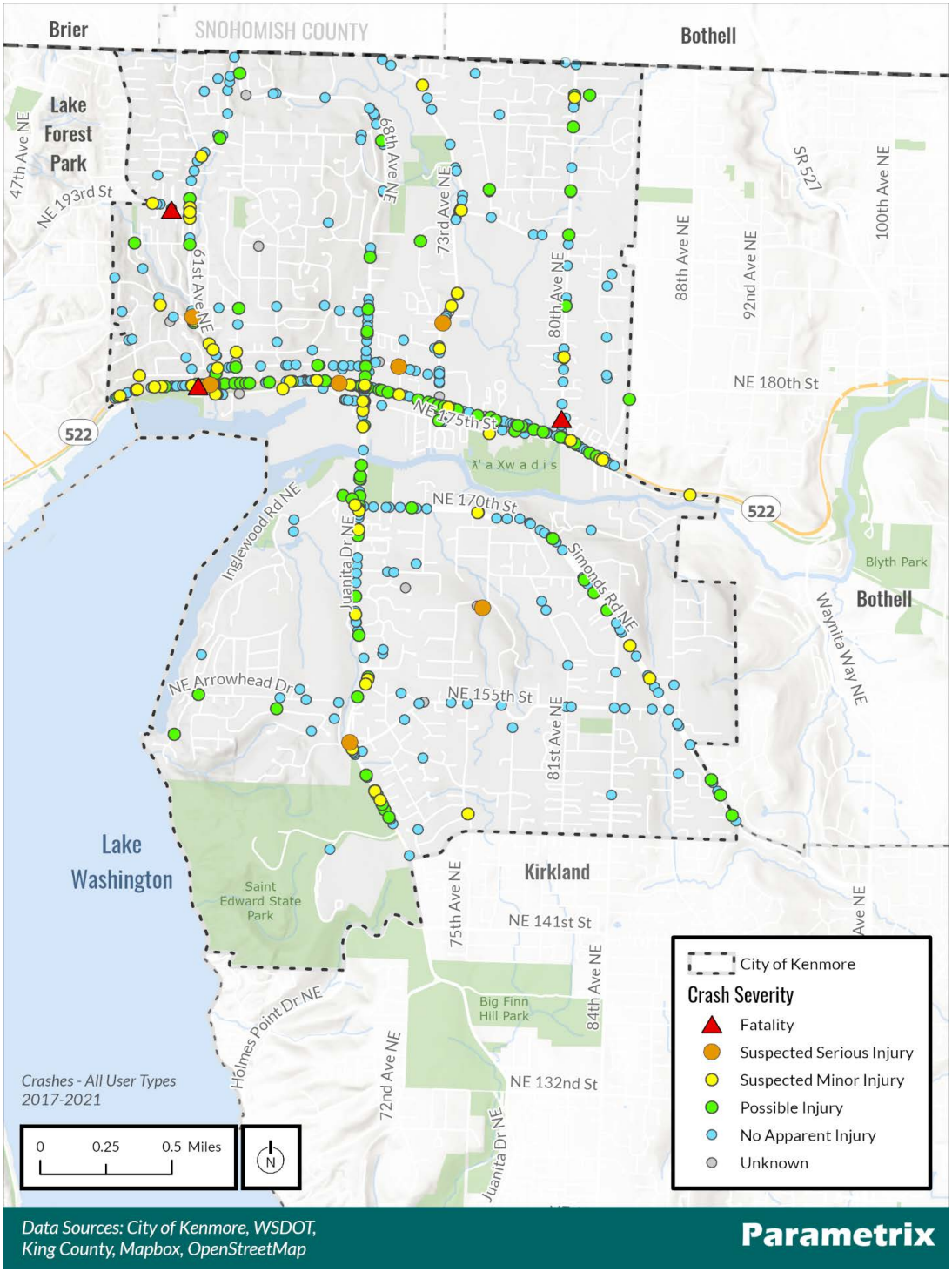
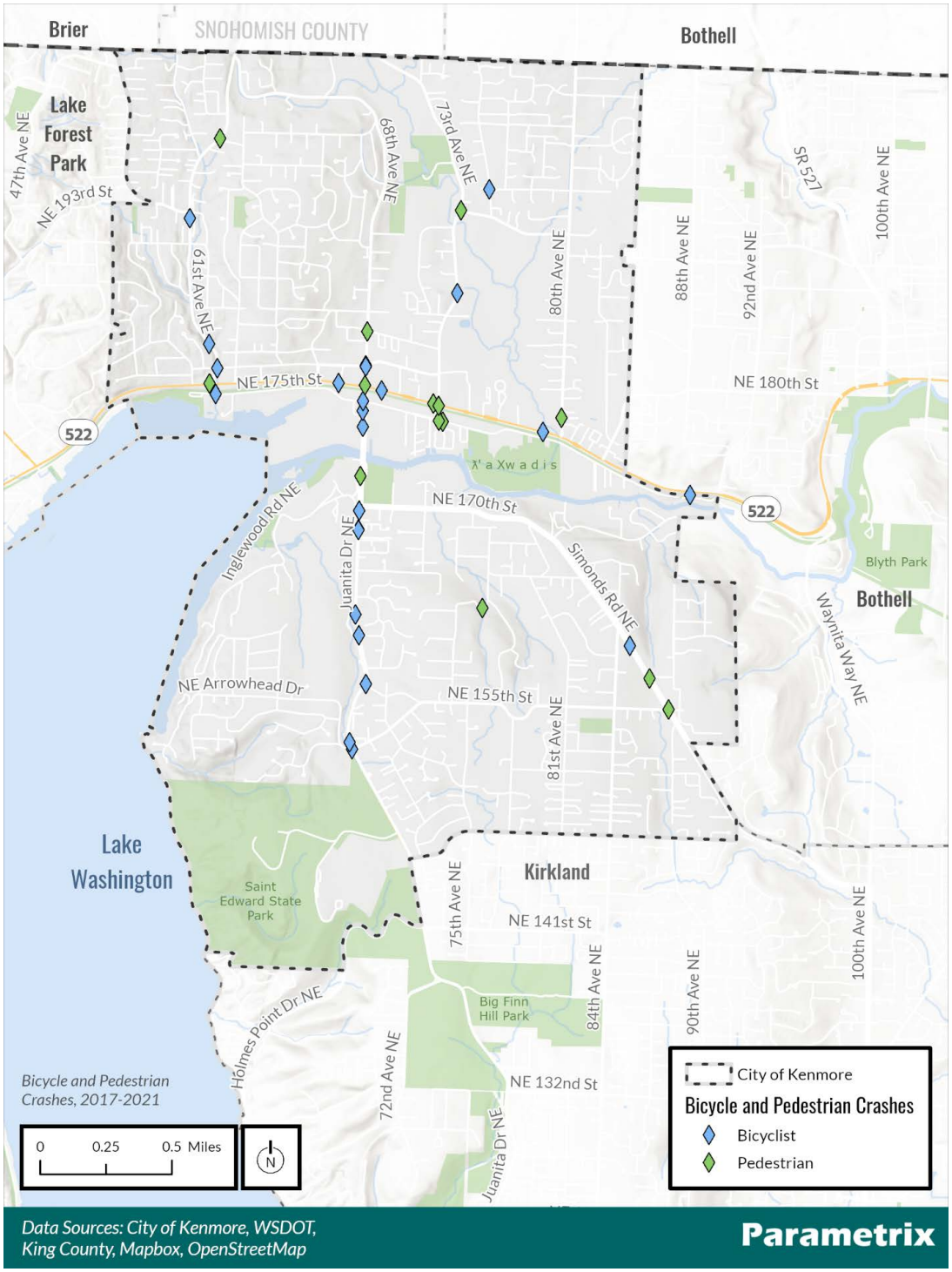


Figure T-13: Crashes Involving Bicycles and Pedestrians



The City of Kenmore's Target Zero Initiative was adopted in April of 2014. The goal of this program is to achieve zero pedestrian and bicyclist fatalities and serious injuries in Kenmore by 2025 by increasing awareness of pedestrian, bicyclist, and driver safety issues. The City works toward its Target Zero goal by engaging the Three E's: Engineering, Enforcement, and Education. These efforts include creating safer pedestrian and bicycle pathways, offering helmets at a low price, educating bicyclists, pedestrians, and drivers through events and pamphlets, offering safety vests annually at no charge (while supplies last), and enforcing traffic safety laws for all road users - among many other citywide improvements.

Kenmore has made many pedestrian improvements in recent years as the City strives for a more walkable/bikeable city. Sidewalk and crosswalk improvements along SR 522 have created a better environment for pedestrians moving around the City's commercial areas and connecting with public transit services or the Burke Gilman Trail. There are seven pedestrian actuated crossings that are also ADA compliant. Four are located near SR 522 and 61st Avenue NE and three are located near Juanita Drive and NE 170th Street.

The Burke-Gilman Trail provides a major bicycle route through Kenmore and is a major asset to the community for both transportation and recreational purposes. Creating safer and more attractive connections from neighborhoods to the trail will encourage residents to make more walking and biking trips and visitors to patronize local businesses near the trail.

As a part of Walkways & Waterways, a voter-approved bond passed in 2016, the 68th Avenue/Juanita Drive corridor received pedestrian and bicycle safety treatments:

(1) Juanita Drive NE Pedestrian and Bicycle Safety Improvements: 1.5 miles of new sidewalk on the east side of Juanita Drive from 143rd Street to NE 170th Street, buffered bicycle lanes in each direction, bus stop improvements, improved lighting, and some traffic signal modifications.

(2) The 68th Avenue NE Pedestrian and Bicycle Improvements: 1.5 miles of new sidewalk on one side of 68th Avenue NE from NE 182nd Street to 61st Place NE, new bicycle lanes in each direction, and lighting improvements.

In addition to the Walkways and Waterways projects, several other projects were initiated and completed that provided sidewalk and/or bicycle safety treatments:

(1) The West Sammamish River Bridge Replacement Project: New sidewalk and bike facilities on the west side of the road between NE 170th Street and NE 175th Street, lighting improvements and some traffic signal improvements.

(2) SR522 West A Project: New sidewalk on the north and south side of SR522 from 61st Avenue NE to 65th Avenue NE along with street lighting and traffic signal improvements.

(3) Simonds Road Overlay: New bike lanes added from 92nd Avenue NE to 84th Avenue NE.

(4) 62nd Avenue NE Sidewalk Project: New sidewalk on the east side of 62nd Avenue NE from SR522 to 185th Avenue NE.

(5) NE 181st Street Sidewalks: New sidewalk along the north and south side of NE 181st from 68th Avenue NE to 73rd Avenue NE and new sidewalk on the north side from 65th Avenue NE to 67th Avenue NE. Improvements included new street lighting.

(6) 73rd Avenue NE Overlay: New bike lanes added from NE 181st St to NE 192nd St.

(7) NE 153rd Street Sidewalks: New sidewalks on the south side of NE 153rd Street from 70th NE to Juanita Drive.

Transit Availability and Access to High Capacity Transit

Many people use public transit in Kenmore, as evidenced by 2019 ridership and park-and-ride occupancy levels. The opening of the Lynnwood Link light rail extension in 2024, particularly the Shoreline South/148th Street station, will provide an opportunity to greatly expand options for Kenmore residents wishing to ride transit to destinations throughout the Puget Sound region. Sound Transit's BRT Stride service on SR 522, planned for implementation in 2026, will provide high-capacity transit service directly in Kenmore, providing residents with a direct connection to light rail in Shoreline and Stride service on I-405. There are no planned improvements to parking capacity in Kenmore, by Sound Transit or Metro, until 2034. Robust local transit options and nonmotorized access improvements that connect Kenmore neighborhoods to bus service on SR 522 will be critical components to facilitating reliable access to these regional transit investments.

Kenmore is also interested in creation of a Metro-operated water taxi route that would connect the City to the University of Washington, providing another transit option for residents to access this regional employment and education center.

Service cuts are likely to hurt public transit as an attractive travel mode so the City should closely monitor these developments and advocate for its desire to maintain quality service. Additionally, infrequent or poorly timed service connections might further dissuade residents from using transit if it does not provide a fast and reliable trip compared with auto travel. While Kenmore cannot control transit service levels, the City's land use vision is designed to create a supportive environment for transit.

Limited Nonmotorized Connectivity

The existing transportation network in Kenmore was developed with limited facilities that can accommodate travel across the City. The 68th Avenue Bridge is the only public crossing over the Sammamish River in the City and currently acts as one of Kenmore's most congested points for all roadway users. In 2022, the City completed replacement of the southbound bridge, which included construction of new sidewalk and bicycle facilities on the west side of the road between NE 170th Street and NE 175th Street. Even with the bridge improvements, the intersection with SR 522 frequently backs up traffic for long stretches during peak hours.

Similarly, SR 522 serves as another major barrier to north-south connectivity. Its wide cross-section and limited number of signalized crossings affect all modes of travel, particularly pedestrians and cyclists. Additional signalized mid-block pedestrian crossings where warranted would improve crossing options for nonmotorized travelers.

East-west travel is also challenging, particularly north of SR 522 east of 73rd Avenue NE. A lack of walkways or paths for non-motorized users results in long, circuitous routes for pedestrians and cyclists wishing to travel in this area. Development of new non-motorized facilities could help to provide these connections.

Trends

Aside from existing conditions and challenges, there are other factors that will affect Kenmore's transportation system. Growth in downtown Kenmore and throughout the region generally plays a role in how the City will plan the improvements to its transportation network for the future.

Transportation Related Climate Impacts

The City of Kenmore's CAP establishes a multi-faceted approach for reducing greenhouse gas (GHG) emissions associated with transportation. The CAP describes policies, programs, and infrastructure investments that will help the City achieve its goal of net zero GHG emissions by 2050. Changes to municipal operations, construction of dense, mixed-use, and transit-oriented development (TOD), reduced single-occupancy vehicle (SOV) trips, and incentives for drivers to use electric vehicles (EVs) are the key transportation-focused strategies included in the CAP.

Downtown Development

In 2021, King County updated the 2021 Countywide Planning Polices to include a new category—Countywide Growth Centers—with zoned densities that support high capacity transit along existing or planned transit corridors. Designated countywide growth centers make efficient use of urban land by sufficiently providing housing, employment, and services in a compact form and density near the high capacity transit areas. Additionally, designated countywide growth centers use strategies to mitigate identified displacement impacts of residents and businesses, particularly for Black, Indigenous, and other People of Color communities; immigrants and refugees; low-income populations; people with disabilities; and other communities at greatest risk of displacement.

Downtown Kenmore is preliminarily designated as a Countywide Growth Center. Policies focus on mixed use, higher density development, including affordable housing, in the downtown area as it develops along the SR 522 high capacity transit corridor. Future redevelopment will add mixed use projects to provide housing, dining, shopping, and other services in the downtown. These land uses will generate additional travel in the downtown area and, while many people will be able to walk or use public transit for these trips, the transportation network must be able to support this concentrated growth.

Regional Growth

Regional development outside of the City itself is the other major aspect of growth affecting Kenmore by 2044. South Snohomish County, Bothell, and Woodinville are all expected to add a substantial number of residents and jobs during this time period and many of them travel through Kenmore en route to other regional destinations. The continued tolling of SR520 bridge and expected regional growth south of Kenmore are likely to have a continued impact on SR522.

Kenmore Travel Demand Forecasting

The GMA requires that the Transportation Element supports the land uses envisioned in the Comprehensive Plan. Thus, an important component of the work was forecasting how the future land uses envisioned in the City, as well as regional growth, would influence demand on Kenmore's transportation network. A description of the travel demand modeling process is summarized below with more detail about land use assumptions in **Appendix D-2.**

- **The Tool.** The PSRC regional Activity Based Travel Demand model was used for travel demand forecasting.
- **Estimate Land Use Growth in the City.** The City is planning for expected growth in housing units and employment over the next 20 years through 2044. The City allocates the growth throughout Kenmore based on adopted zoning, observed development patterns, and other city policies.
- **Capture Regional Growth Patterns.** Other communities throughout the region are going through this very same process, based on direction from PSRC. Since travel does not stop at a jurisdiction's borders, it is important to capture how regional growth could influence travel patterns on Kenmore's streets.
- **Translating Land Uses into Trips.** The next step is evaluating how the City and regional growth assumptions described above translate into walking, biking, transit, and auto trips. The travel model represents the number of housing units and employees in spatial units called traffic analysis zones (TAZs). TAZs can be as small as a few street blocks to as large as an entire neighborhood. They provide a simplified means to represent trip making rather than modeling individual parcels. The travel model estimates trips generated from each TAZ (both inside and outside of the City) using established relationships between different land use types with trip making. These trips are then assigned onto the roadway network to estimate how much traffic would be on each street during the evening commute hour.
- **Model Refinements.** The final step is refining the forecasts based on reality checks that the travel model may not capture. In this case, forecasts were refined to reflect the more walkable, urban characteristic planned for Kenmore's downtown, by recognizing that some short trips could be made by walking and biking, rather than driving. Moreover, travel patterns were refined to reflect existing driver preferences, including recognizing the relative attractiveness of the Simonds Road / 170th Corridor over Juanita Drive.

GOALS, OBJECTIVES, AND POLICIES

Kenmore has established eight goals to accomplish its overall vision for transportation in the future. The goals establish overarching priorities that serve the vision of this Transportation Element while objectives and policies lay out specific actions. The consolidated set of goals, objectives, and policies is included in this chapter.

GOAL 1. PROVIDE A COMPREHENSIVE TRANSPORTATION NETWORK THAT SAFELY ACCOMMODATES LOCAL AND REGIONAL TRAVEL FOR PEDESTRIANS, BICYCLISTS, TRANSIT USERS, AND MOTORIZED VEHICLES.

OBJECTIVE 1.1: Develop and maintain a Layered Network that provides connectivity and recognizes that not all streets provide the same quality of travel experience. Classify streets as State Highways, Major Arterials, Minor Arterials, Collectors, and Local Roads.

Policy T-1.1.1: Ensure that the Layered Network continues to provide for all varieties of street uses including regional mobility and cross-town trips, commuting, shopping, recreational travel, property and business access, and parking, regardless of mode.

Policy T-1.1.2: Guide the development of new streets and maintenance of existing streets to form a well-connected network that accommodates safe, direct, and convenient access to the existing roadway network for pedestrians, bicyclists, transit, and automobiles. Prioritize non-motorized connections to reinforce the City's vision of a pedestrian-friendly and robust downtown.

Policy T-1.1.3: New development should be consistent with the Future Roadway Network. Cul-de-sac construction should require the approval of the City Engineer. Pedestrian facilities identified in the City's Sidewalk Priority Network should be prioritized using the Pedestrian Facilities Plan. Bicycle facilities should be considered for streets identified within the Bicycle Priority Network.

Policy T-1.1.4: Coordinate with park-and-ride and transit service providers to reinforce the City's designation as a high capacity transit community, attracting residential and employment densities that support ridership along the high capacity corridors. Pursue improvement projects that are consistent with the Layered Network and which benefit transit users in Kenmore.

Policy T-1.1.5: Continue to enhance the City's Layered Network by using the following methods:

a. Require dedication of rights-of-way as a condition for development when the need for such rights-of-way is linked to the development or where shown on the Future Roadway Network;
b. Request donations of rights-of-way to the public;
c. Purchase rights-of-way in accordance with State laws and procedures
d. Acquire development rights and easements from property owners; and
e. Implement traffic impact fees with new development consistent with the City's Traffic Impact Analysis Guidelines to allocate funding for new multimodal facilities.

Policy T-1.1.6: Maintain criteria to consider street vacations. Criteria should address:

a. State laws regarding street vacations;
b. Consistency with the Layered Network, including the effects of the street vacation on existing and future circulation;
c. Ability to utilize excess right-of-way for other public purposes such as parks, recreation, waterfront access, viewpoints, stormwater management, or affordable housing;
d. Public benefit of the street vacation; and
e. Fair compensation.

OBJECTIVE 1.2: Design and maintain transportation facilities consistent with the community vision.

Policy T-1.2.1: Consider the environmental consequences of street design standards and maintenance practices. Design City-sponsored transportation projects to minimize impacts to the environment and water quality to the greatest extent feasible. When preparing City-sponsored ~~street or driveway design~~ transportation project designs or reviewing development proposals, the City should follow steps outlined in the *Street Planning Toolkit (**Figure T-14**).*

Policy T-1.2.2: Require new development to minimize and consolidate access points along all major and minor arterials, especially along SR 522 and any new arterials that may be developed. Coordinate this effort with local businesses, property owners, and WSDOT.

Policy T-1.2.3: Protect rights-of-way from encroachment by structures, fences, retaining walls, substantial landscaping, or other obstructions to preserve the public's use of the right-of-way, safety, and mobility. Protection methods may include minimum setback requirements for property improvements allowing future roadway expansion, street use agreements, and

development of specific guidelines regarding installation and maintenance of landscaping within the public right-of-way.

Policy T-1.2.4: Maintain a right-of-way use permit application process and criteria to ensure that temporary development and utility construction activities do not create adverse safety, environmental, or traffic impacts.

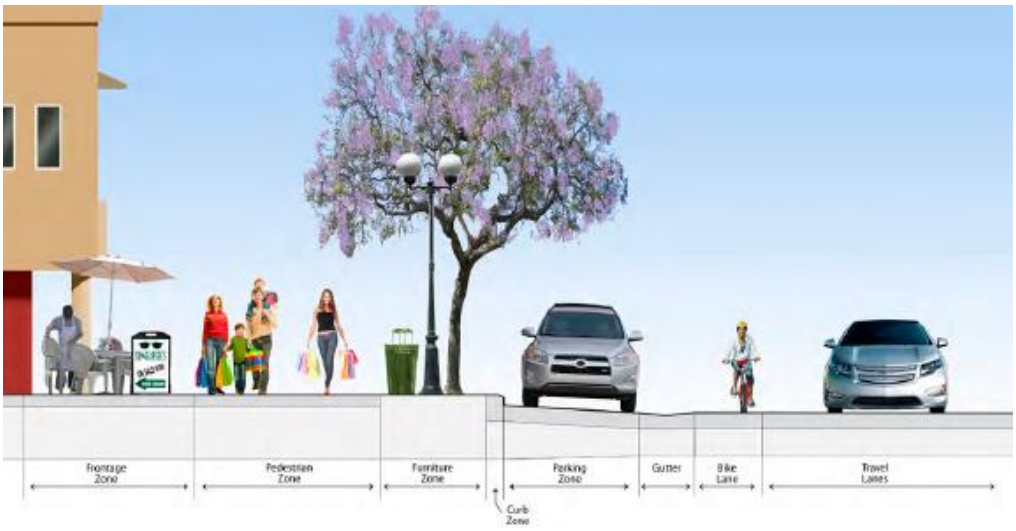
Policy T-1.2.5: Ensure pedestrian facilities are designed consistent with ADA guidelines and that existing infrastructure is updated per the city's *ADA Transition Plan* to accommodate users of all ages and abilities. Design curb cuts, ramps, and other facilities to accommodate pedestrians with a disability or mobility challenges.

Policy T-1.2.6: Implement the Street Planning Toolkit to provide uniform street design and maintenance methods that enhance safety for pedestrians, bicyclists, and motorists.

Policy T-1.2.7: Ensure structured parking facilities incorporate context sensitive, preemptive designs that can accommodate changing parking demand as a result of increased walkability in high-density areas, such as downtown.

Figure T-14: Street Planning Toolkit

When planning for new streets or redesigning existing ones, the City should implement uniform designs and maintenance methods that create a safe, effective, environmentally sensitive, and welcoming transportation system for all users in line with the City's vision and Comprehensive Plan policies. Throughout this process, the City must consider the various financial and non-financial costs of development and operation of the transportation system in addition to the concerns of interested parties.



- Align and locate transportation facilities away from environmentally sensitive areas, consistent with other Comprehensive Plan policies;
- Minimize and mitigate significant environmental impacts whenever possible, including the incorporation of improvements, such as larger stormwater treatment facilities, to respond to the impacts of climate change~~;~~. Minimize and mitigate water quality impacts from the transportation network to the environment and aquatic habitats.
- Whenever practical, incorporate the use of native grasses, shrubs, and trees, and drought-resistant species in the design of streets, landscape strips, and medians.
- Enhance the safety of pedestrians, bicyclists, and motorists through sidewalk or other separated pedestrian facilities and on-street facility location, design, and maintenance, lighting requirements, signs, lane widths and geometrics, and access to properties using the Layered Network as a guide.
- Consider the conflicts between different users in the design of multi-purpose paths, including the use of separate paths, striping different lanes for pedestrians and cyclists, speed limits, and increased use of protected bicycle facilities on streets to provide additional options for cyclists.
- Establish standards that discourage excessive parking. Provide options or incentives to reduce underutilized parking lots and encourage alternate modes of travel.

OBJECTIVE 1.3: **Improve street safety and function with a particular reference to the "Target Zero" goal (adopted City Resolution 14-235) to have no pedestrian or bicycle deaths or serious injuries as the result of a collision with a motorized vehicle.**

Policy T-1.3.1: Continue to collect data on traffic speed and volume and collisions to support studies, operational changes, and designs, enhance efforts when possible.

Policy T-1.3.2: Include emergency service providers in review of roadway designs to ensure emergency vehicle passage. Design considerations include dead-end street lengths, turn-arounds, travel lane widths, maximum road grades, and parking location.

Policy T-1.3.3: Implement the City's Target Zero strategy to focus on transportation improvements, education, and enforcement measures to improve safety conditions for pedestrians and bicyclists on Kenmore's streets. Use the Local Road Safety Plan to identify and prioritize low-cost, quick build, effective enhancements.

OBJECTIVE 1.4: **Develop a transportation system that achieves the following LOS metrics:**

Policy T-1.4.1: Vehicular LOS:

- Major Arterials: LOS E or better
- Minor Arterials and Connectors: LOS D or better
- Local Streets: LOS C or better
- Roadways in the Kenmore countywide growth center
    - Signalized intersections shall operate at LOS F or better and not exceed 100 seconds of average total vehicle delay of all movements
    - Unsignalized intersections shall operate at LOS F or better on the minor street approach until a signal warrant is met using the current version of the Manual for Uniform Traffic Control Devices

LOS along SR 522 and 68th Avenue (south of SR 522) / Juanita Drive will be measured as average delay at the corridor level rather than the intersection level.

~~Policy T-1.4.2: Downtown Intersections: Explore changes to the LOS requirements for downtown intersections along SR 522 that prioritize safe and comfortable non-motorized crossings over fast vehicular flow.~~

Policy T-1.4.~~3~~2: Pedestrian LOS as described in Table T-4, bicycle LOS as described in Table T-5, and transit LOS as described in Table T-6

Table T-4. Pedestrian LOS – Sidewalk Requirements

LOS	Within Pedestrian Priority Network*
	Pedestrian facility** on both sides of the street with a buffer as indicated in Pedestrian Priority Network
	Pedestrian facility** provided on one side of the street with or without a buffer as indicated in Pedestrian Priority Network
	No pedestrian facility

* The pedestrian LOS standard does not pertain to local streets

** Pedestrian facility includes sidewalks and paved shoulders protected by a raised curb.

Table T-5. Bicycle LOS – Facility Requirements

LOS	Within Bicycle Priority Network
	Provides minimum treatment* recommendation, as shown within Bicycle Priority Network
	Provides a lower-level facility* than recommended in the Bicycle Priority Network
	No bicycle facility

* Bicycle facilities – lowest-level to highest-level of treatment: shared; bike lanes; buffered bike facility; separated trail.

Table T-6. Transit Priority Corridor Level of Service

LOS	Transit Stop Amenities	Pedestrian Access	Frequency of Service
	High level	Sidewalks and marked crosswalks serving stops	All day service. Peak service 15 minutes or less, midday 30 minutes or less
	Some amenities	Sidewalks and marked crosswalks serving some stops	All day service. Peak services 30 minutes or less, midday service 60 minutes or less
	Little or no amenities	General lack of sidewalks and marked crosswalks	Low level of service

OBJECTIVE 1.5: Perform periodic review and monitoring (every 2-4 years) of the transportation system to ensure it adequately serves existing and future land uses.

Policy T-1.5.1: Forecast travel to identify needed transportation improvements. The forecasts should:

a. Account for expected changes in personal travel behavior, funded capital improvements, and feasibility of mode choices;

b. Use current data and policies;

c. Be compatible with other jurisdictions and the regional growth strategy; and

d. Reflect the Vision Statement and land use policies.

Policy T-1.5.2: Identify the improvements and strategies needed to fully implement the City's *Layered Network* and meet LOS requirements for transportation.

Policy T-1.5.3: Monitor growth in population and employment in relation to the land use and growth assumptions of the Transportation Element. Reassess the Land Use and Transportation Elements as needed to ensure that planned improvements will address the potential impacts of growth.

Policy T-1.5.4: Require construction of necessary transportation improvements from the private or public sector at the time of development or within six years of development.

GOAL 2. COORDINATE WITH LOCAL, REGIONAL, STATE, AND FEDERAL AGENCIES AS WELL AS NON-GOVERNMENTAL ENTITIES TO DEVELOP AND OPERATE THE TRANSPORTATION SYSTEM.

OBJECTIVE 2.1: Support and complement the transportation functions of the State of Washington, transit agencies, and other entities responsible for transportation facilities and services to meet Kenmore's needs.

Policy T-2.1.1: Coordinate planning, construction, and operation of transportation facilities and programs with the State, Counties, neighboring cities, PSRC, Metro, Sound Transit, and other entities. This coordination will be achieved by:

a. Participating in the transportation-related activities of King County and other advisory committees;

b. Working with other jurisdictions to plan, fund, and implement multi-jurisdictional projects necessary to meet shared transportation needs; and

c. Making transportation decisions consistent with the City's adopted transportation plans in coordination with the State, PSRC, transit agencies, King County, Snohomish County, and neighboring jurisdictions.

Policy T-2.1.2: Support increased transit service for the Kenmore Downtown area based upon existing and future population and employment densities. Support additional market demand for TOD along the SR 522 corridor to promote

Kenmore's status as a High Capacity Transit community and provide residents with access to regional transit.

Policy T-2.1.3: Work with private property owners to create multimodal transportation options around the Downtown area to achieve a walkable city center that reinforces the community identity and provides connections to housing and community destinations.

Policy T-2.1.4: Coordinate planning, construction, and operation of transportation facilities and programs with the State, Counties, neighboring cities, PSRC, Metro, Sound Transit, and other entities to minimize impacts to the environment and aquatic habitats and ensure critical infrastructure is in place to respond to both natural disasters, human-caused disasters, and climate change impacts.

OBJECTIVE 2.2: Cooperate with neighboring cities, King and Snohomish Counties, transit agencies, PSRC, and WSDOT to address regional transportation issues.

Policy T-2.2.1: In partnership with State, regional and local agencies, address regional transportation issues. These include:

d. Regional air, rail, and water transportation facilities and services;

e. Operation of and improvements to the State highway network, including SR 522;

f. Improvements to roadways connecting Kenmore to the surrounding region, including SR 522;

g. Improvements to major roadways bordering, yet having an influence upon internal traffic flows within Kenmore, including those located in Snohomish County;

h. Improved access to I-5 and I-405 corridors and other employment corridors;

i. Regional pedestrian and bicycle facility needs;

j. Transit access to meet the diverse needs of residents for populations of all income levels; and

k. Consideration of last-mile connection to transit stops for local and regional users.

Policy T-2.2.2: Work with neighboring jurisdictions to ensure that new development outside of Kenmore does not unreasonably affect transportation systems, transportation LOS, and the quality of life in Kenmore. Utilize the following approaches:

a. Promote thoughtful planning by neighboring jurisdictions consistent with comprehensive plans and the regional growth strategy; and

b. Support the establishment of regional traffic planning, expanded access to transit, improved non-motorized facilities, and mitigation payment system.

Policy T-2.2.3: Coordinate transit levels of service with Metro, Sound Transit, and private transit operators.

Policy T-2.2.4: In partnership with state and other agencies, support development of a corridor plan for SR 522 to consistently maintain travel conditions for all users along this route.

OBJECTIVE 2.3: Ensure regional transportation improvements and services are compatible with the Comprehensive Plan and the City's *Layered Network*.

Policy T-2.3.1: Continue to take a lead role in the planning, design, and implementation of SR 522 improvements within Kenmore. Encourage multi-agency cooperation (such as WSDOT and Sound Transit) and ensure that improvements in Kenmore are coordinated with adjacent communities.

Policy T-2.3.2: Work with the adjacent jurisdictions to coordinate planned improvements along connecting roads.

Policy T-2.3.3: Work with WSDOT to identify and mitigate the impact that reconstruction and existing and planned toll projects have on Kenmore; particularly on SR 522.

OBJECTIVE 2.4: Work with business leaders, private owners, and other local organizations to support transportation efforts in reaching mutual goals.

Policy T-2.4.1: Attract and retain future development to Kenmore by directing growth into its Countywide Growth Center and providing multi-modal connections to downtown and equitable access to regional transit.

Policy T-2.4.2: Provide additional incentives to minimize surface parking within walkable areas, such as downtown. Ensure that regulations require appropriate parking for business customers.

Policy T-2.4.3 Provide local transit connections from the City's residential areas to the regional high capacity transit system along the SR 522 corridor.

OBJECTIVE 2.5: Position Kenmore to respond to technological innovations, such as EVs, connected/autonomous vehicles, and intelligent transportation systems.

Policy T-2.5.1: Coordinate with PSRC and other regional entities to understand regional plans for EV charging and accommodation of other alternative fuel sources.

Policy T-2.5.2: Review vehicle regulations periodically to ensure accordance with current technologies that can support Kenmore's transportation system.

Policy T-2.5.3: Keep pace with evolving technologies to understand their impacts on the financing, expansion, and evolving operational and maintenance needs for transportation facilities.

Policy T-2.5.4: Explore micromobility transportation options as an alternate transportation mode to SOVs. Implement policies and pilot programs in coordination with other jurisdictions to test their efficacy in Kenmore.

GOAL 3. PROMOTE A TRANSPORTATION SYSTEM THAT IS SUSTAINABLE FROM BOTH FISCAL AND ENVIRONMENTAL PERSPECTIVES WITH PARTICIPATION FROM BOTH THE PUBLIC AND PRIVATE SECTORS.

OBJECTIVE 3.1: Emphasize priorities of the community when prioritizing transportation system improvements needed to fully implement the City's *Layered Network*, including safety, multi-modal mobility, access to transit, maintenance, and congestion relief.

OBJECTIVE 3.2: Regularly prepare and adopt a Six-Year Transportation Improvement Program to implement the Transportation Element.

Policy T-3.2.1: In preparation of specific planning and implementation documents, including the Six-Year Transportation Improvement Program, the City will involve the public, interested agencies, and other jurisdictions through a clearly stated process that provides opportunities for review and comments regarding the City's priorities and recommendations.

Policy T-3.2.2: Ensure that plans consider the best available lifecycle cost of an improvement, including operation and maintenance costs; environmental, climate change, economic, and social impacts; and any replacement or closure costs.

OBJECTIVE 3.3: Leverage City resources and secure adequate funding sources for transportation improvements and services through a variety of mechanisms, including those required as a result of development.

Policy T-3.3.1: Seek to secure adequate funding sources for transportation through a variety of methods. These methods may include:

a. Seeking federal and state funds;

b. Encouraging public/private partnerships for financing transportation projects that remedy existing transportation problems or foster economic growth in Kenmore; and

c. Encouraging the use of Local Improvement Districts (LIDs) by property owners to upgrade roads to meet City road standards.

Policy T-3.3.2: Ensure shared responsibility of mitigating development impacts between the public and private sector. Require that developers contribute their fair share toward transportation improvements needed to accommodate development through implementation of the City's Traffic Impact Fee program, by providing additional transportation facilities and services in proportion to the impacts and needs generated by the development and encouraging developers to design projects that generate less traffic.

Policy T-3.3.3: Require traffic analyses for new development proposals consistent with the City's *Traffic Impact Analysis Guidelines* that determine the need for transportation improvements that address traffic impacts. Ensure new developments are accordant with the City's vision as a high capacity transit community.

OBJECTIVE 3.4: Ensure improvements to the transportation network occur concurrently with development.

Policy T-3.4.1: Allow development only when those proposals are concurrent with specific documentation or plans showing how the transportation system can adequately support existing and proposed development needs.

OBJECTIVE 3.5: Cooperate regionally and strive locally to mitigate transportation impacts to air quality through interconnected land use and transportation strategies.

Policy T-3.5.1: Support ongoing efforts for improving air quality throughout the Kenmore area and develop a transportation system compatible with the goals of the Federal and State Clean Air Acts.

Policy T-3.5.2: Support local and regional efforts to reduce vehicle emissions. Support installation of EV charging stations on local privately owned property and explore options for the development of charging facilities on publicly owned property. Reduce emissions from City fleet by implementing a green vehicle selection process, identifying green fleet resources for new or replacement vehicles, and installing electric car charging stations in City-owned facilities.

Policy T-3.5.3: Coordinate with Metro, Sound Transit, and other jurisdictions on Commute Trip Reduction (CTR) programs for major employers in Kenmore.

Policy T-3.5.4: Reduce vehicle miles traveled (VMT) of SOVs by implementing Transportation Demand Management (TDM) programs and strategies.

OBJECTIVE 3.6: Reduce impacts to water quality with new development and maintenance of the existing transportation system.

Policy T-3.6.1: Design roadway improvements to be consistent with the City's Surface Water Management Plan, CAP, and stormwater regulations. Implement, where feasible, green stormwater infrastructure to reduce stormwater runoff and minimize and mitigate water quality impacts to aquatic habitats.

Policy T-3.6.2: Determine potential surface water retrofitting or treatments that could be applied in conjunction with transportation improvements.

Policy T-3.6.3: Support expanding stormwater facilities along with new projects to accommodate stormwater runoff adjacent to the project area, when feasible, to expand treatment to undisturbed but currently untreated areas.

GOAL 4. ENCOURAGE PUBLIC TRANSPORTATION, NON-MOTORIZED TRAVEL, AND OTHER TRANSPORTATION STRATEGIES THAT REDUCE THE NEED FOR AUTOMOBILE TRAVEL, ESPECIALLY BY SOVs.

OBJECTIVE 4.1: Support expansion of transit service within Kenmore that provides connections to local destinations as well as the regional high capacity transit network.

Policy T-4.1.1: Support the implementation of Sound Transit's planned and funded regional BRT along SR 522 and prioritize investments that support high capacity transit stations.

Policy T-4.1.2: Work with Metro and other transit providers to establish local transit service that provides Kenmore residents access to the regional high capacity transit network, as well as connections to the Downtown, major commercial and mixed centers in Kenmore, and other key destinations in the City, and destinations in surrounding communities.

Policy T-4.1.3: Examine the opportunities for increasing transit service with Metro and Sound Transit with priorities tailored to meet the needs of the community by:

a. Requiring transit facilities as mitigation where appropriate for new developments;

b. Identifying and developing locations that are accessible to public transportation for use as park-and-pool or park-and-ride lots;

c. Requiring adequate right-of-way, sidewalk, and roadway improvements where transit stops are located;

d. Adopting design standards that promote safety and aesthetics in accordance with the *Street Planning Toolkit*; and

e. Encourage development and maintenance of passenger ferry, water taxi, and or other water-based transportation services on Lake Washington to connect Kenmore to other regional destinations

Policy T-4.1.4: Maintain BAT lanes on SR 522 for use by transit and business access only to encourage transit usage and improvements, and to preserve its use for transit over the long term.

OBJECTIVE 4.2: Work with local and regional transit agencies to site, size, and design park-and-ride facilities that reflect the land use vision for the areas in which they are located.

Policy T-4.2.1: Design structured parking facilities as integrated elements of mixed use developments with ground floor uses that support TOD, improve transit access to support the downtown plan, and improve and encourage non-motorized travel to and from high capacity transit areas.

Policy T-4.2.2: Explore the potential for joint use of park-and-ride lots with the public and private sectors for commercial and residential use.

OBJECTIVE 4.3: Create an accessible sidewalk and pedestrian trail network linking neighborhoods, the Downtown, and key community destinations consistent with that laid out in the *Pedestrian Priority Network*.

Policy T-4.3.1: Focus early sidewalk improvements on the *Pedestrian Priority Network*. Prioritize sidewalk investments consistent with the *Pedestrian Facilities Plan*, which rank projects based on safety, community connections, network connectivity, proximity to schools, connections to opportunities, and potential population served.

Policy T-4.3.2: Prioritize implementation of the Americans with Disabilities Act (ADA) Transition Plan.

Policy T-4.3.3: Require development to provide sidewalks along one side of the roadway or pay a contribution to a sidewalk fund to complete missing links, increase pedestrian safety, and provide linkages to key destinations in accordance with the *Pedestrian Priority Network.*

Policy T-4.3.4: Design and construct accessible pedestrian facilities in accordance with the *Pedestrian Priority Network, ADA Transition Plan,* and street classification system.

Policy T-4.3.5: As part of the *Pedestrian Priority Network*, provide crosswalks at key locations such as in the Downtown, on SR 522 near park-and-ride lots and transit stops, near schools, and at other locations with significant pedestrian volumes.

Policy T-4.3.6: Explore opportunities to utilize undeveloped rights of way to develop and maintain safe pedestrian connections.

Policy T-4.3.7: Consider future bond measures to fund pedestrian projects that expand the pedestrian network.

OBJECTIVE 4.4: Implement a comprehensive *Bicycle Priority Network* in Kenmore.

Policy T-4.4.1: Require roadway development to include bicycle facilities in accordance with the *Bicycle Priority Network*.

Policy T-4.4.2: Prioritize future bicycle facility improvements that increase safety for bicyclists, link to key destinations, promote multi-modal trips, complete gaps in the existing bicycle system, provide linkages to the Burke-Gilman Trail and other key off-road facilities, and meet other priorities for bicyclists in Kenmore.

Policy T-4.4.3: Encourage off-road non-motorized vehicle facilities on designated trails. Promote the on-going maintenance and use of the Burke-Gilman Trail.

Policy T-4.4.4: Promote non-motorized vehicle trails in utility corridors or undeveloped rights of way where consistent with environmental constraints.

Policy T-4.4.5: Allow for a secondary pedestrian and bicycle loop around the downtown area with connections to the waterfront and high capacity transit areas.

Policy T-4.4.6: Accommodate bicycles and non-motorized vehicles in the design and management of the City's *Layered Network* in accordance with the *Bicycle Priority Network.*

OBJECTIVE 4.5: Implement programs and regulations that help reduce the use of SOVs.

Policy T-4.5.1: Create and implement development standards that:

a. Encourage continuous, direct, convenient non-motorized linkages;

b. Provide sufficient illumination in parking lots and along travel routes to increase visibility and security for non-motorists;

c. Minimize front yard parking along commercial street fronts, particularly in the Downtown;

d. Establish standards that discourage excessive parking. Provide options or incentives to reduce underutilized parking lots and encourage alternate modes of travel;

e. Promote mixed-use development in the Downtown; and

f. Require minimum densities through floor area ratios, employment levels, and / or business retention and expansion activities in the Downtown and major commercial areas to support transit.

Policy T-4.5.2: Implement the City's CTR Ordinance applicable to large employers in accordance with State laws.

Policy T-4.5.3: Support the goals of the PSRC's Regional TDM Action Plan to manage travel behavior and reduce vehicle trips.

GOAL 5. MAINTAIN THE AVAILABILITY OF SAFE AIR TRAVEL SERVICES IN KENMORE.

OBJECTIVE 5.1: Support the continued operation of the Air Harbor to provide private air transportation services to the region and community.

Policy T-5.1.1: Recognize the Kenmore Air Harbor as a business that is economically and historically significant to the community.

Policy T-5.1.2 Provide multimodal connections from Kenmore Air Harbor to downtown commercial areas.

OBJECTIVE 5.2: Plan for appropriate uses and activities in the vicinity to minimize impacts to and from the Air Harbor.

Policy T-5.2.1: In consultation with the State and the Air Harbor operator, comply with State laws requiring plans and regulations that discourage the siting of incompatible uses adjacent to the Air Harbor.

Policy T-5.2.2: Ensure plans and regulations address the Air Harbor as an allowed use and, where appropriate, acknowledge compatibility issues including height hazards, safety, and noise that can affect the long-term viability of the Air Harbor. Consider WSDOT guidelines addressing airports and compatible land use as well as guidance from the PSRC Airport Compatible Land Use Program. Allow compatible uses, buildings, or land or water activities in the vicinity that do not present safety problems to normal Air Harbor operations, or that would not be sensitive to noise from the Air Harbor operations.

OBJECTIVE 5.3: Work with the Air Harbor to ensure compliance with appropriate noise and safety standards.

Policy T-5.3.1: Work in partnership with the Air Harbor to address noise management and compliance with Federal, State and local noise ordinances. Consider a special overlay or property title process that identifies the noise-related impacts of the Air Harbor.

Policy T-5.3.2: Work in partnership with the Air Harbor to ensure safe operations in compliance with Federal and State aeronautic safety requirements.

GOAL 6. ***PROVIDE A TRANSPORTATION SYSTEM THAT FACILITATES FREIGHT MOBILITY AND ECONOMIC PROSPERITY.***

OBJECTIVE 6.1: Support the efficient movement of goods in Kenmore's commercial areas to support the local economy.

Policy T-6.1.1: Consider the needs for delivery and collection of goods at local businesses by truck and ensure future transportation improvements address the needs of large trucks in accordance with the *Freight Priority Network.*

Policy T-6.1.2: Monitor commercial truck traffic to ensure use of appropriate corridors to support efficient movement of goods and safety of local streets. Utilize the WSDOT classification system to determine freight and goods movement routes.

OBJECTIVE 6.2: Accommodate local deliveries and other goods movement that are necessary to serve Kenmore residents.

Policy T-6.2.1: Work with local industries and freight companies to understand their needs for adequately moving goods.

Policy T-6.2.2: Ensure roadway improvements do not unnecessarily impede delivery vans and other small freight trucks.

GOAL 7. PROMOTE TRANSPORTATION EQUITY THROUGH SERVICES AND INFRASTRUCTURE IMPROVEMENTS.

OBJECTIVE 7.1: Promote transportation improvements that provide equitable access and benefits for all Kenmore residents.

Policy T-7.1.1: Support ~~projects~~ transportation improvements that provide broad access to jobs, healthcare, goods and services, and social opportunities.

Policy T-7.1.2: Perform periodic review and monitoring of socio-demographic, economic, and geographic population trends to identify transportation facilities and services needed for all Kenmore residents.

Policy T-7.1.3: Ensure transportation improvements do not impose external impacts on historically marginalized or underserved communities, such as increased air pollution, infrastructure costs, or crash risk.

Policy T-7.1.4: Prioritize implementation of the ADA Transition Plan

OBJECTIVE 7.2: Provide a transportation network that promotes inclusive and affordable services to all Kenmore residents, regardless of mode choice.

Policy T-7.2.1: Promote projects that expand bicycle and pedestrian facilities and access to transit for historically marginalized or underserved communities.

~~Policy T-7.2.2: Recognize and support individuals or groups who have historically been underrepresented in transportation planning and/or infrastructure development to identify and correct structural or system inequities in the transportation network to promote social justice.~~

Policy T-7.2.2~~3~~: Promote inclusive transportation modes and accessible community development that provide basic mobility to historically marginalized or underserved communities.

Policy T-7.2.3~~4~~: Incorporate environmental justice criteria into the transportation improvement program review process to identify disproportionate effects on historically marginalized or underserved communities.

~~Policy T-7.2.5: Recognize and support individuals or groups who have historically been underrepresented in transportation planning and/or infrastructure development, such as people of color, indigenous and immigrant populations.~~

OBJECTIVE 7.3: Promote collaborative planning processes through authentic, active partnerships with historically underrepresented community groups.

Policy T-7.3.1: Work with historically marginalized or underserved communities and local organizations to identify transportation facilities improvements.

Policy T-7.3.2: Recognize and support individuals or groups who have historically been underrepresented in transportation planning and/or infrastructure development, such as people of color, indigenous and immigrant populations, to identify and correct structural or system inequities in the transportation network to promote social justice.

GOAL 8. SUPPORT TRANSPORTATION INVESTMENTS THAT MINIMIZE, MITIGATE, AND RESPOND TO THE EFFECTS OF CLIMATE CHANGE.

OBJECTIVE 8.1: Balance transportation demands with environmentally sustainable growth strategies consistent with the City's CAP to minimize long-term climate impacts.

Policy T-8.1.1: Prioritize dense, mixed-use, and transit-oriented development to reduce SOV travel and GHG emissions.

OBJECTIVE 8.2: Reduce VMT by promoting alternative transportation modes and access to high capacity transit.

Policy T-8.2.1: Implement TDM programs and strategies that facilitate transit use.

Policy T-8.2.2: Prioritize infrastructure improvements that include new bicycle and pedestrian connections through project selection.

Policy T-8.2.3: Provide amenities that support bicycle and pedestrian users, such as bike lockers, bike racks, and wayfinding signage near the downtown area.

Policy T-8.2.4: Provide educational and encouragement programming that improves public awareness of Kenmore's bicycle and pedestrian networks.

FUTURE TRANSPORTATION SYSTEM

Kenmore envisions a future transportation system that serves all users and modes of travel by offering a safe and robust network of walkways, bicycle facilities, intersections, and roadways that connect neighborhoods and provide access to transit. This section describes Kenmore's vision for its future transportation network and the infrastructure improvements that will get the City there.

As identified in this element, most of the improvements are focused on the development of a 'layered' transportation network, which focuses less on providing vehicular capacity and more on accommodating all modes of travel. While some of the roadway improvements are needed to meet the City's vehicular LOS standard, most of the future improvements focus on providing safer and more complete facilities for walking, bicycling, and riding transit in order to improve access and mobility for all road users.

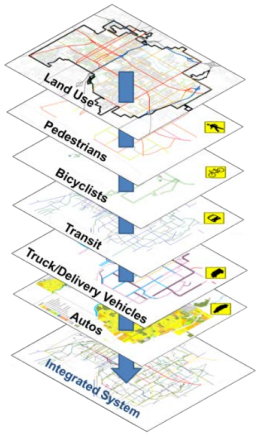
Introduction to the Layered Network

It can be a challenge for a single roadway to meet the demands and expectations of all modes at any given time. Accommodating all users and modes could result in wide or large roadways that are expensive to develop and maintain and do not necessarily reflect the neighborhood character. Alternately, trying to minimize roadway widths and infrastructure costs can result in a lack of facilities and thus less safe conditions for users.

In response to this challenge, the City of Kenmore has adopted a layered network approach that focuses on how the City's transportation network can function as a system to meet the needs of all users. In such a system, individual travel modes are prioritized on different facilities throughout the overall network. This approach promotes a balanced transportation system to serve diverse user needs including sidewalk and bicycle investments, improved access to transit, and roadway improvements for vehicles. **Figure T-15** illustrates the concept of a layered network.

The City implements this layered network through a system of roadway typologies that define each street's user priorities and associated infrastructure needs.

Figure T-15: Layered Network Concept



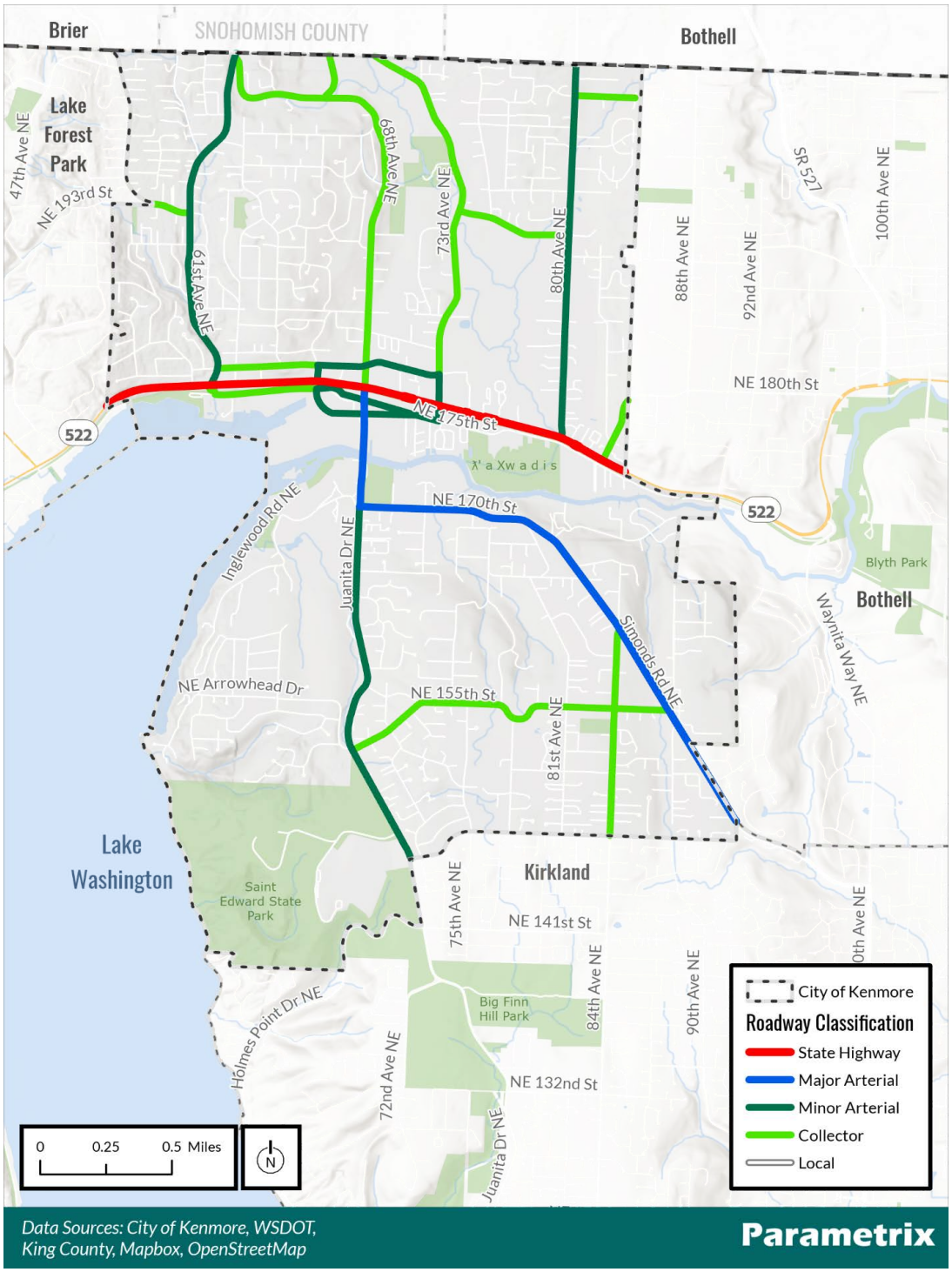
Roadway Typologies

The following street typologies dictate the form and intended functions of roadways in Kenmore. While some roadways are intended to serve regional travel and vehicle circulation, other facilities provide safe options for a more multimodal user base. A description of each roadway type follows and detailed fact sheets are available in **Appendix D-3**.

The roadway types are as follows and are summarized in **Figure T-16**:

- State Highway/Major Arterial – Most conducive for crosstown trips and focus on transit, freight, and auto mobility.
- Minor Arterial – Signals the entry into a higher-density commercial or residential zone. Emphasizes multimodal interactions and travel experience.
- Collector – Provides a connection between local streets and arterials for a safe travel experience for bicycles and pedestrians.
- Local Street – Prioritizes local access (driveways, on-street parking) and pedestrian travel. Bicycles share the roadway.

Figure T-16: City's ~~Layered Network~~ Street Network



Modal Networks

As the roadway descriptions specify, each type focuses on and prioritizes a different balance of users, both in terms of trip purpose and travel mode. The transportation network in Kenmore was developed by identifying desirable streets for each mode, combining them to locate overlaps, and then assigning priority to certain modes. The following sections review the priority networks for each mode and establish their LOS standards.

Walking

While Kenmore's local streets generally tend not to need fully separate sidewalks or paths due to their low traffic volumes and slow speeds, the City's state routes, arterials, collectors, and some local streets do warrant pedestrian infrastructure. **Figure T-17** highlights the Pedestrian Priority Network, indicating whether pedestrian infrastructure should be provided on both sides or one side of the street. The Pedestrian Facilities Plan identifies prioritized sidewalk projects throughout the city based on extending the existing sidewalk network, connections to the existing sidewalk network, and creating sidewalk on both sides of arterial and collector roads.

Building on the Pedestrian Priority Network above, **Table T-7** establishes the LOS standard for pedestrian facilities around the City. The best LOS for walking, indicated as the green standard, would provide walkways with buffers as shown in the Pedestrian Priority Network. The yellow LOS standard, which meets the basic needs for safe walking around the City, requires sidewalks or paved shoulders protected by raised curbs on one side of all the streets called out in the Pedestrian Priority Network. Incomplete or missing pedestrian facilities would fall into the red category and not satisfy the City's LOS for walking. The pedestrian LOS standard does not pertain to local streets, as low-volume roadways may be adequate for pedestrians without separated facilities based on their characteristics and should be evaluated on a case-by-case basis.

In addition to the presence of pedestrian facilities along a corridor, the City also emphasizes the importance of safe pedestrian crossings. Particularly downtown and within ½ mile of schools, the City is looking to provide enhanced crossings at regular intervals

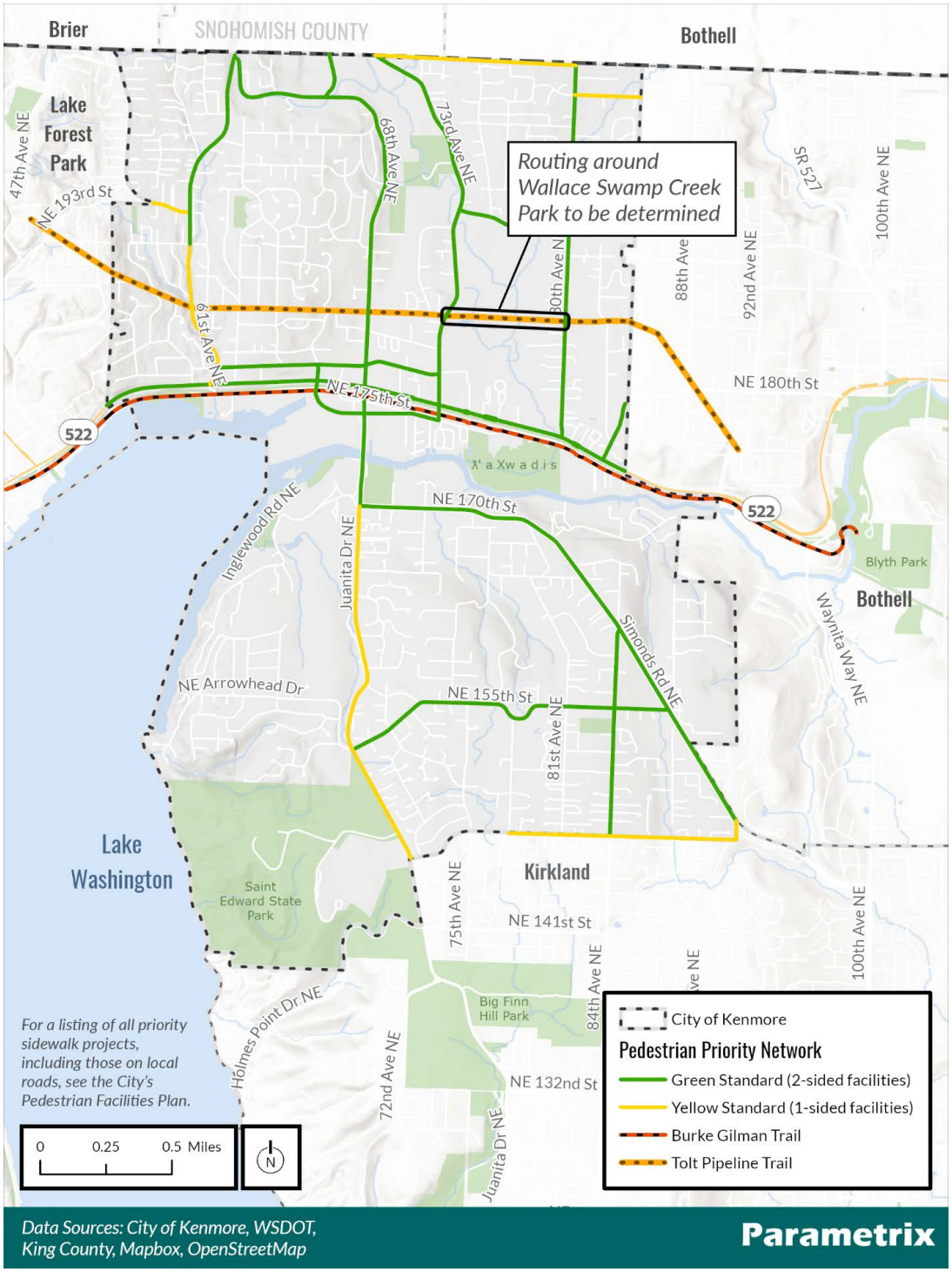
Table T-7. Pedestrian LOS – Sidewalk Requirements

LOS	Within Pedestrian Priority Network*
	Pedestrian facility** on both sides of the street with a buffer as indicated in Pedestrian Priority Network
	Pedestrian facility** provided on one side of the street with or without buffer as indicated in Pedestrian Priority Network
	No pedestrian facility

* The pedestrian LOS standard does not pertain to local streets

** Pedestrian facility includes sidewalks and shoulders protected by a raised curb.

Figure T-17: Pedestrian Priority Network



Bicycling

Kenmore already sees significant levels of bicycling along the Burke-Gilman Trail and Juanita Drive, which serve as major commuter and recreational corridors. Connecting to these routes from other areas of the City can be difficult, however, due to challenging topography and limited through streets in some neighborhoods. Key mobility corridors for bicyclists include 68th Avenue / Juanita Drive / Simonds Road which have buffered bicycle facilities.

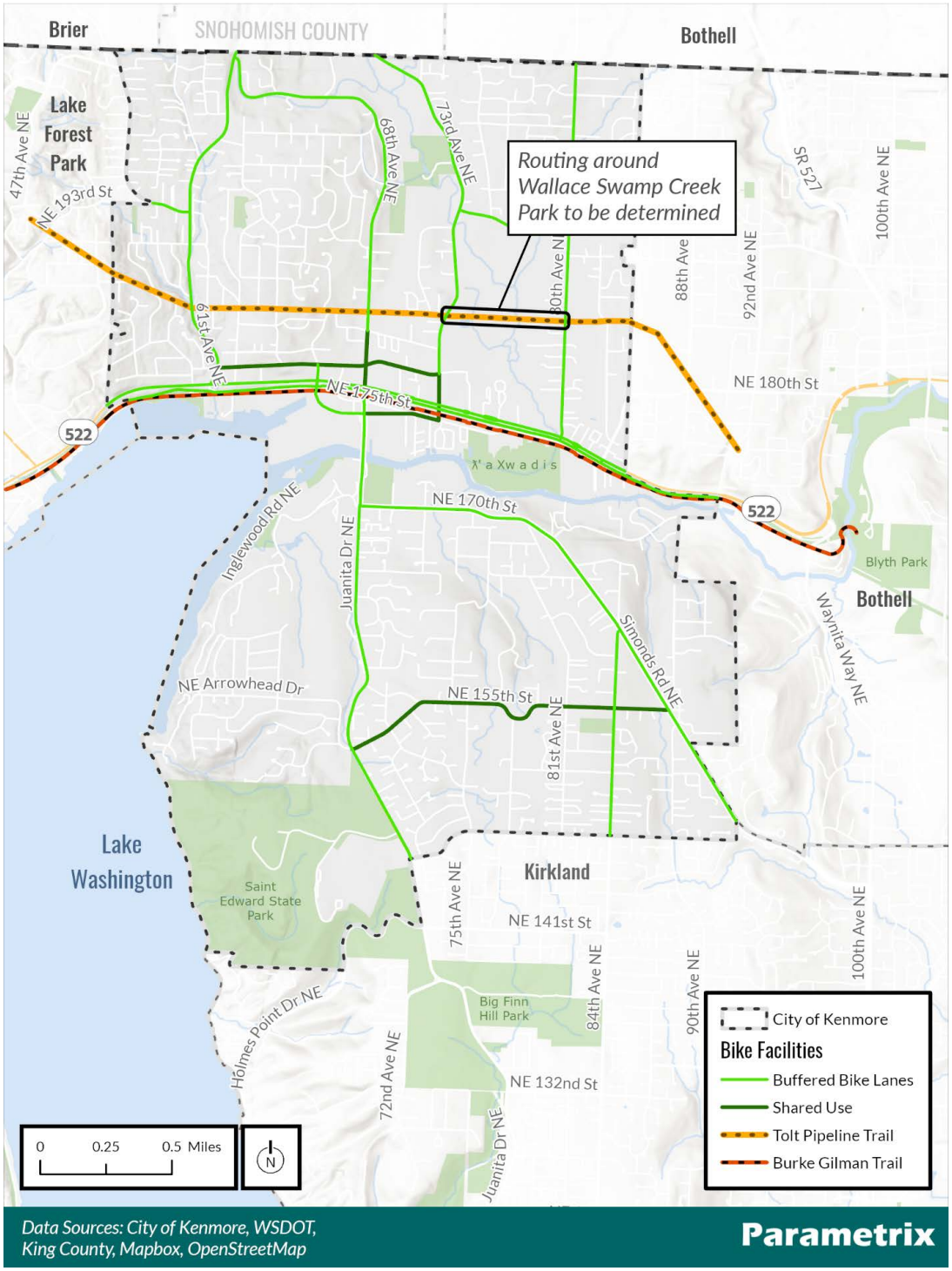
Similar to Pedestrian LOS, the City of Kenmore can strive for the green LOS for bicycling by installing the bicycle facilities depicted in the Bicycle Priority Network or a facility that offers more separation from vehicle traffic. At a minimum, the City plans to provide the yellow LOS by installing some sort of bicycle infrastructure on the streets identified in the Bicycle Priority Network (see **Figure T-18**). These facilities would be signed bike routes. Incomplete or missing bicycle facilities would fall into the red standard and not meet the City's LOS for bicycling. The LOS standards for bicycle facilities are described in **Table T-8.**

Table T-8. Bicycle LOS – Facility Requirements

LOS	Within Bicycle Priority Network
	Provides minimum treatment* recommendation, as shown within Bicycle Priority Network
	Provides a lower-level facility* than recommended in the Bicycle Priority Network
	No bicycle facility

* Bicycle facilities – lowest-level to highest-level of treatment: shared; bike lanes; buffered bike facility; separated trail.

Figure T-18: Bicycle Priority Network



Transit

Transit operations are out of the City's direct control, but Kenmore can still aim to create corridors that are welcoming to transit. The Transit Priority Network identifies the corridors that the City should focus their efforts on and is shown in **Figure T-19**. The City can improve the transit user's comfort and safety by providing:

- Street lighting
- Right of way for bus shelters and benches or requiring installation of transit facilities as a condition of private development
- Safe routes for accessing transit stops

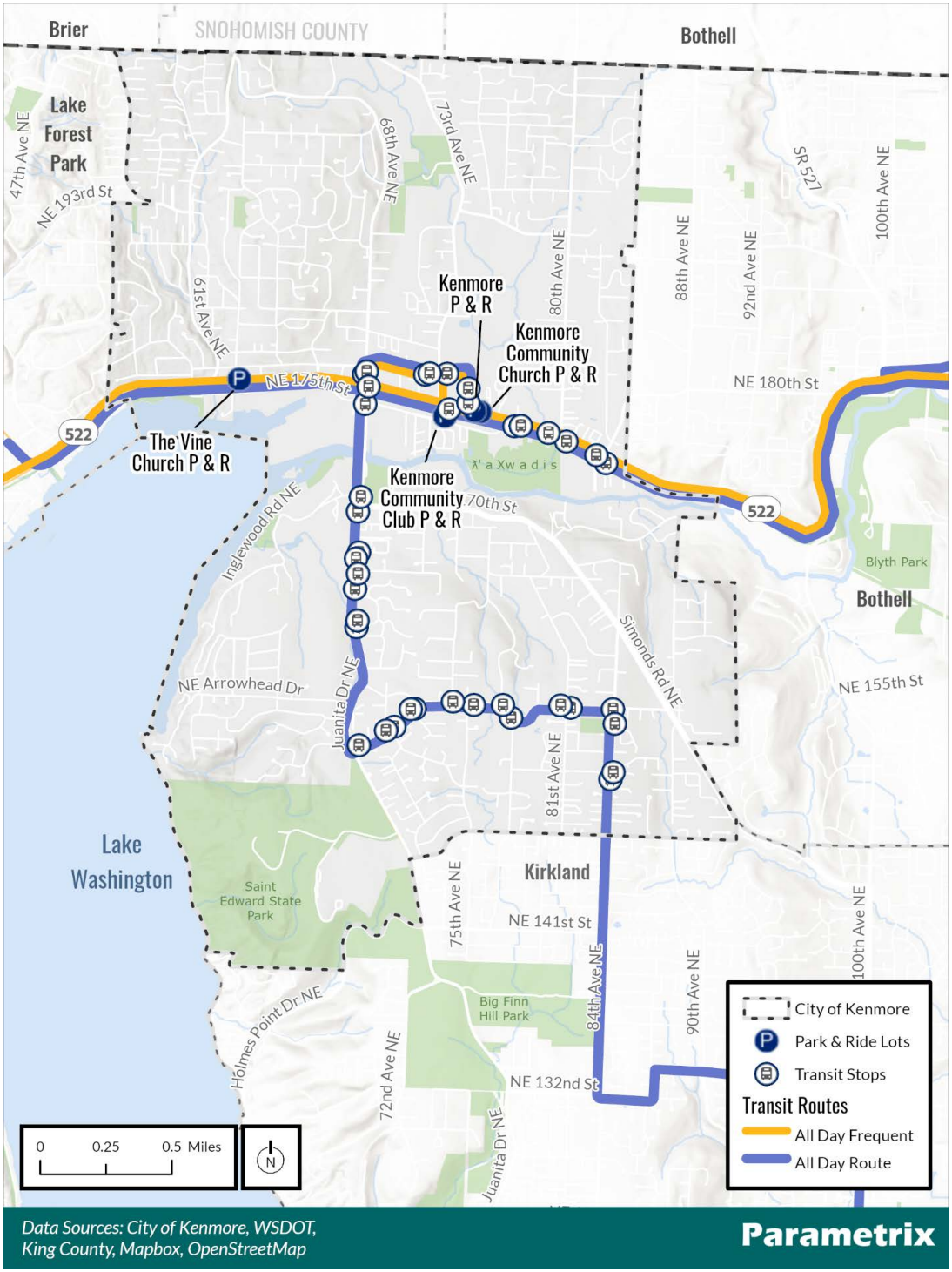
Kenmore's transit LOS is defined based on the amenities, access, and service frequencies discussed above. The City can achieve the green LOS standard by providing a high level of the transit supportive amenities at major stops, installing sidewalks and marked crosswalks at all stops, and encouraging and permitting housing and employment densities that support frequent, all day transit service, including Sound Transit's planned SR 522 BRT service. The yellow standard, which the City has adopted as its minimum target, includes some transit stop amenities, sidewalks and marked crosswalks at some stops, and all day service with headways of 30 minutes or less during the peak hour and 60 minutes or less during midday. Kenmore's measurement of transit LOS is summarized in **Table T-9**.

Table T-9. Transit Priority Corridor Level of Service

LOS	Transit Stop Amenities	Pedestrian Access	Frequency of Service
	High level	Sidewalks and marked crosswalks serving stops	All day service. Peak service 15 minutes or less, midday 30 minutes or less
	Some amenities	Sidewalks and marked crosswalks serving some stops	All day service. Peak services 30 minutes or less, midday service 60 minutes or less
	Few or no amenities	General lack of sidewalks and marked crosswalks	Low level of service

While the City itself does not operate transit, providing amenities and transit supportive uses and densities can encourage residents and employees to use transit and therefore justify additional service hours from Metro and Sound Transit.

Figure T-19: Transit Priority Network



Freight and Auto

Residents and workers in Kenmore use nearly every street in the roadway network at some point each day to access their homes, jobs, and other destinations. The highest volumes of automobile traffic currently occur on arterial and collector roadways whereas ~~Many of these streets are~~ local streets~~, however, and~~ do not see significant traffic volumes throughout the day. Similarly, goods movement ~~and delivery vehicles~~ predominantly utilize arterial and collector roadways, with local streets used mostly for residential deliveries~~. some corridors frequently while other streets see only the occasional local delivery.~~

Figure T-16 identifies the classification of each of Kenmore's streets, in terms of whether it is a state route, arterial, collector, or local road. These classifications indicate the intended function of each street, specifically in terms of its intended function in facilitating vehicle and freight mobility as well as other models. These classifications (further described in **Appendix D-3**) ~~should~~ guide future investments in streetscape and LOS objectives.

The expected growth in Kenmore and across the region ~~by 2044~~over the next 20 years will generate higher auto volumes on City roadways and increase delay at several intersections. **Figures T-20 and T-21** displays the forecast ~~volumes~~ level of service performance ~~on~~ at several intersections in Kenmore's street network in 2030 and 2044, respectively.

While delays are forecasted to increase at some intersections, with the exception of several along SR 522, all intersections in Kenmore are forecast to perform at or better than the adopted LOS standard described in Policy T-1.4.1.

~~Kenmore will maintain its current LOS standard, as presented below.~~ As noted in Policy T-1.4.1, ~~However,~~ the City ~~will~~ measures LOS at the corridor level on SR 522 and 68th Avenue (south of SR 522) / Juanita Drive / Simonds Road rather than at the intersection level. ~~Though~~ Although several individual ~~a single~~ intersections on these corridors are forecast to ~~may~~ experience longer delays than indicated by the standard, the safety and comfort of pedestrians and bicyclists is prioritized at intersections throughout the city. For this reason, average delay along the corridor is a more meaningful LOS standard than the experience at a single intersection.

The forecasted level of service along SR 522 in Kenmore does not meet WSDOT's current LOS standard of D but it does meet the City's concurrency standards of LOS E for Major Arterials. As a Highway of Statewide Significance, SR 522 is not subject to City concurrency standards and the City is not responsible for the regional traffic impacts that reduce the performance of the highway. The City notes that WSDOT considers exceeding LOS D to be an operational deficiency and will work with WSDOT as it addresses LOS conditions along SR 522.

~~The City's LOS policy sets the following standards for its roadways:~~

- ~~Major Arterials – LOS E or better~~
- ~~Minor Arterials and Collectors – LOS D or better~~
- ~~Local Roads – LOS C or better~~

~~The expected growth in Kenmore and across the region by 2044 will generate higher auto volumes on City roadways. **Figure T-20** displays the forecast volumes on Kenmore's street network.~~

Figure T-20: 2030 ~~Future~~ Forecasted ~~Traffic~~ Auto Level of Service and Volumes

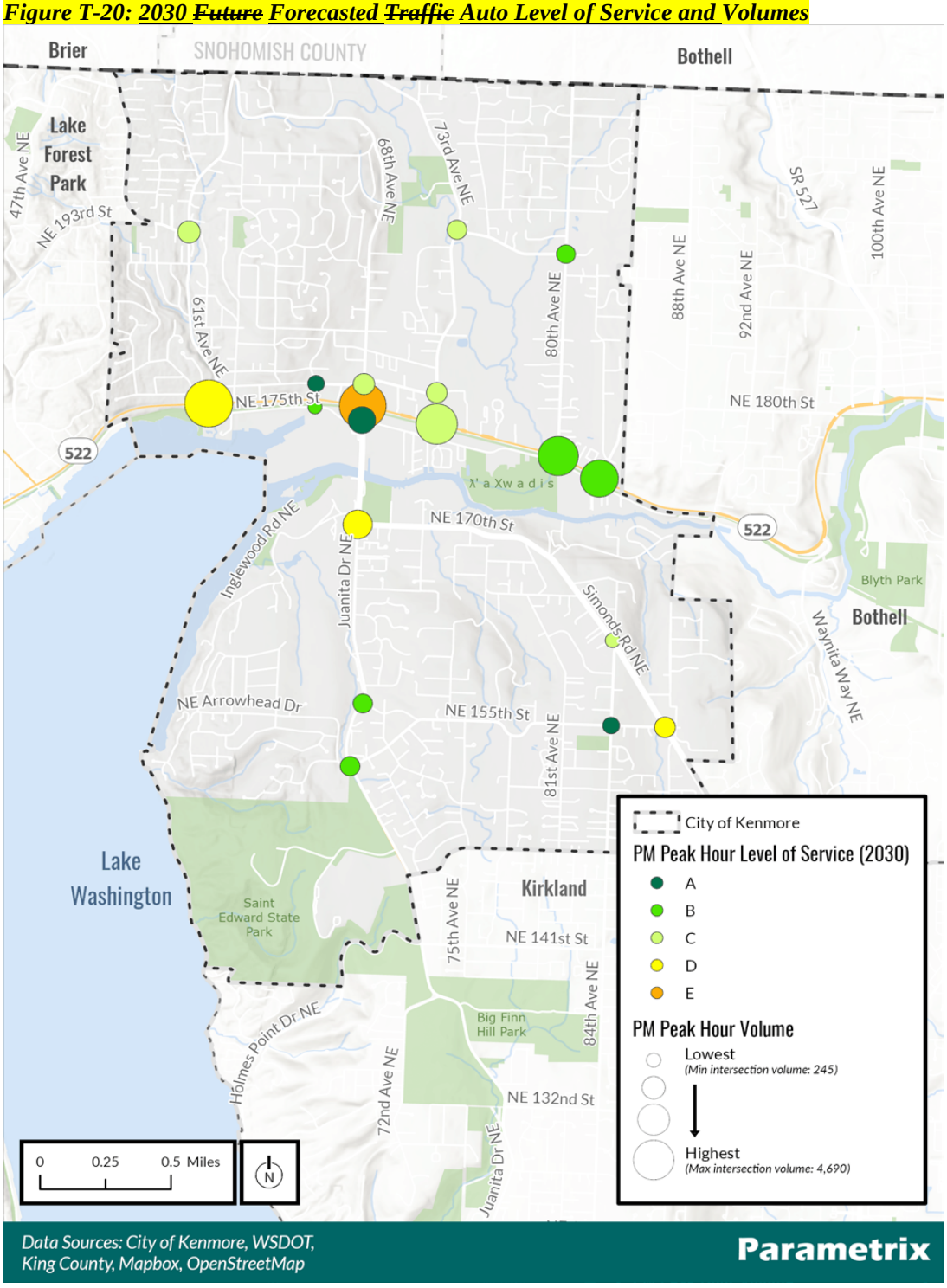
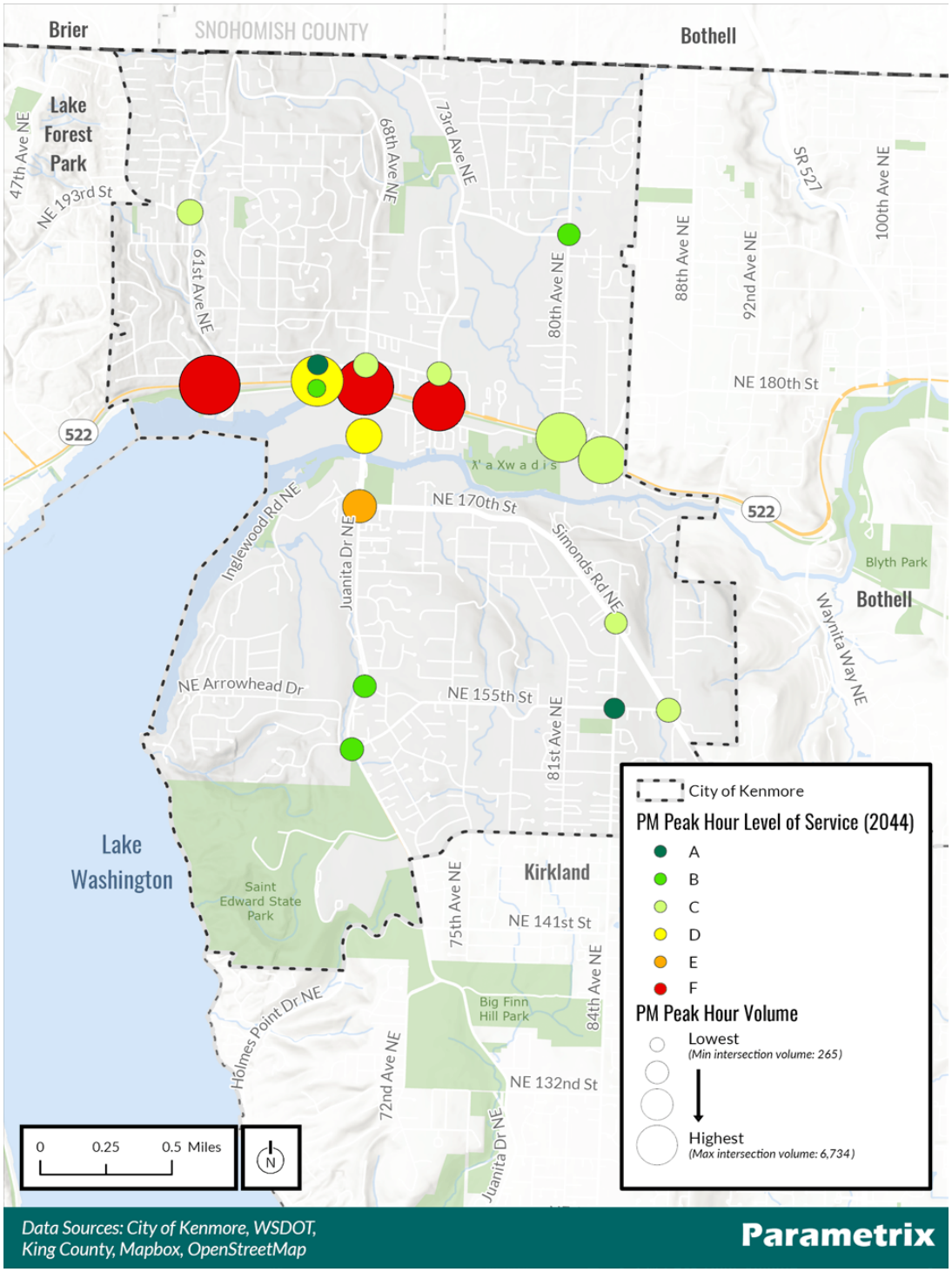


Figure T-21: 2044 Forecasted Auto Level of Service and Volumes



Downtown Parking

The City's on-street parking supply is currently available on a first-come, first-served basis, with time restrictions. Anticipated development in the Downtown quadrants may necessitate more active parking management in the future as demand for parking increases. The City should monitor parking use in downtown and consider the following actions, as appropriate, to manage demand:

- If parking spillover is perceived as an issue on nearby residential streets, consider establishing residential parking zones to maintain curb space for neighborhood residents.
- As downtown develops, review the City's parking code to ensure it is aligned with an urban setting.
- Consider encouraging more shared parking by developing a public parking facility that promotes a "park once" concept in the downtown.
- Consider installation of nonmotorized facilities to help balance demand.
- Develop structured parking standards to encourage the design of facilities that can adapt over time as parking demand changes.

There are 722 designated park and ride spaces in Kenmore of which 603 spaces are provided in the Kenmore Park and Ride at 73rd Avenue NE. The remainder of spaces in the City are distributed in two church parking lots and the Kenmore Community Club. The spaces are reserved for transit users who then access Metro and Sound Transit bus service. During weekdays in 2019, total utilization at these facilities were typically filled to 90 percent capacity, with the Kenmore Park and Ride being filled to 100 percent capacity. This results in overflow parking on adjoining streets and properties in the downtown area, thereby reducing the availability of downtown parking. Planned expansion to park and ride capacity may not occur until 2034 and the City will need to continue working with Metro and Sound Transit to identify opportunities to address park and ride demand for high capacity transit areas.

NEAR TERM AND LONG TERM CAPITAL PROJECTS

This section identifies projects that will support implementation of the City's transportation vision. Collectively, this program adds up to over $XXX million in transportation projects to be constructed over the next few decades. Projects are planned across two time frames. The Six Year (near term) list represents years 0 to 6 (2024-2030) and is financially constrained to only those projects that could realistically receive funding over the next six years[1]. The Twenty Year (long term) list reaches out to the 20 year time horizon (through 2044) and includes unfunded projects that may stretch beyond this time period. Detailed cost estimates are provided in Appendix D-4.

Table T-10 describes the Six and Twenty Year Project Lists and **Figure T-22** displays the locations of these projects around the City. These ~~selected~~ projects represent a balance of safety, maintenance, and operational improvements for all modes, with a focus on those that provide the most benefit to Kenmore residents and leverage outside funds to the greatest extent possible. The full set of projects would help complete the layered network and realize the City's transportation vision, many are deemed to be longer-term. The Pedestrian Facilities Plan and ADA Transition Plan will inform the sequence of projects for the Sidewalk Program and ADA Transition Plan Program, respectively, undertaken in both the six and twenty year time horizons. No projects are identified to maintain LOS, as all streets are forecast to operate within the City's adopted LOS standards. ~~**Figure T-21** displays the locations of these projects around the City.~~

~~It is important to note that the Six Year Project List reflects a rough order of priority. This order seeks to maintain safety, focus on projects that provide the most benefit to Kenmore residents, and leverage outside funds to the extent possible.~~

~~It is recognized that the availability of outside funds is not always predictable. As a result, any of the projects on the near term list are high priority projects that the City would consider moving forward should funding become available.~~ Projects included on the Six Year Project List are considered community priorities that the City would move forward in the near term should funds become available. These projects provide a starting point for the City in developing its financially constrained Six Year CIP, which is updated every two years, and the annually updated 6-year Transportation Improvement Plan, and are developed based on more updated knowledge related to project feasibility and funding availability.

The Twenty Year Project List also represents important projects, but these projects tend not to have identified funding or are only necessary to address future growth, rather than existing deficiencies. While the scope of the 20-year project list exceeds revenues from exclusively city sources over the next few decades, it has been sized to fit within reasonable assumptions for grants and other outside funding sources.

The expected City contribution noted in Table T-10 includes anticipated grant funds. It is recognized that the availability of outside funds is not always predictable. As a result, the projects included in the Six and Twenty Year Project Lists could be advanced should funding become available.

[1] It should be noted that it is unlikely that all of the projects on the 6-year list would receive funding (the projects total to over $50 million). However, at this time, it is uncertain which ones will move forward in the near term and which will not. All of these projects are high priority projects that the City would move forward with if funds are available.

Table T-10. Six-Year Project List

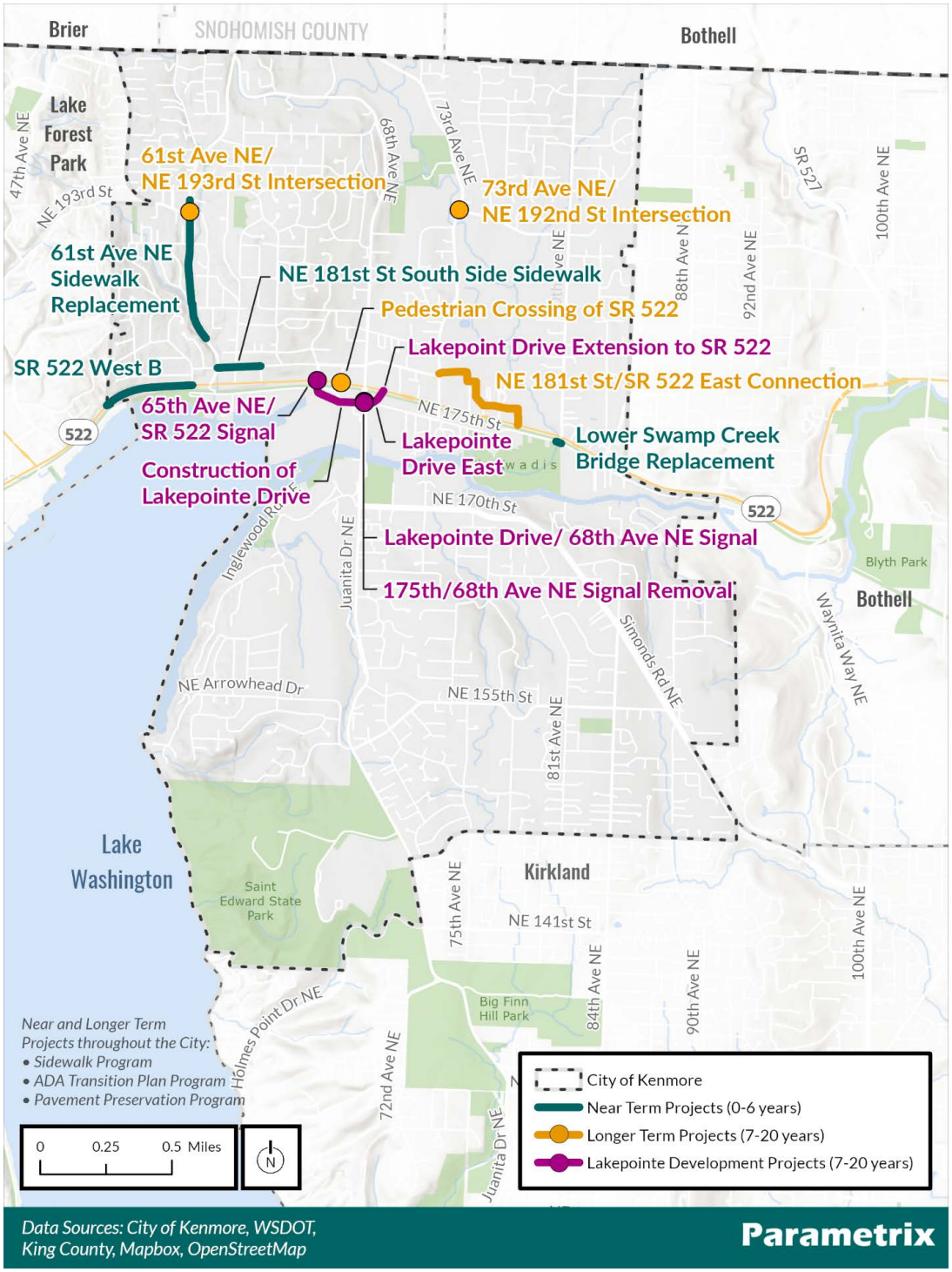
Projects	*Benefit to Kenmore*	*Primary Benefit*	*Total Cost*	*Expected City Contribution*	*Goal Met*
	Total		*$XXX,XXX,XXX*	*$XX,XXX,XXX*	

Table T-10. Six- and Twenty-Year Project List

Projects	Benefit to Kenmore	Primary Benefit	Total Cost	Expected City Contribution	Goal Met
Near Term (0-6 year) Projects					
SR 522 West B (West boundary to 61st Ave NE)	Improve pedestrian and bicycle accessibility, improve safety	Regional, Local	$2M	$0	1, 3, 4, 7, 8
NE 181st St South Side (61st-63rd) Sidewalk	Improve pedestrian safety and encourage walking	Local	$1.3M	$200K	1, 3, 4, 7, 8
61st Ave NE Sidewalk Replacement (181st-62nd)	Improve pedestrian safety, add accommodation for bicycles, enhance stream environment	Local	$5.11M	$247K	1, 3, 4, 7, 8
Lower Swamp Creek Bridge Replacement	Safely accommodate all uses by replacing aging bridge, maintain public access to residents.	Local	$3.1M	$50K	2, 6, 8
Pavement Preservation Program	Maintain the city's investment in roads and the safety for users	Local	$5.36M	$5.36M	2, 6, 8
ADA Transition Plan Program	Improve pedestrian safety, access, and accommodation for all users	Local	$2.75M	$2.75M	1, 3, 4, 7, 8
Pedestrian Facilities Plan Program (Sidewalk Program)	Improve pedestrian circulation, accessibility, safety, and encourage walking.	Local	$2M	$1M	1, 3, 4, 7, 8
	Total		**$21.6M**	**$9.6M**	
Longer Term (7-20 year) Projects					
Pedestrian Facilities Plan Program (Sidewalk Program)	Improve pedestrian circulation, accessibility, safety, and encourage walking.	Local	$14M	$1.4M	1, 3, 4, 7, 8
ADA Transition Plan Program	Improve pedestrian safety, access, and accommodation for all users	Local	$8.75M	$8.75M	1, 3, 4, 7, 8
Pavement Preservation Program	Maintain the city's investment in roads and the safety for users	Local	$12M	$12M	2, 6, 8
Lakepointe Development Mitigation	Intersection, pedestrian, bicycle, and access improvements to accommodate increased volumes	Local	To be determined	$0	1, 2, 3, 4, 7, 8

Projects	Benefit to Kenmore	Primary Benefit	Total Cost	Expected City Contribution	Goal Met
	related to the Lakepointe development. Improvements include: • Construction of a new road (Lakepointe Drive) from 65th Avenue/SR522 to 68th Avenue NE • Extending Lakepointe Drive east of 68th Avenue NE • Construction of the new Lakepointe Drive/68th Avenue intersection, including a new traffic signal • Elimination of the signal at 175th Street/68th Avenue • Installation of a signalized full-access intersection at 65th Avenue/SR 522				
61st Ave NE/NE 193rd St Intersection	Intersection treatment to improve safety and vehicle operations	Local	$2.2M	$220K	1, 2, 4, 6, 7
73rd Ave NE/NE 192nd St Intersection	Intersection treatment to improve safety and vehicle operations	Local	Cost under development	Cost under development	1, 2, 4, 6, 7
Nonmotorized crossing of SR 522	Improved nonmotorized access across SR 522 in the vicinity of 67th Avenue NE	Local	Cost under development	Cost under development	1, 2, 4, 6, 7
NE 181st Street/SR 522 East Connection	Improved local access between future developments near the Kenmore Park & Ride, SR 522, and downtown Kenmore	Local	Cost under development	Cost under development	1, 2, 4, 7
	Total		**Cost under development**	**Cost under development**	

Figure T-~~22~~23: Six- and Twenty-Year Transportation Improvement Projects ~~List~~



~~The full set of projects that the City would like to complete during the 20-year planning horizon (including the 6-year projects) are shown in **Table T-11** and **Figure T-22**. While all of these projects would help complete the layered network and realize the City's transportation vision, many are deemed to be longer-term.~~

~~Projects included on the Six-Year Project List are considered community priorities that the City would move forward in the near-term should funds become available. These projects provide a starting point for the City in developing its financial-constrained Six-Year CIP, which is updated every two years and is developed based on more updated knowledge related to project feasibility and funding availability.~~

~~The Twenty-Year Project List also represents important projects, but these projects tend not to have identified funding or are only necessary to address future growth, rather than existing deficiencies.~~

Table T-11. Twenty Year Project List (Includes Six Year Projects)

Projects	Benefit to Kenmore	Primary Benefit	Total Cost	Expected City Contribution	Goal Met
	Near Term (0-6 year) Projects				
	Total		**$XX.XM**	**$XX.XM**	
	Longer Term (7-20 year) Projects				
	Total		**$XX.XM**	**$XX.XM**	
	Beyond 20 Year Vision				

~~***Figure T-24: 6- and 20- Year Transportation Improvement Projects***~~

Non-City Projects

State Facilities

There are projects outside of Kenmore's purview that will also affect travel in and around the City. WSDOT oversees planning and operations of SR 522, a Highway of Statewide Significance and Kenmore's major east-west corridor. The City coordinates with WSDOT and provides input on potential roadway projects on SR 522, but the State ultimately has control of this corridor.

Another State-controlled project affecting travel in Kenmore is the tolling of the SR 520 Bridge across Lake Washington. Future increases in this toll, or potential tolling of I-90, may cause additional drivers to divert along Lake Washington, adding volume to Kenmore's already busy 68th Avenue / Juanita Drive and SR 522 corridors. The City will continue to monitor congestion changes along these corridors and work with the State to identify potential solutions.

Downtown Development South of SR 522

The southern two downtown quadrants between SR 522 and the Sammamish River (including the Lakepointe properties, Glacier/Cal Portland properties and properties within the Plywood Supply Special Study Area) have long been envisioned as sites for future master planned urban mixed-use development. These properties are subject to additional development regulations called P-Suffix regulations. P-Suffix regulations are property specific and include requirements for transportation infrastructure improvements that would need to be in place to accommodate full development.

Transportation infrastructure improvements described within the P-Suffix regulations include:

- Construction of a new road (Lakepointe Drive) from 65th Avenue/SR522 to 68th Avenue NE
- Extending Lakepointe Drive east of 68th Avenue NE
- Construction of the new Lakepointe Drive/68th Avenue intersection, including a new traffic signal.
- Elimination of the signal at 175th Street/68th Avenue.
- Installation of a signalized full-access intersection at 65th Avenue/SR 522.
- Construction of a pedestrian overcrossing of SR 522.

The approved Master Plan for the southern two downtown quadrants was originally approved in 1998 and did not account for many of the existing and planned transportation investments that currently and will influence travel to, from, and within Kenmore. For example, Sound Transit's Stride BRT service was not a consideration when assessing the impacts of these developments. Additional traffic modelling would be required in accordance with future planned development for these sites. Modifications to the transportation infrastructure improvements described within the P-Suffix regulations and/or new projects or additional improvements, including revised SR522 connection points, may be necessary.

The City assumes that the Lakepointe property will redevelop within the next 20 years, accompanied by construction of the required transportation improvements. All of the required

improvements are expected to be fully funded by the developer(s) of the Lakepointe properties, with the exception of the SR 522 pedestrian crossing. The City anticipates contributing to the cost of this improvement, which may include securing grant funding. Should the redevelopment not be fully realized in the 20-year horizon, the associated transportation improvements would not be implemented in that time frame.

IMPLEMENTATION STRATEGIES

The Transportation policies would require new, continuing, or increased commitments of City resources to implement projects and programs, create educational or incentive programs, or coordinate with adjacent jurisdictions. Implementing the Transportation Element will require close coordination among the City departments, citizens, businesses, and other agencies within the region.

In order to guide the City's implementation of the transportation element, project priorities should be assigned to assist in assembling an updated six-year CIP, working toward the 2044 planning horizon. This section summarizes the recommended future projects and documents the criteria used to prioritize them.

The Transportation Element is a living document and serves as the blueprint for transportation in Kenmore over the next several years. Several implementation steps should be initiated over the next couple of years to determine if changes are needed, or to reaffirm a particular strategy.

Overview of Costs and Revenues

A key GMA planning requirement is the concept of fiscal restraint in transportation planning. A fiscally constrained Transportation Element must first allow for operation and maintenance of existing facilities, and then capital improvements. To introduce fiscal constraint into the Transportation Element, an inventory of revenues and costs was undertaken to identify funds that are likely to be available for capital construction and operations.

The proposed Transportation Element for the City of Kenmore contains a variety of projects that will likely cost the city between $XX and $XXX million over 20 years. **Table T-~~12~~11** summarizes the costs of the major types of transportation improvements. The Transportation Element focuses on capital projects that will complete the layered network plan. The Transportation Element also includes ongoing pavement maintenance to ensure that the roadway network is kept in good condition.

Table T-11~~2~~. Costs of Kenmore Transportation Element (20+ years)

Project Needs	*Description*	*Total Cost*	*Expected City Cost*
Auto/Truck Priority Projects	Bridges, traffic signals, intersection channelization, SR 522 improvements	Cost under development	Cost under development
Pedestrian Projects	Sidewalks, crossings	Cost under development	Cost under development
Bicycle Projects	Bike boulevards, bike lanes, crossings	Cost under development	Cost under development
Multimodal Projects	Multimodal corridors, SR 522 crossings	Cost under development	Cost under development

Project Needs	*Description*	*Total Cost*	*Expected City Cost*
Pavement Maintenance	Overlay and pavement repair	Cost under development	Cost under development
	Total	**Cost under development ~~$XXX-XXXM~~**	**Cost under development ~~$XX-XXXM~~**

*Costs denoted in millions

Revenues for transportation capital and operations include those from outside sources and grants, general city funds, real estate excise taxes, impact fees, photo enforcement fees, and gas tax receipts. If the city were able to maintain this level of revenue, the City could afford between $80-$100 million in transportation projects over the next 20 years. Other potential revenue sources include:

- Proceeds from General Obligation Bonds
- Creation of LIDs
- Reciprocal impact fees with adjacent jurisdictions
- Business license fee per employee

The comparison of revenues to costs indicates that the city will need to carefully prioritize its projects, since not all of the transportation needs are likely to be affordable with existing revenue sources during the 20-year period. If this occurs, the City has several options:

- Increase the amount of revenue from existing sources, including impact fees, real estate excise taxes, transportation benefit district, or increased general fund revenues.
- Adopt new sources of revenue.
- Lower the LOS standard, and therefore reduce the need for some transportation improvements.

The city can explore the feasibility and likely revenue amounts from these or other sources as the Transportation Element is implemented over the next several years.

Setting Priorities

Project prioritization is needed to help identify when best to fund and implement the projects since funding is limited. Criteria were established to help prioritize the projects and implementation. These unweighted criteria include:

Criteria for Project Prioritization

(1) Meets City's transportation goals

(2) Maintains/improves safety of traveling in Kenmore

(3) Provides improved mobility and accessibility within Kenmore

(4) Leverages non-city (federal, state, private) funds freeing up city revenues for additional projects

(5) Responds to capacity needs using strategies identified in the Comprehensive Plan.

Using these criteria, the identified projects will need to be evaluated and ranked based on how well each could meet the criteria. Since one of the criteria relates to funding availability, priorities may shift over time as fund sources change.

High priority projects for Kenmore are those that meet multiple criteria in terms of effectiveness, benefit to the community, and ability to be implemented. These attributes will allow the City to take advantage of a variety of public and private funding sources to complete key projects.

APPENDIX D - 1: TRAFFIC MODELING ASSUMPTIONS AND LEVEL OF SERVICE REPORTS

This appendix describes the traffic modeling assumptions used to forecast future traffic operations in the City of Kenmore and describes the level of service (LOS) calculations at 19 intersections for year 2022 Existing conditions, 2030 year No Action conditions, year 2044 No Action conditions, and year 2044 With Improvements conditions.

Traffic Modeling Assumptions

Data Collection

Turning Movement Counts

Table 1 summarizes the 19 intersections in the City were evaluated for LOS operations, including where PM peak period turning movement counts (TMCs) were available and intersections where counts were needed. TMCs were collected in 15-minute increments and included heavy vehicle percentage and pedestrian and bicycle volumes. The City provided TMC data for the remaining two locations.

Table 1: Study Intersections – Proposed Data Collection for PM Peak Period

#	Intersection	Collected 1/25/22	PM Peak Period to be collected	Data provided by City
1	NE 193rd St / 61st Ave NE	x	PM 16:00 to 18:00	
2	SR 522 / 61st Ave NE	x	PM 16:00 to 18:00	
3	NE 181st St / 65th Ave NE	x	PM 16:00 to 18:00	
4	NE 175th St / 65th Ave NE	x	PM 15:00 to 17:00	
5	NE 181st ST / 68th Ave NE	x	PM 15:45 to 17:45	
6	SR 522 / 68th Ave NE	x	PM 16:00 to 18:00	
7	NE 175th St / 68th Ave NE	x	PM 15:00 to 17:00	
8	NE 170th St / 68th Ave NE	-	-	Gridsmart
9	NE 155th Pl / Juanita Drive NE	x	PM 16:45 to 18:45	
10	NE 153rd Pl / Juanita Drive NE	x	PM 17:00 to 19:00	
11	NE 192nd St / 73rd Ave NE	x	PM 15:00 to 17:00	
12	NE 181st St / 73rd Ave NE	x	PM 16:00 to 18:00	
13	SR 522 / 73rd Ave NE	x	PM 16:00 to 18:00	
14	NE 192nd St / 80th Ave NE	x	PM 15:45 to 17:45	
15	SR 522 / 80th Ave NE	x	PM 16:00 to 18:00	
16	SR 522 /83rd PL NE	x	PM 16:00 to 18:00	
17	Simonds Road NE / 84th Ave NE	x	PM 15:30 to 17:30	
18	NE 155th St / 84th Ave NE	x	PM 16:00 to 18:00	
19	NE 155th St / Simonds Road NE	-	-	Gridsmart

Average Daily Traffic

Average daily traffic (ADT) volumes were provided by the City and the Washington State Department of Transportation (WSDOT). ADT volumes from WSDOT were acquired from https://www.wsdot.wa.gov/data/tools/geoportal/?config=traffic Table 2 illustrates locations and sources of ADT data.

Table 2: Average Daily Traffic Counts – Data Location and Source

#	Roadways	Data Source	Location of Counts
1	SR 522	WSDOT Geoportal	west of 68th Avenue
2	SR 522	WSDOT Geoportal	east of 68th Avenue
3	68th Ave NE	City	175th St & Juanita Dr
4	68th Ave NE	City	68th Av btw 181st St and 182nd St 11/12/2021
5	Juanita Drive	City	Juanita Dr btw 166th Ct and 170th St (Cont. Count)
6	NE 170th	City	170th St btw Juanita Dr and 70th Av (Cont. Count)
7	61st Ave NE	City	61st Av n/o 190th St, 61st Av n/o 193rd St, both 6/7/2021
8	80th Ave NE	City	80th Av n/o 192nd St 8/16/2021
9	Simonds Rd NE	City	155th St & Simonds Rd
10	73rd Ave NE	City	73rd Av n/o 185th St 3/15/2021

Historical Count Data

The City also provided historic TMCs collected in 2019. This data was used to help validate the existing conditions EMME model. This data was also used to make possible adjustments to future travel patterns. It was noted that current construction projects, including the West Sammamish River Bridge project and the Juanita Drive NE Sidewalk and Bicycle Improvement projects, have heavily influenced route choice. The City is expecting route choices and travel patterns to change once construction on these projects in complete.

Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes at additional locations not collected with the TMCs was provided by the City. Pedestrian and bicycle data from WSDOT's Bicycle and Pedestrian Count Portal https://wsdot.wa.gov/data/tools/bikepedcounts/ was evaluated to confirm the data was relevant and useful.

Crash Data

Citywide crash data was provided by the City for the years 2016 to 2020. They City also provided all the available data for 2021.

Traffic Operations Analysis

Traffic operations analysis for this project included PM peak hour conditions for the following years:

- Existing Conditions (2022)
- Year 2030
- Year 2044

Intersections were analyzed based on WSDOT's analysis policies and Synchro protocols (August 2018).

Synchro 11 software was used to analyze the operation of signalized and stop-controlled intersections.

Existing Conditions

Existing conditions traffic volumes were baselined using the following approach:

- **Pandemic adjustments**: Given the change in travel patterns and traffic volumes since the beginning of the COVID pandemic in March 2020, turning movement counts taken after March 2020 were adjusted as needed. Data collected as part of this study was compared to counts taken prior to March 2020 to gauge changes in traffic growth and potential changes in mode. If current counts were significantly lower than pre-March 2020 conditions, volumes were adjusted to pre-pandemic conditions using data from nearby WSDOT permanent traffic recorders (PTR) and other historic traffic data available from the City.
  As future traffic volumes were built from forecasting from baseline conditions, the goal was to model an existing 2022 baseline condition that best reflects overall trends from the past several years. Overestimating volumes would lead to future forecasts that may be too high, potentially leading to infrastructure that is overbuilt for future conditions. Conversely, underestimating baseline conditions could lead to future forecasts that may be too low, leading to infrastructure that would be potentially underbuilt for future conditions.
- **Seasonal adjustments:** Existing volumes were seasonally adjusted based on information from WSDOT and the City.
- **Signal timing** - Existing signal timing plans for signalized intersections were used to model existing conditions. Existing signal timing cards were provided by the City.
- **Geometrics** – The roadway network and geometrics for the 2022 Existing Condition reflected current conditions.

Future Conditions

The goal of modeling future conditions was identify demands placed on the existing transportation infrastructure and services by expected growth in traffic. For the 2030 Future Baseline conditions, the existing Synchro model was updated to reflect forecasted growth. Projects needed to maintain minimum LOS standards under the 2030 conditions were identified and analyzed in Synchro. To model 2044 conditions, the 2030 Build Synchro models were updated to reflect forecasted growth as described in the Land Use Element and Appendix D-2. Projects needed to maintain minimum LOS standards under the 2044 condition were identified and analyzed in Synchro. Cycle lengths, offsets and splits were optimized for all future Synchro models.

Level of Service Reports

The 2044 With Improvements conditions include channelization and signal timing changes at 7 intersections. The 2022 volumes represent counts collected in January 2022. It was assumed that construction on Juanita Drive during January 2022 influenced route choices between Juanita Drive and Simonds Road. Post-construction, it is expected that travel patterns along Juanita Drive and Simonds Road would return to pre-construction conditions. 2030 traffic forecasts and analysis was adjusted to reflect such changes.

For the 2030 scenario and for both 2044 future scenarios, volumes represent traffic forecasts developed using the Kenmore City Model and the traffic growth assumptions described in Appendix D-2. For the 2044 No Action LOS calculations assume the P-suffix transportation projects defined as part of the Lakepoint Mixed Use Master Plan The 2044 With Improvements LOS calculations assume the improvements recommended as a part of this plan are in place.

As noted in the Transportation Element, the City measures LOS at the corridor level on SR 522 and 68th

Avenue / Juanita Drive / Simonds Road rather than at the intersection level. Though a single intersection on these corridors may experience longer delays than indicated by the standard, the overall concern for residents and travelers on these roadways is to get through multiple intersections in a reasonable amount of time. For this reason, average delay along the corridor is a more meaningful level of service standard than the experience at a single intersection. Table 3 summarizes these average delay calculations for existing and forecasted conditions.

Table 3. Corridor LOS Values (weighted averages)

Corridor	2022 Existing	2030 No Action	2044 No Action	2044 with improvements
SR 522[1]	D / 35.5	D / 53.9	E / 72.8	E / 64.1
Simonds Road / 68th Ave Corridor[2]	D / 46	D / 54.2	F / 84.5	E / 72.7

[1] Intersections: 61st Ave NE, 68th Ave NE, 73rd Ave NE, 80th Ave NE, 83rd Ave NE
[2] Intersections: NE 181st St, SR 522, NE 175th St, NE 170th St

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	0	160	5	0	0	310	455	15	0	285	55
Future Vol, veh/h	40	0	160	5	0	0	310	455	15	0	285	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	9	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	-	100	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	3	0	1	0	0	0	1	3	0	0	1	2
Mvmt Flow	41	0	165	5	0	0	320	469	15	0	294	57

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1411	1427	294	1420	1420	486	294	0	0	493	0	0
Stage 1	294	294	-	1126	1126	-	-	-	-	-	-	-
Stage 2	1117	1133	-	294	294	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.5	6.21	7.1	6.5	6.2	4.11	-	-	4.1	-	-
Critical Hdwy Stg 1	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4	3.309	3.5	4	3.3	2.209	-	-	2.2	-	-
Pot Cap-1 Maneuver	115	136	748	115	138	585	1273	-	-	1081	-	-
Stage 1	712	673	-	251	282	-	-	-	-	-	-	-
Stage 2	251	280	-	719	673	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	93	101	748	72	103	581	1273	-	-	1073	-	-
Mov Cap-2 Maneuver	93	101	-	72	103	-	-	-	-	-	-	-
Stage 1	533	673	-	186	210	-	-	-	-	-	-	-
Stage 2	188	208	-	560	673	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	0	3.5	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1273	-	-	465	-	1073	-	-
HCM Lane V/C Ratio	0.251	-	-	0.355	-	-	-	-
HCM Control Delay (s)	8.8	-	-	16.9	0	0	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	1	-	-	1.6	-	0	-	-

HCM 6th Signalized Intersection Summary
2: 61st Ave NE & SR 522 03/13/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	1575	125	10	1610	240	40	25	5	115	40	245
Future Volume (veh/h)	285	1575	125	10	1610	240	40	25	5	115	40	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1856	1900	1870	1856	1900	1900	1900	1841	1900	1900
Adj Flow Rate, veh/h	300	1658	132	11	1695	0	42	26	5	121	0	286
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	3	3	0	2	3	0	0	0	4	0	0
Cap, veh/h	257	2255	981	22	1808		54	171	33	144	0	503
Arrive On Green	0.14	0.64	0.64	0.01	0.51	0.00	0.03	0.11	0.11	0.08	0.00	0.16
Sat Flow, veh/h	1795	3526	1534	1810	3554	1572	1810	1537	296	1753	0	3082
Grp Volume(v), veh/h	300	1658	132	11	1695	0	42	0	31	121	0	286
Grp Sat Flow(s),veh/h/ln	1795	1763	1534	1810	1777	1572	1810	0	1833	1753	0	1541
Q Serve(g_s), s	21.5	48.0	5.1	0.9	67.2	0.0	3.5	0.0	2.3	10.2	0.0	12.8
Cycle Q Clear(g_c), s	21.5	48.0	5.1	0.9	67.2	0.0	3.5	0.0	2.3	10.2	0.0	12.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	257	2255	981	22	1808		54	0	204	144	0	503
V/C Ratio(X)	1.17	0.74	0.13	0.50	0.94		0.77	0.00	0.15	0.84	0.00	0.57
Avail Cap(c_a), veh/h	257	2255	981	60	1808		60	0	229	244	0	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	64.3	18.4	10.7	73.6	34.6	0.0	72.2	0.0	60.3	67.9	0.0	57.9
Incr Delay (d2), s/veh	108.4	2.2	0.3	16.1	10.8	0.0	41.8	0.0	0.3	12.3	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.5	18.9	1.8	0.5	30.5	0.0	2.2	0.0	1.1	5.1	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	172.7	20.6	10.9	89.7	45.4	0.0	114.0	0.0	60.6	80.1	0.0	58.9
LnGrp LOS	F	C	B	F	D		F	A	E	F	A	E
Approach Vol, veh/h		2090			1706	A		73			407	
Approach Delay, s/veh		41.8			45.7			91.3			65.2	
Approach LOS		D			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	82.6	17.8	22.6	7.3	102.3	10.0	30.4
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	* 5.9
Max Green Setting (Gmax), s	21.5	65.7	20.9	18.7	5.0	82.2	5.0	* 35
Max Q Clear Time (g_c+I1), s	23.5	69.2	12.2	4.3	2.9	50.0	5.5	14.8
Green Ext Time (p_c), s	0.0	0.0	0.2	0.1	0.0	17.0	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	46.4
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	165	10	20	175	35	15	35	45	40	15	10
Future Vol, veh/h	10	165	10	20	175	35	15	35	45	40	15	10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	177	11	22	188	38	16	38	48	43	16	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.2	9.5	8.6	8.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	5%	9%	62%
Vol Thru, %	37%	89%	76%	23%
Vol Right, %	47%	5%	15%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	185	230	65
LT Vol	15	10	20	40
Through Vol	35	165	175	15
RT Vol	45	10	35	10
Lane Flow Rate	102	199	247	70
Geometry Grp	1	1	1	1
Degree of Util (X)	0.135	0.253	0.307	0.099
Departure Headway (Hd)	4.752	4.578	4.476	5.077
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	751	782	801	702
Service Time	2.803	2.619	2.515	3.131
HCM Lane V/C Ratio	0.136	0.254	0.308	0.1
HCM Control Delay	8.6	9.2	9.5	8.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1	1.3	0.3

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	160	45	5	10	0
Future Vol, veh/h	20	160	45	5	10	0
Conflicting Peds, #/hr	110	0	0	110	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	6	1	2	0	25	0
Mvmt Flow	21	167	47	5	10	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	162	0	-	0	369	160
Stage 1	-	-	-	-	160	-
Stage 2	-	-	-	-	209	-
Critical Hdwy	4.16	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.254	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	1393	-	-	-	588	890
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	774	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1265	-	-	-	476	808
Mov Cap-2 Maneuver	-	-	-	-	476	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	703	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1265	-	-	-	476
HCM Lane V/C Ratio	0.016	-	-	-	0.022
HCM Control Delay (s)	7.9	0	-	-	12.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th Signalized Intersection Summary
5: 68th Ave NE & NE 181st St 03/13/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	205	120	60	120	30	180	150	95	50	95	35
Future Volume (veh/h)	65	205	120	60	120	30	180	150	95	50	95	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	0.98		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1900	1841	1885	1900	1885	1856	1885	1870	1870	1900
Adj Flow Rate, veh/h	68	216	126	63	126	32	189	158	100	53	100	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	4	1	0	1	3	1	2	2	0
Cap, veh/h	88	301	175	81	387	98	635	512	324	524	629	233
Arrive On Green	0.05	0.27	0.27	0.05	0.27	0.27	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1810	1103	644	1753	1434	364	1240	1051	665	1107	1292	478
Grp Volume(v), veh/h	68	0	342	63	0	158	189	0	258	53	0	137
Grp Sat Flow(s),veh/h/ln	1810	0	1747	1753	0	1798	1240	0	1716	1107	0	1770
Q Serve(g_s), s	3.2	0.0	15.1	3.0	0.0	6.0	8.5	0.0	7.7	2.6	0.0	3.7
Cycle Q Clear(g_c), s	3.2	0.0	15.1	3.0	0.0	6.0	12.2	0.0	7.7	10.3	0.0	3.7
Prop In Lane	1.00		0.37	1.00		0.20	1.00		0.39	1.00		0.27
Lane Grp Cap(c), veh/h	88	0	476	81	0	486	635	0	836	524	0	862
V/C Ratio(X)	0.77	0.00	0.72	0.78	0.00	0.33	0.30	0.00	0.31	0.10	0.00	0.16
Avail Cap(c_a), veh/h	138	0	684	190	0	761	635	0	836	524	0	862
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.86	0.00	0.86	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.0	0.0	28.0	40.1	0.0	24.8	15.5	0.0	13.2	16.3	0.0	12.1
Incr Delay (d2), s/veh	13.3	0.0	2.0	14.9	0.0	0.4	1.0	0.0	0.8	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	6.4	1.6	0.0	2.5	2.5	0.0	3.0	0.7	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	0.0	30.0	55.0	0.0	25.2	16.5	0.0	14.0	16.6	0.0	12.5
LnGrp LOS	D	A	C	D	A	C	B	A	B	B	A	B
Approach Vol, veh/h		410			221			447			190	
Approach Delay, s/veh		33.9			33.7			15.1			13.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		46.9	9.4	28.7		46.9	9.6	28.5				
Change Period (Y+Rc), s		5.5	5.5	5.5		5.5	5.5	5.5				
Max Green Setting (Gmax), s		26.0	9.2	33.3		26.0	6.5	36.0				
Max Q Clear Time (g_c+I1), s		14.2	5.0	17.1		12.3	5.2	8.0				
Green Ext Time (p_c), s		1.8	0.0	1.9		0.8	0.0	0.9				

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	115	1070	380	10	150	1190	95	630	185	125	120
Future Volume (vph)	5	115	1070	380	10	150	1190	95	630	185	125	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3	6.3		5.9	5.9	5.9	4.0	6.3		4.0
Lane Util. Factor		1.00	0.95	1.00		0.97	0.95	1.00	0.97	0.95		1.00
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.97	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.94		1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00		0.95
Satd. Flow (prot)		1771	3471	1554		3437	3539	1538	3433	3235		1752
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00		0.95
Satd. Flow (perm)		1771	3471	1554		3437	3539	1538	3433	3235		1752
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	120	1115	396	10	156	1240	99	656	193	130	125
RTOR Reduction (vph)	0	0	0	84	0	0	0	51	0	83	0	0
Lane Group Flow (vph)	0	125	1115	312	0	166	1240	48	656	240	0	125
Confl. Peds. (#/hr)	18	13		10	25	10		13	24		25	25
Heavy Vehicles (%)	0%	2%	4%	1%	0%	2%	2%	2%	2%	1%	5%	3%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases				2				6				
Actuated Green, G (s)		15.9	76.4	76.4		12.6	73.1	73.1	25.0	23.1		15.4
Effective Green, g (s)		15.9	76.4	76.4		12.6	73.1	73.1	25.0	23.1		15.4
Actuated g/C Ratio		0.11	0.51	0.51		0.08	0.49	0.49	0.17	0.15		0.10
Clearance Time (s)		6.3	6.3	6.3		5.9	5.9	5.9	4.0	6.3		4.0
Vehicle Extension (s)		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		187	1767	791		288	1724	749	572	498		179
v/s Ratio Prot		c0.07	c0.32			0.05	c0.35		c0.19	0.07		0.07
v/s Ratio Perm				0.20				0.03				
v/c Ratio		0.67	0.63	0.39		0.58	0.72	0.06	1.15	0.48		0.70
Uniform Delay, d1		64.5	26.6	22.6		66.1	30.4	20.4	62.5	58.0		65.1
Progression Factor		1.00	1.00	1.00		1.18	0.60	1.35	0.94	0.91		1.00
Incremental Delay, d2		8.7	1.7	1.5		2.2	2.0	0.1	84.1	0.7		11.3
Delay (s)		73.2	28.3	24.1		80.3	20.4	27.7	143.0	53.4		76.3
Level of Service		E	C	C		F	C	C	F	D		E
Approach Delay (s)			30.7				27.4			113.5		
Approach LOS			C				C			F		

Intersection Summary			
HCM 2000 Control Delay	50.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
7: 68th Ave NE & NE 175th St 03/13/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	50	115	45	10	10	20	880	110	0	665	15
Future Volume (veh/h)	10	50	115	45	10	10	20	880	110	0	665	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	0.99		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1841	1900	1900	1693	1900	1826	1856	1856	0	1856	1900
Adj Flow Rate, veh/h	11	53	121	47	11	11	21	926	116	0	700	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	20	4	0	0	14	0	5	3	3	0	3	0
Cap, veh/h	74	205	195	156	35	21	70	2173	269	0	1334	1111
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.72	0.72	0.72	0.00	1.00	1.00
Sat Flow, veh/h	143	1650	1574	610	281	169	28	3023	374	0	1856	1545
Grp Volume(v), veh/h	64	0	121	69	0	0	563	0	500	0	700	16
Grp Sat Flow(s),veh/h/ln	1793	0	1574	1060	0	0	1812	0	1612	0	1856	1545
Q Serve(g_s), s	0.0	0.0	5.5	2.8	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.4	0.0	5.5	5.2	0.0	0.0	9.2	0.0	9.5	0.0	0.0	0.0
Prop In Lane	0.17		1.00	0.68		0.16	0.04		0.23	0.00		1.00
Lane Grp Cap(c), veh/h	279	0	195	212	0	0	1352	0	1159	0	1334	1111
V/C Ratio(X)	0.23	0.00	0.62	0.33	0.00	0.00	0.42	0.00	0.43	0.00	0.52	0.01
Avail Cap(c_a), veh/h	896	0	755	640	0	0	1352	0	1159	0	1334	1111
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.83	0.83
Uniform Delay (d), s/veh	29.8	0.0	31.2	31.2	0.0	0.0	4.3	0.0	4.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	3.2	0.9	0.0	0.0	0.9	0.0	1.2	0.0	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	2.2	1.2	0.0	0.0	2.9	0.0	2.7	0.0	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	0.0	34.4	32.1	0.0	0.0	5.2	0.0	5.5	0.0	1.2	0.0
LnGrp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		185			69			1063			716	
Approach Delay, s/veh		32.9			32.1			5.3			1.2	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.8		15.2		59.8		15.2				
Change Period (Y+Rc), s		5.9		5.9		5.9		5.9				
Max Green Setting (Gmax), s		27.2		36.0		27.2		36.0				
Max Q Clear Time (g_c+I1), s		11.5		7.5		2.0		7.2				
Green Ext Time (p_c), s		6.8		0.8		5.7		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			7.3									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
8: 68th Ave NE & NE 170th St

03/13/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	0	10	30	5	535	5	465	20	400	485	50
Future Volume (veh/h)	45	0	10	30	5	535	5	465	20	400	485	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	0	11	33	5	582	5	505	22	435	527	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	8	51	484	68	491	12	885	38	414	807	83
Arrive On Green	0.31	0.00	0.31	0.31	0.31	0.31	0.01	0.25	0.25	0.23	0.48	0.48
Sat Flow, veh/h	706	27	165	1292	219	1585	1781	3469	151	1781	1669	171
Grp Volume(v), veh/h	60	0	0	38	0	582	5	258	269	435	0	581
Grp Sat Flow(s),veh/h/ln	898	0	0	1510	0	1585	1781	1777	1843	1781	0	1840
Q Serve(g_s), s	3.0	0.0	0.0	0.0	0.0	24.8	0.2	10.1	10.2	18.6	0.0	19.1
Cycle Q Clear(g_c), s	4.2	0.0	0.0	1.2	0.0	24.8	0.2	10.1	10.2	18.6	0.0	19.1
Prop In Lane	0.82		0.18	0.87		1.00	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	360	0	0	552	0	491	12	453	470	414	0	889
V/C Ratio(X)	0.17	0.00	0.00	0.07	0.00	1.18	0.43	0.57	0.57	1.05	0.00	0.65
Avail Cap(c_a), veh/h	362	0	0	552	0	491	111	458	475	414	0	889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.5	0.0	0.0	19.4	0.0	27.6	39.6	26.0	26.0	30.7	0.0	15.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	102.1	22.8	5.1	5.0	58.0	0.0	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.5	0.0	22.9	0.2	4.8	5.0	14.4	0.0	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	0.0	19.5	0.0	129.7	62.3	31.1	31.0	88.7	0.0	19.3
LnGrp LOS	C	A	A	B	A	F	E	C	C	F	A	B
Approach Vol, veh/h		60			620			532			1016	
Approach Delay, s/veh		20.7			123.0			31.3			49.0	
Approach LOS		C			F			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.0	25.8		30.2	5.7	44.1		30.2				
Change Period (Y+Rc), s	5.4	* 5.4		5.4	5.2	5.4		* 5.4				
Max Green Setting (Gmax), s	18.6	* 21		24.8	5.0	34.2		* 25				
Max Q Clear Time (g_c+I1), s	20.6	12.2		26.8	2.2	21.1		6.2				
Green Ext Time (p_c), s	0.0	2.1		0.0	0.0	3.4		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	64.6
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	30	385	0	35	365
Future Vol, veh/h	0	30	385	0	35	365
Conflicting Peds, #/hr	1	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	0	32	414	0	38	392

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	883	416	0	0	414	0
Stage 1	414	-	-	-	-	-
Stage 2	469	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	319	641	-	-	1156	-
Stage 1	671	-	-	-	-	-
Stage 2	634	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	305	640	-	-	1156	-
Mov Cap-2 Maneuver	305	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	640	1156	-
HCM Lane V/C Ratio	-	-	0.05	0.033	-
HCM Control Delay (s)	-	-	10.9	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	25	30	30	35	20	55	265	25	40	245	75
Future Volume (vph)	55	25	30	30	35	20	55	265	25	40	245	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.95			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			0.97		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1624			1697		1805	1870		1671	1807	
Flt Permitted	0.68	1.00			0.86		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1248	1624			1479		1805	1870		1671	1807	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	62	28	34	34	39	22	62	298	28	45	275	84
RTOR Reduction (vph)	0	31	0	0	20	0	0	2	0	0	6	0
Lane Group Flow (vph)	62	31	0	0	75	0	62	324	0	45	353	0
Confl. Peds. (#/hr)	3		15	15		3	3		4	4		3
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	12%	0%	0%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3			7								
Actuated Green, G (s)	8.6	8.6			8.6		7.4	60.9		5.5	59.0	
Effective Green, g (s)	8.6	8.6			8.6		7.4	60.9		5.5	59.0	
Actuated g/C Ratio	0.10	0.10			0.10		0.08	0.68		0.06	0.66	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	119	155			141		148	1265		102	1184	
v/s Ratio Prot		0.02					c0.03	0.17		0.03	c0.20	
v/s Ratio Perm	0.05				c0.05							
v/c Ratio	0.52	0.20			0.53		0.42	0.26		0.44	0.30	
Uniform Delay, d1	38.7	37.5			38.8		39.3	5.7		40.8	6.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	0.6			3.8		1.9	0.5		3.0	0.6	
Delay (s)	42.8	38.2			42.6		41.2	6.2		43.8	7.3	
Level of Service	D	D			D		D	A		D	A	
Approach Delay (s)		40.5			42.6			11.8			11.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	180	95	210	275	70	120
Future Vol, veh/h	180	95	210	275	70	120
Conflicting Peds, #/hr	0	2	0	19	19	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	1	4	1	5	5
Mvmt Flow	194	102	226	296	75	129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	524	247	0	0	541	0
Stage 1	245	-	-	-	-	-
Stage 2	279	-	-	-	-	-
Critical Hdwy	6.42	6.21	-	-	4.15	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.309	-	-	2.245	-
Pot Cap-1 Maneuver	514	794	-	-	1013	-
Stage 1	796	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	465	780	-	-	997	-
Mov Cap-2 Maneuver	465	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.4	0	3.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	540	997	-
HCM Lane V/C Ratio	-	-	0.548	0.075	-
HCM Control Delay (s)	-	-	19.4	8.9	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.3	0.2	-

HCM 6th Signalized Intersection Summary
12: 73rd Ave NE & NE 181st St 03/13/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	15	145	15	5	15	90	255	5	10	170	140
Future Volume (veh/h)	235	15	145	15	5	15	90	255	5	10	170	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1707	1885	1900	1900	1900	1870	1900	1648	1693	1856	1885
Adj Flow Rate, veh/h	245	16	151	16	5	16	94	266	5	10	177	146
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	13	1	0	0	0	2	0	17	14	3	1
Cap, veh/h	273	13	432	54	27	21	616	1125	21	614	566	467
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	730	48	1580	0	99	76	1052	1858	35	998	935	771
Grp Volume(v), veh/h	261	0	151	37	0	0	94	0	271	10	0	323
Grp Sat Flow(s),veh/h/ln	778	0	1580	175	0	0	1052	0	1893	998	0	1707
Q Serve(g_s), s	0.0	0.0	7.3	0.0	0.0	0.0	4.5	0.0	6.3	0.4	0.0	8.8
Cycle Q Clear(g_c), s	26.0	0.0	7.3	26.0	0.0	0.0	13.3	0.0	6.3	6.7	0.0	8.8
Prop In Lane	0.94		1.00	0.43		0.43	1.00		0.02	1.00		0.45
Lane Grp Cap(c), veh/h	286	0	432	102	0	0	616	0	1146	614	0	1033
V/C Ratio(X)	0.91	0.00	0.35	0.36	0.00	0.00	0.15	0.00	0.24	0.02	0.00	0.31
Avail Cap(c_a), veh/h	286	0	432	102	0	0	616	0	1146	614	0	1033
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.93	0.00	0.93	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.9	0.0	27.7	28.5	0.0	0.0	12.4	0.0	8.6	10.2	0.0	9.1
Incr Delay (d2), s/veh	31.3	0.0	0.5	2.1	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	2.8	0.7	0.0	0.0	1.1	0.0	2.4	0.1	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	0.0	28.2	30.6	0.0	0.0	12.9	0.0	9.1	10.2	0.0	9.9
LnGrp LOS	E	A	C	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		412			37			365			333	
Approach Delay, s/veh		53.5			30.6			10.1			9.9	
Approach LOS		D			C			B			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		63.5		31.5		63.5		31.5				
Change Period (Y+Rc), s		6.0		5.5		6.0		5.5				
Max Green Setting (Gmax), s		28.0		26.0		28.0		24.0				
Max Q Clear Time (g_c+I1), s		15.3		28.0		10.8		28.0				
Green Ext Time (p_c), s		1.5		0.0		1.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	25	70	1210	25	20	80	1335	200	35	70	85	215
Future Volume (vph)	25	70	1210	25	20	80	1335	200	35	70	85	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.3	6.3		5.5	6.3	6.3	4.0	5.5	5.5	4.0
Lane Util. Factor		1.00	0.95	1.00		1.00	0.95	1.00	1.00	1.00	1.00	0.97
Frpb, ped/bikes		1.00	1.00	0.94		1.00	1.00	0.94	1.00	1.00	0.95	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		1766	3471	1330		1736	3539	1491	1612	1863	1503	3467
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		1766	3471	1330		1736	3539	1491	1612	1863	1503	3467
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	26	73	1260	26	21	83	1391	208	36	73	89	224
RTOR Reduction (vph)	0	0	0	11	0	0	0	48	0	0	82	0
Lane Group Flow (vph)	0	99	1260	15	0	104	1391	160	36	73	7	224
Confl. Peds. (#/hr)	18	14		15	28	15		14	18		28	28
Heavy Vehicles (%)	0%	3%	4%	14%	0%	5%	2%	2%	12%	2%	2%	1%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases				2				6			8	
Actuated Green, G (s)		13.9	88.7	88.7		14.4	89.2	89.2	6.3	12.1	12.1	13.5
Effective Green, g (s)		13.9	88.7	88.7		14.4	89.2	89.2	6.3	12.1	12.1	13.5
Actuated g/C Ratio		0.09	0.59	0.59		0.10	0.59	0.59	0.04	0.08	0.08	0.09
Clearance Time (s)		5.5	6.3	6.3		5.5	6.3	6.3	4.0	5.5	5.5	4.0
Vehicle Extension (s)		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		163	2052	786		166	2104	886	67	150	121	312
v/s Ratio Prot		0.06	0.36			c0.06	c0.39		0.02	0.04		c0.06
v/s Ratio Perm				0.01				0.11			0.00	
v/c Ratio		0.61	0.61	0.02		0.63	0.66	0.18	0.54	0.49	0.06	0.72
Uniform Delay, d1		65.4	19.7	12.7		65.2	20.3	13.8	70.4	66.0	63.7	66.4
Progression Factor		0.98	0.58	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.1	1.1	0.0		7.2	1.7	0.4	8.1	2.5	0.2	7.7
Delay (s)		68.9	12.4	12.7		72.4	22.0	14.2	78.5	68.5	63.9	74.1
Level of Service		E	B	B		E	C	B	E	E	E	E
Approach Delay (s)			16.5				24.1			68.2		
Approach LOS			B				C			E		

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.7
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	65	65
Future Volume (vph)	65	65
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.93	
Flt Protected	1.00	
Satd. Flow (prot)	1677	
Flt Permitted	1.00	
Satd. Flow (perm)	1677	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	68	68
RTOR Reduction (vph)	29	0
Lane Group Flow (vph)	107	0
Confl. Peds. (#/hr)		18
Heavy Vehicles (%)	3%	3%
Turn Type	NA	
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	18.9	
Effective Green, g (s)	18.9	
Actuated g/C Ratio	0.13	
Clearance Time (s)	5.9	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	211	
v/s Ratio Prot	c0.06	
v/s Ratio Perm		
v/c Ratio	0.51	
Uniform Delay, d1	61.2	
Progression Factor	1.00	
Incremental Delay, d2	1.9	
Delay (s)	63.1	
Level of Service	E	
Approach Delay (s)	69.9	
Approach LOS	E	

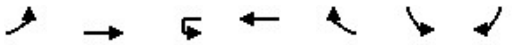
Intersection Summary

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	155	70	75	230	195	130
Future Vol, veh/h	155	70	75	230	195	130
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	5	1	5	1	1
Mvmt Flow	167	75	81	247	210	140
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11.8	12.7	12.2
HCM LOS	B	B	B

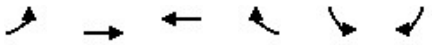
Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	25%	69%	0%
Vol Thru, %	75%	0%	60%
Vol Right, %	0%	31%	40%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	305	225	325
LT Vol	75	155	0
Through Vol	230	0	195
RT Vol	0	70	130
Lane Flow Rate	328	242	349
Geometry Grp	1	1	1
Degree of Util (X)	0.47	0.371	0.472
Departure Headway (Hd)	5.155	5.52	4.861
Convergence, Y/N	Yes	Yes	Yes
Cap	702	651	744
Service Time	3.166	3.556	2.872
HCM Lane V/C Ratio	0.467	0.372	0.469
HCM Control Delay	12.7	11.8	12.2
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.5	1.7	2.5



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	155	1345	0	1450	155	90	150
Future Volume (vph)	155	1345	0	1450	155	90	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3		6.3	6.3	6.4	6.4
Lane Util. Factor	1.00	0.95		0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.96	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1719	3505		3574	1512	1736	1599
Flt Permitted	0.12	1.00		1.00	1.00	0.95	1.00
Satd. Flow (perm)	213	3505		3574	1512	1736	1599
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	165	1431	0	1543	165	96	160
RTOR Reduction (vph)	0	0	0	0	16	0	144
Lane Group Flow (vph)	165	1431	0	1543	149	96	16
Confl. Peds. (#/hr)	6		20		6	20	
Heavy Vehicles (%)	5%	3%	0%	1%	3%	4%	1%
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	Perm
Protected Phases	5	2	1	6		8	
Permitted Phases	2		6		6	4	4
Actuated Green, G (s)	123.6	123.6		107.7	107.7	13.7	13.7
Effective Green, g (s)	123.6	123.6		107.7	107.7	13.7	13.7
Actuated g/C Ratio	0.82	0.82		0.72	0.72	0.09	0.09
Clearance Time (s)	4.0	6.3		6.3	6.3	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	294	2888		2566	1085	158	146
v/s Ratio Prot	c0.04	0.41		c0.43		c0.06	
v/s Ratio Perm	0.42				0.10		0.01
v/c Ratio	0.56	0.50		0.60	0.14	0.61	0.11
Uniform Delay, d1	10.4	3.9		10.5	6.6	65.6	62.5
Progression Factor	1.00	1.00		2.13	2.34	1.00	1.00
Incremental Delay, d2	2.4	0.6		0.9	0.2	6.5	0.3
Delay (s)	12.8	4.5		23.2	15.7	72.0	62.9
Level of Service	B	A		C	B	E	E
Approach Delay (s)		5.4		22.4		66.3	
Approach LOS		A		C		E	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.7
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	105	1325	1490	25	15	135
Future Volume (veh/h)	105	1325	1490	25	15	135
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1841	1870	1767	1707	1885
Adj Flow Rate, veh/h	112	1410	1585	27	16	144
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	4	2	9	13	1
Cap, veh/h	134	2838	2490	1048	170	167
Arrive On Green	0.10	1.00	0.70	0.70	0.10	0.10
Sat Flow, veh/h	1810	3589	3647	1496	1626	1598
Grp Volume(v), veh/h	112	1410	1585	27	16	144
Grp Sat Flow(s),veh/h/ln	1810	1749	1777	1496	1626	1598
Q Serve(g_s), s	9.1	0.0	36.2	0.8	1.3	13.3
Cycle Q Clear(g_c), s	9.1	0.0	36.2	0.8	1.3	13.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	134	2838	2490	1048	170	167
V/C Ratio(X)	0.84	0.50	0.64	0.03	0.09	0.86
Avail Cap(c_a), veh/h	199	2838	2490	1048	347	341
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.7	0.0	12.1	6.8	60.7	66.1
Incr Delay (d2), s/veh	15.2	0.5	1.3	0.0	0.2	12.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.2	13.5	0.3	0.6	11.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	81.9	0.5	13.4	6.9	61.0	78.2
LnGrp LOS	F	A	B	A	E	E
Approach Vol, veh/h		1522	1612		160	
Approach Delay, s/veh		6.5	13.3		76.5	
Approach LOS		A	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		128.0		22.0	16.6	111.4
Change Period (Y+Rc), s		6.3		6.3	5.5	6.3
Max Green Setting (Gmax), s		105.4		32.0	16.5	83.4
Max Q Clear Time (g_c+I1), s		2.0		15.3	11.1	38.2
Green Ext Time (p_c), s		16.8		0.4	0.1	17.6

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	80	10	15	475	290	85
Future Vol, veh/h	80	10	15	475	290	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	86	11	16	511	312	91

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	901	358	403	0	-	0
Stage 1	358	-	-	-	-	-
Stage 2	543	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	309	686	1156	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	303	686	1156	-	-	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	582	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.8	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1156	-	323	-	-
HCM Lane V/C Ratio	0.014	-	0.3	-	-
HCM Control Delay (s)	8.2	0	20.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.2	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	5	0	5	540	10	0	370	0
Future Vol, veh/h	0	0	0	5	5	0	5	540	10	0	370	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	5	0	5	581	11	0	398	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	997	1000	398	995	995	587	398	0	0	592	0	0
Stage 1	398	398	-	597	597	-	-	-	-	-	-	-
Stage 2	599	602	-	398	398	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	223	243	652	224	245	510	1161	-	-	984	-	-
Stage 1	628	603	-	490	491	-	-	-	-	-	-	-
Stage 2	488	489	-	628	603	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	218	242	652	223	244	510	1161	-	-	984	-	-
Mov Cap-2 Maneuver	218	242	-	223	244	-	-	-	-	-	-	-
Stage 1	624	603	-	487	488	-	-	-	-	-	-	-
Stage 2	480	486	-	628	603	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	21.2	0.1	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1161	-	-	-	233	984	-	-
HCM Lane V/C Ratio	0.005	-	-	-	0.046	-	-	-
HCM Control Delay (s)	8.1	0	-	0	21.2	0	-	-
HCM Lane LOS	A	A	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	125	15	30	135	5	20	95	60	10	75	15
Future Vol, veh/h	30	125	15	30	135	5	20	95	60	10	75	15
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles, %	4	4	14	4	2	0	11	1	0	0	0	0
Mvmt Flow	41	171	21	41	185	7	27	130	82	14	103	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.3	11.4	11.5	10
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	18%	18%	10%
Vol Thru, %	54%	74%	79%	75%
Vol Right, %	34%	9%	3%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	170	170	100
LT Vol	20	30	30	10
Through Vol	95	125	135	75
RT Vol	60	15	5	15
Lane Flow Rate	240	233	233	137
Geometry Grp	1	1	1	1
Degree of Util (X)	0.36	0.348	0.35	0.21
Departure Headway (Hd)	5.412	5.383	5.415	5.52
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	664	668	664	649
Service Time	3.452	3.42	3.453	3.564
HCM Lane V/C Ratio	0.361	0.349	0.351	0.211
HCM Control Delay	11.5	11.3	11.4	10
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	1.6	1.6	1.6	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	25	110	55	25	45	105	465	35	15	300	10
Future Volume (vph)	25	25	110	55	25	45	105	465	35	15	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.91			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1676			1801	1583	1770	1843		1770	1854	
Flt Permitted		0.93			0.29	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1567			533	1583	1770	1843		1770	1854	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	120	60	27	49	114	505	38	16	326	11
RTOR Reduction (vph)	0	93	0	0	0	40	0	2	0	0	1	0
Lane Group Flow (vph)	0	81	0	0	87	9	114	541	0	16	336	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			3		5	2		1	6	
Permitted Phases	4			3		3						
Actuated Green, G (s)		10.7			19.1	19.1	16.2	52.2		3.0	39.0	
Effective Green, g (s)		10.7			19.1	19.1	16.2	52.2		3.0	39.0	
Actuated g/C Ratio		0.10			0.18	0.18	0.15	0.50		0.03	0.37	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		159			96	287	273	916		50	688	
v/s Ratio Prot							c0.06	c0.29		0.01	0.18	
v/s Ratio Perm		c0.05			c0.16	0.01						
v/c Ratio		0.51			0.91	0.03	0.42	0.59		0.32	0.49	
Uniform Delay, d1		44.7			42.1	35.3	40.1	18.8		50.0	25.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.8			61.8	0.0	1.0	2.8		3.7	2.5	
Delay (s)		47.5			103.9	35.4	41.2	21.6		53.7	27.8	
Level of Service		D			F	D	D	C		D	C	
Approach Delay (s)		47.5			79.2			25.0			29.0	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	0	165	5	0	0	315	465	15	0	290	55
Future Vol, veh/h	40	0	165	5	0	0	315	465	15	0	290	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	9	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	-	100	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	0	1	0	0	0	1	3	0	0	1	2
Mvmt Flow	40	0	165	5	0	0	315	465	15	0	290	55

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1393	1409	290	1402	1402	482	290	0	0	489	0	0
Stage 1	290	290	-	1112	1112	-	-	-	-	-	-	-
Stage 2	1103	1119	-	290	290	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.5	6.21	7.1	6.5	6.2	4.11	-	-	4.1	-	-
Critical Hdwy Stg 1	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4	3.309	3.5	4	3.3	2.209	-	-	2.2	-	-
Pot Cap-1 Maneuver	119	140	752	119	141	588	1278	-	-	1085	-	-
Stage 1	716	676	-	256	287	-	-	-	-	-	-	-
Stage 2	255	285	-	722	676	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	96	105	752	75	106	584	1278	-	-	1077	-	-
Mov Cap-2 Maneuver	96	105	-	75	106	-	-	-	-	-	-	-
Stage 1	540	676	-	191	215	-	-	-	-	-	-	-
Stage 2	192	213	-	564	676	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16	0	3.5	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1278	-	-	492	-	1077	-	-
HCM Lane V/C Ratio	0.246	-	-	0.335	-	-	-	-
HCM Control Delay (s)	8.7	-	-	16	0	0	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	1	-	-	1.5	-	0	-	-

HCM 6th Signalized Intersection Summary
2: 61st Ave NE & SR 522 08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	310	1715	135	10	1750	260	45	25	5	125	45	265
Future Volume (veh/h)	310	1715	135	10	1750	260	45	25	5	125	45	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1856	1900	1870	1856	1900	1900	1900	1841	1900	1900
Adj Flow Rate, veh/h	310	1715	135	10	1750	0	45	25	5	125	0	295
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	0	2	3	0	0	0	4	0	0
Cap, veh/h	257	2245	977	21	1794		58	172	34	148	0	509
Arrive On Green	0.14	0.64	0.64	0.01	0.50	0.00	0.03	0.11	0.11	0.08	0.00	0.16
Sat Flow, veh/h	1795	3526	1533	1810	3554	1572	1810	1526	305	1753	0	3084
Grp Volume(v), veh/h	310	1715	135	10	1750	0	45	0	30	125	0	295
Grp Sat Flow(s),veh/h/ln	1795	1763	1533	1810	1777	1572	1810	0	1831	1753	0	1542
Q Serve(g_s), s	21.5	51.6	5.3	0.8	72.1	0.0	3.7	0.0	2.2	10.5	0.0	13.3
Cycle Q Clear(g_c), s	21.5	51.6	5.3	0.8	72.1	0.0	3.7	0.0	2.2	10.5	0.0	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	257	2245	977	21	1794		58	0	206	148	0	509
V/C Ratio(X)	1.20	0.76	0.14	0.49	0.98		0.77	0.00	0.15	0.85	0.00	0.58
Avail Cap(c_a), veh/h	257	2245	977	60	1794		60	0	228	244	0	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	64.3	19.3	10.8	73.7	36.2	0.0	72.0	0.0	60.0	67.7	0.0	57.8
Incr Delay (d2), s/veh	122.9	2.5	0.3	16.7	16.2	0.0	44.2	0.0	0.3	13.1	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.5	20.5	1.9	0.5	33.8	0.0	2.4	0.0	1.1	5.3	0.0	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	187.2	21.8	11.1	90.4	52.4	0.0	116.2	0.0	60.3	80.8	0.0	58.9
LnGrp LOS	F	C	B	F	D		F	A	E	F	A	E
Approach Vol, veh/h		2160			1760	A		75			420	
Approach Delay, s/veh		44.9			52.6			93.9			65.4	
Approach LOS		D			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	82.0	18.2	22.8	7.2	101.8	10.3	30.6
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	* 5.9
Max Green Setting (Gmax), s	21.5	65.7	20.9	18.7	5.0	82.2	5.0	* 35
Max Q Clear Time (g_c+I1), s	23.5	74.1	12.5	4.2	2.8	53.6	5.7	15.3
Green Ext Time (p_c), s	0.0	0.0	0.2	0.1	0.0	16.6	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	50.7
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	170	10	20	180	35	15	35	45	40	15	10
Future Vol, veh/h	10	170	10	20	180	35	15	35	45	40	15	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	170	10	20	180	35	15	35	45	40	15	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	9.3	8.4	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	5%	9%	62%
Vol Thru, %	37%	89%	77%	23%
Vol Right, %	47%	5%	15%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	190	235	65
LT Vol	15	10	20	40
Through Vol	35	170	180	15
RT Vol	45	10	35	10
Lane Flow Rate	95	190	235	65
Geometry Grp	1	1	1	1
Degree of Util (X)	0.124	0.239	0.289	0.09
Departure Headway (Hd)	4.689	4.526	4.429	5.011
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	762	792	811	712
Service Time	2.734	2.561	2.463	3.058
HCM Lane V/C Ratio	0.125	0.24	0.29	0.091
HCM Control Delay	8.4	9	9.3	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.9	1.2	0.3

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	165	45	5	10	0
Future Vol, veh/h	20	165	45	5	10	0
Conflicting Peds, #/hr	110	0	0	110	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	1	2	0	25	0
Mvmt Flow	20	165	45	5	10	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	160	0	-	0	363	158
Stage 1	-	-	-	-	158	-
Stage 2	-	-	-	-	205	-
Critical Hdwy	4.16	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.254	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	1395	-	-	-	593	893
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	777	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1267	-	-	-	480	811
Mov Cap-2 Maneuver	-	-	-	-	480	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	706	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1267	-	-	-	480
HCM Lane V/C Ratio	0.016	-	-	-	0.021
HCM Control Delay (s)	7.9	0	-	-	12.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th Signalized Intersection Summary
5: 68th Ave NE & NE 181st St 08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	210	125	60	125	30	185	155	95	50	95	35
Future Volume (veh/h)	65	210	125	60	125	30	185	155	95	50	95	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	0.98		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1900	1841	1885	1900	1885	1856	1885	1870	1870	1900
Adj Flow Rate, veh/h	65	210	125	60	125	30	185	155	95	50	95	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0	4	1	0	1	3	1	2	2	0
Cap, veh/h	84	296	176	77	389	93	648	524	321	537	636	234
Arrive On Green	0.05	0.27	0.27	0.04	0.27	0.27	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1810	1094	651	1753	1453	349	1247	1066	653	1115	1294	477
Grp Volume(v), veh/h	65	0	335	60	0	155	185	0	250	50	0	130
Grp Sat Flow(s),veh/h/ln	1810	0	1745	1753	0	1801	1247	0	1719	1115	0	1770
Q Serve(g_s), s	3.0	0.0	14.7	2.9	0.0	5.9	8.1	0.0	7.4	2.4	0.0	3.4
Cycle Q Clear(g_c), s	3.0	0.0	14.7	2.9	0.0	5.9	11.5	0.0	7.4	9.7	0.0	3.4
Prop In Lane	1.00		0.37	1.00		0.19	1.00		0.38	1.00		0.27
Lane Grp Cap(c), veh/h	84	0	472	77	0	482	648	0	845	537	0	871
V/C Ratio(X)	0.77	0.00	0.71	0.78	0.00	0.32	0.29	0.00	0.30	0.09	0.00	0.15
Avail Cap(c_a), veh/h	138	0	684	190	0	763	648	0	845	537	0	871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.85	0.00	0.85	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	0.0	28.0	40.2	0.0	24.9	15.0	0.0	12.9	15.7	0.0	11.9
Incr Delay (d2), s/veh	13.9	0.0	2.0	15.6	0.0	0.4	0.9	0.0	0.8	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	6.2	1.6	0.0	2.5	2.4	0.0	2.9	0.6	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	0.0	30.0	55.9	0.0	25.3	16.0	0.0	13.6	16.1	0.0	12.2
LnGrp LOS	D	A	C	E	A	C	B	A	B	B	A	B
Approach Vol, veh/h		400			215			435			180	
Approach Delay, s/veh		33.9			33.8			14.6			13.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	47.3	9.2	28.5	47.3	9.4	28.3
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	26.0	9.2	33.3	26.0	6.5	36.0
Max Q Clear Time (g_c+I1), s	13.5	4.9	16.7	11.7	5.0	7.9
Green Ext Time (p_c), s	1.8	0.0	1.9	0.7	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

HCM Signalized Intersection Capacity Analysis
6: 68th Ave NE & SR 522 08/24/2022

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	125	1165	415	10	165	1295	105	685	200	135	130
Future Volume (vph)	5	125	1165	415	10	165	1295	105	685	200	135	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3	6.3		5.9	5.9	5.9	4.0	6.3		4.0
Lane Util. Factor		1.00	0.95	1.00		0.97	0.95	1.00	0.97	0.95		1.00
Frpb, ped/bikes		1.00	1.00	0.97		1.00	1.00	0.97	1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	0.94		1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00		0.95
Satd. Flow (prot)		1771	3471	1554		3437	3539	1538	3433	3235		1752
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00		0.95
Satd. Flow (perm)		1771	3471	1554		3437	3539	1538	3433	3235		1752
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	125	1165	415	10	165	1295	105	685	200	135	130
RTOR Reduction (vph)	0	0	0	85	0	0	0	54	0	84	0	0
Lane Group Flow (vph)	0	130	1165	330	0	175	1295	51	685	251	0	130
Confl. Peds. (#/hr)	18	13		10	25	10		13	24		25	25
Heavy Vehicles (%)	0%	2%	4%	1%	0%	2%	2%	2%	2%	1%	5%	3%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases				2				6				
Actuated Green, G (s)		16.3	75.5	75.5		13.0	72.2	72.2	25.0	23.3		15.7
Effective Green, g (s)		16.3	75.5	75.5		13.0	72.2	72.2	25.0	23.3		15.7
Actuated g/C Ratio		0.11	0.50	0.50		0.09	0.48	0.48	0.17	0.16		0.10
Clearance Time (s)		6.3	6.3	6.3		5.9	5.9	5.9	4.0	6.3		4.0
Vehicle Extension (s)		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		192	1747	782		297	1703	740	572	502		183
v/s Ratio Prot		c0.07	c0.34			0.05	c0.37		c0.20	0.08		0.07
v/s Ratio Perm				0.21				0.03				
v/c Ratio		0.68	0.67	0.42		0.59	0.76	0.07	1.20	0.50		0.71
Uniform Delay, d1		64.3	27.8	23.5		65.9	31.8	20.9	62.5	58.0		65.0
Progression Factor		1.00	1.00	1.00		1.16	0.64	1.50	0.95	0.91		1.00
Incremental Delay, d2		9.1	2.0	1.7		2.2	2.4	0.1	104.3	0.7		12.2
Delay (s)		73.4	29.9	25.2		78.7	22.7	31.4	163.6	53.6		77.2
Level of Service		E	C	C		E	C	C	F	D		E
Approach Delay (s)			32.0				29.5			127.5		
Approach LOS			C				C			F		

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	160	70
Future Volume (vph)	160	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.3	
Lane Util. Factor	0.95	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.95	
Flt Protected	1.00	
Satd. Flow (prot)	3312	
Flt Permitted	1.00	
Satd. Flow (perm)	3312	
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	160	70
RTOR Reduction (vph)	36	0
Lane Group Flow (vph)	194	0
Confl. Peds. (#/hr)		24
Heavy Vehicles (%)	2%	3%
Turn Type	NA	
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	14.0	
Effective Green, g (s)	14.0	
Actuated g/C Ratio	0.09	
Clearance Time (s)	6.3	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	309	
v/s Ratio Prot	c0.06	
v/s Ratio Perm		
v/c Ratio	0.63	
Uniform Delay, d1	65.5	
Progression Factor	1.00	
Incremental Delay, d2	3.9	
Delay (s)	69.4	
Level of Service	E	
Approach Delay (s)	72.2	
Approach LOS	E	

Intersection Summary

HCM 6th Signalized Intersection Summary
7: 68th Ave NE & NE 175th St 08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	50	120	45	10	10	20	900	115	0	680	15
Future Volume (veh/h)	10	50	120	45	10	10	20	900	115	0	680	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	0.99		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1841	1900	1900	1693	1900	1826	1856	1856	0	1856	1900
Adj Flow Rate, veh/h	10	50	120	45	10	10	20	900	115	0	680	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	20	4	0	0	14	0	5	3	3	0	3	0
Cap, veh/h	73	204	193	159	34	20	69	2173	274	0	1335	1112
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.72	0.72	0.72	0.00	1.00	1.00
Sat Flow, veh/h	135	1658	1574	631	273	164	26	3019	381	0	1856	1545
Grp Volume(v), veh/h	60	0	120	65	0	0	549	0	486	0	680	15
Grp Sat Flow(s),veh/h/ln	1793	0	1574	1069	0	0	1815	0	1611	0	1856	1545
Q Serve(g_s), s	0.0	0.0	5.4	2.6	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	5.4	4.8	0.0	0.0	8.8	0.0	9.1	0.0	0.0	0.0
Prop In Lane	0.17		1.00	0.69		0.15	0.04		0.24	0.00		1.00
Lane Grp Cap(c), veh/h	277	0	193	213	0	0	1356	0	1159	0	1335	1112
V/C Ratio(X)	0.22	0.00	0.62	0.31	0.00	0.00	0.40	0.00	0.42	0.00	0.51	0.01
Avail Cap(c_a), veh/h	897	0	755	641	0	0	1356	0	1159	0	1335	1112
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.81	0.81
Uniform Delay (d), s/veh	29.8	0.0	31.2	31.1	0.0	0.0	4.2	0.0	4.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	3.2	0.8	0.0	0.0	0.9	0.0	1.1	0.0	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	2.2	1.1	0.0	0.0	2.8	0.0	2.6	0.0	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	0.0	34.4	31.9	0.0	0.0	5.1	0.0	5.3	0.0	1.1	0.0
LnGrp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		180			65			1035			695	
Approach Delay, s/veh		33.0			31.9			5.2			1.1	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	59.9	15.1	59.9	15.1
Change Period (Y+Rc), s	5.9	5.9	5.9	5.9
Max Green Setting (Gmax), s	27.2	36.0	27.2	36.0
Max Q Clear Time (g_c+I1), s	11.1	7.4	2.0	6.8
Green Ext Time (p_c), s	6.7	0.7	5.5	0.3

Intersection Summary	
HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
8: 68th Ave NE & NE 170th St

08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	0	10	30	5	550	5	545	20	410	565	50
Future Volume (veh/h)	45	0	10	30	5	550	5	545	20	410	565	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	0	10	30	5	550	5	545	20	410	565	50
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	308	8	52	478	73	491	12	891	33	414	819	72
Arrive On Green	0.31	0.00	0.31	0.31	0.31	0.31	0.01	0.26	0.26	0.23	0.48	0.48
Sat Flow, veh/h	729	27	168	1271	237	1585	1781	3496	128	1781	1694	150
Grp Volume(v), veh/h	55	0	0	35	0	550	5	277	288	410	0	615
Grp Sat Flow(s),veh/h/ln	923	0	0	1508	0	1585	1781	1777	1847	1781	0	1843
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	24.8	0.2	11.0	11.0	18.4	0.0	20.7
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.1	0.0	24.8	0.2	11.0	11.0	18.4	0.0	20.7
Prop In Lane	0.82		0.18	0.86		1.00	1.00		0.07	1.00		0.08
Lane Grp Cap(c), veh/h	368	0	0	551	0	491	12	453	471	414	0	891
V/C Ratio(X)	0.15	0.00	0.00	0.06	0.00	1.12	0.43	0.61	0.61	0.99	0.00	0.69
Avail Cap(c_a), veh/h	370	0	0	551	0	491	111	458	476	414	0	891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	0.0	19.4	0.0	27.6	39.6	26.3	26.3	30.6	0.0	16.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.0	77.5	22.8	6.0	5.8	41.5	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.4	0.0	19.6	0.2	5.3	5.5	12.4	0.0	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	0.0	0.0	19.5	0.0	105.1	62.3	32.3	32.1	72.1	0.0	20.4
LnGrp LOS	C	A	A	B	A	F	E	C	C	E	A	C
Approach Vol, veh/h		55			585			570			1025	
Approach Delay, s/veh		20.5			100.0			32.5			41.1	
Approach LOS		C			F			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.0	25.8		30.2	5.7	44.1		30.2				
Change Period (Y+Rc), s	5.4	* 5.4		5.4	5.2	5.4		* 5.4				
Max Green Setting (Gmax), s	18.6	* 21		24.8	5.0	34.2		* 25				
Max Q Clear Time (g_c+I1), s	20.4	13.0		26.8	2.2	22.7		5.7				
Green Ext Time (p_c), s	0.0	2.1		0.0	0.0	3.4		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		53.8
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	30	450	0	35	425
Future Vol, veh/h	0	30	450	0	35	425
Conflicting Peds, #/hr	1	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	0	30	450	0	35	425

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	946	452	0	0	450	0
Stage 1	450	-	-	-	-	-
Stage 2	496	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	293	612	-	-	1121	-
Stage 1	647	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	281	611	-	-	1121	-
Mov Cap-2 Maneuver	281	-	-	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	611	1121	-
HCM Lane V/C Ratio	-	-	0.049	0.031	-
HCM Control Delay (s)	-	-	11.2	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

HCM Signalized Intersection Capacity Analysis
10: Juanita Dr NE & NE Arrowhead Dr/NE 153rd Pl 08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	25	30	30	35	20	55	310	25	40	285	75
Future Volume (vph)	55	25	30	30	35	20	55	310	25	40	285	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.94			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			0.97		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	1621			1692		1805	1874		1671	1815	
Flt Permitted	0.72	1.00			0.86		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1321	1621			1482		1805	1874		1671	1815	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	25	30	30	35	20	55	310	25	40	285	75
RTOR Reduction (vph)	0	27	0	0	18	0	0	1	0	0	5	0
Lane Group Flow (vph)	55	28	0	0	67	0	55	334	0	40	355	0
Confl. Peds. (#/hr)	3		15	15		3	3		4	4		3
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	12%	0%	0%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3			7								
Actuated Green, G (s)	8.1	8.1			8.1		7.1	61.6		5.3	59.8	
Effective Green, g (s)	8.1	8.1			8.1		7.1	61.6		5.3	59.8	
Actuated g/C Ratio	0.09	0.09			0.09		0.08	0.68		0.06	0.66	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	118	145			133		142	1282		98	1205	
v/s Ratio Prot		0.02					c0.03	0.18		0.02	c0.20	
v/s Ratio Perm	0.04				c0.05							
v/c Ratio	0.47	0.19			0.50		0.39	0.26		0.41	0.29	
Uniform Delay, d1	38.9	37.9			39.0		39.4	5.5		40.8	6.3	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.6			3.0		1.8	0.5		2.8	0.6	
Delay (s)	41.8	38.6			42.0		41.1	5.9		43.6	6.9	
Level of Service	D	D			D		D	A		D	A	
Approach Delay (s)		40.2			42.0			10.9			10.6	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	46.9%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

MOVEMENT SUMMARY

Site: 101 [2030 (Site Folder: NE 192nd and 73rd Ave NE)]

Kenmore - 2030
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 73r Ave NE														
8	T1	215	4.0	234	4.0	0.396	4.3	LOS A	2.6	66.0	0.28	0.44	0.28	37.2
18	R2	280	1.0	304	1.0	0.396	4.3	LOS A	2.6	66.0	0.28	0.44	0.28	36.1
Approach		495	2.3	538	2.3	0.396	4.3	LOS A	2.6	66.0	0.28	0.44	0.28	36.6
East: NE 192nd St														
1	L2	185	2.0	201	2.0	0.248	10.8	LOS B	1.3	33.8	0.41	0.64	0.41	35.0
16	R2	95	1.0	103	1.0	0.248	4.9	LOS A	1.3	33.8	0.41	0.64	0.41	34.0
Approach		280	1.7	304	1.7	0.248	8.8	LOS A	1.3	33.8	0.41	0.64	0.41	34.7
North: 73r Ave NE														
7	L2	70	5.0	76	5.0	0.176	10.6	LOS B	0.9	23.6	0.37	0.55	0.37	35.8
4	T1	125	5.0	136	5.0	0.176	4.7	LOS A	0.9	23.6	0.37	0.55	0.37	35.8
Approach		195	5.0	212	5.0	0.176	6.8	LOS A	0.9	23.6	0.37	0.55	0.37	35.8
All Vehicles		970	2.7	1054	2.7	0.396	6.1	LOS A	2.6	66.0	0.34	0.52	0.34	35.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

HCM 6th Signalized Intersection Summary
12: 73rd Ave NE & NE 181st St 08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	15	150	15	5	15	90	260	5	10	175	145
Future Volume (veh/h)	240	15	150	15	5	15	90	260	5	10	175	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1707	1885	1900	1900	1900	1870	1900	1648	1693	1856	1885
Adj Flow Rate, veh/h	240	15	150	15	5	15	90	260	5	10	175	145
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	13	1	0	0	0	2	0	17	14	3	1
Cap, veh/h	272	12	432	54	28	21	618	1124	22	618	565	468
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	725	45	1580	0	102	76	1055	1857	36	1003	933	773
Grp Volume(v), veh/h	255	0	150	35	0	0	90	0	265	10	0	320
Grp Sat Flow(s),veh/h/ln	770	0	1580	178	0	0	1055	0	1893	1003	0	1706
Q Serve(g_s), s	0.0	0.0	7.2	0.0	0.0	0.0	4.3	0.0	6.1	0.4	0.0	8.7
Cycle Q Clear(g_c), s	26.0	0.0	7.2	26.0	0.0	0.0	13.0	0.0	6.1	6.5	0.0	8.7
Prop In Lane	0.94		1.00	0.43		0.43	1.00		0.02	1.00		0.45
Lane Grp Cap(c), veh/h	284	0	432	103	0	0	618	0	1146	618	0	1033
V/C Ratio(X)	0.90	0.00	0.35	0.34	0.00	0.00	0.15	0.00	0.23	0.02	0.00	0.31
Avail Cap(c_a), veh/h	284	0	432	103	0	0	618	0	1146	618	0	1033
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.93	0.00	0.93	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.8	0.0	27.7	28.4	0.0	0.0	12.3	0.0	8.6	10.1	0.0	9.1
Incr Delay (d2), s/veh	28.5	0.0	0.5	1.9	0.0	0.0	0.5	0.0	0.4	0.0	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.0	2.8	0.6	0.0	0.0	1.0	0.0	2.4	0.1	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.3	0.0	28.2	30.4	0.0	0.0	12.7	0.0	9.0	10.2	0.0	9.9
LnGrp LOS	E	A	C	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		405			35			355			330	
Approach Delay, s/veh		51.5			30.4			10.0			9.9	
Approach LOS		D			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		63.5		31.5		63.5		31.5				
Change Period (Y+Rc), s		6.0		5.5		6.0		5.5				
Max Green Setting (Gmax), s		28.0		26.0		28.0		24.0				
Max Q Clear Time (g_c+I1), s		15.0		28.0		10.7		28.0				
Green Ext Time (p_c), s		1.5		0.0		1.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	25.5
HCM 6th LOS	C

HCM Signalized Intersection Capacity Analysis
13: 73rd Ave NE & SR 522 08/24/2022

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	25	75	1315	25	20	85	1450	220	40	75	90	235
Future Volume (vph)	25	75	1315	25	20	85	1450	220	40	75	90	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.3	6.3		5.5	6.3	6.3	4.0	5.5	5.5	4.0
Lane Util. Factor		1.00	0.95	1.00		1.00	0.95	1.00	1.00	1.00	1.00	0.97
Frpb, ped/bikes		1.00	1.00	0.94		1.00	1.00	0.94	1.00	1.00	0.95	1.00
Flpb, ped/bikes		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		1765	3471	1330		1735	3539	1491	1612	1863	1503	3467
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		1765	3471	1330		1735	3539	1491	1612	1863	1503	3467
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	75	1315	25	20	85	1450	220	40	75	90	235
RTOR Reduction (vph)	0	0	0	10	0	0	0	49	0	0	83	0
Lane Group Flow (vph)	0	100	1315	15	0	105	1450	171	40	75	7	235
Confl. Peds. (#/hr)	18	14		15	28	15		14	18		28	28
Heavy Vehicles (%)	0%	3%	4%	14%	0%	5%	2%	2%	12%	2%	2%	1%
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases				2				6			8	
Actuated Green, G (s)		14.1	88.3	88.3		14.5	88.7	88.7	6.2	12.3	12.3	13.6
Effective Green, g (s)		14.1	88.3	88.3		14.5	88.7	88.7	6.2	12.3	12.3	13.6
Actuated g/C Ratio		0.09	0.59	0.59		0.10	0.59	0.59	0.04	0.08	0.08	0.09
Clearance Time (s)		5.5	6.3	6.3		5.5	6.3	6.3	4.0	5.5	5.5	4.0
Vehicle Extension (s)		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		165	2043	782		167	2092	881	66	152	123	314
v/s Ratio Prot		0.06	0.38			c0.06	c0.41		0.02	0.04		c0.07
v/s Ratio Perm				0.01				0.11			0.00	
v/c Ratio		0.61	0.64	0.02		0.63	0.69	0.19	0.61	0.49	0.06	0.75
Uniform Delay, d1		65.3	20.4	12.8		65.2	21.2	14.2	70.7	65.9	63.5	66.5
Progression Factor		0.98	0.57	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		4.8	1.2	0.0		7.2	1.9	0.5	14.7	2.5	0.2	9.4
Delay (s)		68.7	13.0	12.9		72.4	23.1	14.6	85.4	68.4	63.7	75.9
Level of Service		E	B	B		E	C	B	F	E	E	E
Approach Delay (s)			16.8				25.0			69.7		
Approach LOS			B				C			E		

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	21.7
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	70	70
Future Volume (vph)	70	70
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.9	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.98	
Flpb, ped/bikes	1.00	
Frt	0.93	
Flt Protected	1.00	
Satd. Flow (prot)	1677	
Flt Permitted	1.00	
Satd. Flow (perm)	1677	
Peak-hour factor, PHF	1.00	1.00
Adj. Flow (vph)	70	70
RTOR Reduction (vph)	29	0
Lane Group Flow (vph)	111	0
Confl. Peds. (#/hr)		18
Heavy Vehicles (%)	3%	3%
Turn Type	NA	
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	19.3	
Effective Green, g (s)	19.3	
Actuated g/C Ratio	0.13	
Clearance Time (s)	5.9	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	215	
v/s Ratio Prot	c0.07	
v/s Ratio Perm		
v/c Ratio	0.52	
Uniform Delay, d1	61.0	
Progression Factor	1.00	
Incremental Delay, d2	2.1	
Delay (s)	63.1	
Level of Service	E	
Approach Delay (s)	71.1	
Approach LOS	E	

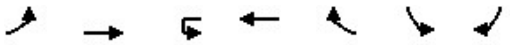
Intersection Summary

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	160	70	75	235	200	135
Future Vol, veh/h	160	70	75	235	200	135
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	1	5	1	5	1	1
Mvmt Flow	160	70	75	235	200	135
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	11.3	12	11.4
HCM LOS	B	B	B

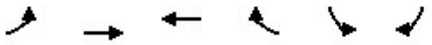
Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	24%	70%	0%
Vol Thru, %	76%	0%	60%
Vol Right, %	0%	30%	40%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	310	230	335
LT Vol	75	160	0
Through Vol	235	0	200
RT Vol	0	70	135
Lane Flow Rate	310	230	335
Geometry Grp	1	1	1
Degree of Util (X)	0.437	0.347	0.436
Departure Headway (Hd)	5.078	5.435	4.786
Convergence, Y/N	Yes	Yes	Yes
Cap	713	665	757
Service Time	3.078	3.448	2.786
HCM Lane V/C Ratio	0.435	0.346	0.443
HCM Control Delay	12	11.3	11.4
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.2	1.5	2.2



Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (vph)	170	1465	0	1580	170	100	160
Future Volume (vph)	170	1465	0	1580	170	100	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.3		6.3	6.3	6.4	6.4
Lane Util. Factor	1.00	0.95		0.95	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.96	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1719	3505		3574	1512	1736	1599
Flt Permitted	0.11	1.00		1.00	1.00	0.95	1.00
Satd. Flow (perm)	197	3505		3574	1512	1736	1599
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	1465	0	1580	170	100	160
RTOR Reduction (vph)	0	0	0	0	16	0	142
Lane Group Flow (vph)	170	1465	0	1580	154	100	18
Confl. Peds. (#/hr)	6		20		6	20	
Heavy Vehicles (%)	5%	3%	0%	1%	3%	4%	1%
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	Perm
Protected Phases	5	2	1	6		8	
Permitted Phases	2		6		6	4	4
Actuated Green, G (s)	123.3	123.3		106.3	106.3	14.0	14.0
Effective Green, g (s)	123.3	123.3		106.3	106.3	14.0	14.0
Actuated g/C Ratio	0.82	0.82		0.71	0.71	0.09	0.09
Clearance Time (s)	4.0	6.3		6.3	6.3	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	293	2881		2532	1071	162	149
v/s Ratio Prot	c0.05	0.42		c0.44		c0.06	
v/s Ratio Perm	0.43				0.10		0.01
v/c Ratio	0.58	0.51		0.62	0.14	0.62	0.12
Uniform Delay, d1	12.7	4.1		11.4	7.1	65.4	62.3
Progression Factor	1.00	1.00		2.07	2.27	1.00	1.00
Incremental Delay, d2	2.9	0.6		0.9	0.2	6.8	0.4
Delay (s)	15.6	4.7		24.6	16.3	72.2	62.7
Level of Service	B	A		C	B	E	E
Approach Delay (s)		5.9		23.8		66.4	
Approach LOS		A		C		E	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.7
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	1440	1620	25	15	145
Future Volume (veh/h)	115	1440	1620	25	15	145
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1841	1870	1767	1707	1885
Adj Flow Rate, veh/h	115	1440	1620	25	15	145
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	2	9	13	1
Cap, veh/h	137	2835	2481	1045	171	168
Arrive On Green	0.10	1.00	0.70	0.70	0.11	0.11
Sat Flow, veh/h	1810	3589	3647	1496	1626	1598
Grp Volume(v), veh/h	115	1440	1620	25	15	145
Grp Sat Flow(s),veh/h/ln	1810	1749	1777	1496	1626	1598
Q Serve(g_s), s	9.4	0.0	37.9	0.8	1.2	13.4
Cycle Q Clear(g_c), s	9.4	0.0	37.9	0.8	1.2	13.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	137	2835	2481	1045	171	168
V/C Ratio(X)	0.84	0.51	0.65	0.02	0.09	0.86
Avail Cap(c_a), veh/h	199	2835	2481	1045	347	341
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.5	0.0	12.6	6.9	60.6	66.0
Incr Delay (d2), s/veh	16.0	0.6	1.4	0.0	0.2	12.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.2	14.2	0.2	0.5	12.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	82.5	0.6	13.9	7.0	60.8	78.1
LnGrp LOS	F	A	B	A	E	E
Approach Vol, veh/h		1555	1645		160	
Approach Delay, s/veh		6.6	13.8		76.5	
Approach LOS		A	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		127.9		22.1	16.9	111.0
Change Period (Y+Rc), s		6.3		6.3	5.5	6.3
Max Green Setting (Gmax), s		105.4		32.0	16.5	83.4
Max Q Clear Time (g_c+I1), s		2.0		15.4	11.4	39.9
Green Ext Time (p_c), s		17.5		0.4	0.1	18.0

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	80	10	10	405	250	85
Future Vol, veh/h	80	10	10	405	250	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	10	10	405	250	85

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	718	293	335	0	-	0
Stage 1	293	-	-	-	-	-
Stage 2	425	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	396	746	1224	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	392	746	1224	-	-	-
Mov Cap-2 Maneuver	392	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	659	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1224	-	414	-	-
HCM Lane V/C Ratio	0.008	-	0.217	-	-
HCM Control Delay (s)	8	0	16.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	5	0	5	485	15	0	335	0
Future Vol, veh/h	0	0	0	5	5	0	5	485	15	0	335	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	5	0	5	485	15	0	335	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	840	845	335	838	838	493	335	0	0	500	0	0
Stage 1	335	335	-	503	503	-	-	-	-	-	-	-
Stage 2	505	510	-	335	335	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	285	300	707	286	302	576	1224	-	-	1064	-	-
Stage 1	679	643	-	551	541	-	-	-	-	-	-	-
Stage 2	549	538	-	679	643	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	280	298	707	285	300	576	1224	-	-	1064	-	-
Mov Cap-2 Maneuver	280	298	-	285	300	-	-	-	-	-	-	-
Stage 1	675	643	-	548	538	-	-	-	-	-	-	-
Stage 2	541	535	-	679	643	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	17.8	0.1	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1224	-	-	-	292	1064	-	-
HCM Lane V/C Ratio	0.004	-	-	-	0.034	-	-	-
HCM Control Delay (s)	8	0	-	0	17.8	0	-	-
HCM Lane LOS	A	A	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	130	15	30	140	5	20	95	60	10	75	15
Future Vol, veh/h	30	130	15	30	140	5	20	95	60	10	75	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	4	4	14	4	2	0	11	1	0	0	0	0
Mvmt Flow	30	130	15	30	140	5	20	95	60	10	75	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	9.5	9.5	8.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	17%	17%	10%
Vol Thru, %	54%	74%	80%	75%
Vol Right, %	34%	9%	3%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	175	175	100
LT Vol	20	30	30	10
Through Vol	95	130	140	75
RT Vol	60	15	5	15
Lane Flow Rate	175	175	175	100
Geometry Grp	1	1	1	1
Degree of Util (X)	0.237	0.236	0.237	0.136
Departure Headway (Hd)	4.881	4.845	4.877	4.909
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	732	737	732	725
Service Time	2.941	2.903	2.937	2.977
HCM Lane V/C Ratio	0.239	0.237	0.239	0.138
HCM Control Delay	9.5	9.4	9.5	8.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.9	0.9	0.5

HCM Signalized Intersection Capacity Analysis
19: Simonds Rd NE & NE 155th St/Viking Way 08/24/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	25	115	55	25	45	110	410	35	15	265	10
Future Volume (vph)	25	25	115	55	25	45	110	410	35	15	265	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.91			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1675			1801	1583	1770	1841		1770	1853	
Flt Permitted		0.93			0.28	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1569			516	1583	1770	1841		1770	1853	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	25	115	55	25	45	110	410	35	15	265	10
RTOR Reduction (vph)	0	96	0	0	0	38	0	2	0	0	1	0
Lane Group Flow (vph)	0	69	0	0	80	7	110	443	0	15	274	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			3		5	2		1	6	
Permitted Phases	4			3		3						
Actuated Green, G (s)		10.0			16.0	16.0	15.9	56.0		3.0	43.1	
Effective Green, g (s)		10.0			16.0	16.0	15.9	56.0		3.0	43.1	
Actuated g/C Ratio		0.10			0.15	0.15	0.15	0.53		0.03	0.41	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		149			78	241	268	981		50	760	
v/s Ratio Prot							c0.06	c0.24		0.01	0.15	
v/s Ratio Perm		c0.04			c0.16	0.00						
v/c Ratio		0.46			1.03	0.03	0.41	0.45		0.30	0.36	
Uniform Delay, d1		45.0			44.5	37.9	40.3	15.1		50.0	21.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			109.1	0.0	1.0	1.5		3.4	1.3	
Delay (s)		47.2			153.6	37.9	41.3	16.6		53.3	22.7	
Level of Service		D			F	D	D	B		D	C	
Approach Delay (s)		47.2			112.0			21.5			24.3	
Approach LOS		D			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	0	180	5	0	0	345	505	15	0	315	60
Future Vol, veh/h	45	0	180	5	0	0	345	505	15	0	315	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	9	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	-	100	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	0	1	0	0	0	1	3	0	0	1	2
Mvmt Flow	45	0	180	5	0	0	345	505	15	0	315	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1518	1534	315	1527	1527	522	315	0	0	529	0	0
Stage 1	315	315	-	1212	1212	-	-	-	-	-	-	-
Stage 2	1203	1219	-	315	315	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.5	6.21	7.1	6.5	6.2	4.11	-	-	4.1	-	-
Critical Hdwy Stg 1	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4	3.309	3.5	4	3.3	2.209	-	-	2.2	-	-
Pot Cap-1 Maneuver	97	118	728	97	119	559	1251	-	-	1048	-	-
Stage 1	694	659	-	225	257	-	-	-	-	-	-	-
Stage 2	224	255	-	700	659	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	76	85	728	57	86	555	1251	-	-	1040	-	-
Mov Cap-2 Maneuver	76	85	-	57	86	-	-	-	-	-	-	-
Stage 1	502	659	-	162	185	-	-	-	-	-	-	-
Stage 2	162	183	-	527	659	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.7	0	3.6	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1251	-	-	380	-	1040	-	-
HCM Lane V/C Ratio	0.276	-	-	0.474	-	-	-	-
HCM Control Delay (s)	9	-	-	22.7	0	0	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	1.1	-	-	2.5	-	0	-	-

HCM 6th Signalized Intersection Summary
2: 61st Ave NE & SR 522 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	2200	310	20	2350	375	105	135	10	160	75	340
Future Volume (veh/h)	400	2200	310	20	2350	375	105	135	10	160	75	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1856	1900	1870	1856	1900	1900	1900	1841	1900	1900
Adj Flow Rate, veh/h	400	2200	310	20	2350	0	105	135	10	160	0	390
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	0	2	3	0	0	0	4	0	0
Cap, veh/h	290	2095	911	34	1882		90	224	17	182	0	564
Arrive On Green	0.08	0.59	0.59	0.01	0.35	0.00	0.05	0.13	0.13	0.10	0.00	0.18
Sat Flow, veh/h	3483	3526	1533	1810	3554	1572	1810	1743	129	1753	0	3097
Grp Volume(v), veh/h	400	2200	310	20	2350	0	105	0	145	160	0	390
Grp Sat Flow(s),veh/h/ln	1742	1763	1533	1810	1777	1572	1810	0	1872	1753	0	1548
Q Serve(g_s), s	12.5	89.1	15.4	1.6	79.5	0.0	7.5	0.0	11.0	13.5	0.0	17.7
Cycle Q Clear(g_c), s	12.5	89.1	15.4	1.6	79.5	0.0	7.5	0.0	11.0	13.5	0.0	17.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	290	2095	911	34	1882		90	0	240	182	0	564
V/C Ratio(X)	1.38	1.05	0.34	0.59	1.25		1.16	0.00	0.60	0.88	0.00	0.69
Avail Cap(c_a), veh/h	290	2095	911	60	1882		90	0	297	214	0	723
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.8	30.4	15.5	73.5	48.4	0.0	71.3	0.0	61.8	66.3	0.0	57.4
Incr Delay (d2), s/veh	190.3	34.4	1.0	1.4	112.2	0.0	144.3	0.0	2.4	28.4	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	45.0	5.7	0.8	65.3	0.0	7.1	0.0	5.4	7.5	0.0	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	259.1	64.8	16.5	74.9	160.6	0.0	215.5	0.0	64.2	94.7	0.0	59.3
LnGrp LOS	F	F	B	E	F		F	A	E	F	A	E
Approach Vol, veh/h		2910			2370	A		250			550	
Approach Delay, s/veh		86.4			159.9			127.7			69.6	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	85.8	21.1	25.2	8.3	95.4	13.0	33.2
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	* 5.9
Max Green Setting (Gmax), s	12.5	72.2	18.3	23.8	5.0	79.7	7.5	* 35
Max Q Clear Time (g_c+I1), s	14.5	81.5	15.5	13.0	3.6	91.1	9.5	19.7
Green Ext Time (p_c), s	0.0	0.0	0.1	0.5	0.0	0.0	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	115.2
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	185	10	20	195	40	15	40	50	45	15	10
Future Vol, veh/h	10	185	10	20	195	40	15	40	50	45	15	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	185	10	20	195	40	15	40	50	45	15	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	9.6	8.6	8.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	5%	8%	64%
Vol Thru, %	38%	90%	76%	21%
Vol Right, %	48%	5%	16%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	205	255	70
LT Vol	15	10	20	45
Through Vol	40	185	195	15
RT Vol	50	10	40	10
Lane Flow Rate	105	205	255	70
Geometry Grp	1	1	1	1
Degree of Util (X)	0.139	0.262	0.318	0.1
Departure Headway (Hd)	4.781	4.599	4.489	5.127
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	745	779	798	695
Service Time	2.836	2.641	2.529	3.185
HCM Lane V/C Ratio	0.141	0.263	0.32	0.101
HCM Control Delay	8.6	9.3	9.6	8.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1	1.4	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	180	50	5	10	0
Future Vol, veh/h	20	180	50	5	10	0
Conflicting Peds, #/hr	110	0	0	110	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	1	2	0	25	0
Mvmt Flow	20	180	50	5	10	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	165	0	-	0	383	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	220	-
Critical Hdwy	4.16	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.254	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	1389	-	-	-	577	887
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	765	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1262	-	-	-	467	806
Mov Cap-2 Maneuver	-	-	-	-	467	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1262	-	-	-	467
HCM Lane V/C Ratio	0.016	-	-	-	0.021
HCM Control Delay (s)	7.9	0	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th Signalized Intersection Summary
5: 68th Ave NE & NE 181st St 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	230	135	65	135	35	200	165	105	55	105	40
Future Volume (veh/h)	70	230	135	65	135	35	200	165	105	55	105	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	0.98		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1900	1841	1885	1900	1885	1856	1885	1870	1870	1900
Adj Flow Rate, veh/h	70	230	135	65	135	35	200	165	105	55	105	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0	4	1	0	1	3	1	2	2	0
Cap, veh/h	91	308	181	83	396	103	616	501	319	502	612	233
Arrive On Green	0.05	0.28	0.28	0.05	0.28	0.28	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1810	1101	646	1753	1427	370	1231	1048	667	1096	1280	488
Grp Volume(v), veh/h	70	0	365	65	0	170	200	0	270	55	0	145
Grp Sat Flow(s),veh/h/ln	1810	0	1747	1753	0	1797	1231	0	1715	1096	0	1768
Q Serve(g_s), s	3.2	0.0	16.2	3.1	0.0	6.4	9.4	0.0	8.3	2.8	0.0	4.0
Cycle Q Clear(g_c), s	3.2	0.0	16.2	3.1	0.0	6.4	13.3	0.0	8.3	11.1	0.0	4.0
Prop In Lane	1.00		0.37	1.00		0.21	1.00		0.39	1.00		0.28
Lane Grp Cap(c), veh/h	91	0	490	83	0	499	616	0	820	502	0	845
V/C Ratio(X)	0.77	0.00	0.75	0.78	0.00	0.34	0.32	0.00	0.33	0.11	0.00	0.17
Avail Cap(c_a), veh/h	138	0	684	190	0	761	616	0	820	502	0	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.46	0.00	0.46	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	27.8	40.0	0.0	24.5	16.4	0.0	13.7	17.2	0.0	12.6
Incr Delay (d2), s/veh	13.5	0.0	2.8	14.4	0.0	0.4	0.6	0.0	0.5	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	6.9	1.7	0.0	2.7	2.6	0.0	3.1	0.8	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.4	0.0	30.7	54.4	0.0	24.9	17.0	0.0	14.2	17.6	0.0	13.0
LnGrp LOS	D	A	C	D	A	C	B	A	B	B	A	B
Approach Vol, veh/h		435			235			470			200	
Approach Delay, s/veh		34.3			33.1			15.4			14.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	46.1	9.5	29.3	46.1	9.8	29.1
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	26.0	9.2	33.3	26.0	6.5	36.0
Max Q Clear Time (g_c+I1), s	15.3	5.1	18.2	13.1	5.2	8.4
Green Ext Time (p_c), s	1.8	0.0	2.0	0.8	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
6: 68th Ave NE & SR 522 10/12/2022

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	5	230	1650	530	20	345	1660	135	730	295	455	170
Future Volume (veh/h)	5	230	1650	530	20	345	1660	135	730	295	455	170
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		0.99		1.00		0.99	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1870	1841	1885		1870	1870	1870	1870	1885	1826	1856
Adj Flow Rate, veh/h		230	1650	530		345	1660	135	730	295	0	170
Peak Hour Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %		2	4	1		2	2	2	2	1	5	3
Cap, veh/h		254	1461	661		409	1389	614	576	734		192
Arrive On Green		0.14	0.42	0.42		0.12	0.39	0.39	0.17	0.20	0.00	0.11
Sat Flow, veh/h		1781	3497	1583		3456	3554	1569	3456	3676	0	1767
Grp Volume(v), veh/h		230	1650	530		345	1660	135	730	295	0	170
Grp Sat Flow(s),veh/h/ln		1781	1749	1583		1728	1777	1569	1728	1791	0	1767
Q Serve(g_s), s		19.1	62.7	44.0		14.7	58.6	8.6	25.0	10.7	0.0	14.2
Cycle Q Clear(g_c), s		19.1	62.7	44.0		14.7	58.6	8.6	25.0	10.7	0.0	14.2
Prop In Lane		1.00		1.00		1.00		1.00	1.00		0.00	1.00
Lane Grp Cap(c), veh/h		254	1461	661		409	1389	614	576	734		192
V/C Ratio(X)		0.91	1.13	0.80		0.84	1.19	0.22	1.27	0.40		0.88
Avail Cap(c_a), veh/h		321	1461	661		806	1389	614	576	740		224
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.00	0.98
Uniform Delay (d), s/veh		63.3	43.7	38.2		64.8	45.7	30.4	62.5	51.7	0.0	65.9
Incr Delay (d2), s/veh		24.2	67.4	9.9		4.8	95.0	0.8	133.7	0.4	0.0	28.2
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		10.3	39.9	19.0		6.7	43.5	3.5	21.8	4.9	0.0	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		87.5	111.1	48.1		69.6	140.6	31.3	196.2	52.0	0.0	94.1
LnGrp LOS		F	F	D		E	F	C	F	D		F
Approach Vol, veh/h			2410				2140			1025	A	
Approach Delay, s/veh			95.0				122.3			154.7		
Approach LOS			F				F			F		

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.7	69.0	29.0	28.4	27.7	64.9	20.3	37.0
Change Period (Y+Rc), s	5.9	6.3	4.0	6.3	6.3	* 6.3	4.0	6.3
Max Green Setting (Gmax), s	35.0	42.5	25.0	25.0	27.0	* 51	19.0	31.0
Max Q Clear Time (g_c+I1), s	16.7	64.7	27.0	15.2	21.1	60.6	16.2	12.7
Green Ext Time (p_c), s	1.1	0.0	0.0	1.3	0.3	0.0	0.1	1.8

Intersection Summary	
HCM 6th Ctrl Delay	113.1
HCM 6th LOS	F

Notes

User approved ignoring U-Turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	220	90
Future Volume (veh/h)	220	90
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.95
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1870	1856
Adj Flow Rate, veh/h	220	90
Peak Hour Factor	1.00	1.00
Percent Heavy Veh, %	2	3
Cap, veh/h	361	141
Arrive On Green	0.15	0.15
Sat Flow, veh/h	2452	961
Grp Volume(v), veh/h	157	153
Grp Sat Flow(s),veh/h/ln	1777	1636
Q Serve(g_s), s	12.4	13.2
Cycle Q Clear(g_c), s	12.4	13.2
Prop In Lane		0.59
Lane Grp Cap(c), veh/h	261	241
V/C Ratio(X)	0.60	0.64
Avail Cap(c_a), veh/h	296	273
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.98	0.98
Uniform Delay (d), s/veh	59.8	60.2
Incr Delay (d2), s/veh	2.6	3.9
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	5.8
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	62.4	64.1
LnGrp LOS	E	E
Approach Vol, veh/h	480	
Approach Delay, s/veh	74.2	
Approach LOS	E	

Timer - Assigned Phs
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: 68th Ave NE & NE 170th St

10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	10	35	5	595	5	650	20	445	800	55
Future Volume (veh/h)	50	0	10	35	5	595	5	650	20	445	800	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	50	0	10	35	5	595	5	650	20	445	800	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	8	45	489	64	491	12	897	28	414	836	57
Arrive On Green	0.31	0.00	0.31	0.31	0.31	0.31	0.01	0.25	0.25	0.23	0.48	0.48
Sat Flow, veh/h	705	24	146	1304	208	1585	1781	3519	108	1781	1730	119
Grp Volume(v), veh/h	60	0	0	40	0	595	5	328	342	445	0	855
Grp Sat Flow(s),veh/h/ln	875	0	0	1512	0	1585	1781	1777	1851	1781	0	1849
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	24.8	0.2	13.5	13.5	18.6	0.0	35.5
Cycle Q Clear(g_c), s	4.5	0.0	0.0	1.2	0.0	24.8	0.2	13.5	13.5	18.6	0.0	35.5
Prop In Lane	0.83		0.17	0.87		1.00	1.00		0.06	1.00		0.06
Lane Grp Cap(c), veh/h	354	0	0	553	0	491	12	453	472	414	0	894
V/C Ratio(X)	0.17	0.00	0.00	0.07	0.00	1.21	0.43	0.72	0.72	1.07	0.00	0.96
Avail Cap(c_a), veh/h	356	0	0	553	0	491	111	458	477	414	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.37	0.00	0.37
Uniform Delay (d), s/veh	20.6	0.0	0.0	19.5	0.0	27.6	39.6	27.2	27.2	30.7	0.0	19.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	112.6	22.8	9.7	9.3	49.3	0.0	10.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.5	0.0	24.4	0.2	6.8	7.0	13.4	0.0	16.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	0.0	0.0	19.5	0.0	140.2	62.3	36.9	36.6	80.0	0.0	30.5
LnGrp LOS	C	A	A	B	A	F	E	D	D	F	A	C
Approach Vol, veh/h		60			635			675			1300	
Approach Delay, s/veh		20.9			132.6			36.9			47.4	
Approach LOS		C			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.0	25.8		30.2	5.7	44.1		30.2				
Change Period (Y+Rc), s	5.4	* 5.4		5.4	5.2	5.4		* 5.4				
Max Green Setting (Gmax), s	18.6	* 21		24.8	5.0	34.2		* 25				
Max Q Clear Time (g_c+I1), s	20.6	15.5		26.8	2.2	37.5		6.5				
Green Ext Time (p_c), s	0.0	1.9		0.0	0.0	0.0		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		64.4
HCM 6th LOS		E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

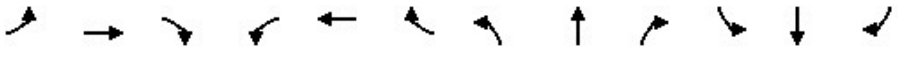
Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	485	0	40	460
Future Vol, veh/h	0	35	485	0	40	460
Conflicting Peds, #/hr	1	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	0	35	485	0	40	460

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1026	487	0	0	485	0
Stage 1	485	-	-	-	-	-
Stage 2	541	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	262	585	-	-	1088	-
Stage 1	623	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	249	584	-	-	1088	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	559	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	584	1088	-
HCM Lane V/C Ratio	-	-	0.06	0.037	-
HCM Control Delay (s)	-	-	11.6	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	30	35	35	40	20	60	335	30	45	310	85
Future Volume (vph)	60	30	35	35	40	20	60	335	30	45	310	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.95			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			0.97		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1628			1705		1805	1872		1671	1813	
Flt Permitted	0.68	1.00			0.85		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1249	1628			1478		1805	1872		1671	1813	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	30	35	35	40	20	60	335	30	45	310	85
RTOR Reduction (vph)	0	32	0	0	18	0	0	2	0	0	5	0
Lane Group Flow (vph)	60	33	0	0	77	0	60	363	0	45	390	0
Confl. Peds. (#/hr)	3		15	15		3	3		4	4		3
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	12%	0%	0%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3			7								
Actuated Green, G (s)	8.5	8.5			8.5		7.3	61.0		5.5	59.2	
Effective Green, g (s)	8.5	8.5			8.5		7.3	61.0		5.5	59.2	
Actuated g/C Ratio	0.09	0.09			0.09		0.08	0.68		0.06	0.66	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	117	153			139		146	1268		102	1192	
v/s Ratio Prot		0.02					c0.03	0.19		0.03	c0.22	
v/s Ratio Perm	0.05				c0.05							
v/c Ratio	0.51	0.22			0.55		0.41	0.29		0.44	0.33	
Uniform Delay, d1	38.8	37.7			38.9		39.3	5.8		40.8	6.7	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.7			4.7		1.9	0.6		3.0	0.7	
Delay (s)	42.5	38.4			43.6		41.2	6.4		43.8	7.4	
Level of Service	D	D			D		D	A		D	A	
Approach Delay (s)		40.4			43.6			11.3			11.2	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.39				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	49.4%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

MOVEMENT SUMMARY

Site: 101 [2044 (Site Folder: NE 192nd and 73rd Ave NE)]

Kenmore - 2044
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 73r Ave NE														
8	T1	235	4.0	255	4.0	0.436	4.4	LOS A	3.0	76.7	0.32	0.45	0.32	37.1
18	R2	305	1.0	332	1.0	0.436	4.4	LOS A	3.0	76.7	0.32	0.45	0.32	36.0
Approach		540	2.3	587	2.3	0.436	4.4	LOS A	3.0	76.7	0.32	0.45	0.32	36.5
East: NE 192nd St														
1	L2	200	2.0	217	2.0	0.275	10.9	LOS B	1.5	38.8	0.44	0.65	0.44	35.0
16	R2	105	1.0	114	1.0	0.275	5.0	LOS A	1.5	38.8	0.44	0.65	0.44	33.9
Approach		305	1.7	332	1.7	0.275	8.9	LOS A	1.5	38.8	0.44	0.65	0.44	34.6
North: 73r Ave NE														
7	L2	80	5.0	87	5.0	0.196	10.7	LOS B	1.0	27.1	0.39	0.56	0.39	35.7
4	T1	135	5.0	147	5.0	0.196	4.8	LOS A	1.0	27.1	0.39	0.56	0.39	35.7
Approach		215	5.0	234	5.0	0.196	7.0	LOS A	1.0	27.1	0.39	0.56	0.39	35.7
All Vehicles		1060	2.7	1152	2.7	0.436	6.2	LOS A	3.0	76.7	0.37	0.53	0.37	35.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: PARAMETRIX | Licence: NETWORK / 1PC | Processed: Thursday, August 18, 2022 11:51:44 AM
Project: U:\PSO\Projects\Clients\3744-City of Kenmore\554-3744-004 Transportation Element\02WBS\Task 4 - Evaluate Future Transportation System\Sidra\Roundabouts.sip9

Intersection	
Int Delay, s/veh	9.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	200	105	235	305	80	135
Future Vol, veh/h	200	105	235	305	80	135
Conflicting Peds, #/hr	0	2	0	19	19	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	1	4	1	5	5
Mvmt Flow	200	105	235	305	80	135

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	702	409	0	0	559	0
Stage 1	407	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.21	-	-	4.15	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.309	-	-	2.245	-
Pot Cap-1 Maneuver	404	645	-	-	997	-
Stage 1	672	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	362	634	-	-	981	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.2	0	3.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	425	981	-
HCM Lane V/C Ratio	-	-	0.718	0.082	-
HCM Control Delay (s)	-	-	32.2	9	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	5.6	0.3	-

HCM 6th Signalized Intersection Summary
12: 73rd Ave NE & NE 181st St 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	15	160	15	5	15	100	285	5	10	190	155
Future Volume (veh/h)	260	15	160	15	5	15	100	285	5	10	190	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1707	1885	1900	1900	1900	1870	1900	1648	1693	1856	1885
Adj Flow Rate, veh/h	260	15	160	15	5	15	100	285	5	10	190	155
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	13	1	0	0	0	2	0	17	14	3	1
Cap, veh/h	273	11	432	54	28	21	597	1126	20	599	569	464
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	727	42	1580	0	102	76	1031	1861	33	981	940	767
Grp Volume(v), veh/h	275	0	160	35	0	0	100	0	290	10	0	345
Grp Sat Flow(s),veh/h/ln	768	0	1580	178	0	0	1031	0	1894	981	0	1708
Q Serve(g_s), s	0.0	0.0	7.8	0.0	0.0	0.0	5.0	0.0	6.8	0.5	0.0	9.5
Cycle Q Clear(g_c), s	26.0	0.0	7.8	26.0	0.0	0.0	14.5	0.0	6.8	7.2	0.0	9.5
Prop In Lane	0.95		1.00	0.43		0.43	1.00		0.02	1.00		0.45
Lane Grp Cap(c), veh/h	284	0	432	103	0	0	597	0	1146	599	0	1034
V/C Ratio(X)	0.97	0.00	0.37	0.34	0.00	0.00	0.17	0.00	0.25	0.02	0.00	0.33
Avail Cap(c_a), veh/h	284	0	432	103	0	0	597	0	1146	599	0	1034
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.88	0.00	0.88	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.6	0.0	27.9	28.4	0.0	0.0	12.9	0.0	8.7	10.4	0.0	9.3
Incr Delay (d2), s/veh	44.6	0.0	0.5	1.9	0.0	0.0	0.5	0.0	0.5	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.0	0.0	3.0	0.6	0.0	0.0	1.2	0.0	2.6	0.1	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.1	0.0	28.4	30.4	0.0	0.0	13.4	0.0	9.2	10.5	0.0	10.1
LnGrp LOS	F	A	C	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		435			35			390			355	
Approach Delay, s/veh		62.4			30.4			10.3			10.2	
Approach LOS		E			C			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	63.5	31.5	63.5	31.5
Change Period (Y+Rc), s	6.0	5.5	6.0	5.5
Max Green Setting (Gmax), s	28.0	26.0	28.0	24.0
Max Q Clear Time (g_c+I1), s	16.5	28.0	11.5	28.0
Green Ext Time (p_c), s	1.6	0.0	1.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
13: 73rd Ave NE & SR 522 10/12/2022

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	35	170	2110	45	40	110	1980	280	50	100	120	300
Future Volume (veh/h)	35	170	2110	45	40	110	1980	280	50	100	120	300
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		0.99		1.00		0.99	1.00		0.95	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1856	1841	1693		1826	1870	1870	1722	1870	1870	1885
Adj Flow Rate, veh/h		170	2110	45		110	1980	280	50	100	120	300
Peak Hour Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %		3	4	14		5	2	2	12	2	2	1
Cap, veh/h		147	1807	730		132	1810	796	63	329	266	302
Arrive On Green		0.08	0.52	0.52		0.08	0.51	0.51	0.04	0.18	0.18	0.09
Sat Flow, veh/h		1767	3497	1414		1739	3554	1562	1640	1870	1509	3483
Grp Volume(v), veh/h		170	2110	45		110	1980	280	50	100	120	300
Grp Sat Flow(s),veh/h/ln		1767	1749	1414		1739	1777	1562	1640	1870	1509	1742
Q Serve(g_s), s		12.5	77.5	2.4		9.4	76.4	16.1	4.5	7.0	10.7	12.9
Cycle Q Clear(g_c), s		12.5	77.5	2.4		9.4	76.4	16.1	4.5	7.0	10.7	12.9
Prop In Lane		1.00		1.00		1.00		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h		147	1807	730		132	1810	796	63	329	266	302
V/C Ratio(X)		1.15	1.17	0.06		0.83	1.09	0.35	0.80	0.30	0.45	0.99
Avail Cap(c_a), veh/h		147	1807	730		157	1810	796	77	455	367	302
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.92
Uniform Delay (d), s/veh		68.8	36.2	18.1		68.4	36.8	22.0	71.6	53.8	55.3	68.5
Incr Delay (d2), s/veh		121.7	81.8	0.2		26.6	51.7	1.2	37.0	0.5	1.2	47.9
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		10.6	52.8	0.8		5.1	44.5	6.2	2.5	3.3	4.2	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		190.4	118.1	18.3		95.0	88.5	23.2	108.5	54.3	56.5	116.4
LnGrp LOS		F	F	B		F	F	C	F	D	E	F
Approach Vol, veh/h			2325				2370			270		
Approach Delay, s/veh			121.4				81.1			65.3		
Approach LOS			F				F			E		

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.9	83.8	9.7	39.6	18.0	82.7	17.0	32.3
Change Period (Y+Rc), s	5.5	6.3	4.0	5.9	5.5	6.3	4.0	* 5.9
Max Green Setting (Gmax), s	13.5	65.7	7.0	42.1	12.5	66.7	13.0	* 37
Max Q Clear Time (g_c+I1), s	11.4	79.5	6.5	18.0	14.5	78.4	14.9	12.7
Green Ext Time (p_c), s	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	98.4
HCM 6th LOS	F

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

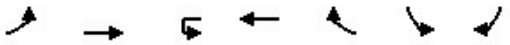
Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	90	110
Future Volume (veh/h)	90	110
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.96
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1856	1856
Adj Flow Rate, veh/h	90	110
Peak Hour Factor	1.00	1.00
Percent Heavy Veh, %	3	3
Cap, veh/h	167	204
Arrive On Green	0.22	0.22
Sat Flow, veh/h	743	908
Grp Volume(v), veh/h	0	200
Grp Sat Flow(s),veh/h/ln	0	1650
Q Serve(g_s), s	0.0	16.0
Cycle Q Clear(g_c), s	0.0	16.0
Prop In Lane		0.55
Lane Grp Cap(c), veh/h	0	370
V/C Ratio(X)	0.00	0.54
Avail Cap(c_a), veh/h	0	463
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	0.92
Uniform Delay (d), s/veh	0.0	51.3
Incr Delay (d2), s/veh	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.8
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	0.0	52.5
LnGrp LOS	A	D
Approach Vol, veh/h	500	
Approach Delay, s/veh	90.8	
Approach LOS	F	
Timer - Assigned Phs		

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	170	80	85	255	215	145
Future Vol, veh/h	170	80	85	255	215	145
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	1	5	1	5	1	1
Mvmt Flow	170	80	85	255	215	145
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.1	13.1	12.6
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	25%	68%	0%
Vol Thru, %	75%	0%	60%
Vol Right, %	0%	32%	40%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	340	250	360
LT Vol	85	170	0
Through Vol	255	0	215
RT Vol	0	80	145
Lane Flow Rate	340	250	360
Geometry Grp	1	1	1
Degree of Util (X)	0.49	0.387	0.49
Departure Headway (Hd)	5.193	5.578	4.897
Convergence, Y/N	Yes	Yes	Yes
Cap	694	645	738
Service Time	3.22	3.61	2.925
HCM Lane V/C Ratio	0.49	0.388	0.488
HCM Control Delay	13.1	12.1	12.6
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.7	1.8	2.7



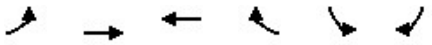
Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (veh/h)	215	2300	0	2140	215	125	210
Future Volume (veh/h)	215	2300	0	2140	215	125	210
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00				1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No	
Adj Sat Flow, veh/h/ln	1826	1856		1885	1856	1841	1885
Adj Flow Rate, veh/h	215	2300		2140	215	125	210
Peak Hour Factor	1.00	1.00		1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	3		1	3	4	1
Cap, veh/h	236	2706		2296	1003	259	236
Arrive On Green	0.10	0.77		0.64	0.64	0.15	0.15
Sat Flow, veh/h	1739	3618		3676	1565	1753	1598
Grp Volume(v), veh/h	215	2300		2140	215	125	210
Grp Sat Flow(s),veh/h/ln	1739	1763		1791	1565	1753	1598
Q Serve(g_s), s	12.9	65.5		79.9	8.6	9.8	19.3
Cycle Q Clear(g_c), s	12.9	65.5		79.9	8.6	9.8	19.3
Prop In Lane	1.00				1.00	1.00	1.00
Lane Grp Cap(c), veh/h	236	2706		2296	1003	259	236
V/C Ratio(X)	0.91	0.85		0.93	0.21	0.48	0.89
Avail Cap(c_a), veh/h	248	2706		2296	1003	393	358
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		0.37	0.37	1.00	1.00
Uniform Delay (d), s/veh	58.4	11.7		24.0	11.2	58.6	62.7
Incr Delay (d2), s/veh	33.6	3.6		3.6	0.2	1.4	16.2
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	23.1		32.0	2.9	4.5	8.9
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	92.0	15.3		27.6	11.4	60.0	78.9
LnGrp LOS	F	B		C	B	E	E
Approach Vol, veh/h		2515		2355		335	
Approach Delay, s/veh		21.8		26.1		71.8	
Approach LOS		C		C		E	

Timer - Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		121.4			19.0	102.4		28.6
Change Period (Y+Rc), s		6.3			4.0	6.3		6.4
Max Green Setting (Gmax), s		95.7			16.0	83.7		33.6
Max Q Clear Time (g_c+I1), s		67.5			14.9	81.9		21.3
Green Ext Time (p_c), s		22.7			0.1	1.7		0.8

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	145	2270	2195	45	20	190
Future Volume (veh/h)	145	2270	2195	45	20	190
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1841	1870	1767	1707	1885
Adj Flow Rate, veh/h	145	2270	2195	45	20	190
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	2	9	13	1
Cap, veh/h	167	2736	2322	977	217	214
Arrive On Green	0.12	1.00	0.65	0.65	0.13	0.13
Sat Flow, veh/h	1810	3589	3647	1496	1626	1598
Grp Volume(v), veh/h	145	2270	2195	45	20	190
Grp Sat Flow(s),veh/h/ln	1810	1749	1777	1496	1626	1598
Q Serve(g_s), s	11.8	0.0	84.0	1.6	1.6	17.5
Cycle Q Clear(g_c), s	11.8	0.0	84.0	1.6	1.6	17.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	167	2736	2322	977	217	214
V/C Ratio(X)	0.87	0.83	0.95	0.05	0.09	0.89
Avail Cap(c_a), veh/h	199	2736	2322	977	347	341
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.49	0.49	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.9	0.0	23.6	9.3	57.0	63.9
Incr Delay (d2), s/veh	15.7	1.5	9.6	0.1	0.2	15.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.6	35.1	0.5	0.7	15.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	80.6	1.5	33.2	9.4	57.2	79.7
LnGrp LOS	F	A	C	A	E	E
Approach Vol, veh/h		2415	2240		210	
Approach Delay, s/veh		6.3	32.7		77.5	
Approach LOS		A	C		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		123.7		26.3	19.4	104.3
Change Period (Y+Rc), s		6.3		6.3	5.5	6.3
Max Green Setting (Gmax), s		105.4		32.0	16.5	83.4
Max Q Clear Time (g_c+I1), s		2.0		19.5	13.8	86.0
Green Ext Time (p_c), s		52.1		0.5	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	90	10	10	460	275	95
Future Vol, veh/h	90	10	10	460	275	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	90	10	10	460	275	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	803	323	370	0	-	0
Stage 1	323	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	353	718	1189	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	622	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	718	1189	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	622	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.4	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1189	-	368	-	-
HCM Lane V/C Ratio	0.008	-	0.272	-	-
HCM Control Delay (s)	8.1	0	18.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.1	-	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	140	15	35	150	5	20	105	65	10	85	15
Future Vol, veh/h	35	140	15	35	150	5	20	105	65	10	85	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	4	4	14	4	2	0	11	1	0	0	0	0
Mvmt Flow	35	140	15	35	150	5	20	105	65	10	85	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.8	9.9	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	18%	18%	9%
Vol Thru, %	55%	74%	79%	77%
Vol Right, %	34%	8%	3%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	190	190	110
LT Vol	20	35	35	10
Through Vol	105	140	150	85
RT Vol	65	15	5	15
Lane Flow Rate	190	190	190	110
Geometry Grp	1	1	1	1
Degree of Util (X)	0.263	0.261	0.263	0.154
Departure Headway (Hd)	4.98	4.947	4.978	5.027
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	714	720	714	706
Service Time	3.056	3.024	3.054	3.112
HCM Lane V/C Ratio	0.266	0.264	0.266	0.156
HCM Control Delay	9.9	9.8	9.8	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	1	1.1	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	30	120	60	30	50	115	445	40	15	285	10
Future Volume (vph)	30	30	120	60	30	50	115	445	40	15	285	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.91			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1681			1803	1583	1770	1840		1770	1853	
Flt Permitted		0.92			0.30	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1565			563	1583	1770	1840		1770	1853	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	30	120	60	30	50	115	445	40	15	285	10
RTOR Reduction (vph)	0	82	0	0	0	41	0	2	0	0	1	0
Lane Group Flow (vph)	0	98	0	0	90	9	115	483	0	15	294	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			3		5	2		1	6	
Permitted Phases	4			3		3						
Actuated Green, G (s)		11.7			19.1	19.1	16.1	51.2		3.0	38.1	
Effective Green, g (s)		11.7			19.1	19.1	16.1	51.2		3.0	38.1	
Actuated g/C Ratio		0.11			0.18	0.18	0.15	0.49		0.03	0.36	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		174			102	287	271	897		50	672	
v/s Ratio Prot							c0.06	c0.26		0.01	0.16	
v/s Ratio Perm		c0.06			c0.16	0.01						
v/c Ratio		0.56			0.88	0.03	0.42	0.54		0.30	0.44	
Uniform Delay, d1		44.2			41.9	35.3	40.3	18.7		50.0	25.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.2			53.3	0.0	1.1	2.3		3.4	2.1	
Delay (s)		48.4			95.1	35.4	41.3	21.0		53.3	27.4	
Level of Service		D			F	D	D	C		D	C	
Approach Delay (s)		48.4			73.8			24.9			28.6	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	5	0	5	530	15	0	365	0
Future Vol, veh/h	0	0	0	5	5	0	5	530	15	0	365	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	5	0	5	530	15	0	365	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	915	920	365	913	913	538	365	0	0	545	0	0
Stage 1	365	365	-	548	548	-	-	-	-	-	-	-
Stage 2	550	555	-	365	365	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	253	271	680	254	273	543	1194	-	-	1024	-	-
Stage 1	654	623	-	521	517	-	-	-	-	-	-	-
Stage 2	519	513	-	654	623	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	248	269	680	253	271	543	1194	-	-	1024	-	-
Mov Cap-2 Maneuver	248	269	-	253	271	-	-	-	-	-	-	-
Stage 1	650	623	-	518	514	-	-	-	-	-	-	-
Stage 2	511	510	-	654	623	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	19.3	0.1	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	-	262	1024	-	-
HCM Lane V/C Ratio	0.004	-	-	-	0.038	-	-	-
HCM Control Delay (s)	8	0	-	0	19.3	0	-	-
HCM Lane LOS	A	A	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	2150	165	10	2450	50	300	5	280	15	15	45
Future Volume (vph)	50	2150	165	10	2450	50	300	5	280	15	15	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1805	3471	1599	1770	3539	1583	1805	1619			1817	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.70	1.00
Satd. Flow (perm)	1805	3471	1599	1770	3539	1583	1805	1619			1306	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	2150	165	10	2450	50	300	5	280	15	15	45
RTOR Reduction (vph)	0	0	30	0	0	18	0	69	0	0	0	43
Lane Group Flow (vph)	50	2150	135	10	2450	32	300	216	0	0	30	2
Heavy Vehicles (%)	0%	4%	1%	2%	2%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8				6		6
Actuated Green, G (s)	10.1	102.5	102.5	3.0	95.4	95.4	21.0	32.5			7.5	7.5
Effective Green, g (s)	10.1	102.5	102.5	3.0	95.4	95.4	21.0	32.5			7.5	7.5
Actuated g/C Ratio	0.07	0.68	0.68	0.02	0.64	0.64	0.14	0.22			0.05	0.05
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	121	2371	1092	35	2250	1006	252	350			65	79
v/s Ratio Prot	c0.03	c0.62		0.01	c0.69		c0.17	c0.13				
v/s Ratio Perm			0.08			0.02					0.02	0.00
v/c Ratio	0.41	0.91	0.12	0.29	1.09	0.03	1.19	0.62			0.46	0.03
Uniform Delay, d1	67.1	19.8	8.2	72.4	27.3	10.1	64.5	53.1			69.3	67.8
Progression Factor	1.27	0.83	0.29	0.63	1.43	4.82	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.7	0.0	0.4	40.9	0.0	118.1	3.2			5.1	0.1
Delay (s)	85.5	17.1	2.4	46.2	80.0	48.9	182.6	56.4			74.4	67.9
Level of Service	F	B	A	D	F	D	F	E			E	E
Approach Delay (s)		17.5			79.3			121.1			70.5	
Approach LOS		B			E			F			E	

Intersection Summary					
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.05				
Actuated Cycle Length (s)	150.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	98.7%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2150	165	10	2450	50	300	5	280	15	15	45
Future Volume (veh/h)	50	2150	165	10	2450	50	300	5	280	15	15	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1885	1870	1870	1870	1900	1870	1900	1870	1870	1870
Adj Flow Rate, veh/h	50	2150	165	10	2450	50	300	5	280	15	15	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	1	2	2	2	0	2	0	2	2	2
Cap, veh/h	48	2455	1122	16	2432	1085	253	6	326	59	40	67
Arrive On Green	0.05	1.00	1.00	0.01	0.68	0.68	0.14	0.21	0.21	0.04	0.04	0.04
Sat Flow, veh/h	1810	3497	1598	1781	3554	1585	1810	28	1561	540	947	1585
Grp Volume(v), veh/h	50	2150	165	10	2450	50	300	0	285	30	0	45
Grp Sat Flow(s),veh/h/ln	1810	1749	1598	1781	1777	1585	1810	0	1589	1487	0	1585
Q Serve(g_s), s	4.0	0.0	0.0	0.8	102.7	1.5	21.0	0.0	25.9	1.3	0.0	4.2
Cycle Q Clear(g_c), s	4.0	0.0	0.0	0.8	102.7	1.5	21.0	0.0	25.9	2.7	0.0	4.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.98	0.50		1.00
Lane Grp Cap(c), veh/h	48	2455	1122	16	2432	1085	253	0	332	99	0	67
V/C Ratio(X)	1.04	0.88	0.15	0.62	1.01	0.05	1.18	0.00	0.86	0.30	0.00	0.67
Avail Cap(c_a), veh/h	48	2455	1122	131	2432	1085	253	0	434	188	0	169
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.0	0.0	0.0	74.1	23.7	7.7	64.5	0.0	57.2	70.0	0.0	70.8
Incr Delay (d2), s/veh	48.5	0.5	0.0	32.6	20.0	0.1	115.6	0.0	12.6	1.7	0.0	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.2	0.0	0.5	44.6	0.5	17.8	0.0	11.6	1.2	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	119.5	0.5	0.0	106.7	43.7	7.8	180.1	0.0	69.8	71.7	0.0	81.9
LnGrp LOS	F	A	A	F	F	A	F	A	E	E	A	F
Approach Vol, veh/h		2365			2510			585			75	
Approach Delay, s/veh		2.9			43.2			126.4			77.8	
Approach LOS		A			D			F			E	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.3	5.4	109.3	25.0	10.3	8.0	106.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	41.0	11.0	86.0	21.0	16.0	4.0	93.0
Max Q Clear Time (g_c+I1), s	27.9	2.8	2.0	23.0	6.2	6.0	104.7
Green Ext Time (p_c), s	1.5	0.0	42.2	0.0	0.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.3
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary
22: 68th Ave NE & Lake Point 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	0	235	5	55	0	60	1140	35	0	950	105
Future Volume (veh/h)	420	0	235	5	55	0	60	1140	35	0	950	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	457	0	255	5	60	0	65	1239	38	0	1033	114
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	475	0	308	227	103	0	378	1918	59	0	1076	119
Arrive On Green	0.27	0.00	0.19	0.13	0.06	0.00	0.17	0.54	0.54	0.00	0.33	0.33
Sat Flow, veh/h	1781	0	1585	1781	1870	0	1781	3520	108	0	3321	356
Grp Volume(v), veh/h	457	0	255	5	60	0	65	625	652	0	568	579
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	0	1781	1777	1851	0	1777	1806
Q Serve(g_s), s	22.8	0.0	13.9	0.2	2.8	0.0	0.0	22.2	22.3	0.0	28.2	28.3
Cycle Q Clear(g_c), s	22.8	0.0	13.9	0.2	2.8	0.0	0.0	22.2	22.3	0.0	28.2	28.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.06	0.00		0.20
Lane Grp Cap(c), veh/h	475	0	308	227	103	0	378	968	1009	0	592	602
V/C Ratio(X)	0.96	0.00	0.83	0.02	0.58	0.00	0.17	0.65	0.65	0.00	0.96	0.96
Avail Cap(c_a), veh/h	475	0	634	227	333	0	378	968	1009	0	592	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.56	0.56	0.56	0.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	0.0	34.8	34.3	41.5	0.0	31.2	14.4	14.4	0.0	29.4	29.4
Incr Delay (d2), s/veh	31.7	0.0	5.7	0.0	5.1	0.0	0.1	1.9	1.8	0.0	28.3	28.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.7	0.0	5.7	0.1	1.4	0.0	1.2	8.9	9.3	0.0	16.2	16.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	0.0	40.5	34.4	46.6	0.0	31.3	16.3	16.2	0.0	57.7	57.6
LnGrp LOS	E	A	D	C	D	A	C	B	B	A	E	E
Approach Vol, veh/h		712			65			1342			1147	
Approach Delay, s/veh		55.7			45.7			17.0			57.7	
Approach LOS		E			D			B			E	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	53.0	15.5	21.5	19.0	34.0	28.0	9.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	38.0	4.0	36.0	4.0	30.0	24.0	16.0
Max Q Clear Time (g_c+I1), s	24.3	2.2	15.9	2.0	30.3	24.8	4.8
Green Ext Time (p_c), s	7.5	0.0	1.6	0.0	0.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	40.3
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	0	180	5	0	0	345	505	15	0	315	60
Future Vol, veh/h	45	0	180	5	0	0	345	505	15	0	315	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	9	9	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Yield
Storage Length	-	-	-	-	-	-	100	-	-	100	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	0	1	0	0	0	1	3	0	0	1	2
Mvmt Flow	45	0	180	5	0	0	345	505	15	0	315	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1518	1534	315	1527	1527	522	315	0	0	529	0	0
Stage 1	315	315	-	1212	1212	-	-	-	-	-	-	-
Stage 2	1203	1219	-	315	315	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.5	6.21	7.1	6.5	6.2	4.11	-	-	4.1	-	-
Critical Hdwy Stg 1	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4	3.309	3.5	4	3.3	2.209	-	-	2.2	-	-
Pot Cap-1 Maneuver	97	118	728	97	119	559	1251	-	-	1048	-	-
Stage 1	694	659	-	225	257	-	-	-	-	-	-	-
Stage 2	224	255	-	700	659	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	76	85	728	57	86	555	1251	-	-	1040	-	-
Mov Cap-2 Maneuver	76	85	-	57	86	-	-	-	-	-	-	-
Stage 1	502	659	-	162	185	-	-	-	-	-	-	-
Stage 2	162	183	-	527	659	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.7	0	3.6	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1251	-	-	380	-	1040	-	-
HCM Lane V/C Ratio	0.276	-	-	0.474	-	-	-	-
HCM Control Delay (s)	9	-	-	22.7	0	0	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	1.1	-	-	2.5	-	0	-	-

HCM 6th Signalized Intersection Summary
2: 61st Ave NE & SR 522 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	400	2200	310	20	2635	375	105	135	10	160	75	340
Future Volume (veh/h)	400	2200	310	20	2635	375	105	135	10	160	75	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1856	1856	1900	1870	1856	1900	1900	1900	1841	1900	1900
Adj Flow Rate, veh/h	400	2200	310	20	2635	0	105	135	10	160	0	390
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	0	2	3	0	0	0	4	0	0
Cap, veh/h	405	2417	1052	30	2068		90	152	11	176	0	795
Arrive On Green	0.12	0.69	0.69	0.02	0.58	0.00	0.05	0.09	0.09	0.10	0.00	0.14
Sat Flow, veh/h	3483	3526	1534	1810	3554	1572	1810	1740	129	1753	0	3056
Grp Volume(v), veh/h	400	2200	310	20	2635	0	105	0	145	160	0	390
Grp Sat Flow(s),veh/h/ln	1742	1763	1534	1810	1777	1572	1810	0	1869	1753	0	1528
Q Serve(g_s), s	24.1	109.6	16.7	2.3	122.2	0.0	10.5	0.0	16.1	19.0	0.0	2.3
Cycle Q Clear(g_c), s	24.1	109.6	16.7	2.3	122.2	0.0	10.5	0.0	16.1	19.0	0.0	2.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	405	2417	1052	30	2068		90	0	163	176	0	795
V/C Ratio(X)	0.99	0.91	0.29	0.67	1.27		1.16	0.00	0.89	0.91	0.00	0.49
Avail Cap(c_a), veh/h	405	2417	1052	43	2068		90	0	187	201	0	884
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.13	0.13	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	92.6	27.6	13.0	102.7	43.9	0.0	99.8	0.0	94.9	93.5	0.0	45.4
Incr Delay (d2), s/veh	41.2	6.5	0.7	3.4	123.9	0.0	144.3	0.0	34.4	36.6	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	46.1	6.2	1.1	87.6	0.0	8.6	0.0	9.4	10.5	0.0	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	133.8	34.1	13.7	106.2	167.8	0.0	244.0	0.0	129.3	130.1	0.0	45.9
LnGrp LOS	F	C	B	F	F		F	A	F	F	A	D
Approach Vol, veh/h		2910			2655	A		250			550	
Approach Delay, s/veh		45.6			167.4			177.5			70.4	
Approach LOS		D			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.7	128.5	26.6	24.2	8.9	150.3	16.0	34.8
Change Period (Y+Rc), s	6.3	* 6.3	5.5	5.9	5.5	6.3	5.5	* 5.9
Max Green Setting (Gmax), s	19.5	* 1.2E2	24.1	21.0	5.0	136.7	10.5	* 35
Max Q Clear Time (g_c+I1), s	26.1	124.2	21.0	18.1	4.3	111.6	12.5	4.3
Green Ext Time (p_c), s	0.0	0.0	0.1	0.2	0.0	20.3	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	103.7
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	185	10	20	195	40	15	40	50	45	15	10
Future Vol, veh/h	10	185	10	20	195	40	15	40	50	45	15	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	185	10	20	195	40	15	40	50	45	15	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	9.6	8.6	8.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	5%	8%	64%
Vol Thru, %	38%	90%	76%	21%
Vol Right, %	48%	5%	16%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	205	255	70
LT Vol	15	10	20	45
Through Vol	40	185	195	15
RT Vol	50	10	40	10
Lane Flow Rate	105	205	255	70
Geometry Grp	1	1	1	1
Degree of Util (X)	0.139	0.262	0.318	0.1
Departure Headway (Hd)	4.781	4.599	4.489	5.127
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	745	779	798	695
Service Time	2.836	2.641	2.529	3.185
HCM Lane V/C Ratio	0.141	0.263	0.32	0.101
HCM Control Delay	8.6	9.3	9.6	8.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1	1.4	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	180	50	5	10	0
Future Vol, veh/h	20	180	50	5	10	0
Conflicting Peds, #/hr	110	0	0	110	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	1	2	0	25	0
Mvmt Flow	20	180	50	5	10	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	165	0	-	0	383	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	220	-
Critical Hdwy	4.16	-	-	-	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.254	-	-	-	3.725	3.3
Pot Cap-1 Maneuver	1389	-	-	-	577	887
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	765	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1262	-	-	-	467	806
Mov Cap-2 Maneuver	-	-	-	-	467	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1262	-	-	-	467
HCM Lane V/C Ratio	0.016	-	-	-	0.021
HCM Control Delay (s)	7.9	0	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th Signalized Intersection Summary
5: 68th Ave NE & NE 181st St 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	230	135	65	135	35	200	165	105	55	105	40
Future Volume (veh/h)	70	230	135	65	135	35	200	165	105	55	105	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	0.98		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1900	1841	1885	1900	1885	1856	1885	1870	1870	1900
Adj Flow Rate, veh/h	70	230	135	65	135	35	200	165	105	55	105	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	0	4	1	0	1	3	1	2	2	0
Cap, veh/h	91	308	181	83	396	103	616	501	319	502	612	233
Arrive On Green	0.05	0.28	0.28	0.05	0.28	0.28	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1810	1101	646	1753	1427	370	1231	1048	667	1096	1280	488
Grp Volume(v), veh/h	70	0	365	65	0	170	200	0	270	55	0	145
Grp Sat Flow(s),veh/h/ln	1810	0	1747	1753	0	1797	1231	0	1715	1096	0	1768
Q Serve(g_s), s	3.2	0.0	16.2	3.1	0.0	6.4	9.4	0.0	8.3	2.8	0.0	4.0
Cycle Q Clear(g_c), s	3.2	0.0	16.2	3.1	0.0	6.4	13.3	0.0	8.3	11.1	0.0	4.0
Prop In Lane	1.00		0.37	1.00		0.21	1.00		0.39	1.00		0.28
Lane Grp Cap(c), veh/h	91	0	490	83	0	499	616	0	820	502	0	845
V/C Ratio(X)	0.77	0.00	0.75	0.78	0.00	0.34	0.32	0.00	0.33	0.11	0.00	0.17
Avail Cap(c_a), veh/h	138	0	684	190	0	761	616	0	820	502	0	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.33	0.00	0.33	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	27.8	40.0	0.0	24.5	16.4	0.0	13.7	17.2	0.0	12.6
Incr Delay (d2), s/veh	13.5	0.0	2.8	14.4	0.0	0.4	0.5	0.0	0.4	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	6.9	1.7	0.0	2.7	2.6	0.0	3.1	0.8	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.4	0.0	30.7	54.4	0.0	24.9	16.9	0.0	14.1	17.6	0.0	13.0
LnGrp LOS	D	A	C	D	A	C	B	A	B	B	A	B
Approach Vol, veh/h		435			235			470			200	
Approach Delay, s/veh		34.3			33.1			15.3			14.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	46.1	9.5	29.3	46.1	9.8	29.1
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	26.0	9.2	33.3	26.0	6.5	36.0
Max Q Clear Time (g_c+I1), s	15.3	5.1	18.2	13.1	5.2	8.4
Green Ext Time (p_c), s	1.8	0.0	2.0	0.8	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
6: 68th Ave NE & SR 522 10/12/2022

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	5	230	1650	530	20	345	1660	135	730	295	455	170
Future Volume (veh/h)	5	230	1650	530	20	345	1660	135	730	295	455	170
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		0.99		1.00		0.99	1.00		1.00	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1870	1841	1885		1870	1870	1870	1870	1885	1826	1856
Adj Flow Rate, veh/h		230	1650	530		345	1660	135	730	295	0	170
Peak Hour Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %		2	4	1		2	2	2	2	1	5	3
Cap, veh/h		230	1675	759		389	1636	724	642	739		168
Arrive On Green		0.13	0.48	0.48		0.11	0.46	0.46	0.19	0.21	0.00	0.10
Sat Flow, veh/h		1781	3497	1585		3456	3554	1572	3456	3676	0	1767
Grp Volume(v), veh/h		230	1650	530		345	1660	135	730	295	0	170
Grp Sat Flow(s),veh/h/ln		1781	1749	1585		1728	1777	1572	1728	1791	0	1767
Q Serve(g_s), s		27.1	97.7	55.0		20.7	96.7	10.6	39.0	15.0	0.0	20.0
Cycle Q Clear(g_c), s		27.1	97.7	55.0		20.7	96.7	10.6	39.0	15.0	0.0	20.0
Prop In Lane		1.00		1.00		1.00		1.00	1.00		0.00	1.00
Lane Grp Cap(c), veh/h		230	1675	759		389	1636	724	642	739		168
V/C Ratio(X)		1.00	0.99	0.70		0.89	1.01	0.19	1.14	0.40		1.01
Avail Cap(c_a), veh/h		230	1675	759		576	1636	724	642	750		168
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.00	0.98
Uniform Delay (d), s/veh		91.4	54.0	42.8		91.9	56.7	33.4	85.5	72.1	0.0	95.0
Incr Delay (d2), s/veh		59.5	18.7	5.3		11.1	25.9	0.6	79.8	0.3	0.0	71.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		16.3	46.6	23.2		9.9	48.6	4.4	24.8	7.0	0.0	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		151.0	72.7	48.1		103.0	82.6	34.0	165.3	72.4	0.0	166.3
LnGrp LOS		F	E	D		F	F	C	F	E		F
Approach Vol, veh/h			2410				2140			1025	A	
Approach Delay, s/veh			74.8				82.8			138.6		
Approach LOS			E				F			F		

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.5	106.9	43.0	30.6	33.4	103.0	24.0	49.6
Change Period (Y+Rc), s	5.9	6.3	4.0	6.3	6.3	* 6.3	4.0	6.3
Max Green Setting (Gmax), s	35.0	88.5	39.0	25.0	27.1	* 96	20.0	44.0
Max Q Clear Time (g_c+I1), s	22.7	99.7	41.0	21.3	29.1	98.7	22.0	17.0
Green Ext Time (p_c), s	0.9	0.0	0.0	0.6	0.0	0.0	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay	92.7
HCM 6th LOS	F

Notes

User approved ignoring U-Turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	220	90
Future Volume (veh/h)	220	90
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.94
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1870	1856
Adj Flow Rate, veh/h	220	90
Peak Hour Factor	1.00	1.00
Percent Heavy Veh, %	2	3
Cap, veh/h	283	110
Arrive On Green	0.12	0.12
Sat Flow, veh/h	2443	954
Grp Volume(v), veh/h	157	153
Grp Sat Flow(s),veh/h/ln	1777	1621
Q Serve(g_s), s	18.0	19.3
Cycle Q Clear(g_c), s	18.0	19.3
Prop In Lane		0.59
Lane Grp Cap(c), veh/h	206	188
V/C Ratio(X)	0.76	0.81
Avail Cap(c_a), veh/h	212	193
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.98	0.98
Uniform Delay (d), s/veh	90.1	90.6
Incr Delay (d2), s/veh	14.6	22.0
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	9.4
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	104.6	112.7
LnGrp LOS	F	F
Approach Vol, veh/h	480	
Approach Delay, s/veh	129.0	
Approach LOS	F	

Timer - Assigned Phs
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
8: 68th Ave NE & NE 170th St

10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	0	10	35	5	595	5	650	20	445	800	55
Future Volume (veh/h)	50	0	10	35	5	595	5	650	20	445	800	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	50	0	10	35	5	595	5	650	20	445	800	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	8	45	489	64	491	12	875	27	425	836	57
Arrive On Green	0.31	0.00	0.31	0.31	0.31	0.31	0.01	0.25	0.25	0.24	0.48	0.48
Sat Flow, veh/h	705	24	146	1304	208	1585	1781	3519	108	1781	1730	119
Grp Volume(v), veh/h	60	0	0	40	0	595	5	328	342	445	0	855
Grp Sat Flow(s),veh/h/ln	875	0	0	1512	0	1585	1781	1777	1851	1781	0	1849
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	24.8	0.2	13.6	13.6	19.1	0.0	35.5
Cycle Q Clear(g_c), s	4.5	0.0	0.0	1.2	0.0	24.8	0.2	13.6	13.6	19.1	0.0	35.5
Prop In Lane	0.83		0.17	0.87		1.00	1.00		0.06	1.00		0.06
Lane Grp Cap(c), veh/h	354	0	0	553	0	491	12	442	460	425	0	894
V/C Ratio(X)	0.17	0.00	0.00	0.07	0.00	1.21	0.43	0.74	0.74	1.05	0.00	0.96
Avail Cap(c_a), veh/h	356	0	0	553	0	491	111	446	465	425	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.16	0.00	0.16
Uniform Delay (d), s/veh	20.6	0.0	0.0	19.5	0.0	27.6	39.6	27.7	27.7	30.5	0.0	19.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	112.6	22.8	10.7	10.4	31.1	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	0.5	0.0	24.4	0.2	7.0	7.2	11.6	0.0	15.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	0.0	0.0	19.5	0.0	140.2	62.3	38.4	38.1	61.6	0.0	25.4
LnGrp LOS	C	A	A	B	A	F	E	D	D	F	A	C
Approach Vol, veh/h		60			635			675			1300	
Approach Delay, s/veh		20.9			132.6			38.4			37.8	
Approach LOS		C			F			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.5	25.3		30.2	5.7	44.1		30.2				
Change Period (Y+Rc), s	5.4	* 5.4		5.4	5.2	5.4		* 5.4				
Max Green Setting (Gmax), s	19.1	* 20		24.8	5.0	34.2		* 25				
Max Q Clear Time (g_c+I1), s	21.1	15.6		26.8	2.2	37.5		6.5				
Green Ext Time (p_c), s	0.0	1.7		0.0	0.0	0.0		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	60.1
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

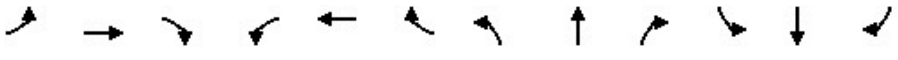
Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	485	0	40	460
Future Vol, veh/h	0	35	485	0	40	460
Conflicting Peds, #/hr	1	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	0	35	485	0	40	460

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1026	487	0	0	485	0
Stage 1	485	-	-	-	-	-
Stage 2	541	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	262	585	-	-	1088	-
Stage 1	623	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	249	584	-	-	1088	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	559	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	584	1088	-
HCM Lane V/C Ratio	-	-	0.06	0.037	-
HCM Control Delay (s)	-	-	11.6	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	30	35	35	40	20	60	335	30	45	310	85
Future Volume (vph)	60	30	35	35	40	20	60	335	30	45	310	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.95			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			0.97		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1628			1705		1805	1872		1671	1813	
Flt Permitted	0.68	1.00			0.85		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1249	1628			1478		1805	1872		1671	1813	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	30	35	35	40	20	60	335	30	45	310	85
RTOR Reduction (vph)	0	32	0	0	18	0	0	2	0	0	5	0
Lane Group Flow (vph)	60	33	0	0	77	0	60	363	0	45	390	0
Confl. Peds. (#/hr)	3		15	15		3	3		4	4		3
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	12%	0%	0%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			7		1	6		5	2	
Permitted Phases	3			7								
Actuated Green, G (s)	8.5	8.5			8.5		7.3	61.0		5.5	59.2	
Effective Green, g (s)	8.5	8.5			8.5		7.3	61.0		5.5	59.2	
Actuated g/C Ratio	0.09	0.09			0.09		0.08	0.68		0.06	0.66	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	117	153			139		146	1268		102	1192	
v/s Ratio Prot		0.02					c0.03	0.19		0.03	c0.22	
v/s Ratio Perm	0.05				c0.05							
v/c Ratio	0.51	0.22			0.55		0.41	0.29		0.44	0.33	
Uniform Delay, d1	38.8	37.7			38.9		39.3	5.8		40.8	6.7	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.7			4.7		1.9	0.6		3.0	0.7	
Delay (s)	42.5	38.4			43.6		41.2	6.4		43.8	7.4	
Level of Service	D	D			D		D	A		D	A	
Approach Delay (s)		40.4			43.6			11.3			11.2	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.39				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	49.4%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

MOVEMENT SUMMARY

Site: 101 [2044 (Site Folder: NE 192nd and 73rd Ave NE)]

Kenmore - 2044
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 73r Ave NE														
8	T1	235	4.0	255	4.0	0.436	4.4	LOS A	3.0	76.7	0.32	0.45	0.32	37.1
18	R2	305	1.0	332	1.0	0.436	4.4	LOS A	3.0	76.7	0.32	0.45	0.32	36.0
Approach		540	2.3	587	2.3	0.436	4.4	LOS A	3.0	76.7	0.32	0.45	0.32	36.5
East: NE 192nd St														
1	L2	200	2.0	217	2.0	0.275	10.9	LOS B	1.5	38.8	0.44	0.65	0.44	35.0
16	R2	105	1.0	114	1.0	0.275	5.0	LOS A	1.5	38.8	0.44	0.65	0.44	33.9
Approach		305	1.7	332	1.7	0.275	8.9	LOS A	1.5	38.8	0.44	0.65	0.44	34.6
North: 73r Ave NE														
7	L2	80	5.0	87	5.0	0.196	10.7	LOS B	1.0	27.1	0.39	0.56	0.39	35.7
4	T1	135	5.0	147	5.0	0.196	4.8	LOS A	1.0	27.1	0.39	0.56	0.39	35.7
Approach		215	5.0	234	5.0	0.196	7.0	LOS A	1.0	27.1	0.39	0.56	0.39	35.7
All Vehicles		1060	2.7	1152	2.7	0.436	6.2	LOS A	3.0	76.7	0.37	0.53	0.37	35.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: PARAMETRIX | Licence: NETWORK / 1PC | Processed: Thursday, August 18, 2022 11:51:44 AM
Project: U:\PSO\Projects\Clients\3744-City of Kenmore\554-3744-004 Transportation Element\02WBS\Task 4 - Evaluate Future Transportation System\Sidra\Roundabouts.sip9

HCM 6th Signalized Intersection Summary
12: 73rd Ave NE & NE 181st St 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	15	160	15	5	15	100	285	5	10	190	155
Future Volume (veh/h)	260	15	160	15	5	15	100	285	5	10	190	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1707	1885	1900	1900	1900	1870	1900	1648	1693	1856	1885
Adj Flow Rate, veh/h	260	15	160	15	5	15	100	285	5	10	190	155
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	13	1	0	0	0	2	0	17	14	3	1
Cap, veh/h	273	11	432	54	28	21	597	1126	20	599	569	464
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	727	42	1580	0	102	76	1031	1861	33	981	940	767
Grp Volume(v), veh/h	275	0	160	35	0	0	100	0	290	10	0	345
Grp Sat Flow(s),veh/h/ln	768	0	1580	178	0	0	1031	0	1894	981	0	1708
Q Serve(g_s), s	0.0	0.0	7.8	0.0	0.0	0.0	5.0	0.0	6.8	0.5	0.0	9.5
Cycle Q Clear(g_c), s	26.0	0.0	7.8	26.0	0.0	0.0	14.5	0.0	6.8	7.2	0.0	9.5
Prop In Lane	0.95		1.00	0.43		0.43	1.00		0.02	1.00		0.45
Lane Grp Cap(c), veh/h	284	0	432	103	0	0	597	0	1146	599	0	1034
V/C Ratio(X)	0.97	0.00	0.37	0.34	0.00	0.00	0.17	0.00	0.25	0.02	0.00	0.33
Avail Cap(c_a), veh/h	284	0	432	103	0	0	597	0	1146	599	0	1034
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.86	0.00	0.86	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.6	0.0	27.9	28.4	0.0	0.0	12.9	0.0	8.7	10.4	0.0	9.3
Incr Delay (d2), s/veh	44.6	0.0	0.5	1.9	0.0	0.0	0.5	0.0	0.5	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.0	0.0	3.0	0.6	0.0	0.0	1.2	0.0	2.6	0.1	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.1	0.0	28.4	30.4	0.0	0.0	13.4	0.0	9.2	10.5	0.0	10.1
LnGrp LOS	F	A	C	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		435			35			390			355	
Approach Delay, s/veh		62.4			30.4			10.3			10.2	
Approach LOS		E			C			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		63.5		31.5		63.5		31.5				
Change Period (Y+Rc), s		6.0		5.5		6.0		5.5				
Max Green Setting (Gmax), s		28.0		26.0		28.0		24.0				
Max Q Clear Time (g_c+I1), s		16.5		28.0		11.5		28.0				
Green Ext Time (p_c), s		1.6		0.0		1.9		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Summary
13: 73rd Ave NE & SR 522 10/12/2022

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (veh/h)	25	170	2110	35	30	110	1980	280	50	100	120	300
Future Volume (veh/h)	25	170	2110	35	30	110	1980	280	50	100	120	300
Initial Q (Qb), veh		0	0	0		0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00		0.99		1.00		0.99	1.00		0.94	1.00
Parking Bus, Adj		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach			No				No			No		
Adj Sat Flow, veh/h/ln		1856	1841	1693		1826	1870	1870	1722	1870	1870	1885
Adj Flow Rate, veh/h		170	2110	35		110	1980	280	50	100	120	300
Peak Hour Factor		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %		3	4	14		5	2	2	12	2	2	1
Cap, veh/h		185	2109	854		126	2028	893	62	263	209	282
Arrive On Green		0.10	0.60	0.60		0.07	0.57	0.57	0.04	0.14	0.14	0.08
Sat Flow, veh/h		1767	3497	1417		1739	3554	1564	1640	1870	1490	3483
Grp Volume(v), veh/h		170	2110	35		110	1980	280	50	100	120	300
Grp Sat Flow(s),veh/h/ln		1767	1749	1417		1739	1777	1564	1640	1870	1490	1742
Q Serve(g_s), s		20.0	126.6	2.1		13.2	113.5	19.7	6.4	10.2	15.8	17.0
Cycle Q Clear(g_c), s		20.0	126.6	2.1		13.2	113.5	19.7	6.4	10.2	15.8	17.0
Prop In Lane		1.00		1.00		1.00		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h		185	2109	854		126	2028	893	62	263	209	282
V/C Ratio(X)		0.92	1.00	0.04		0.87	0.98	0.31	0.81	0.38	0.57	1.06
Avail Cap(c_a), veh/h		185	2109	854		137	2028	893	102	325	259	282
HCM Platoon Ratio		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.92
Uniform Delay (d), s/veh		93.1	41.7	17.0		96.5	43.7	23.6	100.3	82.0	84.4	96.5
Incr Delay (d2), s/veh		43.6	19.7	0.1		40.4	15.2	0.9	21.2	0.9	2.5	69.3
Initial Q Delay(d3),s/veh		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln		11.5	59.6	0.7		7.4	52.8	7.7	3.1	5.0	6.3	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh		136.7	61.4	17.1		136.9	58.9	24.5	121.5	82.9	86.9	165.8
LnGrp LOS		F	F	B		F	E	C	F	F	F	F
Approach Vol, veh/h			2315				2370			270		
Approach Delay, s/veh			66.2				58.4			91.8		
Approach LOS			E				E			F		

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.7	132.9	11.9	44.4	27.5	126.1	21.0	35.4
Change Period (Y+Rc), s	5.5	6.3	4.0	5.9	5.5	6.3	4.0	* 5.9
Max Green Setting (Gmax), s	16.5	118.7	13.0	40.1	22.0	113.2	17.0	* 37
Max Q Clear Time (g_c+I1), s	15.2	128.6	8.4	25.8	22.0	115.5	19.0	17.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	70.3
HCM 6th LOS	E

Notes

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

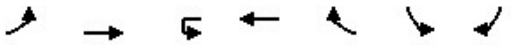
Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	90	110
Future Volume (veh/h)	90	110
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		0.95
Parking Bus, Adj	1.00	1.00
Work Zone On Approach	No	
Adj Sat Flow, veh/h/ln	1856	1856
Adj Flow Rate, veh/h	90	110
Peak Hour Factor	1.00	1.00
Percent Heavy Veh, %	3	3
Cap, veh/h	136	166
Arrive On Green	0.18	0.18
Sat Flow, veh/h	739	903
Grp Volume(v), veh/h	0	200
Grp Sat Flow(s),veh/h/ln	0	1642
Q Serve(g_s), s	0.0	23.8
Cycle Q Clear(g_c), s	0.0	23.8
Prop In Lane		0.55
Lane Grp Cap(c), veh/h	0	301
V/C Ratio(X)	0.00	0.66
Avail Cap(c_a), veh/h	0	314
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	0.00	0.92
Uniform Delay (d), s/veh	0.0	79.7
Incr Delay (d2), s/veh	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	10.5
Unsig. Movement Delay, s/veh		
LnGrp Delay(d),s/veh	0.0	84.2
LnGrp LOS	A	F
Approach Vol, veh/h	500	
Approach Delay, s/veh	133.2	
Approach LOS	F	
Timer - Assigned Phs		

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	170	80	85	255	215	145
Future Vol, veh/h	170	80	85	255	215	145
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	1	5	1	5	1	1
Mvmt Flow	170	80	85	255	215	145
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.1	13.1	12.6
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	25%	68%	0%
Vol Thru, %	75%	0%	60%
Vol Right, %	0%	32%	40%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	340	250	360
LT Vol	85	170	0
Through Vol	255	0	215
RT Vol	0	80	145
Lane Flow Rate	340	250	360
Geometry Grp	1	1	1
Degree of Util (X)	0.49	0.387	0.49
Departure Headway (Hd)	5.193	5.578	4.897
Convergence, Y/N	Yes	Yes	Yes
Cap	694	645	738
Service Time	3.22	3.61	2.925
HCM Lane V/C Ratio	0.49	0.388	0.488
HCM Control Delay	13.1	12.1	12.6
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.7	1.8	2.7



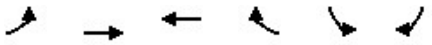
Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (veh/h)	215	2300	0	2140	215	125	210
Future Volume (veh/h)	215	2300	0	2140	215	125	210
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00				1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No	
Adj Sat Flow, veh/h/ln	1826	1856		1885	1856	1841	1885
Adj Flow Rate, veh/h	215	2300		2140	215	125	210
Peak Hour Factor	1.00	1.00		1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	3		1	3	4	1
Cap, veh/h	231	2815		2418	1057	247	225
Arrive On Green	0.10	0.80		0.68	0.68	0.14	0.14
Sat Flow, veh/h	1739	3618		3676	1566	1753	1598
Grp Volume(v), veh/h	215	2300		2140	215	125	210
Grp Sat Flow(s),veh/h/ln	1739	1763		1791	1566	1753	1598
Q Serve(g_s), s	19.7	79.4		101.3	10.9	13.9	27.3
Cycle Q Clear(g_c), s	19.7	79.4		101.3	10.9	13.9	27.3
Prop In Lane	1.00				1.00	1.00	1.00
Lane Grp Cap(c), veh/h	231	2815		2418	1057	247	225
V/C Ratio(X)	0.93	0.82		0.89	0.20	0.51	0.93
Avail Cap(c_a), veh/h	265	2815		2418	1057	267	243
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		0.45	0.45	1.00	1.00
Uniform Delay (d), s/veh	85.3	12.3		27.5	12.9	83.4	89.2
Incr Delay (d2), s/veh	34.7	2.8		2.5	0.2	1.6	38.3
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.9	29.7		42.4	3.9	6.4	13.8
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	120.0	15.0		30.0	13.0	85.0	127.5
LnGrp LOS	F	B		C	B	F	F
Approach Vol, veh/h		2515		2355		335	
Approach Delay, s/veh		24.0		28.5		111.7	
Approach LOS		C		C		F	

Timer - Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		174.0			25.9	148.1		36.0
Change Period (Y+Rc), s		6.3			4.0	6.3		6.4
Max Green Setting (Gmax), s		157.3			26.0	135.3		32.0
Max Q Clear Time (g_c+I1), s		81.4			21.7	103.3		29.3
Green Ext Time (p_c), s		45.8			0.2	23.6		0.3

Intersection Summary	
HCM 6th Ctrl Delay	31.7
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	145	2270	2195	45	20	190
Future Volume (veh/h)	145	2270	2195	45	20	190
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1841	1870	1767	1707	1885
Adj Flow Rate, veh/h	145	2270	2195	45	20	190
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	2	9	13	1
Cap, veh/h	161	2838	2473	1041	209	205
Arrive On Green	0.09	0.81	0.70	0.70	0.13	0.13
Sat Flow, veh/h	1810	3589	3647	1496	1626	1598
Grp Volume(v), veh/h	145	2270	2195	45	20	190
Grp Sat Flow(s),veh/h/ln	1810	1749	1777	1496	1626	1598
Q Serve(g_s), s	16.7	73.2	103.1	2.0	2.3	24.7
Cycle Q Clear(g_c), s	16.7	73.2	103.1	2.0	2.3	24.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	161	2838	2473	1041	209	205
V/C Ratio(X)	0.90	0.80	0.89	0.04	0.10	0.93
Avail Cap(c_a), veh/h	183	2838	2473	1041	248	243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.54	0.54	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.7	10.6	25.4	10.0	80.7	90.5
Incr Delay (d2), s/veh	23.7	1.3	5.2	0.1	0.2	34.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	26.0	43.2	0.7	1.0	22.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	118.4	12.0	30.6	10.1	80.9	125.4
LnGrp LOS	F	B	C	B	F	F
Approach Vol, veh/h		2415	2240		210	
Approach Delay, s/veh		18.4	30.2		121.2	
Approach LOS		B	C		F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		176.7		33.3	24.2	152.5
Change Period (Y+Rc), s		6.3		6.3	5.5	6.3
Max Green Setting (Gmax), s		165.4		32.0	21.2	138.7
Max Q Clear Time (g_c+I1), s		75.2		26.7	18.7	105.1
Green Ext Time (p_c), s		48.9		0.3	0.1	24.4

Intersection Summary	
HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	90	10	10	460	275	95
Future Vol, veh/h	90	10	10	460	275	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	90	10	10	460	275	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	803	323	370	0	-	0
Stage 1	323	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	353	718	1189	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	622	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	718	1189	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	622	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.4	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1189	-	368	-	-
HCM Lane V/C Ratio	0.008	-	0.272	-	-
HCM Control Delay (s)	8.1	0	18.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	5	0	5	530	15	0	365	0
Future Vol, veh/h	0	0	0	5	5	0	5	530	15	0	365	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	5	0	5	530	15	0	365	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	915	920	365	913	913	538	365	0	0	545	0	0
Stage 1	365	365	-	548	548	-	-	-	-	-	-	-
Stage 2	550	555	-	365	365	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	253	271	680	254	273	543	1194	-	-	1024	-	-
Stage 1	654	623	-	521	517	-	-	-	-	-	-	-
Stage 2	519	513	-	654	623	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	248	269	680	253	271	543	1194	-	-	1024	-	-
Mov Cap-2 Maneuver	248	269	-	253	271	-	-	-	-	-	-	-
Stage 1	650	623	-	518	514	-	-	-	-	-	-	-
Stage 2	511	510	-	654	623	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	19.3	0.1	0
HCM LOS	A	C		

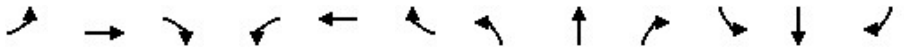
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	-	262	1024	-	-
HCM Lane V/C Ratio	0.004	-	-	-	0.038	-	-	-
HCM Control Delay (s)	8	0	-	0	19.3	0	-	-
HCM Lane LOS	A	A	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	140	15	35	150	5	20	105	65	10	85	15
Future Vol, veh/h	35	140	15	35	150	5	20	105	65	10	85	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	4	4	14	4	2	0	11	1	0	0	0	0
Mvmt Flow	35	140	15	35	150	5	20	105	65	10	85	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.8	9.9	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	18%	18%	9%
Vol Thru, %	55%	74%	79%	77%
Vol Right, %	34%	8%	3%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	190	190	110
LT Vol	20	35	35	10
Through Vol	105	140	150	85
RT Vol	65	15	5	15
Lane Flow Rate	190	190	190	110
Geometry Grp	1	1	1	1
Degree of Util (X)	0.263	0.261	0.263	0.154
Departure Headway (Hd)	4.98	4.947	4.978	5.027
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	714	720	714	706
Service Time	3.056	3.024	3.054	3.112
HCM Lane V/C Ratio	0.266	0.264	0.266	0.156
HCM Control Delay	9.9	9.8	9.8	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	1	1.1	0.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	30	120	60	30	50	115	445	40	15	285	10
Future Volume (vph)	30	30	120	60	30	50	115	445	40	15	285	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.91			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1681			1803	1583	1770	1840		1770	1853	
Flt Permitted		0.92			0.30	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1565			563	1583	1770	1840		1770	1853	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	30	120	60	30	50	115	445	40	15	285	10
RTOR Reduction (vph)	0	82	0	0	0	41	0	2	0	0	1	0
Lane Group Flow (vph)	0	98	0	0	90	9	115	483	0	15	294	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			3		5	2		1	6	
Permitted Phases	4			3		3						
Actuated Green, G (s)		11.7			19.1	19.1	16.1	51.2		3.0	38.1	
Effective Green, g (s)		11.7			19.1	19.1	16.1	51.2		3.0	38.1	
Actuated g/C Ratio		0.11			0.18	0.18	0.15	0.49		0.03	0.36	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		174			102	287	271	897		50	672	
v/s Ratio Prot							c0.06	c0.26		0.01	0.16	
v/s Ratio Perm		c0.06			c0.16	0.01						
v/c Ratio		0.56			0.88	0.03	0.42	0.54		0.30	0.44	
Uniform Delay, d1		44.2			41.9	35.3	40.3	18.7		50.0	25.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.2			53.3	0.0	1.1	2.3		3.4	2.1	
Delay (s)		48.4			95.1	35.4	41.3	21.0		53.3	27.4	
Level of Service		D			F	D	D	C		D	C	
Approach Delay (s)		48.4			73.8			24.9			28.6	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
21: 65th Ave NE/65th Ave 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	2150	165	10	2350	50	300	5	280	15	15	45
Future Volume (veh/h)	50	2150	165	10	2350	50	300	5	280	15	15	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1885	1870	1870	1870	1900	1870	1900	1870	1870	1870
Adj Flow Rate, veh/h	50	2150	165	10	2350	50	300	5	280	15	15	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	1	2	2	2	0	2	0	2	2	2
Cap, veh/h	52	2585	1181	15	2555	1140	241	5	305	39	31	68
Arrive On Green	0.04	0.98	0.98	0.01	0.72	0.72	0.13	0.20	0.20	0.04	0.04	0.04
Sat Flow, veh/h	1810	3497	1598	1781	3554	1585	1810	28	1561	314	710	1585
Grp Volume(v), veh/h	50	2150	165	10	2350	50	300	0	285	30	0	45
Grp Sat Flow(s),veh/h/ln	1810	1749	1598	1781	1777	1585	1810	0	1589	1024	0	1585
Q Serve(g_s), s	5.8	12.0	0.4	1.2	115.2	1.9	28.0	0.0	36.9	1.9	0.0	5.9
Cycle Q Clear(g_c), s	5.8	12.0	0.4	1.2	115.2	1.9	28.0	0.0	36.9	6.8	0.0	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.98	0.50		1.00
Lane Grp Cap(c), veh/h	52	2585	1181	15	2555	1140	241	0	310	70	0	68
V/C Ratio(X)	0.97	0.83	0.14	0.67	0.92	0.04	1.24	0.00	0.92	0.43	0.00	0.66
Avail Cap(c_a), veh/h	52	2585	1181	34	2555	1140	241	0	409	155	0	166
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.29	0.29	0.29	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	100.9	0.6	0.5	103.8	24.5	8.6	91.0	0.0	82.8	99.1	0.0	99.0
Incr Delay (d2), s/veh	57.6	1.0	0.1	40.8	6.8	0.1	139.5	0.0	21.5	4.2	0.0	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	1.3	0.2	0.7	49.3	0.7	22.6	0.0	17.2	1.7	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	158.5	1.6	0.5	144.6	31.3	8.6	230.5	0.0	104.4	103.2	0.0	109.4
LnGrp LOS	F	A	A	F	C	A	F	A	F	F	A	F
Approach Vol, veh/h		2365			2410			585			75	
Approach Delay, s/veh		4.8			31.3			169.0			106.9	
Approach LOS		A			C			F			F	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	45.0	5.8	159.2	32.0	13.0	10.0	155.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	54.0	4.0	140.0	28.0	22.0	6.0	138.0
Max Q Clear Time (g_c+I1), s	38.9	3.2	14.0	30.0	8.8	7.8	117.2
Green Ext Time (p_c), s	1.6	0.0	55.5	0.0	0.2	0.0	18.1

Intersection Summary	
HCM 6th Ctrl Delay	35.6
HCM 6th LOS	D

HCM Signalized Intersection Capacity Analysis
22: 68th Ave NE & Lake Point 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	420	0	235	5	55	0	60	1140	35	0	950	105
Future Volume (vph)	420	0	235	5	55	0	60	1140	35	0	950	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95			0.95	
Frt	1.00	0.85		1.00	1.00		1.00	1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1583		1770	1863		1770	3523			3486	
Flt Permitted	0.95	1.00		0.95	1.00		0.11	1.00			1.00	
Satd. Flow (perm)	1770	1583		1770	1863		206	3523			3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	457	0	255	5	60	0	65	1239	38	0	1033	114
RTOR Reduction (vph)	0	142	0	0	0	0	0	2	0	0	9	0
Lane Group Flow (vph)	457	113	0	5	60	0	65	1275	0	0	1138	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA			NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	31.4	33.8		4.8	7.2		39.4	39.4			32.2	
Effective Green, g (s)	31.4	33.8		4.8	7.2		39.4	39.4			32.2	
Actuated g/C Ratio	0.35	0.38		0.05	0.08		0.44	0.44			0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	617	594		94	149		145	1542			1247	
v/s Ratio Prot	c0.26	0.07		0.00	c0.03		0.02	c0.36			c0.33	
v/s Ratio Perm							0.18					
v/c Ratio	0.74	0.19		0.05	0.40		0.45	0.83			0.91	
Uniform Delay, d1	25.7	18.9		40.4	39.4		35.3	22.3			27.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	4.8	0.2		0.2	1.8		2.2	5.2			11.6	
Delay (s)	30.5	19.1		40.7	41.1		37.5	27.5			39.2	
Level of Service	C	B		D	D		D	C			D	
Approach Delay (s)		26.4			41.1			28.0			39.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
22: 68th Ave NE & Lake Point 10/12/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	0	235	5	55	0	60	1140	35	0	950	105
Future Volume (veh/h)	420	0	235	5	55	0	60	1140	35	0	950	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	457	0	255	5	60	0	65	1239	38	0	1033	114
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	475	0	308	227	103	0	378	1918	59	0	1076	119
Arrive On Green	0.27	0.00	0.19	0.13	0.06	0.00	0.17	0.54	0.54	0.00	0.33	0.33
Sat Flow, veh/h	1781	0	1585	1781	1870	0	1781	3520	108	0	3321	356
Grp Volume(v), veh/h	457	0	255	5	60	0	65	625	652	0	568	579
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	0	1781	1777	1851	0	1777	1806
Q Serve(g_s), s	22.8	0.0	13.9	0.2	2.8	0.0	0.0	22.2	22.3	0.0	28.2	28.3
Cycle Q Clear(g_c), s	22.8	0.0	13.9	0.2	2.8	0.0	0.0	22.2	22.3	0.0	28.2	28.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.06	0.00		0.20
Lane Grp Cap(c), veh/h	475	0	308	227	103	0	378	968	1009	0	592	602
V/C Ratio(X)	0.96	0.00	0.83	0.02	0.58	0.00	0.17	0.65	0.65	0.00	0.96	0.96
Avail Cap(c_a), veh/h	475	0	634	227	333	0	378	968	1009	0	592	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.57	0.57	0.57	0.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	0.0	34.8	34.3	41.5	0.0	31.2	14.4	14.4	0.0	29.4	29.4
Incr Delay (d2), s/veh	31.7	0.0	5.7	0.0	5.1	0.0	0.1	1.9	1.8	0.0	28.3	28.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.7	0.0	5.7	0.1	1.4	0.0	1.2	8.9	9.3	0.0	16.2	16.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	0.0	40.5	34.4	46.6	0.0	31.3	16.3	16.2	0.0	57.7	57.6
LnGrp LOS	E	A	D	C	D	A	C	B	B	A	E	E
Approach Vol, veh/h		712			65			1342			1147	
Approach Delay, s/veh		55.7			45.7			17.0			57.7	
Approach LOS		E			D			B			E	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	53.0	15.5	21.5	19.0	34.0	28.0	9.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	38.0	4.0	36.0	4.0	30.0	24.0	16.0
Max Q Clear Time (g_c+I1), s	24.3	2.2	15.9	2.0	30.3	24.8	4.8
Green Ext Time (p_c), s	7.5	0.0	1.6	0.0	0.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	40.3
HCM 6th LOS	D

APPENDIX D - 2: LAND USE MAPS

Figures 1 through 10 depict employment and housing land uses by traffic analysis zone (TAZ) around Kenmore. The 2018 maps represent the base year for the travel model, which was reviewed for consistency with the city's data on employment and housing. The 2044 maps show the forecasted future levels of jobs and housing based on the amount of growth assigned by the Puget Sound Regional Council (PSRC) local target representation data set that was reviewed by the City and adjusted within City limits based on more detailed information about known development and growth targets in specific parcels. The growth maps display where employment and housing growth is expected to occur around Kenmore. This land use growth informs the City on where to expect increases in travel volumes and translates into future traffic levels through the travel demand forecasting process.

	Housing Units	Employment
2018	9,429	3,797
2044	12,499	7,212
Growth	33%	90%

Travel Demand Forecasting
The PSRC regional Activity Based Travel Demand model will be used for existing baseline and future travel demand forecasting.

Validation
The underlying input assumptions of the existing conditions were reviewed and updated to reflect appropriate level of detail for the City. The existing traffic analysis zones (TAZs) in the PSRC model were scaled to match the City's data on existing employment and housing. The existing conditions model was validated against available count data. To improve the model's performance, the following adjustments were made:

- Updated the quantity and location of housing units and employment estimates within the model area by zone.
- Calculated households for use in the model by assuming a 5 percent housing unit vacancy rate after discussing the conversion with PSRC staff.
- Adjusted PM peak hour vehicle trip generation rates by comparing with Institute of Traffic Engineers (ITE) most recent trip generation rates, local traffic studies, or vehicle driveway counts.
- Calibrated the roadway network parameters (speeds, capacities, and functional class) to better reflect the routes that people use throughout the model area.
- Adjusted the number of the trips that enter or exit the model area based on observed vehicle counts.

Future land use was developed using a variety of sources including city staff input, growth assigned by the PSRC Land Use Vision data set, and previous land use forecasts from the 2014 Transportation Element Update. Future land was allocated through the following process:

- Using the 2050 PSRC Land Use Vision representation data, provided by regional model TAZs, the land use for the Kenmore model was scaled to match City-approved growth targets for housing units and employment.
- Housing units and employment data was disaggregated to the Kenmore TAZ system using land use intensity ratios created for the 2014 Transportation Element update and discussions with City staff.
- The 2050 land use by Kenmore TAZ produced in the previous step was reviewed by city staff and the project team during an in-person working session. Based on specific knowledge of future

developments and zoning allowances as well as review of aerial imagery, housing unit and employment growth was reallocated between Kenmore TAZs.

- Any specific housing unit and/or employment growth for a Kenmore TAZ not established during the working session was assumed to have the same amount of growth as the 2030 land use forecast.
- Housing units were converted to households for use in the PSRC model using a 5 percent vacancy rate that was arrived at in coordination with PSRC staff.

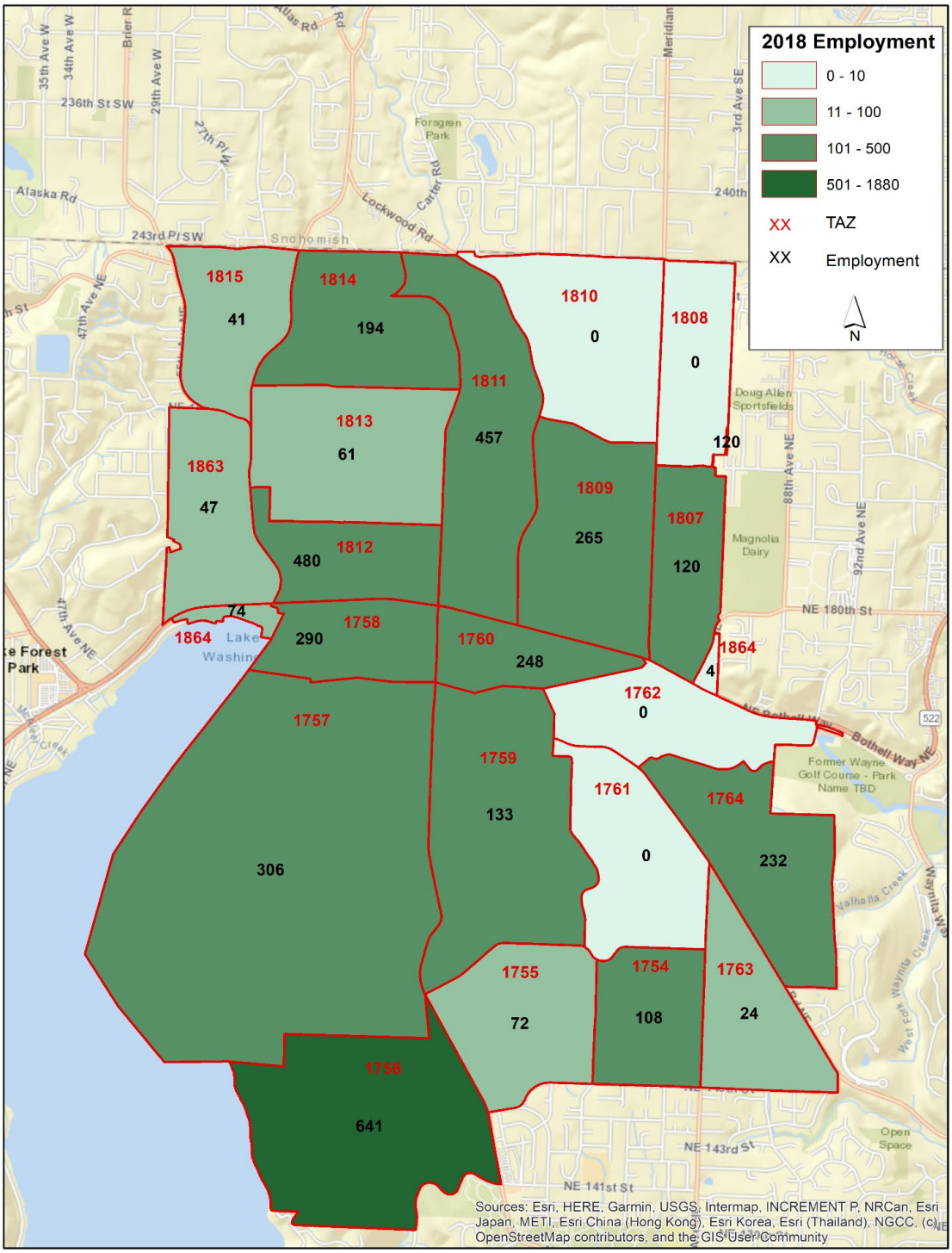
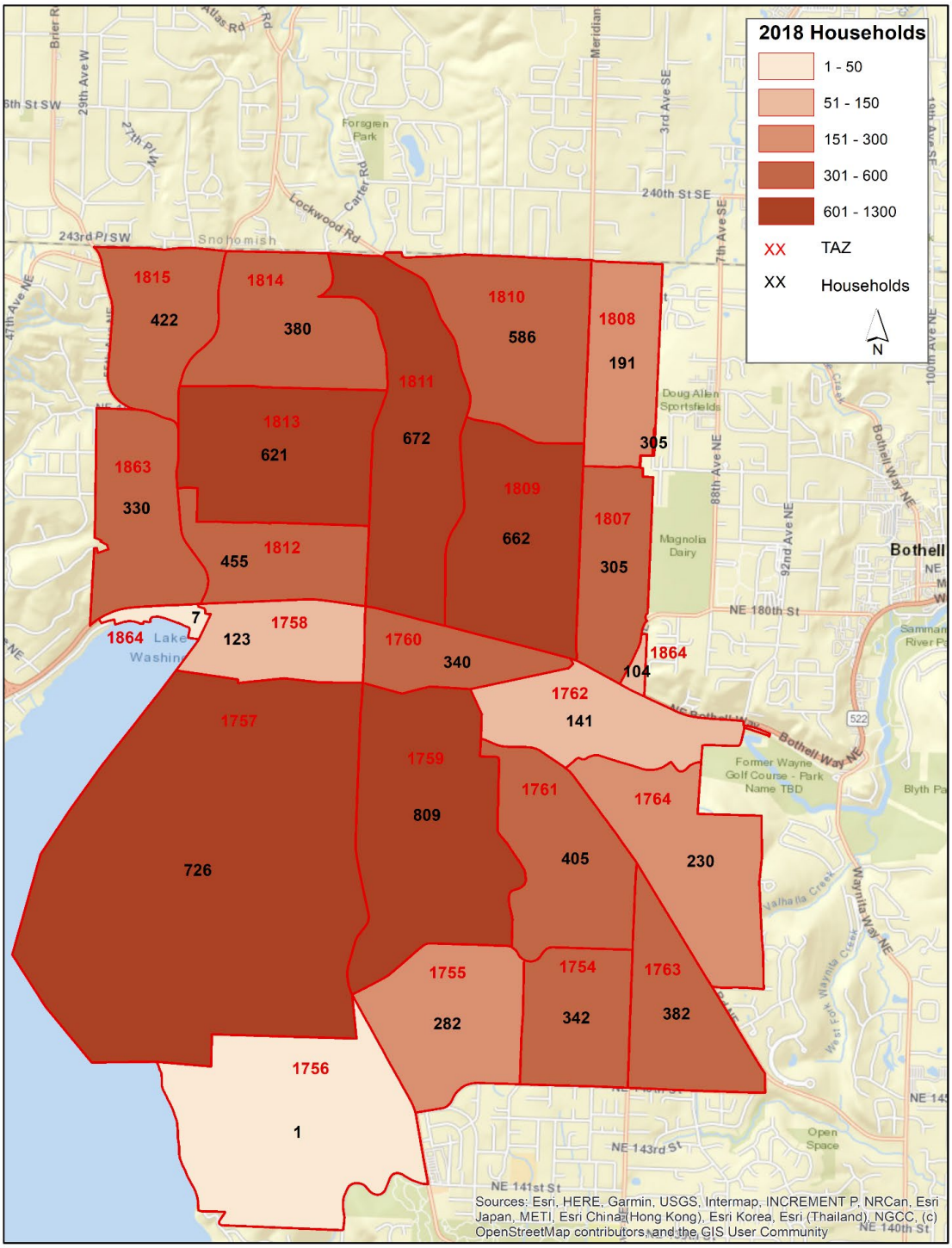


Figure 1. 2018 Employment in Kenmore by TAZ



This map reflects PSRC model input values for households that were arrived at through assuming a 5% vacancy rate of housing units.

Figure 2. 2018 Households in Kenmore by TAZ

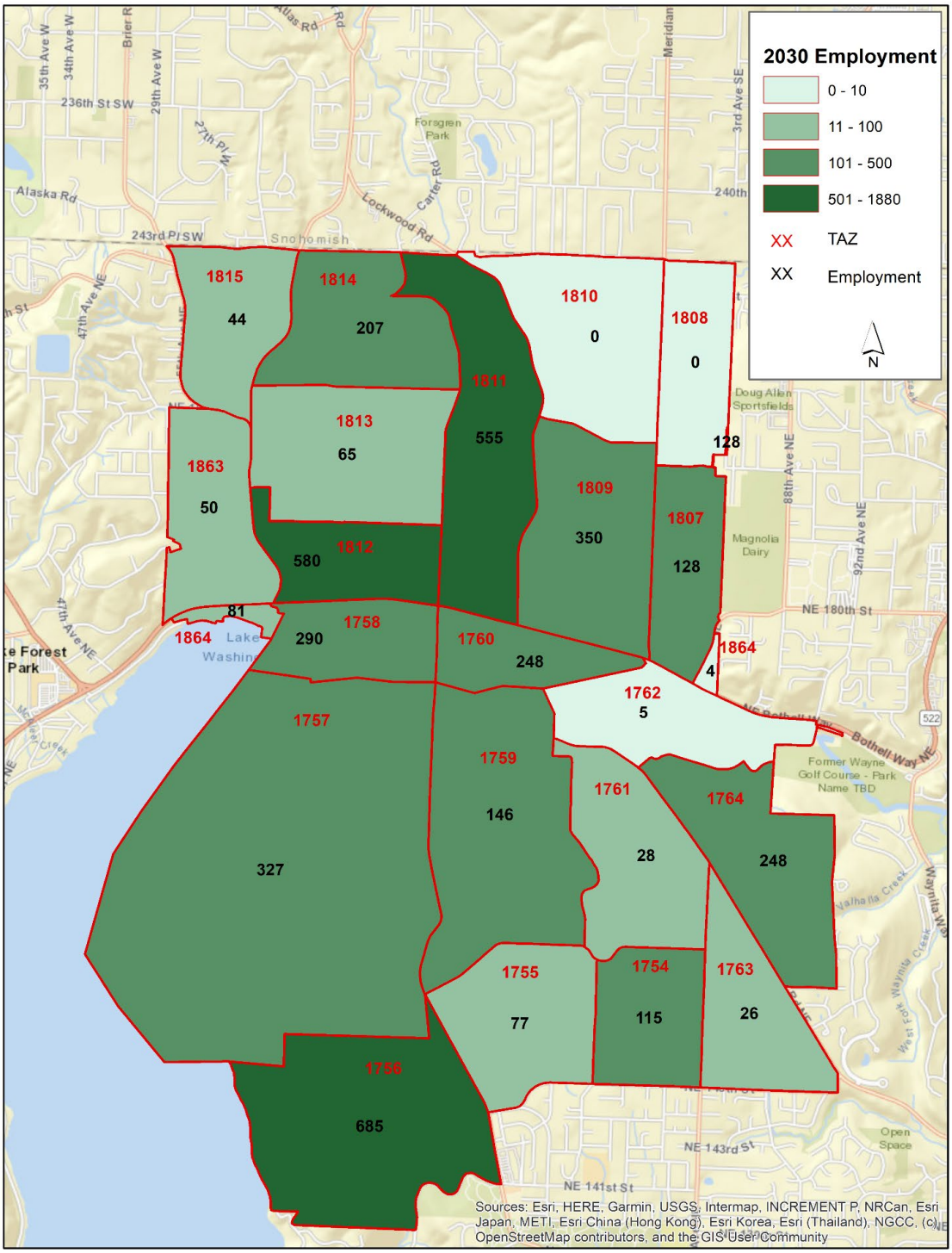
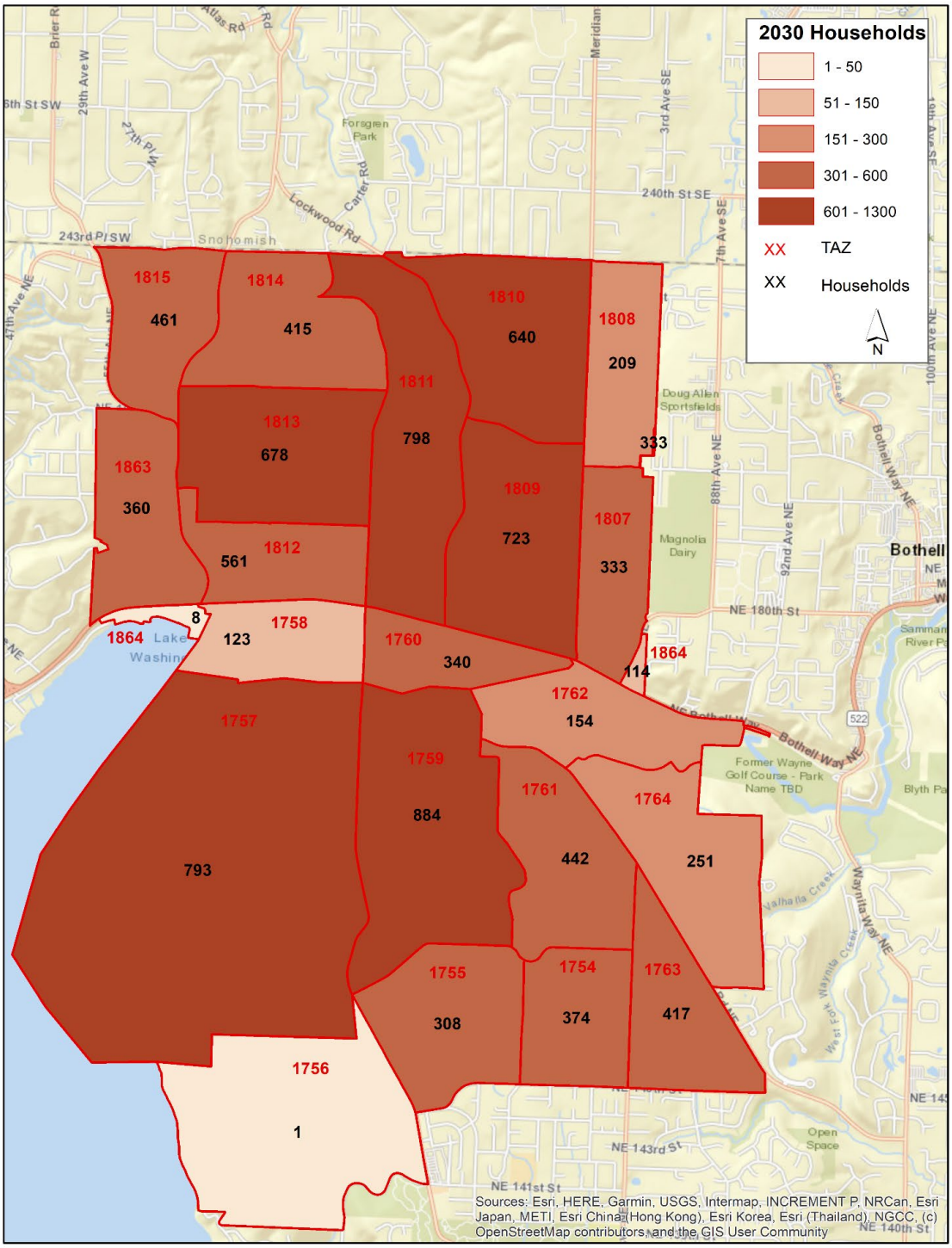


Figure 3. 2030 Employment in Kenmore by TAZ



This map reflects PSRC model input values for households that were arrived at through assuming a 5% vacancy rate of housing units.

Figure 4. 2030 Households in Kenmore by TAZ

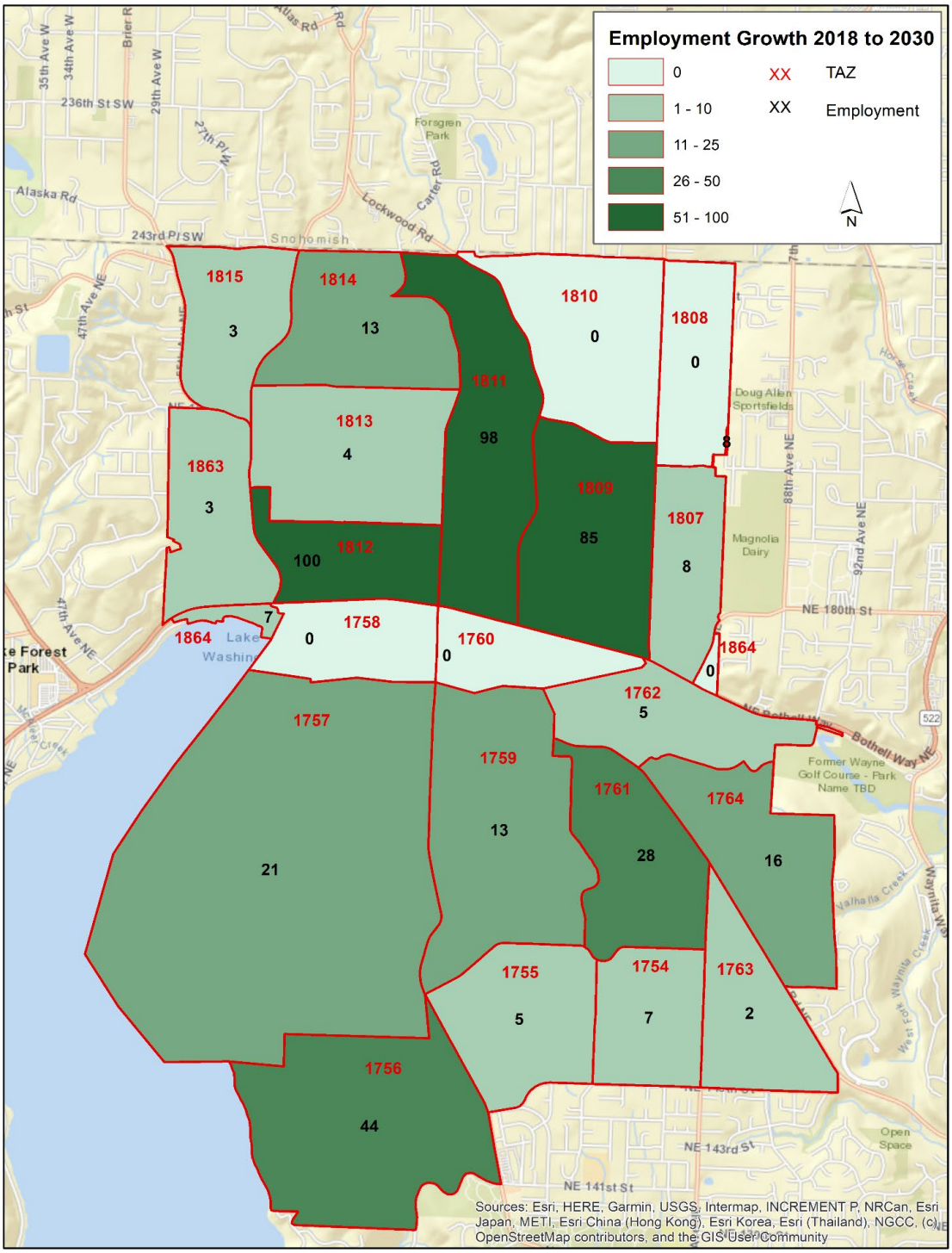


Figure 5. 2018-2030 Employment Change in Kenmore by TAZ

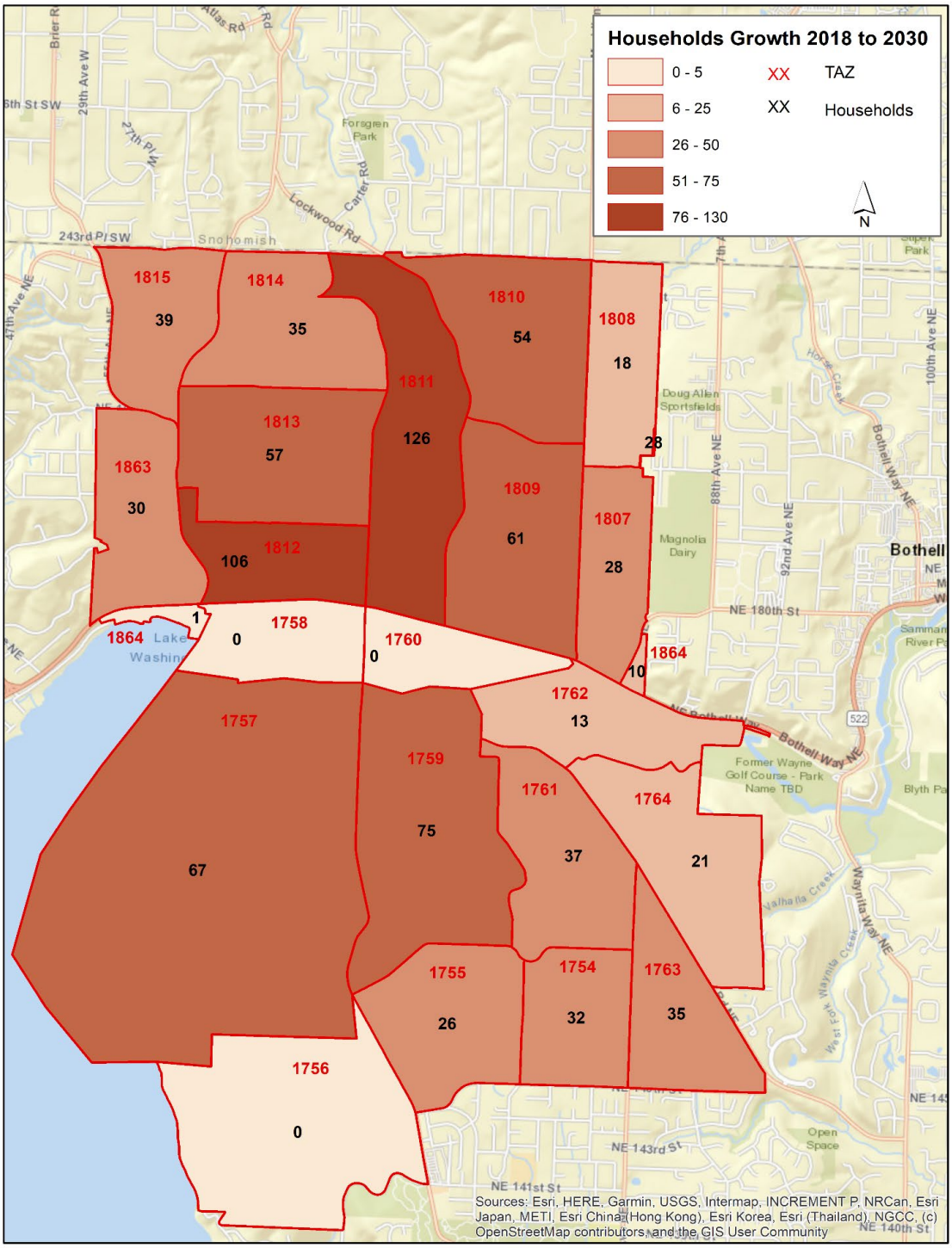


Figure 6. 2018-2030 Households Change in Kenmore by TAZ

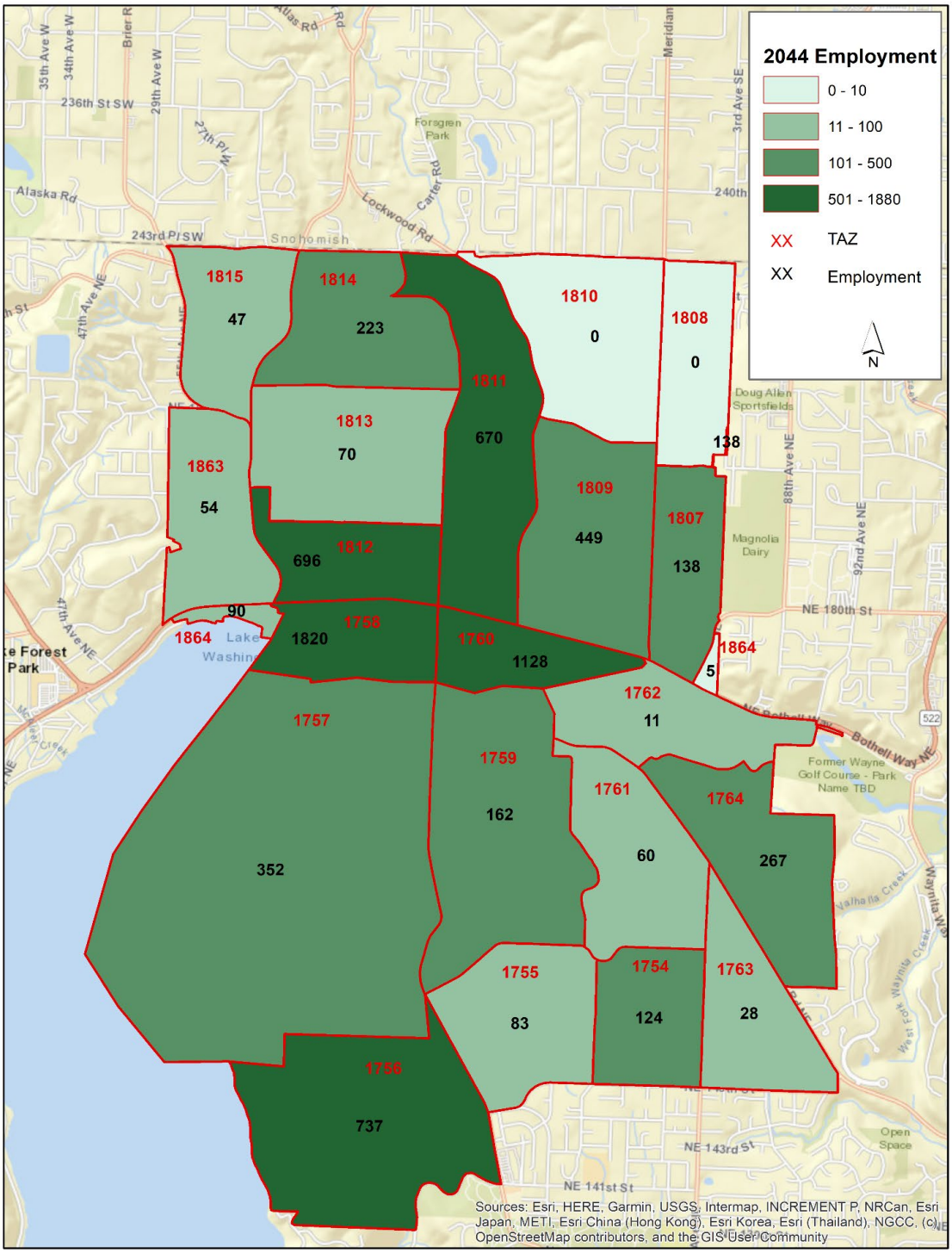
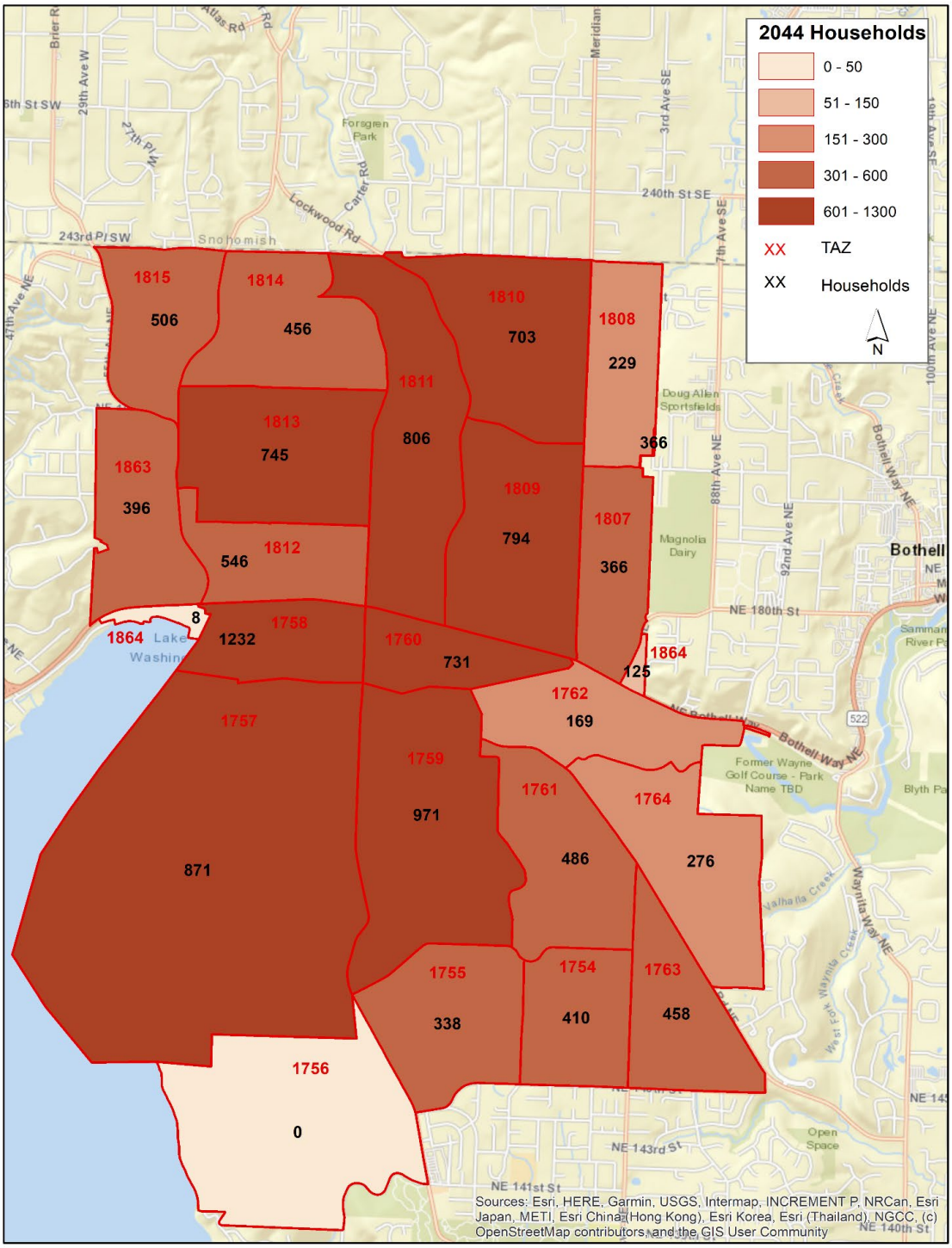


Figure 7. 2044 Employment in Kenmore by TAZ



This map reflects PSRC model input values for households that were arrived at through assuming a 5% vacancy rate of housing units.

Figure 8. 2044 Households in Kenmore by TAZ

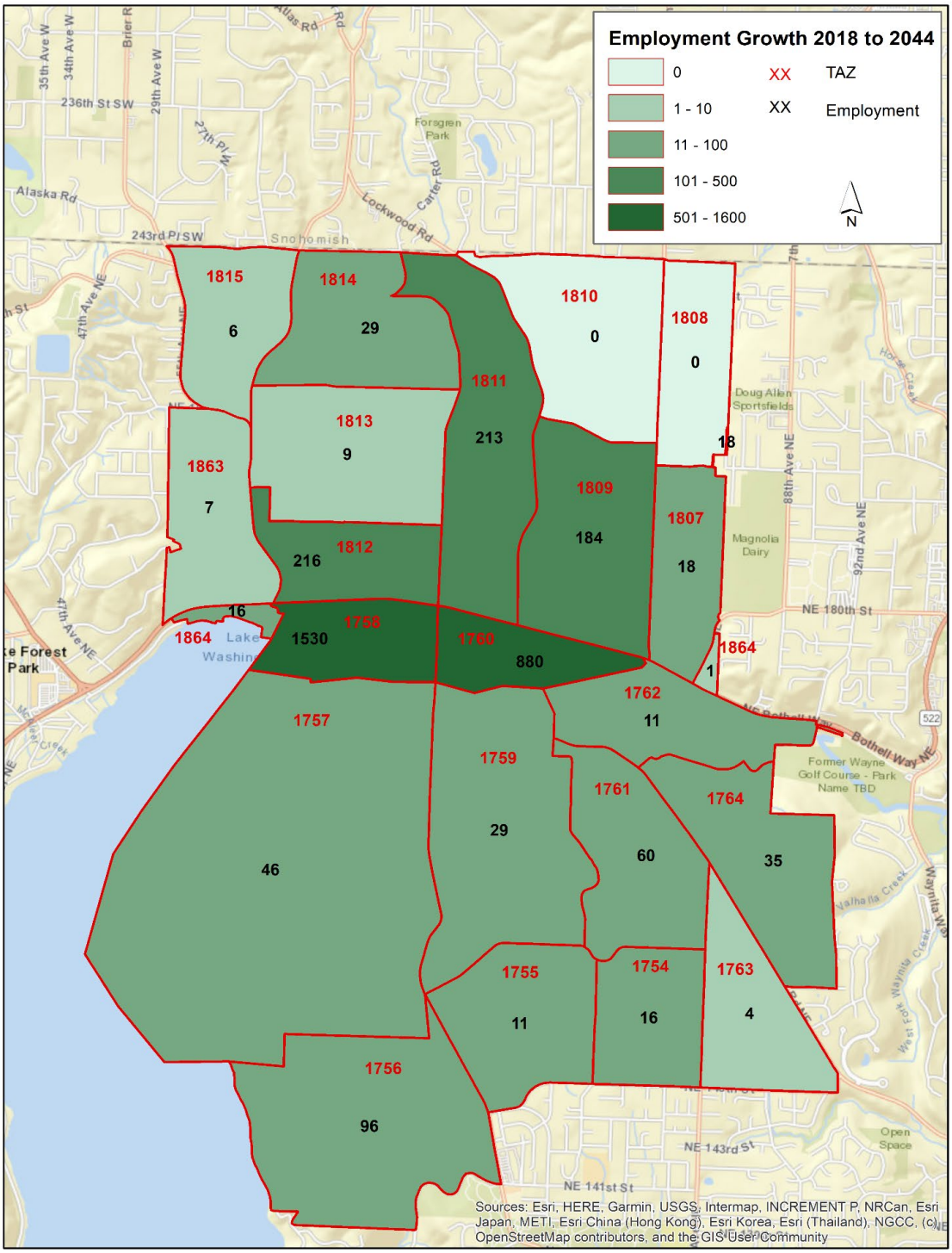


Figure 9. 2018-2044 Employment Change in Kenmore by TAZ

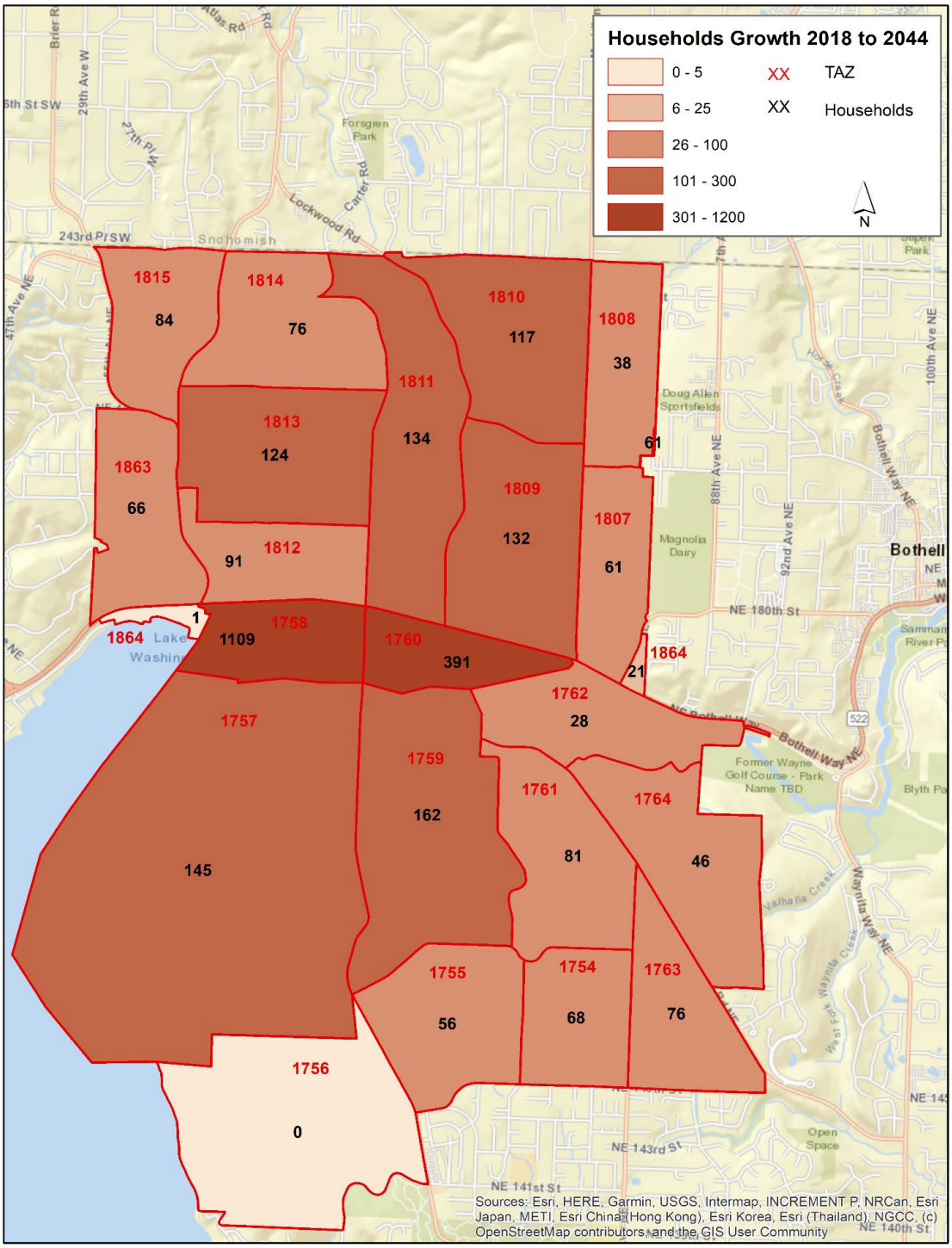


Figure 10. 2018-2044 Households Change in Kenmore by TAZ

City Of Kenmore, Washington

Memorandum

Date: October 25, 2022

To: Planning Commission

From: Debbie Bent, Community Development Director
Lauri Anderson, Principal Planner
Mike Stanger, ARCH

Regarding: Transit-Oriented Development (TOD) Code Amendments

October 18 was the public hearing on the preliminary TOD code amendments. A summary of all public input received, with staff responses, is included as Attachment 1. As you will recall, an informational postcard was mailed to all addresses within the TOD Overlay area and Downtown Commercial zoning district, to supplement the City's typical notification procedures.

Most of the hearing commenters were reacting to a development proposal on a property neighboring their condominium development. That project is being proposed under the current TOD rules that have been in place since 2015. Although the developer of the property initially proposed townhomes, the City's interim TOD regulations prohibit townhomes as a standalone use as townhome development is not considered "transit supportive." Commenters specifically were concerned about building heights, although the current underlying multifamily zoning allows heights up to 60' and the TOD overlay presently allows heights up to 65'.

The recommended boundaries of the TOD area have not changed from the 2015 boundaries, except for the removal of some areas presently zoned R-1. Attachment 2 is an aerial photo of the TOD area showing existing development. At the time the City Council adopted the boundaries in 2015 (based on the Planning Commission's recommendations), an analysis of walking distances had been completed and although there are lower density uses in these multifamily areas, the conclusion was that the vacant/redevelopable properties could support TOD for the future.

Responding to other comments, staff has the following policy recommendations:

1. **Consider prohibiting drive-throughs in the Urban Corridor area, west subarea.**

   Drive-throughs are not pedestrian-friendly uses and they do require additional driving surfaces. Staff recommends that drive throughs no longer be permitted. Existing drive-throughs would become nonconforming.

2. **Add or amend Code provisions related to parking for staff and visitors of senior housing projects.**

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Office: (425) 398-8900 · Fax: (425) 481-3236 · cityhall@kenmorewa.gov · www.kenmorewa.gov

State law mandates that no parking be required for residents of senior housing projects. However, there is an allowance for parking for staff and visitors. The Zoning Code already discusses parking for senior assisted living facilities, generally. Staff recommends that additional revised language be included to add parking standards for staff and visitors to senior housing projects in the area of the TOD.

3. **Revise Downtown Commercial maximum building heights downward.**

   Staff has recognized that the TOD amendments project to date has not included consideration of the impacts of taller downtown building heights on Kenmore Air. For that reason, staff recommends lowering proposed building heights in the Downtown Commercial zoning district to a flat 65' at this time, rather than the 85' maximum height allowance previously endorsed.

The amendments as presented at the public hearing are included as Attachment 3. The map showing the area of the new Urban Residential (UR) zone is included as Attachment 4.

If possible, the Planning Commission should make final recommendations (including responses to the three policy questions above) on November 1. It this is not possible, TOD will again be discussed at your November 15 Planning Commission meeting.

Attachment 1: Public comment summary and staff responses
Attachment 2: Aerial image of the TOD area
Attachment 3: Revised TOD code amendments
Attachment 4: Revised Zoning Map (excerpt)

ATTACHMENT 1

Staff Responses to Public Comments: Transit-Oriented Development

(This matrix contains comments received between 10/10/22 and 10/24/22.)

	Commenter	Concern	Staff Response
1.	**Colleen Anderson** 10/18/22 public hearing	Don't have enough parking Downtown. People farther from the core won't have services. Need additional infrastructure. Want firm requirement for affordable housing.	• New regulations would require .75 stall per unit within ¼-mile of transit consistent with State law. Parking adds to the cost of construction and increases impervious surface. Parking on the street, when street widths are adequate, makes use of existing impervious surface. • The area where densities are being increased is within ¼-mile of SR-522 and services along the corridor. • Including 25% affordable housing units would be a requirement.
2.	**Mark Carpenter** 10/18/22 public hearing	Don't want to live in Ballard or Capitol Hill with increased density. Occupants will own cars. The proposal on NE 80th is a giant box. King County is losing population so no need for this. Opposed to the change. Townhomes would be better.	• Kenmore has a regional responsibility as a "High-Capacity Transit Community" to provide transit-supportive densities near the bus rapid transit (BRT) line. Putting more housing close to transit provides an opportunity for residents to reduce driving; townhomes are not developed at transit-supportive densities. • Design regulations should keep any development from being a "giant box." • The zoning rules that would allow a TOD development on NE 80th have been in place since 2015.
3.	**Marcia Fischer** 10/18/22 public hearing	Kenmore doesn't have an economic base so people must drive. The bus takes too long, with many transfers. Where do Kenmore residents work? Are those workers served by transit? Transit systems aren't centralized—the lake makes it difficult.	• It is true that most Kenmore residents do not work in Kenmore. • Providing additional housing close to transit makes it possible to reduce driving. • BRT should improve transit options for the community, with links to light rail to Seattle to the west and to new eastside transit opportunities.

4.	**Corey Holder** 10/18/22 public hearing	Not opposed to TOD, but no confidence that infrastructure will be distributed equitably. Loss of street parking conflicts with these plans. Is there a commercial/retail requirement on the ground floor? How is TOD going to impact the neighbors?	• A policy in the City's Comprehensive Plan speaks to the need to distribute improved infrastructure equitably. • Although there is no requirement that commercial/retail be on the main floor, that opportunity is provided at a small scale in the Urban Residential area and at any scale in the Urban Corridor and Downtown Commercial areas. • TOD will add new density, but design regulations should ensure building quality.
5.	**Brian Houten** 10/18/22 letter	Must plan for the future without impacting current residents.	• The opportunity to develop TOD in the area under consideration has been in place since 2015. With the exception of increased heights and a more significant affordable housing requirement, the new standards are relatively unchanged from the existing rules.
	10/18/22 public hearing	Proximity to Bothell Way shouldn't be the only thing considered. TOD will impact townhomes—block out sun. Those living there will be renters not owners. Driveway will be right outside window. Garbage smell. Not enough parking. Net result will be a negative impact to the quality of life. Will further destroy Swamp Creek.	• The opportunity to develop TOD has been in place since 2015. • State law mandates that parking be reduced in areas within ¼-mile of transit. • Complaints about driveway location and garbage smell are related to a specific development under consideration using the existing TOD rules and for which the final site plan has not been established. • The City's critical area and shoreline rules are unaffected by the TOD changes and will continue to protect Swamp Creek. Additional protection would be given to the heron rookery.
6.	**Jan Howard** 10/18/22 public hearing	The proposal at 17715 80th Avenue NE is for a 6 story TOD development. Current neighborhood is townhomes. Neighborhood has limited sidewalks and no crosswalks. Should only allow TOD directly along Bothell Way.	• The project of concern being proposed under the existing TOD rules. Although the neighborhood may contain townhomes, the TOD zoning has been in place since 2015 and even the underlying R-18 zoning allows heights up to 60'. • TOD is proposed for the area within ¼-mile of the transit corridor to place more housing in close proximity to the high-capacity transit service. New

			developments are to provide pedestrian connections to facilitate walking to transit.
7.	**Jim Howard** 10/23/22, 10:45 a.m.	• Slow down on any changes to the TOD standards until a new community vision plan can be developed. The City of Redmond Overlake Village planning document provides a vision for new Overlake Village TOD located next to the new Sound Transit light rail station. • The City of Kenmore Downtown vision plan was prepared 20 years ago. This plan does not provide the vision needed to ensure a vibrant and pedestrian friendly, multimodal downtown. • Need new landscape codes and environmental BMP's be considered for the TOD as part of any new changes.	• The City has envisioned TOD in this area since 2015. The proposed zoning standards are little changed from the original regulations. • Design standards address pedestrian-friendly development. • Critical area and shoreline rules were last updated in 2020, using best available science.
8.	**Scott Inslee** 10/18/22 public hearing	TOD will go all the way to Finn Hill. Not enough parking. This proposal is to expand the tax base.	• Not quite sure why the comment about Finn Hill (in Kirkland) is made. TOD is only proposed on the north side of SR-522 within about ¼-mile of the SR-522 transit corridor. • Expanding the tax base was not the motivation behind the proposal. The City's regional responsibilities as a "high-capacity transit community" were the impetus to making the TOD standards mandatory instead of optional.
9.	**Alicia Kelly** 10/18/22 public hearing	Don't put apartments at 17715 80th Avenue NE. There are 600 new homes on 80th—lots of traffic. Renters will have cars and use parking spots on the neighboring condo properties. There is no street parking. There are school bus stops on 80th.	• The project of concern is being proposed under the existing TOD rules not the new regulations. Although a pre-application meeting for this development has been held, no permits have been applied for or issued. • People cannot park on others' private property.
10.	**Dave Lange** 10/10/22, 11:31 a.m. email	• The transit corridor is ripe for density in many people's minds. A common metric is a quarter mile off the corridor should be densified. For zoning, HWY522 is an arterial with transit stations not a transit corridor. Kenmore is only getting 3 stations for BRT and the expectation of suburban light rail won't add more stations. There has been no city efforts to densify the corridor between the stations.	• Mapping shows that areas within ¼-mile of the transit stops include the TOD area under consideration. • The TOD standards are focused around the Kenmore Park and Ride. The extension of some standards to Downtown recognizes the stop at 68th Avenue NE. • No TOD is proposed west of Downtown.

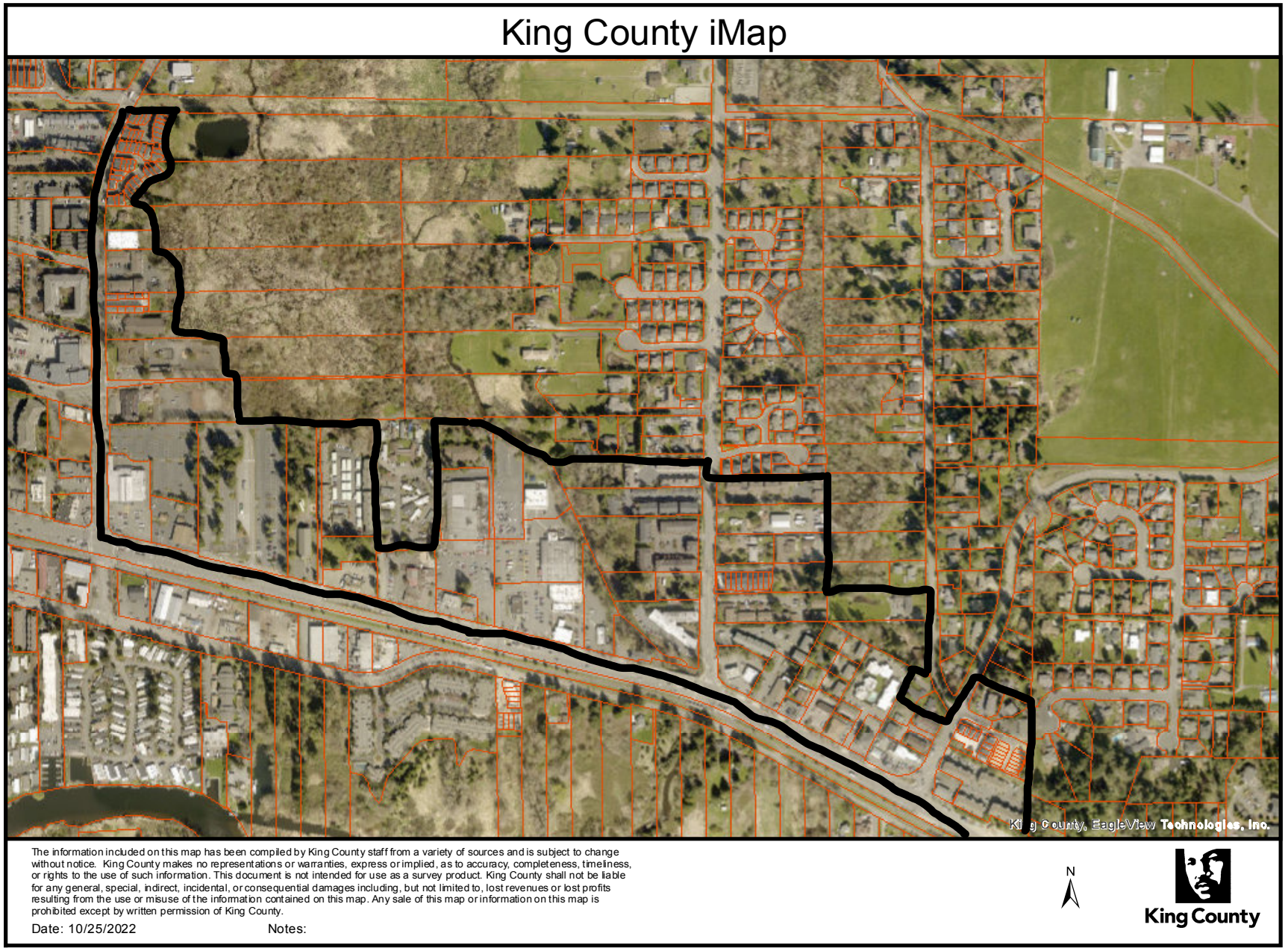
		• Kenmore should be building medium high density up to a quarter mile from the station areas with transitions back to residential for the second quarter mile and leaving the nonstation arterial alone. • Urban planners have no business reducing car garages on the transit corridor away from the stations. Those dwellings are going to need every car since they have few destinations in the pedshed. • Density along an arterial increases the crosswalks and signals at intersections because residents need to cross the road. • Please keep the building heights lower on the lake side of the street to increase views from the hillside of the street. The goal should be reducing driveways on Hwy522 and making sure left turns across traffic are accounted for. The normal designs for arterial density are back exits to sidestreets, but Hwy522 doesn't have those for the whole corridor.	• The draft Transportation Element shows a future roadway east-west through the TOD area that would provide additional access. • Parking within ¼ mile of SR-522 is regulated by the State. • The TOD does not extend to the lake side of SR-522.
	10/18/22, 12:49 p.m. email	• From the middle station to the west station is about .7 miles. If you take a quarter mile toward the other station we have about a quarter mile with little penetration for TOD zoning. • Do not weaponize the existing service access/driveways on HWY 522 with more density sending cars turning into the bus lanes. The Transit Corridor should have depended on a sideroad a block away from HWY 522 as well as radi around the transit stations and sidewalks. Intersections would provide the crosswalks and turn lanes to access the sideroads and the back/side accesses for the new density. • Make sure the local fire departments have appropriate ladder trucks. • We have little research how the daily two hump commute has changed with work at home. • TOD is residential and the businesses and services to attract those from out of the area to come here. If you are considering towers of density near the transit stations consider more than the ground level as commercial. A second floor of professional offices is recommended.	• The TOD does not extend all along SR-522, but only in the area near the Kenmore Park and Ride and Downtown. • As previously mentioned, an additional roadway east-west through the TOD area is proposed. • The Fire Department has confirmed that they have ladders that will access an 85' height. • Traffic impacts will be assessed through the State Environmental Policy Act review. However, the ability to develop TOD has been in place since 2015 so current traffic analyses include that possibility. • Commercial/retail/office uses are allowed in the Urban Corridor and Downtown Commercial zones. Smaller scale uses also would be permitted in the Urban Residential zone. • If TOD is not planned for, development may occur at a lower density that is not supportive of transit. Once buildings are built, they generally remain in place for

		• King County publishes daily trip research every couple of years. It shows distributed residents (Kenmore's R6?) use transit about 7% when you densify the residents (Shoreline South) we get about 11% transit adoption. Its clear the urbanist view of no cars is hardly the observable view that the wrong mode of travel is still the dominant mode. Until we can see enough business and services in the transit corridor to promote walkability, Single Occupant Cars are the appropriate design metric in Kenmore when BRT is a decade away and light rail or real mass transit is still questionable for the Transit Corridor.	many years. The new regulations plan for a future where transit provides alternatives to driving. • BRT is not a decade away, but is expected in 2026.
11.	**Metro/Sound Transit,** Mike Chargualaf, Interim Director of Capital Division, and Alex Krieg, Director of Access, Integration and Station Area Planning 10/18/22 letter	Metro and Sound Transit support the City's desire to increase density in the zone, to realize affordable housing goals, while protecting environmentally sensitive areas. We encourage the city to embrace flexibility while still providing clear guidance and simplify the code where possible. **Affordable Housing** Concerned that the combination of the total number of units required at the depth of affordability sought is high and may limit or prevent housing production. Rather than a flat 25% inclusionary requirement, consider a tiered approach that would increase developers' choice such as: • 15% at 50% of AMI or below, or • 20% at 60% of AMI or below, or • 25% at 70% of AMI or below. **Parking** Take a district level approach to parking management, to reduce excess supply cost for individual projects, while improving access and parking availability for existing and new projects across the zone. Include: • Comprehensive evaluation of the existing supply, and utilization of on- and off-street parking • Establishing a District-wide maximum number of new parking spaces (based on a ratio of no more than 0.75 spaces per unit)	• Research by A Regional Coalition for Housing has determined that, with parking reductions, the 25% affordability level is feasible. • A district level analysis of parking is not possible at this time given the project's schedule. • The standalone parking provision is not designed to be flexible, but to ensure an attractive building with a pedestrian-friendly façade. • The City does not use FAR to regulate building size. • "Transportation" is a specific defined term and includes things like trucking companies or taxi services. In the Urban Corridor, Downtown Commercial, and Urban Residential zoning districts, the Park and Ride is considered a "Regional Land Use" and is permitted with review processes. In the Public/Semi-Public zone, "Standalone parking" is permitted with conditions as is "Regional Land Use" through a site plan review process. • Drive-throughs are permitted in the Urban Corridor zoning district. • Again, FAR is not used in the City so a bonus FAR is not possible.

		• Eliminating parking minimum requirements for individual uses and adding further flexibility for efficient shared use of existing and new off-street parking throughout the zoning district. • The standalone parking garage provision should be more flexible. For example: "*Where feasible, parking shall be integrated with mixed-use wrapped with active ground floor uses, or screened*." **Density Requirements** Consider setting Floor Area Ratio (FAR) maximum density rather than dwelling unit per acre maximum density **Use Allowances** • Ensure that transportation is a permitted use on the existing park and ride lot and adjacent properties. • Discourage uses that include provision for auto-oriented features (e.g., drive-thrus) in this zone. **Tree Retention** Simplify the code provisions related to tree retention. To incentivize tree protection while supporting transit-oriented development, replace the option for a reduction in off-street parking requirements with an option to deliver "Bonus FAR," allowing additional housing and commercial development in the zone.	
12.	**Annie Matthews** 10/18/22 public hearing	Can walk to store; takes buses to Seattle. Tall buildings will impact her as she works from home. There will be noise from construction; sun will be blocked. Parking reduction is unrealistic.	• The existing building height in the underlying multifamily zone is 60'. The current TOD rules allow up to 65'. The proposal is for buildings up to 85'. • The State has standards for parking reductions in the area within ¼-mile of a transit corridor.
13.	**John Paul Mickle** 10/18/22 public hearing	Not enough parking. All new development will exacerbate street parking. Projects for seniors also need parking. Need space for small businesses, not housing. 85' height limit will block views.	• The State has established parking minimums for areas within ¼-mile of a transit corridor, including senior housing projects. The City could establish parking requirements for staff and visitors of senior housing projects. • Parking adds to the cost of construction and increases impervious surface. Parking on the street, when street widths are adequate, makes use of existing impervious

			surface and allows for more greenspace and, potentially, more tree retention, on building lots. • The zoning districts under consideration allow commercial uses. • Views to Lake Washington in the areas east of Downtown have not been identified.
14.	**Elizabeth Mooney** 10/18/22 public hearing	Citizens need time—slow down the process. Supports heron rookery protections. Wary of fee-in-lieu. Concerned that parking enforcement will be needed. Shouldn't put affordable housing in path of asphalt fumes.	• Comments noted. • The recommendations include standards for use of a fee-in-lieu that should mitigate concerns.
15.	**Chris Olson** 10/18/22 public hearing	Cost to construct a parking space is about $60,000. If people want lots of parking, they could move elsewhere. Should emphasize mixed use. Wants more plazas, greenspaces, recovery of environmental areas. Shouldn't have to drive to the transit station. For transit to work, must have higher density.	• Parking does add to the cost of housing. • Commercial uses (mixed use) are permitted in the TOD area. • The goal of TOD is to place more residents within walking distance of transit so that driving can be reduced.
	10/18/22, 7:09 p.m. email	A comment proposes circular regions only 1/4 mile from transit stations should be TOD and states that this is not what's planned. I drew a quick map showing circles centered on the station, one with a radius of 1/4 mile and then another with a 1/2 mile radius. In addition, I drew a line offset 1/4 mile from 522 to show that everything within a 1/4 mile of 522 is well within the 1/2 mile max walk shed distance. In addition, comments state that decreasing speed through downtown and along 522 would be a mistake. I disagree, 522 is the most dangerous road in Kenmore, and changing safety and perceived safety along the road in Kenmore will have dramatically positive impacts on the city.	• Comments noted. The area under consideration is generally within ¼-mile of the transit stops.
16.	**James Olson** 10/18/22 public hearing	More parking encourages more people to drive and makes it dangerous to walk or bike. Kenmore can't remain unchanged.	• Comments noted.
17.	**Kimberly Taylor** 10/18/22 letter	I reside in the Transit Oriented Development area. I understand its purpose to revitalize the City's core by creating incentives and opportunities for a mix of jobs and residences, cultivating a respectful relationship among development within the	• The project of concern is being considered under the existing TOD rules that have been in place since 2015. A preapplication meeting has been held, but no application has been received or permits issued.

		district, the natural environment, nearby traditional neighborhoods and incentive to preserve significant tree groves where they exist. Themes from the Comprehensive Plan include environmental stewardship, enhancing the exceptional quality of life in residential neighborhoods, and a diversity of housing types that complement the neighborhoods in which they occupy. How is a proposed 6-story, 65 feet tall apartment building, 150 feet from Swamp Creek consistent with these values? Concerned about tree retention, blocking of daylight and sky view, roll-up metal garage door, parking, and compatibility?	Neighborhood concerns will be considered during the permitting process. • Current multifamily rules (without the TOD overlay) allow building heights up to 60'. The existing TOD overlay rules allow building heights up to 65'. • The City's critical area and shoreline rules would apply to the project.
	10/18/22 public hearing	Read Comprehensive Plan materials. Concerned about environmental protection, good neighborhoods, compatible building types. How does the proposed project fit with these goals? New building will tower over its tallest neighbor.	• See comments above.
18.	**Stacey Valenzuela** 10/18/22 public hearing	Support 25% affordable housing. Do not allow fee-in-lieu. Height may be too tall. Should have lower heights around Swamp Creek. Don't create the UR zone; keep previous TOD rules. May be a while before transit comes to Kenmore.	• Comments noted. • The recommendations include standards for use of a fee-in-lieu that should mitigate concerns. • Height limits under current standards generally would allow a 55'-65' height limit, depending on the zoning district and whether the TOD overlay is used. • BRT is scheduled to arrive in Kenmore by 2026.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Date: 10/25/2022
Notes:
N
King County

new or deleted text
changes made at October 4 meeting

Zoning District Changes

Urban Corridor (UC) Zone Changes

18.25A.040 Use allowances – Urban corridor east subarea.

The following *uses* listed in Table B are identified as permitted, conditionally permitted, or *prohibited uses* in the urban corridor east subarea:

Table B. Urban Corridor East Subarea Use Allowances

PERMITTED	CONDITIONALLY PERMITTED	PROHIBITED
Adult entertainment business[1]	*College/university*	*Air transportation service*
Ambulatory surgery center	*Fire or police facility*	*Arts, entertainment, outdoor*[3]
Animal kennel/shelter[2]	*Hospital*[5]	*Auction house*
Arts, entertainment, indoor	*Laboratory*[7]	*Automotive sales and service, marine*
Arts, entertainment, outdoor[3]	*Regional land use*[5]	*Automotive sales and service, nonmarine*
Business service, standard	*Retail sales, bulk*[5,10]	*Business service, intensive*
Cemetery, columbarium or mausoleum[4]		*Community residential facility*[5]
Community residential facility[5]		*Construction and trade*
Day care		*Family child-care home*
Eating and drinking place[6]		*Hospital*[5]
Educational service		*Manufactured housing community*
Funeral home/crematory		*Manufacturing, heavy*
Health care and social assistance		*Marijuana cooperative*
Laboratory[7]		*Recreational facility, outdoor*[3]
Manufacturing, light		*Regional land use*[5]
Marijuana business		*Resource land use*
Mobile food service[8]		*Retail sales, bulk*[5]
Multiple-family dwelling[13]		*Secure facility*
Office		*Single detached dwelling unit*
Park		*Standalone parking*[11]
Personal service		*Transportation*
Recreational facility, indoor		*Utility facility*
Recreational facility, outdoor[3,9]		*Vehicle or equipment rental*
Religious institution		*Vehicle refueling station*[12]
Retail sales		*Warehousing*
Retail sales, bulk[5,10]		*Wholesale trade*
Standalone parking[11]		
Supportive living facility		
Temporary lodging		
Vehicle refueling station[12]		

. . .

[13] A standalone townhouse development is prohibited.

18.25A.060 Zoning standards.

The following zone-specific development standards in Table C apply in the urban corridor zone:

Table C. Urban Corridor Zone Development Standards

STANDARD	REQUIREMENT
Urban Corridor west subarea Base Density: *Dwelling Units*/Acre	48 du/ac
Urban Corridor west subarea Maximum Density: *Dwelling Units*/Acre	72 du/ac[1]
Urban Corridor east subarea Minimum Density: *Dwelling Units*/Acre	60 du/ac
Urban Corridor east subarea Maximum Density: *Dwelling Units*/Acre	150 du/ac
Minimum *Street Setback*	10 ft.[2]
Minimum Interior *Setback*	20 ft.[3]
Maximum Height:	
Urban corridor east subarea	~~55~~85 ft.[5,6]
Urban corridor west subarea:	
• south of SR-522	35 ft.
• north of SR-522 west of 63rd Ave. NE	35 ft.
• north of SR-522 east of 63rd Ave. NE	35 ft.[4]
Maximum *Impervious Surface*: Percentage	90%

4. Transit-Oriented Development (TOD) Regulations

[1] This density may only be achieved through the application of residential density incentives or *transfer of density credits* in *mixed use developments*. See Chapter 18.80 KMC.

[2] Gas station pump islands shall be placed no closer than 25 feet to *street* front lines.

[3] Required on property lines adjoining residential zones.

[4] The maximum height on a *site* north of SR-522 east of 63rd Avenue NE may be increased up to a maximum of 55 feet if (1) there is no intervening parcel between the *site* and the NE 181st Street right-of-way, and (2) if the *applicant* can demonstrate, based on ground elevation data, that a topographic change is adequate to protect views of Lake Washington from uphill lots. The measurement shall be taken as follows: a) determine average existing ground elevation along the centerline of the NE 181st Street right-of-way abutting the *site*; b) determine average existing ground elevation along an artificial east-west line 60 feet north of and paralleling the SR-522 right-of-way abutting the *site*; c) subtract the elevation calculated in b) from the elevation calculated in a). If this difference is more than 35 feet, the maximum height for the *site* may be increased to that difference. In no case, however, shall the maximum allowable height exceed 55 feet.

[5] Portions of any property that are within 50 feet of an R-1, R-4, ~~or~~ R-6, or MHC zoning district shall have a maximum height of 35 feet within that area to provide a transition in height to the lower intensity uses.

[6] Building heights and orientation for proposals within the great blue heron rookery buffer shall be carefully assessed through the required habitat management plan (see KMC 18.55, Articles XIII through XV). In particular, potential impacts related to the flyway and shadowing of nest trees shall be evaluated. The *city manager* may require adjustments to maximum building height and/or building orientation to protect the rookery.

18.25A.070 Additional development standards. *(changes made for clarity)*

A. Where the urban corridor zone abuts a residential zone, the *city manager* may require additional landscaping pursuant to Chapter 18.35 KMC, blank wall treatments pursuant to Chapter 18.52 KMC, and/or measures to address building mass and bulk pursuant to KMC 18.52.310 and/or 18.52.330 in order to mitigate impacts of new development on neighboring residential areas.

~~B. In the urban corridor west subarea, parcels on the south side of SR-522 shall provide a public view corridor from SR-522 to Lake Washington. The intent of the corridor is to provide an unobstructed view from SR-522 to the lake. A minimum view corridor equivalent to 30 percent~~

~~of the average east-west dimension of the development proposal site shall be maintained. The location of the view corridor shall be designed to meet the following standards and must be approved by the *city manager*:~~

~~1. The view corridor must be adjacent to one of the two side property lines, whichever will result in the widest view corridor, considering the following in order of priority:~~

~~a. Locations of existing view corridors;~~

~~b. Existing development or potential development on adjacent properties, given the topography, access and likely location of future improvements;~~

~~c. Locations of existing sight-obscuring structures, parking areas or vegetation that are likely to remain in place in the foreseeable future.~~

~~2. The view corridor must be in one continuous piece.~~

~~3. For land divisions, the view corridor shall be established as part of the land division and shall be located to create the largest view corridor on the subject property.~~

~~4. The following shall be permitted within a view corridor:~~

~~a. Areas provided for public access, such as public pedestrian walkways, public use areas, or viewing platforms;~~

~~b. Parking lots for passenger vehicles and subsurface parking structures; provided, that the parking does not completely obstruct the view of the lake from the public right-of-way;~~

~~c. Structures, if the slope of the subject property permits full, unobstructed views of the lake over the structures from the public right-of-way;~~

~~d. Vegetation, including required vegetation screening, provided it is designed and of a size that will not obscure the view from the public right-of-way to the lake at the time of planting or upon future growth. Low growing, native vegetation is encouraged. In the event of a conflict between required landscaping and view preservation, view preservation shall take precedence over landscaping requirements;~~

~~e. Open fencing that is designed not to obscure the view from the public right-of-way to the lake.~~

~~5. The *applicant* shall execute a covenant or similar legal agreement, in a form acceptable to the city attorney, and record the agreement with the county records and elections~~

4. Transit-Oriented Development (TOD) Regulations

~~division to protect the view corridor. Land survey information shall be provided by the *applicant* for this purpose in a format approved by the *city manager*.~~

~~C~~B. *Drive-through service* is permitted as an *accessory use*. *Drive-through service* shall be oriented to the side and/or rear of the *building*, and integrated into the exterior wall. Drive-through lanes shall not be located between the *street* and the main pedestrian access to the *buildings*. Modifications to these requirements may be reviewed through the site plan or building permit review process when meeting the intent of pedestrian orientation pursuant to Chapter 18.52 KMC, ~~Downtown~~ Design Standards.

~~D~~C. Outdoor storage is prohibited in the urban corridor zone, west subarea, and in the urban corridor zone, east subarea, east of 80th Avenue NE. In the urban corridor zone, east subarea, west of 80th Avenue NE, accessory outdoor storage is limited to a maximum of 50 percent of the site area.

18.25.075 View corridors in the Urban Corridor zone, west subarea. *(changes made for clarity)*

A. In the urban corridor west subarea, parcels on the south side of SR-522 shall provide a public view corridor from SR-522 to Lake Washington. The intent of the corridor is to provide an unobstructed view from SR-522 to the lake. A minimum view corridor equivalent to 30 percent of the average east-west dimension of the development proposal site shall be maintained. The location of the view corridor shall be designed to meet the following standards and must be approved by the *city manager*:

1. The view corridor must be adjacent to one of the two side property lines, whichever will result in the widest view corridor, considering the following in order of priority:

   a. Locations of existing view corridors;

   b. Existing development or potential development on adjacent properties, given the topography, access and likely location of future improvements;

   c. Locations of existing sight-obscuring structures, parking areas or vegetation that are likely to remain in place in the foreseeable future.

2. The view corridor must be in one continuous piece.

3. For land divisions, the view corridor shall be established as part of the land division and shall be located to create the largest view corridor on the subject property.

4. The following shall be permitted within a view corridor:

a. Areas provided for public access, such as public pedestrian walkways, public use areas, or viewing platforms;

b. Parking lots for passenger vehicles and subsurface parking structures; provided, that the parking does not completely obstruct the view of the lake from the public right-of-way;

c. Structures, if the slope of the subject property permits full, unobstructed views of the lake over the structures from the public right-of-way;

d. Vegetation, including required vegetation screening, provided it is designed and of a size that will not obscure the view from the public right-of-way to the lake at the time of planting or upon future growth. Low growing, native vegetation is encouraged. In the event of a conflict between required landscaping and view preservation, view preservation shall take precedence over landscaping requirements;

e. Open fencing that is designed not to obscure the view from the public right-of-way to the lake.

5. The *applicant* shall execute a covenant or similar legal agreement, in a form acceptable to the city attorney, and record the agreement with the county records and elections division to protect the view corridor. Land survey information shall be provided by the *applicant* for this purpose in a format approved by the *city manager*.

18.25A.090 Connectivity requirements in the Urban Corridor zone, east subarea.

The urban corridor zone, east subarea, should remove impediments to pedestrian use of the district and the downtown area by fostering the creation of an extensive network of sidewalks and pedestrian walkways.

Development proposals shall:

A. Provide any direct pedestrian connections between proposed development and transit facilities, or arterials providing transit access in order to minimize walking distances to transit.

B. Comply with the ~~downtown~~ design standards pertaining to pedestrian walkways, as set forth in KMC 18.52.100.

C. Properties abutting water bodies (i.e., wetlands or streams) shall provide a public access trail paralleling the water body from one property line to the next with setbacks that are consistent with the requirements of KMC Title 16 and Chapter 18.55 KMC. The public access trail shall connect to a public right-of-way.

1. Where a development proposal abuts a property with a public access trail segment, the public access segment on the subject property shall connect to abutting property public access segment(s).

2. The public access easement for public access trails shall be documented on the face of the plat or plan and recorded with the King County Department of Records and Elections. Public access easements shall run with the land in perpetuity.

18.25A.100 Affordable housing requirements in the Urban Corridor zone, east subarea.

Development in the urban corridor zone, east subarea, containing residential units shall provide affordable housing as described in Chapter 18.77 KMC.

18.25A.~~080~~105 ~~Conflict with design standards~~Design requirements.

Development within the Urban Corridor zone shall comply with the provisions of the design standards, as set forth in Chapter 18.52 KMC. In the event of a conflict between Chapter 18.52 KMC, ~~Downtown~~ Design Standards, and urban corridor zone standards, the Kenmore ~~downtown~~ design standards shall prevail.

Note to Planning Commission: 18.52.070.A.1, map of design districts, will be changed to show UC East as Design Standard 1 (most stringent).

18.25A.~~075~~110 Wireless communication facilities.

Use allowances and development regulations for *wireless communication facilities* are located in Chapter 18.60 KMC.

Downtown Commercial (DC) Zone Changes

18.25.040 Zoning standards.

The following zone-specific development standards in Table B apply in the downtown commercial zone:

Table B. Downtown Commercial Development Standards

STANDARD	REQUIREMENT
~~Base Density: *Dwelling Units*/Gross Acre~~	~~48; applies east of 68th Avenue NE~~
Maximum Density: *Dwelling Units*/Gross Acre ~~with Density Bonus Incentives~~	~~72; density incentives or bonuses not required west of 68th Avenue NE~~150
Minimum Density: *Dwelling Units*/Net Acre for Stand-Alone Multifamily Proposals	~~36~~60
Street Setback	Minimum 10 ft. from SR-522, unless otherwise allowed through Chapter 18.52 KMC, Downtown Design Standards; other *streets* 0 ft. Maximum 10 ft. unless otherwise allowed through Chapter 18.52 KMC, Downtown Design Standards The *City* may authorize intrusions of structural elements into the public right-of-way, including awnings, columns, bay windows, or others, through the design review, site plan review, building permit review, or right-of-way use permit processes, if such intrusions would not impede safe travel by pedestrians, solar access is not significantly diminished, and *City* liability is limited
Minimum Interior *Setback*	0 ft.; except when property adjoins R-1 to R-12 property, then 20 ft.
Base Height	~~35~~65 ft.[1]
Maximum Height Applicable to ~~*mixed use developments* containing residential dwellings at a minimum 50 percent of square footage to a maximum of 75 percent square footage; or to *developments* achieving density bonus; or to~~ *developments* providing structured parking	~~65~~85 ft.[1]
Maximum *Impervious Surface*: Percentage	90%
Pedestrian Connections	Pedestrian connections are required to be provided in accordance with Chapter 18.52 KMC, Downtown Design Standards

[1] Building heights and orientation for proposals within the great blue heron rookery buffer shall be carefully assessed through the required habitat management plan (see KMC 18.55, Articles XIII through XV). In particular, potential impacts related to the flyway and shadowing of nest trees shall be evaluated. The *city manager* may require adjustments to maximum building height and/or building orientation to protect the rookery.

4. Transit-Oriented Development (TOD) Regulations

18.25.041 Affordable housing requirements.

Development containing residential units shall provide affordable housing as described in Chapter 18.77 KMC.

Public and Semi-Public (PSP) Zone Changes

18.27.020 Public and semi-public zone – Use allowances.

A. The following *uses* listed in Table A are identified as *permitted*, conditionally permitted, or *prohibited uses* in the public and semi-public zone:

Table A. Public and Semi-Public Zone Use Allowances

PERMITTED	CONDITIONALLY PERMITTED	PROHIBITED
Arts, entertainment, indoor	*College/university*	*Marijuana business*
Arts, entertainment, outdoor[1]	*Construction and trade*[4]	*Marijuana cooperative*
Educational service		*Regional land use*[5]
Fire or police facility		*Secure facility*
Multiple-family dwelling[6,7]		
Office[2]		
Park		
Recreational facility, indoor		
Recreational facility, outdoor		
Standalone parking[3]		
Utility facility		

1. Except outdoor performance center which is conditionally permitted.

2. Limited to *public agency offices.*

3. Limited to commuter parking facilities for users of transit, carpools or ride-share programs. Standalone parking garages shall be part of a *mixed use development* and shall use techniques such as architectural screening treatments and/or "wrapping" of the building with other uses to mitigate the visual impacts of the garage.

4. Limited to *public agency* maintenance yards or facilities.

5. Landfill and transfer station are specifically prohibited. Consideration of all other *regional land uses* shall follow the process outlined in KMC Section 18.27.060.

6. Limited to: (1) developments sponsored by a *public agency* on properties abutting SR-522 containing at least 25% *very-low* or *low-income affordable housing units*; or (2) developments on surplus *public agency* property. Developments containing *very-low* or *low-income affordable housing units* shall meet the standards of Chapter 18.77 KMC.

[7] A standalone townhouse development is prohibited on properties abutting SR-522.

B. Classified land *uses* not listed or prohibited in Table A may be allowed through completion of a site plan review process pursuant to KMC 18.27.060 and Chapter 18.105 KMC.

C. *Uses* Established by *Master Plan*. Adopted *master plans* that specify *uses* include the following:

1. Bastyr University Master Plan, December 2009, approved by *City* Ordinance 09-0304.

18.27.040 Public and semi-public zone – Development standards.

A. Specific zone-based development standards for the public and semi-public zone in Table B shall apply to the public and semi-public zone as follows:

Table B. Public and Semi-Public Zone Development Standards

Standard	Requirement
Maximum Density: *Dwelling Units*/Gross Acre	~~0.10~~[1] 150[1]
Minimum Lot Size	4,500 sq. ft.[2]
Minimum Lot Width	35 ft.
Minimum *Street Setback*	0 ft., 10 ft., or 20 ft.[3]
Minimum Interior *Setback*	0 ft., 5 ft., or 20 ft.[3]
Base Height	35 ft.[4][5]
Maximum *Impervious Surface*: Percentage	70%, 90%[5][6]

[1] ~~*Dwelling unit, single detached uses*: limited to one *single detached dwelling unit* per existing legal *lot* as of December 16, 2008.~~Maximum density allowed only for development

4. Transit-Oriented Development (TOD) Regulations

projects abutting SR-522 and containing at least 25% *very low-income* or *low-income affordable housing units*. Permitted densities for other housing projects shall be consistent with permitted residential densities in adjoining zoning districts.

[2] The minimum lot size may be reduced if the *city manager* determines *use* on the *site* is compatible with adjoining property, does not impair *development* of adjoining property and does not adversely affect the public health, safety or welfare.

[3] a. *Street setbacks*: the minimum *street setback* for nonresidential or *mixed use development* varies depending on the adjacent zoning:

(1) Zero feet if adjacent zoning is downtown commercial or downtown residential.

(2) Twenty feet if adjacent zoning is R-1 to R-6.

(3) Ten feet in all other cases.

b. Interior *setbacks* for nonresidential or *mixed use development*: zero feet if adjacent zoning is downtown commercial or downtown residential; 20 feet if adjacent zoning is R-1 to R-6; five feet in all other cases.

c. *Setbacks* for residential development shall match those of the adjoining zoning district.

[4] Height limits may be increased when portions of the *building* which exceed the base height limit provide one additional foot of *street* and interior *setback* for each foot above the base height limit, provided the maximum height does not exceed 75 feet. Properties abutting downtown commercial or downtown residential zones or regional business zones may achieve the heights allowed by those abutting zones if meeting conditions for the maximum height as expressed in those abutting zones.

[5] Building heights and orientation for proposals within the great blue heron rookery buffer shall be carefully assessed through the required habitat management plan (see KMC 18.55, Articles XIII through XV). In particular, potential impacts related to the flyway and shadowing of nest trees shall be evaluated. The *city manager* may require adjustments to maximum building height and/or building orientation to protect the rookery.

[5][6] a. Ninety percent if abutting properties are zoned downtown commercial or downtown residential or regional business. Seventy percent in all other cases.

b. Measures to reduce *impervious surfaces* and to promote *low impact development* shall be employed unless infeasible, consistent with adopted Kenmore stormwater management standards.

B. Standards may be varied through a *variance* process pursuant to Chapter 19.25 KMC and KMC 18.115.030, or through the site plan review process in KMC 18.27.060.

18.27.052 Connectivity requirements for properties abutting SR-522.

Properties in the public/semi-public zone abutting SR-522 should remove impediments to pedestrian use of the area by fostering the creation of an extensive network of sidewalks and pedestrian walkways.

Development proposals shall:

A. Provide any direct pedestrian connections between proposed development and transit facilities, or arterials providing transit access in order to minimize walking distances to transit.

B. Comply with the ~~downtown~~ design standards pertaining to pedestrian walkways, as set forth in KMC 18.52.100.

C. Properties abutting water bodies (i.e., wetlands or streams) shall provide a public access trail paralleling the water body from one property line to the next with setbacks that are consistent with the requirements of KMC Title 16 and Chapter 18.55 KMC. The public access trail shall connect to a public right-of-way.

1. Where a development proposal abuts a property with a public access trail segment, the public access segment on the subject property shall connect to abutting property public access segment(s).

2. The public access easement for public access trails shall be documented on the face of the plat or plan and recorded with the King County Department of Records and Elections. Public access easements shall run with the land in perpetuity.

Urban Residential (UR) Zone

(new zoning district based on TOD overlay standards)

Chapter 18.29

~~TOD DISTRICT OVERLAY~~URBAN RESIDENTIAL ZONE

Sections:

18.29.010 Intent.

The purpose of the ~~transit oriented development (TOD) district overlay~~Urban Residential zone is to reinforce the City's planned concentration of pedestrian-oriented mixed use residential development at intensities that support and are supported by multi-modal transportation options, including high capacity transit. The ~~TOD district overlay~~Urban Residential zone ~~revitalizes the City's core by creating incentives and~~ provides opportunities for a mix of jobs and high-density residences, cultivates a respectful relationship among development within the ~~district~~area, the natural environment, and nearby traditional neighborhoods, and provides a framework for future infrastructure and service decisions. ~~The~~ ~~TOD district overlay~~Urban Residential zone provides public benefits in the form of ~~encouraging~~ ~~housing~~ affordable ~~to all economic groups~~housing, increased pedestrian connectivity, quality design, and incentives to preserve significant tree groves where they exist.

~~18.29.020 Area.~~

~~The area of the TOD district overlay is shown on Figure 18.29.020.1. In order to develop under the TOD district overlay, at least 50 percent of a parcel shown on Figure 18.29.020.1 shall be located within the TOD district overlay.~~

~~18.29.030 Applicability.~~

~~A. The TOD district overlay is an incentive-based zoning overlay. Applicants who elect to develop under the provisions of the TOD district overlay shall adhere to all development standards set forth in this chapter; except that development standards not addressed in this chapter shall be governed by provisions of the underlying zone.~~

~~B. In order to be eligible to develop under the TOD district overlay regulations, a development application shall meet the following criteria:~~

~~1. The property must be located within the TOD district overlay area as described in KMC 18.29.020;~~

~~2. The proposed development must either:~~

~~a. Be considered a mixed use development as defined in KMC 18.20.1740; or~~

~~b. Be a residential-only development or mixed use development with commercial permitted only on the ground floor if located in the R-12, R-18, or R-24 underlying zones, which are areas designated as primarily residential.~~

~~C. Eligible properties within the TOD district overlay that do not choose to develop under the provisions of this chapter shall comply with the provisions of the underlying zone in their entirety. [Ord. 15-0406 § 1 (Att. A).]~~

18.29.040 Use allowances.

The following uses listed in Table A are identified as *permitted*, conditionally permitted or *prohibited uses* ~~for properties electing to develop under provisions of~~in the ~~TOD district overlay~~Urban Residential zone.

All uses not specifically listed in this section shall be prohibited.

Table A – ~~TOD Overlay District~~Urban Residential Zone
Use Allowances

PERMITTED	CONDITIONALLY PERMITTED	PROHIBITED
Day care	*Arts, entertainment, indoor*[1,~~3~~]	*Adult entertainment business*
Eating and drinking place[1]	*Business service, standard*[1,~~3~~]	*Air transportation service*

Table A – ~~TOD Overlay District~~Urban Residential Zone
Use Allowances

PERMITTED	CONDITIONALLY PERMITTED	PROHIBITED
Educational service[1]	*Health care and social assistance*[1,~~3~~]	*Ambulatory surgery center*[2]
Mobile food service[~~4~~2]	*Manufacturing, light*[1,~~3,5~~3]	*Animal kennel/shelter*[2,~~5~~]
Multiple-family dwelling[4]	*Park*	*Arts, entertainment, outdoor*
Office[1]	*Personal service*[1,~~3~~]	*Auction house*
	Recreational facility, indoor[1,~~3~~]	*Automotive sales and service, marine*
	Regional land use	*Automotive sales and service, non-marine*
	Retail sales[1,~~3,5~~3]	*Business service, intensive*
	Temporary lodging[1,~~3~~]	*Cemetery, columbarium or mausoleum*
		College/university[2]
		Community residential facility
		Construction and trade
		Family child-care home
		Fire or police facility[2]
		Funeral home/crematory
		Hospital
		Laboratory[2]
		Manufactured housing community
		Manufacturing, heavy
		Marijuana business
		Marijuana cooperative
		Recreational facility, outdoor
		Religious institution[2]
		Resource land use
		Retail sales, bulk
		Secure facility
		Single detached dwelling unit
		Standalone parking
		Supportive living facility[2]

Table A – ~~TOD Overlay District~~Urban Residential Zone
Use Allowances

PERMITTED	CONDITIONALLY PERMITTED	PROHIBITED
		Transportation
		Utility facility
		Vehicle or equipment rental
		Vehicle refueling station
		Warehousing
		Wholesale trade

[1] ~~Commercial use limitations in residentially oriented underlying zones: If these uses are proposed for property with underlying zoning of R-12, R-18, or R-24, then e~~Each use is limited to maximum 5,000 square feet per use and 15,000 square feet total contiguous nonresidential area within the development.

~~[2] Conditional use permit required in underlying urban corridor, downtown commercial, and public/semi-public zones. Prohibited in all other underlying zones within the TOD district overlay area.~~

~~[3] Conditional use permit required in underlying R-12, R-18, R-24 zones. Permitted in underlying urban corridor, downtown commercial, and public/semi-public zones within the TOD district overlay area.~~

[42] *Mobile food service* is permitted subject to the following requirements:

a. For a stand, location shall be on a sidewalk or near a storefront consistent with barrier-free regulations;

b. For a stand, location on the sidewalk or near a storefront shall provide for at least four feet of unobstructed sidewalk between the stand and the sidewalk edge for pedestrian movement;

c. No permanent fencing, walls, or other structures are installed which hinder removal of the structure from the site;

d. No required parking stall shall be blocked or rendered unusable as a result of the mobile *food service*;

e. Safe ingress and egress to the site shall be maintained. Visibility for transportation and pedestrian access shall be maintained;

f. The limited duration of the *mobile food service* shall be established as a condition of approval of any applicable permits; if accessory to a use, such operation is removed daily at the time of or prior to the close of business hours;

g. A sign permit is required for exterior signage in accordance with the sign code, Chapter 18.42 KMC.

~~3~~3 No *outdoor storage* of materials shall be permitted.

4 A standalone *townhouse* development is prohibited.

18.29.045 Accessory uses.

Accessory uses, when consistent with the definition in Chapter 18.20 KMC, are allowed as determined by the *city manager*.

18.29.050 Zoning standards.

The following development standards in Table B apply ~~to properties electing to develop under provisions of~~in the ~~TOD district overlay~~Urban Residential zone:

Table B – ~~TOD Overlay District~~Urban Residential Zone Development Standards

STANDARD	REQUIREMENT
Minimum Density: *Dwelling Units*/Gross Acre	60[1]
Maximum Density: *Dwelling Units*/Gross Acre	150[1]
Maximum Height	~~65~~85'[2][12]
Minimum Lot Width	30'[3]
Street Setback	Minimum 10' from SR-522 unless otherwise allowed through Chapter 18.52 KMC, ~~Downtown~~ Design Standards; other *streets* 0' Maximum 10 ' unless otherwise allowed through Chapter 18.52 KMC, ~~Downtown~~ Design Standards.
Minimum Side Setback[4]	5'
Minimum Rear Setback[4]	5'
Maximum Impervious Surface	90%

[1] Portions of any property developing under the TOD district overlay regulations with an underlying zoning of R-1 shall cluster development away from critical areas or corridors such as urban separators or the wildlife habitat network to the extent possible and the open space shall be placed in a separate tract that includes at least 50 percent of the site. The open space tract shall be permanent and meet the provisions of KMC 17.20.130(B).

[21] Portions of any property developing under the TOD district overlay regulations that are within 50 feet of an single-family zone (R-1, R-4, R-6, or MHC zoning district shall have a maximum height of 35 feet within that area to provide a transition in height to the lower intensity uses.

[2] Building heights and orientation for proposals within the great blue heron rookery buffer shall be carefully assessed through the required habitat management plan (see KMC 18.55, Articles XIII through XV). In particular, potential impacts related to the flyway and shadowing of nest trees shall be evaluated. The *city manager* may require adjustments to maximum building height and/or building orientation to protect the rookery.

[3] Minimum lot width measurement is described in KMC 18.30.110.

[4] In addition, the following design requirements shall apply:

Relational Setback Requirements. Any proposed development within the TOD district overlay adjacent to an existing single-family zone (R-1, R-4, or R-6, or MHC) zoning district shall be required to provide an interior ground level setback of 15 feet on the side of the property facing the single-familythat zone, unless a larger setback is required in the underlying zone. In that event, the larger of the two setback requirements shall govern. The setback required by this subsection shall be landscaped with Type II landscaping as definedescribed in KMC 18.35.040(B)18.35.045 to provide a visual buffer.

18.29.060 Affordable housing requirements.

For properties choosing to develop under the TOD district overlay, *dDevelopment* containing residential units shall provide affordable housing as described in Chapter 18.77 KMC. *Development* choosing to develop under the TOD district overlay shall not utilize the provisions of residential density incentives found in Chapter 18.80 KMC to achieve maximum densities.

18.29.080 Design requirements.

Development within the TOD district overlayurban residential zone shall comply with Standard 1 provisions of the downtown design standards, as set forth in Chapter 18.52 KMC.

Note to Planning Commission: 18.52.070.A.1, map of design districts, will be changed to show UR as Design Standard 1 (most stringent).

18.29.090 Connectivity requirements.

Development in ~~T~~the ~~TOD district overlay~~urban residential zone should remove impediments to pedestrian use of the district and the downtown area by fostering the creation of an extensive network of sidewalks and pedestrian walkways.

Development proposals ~~within the boundaries of the TOD district overlay that elect to develop under the provisions of this chapter~~ shall:

A. Provide any direct pedestrian connections between proposed development and transit facilities, or arterials providing transit access in order to minimize walking distances to transit.

B. Comply with the ~~downtown~~ design standards pertaining to pedestrian walkways, as set forth in KMC 18.52.100.

C. Properties abutting water bodies (i.e., wetlands, ~~rivers, lakes,~~ or streams) shall provide a public access trail paralleling the water body from one property line to the next with setbacks that are consistent with the requirements of KMC Title 16 and Chapter 18.55 KMC. The public access trail shall connect to a public right-of-way.

1. Where a development proposal abuts a property with a public access trail segment, the public access segment on the subject property shall connect to abutting property public access segment(s).

2. The public access easement for public access trails shall be documented on the face of the plat or plan and recorded with the King County Department of Records and Elections. Public access easements shall run with the land in perpetuity.

Amendments Related to Affordable Housing

Definitions:

18.20.098 Affordable housing unit.

"Affordable housing unit" means housing reserved for occupancy by eligible households and having monthly housing expenses less than or equal to 30 percent of the monthly household income described in the subsections below, adjusted for household size. (Housing expenses for

ownership housing include mortgage and mortgage insurance, property taxes, property insurance, and homeowner's dues. Housing expenses for rental housing include rent, ~~and appropriate utility allowance~~utilities, expenses required by the landlord, and parking to the extent that the city requires the property or development to provide off-street parking.)

~~A. For rental housing:~~

1. A "~~moderate~~low-income affordable housing unit" is affordable at or below ~~70~~80 percent of median income, adjusted for household size;

2. A "very low-income affordable housing unit" is affordable at or below 50 percent of median income, adjusted for household size;

3. ~~A~~An "extremely~~very~~ low-income affordable housing unit" is affordable at or below ~~35~~30 percent of median income, adjusted for household size.

~~B. For ownership housing:~~

~~1. A "moderate-income affordable housing unit" is affordable at 80 percent of median income, adjusted for household size;~~

~~2. A "low-income affordable housing unit" is affordable at 65 percent of median income, adjusted for household size;~~

~~3. A "very low-income affordable housing unit" is affordable at 50 percent of median income, adjusted for household size.~~

Pursuant to the authority of RCW 36.70A.540, the City finds that the higher income levels specified in the definition of "affordable housing" under this section, rather than those stated in the definition of "low-income households" in RCW 36.70A.540, are needed to address local housing market conditions in the City.

Chapter 18.77
AFFORDABLE HOUSING

Sections:

18.77.010 Affordable housing – Purpose and intent.

The purpose of this chapter is to implement, through regulations, the responsibility of the *City* under the Washington State Growth Management Act to consider the housing needs of all economic segments of the community, and to assure an adequate affordable housing supply in the *City*. The *City* recognizes that the marketplace is the primary supplier of adequate housing for those in the upper economic groups, but that some combination of appropriately zoned land, regulatory incentives, innovative planning techniques, and requirements will be necessary to make adequate provisions for the needs of households whose incomes are at or below median income.

18.77.015 General provisions.

A. Determination of Number of Affordable Housing Units Required – Rounding. See KMC 18.30.020(D) for method of rounding to determine the number of affordable housing units required.

B. Adjacent Developments. Adjacent *developments* by the same or affiliated *developer* will be considered as a single *development* for the purpose of applying the thresholds for compliance.

C. Designation of Affordable Housing Units. Prior to the issuance of any permit(s), the *City* shall review and approve the location and unit mix of the affordable housing units consistent with the following standards:

1. Location. The location of the affordable housing units shall be approved by the *City*, with the intent that they generally be intermingled with all other *dwelling units* in the *development*.

2. Tenure. The tenure of the affordable housing units (ownership or rental) shall be the same as the tenure for the rest of the housing units in the *development*.

3. Size (Bedroom). The affordable housing units shall consist of a range of number of bedrooms that is comparable to units in the overall *development*.

4. Size (Square Footage). The size of the affordable housing units, if smaller than the other units with the same number of bedrooms in the *development*, shall be approved by the *city manager*. If there is a proposal that the affordable units be smaller than the market rate units, in no case shall the affordable housing units be less than 500 square feet for a studio unit, 600 square feet for a one-bedroom unit, 800 square feet for a two-bedroom unit, or 1,000 square feet for a three-bedroom unit.

5. Design. The exterior design of the affordable housing units shall be compatible and comparable with the rest of the *dwelling units* in the *development* and shall comply with any applicable design standards. The interior finish and quality of construction of the affordable housing units shall at a minimum be comparable to entry level rental or ownership housing in the *City*.

D. Duration. Housing shall serve only income-eligible households for a minimum period of 50 years from the latter of the date when the affordability agreement between the housing owner and the *City*, as described in KMC 18.77.050, is recorded, or the date when the affordable housing becomes available for occupancy as determined by the *City*.

E. Timing/Phasing. The affordable housing units shall be available for occupancy in a time frame comparable to the availability of the rest of the *dwelling units* in the *development*.

18.77.020 Downtown residential ~~and downtown commercial~~ zone~~s~~.

The provisions of this section shall apply to multifamily residential *developments* proposed on property four acres or greater in size within the downtown residential ~~or downtown commercial~~ zone~~s~~ that lie west of 68th Avenue NE, and which are providing for more than 20 *multiple-family dwelling units*.

A. Twenty-five percent of the total number of units in the *development* shall be reserved for eligible households and affordable to households with incomes no greater than 70 percent of the King County median income, if renter-occupied, or affordable to households with incomes no greater than 80 percent of median income, if owner-occupied~~*moderate-income affordable housing units*~~.

B. Subject to *City* authorization, the affordable units need not be provided within the *development*, but must be provided within the downtown commercial, downtown residential, urban corridor, waterfront commercial, or regional business zone.

18.77.025 Downtown commercial zone.

A. *Multifamily* or *mixed-use development* proposed within the downtown commercial zone east of 73rd Avenue NE shall provide affordable housing as follows:

Twenty-five percent of the total number of residential units in the development shall be *very low-income affordable housing units* if renter-occupied or *low-income affordable units* if owner-occupied.

B. *Multifamily* or *mixed-use development* proposed within the downtown commercial zone west of 73rd Avenue NE shall provide affordable housing as follows:

Twenty-five percent of the total number of units in the *development* shall be reserved for eligible households and affordable to households with incomes no greater than 70 percent of the King County median income, if renter-occupied, or affordable to households with incomes no greater than 80 percent of median income, if owner-occupied.

18.77.030 ~~Transit oriented development (TOD) district overlay~~Urban corridor zone, east subarea.

Multifamily or *mixed use development* proposed within the urban corridor zone, east subarea, shall provide affordable housing as follows:

Twenty-five percent of the total number of residential units in the development shall be *very low-income affordable housing units* if renter-occupied or *low-income affordable housing units* if owner-occupied.

~~A. Properties developed under the TOD district overlay, Chapter 18.29 KMC, shall include affordable housing units.~~

~~B. Cap on Total Number of Affordable Housing Units Required. Affordable housing requirements shall be capped at 10 percent of the total number of *dwelling units* being provided.~~

~~C. Number of Affordable Housing Units Required. Affordable housing units shall be provided for any *development* exceeding the base density of the underlying zone as follows:~~

~~1. Tier 1. If the number of bonus units is less than or equal to 30 percent of the total number of *dwelling units*, then for every three bonus units, one *dwelling unit* shall be a *moderate-income affordable housing unit* and two bonus *dwelling units* may be bonus market rate *dwelling units*.~~

~~2. Tier 2. If the number of bonus units is greater than 30 percent of the total number of *dwelling units* and if the overall project density is less than or equal to 120 *dwelling units* per acre, then a combination of *low-income affordable housing units* and *moderate-income affordable housing units* shall be provided as follows: For every four bonus units allowed beyond that needed to achieve the 10 percent *moderate-income affordable housing units*, one of the *moderate-income affordable housing units* shall be made into a *low-income affordable housing unit* up to a maximum of 33 percent of the affordable housing units (or 3.3 percent of the total *dwelling units* in the *development*).~~

~~3. Tier 3. If the overall development density is greater than 120 *dwelling units* per acre, a combination of *very low-income affordable housing units, low-income affordable housing units* and *moderate-income affordable housing units* shall be provided as follows: The required numbers of *low-income affordable housing units* and *moderate-income affordable housing units* shall be equivalent to those that would be required under Tier 2, assuming~~

~~that the project were to be developed at a density of 120 *dwelling units* per acre. An amount of *very low-income affordable housing* shall be required so that the total combined amount of *very low-income, low-income* and *moderate-income affordable housing units* is equal to 10 percent of the total number of *dwelling units* in the *development*.~~

~~4. Affordable Housing Example. Example is a one-and-one-half-acre property with a base density of 48 *dwelling units* (du)/acre. Without the TOD district overlay, the property could achieve up to 72 *dwelling units*.~~

~~Tier 1 example: Proposed TOD *development* would achieve 93 *dwelling units* on *site* for 62 du/acre. This provides 21 "bonus" *dwelling units* above the 48 du/acre base density of the zone. Since the number of bonus units (21) is less than 30 percent of the total units (93), seven of the 21 bonus units must be affordable to moderate-income households, meeting Tier 1 affordability requirements.~~

~~Tier 2 example: Proposed TOD *development* would achieve 113 *dwelling units* on *site* for 75 du/acre. This provides 41 "bonus" *dwelling units* above the 48 du/acre base density of the zone.~~

~~Since the number of bonus units (41) is greater than 30 percent of the total units (113), 11 of the 41 bonus units must be affordable, meeting the 10 percent affordability cap. Nine of these are affordable to moderate-income households and two are affordable to low-income households (33 of the bonus units used toward achieving 10 percent affordable units (11*3) plus eight of the bonus units applied toward making two of the affordable units low-income affordable units (8*.25=2).~~

~~Tier 3 example: Proposed TOD *development* would achieve 210 *dwelling units* on *site* for 140 du/acre. The first step is to determine how many affordable units would have been required assuming 120 du/acre using the Tier 2 formula This calculation results in 13 *moderate-income affordable housing units* and five *low-income affordable housing units*. To achieve the requirement that 10 percent of the total units in the *development* be affordable, three additional affordable housing units would be needed (21-18=3). These three units would be required to be *very low-income affordable housing units*. In summary, the *development* would provide 13 *moderate-income affordable housing units*, five *low-income affordable housing units*, and three *very low-income affordable housing units*.~~

18.77.040 Community business zone, Juanita subarea.

A. For properties choosing to develop at higher residential densities in the CB Juanita subarea, Chapter 18.23 KMC, affordable housing units shall be provided for any *development* exceeding the base density of 24 *dwelling units* per acre as follows:

1. For every four *bonus units*, one bonus *dwelling unit* shall be reserved for eligible households and affordable to households with incomes no greater than 70 percent of the King County median income, if renter-occupied, or affordable to households with incomes

no greater than 80 percent of median income, if owner-occupied,~~a *moderate-income affordable housing unit*~~ and three bonus *dwelling units* may be bonus market rate *dwelling units*.

2. ~~Each *low-income affordable housing unit* provided counts as two *moderate-income affordable housing units* f~~For the purpose of satisfying the affordable unit requirement under ~~subsection (A)(1) of~~ this section:

a. Each *very low-income affordable housing unit* provided counts as two renter-occupied affordable units required by subsection (A)(1).

b. Each unit provided, affordable at 65 percent of the King County median income, counts as two owner-occupied affordable units required by subsection (A)(1).

Example: Proposed *development* would achieve 36 *dwelling units* on a one-acre *site* for a density of 36 du/acre. This provides 12 "bonus" *dwelling units* above the 24 du/acre base density of the zone. Three of the 12 *bonus units* must be affordable units as described in subsection (A)(1)~~*moderate-income affordable housing units*~~. Alternatively, the project could provide ~~two~~one affordable unit as described in subsection (A)(2) and one affordable unit as described in subsection (A)(1) ~~*low-income affordable housing units* (rounded)~~.

18.77.042 Urban residential zone.

Multifamily or *mixed use development* proposed within the urban residential zone shall provide affordable housing as follows:

Twenty-five percent of the total number of residential units in the development shall be *very low-income affordable housing units* if renter-occupied or *low-income affordable housing units* if owner-occupied.

18.77.045 Alternative compliance.

~~Alternative Compliance. The~~While the *City* prefers to achieve affordable housing on-site, the *city manager* may approve a request for satisfying all or part of the affordable housing requirements with alternative compliance methods as follows:

A. Application. Applications for alternative compliance shall be submitted at the time of permit application, and must be approved prior to issuance of any building permit.

B. Off-Site Provision. A project proponent may propose to satisfy all or part of affordable housing requirements off site.

1. The project proponent must demonstrate that off-site provision of new affordable housing achieves a result equal to or better than providing affordable housing on site.

2. Affordable housing units provided through this method must be the same type of units as the units in the project which gave rise to the requirement.

3. Priority is for the project to be located within the same zoning district as the *development* responsible for providing affordable housing. However, the *city manager* may approve a project located outside the zoning district if the location has access to commercial *uses* and transit, does not result in an undue concentration of affordable housing, and has adequate infrastructure.

4. The proposal must demonstrate that the affordable units provided off site will be completed before or within the same time period as the *development* generating the affordable housing requirement. For projects approved for off-site affordable housing, there will be a recorded agreement on both the "sending" property and the "receiving" property. The covenant on the sending site will be released once the affordable housing is completed on the receiving property.

C. Contribution to Preservation of Existing Affordable Housing. A project proponent may propose to satisfy all or part of affordable housing requirements through purchase and long-term preservation of existing affordable housing, particularly in the *City's manufactured housing communities*. The *applicant* shall provide information demonstrating affordability of the units to be preserved and a long-term covenant shall be placed over the preserved units, ensuring preservation and maintenance of the affordable units.

D. Fee in Lieu. Cash payments in lieu of providing actual housing units may be proposed and, if approved by the ~~*City*~~*city manager*, shall be used only for the subsequent preservation or provision of affordable housing units by the *City* or other housing provider approved by the *city manager*.

1. Payments in lieu shall be based on the difference between the cost of construction for a prototype affordable housing unit on the subject property, including land costs and development fees, and the revenue generated by an affordable housing unit.

2. Prior to issuance of building permits for the project, the *City* and *applicant* shall execute a written agreement that establishes the *applicant's* ~~The~~ payment obligations (amounts and due dates) ~~will be established at the time of issuance of building permits~~ for the project. The *City* may require the *applicant* to secure its payment obligations by irrevocable letter of credit or other form acceptable to the *City*.

3. The *City* shall deposit collected payments in an affordable housing fund established by the *City*.

4. Before the *city manager* approves or executes an agreement to accept payment in lieu of affordable housing, the *City* must have a plan for investing funds in affordable housing

that supports *City* objectives. The *City* should make every effort to use these funds as quickly as possible.

5. The highest priority location for affordable housing funded wholly or in part with in-lieu fees is the subarea location of the project that generated the in-lieu fee; however, the *city manager* may authorize the use of these funds for affordable housing projects in other subareas of the *City* (as a second priority) or within another jurisdiction (as a third priority) with close proximity to commercial uses, transit services, and/or employment opportunities.

18.77.050 Affordability agreement.

A. Prior to issuing any building permit, an agreement in a form approved by the *city manager* that addresses price restrictions, homebuyer or tenant qualifications, phasing of construction, monitoring of affordability, duration of affordability, and any other applicable topics of the affordable housing units shall be recorded with King County Department of Records and Elections. This agreement shall be a covenant running with the land and shall be binding on the assigns, heirs and successors of the *applicant*. The City may agree, at its sole discretion, to subordinate any affordable housing regulatory agreement for the purpose of enabling the owner to obtain financing for *development* of the property.

B. Monitoring and Fees. The *City* reserves the right to establish, in the affordability agreement referred to in subsection A of this section, monitoring fees for the affordable housing unit, which can be adjusted over time to account for inflation. The purpose of any monitoring fee is for the review and processing of documents to maintain compliance with income and affordability restrictions of the affordability agreement.

18.77.060 Expedited permit processing.

A. Certain projects containing ~~*very*~~*extremely low-income* or *very low-income affordable housing units* in the R-12, R-18, R-24, NB, CB, DR, DC, UC, UR, WC, RB, and PSP zones that require a Type 2 land use decision as described in KMC 19.25.020 may have that process reduced to a Type 1 land use decision unless the proposal includes any of the following:

1. Short subdivision, including revisions and alterations;

2. Zoning variance;

3. Conditional use permit;

4. Shoreline permit; or

5. Critical area exceptions, variances or modifications under Chapter 18.55 KMC.

B. Any applicant for a project containing ~~*very*~~*extremely* *low-income* or *very* *low-income affordable housing* units may request that review of the project be expedited. The request may be made on forms provided by the *City*. If a determination is made by the *city manager* that *City* staffing or other permit priorities do not allow expedited permit review, the *applicant* may request that the project be reviewed by a consultant working for the City at the *applicant's* expense.

Miscellaneous amendments

(includes TOD parking and significant tree grove retention standards)

3.65.040 Project eligibility. (MFTE)

To be eligible for exemption from property taxation under this chapter, the property shall satisfy all of the following requirements:

A. The property must be located in a residential targeted area.

B. A building or buildings in the project on the property shall have at least four dwelling units. Any project may be proposed in phases. If applicable, the *affordable housing* units may be located in all or some of the buildings in the project.

C. For new construction, a minimum of four new dwelling units must be created; for rehabilitation or conversion of existing occupied structures, a minimum of four additional dwelling units must be added.

D. Existing dwelling units proposed for rehabilitation shall have been unoccupied for a minimum of 12 months prior to submission of an application and shall fail to comply with one or more requirements of the building code as set forth in KMC Title 15.

E. No application may result in the net loss of existing *affordable housing* which receives housing assistance through Federal low- or moderate-income housing programs (e.g., HUD Section 8 program).

F. Prior to issuing a certificate of occupancy, an agreement in a form acceptable to the city attorney that addresses *eligible household* qualifications and any other applicable topics of the *affordable housing* units shall be recorded with the King County department of records and elections. This agreement shall be a covenant running with the land and shall be binding on the assigns and successors of the *owners*.

G. The project shall comply with all applicable zoning, land use, building and housing requirements contained in this code~~, including, but not limited to, if the project is on property located in the transit oriented development district overlay, the project shall comply with Chapter 18.29 KMC and all other applicable zoning regulations.~~

18.15.010 Zones and map designations established.

In order to accomplish the purposes of this title, the following zoning designations and zoning map symbols are established:

ZONING DESIGNATIONS	MAP SYMBOL
Residential	R (base density in dwellings per acre)
Manufactured Housing Community	MHC
Neighborhood Business	NB
Community Business	CB
Downtown Residential	DR
Downtown Commercial	DC
Urban Corridor	UC
Urban Residential	UR
Waterfront Commercial	WC
Regional Business	RB
Public and Semi-Public	PSP
Parks	P
Golf Course	GC
Property-Specific Development Standards	P-suffix
Special District Overlay	SO

18.30.040 Fences.

Fences are permitted as follows:

A. *Fences* exceeding a height of eight feet shall comply with the applicable *street* and interior *setbacks* of the zone in which the property is located;

B. *Fences* located on a rockery, *retaining wall*, or *berm* within a required *setback* area are permitted subject to the following requirements:

1. In R-1 through R-18, P and GC zones:

a. The total height of the *fence* and the rockery, *retaining wall* or *berm* upon which the *fence* is located shall not exceed a height of 12 feet. This height shall be measured from the top of the *fence* to the ground on the low side of the rockery, *retaining wall* or *berm*; and

b. The total height of the *fence* itself, measured from the top of the *fence* to the top of the rockery, *retaining wall* or *berm*, shall not exceed eight feet;

2. In the R-24, R-48, UR, DR, PSP, and commercial zones, the height of the *fence*, measured from the top of the *fence* to the top of the rockery, *retaining wall* or *berm*, shall not exceed eight feet;

3. Any portion of the *fence* above a height of eight feet, measured to include both the *fence* and the rockery, *retaining wall*, or *berm* (as described in subsection (B)(1)(a) of this section), shall be an *open-work fence*;

C. *Fences* located on a rockery, *retaining wall* or *berm* outside required *setback* areas shall not exceed the building height for the zone, measured in accordance with the standards established in the *City* building code, KMC Title 15;

. . .

18.30.112 Marijuana businesses – Standards.

Nothing in this code or the ordinances of the City shall be construed as an authorization to violate any federal law. Affirmative terminology used in this section regarding permitting, licensing, authorization, and similar terms shall not be construed as approval, support, endorsement, or encouragement of the activities addressed in this code or City ordinances with regard to *marijuana businesses*. Such terms shall instead be construed only to describe circumstances under which there is conditional absence of local prohibition. The City does not intend to aid, abet, counsel, command, induce or procure any offense against the United States. The City also does not intend to conspire with any *marijuana producer*, *processor*, *researcher*, or *retailer* to commit any offense against the United States. The purpose of all regulations relating to *marijuana businesses* is to establish local laws which protect public safety, health and welfare to the greatest extent allowed by a Washington State law that cannot be reconciled with federal law. Nothing herein shall be construed to supersede federal law prohibiting the possession, use, manufacture, or sale of *marijuana*.

The following standards shall apply to *marijuana businesses*:

A. No person or entity may apply for, receive or maintain a permit to locate a *marijuana business* in the City unless that person or entity holds a valid marijuana business license from the Washington State Liquor and Cannabis Board verifying that the business complies with Chapter 314-55 WAC and all State laws relating to *marijuana businesses*. A *marijuana business* with an active administrative violation notice from the Washington State Liquor and Cannabis Board and/or a suspended license shall not be permitted to locate in the City until the violation is resolved and/or any associated fines have been paid or suspensions concluded.

B. *Marijuana businesses* shall maintain a 1,000-foot separation from the perimeter of the grounds of any of the following entities:

1. Elementary or secondary school;

2. Playground;

3. Recreation center or facility;

4. Child care center;

5. Public park;

6. Public transit center;

7. Library;

8. Any game arcade (where admission is not restricted to persons age 21 or older);

9. Properties owned or under contract by a public entity such as a school district or the City where a future elementary or secondary school or public park is planned when such plans have been approved or adopted by the public entities' governing authority; or

10. Another *marijuana business*, except that a *marijuana researcher* shall not have this particular separation requirement.

Definitions of subsections (B)(1) through (8) of this section, and the methodology for measuring the buffers outlined above, shall be as provided in Chapter 314-55 WAC.

C. *Marijuana businesses* shall not be located on a parcel any portion of which is within 200 feet of a residential zone (R-1, R-4, R-6, R-12, R-18, R-24, ~~or~~ R-48, or UR).

. . .

18.30.130 Recreation space – On-site areas.

A. Excluding age restricted *senior citizen* housing, ~~S~~single-family detached subdivisions~~,~~; *apartment*, *townhouse* and *mixed use development* of more than nine units in the R-4 through R-48, UR, and DR zones; and standalone *apartment* or *townhouse developments* in the NB, UC or DC zone of more than nine units~~, excluding age restricted *senior citizen* housing,~~ shall provide a common recreational open space area on site, except when facilities are available to the public that meet all of the following requirements:

1. Are developed as a county, municipal or regional *park*;

2. Are located within one-quarter mile walking distance; and

3. Are accessible without crossing any arterial *street*.

. . .

18.30.230 Setbacks – Projections and structures allowed.

. . .

B. Uncovered porches and decks which exceed 18 inches above the finished grade may project:

1. Eighteen inches into interior *setbacks* in the NB, CB, UR, DR, DC, UC, WC, RB, PSP, P, and GC zones;

2. Eighteen inches into side *setbacks* in the R and MHC zones;

3. Eighteen inches into rear *setbacks* in the R-12 through R-24 and MHC zones;

4. Five feet into rear *setbacks* in the R-1 through R-6 zones; and

5. Five feet into *street setbacks*;

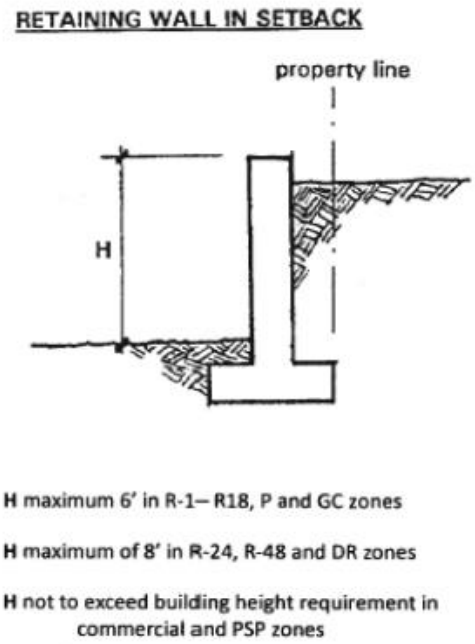
. . .

G. Rockeries, *retaining walls* and curbs may project into or be located in any *setback*, provided these *structures*:

1. Do not exceed a height of six feet in the R-1 through R-18, parks and golf course zones;

2. Do not exceed a height of eight feet in the R-24, R-48, MHC, urban residential, and downtown residential zones; and

3. Do not exceed the building height for the zone in commercial and public/semi-public zones, measured in accordance with the standards established in the *City* building code,



KMC Title 15;

Note to staff: illustration must be revised to add UR zone.

18.35.045 Landscaping – General requirements.

	Street frontage perimeter landscaping (average width)[9]	**Interior lot line perimeter landscaping (average width)[14]**	**Surface parking lots of 10 or more stalls**
Residential development[1]	10' Type III[8]	5' Type II[8] 10' Type II[11]	20 sq. ft. per stall in common parking areas.
Commercial development[2]	10' Type III	20' Type I[10]	20 sq. ft. per stall if 10 – 30 stalls provided; 25 sq. ft. per stall if 31 or more stalls provided.
Industrial development[3]	10' Type II	10' Type II[12] 20' Type I[10]	20 sq. ft. per stall if 10 – 30 stalls provided;

4. Transit-Oriented Development (TOD) Regulations

	Street frontage perimeter landscaping (average width)[9]	**Interior lot line perimeter landscaping (average width)[14]**	**Surface parking lots of 10 or more stalls**
			25 sq. ft. per stall if 31 or more stalls provided.
Institutional development[4]	20' Type II[6]	10' Type II	20 sq. ft. per stall if 10 – 30 stalls provided; 25 sq. ft. per stall if 31 or more stalls provided.
Utility development[5]	10' Type II[7]	10' Type II[13]	20 sq. ft. per stall if 10 – 30 stalls provided; 25 sq. ft. per stall if 31 or more stalls provided.

[1] As described in KMC 18.35.030(A).

[2] As described in KMC 18.35.030(D).

[3] As described in KMC 18.35.030(E).

[4] As described in KMC 18.35.030(F).

[5] As described in KMC 18.35.030(G).

[6] Excluding playgrounds and playfields.

[7] For an above-ground *utility facilities development* only, excluding distribution and transmission corridors.

[8] Only for attached/group residence *development* as described in KMC 18.35.030(B).

[9] For all zones except the UR, DC and DR zones. In the CB zone, where *street frontage setbacks* are required, the area within the *setback* must contain Type II *landscaping*.

[10] Along any portion adjacent to a residential *development* as described in KMC 18.35.030(A).

[11] Along portions of an attached/group residence *development* as described in KMC 18.35.030(B) adjacent to property developed with single detached residences or vacant property that is zoned R-1 through R-6.

[12] Along any portion adjacent to a commercial or institutional *development* as described in KMC 18.35.030(D) and (F).

[13] Excluding distribution or transmission corridors.

4. Transit-Oriented Development (TOD) Regulations

[14] In the DC zone, where interior *setbacks* are required and/or provided, *setbacks* shall be landscaped with Type II *landscaping*. In the CB zone, where interior *setbacks* are required and/or provided, *setbacks* shall be landscaped with Type II *landscaping*.

18.35.070 Landscaping – Surface parking areas.

. . .

D. Landscaping around the perimeter of a *site* that is in addition to the perimeter *landscaping* required by KMC 18.35.045 may count toward 10 percent of the required surface parking area *landscaping* in all zones except the DC, ~~and~~ DR, and UR zones, or RB-zoned properties that are not subject to P-suffix condition NS-P4, and which lie north of NE 175th Street (see subsection F of this section), if it is adjacent to the parking area;

. . .

F. Standards for perimeter *landscaping* and screening of surface parking lots for the DC, ~~and~~ DR, and UR zones, or RB-zoned properties that are not subject to P-suffix condition NS-P4, and which lie north of NE 175th Street, are defined in Chapter 18.52 KMC, ~~Downtown~~ Design Standards. All other landscape requirements for surface parking lot landscaping in this section apply to the DC, ~~and~~ DR, and UR zones, and RB-zoned properties that are not subject to P-suffix condition NS-P4, and which lie north of NE 175th Street.

18.40.030 Computation of required off-street parking spaces.

A. Except as modified in KMC 18.40.035, 18.40.040, 18.40.050 or 18.40.090, off-street parking areas shall contain at a minimum the number of *parking spaces* as stipulated in the following table. Off-street parking ratios expressed as number of spaces per square feet means the usable or net square footage of floor area, exclusive of nonpublic areas. Nonpublic areas include but are not limited to building maintenance areas, storage areas, closets, restrooms and exterior walls. If the formula for determining the number of off-street *parking spaces* results in a fraction, the number of off-street *parking spaces* shall be rounded to the nearest whole number with fractions of 0.50 or greater rounding up and fractions below 0.50 rounding down.

. . .

~~F. Exceedance of Minimum Parking – Downtown Commercial and Downtown Residential Zones West of 68th Avenue NE. Provision of parking in excess of the minimum parking requirements shall require the excess parking be included in a structured parking garage, or under *building* and screened from the *street frontage*, unless the additional parking is associated with a phased, *mixed use development* and is interim in nature.~~

~~G~~F. Exceedance of Minimum Parking – Zones Other Than Downtown Commercial and Downtown Residential Zones West of 68th Avenue NE. Provision of parking shall not exceed 30

percent more than the minimum parking requirements unless the excess parking spaces are included in a structured parking garage, or under building and screened from the street frontage, unless the additional parking is associated with a phased, mixed use development and is interim in nature.

~~H~~G. Tree Retention – DC and DR Zones. Where an applicant proposes retention of *trees* in accordance with KMC 18.35.100(G) in the DC and DR zones, the *city manager* may reduce parking requirements by one *parking space* for every two *significant trees* that are saved in excess of the significant tree ordinance requirements.

~~I~~H. Critical Area or Buffer Protection. When unavoidable, the *city manager* may reduce minimum parking requirements in order to maximize the protection of a *critical area* or its *buffer*. The reduction in the number of parking stalls or alternative stall or drive aisle dimensional requirements shall be in proportion to the area to be retained in the *buffer* or *critical area*.

~~18.29.070 Parking~~18.40.035 Parking in the Urban Residential zone, Downtown Commercial zone east of 73rd Avenue NE, Public and Semi-Public zone abutting SR-522, and the Urban Corridor zone, east subarea

Parking in the ~~TOD district overlay~~urban residential zone, the downtown commercial zone east of 73rd Avenue NE, the public and semi-public zone abutting SR-522, and the urban corridor zone, east subarea should be sufficient to support local businesses and residential development, while at the same time promoting transit ridership, walkable streets, and efficient use of land. Proposed development ~~choosing to develop under the TOD district overlay~~ shall provide parking as follows:

A. Minimum parking requirements for nonresidential uses may be reduced to 75 percent of the minimum requirement computed according to the provisions of KMC 18.40.030.

B. Minimum residential parking shall be supplied at the following ratios:

1. ~~1.0~~0.50 *parking spaces* per ~~market-rate~~ *dwelling unit*~~, except as follows:~~

   ~~a. Pioneer Project Incentive. For purposes of this section, a pioneer project consists of the first 100 bonus housing units provided in the city under the TOD district overlay regulations. The first 100 bonus housing units in a pioneer project(s) may elect to provide parking spaces for market rate bonus units at 0.6 parking spaces per dwelling unit.~~

2. ~~1.0~~0.50 additional *parking space* per every five ~~market rate~~ *dwelling units* shall be provided and designated as guest parking for use by all guests.

3. ~~0.60 parking spaces per dwelling unit for *affordable* or *senior dwelling units*.~~There are no minimum parking requirements for multifamily residential developments specifically for housing *senior citizens* or people with disabilities.

~~4. Affordable housing shall be as defined under KMC 18.29.060. Senior housing shall be defined as housing restricted to those meeting the definition of "senior citizen" as found in KMC 18.20.2500.~~

C. The following factors shall count towards minimum parking standards for residential and nonresidential development:

1. On-street parking immediately adjoining a property proposed for development or provided as part of the proposed development may be counted toward the minimum parking requirement.

~~2. Minimum on-site parking may be reduced further by provisions of KMC 18.40.090(B) for properties within the TOD district overlay that meet the requirements of KMC 18.40.090(B) for accessibility to high frequency transit service.~~

~~3~~2. Shared parking among uses is encouraged ~~within the TOD district overlayas described in KMC 18.40.040~~. Developments that propose shared parking arrangements shall submit a *parking management plan* ~~as defined in KMC 18.20.1995~~ that describes the terms and conditions of shared parking arrangements on site.

~~D. Parking Provided in Excess of Minimum. Provision of parking in excess of the minimum parking requirements outlined in subsections A and B of this section shall require the excess parking be included in a structured parking garage, or under building and screened from the street frontage, unless the additional parking is associated with a phased, mixed use development, is interim in nature, and is temporarily located on land reserved for future phases not yet built.~~

~~E~~D. Maximum parking ~~within the TOD district overlay~~ shall not exceed the minimum requirement calculated under the provisions of KMC 18.40.030.

1. Applicants may be allowed to exceed the maximum parking if the applicant can produce a parking study that demonstrates probable on-site parking needs that are significantly higher than similar uses. This traffic study shall be subject to review by the city manager before approval for additional parking is granted. All parking granted in excess of the maximum shall be provided in a structured parking garage or under building and screened from the street frontage.

~~F~~E. All other parking requirements shall be as provided in ~~Chapter 18.40 KMC~~this chapter.

18.40.038 Exceedance of Minimum Parking – Downtown Commercial Zone, Downtown Residential Zone, Urban Corridor Zone, East Subarea, and Urban Residential Zone.

Provision of parking in excess of the minimum parking requirements shall require the excess parking be included in a structured parking garage, or under *building* and screened from the *street frontage*, unless the additional parking is associated with a phased, *mixed use development* and is interim in nature.

18.42.090 Residential zone signs.

Signs in the downtown residential, urban residential, R and MHC zones are limited as follows:

A. Nonresidential *Use*.

1. One *sign* identifying nonresidential *uses*, not exceeding 25 square feet and not exceeding six feet in height, is permitted;

2. Schools are permitted one *sign* per school or school facility entrance, which may be located in the *setback*. Two additional *wall signs* attached directly to the school or school facility are permitted;

3. *Home occupation* and *home industry signs* are limited to *wall signs* not exceeding six square feet.

B. Residential *Use*.

1. One *sign* not exceeding two square feet is permitted; and

2. One *permanent residential development identification sign* not exceeding 32 square feet is permitted per neighborhood, subdivision, manufactured housing community, apartment/condominium complex, or other residential area. The maximum height for the *sign* shall be six feet. The *sign* may be freestanding or mounted on a wall, *fence*, or other *structure*.

Chapter 18.52
~~DOWNTOWN~~ DESIGN STANDARDS

Note to staff: eliminate "Downtown" from references to the design standards

Sections:

Article I. Introduction and Applicability

Article II. Site Design – Standards for All Uses

Article III. Building Design – Standards for All Uses

Article IV. Building Design – Standards for Commercial/Mixed Use Buildings

Article V. Building Design – Standards for Residential/Primarily Residential Uses

Article I. Introduction and Applicability

18.52.010 Purpose and intent.

The Kenmore ~~downtown~~ design standards are intended to implement the *City's* comprehensive plan and vision for the creation of "...a community ~~with an attractive, vital, pedestrian-oriented *City* center offering commercial, civic, cultural and *park* spaces, integrated with higher density housing..." and "...a community with~~... that has clear design standards creating attractive, functional, and enduring *buildings* and places..."

The purpose of the ~~downtown~~ design standards is to create ~~a~~ pedestrian-oriented ~~downtown~~mixed use areas by identifying appropriate *site* and development standards, including green infrastructure, for new *development*.

The Kenmore design standards are structured in the following manner.

. . .

18.52.030 Scale of ~~downtown~~ development.

18.52.050 Recommended guiding principles – ~~General~~Downtown.

18.52.070 Applicability.

A. Design standards shall apply as depicted in Figure 18.52.070.A.1.

~~B. A property owner or developer electing to develop under Chapter 18.29 KMC, Transit Oriented Development (TOD) District Overlay, shall comply with Standard 1 as described in subsection C of this section.~~

. . .

D. In the event of conflict between the ~~downtown~~ design standards and any other applicable code, the *city manager* shall determine the appropriate application of the conflicting codes, recognizing the need to protect public health, safety, and welfare, any specific interpretation criteria, as well as furtherance of the intent of the comprehensive plan and these ~~downtown~~ design standards.

. . .

G. The degree to which each standard applies to a redevelopment project shall be evaluated on a case-by-case basis in an effort to achieve an overall design which meets the purpose and intent of the ~~downtown~~ design standards. In determining the degree of applicability, the *city manager* shall give priority to design standards which address *building* placement, parking standards, window/door treatments, and *first floor facades*.

H. For proposed existing *structure* exterior remodels, or existing *structure* expansions, parking reconfigurations, or other activities subject to design standards that are less than new construction, the *city manager* shall determine the extent of compliance with the design standards as appropriate to recognize current conditions and further the intent of the ~~downtown~~ design standards. The required design or development standards shall be related to the improvement proposed. For example, if a parking reconfiguration is proposed, the required design standards should address *pedestrian walkways* between parking lots and building entrances or parking lot screening; or if a building entrance is modified, visible building entrance requirements should be applied.

18.52.100 Pedestrian walkways.

. . .

B. Standards – Required.

1. Locations. Clear and visible *pedestrian walkways* shall be provided in the following locations:

a. Through Block Connections.

(1) Northwest Quadrant. If the property abuts a proposed pedestrian route designated in the Northwest Quadrant circulation plan, see KMC 18.52.110. In areas not identified on the circulation plan, one *pedestrian walkway* shall be provided for an average of every 300 feet or less of *street frontages* in the north-south and east-west directions to create a linked *pedestrian walkway* system around and through the Northwest Quadrant. Distances may vary from exactly 300 feet to accommodate linking adjacent *development* on a case-by-case basis.

(a) *Public spaces* shall be linked to adjacent *streets* and *developments*.

(b) Exact locations of *pedestrian walkways* shall be determined at the time of *development* to accommodate linkages between adjacent *developments*.

(2) Northeast Quadrant ~~and TOD District Overlay~~, Urban Corridor zone, east subarea, Urban Residential zone, and Public/Semi-Public properties abutting SR-

522. In the Northeast Quadrant, Urban Corridor zone, east subarea, Urban Residential zone, and Public/Semi-Public properties abutting SR-522 ~~and for properties electing to develop under Chapter 18.29 KMC in the TOD district overlay~~, one *pedestrian walkway* shall be provided between the north and south end of the property, spaced an average of every 300 feet or less of *street frontages*. The walkway must connect with walkways located on other properties established in accordance with this condition. Distances may vary from exactly 300 feet to accommodate linking adjacent *developments* on a case-by-case basis. The comprehensive plan downtown circulation concept shall be a general guide to priority pedestrian links.

(a) *Public spaces* shall be linked to adjacent *streets* and *developments*.

(b) Exact locations of *pedestrian walkways* shall be determined at the time of *development* to accommodate linkages between adjacent *developments*.

. . .

18.52.150 Building location/setbacks (for commercial/mixed use buildings).

A. Intent.

1. Retail Visibility. To ensure visibility of retail businesses, to establish active, lively uses along the sidewalk, and to encourage strolling ~~in the downtown~~.

18.52.160 Building setbacks (for residential/primarily residential uses).

A. Intent.

1. Pedestrian Orientation and Densities. To ensure pedestrian orientation and desired densities ~~in downtown~~.

18.52.210 Corner features.

A. Intent.

1. To ensure architectural interest and pedestrian-scaled detail ~~in downtown~~.

2. To allow for comfortable pedestrian queuing space.

18.52.220 Roof form.

. . .

C. Not Allowed.

1. Flat, Unadorned Roofs. Flat roofs without architectural embellishments are not allowed ~~on *buildings* in the downtown~~.

18.52.230 Structured parking.

A. Intent.

1. Visually Integrated. To visually integrate parking garages with other ~~downtown~~ *uses* through active *ground floor uses*, and the use of architectural treatments, such as materials, treatments of openings, and *human-scaled* facade *elements*.

18.52.250 Pedestrian bridges.

. . .

2. *Building* and Landscape Treatments. Pedestrian bridges shall be designed as unique *structures* which serve as a key gateway feature ~~to the~~in downtown.

18.52.290 Weather protection.

A. Intent.

1. *Weather Protection*. To provide *weather protection* for pedestrians ~~throughout downtown~~.

18.52.300 Building materials.

A. Intent.

1. To develop a visual downtown identity and to ensure that ~~downtown~~ *development* in Kenmore's commercial and higher-density residential areas forms a cohesive visual whole over time. This shall be accomplished through the use of a primarily masonry materials palette.

2. To provide a materials palette which allows for individual and creative architectural expression in individual *development*.

B. Standards – Required.

1. Primary Materials Palette. Commercial and mixed use *buildings* shall be built with materials which will form a visually cohesive identity over time. Facades of commercial and commercial levels of mixed use *buildings* shall be primarily of the following masonry materials:

a. Brick;

b. Stone;

c. Ceramic Tile. Alternate coursing with changes in color and/or texture is required with use of tile. Alternate coursing can be vertical, horizontal, or both;

d. Split Face Alternate Course Concrete Masonry Units. Alternate coursing with changes in color and/or texture is required with use of split face masonry units. Alternate coursing can be vertical, horizontal, or both;

e. Stucco, if limited to a maximum 50 percent of total building surface area.

2. On any facade adjoining a public sidewalk, at the first two stories above the public sidewalk level, and at exposed stories below the public sidewalk level, primary materials must cover 85 percent of the opaque surfaces on any elevation. On other facades in the public view (from adjacent public *streets*, *pedestrian walkways*, or *public spaces*), primary materials must cover more than 50 percent of the opaque surfaces.

Exceptions:

a. Transparent glass may cover 75 percent of the first story of any one facade. Transparent glass may cover 40 percent of the second story of any one facade.

b. Where there are two front property lines, transparent glass may cover 75 percent of a second facade if the facade is within 15 feet of the property line.

3. Residential Floors, Mixed Use *Buildings*. Nonmasonry materials may be used as a primary material in the residential portions of mixed use *buildings* subject to any applicable restrictions in this section.

4. Vinyl Siding. Vinyl siding is only permitted on floors three and above, and shall not exceed 15 percent of the total building surface area of those floors.

C. Not Allowed.

1. Plain Faced and/or Uncolored Concrete Masonry Units. Plain faced and/or uncolored concrete masonry units shall not cover an area greater than five percent of any facade.

2. Siding Materials Not Allowed. The following siding materials are not allowed on any *building facade*:

a. Asphalt siding;

b. Aluminum lap siding;

c. Siding grade plywood. [Ord. 11-0329 § 3 (Exh. 1).]

18.52.310 Upper level stepbacks, mass, and bulk.

A. Intent.

1. Develop Pedestrian Scale. To ensure that multiple-storied *building facades* do not overwhelm ~~the~~ pedestrian orientation and scale ~~of downtown~~.

18.52.320 Primary residential entrances.

A. Intent.

1. Active and Lively *Street*. To face residential entrances onto *streets* to create and maintain a lively and active ~~downtown~~environment.

18.52.330 Building mass and bulk.

A. Intent.

1. Reduce Building Bulk with Smaller Architectural Components. To reduce the apparent bulk of *buildings* by breaking them down into smaller components which are consistent with ~~the~~ pedestrian scale ~~of downtown~~.

18.52.350 Windows.

A. Intent.

1. Active and Lively *Street*. To face windows onto *streets* to create and maintain a lively and active ~~downtown~~environment.

18.57.065 Significant tree grove retention in the Urban Residential zone, Downtown Commercial zone east of 73rd Avenue NE, Public and Semi-Public zone abutting SR-522, and the Urban Corridor zone, east subarea

~~18.29.100 Significant tree grove retention.~~

A. Definitions.

1. Significant Tree Grove Definition. A "significant tree grove" shall consist of two or more trees with a minimum of five and one-half tree units total. A qualifying tree has two tree units minimum. The maximum distance measured in feet between qualifying trees shall be equal to two times the critical root zone in order to be defined as a significant tree grove. For example a 24-inch d.b.h. tree must be within 24 feet of another tree in the grove to be included in the significant tree grove. A tree of any size that is topped or considered a "hazard tree" as defined in KMC 18.20.3084 may not qualify as part of a significant tree grove as herein defined. For purposes of this chapter, a significant tree grove may not contain trees that are located within a critical area or critical area buffer protected under Chapter 18.55 KMC. A significant tree grove is not the same as a "grove," as defined in KMC 18.20.1273.

2. Tree Units. See KMC 18.57.060(A) for translation of *diameter at breast height* (d.b.h.) to tree units.

B. Applicability.

~~1. If the underlying zone within the TOD district overlay requires tree retention as provided in Chapter 18.57 KMC, then the provisions of Chapter 18.57 KMC shall be retained. If Chapter 18.57 KMC exempts a property from tree retention then it shall remain exempt.~~

~~2~~1. Development proposals ~~within the boundaries of the TOD district overlay that elect to develop under the provisions of this chapter~~in the urban residential zone, downtown commercial zone east of 73rd Avenue NE, public and semi-public zone abutting SR-522, and the urban corridor zone, east subarea shall be eligible to benefit from providing less parking or more dwelling units or any combination of the two if the development retains one or more significant tree grove(s) as defined in this section in perpetuity. A development may be able to benefit from both reduced parking and additional dwelling units by preserving a significant tree grove so long as the same tree credits are not counted towards both reductions in parking and additional bonus dwellings. Trees or groves retained through ~~the~~ other provision of ~~Chapter 18.57 KMC~~this chapter may count towards the significant tree grove retention if they meet the definitions found in subsection A of this section.

~~3~~2. Tree on Property Line. In instances where one or more trees that would qualify as part of a significant tree grove is located on a property line such that the tree is on more than one property, and the properties are in separate ownerships, the tree shall qualify to be counted as part of a separate tree grove by each property owner.

C. Reduced Parking. In order to retain qualifying significant tree groves, required parking may be reduced at the maximum rate of one stall per each five and one-half tree units. Parking quantities may be reduced up to a maximum of 20 percent from the parking requirement after other reductions are applied, if any.

D. Residential Bonus Units. In order to retain qualifying significant tree groves, residential units are offered at the rate of one bonus unit per each 11 tree units preserved. Grove bonus units are not included in maximum unit density calculations. Grove bonus units are not subject to the affordability requirements of KMC ~~18.29.060~~18.27.020 and 18.77.

E. Significant Tree Grove Preservation Requirements.

1. Tree Protection Plan Required. A tree protection plan as identified in KMC 18.57.050 shall be required for any development application proposing to protect one or more significant tree groves through this section.

2. Recorded on Title. The map of significant tree groves preserved through this section, along with a covenant preventing removal, shall be recorded and shown on the property title.

3. Subject to Tree Protection Measures of Chapter 18.57 KMC. Significant tree groves protected under this section shall be subject to the tree protection measures during construction found in KMC 18.57.090, the post-construction replacement, financial guarantee, and maintenance requirements of KMC 18.57.100, and the penalties and enforcement of KMC 18.57.110.

18.60.050 Wireless communication facility review processes and maximum allowable heights.

P – Permitted Use

C – Conditional Use – reviewed through Type 2 process outlined in KMC 19.25.020.

X – Prohibited Use[5]

Type of wireless communication facility	Residential zones R-1 through R-6 and MHC	Residential zones R-12 through R-24, UR, and DR	Nonresidential zones RB, UC east, DC, CB Juanita, and NB	Nonresidential zones UC west, WC, and CB west (view zones)	Other nonresidential zones PSP, P, and GC
Antenna collocation on an existing conforming tower	P Maximum height: same as existing tower	P Maximum height: same as existing tower	P Maximum height: same as existing tower	P Maximum height: same as existing tower	P Maximum height: same as existing tower
Rooftop antenna	X, C[1,2], P[1,7] Maximum height: 15' above the roof height at the antenna location	P Maximum height: 15' above the roof height at the antenna location	P Maximum height: 15' above the roof height at the antenna location	X	P Maximum height: 15' above the roof height at the antenna location
Facade antenna	X, C[1,2], P[1,7] Maximum height: 2' above the roofline or parapet wall	P Maximum height: 2' above the roofline or parapet wall	P Maximum height: 2' above the roofline or parapet wall	P Maximum height: May not extend above the roofline or parapet wall	P Maximum height: 2' above the roofline or parapet wall
Amateur (ham) radio facilities	P Maximum height[3]: Ground-mounted facility – 65'. Rooftop facility – 30' above the roof height at the antenna location	P Maximum height[3]: Ground-mounted facility – 65'. Rooftop facility – 30' above the roof height at the antenna location	P Maximum height[3]: Ground-mounted facility – 65'. Rooftop facility – 30' above the roof height at the antenna location	P Maximum height: 35'	P Maximum height[3]: Ground-mounted facility – 65'. Rooftop facility – 30' above the roof height at the antenna location
Antennas on utility or light poles. (Nearest abutting zone is used to determine process if in the right-of-way.)	C[2], P[7] Maximum height: 55'	P Maximum height: 55'	P Maximum height: 55'	C[2], P[8] Maximum height: up to the building height limit as specified in the	P Maximum height: 55'

Type of wireless communication facility	Residential zones R-1 through R-6 and MHC	Residential zones R-12 through R-24, UR, and DR	Nonresidential zones RB, UC east, DC, CB Juanita, and NB	Nonresidential zones UC west, WC, and CB west (view zones)	Other nonresidential zones PSP, P, and GC
				underlying zoning district	
Satellite dish	C[2] if no more than 2 meters (6.6') in diameter; otherwise X Maximum height: Ground-mounted dishes – 15'. Rooftop dishes – 15' above the roof height at the dish location	P if no more than 2 meters (6.6') in diameter and limited to a maximum of 1 dish per site; otherwise C[2] Maximum height: Ground-mounted dishes – 15'. Rooftop dishes – 15' above the roof height at the dish location	P if no more than 2 meters (6.6') in diameter and limited to a maximum of 3 dishes per site; otherwise C[2] Maximum height: Ground-mounted dishes – 15'. Rooftop dishes – 15' above the roof height at the dish location	P if ground-mounted; otherwise X Maximum height: Ground-mounted dishes – 15'	C[2] Maximum height: Ground-mounted dishes – 15'. Rooftop dishes – 15' above the roof height at the dish location
Tower[6]	X	X	X in the DC zone; otherwise C[2,4] Maximum height: up to the building height limit as specified in the underlying zoning district	X	C[2,4] Maximum height: up to the building height limit as specified in the underlying zoning district

18.60.110 Landscaping requirements.

A *wireless communication facility site*, with the exception of an *amateur (ham) radio facility*, shall provide *landscaping* as follows:

A. When the facility is located in:

1. The NB, CB, PSP, RB, WC, UC, DC, UR, or DR zone, the base of any *tower* and any ground equipment, whether or not in a *structure* or cabinet, shall be landscaped with eight feet of

Type II *landscaping* as defined by KMC 18.35.040(B). This landscaped area shall be increased to 10 feet of Type I *landscaping* as defined by KMC 18.35.040(A) in areas adjacent to residential development as described in KMC 18.35.030(A). For *satellite dishes*, the visual screen may be reduced to the height of the center of the dish on the transmitting side.

2. The R, MHC, GC, and P zones, the base of any *tower* and any ground equipment, whether or not in a *structure* or cabinet, shall be landscaped with 10 feet of Type I *landscaping* as defined by KMC 18.35.040(A). For *satellite dishes*, the visual screen may be reduced to the height of the center of the dish on the transmitting side.

. . .

18.73.120 Home industry.

In all zones except R-12, R-18, R-24, UR, CB Juanita subarea, and NB, a resident may establish a *home industry* as an accessory activity, provided:

. . .

18.80.020 Permitted locations of residential density incentives.

Residential density incentives (RDIs) shall be used only on *sites* served by public sewers and only in the following zones:

A. In R-4 through R-24, ~~and~~ downtown residential, and urban residential zones; and

B. In DC, NB, CB, UC, WC, and RB zones when part of a *multiple-family dwelling* or *mixed use development*.

18.80.040 Public benefits and density incentives.

E. The following are the public benefits eligible to earn density incentives through RDI review:

BENEFIT	DENSITY INCENTIVE
1. AFFORDABLE HOUSING	
a. Benefit units consisting of rental housing permanently affordable to very low-income households, as defined in KZC 18.20.098~~priced to serve low-income~~	2.0 bonus units per benefit unit.

~~households (i.e., no greater than 30 percent of gross income for households at or below 50 percent of King County median income, adjusted for household size)~~. A covenant on the site that specifies the income level being served, rent levels, and requirements for reporting to the City shall be recorded at final approval.	
b. Benefit units consisting of assisted housing units 600 square feet or less.	1.0 bonus unit per benefit unit.
c. Benefit units consisting of rental housing permanently affordable (as defined in KZC 18.20.098)~~priced to serve moderate-income households (i.e., no greater than 30 percent of gross income for~~ to households with incomes at or below 70 percent of King County median income, adjusted for household size~~)~~. A covenant on the site that specifies the income level being served, rent levels, and requirements for reporting to the City shall be recorded at final approval.	1.0 bonus unit per benefit unit.
d. Benefit units consisting of ~~moderate~~low-income, owner-occupied housing (as defined in KZC 18.20.098), reserved for ~~income- and asset-qualified~~ eligible home buyers ~~(total household income at or below 80 percent of King County median, adjusted for household size). Benefit units shall be limited to owner-occupied housing, with prices restricted to same income group, based on current underwriting ratios and other lending standards for 30 years from date of first sale~~. A covenant on the site that specifies the income level and other aspects of buyer eligibility, price levels, and requirements for reporting to the City shall be recorded at final approval.	1.0 bonus unit per benefit unit.
e. ~~Projects in which units are reserved for moderate-~~Benefit units consisting of very	2.0 bonus units per benefit unit.

4. Transit-Oriented Development (TOD) Regulations

low-income, owner-occupied housing (as defined in KZC 18.20.098), reserved for eligible home ~~and asset-qualified~~ buyers. ~~(total household income at or below 50 percent of the King County median, adjusted for household size). All units shall be limited to owner-occupied housing with prices restricted based on current underwriting ratios and other lending standards, and with prices restricted to same income group, for 30 years from date of first sale. Final approval conditions shall specify requirements for reporting to the City on both buyer eligibility and housing prices.~~ A covenant on the site that specifies the income level and other aspects of buyer eligibility, price levels, and requirements for reporting to the City shall be recorded at final approval.

. . .

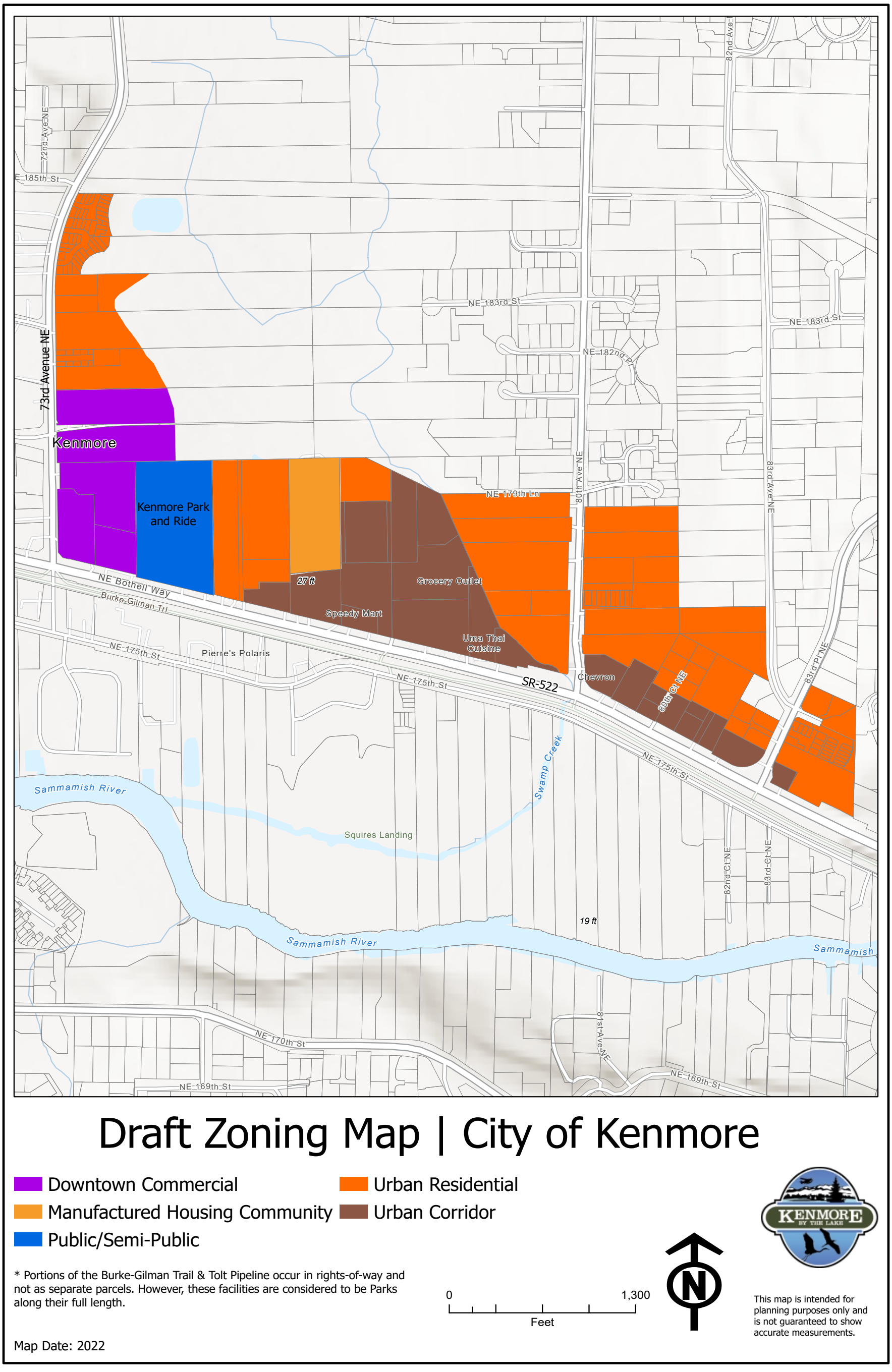
g. Affordable housing units provided under this section shall remain affordable housing for a minimum of 50 years from the date of initial sale, if owner-occupied, or the life of the project (i.e., the duration of the property's residential use), if renter-occupied.

g. Affordable housing units provided under this section shall remain affordable housing for a minimum of 50 years from the date of initial sale, if owner-occupied, or the life of the project (i.e., the duration of the property's residential use), if renter-occupied

18.110.020 General provisions.

D. A *development agreement* may be proposed and approved only for the following properties:

1. Properties in the downtown commercial (DC), regional business (RB), waterfront commercial (WC), urban corridor (UC), urban residential (UR), downtown residential (DR), community business (CB), neighborhood business (NB), public and semi-public (PSP), parks (P) and golf course (GC) zones.



4. Transit-Oriented Development (TOD) Regulations