City of St. Helens
ORDINANCE NO. 3241

AN ORDINANCE ADOPTING THE RIVERFRONT CONNECTOR PLAN AS AN ADDENDUM TO THE CITY OF ST. HELENS COMPREHENSIVE PLAN, AMENDING THE ST. HELENS MUNICIPAL CODE CHAPTERS 10.04, 17.16, 17.152, 19.08 AND 19.12, AND ADDING CHAPTER 19.36

WHEREAS, pursuant to St. Helens Municipal Code 17.20.020(1)(c) the Planning Director initiated a legislative change to the St. Helens Comprehensive Plan to adopt the Riverfront Connector Plan as an addendum to the Comprehensive Plan and to adopt related text amendments to the Municipal Code, Vehicles and Traffic (St. Helens Municipal Code Title 10), Community Development Code (St. Helens Municipal Code Title 17) and Comprehensive Plan (St. Helens Municipal Code Title 19); and

WHEREAS, consultants have prepared the Riverfront Connector Plan and related amendments after extensive review of existing plans, policies, studies and other information; analysis; consultation with an ad hoc technical and citizen advisory committee, the City Council, Planning Commission, City staff and other agencies; and public involvement; and

WHEREAS, pursuant to the St. Helens Municipal Code and Oregon Revised Statutes, the City has provided notice to: the Oregon Department of Land Conservation and Development on April 9, 2019, and the local newspaper of record on May 1, 2019; and

WHEREAS, the St. Helens Planning Commission did hold a duly noticed public hearing on May 14, 2019 and, following deliberation, made a recommendation of approval to the City Council; and

WHEREAS, the St. Helens City Council conducted a public hearing on June 5, 2019 and having the responsibility to approve, approve with modifications, or deny an application for a legislative change, has deliberated and found that based on the information in the record and the applicable criteria in the SHMC that the proposed addendum and related amendments be approved.

NOW, THEREFORE, THE CITY OF ST. HELENS DOES ORDAIN AS FOLLOWS:

Section 1. The above recitations are true and correct and are incorporated herein by reference.

Section 2. The City hereby adopts the Riverfront Connector Plan, attached hereto as **Attachment "A"** and made part of this reference, as an addendum to the St. Helens Comprehensive Plan (St. Helens Municipal Code Title 19).

Section 3. The City of St. Helens Municipal Code and Comprehensive Plan are hereby amended, attached hereto as **Attachment "B"** and made part of this reference.

Section 4. In support of the plan addendum and related amendments described herein, the Council hereby adopts the Findings of Fact and Conclusions of Law, attached hereto as **Attachment "C"** and made part of this reference.

Section 5. Severability. If any section, provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person or circumstances shall be held invalid, such invalidity shall not affect the other sections, provisions, clauses or paragraphs of this Ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this Ordinance are declared to be servable. This City Council hereby declares that it would have adopted this ordinance irrespective of the invalidity of any particular portion thereof and intends that the invalid portions should be severed and the balance of the ordinance be enforced.

Section 6. Provisions of this Ordinance shall be incorporated in the St. Helens Municipal Code and the word "ordinance" may be changed to "code," "article," "section," or another word, and the sections of this Ordinance may be renumbered, or re-lettered, provided however that Whereas clauses and boilerplate provisions need not be codified.

Section 7. The effective date of this Ordinance shall be 30 days after approval, in accordance with the City Charter and other applicable laws.

Read the first time: July 17, 2019
Read the second time: August 7, 2019

APPROVED AND ADOPTED this 7th day of August, 2019 by the following vote:

Ayes: Locke, Carlson, Morten, Topaz, Scholl

Nays: None

Rick Scholl

Rick Scholl, Mayor

ATTEST:

Kathy Payne

Kathy Payne, City Recorder

Riverfront Connector Plan

ORD No. 3241 Attachment "A"

ST. HELENS RIVERFRONT CONNECTOR PLAN
June, 2019

ST. HELENS PLANNING COMMISSION
Kathryn Lawrence
Dan Cary, Vice Chair
Greg Cohen
Russell Hubbard, Chair
Julie Sternberg
Shelia Semling
Audrey Webster

ST. HELENS CITY COUNCIL
Rick Scholl, Mayor
Doug Morten, Council President
Keith Locke, City Councilor
Stephen Topaz, City Councilor
Ginny Carlson, City Councilor

PROJECT ADVISORY COMMITTEE (COOLPPL)
Ginny Carlson, City Councilor
Jenny Dimsho, City of St. Helens
Jacob Graichen, City of St. Helens
Scott Jensen, Port of St. Helens
Sue Nelson, City of St. Helens
Nichole Perry, Resident
Rick Scholl, Mayor
Neal Sheppeard, City of St. Helens
Julie Stenberg, Resident
John Walsh, City of St. Helens
Lonny Welter, Columbia County

PROJECT TEAM
Matt Hastie, Angelo Planning Group
Andrew Parish, Angelo Planning Group
Matt Bell, Kittelson & Associates
Krista Purser, Kittleson & Associates
Mike Faha, GreenWorks
Andrew Holder, GreenWorks
Kelly Stoecklein, GreenWorks

The project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Fixing America's Surface Transportation Act ("FAST Act"), local government, and the State of Oregon funds.

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INTRODUCTION

The City of St. Helens, in partnership with the Oregon Department of Transportation (ODOT) and a team of urban design, land use planning, and transportation engineering and planning consultants, has prepared this corridor plan to provide a cohesive, multi-modal, and inviting loop through the city's downtown, along the waterfront, and connecting to US30. This plan aims to complete the city's business loop concept included in the *2015 US30 & Columbia Blvd./St Helens Street Corridor Master Plan* and the city's *2011 Transportation System Plan* (TSP).

The plan focuses primarily on how the streets and intersections along this corridor are designed and improved over time to ensure that vehicles, bicyclists, and pedestrians have safe and convenient access. This Plan was adopted by the St. Helens City Council in June, 2019 and it may be amended by the Council in the future, as needed.

RIVERFRONT CONNECTOR PLAN AREA

The project area map can be seen on the following page. It is divided into two major sections: the *Primary Project Area* is the main focus of this plan, and covers South 1st Street, the Veneer Property, Plymouth Street, Old Portland Road, and Gable Road (Segments 1 through 4.2). The *Secondary Project Area* (Segment 5) represents key alternative routes from US30 to the Waterfront Redevelopment Area and downtown St. Helens, including portions of McNulty Road, Old Portland Road and Millard Road north of Gable Road.

The Riverfront Connector Plan Area is divided into seven segments:

Segment 1 – South 1st Street (St. Helens Street to End of Existing South 1st Street)

Segment 2.1 – Veneer Property (End of existing South 1st Street to Lagoon Dam)

Segment 2.2 – Plymouth Street (Lagoon Dam to South 6th Street)

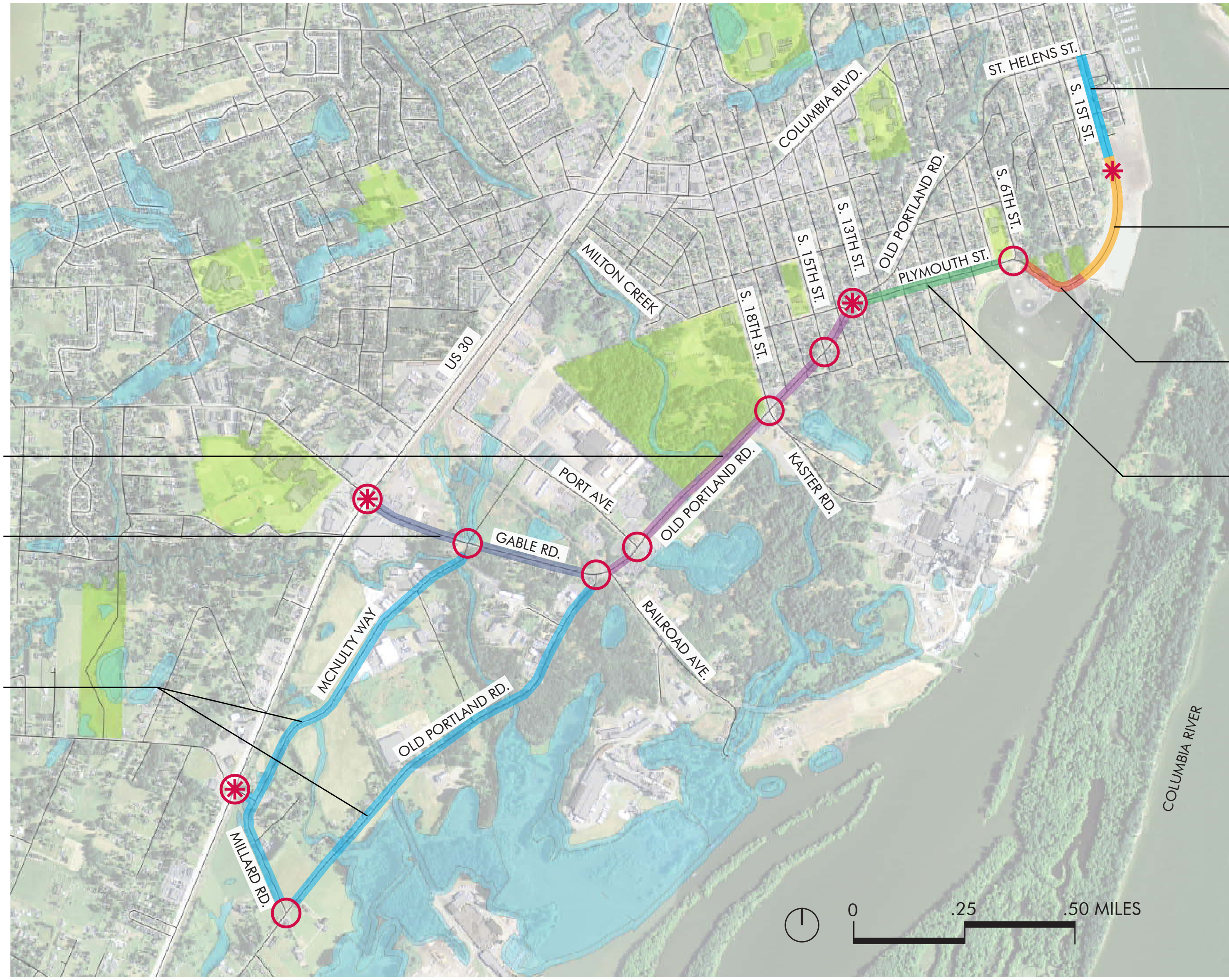
Segment 3 – Plymouth Street (South 6th Street to Old Portland Road)

Segment 4.1 – Old Portland Road

Segment 4.2 – Gable Road

Segment 5 – Secondary Study Area (Millard Road, McNulty Way and Old Portland Road)

PROJECT AREA



SEGMENT 1: SOUTH 1ST STREET (ST. HELENS STREET TO END OF EXISTING SOUTH 1ST STREET)

SEGMENT 2.1: VENEER PROPERTY (END OF EXISTING SOUTH 1ST STREET TO LAGOON DAM)

SEGMENT 2.2: PLYMOUTH STREET (LAGOON DAM TO SOUTH 6TH STREET)

SEGMENT 3: PLYMOUTH STREET (SOUTH 6TH STREET TO OLD PORTLAND ROAD)

SEGMENT 4.1: OLD PORTLAND ROAD

SEGMENT 4.2: GABLE ROAD

SEGMENT 5: SECONDARY STUDY AREA (MILLARD ROAD, MCNULTY WAY, AND OLD PORTLAND ROAD)

LEGEND

Key Intersection

Gateway Feature

PLANNING, PROCESS, PUBLIC & AGENCY INVOLVEMENT

This project began in October, 2017. Over the course of the project, the project team prepared a series of technical memoranda to describe existing and future conditions in the area, including land use, urban design, transportation facilities, and relevant plans and policies. The team then evaluated a variety of strategies to meet the goals for the corridor. Previous reports summarized and illustrated alternative design concepts and improvements for the corridor's various segments and intersections. The information within this plan builds on the previous work conducted as part of this project. The project team, COOLPPL[1] advisory committee, St. Helens Planning Commission and City Council, and other community members have reviewed and evaluated these documents and provided valuable input which was used to refine those reports and inform this plan.

The COOLPPL consisted of representatives from the St. Helens Planning Commission, City Council, Public Works, the Port of St Helens, and Columbia County, as well as interested residents. The COOLPPL met five times over the course of the project. The project also included one neighborhood meeting, two public open houses and an online open house to present project information and get public feedback on draft materials. Neighborhood and public meetings also coincided with work sessions with the St. Helens Planning Commission which met three times to review project results to date and provide guidance. City staff also briefed the St. Helens City Council about the project four times.

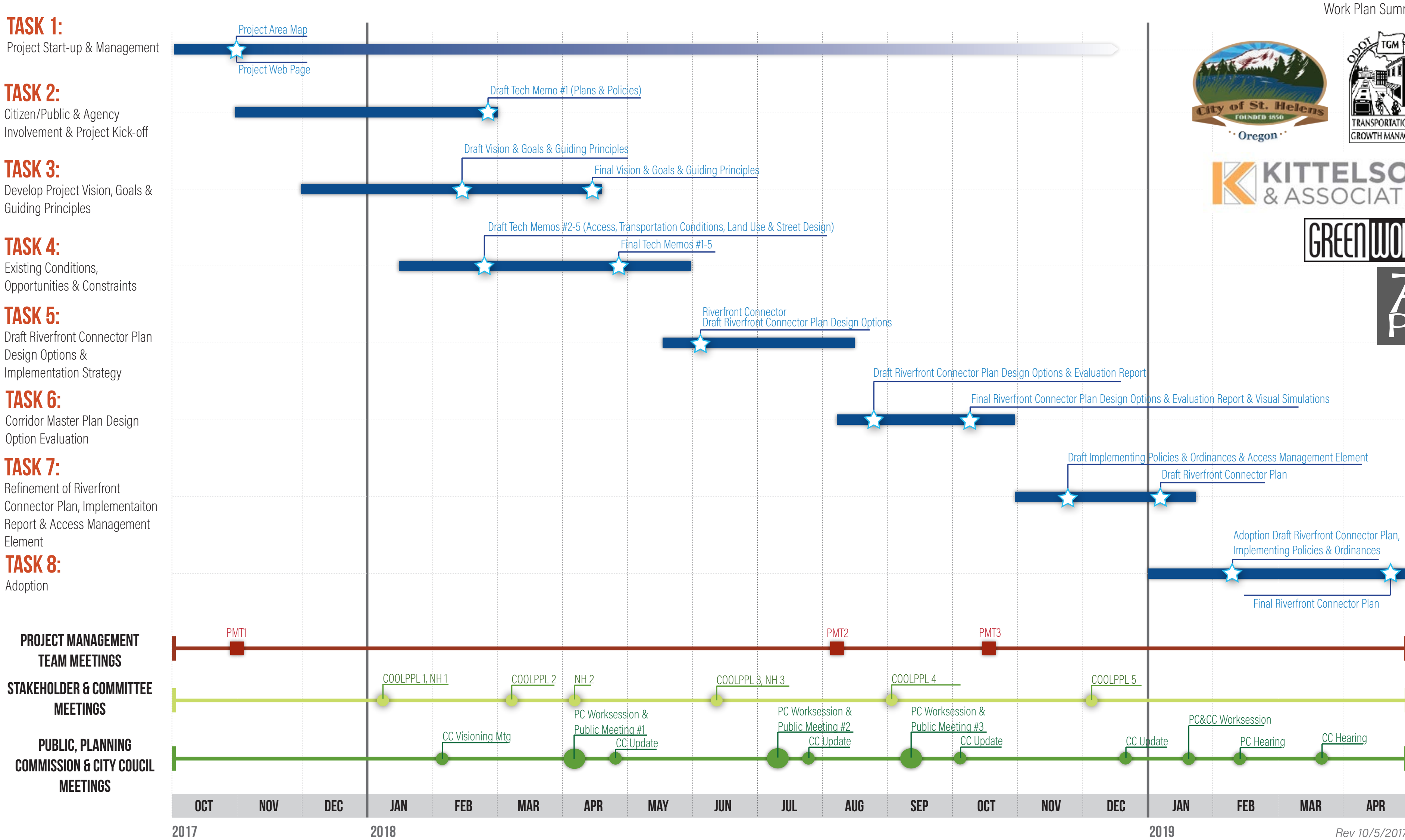
A project website provided community members with information about the schedule for project meetings, summaries of those meetings, draft work products, and other project materials. The website also provided an opportunity for people to submit comments or questions about the project.

The project's work plan summary can be seen on the following page.

[1] Committee Overseeing Overt Long-range Passageway Planning

ST. HELENS RIVERFRONT CONNECTOR PLAN

Work Plan Summary



COOLPPL = Committee Overseeing Overt Long-Range Passageway Planning; NH = Neighborhood; PC = Planning Commission; CC = City Council

OVERALL PROJECT GOALS & CORRIDOR GUIDING PRINCIPLES

Overall Project Goals

Create “streetscape” plans for the study area to help provide the foundation for orderly redevelopment that connects the various St. Helens neighborhoods together, brings the people back to the Riverfront District, and creates a connection to the greater local region.

Improve the aesthetics and function of the corridors to attract business and investment, provide better access, direction and signage to the Riverfront District, ensure multi-modal access, and improve desirability of the study area.

Planning Process & Community Involvement

• Establish a community vision, goals, and guiding principles for the study area.

• Engage business and property owners, neighborhood residents, stakeholders, and elected and appointed officials.

• Ensure consistency with previous community planning efforts, including the *Waterfront Framework Plan*, *Branding and Wayfinding Master Plan*, *US30 and Columbia Blvd./St. Helens Street Corridor Plan*, and other relevant plans.

• Ensure consistency with state plans and policies.

Economy & Business Support

• Develop planning design and implementation standards to revitalize businesses and business districts in the planning area, including industrial uses.

• Create improvements, including signage, that also support businesses in other commercial areas in St. Helens.

• Ensure that customers, employees, and others have good access to local businesses, including through on-street parking.

• Ensure that proposed solutions and projects are cost-effective and make efficient use of limited resources.

Transportation Safety & Mobility

• Improve street connectivity, design, and ability to access and locate business areas.

• Improve pedestrian and bicycle safety and accessibility, thereby encouraging walking and bicycling.

• Balance the need for local access and traffic calming with the need to provide for through-traffic movement and mobility, as well as emergency vehicle accommodations.

• Develop and implement solutions that are consistent with local and regional transportation levels, needs, and analyses, and can be cost-effectively maintained.

Connectivity & Streetscape Aesthetics

• Improve the appearance of all primary streets within the corridor, including South 1st Street, Plymouth Street, Gable Road, Old Portland Road, Millard Road, and McNulty Way.

• Improve pedestrian and bicycle connectivity between the corridor areas and adjacent open spaces and parks, trail/bicycle/transit networks, and neighborhoods, including the waterfront redevelopment site.

• Develop and apply street designs that serve the unique needs of each corridor segment (Riverfront District, and the Plymouth Street, Old Portland Road, Gable Road, Millard Road, and McNulty Way corridor sections), including business areas and residential neighborhoods.

• Consider opportunities for integrating sustainable design strategies into the streetscape design and implement them where appropriate.

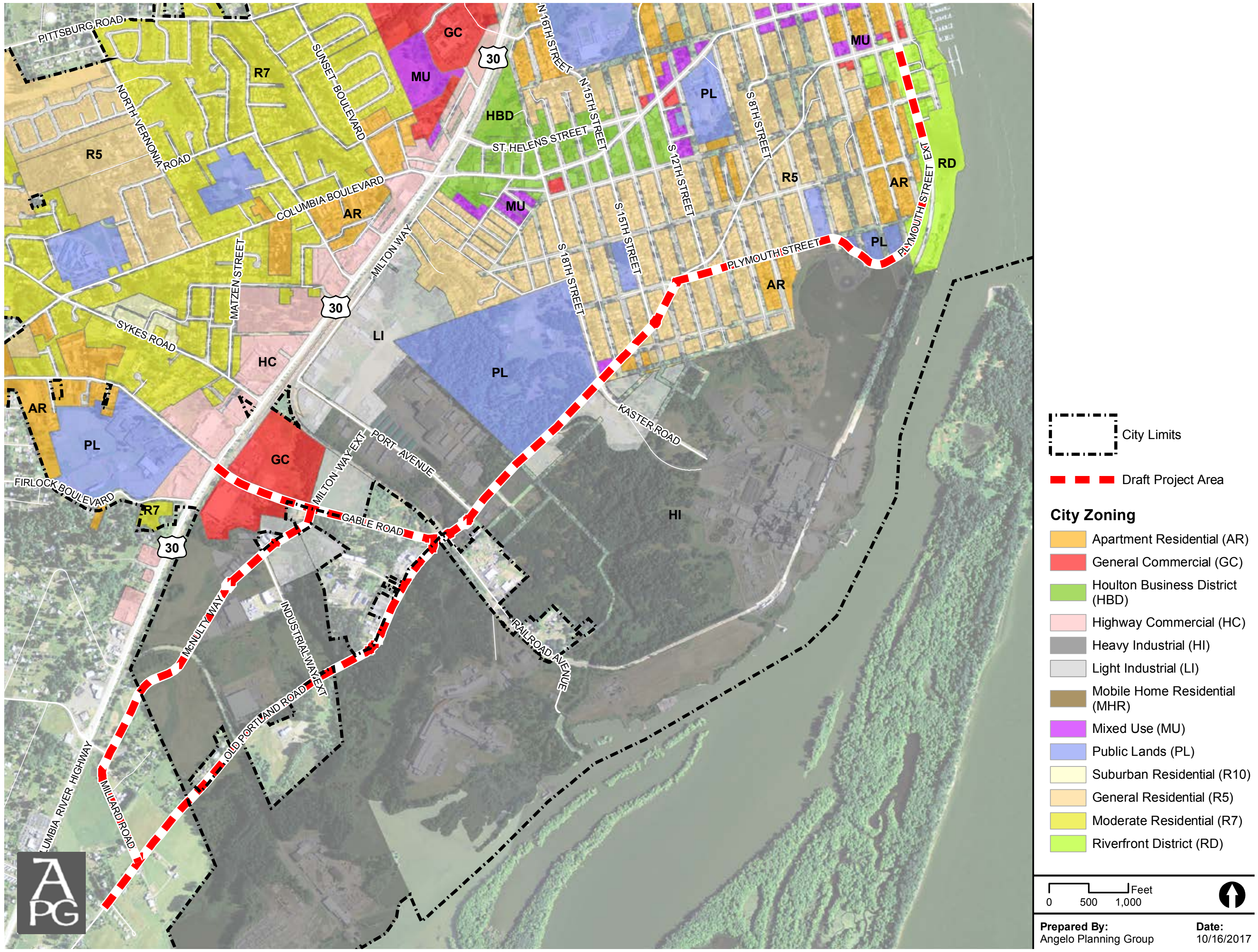
SUMMARY OF EXISTING CONDITIONS & OPPORTUNITIES

Zoning

This map shows the zoning designations throughout the Project Area, which encompasses land both inside and outside the St. Helens city limits. Land outside the city limits does not have a zoning designation, but does have a comprehensive plan designation that determines the zone that would be applied upon annexation.

As seen in the zoning map, the corridor traverses a variety of zones, from mixed use to medium- and high-density residential to industrial and commercial.

For more detail on existing conditions, refer to Technical Memoranda #2 and #4 in Appendices 4 and 6.



City of St. Helens zoning map

Riverfront Area

(Segments 1, 2.1 & 2.2)

The Riverfront Area includes existing businesses and residences, as well as land planned for significant new residential and employment growth. The streetscape here must accommodate vehicles, pedestrians, and bicycles moving along the corridor and accessing local businesses and recreational facilities.

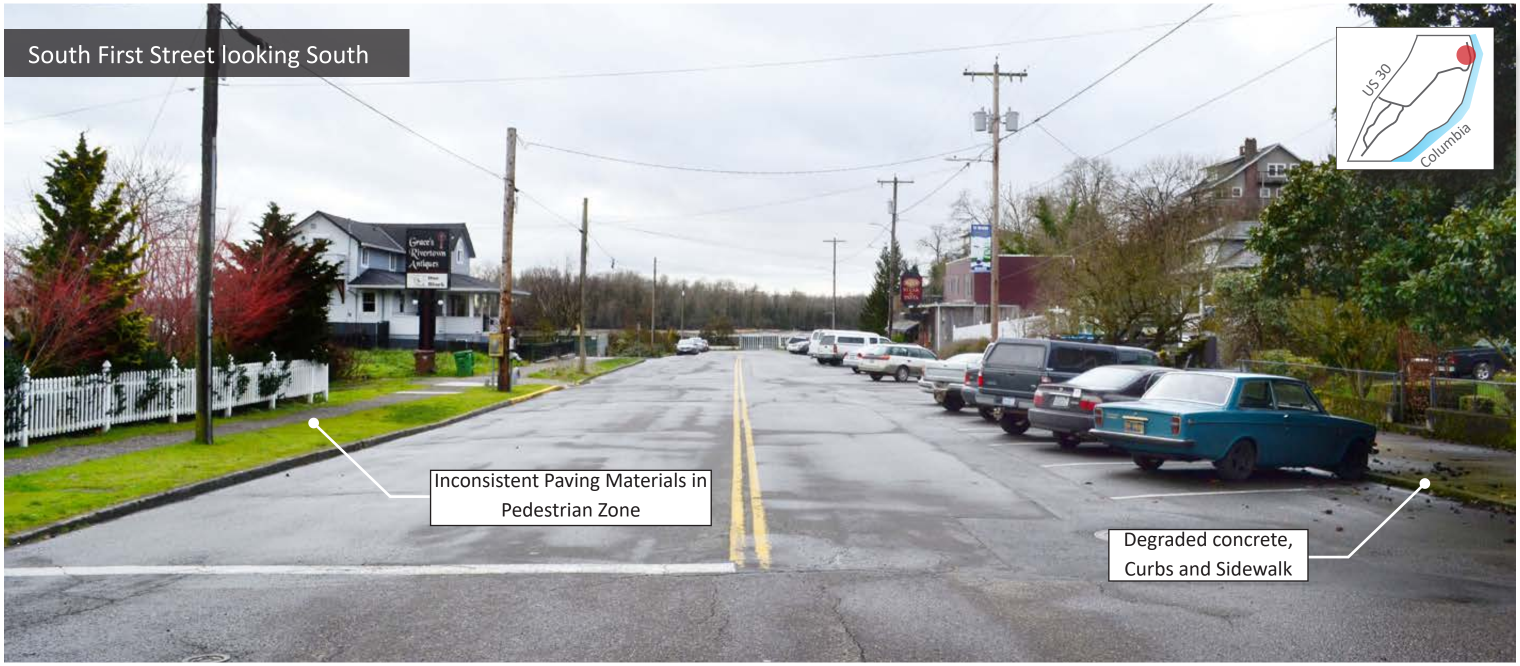
This area has significant opportunities for wayfinding signage, improved bicycle and pedestrian facilities, on and off-street parking, and lighting.

The Waterfront Framework Plan provided a conceptual design for the extension of South 1st Street to Plymouth Street that includes wide sidewalks with planters or tree wells, bike lanes, on-street parking, curb bulb-outs, and clearly marked pedestrian crossings.


Rendering of future Waterfront Area

Image Credit: Waterfront Framework Plan


View of existing Waterfront Area



South First Street looking South

EXISTING CONDITIONS & OPPORTUNITIES

Residential Area

(Segment 3)

Plymouth Road and Old Portland Road run through this area, which is zoned mostly R5 and AR, with a small piece of MU land as well. This portion of the study area is currently very auto-centric and has several problematic intersections.

There is opportunity to make this portion of the corridor much more pedestrian and bicycle-friendly through safe and visible crossings, bicycle and pedestrian facilities, and re-configuration of particular intersections.

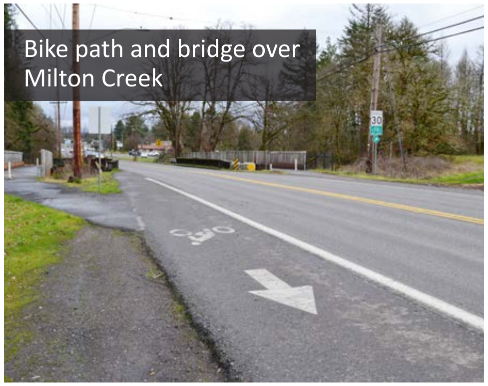
EXISTING CONDITIONS & OPPORTUNITIES

Industrial & Commercial Area

(Segments 4.1 & 4.2)

The intersection of Gable Road and US 30 is very busy and is expected to become even more so in the future. There is opportunity along these segments to improve roadway function while making several intersections safer to navigate, but access to existing property will be a consideration when implementing the recommended roadway design. Bicycle and pedestrian facilities will be an important addition to this area.


Curb-tight concrete sidewalk and bike lane on Old Portland Road-looking North


Bike path and bridge over Milton Creek


Grass conveyance ditch and bike lane on Gable Road-looking North

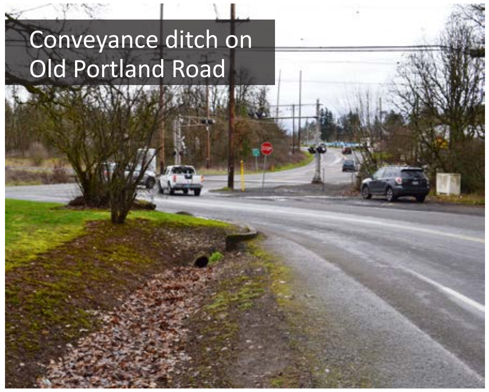
Railroad crossing at Old Portland Road and Railroad Avenue

EXISTING CONDITIONS & OPPORTUNITIES

Linkage Area

(Segment 5)

This area consists mostly of rural streets with no pedestrian or bicycle facilities, with the exception of some concrete sidewalks and bicycle lanes along McNulty Way. The intersection of Millard Road and US 30 is anticipated to eventually be signalized.



Conveyance ditch on Old Portland Road

Gravel shoulder on Old Portland Road

Bike lanes on McNulty Way

Millard Road at Old Portland Road

EXISTING CONDITIONS & OPPORTUNITIES

Non-Conforming Uses & Land Violations

A “Nonconforming Use” is something that is not allowed by a property’s current zoning. Typically, these uses predate the zoning applied to the property. A nonconforming use may face difficulty expanding or redeveloping, and may cause other issues for planning staff and property owners.

• There are several residential uses along Old Portland Road (South of Gable Road) in areas that have an industrial zoning or comprehensive plan designation. Residential uses are extremely limited in the City’s industrial zones; only a caretaker dwelling related to another principle (and allowed) use are permitted.

• There are nonconforming dwellings in commercial and industrial areas) along the south side of Gable Road. Sanitary sewer is a challenge here.

• Industrial parks are a conditional use in the LI zone. A conditionally-approved industrial park is located at the southeastern corner of the McNulty Way and Industrial Way intersection, and Lower Columbia Engineering was permitted as an industrial park within this zone. However, the development does not meet the code’s intent for an industrial park. As the properties develop further, the City wishes to better implement the code’s stated intent for industrial parks.

For more detail on regulatory policies and standards, see Technical Memorandum #1, in Appendix 3.

SUMMARY OF EVALUATION & RECOMMENDATIONS

Following is a summary of recommendations for preferred design options based on the analysis described in the remainder of this report. In a small number of cases, more than one option performed well in our evaluation, and further discussion with the city, agency partners, and the broader community was required to identify a recommended design option. These recommendations reflect comments from members of the project advisory committee, the St. Helens Planning Commission and City Council, and other community members.

The options and recommendations described in this and other sections of this report have been designed to address future land use and traffic conditions in the project area and are generally consistent with transportation improvements identified in previous planning efforts.

More information about projected future conditions can be found in Technical Memorandum 3 in Appendix 5.

Segment 1: South 1st Street

(St. Helens St. to End of Existing S. 1st St.)

Only one roadway cross-section was developed and evaluated and this option is recommended as the preferred alternative in large part due to the built-out nature of this segment, the character of existing facilities, consistency with other city plans, and feedback from the city. No key intersections were evaluated in this segment. This segment currently includes angled parking. The City may investigate use of reverse angled parking in this area in the future.

Segment 2.1: Waterfront Area

(End of Existing S. 1st St. to Lagoon Dam)

Only one roadway cross-section was identified and evaluated and this option is recommended as the preferred alternative. The preferred design was established through an extensive planning and community engagement process as part of the St. Helens Waterfront Framework Plan. The city and project team agreed that this alternative did not need to be revisited as part of the current planning process. No key intersections were evaluated in this segment. The proposed design may be refined, depending on available right-of-way. If less than 80 feet of right-of-way is available, some elements of the design may be narrowed or eliminated.

A traffic calming circle also may be located in this segment. This feature could also serve as a way for drivers to turn around. The design of the traffic circle will depend on whether or not it includes a gateway feature and whether it will need to accommodate large trucks.

Segment 2.2: Plymouth Street

(Lagoon Dam to Plymouth St.)

Only one roadway cross-section was identified and evaluated.

For the intersection of Plymouth Street and South 6th Street, Option A (stop controlled intersection, no splitter island) is recommended based on the evaluation. This option provides superior through-movement and mobility for those accessing properties on South 6th, and the lack of splitter island provides better emergency vehicle access.

Segment 3: Plymouth Street

(South 6th St. to Old Portland Rd.)

Roadway cross section Option B (Sharrows and Multi-Use Path) is the recommended design for this section. This option has superior ratings for improved connectivity and access, improved bicycle and pedestrian safety and accessibility, improved street appearance, and the potential to incorporate sustainable design principles.

Of the four designs presented for the intersection of Old Portland Road and Plymouth Street, Options B, C, and D all scored highly in the evaluation, providing superior safety and mobility compared to Option A. Options C and D provide more potential to improve street appearance and incorporate sustainable design principles.

Based on discussion with members of the project advisory committee and other community members, a modified alternative is proposed as the preferred option. This roundabout allows for continued direct travel to both Old Portland Road and Plymouth Street. It has a smaller footprint than the other roundabout options evaluated, with less resulting impact on surrounding private properties and a lower cost to build compared to the earlier roundabouts studied.

Segment 4.1: Old Portland Road

A modified version of Option C is the recommended design. Option C achieved the highest safety score for all modes, incremental development may be challenging. This option was refined based on feedback from the advisory committee, Planning Commission, City Council and other community members. The refined option places the landscaping strip between the roadway and cycletrack. The cycletrack will be separated from the pedestrian walkway by a curb or other means. Implementation of this option will require careful planning to allow for safe convenient transitions between this design and sections of the roadway that have undergone recent improvements.

At the intersection of Old Portland Rd. and Kaster Rd. Option B (roundabout) is the preferred design, allowing for through-movement in all directions without queueing at a signal. At the intersection of Old Portland Rd. and Railroad Ave., Option B is preferred. Option A is problematic from a transportation safety and mobility standpoint.

At the intersection of Old Portland Rd. and Gable Rd., Option A is the preferred long-term alternative. The City should monitor changes in travel performance after improvements to the US 30/Millard Road intersection are implemented and/or other measures are successful in encouraging more drivers to use Old Portland Road to access the Riverfront area. At the point that increased potential traffic on Old Portland Road warrants the investment in improvements to this intersection, this improvement may be evaluated further.

Segment 4.2: Gable Road

Similar to Segment 4.1, a modified version of Option C is the recommended design. Option C achieved the highest safety score for all modes, though implementing a cycletrack facility through incremental development may be challenging. This option was refined based on feedback from the advisory committee, Planning Commission, City Council and other community members. The refined option places the landscaping strip between the roadway and cycletrack. The cycletrack will be separated from the pedestrian walkway by a curb or other means. Implementation of this option will require careful planning to allow for safe convenient transitions between this design and sections of the roadway that have undergone recent improvements.

Only one option was identified and evaluated for the intersections of Gable Road/McNulty Way and Gable Road/US 30.

Segment 5: Secondary Study Area

(Millard Rd., McNulty Way & Old Portland Rd.)

The proposed designs for roadway cross sections and intersections in this area did not include alternatives to evaluate.

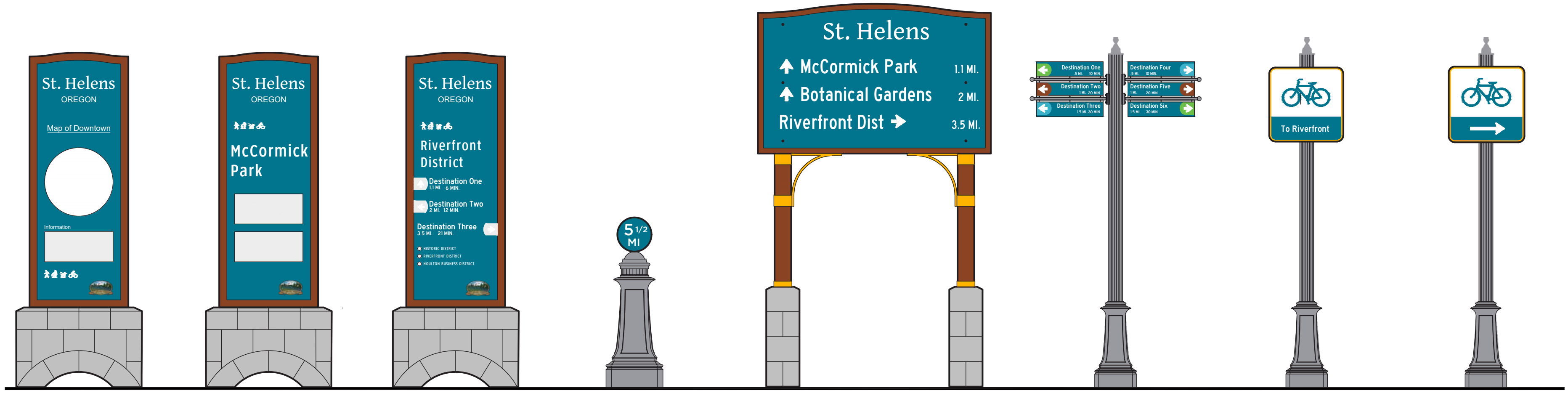
SUMMARY OF WAYFINDING RECOMMENDATIONS

Wayfinding signage was evaluated and identified for the corridor based on guidance from the *City of St. Helens Branding and Wayfinding Master Plan*, adopted in October 2017. The wayfinding recommendations in this report are intended to comply with the placement and design standards identified in the *Branding and Wayfinding Master Plan*. For the purpose of this planning process, only wayfinding along the project corridor has been addressed. Future wayfinding efforts should consider existing and planned signage to develop a citywide wayfinding system that is consistent and complete.

The recommended wayfinding sign types along the project corridor include vehicular directional signs, on-street directional and confirmation signs for pedestrians and/or bicycles, trailhead kiosks at key entry points to local trails, and a map kiosk in the heart of the City's downtown Historic District. Signs directing users to one of the City's districts should include color-coded directional arrows per the *Branding and Wayfinding Master Plan*.

On-street directional signs are recommended at key intersections and decision points along the route. Whether on-street directional signs are recommended to be designed for vehicles or for bicycles and/or pedestrians depends on the presence of bicycle or pedestrian infrastructure along the road segment. The majority of on-street directional signs recommended could be designed for either bicycle or pedestrian use. Travel times on the recommended bicycle/pedestrian directional signs have been calculated for bicycle travel but could easily be recalculated for pedestrian travel if desired.

See Appendix 2 for the full table of wayfinding recommendations, including destinations, sign types, estimated distances and travel times, and installation locations.



MAP KIOSK

TRAILHEAD KIOSK

OFF-STREET DIRECTIONAL KIOSK

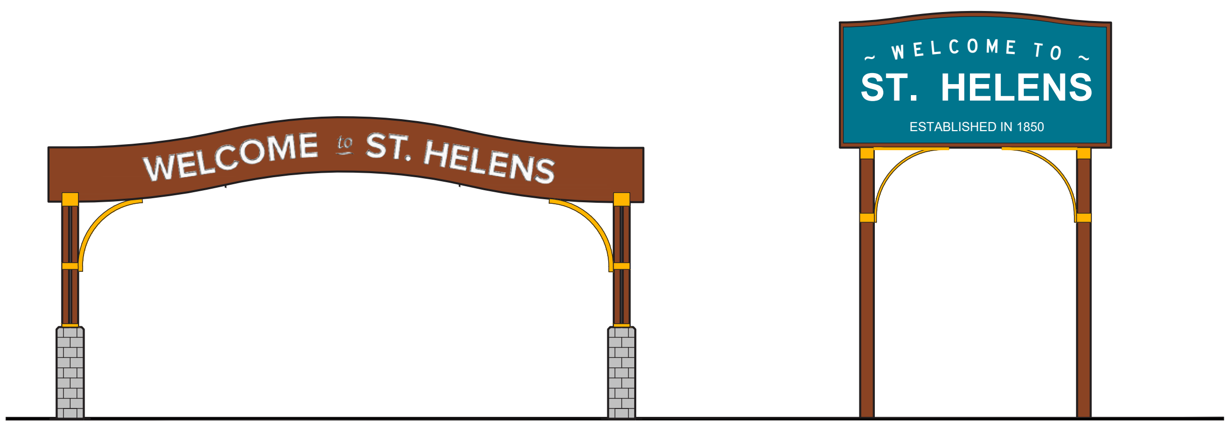
OFF-STREET MILE MARKER

VEHICULAR DIRECTIONAL SIGN

ON-STREET DIRECTIONAL SIGN

ON-STREET CONFIRMATION SIGN

ON-STREET TURN SIGN



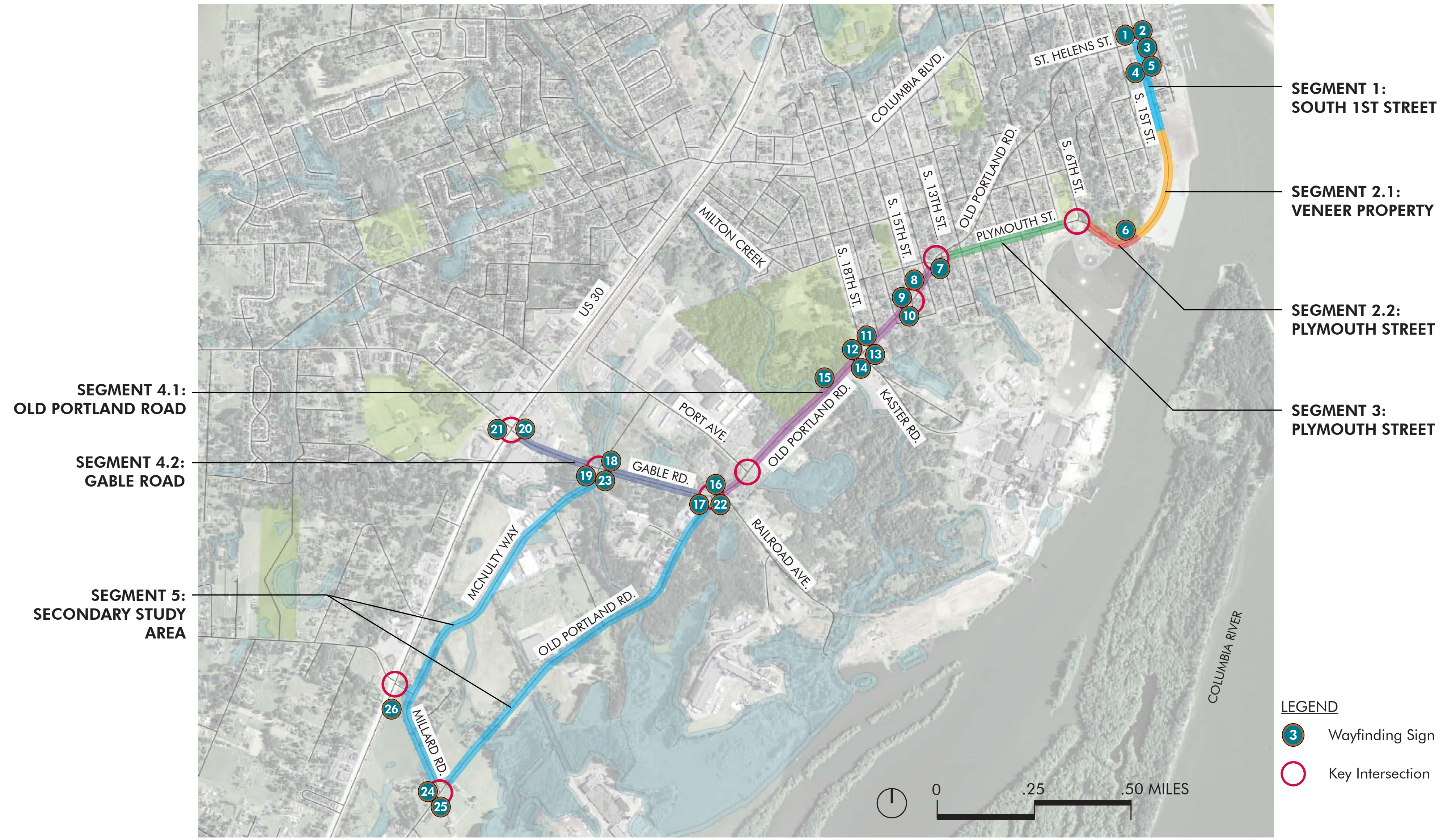
GATEWAY SIGN

HIGHWAY IDENTITY SIGN

Sign types identified in the 'City of St. Helens Branding & Wayfinding Master Plan' (2017)

Wayfinding Recommendations Summary				(See Appendix 2 for full table including destinations)		
ID #	**Corridor Segment**	**Mode Type**	**Sign Type**	**Installation Street**	**Intersecting Street**	**Sign Facing**
1	1	Bicycle/Pedestrian	On-Street Directional	South 1st Street	St. Helens Street	North
2	1	Bicycle/Pedestrian	On-Street Directional	St. Helens Street	South 1st Street	East
3	1	Bicycle/Pedestrian	On-Street Directional	South 1st Street	St. Helens Street	South
4	1	Pedestrian	On-Street Directional	South 1st Street	Plaza Square	North
5	1	Pedestrian	Map Kiosk	South 1st Street	Plaza Square	East
6	2.2	Bicycle/Pedestrian	Trailhead Kiosk	Nob Hill Nature Park Trail	N/A	South
7	3	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	Plymouth Street	South
8	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 15th Street	North
9	4.1	Bicycle/Pedestrian	On-Street Directional	South 15th Street	Old Portland Road	North
10	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 15th Street	West
11	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 18th Street/Kaster Road	East
12	4.1	Bicycle/Pedestrian	On-Street Directional	South 18th Street	Old Portland Road	North
13	4.1	Bicycle/Pedestrian	On-Street Directional	Kaster Road	Old Portland Road	South
14	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 18th Street/Kaster Road	West
15	4.1	Bicycle/Pedestrian	Trailhead Kiosk	Old Portland Road	N/A	South
16	4.1	Bicycle	On-Street Confirmation	Old Portland Road	Gable Road	East
17	4.2	Bicycle	On-Street Confirmation	Gable Road	Old Portland Road	West
18	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	McNulty Way/Milton Way	East
19	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	McNulty Way/Milton Way	West
20	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	Highway 30	East
21	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	Highway 30	West
22	5	Vehicle	Vehicular Directional	Old Portland Road	Gable Road/Old Portland Road	South
23	5	Vehicle	Vehicular Directional	McNulty Way	Gable Road	South
24	5	Vehicle	Vehicular Directional	Millard Road	Old Portland Road	North
25	5	Vehicle	Vehicular Directional	Old Portland Road	Millard Road	South
26	5	Vehicle	Vehicular Directional	Highway 30	Millard Road	South

WAYFINDING RECOMMENDATIONS SUMMARY



Wayfinding locations for entire study area (refer to table on previous page)

EVALUATION OF DRAFT DESIGN OPTIONS

For each corridor segment, alternative road cross-section design and intersection options were evaluated against a set of criteria which are based on the goals and objectives developed at the outset of this project.

The criteria are a mix of quantitative and qualitative measurements or assessments. Consistency with the criteria is described in the following sections of this report and is generally presented on a scale of 1 to 5, where 1 means poor and 5 means good.

Evaluation of each option is in relation to the group of options being evaluated, rather than against an absolute scale. All criteria are weighted equally for the purposes of the evaluation. Following is a list of the project goals and objectives and corresponding evaluation criteria.

Rating System:

Poor Moderate Good

○ ◔ ◑ ◕ ●

Guiding Principle	Specific Criteria	Notes
Economy and Business Support		
Consistency with Previous Planning	• Consistent with previous planning efforts • Improves upon previous planning efforts with context sensitive solutions • Consider timing of development related to emphasis of Plymouth vs Old Portland routes	Transportation System Plan, Waterfront Framework Plan, other plans Qualitative criteria
Supports businesses and business districts	• Improves awareness of business areas through wayfinding, signage, and gateway treatments • Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access	
Supports customers, employees, and others by providing access	• Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities • Change to amount of on-street parking in business areas	
Relative Cost effectiveness	• Relative price for construction and maintenance • Will improvements have economic benefit in terms of supporting or encouraging redevelopment?	

Guiding Principle	Specific Criteria	Notes
Transportation Safety & Mobility		
Improved connectivity & access	• Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity • Site-specific property impacts • Opportunity to incorporate transit service and facilities	Qualitative score
Improved pedestrian/bicycle safety and accessibility	• Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities • Bicycle Level of Stress; Pedestrian Level of Stress • Ease of transition between segments and intersections	
Through-movement and mobility	• Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails • Volume/Capacity Ratio or similar metric	
Safety	• Provides safety improvement at a location with a known safety issue • Reduces potential for future crashes – providing separation between travel modes, other design strategies	
Emergency Vehicle accommodations	• Provides additional routes for emergency vehicles • Decreases response time for emergency vehicles • Emergency vehicle accommodation (i.e. size of roadway)	Qualitative score

Guiding Principle	Specific Criteria	Notes
Connectivity & Streetscape Aesthetics		
Improved street appearance	• Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Poor = very little improvement of street elements. Moderate = moderate improvement of multiple elements, or major improvement of one element. Good = major improvement of multiple elements, or a proposed gateway feature.
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	Best score for options that create a long separated bike path and connect it to rest of city, and for new bike/pedestrian connections to attractions. (Ease of transition <u>between</u> segments is covered in *Improved pedestrian/bicycle safety and accessibility.*)
Improves/affects quality of life	• Improved health – more attractive options for walking and biking • Composite of related criteria	Connecting people and places, improved business/employment opportunity, improved appearance, improved safety, and lower bike/ped level of stress all help improve quality of life.
Street designs catered to needs of particular segments	• Provides context sensitive solution • Consistency with Vision Statement for that segment • Is it overkill? (too nice/too much of a "parkway", for example, for a fairly rural area?)	Safety is part of the Vision Statements for each segment. Some options are a little less safe for bicyclists (in-street bike lanes on streets with higher speeds), otherwise all options seem like an appropriate level of improvement considering expected future development.
Sustainable Design Strategies	• Potentially incorporates storm water facilities (assuming feasibility based on underlying geology) • Reduced impervious surface, or less than typical improvements would have.	Only road sections with landscape strips and intersections with roundabouts (or which reconfigure roads to create new open space) have opportunity for stormwater facilities.

SUMMARY OF EVALUATION CRITERIA AND PROCESS

SEGMENT 1 EVALUATION

Segment 1 connects the historic Riverfront District and downtown core of St. Helens to the future Waterfront Redevelopment area.

The current roadway configuration, with sidewalks and angled parking, is expected to remain on parts of the segment that are already built, unless redevelopment occurs in those areas. This segment currently includes angled parking. The City may investigate use of reverse angled parking in this area in the future.

Street furniture, ornamental lighting, and other design elements will identify this area as the heart of the Riverfront District.

Bicycle travel will be accommodated by shared-street markings (sharrows) on existing portions of the roadway.

SEGMENT 1: SOUTH 1ST STREET

Segment 1 project area.

Existing Road Section

TSP Classification: Collector Street

80’ wide ROW

Approximately 1,200 linear feet

On-street parking

No bicycle facilities

Wide sidewalks with few planters

Typical section facing north

SEGMENT 1: SOUTH 1ST STREET

Potential Road Section

The proposed section for South 1st Street is similar to the existing street and includes sidewalks on both sides of the street, parallel parking on the east side, angled parking on the west side, and two travel lanes. Landscape planters are also proposed on both sides of the street with access across for pedestrians.

Painted sharrows will indicate that bicyclists share the roadway with vehicles on both sides of the street.

Sidewalk bulb-outs will provide a traffic calming effect, and shorten crossing distances for pedestrians. The bulb-outs will not reduce on-street parking, because those areas are already marked to prohibit parking in order to increase visibility for pedestrians and turning vehicles.

Depending on the final streetscape design, the number of on-street parking stalls should be the same or very close to the number of existing stalls.

As noted previously, this segment currently includes angled parking. The City may investigate use of reverse angled parking in this area in the future.

Typical section facing north

SEGMENT 1: SOUTH 1ST STREET

Potential Road Section

Typical section facing south

SEGMENT 1: SOUTH 1ST STREET

Potential Road Section

Sidewalk view facing north

SEGMENT 1: SOUTH 1ST STREET

Evaluation Summary Table

Rating System:

Poor ○ ◔ Moderate ◑ ◕ Good ●

	Economy and Business Support				*Transportation Safety and Mobility*					*Connectivity & Streetscape Aesthetics*			
	Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Proposed Road Section	●	◕	◕	●	◕	◕	◕	◑	◑	◕	◔	●	◑

SEGMENT 1: SOUTH 1ST STREET

Wayfinding Recommendations

Wayfinding locations for Segment 1

Wayfinding Recommendations: Segment 1			(See Appendix 2 for full table including destinations)		
ID #	**Mode Type**	**Sign Type**	**Installation Street**	**Intersecting Street**	**Sign Facing**
1	Bicycle/Pedestrian	On-Street Directional	South 1st Street	St. Helens Street	North
2	Bicycle/Pedestrian	On-Street Directional	St. Helens Street	South 1st Street	East
3	Bicycle/Pedestrian	On-Street Directional	South 1st Street	St. Helens Street	South
4	Pedestrian	On-Street Directional	South 1st Street	Plaza Square	North
5	Pedestrian	Map Kiosk	South 1st Street	Plaza Square	East

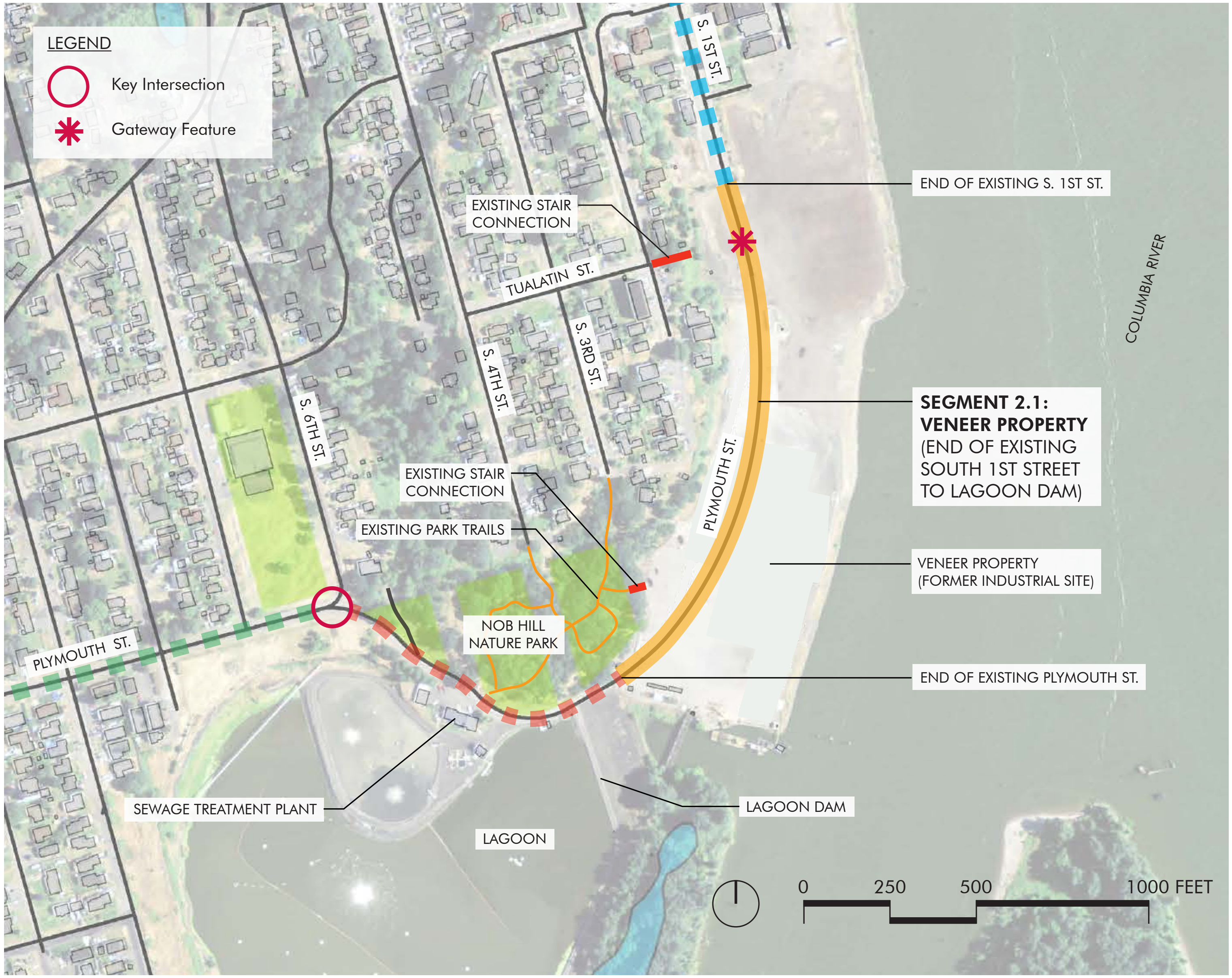
SEGMENT 1: SOUTH 1ST STREET

SEGMENT 2.1 EVALUATION

Design of this segment was proposed in the Waterfront Framework Plan. It is intended to provide a safe and attractive pedestrian environment, stormwater management, bicycle access, as well as automobile parking and connectivity to future land uses in the waterfront area.

Segment 2.1 is a new connection from the historic downtown and Riverfront District south to Plymouth Street and beyond.

SEGMENT 2.1: VENEER PROPERTY



Segment 2.1 project area

Existing Conditions

TSP Classification: Collector Street

No existing ROW

Approximately 1,500 linear feet

No road improvements

This segment travels through a relatively flat, currently undeveloped area with few to no physical constraints. Future improvements will need to be coordinated with future redevelopment in the Waterfront Redevelopment area.

View facing north (the fence marks the end of existing South 1st Street)

SEGMENT 2.1: VENEER PROPERTY

Potential Road Section

The proposed section for this segment is generally consistent with previous planning work conducted for the City's Waterfront Framework Plan.

Compared to Segment 1, this section has parallel parking on both sides instead of angle parking, and adds bicycle lanes.

Parallel parking is recommended rather than diagonal parking to reduce potential safety issues associated with bicycles and vehicles, to reduce right-of-way needs and to reduce pedestrian crossing distances. In addition, new development in the Waterfront Framework area will have to meet off-street parking requirements, resulting in a reduce need for on-street parking, in comparison to the existing downtown area in Segment 1.

This road is classified by the St. Helens TSP as a Collector, but to be consistent with the Waterfront Framework Plan, the proposed section is very similar to the TSP's "Minor Arterial (Two-Way Downtown)" section.

Sidewalk bulb-outs at crossings will shorten crossing distances for pedestrians and provide a traffic calming effect.

Transitions from bicycle lanes in Segment 2.1 to shared travel lanes in Segment 1 and the multi-use path in Segment 2.2 will need to be considered.

(continued on page 38)

Typical section facing north

SEGMENT 2.1: VENEER PROPERTY

(continued from page 37)

The proposed design ultimately may be refined as part of future redevelopment processes, depending on available right-of-way. If less than 80 feet of right-of-way is available, some elements of the design may be narrowed and/or the dedicated bicycle lanes may be replaced with sharrows indicating a shared vehicle/bicycle lane.

Element Width
Travel lanes...........10-12’
Bike lanes..............0-6’
Parallel parking......8’
Planting strips........4-6’
Sidewalks..............8’
Total......................60-80’

See Appendix 9 for an example of a narrower road section, reduced to fit a 60’ wide right-of-way.

A traffic calming circle also may be located in this segment. This feature could also serve as a way for drivers to turn around. The design of the traffic circle will depend on whether or not it includes a gateway feature and whether it will need to accommodate large trucks.

At some point within this segment, the street name will change from S. 1st Street to Plymouth Street. This location will be determined as development and/or roadway construction occurs. The alignment of this segment illustrated in the plan on page 35 is conceptual and may be refined as part of a future detailed design and planning process for this area.

SEGMENT 2.1: VENEER PROPERTY

Evaluation Summary Table

Rating System:

Poor		Moderate		Good
○	◔	◑	◕	●

	Economy and Business Support				*Transportation Safety and Mobility*					*Connectivity & Streetscape Aesthetics*			
	Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Proposed Road Section	●	●	●	◑	●	◑	●	◕	●	●	◕	●	◑

SEGMENT 2.1: VENEER PROPERTY

SEGMENT 2.2 EVALUATION

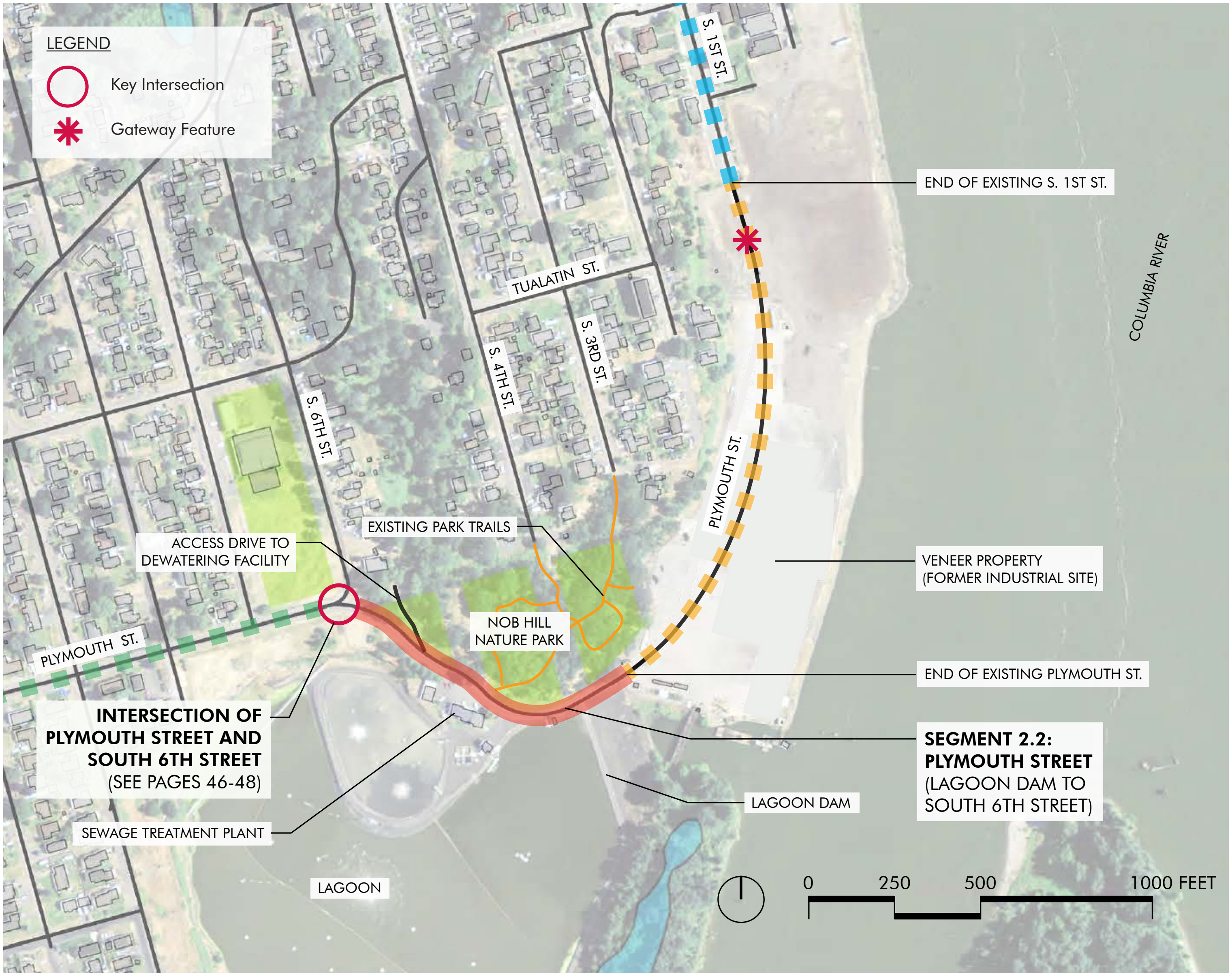
Several alternative designs have been considered by the project team to provide mobility for drivers, pedestrians and bicyclists while working within the constrained conditions in this segment. Ultimately, the team has identified one proposed approach based on the following objectives:

Provide a dedicated facility for pedestrians on at least one side of the road.
Given that alternate routes through the Nob Hill Nature Park would not meet accessibility requirements for people with disabilities, it is important to have an accessible pedestrian facility on this segment.

Keep costs reasonable.
Extensive blasting or moving wastewater treatment vaults is likely to be very expensive. The proposed section should fit within existing available area where possible.

Provide reasonable options for cyclists.
Providing a dedicated facility for cyclists in the form of a multi-use pathway on the north (uphill) side of the road will provide a separated route for cyclists where they are moving more slowly. A shared pathway for bicyclists and pedestrians traveling uphill is safer, compared to doing so in the downhill direction. Providing a shared route with vehicles on the south (downhill) side of the road will make efficient use of limited space and allow bicyclists and vehicles to share the roadway where their speeds are more similar.

Allow flexibility where conditions vary.
A landscaping strip is recommended where space allows on the north side of the road. The width of this area will increase where more area is available. A landscaping strip will enhance the appearance of the road and enhance comfort and safety for pedestrians and bicyclists using the shared pathway.



Segment 2.2 project area

Existing Road Section

TSP Classification: Collector Street

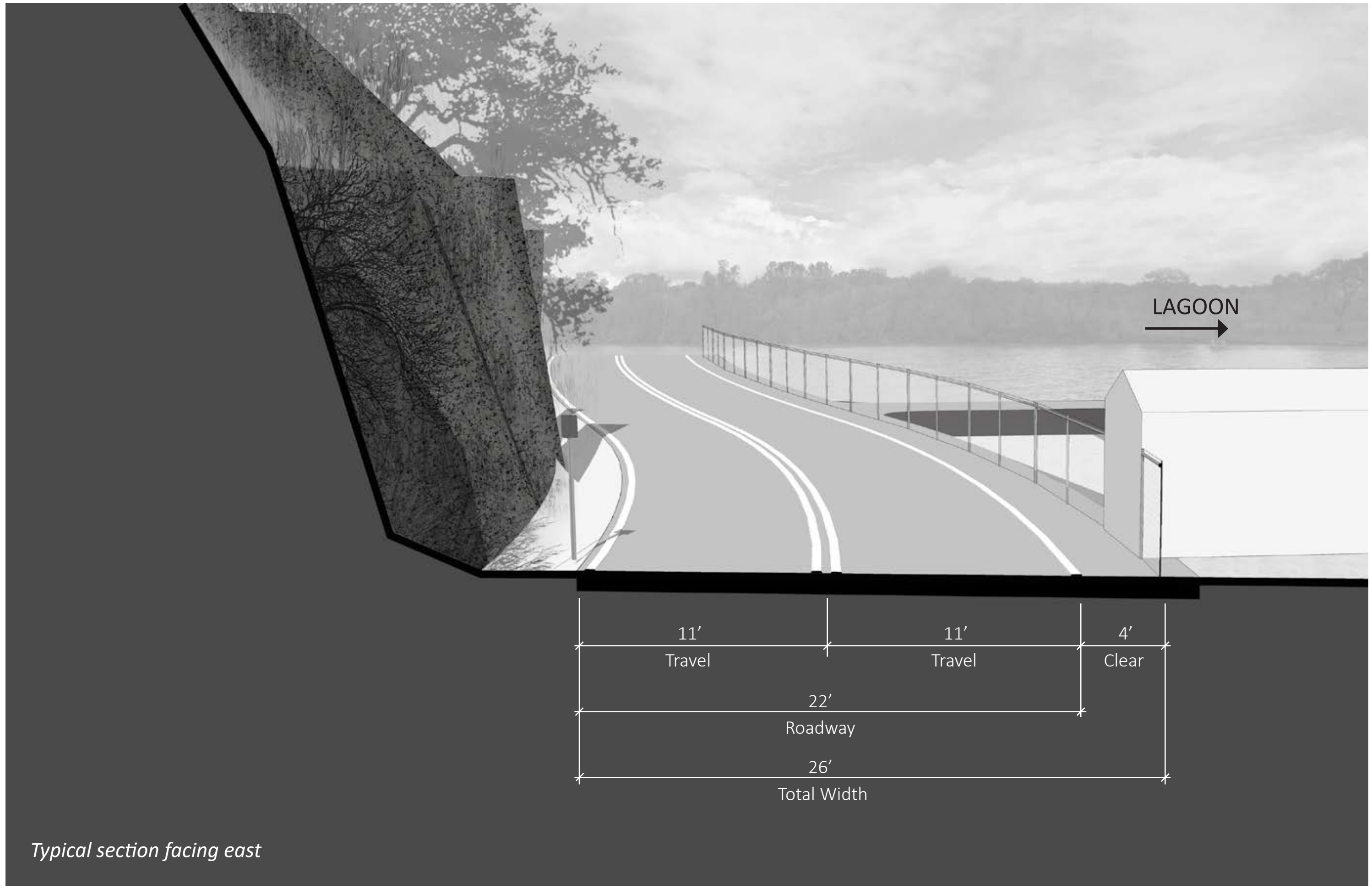
No existing ROW

Approximately 1,100 linear feet

No bike facilities

No sidewalks

Plymouth Street through Segment 2.2 has a constrained available width of approximately 26’ to 34’ due to topography, basalt outcrops, improvements at the sewage treatment plant to the south, and the dewatering facility drive to the north. Approximately 40’ or more width may be usable with some combination of retaining walls, fill, blasting, and/or moving some treatment plant vaults or other improvements.



SEGMENT 2.2: PLYMOUTH STREET

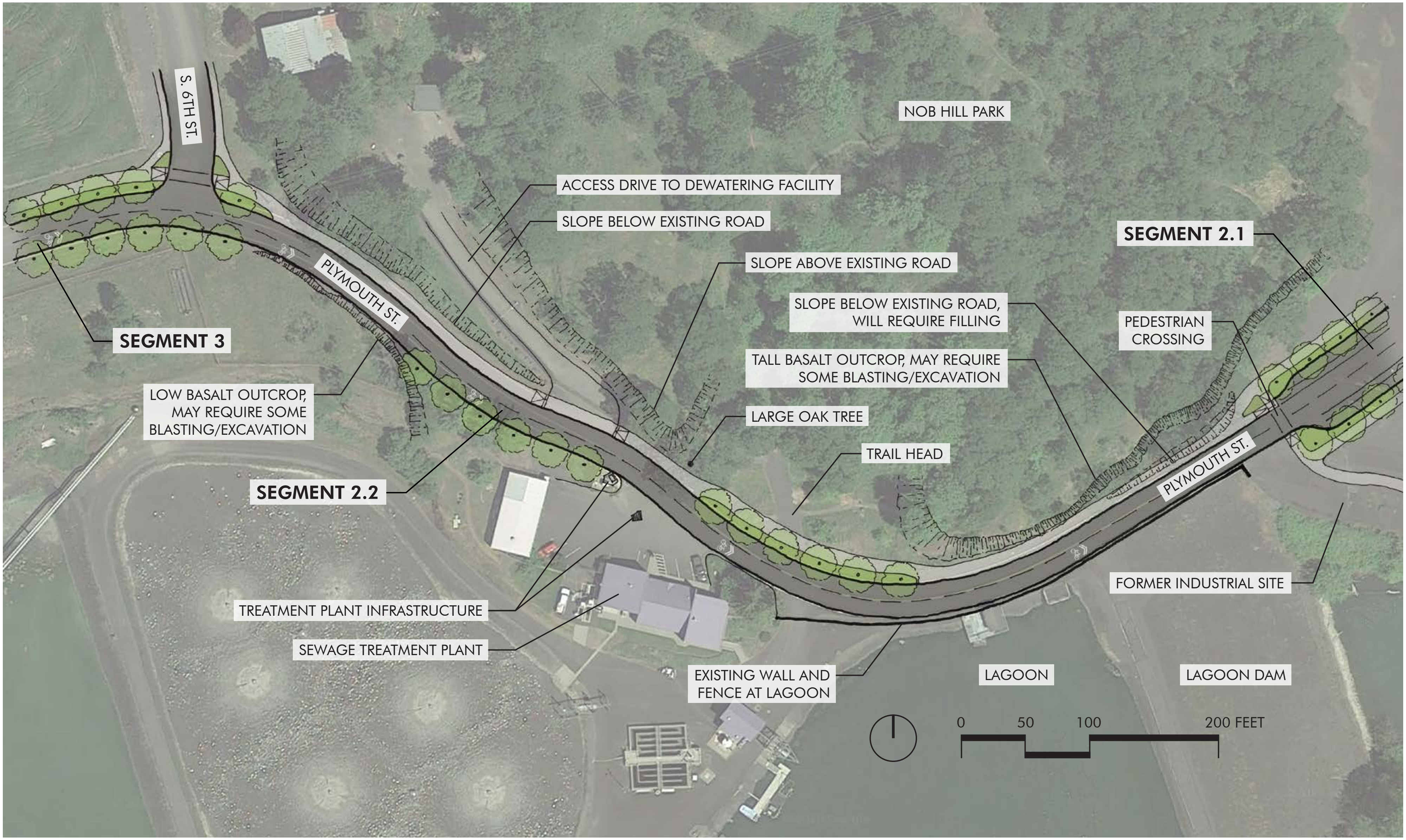
Potential Road Section

The proposed road section contains two 11’ travel lanes, one of which is shared with bicycle travel (the east-bound/ southern lane), and a 10’ multi-use path on the north side of the road, separated from the travel lanes by a landscape strip where space allows (varying in size depending on available space).

Implementation of the proposed road section will need to consider pedestrian crossings where the south side sidewalk ends at the south end of Segment 2.1, and how bicycle facilities will transition to adjacent segments.

Typical section facing east

Potential Plan



SEGMENT 2.2: PLYMOUTH STREET

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Intersection Evaluation

The Plymouth Street/S. 6th Street intersection is located at the crest of a vertical curve and on the outside of a horizontal curve along Plymouth Street, which together limit sight distance. There is currently no stop sign at the southbound approach to the intersection or warning signs at the eastbound approach to alert motorists of the horizontal/vertical curve. The following design options were developed for further consideration.

Existing conditions (image: Google Earth)

INTERSECTION: PLYMOUTH STREET & SOUTH 6TH STREET

Option A:
Stop Control

- Realigns the southbound approach to create a "T" intersection with Plymouth Street.
- Provides a stop sign at the southbound approach from S. 6th Street to Plymouth Street.
- Provides curve warning signs on Plymouth Street.

INTERSECTION: PLYMOUTH STREET & SOUTH 6TH STREET

Option B:
Right in/Right Out

Includes the same improvements as Option A with the addition of a splitter island to limit turn movements to right-in and right-out. Residents can use S. 7th Street to complete eastbound and southbound left-turn movements.

INTERSECTION: PLYMOUTH STREET & SOUTH 6TH STREET

Evaluation Summary Table

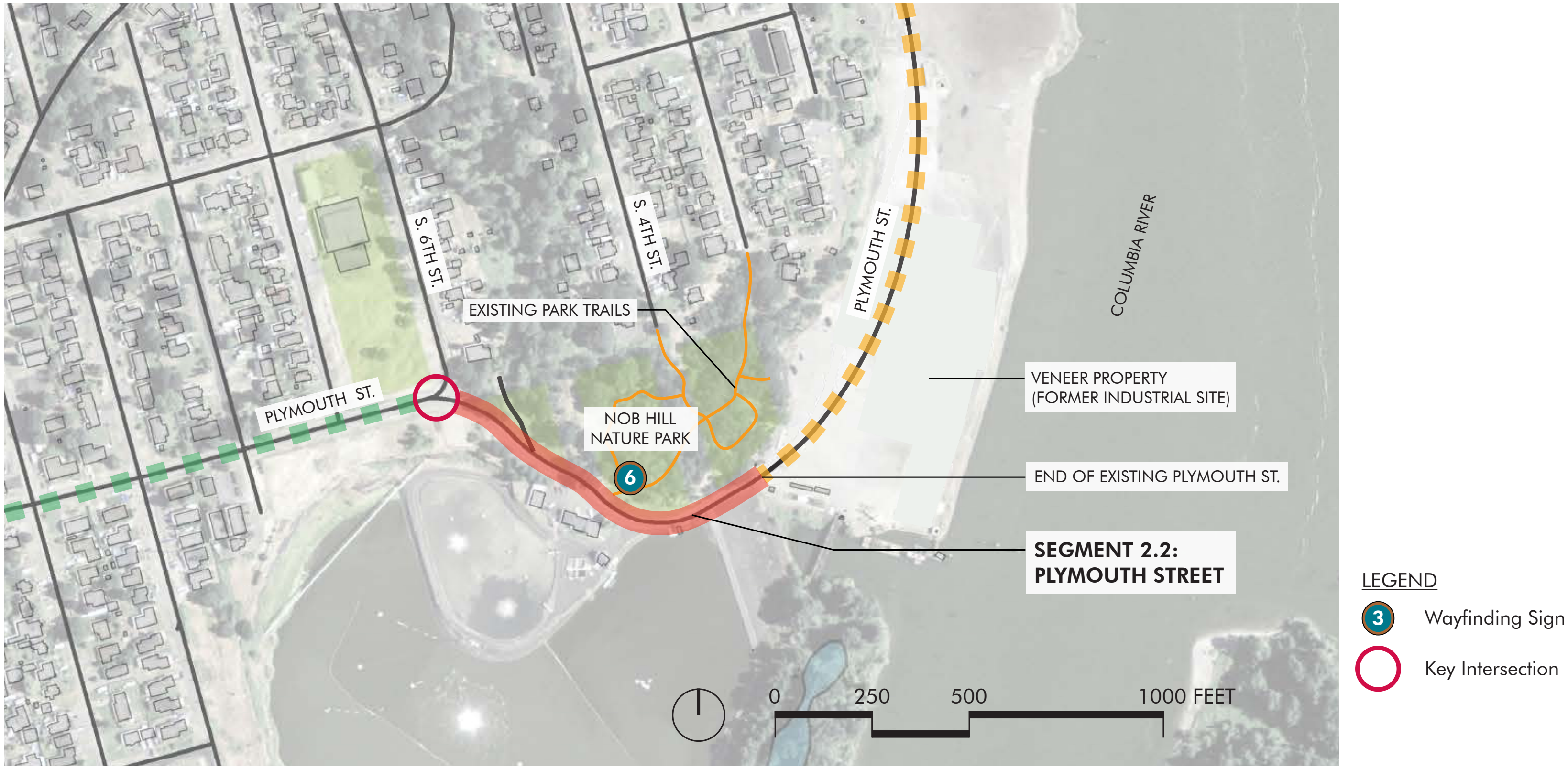
Rating System:

Poor ○ ◔ Moderate ◑ ◕ ● Good

		Economy and Business Support				Transportation Safety and Mobility					Connectivity & Streetscape Aesthetics			
		Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Proposed Road Section		◕	●	●	◕	◔	◑	◕	◕	◑	◑	●	●	●
Plymouth Street/ South 6th Street	Option A	●	●	●	●	◕	◕	◑	◑	◑	◑	◑	●	◔
	Option B	◕	◑	◑	◕	◔	◑	○	●	○	◑	◑	●	◔

SEGMENT 2.2: PLYMOUTH STREET

Wayfinding Recommendations



Wayfinding locations for Segment 2.2

Wayfinding Recommendations: Segment 2.2			(See Appendix 2 for full table including destinations)		
ID #	**Mode Type**	**Sign Type**	**Installation Street**	**Intersecting Street**	**Sign Facing**
6	Bicycle/Pedestrian	Trailhead Kiosk	Nob Hill Nature Park Trail	N/A	South

SEGMENT 2.2: PLYMOUTH STREET

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SEGMENT 3 EVALUATION

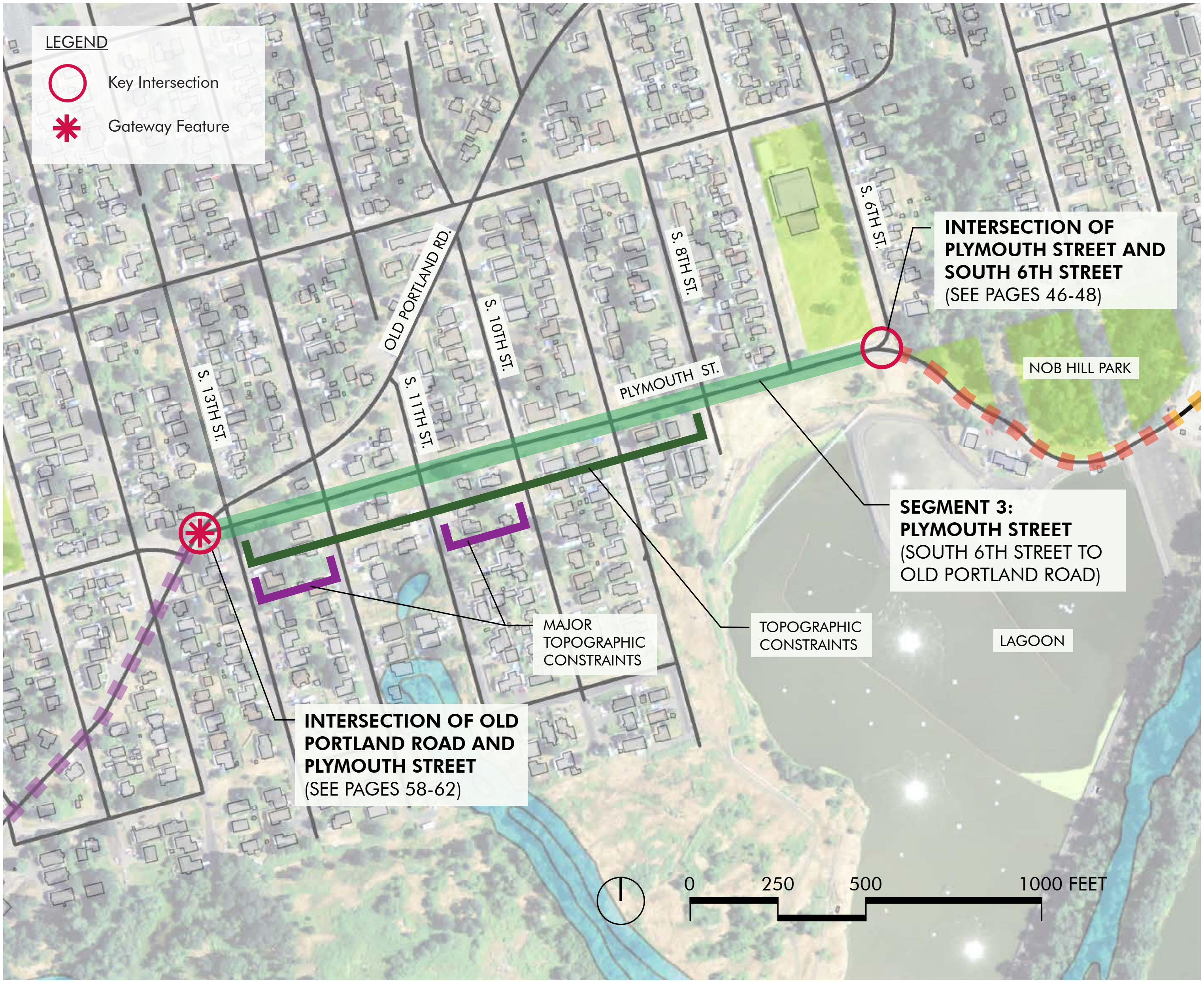
Segment 3 connects Segment 2.2 to Old Portland Road along a straight section of Plymouth Street through a largely developed residential area.

Topographic constraints exist within the ROW on five of the seven blocks in this segment. Approximately 48’-50’ of width is available between S. 8th and S. 10th Streets, and between S. 11th and S. 12th Streets, or wider with retaining walls. Approximately 42’-45’ of width is available between S. 10th and S. 11th Streets, and between S. 12th and S. 13th Streets, or wider with retaining walls.

Plymouth Street is already off-center near S. 11th St. due to topography. This segment may need a three-lane road section for turn lanes at the west end of Segment 3, depending on the proposed intersection layout for Plymouth Street and Old Portland Road.

The overall approach for this section is to provide continuous pedestrian and bicycle facilities along the north side of Plymouth Street. Two possible options have been identified to implement this approach. Where a sidewalk is provided on the south side of the road, pedestrian crossings will be needed where those sections end. Both options propose to provide a sidewalk on the south side only between S. 8th St. and S. 10th St.

SEGMENT 3: PLYMOUTH STREET



Segment 3 project area

Existing Road Section

TSP Classification: Collector Street

80' wide ROW

Approximately 1,950 linear feet

No bike facilities

No sidewalks

Typical section facing east

SEGMENT 3: PLYMOUTH STREET

Road Section: Option A

Bicycle Lanes

This option would include bicycle lanes on both sides of the street and a sidewalk along the north side of the street.

The sidewalk on the south side of the street would only occur between S. 8th St. and S. 10th St., where there are residences and where space for a sidewalk is available.

The bicycle lane and sidewalk on the north side would need to transition to the multi-use path in Section 2.2 at S. 6th Street and the bicycle lane on the south side would transition to a shared bicycle and auto travel lane at S. 6th Street.

This road section would displace the existing utility poles, which will need to be moved.

Typical section facing east

SEGMENT 3: PLYMOUTH STREET

Road Section: Option B
Sharrows & Multi-Use Path

This option would continue the multi-use path and landscaping strip from Segment 2.2 along the north side of Plymouth. On the south side of Plymouth, a sidewalk could be provided where available width allows and where residences would make use of it - between S. 8th and S. 10th Streets.

This road section would displace the existing utility poles, which will need to be moved.

SEGMENT 3: PLYMOUTH STREET

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Intersection Evaluation

The intersection of Old Portland Road and Plymouth Street presents many challenges, including visibility issues, steep grades and curves, several closely-spaced intersections, and potential impacts to private property associated with improvements.

Several options for improving this intersection were identified and evaluated. The project team narrowed them down to four options which are illustrated and described in the following pages.

Based on further analysis and discussion with members of the advisory committee, Planning Commission, City Council and other community members, the project team developed a new preferred option shown in the Recommendations section of this report.

This new roundabout design allows for continued direct travel to both Old Portland Road and Plymouth Street. It has a smaller footprint than the other roundabout options evaluated, with less resulting impact on surrounding private properties and a lower cost to build compared to the earlier roundabouts studied. This intersection has been designed to accommodate medium-sized trucks, including typical delivery trucks (approximately 40-50 feet in length).

Existing conditions (image: Google Earth)

INTERSECTION: OLD PORTLAND ROAD & PLYMOUTH STREET

Option A:
Re-Align Plymouth St.

- Realigns Plymouth Street to intersect with Old Portland Road at S. 13th Street (north).
- Old Portland Road is emphasized as the through-route.
- S. 13th Street (south) is realigned to intersect with Plymouth Street.
- Optional component: add a cul-de-sac on S. 14th Street (north) to separate it from Old Portland Road.
- Some impacts to private property but no direct impact to existing homes or other structures.
- This option does not meet mobility standards under future traffic conditions. However, it could be developed as an interim treatment to address existing safety issues.

INTERSECTION: OLD PORTLAND ROAD & PLYMOUTH STREET

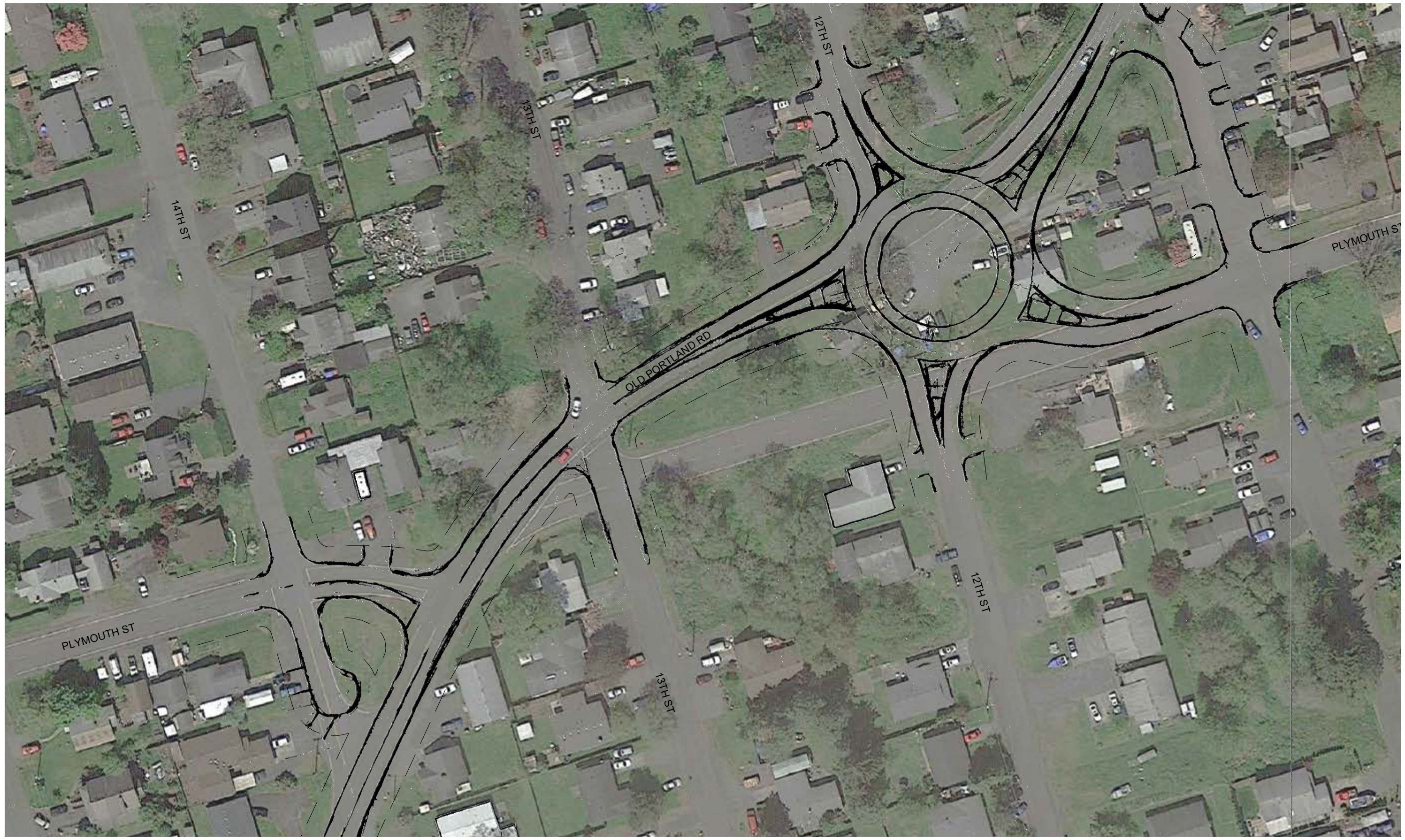
Option B:
Re-Align Old Portland Rd.

- Realigns Old Portland Road to emphasize Plymouth Street as the through-route.
- The north leg of Old Portland Road is realigned to intersect with Plymouth Street at S. 12th Street, and part of the prior Old Portland Road alignment is vacated.
- S. 12th Street is realigned to intersect with the new Old Portland Road alignment at a 'T'.
- Optional component: disconnect the north leg of S. 14th Street from Old Portland Road, and realign the south leg to intersect Old Portland Road.
- Impacts one property, including an existing dwelling; this property has been purchased by the City.

INTERSECTION: OLD PORTLAND ROAD & PLYMOUTH STREET

Option C:
Five-Leg Roundabout

- Adds a five-legged roundabout, with equal emphasis on Old Portland Road and Plymouth Street.
- Part of the prior Plymouth Street alignment is vacated.
- Optional components: Disconnect the north leg of S. 14th Street from Old Portland Road and re-align the south leg to intersect at a 'T'.
- Impacts multiple properties and existing dwellings; one of these properties has been purchased by the City.

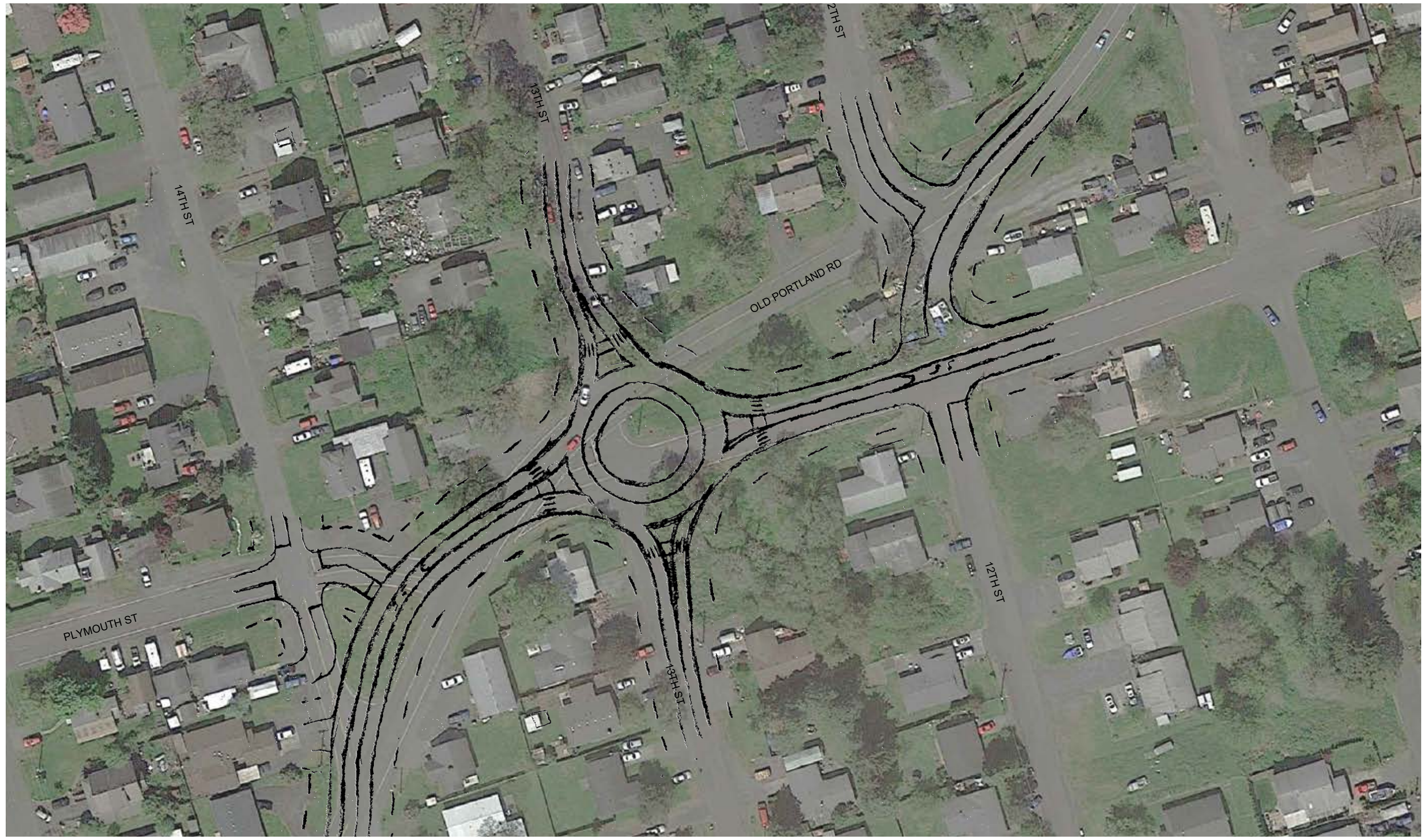


INTERSECTION: OLD PORTLAND ROAD & PLYMOUTH STREET

Option D:

Four-Leg Roundabout

- Adds a four-legged roundabout and emphasizes Plymouth Street.
- The north leg of Old Portland Road is realigned to intersect with Plymouth Street at a ‘T’.
- Part of the prior Old Portland Road alignment is vacated.
- Impacts multiple properties and one existing dwelling; one affected property is owned by the City.
- Vertical challenges on the south side of the roundabout would result in additional costs not captured in planning-level analysis and adds potential for property impacts.



INTERSECTION: OLD PORTLAND ROAD & PLYMOUTH STREET

Evaluation Summary Table

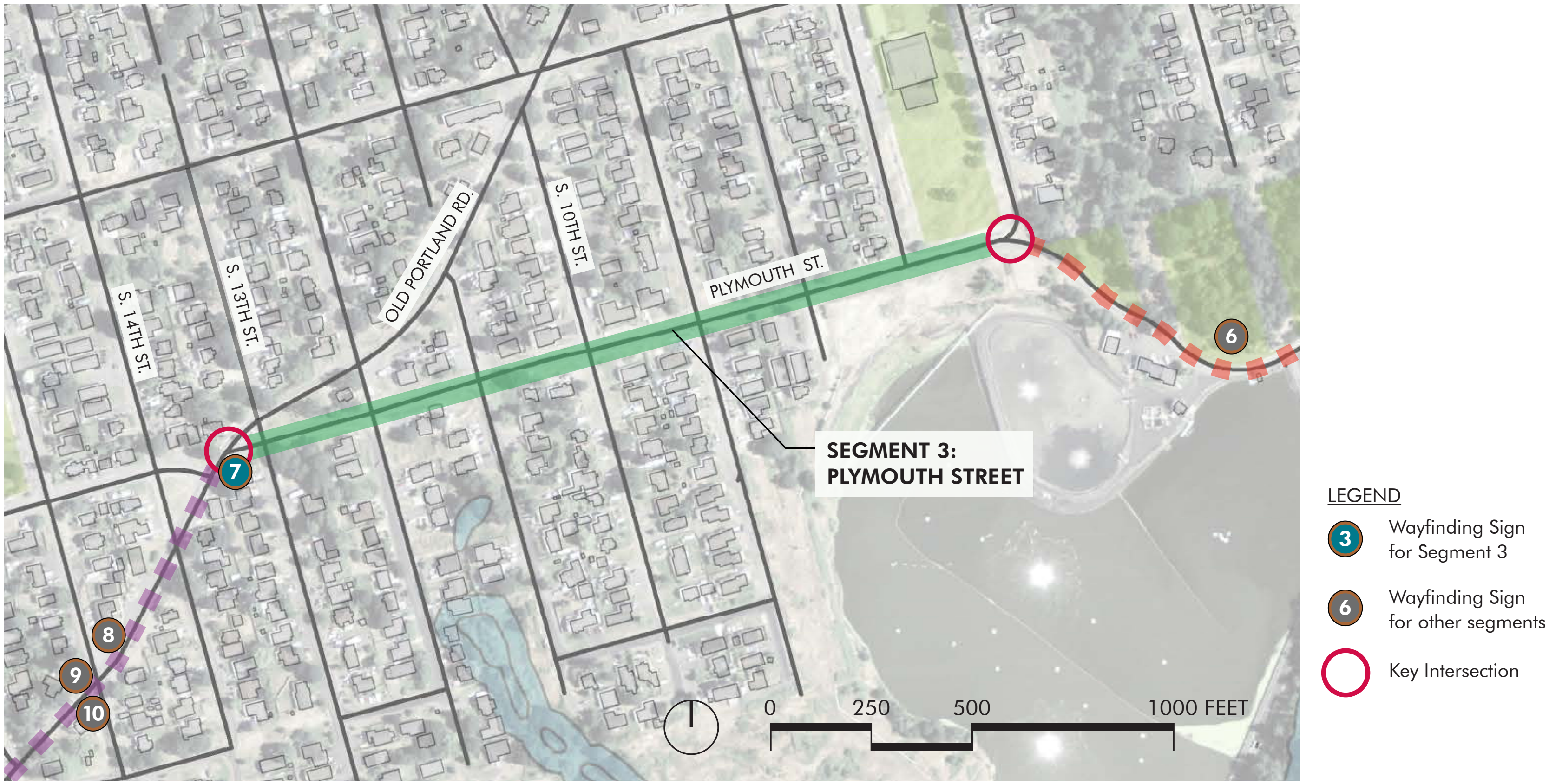
Rating System:

Poor ○ ◔ Moderate ◑ ◕ Good ●

		Economy and Business Support				Transportation Safety and Mobility					Connectivity & Streetscape Aesthetics			
		Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Road Section Options	Option A	◕	●	●	◕	◔	◑	◕	◕	◑	◔	◑	●	○
	Option B	◕	●	◕	◕	◑	●	◕	◕	◑	◑	●	●	◕
Plymouth Street/Old Portland Road	Option A	●	◑	◑	●	○	◑	○	◔	◔	◕	◑	●	◔
	Option B	◕	●	●	◕	●	◑	●	◕	●	◕	◑	●	◑
	Option C	◑	●	●	◑	○	●	●	●	●	●	◑	●	◕
	Option D	◕	●	●	◑	○	●	●	●	●	●	◑	●	◕

SEGMENT 3: PLYMOUTH STREET

Wayfinding Recommendations



Wayfinding locations for Segment 3

Wayfinding Recommendations: Segment 3			(See Appendix 2 for full table including destinations)		
ID #	**Mode Type**	**Sign Type**	**Installation Street**	**Intersecting Street**	**Sign Facing**
7	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	Plymouth Street	South

SEGMENT 3: PLYMOUTH STREET

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SEGMENT 4.1 EVALUATION

This segment connects Plymouth Street to Gable Road, transitioning from residential neighborhoods in the East to park and industrial land. The lack of existing sidewalks or pathways in the majority of this segment, coupled with higher traffic speeds necessitate improved pedestrian facilities.

There are few intersections along a portion of this segment, posing the potential need for multiple mid-block crossings for pedestrians. Lower travel speeds or separated bicycle facilities will improve safety for bicyclists.

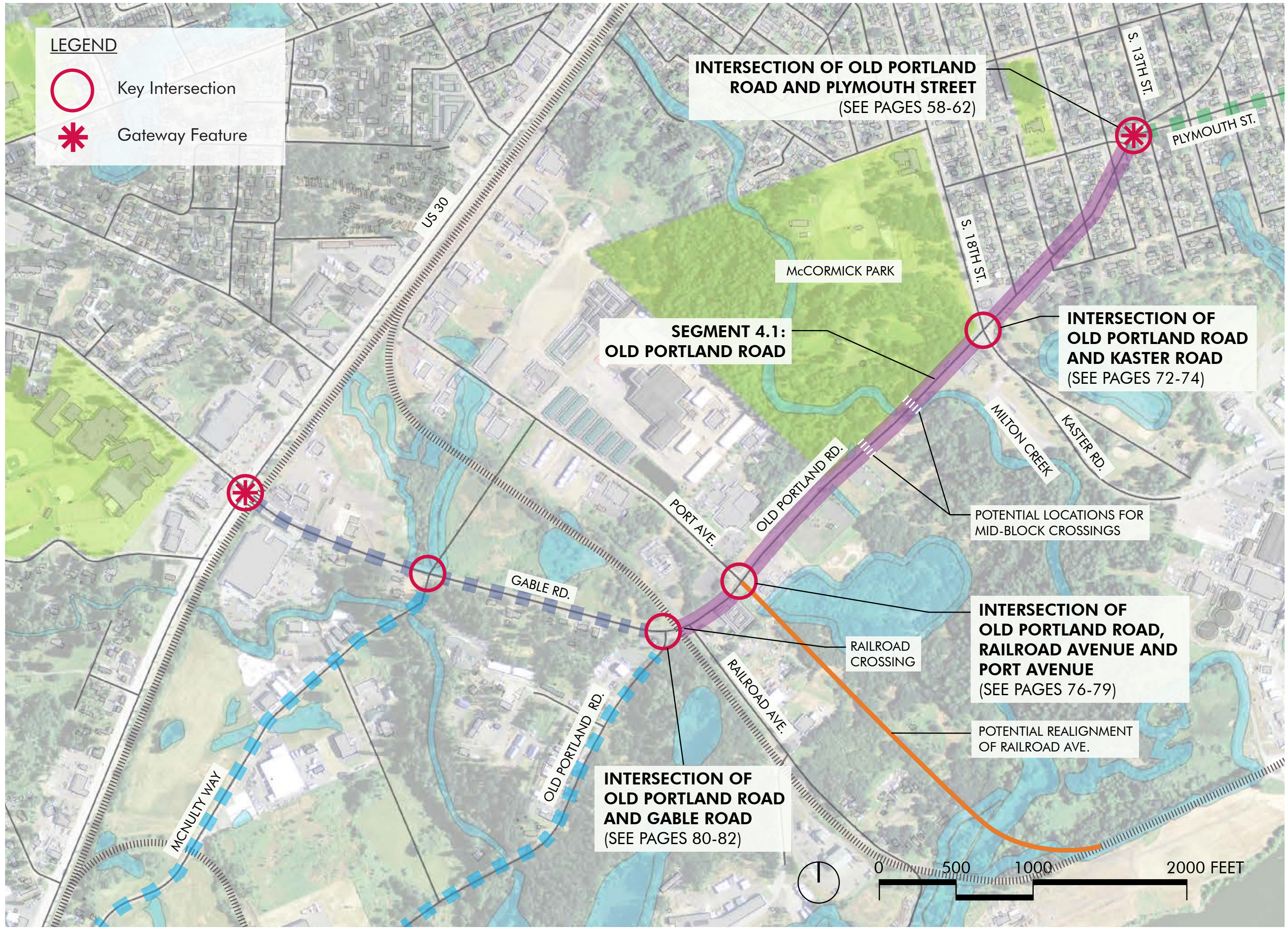
The options for this segment show one travel lane in each direction and various ways to accommodate pedestrian and bicycle movement.

There is a railroad crossing on this segment at the intersection of Old Portland Road and Railroad Avenue. The current roadway has two travel lanes, bicycle lanes only west of Kaster Road, and drainage ditches on either side of the roadway. Speed limits are posted at 40 mph west of the Milton Creek Bridge, and 30 mph east of the bridge where the land use is primarily residential. Pedestrian facilities in this area are limited.

Development within this segment is a mixture of light industrial buildings, a public park, an institutional facility, and several single-family homes. McCormick Park borders the corridor along Old Portland Road, although there is no public vehicle access from Old Portland Road. One gated maintenance access drive does exist. There is also a pedestrian path connection into the park on the east side of the Milton Creek bridge, which has potential to become a trailhead.

The Columbia County Jail and Sheriff’s Office are also located near this area and are set back 150’ from the road. Several commercial businesses are located near the intersection of Old Portland Road and Gable Road.

SEGMENT 4.1: OLD PORTLAND ROAD



Segment 4.1 project area

Existing Road Section

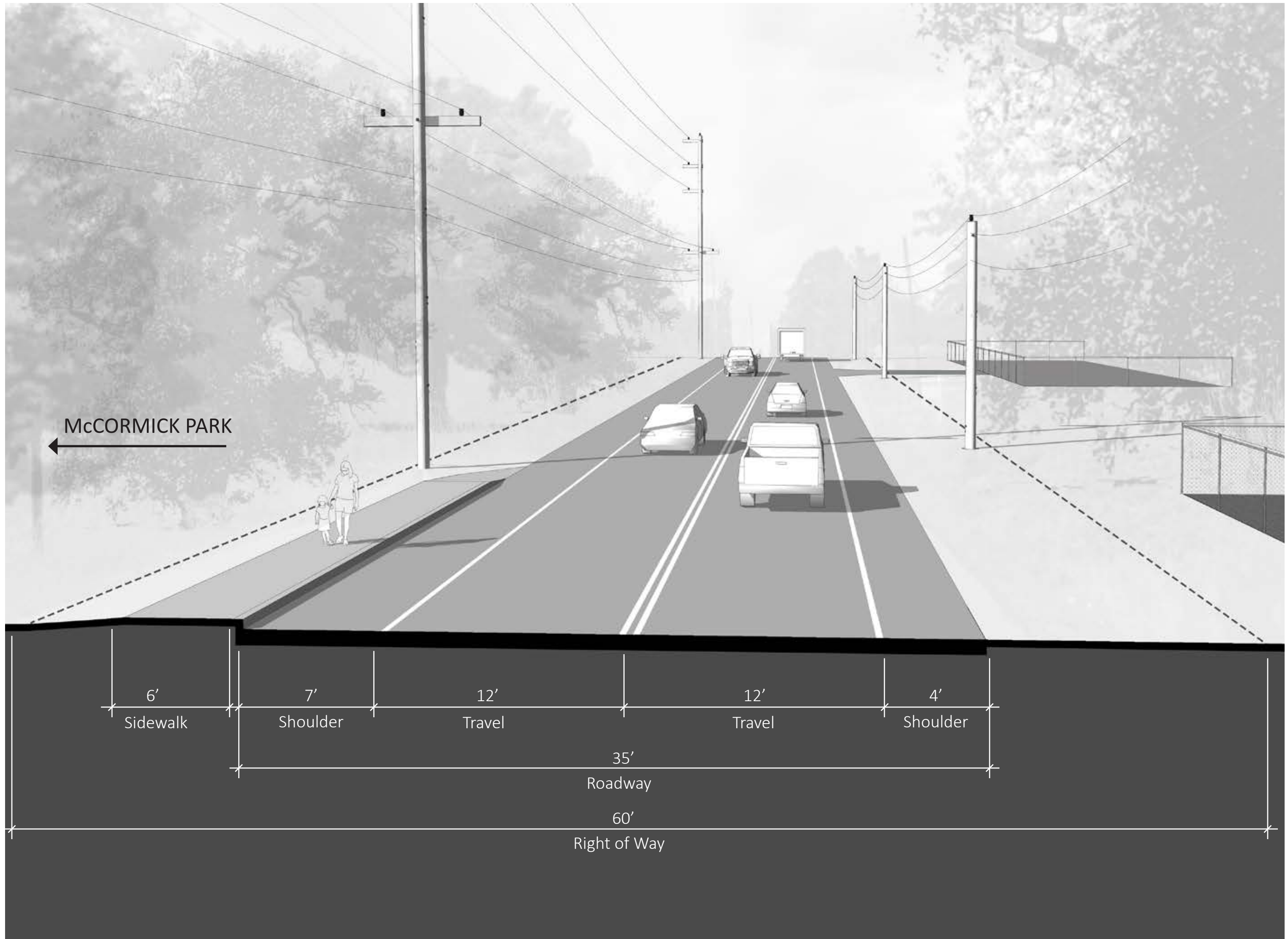
TSP classification: Minor Arterial

60’ wide ROW

Approximately 4,500 linear feet

Bike lanes on portion of segment

Sidewalk on portion of segment



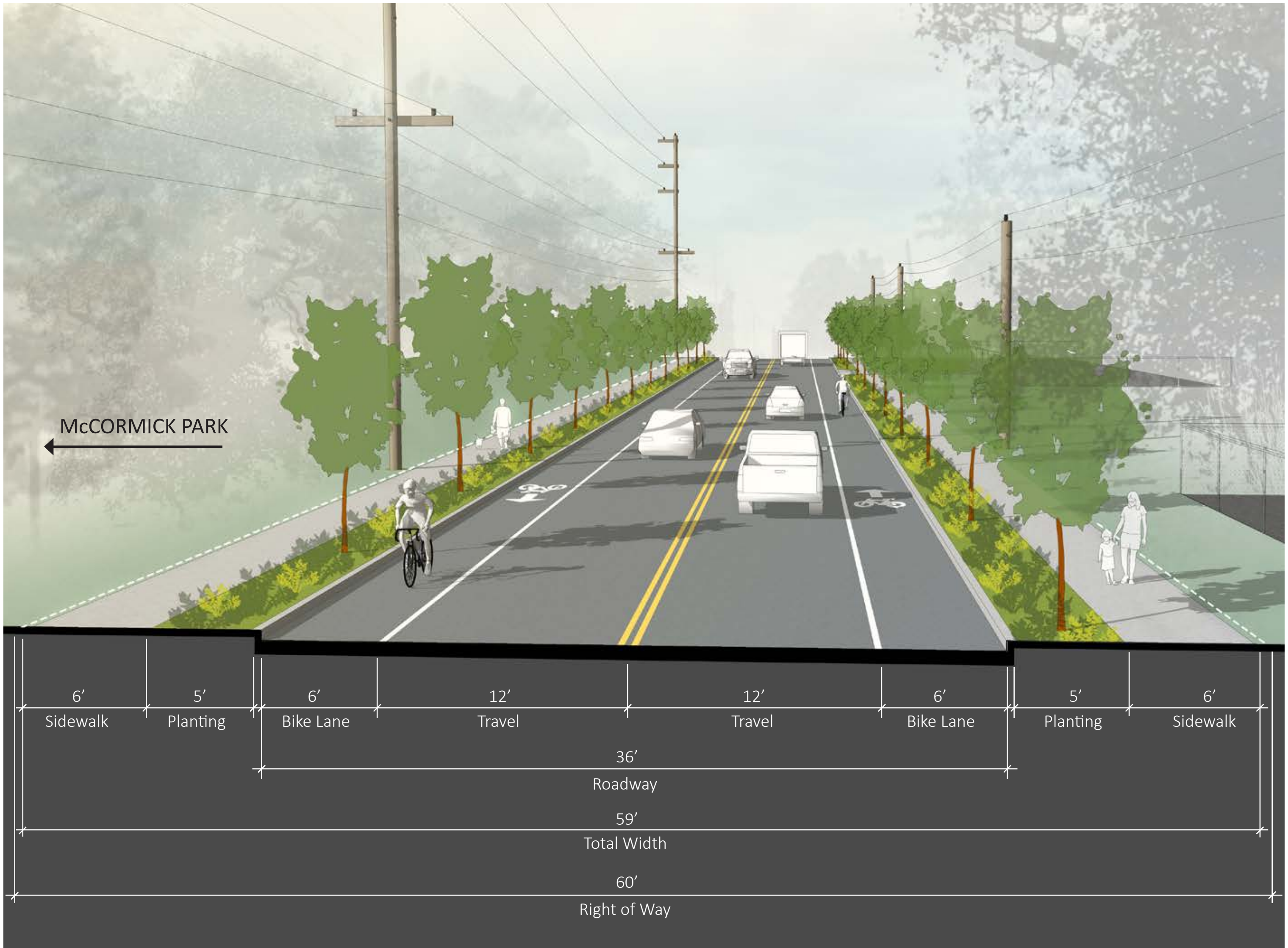
Typical section facing north

SEGMENT 4.1: OLD PORTLAND ROAD

Road Section: Option A

Standard Minor Arterial

Option A is the standard Minor Arterial section from the St. Helens TSP. Because of the on-street bike lanes, this design targets a speed limit of 35 mph or less west of the Milton Creek Bridge, where it is currently signed at 40 mph (east of the bridge is currently signed at 30 mph).



Typical section facing north

SEGMENT 4.1: OLD PORTLAND ROAD

Road Section: Option B

Multi-Use Path

Option B replaces the bicycle lanes and one sidewalk with a 12’ wide multi-use path for both bicyclists and pedestrians. Transitions from the multi-use path to bike facilities and sidewalks on adjacent road segments (depending on the options selected) will need to be considered.

Typical section facing north

SEGMENT 4.1: OLD PORTLAND ROAD

Road Section: Option C

Two-Way Cycletrack

Option C replaces the bicycle lanes with a 12’ wide raised two-way cycletrack. Transitions from the cycletrack to bike lanes on adjacent road segments and cycletrack crossings at intersections (depending on the options selected) will need to be considered. This general concept could also be achieved with two one-way cycletracks on either side of the road, or two buffered bicycle lanes, though having a consistent bicycle facility traversing several segments is preferred.

Typical section facing north

SEGMENT 4.1: OLD PORTLAND ROAD

Intersection Evaluation

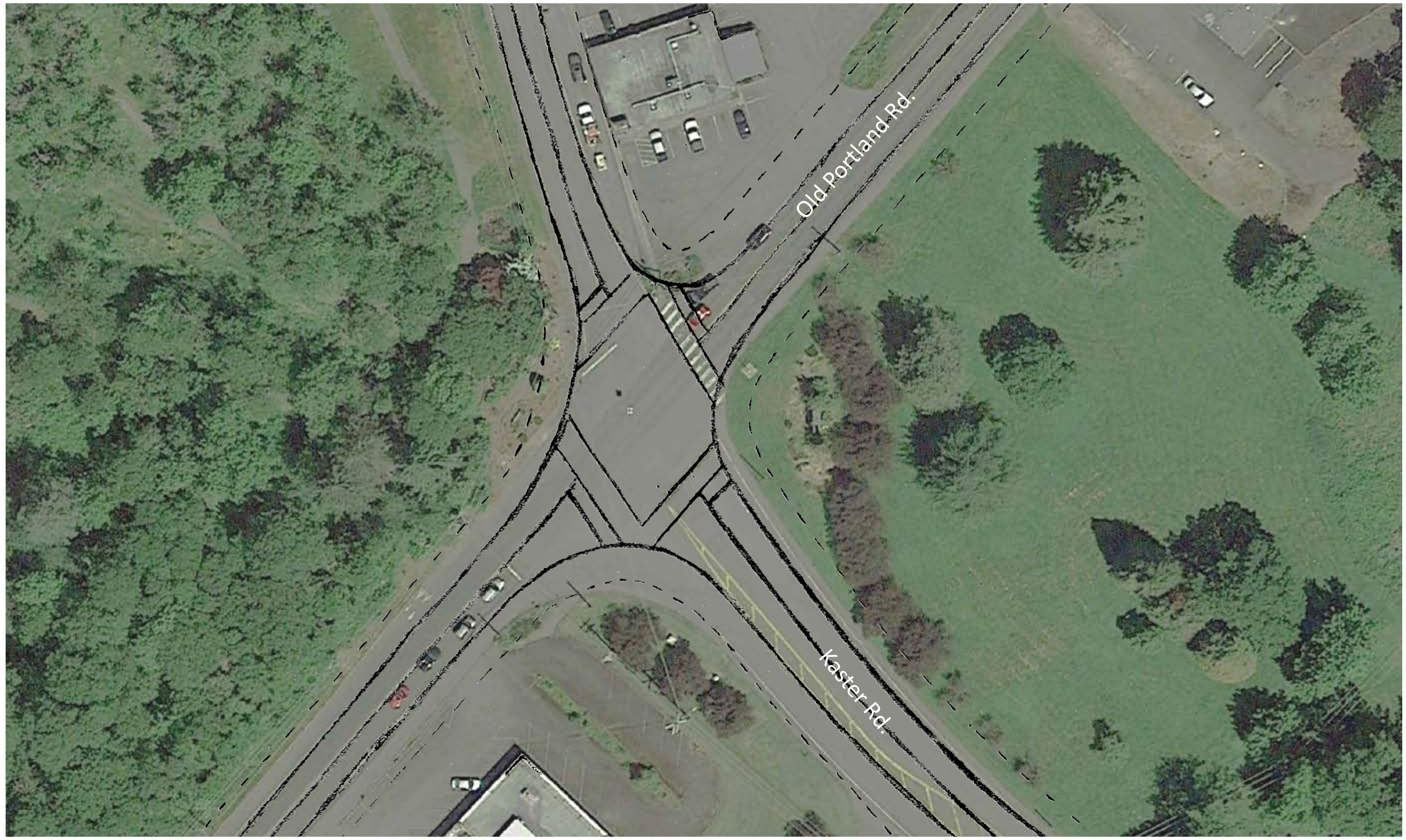
The intersection of Old Portland Road and Kaster Road is currently signalized; however, the signal is not consistent with current standards. Therefore, modifications to the intersection would require a full upgrade of the traffic signal as well as reconstruction of the intersection to meet ADA requirements.

Existing conditions (image: Google Earth)

INTERSECTION: OLD PORTLAND ROAD & KASTER ROAD

Option A
Upgrade Traffic Signal

- Upgrades the traffic signal to current standards
- Reduces the footprint of the intersection
- Provides signalized pedestrian crosswalks
- Meets traffic signal warrants

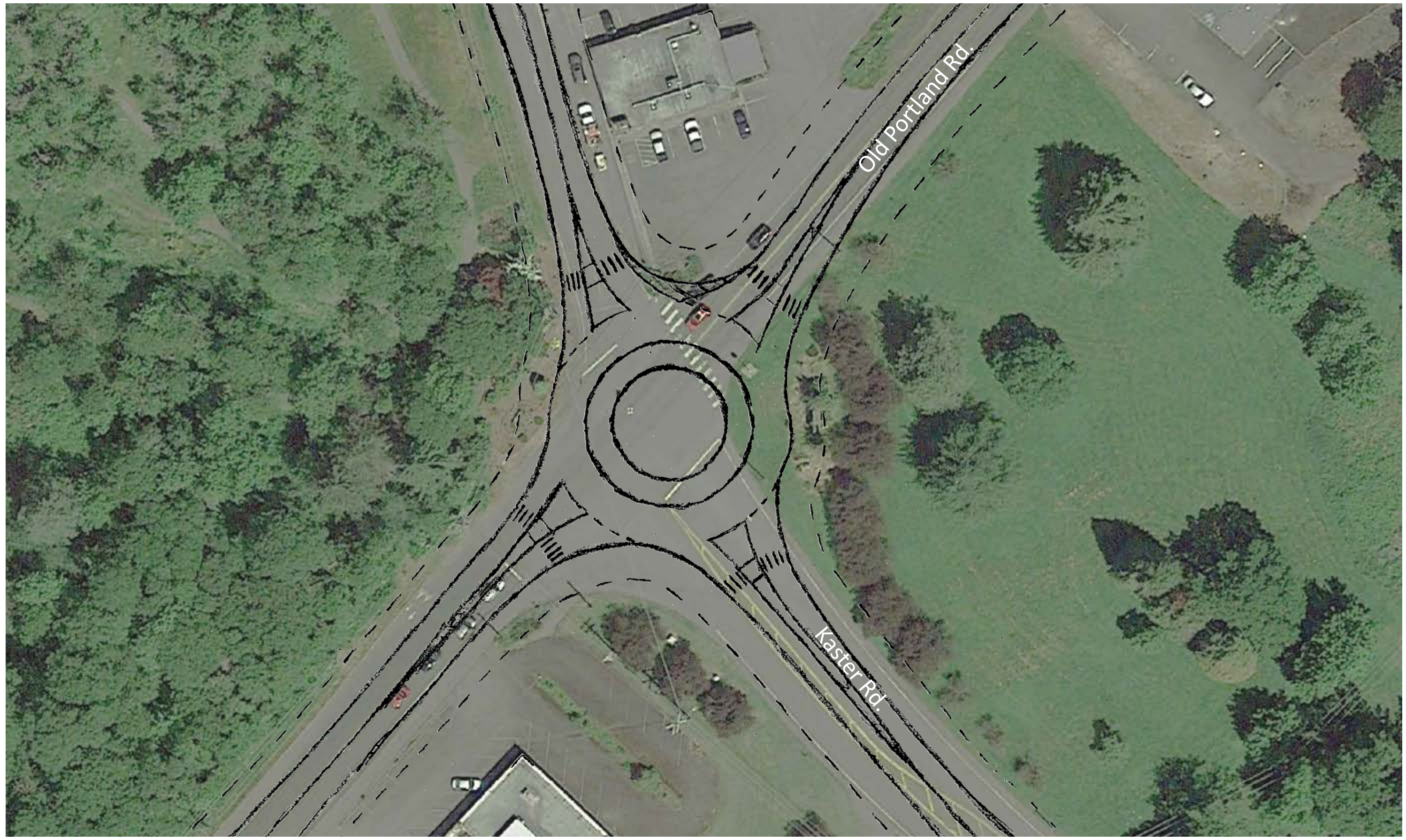


INTERSECTION: OLD PORTLAND ROAD & KASTER ROAD

Option B

Four-Leg Roundabout

- Provides a four-legged roundabout in place of the traffic signal
- The center island of the roundabout could be used for an art feature
- Roundabout provides designated pedestrian crossings
- Roundabout reduces travel speeds relative to a signalized intersection



INTERSECTION: OLD PORTLAND ROAD & KASTER ROAD

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Intersection Evaluation

The intersection of Old Portland Road and Railroad Avenue is located adjacent to an existing spur line railroad track that serves the industrial properties to the south. The intersection is also closely spaced with other intersections along the corridor and has a history of safety and operational issues. The following design options were developed for further consideration.

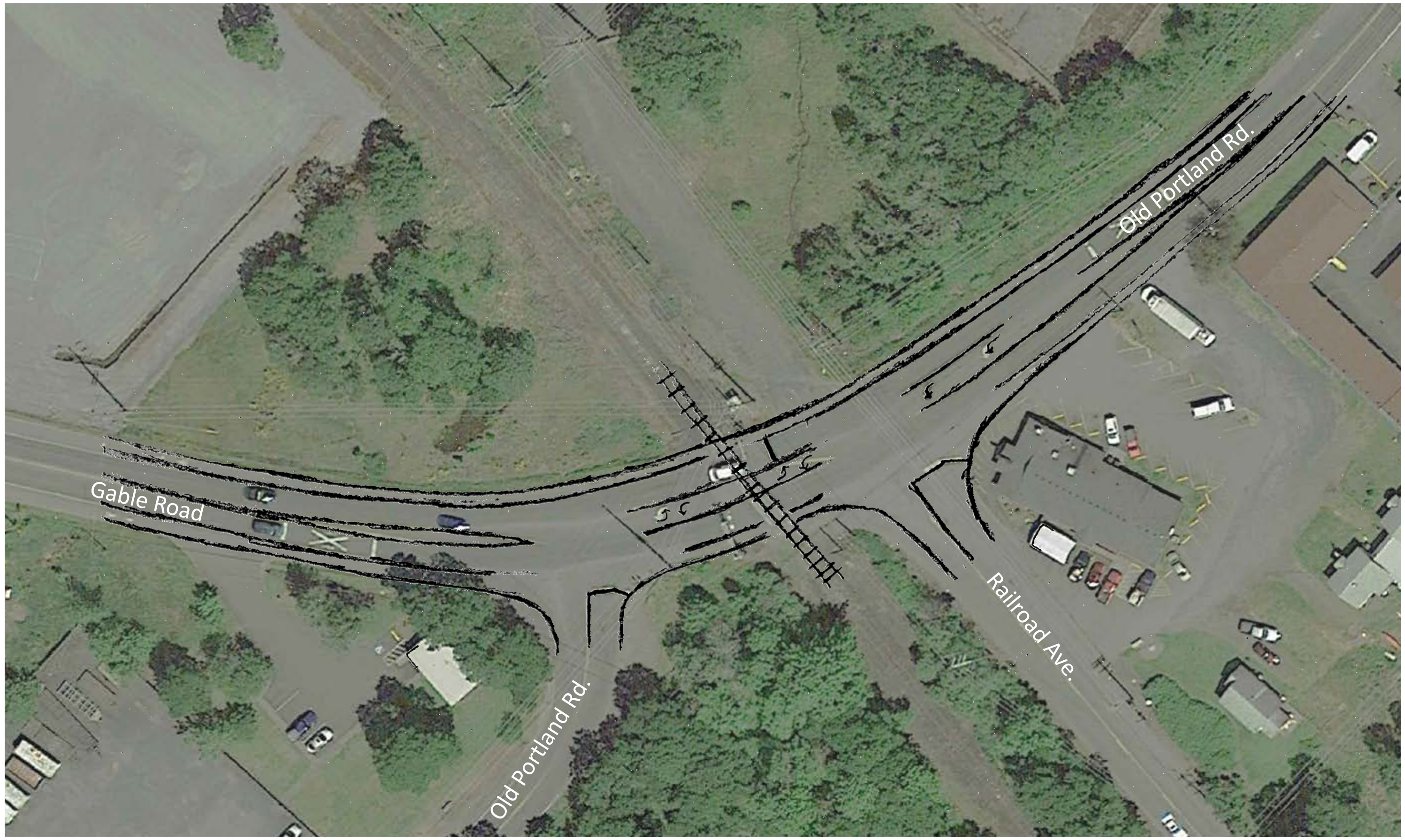
Existing conditions (image: Google Earth)

INTERSECTION: OLD PORTLAND ROAD & PORT AVENUE

Option A

Two-Way Left Turn Lane

- Provides a continuous two-way left-turn lane along Old Portland Road through the Old Portland Road/ Railroad Avenue intersection.
- The two-way left-turn lane facilitates the ability for northbound motorists to complete two-stage left-turns from Railroad Avenue to Old Portland Road.
- May not require widening along Old Portland Road due to current roadway width.
- May require reconstruction of adjacent rail crossing to current standards
- ODOT Rail unlikely to permit this option without relocation of Old Portland Road given the potential to trap a vehicle in the left-turn lane

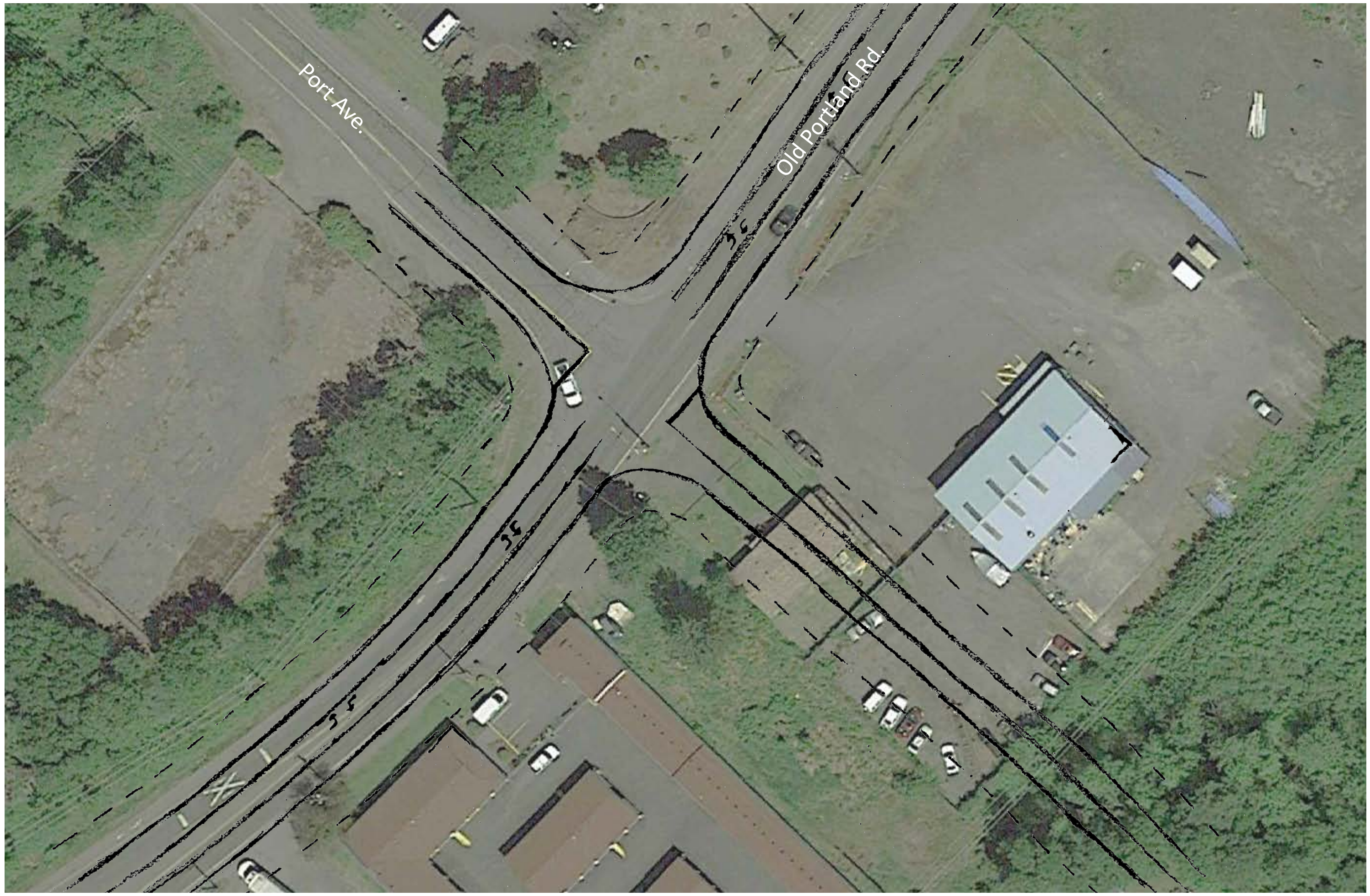


INTERSECTION: OLD PORTLAND ROAD & PORT AVENUE

Option B

Re-Align & Two-Way Left-Turn Lane

- Re-aligns Railroad Avenue across from Port Avenue.
- Consolidates the Railroad Avenue and Port Avenue intersections into one intersection and relieves current issues with closely-spaced intersections along Old Portland Road.
- Provides a continuous two-way left-turn lane along Old Portland Road through the Old Portland Road/Railroad Avenue-Port Avenue intersection.
- The two-way left-turn lane provides the ability for northbound and southbound motorists to complete two-stage left-turns from Railroad Avenue and Port Avenue to Old Portland Road.
- Will require widening along Old Portland Road due to current roadway width.

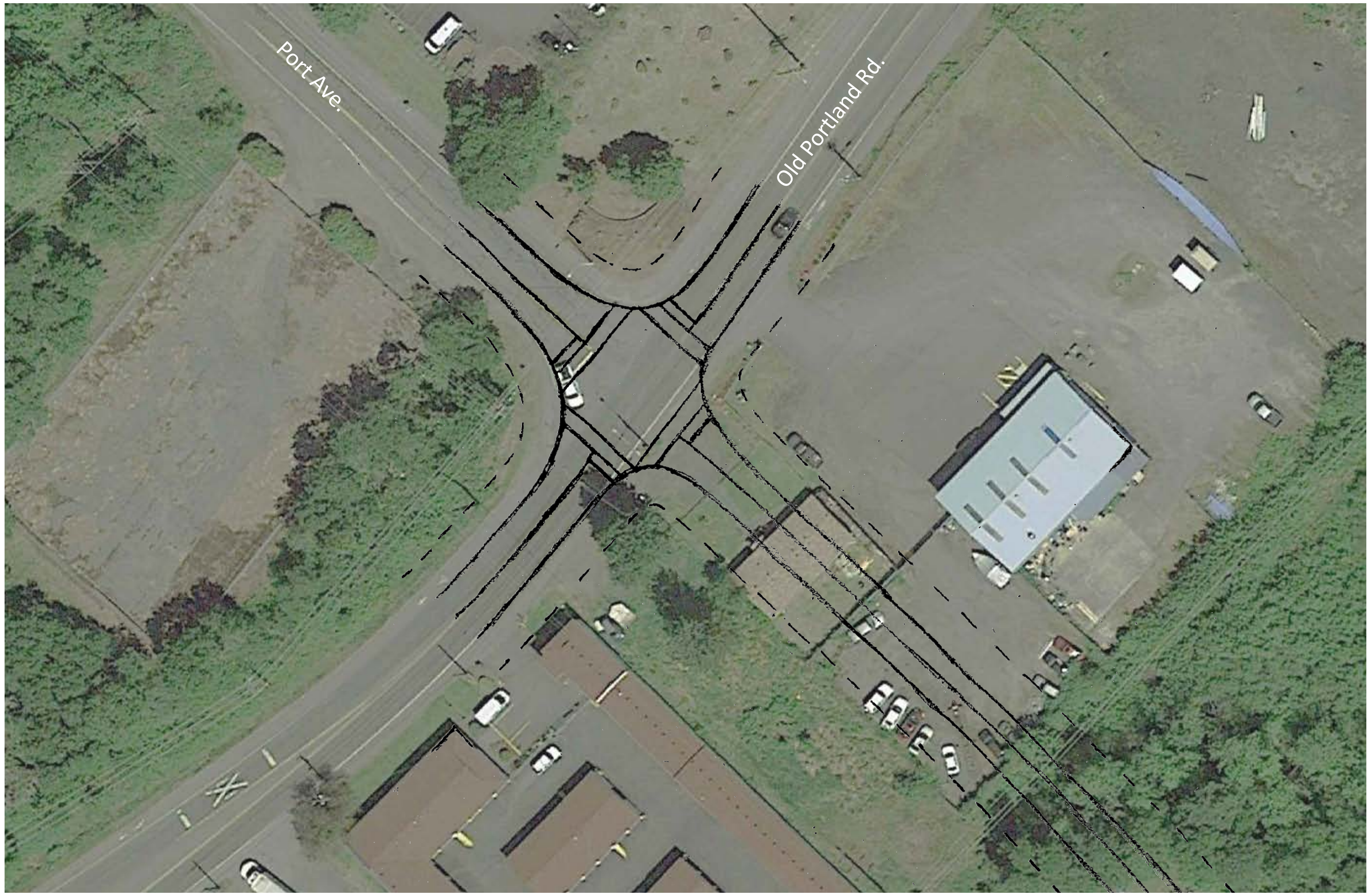


INTERSECTION: OLD PORTLAND ROAD & PORT AVENUE

Option C

Re-Align & Traffic Signal

- Re-aligns Railroad Avenue across from Port Avenue.
- Consolidates the Railroad Avenue and Port Avenue intersections into one intersection and relieves current issues with closely-spaced intersections along Old Portland Road.
- Provides a traffic signal at the new Old Portland Road/Railroad Avenue-Port Avenue intersection.
- Does not require widening along old Portland Road.
- Traffic volumes meet signal warrants under horizon year projections.



INTERSECTION: OLD PORTLAND ROAD & PORT AVENUE

Intersection Evaluation

Several options for improving this intersection were identified and narrowed to the following two options for evaluation.

Both options performed well in the evaluation. Based on further review and discussion with the project management team, Option B is the preferred long-term alternative.

The City should monitor changes in traffic and travel performance after improvements to the US 30/Millard Road intersection are implemented and/or other measures are successful in encourage more drivers to use Old Portland Road to access the Riverfront area.

At the point that increased potential traffic on Old Portland Road warrants investment in additional improvements to this intersection, Option A may be evaluated further.

Existing conditions (image: Google Earth)

INTERSECTION: OLD PORTLAND ROAD & GABLE ROAD

Option A

Re-Align Gable Road with Signal

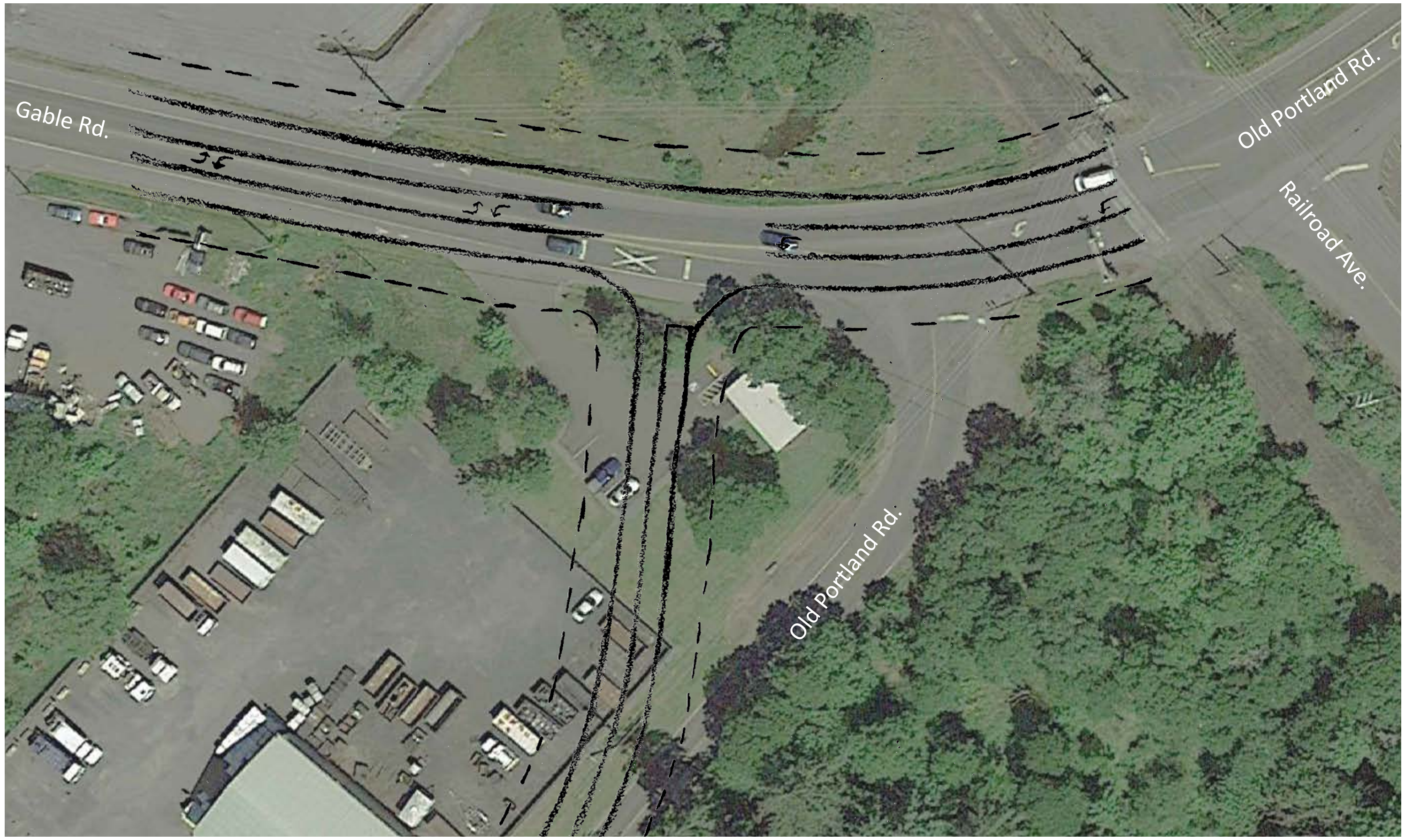
- Realigns Gable Road to create a 'T' intersection with Old Portland Road.
- Emphasizes Old Portland Road as the through-route.
- The intersection is moved to the southwest to increase the separation from the rail crossing and to reduce the potential for westbound right-turn queues that extend beyond spur line track.
- The intersection is signalized with turn pockets.
- May require traffic signal interconnect to railroad crossing which may trigger the need for rail crossing improvements.

INTERSECTION: OLD PORTLAND ROAD & GABLE ROAD

Option B

Re-Align Old Portland Road

- Realigns Old Portland Road to create a 'T' with Gable Road further to the west.
- Emphasizes Gable Road as the through-route.
- The intersection is moved to The intersection is moved to the northwest to increase the separation from the rail crossing and to reduce potential for westbound left-turn queues that extend beyond the spur line track.
- The intersection is unsignalized; however, Gable Road is widened to provide a two-way left-turn lane through the intersection.
- The two-way left-turn lane will allow northbound motorists along Old Portland Road to complete two-stage left-turns onto Gable Road.



INTERSECTION: OLD PORTLAND ROAD & GABLE ROAD

Evaluation Summary Table

Rating System:

Poor		Moderate		Good
○	◔	◑	◕	●

Road Section Options	*Economy and Business Support*				*Transportation Safety and Mobility*					*Connectivity & Streetscape Aesthetics*			
	Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Option A	●	●	◕	◕	◑	◕	◕	◑	◑	◑	◑	◕	◑
Option B	◑	◕	◕	◕	◑	◑	◕	◕	◑	◑	●	●	●
Option C	◑	◕	◕	◑	◑	●	◕	●	◑	◑	●	●	◑

SEGMENT 4.1: OLD PORTLAND ROAD

Evaluation Summary Table

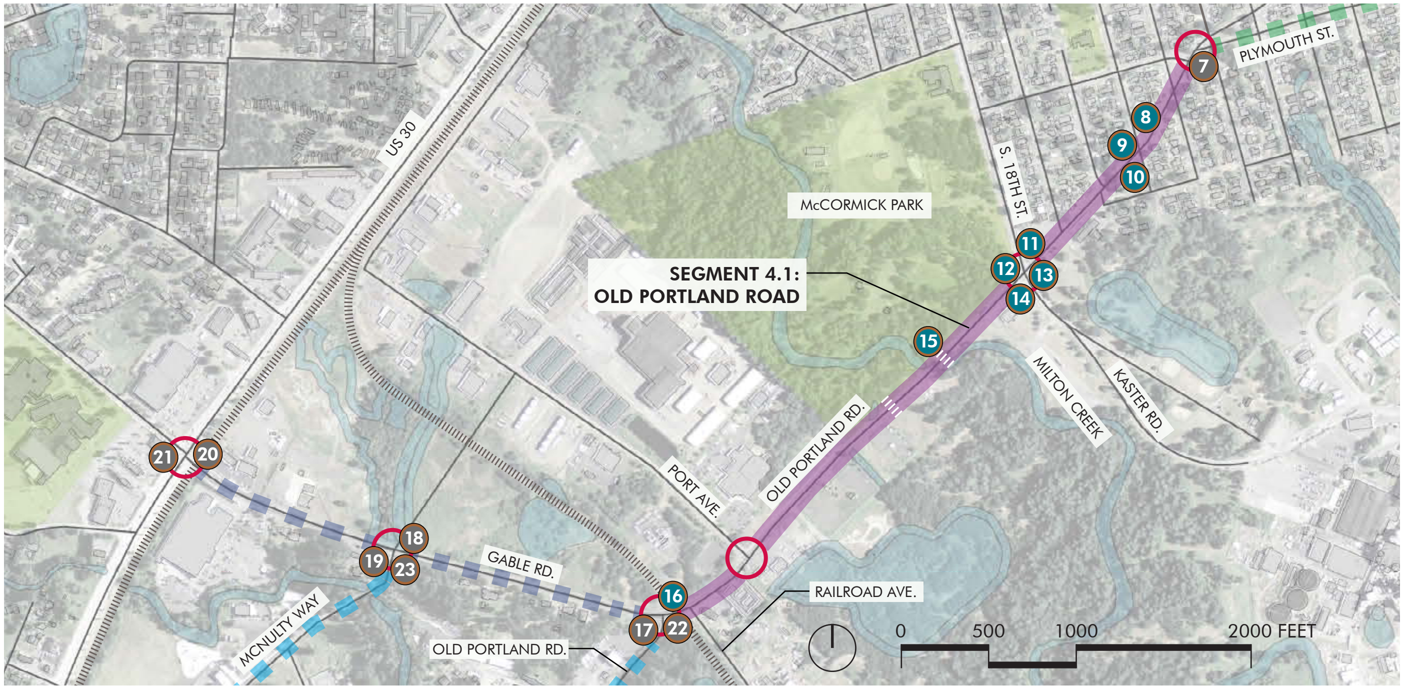
Rating System:

Poor ○ ◔ Moderate ◑ ◕ Good ●

		Economy and Business Support				Transportation Safety and Mobility					Connectivity & Streetscape Aesthetics			
		Consistency with Previous Planning	Supports businesses and business districts	Supports customers, employees, and others by providing access	Relative Cost effectiveness	Improved connectivity & access	Improved pedestrian/bicycle safety and accessibility	Through-movement and mobility	Safety	Emergency Vehicle accommodations	Improved street appearance	Improved ped/bike connectivity	Street designs catered to needs of particular segments	Sustainable Design Strategies
Old Portland Road/ Kaster Road	Option A	●	◕	◕	◕	●	◕	●	◕	●	◑	◑	●	○
	Option B	◕	◕	◑	◕	●	●	●	●	●	◕	◑	●	◕
Old Portland Road/Port Avenue	Option A	●	◕	●	●	○	○	◔	○	◑	◑	◑	●	○
	Option B	◕	◕	●	◕	○	●	●	●	●	◑	◑	●	◔
	Option C	◕	◕	●	◑	○	◕	●	●	●	◑	◑	●	○
Old Portland Road/ Gable Road	Option A	◕	◕	◕	◑	●	◕	●	●	●	◑	◑	●	○
	Option B	●	◕	◕	◕	◔	●	●	●	●	◑	◑	●	◔

SEGMENT 4.1: OLD PORTLAND ROAD

Wayfinding Recommendations



Wayfinding locations for Segment 4.1

Wayfinding Recommendations: Segment 4.1 (See Appendix 2 for full table including destinations)

ID #	Mode Type	Sign Type	Installation Street	Intersecting Street	Sign Facing
8	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 15th Street	North
9	Bicycle/Pedestrian	On-Street Directional	South 15th Street	Old Portland Road	North
10	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 15th Street	West
11	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 18th Street/Kaster Road	East
12	Bicycle/Pedestrian	On-Street Directional	South 18th Street	Old Portland Road	North
13	Bicycle/Pedestrian	On-Street Directional	Kaster Road	Old Portland Road	South
14	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 18th Street/Kaster Road	West
15	Bicycle/Pedestrian	Trailhead Kiosk	Old Portland Road	N/A	South
16	Bicycle	On-Street Confirmation	Old Portland Road	Gable Road	East

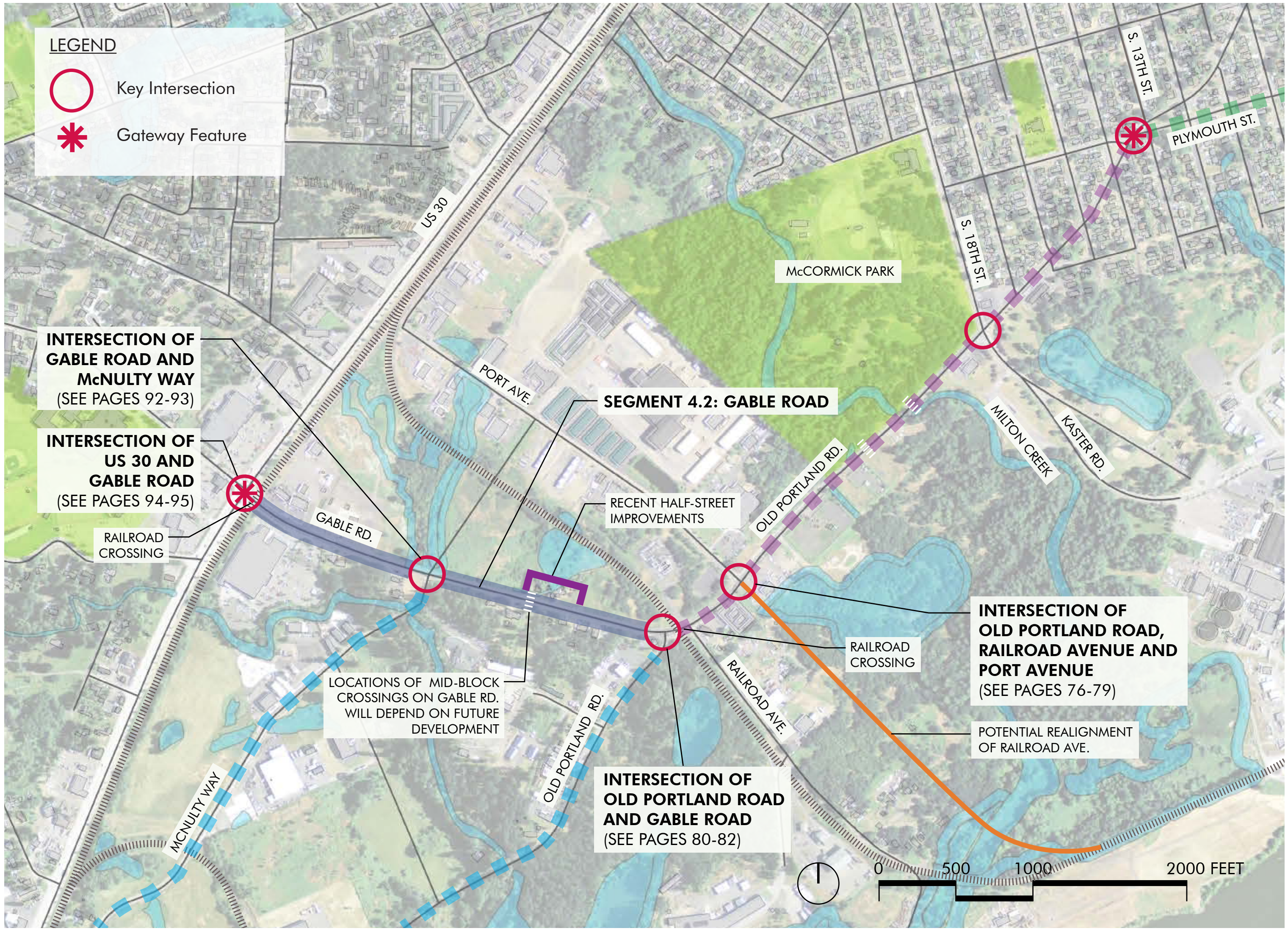
SEGMENT 4.1: OLD PORTLAND ROAD

SEGMENT 4.2 EVALUATION

This segment provides connections from Highway 30 to Old Portland Road. It is a major access point for commercial land uses near the highway and entryway to the City of St. Helens.

Similar to Segment 4.1, the lack of adequate pedestrian facilities (except near US 30), bicycle lanes without buffers or other separation from vehicle traffic, and higher travel speeds on the eastern portion of this segment all necessitate improved pedestrian and bicycle facilities.

SEGMENT 4.2: GABLE ROAD



Segment 4.2 project area

Existing Road Section

TSP classification: Minor Arterial

80’ wide ROW

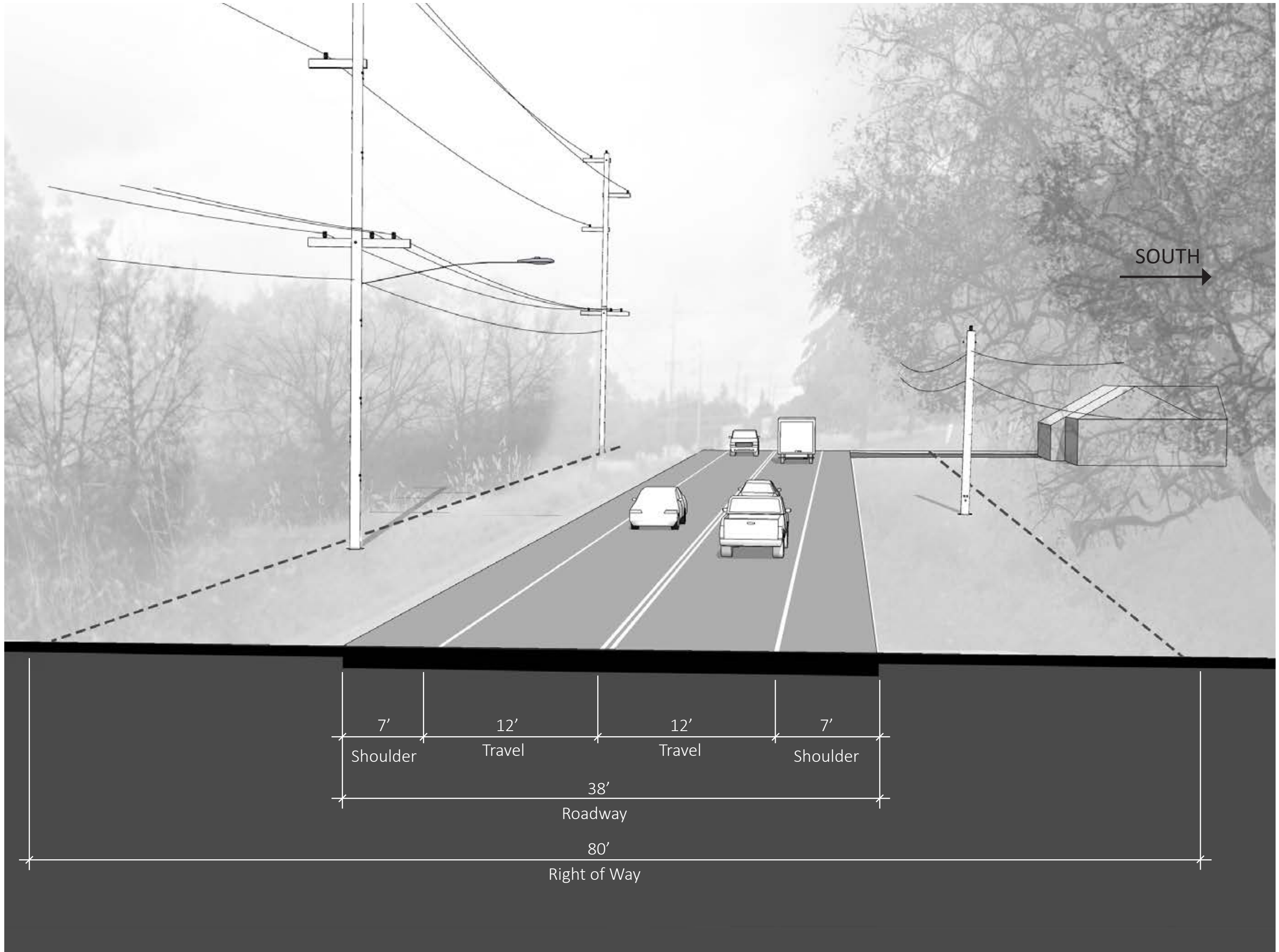
Approximately 2,900 linear feet

Bike lanes on both sides

Sidewalks only near US 30

Similar to Old Portland Road, the current roadway has two travel lanes and bicycle lanes on both sides, along with drainage ditches on either side of the roadway, and has a 40 mph speed limit, except in the vicinity of US 30 where the speed limit is 30 mph.

Much of this segment is characterized by industrial land uses, along with an area of concentrated retail near the intersection with US 30 and smaller collection of commercial and other uses near the intersection of Gable and Old Portland Roads.



Typical section facing east

SEGMENT 4.2: GABLE ROAD

Road Section: Option A

Standard Minor Arterial with Median

This section is similar to Option A in Segment 4.1, with the addition of a 14' wide planted median.

Because of the on-street bike lanes, this design targets a speed limit of 35 mph or less. Currently Gable Road is signed at 40 mph.

The planted median provides a location for turn pockets, a 2-way left turn lane, and for a pedestrian refuge at mid-block crossings, as needed.

Implementation of the median and turn pockets would require anticipation of the location of future development along the road. In addition, local emergency service providers may have issues related to their ability to pass motorists if needed in the event of an emergency.

Typical section facing east

SEGMENT 4.2: GABLE ROAD

Road Section: Option B
Multi-Use Path with Median

This section is similar to Option B in Segment 4.1, with the addition of a 14' wide planted median.

Option B replaces the bicycle lanes and one sidewalk with a 12' wide multi-use path for both bicyclists and pedestrians. Transitions from the multi-use path to bike lanes and sidewalks on adjacent road segments will need to be considered.

The planted median provides a location for turn pockets, a 2-way left turn lane, and for a pedestrian refuge at mid-block crossings, as needed.

Implementation of the median and turn pockets would require anticipation of the location of future development along the road. In addition, local emergency service providers may have issues related to their ability to pass motorists if needed in the event of an emergency.

Typical section facing east

Road Section: Option C

Two-Way Cycletrack with Median

This section is similar to Option C in Segment 4.1, with the addition of a 14' wide planted median.

Option C replaces the bicycle lanes with a 12' wide raised two-way cycletrack. Transitions from the cycletrack to bike facilities on adjacent road segments and cycletrack crossings at intersections need to be considered. This general concept could also be achieved with two one-way cycletracks or two buffered bicycle lanes.

The planted median provides a location for turn pockets, a 2-way left turn lane, and for a pedestrian refuge at mid-block crossings, as needed.

Implementation of the median and turn pockets would require anticipation of the location of future development along the road. In addition, local emergency service providers may have issues related to their ability to pass motorists if needed in the event of an emergency.

Typical section facing east

SEGMENT 4.2: GABLE ROAD

Intersection Evaluation

The intersection of McNulty Way and Gable Road currently provides single-lane approaches with shared turn movements for all legs of the intersection. McNulty Way is stop-controlled. Few gaps are available for left-turning vehicles on both McNulty Way and Gable Road.

The St. Helens TSP shows a future extension of McNulty Way to Port Avenue, creating a 4-legged intersection in the future. A traffic signal is not expected to be warranted within the planning horizon.

Existing conditions (image: Google Earth)

INTERSECTION: GABLE ROAD & MCNULTY WAY

Potential Intersection

The addition of a westbound left-turn lane provides separation of stopped left-turning vehicles waiting for a gap and westbound through vehicles. The two-way left-turn lane to the west will allow northbound motorists along McNulty Way to complete two-stage left-turns onto Gable Road.

Though the proposed intersection provides acceptable operations for the horizon year, separate left- and right-turn lanes could be provided on McNulty Way beyond the horizon year and/or when a connection to Port Avenue is made.

INTERSECTION: GABLE ROAD & MCNULTY WAY

Intersection Evaluation

The intersection of US 30 and Gable Road currently serves as an entrance to the east and west areas of the City. It is located along a statewide highway, adjacent to several major retail/commercial centers, and within close proximity to St Helens High School. It is also located adjacent to a heavy rail line, which makes modification of the intersection challenging and very expensive.

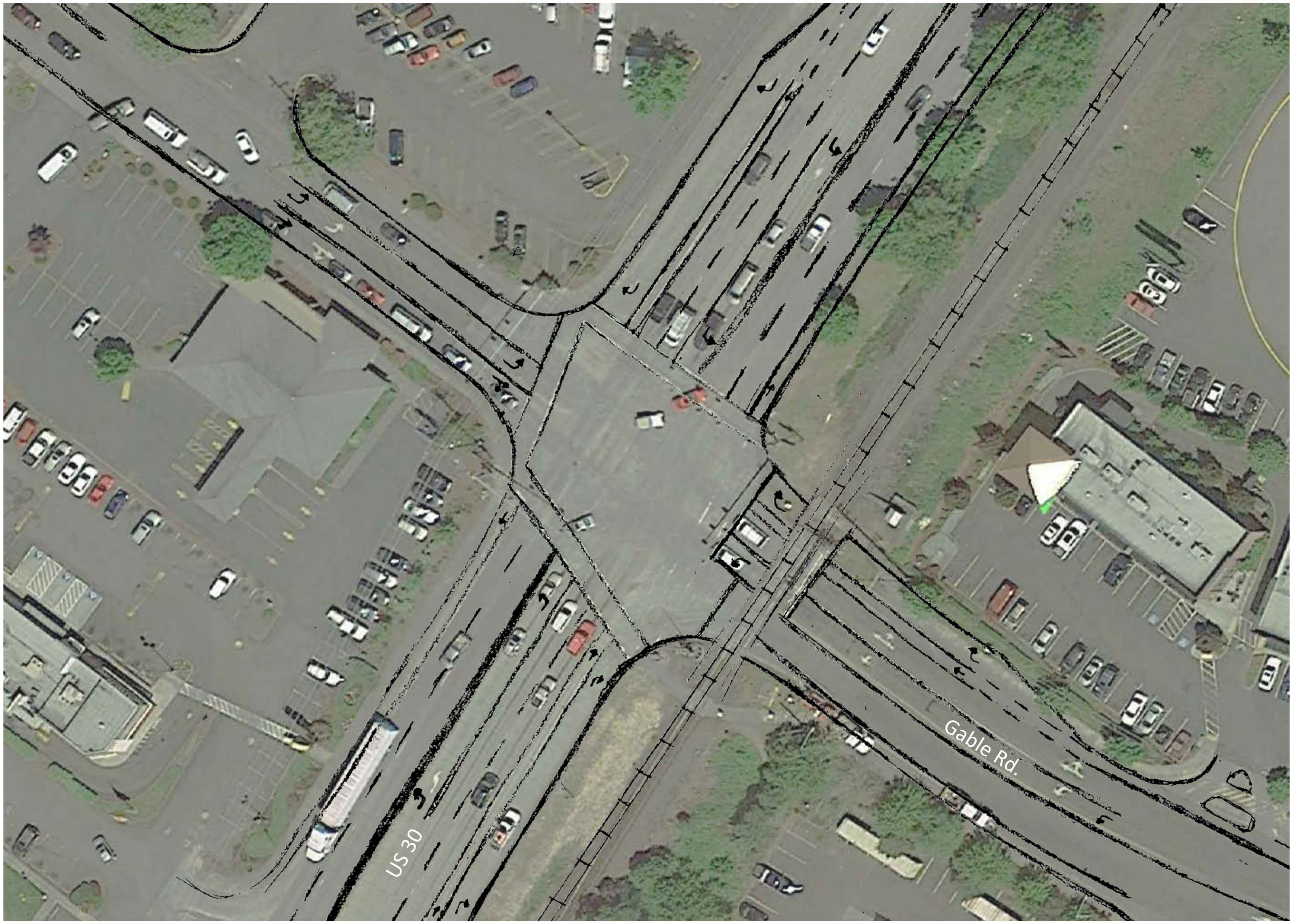
The safety and operational issues at the intersection are well documented; however, there are few options to improve overall conditions and to bring the intersection to standard. Consistent with the City's Transportation System Plan, the proposed intersection design includes the addition of a separate right-turn lane at the westbound approach.

Existing conditions (image: Google Earth)

INTERSECTION: GABLE ROAD & US 30

Potential Intersection

The proposed intersection design is expected to improve conditions but is not expected to fully address the operational issues. Therefore, an alternative mobility standard that evaluates the intersection over the course of an hour (or two hours as opposed to the peak 15-minutes) is also being considered. The standard could remain at v/c = 0.85 or could increase to v/c = 1.0 to allow for higher levels of congestion.



INTERSECTION: GABLE ROAD & US 30

Evaluation Summary Table

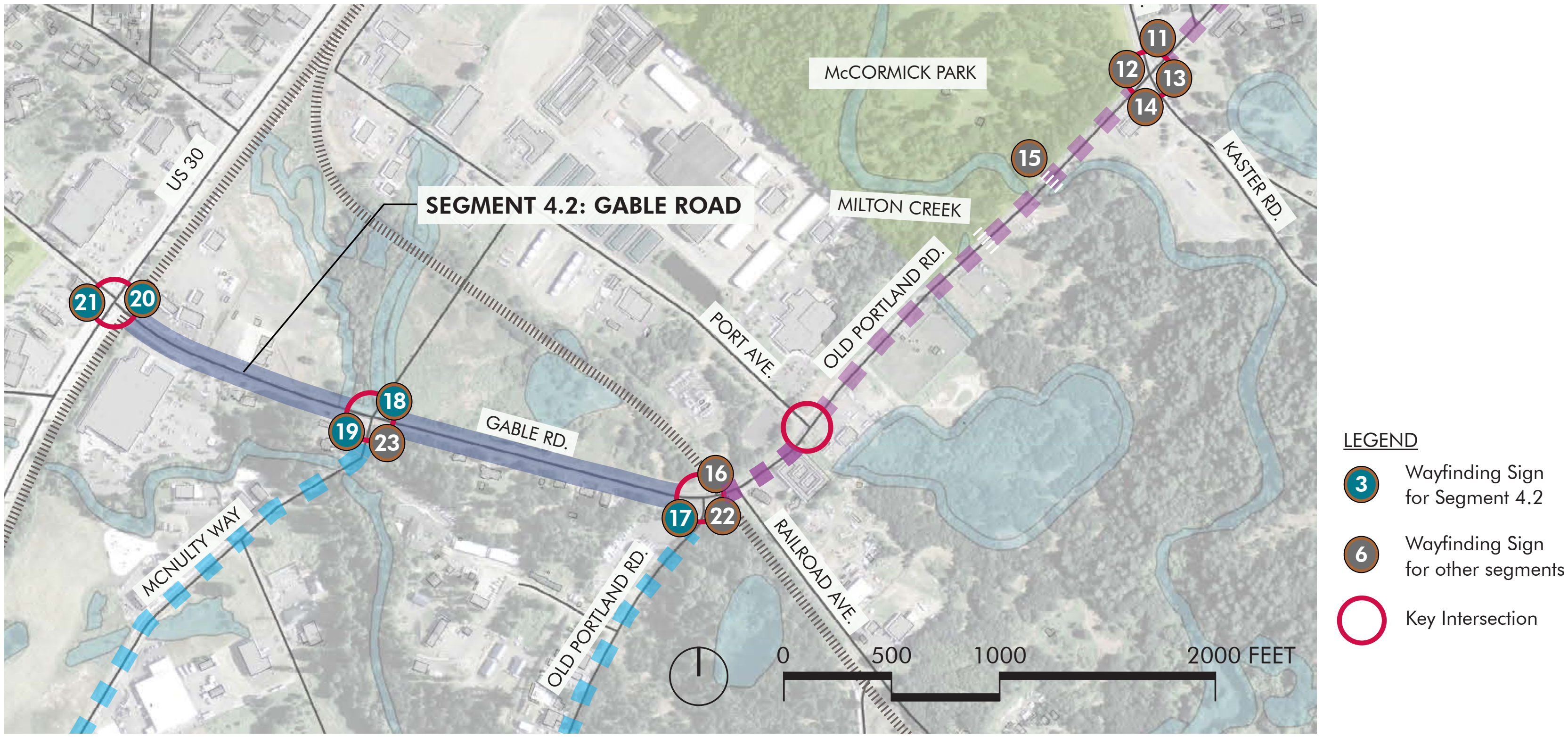
Rating System:

Poor ○ ◔ Moderate ◑ ◕ Good ●

		Economy and Business Support				Transportation Safety and Mobility					Connectivity & Streetscape Aesthetics			
		Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Road Section Options	Option A	●	●	◕	◕	●	◕	●	◑	◑	◕	◑	◕	◑
	Option B	◑	◕	◕	◕	●	◑	●	◕	◑	◕	●	●	●
	Option C	◑	◕	◕	◑	●	●	●	●	◑	◕	●	●	◑
Gable Road/ McNulty Way	Proposed Intersection	●	●	●	●	●	●	●	●	●	◑	◑	●	○
Gable Road/ US 30	Proposed Intersection	●	◕	◑	◑	◕	◕	◕	●	●	●	◑	●	○

SEGMENT 4.2: GABLE ROAD

Wayfinding Recommendations



Wayfinding locations for Segment 4.2

Wayfinding Recommendations: Segment 4.2			(See Appendix 2 for full table including destinations)		
ID #	**Mode Type**	**Sign Type**	**Installation Street**	**Intersecting Street**	**Sign Facing**
17	Bicycle	On-Street Confirmation	Gable Road	Old Portland Road	West
18	Bicycle/Pedestrian	On-Street Directional	Gable Road	McNulty Way/Milton Way	East
19	Bicycle/Pedestrian	On-Street Directional	Gable Road	McNulty Way/Milton Way	West
20	Bicycle/Pedestrian	On-Street Directional	Gable Road	Highway 30	East
21	Bicycle/Pedestrian	On-Street Directional	Gable Road	Highway 30	West

SEGMENT 4.2: GABLE ROAD

SEGMENT 5 EVALUATION

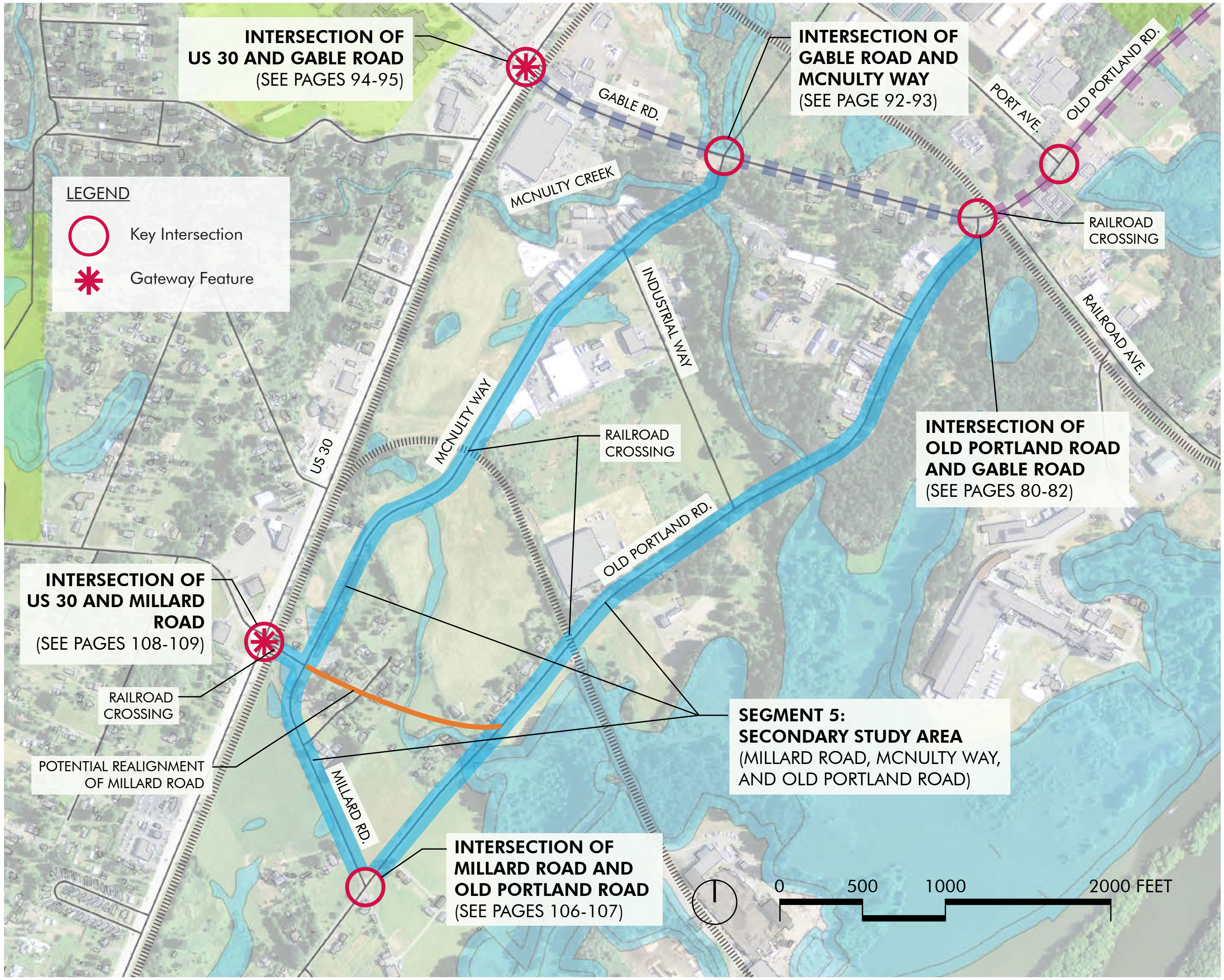
Segment 5 is a secondary area of this analysis; alternatives for this portion of the study area have not been evaluated. It is a possible secondary route to the Riverfront District from US 30, either along McNulty Way or Millard/Old Portland Road. Use of this route would relieve congestion at the US 30/ Gable Road intersection.

The three sections of road in this corridor segment each consist of two travel lanes. There are two railroad crossings: one on McNulty Way, and the other on Old Portland Road. McNulty Way has dedicated bike lanes, which are accessible along a majority of the street. It is also the most developed street and portions of it include curb-tight sidewalks or concrete curbs.

Stormwater runoff on McNulty Way is captured by catch basins located along both sides of the street where there are curbs and then conveyed into a storm drainage system. On the rest of McNulty Way, and all of Millard Road and Old Portland Road, stormwater is captured in ditches, some of which is conveyed to stormwater ponds.

On the northern end of McNulty Way and Old Portland Road adjacent development is a mix of single-story commercial and light industrial buildings. At the southern end of McNulty Way and Old Portland Road, and along Millard Road, residential homes of various sizes and characteristics populate the area.

SEGMENT 5: SECONDARY STUDY AREA



Segment 5 project area

Existing Road Conditions

TSP classification: Minor Arterial

Approximately. 60' wide ROW, minimum 52'

Approximately 5,600 Linear Feet

No bike lanes

No sidewalks

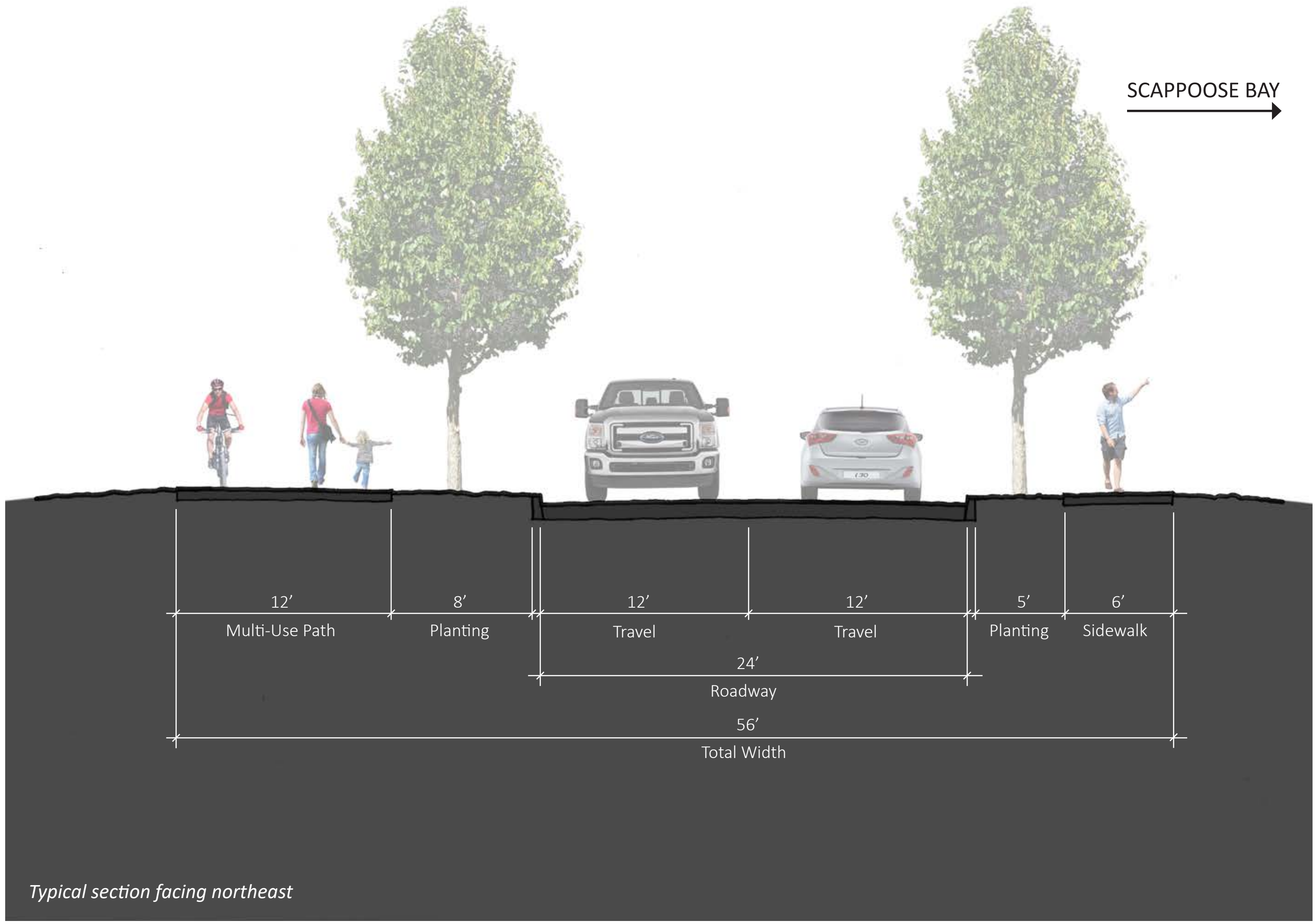
(Image: Google Streetview)

SEGMENT 5: OLD PORTLAND ROAD

Potential Road Section

The TSP identifies a shared-use path on the south side of Old Portland Road, (classified as a Minor Arterial) through this area. However, for this study, the shared use path is proposed to be realigned to the north side, depending on which cross-section is recommended for Segment 4.1.

This proposed section is the same as Option B for Old Portland Road in Segment 4.1.



Typical section facing northeast

SEGMENT 5: OLD PORTLAND ROAD

Existing Road Conditions

TSP classification: Collector Street

60’ to 90’ wide ROW

Approximately 4,100 Linear Feet

Bike lanes are incomplete

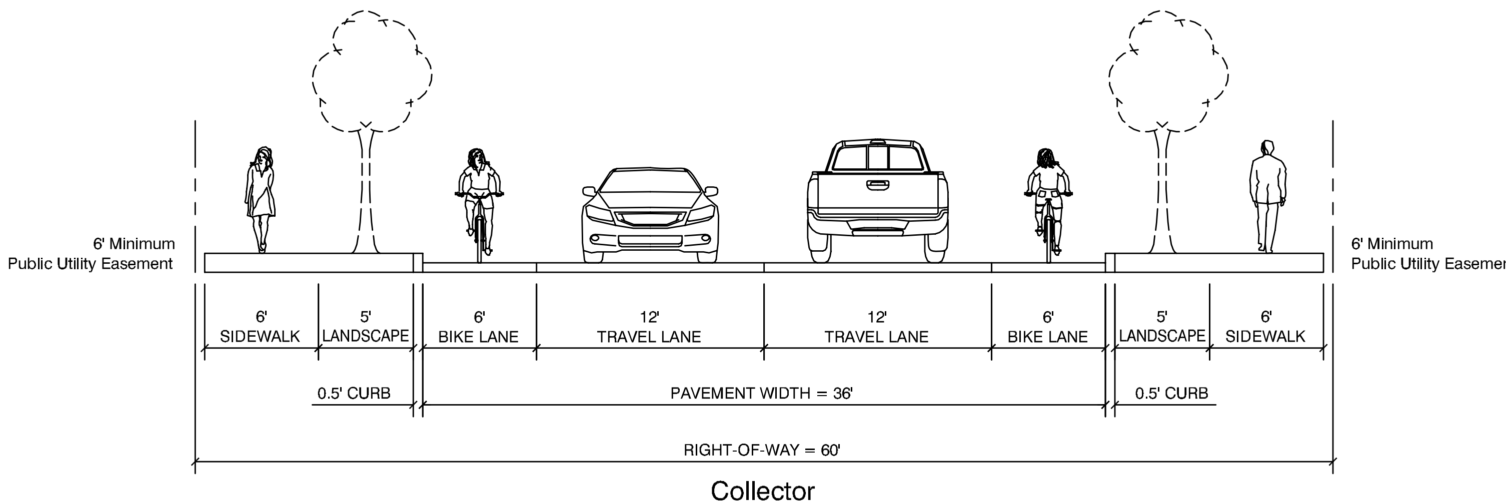
Sidewalks are incomplete

(Image: Google Streetview)

SEGMENT 5: MCNULTY WAY

Potential Road Section

McNulty Way is classified as a Collector street and the standard TSP cross-section is recommended.



Typical section

SEGMENT 5: MCNULTY WAY

Existing Road Conditions

TSP classification: Minor Arterial

40' wide ROW, wider at US. 30

Approximately 1,700 Linear feet

No bike lanes

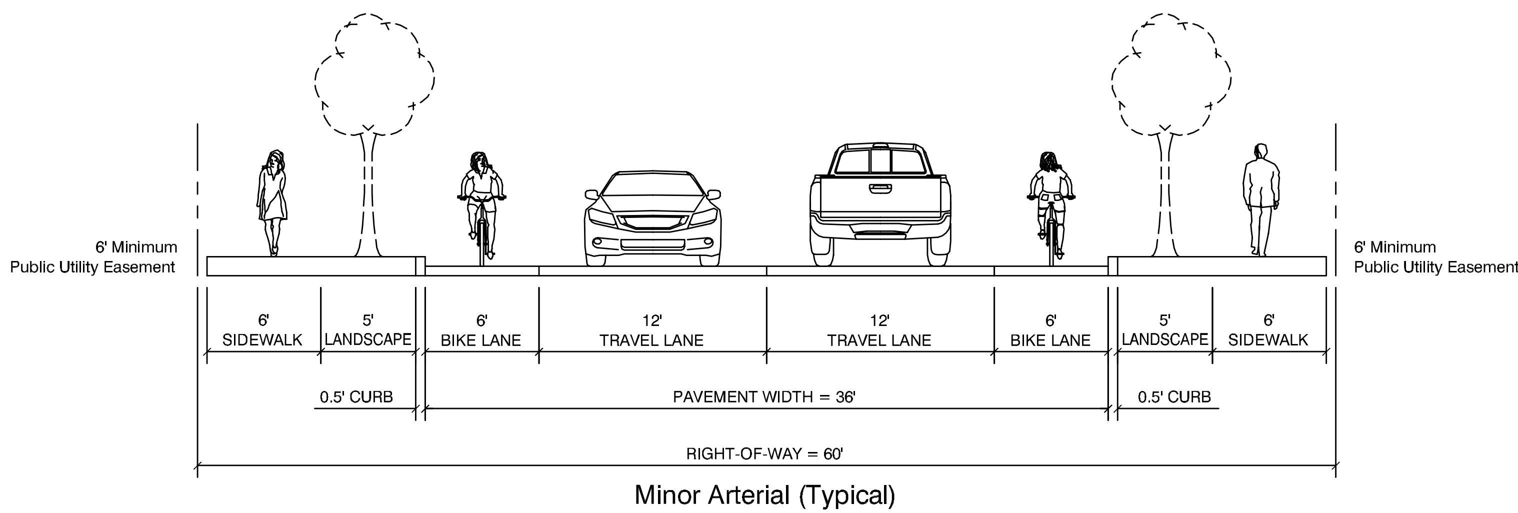
No sidewalks

(Image: Google Streetview)

SEGMENT 5: MILLARD ROAD

Potential Road Section

Millard Road is classified as a Minor Arterial and the standard TSP cross-section is recommended.



Typical section

SEGMENT 5: MILLARD ROAD

Intersection Evaluation

The intersection of Old Portland Road and Millard Road currently provides single-lane approaches with share turn movements for all legs of the intersection. Millard Road is stop-controlled. The existing intersection's skewed angle makes truck turns difficult for the westbound right-turn movement.

Existing conditions (image: Google Earth)

INTERSECTION: MILLARD ROAD & OLD PORTLAND ROAD

Potential Intersection

The intersection of Old Portland Road and Millard Road is being considered for a re-alignment to improve sight conditions and safety. A broader re-alignment of the roadway which brings Millard to the east was identified in the TSP and is also under consideration.

Additional pavement in the northwest corner of the intersection will help accommodate large truck turning movements from Old Portland Road to Millard Road.

Wayfinding signage at both Old Portland Road and McNulty Way (from Millard and US 30) would direct people towards Gable Road, the Riverfront and the Downtown area to the north.

INTERSECTION: MILLARD ROAD & OLD PORTLAND ROAD

Intersection Evaluation

The intersection of US 30 and Millard Road is currently side-street stop-controlled. Two through lanes, left-, and right-turn lanes are provided along US 30 and shared left-and-through lanes and right-turn lanes are provided on Millard Road. A railroad crossing is present on the east leg.

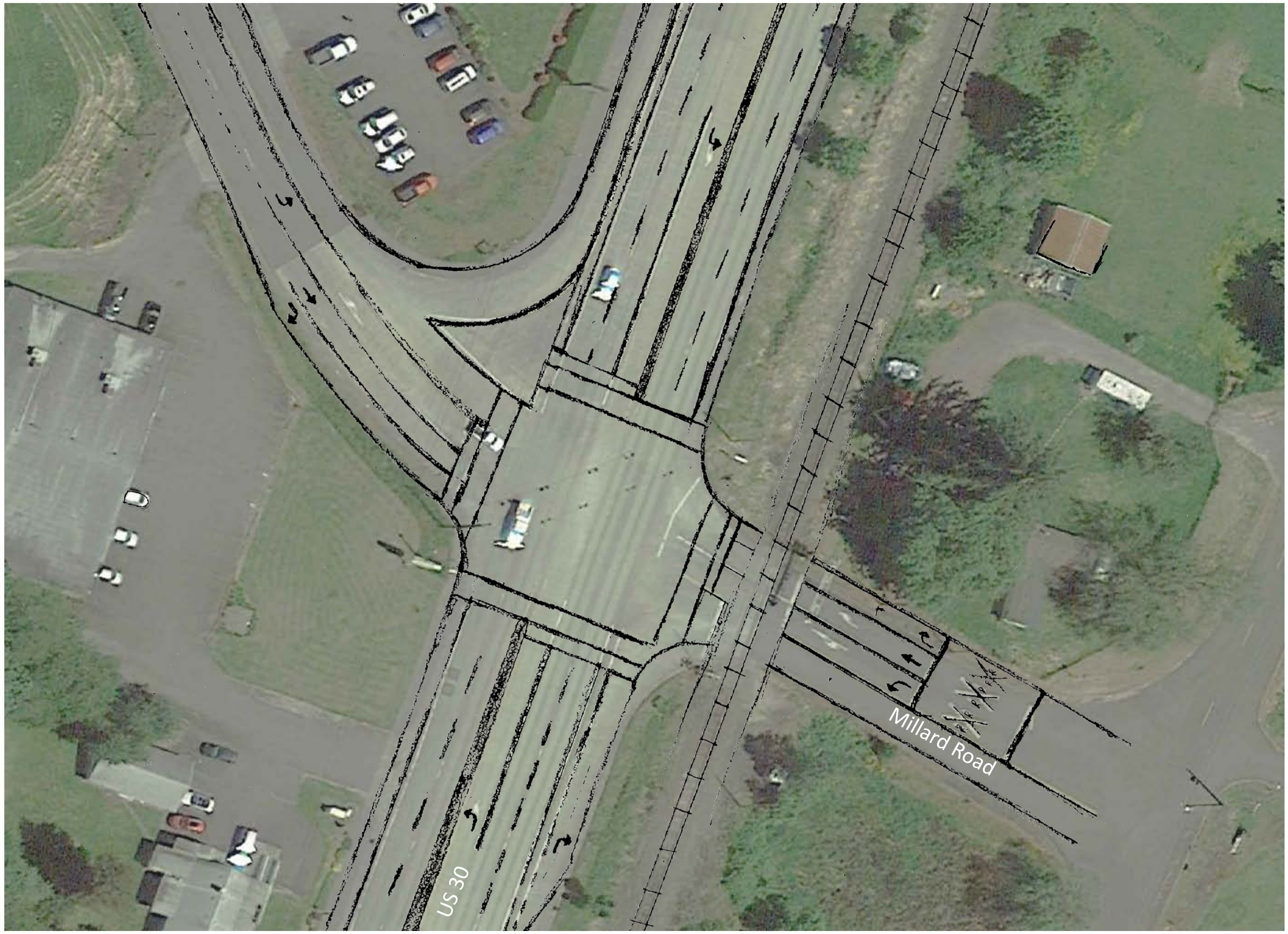
Existing conditions (image: Google Maps)

INTERSECTION: MILLARD ROAD & US 30

Potential Intersection

The Oregon Department of Transportation (ODOT) is currently planning to install a traffic signal at the intersection of US 30 and Millard Road. The traffic signal will improve existing traffic operations and safety at the intersection as well as at the intersection of US 30 and Gable Road.

Some traffic from the intersection of US 30 and Gable Road is expected to re-distribute to Millard Road via Old Portland Road and McNulty Way. However, based on an evaluation of ODOT's current plans, the intersection is expected to experience capacity limitations in the long-term future; therefore, the proposed intersection design includes separate left, through, and right-turn lanes at the eastbound and westbound approaches.



INTERSECTION: MILLARD ROAD & US 30

Evaluation Summary Table

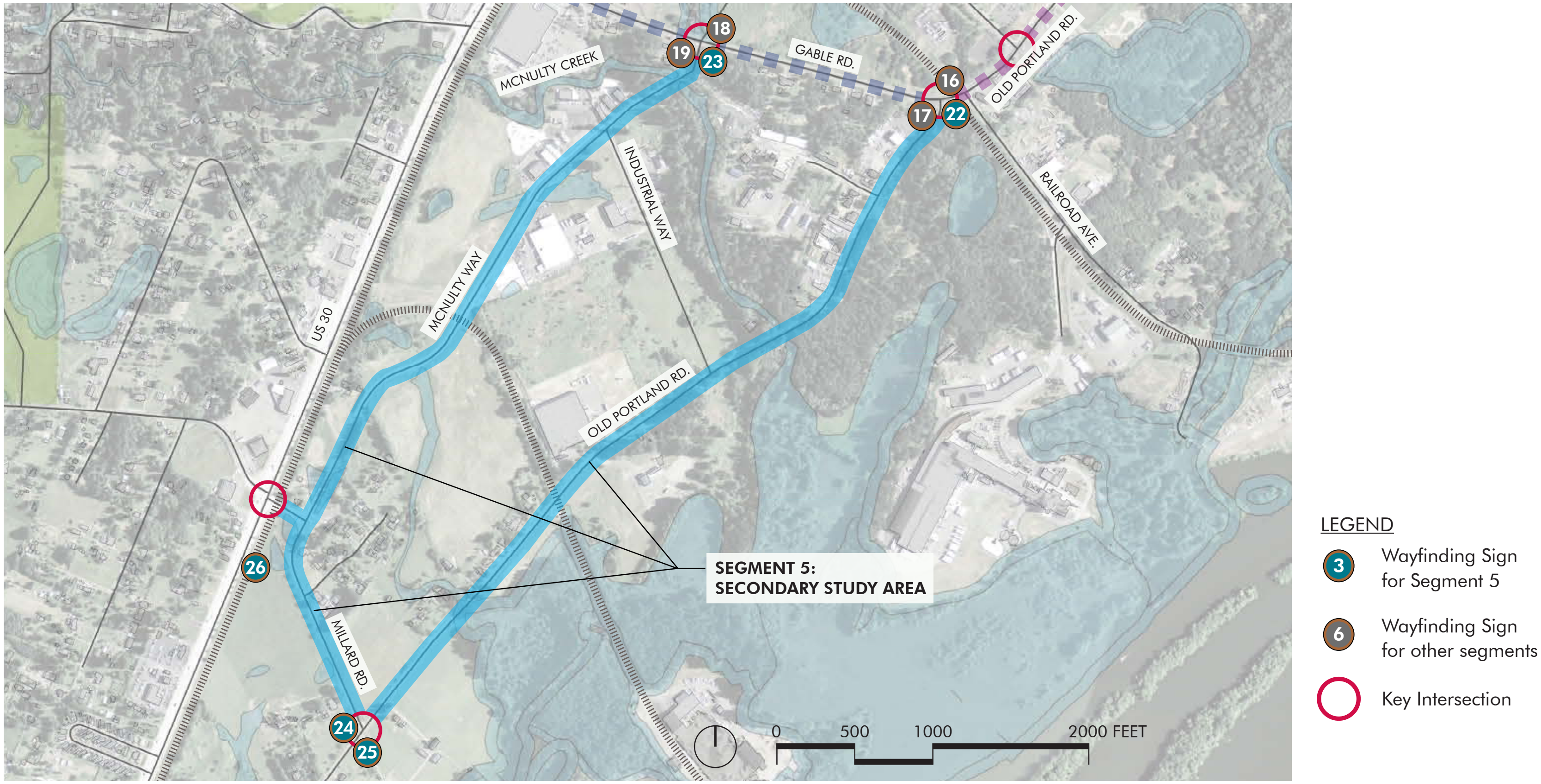
Rating System:

Poor		Moderate		Good
○	◔	◑	◕	●

		Economy and Business Support				Transportation Safety and Mobility					Connectivity & Streetscape Aesthetics			
		Consistency with Previous Planning	*Supports businesses and business districts*	*Supports customers, employees, and others by providing access*	*Relative Cost effectiveness*	*Improved connectivity & access*	*Improved pedestrian/bicycle safety and accessibility*	*Through-movement and mobility*	*Safety*	*Emergency Vehicle accommodations*	*Improved street appearance*	*Improved ped/bike connectivity*	*Street designs catered to needs of particular segments*	*Sustainable Design Strategies*
Proposed Road Section	Old Portland Road	●	●	●	◕	◑	◑	◕	◑	◑	◑	●	●	●
	Millard Road	●	●	●	◕	◑	◕	◕	◑	◑	◑	◑	●	◑
	McNulty Way	●	●	●	◕	◑	◕	◕	◑	◑	◑	◑	●	◑
Old Portland / Millard Road	Proposed Intersection	◑	●	●	◕	●	◑	●	◑	●	◑	◑	●	○
US 30/ Millard Road	Proposed Intersection	◑	●	●	◕	◕	◔	●	◑	●	●	◑	●	○

SEGMENT 5: SECONDARY STUDY AREA

Wayfinding Recommendations



Wayfinding locations for Segment 5

Wayfinding Recommendations: Segment 5 (See Appendix 2 for full table including destinations)

ID #	Mode Type	Sign Type	Installation Street	Intersecting Street	Sign Facing
22	Vehicle	Vehicular Directional	Old Portland Road	Gable Road/Old Portland Road	South
23	Vehicle	Vehicular Directional	McNulty Way	Gable Road	South
24	Vehicle	Vehicular Directional	Millard Road	Old Portland Road	North
25	Vehicle	Vehicular Directional	Old Portland Road	Millard Road	South
26	Vehicle	Vehicular Directional	Highway 30	Millard Road	South

SEGMENT 5: SECONDARY STUDY AREA

RECOMMENDED DESIGN OPTIONS

The evaluation described in the preceding section of this report has led to the following recommendations for preferred roadway and intersection design along the study area corridor. In some cases, more than one option performed well in our evaluation, and further discussion with the city, agency partners, and the broader community will lead to a preferred design option.

The following pages describe and illustrate these preferred options, including the basic design of key elements of the street and intersections for each segment, including facilities for vehicles, bicycles and pedestrians, and how these facilities transition between segments where elements differ. The recommended options also include a summary of proposed wayfinding signage in each segment.

More detailed design of the segments would occur during subsequent phases of design once the city or its partners have committed funding to a given segment or section. At that point, additional elements such as pedestrian amenities, stormwater drainage or other facilities would be determined.

Examples of designs and facility types are provided in the Streetscape Design Toolkit (Technical Memo 5 in Appendix 7).

Recommended Street Section

The proposed section for South 1st Street is similar to the existing street and includes sidewalks on both sides of the street, parallel parking on the east side, angled parking on the west side, and two travel lanes. Landscape planters are also proposed on both sides of the street with access across for pedestrians.

Painted sharrows will indicate that bicyclists share the roadway with vehicles on both sides of the street.

Sidewalk bulb-outs will provide a traffic calming effect, and shorten crossing distances for pedestrians. The bulb-outs will not reduce on-street parking, because those areas are already marked to prohibit parking in order to increase visibility for pedestrians and turning vehicles.

Depending on the final streetscape design, the number of on-street parking stalls should be the same or very close to the number of existing stalls.

As noted previously, this segment currently includes angled parking. The City may investigate use of reverse angled parking in this area in the future.

Typical section facing north

SEGMENT 1: SOUTH 1ST STREET

Recommended Street Section

Only one roadway cross-section was proposed. No key intersections were evaluated in this segment. The proposed cross-section ultimately may be refined as part of future redevelopment processes, depending on available right-of-way.

Element Width
Travel lanes............10-12’
Bike lanes...............0-6’
Parallel parking......8’
Planting strips........4-6’
Sidewalks...............8’
Total.......................60-80’

See Appendix 9 for an example of a narrower cross-section, reduced to fit a 60’ wide right-of-way.

A traffic calming circle could serve as a gateway feature and a way for drivers to turn around in this area. The design of the traffic circle will depend on whether or not it includes a gateway feature and whether it will need to accommodate large trucks.

Parallel parking is recommended rather than diagonal parking to reduce potential safety issues associated with bicycles and vehicles, to reduce right-of-way needs and to reduce pedestrian crossing distances. In addition, new development in the Waterfront Framework area will have to meet off-street parking requirements, resulting in a reduced need for on-street parking, in comparison to the existing downtown area in Segment 1.

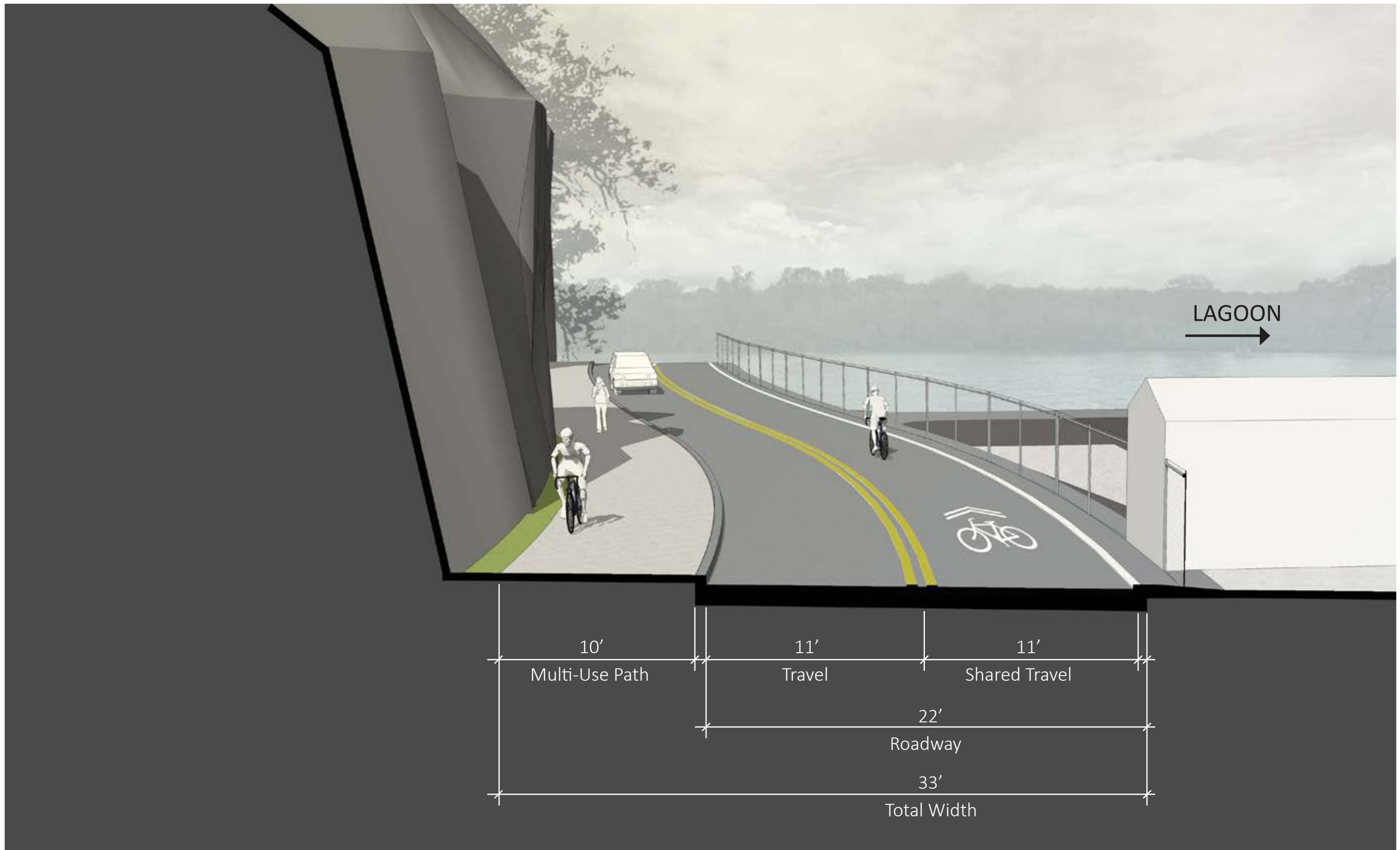
Typical section facing north

SEGMENT 2.1: VENEER PROPERTY

Recommended Street Section

The proposed road section contains two 11’ travel lanes, one of which is shared with bicycle travel (the east-bound/southern lane), and a 10’ multi-use path on the north side of the road, separated from the travel lanes by a landscape strip where space allows (varying in size depending on available space).

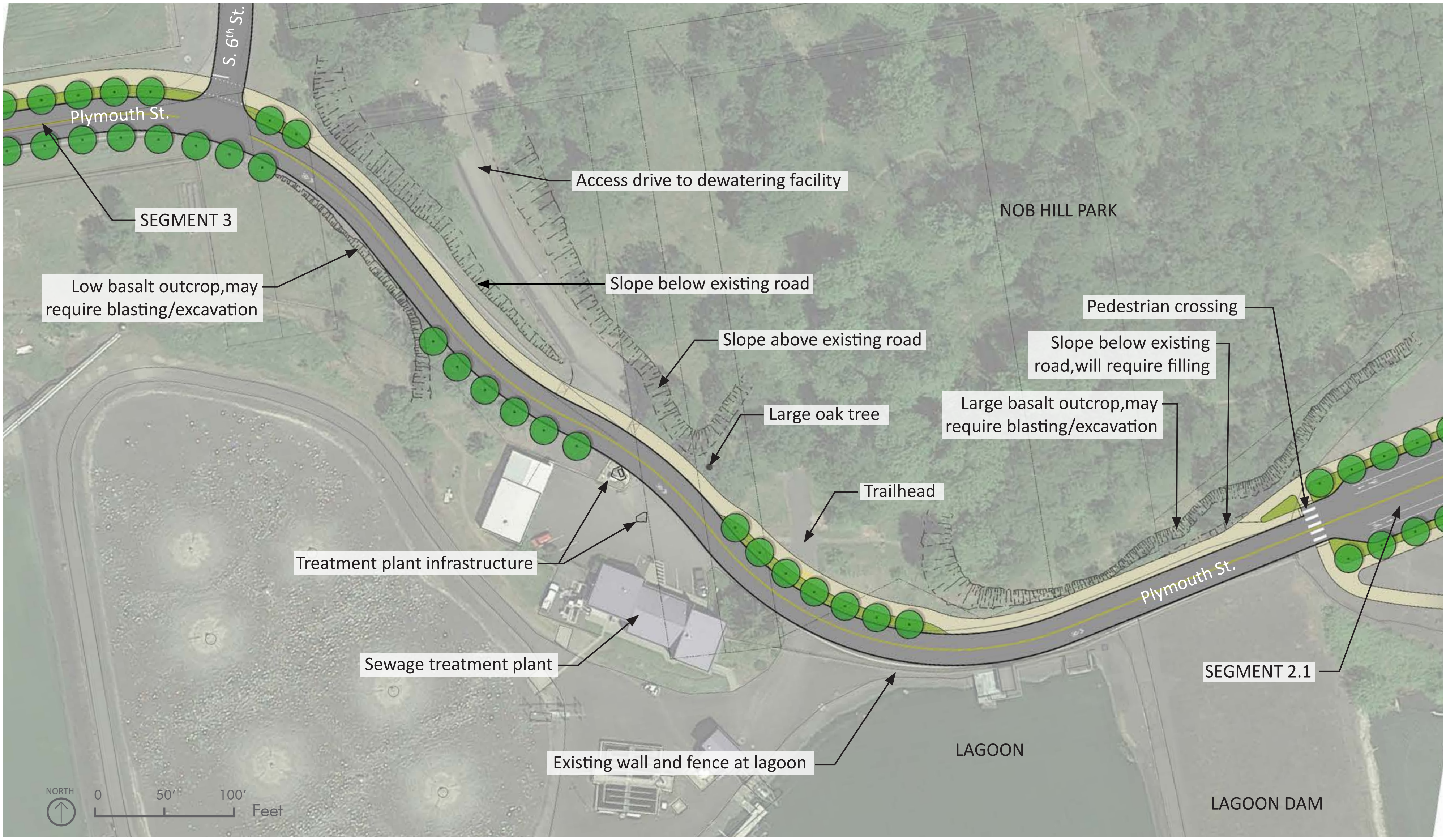
Implementation of the proposed road section will need to consider pedestrian crossings where the south side sidewalk ends at the south end of Segment 2.1, and how bicycle facilities will transition to adjacent segments.



Typical section facing east

SEGMENT 2.2: PLYMOUTH STREET

Proposed Segment 2.2 Plan

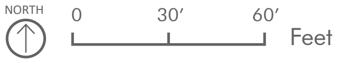


SEGMENT 2.2: PLYMOUTH STREET

Recommended Intersection

For the intersection of Plymouth Street and S. 6th Street, Option A (stop controlled intersection, no splitter island) is recommended based on the evaluation.

This option provides superior through-movement and mobility for those accessing properties on S. 6th Street, and the lack of splitter island provides better emergency vehicle access.



INTERSECTION: PLYMOUTH STREET & SOUTH 6TH STREET

Recommended Street Section

Roadway cross section Option B is the recommended design for this section. This option has superior ratings for improved connectivity and access, improved bicycle and pedestrian safety and accessibility, improved street appearance, and the potential to incorporate sustainable design principles.

SEGMENT 3: PLYMOUTH STREET

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Proposed Segment 3 Plan

SEGMENT 3: PLYMOUTH STREET


S. 8th St.
S. 7th St.
S. 6th St.
Plymouth St.
MATCHLINE: SEE PG. 120
NORTH
0
40′
80′
Feet

Recommended Intersection

Several options for improving this intersection were identified and evaluated. The project team narrowed them down to four options for evaluation. Based on further analysis and discussion with members of the advisory committee, Planning Commission, City Council and other community members, the project team developed a new preferred option.

This roundabout design allows for continued direct travel to both Old Portland Road and Plymouth Street. It has a smaller footprint than the other roundabout options evaluated, with less resulting impact on surrounding private properties and a lower cost to build compared to the earlier roundabouts studied.

Truck movements through the Plymouth Street/Old Portland Road intersection have been a key topic of discussion, and the roundabout has been designed to accommodate these vehicles through sufficient size and a mountable apron. The roundabout center is recommended to be non-mountable in order to provide space for a gateway feature.

This intersection has been designed to accommodate medium-sized trucks, including typical delivery trucks (approximately 40-50 feet in length).

NORTH 0 50′ 100′ Feet

INTERSECTION: OLD PORTLAND ROAD & PLYMOUTH STREET

Recommended Street Section

A new preferred option was identified for Old Portland Road through further discussion and refinement of the preliminary preferred option with members of the advisory committee, Planning Commission, City Council and other community members.

It includes one-way cycletracks on both sides of the street. The cycletracks are separated from the roadway by a landscaping strip. Each cycletrack will be separated from the adjacent pedestrian walkway by a curb or other means.

The new option has the same safety benefits of the original Option C but can be transitioned from adjacent segments more effectively. Implementation of this option will require careful planning to allow for safe convenient transitions between this design and sections of the roadway that have undergone recent improvements.

Locations for transitions will include intersections such as Old Portland/Plymouth Roads, Old Portland/Kaster Roads, and Old Portland/Gable Roads, as well as the bridge over Milton Creek. Transitions in several of these locations are shown on pages 116, 122 and 125.

(Continued on page 124)

Typical section facing north

SEGMENT 4.1: OLD PORTLAND ROAD

Recommended Street Section

(Continued from page 123)

The existing bridges across Milton Creek (one with vehicular lanes, plus pedestrian bridges on either side) need to be replaced to fit the recommended street section. If the street improvements occur before the bridges are replaced, interim measures will be needed. These would include signage warning that the sidewalk and cycletrack are combined on the bridge, and possibly "narrow bridge" signs for the vehicular lanes.

Detailed design and implementation of this section will need to ensure that intersections and access points address bicycle and pedestrian safety and minimize conflicts between bicyclists, pedestrians and motor vehicles. Examples of treatments for similar facilities are found in Appendix 8.

Recommended Intersection

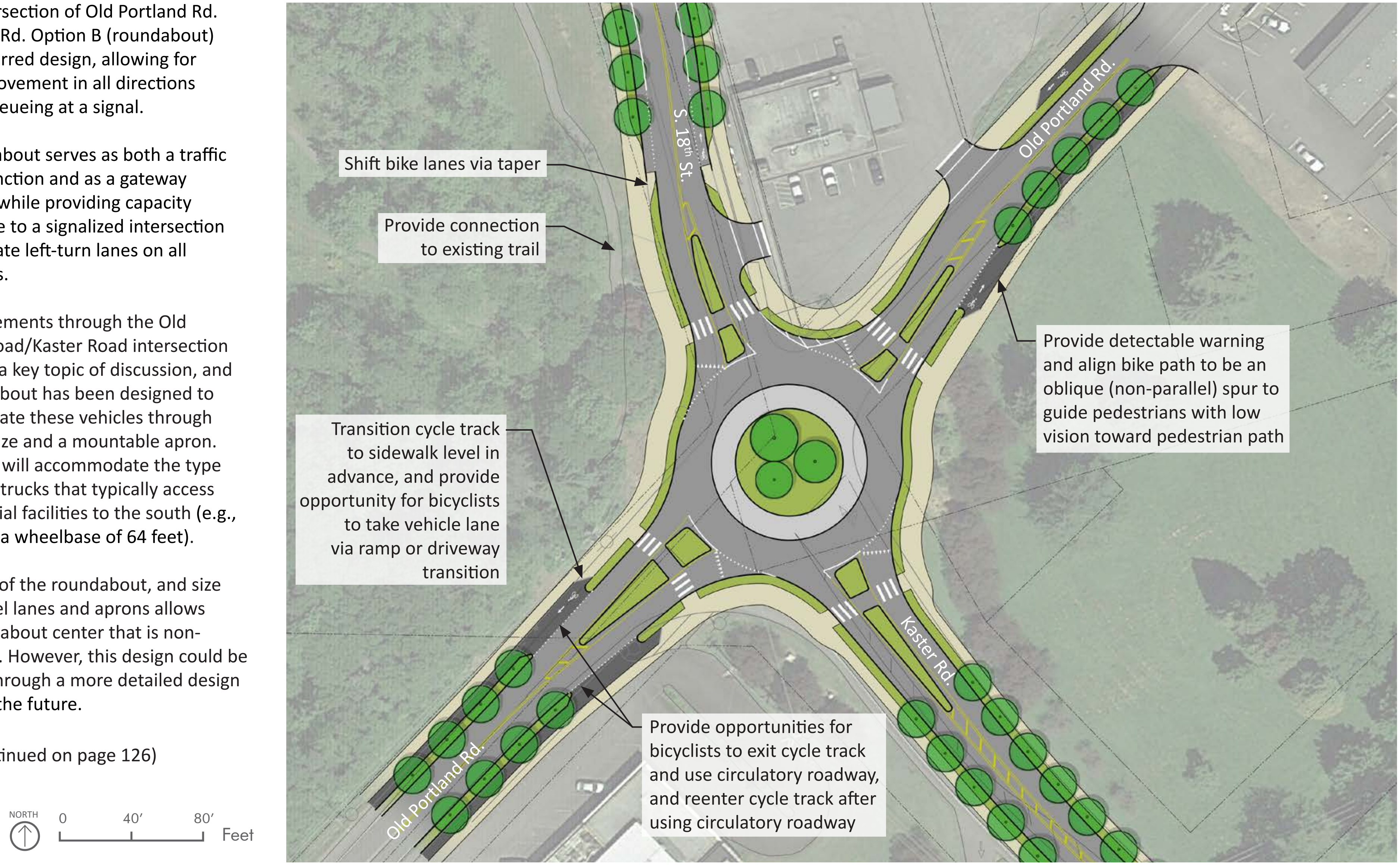
At the intersection of Old Portland Rd. and Kaster Rd. Option B (roundabout) is the preferred design, allowing for through-movement in all directions without queueing at a signal.

The roundabout serves as both a traffic calming function and as a gateway treatment while providing capacity comparable to a signalized intersection with separate left-turn lanes on all approaches.

Truck movements through the Old Portland Road/Kaster Road intersection have been a key topic of discussion, and the roundabout has been designed to accommodate these vehicles through sufficient size and a mountable apron. The design will accommodate the type and size of trucks that typically access the industrial facilities to the south (e.g., those with a wheelbase of 64 feet).

The radius of the roundabout, and size of the travel lanes and aprons allows for a roundabout center that is non-mountable. However, this design could be modified through a more detailed design process in the future.

(continued on page 126)



INTERSECTION: OLD PORTLAND ROAD & KASTER ROAD

(continued from page 125)

The combined costs of replacing the signal and maintaining it over time are projected to be higher than the cost of building the proposed roundabout in this location. The roundabout also is expected to provide superior operations in terms of mobility and travel time at this location.

Future detailed design of the roundabout will need to ensure adequate sight distance and visibility for vehicles entering and traversing the facility.

INTERSECTION: OLD PORTLAND ROAD & KASTER ROAD

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Recommended Intersections

For clarity the recommended intersections of Old Portland Road with Gable Road and Port Avenue are shown together. In the Evaluation section, the options for these two intersections were shown and evaluated separately.

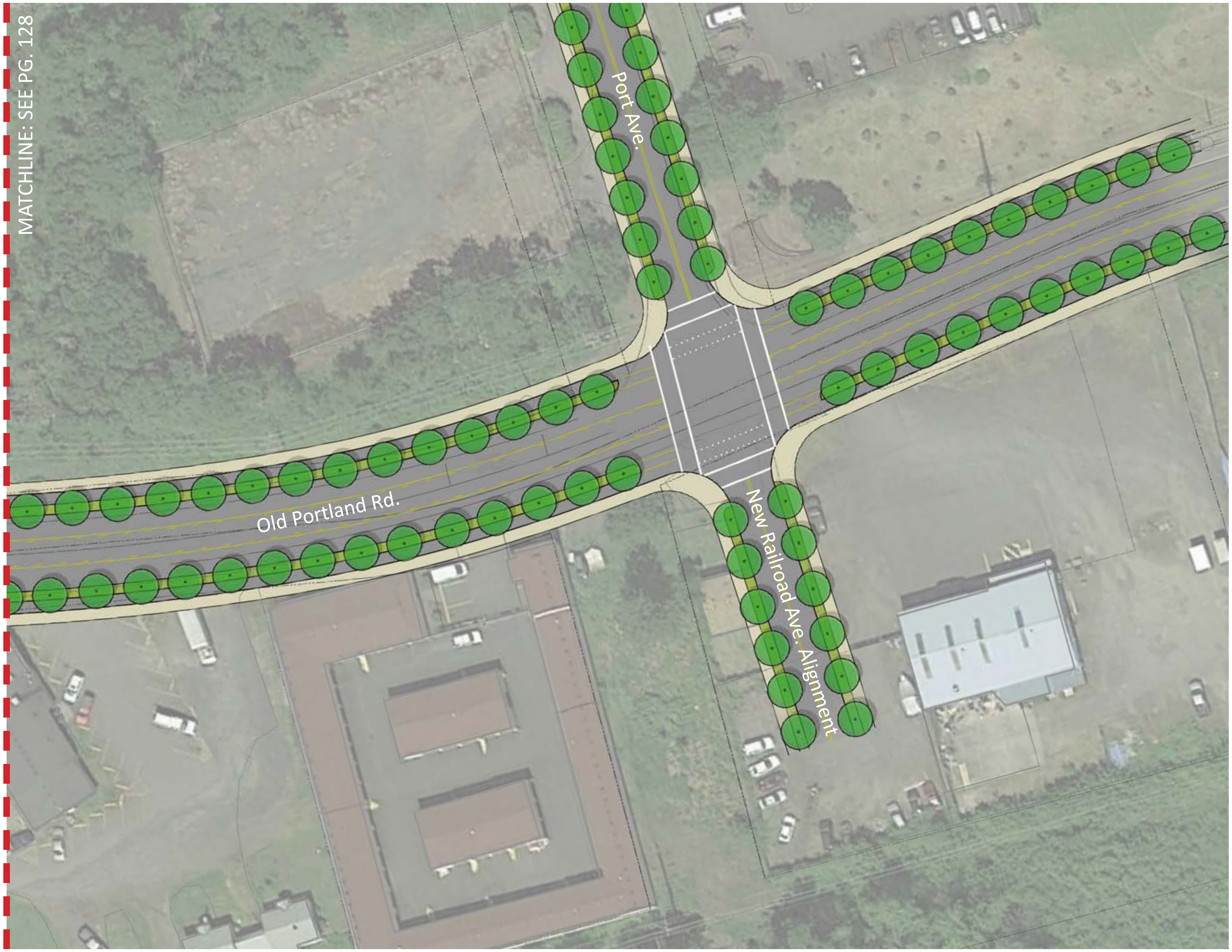
Old Portland Road & Gable Road

Several options for improving this intersection were identified and narrowed to two options for evaluation. Both options performed well in the evaluation; however, Option B performed slightly better. Based on further review and discussion with the project management team, Option B is the preferred near-term alternative.

- Option B provides greater separation from the railroad crossing as well as the Old Portland Road/Railroad Avenue and Old Portland Road/Port Avenue intersections relative to Option A.

- Option B, coupled with the planned improvements along Gable Road, provides a greater improvement in traffic operations (volume/capacity, delay, LOS) at the intersection relative to Option A.
- Option B does not require a traffic signal to achieve acceptable traffic operations in the future and therefore,

INTERSECTIONS: OLD PORTLAND ROAD, GABLE ROAD & PORT AVENUE



costs significantly less relative to Option A.

The City should monitor changes in traffic and travel performance after improvements to the US 30/Millard Road intersection are implemented and/or other measures are successful in encouraging more drivers to use Old Portland Road to access the Riverfront area.

At the point that increased potential traffic on Old Portland Road warrants investment in additional improvements to this intersection, Option A may be evaluated further.

Consider incorporating protected intersection treatment options to improve transitions through the intersection and to the shared-use path at Old Portland Road.

Old Portland Road and Port Avenue

At the intersection of Old Portland Road and Port Avenue, Option B (Re-Align with Two-Way Left-Turn Lane) is preferred. Option A is problematic from a transportation safety and mobility standpoint.

Consider incorporating protected intersection treatment options to improve transitions through the intersection.

Recommended Street Section

A new preferred option was identified through further discussion and review with members of the advisory committee, Planning Commission, City Council and other community members. It includes one-way cycletracks on both sides of the street.

Each cycletrack is separated from the roadway by a landscaping strip, and each will be separated from the adjacent pedestrian walkway by a curb or other means. The new option has the same safety benefits of the original Option C but can be transitioned to adjacent segments more effectively.

Implementation of this option will require careful planning to allow for safe, convenient transitions between this design and parts of the roadway that have undergone recent improvements. Typical transitions are illustrated in the conceptual intersection designs in this document. The final design will also need to ensure that intersections and access points address bicycle and pedestrian safety and minimize conflicts between bicyclists, pedestrians and motor vehicles. Examples of treatments for similar facilities are found in Appendix 8.

This cross-section also includes a center lane to accommodate turn lanes needed at key intersections or other access points to maintain traffic mobility. A landscaped median could be used in short portions of this segment but will need to be located to continue to ensure access to local businesses in this part of the corridor.

Typical section facing east

SEGMENT 4.2: GABLE ROAD

Recommended Intersection

Only one option was proposed for the intersection of Gable Road and McNulty Way.

INTERSECTION: GABLE ROAD & MCNULTY WAY

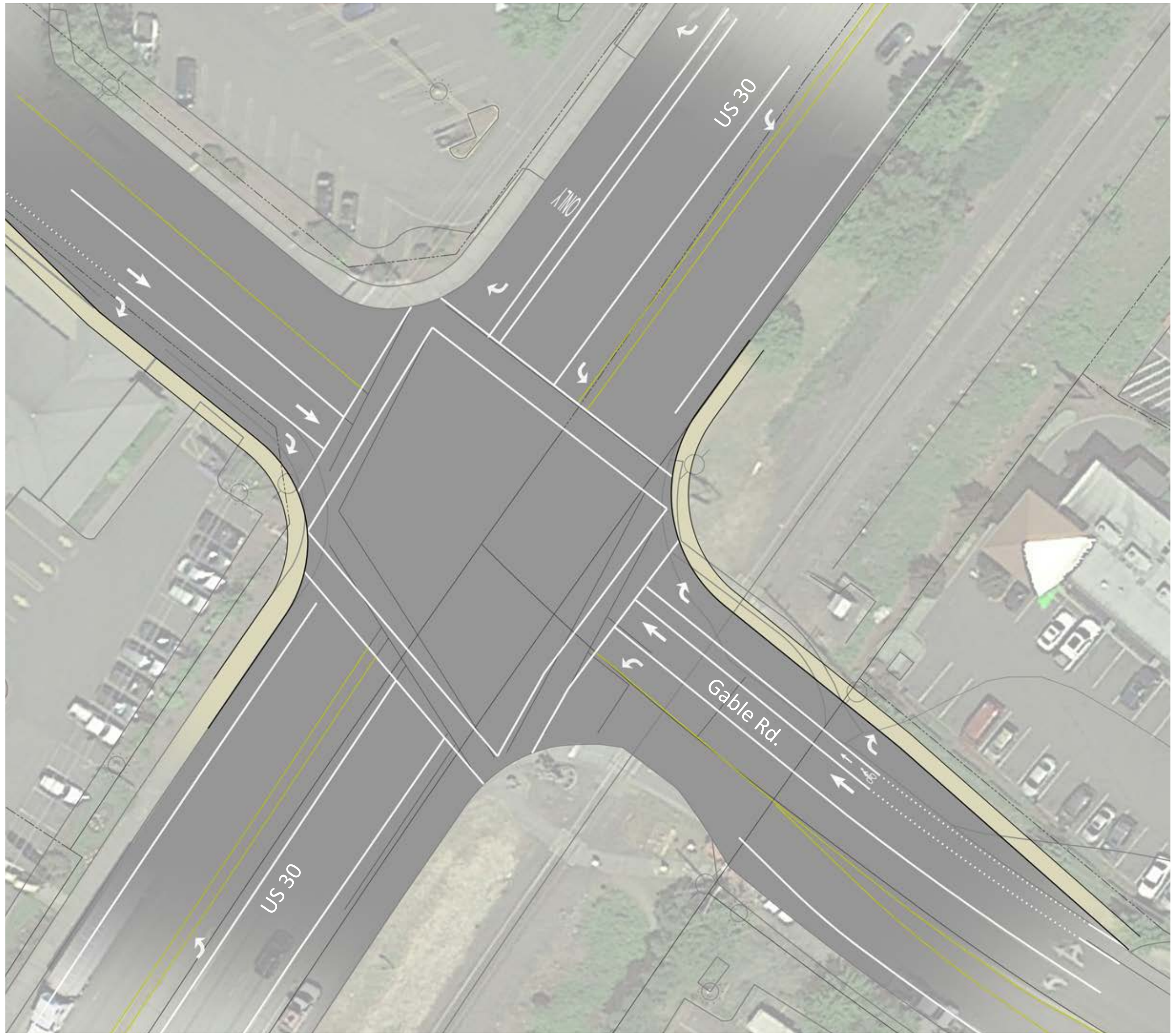
Recommended Intersection

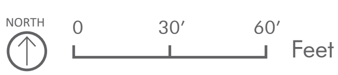
Only one option was proposed for the intersection of Gable Road and US 30.

Adding capacity at Millard Road/US 30 will reduce long-term turn movement demand at Gable Road/US 30.

Provide a separate westbound right-turn lane to separate westbound right-turn movements from through movements at the intersection. This will require reconfiguring the westbound approach to the intersection and potentially widening along Gable Road. The additional lane will also require coordination with ODOT rail, who may not be receptive to the additional lane without significant investment in rail infrastructure.

As an alternative, an eastbound right-turn lane could be considered when the bank in the southwest corner of the intersection redevelops. Either improvement will improve traffic operations at the intersection and provide much needed capacity for future growth; however, the additional capacity is not expected to be sufficient to carry the intersection through 2031; therefore, alternative performance measures should also be considered at the intersection.

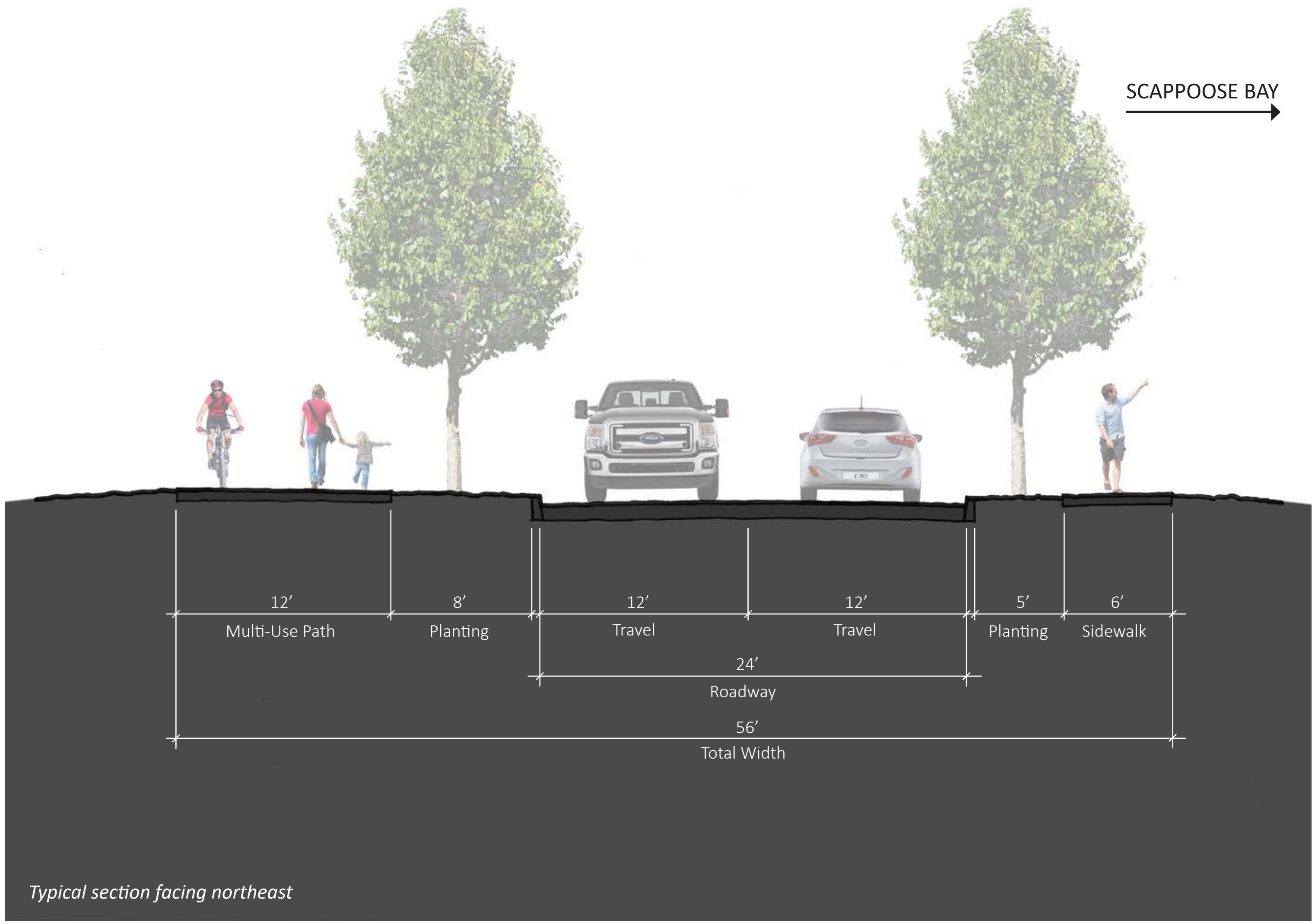




INTERSECTION: GABLE ROAD & US 30

Recommended Street Section

The proposed designs for roadway cross sections and intersections in this area did not include alternatives to evaluate.

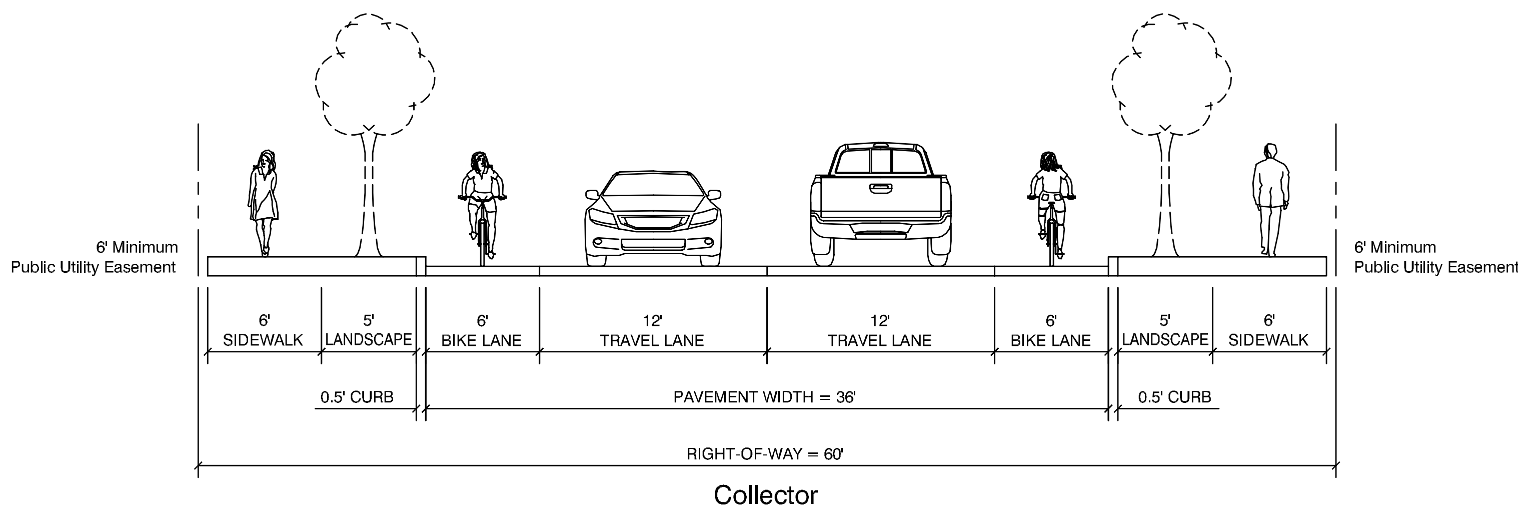


Typical section facing northeast

SEGMENT 5: OLD PORTLAND ROAD

Recommended Street Section

The proposed designs for roadway cross sections and intersections in this area did not include alternatives to evaluate.

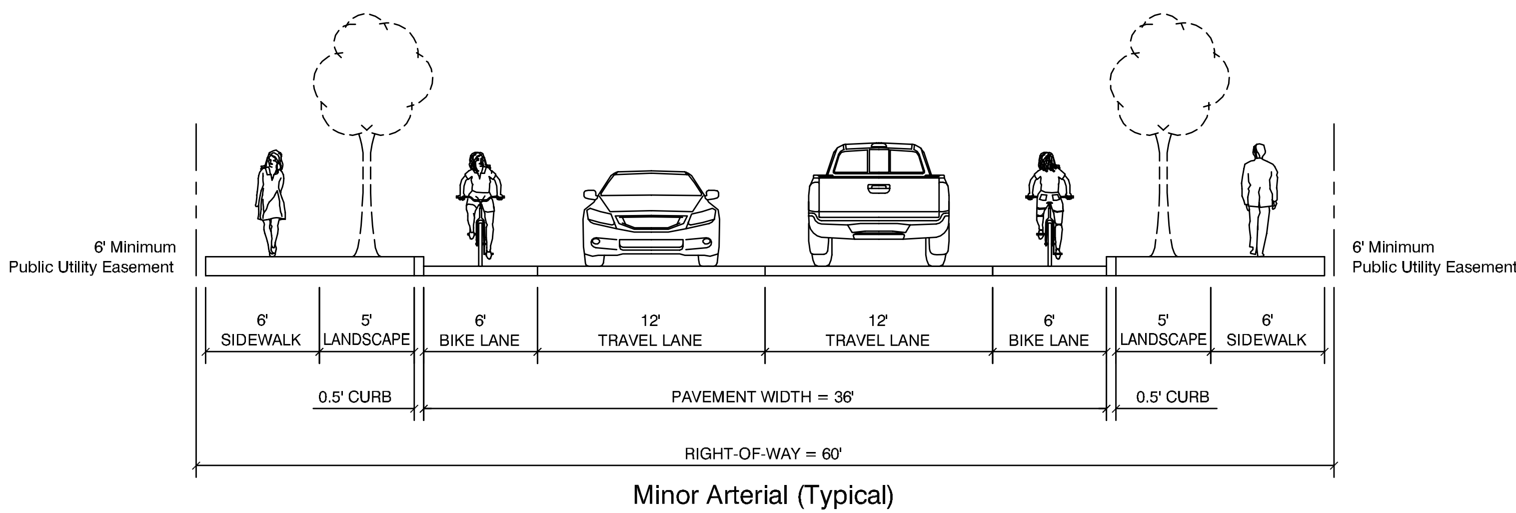


Typical section

SEGMENT 5: MCNULTY WAY

Recommended Street Section

The proposed designs for roadway cross sections and intersections in this area did not include alternatives to evaluate.

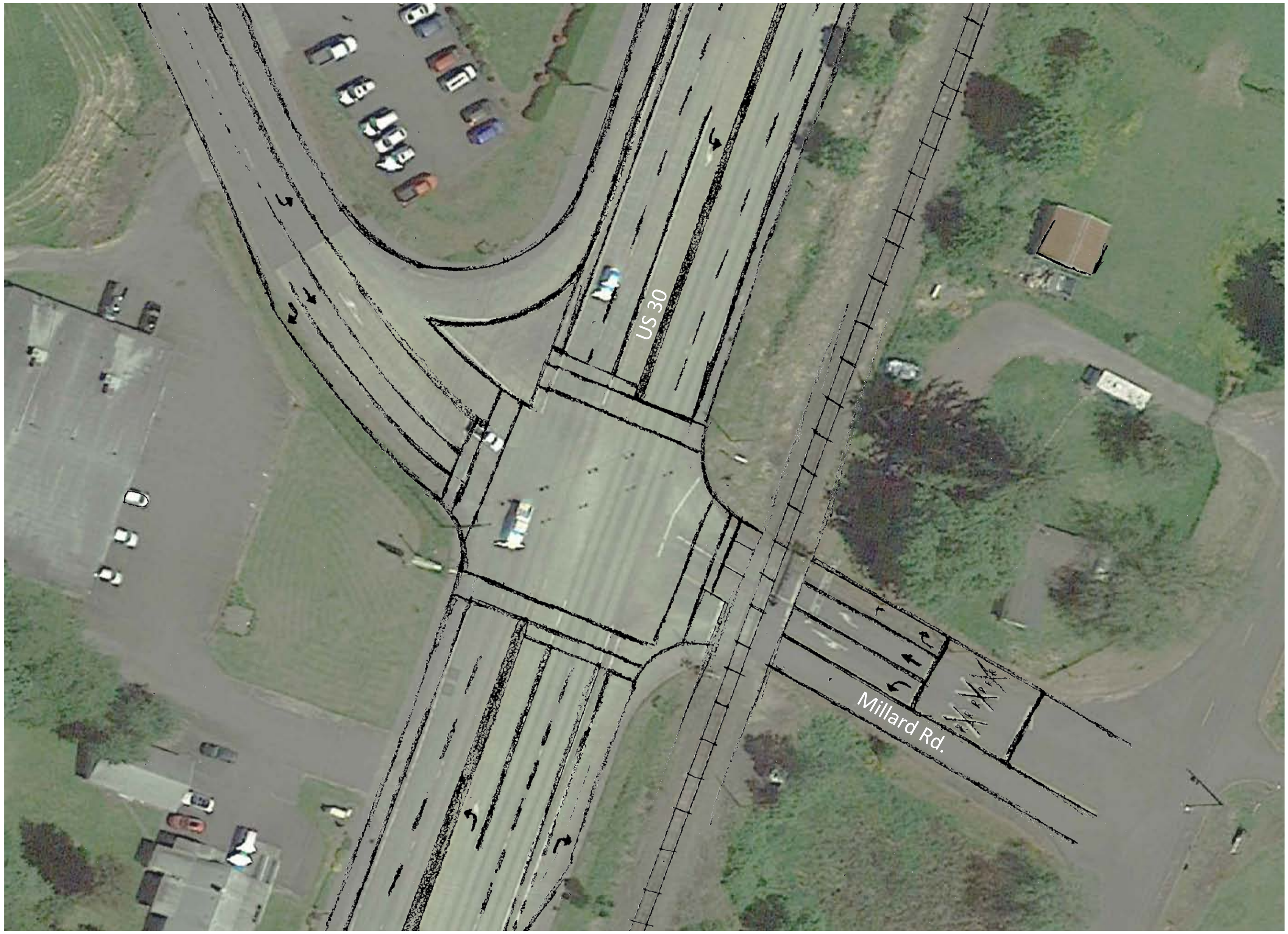


Typical section

SEGMENT 5: MILLARD ROAD

Recommended Intersection

Only one option was proposed for the intersection of Millard Road and US 30.



INTERSECTION: MILLARD ROAD & US 30

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LAND USE & REGULATORY CHANGES

Following is a preliminary list of policy and regulatory changes that may be necessary to implement the recommended Design Options. This list is high-level and conceptual at this time, and will be refined as the recommended design options are reviewed and discussed by the community.

Parking Location Requirements

Current development standards related to the amount, location and design of parking areas have been reviewed and may be further updated. Requirements related to the number of off-street parking spaces required, pathways within parking areas, and interior parking lot landscaping have been updated as part of previous planning processes and no changes to these standards are proposed.

Requirements related to the location of parking relative to the street may be updated to require parking areas to be located next to or behind buildings, rather than between buildings and the public right-of-way.

Land Use and Zoning

No changes to zoning designations for properties along the corridor are recommended in order to achieve these design options. It is expected that land along the corridor will continue to develop consistent with existing zoning.

Roadway Cross Sections

The City should consider updating the cross-sections contained within the Transportation System Plan to incorporate the recommended design options in order to require the appropriate improvements from property development along the corridor. The cross-sections of the recommended design options may also be appropriate for use in other locations within St. Helens.

The development code and Comprehensive Plan should include language that clarifies the relationship between the Riverfront Framework Plan and Riverfront Connector Plan in terms of proposed road cross-section designs. The Riverfront Connector Plan is generally consistent with the Framework Plan but includes more detailed information and alternatives to the designs identified in the Framework Plan. The information in the Riverfront Connector Plan will take precedence over the Framework Plan in this regard.

Street Furniture & Pedestrian Amenity Requirements

The urban design of Segment 1 and 2.1 in the waterfront area should contribute to a cohesive sense of place. Specific design standards aiming to improve the public realm through this area could be achieved through an overlay district or changes to existing zoning regulations.

Landscaping Requirements

Current development code regulations should be reviewed to see if they support the type and amount of landscaping contained in the recommended design options. Landscaping requirements can specify trees that are particularly suited to the soil conditions in the study corridor.

Definitions

New definitions for Shared Use Paths and Cycle Tracks will be added to the City's Development Code and/or Municipal Code, in part to distinguish these facilities from sidewalks, and to clarify that bicycles and pedestrians may use a "shared use path" simultaneously.

Fee In-Lieu Requirements

The City's fee-in-lieu requirements for transportation improvements should be refined. Currently the required fee-in-lieu only covers the cost of providing new sidewalks associated with new development or redevelopment. The calculation of the fee should be evaluated and potentially refined to cover the full cost of road improvements if they are not installed as part of a development project. Fee-in-lieu and improvement requirements also must address proportionality and nexus requirements, consistent with land use case law decisions.

APPENDIX 1: DESIGN OPTIONS EVALUATION NOTES

Due to size, the Design Options Evaluation Notes are provided separately, both as a PDF file and an Excel spreadsheet.

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APPENDIX 2: COMPLETE WAYFINDING MATRIX

Wayfinding Recommendations

ID #	Corridor Segment	Mode Type	Sign Type	Installation Street	Intersecting Street	Sign Facing	Destination #1	Destination #1 Arrow	Destination #1 Distance	Destination #1 Time	Destination #2	Destination #2 Arrow	Destination #2 Distance	Destination #2 Time
1	1	Bicycle/Pedestrian	On-Street Directional	South 1st Street	St. Helens Street	North	Riverfront Dist	Straight	0.1 mi	1 min	Courthouse	Left	0.1 mi	1 min
2	1	Bicycle/Pedestrian	On-Street Directional	St. Helens Street	South 1st Street	East	Houlton Bus Dist	Right	1.1 mi	7 min	Nob Hill Park	Left	0.7 mi	4 min
3	1	Bicycle/Pedestrian	On-Street Directional	South 1st Street	St. Helens Street	South	Houlton Bus Dist	Straight	1.1 mi	7 min	Boat Launch	Diagonal Right	0.3 mi	2 min
4	1	Pedestrian	On-Street Directional	South 1st Street	Plaza Square	North	City Hall	Left	0.1 mi	1 min	Columbia View Park	Left	0.1 mi	1 min
5	1	Pedestrian	Map Kiosk	South 1st Street	Plaza Square	East	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	2.2	Bicycle/Pedestrian	Trailhead Kiosk	Nob Hill Nature Park Trail	N/A	South	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	3	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	Plymouth Street	South	Riverfront Dist	Straight	0.6 mi	3 min	Historic Dist	Slight left (2nd roundabout exit)	0.7 mi	4 min
8	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 15th Street	North	Houlton Bus Dist	Right	0.4 mi	2 min	McCormick Park	Straight	0.4 mi	2 min
9	4.1	Bicycle/Pedestrian	On-Street Directional	South 15th Street	Old Portland Road	North	Riverfront Dist	Left	0.7 mi	4 min	Historic Dist	Left	0.8 mi	4 min
10	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 15th Street	West	Houlton Bus Dist	Left	0.4 mi	2 min	Riverfront Dist	Straight	0.7 mi	3 min
11	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 18th Street/Kaster Road	East	Houlton Bus Dist	Right	0.5 mi	3 min	McCormick Park	Right	0.1 mi	1 min
12	4.1	Bicycle/Pedestrian	On-Street Directional	South 18th Street	Old Portland Road	North	Riverfront Dist	Left	0.9 mi	5 min	Historic Dist	Left	1 mi	6 min
13	4.1	Bicycle/Pedestrian	On-Street Directional	Kaster Road	Old Portland Road	South	Houlton Bus Dist	Straight	0.5 mi	3 min	Riverfront Dist	Right	0.9 mi	5 min
14	4.1	Bicycle/Pedestrian	On-Street Directional	Old Portland Road	South 18th Street/Kaster Road	West	Houlton Bus Dist	Left	0.5 mi	3 min	Riverfront Dist	Straight	0.9 mi	5 min
15	4.1	Bicycle/Pedestrian	Trailhead Kiosk	Old Portland Road	N/A	South	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	4.1	Bicycle	On-Street Confirmation	Old Portland Road	Gable Road	East	Scappoose Bay	Left	N/A	N/A	N/A	N/A	N/A	N/A
17	4.2	Bicycle	On-Street Confirmation	Gable Road	Old Portland Road	West	Scappoose Bay	Right	N/A	N/A	N/A	N/A	N/A	N/A
18	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	McNulty Way/Milton Way	East	CC Mental Health	Left	0.1 mi	1 min	State Police	Left	0.2 mi	1 min
19	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	McNulty Way/Milton Way	West	Houlton Bus Dist	Straight	1.3 mi	7 min	Riverfront Dist	Straight	1.7 mi	9 min
20	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	Highway 30	East	Houlton Bus Dist	Right	0.9 mi	5 min	Chamber of Com	Right	0.9 mi	5 min
21	4.2	Bicycle/Pedestrian	On-Street Directional	Gable Road	Highway 30	West	Houlton Bus Dist	Left	0.9 mi	5 min	Riverfront Dist	Straight	2 mi	9 min
22	5	Vehicle	Vehicular Directional	Old Portland Road	Gable Road/Old Portland Road	South	Houlton Bus Dist	Right	1 mi	3 min	Riverfront Dist	Right	1.4 mi	4 min
23	5	Vehicle	Vehicular Directional	McNulty Way	Gable Road	South	Houlton Bus Dist	Right	1.3 mi	3 min	Riverfront Dist	Right	1.7 mi	5 min
24	5	Vehicle	Vehicular Directional	Millard Road	Old Portland Road	North	Riverfront Dist	Left	2.5 mi	6 min	Historic Dist	Left	2.6 mi	6 min
25	5	Vehicle	Vehicular Directional	Old Portland Road	Millard Road	South	Houlton Bus Dist	Straight	2.1 mi	4 min	Riverfront Dist	Straight	2.5 mi	6 min
26	5	Vehicle	Vehicular Directional	Highway 30	Millard Road	South	Riverfront Dist	Right	2.9 mi	7 min.	Historic Dist	Right	3 mi	6 min.

Complete Wayfinding Matrix

Destination #3	Destination #3 Arrow	Destination #3 Distance	Destination #3 Time	Destination #4	Destination #4 Arrow	Destination #4 Distance	Destination #4 Time	Destination #5	Destination #5 Arrow	Destination #5 Distance	Destination #5 Time	Destination #6	Destination #6 Arrow	Destination #6 Distance	Destination #6 Time
City Hall	Straight	0.1 mi	1 min	Columbia View Park	Left	0.2 mi	1 min	Nob Hill Park	Straight	0.7 mi	6 min	McCormick Park	Right	1.1 mi	6 min
McCormick Park	Straight	1.2 mi	7 min	Library	Straight	1.2 mi	7 min	Chamber of Com	Right	1.4 mi	10 min	N/A	N/A	N/A	N/A
Grey Cliffs Park	Diagonal Right	0.3 mi	2 min	McCormick Park	Left	1.1 mi	6 min	Library	Left	1.1 mi	6 min	Chamber of Com	Straight	1.3 mi	9 min
Public Docks	Left	0.1 mi	1 min	History Museum	Left	0.1 mi	1 min	Nob Hill Park	Straight	0.7 mi	6 min	Armory	Straight	0.8 mi	4 min
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nob Hill Park	Straight	0.5 mi	3 min	Boat Launch	Slight left (2nd roundabout exit)	1.1 mi	6 min	Grey Cliffs Park	Slight left (2nd roundabout exit)	1.2 mi	7 min	Courthouse Plaza	Slight left (2nd roundabout exit)	0.9 mi	4 min
Senior Center	Right	0.1 mi	1 min	Library	Straight	0.4 mi	2 min	Veteran's Memorial	Straight	0.5 mi	2 min	Sheriff’s Office	Straight	0.7 mi	4 min
McCormick Park	Right	0.3 mi	2 min	Nob Hill Park	Left	0.6 mi	3 min	Courthouse Plaza	Left	1 mi	5 min	Boat Launch	Left	1.2 mi	6 min
Historic Dist	Straight	0.8 mi	4 min	Senior Center	Left	0.1 mi	1 min	Nob Hill Park	Straight	0.5 mi	3 min	Columbia View Park	Straight	1.1 mi	7 min
Library	Right	0.1 mi	1 min	Veteran's Memorial	Right	0.3 mi	2 min	Sheriff's Office	Straight	0.5 mi	3 min	State Police	Straight	1.1 mi	6 min
Nob Hill Park	Left	0.8 mi	4 min	Boat Launch	Left	1.4 mi	8 min	Sheriff's Office	Right	0.5 mi	3 min	State Police	Right	1.1 mi	6 min
Historic Dist	Right	1 mi	6 min	McCormick Park	Straight	0.1 mi	1 min	Nob Hill Park	Right	0.8 mi	4 min	Boat Launch	Right	1.4 mi	8 min
Historic Dist	Straight	1 mi	6 min	McCormick Park	Left	0.1 mi	1 min	Nob Hill Park	Straight	0.8 mi	4 min	Boat Launch	Straight	1.4 mi	8 min
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Campbell Park	Straight	1.2 mi	7 min	Fairgrounds	Straight	2.4 mi	15 min	High School	Straight	0.4 mi	3 min	Public Health	Straight	0.4 mi	3 min
Historic Dist	Straight	1.8 mi	10 min	McCormick Park	Straight	1 mi	5 min	CC Mental Health	Right	0.1 mi	1 min	State Police	Right	0.2 mi	1 min
Urgent Care	Right	1.2 mi	7 min	Transit Center	Right	1.8 mi	8 min	Fairgrounds	Straight	2.2 mi	13 min	High School	Straight	0.1 mi	1 min
Historic Dist	Straight	2.1 mi	10 min	Urgent Care	Left	1.2 mi	7 min	McCormick Park	Straight	1.2 mi	7 min	Nob Hill Park	Straight	1.9 mi	9 min
Historic Dist	Right	1.5 mi	5 min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Historic Dist	Right	1.8 mi	4 min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scappoose Bay	Right	0.5 mi	1 min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Historic Dist	Straight	2.6 mi	6 min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Houlton Bus Dist	Straight	1.6 mi	3 min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX 3: TECHNICAL MEMORANDUM #1

Due to size, Technical Memorandum #1 Overview of Standards, Policies, and Practices is provided separately as a PDF.

APPENDIX 4: TECHNICAL MEMORANDUM #2

Due to size, Technical Memorandum #2 Existing Transportation System Conditions is provided separately as a PDF.

APPENDIX 5: TECHNICAL MEMORANDUM #3

Due to size, Technical Memorandum #3 Future Year 2031 Baseline Transportation System Conditions is provided separately as a PDF.

APPENDIX 6: TECHNICAL MEMORANDUM #4

Due to size, Technical Memorandum #4 Land Use and Urban Design is provided separately as a PDF.

APPENDIX 7: TECHNICAL MEMORANDUM #5

Due to size, Technical Memorandum #5 Streetscape Design Toolkit is provided separately as a PDF.

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APPENDIX 8: EXAMPLES OF CYCLETRACK INTERSECTION AND ACCESS POINT TREATMENTS

The following images represent techniques for designing cycletracks such as those proposed for Segments 3 and 4 of the Connector Plan to minimize conflicts between vehicles, pedestrians and cyclists at points where vehicles cross the cycletrack. These or similar techniques should be incorporated in future detailed design of these facilities.

Grade-separated cycletrack with driveway in Austin, TX

Photo: www.pedbikeimages.org - Greg Griffin, AICP

Two-way cycletrack with driveway in Seattle, WA

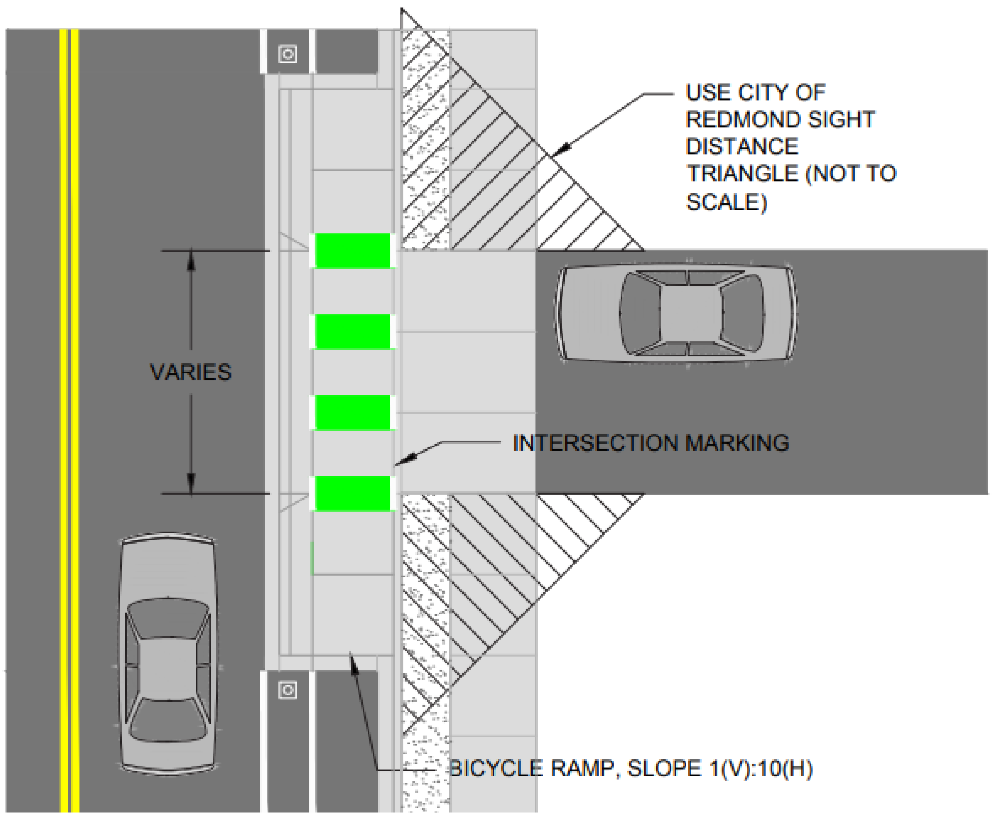
Photo: www.pedbikeimages.org - Toole Design Group

Two-way cycletrack with driveway in Santa Monica, CA

Photo: www.pedbikeimages.org - Toole Design Group

Enhanced Driveway Crossing

INTENT: Improve safety and comfort of sidepath or cycle track facility by conveying bicyclists priority and requiring motorists to slow as they turn across the bikeway.



City of Redmond Bicycle Manual
Cycle Track Driveway Design

APPENDIX 9: ALTERNATE CROSS-SECTION FOR SEGMENT 2.1

This cross-section shows one option for a street that fits a 60’ wide right-of-way, compared to the 80’ wide Recommended Street Section for Segment 2.1.

The travel lanes are reduced to 10’ wide and include sharrows to indicate shared travel with bikes, instead of separate bike lanes.

The planter widths are reduced to 3.5’ wide, which will limit the size of street tree species that can be planted. The Recommended Street Trees Application Matrix (chapter 17.72 of the St. Helens Municipal Code) lists smaller tree species that are recommended for 3.5’ x 3.5’ planters. If the planters are longer, as shown in this cross-section, the additional soil volume may allow tree species that are recommended for 5.5’ x 5.5’ planters.

Typical section facing north

SEGMENT 2.1: VENEER PROPERTY

APPENDIX 10: ENGINEER'S CONCEPTUAL ESTIMATE

Due to size, the Engineer's Conceptual Estimate is provided separately as a PDF.

RIVERFRONT CONNECTOR PLAN

APPENDIX 1:

DESIGN OPTIONS EVALUATION NOTES

Study Segment			Segment 1 - South 1st Street	Segment 2.1 - Veneer Property	Segment 2.2 - Plymouth Street (Lagoon Dam to South 6th Street)		
Guiding Principle	**Specific Criteria**	**Criteria Notes**	**Proposed Road Section**	**Proposed Road Section**	**Proposed Road Section**	**Option A - Plymouth Street & South 6th Street**	**Option B - Plymouth Street & South 6th Street**
Economy and Business Support							
Consistency with Previous Planning	Consistent with previous planning efforts	TSP, Waterfront Redevelopment Plan, Other plans	No change to existing configuration proposed, but improvements to street/sidewalk conditions possible with development.	No change from Waterfront Framework Plan.	Plymouth street is designated truck route per TSP, but that dead ends currently. Improvements recommended prior/concurrent to segment 2.1 in order to safely accommodate all modes for new actives on waterfront. Sidewalk addresses identified deficiency in TSP. Connects sidewalks to trails in Nob Hill.	Not identified in previous plans.	Not identified in previous plans.
	Improves upon previous planning efforts with context sensitive solutions	TSP, Waterfront Redevelopment Plan, Other plans	Identified in TSP for ped crossing improvements in this area.	This is the key connection to make Plymouth viable	TSP says this section is recommended to "Add bike lanes." (fig 6.2)	No difference in other metrics.	No difference in other metrics.
	Consider timing of development related to emphasis of Plymouth vs Old Portland routes	Qualitative criteria	Likely to occur with development of Veneer property	Dependent on development of Veener property.	Needed to provide access to waterfront area/veneer property	NA	NA
Supports businesses and business districts	Improves awareness of business areas through wayfinding, signage, and gateway treatments		Downtown currently fairly walkabale and inviting - selected improvements and identified crossings will help further. 5/5	Allows for gateway treatment. Walkable streetscape will be signature waterfront feature. 5/5	Provides automobile access to the new waterfront, downtown and the columbia/houlton business district.	Allows for improved wayfinding	Allows for improved wayfinding
	Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access				Provides pedestrian access to these areas where none exists today. Not a business area currently though.	Not in business area	Not in business area
Supports customers, employees, and others by providing access	Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities		No change to existing configuration proposed, but improvements to street/sidewalk conditions possible with development.	Adds additional parking on streets. Will likely be combined with public parking in area.	Provides multi-modal access to new waterfront, downtown, and the columbia/houlton district. Due to narrow ROW, bicycle facilities are higher stress than is ideal for downhill section.	Clear intersection and improvements help bike/ped stress.	Clear intersection and improvements help bike/ped stress.
	Change to amount of on-street parking in business areas				No change to parking.	No change to parking	No change to parking.
Relative Cost effectiveness	Relative price for construction and maintenance		No alternatives proposed, but costs may be borne in part by private development.	No alternatives proposed, but costs may be borne in part by private development.	No alternatives proposed, but costs may be borne in part by private development. Potential blasting of existing rock outcrops would raise construction cost.	Not very costly. No clear economic benefit.	Slightly more costly? No clear economic benefit.
	Will improvements have economic benefit in terms of supporting or encouraging redevelopment?		Improvements will support tourism and redevelopment.	Improvements will support tourism and redevelopment.	Improvements will provide access to redeveloped property. No adjacent development expected.	5-Mar	5-Feb
Transportation Safety & Mobility							
Improved connectivity & access	Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity	Qualitative score	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Provides a new street connection betweem Plymouth and 1st Street	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Maintains existing connectivity, does not increase roadway/intersection capacity	Limits connectivity, reduces intersection capacity
	Site-specific property impacts		No site-specific impacts anticipated	Improves access to waterfront redevelopment area	Could impact sewage treatment plan facilities	No site-specific impacts anticipated	Limits access to 6th Avenue from west
	Opportunity to incorporate transit service and facilities		Does not limit opportunity for transit service	Provides potential route for transit service/could include bus pullouts in design	No space for transit facilities.	Does not limit opportunity for transit service	Does not limit opportunity for transit service
Improved pedestrian/bicycle safety and accessibility	Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities		Maintains existing sidewalk width/ provides shared lane pavement markings "Sharrows" for bicylists	Provides new pedestrian and bicycle connections between Plymouth and 1st Street and access to the waterfront redevelopment area	Provides Sharrows on south side and shared-use path on noth side	No impact to pedestrian and bicycle access	Limits bicycle access to 6th Avenue from west
	Bicycle Level of Stress; Pedestrian Level of Stress		Maintains low LTS for pedestrians and bicyclists	Provides new low-stress pedestrian and bicycle facilities	Provides new low-stress pedestrian and bicycle facilities	Provides low stress pedestrian and bicycle facility	Provides low stress pedestrian and bicycle facility
	Ease of transition between segments and intersections		On-street bike lanes are provided north and south of segment	Sharrows to the north, shared-use paths and sharrows to the south	Bike lanes to the north and south	No challenge with transitions between segments	No challenge with transitions between segments
Through-movement and mobility	Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails		Provides shared lane pavement marking for bicyclists	Provides new pedestrian and bicycle facilities between Plymouth and 1st Street and access to the waterfront redevelopment area	Provides new pedestrian and bicycle facilities between Plymouth and new street segment, could also improve access to trails in Nob Hill Park	Maintains multimodal connectivity	Limits access to 6th Avenue from west for vehicles and bicycles
	Volume/Capacity Ratio or similar metric		Maintains adaquate capacity	Increases roadway capacity	Maintains adaquate capacity	Maintains adaquate capacity	Limits intersection capacity
Safety	Provides safety improvement at a location with a known safety issue		Maintains existing cross section	No known safety issues	No known safety issues	Addresses known safety issues	Addresses known safety issues
	Reduces potential for future crashes – providing separation between travel modes, other design strategies		Maintains existing cross section	Provides seprate pedestrian, bicycle, and motor vehicle facilities	Provides seprate pedestrian, bicycle, and motor vehicle facilities	Maintains higher amount of conflict points with left-turns.	Limits conflict points through elimination of left-turns.
Emergency Vehicle accommodations	Provides additional routes for emergency vehicles	Qualitative score	No additional routes or connections	Provides a new street connection betweem Plymouth and 1st Street	No additional routes or connections	No additional routes or connections	Limits access to 6th from west
	Decreases response time for emergency vehicles	Qualitative score	No impact to response time	Provides a new street connection betweem Plymouth and 1st Street	No impact to response time	No impact to response time	Limits access to 6th from west
	Emergency vehicle accommodation (i.e. size of roadway)	Qualitative score	Maintains existing cross section for vehicles	Provides continuous 12-foot travel lanes	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Limits access to 6th from west
Connectivity & Streetscape Aesthetics							
Improved street appearance	Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Poor = very little improvement of street elements. Moderate = moderate improvement of multiple elements, or major improvement of one element. Good = major improvement of multiple elements, or a proposed gateway feature.	Added street trees, planters, and site furnishings	New street, so nothing to compare to. Proposed gateway element.	Added street trees, planting strips, curbs and multi-use path	Little change in appearance	Little change in appearance
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	Best score for options that create a long separated bike path and connect it to rest of city, and for new bike/pedestrian connections to attractions. (Ease of transition <u>between</u> segments is covered in *Improved pedestrian/bicycle safety and accessibility* .)	No change to pedestrian connectivity. Moderate improvement to bike connectivity by adding sharrows.	Completely new connection for all modes.	New connection for pedestrians, including to the Nob Hill Park trails. The multi-use path and sharrows improve the connection for bikes.	NA	NA
Improves/affects quality of life	Improved health – more attractive options for walking and biking (Composite of related criteria)	Connecting people and places, improved business/employment opportunity, improved appearance, improved safety, and lower bike/ped level of stress all help improve quality of life.					
Street designs catered to needs of particular segments	Provides context sensitive solution	Appropriate level of improvements/change, or overkill? (e.g., too urban or too large scale for a fairly rural area?)	Similar to existing street. Changes are improved versions of the same elements.	Similar scale/design to existing South 1st Street	Minimal road section, which would be wider if there were no width constraints.	Minimal change from existing	Minimal change from existing
	Consistency with Vision Statement for that segment	Safety is part of the Vision Statements for each segment. Some options are a little less safe for bicyclists (in-street bike lanes on streets with higher speeds)	Consistent with Vision Statement. Sidewalk bulb-outs increase pedestrian safety at crossings, and have a traffic calming effect.	Consistent with Vision Statement. Sidewalk bulb-outs increase pedestrian safety at crossings, and have a traffic calming effect.	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement
Sustainable Design Strategies	Potentially incorporates storm water facilities (assuming feasible based on underlying geology)	Only road sections with landscape strips and intersections with roudabouts (or which reconfigure roads to create new open space) have opportunity for stormwater facilities.	New planters are potentially stormwater facilities	New planters are potentially stormwater facilities	New landscape strips are potentially stormwater facilities	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility
	Reduced impervious surface, or less than typical improvements would have	Poor = typical impervious surface, no landscape suitable for stormwater facilities; Moderate = less impervious surface <u>or</u> includes landscape; Good = less impervious surface <u>and</u> includes landscape	The new planters decrease impervious surface.	Typical impervious surface for this type of street	Because of width constraints, there is less impervious surface than a road like this would typically have.	Typical impervious surface for this type of intersection	Typical impervious surface for this type of intersection

Study Segment		Segment 3 - Plymouth Street (South 6th Street to Old Portland Road)					
Guiding Principle	**Specific Criteria**	**Option A - Proposed Road Section**	**Option B - Proposed Road Section**	**Option A - Old Portland Road & Plymouth Street**	**Option B - Old Portland Road & Plymouth Street**	**Option C - Old Portland Road & Plymouth Street**	**Option D - Old Portland Road & Plymouth Street**
Economy and Business Support							
Consistency with Previous Planning	Consistent with previous planning efforts	More consistent - sidewalks/ bike lanes both sides called for in TSP	More context sensitive than TSP	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.
	Improves upon previous planning efforts with context sensitive solutions	Less context sensitive given topography and adjacent properties	Addresses constrained condition on south side of road	Largely consistent with TSP	Improves on TSP, has property impacts.	Potentially outsized.	Improves on TSP, has property impacts.
	Consider timing of development related to emphasis of Plymouth vs Old Portland routes	N/A	N/A	This intersection will direct people to the existing route (Old Portland).	This intersection will direct people to the new Plymouth route. Timing of this intersection should coincide with waterfront/Plymouth improvements.	This intersection will direct people to either the existing route (Old Portland) or the new Plymouth route. Timing of this intersection should coincide with waterfront/Plymouth improvements.	This intersection will direct people to the new Plymouth route. Timing of this intersection should coincide with waterfront/Plymouth improvements.
Supports businesses and business districts	Improves awareness of business areas through wayfinding, signage, and gateway treatments	Allows for improved wayfinding	Allows for improved wayfinding	Not in business area. Few wayfinding opportunities.	Not in business area. Moderate wayfinding opportunities.	Not in business area. Roundabouts provide wayfinding/gateway opportunities.	Not in business area. Roundabouts provide wayfinding/gateway opportunities.
	Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access	Not in business area	Not in business area				
Supports customers, employees, and others by providing access	Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities	Lower stress for eastbound bicyclists, greater for west. No informal parking compared to current status.	Greater stress for eastbound bicyclists due to shared lane, lower for westbound. No informal parking compared to current status.	Only modest differenct from current conditions - closes some road connections to automobiles.	Improved multimodal access, no impact to parking	Improved multimodal access, no impact to parking	Improved multimodal access, no impact to parking
	Change to amount of on-street parking in business areas						
Relative Cost effectiveness	Relative price for construction and maintenance	Similar costs. May encourage some redevelopment/ residential improvements.	Similar costs. May encourage some redevelopment/ residential improvements.	Low relative cost	Low relative cost	Likely to have the largest direct cost and property impacts	Large diresct cost and property impacts
	Will improvements have economic benefit in terms of supporting or encouraging redevelopment?						
Transportation Safety & Mobility							
Improved connectivity & access	Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Minor improvement to traffic flow; however, intersection will operate below standard in long-term	Realigns Old Portland Road to connect with Plymouth, maintains or improves connectivity along adjacent streets	Provides a 5-leg roundabout, maintains or improves connectivity along adjacent streets	Provides a 4-leg roundabout, maintains or improves connectivity along adjacent streets
	Site-specific property impacts	Could impact properties on south side of roadway	No site-specific impacts anticipated	Potential impacts to adjacent property	Minor impacts to adjacent property	Major impacts to adjacent property	Major impacts to adjacent property
	Opportunity to incorporate transit service and facilities	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service
Improved pedestrian/bicycle safety and accessibility	Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities	Provides new pedestrian and bicycle facilities between Old Portland Road and 6th Street, facilities on south side may be discontinuous	Provides new pedestrian and bicycle facilities between Old Portland Road and 6th Street	No impact to pedestrian or bicycle access	Could improve pedestrian and bicycle access along Old Portland Road, Plymouth Street, and adjacent streets	Could improve pedestrian and bicycle access along Old Portland Road, Plymouth Street, and adjacent streets	Could improve pedestrian and bicycle access along Old Portland Road, Plymouth Street, and adjacent streets
	Bicycle Level of Stress; Pedestrian Level of Stress	Provides low stress pedestrian and bicycle facility	Provides low stress pedestrian and bicycle facility	No impact to pedestrian or bicycle LTS	Improve pedestrian and bicycle LTS	Improve pedestrian and bicycle LTS	Improve pedestrian and bicycle LTS
	Ease of transition between segments and intersections	Requires transition to shared-use path to east	Provides continuous shared-use path along north side	Minor improvement to connection between Old Portland Road and Plymouth Street	Improves connection between Old Portland Road , Plymouth Street, and adjacent streets	Improves connection between Old Portland Road , Plymouth Street, and adjacent streets	Improves connection between Old Portland Road , Plymouth Street, and adjacent streets
Through-movement and mobility	Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails	Provides new pedestrian and bicycle facilities between Old Portland Road and 6th Street, facilities on south side may be discontinuous	Provides new pedestrian and bicycle facilities between Old Portland Road and 6th Street	Minor improvement to connection between Old Portland Road and Plymouth Street	Improves pedestrian and bicycle connections between Old Portland Road , Plymouth Street, and adjacent streets	Improves pedestrian and bicycle connections between Old Portland Road , Plymouth Street, and adjacent streets	Improves pedestrian and bicycle connections between Old Portland Road , Plymouth Street, and adjacent streets
	Volume/Capacity Ratio or similar metric	Maintains adaquate capacity	Maintains adaquate capacity	Intersection will operate below capacit in future	Improves capacity of intersections	Improves capacity of intersections	Improves capacity of intersections
Safety	Provides safety improvement at a location with a known safety issue	No known safety issues	No known safety issues	Provides minor improvement to sight distance	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues
	Reduces potential for future crashes – providing separation between travel modes, other design strategies	Provides seprate pedestrian, bicycle, and motor vehicle facilities	Provides seprate pedestrian, bicycle, and motor vehicle facilities	Maintains existing cross section	Provides separate left-turn lanes	Roundabouts can reduce potential for future crashes	Roundabouts can reduce potential for future crashes
Emergency Vehicle accommodations	Provides additional routes for emergency vehicles	No additional routes or connections	No additional routes or connections	No additional routes or connections	Improve access between Old Portland Road, Plymouth Street, and adjacent streets	Improve access between Old Portland Road, Plymouth Street, and adjacent streets	Improve access between Old Portland Road, Plymouth Street, and adjacent streets
	Decreases response time for emergency vehicles	No impact to response time	No impact to response time	No impact to response time	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles
	Emergency vehicle accommodation (i.e. size of roadway)	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Improves access for emergency vehicles	Improves access for emergency vehicles	Improves access for emergency vehicles
Connectivity & Streetscape Aesthetics							
Improved street appearance	Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Added street trees, curbs, and sidewalk	Added street trees, planting strip, curbs, and sidewalk	Gateway element	Gateway element	The roundabout provides a larger venue for a gateway element	The roundabout provides a larger venue for a gateway element
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	New pedestrian connection. Bike lanes are a moderate improvement over shared use of vehicle lanes.	New pedestrian connection. The multi-use path is a major improvement over shared use of vehicle lanes.	NA	NA	NA	NA
Improves/affects quality of life	Improved health – more attractive options for walking and biking (Composite of related criteria)						
Street designs catered to needs of particular segments	Provides context sensitive solution	Scale of road is consistent with residential context	Scale of road is consistent with residential context	Similar scale to existing intersections	Similar scale to existing intersections	Smaller roundabout moderately increases scale to compared to existing intersections	Larger roundabout increases scale to compared to existing intersections
	Consistency with Vision Statement for that segment	Consistent with Vision Statement. On-street bike lanes are somewhat less safe than separated facilities.	Consistent with Vision Statement. The multi-use path increases bike safety compared to Option A.	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement
Sustainable Design Strategies	Potentially incorporates storm water facilities (assuming feasible based on underlying geology)	Does not provide opportunity for stormwater facility	New landscape strips are potentially stormwater facilities	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility	Roundabout provides an opportunity for stormwater facility	Roundabout provides an opportunity for stormwater facility
	Reduced impervious surface, or less than typical improvements would have	Slightly less impervious surface compared to typical road, only because one sidewalk is partially omitted due to width constraints.	Less impervious surface than a road like this would typically have.	Moderate decrease to impervious surface	Moderate decrease to impervious surface	Similar amount of impervious surface compared to existing	Similar amount of impervious surface compared to existing

Study Segment		Segment 4.1 - Old Portland Road				
Guiding Principle	**Specific Criteria**	**Option A - Proposed Road Section**	**Option B - Proposed Road Section**	**Option C - Proposed Road Section**	**Option A - Old Portland Road & Kaster Road**	**Option B - Old Portland Road & Kaster Road**
Economy and Business Support						
Consistency with Previous Planning	Consistent with previous planning efforts	Consistent with proposed TSP cross-section	Differs from TSP cross-section but provides similar multi-modal facilities	Differs from TSP cross-section but provides similar multi-modal facilities	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.
	Improves upon previous planning efforts with context sensitive solutions	No improvement over previous efforts	Meets criterion	Meets criterion	No change from previous plan	Provides context sensitive solution
	Consider timing of development related to emphasis of Plymouth vs Old Portland routes	NA	NA	NA	NA	NA
Supports businesses and business districts	Improves awareness of business areas through wayfinding, signage, and gateway treatments	Improves access over current conditions	Access to adjacent properties somewhat more difficult due to crossing cycletrack/multi use path	Access to adjacent properties somewhat more difficult due to crossing cycletrack/multi use path	Upgrading intersection allows opportunities for new wayfinding.	Upgrading intersection allows opportunities for new wayfinding.
	Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access				Improves walking access to existing business.	Roundabout offers somewhat less direct pedestrian connections. May impact existing business property.
Supports customers, employees, and others by providing access	Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities	Improves access over current conditions	Access to adjacent properties somewhat more difficult due to crossing cycletrack/multi use path	Access to adjacent properties somewhat more difficult due to crossing cycletrack/multi use path	Upgrading intersection will improve multi-modal access	Roundabout offers somewhat less direct pedestrian connections. May impact existing business property.
	Change to amount of on-street parking in business areas				No change	May impact parking near existing business
Relative Cost effectiveness	Relative price for construction and maintenance	Moderately costly, likely to be borne by development.	Increase in costs over option A	Increase in costs over option A	Roundabouts typically have higher construction costs and lower operation/maintenance costs than signalized intersections	Roundabouts typically have higher construction costs and lower operation/maintenance costs than signalized intersections
	Will improvements have economic benefit in terms of supporting or encouraging redevelopment?				No difference	No difference
Transportation Safety & Mobility						
Improved connectivity & access	Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Provides signaized access to Kaster Road from Old Portland Road	Provides a 4-leg Roundabout at Kaster Road
	Site-specific property impacts	No site-specific impacts anticipated	No site-specific impacts anticipated - narrow ROW	No site-specific impacts anticipated	No site-specific impacts anticipated	Minor impacts to adjacent property
	Opportunity to incorporate transit service and facilities	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Provides potential for signalized crossing near a future transit stop	Does not limit opportunity for transit service
Improved pedestrian/bicycle safety and accessibility	Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities	Provides continuous on-street bike lanes and sidewalks on boths sides of the roadway	Provides shared use path on one side of the roadway and sidewalks on the other; bicyclists have to share the shared-use path with pedestrians	Provides continuous sidewalks on both sides of the roadway and either one-way or two-way cycle tracks	Provides signalized crossing for pedestrian and bicycles	Provides a 4-leg Roundabout with multiple crossing opportunities for pedestrians and bicyclists
	Bicycle Level of Stress; Pedestrian Level of Stress	Provides continuous low-stress pedestrian and bicycle facilities	Provides continuous low-stress pedestrian and bicycle facilities	Provides continuous low-stress pedestrian and bicycle facilities	Improve pedestrian and bicycle LTS	Improve pedestrian and bicycle LTS
	Ease of transition between segments and intersections	No challenge with transitions between segments	May require challenging transition for bicyclists	No challenge with transitions between segments	No challenge with transitions between segments	No challenge with transitions between segments
Through-movement and mobility	Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Improves pedestrian and bicycle connections between Old Portland Road and Kaster Road	Improves pedestrian and bicycle connections between Old Portland Road and Kaster Road
	Volume/Capacity Ratio or similar metric	Maintains adaquate capacity	Maintains adaquate capacity	Maintains adaquate capacity	Improves capacity of intersection	Improves capacity of intersection
Safety	Provides safety improvement at a location with a known safety issue	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues
	Reduces potential for future crashes – providing separation between travel modes, other design strategies	Sidewalks are separated by a landscape buffer; however, bike lanes are adjacent to street traffic	Shared-use path and sidewalks are separated by landscape buffer; however, pedestrian and bicyclists share the shared-use path	Sidewalks are separated by landscape buffers and cycle tracks are separated by elevation/pavement type	Could reduce potential for future turn movement and angle crashes, could result in an increase in rear-end crashes	Roundabouts can reduce potential for future crashes
Emergency Vehicle accommodations	Provides additional routes for emergency vehicles	No additional routes or connections	No additional routes or connections	No additional routes or connections	Improve access between Old Portland Road and Kaster Road	Improve access between Old Portland Road and Kaster Road
	Decreases response time for emergency vehicles	No impact to response time	No impact to response time	No impact to response time	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles
	Emergency vehicle accommodation (i.e. size of roadway)	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Improves access for emergency vehicles	Improves access for emergency vehicles
Connectivity & Streetscape Aesthetics						
Improved street appearance	Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Added street trees, planting strips, curbs, and sidewalks	Added street trees, planting strips, curbs, and sidewalk/multi-use path. Wider landscape strip compared to the other Options.	Added street trees, planting strips, curbs, cycletrack, and sidewalks	Intersection itself is similar in appearance to existing	Roundabout provides opportunity for art feature
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	New connection for pedestrians and bikes, including new connection to McCormick Park trails.	New connection for pedestrians and bikes, including new connection to McCormick Park trails. Separated facilities for bikes and pedestrians.	New connection for pedestrians and bikes, including new connection to McCormick Park trails. Separated facilities for bikes and pedestrians.	NA	NA
Improves/affects quality of life	Improved health – more attractive options for walking and biking (Composite of related criteria)					
Street designs catered to needs of particular segments	Provides context sensitive solution	Appropriate scale given expected development	Appropriate scale given expected development	Appropriate scale given expected development	Similar scale to existing intersection	Larger scale than existing but appropriate given expected development
	Consistency with Vision Statement for that segment	Consistent with Vision Statement. On-street bike lanes are somewhat less safe than separated facilities.	Consistent with Vision Statement. The multi-use path has potential for conflict/safety issues between bicyclists and pedestrians.	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement
Sustainable Design Strategies	Potentially incorporates storm water facilities (assuming feasible based on underlying geology)	New landscape strips are potentially stormwater facilities	New landscape strips are potentially stormwater facilities	New landscape strips are potentially stormwater facilities	Does not provide opportunity for stormwater facility	Roundabout provides an opportunity for stormwater facility
	Reduced impervious surface, or less than typical improvements would have	Typical impervious surface for this type of road	Less impervious surface than a road like this would typically have	Less impervious surface than a road like this would typically have	Similar amount of impervious surface compared to existing	Similar amount of impervious surface compared to existing

Study Segment		Segment 4.1 - Old Portland Road (continued)				
Guiding Principle	**Specific Criteria**	**Option A - Old Portland Road & Port Avenue**	**Option B - Old Portland Road & Port Avenue**	**Option C - Old Portland Road & Port Avenue**	**Option A - Old Portland & Gable Road**	**Option B - Old Portland & Gable Road**
Economy and Business Support						
Consistency with Previous Planning	Consistent with previous planning efforts	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.
	Improves upon previous planning efforts with context sensitive solutions	NA/No difference between options	NA/No difference between options	NA/No difference between options	NA/No difference between options	NA/No difference between options
	Consider timing of development related to emphasis of Plymouth vs Old Portland routes	NA	NA	NA	NA	NA
Supports businesses and business districts	Improves awareness of business areas through wayfinding, signage, and gateway treatments	No significant difference between options	No significant difference between options	No significant difference between options	No significant difference between options	No significant difference between options
	Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access	NA/No difference between options	NA/No difference between options	NA/No difference between options	NA/No difference between options	NA/No difference between options
Supports customers, employees, and others by providing access	Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities	Improvement over existing conditions	Improvement over existing conditions	Improvement over existing conditions	Improvement over existing conditions	Improvement over existing conditions
	Change to amount of on-street parking in business areas	Not a determinant in amount of on-street parking	Not a determinant in amount of on-street parking	Not a determinant in amount of on-street parking	Will impact existing off-street parking	Will impact existing off-street parking
Relative Cost effectiveness	Relative price for construction and maintenance	Less costly than other options	New ROW has significant costs	New ROW has significant costs. Signalized intersection has additional costs.	May be somewhat costlier than Option B due to new signalized interseciton	May be somewhat less costly than Option A
	Will improvements have economic benefit in terms of supporting or encouraging redevelopment?	NA/No difference between options	NA/No difference between options	NA/No difference between options	N/A	N/A
Transportation Safety & Mobility						
Improved connectivity & access	Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity	Provides a separate left-turn lane from Old Portland Road to Railroad Avenue and provides ability to complete two-stage left from Railroad Avenue	Provides signalized access to Railroad Avenue and Port Avenue, and creates greater separation between intersections	Provides a separate left-turn lane from Old Portland Road to Railroad/Port Avenue and provides ability to complete two-stage left from Railroad/Port Avenue. Also creates greater separation between intersections	Realigns Old Portland Road and Gable Road and provides a signalized acess from Gable Road to Old Portland Road. Also creates greater separation between intersections.	Realigns Old Portland Road, provides separate left-turn lane from Gable Road to Old Portland Road and provides the ability to complete two-stage left from Old Portland to Gable Road. . Also creates greater separation between intersections
	Site-specific property impacts	Potential impacts to adjacent property	Minor impacts to adjacent property	Minor impacts to adjacent property	Major impacts to adjacent property	Major impacts to adjacent property
	Opportunity to incorporate transit service and facilities	Does not limit opportunity for transit service	Provides potential for signalized crossing near a future transit stop	Does not limit opportunity for transit service	Provides potential for signalized crossing near a future transit stop	Does not limit opportunity for transit service
Improved pedestrian/bicycle safety and accessibility	Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities	Could provide two-stage pedestrian/bicycle crossing	Provides signalized crossing for pedestrian and bicycles	Could provide two-stage pedestrian/bicycle crossing	Provides signalized crossing for pedestrian and bicycles	Could provide two-stage pedestrian/bicycle crossing
	Bicycle Level of Stress; Pedestrian Level of Stress	Could improve pedestrian and bicycle LTS	Improve pedestrian and bicycle LTS	Could improve pedestrian and bicycle LTS	Improve pedestrian and bicycle LTS	Could improve pedestrian and bicycle LTS
	Ease of transition between segments and intersections	No challenge with transitions between segments	No challenge with transitions between segments	No challenge with transitions between segments	Emphasizes Old Portland Road	No challenge with transitions between segments
Through-movement and mobility	Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails	Could improve pedestrian and bicycle connections between Old Portland Road and Railroad Avenue	Improves pedestrian and bicycle connections between Old Portland Road and Railroad/Port Avenue	Could improve pedestrian and bicycle connections between Old Portland Road and Railroad/Port Avenue	Improves pedestrian and bicycle connections between Old Portland Road and Gable Road	Could improve pedestrian and bicycle connections between Old Portland Road and Gable Road
	Volume/Capacity Ratio or similar metric	Improves capacity of intersection	Improves capacity of intersection	Improves capacity of intersection	Improves capacity of intersection	Improves capacity of intersection
Safety	Provides safety improvement at a location with a known safety issue	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues
	Reduces potential for future crashes – providing separation between travel modes, other design strategies	Provides separation between slowed or stopped vehicles waiting to turn left	Could reduce potential for future turn movement and angle crashes, could result in an increase in rear-end crashes	Provides separation between slowed or stopped vehicles waiting to turn left	Could reduce potential for future turn movement and angle crashes, could result in an increase in rear-end crashes	Provides separation between slowed or stopped vehicles waiting to turn left
Emergency Vehicle accommodations	Provides additional routes for emergency vehicles	Improve access between Old Portland Road and Railroad Avenue	Improve access between Old Portland Road and Railroad/Port Avenue	Improve access between Old Portland Road and Railroad/Port Avenue	Could improve access along Old Portland Road, but limits access along Gable Road	Improve access between Old Portland Road and Gable Road
	Decreases response time for emergency vehicles	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles	Could improve response time along along Portland Road, but reduce response time along Gable Road	Could decrease response times for emergency vehicles
	Emergency vehicle accommodation (i.e. size of roadway)	Improves access for emergency vehicles	Improves access for emergency vehicles	Improves access for emergency vehicles	Able to accommodate emergency vehicles	Improves access for emergency vehicles
Connectivity & Streetscape Aesthetics						
Improved street appearance	Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Little change in appearance	Little change in appearance	Little change in appearance	Little change in appearance (similar looking intersections in reconfigured layout)	Little change in appearance (similar looking intersections in reconfigured layout)
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	NA	NA	NA	NA	NA
Improves/affects quality of life	Improved health – more attractive options for walking and biking (Composite of related criteria)					
Street designs catered to needs of particular segments	Provides context sensitive solution	Similar scale to existing intersection	Larger scale than existing but appropriate given expected development	Similar scale to existing intersection	Similar scale to existing intersection	Similar scale to existing intersection
	Consistency with Vision Statement for that segment	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement
Sustainable Design Strategies	Potentially incorporates storm water facilities (assuming feasible based on underlying geology)	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility
	Reduced impervious surface, or less than typical improvements would have	Similar amount of impervious surface compared to existing	Added impervious surface due to new turn lanes, and new extension of Port Avenue	Added impervious surface due to new extension of Port Avenue	Moderate increase in impervious surface	Similar amount of impervious surface compared to existing

Study Segment		Segment 4.2 - Gable Road				
Guiding Principle	**Specific Criteria**	**Option A - Proposed Road Section**	**Option B - Proposed Road Section**	**Option C - Proposed Road Section**	**Gable Road & McNulty Way**	**Gable Road & US 30**
Economy and Business Support						
Consistency with Previous Planning	Consistent with previous planning efforts	Consistent with proposed TSP cross-section	Differs from TSP cross-section but provides similar multi-modal facilities	Differs from TSP cross-section but provides similar multi-modal facilities	Recofiguring this intersection not called for in TSP.	Recofiguring this intersection not called for in TSP.
	Improves upon previous planning efforts with context sensitive solutions	No improvement over previous efforts	Meets criterion	Meets criterion	NA/No difference between options	NA/No difference between options
	Consider timing of development related to emphasis of Plymouth vs Old Portland routes	Equally supportive of Plymouth and Old Portland.	Equally supportive of Plymouth and Old Portland.	Equally supportive of Plymouth and Old Portland.	NA	NA
Supports businesses and business districts	Improves awareness of business areas through wayfinding, signage, and gateway treatments	Improved over current conditions.	Automobile crossings of multi use path/cycletracks may be a challenge.	Automobile crossings of multi use path/cycletracks may be a challenge.	No alternatives provided	No alternatives provided
	Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access				NA/No difference between options	NA/No difference between options
Supports customers, employees, and others by providing access	Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities	Improved multi-modal connectivity and access.	Improved multi-modal connectivity and access.	Improved multi-modal connectivity and access.	No alternatives provided	No alternatives provided
	Change to amount of on-street parking in business areas				NA/No difference between options	NA/No difference between options
Relative Cost effectiveness	Relative price for construction and maintenance	Standard street construction costs, improvements likely to encourage activity and development.	Narrower total width, costs associated with multi-use path. improvements likely to encourage activity and development.	Likely somewhat costlier than other options due to overall width. improvements likely to encourage activity and development.	No alternatives provided	No alternatives provided
	Will improvements have economic benefit in terms of supporting or encouraging redevelopment?				NA/No difference between options	NA/No difference between options
Transportation Safety & Mobility						
Improved connectivity & access	Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity	Left-turn lane improves access to adjacent land uses/increases roadway/intersection capacity	Left-turn lane improves access to adjacent land uses/increases roadway/intersection capacity	Left-turn lane improves access to adjacent land uses/increases roadway/intersection capacity	Provides a separate left-turn lane from Gable Road to McNulty Way and provides ability to complete two-stage left from McNulty Way	Provides separate right-turn lane, improves capacity of intersection to accommodate future growth
	Site-specific property impacts	No site-specific impacts anticipated	No site-specific impacts anticipated - narrow ROW	No site-specific impacts anticipated	Minor impacts to adjacent property	Minor impacts to adjacent property
	Opportunity to incorporate transit service and facilities	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Provides potential for signalized crossing near a future transit stop
Improved pedestrian/bicycle safety and accessibility	Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities	Provides continuous on-street bike lanes and sidewalks on boths sides of the roadway	Provides shared use path on one side of the roadway and sidewalks on the other; bicyclists have to share the shared-use path with pedestrians	Provides continuous sidewalks on both sides of the roadway and either one-way or two-way cycle tracks	Could provide two-stage pedestrian/bicycle crossing	Provides signalized crossing for pedestrian and bicycles
	Bicycle Level of Stress; Pedestrian Level of Stress	Provides continuous low-stress pedestrian and bicycle facilities	Provides continuous low-stress pedestrian and bicycle facilities	Provides continuous low-stress pedestrian and bicycle facilities	Could improve pedestrian and bicycle LTS	Could improve pedestrian and bicycle LTS
	Ease of transition between segments and intersections	No challenge with transitions between segments	May require challenging transition for bicyclists	No challenge with transitions between segments	No challenge with transitions between segments	No challenge with transitions between segments
Through-movement and mobility	Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Could improve pedestrian and bicycle connections between Gable Road and McNulty Way	Could improve pedestrian and bicycle connections along Gable Road and between Gable Road and US 30
	Volume/Capacity Ratio or similar metric	Improves roadway capacity	Improves roadway capacity	Improves roadway capacity	Improves capacity of intersection	Improves capacity of intersection
Safety	Provides safety improvement at a location with a known safety issue	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues	Addresses known safety issues
	Reduces potential for future crashes – providing separation between travel modes, other design strategies	Sidewalks are separated by a landscape buffer; however, bike lanes are adjacent to street traffic	Shared-use path and sidewalks are separated by landscape buffer; however, pedestrian and bicyclists share the shared-use path	Sidewalks are separated by landscape buffers and cycle tracks are separated by elevation/pavement type	Provides separation between slowed or stopped vehicles waiting to turn left	Provides separation between slowed or stopped vehicles waiting to turn right
Emergency Vehicle accommodations	Provides additional routes for emergency vehicles	No additional routes or connections	No additional routes or connections	No additional routes or connections	Improve access between Gable Road and McNulty Way	Improves access from Gable Road to US 30
	Decreases response time for emergency vehicles	No impact to response time	No impact to response time	No impact to response time	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles
	Emergency vehicle accommodation (i.e. size of roadway)	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Improves access for emergency vehicles	Improves access for emergency vehicles
Connectivity & Streetscape Aesthetics						
Improved street appearance	Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Added street trees, planting strips, planted median, curbs, and sidewalks	Added street trees, planting strips, planted median, curbs, and sidewalk/multi-use path. Wider landscape strip compared to the other Options.	Added street trees, planting strips, planted median, curbs, cycletrack, and sidewalks	Little change in appearance	Little change in appearance
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	New connection for pedestrians, improved connection for bikes	New connection for pedestrians, improved connection for bikes. Separated facilities for bikes and pedestrians.	New connection for pedestrians, improved connection for bikes. Separated facilities for bikes and pedestrians.	NA	NA
Improves/affects quality of life	Improved health – more attractive options for walking and biking (Composite of related criteria)					
Street designs catered to needs of particular segments	Provides context sensitive solution	Wider section than existing, but appropriate scale given expected development	Wider section than existing, but appropriate scale given expected development	Wider section than existing, but appropriate scale given expected development	Similar scale to existing intersection	Similar scale to existing intersection
	Consistency with Vision Statement for that segment	Consistent with Vision Statement. On-street bike lanes are somewhat less safe than separated facilities.	Consistent with Vision Statement. The multi-use path has potential for conflict/safety issues between bicyclists and pedestrians.	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement
Sustainable Design Strategies	Potentially incorporates storm water facilities (assuming feasible based on underlying geology)	New landscape strips and median are potentially stormwater facilities	New landscape strips and median are potentially stormwater facilities	New landscape strips and median are potentially stormwater facilities	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility
	Reduced impervious surface, or less than typical improvements would have	Typical impervious surface for this type of road	Less impervious surface than a road like this would typically have	Less impervious surface than a road like this would typically have	Similar amount of impervious surface compared to existing	Similar amount of impervious surface compared to existing

Study Segment		Segment 5 - Secondary Study Area				
Guiding Principle	**Specific Criteria**	**Old Portland Road - Proposed Road Section**	**Millard Road - Proposed Road Section**	**McNulty Way - Proposed Road Section**	**Millard Road & Old Portland Road**	**Millard Road & US 30**
Economy and Business Support						
Consistency with Previous Planning	Consistent with previous planning efforts	Consistent with adopted plans.		Consistent with adopted plans.	Change from existing plans	Intersection currently being evaluated
	Improves upon previous planning efforts with context sensitive solutions	NA	NA	NA	NA	NA
	Consider timing of development related to emphasis of Plymouth vs Old Portland routes	NA	NA	NA	NA	NA
Supports businesses and business districts	Improves awareness of business areas through wayfinding, signage, and gateway treatments	Opportunities for wayfinding to other areas of the City.	Opportunities for wayfinding to other areas of the City.	Opportunities for wayfinding to other areas of the City.	Opportunities for wayfinding to other areas of the City.	Opportunities for wayfinding to other areas of the City.
	Creates walkable and inviting business areas – can compare potential sidewalk widths and pedestrian access	Improved multi-modal access over existing conditions	Improved multi-modal access over existing conditions	Improved multi-modal access over existing conditions		
Supports customers, employees, and others by providing access	Improves multi-modal access to business areas – provides continuous, low stress, pedestrian and bicycle facilities	Improved multi-modal access over existing conditions	Improved multi-modal access over existing conditions	Improved multi-modal access over existing conditions	Improvements likely to result in easier-to-cross intersections.	Improvements likely to result in easier-to-cross intersections.
	Change to amount of on-street parking in business areas	No change	No change	No change		
Relative Cost effectiveness	Relative price for construction and maintenance	Costlier than current rural condition, likely to be paid for by neighborhing development	Costlier than current rural condition, likely to be paid for by neighborhing development	Costlier than current rural condition, likely to be paid for by neighborhing development	Costlier than current rural condition, likely to be paid for by neighborhing development	ODOT primarily responsible for costs and maintenance.
	Will improvements have economic benefit in terms of supporting or encouraging redevelopment?	Roadway improvements likely to support development/redevelopment.	Roadway improvements likely to support development/redevelopment.	Roadway improvements likely to support development/redevelopment.		
Transportation Safety & Mobility						
Improved connectivity & access	Improves motor vehicle access to business areas – improves traffic flow, increases roadway and/or intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Maintains existing cross section for vehicles (two 12-foot travel lanes)/does not increase roadway/ intersection capacity	Increases turning radius for large trucks	Provides signaized access to Millard Road and additional turn lanes from Millard to US 30
	Site-specific property impacts	No site-specific impacts anticipated	No site-specific impacts anticipated	No site-specific impacts anticipated	Minimal impact to adjacent property	Minimal impact to adjacent property
	Opportunity to incorporate transit service and facilities	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service	Does not limit opportunity for transit service
Improved pedestrian/bicycle safety and accessibility	Improves pedestrian and bicycle access to business areas – provides continuous, low stress pedestrian and bicycle facilities	Provides shared use path on one side of the roadway and sidewalks on the other; bicyclists have to share the shared-use path with pedestrians	Provides continuous on-street bike lanes and sidewalks on boths sides of the roadway	Provides continuous on-street bike lanes and sidewalks on boths sides of the roadway	No impact to pedestrian or bicycle access	Provides signalized crossing for pedestrian and bicycles
	Bicycle Level of Stress; Pedestrian Level of Stress	Provides continuous low-stress pedestrian and bicycle facilities	Provides continuous low-stress pedestrian and bicycle facilities	Provides continuous low-stress pedestrian and bicycle facilities	No impact to pedestrian or bicycle LTS	Provides low-stress pedestrian and bicycle crossing
	Ease of transition between segments and intersections	May require challenging transition for bicyclists	No challenge with transitions between segments	No challenge with transitions between segments	Improves transition from Old Portland Road to Millard Road for large trucks	Improves transition from US 30 to Millard Road
Through-movement and mobility	Improves multi-modal access to other parts of the city – increased street connectivity, increased ped/bike connectivity, increased access to multi-use paths and trails	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Provides continuous bicycle and pedestrian facilities on both sides of the roadway	Improves access for large trucks	Provides signaized access to Millard Road and additional turn lanes from Millard to US 30
	Volume/Capacity Ratio or similar metric	Maintains adaquate capacity	Maintains adaquate capacity	Maintains adaquate capacity	Maintains adaquate capacity	improves capacity of intersection
Safety	Provides safety improvement at a location with a known safety issue	No known safety issues	No known safety issues	No known safety issues	Addresses known safety issues	Addresses known safety issues
	Reduces potential for future crashes – providing separation between travel modes, other design strategies	Shared-use path and sidewalks are separated by landscape buffer; however, pedestrian and bicyclists share the shared-use path	Sidewalks are separated by a landscape buffer; however, bike lanes are adjacent to street traffic	Sidewalks are separated by a landscape buffer; however, bike lanes are adjacent to street traffic	Does not impact potential for future crashes	Reduces potential for future turn movement and angle crashes, could result in an increase in rear-end crashes
Emergency Vehicle accommodations	Provides additional routes for emergency vehicles	No additional routes or connections	No additional routes or connections	No additional routes or connections	No additional routes or connections	Improve access to/from Millard Road for emergency vehicles
	Decreases response time for emergency vehicles	No impact to response time	No impact to response time	No impact to response time	Could decrease response times for emergency vehicles	Could decrease response times for emergency vehicles
	Emergency vehicle accommodation (i.e. size of roadway)	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Maintains existing cross section for vehicles	Improves access for emergency vehicles	Improves access for emergency vehicles
Connectivity & Streetscape Aesthetics						
Improved street appearance	Qualitative score, based on amount of added landscaping and street trees, higher quality paving materials, space for added street furnishings, and for a proposed gateway element.	Added street trees, planting strips, curbs, and sidewalk/multi-use path	Added street trees, planting strips, curbs, and sidewalks	Added street trees, planting strips, curbs, and sidewalks	Little change in appearance	Little change in appearance
Improved ped/bike connectivity between corridor and adjacent attractions	• Separated (off-street) bike route • Separated (not curb-tight) pedestrian route • New bike and pedestrian connectivity through the corridor • New bike and pedestrian connections to adjacent attractions	New connection for bikes and pedestrians. Separated facilities for bikes and pedestrians.	New connection for bikes and pedestrians.	New connection for bikes and pedestrians.	NA	NA
Improves/affects quality of life	Improved health – more attractive options for walking and biking (Composite of related criteria)					
Street designs catered to needs of particular segments	Provides context sensitive solution	Wider section than existing, but appropriate scale given expected development	Wider section than existing, but appropriate scale given expected development	Wider section than existing, but appropriate scale given expected development	Similar scale to existing intersection	Similar scale to existing intersection
	Consistency with Vision Statement for that segment	Consistent with Vision Statement.	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement	Consistent with Vision Statement
Sustainable Design Strategies	Potentially incorporates storm water facilities (assuming feasible based on underlying geology)	New landscape strips are potentially stormwater facilities	New landscape strips are potentially stormwater facilities	New landscape strips are potentially stormwater facilities	Does not provide opportunity for stormwater facility	Does not provide opportunity for stormwater facility
	Reduced impervious surface, or less than typical improvements would have	Less impervious surface than a road like this would typically have	Less impervious surface than a road like this would typically have	Less impervious surface than a road like this would typically have	Similar amount of impervious surface compared to existing	Similar amount of impervious surface compared to existing

RIVERFRONT CONNECTOR PLAN

APPENDIX 3:

TECHNICAL MEMORANDUM #1

MEMORANDUM

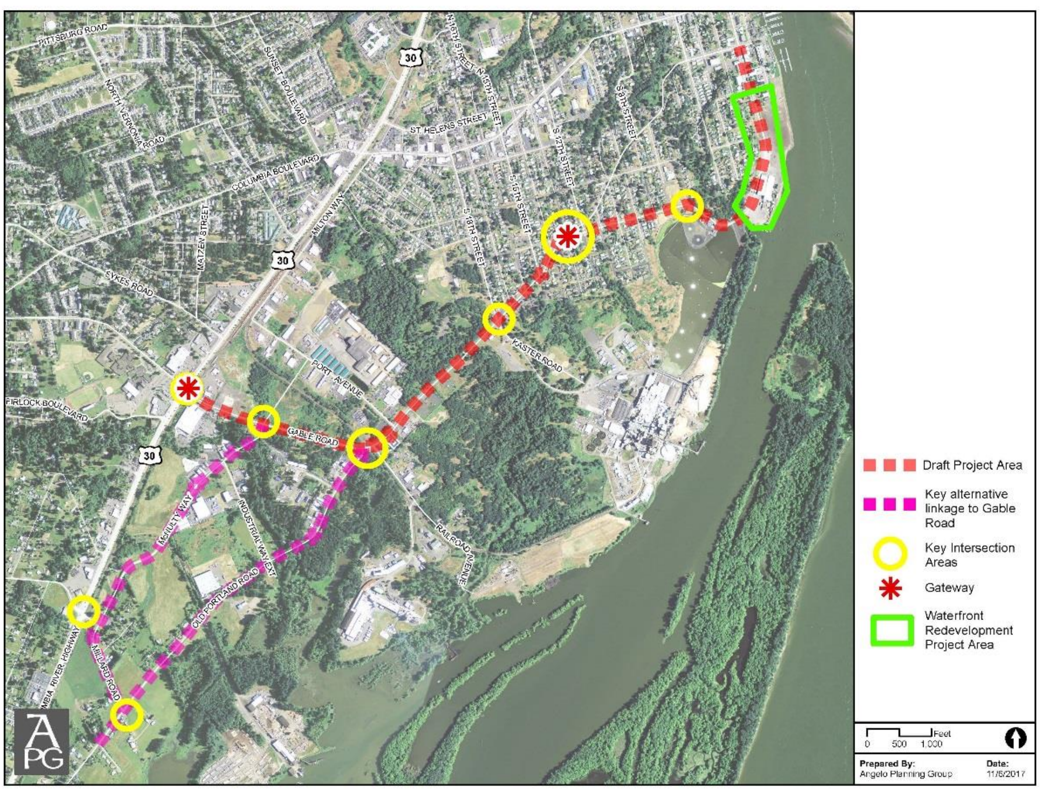
Technical Memorandum #1
City of St. Helens Riverfront Connector Plan

DATE	February 6, 2018
TO	Project Management Team
FROM	Matt Hastie and Kyra Haggart, Angelo Planning Group
CC	

INTRODUCTION

The purpose of this background document report is to provide an overview of the policies, standards, and practices related to corridor planning as they apply to the study area, shown in Figure 1.

Figure 1. Study Area



The documents that were reviewed for policies, standards, and practices related to access management, highway design, signals, crosswalks, street lighting, and landscaping include the following documents, as identified in Task 2.3. Policies, standards, and practices applicable to the study area and related topics were not necessarily found in every document.

- Oregon Administrative Rules Chapter 734 Division 51 – Access Management Rule
- 2006 Oregon Transportation Plan
- 1999 Oregon Highway Plan and amendments
- 2016 Oregon Bicycle and Pedestrian Plan
- 2012 Highway Design Manual and amendments
- 2016 ODOT Traffic Manual
- Oregon Administrative Rules Chapter 734 Division 20 – Traffic Control
- 2011 St. Helens Transportation System Plan (TSP)
- 2016 St. Helens Waterfront Framework Plan
- 2017 St. Helens Branding & Wayfinding Master Plan
- 2017 St. Helens Urban Renewal Plan & Urban Renewal Report
- 2005 St. Helens Strategic Plan
- 2007 Economic Development Plan
- 1997 A Vision for the St. Helens in the Year 2020
- St. Helens Municipal Code Chapter 17.32 Zones and Uses

Corridor planning elements listed below, as identified in Task 2.3, have been expanded to include planning elements identified in Task 7.2 (Draft Implementing Policies and Ordinances). These elements will potentially be the subject of plan and code amendments needed for implementation of the corridor plan. Elements outside public right-of-way may be addressed only nominally and insofar as they interact with elements in the right-of-way.

Streetscape and street design elements (inside right-of-way):

- Access management (driveways and curbcuts)
- Highway design
- Signals
- Crosswalk enhancements (paving, pavement markings, signs, advance stop bars, lighting)
- Street lighting (pole design, banner hangers, flower baskets)
- Landscaping
- Pedestrian and bicycle facilities
- Pedestrian and bicycle connections between commercial, public, and residential uses
- Streetscape
- Lane widths
- Mid-block curb extensions (wider sidewalks, potential pedestrian crossings)
- Curb extensions (designs, dimensions, uses of additional space, landscaping)
- Sidewalk paving (materials and patterns)
- Street trees (locations, grates or pavers, species)

- Setbacks
- Parking and parking lot landscaping and design
- On-site stormwater management that can include green streets strategies

Site design and building design/orientation (outside right-of-way):

- Building street interface and presence, including orientation, windows, awnings and overhangs
- Architectural design
- Building height and massing
- Gateway treatments
- Direction signs & wayfinding
- Public art locations
- Street furniture (locations, benches, trash cans, and style)
- Walls and fences
- Special opportunity areas that can include small plazas
- Mixed use development

The corridor planning study area includes the following corridor segments:

- **South 1st Street Segment.** South 1st Street is located within the City's Riverfront District. It will continue to provide multi-modal access to local businesses within the Riverfront District, and will serve as a primary route within the redeveloped Riverfront District area. The portion that is within the redeveloped waterfront site will be a walkable street that supports the redevelopment of a vibrant waterfront district and provides access to the area from surrounding neighborhoods.

- **Plymouth Street, northern Old Portland Road, and Gable Road Segments.** These roads will provide multi-modal connections to the waterfront redevelopment site, the surrounding Riverfront District, and adjacent neighborhoods. Street designs will incorporate opportunities for landscaping, wayfinding signage, and gateway features that direct people to the Riverfront District.

- **McNulty Way and southern Old Portland Road Segments.** These roads will provide an alternative route to the area from US 30. Proposed street and intersection designs for these segments will focus on key intersection improvements, wayfinding signage, and multi-modal connectivity, and support the access needs of adjacent land uses.

This report begins with background in the general planning context provided by State documents and local documents. Then the report moves into more specific corridor planning elements, organized by those inside the right-of-way (Streetscape and Street Design) and those outside the right-of-way (Site Design and Building Design/Orientation).

PLANNING BACKGROUND

Statewide Planning Context

The following statewide planning documents impact the St. Helens Riverfront Connector corridor planning process.

Oregon Administrative Rules Chapter 734 Division 51 – Access Management Rule

Oregon Administrative Rule (OAR) 734-051 defines the State's role in managing access to highway facilities in order to maintain functional use and safety and to preserve public investment. The rule includes spacing standards for varying types of State roadways and criteria for granting right of access and approach locations onto State highway facilities.

Amendments to OAR 734-051 were adopted in early 2012 based on passage of Senate Bill 1024 and Senate Bill 264 in the 2010 and 2011 Oregon Legislature respectively. The amendments were intended to allow more consideration for economic development when developing and implementing access management rules and involved changes to how ODOT deals with approach road spacing, highway improvement requirements with development, and traffic impact analyses requirements for approach road permits.

Senate Bill 408, which passed in the 2013 legislative session and became effective January 1, 2014, addressed three priorities: existing approaches (private driveways) without ODOT's written permission; access management in highway facility plans; and access management in highway project delivery. The legislation provides new requirements for access management in the development of highway facility plans such as interchange are management plans and corridor plans, and requires collaboration with local governments in determining the location of local roads that intersection highways in the planning area. The legislation also directs ODOT to develop an access management strategy[1] for each highway modernization or improvement project. ODOT must develop key principles for each facility plan, which will be used to evaluate how abutting properties may retain or obtain access to the State highway during and after plan implementation. In developing the key principles, the department must also develop a methodology to weigh the benefits of a highway improvement to public safety and mobility against the locally adopted Transportation System Plan (TSP) and land uses permitted in the local comprehensive plan, as well as the economic development objectives of affected real property owners who require access to the State highway. If a facility plan identifies the need to modify, relocate or close existing private approaches, the plan must include key principles for managing access to the State highway and a timeline for plan implementation. Each facility plan also must document that there was

[1] The 2011 City of St. Helens Transportation System Plan Update defined an access management plan for City streets and US 30 through the community. The preparation of the current Riverfront Connector Plan will address access management and comply with OAR 734-051 and the TSP-defined access management strategy.

collaborative discussion and agreement between the department and the affected cities and counties regarding the location of County roads and City streets that intersect a State highway within the study area. Senate Bill 408 resulted in the adoption of two permanent rules by the Oregon Transportation Commission (OTC): 734-051-1065 Restriction of Turning Movements for Existing Approaches, and 734-051-3015 Presumption of Written Permission for an Existing Private Connection. Additionally, fifteen (15) existing permanent rules were amended, and five previously adopted temporary rules were repealed.

OAR 734-051-4020 (Standards and Criteria for Approval of Private Approaches)

Revised spacing standards were established in 2012 for new or modified approaches to statewide highways.[2] The amendments allow access management plans to establish spacing standards that may take precedence over the highway/approach spacing standards in the rule.[3]

Improvements that are proposed in corridor plans will need to meet these standards or move "in the direction of the access management spacing standards" by means of an access management strategy, plan, or mitigation proposal.[4]

Any recommended changes to existing access points or new access points from US 30 will need to meet or move in the direction of compliance with spacing standards in OAR 734-051. To be consistent with the direction provided in Senate Bill 408 and the resulting adopted and amended permanent rules, the development and evaluation of alternatives to address identified transportation system deficiencies should acknowledge the impacts and benefits to the local economy, as measured by adopted local land use designations (allowed uses) and economic development objectives and, to the extent known, the economic development objectives of property owners. While these standards are important in maintaining the integrity of state facilities like US 30, they will have a relatively minor impact on the Riverfront Connector Plan, given that the study area only interfaces with US 30 at two intersections.

Oregon Transportation Plan (Updated 2006)

The Oregon Transportation Plan (OTP) is a comprehensive plan that addresses the future transportation needs of the State of Oregon through the year 2030. The primary function of the OTP is to establish goals, policies, strategies, and initiatives that are translated into a series of modal plans, such as the Oregon Highway Plan (OHP) and the Oregon Bike and Pedestrian Plan (OBPP). The OTP emphasizes:

- Maintaining and maximizing the assets in place;

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[2] Tables 3 through 6 in OAR 734-051

[3] Pursuant to OAR 734-051-4020(8)(b)(C), spacing standards in AMPs may take precedence only over spacing standards in Tables 3-5 of OAR 734-051.

[4] OAR 734-051-1070(2), (3), and (4)

- Optimizing the performance of the existing system through technology;
- Integrating transportation, land use, economic development, and the environment;
- Integrating the transportation system across jurisdictions, ownerships, and modes;
- Creating sustainable funding; and
- Investing in strategic capacity enhancements.

The 2011 City of St. Helens Transportation System Plan Update identified future transportation needs within the study corridors. The current Riverfront Connector Plan will address deficiencies along key intersections in the project area through detailed streetscape recommendations, intersection improvements, and bicycle and pedestrian enhancements and is expected to be adopted as an addendum to the 2011 TSP. The planning process will be mindful of OTP planning principles.

Oregon Highway Plan

The Oregon Highway Plan (OHP) is a modal plan of the OTP that guides ODOT's Highway Division in planning, operations, and financing. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to better utilize roadway capacity as well as establishing partnerships with other agencies and local governments. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between State highways and local road, bicycle, pedestrian, transit, rail, and air systems. The following policies, in particular, are relevant to the plan. Although the project study area does not include any state highways, it does include two intersections with state highway US 30 at Gable Road.

Goal 1: System Definition

POLICY 1A: STATE HIGHWAY CLASSIFICATION SYSTEM

The OHP classifies the state highway system into four levels of importance: Interstate, Statewide, Regional, and District. ODOT uses this classification system to guide management and investment decisions regarding State highway facilities. The system guides the development of facility plans as well as ODOT's review of local plan and zoning amendments, highway project selection, design and development, and facility management decisions including road approach permits.

US 30 is classified as a Statewide Highway in the State classification system, is part of the National Highway System (NHS), and is a State Freight Route. According to the OHP, Statewide Highways typically provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas that are not directly served by Interstate Highways. A secondary function is to provide connections for intra-urban and intra-regional trips. The management objective for Statewide Highways is to provide safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to flow should be minimal.

POLICY 1B: LAND USE AND TRANSPORTATION

Policy 1B applies to all State highways. It is designed to clarify how ODOT will work with local governments and others to link land use and transportation in transportation plans, facility and corridor plans, plan amendments, access permitting and project development. Policy 1B recognizes that State highways serve as the main streets of many communities—as US 30 does in St. Helens—and strives to maintain a balance between serving local communities (accessibility) and the through traveler (mobility). This policy recognizes the role of both the state and local governments related to the State highway system and calls for a coordinated approach to land use and transportation planning.

POLICY 1F: HIGHWAY MOBILITY STANDARDS ACCESS MANAGEMENT POLICY

Policy 1F sets mobility standards for ensuring a reliable and acceptable level of mobility on the State highway system. The standards are used to assess system needs as part of long range, comprehensive planning, and transportation planning projects during development review, and to demonstrate compliance with the Transportation Planning Rule (TPR).

Significant amendments to Policy 1F were adopted at the end of 2011. The recent revisions were made to address concerns that State transportation policy and requirements have led to unintended consequences and inhibited economic development. Policy 1F now provides a clearer policy framework for considering measures other than volume-to-capacity (v/c) ratios for evaluating mobility performance. Also as part of these amendments, v/c ratios established in Policy 1F were changed from being standards to “targets.” These targets are to be used to determine significant effect pursuant to TPR Section -0060. The targets that apply to US 30 reflect its classification as a Statewide Highway and a designated freight route.

POLICY 1G: MAJOR IMPROVEMENTS

This policy requires maintaining performance and improving safety on the highway system by improving efficiency and management on the existing roadway network before adding capacity. The State’s highest priority is to preserve the functionality of the existing highway system. Tools that could be employed to improve the function of the existing roadway include access management, transportation demand management, traffic operations modifications, and changes to local land use designations or development regulations.

After existing system preservation, the second priority is to make minor improvements to existing highway facilities, such as adding traffic signals, or making improvements to the local street network to minimize local trips on the State facility. The third priority is to make major roadway improvements which could include adding lanes or reconfiguring intersections. These policies will help guide future improvements to intersections with US 30 and Gable and Millard Roads.

Goal 2: System Management

POLICY 2A: PARTNERSHIPS

This policy recognizes the importance of establishing cooperative partnerships between ODOT, state and federal agencies, regional governments, cities, counties, tribal governments, and the private sector in ensuring efficient and effective use of limited resources to develop, operate, and maintain the highway and road system. The project study area does not include any state highways; however, it does include two intersections with US 30. This policy is designed to support planning and development of both highway and local road projects that enhance the seamless qualities of a transportation system which balances state, regional, and local needs.

POLICY 2B: OFF-SYSTEM IMPROVEMENTS

This policy recognizes that the State may provide financial assistance to local jurisdictions to make improvements to local transportation systems if the improvements would provide a cost-effective means of improving the operations of the State highway system.

POLICY 2D: PUBLIC INVOLVEMENT

It is the policy of the State of Oregon to ensure that citizens, businesses, regional and local governments, state agencies, and tribal governments have opportunities to have input into decisions regarding proposed policies, plans, programs, and improvement projects that affect the state highway system.

POLICY 2F: TRAFFIC SAFETY

This policy emphasizes the State's efforts to improve safety of all users of the highway system. Action 2F.3 identifies potential solutions to traffic safety problems, including managing access to highways.

Goal 3: Access Management

POLICY 3A: CLASSIFICATION AND SPACING STANDARDS

It is the policy of the State of Oregon to manage the location, spacing, and type of road intersections on State highways to ensure the safe and efficient operation of State highways consistent with the classification of the highways.

Action 3A.2 calls for spacing standards to be established for State highways based on highway classification, type of area, and posted speed. Tables in OHP Appendix C present access spacing standards which consider urban and rural highway classification, traffic volumes, speed, safety, and operational needs. The access management spacing standards established in the OHP are implemented by access management rules in OAR 734, Division 51, addressed previously in this report.

Goal 4: Travel Alternatives

POLICY 4B: ALTERNATIVE PASSENGER MODES

This policy encourages the development of alternative passenger services and systems as part of broader corridor strategies and promotes the development of alternative passenger transportation services located off the highway system to help preserve the performance and function of the State highway system. Note: No rail passenger or air passenger service is provided within the study area. Public transit service is provided by Columbia County Rider.

The Riverfront Connector Plan is being developed in coordination with ODOT so that projects, policies, and regulations will comply with or move in the direction of meeting the standards and targets related to safety, access, and mobility that are established in the OHP.

Oregon Bicycle and Pedestrian Plan (Updated 2016)

The Oregon Bicycle and Pedestrian Plan (OBPP) is intended to support decision-making for walking and biking investments, and provide strategies and programs that can help develop an interconnected, robust, efficient, and safe state transportation system. The plan was adopted in 1995 and reaffirmed as an element of the OTP in 2006. In 2011, the Bicycle and Pedestrian Design Guide was adopted as the second section of the OBPP. In 2016, the policy section of the document was updated and adopted as a modal plan of the OTP.

The 2016 OBPP guides the state through efforts such as prioritizing projects, developing design guidance, collecting important data and other activities that support walking and biking in Oregon. ODOT has also identified a number of action items from the recently-adopted 2016 Plan that can be implemented within the next five years, which can be found in the Oregon Bicycle and Pedestrian Plan Work Program. The Plan includes a vision statement; background information such as statewide statistics and trends for walking and biking, and relevant state and federal laws; goals, policies, and strategies proposed by ODOT to improve bicycle and pedestrian transportation; funding and investment considerations, including historic spending, funding opportunities, and funding scenarios; and opportunities, challenges, and next steps for implementation.

Highway Design Manual (2012)

The Highway Design Manual (HDM) establishes ODOT standards and procedures for the location and design of new construction, major reconstruction, and resurfacing/restoration/rehabilitation projects. The manual is used for all projects that are located on State highways. Design standards for State highways depend on the highway's functional classification and the project type.

Section 13.5 of the Highway Design Manual includes standards for pedestrian crossings for urban State highways such as US 30. It indicates that crossing improvements should be no closer than 300 feet from the nearest signalized crosswalk. Crossing locations must take into account property access and circulation, along with a variety of other issues, such as land use, transit stops, signal spacing, access management, and others. Additional information related to the design of pedestrian crossings along State highways is also provided in Chapter 13. Any recommendations in the

Riverfront Connector Plan that result in proposed changes to the intersections of Gable or Millard Roads with State highway US 30 will be consistent with the applicable HDM standards.

ODOT Traffic Manual (2016)

The Traffic Manual summarizes ODOT traffic engineering policies and practices and provides guidance for traffic operations, maintenance and project delivery. The manual also clarifies roles and responsibilities, as well as provides information that may be required when considering traffic control changes. The manual underwent and update in 2016, including updates to Chapters 1, 2, 5, and 6. Section 6.1 of the Traffic Manual provides an overview of access management, including the policies and guidelines presented in Chapter 734, Division 51 of the Oregon Administrative Rules, and the process for obtaining a grant of access along State highways. Section 6.6 provides information related to crosswalks along State highways such as US 30, including the criteria for establishing a marked crosswalk at unsignalized intersections, crosswalk approval, crosswalks at signalized intersections, crosswalk safety, and crossing strategies. Any recommendations in the Riverfront Connector Plan that result in proposed changes to the intersections of Gable or Millard Roads with State highway US 30 will be consistent with the applicable HDM standards.

Oregon Administrative Rules Chapter 734 Division 20 – Traffic Control

OAR 734-020 defines the State’s role in managing traffic control along State highways in order to maintain functional use and safety and to preserve public investment. The rule establishes speed limits, speed zones, variable speed zones, high occupancy vehicles lanes, bicycle lanes, along with several other forms of traffic control including traffic signals.

Local Planning Context

The St. Helens Riverfront Connector project builds on the guiding principles for waterfront development that were developed through the City’s Waterfront Redevelopment Project and adopted in the Waterfront Framework Plan in 2016. The Riverfront Connector Plan will complete the City’s business loop planning concept included in the US 30 & Columbia Boulevard/St. Helens Street Corridor Master Plan (adopted in 2015) and in the City’s 2011 TSP. The Plan has its roots in the following planning efforts:

St. Helens Transportation System Plan (2011)

The 2011 Transportation System Plan (TSP) update identified future transportation needs within the study area for this project, with guidance from State transportation planning policies and regulations. The Riverfront Connector Plan is expected to refine TSP recommendations regarding streetscape design and develop a detailed vision for the corridors. Traffic analyses conducted for the TSP also will be updated based on changes in projected or planned developments since that time as part of the traffic analysis conducted for this effort.

St. Helens Waterfront Framework Plan (2016)

The Waterfront Framework Plan is an action-oriented plan intended to guide implementation of the waterfront's redevelopment. The Framework Plan develops a future vision for the waterfront, and plans for new public amenities as well as employment opportunities. The Plan is based on three core principles: public access, natural and cultural heritage, and sustainable economic development. The City has acquired over 230 acres of waterfront property, including an approximate 25-acre brownfield property that is the former location of a plywood veneer plant and is immediately adjacent to the City's historic downtown (Riverfront District). The Riverfront Connector Plan study area includes a segment of South 1st Street that runs through the former veneer plan property. The Riverfront Connector Plan will use the proposed cross-section design for that street as a starting point for streetscape design recommendations and will ensure that recommendations in the Riverfront Connector Plan are consistent with the Waterfront Framework Plan.

St. Helens Branding & Wayfinding Master Plan (2017)

The City's Branding & Wayfinding Master Plan provides a strategy for the City to implement a citywide wayfinding system, including guidance on sign placement and route prioritization, as well as preferred design for wayfinding signs. The goals of the Plan are to connect residents and visitors to city services and destinations such as the Riverfront District, to support and enhance tourism, and to encourage travel off US 30 and into St. Helens. The Branding & Wayfinding Master Plan draws on a recommendation from the Waterfront Framework Plan that suggests a wayfinding plan is needed to help people find the City's downtown and Riverfront District from US 30. The Riverfront Connector Plan should review proposed sign placement from the Branding & Wayfinding Master Plan that falls within the project study area and should include recommendations for the location and general content of proposed new wayfinding signs within the study area.

St. Helens Urban Renewal Plan & Urban Renewal Report (2017)

The Urban Renewal Plan sets the parameters for investments in the City's waterfront, commercial business district, centrally-located brownfield sites, and surrounding industrial properties. The adoption of the Plan created an Urban Renewal Area (URA) intended to capture revenues from growth to reinvest in projects that will achieve the public vision for the area. The accompanying Urban Renewal Report is intended to provide context and supplemental information to support the Urban Renewal Plan, including information about the funding plan and existing conditions of the URA. The primary purposes of the Plan are to cure blight within the URA, assist with implementation of previous planning efforts such as the US 30 & Columbia Boulevard/St. Helens Street Corridor Master Plan and the Waterfront Framework Plan, and improve specific areas of the City that are poorly developed or vacant. A large portion of the Riverfront Connector Plan study area is located within the URA boundary. In addition, the Urban Renewal Plan includes several specific recommendations for corridors in the Riverfront Connector Plan. The Riverfront Connector Plan will build on and be consistent with the URA Plan and Report.

St. Helens Strategic Plan (2005)

The St. Helens Strategic Plan is intended to guide the Council and its staff in a number of strategic projects. The Plan also established a Mission Statement for the City. Recommendations in the Plan were reflected in City budgets and City staff work programs through the year 2007, and the Strategic Focus Areas from the Plan are represented as Council goals in the City's annual budget to this day. Strategic Focus Area #9 – Business Development is particularly relevant to the Riverfront Connector Plan. The desired outcome of this focus area states:

"The City's Old Town and Waterfront become an exciting, dynamic, and successful cultural, government, recreational, and business district; the highway strip is attractive and functional; and the Mid-Town area is a vibrant area of many uses."

Suggested measures to achieve this desired outcome include river-oriented tourism and recreational uses, and a master planned waterfront area. Proposed streetscape designs and improvements in the Riverfront Connector Plan also will support these objectives.

St. Helens Economic Development Plan (2007)

The Economic Development Plan came about through the development and implementation of the St. Helens Comprehensive Plan and the St. Helens Strategic Plan. Two of Strategic Focus Areas from Strategic Plan lay the groundwork for the Economic Development Plan: Strategic Focus Area #4 – Economic Development, and Strategic Focus Area #9 – Business Development. The Economic Development Plan identifies the Old Towne district (now called the Riverfront District) as one of the City's greatest assets and identifies key recommendations and principles to guide future planning efforts in the District. These recommendations will guide recommendations to be developed in the Riverfront Connector Plan.

A Vison for St. Helens in the Year 2020 (1997)

The Vision for St. Helens in the Year 2020 includes several statements that relate to the Riverfront Connector Plan study area, including:

"A Historic Waterfront Redevelopment Plan has united both public and private resources of the community to create a new focus and center for the entire St. Helens area. The Old Town area has been revitalized with historic building restorations and construction of new buildings in a manner consistent with the area's historic character.

[…]

People are guided to both the Old Town and Uptown areas by gateway parks, created on Highway 30 and the Columbia River, as well as tree-lined boulevards and other urban design amenities.

[…]

Emphasis is given throughout the community to pedestrian and bicycle connections to keep the scale of development small and residences in close proximity to work, school, and play. Views of the river, mountains, and other vistas seen from public property are protected."

The Riverfront Connector Plan will support these elements of the Vision.

St. Helens Municipal Code Chapter 17.32 Zones and Uses

Many of the standards outlined in this report depend on zoning designations. Regulations for zoning districts are established in Chapter 17.32 of the St. Helens Municipal Code (SHMC). Zoning in the study area generally consists of the following districts:

- **South 1st Street Corridor Segment:** Riverfront District (RD)
- **Plymouth Street, Old Portland Road, and Gable Road Segments:** Public Lands (PL), Heavy Industrial (HI), Light Industrial (LI), Apartment Residential (AR), General Residential (R5), General Commercial (GC), and Mixed Use (MU)
- **McNulty Way and southern Old Portland Road Segments:** Heavy Industrial (HI) and Light Industrial (LI)

These requirements will be evaluated as part of the Riverfront Connector Plan process and amendments to the Development Code may be recommended to implement the Plan. Additional information on this topic is found in Technical Memorandum #4.

RIVERFRONT CONNECTOR PLAN

APPENDIX 4:

TECHNICAL MEMORANDUM #2

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MEMORANDUM

Date: May 1, 2018 Project #: 21001.0

To: Jacob Graichen, City of St Helens
Ken Shonkwiler, Oregon Department of Transportation (ODOT)

From: Matt Bell, Krista Purser, and Chris Brehmer, Kittelson & Associates, Inc.

Project: St Helens Riverfront Connector Plan

Subject: Existing Transportation System Conditions (Subtask 4.8)

TRANSPORTATION CONDITIONS OVERVIEW

This memorandum documents existing transportation system conditions in the southeast part of St. Helens in support of the St. Helens Riverfront Connector Plan. The information provided in this memorandum is intended to convey an understanding of existing infrastructure as well as opportunities and constraints in improving safety and mobility within the study area. This information is formatted to provide an overview of the study area and available facilities, information regarding known capacity and connectivity limitations, and an initial overview of potential improvement options identified to date. Policy and system planning information presented herein is based on a review of the adopted 2011 *City of St. Helens Transportation System Plan* (TSP, City Ordinance 3150), the 2015 *St. Helens - US 30 & Columbia Blvd./St. Helens St. Corridor Master Plan* (Corridor Plan, City Ordinance 3181), and the Waterfront Redevelopment Plan. Information from the adopted documents is supplemented by additional field data collection, updated information provided by the City and ODOT where noted as well as discussions with the project team.

EXECUTIVE SUMMARY

Key findings of this memorandum are as follows:

- The westbound (non-state) approach to the US 30/Millard Road intersection operates over capacity during the weekday p.m. peak hour. All remaining study intersections currently operate acceptably per the adopted City and ODOT intersection performance standards during the weekday a.m. and p.m. peak hours.
- The locations of access driveways along several study roadways are closer than applicable minimum access spacing standards would otherwise allow, especially within Old Portland Road's residential areas.
  - The driveway locations along City street closer than desired were constructed prior to the City adopting access spacing standards in 2011.

- Review of existing pedestrian facilities using a Pedestrian Level of Traffic Stress (PLTS) assessment methodology employed by ODOT found that all study roadway segments are rated with high traffic stress for pedestrians (PLTS 3 or PLTS 4 on a scale of 1 to 4).
  - Most of the study roadway segments fall outside the downtown core area and currently lack sidewalk facilities.
  - The rankings also reflect factors including pavement in poor condition (where there are no sidewalks), narrow facility widths, and/or a lack of illumination.
- Existing bicycle facilities were assessed using a Bicycle Level of Traffic Stress (BLTS) assessment methodology employed by ODOT, also on a scale of 1 (low stress) to 4 (high stress).
  - A relatively short segment of Old Portland Road within the downtown area was ranked BLTS 1 reflecting provision of striped bicycle lanes and a posted 25 miles per hour (mph) speed limit along the roadway.
  - Segments along US 30, Old Portland Road, and Gable Road with bicycle lanes are rated high stress (BLTS 4) due to narrow widths and adjacency to relatively high-speed traffic. (30 mph or higher)
  - Of the remaining segments rated with high traffic stress (BLTS 3 or BLTS 4), the facilities convey mixed traffic segments with relatively high-speed traffic.
- Local fixed-route, flex route, and dial-a-ride transit service is provided through St. Helens. The South County Flex route currently operates along Old Portland Road.
- The crash history of study intersections and road segments was reviewed to identify potential safety considerations.
  - Crash rates at the S 1st Street/St. Helens Street, Port Avenue/Old Portland Road, and Millard Road/US 30 intersections exceed critical crash rates identified by ODOT, suggesting the need for further investigation and consideration as future conditions and improvement options are assessed.
  - The Millard Road segment crash rate between McNulty Way and Old Portland Road exceeds the statewide average crash rate for similar facilities, also suggesting the need for consideration of improvements along the facility.
  - One fatality was reported midblock on Old Portland Road, approximately 1,300 feet south of its intersection with Gable Road. The fatality report documented a head-on collision attributed to a driver under the influence who was speeding and lost control of the vehicle. No other fatalities were reported in the study area.

This memorandum was reviewed and revised based on input from the project management team (PMT), the Committee Overseeing Overt Long-range Passageway Planning (COOLPPL), and the public during upcoming project meetings.

STUDY AREA

The study area is generally located east of the Columbia River Highway (US 30) and south of Columbia Boulevard. The study area consists of the roadways and intersections that connect US 30 to the Riverfront. This section provides an overview of the study area roadways, intersections, and adjacent land uses. The study area is shown in Figure 1.

STUDY AREA ROADWAYS

The study area roadways include primary and secondary facilities. The primary roadways provide direct access to the Riverfront from US 30 as well as other parts of the City. A large focus of the project is on identifying potential treatments to improve the multimodal environment along the primary roadways. The primary roadways include:

- Gable Road – US 30 to Old Portland Road
- Old Portland Road – Gable Road to Plymouth Street
- Plymouth Street – Old Portland Road to 1st Street
- 1st Street – Plymouth Road to St Helens Street

The secondary roadways provide alternative access to the Riverfront via the primary roadways. The project will also identify potential treatments to improve the multimodal environment along the secondary roadway; however, treatment emphasis is placed on primary facilities. The secondary roadways include:

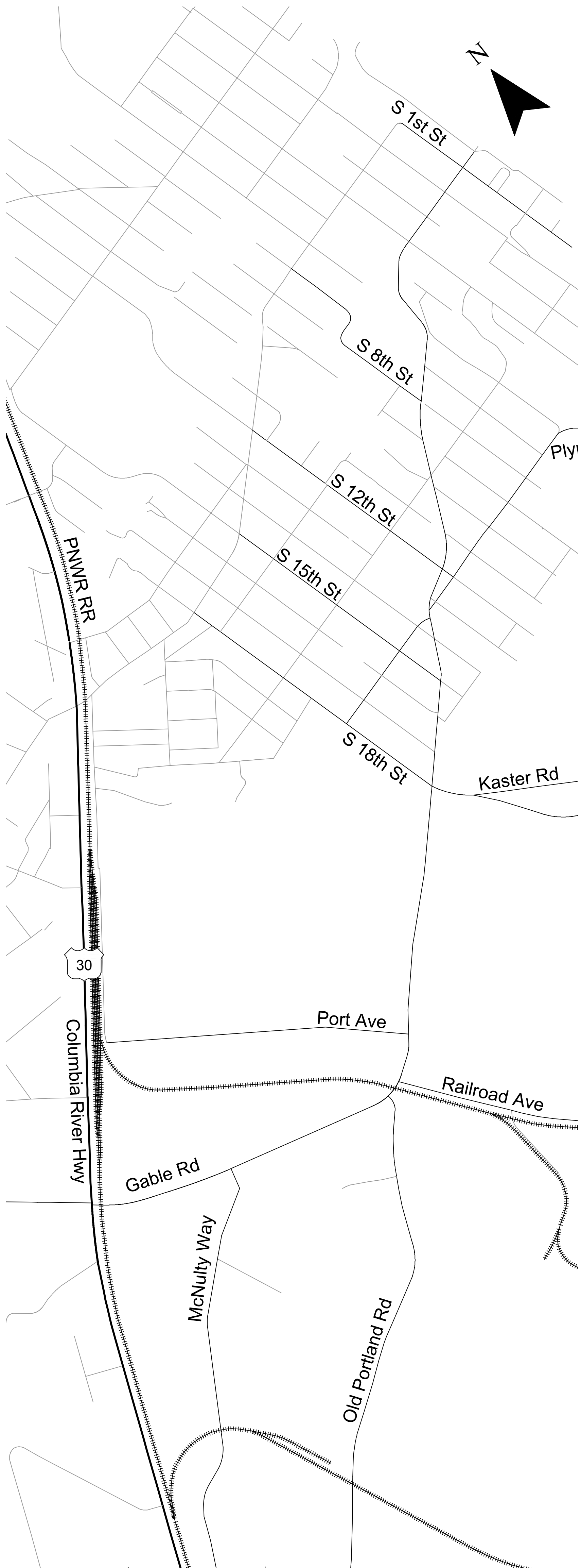
- McNulty Way from Millard Road to Gable Road
- Millard Road from McNulty Way to Old Portland Road
- Old Portland Road from the City's southern Urban Growth Boundary (UGB) to Gable Road

STUDY INTERSECTIONS

The study intersections were identified to evaluate existing traffic operations and safety at key points along the study area roadways. The study intersections include:

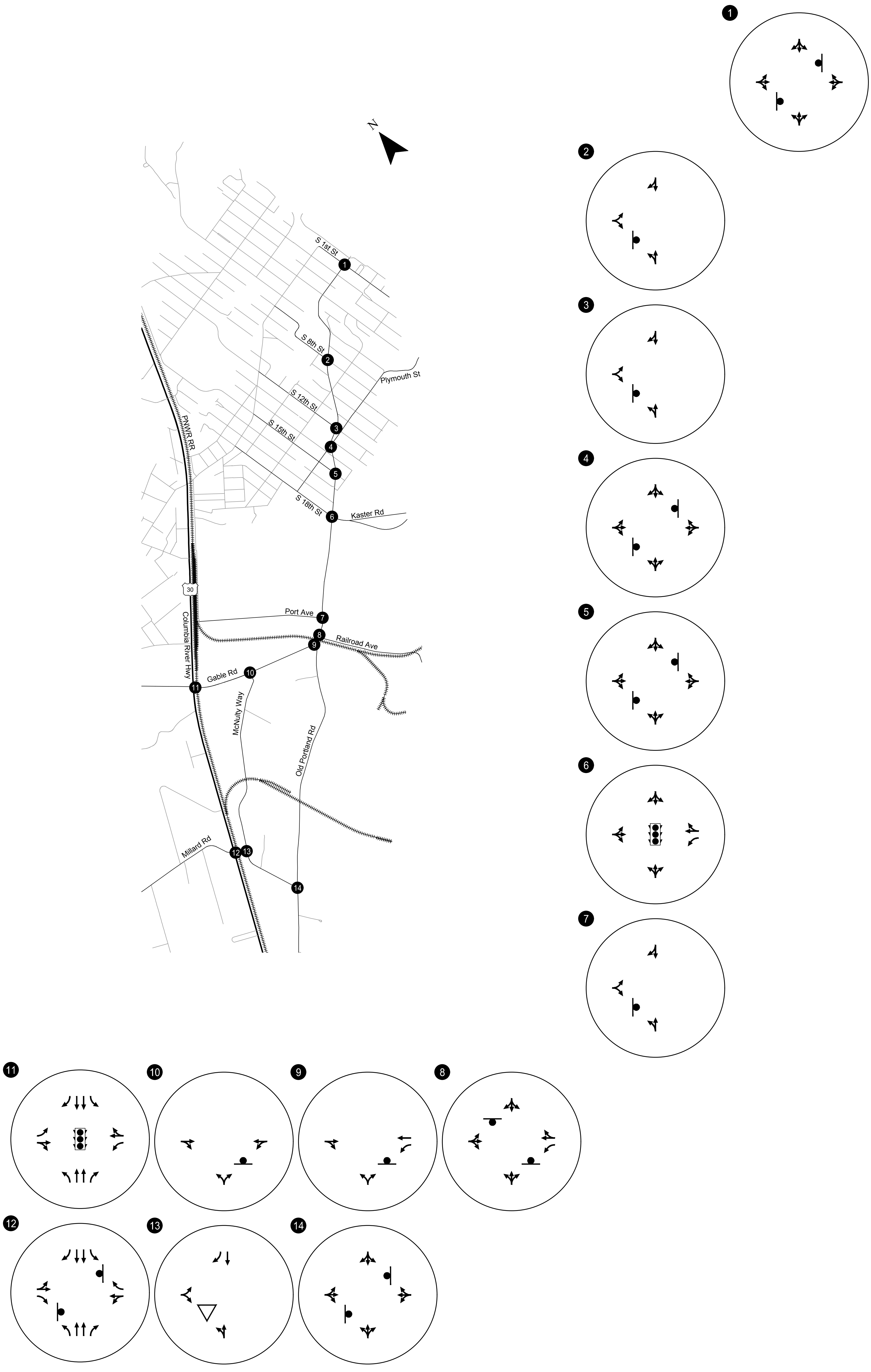
1. St Helens Street/S 1st Street
2. Old Portland Road/S 8th Street
3. Old Portland Road/S 12th Street
4. Old Portland Road/Plymouth Street
5. Old Portland Road/S 15th Street
6. Old Portland Road/S 18th Street/S Kaster Road
7. Old Portland Road/Port Avenue
8. Old Portland Road/Railroad Avenue
9. Old Portland Road/Gable Road
10. McNulty Way/Gable Road
11. US 30/Gable Road
12. US 30/Millard Road
13. McNulty Way/ Millard Road
14. Old Portland Road/ Millard Road

Figure 2 illustrates the existing lane configurations and traffic control devices at the study intersections.



Study Area
St. Helens, OR

Figure
1



- STOP SIGN
- YIELD SIGN
- TRAFFIC SIGNAL

Existing Lane Configurations & Traffic Control Devices
St. Helens, OR

Figure
2

Roadway Connectivity

US 30 is the primary roadway connecting St. Helens with the regional roadway network. US 30 is operated and maintained by the Oregon Department of Transportation (ODOT) and is classified by ODOT as both a Statewide Highway and Freight Route. The remaining roadways are operated and maintained by the City of St. Helens. The City classifies its facilities using three functional categories: arterials (major and minor), collectors, and local streets. Exhibit 1 illustrates the City's adopted Functional Classification Plan. A roadway's functional classification reflects its intended purpose, the amount and character of traffic it is expected to carry, the degree to which non-auto travel is emphasized, right-of-way requirements, and the roadway's design standards and overall management approach.

Exhibit 1: Functional Classification Plan

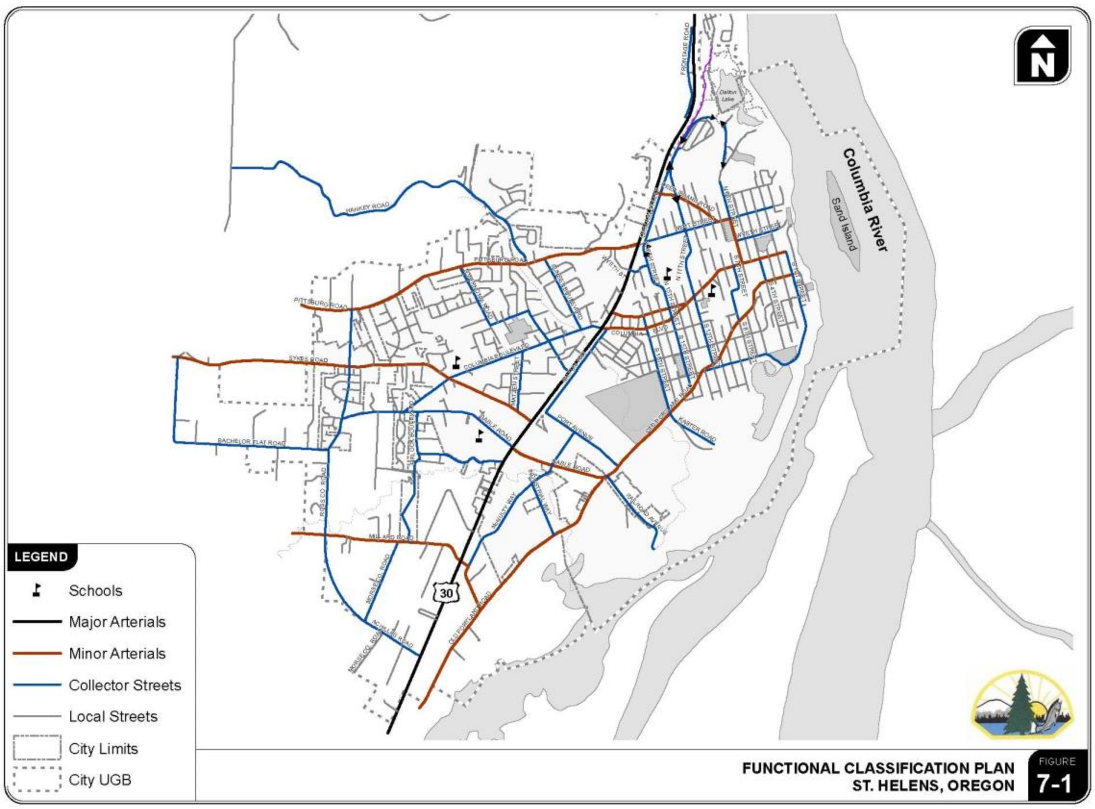


Image Source: St Helens Transportation System Plan, Ordinance 3150

As evidenced by Figure 1 and Exhibit 1, key roadway corridors within the study area include Columbia Boulevard/St. Helens Street, Old Portland Road, and Gable Road. Local connectivity to these key corridors is provided via collector level streets including McNulty Way, Port Avenue, Railroad Avenue, Kaster Road, Plymouth Street, S 15th Street, S 12th Street, S 8th Street, and S 1st Street.

Gable Road Connection

The Gable Road connection between US 30 and the study area is classified as a minor arterial and offers signalized access to US 30. While signalized, the Gable Road/US 30 intersection is relatively congested given its location (currently the southernmost traffic signal on US 30 in the City), surrounding land uses (including several large commercial retailers and St. Helens High School), and the industrial lands within and adjacent to the Port area that it serves. The City's TSP identified a recommended capacity improvement at the intersection involving the addition of a westbound right-turn lane that would also necessitate reconstruction of the adjacent Portland & Western Railroad (PNWR) railroad crossing. No funding for the turn lane improvement is currently programmed.

Millard Road Connection

Millard Road connects with US 30 at a stop-controlled intersection and links to both McNulty Way as well as Old Portland Road. The current intersection configuration offers limited capacity for additional trips and has been identified for geometric improvements and signalization in the City's TSP. Construction of the geometric improvements and signalization by ODOT is planned to begin in 2019.

Bennett Road Connection

Bennett Road currently connects with US 30 at a stop-controlled intersection to the south of the City's southern UGB. Bennett Road in turn links with Old Portland Road and is used by many as a parallel route to US 30, particularly for those traveling north to St. Helens on US 30. ODOT anticipates implementation of geometric changes at the US 30/Bennett Road intersection in 2019 including:

- Geometric improvements to the northbound right-turn lane onto Bennett Road;
- Elimination of eastbound and westbound left turns onto US 30 from Bennett Road through the construction of a raised median;
- Construction of a U-turn lane on US 30 between Millard Road and Bennett Road; and
- Closure of the existing Old Portland Road southern connection to US 30 (and associated passive railroad crossing).

LAND USE

Adjacent land use designations include Light Industrial (LI) and Heavy Industrial (HI) along McNulty Way and Old Portland Road from the City's southern UGB to Kaster Road. From Kaster Road to S 4th Street, land use designations include General Residential (R5) and Public Land (PL – McCormick Park). Toward S 1st Street and the proposed Plymouth Street extension, land uses include Mixed Use (MU) and Apartment Residential (AR). More information regarding existing and future land use designations is detailed in *Technical Memo #4: Land Use and Urban Design*.

PNWR RAILROAD

The PNWR "Portland-Astoria Line" connects the cities of Astoria, Clatskanie, Rainier, Columbia City, St. Helens, and Scappoose with PNWR's facilities and the Burlington Northern Santa Fe Railroad (BNSF) in Portland. The PNWR operates a rail yard in St. Helens east of US 30 that is generally situated north of Gable Road and south of Columbia Boulevard. The rail yard supports local customers served by the railroad, offering a location to stage and switch rail equipment. Trespassing is prohibited, though the yard area is not currently fenced.

Railroad Grade Crossing Terminology

Grade crossings are classified by the type of protection provided and are considered either active or passive. Active crossing systems generally have an electronic train detection system with flashing lights and audible devices that warn the motorist when a train is approaching or at the crossing (they may also have gates). A passive system simply denotes the location of the crossing (typically through signing or pavement markings) and depends on the motorist to detect and yield the right-of-way to the train. Each of the existing PNWR railroad crossings adjacent to US 30 in St. Helens and across Old Portland Road have active crossing systems. The existing grade crossings of McNulty Way, Railroad Avenue (south of Old Portland Road) and other roadways serving the study area are controlled with passive devices.

Grade Crossing Regulation

The ODOT Rail Division regulates all public grade crossings within Oregon and has the authority to eliminate public highway/rail at-grade crossings (ORS Section 824.206). Closure requests can be initiated by ODOT, the railroad or the local jurisdiction. In an effort to make closures more attractive to local communities, ODOT Rail offers assistance in improving intersections at locations near those which can be closed. Because at-grade crossing safety upgrades are expensive, ODOT Rail's approach to closures enables more frequently used crossings to receive the needed safety upgrades. Private railroad crossings are based on an agreement between the railroad and the property owner and are not regulated by ODOT Rail. It appears that some of the at-grade crossings with the Port facilities, including facilities near Old Portland Road and Railroad Avenue, are private railroad crossings.

ROADWAY FACILITIES

Kittelson & Associates, Inc. (KAI) staff visited and inventoried the study area in November 2017. At that time, KAI collected information regarding study area conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area. Roadway characteristics, vehicle operations, access spacing, truck routes, and other considerations are described in their respective sections below.

ROADWAY CHARACTERISTICS

Table 1 summarizes the characteristics of roadways within the study area.

Table 1: Existing Transportation Facilities

Roadway	Functional Classification[1]	Number of Lanes	Posted Speed (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
US 30	Major Arterial / Statewide Freight Route[2]	4-5 Lanes	35/45[3]	West Side	Yes	No
Gable Road	Minor Arterial	2 Lanes	30/40[4]	Partial	Partial	No
Old Portland Road	Minor Arterial	2 Lanes	25/30/40/45[5]	Partial	Partial	Partial
Millard Road	Minor Arterial	2 Lanes	25/40[6]	No	No	No
McNulty Way	Collector Street	2 Lanes	25	Partial	Partial	No
Railroad Avenue	Collector Street	2 Lanes	30	No	No	No
Port Avenue	Collector Street	2 Lanes	40	No	No	No
S 18th Street/Kaster Road	Collector Street	2 Lanes	25	No	No	Partial
S 15th Street	Collector Street	2 Lanes	25	No	No	Yes
Plymouth Street	Collector Street	2 Lanes	25	No	No	No
S 12th Street	Collector Street	2 Lanes	25	No	No	Yes
S 8th Street	Collector Street	2 Lanes	25	No	No	No
S 1st Street	Collector Street	2 Lanes	25	No	Yes	Yes

1. Per *City of St. Helens Transportation System Plan* (TSP – Reference 1).
2. Per *Oregon Highway Plan* (OHP-Reference 2).
3. Speed limit is 35 mph north of Gable Road and 45 mph south of Gable Road.
4. Speed limit is 30 mph west of US 30 and 40 mph east of US 30.
5. Speed limit is 45 mph from Millard Road to the McNulty Creek bridge, 40 mph from McNulty Creek Bridge to Milton Creek Bridge, 30 mph from Milton Creek Bridge to S 4th Street, and 25 mph from S 4th Street to S 1st Street.
6. Speed limit is 40 mph west of US 30 and 25 mph east of US 30.

The US 30/Gable Road and US 30/Millard Road intersections are under ODOT's jurisdiction. All remaining roadways and study intersections are under the City of St. Helens' jurisdiction.

VEHICLE OPERATIONS ANALYSIS

The operational analysis methodology, traffic volumes, jurisdictional operating standards, and existing operations results are described in their respective sections below.

Operations Analysis Methodology

All analyses described in this report were performed in accordance with the procedures stated in the *Highway Capacity Manual* (HCM – Reference 3). A description of level of service (LOS) and the criteria by which it is determined is presented in Appendix "A". Appendix "A" also indicates how level of service is measured and what is generally considered an acceptable range.

All analyses used the peak 15-minute flow rates that occurred during the weekday morning and evening peak hours. Using the peak 15-minute flow rates ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour.

Traffic Volumes and Peak Hour Operations

Turning movement counts were conducted at the study intersections in May 2017. Each of the intersections was assessed during the weekday evening commuter peak hour while only key study intersections were also analyzed during the morning commuter peak hour. All the counts were conducted on a typical mid-week day during the morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak time periods while there was no inclement weather and school was in session. The system-wide morning and evening peak hours were found to occur from 7:15 to 8:15 a.m. and 4:45 to 5:45 p.m., respectively. Figures 3 and 4 summarize the turning movement counts for the weekday morning and evening peak hours. *Appendix "B" contains the traffic count worksheets used in this study.*

The traffic counts shown in Figure 4 were seasonally adjusted to 30th highest hour volumes (30 HV) in accordance with the Seasonal Trend Table methodology outlined in ODOT's *Analysis Procedures Manual* (APM – Reference 4). An average of the commuter and summer trends were used to determine the seasonal adjustment factor, resulting in an adjustment of 1.09. This method of seasonally adjusting peak hour volumes is consistent with the methodology used in the TSP and other recent studies conducted within St. Helens.

Jurisdictional Operating Standards and Thresholds

The City of St. Helens requires all signalized and all-way stop controlled intersections to perform at LOS "D" or better and maintain a volume-to-capacity (v/c) ratio at or below 1.0. For two-way stop controlled intersections, LOS "E" is acceptable for the worst approach and LOS "F" when a traffic signal is not warranted.

Per Table 6 of the *Oregon Highway Plan*, the signalized US 30/Gable Road intersection has a v/c target of 0.85 or below while the unsignalized US 30/Millard Road intersection has a v/c target of 0.80 or below. However, the non-state approach to the US 30/Millard Road intersection has a v/c target of 0.90 or below.

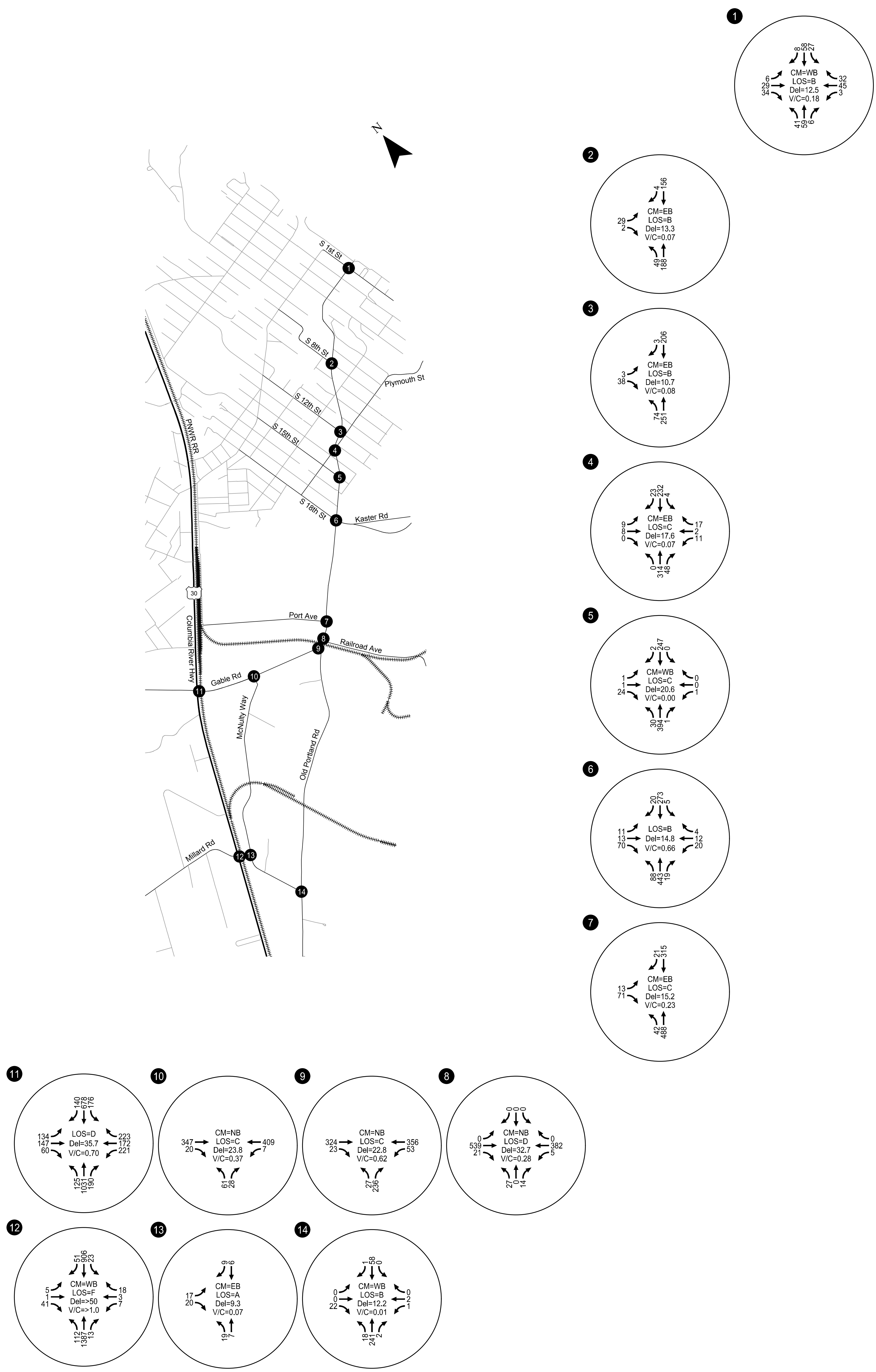
Current Intersection Operations

Figures 3 and 4 summarize the existing traffic volumes and intersection performance analysis. As shown, the stop-controlled Millard Road approach to US 30 operates over capacity during the weekday PM peak hour. All remaining study intersections currently operate acceptably during the weekday a.m. and p.m. peak hours. *Appendix "C" includes the worksheets used to evaluate existing traffic conditions at the study intersections.*

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/
CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/
CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday AM Peak Hour
St. Helens, OR

Figure
3



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/ CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/ CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday PM Peak Hour
St. Helens, OR

Figure
4

ACCESS SPACING

ODOT and the City of St. Helens have adopted access spacing standards for the study area roadways.

ODOT Access Management Standards

Access management standards for approaches to state highways are based on the classification of the highway and highway designation, type of area, and posted speed. Within St Helens, the OHP classifies US 30 as a Statewide Highway and a Freight Route. Future developments along US 30 (new development, redevelopment, zone changes, and/or comprehensive plan amendments) will be required to meet the OHP access management policies and standards. Table 2 summarizes ODOT's current access management standards for US 30 per the OHP.

Table 2: ODOT Access Spacing Standards (US 30)

Posted Speed (MPH)	Minimum Spacing Standard (Feet)[1]
≤ 25	520
30 and 35	720
40 and 45	990
50	1,100
≥ 55	1,320

[1] These access management spacing standards do not apply to approaches in existence prior to April 1, 2000 except as provided in OAR 734-051-0115(1)(c) and 734-051-0125(1)(c).

City Access Management Standards

The City's access management standards include spacing standards for public streets and private driveways. Table 3 identifies the minimum public street and private driveway access spacing standards for the City's roadway network as they relate to new development and redevelopment. County facilities within the City's Urban Growth Boundary (UGB) should also be planned and constructed in accordance with the City's access management standards.

Table 3: City Access Spacing Standards

Functional Classification	Public Street (feet)	Private Access Drive (feet)
Local Street	150	50
Collector	300	100
Minor Arterial	350 or block length	200 or mid-block

Several existing access points along the study roadways are not in compliance with the access spacing standards. For example, US 30 between Gable Road and Millard Road has accesses approximately every 320 feet, where ODOT spacing standards require at least 990 feet of separation. Within Old Portland Road's residential areas, many existing residential driveways are located 100 to 150 feet apart where the City's current requirements seek a minimum of 200 feet (or a mid-block length) of separation.

TRUCK ROUTES

Designated truck routes were established by the City to limit heavy truck traffic on local streets while connecting the industrial areas within St. Helens to US 30. Exhibit 2 illustrates the designated truck routes within St. Helens. As shown, several of the study area roadways are designated truck routes, including Gable Road, Millard Road, McNulty Way, Old Portland Road, and Plymouth Street.

Exhibit 2: Designated Truck Routes

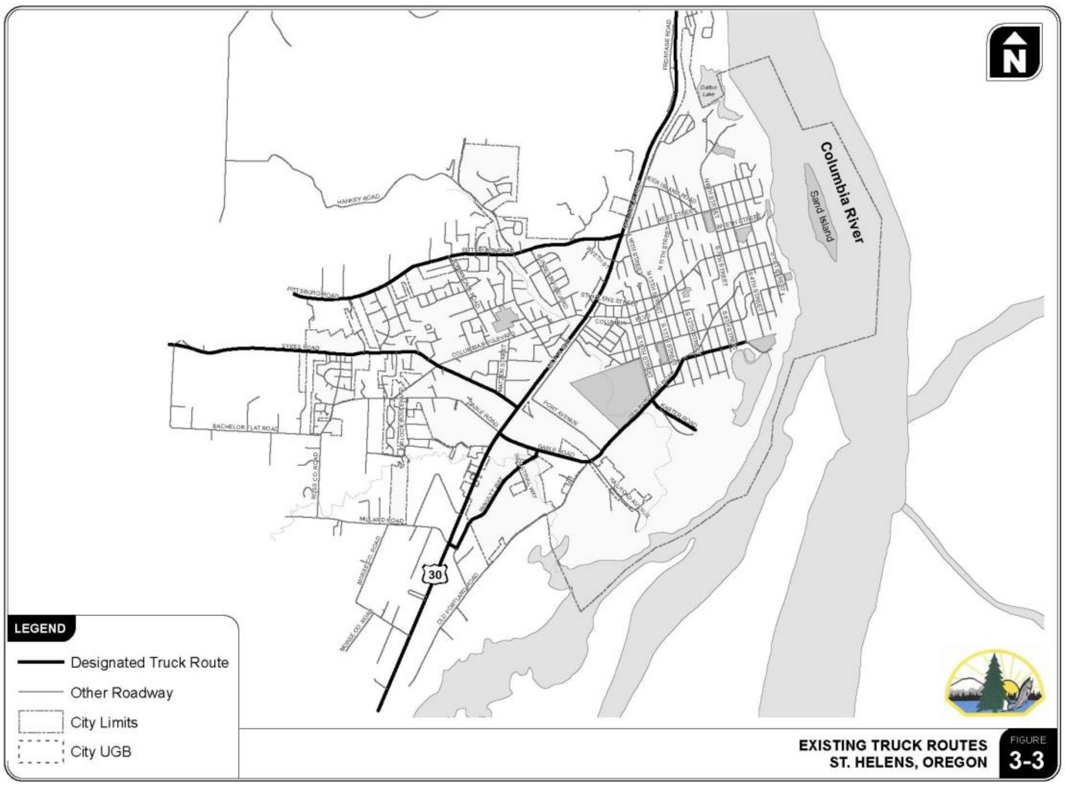


Image Source: St Helens Transportation System Plan, Ordinance 3150

Currently, many of the truck trips to and from the industrial areas east of US 30 access US 30 at Gable Road because it is signalized. This results in a relatively heavy volume of truck traffic on Gable Road that would otherwise use Old Portland Road to travel further south to US 30. Turning maneuvers at the at the Gable Road/US 30 signalized intersection are constrained due to the intersection and railroad crossing geometry, constraining maneuvers made by longer trucks (such as power pole delivery trailers) Consequently, alternate routes are utilized. Historically, re-routing reportedly resulted in situations where trucks struck other vehicles as they attempted to negotiate a turn at the Bennett Road/US 30 intersection. Pilot vehicles are currently used to accompany power pole trucks through the intersection to alert other drivers of the wide turning movement.

While large vehicles can generally navigate the designated truck routes, many of the routes have incomplete pedestrian and/or bicycle facilities. Old Portland Road, for example, is a designated truck and bicycle route; however, the roadway has no sidewalks or bicycle lanes south of Gable Road and offers relatively narrow travel lanes. The City's TSP recommends provision of a separate multi-use path along the east side of Old Portland Road in part to reduce interaction with truck traffic.

PEDESTRIAN FACILITIES

This section summarizes the existing physical and operational characteristics of the pedestrian facilities within the study area, including the location of known gaps and deficiencies. This section also summarizes the results of a Pedestrian Level of Traffic Stress (PLTS) analysis that was used to inform future concepts.

EXISTING PEDESTRIAN FACILITIES

Pedestrian facilities within St Helens consists of sidewalks, shared-use paths, and trails as well as marked and unmarked, signalized and unsignalized pedestrian crossings. These facilities provide local residents with the ability to access local retail, commercial, recreational, and other land uses by foot. In order to assess the adequacy of pedestrian facilities, existing sidewalks and crosswalks were inventoried. The following provides a summary of the facilities.

Sidewalks

Sidewalks are currently provided on at least one side of most arterial and collector streets within the study area. Sidewalks are provided along the west side of US 30 from Gable Road to south of Millard Road; along both sides of Gable Road near US 30, along the northwest side of Old Portland Road from Port Avenue to McCormick Park, and; along both sides of McNulty Way adjacent to new development and along both sides of 1st Street from St Helens Street to the southern terminus. There is also a shared-use path along the east side of Old Portland Road from S 4th Street to S 15th Street. However, the path is approximately 4-feet wide, which does not meet minimum width criteria for shared-use paths per the Oregon Highway Design Manual (HDM – Reference 5). Therefore, this path was evaluated as a sidewalk for the purposes of this analysis. Sidewalks are generally not provided along a majority of all other arterial, collector, and local roadways within the roadway. A summary of the gaps and deficiencies in the sidewalk network is provided below.

Crosswalks

Marked crosswalks, pedestrian push buttons, and pedestrian heads are provided at the signalized US 30/Gable Road intersection. A marked crosswalk is provided on the north leg at the signalized Old Portland Road/S 18th Street/S Kaster Road intersection. Marked crossings are provided at St Helens Street's unsignalized intersections with S 4th Street, S 3rd Street, S 2nd Street, and S 1st Street. Midblock marked crosswalks are provided along Old Portland Road approximately 90 feet south of S 15th Street, 150 feet south of S 10th Street, and 30 feet south of S 9th Street. No other marked crossings are provided in the study area.

Shared-use Paths and Trails

As mentioned, there is a shared-use path along the east side of Old Portland Road; however, the path was evaluated as a sidewalk for the purposes of this analysis. There are also several shared use paths and trails within the parks located adjacent to the study area roadways, including McCormick Park, Nob

Hill Nature Park, and Columbia View Park. Several of the paths and trail intersect or abut the study area roadways.

PEDESTRIAN LEVEL OF TRAFFIC STRESS ANALYSIS

The pedestrian facilities located within the study area were evaluated in an effort to identify potential issues that could be addressed as part of the Riverfront Connector Plan. The ODOT APM provides a methodology for evaluating pedestrian facilities within urban and rural environments called Pedestrian Level of Traffic Stress (PLTS). As applied by ODOT, this methodology classifies four levels of traffic stress that a pedestrian can experience on the roadway, ranging from PLTS 1 (little traffic stress) to PLTS 4 (high traffic stress). A road segment that is rated PLTS 1 generally has low traffic volumes and travel speeds and has a sidewalk that is separated from vehicular traffic. These segments are generally suitable for all users, including children. A road segment that is rated PLTS 4 generally has high traffic volumes and travel speeds and is perceived as unsafe by most adults. Road segments rated PLTS 4 also include those with no sidewalks or other pedestrian facilities. Per the APM, PLTS 2 is considered a reasonable target for most pedestrian facilities due to its acceptability with the majority of people.

The PLTS score is based on four criteria, including sidewalk condition, physical buffer type, total buffering width, and general land use. All four criteria are scored from 1 to 4 and the highest score determines the overall score for the road segment. Figure 5 illustrates the results of the PLTS analysis. It is important to note that while some segments are shown as PLTS 3 or 4, they may have shorter segments with lower PLTS scores. Table 4 summarizes the results of the PLTS analysis, which includes the scores for each criteria. As shown, there are 4 road segments rates PLTS 3 and 26 road segments rated PLTS 4.

A majority of the segments rated PLTS 4 have no sidewalks or other pedestrian facilities to accommodate pedestrians. In order for these segments to be rated PLTS 2, sidewalks with appropriate sidewalk and buffer widths would need to be installed along the full length of the roadway.

Of the remaining sidewalks, PLTS 3 or 4 rankings are often due to sidewalks in fair or poor condition; however, they are too narrow and/or do not have illumination present. In order for these segments to be rated LTS 2, the sidewalks would need to be widened to five feet or more and illumination would need to be installed along the full length of the roadway. Several road segments are also rated LTS 3 due to construction with curb-tight sidewalks on roadways with speeds of 30 mph or higher. In order for these segments to be rated LTS 2, the speeds would need to be reduced to 25 mph or a buffer would need to be installed between the sidewalk and vehicle travel lane. For several other segments rated LTS 3, adjusting the LTS score will be difficult because it is controlled by the general land use next to the segment. *Appendix "D" contains detailed information on the PLTS analysis results.*

Pedestrian Level of Traffic Stress
St. Helens, Oregon

Figure
5

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
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Table 4: PLTS Analysis Results

Street	From	To	Side	Pedestrian LTS Criteria Scores				
				Sidewalk Condition	Buffer Type	Buffering Width	Land Use	PLTS
Major Arterial								
US 30	Millard Road	Gable Road	West	2[1]	2	3	3	3
	Millard Road	Gable Road	East	4	4	3	3	4
Minor Arterial								
Old Portland Road	S 1st Street	S 4th Street	Both	3[1]	2	1	1	3
	S 4th Street	S 8th Street	West	4	3	2	1	4
	S 4th Street	S 8th Street	East	4[1]	2	2	1	4
	S 8th Street	S 12th Street	West	4	3	2	1	4
	S 8th Street	S 12th Street	East	4[1]	2	2	1	4
	S 12th Street	Plymouth Street	West	4	3	2	1	4
	S 12th Street	Plymouth Street	East	4[1]	2	2	1	4
	Plymouth Street	S 15th Street	West	4	3	2	1	4
	Plymouth Street	S 15th Street	East	4[1]	2	2	1	4
	S 15th Street	S 18th Street/ Kaster Road	Both	4	3	2	1	4
	S 18th Street/ Kaster Road	Storage Pal Driveway	Both	4	2	2	1	4
	Storage Pal Driveway	Port Avenue	West	2[1]	2	2	2	2
	Storage Pal Driveway	Port Avenue	East	4	2	2	2	4
	Port Avenue	Gable Road	Both	4	2	2	3	4
	Gable Road	Columbia Drainage Driveway	Both	4	4	2	3	4
	Columbia Drainage Driveway	Millard Road	Both	4	4	2	2	4
Gable Road	McNulty Way	US 30	Both	4	2	2	3	4
	Eastern Walmart Driveway	McNulty Way	Both	4	2	2	3	4
	Old Portland Road	Eastern Walmart Driveway	Both	4	2	2	3	4
Millard Road	Old Portland Road	McNulty Way	Both	4	3	2	3	4
	McNulty Way	US 30	Both	4	2	3	3	4
Collector								
Plymouth Street	Old Portland Road	S 6th Street	Both	4	2	2	1	4
McNulty Way	Millard Road	Residential Driveway	Both	4	2	2	2	4

	Residential Driveway	PNWR Rail Crossing	Both	4	2	2	2	4
	PNWR Rail Crossing	Joint Maintenance Facility Driveway	West	4	2	2	3	4
	PNWR Rail Crossing	Joint Maintenance Facility Driveway	East	2[1]	2	2	3	3
	Joint Maintenance Facility Driveway	Industrial Way	West	2[1]	2	2	3	3
	Joint Maintenance Facility Driveway	Industrial Way	East	4	2	2	3	4
	Industrial Way	Gable Road	Both	4	2	2	3	4

Shaded cells segments that do not meet the LTS 2 target.
* The effective width of the pedestrian facility is greater than 6 feet. The LTS value is from the last line of the sidewalk condition criteria table in the APM.
[1] No illumination present. LTS reduced by one unless already at LTS 4.
[2] Segment located on a bridge. LTS improved to LTS 3.
[3] Existing non-striped parking. Assume parking area is six to eight feet wide.

PEDESTRIAN ACTIVITY

Pedestrian counts were conducted at the study intersections in May 2017 while school was in session. All of the counts include the total number of pedestrians that entered the intersections in 15-minute intervals. Table 5 summarizes the pedestrian count data for the study intersections.

Table 5: Peak Hour Pedestrian Crossing Volumes at Study Intersections

	Intersection	North/South Pedestrian Volume	East/West Pedestrian Volume	Pedestrian Peak Hour
1	S 1st Street/ St. Helens Street	115	26	6:00 PM
2	S 8th Street/ Old Portland Road	1	1	8:15 AM
3	S 12th Street/ Old Portland Road	4	4	2:30 PM
4	Plymouth Street/ Old Portland Road	0	0	N/A
5	S 15th Street/ Old Portland Road	7	7	2:15 PM
6	S 18th Street/ Old Portland Road	6	2	5:45 PM
7	Port Avenue/ Old Portland Road	0	0	N/A
8	Railroad Avenue/ Old Portland Road	0	12	5:00 PM
9	Gable Road/ Old Portland Road	0	8	5:00 PM
10	Gable Road/ McNulty Way	1	3	10:15 AM
11	Gable Road/ US 30	6	31	3:00 PM
12	Millard Road/ Old Portland Road	0	2	3:45 PM
13	Millard Road/ McNulty Way	9	0	2:45 PM
14	Millard Road/ US 30	4	0	3:45 PM

The pedestrian counts show a relatively high level of pedestrian activity at the US 30/Gable Road and the St Helens Street/1st street intersections and relatively low levels of pedestrian activity at the other study intersections. It should be noted that while the peak hour for vehicular traffic typically occurs between 4:45 to 5:45 p.m., the peak hour for pedestrian activity near schools and other activity centers typically occurs earlier in the day.

EXISTING GAPS AND DEFICIENCIES

Streets with no sidewalks or intermittent sidewalks generally result in pedestrians walking along the edge of the travel lane or using the shoulder if available. In many cases, this is not a desirable option for pedestrians due to narrow lane widths or uneven pavement conditions. Similarly, streets with no crosswalks or limited crosswalks may result in pedestrians making unsafe or illegal crossings. Ideally, adequate pedestrian facilities should be provided to allow for safe travel between neighborhoods and essential destinations. The following provides a summary of the existing gaps deficiencies in the pedestrian facilities. These gaps and deficiencies were updated based on input from the project team, the advisory committee, and the public throughout the planning process:

- There are several arterial and collector streets that currently do not provide sidewalks along one or two sides of the roadway. These streets include:

- Old Portland Road from S 4th Street to S 15th Street – west side
- Old Portland Road from S 15th Street to Millard Road – gaps on both sides
- Gable Road from McNulty Road to Old Portland Road – gaps on both sides
- Millard Road from Old Portland Road to US 30 – gaps on both sides
- Plymouth Street from Old Portland Road to its terminus – gaps on both sides
- McNulty Way from Millard Road to Gable Road – gaps on both sides

- Many sidewalks throughout the City do not provide sufficient width to accommodate pedestrian activity or are in a state of disrepair.
- Many sidewalks and pedestrian ramps throughout the City are not compliant with current American's with Disabilities Act (ADA) design standards.
- There are several major (and minor) intersections that do not provide marked pedestrian crossings.

BICYCLE FACILITIES

This section summarizes the existing physical and operational characteristics of the Bicycle facilities within the study area, including the location of known gaps and deficiencies. This section also summarizes the results of a Bicycle Level of Traffic Stress (BLTS) analysis that was used to inform future concepts.

EXISTING BICYCLE FACILITIES

Bicycle facilities within St Helens consist of on-street bike lanes and shared roadways as well as off-street bicycle facilities such as bicycle parking and shared-use paths. These facilities provide local residents with the ability to access local retail, commercial, recreational, and other land uses within St Helens and neighboring cities by bike. Safe and convenient bicycle facilities are essential to a vibrant community and economy within the city. In order to assess the adequacy of bicycle facilities, existing shared roadways, shoulder bikeways, on-street bike lanes, and separated bike facilities were inventoried. The following provides a summary of the facilities.

On-Street Bike Lanes

On-street bike lanes are currently provided along both sides of several arterial and collector street within the study area. On-street bike lanes are provided along both sides of US 30 throughout St Helens. On-street bike lanes are also provided on St Helens Street from S 1st Street to S 4th Street, Old Portland Road from S 18th Street/S Kaster Road to Gable Road, Gable Road from Old Portland Road to US 30, and McNulty Way from Industrial Way to 600 feet north of Millard Road.

Shared Roadways

Most of the study area roadways are shared roadways, meaning there are no on-street bike lanes or shoulder bikeways; therefore, bicyclists share the roadway with motorists. The shared roadways include Old Portland Road from S 4th Street to S 18th Street/S Kaster Road and from Gable Road to Millard Road; Millard Road from Old Portland Road to US 30; Plymouth Street from Old Portland Road to its terminus, and; McNulty Way from Millard Road to 600 feet north of Millard Road and from the Joint Maintenance Facility driveway to Gable Road.

Separated Bike Facilities

As mentioned, there is a shared-use path along the east side of Old Portland Road; however, the path was evaluated as a sidewalk for the purposes of this analysis. Also, while there are several shared use paths and trails within the parks located adjacent to the study area roadways, including McCormick Park, Nob Hill Nature Park, and Columbia View Park, bikes are not allowed within the parks or on the paths and trails.

BICYCLE LEVEL OF TRAFFIC STRESS ANALYSIS

The bicycle facilities located along the study area were evaluated to identify potential issues that could be addressed as part of the Riverfront Connector Plan. The APM provides a methodology for evaluating bicycle facilities within urban and rural environments called Bicycle Level of Traffic Stress (BLTS). As applied by ODOT, this methodology classifies four levels of traffic stress that a bicyclist can experience on the roadway, ranging from BLTS 1 (little traffic stress) to BLTS 4 (high traffic stress). A road segment that is rated BLTS 1 generally has low traffic volumes and travel speeds and is suitable for all cyclists, including children. A road segment that is rated BLTS 4 generally has high traffic volumes and travel speeds and is perceived as unsafe by most adults. Per the APM, BLTS 2 is considered a reasonable target for bicycle facilities due to its acceptability with the majority of people.

The BLTS score is determined based on the speed of the roadway, the number of travel lanes per direction, the presence and width of an on-street bicycle lane and/or adjacent parking lane, and several other factors. Figure 6 illustrates the results of the BLTS analysis for the study area. It is important to note that while some segments are shown as BLTS 3 or 4, they may have shorter segments with lower BLTS scores. Table 6 summarizes the results of the BLTS analysis. As shown, there are eight segments rated BLTS 3 and four segments rated BLTS 4.

As shown, the on-street bike lanes along US 30 are rated BLTS 4. These bike lanes are too narrow for roadway conditions per the APM methodology. For these segments to be rated BLTS 2, the bike lanes would need to be widened to 7 feet and the posted speed limits would need to be reduced to as low as 35 mph. Enhanced facilities, such as separated bike facilities or multi-use paths, may be considered as an alternative in areas where traffic volumes and/or travel speeds are high.

Several segments along Old Portland Road and Gable Road that are rated BLTS 4 have bike lanes that are too narrow for the adjacent high-speed traffic per the APM methodology. Bike lanes would either need to be widened to 7 feet and/or the posted speed limit would need to be reduced to as low as 35 mph to achieve a BLTS 2 rating.

All remaining segments that are rated BLTS 3 or 4 are along Old Portland Road in mixed traffic with high-speed traffic. Bike lanes or a separated bike path would need to be provided and/or the posted speed limit would need to be reduced to as low as 25 mph or the centerline stripe would need to be removed to achieve a BLTS 2 rating.

It should also be noted that a majority of the shared roadway segments that were rated LTS 2 could include signage and potentially striping to remind motorists to share the road. The signing and striping can also provide important wayfinding for cyclists to inform them of the preferred bicycle routes.

Bicycle Level of Traffic Stress
St. Helens, Oregon

Figure
6

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Delete if there isn't one.

Table 6: BLTS Analysis Results

Street	From	To	Side	Facility Type	LTS Criteria					Bicycle LTS
					Speed (MPH)	Lanes per Direction	Bike Lane Width (feet)	Parking	Frequent Blockage	
Major Arterial										
US 30	Millard Road	Gable Road	West	Bike Lane	45	2	< 7	No	No	4
	Millard Road	Gable Road	East	Bike Lane	45	2	< 7	No	No	4
Minor Arterial										
Old Portland Road	S 1st Street	S 4th Street	Both	Bike Lane	25	1	> 7	Yes	No	1
	S 4th Street	S 8th Street	West	Mixed Traffic	30	1	N/A	No	No	3
	S 4th Street	S 8th Street	East	Mixed Traffic	30	1	N/A	No	No	3
	S 8th Street	S 12th Street	West	Mixed Traffic	30	1	N/A	No	No	3
	S 8th Street	S 12th Street	East	Mixed Traffic	30	1	N/A	No	No	3
	S 12th Street	Plymouth Street	West	Mixed Traffic	30	1	N/A	No	No	3
	S 12th Street	Plymouth Street	East	Mixed Traffic	30	1	N/A	No	No	3
	Plymouth Street	S 15th Street	West	Mixed Traffic	30	1	N/A	No	No	3
	Plymouth Street	S 15th Street	East	Mixed Traffic	30	1	N/A	No	No	3
	S 15th Street	S 18th Street/ Kaster Road	Both	Mixed Traffic	30	1	N/A	No	No	3
	S 18th Street/ Kaster Road	Storage Pal Driveway	Both	Bike Lane	40	1	5.5 – 7	No	No	4
	Storage Pal Driveway	Port Avenue	West	Bike Lane	40	1	5.5 – 7	No	No	4
	Storage Pal Driveway	Port Avenue	East	Bike Lane	40	1	5.5 – 7	No	No	4
	Port Avenue	Gable Road	Both	Bike Lane	40	1	5.5 – 7	No	No	4
	Gable Road	Columbia Drainage Driveway	Both	Mixed Traffic	45	1	N/A	No	No	4
	Columbia Drainage Driveway	Millard Road	Both	Mixed Traffic	45	1	N/A	No	No	4
Gable Road	McNulty Way	US 30	Both	Bike Lane	40	1	5.5 – 7	No	No	4
	Eastern Walmart Driveway	McNulty Way	Both	Bike Lane	40	1	> 7	No	No	3
	Old Portland Road	Eastern Walmart Driveway	Both	Bike Lane	40	1	5.5 – 7	No	No	4
Millard Road	Old Portland Road	McNulty Way	Both	Mixed Traffic	30	1	N/A	No	No	3
	McNulty Way	US 30	Both	Mixed Traffic	25	1	N/A	No	No	2
Collector										

Plymouth Street	Old Portland Road	S 6th Street	Both	Mixed Traffic	25	1	N/A	No	No	2
McNulty Way	Millard Road	Residential Driveway	Both	Mixed Traffic	25	1	N/A	No	No	2
	Residential Driveway	PNWR Rail Crossing	Both	Bike Lane	25	1	< 5.5	No	No	2
	PNWR Rail Crossing	Joint Maintenance Facility Driveway	West	Bike Lane	25	1	< 5.5	No	No	2
	PNWR Rail Crossing	Joint Maintenance Facility Driveway	East	Bike Lane	25	1	< 5.5	No	No	2
	Joint Maintenance Facility Driveway	Industrial Way	West	Bike Lane	25	1	< 5.5	No	No	2
	Joint Maintenance Facility Driveway	Industrial Way	East	Mixed Traffic	25	1	N/A	No	No	2
	Industrial Way	Gable Road	Both	Mixed Traffic	25	1	N/A	No	No	2

Shaded cells denote roadway segments that do not satisfy the LTS 2 target.

EXISTING GAPS AND DEFICIENCIES

Streets with no bike lanes or intermittent bike lanes result in bicyclists sharing the travel lane with motor vehicles or using the shoulder if available. In many cases, this is not a desirable option for bicyclists due to narrow lane widths or uneven pavement conditions. Ideally, adequate bicycle facilities should be provided to allow for safe travel between neighborhoods and essential destinations. The City TSP identifies bicycle infrastructure goals and bicycle facility needs.

The following provides a summary of the existing gaps deficiencies in the bicycle facilities within the study area. These gaps and deficiencies were updated based on input from the project team, the advisory committee, and the public throughout the planning process:

- There are several study roadways that currently do not provide on-street bike lanes. These roadways include:
  - Old Portland Road from S 4th Street to S 18th Street/S Kaster Road
  - Old Portland Road from Gable Road to Millard Road
  - Millard Road from Old Portland Road to US 30
  - Plymouth Street from Old Portland Road to its terminus
  - McNulty Way from Millard Road to 600 feet north of Millard Road
  - McNulty Way from the Joint Maintenance Facility driveway to Gable Road
- There are several study roadways whose bike lanes are too narrow or adjacent speeds are too high to achieve a BLTS 2 rating. These streets include:
  - US 30 from Gable Road to Millard Road
  - Old Portland Road from S 18th Street/S Kaster Road to Gable Road
  - Gable Road from Old Portland Road to US 30
- There are several study area roadways with mixed traffic where posted speed limits are too high and/or removal of the centerline would improve BLTS. These roadways include:
  - Old Portland Road from S 4th Street to S 18th Street/S Kaster Road
  - Old Portland Road from Gable Road to Millard Road
  - Millard Road from Old Portland Road to McNulty Way

TRANSIT FACILITIES

Columbia County Rider (CCR) provides transit service within the study area. Route 3, the South County Flex, operates Monday through Friday from 7:30 AM to 5:50 PM on 90-minute headways. Route 3 connects St. Helens to Scappoose with several stops along Old Portland Road and Gable Road in the study area. Several other CCR routes operate along US 30, stopping at the Columbia County Rider Transit Center toward the north side of St. Helens.

Columbia County also offers a flex route that operates on a fixed schedule and stops at certain designated locations on each trip, but is also allowed to make a limited number of deviations off-route each trip to pick up and drop off passengers at other locations. CCR Flex-Route service operates between St. Helens and Scappoose in an effort to reduce the number of dial-a-ride trips between the two cities. The route operates with 90-minute headways and connects with CCR's Fixed Routes to Portland, Washington County, and Tri-Met connections.

Columbia County also offers dial-a-ride service for seniors, individuals with disabilities, and citizens that require Dial-A-Ride for life needs. Dial-A-Ride is available in the study area Monday through Friday from 7:30 AM to 7:00 PM. CCR does not provide service on weekends and federal holidays.

TRAFFIC SAFETY SUMMARY

Five years of historical crash data for study intersections and study roadways was obtained from ODOT and reviewed to identify potential existing safety issues. Figure 7 shows the mapped crash data for the City of St. Helens, including locations of injuries and fatalities for the five-year period. As Millard Road is outside city limits, Millard Road crashes were not mapped.

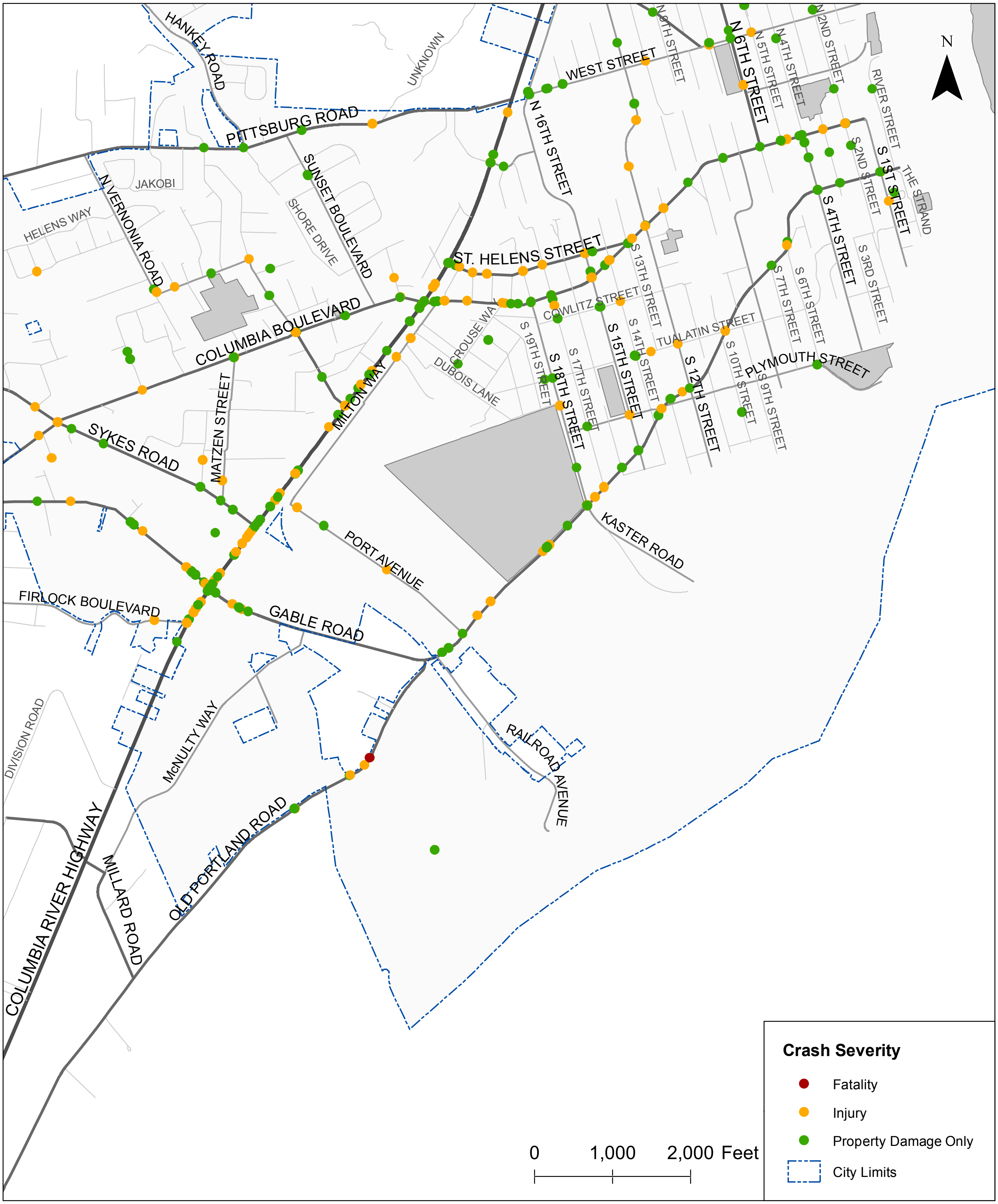
INTERSECTION CRASH HISTORY

Historical crash data for the study intersections was reviewed to identify potential safety issues that could be addressed as part of the Riverfront Connector Plan. Crash data for the study intersections was obtained from ODOT for the five-year period from January 1, 2011 through December 31, 2015 and is summarized in Table 7. As shown, no fatalities were reported at the study intersections over the five-year period. *Appendix "E" contains the historical traffic safety data provided by ODOT.*

Table 7: Intersection Crash History (January 1, 2011 through December 31, 2015)

Intersection	Crash Type						Crash Severity		
	Rear-End	Turning	Angle	Ped	Fixed Object	Other	Property Damage Only	Injury	Fatal
S 1st Street/ St. Helens Street	-	2	2[1]	-	-	-	1	3	-
S 8th Street/ Old Portland Road	-	-	-	-	-	-	-	-	-
S 12th Street/ Old Portland Road	-	-	-	-	1	-	1	-	-
Plymouth Street/ Old Portland Road	-	1	-	-	-	-	-	1	-
S 15th Street/ Old Portland Road	1	-	-	-	-	-	1	-	-
S 18th Street/ Old Portland Road	8	1	1	1	2	-	5	8	-
Port Avenue/ Old Portland Road	2	-	-	-	2	-	2	2	-
Railroad Avenue/ Old Portland Road	-	-	-	-	-	-	-	-	-
Gable Road/ Old Portland Road	-	-	-	-	-	-	-	-	-
Gable Road/ McNulty Way	-	-	-	-	-	-	-	-	-
Gable Road/ US 30	10	9	3	1	-	-	9	14	-
Millard Road/ Old Portland Road	-	1[1]	-	-	-	-	-	1	-
Millard Road/ McNulty Way	-	-	-	-	-	-	-	-	-
Millard Road/ US 30	2	4	2	-	-	-	5	3	-

1. Bicycle Collision



H:\21\21001 - St Helens Riverfront Connector\gis\7_Crash Data.mxd - mbell - 9:57 AM 5/14/2018

Data Provided by ODOT
January 1, 2011 through December 31, 2015

Reported Crash Locations, 2011-2015
St. Helens, Oregon

Figure
7

KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Delete if there isn't one.

Critical crash rates were calculated for each of the study intersections following the analysis methodology presented in ODOT's SPR 667 Assessment of Statewide Intersection Safety Performance (Reference 6). SPR 667 provides average crash rates at a variety of intersection configurations in Oregon based on number of approaches and traffic control types. The average crash rates represent the approximate number of crashes that are "expected" at a study intersection. Additionally, this average crash rate was used to calculate the critical crash rate for each study intersection, based on the Highway Safety Manual methodology (Reference 7). The critical crash rate is calculated for each intersection based on the average crash rate for each facility and serves as a threshold for further analysis.

Table 8 summarizes the critical crash rate for each intersection and compares those values to the observed crash rate. SPR 667 also provides 90th percentile crash rates based on number of approaches and traffic control types. For the signalized intersections whose critical crash rates could not be calculated, the observed crash rate was compared to the 90th percentile crash rate. Per ODOT, if the observed crash rate at the study location exceeds the critical rate, it is a possible indication that the location is exceeding average crash rates.

Table 8: Intersection Crash Rate Assessment

Location	Total Crashes	90th Percentile Crash Rate	Critical Crash Rate	Observed Crash Rate at Intersection	Observed Crash Rate > Critical Crash Rate?
S 1st Street/ St. Helens Street	4	-	0.48	0.63	**Yes**
S 8th Street/ Old Portland Road	0	-	0.29	0.00	No
S 12th Street/ Old Portland Road	1	-	0.25	0.09	No
Plymouth Street/ Old Portland Road	1	-	0.38	0.08	No
S 15th Street/ Old Portland Road	1	-	0.37	0.08	No
S 18th Street/ Old Portland Road	13	0.86	-	0.73	No
Port Avenue/ Old Portland Road	4	-	0.20	0.23	**Yes**
Railroad Avenue/ Old Portland Road	0	-	0.33	0.00	No
Gable Road/ Old Portland Road	0	-	0.20	0.00	No
Gable Road/ McNulty Way	0	-	0.21	0.00	No
Gable Road/ US 30	23	0.86	-	0.40	No
Millard Road/ Old Portland Road	1	-	0.26	0.02	No
Millard Road/ McNulty Way	0	-	0.79	0.00	No
Millard Road/ US 30	8	-	1.27	0.49	**Yes**

As shown in Table 8, the S 1st Street/St. Helens Street, Port Avenue/Old Portland Road, and Millard Road/US 30 intersections exceed the critical crash rate.

At S 1st Street/St. Helens Street, two of the four reported crashes involved turning maneuvers while the other two involved angle collisions. Four crashes were reported at Port Avenue/Old Portland Road, with two involving turning movements and two involving a collision with a fixed-object. No measures were identified to reduce the potential for these types of crashes at these locations based on review of the crash data alone.

Approximately 75% of crashes reported at Millard Road/US 30 involved angle or turning crashes. Signalization of the Millard Road/US 30 intersection is identified in the St. Helens TSP and would provide protected movements for vehicles approaching US 30 from Millard Road.

SEGMENT CRASH HISTORY

Historical crash data along study roadway segments was reviewed in an effort to identify potential existing roadway safety issues. Crash data for the study roadway segments was obtained from ODOT for the five-year period from January 1, 2011 through December 31, 2015. Table 9 identifies the reported crashes along each of the segments during this five-year period.

Table 9: Segment Crash History (January 1, 2011 through December 31, 2015)

	Crash Type						Crash Severity		
Segment	Rear-End	Turning	Angle	Ped	Fixed Object	Other	Property Damage Only	Injury	Fatal
Gable Road – US 30 to Old Portland Road	1	6	2	-	-	-	6	3	-
Old Portland Road – Millard Road to S 1st Street	5	4	3	1	17	5	20	14	1
Plymouth Street – Old Portland Road to Roadway terminus	-	-	-	-	1	-	1	-	-
McNulty Way – Millard Road to Gable Road	-	-	-	-	-	-	-	-	-
Millard Road – McNulty Way to Old Portland Road	-	-	1	-	3	2	5	1	-

As shown in Table 9, one fatality was reported on the study roadways. The fatality reportedly occurred midblock on Old Portland Road, approximately 1,300 feet south of its intersection with Gable Road. The crash report indicates the fatal crash involved a head-on collision attributed to a driver under the influence speeding and losing control of the vehicle.

Segment crash rates were calculated using the methodology provided in ODOT's *Analysis Procedures Manual*. Crash rates were compared to statewide average crash rates for similar facilities based on urban area context and functional classification using ODOT's *2015 Table II: Five-Year Comparison of State Highway Crash Rates* (Reference 8). Table 10 summarizes the average crash rate for each segment and compares those values to the observed crash rate.

Table 10: Segment Crash Rate Assessment

Location	Total Crashes	Segment Length (miles)	AADT	Average Crash Rate	Observed Crash Rate at Segment	Observed Crash Rate > Critical Crash Rate?
Gable Road – US 30 to Old Portland Road	9	0.57	11,290	2.82	0.77	No
Old Portland Road – Millard Road to S 1st Street	35	2.76	9,690	2.82	0.72	No
Plymouth Street – Old Portland Road to Roadway terminus	1	0.57	900	1.91	1.07	No
McNulty Way – Millard Road to Gable Road	0	0.78	1,160	1.91	0	No
Millard Road – McNulty Way to Old Portland Road	6	0.38	650	2.82	13.35	**Yes**

AADT= Average Annual Daily Traffic

As shown in Table 10, the Millard Road segment exceeds the statewide average crash rate. Half of the reported segment crashes involved fixed-object crashes, 33% involved head-on collisions, and 17% were angle crashes. Most reported crashes involved property damage only.

SAFETY PRIORITY INDEX SYSTEM

The ODOT 2016 Safety Priority Index System (SPIS) list identifies existing hazardous intersections for potential safety improvements. No study intersections are listed in the top ten percent of ODOT's SPIS ranking program.

NEXT STEPS

The information presented in this document was used to assist in the identification of near-term transportation improvement needs as well as for comparison to future conditions.

REFERENCES

1. City of St. Helens. *City of St. Helens Transportation System Plan*. 2011.
2. Oregon Department of Transportation. *Oregon Highway Plan*. 1999.
3. Transportation Research Board. *2000 Highway Capacity Manual*. 2000.
4. Oregon Department of Transportation. *Analysis Procedures Manual*. December 2017 update.
5. Oregon Department of Transportation. *Highway Design Manual*. 2012.
6. Oregon Department of Transportation Research Section. *SPR 667 Assessment of Statewide Intersection Safety Performance*. June 2011.
7. American Association of State Highway and Transportation Officials. *Highway Safety Manual*. 2010.
8. Oregon Department of Transportation. *Table II: Five-Year Comparison of State Highway Crash Rates.* 2015.

Appendix A LOS Criteria Definitions

DESCRIPTION OF LEVEL-OF-SERVICE

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from "A" to "F".1

Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table A1. Additionally, Table A2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service "D" is generally considered to represent the minimum acceptable design standard.

Table A1: Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

1 Most of the material in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Table A2: Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2000 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table A3. A quantitative definition of level of service for unsignalized intersections is presented in Table A4. Using this definition, Level of Service "E" is generally considered to represent the minimum acceptable design standard.

Table A3: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table A4: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

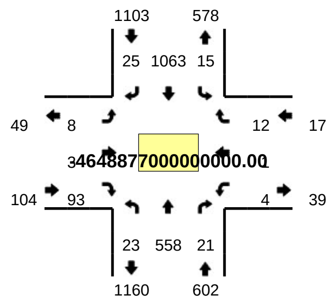
It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

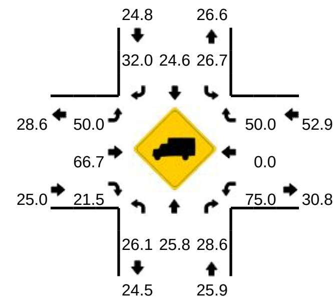
Appendix B Traffic Counts

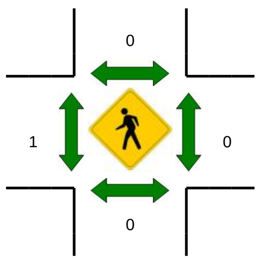
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

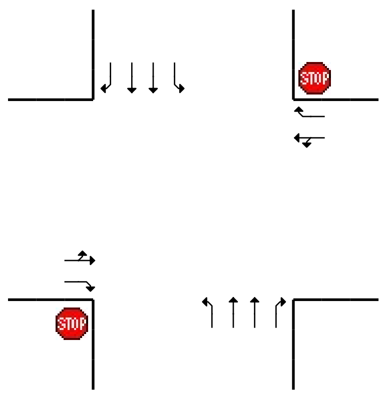
LOCATION: US 30 -- Millard Rd | **QC JOB #:** 14560501
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

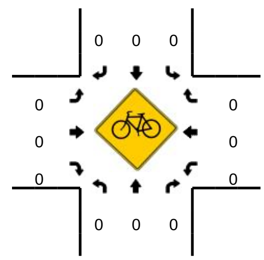


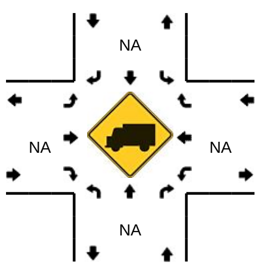
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

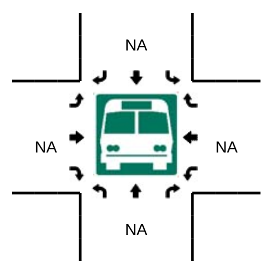












5-Min Count Period Beginning At	US 30 (Northbound) Left	Thru	Right	U	US 30 (Southbound) Left	Thru	Right	U	Millard Rd (Eastbound) Left	Thru	Right	U	Millard Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	0	48	4	0	2	322	1	0	1	0	14	0	2	1	0	0	395	
6:15 AM	0	65	2	0	2	277	3	0	0	1	23	0	2	0	2	0	377	
6:30 AM	3	85	3	0	1	276	4	0	0	1	20	0	1	1	1	0	396	
6:45 AM	2	93	6	0	2	297	3	0	1	0	23	0	1	0	2	0	430	
7:00 AM	3	82	5	0	5	290	7	0	2	0	32	0	1	0	0	0	427	
7:15 AM	8	121	2	0	2	268	4	0	0	1	28	0	0	0	4	0	438	
7:30 AM	2	122	0	0	7	297	6	0	1	0	17	0	0	0	1	0	453	
7:45 AM	6	163	17	0	4	263	6	0	2	2	24	0	4	1	4	0	496	
8:00 AM	7	152	2	0	2	235	9	0	5	0	24	0	0	0	3	0	439	
8:15 AM	6	161	3	0	5	210	14	0	1	0	11	0	0	0	4	0	415	
8:30 AM	15	156	9	0	2	203	6	0	2	0	16	0	0	0	2	0	411	
8:45 AM	10	104	5	0	3	220	12	0	2	1	8	0	3	0	4	0	372	1637
9:00 AM	9	116	3	0	4	175	7	0	0	1	20	0	0	2	1	0	338	1536
9:15 AM	2	129	4	0	1	161	4	0	2	0	12	0	0	1	4	0	320	1441
9:30 AM	6	101	3	0	3	197	8	0	3	1	8	0	2	0	2	0	334	1364
9:45 AM	12	129	3	0	4	180	13	0	1	0	13	0	2	3	2	0	362	1354
10:00 AM	6	135	2	0	0	162	8	0	5	0	16	0	1	0	2	0	337	1353
10:15 AM	4	126	1	0	1	166	7	0	5	1	14	0	2	0	10	0	337	1370
10:30 AM	2	145	2	0	1	176	10	0	6	1	10	0	1	0	2	0	356	1392
10:45 AM	5	143	2	0	3	167	9	0	3	2	7	0	2	0	5	0	348	1378
11:00 AM	6	147	2	0	3	188	15	0	1	0	15	0	3	0	4	0	384	1425
11:15 AM	11	161	1	0	4	169	13	0	4	0	12	0	2	2	5	0	384	1472
11:30 AM	4	137	5	0	5	140	10	0	3	1	6	0	1	0	2	0	314	1430
11:45 AM	4	173	4	0	8	181	6	0	3	0	5	0	1	0	4	0	389	1471

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	24	652	68	0	16	1052	24	0	8	8	96	0	16	4	16	0	1984
Heavy Trucks	4	116	20		0	276	4		4	4	12		12	0	8		460
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

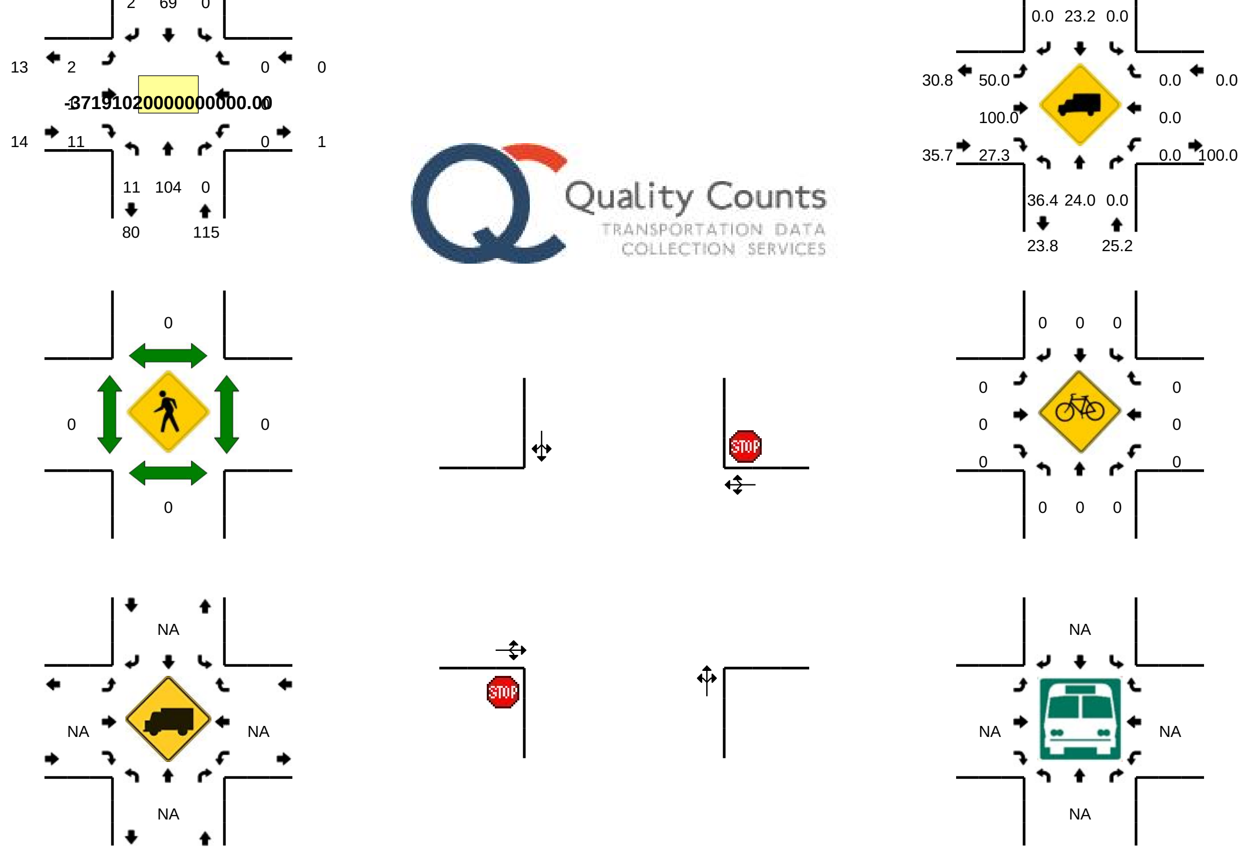
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: Old Portland Rd -- Millard Rd | **QC JOB #:** 14560502

CITY/STATE: Warren, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 7:15 AM -- 8:15 AM

Peak 15-Min: 7:35 AM -- 7:50 AM



5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Millard Rd (Eastbound) Left	Thru	Right	U	Millard Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	1	9	0	0	0	15	1	0	0	0	2	0	0	0	0	0	28	
6:15 AM	1	15	0	0	0	12	0	0	1	0	2	0	0	0	0	0	31	
6:30 AM	3	24	0	0	0	12	0	0	0	0	1	0	0	0	0	0	40	
6:45 AM	2	15	0	0	0	15	0	0	4	0	0	0	0	0	0	0	36	
7:00 AM	0	15	0	0	0	10	0	0	0	0	4	0	0	0	0	0	29	
7:15 AM	5	17	0	0	0	14	0	0	0	1	1	0	0	0	0	0	38	
7:30 AM	1	20	0	0	0	16	0	0	0	0	4	0	0	0	0	0	41	
7:45 AM	1	34	0	0	0	20	2	0	2	0	3	0	0	0	0	0	62	
8:00 AM	4	33	0	0	0	19	0	0	0	0	3	0	0	0	0	0	59	
8:15 AM	3	21	0	0	0	7	0	0	3	0	0	0	0	0	0	0	34	
8:30 AM	1	29	0	0	0	11	2	0	0	0	2	0	0	0	0	0	45	
8:45 AM	3	29	0	0	0	16	3	0	1	0	1	0	0	0	0	0	53	191
9:00 AM	0	12	0	0	0	15	3	0	2	1	1	0	0	0	0	0	34	166
9:15 AM	3	14	0	0	0	12	2	0	2	0	1	0	0	0	1	0	35	167
9:30 AM	0	12	0	0	0	12	1	0	0	0	2	0	0	0	0	0	27	149
9:45 AM	3	18	0	0	0	15	2	0	0	0	1	0	0	0	0	0	39	135
10:00 AM	1	18	0	0	0	8	1	0	2	0	1	0	0	1	0	0	32	133
10:15 AM	9	23	0	0	0	8	2	0	1	0	1	0	0	0	0	0	44	142
10:30 AM	2	17	0	0	0	16	1	0	2	0	3	0	0	0	0	0	41	156
10:45 AM	3	9	0	0	0	14	1	0	2	0	0	0	0	0	0	0	29	146
11:00 AM	1	16	0	0	0	8	3	0	2	0	2	0	0	0	0	0	32	146
11:15 AM	2	17	0	0	0	12	6	0	2	0	1	0	0	2	0	0	42	144
11:30 AM	1	30	0	0	1	17	0	0	3	0	2	0	1	0	0	0	55	158
11:45 AM	2	21	0	0	0	20	2	0	2	0	2	0	0	0	0	0	49	178

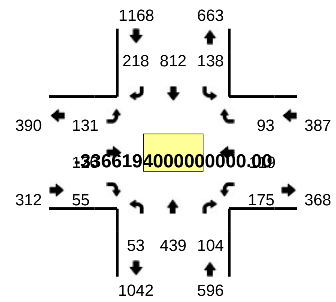
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	4	136	0	0	0	80	8	0	8	0	12	0	0	0	0	0	248
Heavy Trucks	4	40	0		0	20	0		4	0	0		0	0	0		68
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

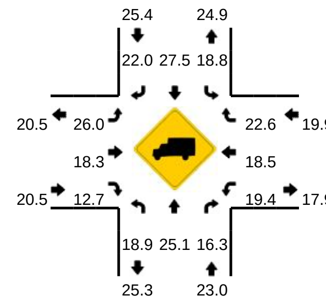
Type of peak hour being reported: User-Defined — Method for determining peak hour: Total Entering Volume

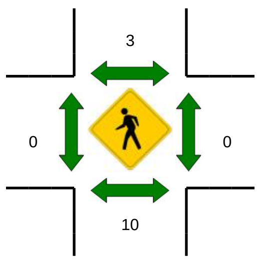
LOCATION: US 30 -- Gable Rd — **QC JOB #:** 14560503

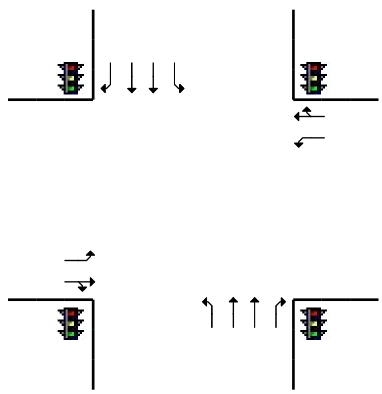
CITY/STATE: Saint Helens, OR — **DATE:** Thu, May 18 2017

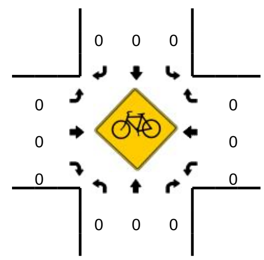


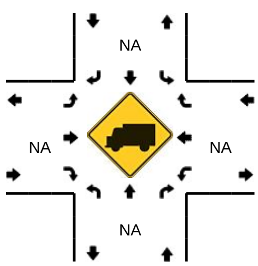
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

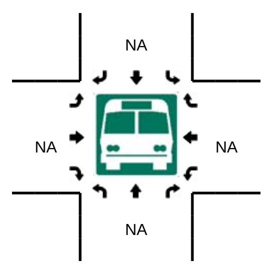












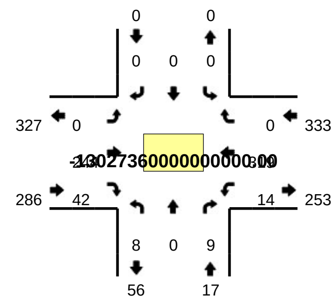
5-Min Count Period Beginning At	US 30 (Northbound) Left	Thru	Right	U	US 30 (Southbound) Left	Thru	Right	U	Gable Rd (Eastbound) Left	Thru	Right	U	Gable Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	6	34	12	0	37	264	10	0	6	6	15	0	51	10	11	0	462	
6:15 AM	4	37	20	0	29	222	13	0	9	9	13	0	40	7	20	0	423	
6:30 AM	3	60	12	0	26	220	14	0	11	18	16	0	47	7	12	0	446	
6:45 AM	9	69	18	0	32	246	19	0	8	19	16	0	35	11	12	0	494	
7:00 AM	11	60	12	0	31	206	25	0	12	17	20	0	50	18	29	0	491	
7:15 AM	14	85	27	0	31	217	33	0	24	21	14	0	38	15	20	0	539	
7:30 AM	9	97	22	0	29	210	36	0	25	26	18	0	61	31	25	0	589	
7:45 AM	17	143	28	0	45	223	64	0	37	31	11	0	34	30	22	0	685	
8:00 AM	13	114	27	0	33	162	85	0	45	48	12	0	42	43	26	0	650	
8:15 AM	5	144	27	0	31	181	36	0	37	27	18	0	33	15	19	0	573	
8:30 AM	9	113	30	0	29	160	25	0	11	27	12	0	31	30	35	0	512	
8:45 AM	7	107	18	0	29	177	21	0	22	23	18	0	39	18	29	0	508	2243
9:00 AM	11	85	27	0	29	138	24	0	25	20	9	0	36	16	25	0	445	2038
9:15 AM	10	101	27	0	23	128	28	0	16	16	11	0	28	21	20	0	429	1894
9:30 AM	4	81	22	0	30	175	27	0	13	28	12	0	35	17	33	0	477	1859
9:45 AM	9	101	26	0	34	127	23	0	32	15	16	0	37	23	42	0	485	1836
10:00 AM	9	103	31	0	37	130	37	0	26	22	12	0	25	30	34	0	496	1887
10:15 AM	6	106	28	0	36	136	30	0	33	18	10	0	45	19	37	0	504	1962
10:30 AM	14	109	27	0	33	139	23	0	23	30	8	0	34	29	35	0	504	1989
10:45 AM	9	108	32	0	32	140	42	0	32	23	10	0	36	30	39	0	533	2037
11:00 AM	23	111	21	0	52	138	16	0	26	34	13	0	45	32	36	0	547	2088
11:15 AM	7	124	38	0	32	137	34	0	27	26	16	0	40	20	28	0	529	2113
11:30 AM	14	103	26	0	46	108	37	0	39	23	9	0	40	28	48	0	521	2130
11:45 AM	13	146	25	0	43	128	37	0	41	33	11	0	41	39	47	0	604	2201

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	68	572	112	0	180	892	256	0	148	124	44	0	136	120	88	0	2740
Heavy Trucks	8	128	8		36	216	52		28	20	0		32	28	36		592
Pedestrians		20				4				0				0			24
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

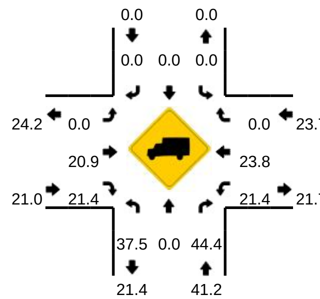
Comments:

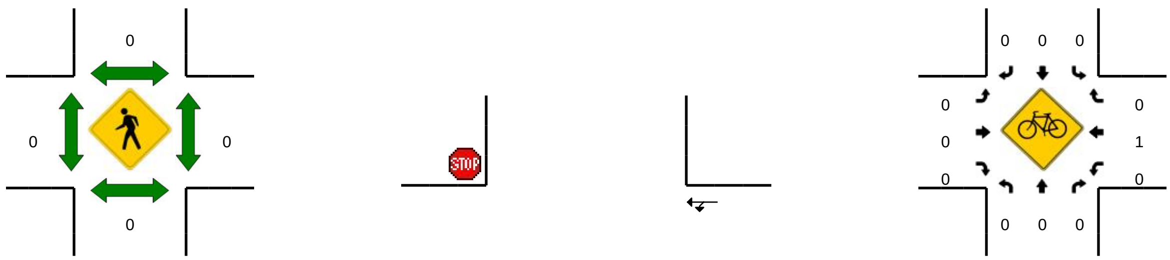
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

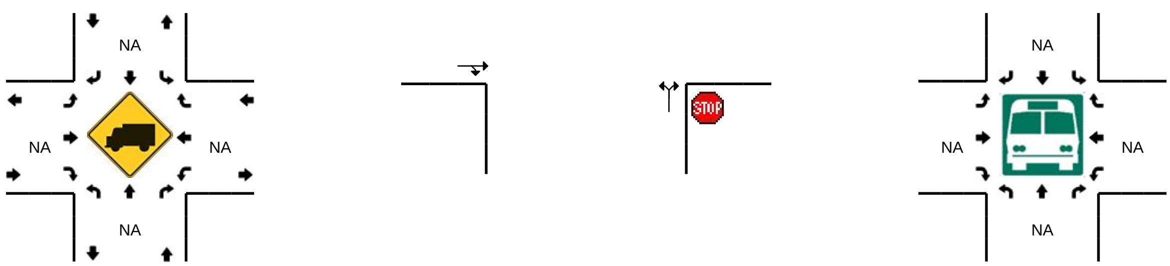
LOCATION: McNulty Way -- Gable Rd | **QC JOB #:** 14560504
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM







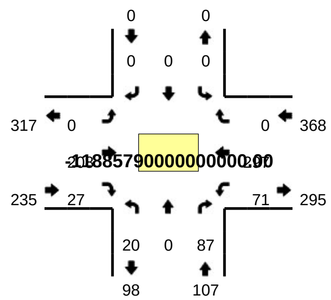
5-Min Count Period Beginning At	McNulty Way (Northbound) Left	Thru	Right	U	McNulty Way (Southbound) Left	Thru	Right	U	Gable Rd (Eastbound) Left	Thru	Right	U	Gable Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	2	0	1	0	0	0	0	0	0	24	12	0	5	61	0	0	105	
6:15 AM	0	0	0	0	0	0	0	0	0	43	1	0	0	54	0	0	98	
6:30 AM	1	0	1	0	0	0	0	0	0	39	3	0	1	50	0	0	95	
6:45 AM	1	0	2	0	0	0	0	0	0	40	7	0	2	52	0	0	104	
7:00 AM	2	0	3	0	0	0	0	0	0	33	9	0	3	73	0	0	123	
7:15 AM	1	0	3	0	0	0	0	0	0	48	8	0	1	66	0	0	127	
7:30 AM	2	0	2	0	0	0	0	0	0	56	4	0	3	100	0	0	167	
7:45 AM	3	0	3	0	0	0	0	0	0	75	18	0	6	72	0	0	177	
8:00 AM	2	0	1	0	0	0	0	0	0	65	12	0	4	81	0	0	165	
8:15 AM	8	0	2	0	0	0	0	0	0	49	9	0	5	52	0	0	125	
8:30 AM	15	0	6	0	0	0	0	0	0	45	25	0	2	60	0	0	153	
8:45 AM	10	0	5	0	0	0	0	0	0	42	4	0	5	63	0	0	129	572
9:00 AM	3	0	4	0	0	0	0	0	0	49	5	0	11	57	0	0	129	536
9:15 AM	7	0	2	0	0	0	0	0	0	39	9	0	4	47	0	0	108	519
9:30 AM	8	0	4	0	0	0	0	0	0	47	10	0	4	63	0	0	136	502
9:45 AM	14	0	9	0	0	0	0	0	0	40	12	0	6	70	0	0	151	524
10:00 AM	12	0	8	0	0	0	0	0	0	50	11	0	1	55	0	0	137	532
10:15 AM	7	0	9	0	0	0	0	0	0	36	8	0	3	72	0	0	135	559
10:30 AM	8	0	6	0	0	0	0	0	0	70	11	0	11	57	0	0	163	586
10:45 AM	8	0	9	0	0	0	0	0	0	37	8	0	6	61	0	0	129	564
11:00 AM	27	0	7	0	0	0	0	0	0	62	16	0	7	80	0	0	199	626
11:15 AM	7	0	2	0	0	0	0	0	0	52	12	0	6	65	0	0	144	635
11:30 AM	12	0	4	0	0	0	0	0	0	68	4	0	9	74	0	0	171	643
11:45 AM	21	0	18	0	0	0	0	0	0	64	11	0	4	92	0	0	210	724

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	12	0	12	0	0	0	0	0	0	300	72	0	24	288	0	0	708
Heavy Trucks	8	0	4		0	0	0		0	64	16		4	92	0		188
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

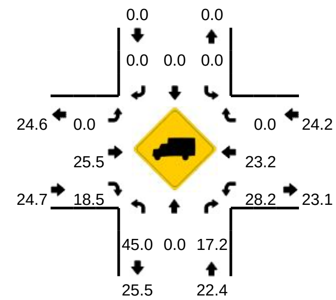
Comments:

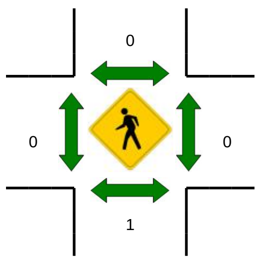
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

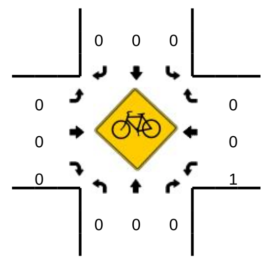
LOCATION: Old Portland Rd -- Gable Rd | **QC JOB #:** 14560505
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

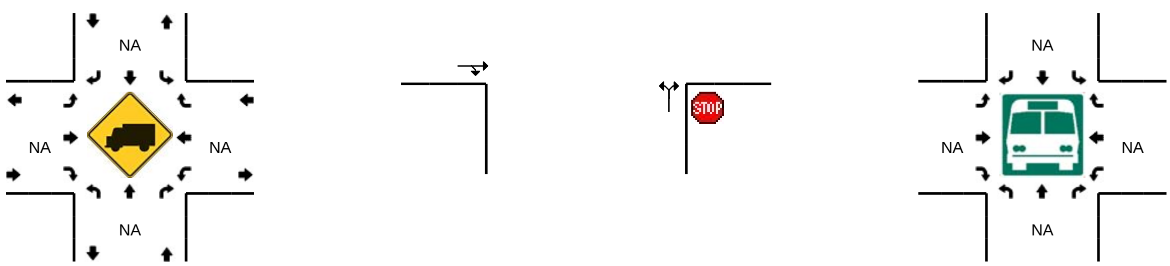


Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM









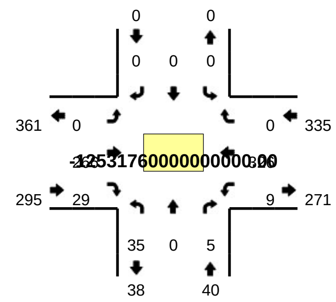
5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Gable Rd (Eastbound) Left	Thru	Right	U	Gable Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	5	0	8	0	0	0	0	0	0	15	6	0	15	56	0	0	105	
6:15 AM	2	0	11	0	0	0	0	0	0	34	9	0	15	48	0	0	119	
6:30 AM	0	0	16	0	0	0	0	0	0	24	7	0	18	45	0	0	110	
6:45 AM	1	0	15	0	0	0	0	0	0	38	5	0	25	48	0	0	132	
7:00 AM	2	0	9	0	0	0	0	0	0	29	3	0	11	66	0	0	120	
7:15 AM	5	0	18	0	0	0	0	0	0	42	8	0	10	61	0	0	144	
7:30 AM	5	0	16	0	0	0	0	0	0	41	7	0	19	90	0	0	178	
7:45 AM	2	0	23	0	0	0	0	0	0	69	7	0	20	73	0	0	194	
8:00 AM	8	0	30	0	0	0	0	0	0	56	5	0	22	73	0	0	194	
8:15 AM	2	0	27	0	0	0	0	0	0	42	5	0	6	49	0	0	131	
8:30 AM	8	0	31	0	0	0	0	0	0	43	0	0	8	51	0	0	141	
8:45 AM	5	0	27	0	0	0	0	0	0	41	3	0	20	56	0	0	152	618
9:00 AM	1	0	13	0	0	0	0	0	0	39	5	0	14	61	0	0	133	557
9:15 AM	6	0	16	0	0	0	0	0	0	34	6	0	13	42	0	0	117	543
9:30 AM	5	0	15	0	0	0	0	0	0	39	6	0	10	56	0	0	131	533
9:45 AM	10	0	14	0	0	0	0	0	0	43	5	0	17	59	0	0	148	529
10:00 AM	7	0	19	0	0	0	0	0	0	46	5	0	10	42	0	0	129	525
10:15 AM	5	0	20	0	0	0	0	0	0	38	6	0	10	65	0	0	144	552
10:30 AM	4	0	18	0	0	0	0	0	0	62	6	0	14	55	0	0	159	580
10:45 AM	3	0	11	0	0	0	0	0	0	37	3	0	13	58	0	0	125	557
11:00 AM	7	0	17	0	0	0	0	0	0	57	7	0	12	74	0	0	174	602
11:15 AM	6	0	19	0	0	0	0	0	0	44	9	0	13	58	0	0	149	607
11:30 AM	5	0	31	0	0	0	0	0	0	59	5	0	17	71	0	0	188	636
11:45 AM	7	0	25	0	0	0	0	0	0	72	7	0	18	81	0	0	210	721

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	8	0	92	0	0	0	0	0	0	276	28	0	80	292	0	0	776
Heavy Trucks	8	0	12		0	0	0		0	72	8		20	92	0		212
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

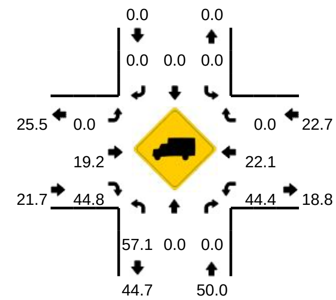
Comments:

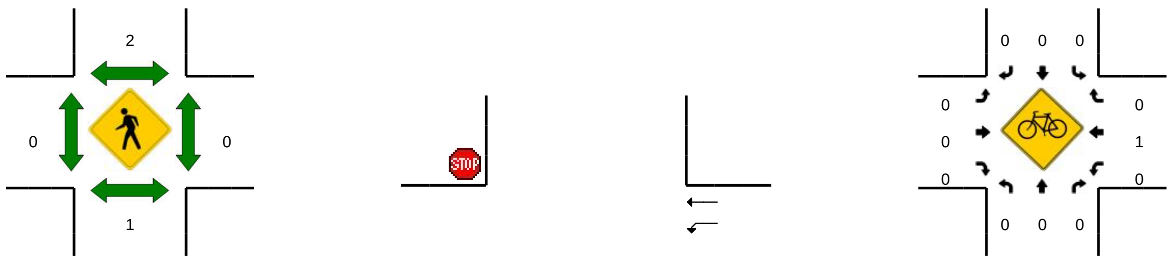
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

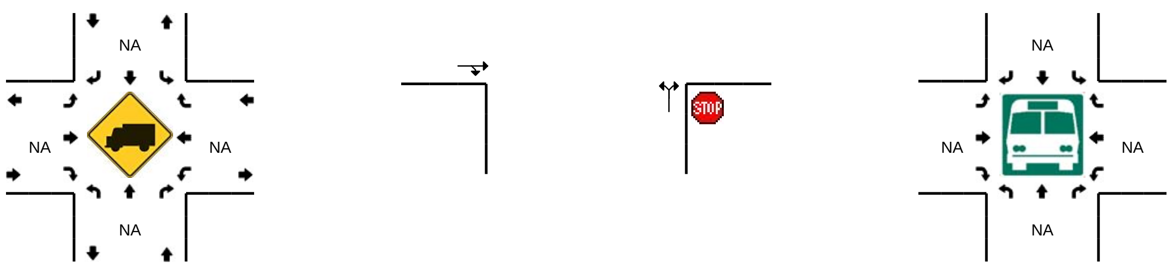
LOCATION: Railroad Ave -- Old Portland Rd | **QC JOB #:** 14560506
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM







5-Min Count Period Beginning At	Railroad Ave (Northbound) Left	Thru	Right	U	Railroad Ave (Southbound) Left	Thru	Right	U	Old Portland Rd (Eastbound) Left	Thru	Right	U	Old Portland Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	2	0	2	0	0	0	0	0	0	15	8	0	4	68	0	0	99	
6:15 AM	1	0	0	0	0	0	0	0	0	24	21	0	2	61	0	0	109	
6:30 AM	3	0	0	0	0	0	0	0	0	30	11	0	9	59	0	0	112	
6:45 AM	3	0	4	0	0	0	0	0	0	40	14	0	2	68	0	0	131	
7:00 AM	16	0	6	0	0	0	0	0	0	29	6	0	3	65	0	0	125	
7:15 AM	12	0	2	0	0	0	0	0	0	54	8	0	3	59	0	0	138	
7:30 AM	8	0	0	0	0	0	0	0	0	52	5	0	4	102	0	0	171	
7:45 AM	10	0	2	0	0	0	0	0	0	82	9	0	2	79	0	0	184	
8:00 AM	5	0	1	0	0	0	0	0	0	78	7	0	0	86	0	0	177	
8:15 AM	4	0	0	0	0	0	0	0	0	61	5	0	1	52	0	0	123	
8:30 AM	3	0	1	0	0	0	0	0	0	65	7	0	2	54	0	0	132	
8:45 AM	7	0	2	0	0	0	0	0	0	62	5	0	4	73	0	0	153	585
9:00 AM	7	0	1	0	0	0	0	0	0	45	9	0	4	64	0	0	130	538
9:15 AM	8	0	4	0	0	0	0	0	0	32	16	0	2	46	0	0	108	523
9:30 AM	8	0	4	0	0	0	0	0	0	51	6	0	4	61	0	0	134	525
9:45 AM	11	0	5	0	0	0	0	0	0	48	8	0	2	63	0	0	137	509
10:00 AM	9	0	2	0	0	0	0	0	0	58	8	0	3	42	0	0	122	501
10:15 AM	9	0	2	0	0	0	0	0	0	44	12	0	6	67	0	0	140	533
10:30 AM	9	0	1	0	0	0	0	0	0	67	13	0	2	59	0	0	151	550
10:45 AM	12	0	2	0	0	0	0	0	0	43	7	0	5	55	0	0	124	537
11:00 AM	7	0	3	0	0	0	0	0	0	60	8	0	2	81	0	0	161	576
11:15 AM	8	0	8	0	0	0	0	0	0	58	4	0	3	62	0	0	143	579
11:30 AM	10	0	3	0	0	0	0	0	0	81	9	0	2	77	0	0	182	610
11:45 AM	7	0	1	0	0	0	0	0	0	79	17	0	7	90	0	0	201	687

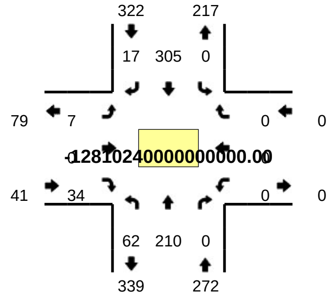
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	40	0	8	0	0	0	0	0	0	328	36	0	8	316	0	0	736
Heavy Trucks	32	0	0		0	0	0		0	64	16		4	76	0		192
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

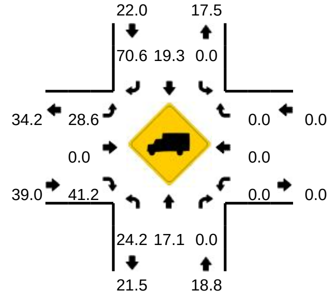
Report generated on 1/4/2018 12:15 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

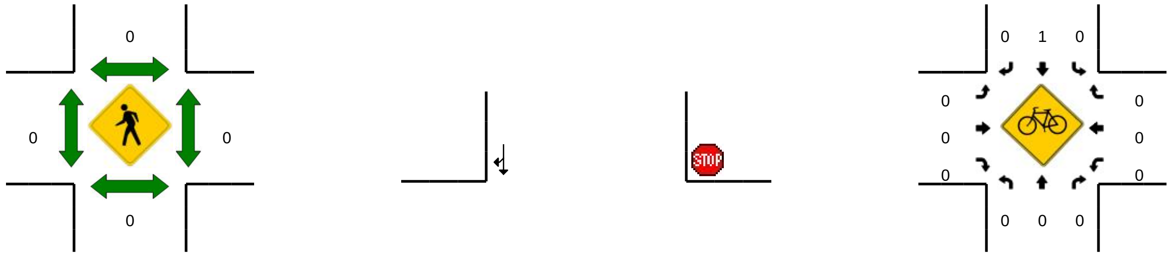
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

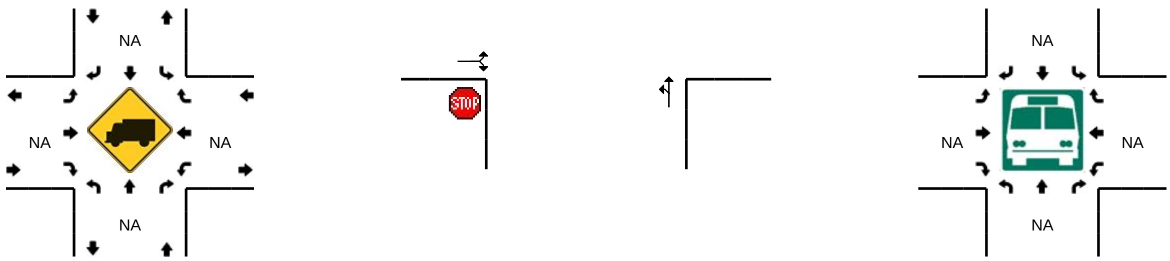
LOCATION: Old Portland Rd -- Port Ave | **QC JOB #:** 14560507
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:50 AM -- 8:05 AM





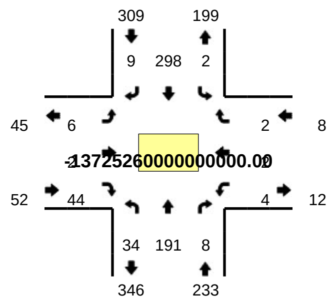


5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Port Ave (Eastbound) Left	Thru	Right	U	Port Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	4	13	0	0	0	67	1	0	0	0	5	0	0	0	0	0	90	
6:15 AM	9	16	0	0	0	53	2	0	0	0	8	0	0	0	0	0	88	
6:30 AM	3	27	0	0	0	61	3	0	0	0	6	0	0	0	0	0	100	
6:45 AM	4	38	0	0	0	61	1	0	0	0	8	0	0	0	0	0	112	
7:00 AM	5	33	0	0	0	64	0	0	1	0	5	0	0	0	0	0	108	
7:15 AM	10	46	0	0	0	55	2	0	1	0	7	0	0	0	0	0	121	
7:30 AM	12	40	0	0	0	100	2	0	0	0	9	0	0	0	0	0	163	
7:45 AM	26	61	0	0	0	73	3	0	1	0	7	0	0	0	0	0	171	
8:00 AM	14	63	0	0	0	77	10	0	5	0	11	0	0	0	0	0	180	
8:15 AM	10	53	0	0	0	44	7	0	2	0	13	0	0	0	0	0	129	
8:30 AM	15	50	0	0	0	50	3	0	1	0	7	0	0	0	0	0	126	
8:45 AM	11	53	0	0	0	68	7	0	0	0	11	0	0	0	0	0	150	585
9:00 AM	11	33	0	0	0	60	5	0	0	0	8	0	0	0	0	0	117	522
9:15 AM	6	33	0	0	0	46	3	0	1	0	5	0	0	0	0	0	94	487
9:30 AM	14	39	0	0	0	54	4	0	3	0	12	0	0	0	0	0	126	487
9:45 AM	9	45	0	0	0	57	7	0	1	0	7	0	0	0	0	0	126	463
10:00 AM	9	50	0	0	0	41	2	0	6	0	3	0	0	0	0	0	111	457
10:15 AM	13	37	0	0	0	56	10	0	1	0	17	0	0	0	0	0	134	497
10:30 AM	8	55	0	0	0	56	1	0	2	0	8	0	0	0	0	0	130	501
10:45 AM	12	33	0	0	0	50	5	0	3	0	12	0	0	0	0	0	115	490
11:00 AM	13	55	0	0	0	70	6	0	2	0	14	0	0	0	0	0	160	539
11:15 AM	14	53	0	0	0	56	4	0	2	0	8	0	0	0	0	0	137	542
11:30 AM	14	74	0	0	0	64	2	0	2	0	16	0	0	0	0	0	172	584
11:45 AM	18	62	0	0	0	84	7	0	5	0	16	0	0	0	0	0	192	661

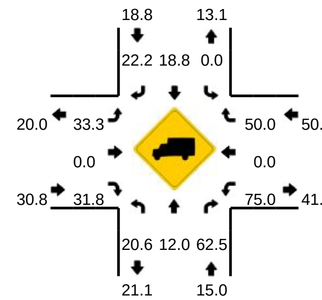
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	56	252	0	0	0	308	40	0	20	0	44	0	0	0	0	0	720
Heavy Trucks	16	44	0		0	64	40		4	0	16		0	0	0		184
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

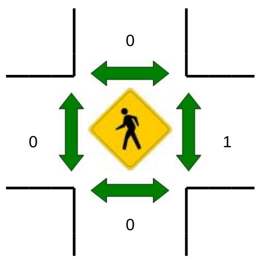
Comments:

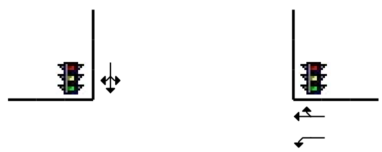
LOCATION: Old Portland Rd -- S 18th St/Kaster Rd **QC JOB #:** 14560508
CITY/STATE: Saint Helens, OR **DATE:** Thu, May 18 2017

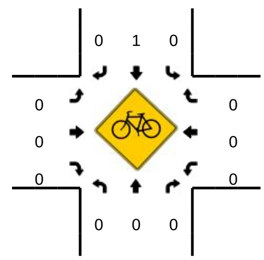


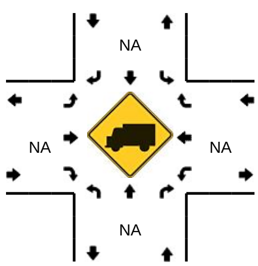
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

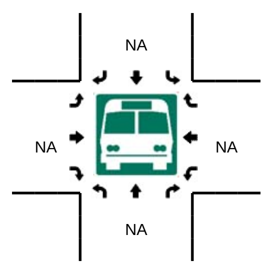












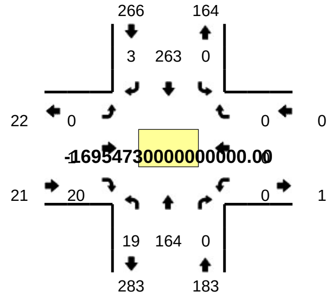
5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 18th St/Kaster Rd (Eastbound) Left	Thru	Right	U	S 18th St/Kaster Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	2	6	3	0	1	60	0	0	1	3	8	0	2	1	0	0	87	
6:15 AM	1	11	7	0	1	48	0	0	0	3	11	0	1	0	0	0	83	
6:30 AM	1	17	11	0	0	55	0	0	0	8	12	0	1	2	0	0	107	
6:45 AM	1	22	12	0	2	60	0	0	1	4	6	0	1	2	1	0	112	
7:00 AM	4	31	5	0	0	61	2	0	3	3	5	0	2	0	0	0	116	
7:15 AM	2	43	4	0	1	52	2	0	1	0	7	0	0	1	1	0	114	
7:30 AM	7	34	1	0	0	97	1	0	0	0	11	0	2	0	0	0	153	
7:45 AM	12	56	2	0	0	76	5	0	5	2	8	0	0	1	0	0	167	
8:00 AM	13	58	1	0	1	73	1	0	0	0	18	0	2	0	1	0	168	
8:15 AM	8	41	3	0	0	45	1	0	1	0	7	0	1	0	0	0	107	
8:30 AM	8	50	2	0	0	50	0	0	2	2	6	0	1	1	0	0	122	
8:45 AM	8	46	4	0	0	66	3	0	1	0	8	0	2	0	1	0	139	536
9:00 AM	6	28	2	0	2	61	1	0	1	1	10	0	2	1	0	0	115	483
9:15 AM	10	25	3	0	0	40	1	0	3	0	10	0	2	0	1	0	95	471
9:30 AM	7	32	5	0	0	51	0	0	0	1	10	0	1	1	1	0	109	458
9:45 AM	9	39	1	0	0	52	2	0	3	1	11	0	5	1	0	0	124	443
10:00 AM	11	43	1	0	0	35	1	0	3	1	7	0	4	0	1	0	107	435
10:15 AM	7	34	4	0	0	47	2	0	1	2	21	0	1	0	0	0	119	459
10:30 AM	15	38	4	0	0	46	3	0	4	0	12	0	1	0	0	0	123	473
10:45 AM	11	32	2	0	1	41	4	0	1	0	13	0	5	0	0	0	110	459
11:00 AM	14	46	2	0	0	63	4	0	5	0	20	0	2	1	2	0	159	511
11:15 AM	4	48	7	0	0	49	6	0	1	0	14	0	3	0	0	0	132	524
11:30 AM	7	56	3	0	0	56	9	0	0	1	16	0	3	0	1	0	152	553
11:45 AM	17	60	2	0	1	59	1	0	2	0	31	0	3	1	2	0	179	622

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	52	232	4	0	4	292	4	0	0	0	72	0	8	0	4	0	672
Heavy Trucks	16	24	4		0	68	0		0	0	36		4	0	4		156
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

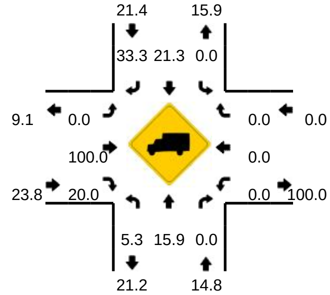
Comments:

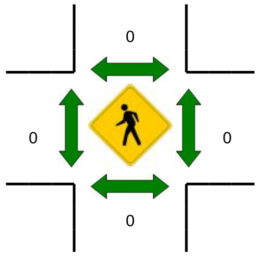
LOCATION: Old Portland Rd -- S 15th St
CITY/STATE: Saint Helens, OR

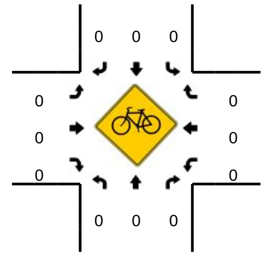
QC JOB #: 14560509
DATE: Thu, May 18 2017

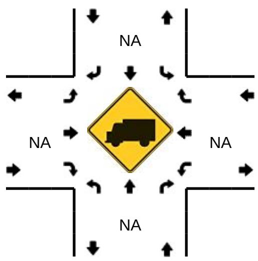


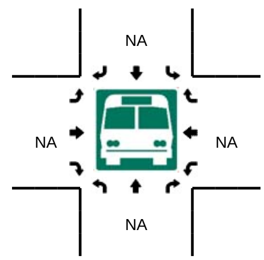
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:20 AM -- 7:35 AM









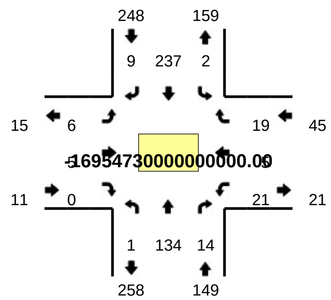


5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 15th St (Eastbound) Left	Thru	Right	U	S 15th St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	0	9	0	0	0	59	0	0	0	0	0	0	0	0	0	0	68	
6:15 AM	1	8	0	0	0	39	0	0	0	0	3	0	0	0	0	0	51	
6:30 AM	1	14	0	0	0	42	0	0	1	0	3	0	1	0	0	0	62	
6:45 AM	2	20	0	0	0	46	0	0	0	0	8	0	0	0	0	0	76	
7:00 AM	4	27	0	0	0	59	1	0	0	0	3	0	0	1	0	0	95	
7:15 AM	2	38	0	0	0	45	0	0	0	0	2	0	0	0	0	0	87	
7:30 AM	7	31	0	0	0	89	2	0	0	1	6	0	0	0	0	0	136	
7:45 AM	5	48	0	0	0	70	1	0	0	0	5	0	0	0	0	0	129	
8:00 AM	5	47	0	0	0	59	0	0	0	0	7	0	0	0	0	0	118	
8:15 AM	5	35	0	0	0	37	1	0	0	0	6	0	0	0	0	0	84	
8:30 AM	5	38	0	0	0	43	0	0	1	1	2	0	0	0	0	0	90	
8:45 AM	1	45	0	0	0	61	0	0	4	0	5	0	1	0	0	0	117	409
9:00 AM	0	28	0	0	0	45	0	0	0	0	5	0	0	0	0	0	78	369
9:15 AM	2	25	1	0	0	35	0	0	0	0	4	0	0	0	0	0	67	352
9:30 AM	1	29	0	0	0	45	0	0	0	0	2	0	0	1	0	0	78	340
9:45 AM	1	32	0	0	0	43	0	0	0	0	3	0	0	0	0	0	79	302
10:00 AM	6	31	1	0	0	31	1	0	0	1	1	0	0	0	0	0	72	296
10:15 AM	1	33	0	0	0	41	0	0	0	0	5	0	0	0	0	0	80	309
10:30 AM	4	36	0	0	0	40	0	0	0	1	5	0	0	0	0	0	86	317
10:45 AM	2	28	1	0	0	40	1	0	1	0	4	0	0	0	0	0	77	315
11:00 AM	5	45	1	0	0	58	1	0	2	0	6	0	0	0	0	0	118	361
11:15 AM	3	43	0	0	0	50	0	0	0	0	7	0	0	0	1	0	104	385
11:30 AM	6	47	0	0	0	50	1	0	0	0	7	0	0	0	0	0	111	410
11:45 AM	7	51	0	0	0	53	0	0	0	0	6	0	0	0	0	0	117	450

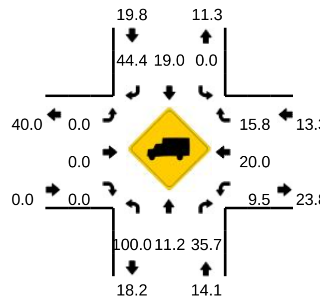
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	28	124	0	0	0	356	8	0	0	4	24	0	0	0	0	0	544
Heavy Trucks	4	8	0		0	80	0		0	4	0		0	0	0		96
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

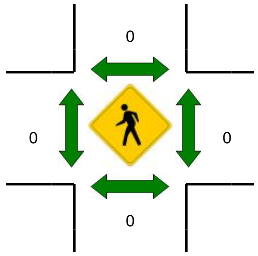
Comments:

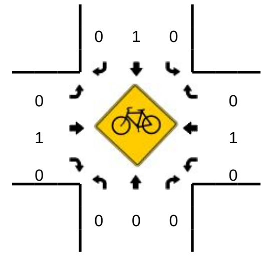
LOCATION: Old Portland Rd -- Plymouth St | **QC JOB #:** 14560510
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

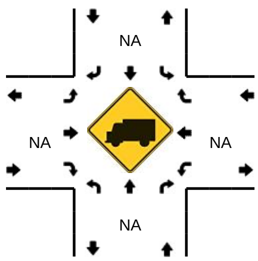


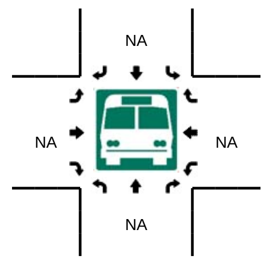
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:20 AM -- 7:35 AM











5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Plymouth St (Eastbound) Left	Thru	Right	U	Plymouth St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	0	5	2	0	0	46	1	0	0	0	0	0	6	0	6	0	66	
6:15 AM	0	8	0	0	0	39	1	0	1	1	0	0	0	0	3	0	53	
6:30 AM	0	13	1	0	0	39	0	0	0	0	0	0	1	0	2	0	56	
6:45 AM	0	14	4	0	0	44	1	0	0	0	0	0	1	0	3	0	67	
7:00 AM	0	21	5	0	0	56	1	0	0	0	1	0	6	0	5	0	95	
7:15 AM	0	33	1	0	0	38	0	0	2	1	0	0	6	0	4	0	85	
7:30 AM	0	20	5	0	2	86	1	0	1	1	0	0	9	2	9	0	136	
7:45 AM	1	38	5	0	0	65	6	0	2	2	0	0	4	1	4	0	128	
8:00 AM	0	43	3	0	0	48	2	0	1	1	0	0	2	2	2	0	104	
8:15 AM	0	34	2	0	0	34	2	0	1	4	0	0	1	1	1	0	80	
8:30 AM	0	28	5	0	1	38	2	0	4	0	0	0	3	1	0	0	82	
8:45 AM	0	41	4	0	1	55	3	0	2	0	0	0	1	0	4	0	111	377
9:00 AM	0	27	3	0	1	40	1	0	2	0	0	0	4	0	2	0	80	353
9:15 AM	0	24	1	0	0	32	4	0	0	2	0	0	2	1	1	0	67	340
9:30 AM	1	23	1	0	1	42	3	0	1	0	0	0	0	0	0	0	72	330
9:45 AM	0	28	2	0	0	34	1	0	2	0	0	0	1	0	0	0	68	287
10:00 AM	0	28	2	0	0	30	4	0	0	2	0	0	1	0	2	0	69	276
10:15 AM	0	31	3	0	0	33	2	0	0	2	0	0	2	1	2	0	76	285
10:30 AM	0	29	6	0	0	36	3	0	1	1	0	0	2	0	5	0	83	296
10:45 AM	0	28	3	0	0	38	2	0	1	0	0	0	1	1	0	0	74	302
11:00 AM	0	35	8	0	0	50	5	0	1	2	6	0	0	0	5	0	112	345
11:15 AM	0	34	7	0	1	42	3	0	0	0	6	0	1	0	2	0	96	365
11:30 AM	1	41	4	0	1	45	3	0	0	3	3	0	4	0	2	0	107	389
11:45 AM	0	46	4	0	0	49	6	0	2	1	1	0	1	2	4	0	116	431

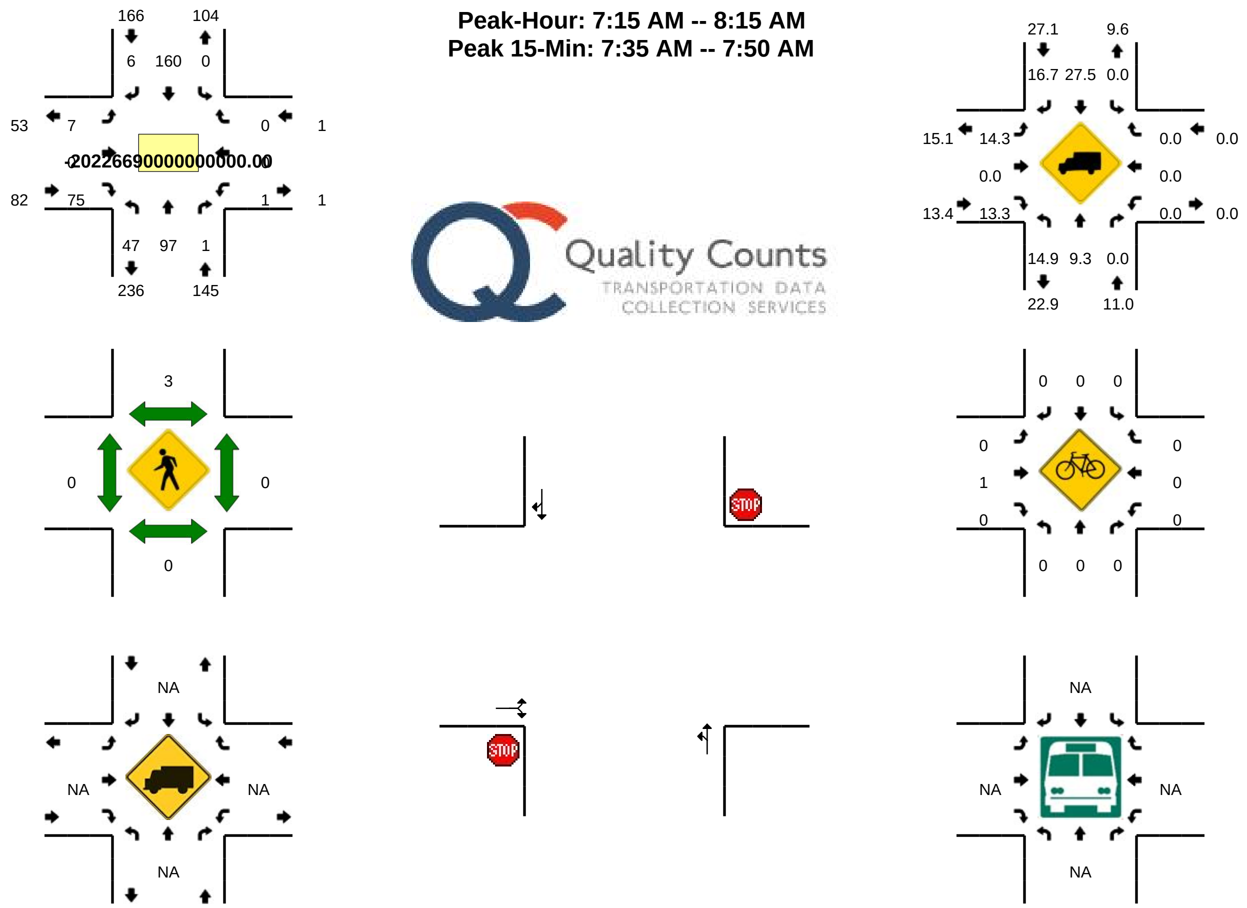
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	80	20	0	8	344	4	0	4	4	0	0	36	8	36	0	544
Heavy Trucks	0	4	0		0	64	0		0	0	0		0	0	0		68
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: Old Portland Rd -- S 12th St | **QC JOB #:** 14560511
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM



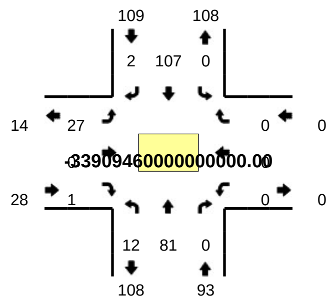
5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 12th St (Eastbound) Left	Thru	Right	U	S 12th St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	1	6	0	0	0	33	0	0	0	0	8	0	0	0	0	0	48	
6:15 AM	0	8	0	0	0	25	0	0	0	0	8	0	0	0	0	0	41	
6:30 AM	3	10	0	0	0	37	1	0	0	0	3	0	0	0	0	0	54	
6:45 AM	6	8	0	0	0	33	0	0	2	0	8	0	0	0	0	0	57	
7:00 AM	9	13	0	0	0	40	0	0	1	0	8	0	0	0	0	0	71	
7:15 AM	15	21	1	0	0	24	1	0	1	0	15	0	0	0	0	0	78	
7:30 AM	6	19	0	0	0	46	4	0	1	0	36	0	0	0	0	0	112	
7:45 AM	14	28	0	0	0	47	1	0	5	0	18	0	1	0	0	0	114	
8:00 AM	12	29	0	0	0	43	0	0	0	0	6	0	0	0	0	0	90	
8:15 AM	5	27	0	0	0	24	0	0	2	0	5	0	0	0	0	0	63	
8:30 AM	1	34	0	0	0	36	1	0	1	0	5	0	0	0	0	0	78	
8:45 AM	5	37	0	0	0	50	1	0	0	0	6	0	0	0	0	0	99	330
9:00 AM	4	23	0	0	0	36	0	0	1	0	5	0	0	0	0	0	69	309
9:15 AM	6	16	0	0	0	27	0	0	2	0	5	0	0	0	0	0	56	302
9:30 AM	5	23	0	0	0	34	1	0	0	0	10	0	0	0	0	0	73	297
9:45 AM	3	24	0	0	0	27	0	0	1	0	9	0	0	1	0	0	65	263
10:00 AM	6	23	0	0	0	28	0	0	1	0	4	0	0	0	0	0	62	256
10:15 AM	9	22	0	0	0	25	0	0	0	0	6	0	0	0	0	0	62	262
10:30 AM	6	26	0	0	0	32	1	0	0	0	6	0	0	0	0	0	71	260
10:45 AM	1	27	0	0	0	38	0	0	1	0	2	0	0	0	0	0	69	264
11:00 AM	8	30	1	0	0	40	1	0	0	0	13	0	0	0	0	0	93	295
11:15 AM	7	27	0	0	0	38	0	0	0	0	6	0	1	0	0	0	79	312
11:30 AM	8	36	0	0	0	42	0	0	3	0	6	0	0	0	0	0	95	336
11:45 AM	7	37	0	0	0	41	1	0	0	0	7	0	0	0	0	0	93	360

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	56	112	0	0	0	188	4	0	20	0	72	0	4	0	0	0	456
Heavy Trucks	12	4	0		0	60	0		4	0	0		0	0	0		80
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

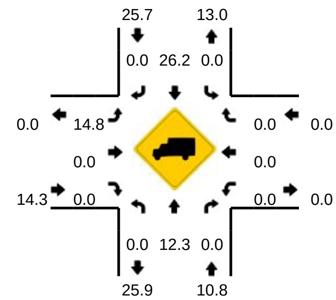
Comments:

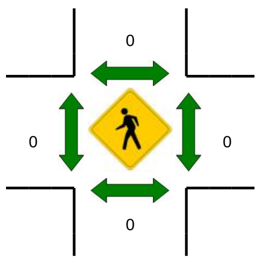
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

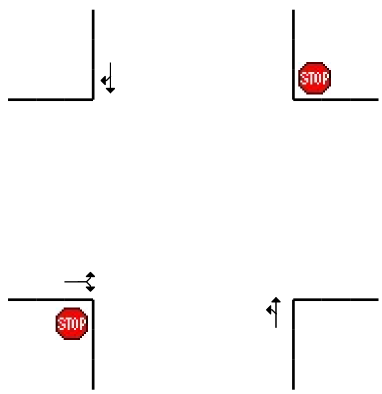
LOCATION: Old Portland Rd -- S 8th St | **QC JOB #:** 14560512
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

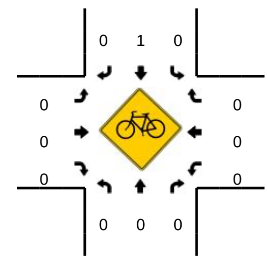


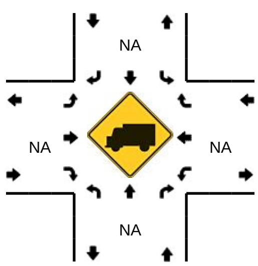
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

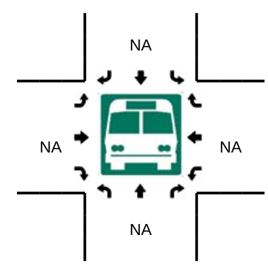












5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 8th St (Eastbound) Left	Thru	Right	U	S 8th St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	3	2	0	0	0	20	0	0	7	0	0	0	0	0	0	0	32	
6:15 AM	1	9	0	0	0	18	1	0	1	0	0	0	0	0	0	0	30	
6:30 AM	1	10	0	0	0	21	0	0	4	0	0	0	0	0	0	0	36	
6:45 AM	1	11	0	0	0	25	0	0	6	0	0	0	0	0	0	0	43	
7:00 AM	1	11	0	0	0	31	1	0	2	0	0	0	0	0	0	0	46	
7:15 AM	3	17	0	0	0	16	1	0	2	0	1	0	0	0	0	0	40	
7:30 AM	5	10	0	0	0	35	1	0	7	0	0	0	0	0	0	0	58	
7:45 AM	3	27	0	0	0	30	0	0	8	0	0	0	0	0	0	0	68	
8:00 AM	1	27	0	0	0	26	0	0	10	0	0	0	0	0	0	0	64	
8:15 AM	7	22	0	0	0	12	3	0	5	0	0	0	0	0	0	0	49	
8:30 AM	2	27	0	0	0	18	0	0	8	0	1	0	0	0	0	0	56	
8:45 AM	6	32	0	0	0	31	0	0	9	0	0	0	0	0	0	0	78	247
9:00 AM	2	25	0	0	0	26	2	0	4	0	1	0	0	0	0	0	60	243
9:15 AM	3	12	0	0	0	23	0	0	0	0	1	0	0	0	0	0	39	233
9:30 AM	2	20	0	0	0	30	0	0	2	0	0	0	0	0	0	0	54	231
9:45 AM	3	21	0	0	0	22	0	0	2	0	0	0	0	0	0	0	48	201
10:00 AM	1	27	0	0	0	16	0	0	3	0	0	0	0	0	0	0	47	188
10:15 AM	1	18	0	0	0	18	0	0	4	0	0	0	0	0	0	0	41	190
10:30 AM	3	18	0	0	0	23	0	0	2	0	0	0	0	0	0	0	46	182
10:45 AM	2	28	0	0	0	32	0	0	1	0	0	0	0	0	0	0	63	197
11:00 AM	5	23	0	0	0	32	0	0	5	0	0	0	0	0	0	0	65	215
11:15 AM	8	17	0	0	0	27	1	0	5	0	0	0	0	0	0	0	58	232
11:30 AM	5	31	0	0	0	31	1	0	4	0	1	0	0	0	0	0	73	259
11:45 AM	6	32	0	0	0	34	0	0	6	0	0	0	0	0	0	0	78	274

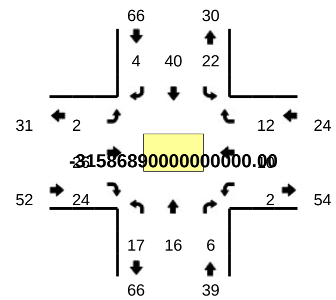
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	12	108	0	0	0	120	0	0	32	0	0	0	0	0	0	0	272
Heavy Trucks	0	4	0		0	32	0		12	0	0		0	0	0		48
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

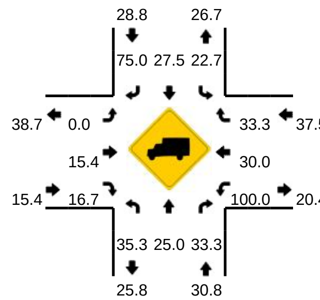
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

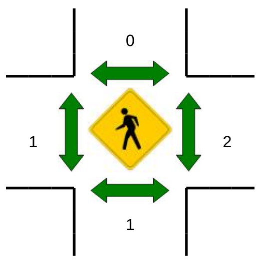
LOCATION: S 1st St -- Saint Helens St | **QC JOB #:** 14560513

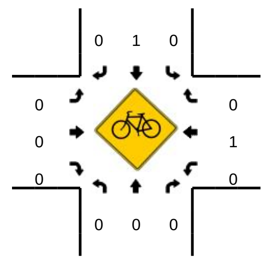
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

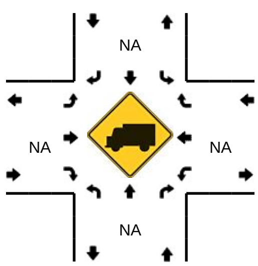


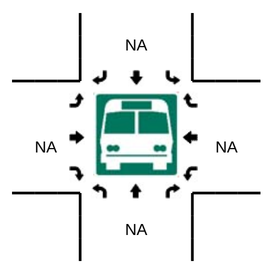
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM











5-Min Count Period Beginning At	S 1st St (Northbound) Left	Thru	Right	U	S 1st St (Southbound) Left	Thru	Right	U	Saint Helens St (Eastbound) Left	Thru	Right	U	Saint Helens St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	2	0	1	0	2	0	3	0	2	0	0	0	0	2	1	0	13	
6:15 AM	2	2	0	0	1	0	1	0	0	1	2	0	0	0	1	0	10	
6:30 AM	1	1	0	0	0	2	0	0	0	2	2	0	0	2	3	0	13	
6:45 AM	3	4	0	0	6	2	2	0	0	3	2	0	0	2	1	0	25	
7:00 AM	5	3	0	0	2	3	2	0	0	2	4	0	0	4	0	0	25	
7:15 AM	3	1	1	0	2	6	0	0	0	5	6	0	0	2	4	0	30	
7:30 AM	4	5	1	0	2	7	1	0	0	1	1	0	0	3	1	0	26	
7:45 AM	5	5	3	0	10	17	2	0	2	8	10	0	1	4	6	0	73	
8:00 AM	5	5	1	0	8	10	1	0	0	12	7	0	1	1	1	0	52	
8:15 AM	4	4	2	0	12	13	0	0	0	11	5	0	0	2	1	0	54	
8:30 AM	7	9	1	0	13	4	3	0	0	11	12	0	0	1	2	0	63	
8:45 AM	7	9	1	0	7	15	3	0	1	10	5	0	1	2	0	0	61	230
9:00 AM	6	9	0	0	5	11	0	0	0	9	9	0	1	2	4	0	56	234
9:15 AM	6	12	0	0	8	14	0	0	0	4	5	0	0	2	7	0	58	238
9:30 AM	12	10	6	0	7	11	0	0	0	3	6	0	1	5	5	0	66	241
9:45 AM	7	14	0	0	7	13	2	0	0	4	8	0	0	3	2	0	60	240
10:00 AM	7	17	1	0	6	18	1	0	2	5	6	0	0	3	4	0	70	254
10:15 AM	6	9	1	0	10	8	3	0	0	2	7	0	0	4	8	0	58	254
10:30 AM	8	14	3	0	5	18	2	0	2	8	3	0	0	2	1	0	66	254
10:45 AM	12	16	2	0	8	8	4	0	1	6	9	0	0	7	1	0	74	268
11:00 AM	16	7	1	0	14	14	1	0	1	6	8	0	0	4	3	0	75	273
11:15 AM	12	14	0	0	5	9	2	0	1	3	5	0	0	11	2	0	64	279
11:30 AM	12	15	2	0	8	17	1	0	2	3	11	0	0	5	2	0	78	291
11:45 AM	11	24	1	0	7	11	4	0	2	7	13	0	2	8	11	0	101	318

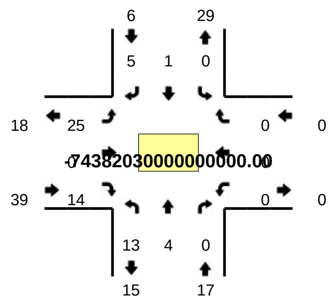
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	20	20	12	0	40	68	8	0	8	32	40	0	4	16	24	0	292
Heavy Trucks	8	4	4		16	20	8		0	4	4		4	8	8		88
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

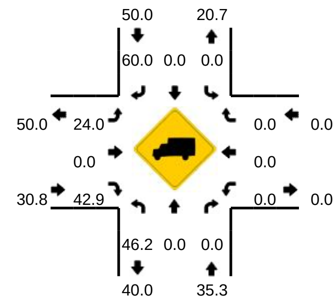
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

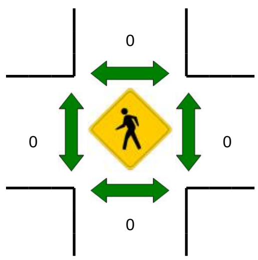
LOCATION: S McNulty Way -- Millard Rd | **QC JOB #:** 14560514

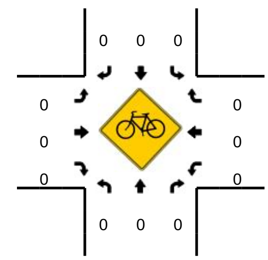
CITY/STATE: Warren, OR | **DATE:** Thu, May 18 2017

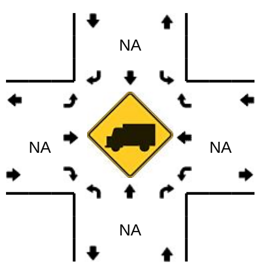


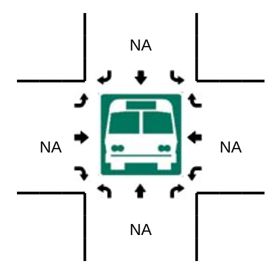
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:35 AM -- 7:50 AM











5-Min Count Period Beginning At	S McNulty Way (Northbound) Left	Thru	Right	U	S McNulty Way (Southbound) Left	Thru	Right	U	Millard Rd (Eastbound) Left	Thru	Right	U	Millard Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
6:00 AM	2	0	0	0	0	0	1	0	4	0	2	0	0	0	0	0	9	
6:15 AM	3	0	0	0	0	0	1	0	2	0	3	0	0	0	0	0	9	
6:30 AM	2	1	0	0	0	0	1	0	3	0	1	0	0	0	0	0	8	
6:45 AM	3	0	0	0	0	1	0	0	5	0	3	0	0	0	0	0	12	
7:00 AM	0	0	0	0	0	1	1	0	5	0	5	0	0	0	0	0	12	
7:15 AM	4	1	0	0	0	0	0	0	3	0	2	0	0	0	0	0	10	
7:30 AM	1	2	0	0	0	0	1	0	1	0	6	0	0	0	0	0	11	
7:45 AM	4	0	0	0	0	0	4	0	19	0	4	0	0	0	0	0	31	
8:00 AM	4	1	0	0	0	1	0	0	2	0	2	0	0	0	0	0	10	
8:15 AM	3	2	0	0	0	0	0	0	4	1	3	0	0	0	0	0	13	
8:30 AM	1	2	0	0	0	0	2	0	9	0	2	0	0	0	1	0	17	
8:45 AM	6	1	0	0	0	0	0	0	7	0	2	0	0	0	0	0	16	56
9:00 AM	1	0	0	0	0	1	2	0	3	0	5	0	0	0	0	0	12	58
9:15 AM	3	2	0	0	1	1	3	0	3	0	2	0	0	0	0	0	15	60
9:30 AM	1	1	0	0	0	0	3	0	4	0	2	0	0	0	0	0	11	54
9:45 AM	5	0	1	0	0	0	1	0	5	1	1	0	0	0	0	0	14	52
10:00 AM	1	2	0	0	0	1	3	0	1	0	2	0	1	0	0	0	11	51
10:15 AM	10	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	13	49
10:30 AM	2	1	0	0	0	2	0	0	1	0	3	0	0	1	0	0	10	48
10:45 AM	5	0	0	0	0	1	1	0	3	0	2	0	0	0	0	0	12	46
11:00 AM	2	1	0	0	0	0	6	0	1	0	4	0	0	0	0	0	14	49
11:15 AM	8	2	0	0	0	2	0	0	4	0	1	0	0	0	0	0	17	53
11:30 AM	2	0	0	0	0	1	1	0	5	0	6	0	0	0	0	0	15	58
11:45 AM	3	3	0	0	0	0	3	0	8	0	4	0	0	0	0	0	21	67

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	16	0	0	0	0	0	16	0	76	0	16	0	0	0	0	0	124
Heavy Trucks	8	0	0		0	0	12		20	0	4		0	0	0		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

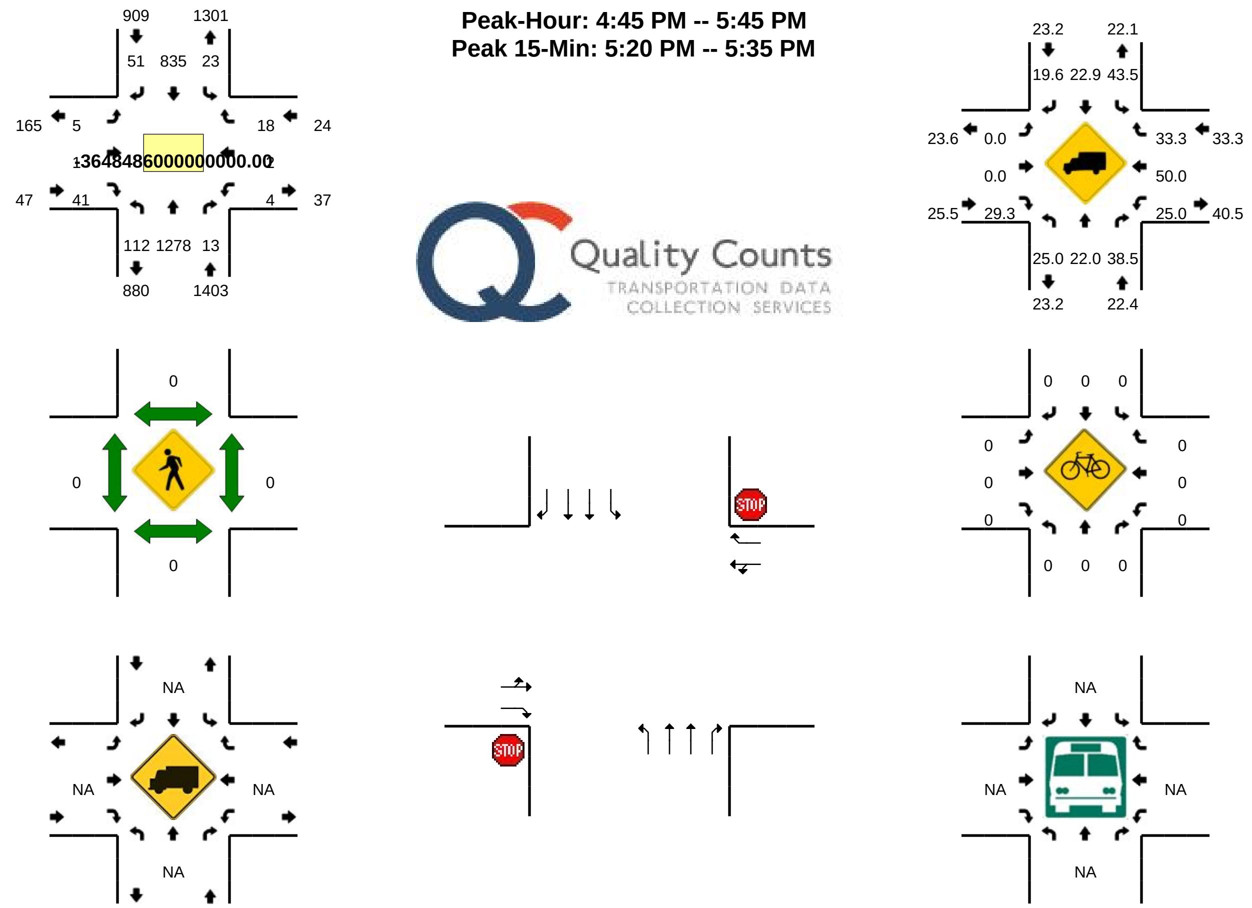
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: US 30 -- Millard Rd | **QC JOB #:** 14560501

CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM

Peak 15-Min: 5:20 PM -- 5:35 PM



5-Min Count Period Beginning At	US 30 (Northbound) Left	Thru	Right	U	US 30 (Southbound) Left	Thru	Right	U	Millard Rd (Eastbound) Left	Thru	Right	U	Millard Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	6	161	3	0	5	210	14	0	1	0	11	0	0	0	4	0	415	
8:30 AM	15	156	9	0	2	203	6	0	2	0	16	0	0	0	2	0	411	
8:45 AM	10	104	5	0	3	220	12	0	2	1	8	0	3	0	4	0	372	1637
9:00 AM	9	116	3	0	4	175	7	0	0	1	20	0	0	2	1	0	338	1536
9:15 AM	2	129	4	0	1	161	4	0	2	0	12	0	0	1	4	0	320	1441
9:30 AM	6	101	3	0	3	197	8	0	3	1	8	0	2	0	2	0	334	1364
9:45 AM	12	129	3	0	4	180	13	0	1	0	13	0	2	3	2	0	362	1354
10:00 AM	6	135	2	0	0	162	8	0	5	0	16	0	1	0	2	0	337	1353
10:15 AM	4	126	1	0	1	166	7	0	5	1	14	0	2	0	10	0	337	1370
10:30 AM	2	145	2	0	1	176	10	0	6	1	10	0	1	0	2	0	356	1392
10:45 AM	5	143	2	0	3	167	9	0	3	2	7	0	2	0	5	0	348	1378
11:00 AM	6	147	2	0	3	188	15	0	1	0	15	0	3	0	4	0	384	1425
11:15 AM	11	161	1	0	4	169	13	0	4	0	12	0	2	2	5	0	384	1472
11:30 AM	4	137	5	0	5	140	10	0	3	1	6	0	1	0	2	0	314	1430
11:45 AM	4	173	4	0	8	181	6	0	3	0	5	0	1	0	4	0	389	1471
12:00 PM	3	172	2	0	6	203	8	0	4	0	12	0	2	3	8	0	423	1510
12:15 PM	15	182	4	0	5	179	13	0	1	0	9	0	2	0	3	0	413	1539
12:30 PM	12	164	2	0	2	181	20	0	7	0	10	0	0	0	2	0	400	1625
12:45 PM	11	146	1	0	5	188	12	0	4	0	13	0	1	0	2	0	383	1619
1:00 PM	16	176	3	0	3	175	10	0	8	0	11	0	1	0	3	0	406	1602
1:15 PM	12	169	6	0	8	159	15	0	2	0	7	0	0	1	7	0	386	1575
1:30 PM	11	151	4	0	7	180	13	0	4	0	11	0	4	0	6	0	391	1566
1:45 PM	11	185	2	0	3	168	14	0	3	0	13	0	0	0	4	0	403	1586
2:00 PM	15	190	6	0	2	175	12	0	9	1	6	0	3	0	4	0	423	1603

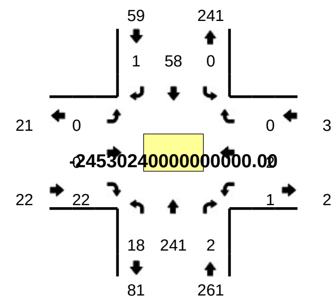
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	136	1432	16	0	16	832	44	0	0	0	32	0	4	4	12	0	2528
Heavy Trucks	24	304	8		8	180	4		0	0	4		0	4	4		540
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

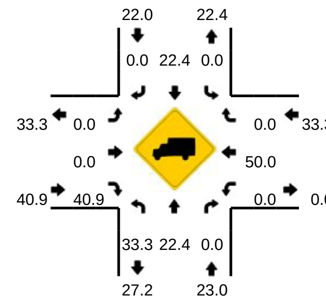
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

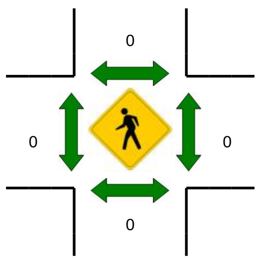
LOCATION: Old Portland Rd -- Millard Rd | **QC JOB #:** 14560502

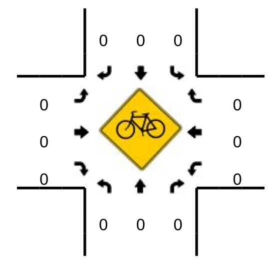
CITY/STATE: Warren, OR | **DATE:** Thu, May 18 2017

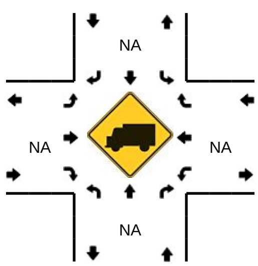


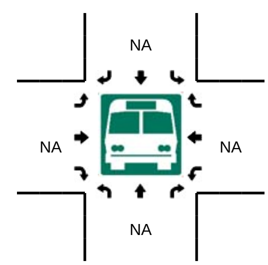
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM











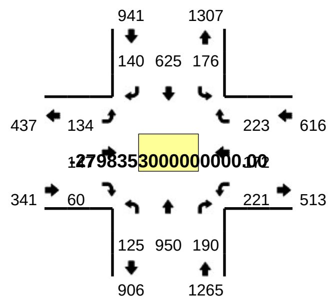
5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Millard Rd (Eastbound) Left	Thru	Right	U	Millard Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	3	21	0	0	0	7	0	0	3	0	0	0	0	0	0	0	34	
8:30 AM	1	29	0	0	0	11	2	0	0	0	2	0	0	0	0	0	45	
8:45 AM	3	29	0	0	0	16	3	0	1	0	1	0	0	0	0	0	53	191
9:00 AM	0	12	0	0	0	15	3	0	2	1	1	0	0	0	0	0	34	166
9:15 AM	3	14	0	0	0	12	2	0	2	0	1	0	0	0	1	0	35	167
9:30 AM	0	12	0	0	0	12	1	0	0	0	2	0	0	0	0	0	27	149
9:45 AM	3	18	0	0	0	15	2	0	0	0	1	0	0	0	0	0	39	135
10:00 AM	1	18	0	0	0	8	1	0	2	0	1	0	0	1	0	0	32	133
10:15 AM	9	23	0	0	0	8	2	0	1	0	1	0	0	0	0	0	44	142
10:30 AM	2	17	0	0	0	16	1	0	2	0	3	0	0	0	0	0	41	156
10:45 AM	3	9	0	0	0	14	1	0	2	0	0	0	0	0	0	0	29	146
11:00 AM	1	16	0	0	0	8	3	0	2	0	2	0	0	0	0	0	32	146
11:15 AM	2	17	0	0	0	12	6	0	2	0	1	0	0	2	0	0	42	144
11:30 AM	1	30	0	0	1	17	0	0	3	0	2	0	1	0	0	0	55	158
11:45 AM	2	21	0	0	0	20	2	0	2	0	2	0	0	0	0	0	49	178
12:00 PM	3	26	1	0	1	15	4	0	2	1	2	0	1	0	0	0	56	202
12:15 PM	2	22	0	0	1	9	0	0	1	0	3	0	1	0	1	0	40	200
12:30 PM	3	23	0	0	1	16	1	0	1	0	5	0	0	0	0	0	50	195
12:45 PM	4	24	0	0	1	15	0	0	2	0	4	0	0	0	2	0	52	198
1:00 PM	1	28	0	0	0	13	0	0	0	1	2	0	0	0	0	0	45	187
1:15 PM	6	28	0	0	0	17	2	0	1	0	6	0	0	0	1	0	61	208
1:30 PM	5	17	0	0	0	10	1	0	1	1	3	0	0	0	0	0	38	196
1:45 PM	1	33	0	0	0	18	1	0	2	0	0	0	0	1	0	0	56	200
2:00 PM	3	29	1	0	0	14	1	0	1	0	2	0	0	1	0	0	52	207
Peak 15-Min Flowrates	**Northbound** Left	Thru	Right	U	**Southbound** Left	Thru	Right	U	**Eastbound** Left	Thru	Right	U	**Westbound** Left	Thru	Right	U	**Total**	
All Vehicles	20	256	0	0	0	64	0	0	0	0	36	0	0	0	0	0	376	
Heavy Trucks	12	88	0		0	12	0		0	0	16		0	0	0		128	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

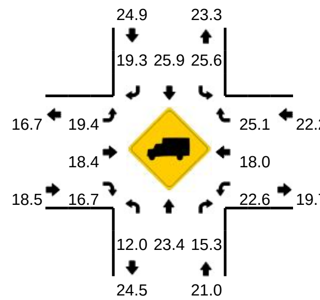
Report generated on 1/4/2018 12:14 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

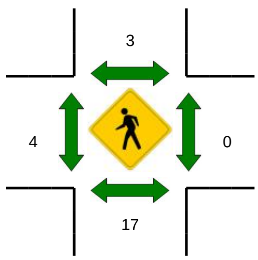
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

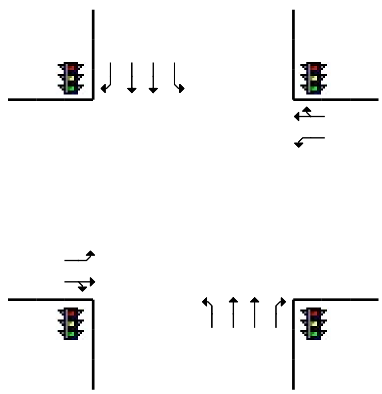
LOCATION: US 30 -- Gable Rd | **QC JOB #:** 14560503
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

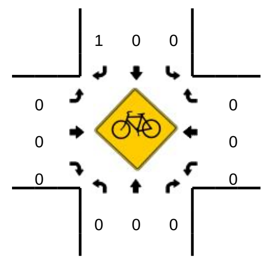


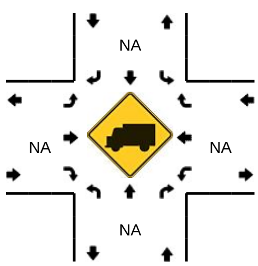
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:20 PM -- 5:35 PM

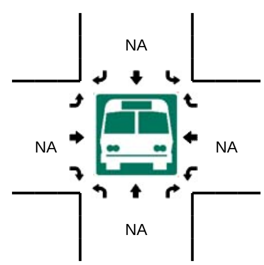












5-Min Count Period Beginning At	US 30 (Northbound) Left	Thru	Right	U	US 30 (Southbound) Left	Thru	Right	U	Gable Rd (Eastbound) Left	Thru	Right	U	Gable Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	5	144	27	0	31	181	36	0	37	27	18	0	33	15	19	0	573	
8:30 AM	9	113	30	0	29	160	25	0	11	27	12	0	31	30	35	0	512	
8:45 AM	7	107	18	0	29	177	21	0	22	23	18	0	39	18	29	0	508	2243
9:00 AM	11	85	27	0	29	138	24	0	25	20	9	0	36	16	25	0	445	2038
9:15 AM	10	101	27	0	23	128	28	0	16	16	11	0	28	21	20	0	429	1894
9:30 AM	4	81	22	0	30	175	27	0	13	28	12	0	35	17	33	0	477	1859
9:45 AM	9	101	26	0	34	127	23	0	32	15	16	0	37	23	42	0	485	1836
10:00 AM	9	103	31	0	37	130	37	0	26	22	12	0	25	30	34	0	496	1887
10:15 AM	6	106	28	0	36	136	30	0	33	18	10	0	45	19	37	0	504	1962
10:30 AM	14	109	27	0	33	139	23	0	23	30	8	0	34	29	35	0	504	1989
10:45 AM	9	108	32	0	32	140	42	0	32	23	10	0	36	30	39	0	533	2037
11:00 AM	23	111	21	0	52	138	16	0	26	34	13	0	45	32	36	0	547	2088
11:15 AM	7	124	38	0	32	137	34	0	27	26	16	0	40	20	28	0	529	2113
11:30 AM	14	103	26	0	46	108	37	0	39	23	9	0	40	28	48	0	521	2130
11:45 AM	13	146	25	0	43	128	37	0	41	33	11	0	41	39	47	0	604	2201
12:00 PM	9	137	31	0	47	167	39	0	35	30	13	0	38	44	47	0	637	2291
12:15 PM	12	149	28	0	38	154	38	0	41	27	14	0	40	38	51	0	630	2392
12:30 PM	19	104	52	0	30	143	29	0	37	37	17	0	37	28	49	0	582	2453
12:45 PM	14	124	26	0	64	166	37	0	30	29	8	0	51	27	34	0	610	2459
1:00 PM	12	141	21	0	31	137	27	0	27	33	15	0	35	35	58	0	572	2394
1:15 PM	14	137	41	0	53	142	38	0	35	18	9	0	41	33	43	0	604	2368
1:30 PM	21	93	29	0	47	121	32	0	29	27	10	0	34	34	54	0	531	2317
1:45 PM	19	154	35	0	41	128	41	0	26	24	16	0	25	33	32	0	574	2281
2:00 PM	22	145	37	0	30	140	39	0	46	42	14	0	39	36	55	0	645	2354

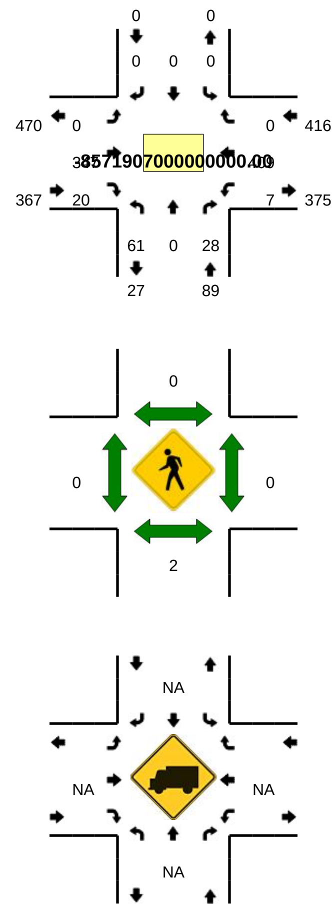
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	144	1084	204	0	220	652	144	0	116	120	48	0	220	168	176	0	3296
Heavy Trucks	16	224	36		36	172	28		20	12	12		52	36	44		688
Pedestrians		4				0				4				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

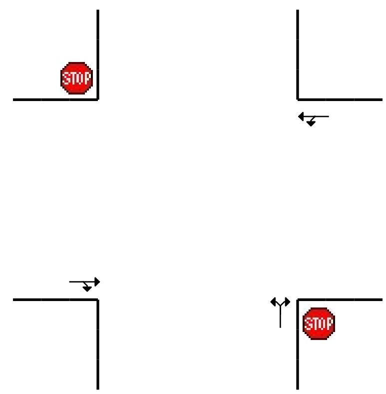
Comments:

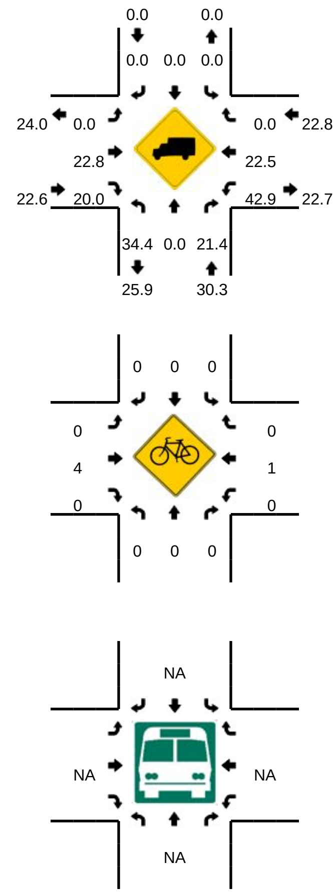
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: McNulty Way -- Gable Rd | **QC JOB #:** 14560504
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM







5-Min Count Period Beginning At	McNulty Way (Northbound)				McNulty Way (Southbound)				Gable Rd (Eastbound)				Gable Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
8:15 AM	8	0	2	0	0	0	0	0	0	49	9	0	5	52	0	0	125	
8:30 AM	15	0	6	0	0	0	0	0	0	45	25	0	2	60	0	0	153	
8:45 AM	10	0	5	0	0	0	0	0	0	42	4	0	5	63	0	0	129	572
9:00 AM	3	0	4	0	0	0	0	0	0	49	5	0	11	57	0	0	129	536
9:15 AM	7	0	2	0	0	0	0	0	0	39	9	0	4	47	0	0	108	519
9:30 AM	8	0	4	0	0	0	0	0	0	47	10	0	4	63	0	0	136	502
9:45 AM	14	0	9	0	0	0	0	0	0	40	12	0	6	70	0	0	151	524
10:00 AM	12	0	8	0	0	0	0	0	0	50	11	0	1	55	0	0	137	532
10:15 AM	7	0	9	0	0	0	0	0	0	36	8	0	3	72	0	0	135	559
10:30 AM	8	0	6	0	0	0	0	0	0	70	11	0	11	57	0	0	163	586
10:45 AM	8	0	9	0	0	0	0	0	0	37	8	0	6	61	0	0	129	564
11:00 AM	27	0	7	0	0	0	0	0	0	62	16	0	7	80	0	0	199	626
11:15 AM	7	0	2	0	0	0	0	0	0	52	12	0	6	65	0	0	144	635
11:30 AM	12	0	4	0	0	0	0	0	0	68	4	0	9	74	0	0	171	643
11:45 AM	21	0	18	0	0	0	0	0	0	64	11	0	4	92	0	0	210	724
12:00 PM	17	0	9	0	0	0	0	0	0	59	13	0	5	94	0	0	197	722
12:15 PM	14	0	9	0	0	0	0	0	0	68	15	0	5	79	0	0	190	768
12:30 PM	8	0	3	0	0	0	0	0	0	81	15	0	7	95	0	0	209	806
12:45 PM	7	0	8	0	0	0	0	0	0	78	16	0	6	72	0	0	187	783
1:00 PM	10	0	8	0	0	0	0	0	0	60	11	0	11	98	0	0	198	784
1:15 PM	9	0	5	0	0	0	0	0	0	65	10	0	6	74	0	0	169	763
1:30 PM	11	0	4	0	0	0	0	0	0	64	8	0	5	85	0	0	177	731
1:45 PM	10	0	6	0	0	0	0	0	0	64	12	0	5	81	0	0	178	722
2:00 PM	11	0	7	0	0	0	0	0	0	79	10	0	13	73	0	0	193	717

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	100	0	44	0	0	0	0	0	0	356	16	0	8	552	0	0	1076
Heavy Trucks	28	0	4		0	0	0		0	92	4		4	116	0		248
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	2	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

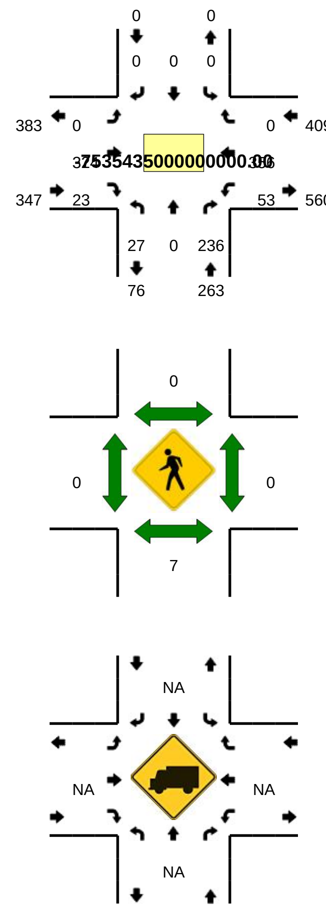
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

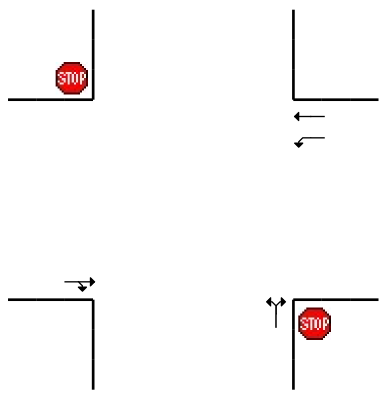
LOCATION: Old Portland Rd -- Gable Rd | **QC JOB #:** 14560505

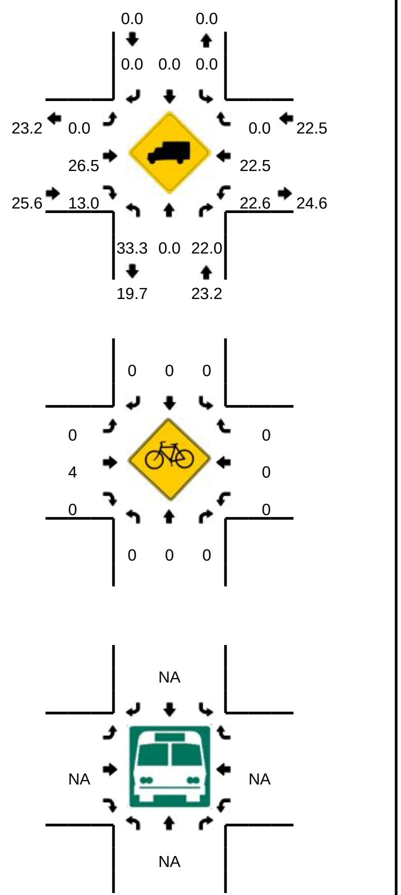
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM

Peak 15-Min: 4:50 PM -- 5:05 PM







5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Gable Rd (Eastbound) Left	Thru	Right	U	Gable Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	2	0	27	0	0	0	0	0	0	42	5	0	6	49	0	0	131	
8:30 AM	8	0	31	0	0	0	0	0	0	43	0	0	8	51	0	0	141	
8:45 AM	5	0	27	0	0	0	0	0	0	41	3	0	20	56	0	0	152	618
9:00 AM	1	0	13	0	0	0	0	0	0	39	5	0	14	61	0	0	133	557
9:15 AM	6	0	16	0	0	0	0	0	0	34	6	0	13	42	0	0	117	543
9:30 AM	5	0	15	0	0	0	0	0	0	39	6	0	10	56	0	0	131	533
9:45 AM	10	0	14	0	0	0	0	0	0	43	5	0	17	59	0	0	148	529
10:00 AM	7	0	19	0	0	0	0	0	0	46	5	0	10	42	0	0	129	525
10:15 AM	5	0	20	0	0	0	0	0	0	38	6	0	10	65	0	0	144	552
10:30 AM	4	0	18	0	0	0	0	0	0	62	6	0	14	55	0	0	159	580
10:45 AM	3	0	11	0	0	0	0	0	0	37	3	0	13	58	0	0	125	557
11:00 AM	7	0	17	0	0	0	0	0	0	57	7	0	12	74	0	0	174	602
11:15 AM	6	0	19	0	0	0	0	0	0	44	9	0	13	58	0	0	149	607
11:30 AM	5	0	31	0	0	0	0	0	0	59	5	0	17	71	0	0	188	636
11:45 AM	7	0	25	0	0	0	0	0	0	72	7	0	18	81	0	0	210	721
12:00 PM	6	0	25	0	0	0	0	0	0	52	8	0	24	81	0	0	196	743
12:15 PM	6	0	29	0	0	0	0	0	0	66	5	0	11	74	0	0	191	785
12:30 PM	6	0	21	0	0	0	0	0	0	61	11	0	15	89	0	0	203	800
12:45 PM	4	0	25	0	0	0	0	0	0	71	10	0	16	68	0	0	194	784
1:00 PM	8	0	20	0	0	0	0	0	0	57	4	0	12	85	0	0	186	774
1:15 PM	6	0	35	0	0	0	0	0	0	57	9	0	17	68	0	0	192	775
1:30 PM	11	0	19	0	0	0	0	0	0	60	4	0	13	74	0	0	181	753
1:45 PM	11	0	27	0	0	0	0	0	0	63	3	0	16	70	0	0	190	749
2:00 PM	4	0	23	0	0	0	0	0	0	80	1	0	10	76	0	0	194	757

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	20	0	256	0	0	0	0	0	0	368	20	0	60	500	0	0	1224
Heavy Trucks	8	0	88		0	0	0		0	92	8		8	104	0		308
Pedestrians		20				0				0				0			20
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

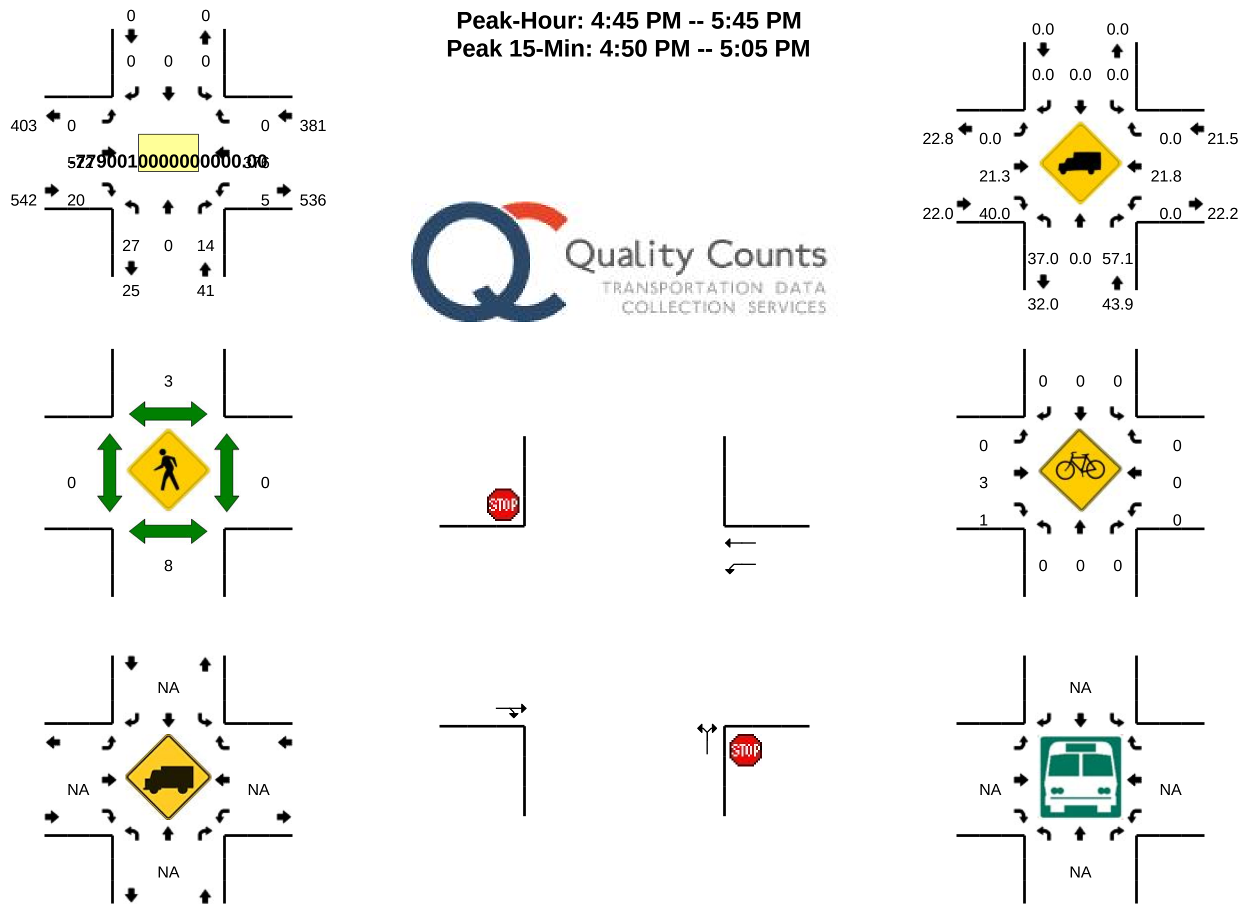
Comments:

Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: Railroad Ave -- Old Portland Rd | **QC JOB #:** 14560506

CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM



5-Min Count Period Beginning At	Railroad Ave (Northbound) Left	Thru	Right	U	Railroad Ave (Southbound) Left	Thru	Right	U	Old Portland Rd (Eastbound) Left	Thru	Right	U	Old Portland Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	4	0	0	0	0	0	0	0	0	61	5	0	1	52	0	0	123	
8:30 AM	3	0	1	0	0	0	0	0	0	65	7	0	2	54	0	0	132	
8:45 AM	7	0	2	0	0	0	0	0	0	62	5	0	4	73	0	0	153	585
9:00 AM	7	0	1	0	0	0	0	0	0	45	9	0	4	64	0	0	130	538
9:15 AM	8	0	4	0	0	0	0	0	0	32	16	0	2	46	0	0	108	523
9:30 AM	8	0	4	0	0	0	0	0	0	51	6	0	4	61	0	0	134	525
9:45 AM	11	0	5	0	0	0	0	0	0	48	8	0	2	63	0	0	137	509
10:00 AM	9	0	2	0	0	0	0	0	0	58	8	0	3	42	0	0	122	501
10:15 AM	9	0	2	0	0	0	0	0	0	44	12	0	6	67	0	0	140	533
10:30 AM	9	0	1	0	0	0	0	0	0	67	13	0	2	59	0	0	151	550
10:45 AM	12	0	2	0	0	0	0	0	0	43	7	0	5	55	0	0	124	537
11:00 AM	7	0	3	0	0	0	0	0	0	60	8	0	2	81	0	0	161	576
11:15 AM	8	0	8	0	0	0	0	0	0	58	4	0	3	62	0	0	143	579
11:30 AM	10	0	3	0	0	0	0	0	0	81	9	0	2	77	0	0	182	610
11:45 AM	7	0	1	0	0	0	0	0	0	79	17	0	7	90	0	0	201	687
12:00 PM	11	0	9	0	0	0	0	0	0	64	12	0	7	93	0	0	196	722
12:15 PM	6	0	7	0	0	0	0	0	0	83	10	0	3	79	0	0	188	767
12:30 PM	15	0	5	0	0	0	0	0	0	76	7	0	5	84	0	0	192	777
12:45 PM	13	0	7	0	0	0	0	0	1	78	17	0	2	73	0	0	191	767
1:00 PM	12	0	1	0	0	0	0	0	0	64	11	0	3	86	0	0	177	748
1:15 PM	8	0	2	0	0	0	1	0	0	81	11	0	3	74	0	0	180	740
1:30 PM	14	0	10	0	0	0	0	0	0	70	10	0	7	75	0	0	186	734
1:45 PM	11	0	4	0	0	0	0	0	0	77	11	0	4	75	0	0	182	725
2:00 PM	9	0	3	0	0	0	0	0	0	87	9	0	1	74	0	0	183	731

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	44	0	24	0	0	0	0	0	0	596	8	0	4	508	0	0	1184
Heavy Trucks	12	0	12		0	0	0		0	148	4		0	100	0		276
Pedestrians		20				0				0				0			20
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

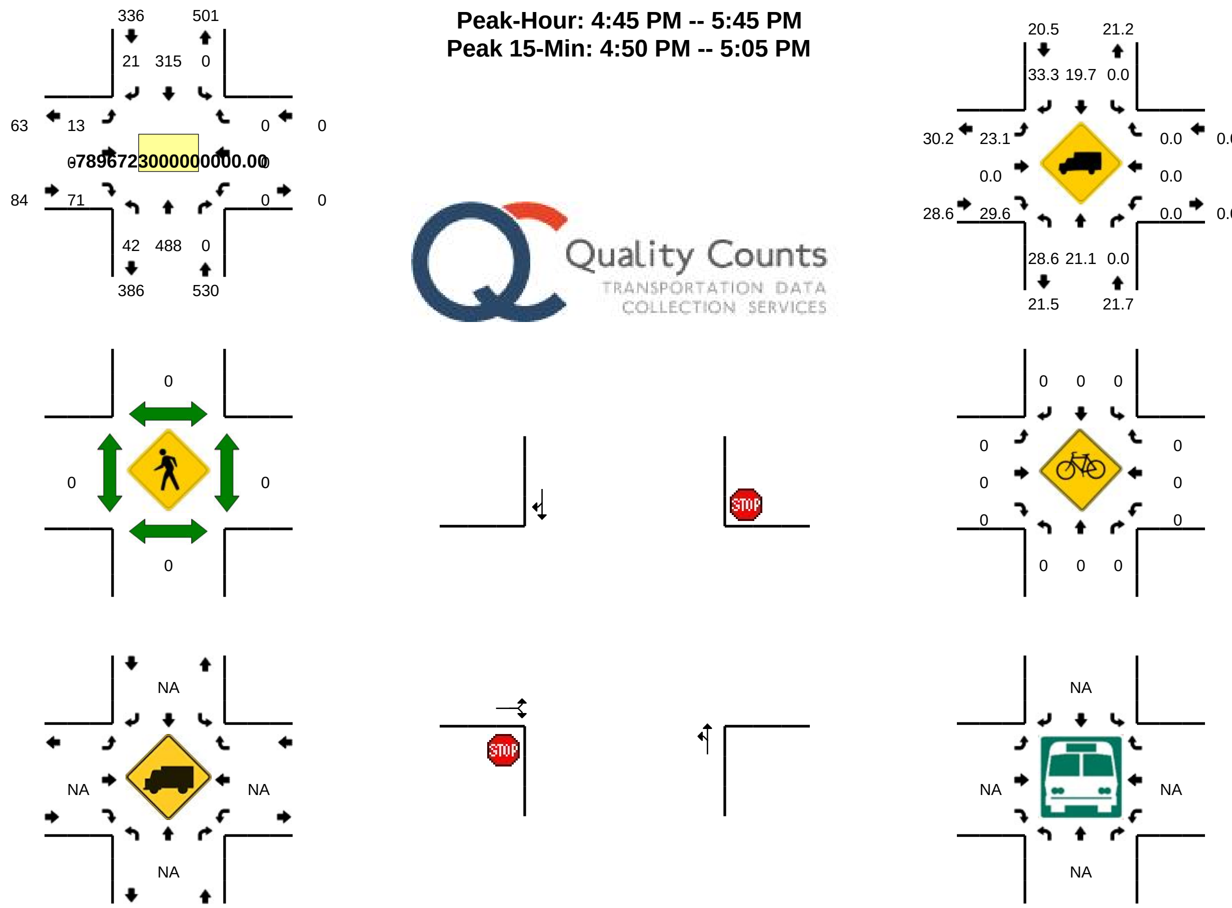
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: Old Portland Rd -- Port Ave | **QC JOB #:** 14560507

CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM

Peak 15-Min: 4:50 PM -- 5:05 PM



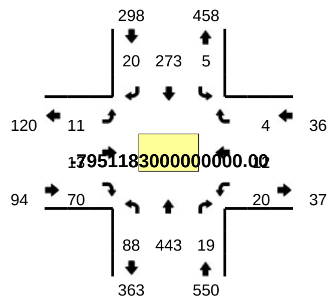
5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Port Ave (Eastbound) Left	Thru	Right	U	Port Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	10	53	0	0	0	44	7	0	2	0	13	0	0	0	0	0	129	
8:30 AM	15	50	0	0	0	50	3	0	1	0	7	0	0	0	0	0	126	
8:45 AM	11	53	0	0	0	68	7	0	0	0	11	0	0	0	0	0	150	585
9:00 AM	11	33	0	0	0	60	5	0	0	0	8	0	0	0	0	0	117	522
9:15 AM	6	33	0	0	0	46	3	0	1	0	5	0	0	0	0	0	94	487
9:30 AM	14	39	0	0	0	54	4	0	3	0	12	0	0	0	0	0	126	487
9:45 AM	9	45	0	0	0	57	7	0	1	0	7	0	0	0	0	0	126	463
10:00 AM	9	50	0	0	0	41	2	0	6	0	3	0	0	0	0	0	111	457
10:15 AM	13	37	0	0	0	56	10	0	1	0	17	0	0	0	0	0	134	497
10:30 AM	8	55	0	0	0	56	1	0	2	0	8	0	0	0	0	0	130	501
10:45 AM	12	33	0	0	0	50	5	0	3	0	12	0	0	0	0	0	115	490
11:00 AM	13	55	0	0	0	70	6	0	2	0	14	0	0	0	0	0	160	539
11:15 AM	14	53	0	0	0	56	4	0	2	0	8	0	0	0	0	0	137	542
11:30 AM	14	74	0	0	0	64	2	0	2	0	16	0	0	0	0	0	172	584
11:45 AM	18	62	0	0	0	84	7	0	5	0	16	0	0	0	0	0	192	661
12:00 PM	10	61	0	0	0	71	1	0	5	0	31	0	0	0	0	0	179	680
12:15 PM	22	68	0	0	0	70	10	0	4	0	12	0	0	0	0	0	186	729
12:30 PM	8	69	0	0	0	62	5	0	1	0	25	0	0	0	0	0	170	727
12:45 PM	18	67	0	0	0	69	6	0	6	0	6	0	0	0	0	0	172	707
1:00 PM	12	53	0	0	0	73	7	0	3	0	15	0	0	0	0	0	163	691
1:15 PM	15	66	0	0	0	76	4	0	0	0	6	0	0	0	0	0	167	672
1:30 PM	8	72	0	0	0	69	5	0	3	0	9	0	0	0	0	0	166	668
1:45 PM	10	72	0	0	0	71	3	0	3	0	10	0	0	0	0	0	169	665
2:00 PM	8	82	0	0	0	59	4	0	1	0	16	0	0	0	0	0	170	672

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	60	544	0	0	0	400	12	0	20	0	132	0	0	0	0	0	1168
Heavy Trucks	20	140	0		0	56	0		4	0	44		0	0	0		264
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

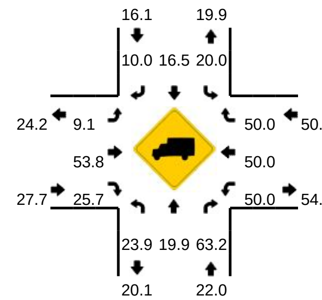
Comments:

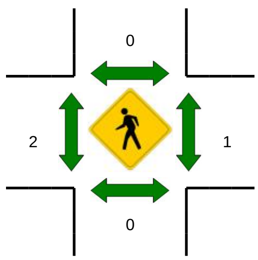
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

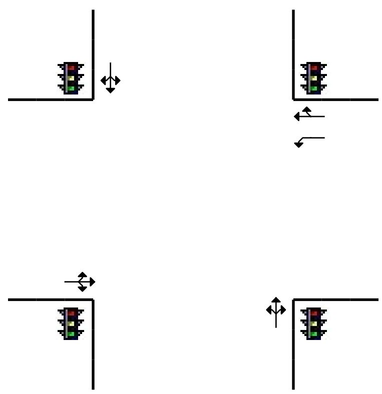
LOCATION: Old Portland Rd -- S 18th St/Kaster Rd | **QC JOB #:** 14560508
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

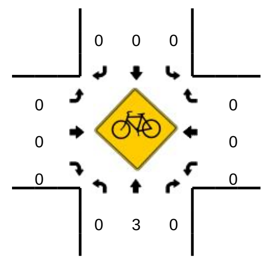


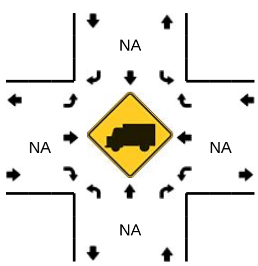
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM

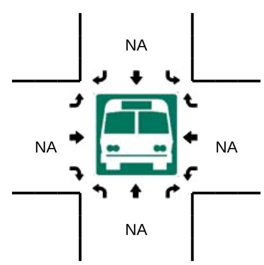












5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 18th St/Kaster Rd (Eastbound) Left	Thru	Right	U	S 18th St/Kaster Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	8	41	3	0	0	45	1	0	1	0	7	0	1	0	0	0	107	
8:30 AM	8	50	2	0	0	50	0	0	2	2	6	0	1	1	0	0	122	
8:45 AM	8	46	4	0	0	66	3	0	1	0	8	0	2	0	1	0	139	536
9:00 AM	6	28	2	0	2	61	1	0	1	1	10	0	2	1	0	0	115	483
9:15 AM	10	25	3	0	0	40	1	0	3	0	10	0	2	0	1	0	95	471
9:30 AM	7	32	5	0	0	51	0	0	0	1	10	0	1	1	1	0	109	458
9:45 AM	9	39	1	0	0	52	2	0	3	1	11	0	5	1	0	0	124	443
10:00 AM	11	43	1	0	0	35	1	0	3	1	7	0	4	0	1	0	107	435
10:15 AM	7	34	4	0	0	47	2	0	1	2	21	0	1	0	0	0	119	459
10:30 AM	15	38	4	0	0	46	3	0	4	0	12	0	1	0	0	0	123	473
10:45 AM	11	32	2	0	1	41	4	0	1	0	13	0	5	0	0	0	110	459
11:00 AM	14	46	2	0	0	63	4	0	5	0	20	0	2	1	2	0	159	511
11:15 AM	4	48	7	0	0	49	6	0	1	0	14	0	3	0	0	0	132	524
11:30 AM	7	56	3	0	0	56	9	0	0	1	16	0	3	0	1	0	152	553
11:45 AM	17	60	2	0	1	59	1	0	2	0	31	0	3	1	2	0	179	622
12:00 PM	19	47	4	0	2	56	1	0	2	1	15	0	8	1	2	0	158	621
12:15 PM	14	57	3	0	0	62	2	0	2	1	14	0	4	0	0	0	159	648
12:30 PM	16	56	7	0	2	58	2	0	5	0	14	0	3	1	0	0	164	660
12:45 PM	15	67	2	0	0	57	5	0	1	2	14	0	5	1	1	0	170	651
1:00 PM	7	52	2	0	1	67	2	0	4	2	19	0	3	0	0	0	159	652
1:15 PM	19	48	1	0	0	57	3	0	4	0	21	0	5	0	0	0	158	651
1:30 PM	13	59	4	0	0	63	4	0	1	0	16	0	1	0	0	0	161	648
1:45 PM	18	61	0	0	0	55	1	0	3	1	17	0	3	1	0	0	160	638
2:00 PM	25	75	2	0	0	54	4	0	1	2	16	0	0	0	0	0	179	658

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	64	524	36	0	0	360	32	0	12	24	72	0	16	16	4	0	1160
Heavy Trucks	16	108	24		0	56	0		0	12	4		4	8	4		236
Pedestrians		0				0				0				4			4
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

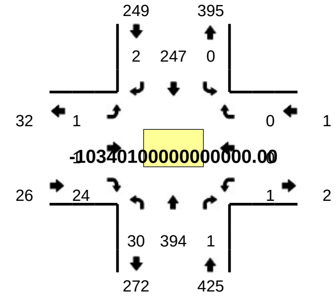
Comments:

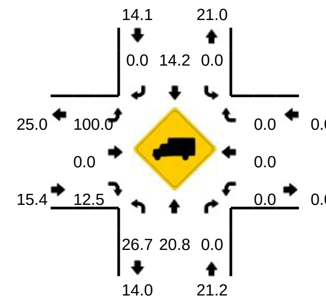
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

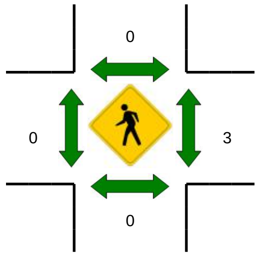
LOCATION: Old Portland Rd -- S 15th St | **QC JOB #:** 14560509

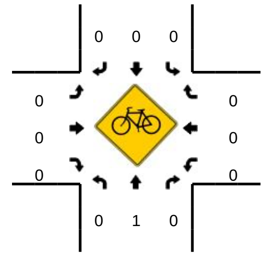
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

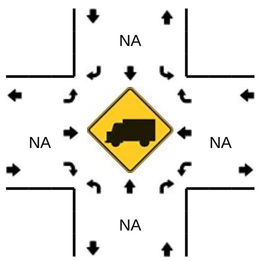
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM

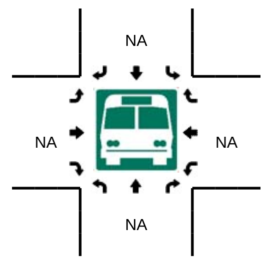












5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 15th St (Eastbound) Left	Thru	Right	U	S 15th St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	5	35	0	0	0	37	1	0	0	0	6	0	0	0	0	0	84	
8:30 AM	5	38	0	0	0	43	0	0	1	1	2	0	0	0	0	0	90	
8:45 AM	1	45	0	0	0	61	0	0	4	0	5	0	1	0	0	0	117	409
9:00 AM	0	28	0	0	0	45	0	0	0	0	5	0	0	0	0	0	78	369
9:15 AM	2	25	1	0	0	35	0	0	0	0	4	0	0	0	0	0	67	352
9:30 AM	1	29	0	0	0	45	0	0	0	0	2	0	0	1	0	0	78	340
9:45 AM	1	32	0	0	0	43	0	0	0	0	3	0	0	0	0	0	79	302
10:00 AM	6	31	1	0	0	31	1	0	0	1	1	0	0	0	0	0	72	296
10:15 AM	1	33	0	0	0	41	0	0	0	0	5	0	0	0	0	0	80	309
10:30 AM	4	36	0	0	0	40	0	0	0	1	5	0	0	0	0	0	86	317
10:45 AM	2	28	1	0	0	40	1	0	1	0	4	0	0	0	0	0	77	315
11:00 AM	5	45	1	0	0	58	1	0	2	0	6	0	0	0	0	0	118	361
11:15 AM	3	43	0	0	0	50	0	0	0	0	7	0	0	0	1	0	104	385
11:30 AM	6	47	0	0	0	50	1	0	0	0	7	0	0	0	0	0	111	410
11:45 AM	7	51	0	0	0	53	0	0	0	0	6	0	0	0	0	0	117	450
12:00 PM	2	44	2	0	0	55	0	0	2	0	4	0	0	0	0	0	109	441
12:15 PM	9	41	1	0	0	47	0	0	1	0	4	0	1	0	0	0	104	441
12:30 PM	4	47	0	0	1	55	0	0	2	0	5	0	0	0	0	0	114	444
12:45 PM	3	58	0	0	0	57	0	0	0	0	4	0	0	0	0	0	122	449
1:00 PM	2	53	0	0	0	51	0	0	0	0	8	0	0	0	0	0	114	454
1:15 PM	7	41	0	0	0	47	2	0	2	0	6	0	0	0	0	0	105	455
1:30 PM	3	51	0	0	0	52	1	0	1	1	9	0	0	0	0	0	118	459
1:45 PM	6	54	0	0	0	48	0	0	0	0	5	0	0	0	0	0	113	450
2:00 PM	6	62	0	0	0	47	1	0	1	0	8	0	0	0	0	0	125	461

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	36	480	0	0	0	356	4	0	4	0	12	0	0	0	0	0	892
Heavy Trucks	12	96	0		0	48	0		4	0	4		0	0	0		164
Pedestrians		0				0				0				4			4
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

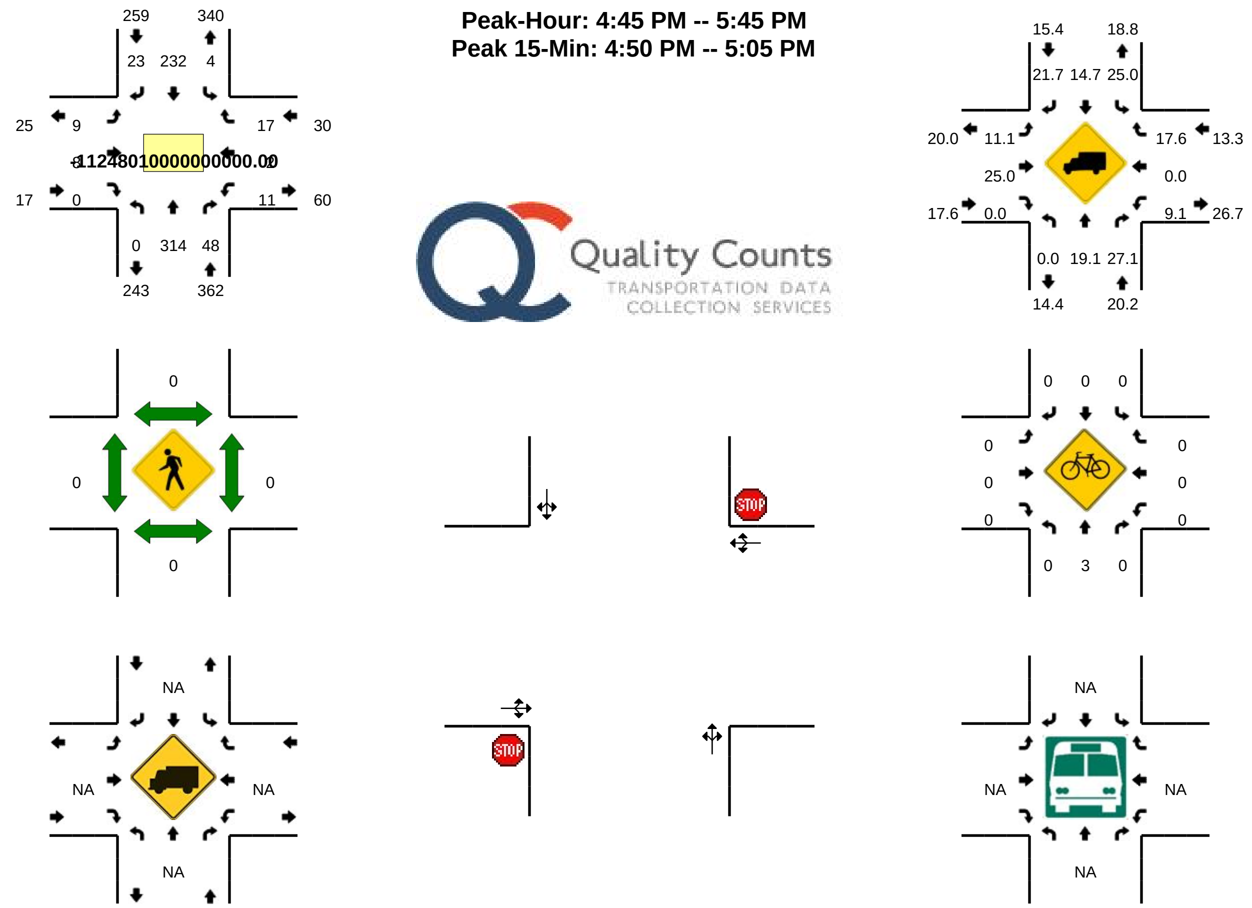
Type of peak hour being reported: User-Defined — Method for determining peak hour: Total Entering Volume

LOCATION: Old Portland Rd -- Plymouth St — **QC JOB #:** 14560510

CITY/STATE: Saint Helens, OR — **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM

Peak 15-Min: 4:50 PM -- 5:05 PM



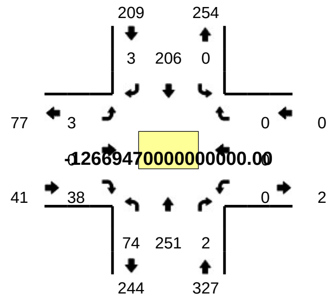
5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	Plymouth St (Eastbound) Left	Thru	Right	U	Plymouth St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	0	34	2	0	0	34	2	0	1	4	0	0	1	1	1	0	80	
8:30 AM	0	28	5	0	1	38	2	0	4	0	0	0	3	1	0	0	82	
8:45 AM	0	41	4	0	1	55	3	0	2	0	0	0	1	0	4	0	111	377
9:00 AM	0	27	3	0	1	40	1	0	2	0	0	0	4	0	2	0	80	353
9:15 AM	0	24	1	0	0	32	4	0	0	2	0	0	2	1	1	0	67	340
9:30 AM	1	23	1	0	1	42	3	0	1	0	0	0	0	0	0	0	72	330
9:45 AM	0	28	2	0	0	34	1	0	2	0	0	0	1	0	0	0	68	287
10:00 AM	0	28	2	0	0	30	4	0	0	2	0	0	1	0	2	0	69	276
10:15 AM	0	31	3	0	0	33	2	0	0	2	0	0	2	1	2	0	76	285
10:30 AM	0	29	6	0	0	36	3	0	1	1	0	0	2	0	5	0	83	296
10:45 AM	0	28	3	0	0	38	2	0	1	0	0	0	1	1	0	0	74	302
11:00 AM	0	35	8	0	0	50	5	0	1	2	6	0	0	0	5	0	112	345
11:15 AM	0	34	7	0	1	42	3	0	0	0	6	0	1	0	2	0	96	365
11:30 AM	1	41	4	0	1	45	3	0	0	3	3	0	4	0	2	0	107	389
11:45 AM	0	46	4	0	0	49	6	0	2	1	1	0	1	2	4	0	116	431
12:00 PM	3	40	5	0	0	50	5	0	4	0	0	0	3	0	1	0	111	430
12:15 PM	3	34	4	0	0	38	2	0	1	1	0	0	2	0	2	0	87	421
12:30 PM	6	44	4	0	2	51	3	0	3	2	0	0	0	0	3	0	118	432
12:45 PM	3	52	7	0	1	50	4	0	2	1	0	0	3	0	4	0	127	443
1:00 PM	8	38	8	0	0	49	2	0	0	1	0	0	0	0	2	0	108	440
1:15 PM	5	33	5	0	0	44	2	0	1	0	0	0	1	0	2	0	93	446
1:30 PM	4	42	5	0	0	49	2	0	0	2	0	0	1	0	2	0	107	435
1:45 PM	2	47	8	0	0	42	4	0	0	0	0	0	1	2	0	0	106	414
2:00 PM	0	48	6	0	1	45	5	0	3	1	0	0	2	1	6	0	118	424

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	372	40	0	8	340	28	0	8	0	0	0	8	0	16	0	820
Heavy Trucks	0	76	12		4	52	8		0	0	0		0	0	8		160
Pedestrians		0				0				0				0			0
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

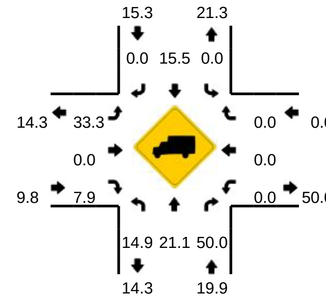
Comments:

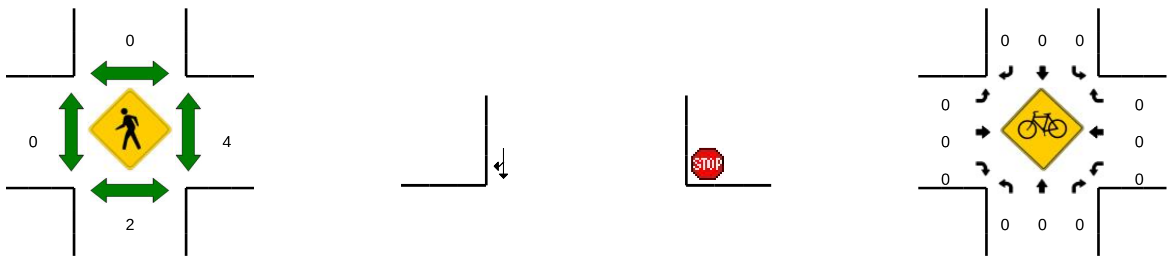
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

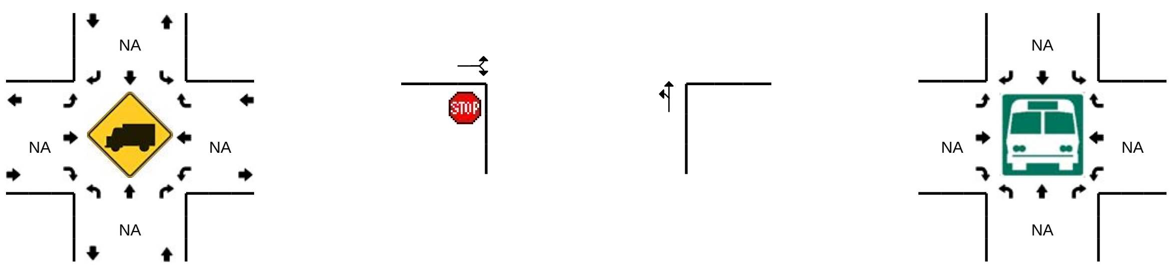
LOCATION: Old Portland Rd -- S 12th St | **QC JOB #:** 14560511
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM







5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 12th St (Eastbound) Left	Thru	Right	U	S 12th St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	5	27	0	0	0	24	0	0	2	0	5	0	0	0	0	0	63	
8:30 AM	1	34	0	0	0	36	1	0	1	0	5	0	0	0	0	0	78	
8:45 AM	5	37	0	0	0	50	1	0	0	0	6	0	0	0	0	0	99	330
9:00 AM	4	23	0	0	0	36	0	0	1	0	5	0	0	0	0	0	69	309
9:15 AM	6	16	0	0	0	27	0	0	2	0	5	0	0	0	0	0	56	302
9:30 AM	5	23	0	0	0	34	1	0	0	0	10	0	0	0	0	0	73	297
9:45 AM	3	24	0	0	0	27	0	0	1	0	9	0	0	1	0	0	65	263
10:00 AM	6	23	0	0	0	28	0	0	1	0	4	0	0	0	0	0	62	256
10:15 AM	9	22	0	0	0	25	0	0	0	0	6	0	0	0	0	0	62	262
10:30 AM	6	26	0	0	0	32	1	0	0	0	6	0	0	0	0	0	71	260
10:45 AM	1	27	0	0	0	38	0	0	1	0	2	0	0	0	0	0	69	264
11:00 AM	8	30	1	0	0	40	1	0	0	0	13	0	0	0	0	0	93	295
11:15 AM	7	27	0	0	0	38	0	0	0	0	6	0	1	0	0	0	79	312
11:30 AM	8	36	0	0	0	42	0	0	3	0	6	0	0	0	0	0	95	336
11:45 AM	7	37	0	0	0	41	1	0	0	0	7	0	0	0	0	0	93	360
12:00 PM	6	37	0	0	0	43	1	0	1	0	9	0	0	0	0	0	97	364
12:15 PM	2	36	1	0	0	34	0	0	0	0	4	0	0	0	0	0	77	362
12:30 PM	4	38	2	0	0	44	3	0	2	0	8	0	1	1	0	0	103	370
12:45 PM	8	44	0	0	0	38	1	0	0	0	12	0	0	0	0	0	103	380
1:00 PM	8	35	0	0	0	46	1	0	0	0	5	0	0	0	0	0	95	378
1:15 PM	4	29	0	0	0	40	0	0	0	0	6	0	0	0	0	0	79	380
1:30 PM	4	38	0	0	0	37	0	0	0	0	12	0	0	0	0	0	91	368
1:45 PM	7	36	0	0	0	43	2	0	2	0	7	0	0	0	0	0	97	362
2:00 PM	11	38	0	0	0	42	0	0	2	0	4	0	0	0	0	0	97	364

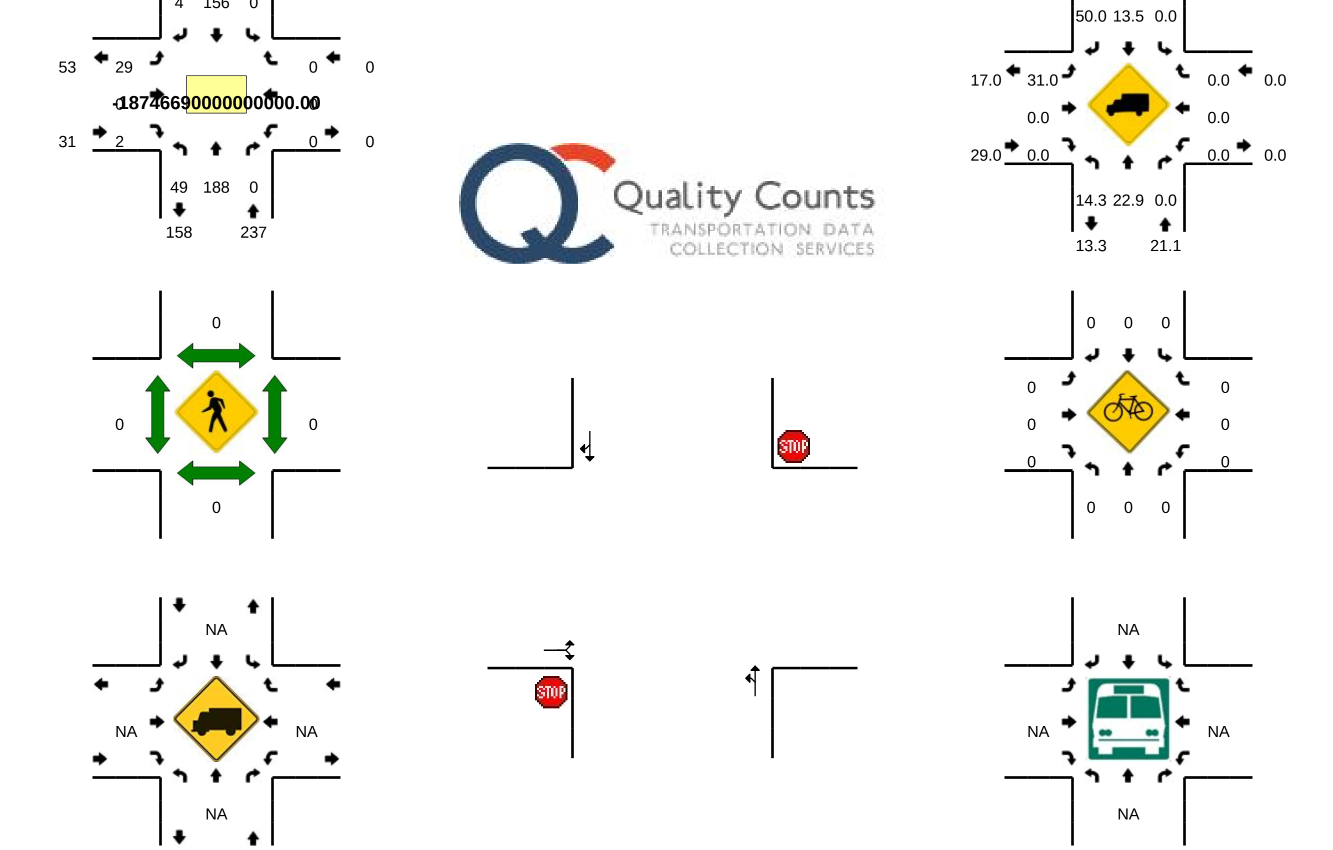
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	108	276	8	0	0	292	4	0	0	0	40	0	0	0	0	0	728
Heavy Trucks	16	64	4		0	40	0		0	0	0		0	0	0		124
Pedestrians		8				0				0				8			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

LOCATION: Old Portland Rd -- S 8th St | **QC JOB #:** 14560512
CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM



5-Min Count Period Beginning At	Old Portland Rd (Northbound) Left	Thru	Right	U	Old Portland Rd (Southbound) Left	Thru	Right	U	S 8th St (Eastbound) Left	Thru	Right	U	S 8th St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	7	22	0	0	0	12	3	0	5	0	0	0	0	0	0	0	49	
8:30 AM	2	27	0	0	0	18	0	0	8	0	1	0	0	0	0	0	56	
8:45 AM	6	32	0	0	0	31	0	0	9	0	0	0	0	0	0	0	78	247
9:00 AM	2	25	0	0	0	26	2	0	4	0	1	0	0	0	0	0	60	243
9:15 AM	3	12	0	0	0	23	0	0	0	0	1	0	0	0	0	0	39	233
9:30 AM	2	20	0	0	0	30	0	0	2	0	0	0	0	0	0	0	54	231
9:45 AM	3	21	0	0	0	22	0	0	2	0	0	0	0	0	0	0	48	201
10:00 AM	1	27	0	0	0	16	0	0	3	0	0	0	0	0	0	0	47	188
10:15 AM	1	18	0	0	0	18	0	0	4	0	0	0	0	0	0	0	41	190
10:30 AM	3	18	0	0	0	23	0	0	2	0	0	0	0	0	0	0	46	182
10:45 AM	2	28	0	0	0	32	0	0	1	0	0	0	0	0	0	0	63	197
11:00 AM	5	23	0	0	0	32	0	0	5	0	0	0	0	0	0	0	65	215
11:15 AM	8	17	0	0	0	27	1	0	5	0	0	0	0	0	0	0	58	232
11:30 AM	5	31	0	0	0	31	1	0	4	0	1	0	0	0	0	0	73	259
11:45 AM	6	32	0	0	0	34	0	0	6	0	0	0	0	0	0	0	78	274
12:00 PM	4	35	0	0	0	37	1	0	6	0	2	0	0	0	0	0	85	294
12:15 PM	4	28	0	0	0	27	0	0	1	0	1	0	0	0	0	0	61	297
12:30 PM	6	33	0	0	0	33	2	0	8	0	1	0	0	0	0	0	83	307
12:45 PM	2	42	0	0	0	37	1	0	1	0	1	0	0	0	0	0	84	313
1:00 PM	5	21	0	0	0	41	0	0	1	0	1	0	0	0	0	0	69	297
1:15 PM	3	27	0	0	0	30	0	0	7	0	0	0	0	0	0	0	67	303
1:30 PM	6	27	0	0	0	23	1	0	7	0	0	0	0	0	0	0	64	284
1:45 PM	9	30	0	0	0	36	0	0	4	0	0	0	0	0	0	0	79	279
2:00 PM	8	26	0	0	0	30	2	0	5	0	2	0	0	0	0	0	73	283

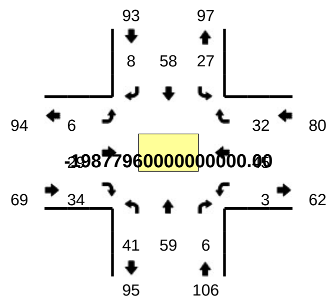
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	32	188	0	0	0	232	8	0	28	0	4	0	0	0	0	0	492
Heavy Trucks	0	52	0		0	28	4		8	0	0		0	0	0		92
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

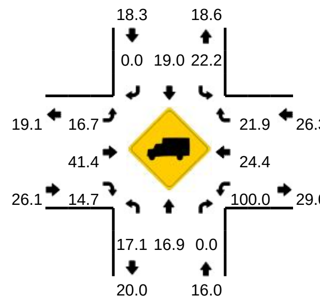
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

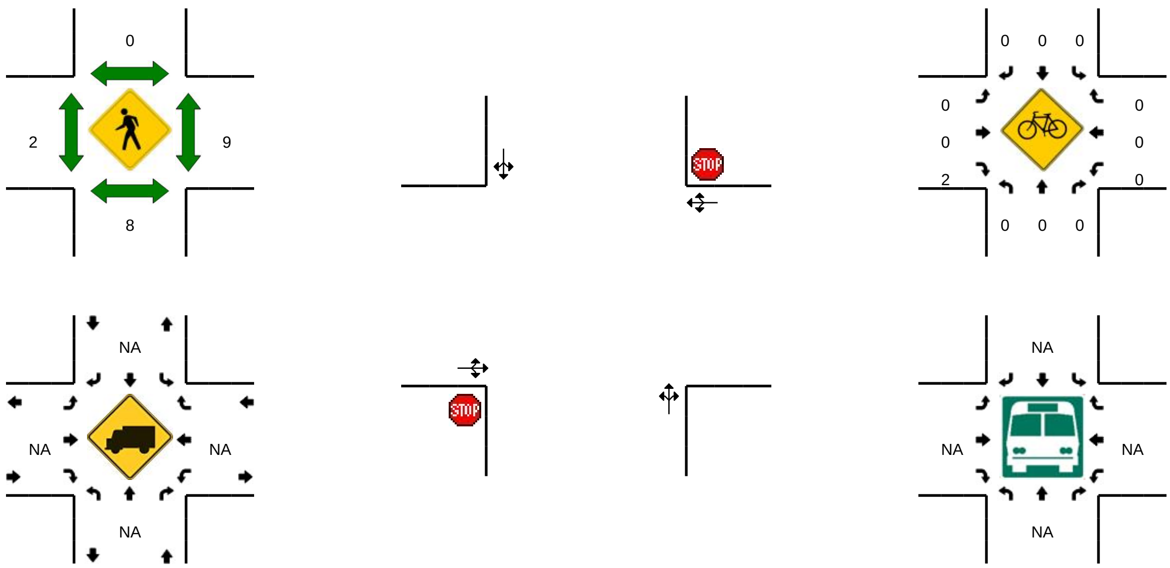
LOCATION: S 1st St -- Saint Helens St | **QC JOB #:** 14560513

CITY/STATE: Saint Helens, OR | **DATE:** Thu, May 18 2017



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM





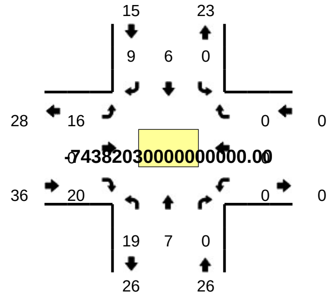
5-Min Count Period Beginning At	S 1st St (Northbound) Left	Thru	Right	U	S 1st St (Southbound) Left	Thru	Right	U	Saint Helens St (Eastbound) Left	Thru	Right	U	Saint Helens St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	4	4	2	0	12	13	0	0	0	11	5	0	0	2	1	0	54	
8:30 AM	7	9	1	0	13	4	3	0	0	11	12	0	0	1	2	0	63	
8:45 AM	7	9	1	0	7	15	3	0	1	10	5	0	1	2	0	0	61	230
9:00 AM	6	9	0	0	5	11	0	0	0	9	9	0	1	2	4	0	56	234
9:15 AM	6	12	0	0	8	14	0	0	0	4	5	0	0	2	7	0	58	238
9:30 AM	12	10	6	0	7	11	0	0	0	3	6	0	1	5	5	0	66	241
9:45 AM	7	14	0	0	7	13	2	0	0	4	8	0	0	3	2	0	60	240
10:00 AM	7	17	1	0	6	18	1	0	2	5	6	0	0	3	4	0	70	254
10:15 AM	6	9	1	0	10	8	3	0	0	2	7	0	0	4	8	0	58	254
10:30 AM	8	14	3	0	5	18	2	0	2	8	3	0	0	2	1	0	66	254
10:45 AM	12	16	2	0	8	8	4	0	1	6	9	0	0	7	1	0	74	268
11:00 AM	16	7	1	0	14	14	1	0	1	6	8	0	0	4	3	0	75	273
11:15 AM	12	14	0	0	5	9	2	0	1	3	5	0	0	11	2	0	64	279
11:30 AM	12	15	2	0	8	17	1	0	2	3	11	0	0	5	2	0	78	291
11:45 AM	11	24	1	0	7	11	4	0	2	7	13	0	2	8	11	0	101	318
12:00 PM	18	23	1	0	8	24	3	0	1	2	18	0	0	6	10	0	114	357
12:15 PM	11	11	3	0	8	16	2	0	3	5	7	0	1	2	9	0	78	371
12:30 PM	15	11	2	0	13	20	1	0	3	1	11	0	0	4	6	0	87	380
12:45 PM	15	15	6	0	10	24	1	0	4	9	8	0	1	6	8	0	107	386
1:00 PM	14	23	3	0	18	21	3	0	3	3	15	0	0	9	4	0	116	388
1:15 PM	12	15	3	0	10	13	2	0	1	11	4	0	1	9	5	0	86	396
1:30 PM	10	13	1	0	9	14	7	0	1	6	4	0	0	4	5	0	74	383
1:45 PM	13	24	1	0	12	16	1	0	2	7	12	0	0	7	8	0	103	379
2:00 PM	8	22	4	0	11	14	1	0	3	8	8	0	1	6	10	0	96	359

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	72	76	4	0	32	48	4	0	12	36	48	0	12	64	56	0	464
Heavy Trucks	8	12	0		4	12	0		0	12	8		12	12	20		100
Pedestrians		12				0				0				12			24
Bicycles	0	0	0		0	0	0		0	0	1		0	0	0		1
Railroad																	
Stopped Buses																	

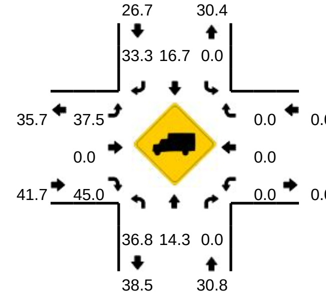
Comments:

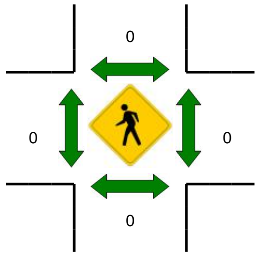
Type of peak hour being reported: User-Defined | Method for determining peak hour: Total Entering Volume

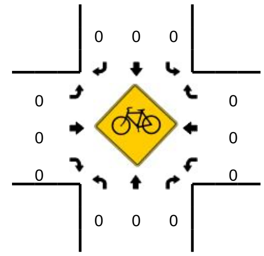
LOCATION: S McNulty Way -- Millard Rd | **QC JOB #:** 14560514
CITY/STATE: Warren, OR | **DATE:** Thu, May 18 2017

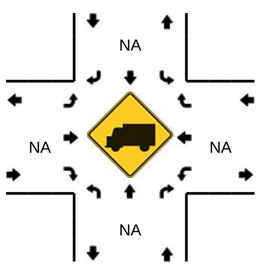


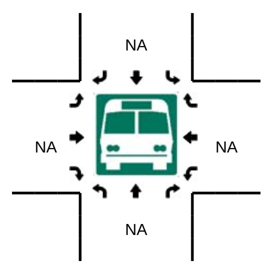
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:50 PM -- 5:05 PM











5-Min Count Period Beginning At	S McNulty Way (Northbound) Left	Thru	Right	U	S McNulty Way (Southbound) Left	Thru	Right	U	Millard Rd (Eastbound) Left	Thru	Right	U	Millard Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
8:15 AM	3	2	0	0	0	0	0	0	4	1	3	0	0	0	0	0	13	
8:30 AM	1	2	0	0	0	0	2	0	9	0	2	0	0	0	1	0	17	
8:45 AM	6	1	0	0	0	0	0	0	7	0	2	0	0	0	0	0	16	56
9:00 AM	1	0	0	0	0	1	2	0	3	0	5	0	0	0	0	0	12	58
9:15 AM	3	2	0	0	1	1	3	0	3	0	2	0	0	0	0	0	15	60
9:30 AM	1	1	0	0	0	0	3	0	4	0	2	0	0	0	0	0	11	54
9:45 AM	5	0	1	0	0	0	1	0	5	1	1	0	0	0	0	0	14	52
10:00 AM	1	2	0	0	0	1	3	0	1	0	2	0	1	0	0	0	11	51
10:15 AM	10	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	13	49
10:30 AM	2	1	0	0	0	2	0	0	1	0	3	0	0	1	0	0	10	48
10:45 AM	5	0	0	0	0	1	1	0	3	0	2	0	0	0	0	0	12	46
11:00 AM	2	1	0	0	0	0	6	0	1	0	4	0	0	0	0	0	14	49
11:15 AM	8	2	0	0	0	2	0	0	4	0	1	0	0	0	0	0	17	53
11:30 AM	2	0	0	0	0	1	1	0	5	0	6	0	0	0	0	0	15	58
11:45 AM	3	3	0	0	0	0	3	0	8	0	4	0	0	0	0	0	21	67
12:00 PM	9	0	0	0	1	1	4	0	3	0	5	0	0	0	0	0	23	76
12:15 PM	2	0	0	0	0	1	2	0	6	0	3	0	0	0	0	0	14	73
12:30 PM	2	1	0	0	1	5	0	0	1	0	3	0	0	0	0	0	13	71
12:45 PM	2	3	0	0	0	3	1	0	3	0	3	0	0	0	0	0	15	65
1:00 PM	1	1	0	0	0	1	1	0	2	0	3	0	0	1	0	0	10	52
1:15 PM	8	3	1	0	0	0	0	0	7	0	8	0	0	1	0	0	28	66
1:30 PM	5	0	1	0	0	0	4	0	4	0	6	0	0	0	0	0	20	73
1:45 PM	3	1	0	0	0	1	0	0	4	0	2	0	0	0	0	0	11	69
2:00 PM	4	0	0	0	0	2	3	0	7	0	3	0	0	0	0	0	19	78

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	20	12	0	0	0	8	20	0	32	0	32	0	0	0	0	0	124
Heavy Trucks	8	4	0		0	0	8		8	0	16		0	0	0		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Appendix C Existing Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	5	0	21	5	19	1	134	14	2	237	9
Future Volume (Veh/h)	6	5	0	21	5	19	1	134	14	2	237	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	7	6	0	25	6	23	1	161	17	2	286	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	493	476	292	470	472	170	297			178		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	493	476	292	470	472	170	297			178		
tC, single (s)	7.1	6.5	6.2	7.2	6.7	6.4	5.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.2	3.4	3.1			2.2		
p0 queue free %	99	99	100	95	99	97	100			100		
cM capacity (veh/h)	471	490	752	485	463	839	864			1410		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	54	179	299
Volume Left	7	25	1	2
Volume Right	0	23	17	11
cSH	479	588	864	1410
Volume to Capacity	0.03	0.09	0.00	0.00
Queue Length 95th (ft)	2	8	0	0
Control Delay (s)	12.7	11.7	0.1	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	12.7	11.7	0.1	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	58	4	4	259	343
v/c Ratio	0.21	0.03	0.02	0.29	0.37
Control Delay	10.1	18.2	15.2	6.5	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	18.2	15.2	6.5	7.1
Queue Length 50th (ft)	2	1	1	34	48
Queue Length 95th (ft)	27	7	7	66	89
Internal Link Dist (ft)	578		583	1147	882
Turn Bay Length (ft)					
Base Capacity (vph)	273	147	266	886	930
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.03	0.02	0.29	0.37

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	2	44	4	2	2	34	191	8	2	298	9
Future Volume (vph)	6	2	44	4	2	2	34	191	8	2	298	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.89		1.00	0.93			1.00			1.00	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1277		1031	1406			1630			1589	
Flt Permitted		0.97		0.72	1.00			0.92			1.00	
Satd. Flow (perm)		1240		781	1406			1511			1588	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	2	49	4	2	2	38	212	9	2	331	10
RTOR Reduction (vph)	0	40	0	0	2	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	18	0	4	2	0	0	257	0	0	341	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	33%	0%	32%	75%	0%	50%	21%	12%	62%	0%	19%	22%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		10.0		10.0	10.0			31.0			31.0	
Effective Green, g (s)		10.0		10.0	10.0			31.0			31.0	
Actuated g/C Ratio		0.19		0.19	0.19			0.58			0.58	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)		233		147	265			883			928	
v/s Ratio Prot					0.00							
v/s Ratio Perm		c0.01		0.01				0.17			c0.21	
v/c Ratio		0.08		0.03	0.01			0.29			0.37	
Uniform Delay, d1		17.7		17.5	17.5			5.5			5.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.7		0.3	0.1			0.8			1.1	
Delay (s)		18.4		17.9	17.5			6.3			6.9	
Level of Service		B		B	B			A			A	
Approach Delay (s)		18.4			17.7			6.3			6.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	208	27	71	297	20	87
Future Volume (Veh/h)	208	27	71	297	20	87
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	229	30	78	326	22	96
Pedestrians					1	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			260		727	245
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			260		727	245
tC, single (s)			4.4		6.8	6.4
tC, 2 stage (s)						
tF (s)			2.5		3.9	3.5
p0 queue free %			93		93	87
cM capacity (veh/h)			1166		312	758

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	259	78	326	118
Volume Left	0	78	0	22
Volume Right	30	0	0	96
cSH	1700	1166	1700	598
Volume to Capacity	0.15	0.07	0.19	0.20
Queue Length 95th (ft)	0	5	0	18
Control Delay (s)	0.0	8.3	0.0	12.5
Lane LOS		A		B
Approach Delay (s)	0.0	1.6		12.5
Approach LOS				B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	194	188	228	57	573	112	148	1060	234
v/c Ratio	0.76	0.79	0.74	0.44	0.07	0.35	0.17	0.17	0.61	0.34
Control Delay	73.6	64.2	67.0	40.7	14.5	24.3	5.8	14.5	26.4	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.6	64.2	67.0	40.7	14.5	24.3	5.8	14.5	26.4	11.4
Queue Length 50th (ft)	106	133	141	139	18	147	0	51	310	41
Queue Length 95th (ft)	171	201	213	200	48	247	42	109	490	127
Internal Link Dist (ft)		1174		1250		3769			940	
Turn Bay Length (ft)	135		175		135		450	125		140
Base Capacity (vph)	247	370	328	760	964	1650	649	871	1731	683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.52	0.57	0.30	0.06	0.35	0.17	0.17	0.61	0.34

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	126	55	175	119	93	53	533	104	138	986	218
Future Volume (vph)	131	126	55	175	119	93	53	533	104	138	986	218
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	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	0.95		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1319	1406		1833	2997		1655	3596	1282	1493	3426	1219
Flt Permitted	0.95	1.00		0.95	1.00		0.18	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	1319	1406		1833	2997		1655	3596	1282	1493	3426	1219
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	141	135	59	188	128	100	57	573	112	148	1060	234
RTOR Reduction (vph)	0	15	0	0	26	0	0	0	61	0	0	68
Lane Group Flow (vph)	141	179	0	188	202	0	57	573	51	148	1060	166
Confl. Peds. (#/hr)	3		10	10		3						
Heavy Vehicles (%)	26%	18%	18%	19%	19%	19%	19%	25%	16%	19%	27%	22%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	16.9	19.9		16.6	19.6		60.8	55.0	55.0	70.0	59.7	59.7
Effective Green, g (s)	16.9	19.9		16.6	19.6		60.8	55.0	55.0	70.0	59.7	59.7
Actuated g/C Ratio	0.14	0.17		0.14	0.16		0.51	0.46	0.46	0.58	0.50	0.50
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.1	4.1	2.3	4.1	4.1
Lane Grp Cap (vph)	185	233		253	489		838	1648	587	870	1704	606
v/s Ratio Prot	c0.11	c0.13		0.10	0.07		0.00	0.16		c0.01	c0.31	
v/s Ratio Perm							0.03		0.04	0.08		0.14
v/c Ratio	0.76	0.77		0.74	0.41		0.07	0.35	0.09	0.17	0.62	0.27
Uniform Delay, d1	49.6	47.8		49.7	45.0		16.5	20.9	18.3	12.3	21.9	17.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.8	13.2		10.3	0.3		0.0	0.6	0.3	0.1	1.7	1.1
Delay (s)	65.4	61.1		60.0	45.4		16.5	21.5	18.6	12.4	23.7	18.6
Level of Service	E	E		E	D		B	C	B	B	C	B
Approach Delay (s)		62.9			52.0			20.7			21.7	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
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)	8	3	93	5	1	12	23	678	21	15	1291	25
Future Volume (Veh/h)	8	3	93	5	1	12	23	678	21	15	1291	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	3	101	5	1	13	25	737	23	16	1403	27
Pedestrians		1										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		0										
Right turn flare (veh)			10			5						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1855	2246	702	1572	2223	368	1404			760		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1855	2246	702	1572	2223	368	1404			760		
tC, single (s)	8.5	7.8	7.3	9.0	6.5	7.9	4.6			4.6		
tC, 2 stage (s)												
tF (s)	4.0	4.7	3.5	4.2	4.0	3.8	2.5			2.5		
p0 queue free %	62	82	70	76	97	97	93			98		
cM capacity (veh/h)	24	16	337	21	40	509	375			702		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	113	19	25	368	368	23	16	702	702	27
Volume Left	9	5	25	0	0	0	16	0	0	0
Volume Right	101	13	0	0	0	23	0	0	0	27
cSH	206	75	375	1700	1700	1700	702	1700	1700	1700
Volume to Capacity	0.55	0.25	0.07	0.22	0.22	0.01	0.02	0.41	0.41	0.02
Queue Length 95th (ft)	73	22	5	0	0	0	2	0	0	0
Control Delay (s)	49.3	72.0	15.3	0.0	0.0	0.0	10.2	0.0	0.0	0.0
Lane LOS	E	F	C				B			
Approach Delay (s)	49.3	72.0	0.5				0.1			
Approach LOS	E	F								

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	29	34	3	45	32	41	59	6	27	58	8
Future Volume (Veh/h)	6	29	34	3	45	32	41	59	6	27	58	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	8	39	45	4	60	43	55	79	8	36	77	11
Pedestrians		2			9			8				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	422	362	92	429	364	92	90			96		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422	362	92	429	364	92	90			96		
tC, single (s)	7.3	6.9	6.4	8.1	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.4	3.4	4.4	4.2	3.5	2.4			2.4		
p0 queue free %	98	92	95	99	88	95	96			97		
cM capacity (veh/h)	420	470	921	331	491	905	1413			1369		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	107	142	124
Volume Left	8	4	55	36
Volume Right	45	43	8	11
cSH	610	589	1413	1369
Volume to Capacity	0.15	0.18	0.04	0.03
Queue Length 95th (ft)	13	16	3	2
Control Delay (s)	11.9	12.5	3.2	2.4
Lane LOS	B	B	A	A
Approach Delay (s)	11.9	12.5	3.2	2.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	2	49	188	156	4
Future Volume (Veh/h)	29	2	49	188	156	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	33	2	56	216	179	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	510	182	184			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	182	184			
tC, single (s)	6.7	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.3			
p0 queue free %	93	100	96			
cM capacity (veh/h)	456	866	1322			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	35	272	184
Volume Left	33	56	0
Volume Right	2	0	5
cSH	468	1322	1700
Volume to Capacity	0.07	0.04	0.11
Queue Length 95th (ft)	6	3	0
Control Delay (s)	13.3	1.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	1.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	38	74	251	206	3
Future Volume (Veh/h)	3	38	74	251	206	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	4	48	94	318	261	4
Pedestrians				2		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	769	265	265			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	769	265	265			
tC, single (s)	6.7	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.4	2.3			
p0 queue free %	99	94	92			
cM capacity (veh/h)	304	758	1227			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	52	412	265
Volume Left	4	94	0
Volume Right	48	0	4
cSH	680	1227	1700
Volume to Capacity	0.08	0.08	0.16
Queue Length 95th (ft)	6	6	0
Control Delay (s)	10.7	2.5	0.0
Lane LOS	B	A	
Approach Delay (s)	10.7	2.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	8	0	11	2	17	0	314	48	4	232	23
Future Volume (Veh/h)	9	8	0	11	2	17	0	314	48	4	232	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	11	10	0	14	2	21	0	388	59	5	286	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	750	757	300	732	742	418	314			447		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	750	757	300	732	742	418	314			447		
tC, single (s)	7.2	6.8	6.2	7.2	6.5	6.4	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.2	3.3	3.6	4.0	3.5	2.2			2.4		
p0 queue free %	96	97	100	96	99	97	100			100		
cM capacity (veh/h)	303	309	744	318	345	602	1258			1002		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	21	37	447	319
Volume Left	11	14	0	5
Volume Right	0	21	59	28
cSH	306	437	1258	1002
Volume to Capacity	0.07	0.08	0.00	0.00
Queue Length 95th (ft)	5	7	0	0
Control Delay (s)	17.6	14.0	0.0	0.2
Lane LOS	C	B		A
Approach Delay (s)	17.6	14.0	0.0	0.2
Approach LOS	C	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	24	1	0	0	30	394	1	0	247	2
Future Volume (Veh/h)	1	1	24	1	0	0	30	394	1	0	247	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	1	1	30	1	0	0	38	499	1	0	313	3
Pedestrians					3							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								962				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88				0.88		
vC, conflicting volume	890	894	314	924	894	502	316			503		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	813	314	847	814	370	316			371		
tC, single (s)	8.1	6.5	6.3	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	4.4	4.0	3.4	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	99	100	96	100	100	100	97			100		
cM capacity (veh/h)	179	268	703	232	267	599	1116			1055		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	32	1	538	316
Volume Left	1	1	38	0
Volume Right	30	0	1	3
cSH	616	232	1116	1055
Volume to Capacity	0.05	0.00	0.03	0.00
Queue Length 95th (ft)	4	0	3	0
Control Delay (s)	11.2	20.6	1.0	0.0
Lane LOS	B	C	A	
Approach Delay (s)	11.2	20.6	1.0	0.0
Approach LOS	B	C		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	111	24	19	655	355
v/c Ratio	0.36	0.15	0.08	0.82	0.38
Control Delay	11.5	20.6	16.6	20.3	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	20.6	16.6	20.3	7.1
Queue Length 50th (ft)	7	6	4	139	49
Queue Length 95th (ft)	37	21	17	#302	81
Internal Link Dist (ft)	578		441	1146	882
Turn Bay Length (ft)					
Base Capacity (vph)	309	163	233	799	946
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.15	0.08	0.82	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	13	70	20	12	4	88	443	19	5	273	20
Future Volume (vph)	11	13	70	20	12	4	88	443	19	5	273	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.90		1.00	0.96			1.00			0.99	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1329		1203	1217			1534			1624	
Flt Permitted		0.96		0.69	1.00			0.88			0.99	
Satd. Flow (perm)		1285		868	1217			1362			1609	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	13	15	83	24	14	5	105	527	23	6	325	24
RTOR Reduction (vph)	0	67	0	0	4	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	44	0	24	15	0	0	653	0	0	350	0
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	9%	54%	26%	50%	50%	50%	24%	20%	63%	20%	16%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		10.0		10.0	10.0			31.0			31.0	
Effective Green, g (s)		10.0		10.0	10.0			31.0			31.0	
Actuated g/C Ratio		0.19		0.19	0.19			0.58			0.58	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)		242		163	229			796			941	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.03		0.03				c0.48			0.22	
v/c Ratio		0.18		0.15	0.07			0.82			0.37	
Uniform Delay, d1		18.1		17.9	17.7			8.8			5.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.6		1.9	0.5			9.2			1.1	
Delay (s)		19.7		19.8	18.2			18.0			7.0	
Level of Service		B		B	B			B			A	
Approach Delay (s)		19.7			19.1			18.0			7.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	71	42	488	315	21
Future Volume (Veh/h)	13	71	42	488	315	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	16	88	52	602	389	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1108	402	415			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1108	402	415			
tC, single (s)	6.6	6.5	4.4			
tC, 2 stage (s)						
tF (s)	3.7	3.6	2.5			
p0 queue free %	92	85	95			
cM capacity (veh/h)	201	592	1013			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	104	654	415
Volume Left	16	52	0
Volume Right	88	0	26
cSH	455	1013	1700
Volume to Capacity	0.23	0.05	0.24
Queue Length 95th (ft)	22	4	0
Control Delay (s)	15.2	1.3	0.0
Lane LOS	C	A	
Approach Delay (s)	15.2	1.3	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	539	21	5	382	0	27	0	14	0	0	0
Future Volume (Veh/h)	0	539	21	5	382	0	27	0	14	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	0	665	26	6	472	0	33	0	17	0	0	0
Pedestrians								8			3	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	475			699			1170	1173	686	1182	1186	475
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	475			699			1170	1173	686	1182	1186	475
tC, single (s)	4.1			4.1			7.5	6.5	6.8	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.8	4.0	3.8	3.5	4.0	3.3
p0 queue free %	100			99			77	100	95	100	100	100
cM capacity (veh/h)	1094			900			142	190	363	158	187	592

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	691	6	472	50	0
Volume Left	0	6	0	33	0
Volume Right	26	0	0	17	0
cSH	1094	900	1700	179	1700
Volume to Capacity	0.00	0.01	0.28	0.28	0.00
Queue Length 95th (ft)	0	1	0	27	0
Control Delay (s)	0.0	9.0	0.0	32.7	0.0
Lane LOS		A		D	A
Approach Delay (s)	0.0	0.1		32.7	0.0
Approach LOS				D	A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	324	23	53	356	27	236
Future Volume (Veh/h)	324	23	53	356	27	236
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	390	28	64	429	33	284
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			425		968	411
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			425		968	411
tC, single (s)			4.3		6.7	6.4
tC, 2 stage (s)						
tF (s)			2.4		3.8	3.5
p0 queue free %			94		86	52
cM capacity (veh/h)			1024		231	596

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	418	64	429	317
Volume Left	0	64	0	33
Volume Right	28	0	0	284
cSH	1700	1024	1700	512
Volume to Capacity	0.25	0.06	0.25	0.62
Queue Length 95th (ft)	0	5	0	104
Control Delay (s)	0.0	8.8	0.0	22.8
Lane LOS		A		C
Approach Delay (s)	0.0	1.1		22.8
Approach LOS				C

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	347	20	7	409	61	28
Future Volume (Veh/h)	347	20	7	409	61	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	428	25	9	505	75	35
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			455		966	442
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			455		966	442
tC, single (s)			4.5		6.7	6.4
tC, 2 stage (s)						
tF (s)			2.6		3.8	3.5
p0 queue free %			99		69	94
cM capacity (veh/h)			919		245	576

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	453	514	110
Volume Left	0	9	75
Volume Right	25	0	35
cSH	1700	919	300
Volume to Capacity	0.27	0.01	0.37
Queue Length 95th (ft)	0	1	41
Control Delay (s)	0.0	0.3	23.8
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	23.8
Approach LOS			C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	218	233	416	132	1215	200	185	799	147
v/c Ratio	0.75	0.81	0.83	0.65	0.16	0.81	0.31	0.23	0.54	0.24
Control Delay	72.6	64.7	73.2	42.7	16.1	38.5	5.5	17.0	29.5	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.6	64.7	73.2	42.7	16.1	38.5	5.5	17.0	29.5	6.9
Queue Length 50th (ft)	106	152	174	257	50	448	0	73	243	5
Queue Length 95th (ft)	171	224	#286	347	99	#690	54	138	371	55
Internal Link Dist (ft)		1174		1250		3769			940	
Turn Bay Length (ft)	135		175		135		450	125		140
Base Capacity (vph)	250	369	313	775	908	1495	637	807	1479	617
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.59	0.74	0.54	0.15	0.81	0.31	0.23	0.54	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	147	60	221	172	223	125	1154	190	176	759	140
Future Volume (vph)	134	147	60	221	172	223	125	1154	190	176	759	140
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.97	1.00	1.00	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	0.96		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1397	1406		1833	2997		1655	3596	1252	1493	3426	1250
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1397	1406		1833	2997		1655	3596	1252	1493	3426	1250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	155	63	233	181	235	132	1215	200	185	799	147
RTOR Reduction (vph)	0	13	0	0	42	0	0	0	117	0	0	77
Lane Group Flow (vph)	141	205	0	233	374	0	132	1215	83	185	799	70
Confl. Peds. (#/hr)	3		17	17		3			4	4		
Heavy Vehicles (%)	19%	18%	18%	23%	23%	23%	12%	23%	15%	26%	26%	19%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	16.2	22.0		18.4	24.2		59.6	49.8	49.8	63.6	51.8	51.8
Effective Green, g (s)	16.2	22.0		18.4	24.2		59.6	49.8	49.8	63.6	51.8	51.8
Actuated g/C Ratio	0.13	0.18		0.15	0.20		0.50	0.41	0.41	0.53	0.43	0.43
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.1	4.1	2.3	4.1	4.1
Lane Grp Cap (vph)	188	257		281	604		821	1492	519	791	1478	539
v/s Ratio Prot	0.10	c0.15		c0.13	0.12		0.01	c0.34		c0.02	0.23	
v/s Ratio Perm							0.07		0.07	0.10		0.06
v/c Ratio	0.75	0.80		0.83	0.62		0.16	0.81	0.16	0.23	0.54	0.13
Uniform Delay, d1	50.0	46.9		49.3	43.7		17.4	31.0	22.0	20.8	25.3	20.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	15.0		17.4	1.6		0.1	5.0	0.7	0.1	1.4	0.5
Delay (s)	64.3	61.9		66.7	45.3		17.5	36.0	22.7	20.9	26.7	21.0
Level of Service	E	E		E	D		B	D	C	C	C	C
Approach Delay (s)		62.8			53.0			32.7			25.0	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.4%	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)	5	1	41	7	3	18	112	1552	13	23	1014	51
Future Volume (Veh/h)	5	1	41	7	3	18	112	1552	13	23	1014	51
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	1	44	7	3	19	119	1651	14	24	1079	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			5						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2192	3030	540	2499	3016	826	1079			1665		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2192	3030	540	2499	3016	826	1079			1665		
tC, single (s)	7.5	6.5	7.5	8.0	7.5	7.6	4.6			5.0		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.8	4.5	3.6	2.5			2.6		
p0 queue free %	32	89	90	0	25	93	77			90		
cM capacity (veh/h)	7	9	423	7	4	258	523			239		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	50	29	119	826	826	14	24	540	540	54
Volume Left	5	7	119	0	0	0	24	0	0	0
Volume Right	44	19	0	0	0	14	0	0	0	54
cSH	64	17	523	1700	1700	1700	239	1700	1700	1700
Volume to Capacity	0.78	1.72	0.23	0.49	0.49	0.01	0.10	0.32	0.32	0.03
Queue Length 95th (ft)	88	104	22	0	0	0	8	0	0	0
Control Delay (s)	112.6	529.5	13.9	0.0	0.0	0.0	21.8	0.0	0.0	0.0
Lane LOS	F	F	B				C			
Approach Delay (s)	112.6	529.5	0.9				0.5			
Approach LOS	F	F								

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	20	19	7	6	9
Future Volume (Veh/h)	17	20	19	7	6	9
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Hourly flow rate (vph)	27	32	31	11	10	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	83	10	25			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	83	10	25			
tC, single (s)	6.8	6.7	4.5			
tC, 2 stage (s)						
tF (s)	3.8	3.7	2.5			
p0 queue free %	97	97	98			
cM capacity (veh/h)	819	959	1390			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	59	42	10	15
Volume Left	27	31	0	0
Volume Right	32	0	0	15
cSH	889	1390	1700	1700
Volume to Capacity	0.07	0.02	0.01	0.01
Queue Length 95th (ft)	5	2	0	0
Control Delay (s)	9.3	5.7	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.3	5.7	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	22	1	2	0	18	241	2	0	58	1
Future Volume (Veh/h)	0	0	22	1	2	0	18	241	2	0	58	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	24	1	2	0	20	262	2	0	63	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	368	368	64	390	367	263	64			264		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	368	368	64	390	367	263	64			264		
tC, single (s)	7.1	6.5	6.6	7.1	7.0	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.7	3.5	4.5	3.3	2.5			2.2		
p0 queue free %	100	100	97	100	100	100	99			100		
cM capacity (veh/h)	584	556	902	551	486	781	1362			1312		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	24	3	284	64
Volume Left	0	1	20	0
Volume Right	24	0	2	1
cSH	902	506	1362	1312
Volume to Capacity	0.03	0.01	0.01	0.00
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	9.1	12.2	0.7	0.0
Lane LOS	A	B	A	
Approach Delay (s)	9.1	12.2	0.7	0.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D PLTS Results

Table D-1: Detailed PLTS Analysis Results

Street	From	To	Side	Pedestrian LTS Criteria									
				Speed (MPH)	Total Number of Lanes	Bike Lane Width (feet)	Parking	Sidewalk Condition	Sidewalk Width (feet) [1]	Buffer	Illumination	Land Use	PLTS
Major Arterial													
US 30	Millard Road	Gable Road	West	45	5	6	No	Fair	8	Solid Surface (6 feet)	No	Auto-oriented commercial	3
	Millard Road	Gable Road	East	45	5	6	No	None	N/A	Solid Surface (6 feet)	No	Auto-oriented commercial	4
Minor Arterial													
Old Portland Road	S 1st Street	S 4th Street	Both	25	2	8	Yes (14 feet)	Poor	6	Solid Surface (22 feet)	No	Residential	3
	S 4th Street	S 8th Street	West	30	2	N/A	No	None	N/A	N/A	No	Residential	4
	S 4th Street	S 8th Street	East	30	2	N/A	No	Poor	4	Landscape (3 feet)	No	Residential	4
	S 8th Street	S 12th Street	West	30	2	N/A	No	None	N/A	N/A	No	Residential	4
	S 8th Street	S 12th Street	East	30	2	N/A	No	Poor	4	Landscape (3 feet)	No	Residential	4
	S 12th Street	Plymouth Street	West	30	2	N/A	No	None	N/A	N/A	No	Residential	4
	S 12th Street	Plymouth Street	East	30	2	N/A	No	Poor	4	Landscape (3 feet)	No	Residential	4
	Plymouth Street	S 15th Street	West	30	2	N/A	No	None	N/A	N/A	No	Residential	4
	Plymouth Street	S 15th Street	East	30	2	N/A	No	Poor	4	Landscape (3 feet)	No	Residential	4
	S 15th Street	S 18th Street/ Kaster Road	Both	30	2	N/A	No	None	N/A	N/A	No	Residential	4
	S 18th Street/ Kaster Road	Storage Pal Driveway	Both	40	2	6	No	None	N/A	Solid Surface (6 feet)	No	Park/Public Facility	4
	Storage Pal Driveway	Port Avenue	West	40	2	6	No	Fair	7	Solid Surface (6 feet)	No	Low Density Development	2
	Storage Pal Driveway	Port Avenue	East	40	2	6	No	None	N/A	Solid Surface (6 feet)	No	Low Density Development	4

	Port Avenue	Gable Road	Both	40	3	6	No	None	N/A	Solid Surface (6 feet)	No	Light Industrial	4
	Gable Road	Columbia Drainage Driveway	Both	45	2	N/A	No	None	N/A	N/A	No	Light Industrial	4
	Columbia Drainage Driveway	Millard Road	Both	45	2	N/A	No	None	N/A	N/A	No	Low Density Development	4
Gable Road	McNulty Way	US 30	Both	40	3	6	No	Fair	6	Solid Surface (6 feet)	**Yes**	Auto-oriented commercial	4
	Eastern Walmart Driveway	McNulty Way	Both	40	2	9	No	None	N/A	Solid Surface (9 feet)	**Yes**	Auto-oriented commercial	4
	Old Portland Road	Eastern Walmart Driveway	Both	40	2	7	No	None	N/A	Solid Surface (7 feet)	**Yes**	Auto-oriented commercial	4
Millard Road	Old Portland Road	McNulty Way	Both	30	2	N/A	No	None	N/A	N/A	No	Light Industrial	4
	McNulty Way	US 30	Both	25	3	N/A	No	None	N/A	N/A	No	Light Industrial	4
Collector													
Plymouth Street	Old Portland Road	S 6th Street	Both	25	2	N/A	No	None	N/A	N/A	No	Residential	4
McNulty Way	Millard Road	Residential Driveway	Both	25	2	N/A	No	None	N/A	N/A	No	Low Density Development	4
	Residential Driveway	PNWR Rail Crossing	Both	25	2	5	No	None	N/A	Solid Surface (5 feet)	No	Low Density Development	4
	PNWR Rail Crossing	Joint Maintenance Facility Driveway	West	25	2	5	No	None	N/A	Solid Surface (5 feet)	No	Light Industrial	4
	PNWR Rail Crossing	Joint Maintenance Facility Driveway	East	25	2	5	No	Good	7	Solid Surface (5 feet)	No	Light Industrial	3
	Joint Maintenance Facility Driveway	Industrial Way	West	25	2	5	No	Good	7	Solid Surface (5 feet)	No	Light Industrial	3
	Joint Maintenance Facility Driveway	Industrial Way	East	25	2	N/A	No	None	N/A	N/A	No	Light Industrial	4
	Industrial Way	Gable Road	Both	25	2	N/A	No	None	N/A	N/A	No	Light Industrial	4

[1] Sidewalk refers to sidewalks, shared-use paths, and pedestrian paths.

Appendix E ODOT Crash Data

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

1st St & St Helens St

January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2015														
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2015 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	0
YEAR: 2013														
ANGLE	0	1	0	1	0	1	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2013 TOTAL	0	2	0	2	0	2	0	2	0	2	0	2	0	0
YEAR: 2011														
ANGLE	0	1	0	1	0	2	0	0	1	0	1	1	0	0
2011 TOTAL	0	1	0	1	0	2	0	0	1	0	1	1	0	0
FINAL TOTAL	0	3	1	4	0	4	0	2	2	2	2	4	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

1st St & St Helens St

January 1, 2011 through December 31, 2015

SER# / INVEST / UNLOC?	SPED / ALC / DRUGS / SCHL / WORK (S P E D / A L C / D R U G S / S C H L / W O R K)	DATE / DAY/TIME / *LAT/LONG*	FC / DISTNC	CITY STREET / FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00416	N N N	11/17/2013	16	ST HELENS ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-R											32,11
NO RPT		Sun 9A	0	1ST ST	SE		STOP SIGN	N	DRY	TURN		PRVTE	SW SE									000		11
No		*45 51 50.21 -122 47 54.42*		1	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	59	F	OR-Y		052,001,080	000		32
																			OR<25					
											02	NONE 0	STRGHT											
												PRVTE	SE NW									000		00
												PSNGR CAR		01	DRVR	NONE	65	M	OR-Y		000	000		00
																			OR<25					
00376	N N N N N	11/17/2011	16	ST HELENS ST	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											03
CITY		Thu 6P	0	1ST ST	CN		STOP SIGN	N	WET	ANGL		PRVTE	SW NE									000		00
No		*45 51 50.22 -122 47 54.37*		1	04	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y		021	000		03
																			OR<25					
											02	NONE 0	STRGHT											
												PRVTE	NW SE									000		00
												PSNGR CAR		01	DRVR	INJC	49	F	OR-Y		000	000		00
																			OR<25					
														02	PSNG	INJC	15	M			000	000		00
00243	N N N N N	07/11/2013	16	ST HELENS ST	INTER	CROSS	N	N	CLR	BIKE	01	NONE 0	STRGHT											03
CITY		Thu 5P	0	1ST ST	CN		STOP SIGN	N	DRY	ANGL		PRVTE	SE NW									000		00
No		*45 51 50.21 -122 47 54.42*		1	04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	41	F	OR-Y		000	000		00
																			OR<25					
													STRGHT	01	BIKE	INJB	14	M		02	021	034		03
													SW NE											
00468	N N N N N	12/12/2015	16	ST HELENS ST	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	TURN-L											02
CITY		Sat 5P	0	1ST ST	CN		STOP SIGN	N	WET	TURN		PRVTE	SE SW									015		00
No		*45 51 50.21 -122 47 54.42*		1	04	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	48	M	OR-Y		028	000		02
																			OR>25					
											02	NONE 0	STRGHT											
												PRVTE	SW NE									000		00
												PSNGR CAR		01	DRVR	NONE	52	F	OR-Y		000	000		00
																			OR<25					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & 8th St
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & 12th St

January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2015														
SIDESWIPE - MEETING	0	0	1	1	0	0	0	0	1	0	1	1	0	1
2015 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	1
FINAL TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	1

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & 15th St
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2011														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2011 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

Old Portland Rd & 15th St
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE DAY/TIME *LAT/LONG*	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00230 NONE No	N	N	N			07/15/2011 Fri 2P *45 51 14.15 -122 48 36.79*	16 0	OLD PORTLAND RD 15TH ST 1	INTER CN 01	4-LEG 0	N STOP SIGN	N N N	CLR DRY DAY	S-1STOP REAR PDO	01	NONE 0 UNKN UNKNOWN	STRGHT NE SW	01	DRVR	NONE	00	M	OR-Y OR<25		026	000 000	092	07,10 00 07
															02	NONE 0 PRVTE PSNGR CAR	STOP NE SW	01	DRVR	NONE	47	M	OR-Y OR<25		000	011 000	092	00 00

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & 18th St / Kaster Rd

January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2015														
REAR-END	0	1	0	1	0	1	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2015 TOTAL	0	1	1	2	0	1	0	2	0	2	0	2	0	0
YEAR: 2014														
ANGLE	0	0	1	1	0	0	0	1	0	1	0	1	0	0
REAR-END	0	1	1	2	0	1	0	2	0	2	0	2	0	0
2014 TOTAL	0	1	2	3	0	1	0	3	0	3	0	3	0	0
YEAR: 2013														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2012														
FIXED / OTHER OBJECT	0	1	0	1	0	1	0	0	1	0	1	1	0	1
REAR-END	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2012 TOTAL	0	2	0	2	0	2	0	1	1	1	1	2	0	1
YEAR: 2011														
FIXED / OTHER OBJECT	0	1	0	1	0	1	0	1	0	0	1	1	0	1
PEDESTRIAN	0	1	0	1	0	1	0	0	1	1	0	1	0	0
REAR-END	0	2	1	3	0	2	0	3	0	3	0	3	0	0
2011 TOTAL	0	4	1	5	0	4	0	4	1	4	1	5	0	1
FINAL TOTAL	0	8	5	13	0	8	0	11	2	11	2	13	0	2

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

Old Portland Rd & 18th St / Kaster Rd

January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	S P E E D	A L C	D R U G S	S C H L	W O R K	DATE DAY/TIME *LAT/LONG*	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF-CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00357	N	N	N			10/28/2012	16	KASTER RD	INTER	CROSS	N	Y	CLD	FIX OBJ	01	NONE 0	STRGHT										053,010	16
CITY						Sun 11P	0	OLD PORTLAND RD	SW		TRF SIGNAL	N	WET	FIX		PRVTE	SW NE									000	053,010	00
No	*45 51 6.99*					*-122 48 45.82*		1	06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	69	F	OR-Y		016,080,081	025		16
																							OR<25					
00427	Y	Y	N	N	N	11/21/2015	16	KASTER RD	INTER	CROSS	N	N	CLR	S-STRGHT	01	NONE 0	STRGHT										079,010	33,01
CITY						Sat 1P	0	OLD PORTLAND RD	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW NE									000	079,010	00
No	*45 51 6.99*					*-122 48 45.82*		1	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	53	M	OR-Y		051,047	088		33,01
																							OR<25					
															02	NONE 0	STRGHT											
																PRVTE	SW NE									000		00
																PSNGR CAR		01	DRVR	NONE	31	F	OR-Y		000	000		00
																							OR<25					
00084	N	N	N			03/07/2013	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NO RPT						Thu 9A	0	18TH ST	NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE SW									000		00
No	*45 51 6.99*					*-122 48 45.82*		1	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	79	M	OR-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	NE SW									011		00
																PSNGR CAR		01	DRVR	NONE	25	F	OR-Y		000	000		00
																							OR<25					
																		02	PSNG	NO<5	01	M			000	000		00
00129	N	N	N			04/14/2014	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						Mon 6P	0	18TH ST	NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE SW									000		00
No	*45 51 6.99*					*-122 48 45.82*		1	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	46	F	OR-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	NE SW									011		00
																PSNGR CAR		01	DRVR	NONE	00	M	UNK		000	000		00
																							UNK					
00302	N	N	N			09/22/2011	16	OLD PORTLAND RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						Thu 11A	0	18TH ST	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW NE									000		00
No	*45 51 7.02*					*-122 48 45.84*		1	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	58	M	OR-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	SW NE									011		00
																PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																							UNK					
00095	N	N	N	N	N	03/26/2012	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	32,27
CITY						Mon 10A	0	18TH ST	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW NE									001		00
No	*45 51 6.99*					*-122 48 45.82*		1	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	32	F	OTH-Y		052,016	038		32,27
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	SW NE									022	013	00
																PSNGR CAR		01	DRVR	INJB	81	F	OR-Y		000	000		00
																							OR<25					

CITY OF ST. HELENS, COLUMBIA COUNTY

Old Portland Rd & 18th St / Kaster Rd

January 1, 2011 through December 31, 2015

SER# / INVEST / UNLOC?	SPEAUCO flags (S P E D / A L C / D R U G S / S C H L / W O R K)	DATE / DAY/TIME / *LAT/LONG*	FC / DISTNC	CITY STREET / FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL / TRAF-CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE TRLR QTY / OWNER / VEH TYPE	MOVE FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
											03	NONE 0	STOP											
												PRVTE	SW NE									011		00
												PSNGR CAR		01	DRVR	NONE	49	M	OR-Y		000	000		00
																			OR<25					
90409	N N N N N	12/10/2011	17	OLD PORTLAND RD	INTER	CROSS	N	Y	CLR	FIX OBJ	01	NONE 0	STRGHT										059,089	32
CITY		Sat 5P	0	18TH ST	NW		TRF SIGNAL	N	DRY	FIX		PRVTE	SE NW									000	059	00
No		*45 51 19.54 -122 48 51.28*		1	05	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJB	74	M	OR-Y		052,080,081	028		32
																			OR<25					
00227	N N N	07/27/2011	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										092	26,07,27
NO RPT		Wed 8A	0	18TH ST	CN		TRF SIGNAL	N	DRY	REAR		PRVTE	NW SE									000		00
No		*45 51 7.02 -122 48 45.79*		1	01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		016,026	038		07,27
																			OR<25					
											02	NONE 0	STOP											
												PRVTE	NW SE									011	092	26
												PSNGR CAR		01	DRVR	INJC	51	F	OR-Y		000	000		00
																			OR<25					
00270	N N N	08/27/2011	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE		Sat 5P	0	18TH ST	CN		TRF SIGNAL	N	DRY	REAR		PRVTE	NE SW									000		00
No		*45 51 7.02 -122 48 45.79*		1	01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	38	F	OR-Y		026	000		07
																			OR<25					
											02	NONE 0	STOP											
												PRVTE	NE SW									011		00
												PSNGR CAR		01	DRVR	INJC	39	M	OR-Y		000	000		00
																			OR<25					
00348	N N N N N	10/28/2011	16	OLD PORTLAND RD	INTER	CROSS	N	N	RAIN	PED	01	NONE 0	TURN-L											02
CITY		Fri 2P	0	18TH ST	CN		TRF SIGNAL	N	WET	PED		PRVTE	NW NE									000		00
No		*45 51 7.02 -122 48 45.79*		1	01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	76	F	OR-Y		029	000		02
																			OR<25					
													STRGHT	01	PED	INJC	60	M		01	000	035		00
													SE NW											
00259	N N N	07/31/2015	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											04
NONE		Fri 7P	0	18TH ST	CN		TRF SIGNAL	N	DRY	TURN		PRVTE	NE SW									000		00
No		*45 51 6.99 -122 48 45.82*		1	01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK		020	000		04
																			OR>25					
											02	NONE 0	TURN-L											
												PRVTE	NW NE									000		00
												PSNGR CAR		01	DRVR	NONE	36	M	OR-Y		000	000		00
																			OR<25					
00083	N N N	01/27/2014	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											04
NO RPT		Mon 12P	0	18TH ST	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	NW SE									000		00
No		*45 51 6.99 -122 48 45.82*		1	04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	UNK		097	000		00
																			OR<25					
											02	NONE 0	STRGHT											
												PRVTE	SW NE									000		00
												PSNGR CAR		01	DRVR	NONE	90	F	OR-Y		097	000		00
																			OR<25					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

Old Portland Rd & 18th St / Kaster Rd
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	S P E E D / E L C / D R U G S / C O H L / S W R K	DATE DAY/TIME *LAT/LONG*	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF-CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00115	N N N	03/31/2014	16	OLD PORTLAND RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										006,092	27
NONE		Mon 6P	0	18TH ST	CN		TRF SIGNAL	N	DRY	REAR		PRVTE	SW NE									000	006	00
No		*45 51 6.99 -122 48 45.82*		1	04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	32	F	OR-Y		016	038		27
																			OR<25					
											02	NONE 0	STOP											
												PRVTE	SW NE									011	092	00
												PSNGR CAR		01	DRVR	NONE	24	F	OR-Y		000	000		00
																			OR<25					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & Gable Rd
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & Millard Rd
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2014 TOTAL	0	1	0	1	0	1	0	1	0	1	0	1	0	0
FINAL TOTAL	0	1	0	1	0	1	0	1	0	1	0	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

COLUMBIA COUNTY

Old Portland Rd & Millard Rd
January 1, 2011 through December 31, 2015

SER# / INVEST / UNLOC?	SPED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS / FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00246	N	N	N			7/20/2014	1.73	OLD PORTLAND RD	INTER	3-LEG	N	N	CLR	BIKE	01	NONE 0	STRGHT											06,02
NO RPT						Sun 4P			CN		STOP SIGN	N	DRY	TURN		PRVTE	S N									031		00
No						*45 50 5.54 -122 50 5.60*			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	17	F	OR-Y		034,027	000		06,02
																							OR<25					
																	TURN-L	01	BIKE	INJB	53	M		03	000	041		00
																	S W											

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & Plymouth St
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
TURNING MOVEMENTS	0	1	0	1	0	1	0	0	1	1	0	1	0	0
2014 TOTAL	0	1	0	1	0	1	0	0	1	1	0	1	0	0
FINAL TOTAL	0	1	0	1	0	1	0	0	1	1	0	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

Old Portland Rd & Plymouth St
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	SPEED ALC DRUGS SCHL WORK	DATE DAY/TIME *LAT/LONG*	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00457	N N N	12/22/2014	16	OLD PORTLAND RD	INTER	6-LEG	N	N	UNK	ANGL-OTH	01	NONE 0	STRGHT											02
NO RPT		Mon 1P	0	PLYMOUTH ST	CN		STOP SIGN	N	WET	TURN		PRVTE	NE SW									000		00
No	*45 51 19.50*	*-122 48 32.79*		1	04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	21	F	OR-Y		000	000		00
																			OR<25					
											02	NONE 0	STRGHT											
												PRVTE	E W									015		00
												PSNGR CAR		01	DRVR	NONE	32	F	SUSP		028	000		02
																			OR<25					

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Old Portland Rd & Port Ave

January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2013														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	1	0	1	0	1	0	1
REAR-END	0	2	0	2	0	2	0	2	0	2	0	2	0	0
2013 TOTAL	0	2	1	3	0	2	0	3	0	3	0	3	0	1
YEAR: 2012														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	1	0	1	0	1
2012 TOTAL	0	0	1	1	0	0	0	0	1	1	0	1	0	1
FINAL TOTAL	0	2	2	4	0	2	0	3	1	4	0	4	0	2

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

Old Portland Rd & Port Ave
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	S P E E D	A L C	D R U G S	S C H L	W O R K	DATE DAY/TIME LAT/LONG	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00302	Y	N	N	N	N	09/04/2013	16	OLD PORTLAND RD	INTER	3-LEG	N	Y	CLR	FIX OBJ	01	NONE 0	STRGHT										092,053	01
CITY						Wed 12P	0	PORT AVE	SW		STOP SIGN	N	DRY	FIX		PRVTE	SW NE									007	092,053	00
No						*45 50 50.28 -122 49 7.68*		1	05	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	50	F	OR-Y		047,080	000		01
																							OR<25					
00328	Y	N	N	N	N	10/12/2012	16	OLD PORTLAND RD	INTER	3-LEG	N	Y	RAIN	FIX OBJ	01	NONE 1	TURN-L										124,040,054	01
CITY						Fri 10A	0	PORT AVE	NW		STOP SIGN	N	WET	FIX		PRVTE	SW NW									000	097,040,054	00
No						*45 50 50.28 -122 49 7.68*		1	05	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	40	M	OR-Y		047,080	017		01
																							OR<25					
00018	N	N	N			01/11/2013	16	OLD PORTLAND RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										004,092	07
NO RPT						Fri 3P	0	PORT AVE	CN		STOP SIGN	N	DRY	REAR		PRVTE	SW NE									000		00
No						*45 50 50.28 -122 49 7.68*		1	04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	21	F	OR-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	SW NE									012	004,092	00
																PSNGR CAR		01	DRVR	INJC	22	F	OR-Y		000	000		00
																							OR<25					
00193	N	N	N	N	N	06/04/2013	16	OLD PORTLAND RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											27
CITY						Tue 3P	0	PORT AVE	CN		STOP SIGN	N	DRY	REAR		PRVTE	SW NE									000		00
No						*45 50 50.28 -122 49 7.68*		1	04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	27	F	OR-Y		016	038		27
																							OR<25					
																		02	PSNG	NO<5	02	F			000	000		00
															02	NONE 0	STOP											
																PRVTE	SW NE									012		00
																PSNGR CAR		01	DRVR	INJC	54	M	OR-Y		000	000		00
																							OR<25					

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Railroad Ave & Old Portland Rd
January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

US 30 Lower Columbia River Hwy & Gable Rd

January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2015														
ANGLE	0	1	0	1	0	2	1	1	0	1	0	1	0	0
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	4	4	0	0	0	4	0	2	2	4	0	0
2015 TOTAL	0	1	5	6	0	2	1	6	0	4	2	6	0	0
YEAR: 2013														
REAR-END	0	3	1	4	0	5	0	3	1	3	1	4	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	0	1	1	0	1	0	0
2013 TOTAL	0	4	1	5	0	6	0	3	2	4	1	5	0	0
YEAR: 2012														
ANGLE	0	1	0	1	0	1	0	1	0	0	1	1	0	0
PEDESTRIAN	0	1	0	1	0	1	0	0	1	1	0	1	0	0
REAR-END	0	2	1	3	0	2	0	1	2	1	2	3	0	0
TURNING MOVEMENTS	0	1	1	2	0	1	2	2	0	2	0	2	0	0
2012 TOTAL	0	5	2	7	0	5	2	4	3	4	3	7	0	0
YEAR: 2011														
ANGLE	0	1	0	1	0	1	0	1	0	1	0	1	0	0
REAR-END	0	1	1	2	0	1	0	1	1	2	0	2	0	0
TURNING MOVEMENTS	0	2	0	2	0	3	0	1	1	2	0	2	0	0
2011 TOTAL	0	4	1	5	0	5	0	3	2	5	0	5	0	0
FINAL TOTAL	0	14	9	23	0	18	3	16	7	17	6	23	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

092 LOWER COLUMBIA RIVER

US 30 Lower Columbia River Hwy & Gable Rd
January 1, 2011 through December 31, 2015

SER# / INVEST / UNLOC?	S P E A U C O / D R S W / E L G H R / D C S L K	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# FC / CMPT/MLG / MILEPNT / LRS	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V# / SPCL USE TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00340	N N N N N	10/17/2011	COLUMBIA	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01 NONE 0	STRGHT											07
CITY		Mon 4P	ST. HELENS	MN 0	LOWER COL RIVER HY	NE		TRF SIGNAL	N	DRY	REAR	PRVTE	NE SW									000		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	64	F	OR-Y		026	000		07
No		*45 50 55.23 -122 49 53.69*		009200100S00	1														OR<25					
												02 NONE 0	STOP											
												PRVTE	NE SW									011		00
												PSNGR CAR		01	DRVR	NONE	24	F	OR-Y		000	000		00
																			OR<25					
														02	PSNG	NO<5	04	M			000	000		00
														03	PSNG	NO<5	02	M			000	000		00
00102	N N N N N	03/29/2012	COLUMBIA	1 14		INTER	CROSS	N	N	RAIN	PED	01 NONE 0	STRGHT										082	18
CITY		Thu 2P	ST. HELENS	MN 0	LOWER COL RIVER HY	NE		TRF SIGNAL	N	WET	PED	PRVTE	NE SW									001		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	18	F	OR-Y		000	000	082	00
No		*45 50 55.23 -122 49 53.69*		009200100S00	1														OR>25					
													STRGHT	01	PED	INJC	28	F		01	055	035		18
													SE NW											
00417	N N N	12/08/2012	COLUMBIA	1 14		INTER	CROSS	N	N	RAIN	S-1STOP	01 NONE 0	STRGHT											07
NONE		Sat 6P	ST. HELENS	MN 0	LOWER COL RIVER HY	NE		TRF SIGNAL	N	WET	REAR	PRVTE	NE SW									000		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DLIT	PDO	PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		026	000		07
No		*45 50 55.23 -122 49 53.69*		009200100S00	1														UNK					
												02 NONE 0	STOP											
												PRVTE	NE SW									011		00
												PSNGR CAR		01	DRVR	NONE	45	F	OR-Y		000	000		00
																			OR<25					
00283	N N N N N	09/08/2011	COLUMBIA	1 14		INTER	CROSS	N	N	CLR	S-OTHER	01 NONE 0	TURN-L										015,013	27
CITY		Thu 4P	ST. HELENS	MN 0	LOWER COL RIVER HY	SE		BUS STPSGN	N	DRY	TURN	PRVTE	NE SE									000		00
			ST HELEN UA	27.69	GABLE RD	05	0		N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	21	F	OR-Y		016	038		27
No		*45 50 55.23 -122 49 53.69*		009200100S00	1														OR<25					
												02 NONE 0	STOP											
												PRVTE	NE SE									013	013	00
												PSNGR CAR		01	DRVR	INJC	33	M	OR-Y		000	000		00
																			OR<25					
														02	PSNG	INJC	44	M			000	000		00
												03 NONE 0	STOP											
												PRVTE	NE SE									013		00
												SCHL BUS		01	DRVR	NONE	42	F	OR-Y		000	000		00
																			OR<25					
00109	N N N	04/02/2011	COLUMBIA	1 14		INTER	CROSS	N	N	RAIN	S-1STOP	01 NONE 0	STRGHT											07
NONE		Sat 10A	ST. HELENS	MN 0	LOWER COL RIVER HY	SW		R-GRN-SIG	N	WET	REAR	PRVTE	SW NE									000		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	34	F	OR-Y		026	000		07
No		*45 50 55.23 -122 49 53.69*		009200100S00	1														OR<25					
														02	PSNG	NO<5	02	F			000	000		00

092 LOWER COLUMBIA RIVER   US 30 Lower Columbia River Hwy & Gable Rd
January 1, 2011 through December 31, 2015

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      S   D
      P   R S W                                      RD#  FC   CONN #                           INT-TYP                                      SPCL USE
SER#   E A U C O  DATE         COUNTY                CMPT/MLG  FIRST  STREET          RD CHAR  (MEDIAN)  INT-REL  OFFRD WTHR  CRASH TYP      TRLR QTY  MOVE                    A  S
INVEST E L G H R  DAY/TIME     CITY                  MILEPNT   SECOND STREET          DIRECT     LEGS    TRAF-    RNDBT SURF  COLL TYP       OWNER     FROM        PRTC INJ    G  E  LICNS PED
UNLOC? D C S L K  LAT/LONG     URBAN AREA            LRS       INTERSECTION SEQ#      LOCTN    (#LANES)  CNTL     DRVWY LIGHT SVRTY     V#  VEH TYPE  TO      P# TYPE SVRTY  E  X  RES   LOC ERROR        ACTN EVENT    CAUSE

                                                                                                                                    02 NONE    0 STOP
                                                                                                                                       PRVTE     SW NE                                                     011              00
                                                                                                                                      PSNGR CAR         01 DRVR INJC  56 F OR-Y       000           000              00
                                                                                                                                                                           OR<25

00293  Y N N     09/12/2012 COLUMBIA             1    14                        INTER     CROSS  N             N CLR   S-1STOP   01 NONE    0 STRGHT                                                                01
NO RPT           Wed     5P ST. HELENS           MN    0   LOWER COL RIVER HY   SW               TRF SIGNAL    N DRY   REAR         PRVTE     SW NE                                                     000              00
                            ST HELEN UA           27.69    GABLE RD             06          0                  N DAY   INJ         PSNGR CAR         01 DRVR NONE  36 F OR-Y       047,026       000              01
No      45 50 55.23  -122 49 53.69              009200100S00              1                                                                                               OR<25

                                                                                                                                    02 NONE    0 STOP
                                                                                                                                       PRVTE     SW NE                                                     011              00
                                                                                                                                      PSNGR CAR         01 DRVR INJC  47 F OR-Y       000           000              00
                                                                                                                                                                           OR<25

00022  N N N     01/16/2013 COLUMBIA             1    14                        INTER     CROSS  N             N CLR   S-1STOP   01 NONE    0 STRGHT                                                           013       07
NONE             Wed     3P ST. HELENS           MN    0   LOWER COL RIVER HY   SW               TRF SIGNAL    N DRY   REAR         PRVTE     SW NE                                                     022              00
                            ST HELEN UA           27.69    GABLE RD             06          0                  N DAY   INJ         PSNGR CAR         01 DRVR NONE  49 F OR-Y       026           000              07
No      45 50 55.23  -122 49 53.69              009200100S00              1                                                                                               OR<25

                                                                                                                                    02 NONE    0 STOP
                                                                                                                                       PRVTE     SW NE                                                     022  013         00
                                                                                                                                      PSNGR CAR         01 DRVR INJC  41 M OR-Y       000           000              00
                                                                                                                                                                           OR<25
                                                                                                                                                        02 PSNG INJC  42 M            000           000              00

                                                                                                                                    03 NONE    0 STOP
                                                                                                                                       PRVTE     SW NE                                                     011              00
                                                                                                                                      PSNGR CAR         01 DRVR NONE  20 M OR-Y       000           000              00
                                                                                                                                                                           OR<25

00125  N N N     04/15/2013 COLUMBIA             1    14                        INTER     CROSS  N             N CLR   S-1STOP   01 NONE    0 STRGHT                                                                07
NO RPT           Mon     4P ST. HELENS           MN    0   LOWER COL RIVER HY   SW               TRF SIGNAL    N DRY   REAR         PRVTE     SW NE                                                     000              00
                            ST HELEN UA           27.69    GABLE RD             06          0                  N DAY   PDO         PSNGR CAR         01 DRVR NONE  32 F OR-Y       026           000              07
No      45 50 55.23  -122 49 53.69              009200100S00              1                                                                                               OR<25

                                                                                                                                    02 NONE    0 STOP
                                                                                                                                       PRVTE     SW NE                                                     011              00
                                                                                                                                      PSNGR CAR         01 DRVR NONE  00 M UNK        000           000              00
                                                                                                                                                                           OR<25

00145  N N N     05/04/2013 COLUMBIA             1    14                        INTER     CROSS  N             N CLR   S-1STOP   01 NONE    0 STRGHT                                                           013       27
CITY             Sat     4P ST. HELENS           MN    0   LOWER COL RIVER HY   SW               TRF SIGNAL    N DRY   REAR         PRVTE     SW NE                                                     022              00
                            ST HELEN UA           27.69    GABLE RD             06          0                  N DAY   INJ         PSNGR CAR         01 DRVR INJC  46 F OR-Y       016           038              27
No      45 50 55.23  -122 49 53.69              009200100S00              1                                                                                               OR<25

                                                                                                                                    02 NONE    0 STOP
                                                                                                                                       PRVTE     SW NE                                                     022  013         00
                                                                                                                                      PSNGR CAR         01 DRVR INJC  43 M OR-Y       000           000              00
                                                                                                                                                                           OR<25
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SER# / INVEST / UNLOC?	S P E A U C O / D R S W / E L G H R / D C S L K	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# FC / CMPT/MLG / MILEPNT / LRS	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS / RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
												03	NONE 0	STOP											
													PRVTE	SW NE									011		00
													PSNGR CAR		01	DRVR	NONE	42	F	OR-Y		000	000		00
																				OR<25					
00445	N N N	12/07/2013	COLUMBIA	1 14		INTER	CROSS	N	N	SNOW	S-1STOP	01	NONE 0	STRGHT										124	07
NONE		Sat 6P	ST. HELENS	MN 0	LOWER COL RIVER HY	SW		TRF SIGNAL	N	ICE	REAR		PRVTE	SW NE									000		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	INJC	52	F	OR-Y		026	000		07
No		*45 50 55.23 -122 49 53.69*		009200100S00	1															OR<25					
												02	NONE 0	STOP											
													PRVTE	SW NE									011		00
													PSNGR CAR		01	DRVR	NONE	45	M	OR-Y		000	000		00
																				OR<25					
00231	N N N	07/08/2015	COLUMBIA	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE		Wed 9A	ST. HELENS	MN 0	LOWER COL RIVER HY	SW		TRF SIGNAL	N	DRY	REAR		PRVTE	SW NE									000		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	56	M	OR-Y		026	000		29
No		*45 50 55.23 -122 49 53.69*		009200100S00	1															OR<25					
												02	NONE 1	STOP											
													PRVTE	SW NE									011		00
													PSNGR CAR		01	DRVR	NONE	63	M	OR-Y		000	000		00
																				OR<25					
00484	N N N N N	12/21/2015	COLUMBIA	1 14		INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE 0	TURN-L											08
CITY		Mon 6P	ST. HELENS	MN 0	LOWER COL RIVER HY	SW		TRF SIGNAL	N	DRY	TURN		PRVTE	SE SW									000		00
			ST HELEN UA	27.69	GABLE RD	06	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	81	M	OR-Y		002,080	000		08
No		*45 50 55.23 -122 49 53.69*		009200100S00	1															OR<25					
												02	NONE 0	STOP											
													PRVTE	SW NE									012		00
													PSNGR CAR		01	DRVR	NONE	57	M	OR-Y		000	000		00
																				OR<25					
00064	N N N N N	02/21/2011	COLUMBIA	1 14		INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT										013	04,27
CITY		Mon 4P	ST. HELENS	MN 0	LOWER COL RIVER HY	CN		TRF SIGNAL	N	DRY	ANGL		PRVTE	SW NE									000		00
			ST HELEN UA	27.69	GABLE RD	01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	65	M	OR-Y		000	000		00
No		*45 50 55.23 -122 49 53.69*		009200100S00	1															OR<25					
												02	NONE 0	STRGHT											
													PRVTE	NW SE									022	013	00
													PSNGR CAR		01	DRVR	NONE	29	F	OR-Y		020,016	038		04,27
																				OR<25					
												03	NONE 0	STOP											
													PRVTE	NE SW									012		00
													PSNGR CAR		01	DRVR	INJC	25	F	OTH-Y		000	000		00
																				OR>25					

092 LOWER COLUMBIA RIVER

US 30 Lower Columbia River Hwy & Gable Rd
January 1, 2011 through December 31, 2015

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       S  D
       P  R S W                              RD#  FC   CONN #                         INT-TYP                                   SPCL USE
SER#   E A U C O  DATE        COUNTY         CMPT/MLG  FIRST  STREET       RD CHAR (MEDIAN)  INT-REL  OFFRD WTHR  CRASH TYP   TRLR QTY  MOVE                        A  S
INVEST E L G H R  DAY/TIME    CITY           MILEPNT   SECOND STREET       DIRECT    LEGS    TRAF-    RNDBT SURF  COLL TYP    OWNER     FROM       PRTC INJ         G  E  LICNS PED
UNLOC? D C S L K  LAT/LONG    URBAN AREA     LRS       INTERSECTION SEQ#   LOCTN   (#LANES)  CNTL     DRVWY LIGHT SVRTY    V# VEH TYPE  TO     P# TYPE SVRTY    E  X  RES   LOC ERROR          ACTN EVENT          CAUSE

00254  N N N     08/04/2012  COLUMBIA       1   14                         INTER     CROSS  N           N CLR  ANGL-OTH   01 NONE    0 STRGHT                                                                     04,27
CITY             Sat    8P   ST. HELENS     MN    0   LOWER COL RIVER HY   CN               TRF SIGNAL  N DRY  ANGL          PRVTE     NE SW                                                    000              00
                             ST HELEN UA     27.69    GABLE RD             01          0                N DUSK INJ          PSNGR CAR         01 DRVR NONE  61 F  OTH-Y      020,016       038              04,27
No      45 50 55.23  -122 49 53.69          009200100S00              1                                                                                        N-RES

                                                                                                                       02 NONE    0 STRGHT
                                                                                                                          PRVTE     SE NW                                                    000              00
                                                                                                                          PSNGR CAR         01 DRVR INJC  29 M  OR-Y       000           000              00
                                                                                                                                                                OR<25

00218  N N N     06/27/2015  COLUMBIA       1   14                         INTER     CROSS  N           N CLR  ANGL-OTH   01 NONE    0 STRGHT                                                                     04
STATE            Sat   11P   ST. HELENS     MN    0   LOWER COL RIVER HY   CN               TRF SIGNAL  N DRY  TURN          PRVTE     NE SW                                                    000              00
                             ST HELEN UA     27.69    GABLE RD             01          0                N DLIT PDO          PSNGR CAR         01 DRVR NONE  36 F  OR-Y       020           000              04
No      45 50 55.23  -122 49 53.69          009200100S00              1                                                                                        OR>25

                                                                                                                       02 NONE    0 TURN-L
                                                                                                                          PRVTE     NW NE                                                    000              00
                                                                                                                          PSNGR CAR         01 DRVR NONE  42 M  OTH-Y      000           000              00
                                                                                                                                                                N-RES

00500  N N N     12/30/2015  COLUMBIA       1   14                         INTER     CROSS  N           N CLR  ANGL-OTH   01 POLCE   0 STRGHT                                                          092        14
CITY             Wed    2P   ST. HELENS     MN    0   LOWER COL RIVER HY   CN               OFCR/FLAG   N DRY  TURN          PUBLC     NE SW                                                    006  092         00
                             ST HELEN UA     27.69    GABLE RD             01          0                N DAY  PDO          PSNGR CAR         01 DRVR NONE  62 M  OR-Y       000           000              00
No      45 50 55.23  -122 49 53.69          009200100S00              1                                                                                        OR<25

                                                                                                                       02 NONE    0 TURN-L
                                                                                                                          PRVTE     SE SW                                                    000              00
                                                                                                                          PSNGR CAR         01 DRVR NONE  57 F  OR-Y       024           000              14
                                                                                                                                                                OR<25

00227  N N N     07/04/2015  COLUMBIA       1   14                         INTER     CROSS  N           N CLR  ANGL-OTH   01 NONE    0 STRGHT                                                                     04
CITY             Sat    8P   ST. HELENS     MN    0   LOWER COL RIVER HY   CN               TRF SIGNAL  N DRY  ANGL          RENTL     NE SW                                                    000              00
                             ST HELEN UA     27.69    GABLE RD             02          0                N DAY  INJ            TRUCK           01 DRVR NONE  28 M  OTH-Y      020           000              04
No      45 50 55.23  -122 49 53.69          009200100S00              1                                                                                        N-RES

                                                                                                                       02 NONE    0 STRGHT
                                                                                                                          PRVTE     NW SE                                                    000              00
                                                                                                                          PSNGR CAR         01 DRVR INJB  20 M  OR-Y       000           000              00
                                                                                                                                                                OR<25
                                                                                                                                            02 PSNG INJC  55 F             000           000              00

00123  N N N     04/18/2012  COLUMBIA       1   14                         INTER     CROSS  N           N CLR  S-OTHER    01 NONE    1 TURN-R                                                                     08
NONE             Wed   11A   ST. HELENS     MN    0   LOWER COL RIVER HY   CN               TRF SIGNAL  N DRY  TURN          PRVTE     SE NE                                                    000              00
                             ST HELEN UA     27.69    GABLE RD             03          0                N DAY  PDO         SEMI TOW           01 DRVR NONE  00 U  UNK        006           000              08
No      45 50 55.23  -122 49 53.69          009200100S00              1                                                                                        UNK

                                                                                                                       02 NONE    0 TURN-R
                                                                                                                          PRVTE     SE NE                                                    000              00
                                                                                                                          PSNGR CAR         01 DRVR NONE  50 F  OR-Y       000           000              00
                                                                                                                                                                OR<25
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092 LOWER COLUMBIA RIVER   US 30 Lower Columbia River Hwy & Gable Rd
January 1, 2011 through December 31, 2015

```
      S  D
      P  R S W                                           RD#  FC   CONN #                        INT-TYP                                      SPCL USE
SER#   E A U C O  DATE         COUNTY                     CMPT/MLG FIRST  STREET        RD CHAR (MEDIAN)  INT-REL  OFFRD WTHR  CRASH TYP    TRLR QTY  MOVE                         A  S
INVEST E L G H R  DAY/TIME     CITY                       MILEPNT  SECOND STREET        DIRECT     LEGS   TRAF-    RNDBT SURF  COLL TYP     OWNER     FROM      PRTC INJ          G  E  LICNS PED
UNLOC? D C S L K  LAT/LONG     URBAN AREA                 LRS      INTERSECTION SEQ#    LOCTN   (#LANES)  CNTL     DRVWY LIGHT SVRTY    V# VEH TYPE   TO     P# TYPE SVRTY     E  X  RES    LOC ERROR       ACTN EVENT     CAUSE

00102  N N N      03/26/2011  COLUMBIA                   1    14                        INTER      CROSS  N            N RAIN  O-1 L-TURN 01 NONE    0 STRGHT                                                                 04
CITY              Sat    1P   ST. HELENS                 MN    0   LOWER COL RIVER HY   CN                TRF SIGNAL   N WET   TURN          PRVTE      SW NE                                                       000             00
                              ST HELEN UA                 27.69    GABLE RD             04           0                 N DAY   INJ          PSNGR CAR          01 DRVR NONE  44 F  OR-Y       020              000             04
No      45 50 55.23  -122 49 53.69                       009200100S00              1                                                                                             OR<25

                                                                                                                                02 NONE    0 TURN-L
                                                                                                                                   PRVTE      SW NW                                                       000             00
                                                                                                                                  PSNGR CAR          01 DRVR INJB  41 F  OR-Y       000              000             00
                                                                                                                                                                            OR<25

00426  N N N N N  12/17/2012  COLUMBIA                   1    14                        INTER      CROSS  N            N CLD   ANGL-OTH   01 NONE    0 STRGHT                                                                 04
CITY              Mon    9A   ST. HELENS                 MN    0   LOWER COL RIVER HY   CN                TRF SIGNAL   N DRY   TURN          PRVTE      SE NW                                                       000             00
                              ST HELEN UA                 27.69    GABLE RD             04           0                 N DAY   INJ          PSNGR CAR          01 DRVR INJB  68 F  OR-Y       020              028             04
No      45 50 55.23  -122 49 53.69                       009200100S00              1                                                                                             OR<25

                                                                                                                                02 NONE    0 TURN-L
                                                                                                                                   PRVTE      NE SE                                                       000             00
                                                                                                                                    TRUCK            01 DRVR NONE  64 M  OR-Y       000              000             00
                                                                                                                                                                            OR<25

00120  N N N N N  04/09/2013  COLUMBIA                   1    14                        INTER      CROSS  N            N CLD   S-OTHER    01 NONE    0 TURN-L                                                                      015        27
CITY              Tue    5P   ST. HELENS                 MN    0   LOWER COL RIVER HY   CN                L-GRN-SIG    N WET   TURN          PRVTE      NE SE                                                       000             00
                              ST HELEN UA                 27.69    GABLE RD             04           0                 N DAY   INJ          PSNGR CAR          01 DRVR NONE  25 F  OTH-Y      016              038             27
No      45 50 55.23  -122 49 53.69                       009200100S00              1                                                                                             N-RES

                                                                                                                                02 NONE    0 TURN-L
                                                                                                                                   PUBLC      NE SE                                                       006             00
                                                                                                                                   SCHL BUS          01 DRVR INJC  31 F  OR-Y       000              000             00
                                                                                                                                                                            OR<25

00220  N N N N N  06/29/2015  COLUMBIA                   1    14                        INTER      CROSS  N            N CLR   ANGL-OTH   01 NONE    0 STRGHT                                                                 04,32
UNK               Mon   10A   ST. HELENS                 MN    0   LOWER COL RIVER HY   CN                TRF SIGNAL   N DRY   TURN          PRVTE      NW SE                                                       000             00
                              ST HELEN UA                 27.69    GABLE RD             04           0                 N DAY   PDO          PSNGR CAR          01 DRVR NONE  49 F  OR-Y       020,052          000             04,32
No      45 50 55.23  -122 49 53.69                       009200100S00              1                                                                                             OR<25

                                                                                                                                02 NONE    0 TURN-L
                                                                                                                                   PRVTE      SW NW                                                       000             00
                                                                                                                                  PSNGR CAR          01 DRVR NONE  33 F  SUSP       000              000             00
                                                                                                                                                                            OR<25
```

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF ST. HELENS, COLUMBIA COUNTY

US 30 Lower Columbia River Hwy & Gable Rd
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE DAY/TIME *LAT/LONG*	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00401	N	N	N			11/30/2012	17	LOWER COL RIVER HY	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											07
CITY						Fri 4P	0	GABLE RD	SE		TRF SIGNAL	N	WET	REAR		PRVTE	SE NW									000		00
No						*45 50 55.23 -122 49 53.69*		1	06	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	30	F	OR-Y		026	000		07
																							OR<25					
															02	NONE 0	STOP											
																PRVTE	SE NW									011		00
																PSNGR CAR		01	DRVR	INJC	82	F	OR-Y		000	000		00
																							OR<25					

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

CRASH SUMMARIES BY YEAR BY COLLISION TYPE

US 30 Lower Columbia River Hwy & Millard Rd

January 1, 2011 through December 31, 2015

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2015														
ANGLE	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2015 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	0
YEAR: 2013														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	1	2	0	1	0	2	0	2	0	2	0	0
2013 TOTAL	0	1	2	3	0	1	0	3	0	3	0	3	0	0
YEAR: 2012														
TURNING MOVEMENTS	0	1	1	2	0	1	0	1	1	2	0	2	0	0
2012 TOTAL	0	1	1	2	0	1	0	1	1	2	0	2	0	0
YEAR: 2011														
ANGLE	0	1	0	1	0	2	0	1	0	1	0	1	0	0
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2011 TOTAL	0	1	1	2	0	2	0	2	0	2	0	2	0	0
FINAL TOTAL	0	3	5	8	0	4	0	6	2	7	1	8	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

092 LOWER COLUMBIA RIVER

US 30 Lower Columbia River Hwy & Millard Rd
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	S P E D C / D A L C / R U G S / S C H L / W O R K (E A U C O / E L G H R / D C S L K)	DATE DAY/TIME LAT/LONG	COUNTY CITY URBAN AREA	RD# FC CMPT/MLG MILEPNT LRS	CONN # FIRST STREET SECOND STREET INTERSECTION SEQ#	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CNTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
00316	Y N N N N	09/27/2011	COLUMBIA	1 14		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										092	03,01
STATE		Tue 3P		MN 0		S		BUS STPSGN	N	DRY	REAR		PRVTE	E W									000		00
			ST HELEN UA	26.96		06	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	84	M	OR-Y		021,047	000		03,01
No		*45 50 20.27 -122 50 15.01*		009200100S00																OR<25					
												02	NONE 0	STOP											
													PRVTE	E W									011	092	00
													PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		000	000		00
																				OR<25					
00058	N N N N N	02/18/2013	COLUMBIA	1 14		INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT										013	14,07
STATE		Mon 1P		MN 0		S		FLASHBCN-A	N	DRY	REAR		PRVTE	S N									022		00
			ST HELEN UA	26.96		06	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	19	M	OR-Y		026	000		07
No		*45 50 20.27 -122 50 15.01*		009200100S00																OR<25					
												02	NONE 0	STOP											
													PRVTE	S N									022	013	00
													PSNGR CAR		01	DRVR	NONE	40	F	OR-Y		000	000		00
																				OR<25					
												03	NONE 0	STOP											
													PRVTE	S N									011		00
													PSNGR CAR		01	DRVR	NONE	47	M	OR-Y		009	000		14
																				OR>25					
00119	N N N N N	04/07/2013	COLUMBIA	1 14		INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT											02,08
STATE		Sun 5P		MN 0		CN		STOP SIGN	N	DRY	TURN		PRVTE	S N									000		00
			ST HELEN UA	26.96		02	1		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	19	M	OR-Y		000	000		00
No		*45 50 20.27 -122 50 15.01*		009200100S00																OR<25					
												02	NONE 0	TURN-R											
													PRVTE	E N									015		00
													PSNGR CAR		01	DRVR	NONE	79	M	OR-Y		028,007	000		02,08
																				OR<25					
00140	N N N N N	04/30/2013	COLUMBIA	1 14		INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	TURN-R											02
COUNTY		Tue 7A		MN 0		CN		STOP SIGN	N	DRY	TURN		PRVTE	E N									015		00
			ST HELEN UA	26.96		02	1		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	29	F	OR-Y		028	000		02
No		*45 50 20.27 -122 50 15.01*		009200100S00																OR<25					
												02	NONE 0	STRGHT											
													PRVTE	S N									000		00
													PSNGR CAR		01	DRVR	NONE	61	F	OTH-Y		000	000		00
																				N-RES					
00482	N N N N N	12/21/2015	COLUMBIA	1 14		INTER	CROSS	N	N	RAIN	PRKD MV	01	NONE 0	STRGHT										089	32,14
CITY		Mon 10P		MN 0		CN		STOP SIGN	N	WET	ANGL		PRVTE	S N									000		00
			ST HELEN UA	26.96		02	1		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	78	M	OR-Y		052,023	088		32,14
No		*45 50 20.27 -122 50 15.01*		009200100S00																OR<25					

092 LOWER COLUMBIA RIVER   US 30 Lower Columbia River Hwy & Millard Rd
January 1, 2011 through December 31, 2015

```
       S   D
       P   R S W                               RD#  FC  CONN #                         INT-TYP                                  SPCL USE
SER#   E A U C O DATE       COUNTY             CMPT/MLG FIRST  STREET        RD CHAR (MEDIAN)  INT-REL OFFRD WTHR  CRASH TYP    TRLR QTY  MOVE                    A S
INVEST E L G H R DAY/TIME   CITY               MILEPNT  SECOND STREET        DIRECT     LEGS   TRAF-   RNDBT SURF  COLL TYP     OWNER     FROM      PRTC INJ      G E LICNS PED
UNLOC? D C S L K LAT/LONG   URBAN AREA         LRS      INTERSECTION SEQ#    LOCTN     (#LANES) CNTL   DRVWY LIGHT SVRTY     V# VEH TYPE  TO     P# TYPE SVRTY  E X RES   LOC ERROR       ACTN EVENT       CAUSE

                                                                                                                              02 POLCE  0 PRKD-P
                                                                                                                                 PUBLC    E  W                                                      008              00
                                                                                                                                PSNGR CAR

00139  N N N N N 05/04/2012 COLUMBIA           1    14                       INTER      CROSS  N          N RAIN ANGL-OTH  01 NONE  0 TURN-L                                                                 02
STATE            Fri   1P                      MN    0                       CN                STOP SIGN  N WET  TURN         PRVTE    NW NE                                                     015              00
                            ST HELEN UA         26.96                        03           1               N DAY  PDO         PSNGR CAR        01 DRVR NONE  22 M OR-Y     028           000              02
No     45 50 20.27  -122 50 15.01              009200100S00                                                                                                 OR<25

                                                                                                                              02 NONE   1 TURN-L
                                                                                                                                 PRVTE    SW NW                                                     000              00
                                                                                                                                PSNGR CAR        01 DRVR NONE  38 M OR-Y     000           000              00
                                                                                                                                                                   OR<25

00313  N N N N N 10/01/2012 COLUMBIA           1    14                       INTER      CROSS  N          N CLR  ANGL-OTH  01 NONE  0 TURN-R                                                                 02
STATE            Mon  12P                      MN    0                       CN                STOP SIGN  N DRY  TURN         PRVTE    W  S                                                      015              00
                            ST HELEN UA         26.96                        03           0               N DAY  INJ         PSNGR CAR        01 DRVR NONE  21 F OR-Y     028           000              02
No     45 50 20.27  -122 50 15.01              009200100S00                                                                                                 OR<25

                                                                                                                              02 NONE   0 STRGHT
                                                                                                                                 PRVTE    N  S                                                      000              00
                                                                                                                                PSNGR CAR        01 DRVR INJC  43 F OR-Y     000           000              00
                                                                                                                                                                   OR<25

00416  N N N N N 12/14/2011 COLUMBIA           1    14                       INTER      CROSS  N          N CLR  ANGL-OTH  01 NONE  0 STRGHT                                                  013            02
STATE            Wed   4P                      MN    0                       CN                STOP SIGN  N DRY  ANGL         PRVTE    S  N                                                      000              00
                            ST HELEN UA         26.96                        04           1               N DAY  INJ         PSNGR CAR        01 DRVR INJB  48 M OR-Y     000           000              00
No     45 50 20.27  -122 50 15.01              009200100S00                                                                                                 OR<25

                                                                                                                              02 NONE   0 STRGHT
                                                                                                                                 PRVTE    W  E                                                      022  013         00
                                                                                                                                PSNGR CAR        01 DRVR INJC  64 M OR-Y     028           000              02
                                                                                                                                                                   OR<25

                                                                                                                              03 NONE   0 STOP
                                                                                                                                 PRVTE    E  W                                                      011              00
                                                                                                                                PSNGR CAR        01 DRVR NONE  42 F OR-Y     000           000              00
                                                                                                                                                                   OR>25
```

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
014	EMR V PKD	EMERGENCY VEHICLE LEGALLY PARKED IN THE ROADWAY
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED OR DISABLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING
055	SPRAY	BLINDED BY WATER SPRAY

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO.
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHIN
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER
51	FAIL LN	FAILED TO MAINTAIN LANE
52	OFF RD	RAN OFF ROAD

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1 L-TURN	FROM OPPOSITE DIRECTION-ONE LEFT TURN,ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TOO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WORK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAY ON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHI(
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

PEDESTRIAN LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
00	PDO	NOT COLLECTED FOR PDO CRASHES
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

RIVERFRONT CONNECTOR PLAN

APPENDIX 5:

TECHNICAL MEMORANDUM #3

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MEMORANDUM

Date:	May 1, 2018	Project #: 21001.0
To:	Jacob Graichen, City of St Helens Ken Shonkwiler, Oregon Department of Transportation (ODOT)	
From:	Matt Bell, Krista Purser, and Chris Brehmer, Kittelson & Associates, Inc.	
Project:	St Helens Riverfront Connector Plan	
Subject:	Future Year 2031 Baseline Transportation System Conditions (Subtask 4.8)	

FUTURE CONDITIONS OVERVIEW

This memorandum documents planned improvements and future traffic conditions in the southeast part of St. Helens in support of the St. Helens Riverfront Connector Plan. The information provided in this memorandum is intended to convey an understanding of assumed future infrastructure that is expected to be in place, forecast traffic volumes, and an assessment of how the study intersections would operate in this baseline condition. The forecast intersection operations suggest areas where additional improvement efforts should be focused while multi-modal opportunities and constraints to improve safety and mobility within the study area are highlighted.

This document highlights improvement needs for the baseline year 2031 future condition. It does not identify or prescribe solutions. Potential mitigation options were identified, vetted, and prioritized through subsequent project efforts.

EXECUTIVE SUMMARY

Key findings of this memorandum are as follows:

- Traffic analysis incorporates projected growth in the waterfront area.
- Traffic analysis does not assume completion of intersection or roadway improvements which are not funded.
- ODOT plans to install a traffic signal and turn lane improvements at the US 30/Millard Road intersection in 2019. The signal will include protected/permissive left-turns from US 30 and permissive left-turns with separate right-turn lanes on Millard Road.
- Potential pedestrian and bicycle improvements include reconstructing study area road segments to the standard cross-sections (width, number of turn lanes, multi-modal amenities) identified in the City's Transportation System Plan (TSP).

  - Per the TSP, collectors and arterials would include landscape-buffered sidewalks and bicycle lanes for collectors and arterials.
  - Local street cross sections include sidewalks and bicycles sharing travel lanes with vehicles.
- Future year 2031 traffic volumes include growth identified in the 2011 TSP, additional growth based on updated land use forecasts, and rerouted traffic due to US 30/Millard Road signalization.
- The following intersections are projected to exceed jurisdictional operating standards during the year 2031 future weekday p.m. peak hour under baseline (unmitigated) conditions:
  - Old Portland Road/Plymouth Street
  - Old Portland Road/S 15th Street
  - Old Portland Road/S 18th Street/Kaster Road
  - Old Portland Road/Railroad Avenue
  - Old Portland Road/Gable Road
  - McNulty Way/Gable Road
  - US 30/Gable Road
  - US 30/Millard Road
- From a pedestrian perspective, Pedestrian Level of Traffic Stress (PLTS) 1 or 2 is achievable where TSP standard roadway cross sections, adequate illumination, and good pavement conditions are present.
- From a bicycle perspective, Bicycle Level of Traffic Stress (BLTS) 1 can be achieved where standard cross sections are provided and the posted speed limit is less than 40 miles per hour (mph). Roadways with a posted speed above 40 mph will be deemed to operate at BLTS 4 even with the TSP-standard road section.

This memorandum was reviewed and revised based on input from the project management team (PMT), the Committee Overseeing Overt Long-range Passageway Planning (COOLPPL), and the public.

PLANNED IMPROVEMENTS

The City of St. Helens Transportation System Plan (TSP, Reference 1) and Waterfront Redevelopment Plan (Reference 2) identify several improvements to the vehicle, pedestrian, bicycle, and transit facilities within St. Helens. The following summarizes the improvements and identifies which improvements are currently funded, and therefore, included in the 2031 analysis.

VEHICLE IMPROVEMENTS

The TSP and Waterfront Redevelopment Plan identify several vehicle improvements at the study intersections, including additional lanes, signalization, and reconfiguration. The following summarizes the funded and unfunded improvements by intersection.

Funded Improvements

US 30/Millard Road

The TSP identifies signalization of the US 30/Millard Road intersection as a mid-term (2017 to 2021) improvement. Per discussions with ODOT staff, reconstruction of the intersection and signalization is anticipated to begin in 2019. The signal will likely include protected/permissive left-turns from US 30 and permissive left-turns from Millard Road with separate right-turn lanes on the east and westbound approaches. Note that the additional right-turn lane at the westbound approach will require widening and reconstruction of the adjacent Portland & Western Railroad (PNWR) grade crossing. This improvement is assumed to be in place for the year 2031 baseline analysis.

Unfunded Improvements

The improvement described below are not funded projects were not included in the 2031 analysis.

US 30/Millard Road

The TSP also identifies a potential overpass at the US 30/Millard intersection as a long-term vision for St. Helens; one that would not be completed within the 20-year planning horizon of the TSP.

US 30/Gable Road

The TSP identifies the addition of a westbound right-turn lane at the US 30/Gable Road intersection as a long-term (2022 to 2031) improvement. Construction of the additional right-turn lane at the westbound approach will require widening and reconstruction of the adjacent PNWR grade crossing. This potential improvement was also identified in the Waterfront Redevelopment Plan as an important improvement to provide additional capacity at the intersection.

Old Portland Road/Millard Road

The TSP identifies reconfiguration of the Old Portland Road/Millard Road intersection to accommodate heavy truck turning movements as a mid-term (2017 to 2021) improvement. This potential improvement was also identified in the Waterfront Redevelopment Plan as an important improvement to provide access to the waterfront area as well as truck access to the industrial areas to the south. Columbia County also recently identified the potential to realign Millard Road to remove the “skew” from the intersection.

Old Portland Road/Gable Road

The TSP identifies a long-term (2022 to 2031) improvement at the Old Portland Road/Gable Road intersection. The improvement includes realigning the intersection to emphasize through movements on Old Portland Road. The Waterfront Redevelopment Plan identifies two potential alternative improvements at the intersection, including realigning 1) Old Portland Road so that it intersects with Gable Road further to the west, providing greater separation from the railroad crossing near Railroad Avenue; or 2) realigning Old Portland Road to emphasize the through movement on Old Portland Road and realigning Gable Road so that it connects with Old Portland Road further to the west and installing a traffic signal at the new Old Portland Road/Gable Road intersection. A final design has not been selected.

Old Portland Road/S 18th Street/Kaster Road

The TSP identifies a near-term (2011 to 2016) improvement need at the Old Portland Road/S 18th Street/Kaster Road intersection. The improvement includes reconfiguring the intersection to provide stop control or upgrading the signal to current standards.

Old Portland Road/Plymouth Street

The Waterfront Redevelopment Plan identifies several potential improvements at the Old Portland Road/Plymouth Street intersection. The improvement options include a minor realignment of the intersection to improvement sight distance; a major realignment of the intersection to emphasize movement from Old Portland to Plymouth Street; installing two closely spaced roundabouts; and/or installing a large five-leg roundabout that connects Old Portland Road to Plymouth Street and 12th Avenue. While a final design of the intersection has not been selected, the City has purchased property in the area that could facilitate the future improvements. A final design has not been selected.

McNulty Way/Gable Road

The Waterfront Redevelopment Plan identifies the addition of a westbound left-turn lane at the McNulty Way/Gable Road intersection to encourage use of McNulty Way and Millard Road to access US 30.

PEDESTRIAN IMPROVEMENTS

The TSP identifies “critical needs” and “additional needs” for pedestrian improvements throughout St. Helens. Improvements include sidewalks on one or both sides of streets and improved pedestrian crossings. Exhibit 1 shows the proposed improvements.

Within the Riverfront Connector Plan study area, identified improvements include sidewalks along McNulty Way in the near-term and Old Portland Road from Gable Road to S 4th Street in the mid-term. Citywide, standard roadway cross sections include 5-feet wide sidewalks for local streets and 6-feet wide sidewalks with a 5-foot landscaping buffer for collectors and arterials.

Study intersections with identified pedestrian crossing improvements include US 30/Millard Road, Old Portland Road/S 18th Street/Kaster Road, and St. Helens Street/S 1st Street. Pedestrian crossing improvements include leading pedestrian intervals at signalized crossings and active treatment at unsignalized intersections. Additional improvements at Old Portland Road/S 18th Street/Kaster Road include marked crosswalks and 6 new handicapped accessible (ADA compliant) ramps.

Exhibit 1: TSP Proposed Pedestrian Improvement Projects

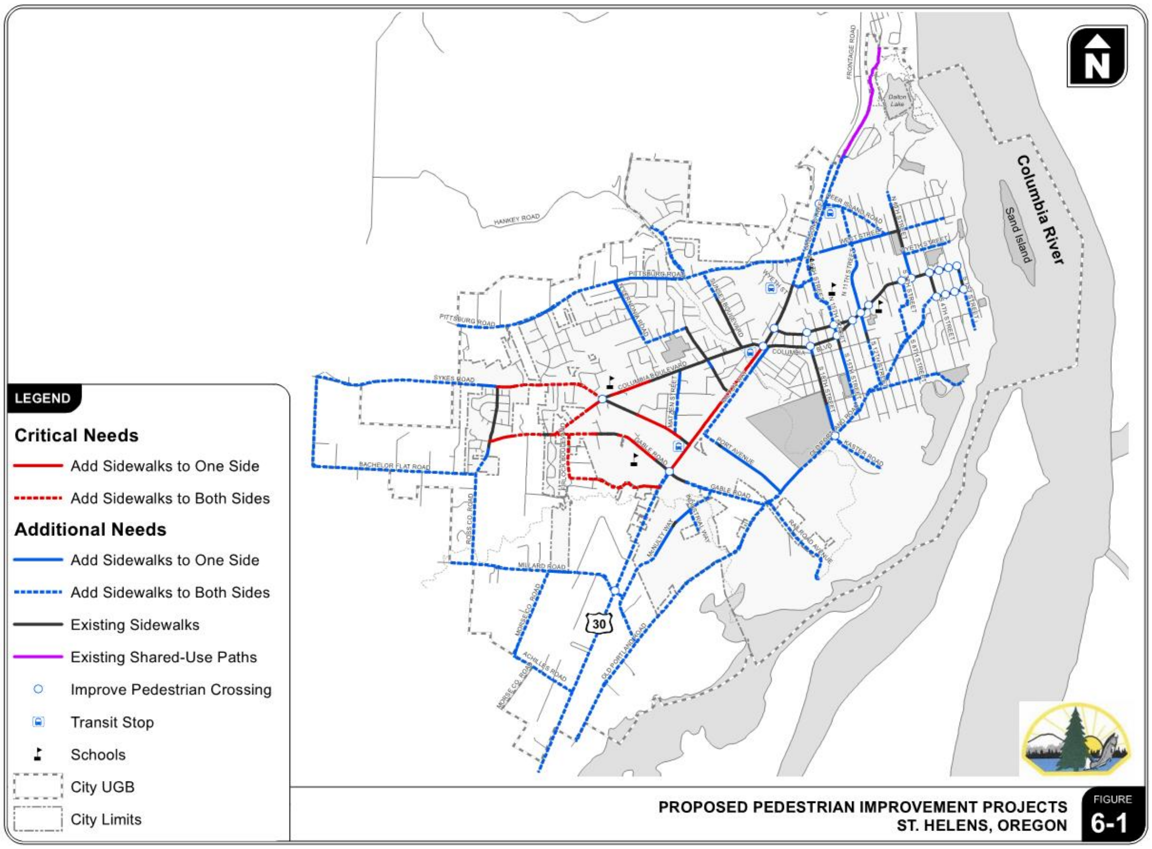


Image Source: St Helens Transportation System Plan, Ordinance 3150

BICYCLE IMPROVEMENTS

The TSP identifies "critical needs" and "additional needs" for bicycle improvements throughout St. Helens. Improvements include bicycle lanes and improved bicycle crossings. Exhibit 2 shows the proposed improvements.

Within the Riverfront Connector Plan study area, improvements include bicycle lanes along McNulty Way in the near-term and Old Portland Road from McNulty Way to S 4th Street in the mid-term. Citywide, standard cross sections include mixed traffic for local streets and 6-feet wide marked bicycle lanes for collectors and arterials. Bicycle parking facilities are recommended along US 30's commercial areas and in the developing Riverfront area.

Bicycle crossing improvements are identified at the US 30/Gable Road intersection. Improvements include enhancing the existing bicycle facilities in the near-term to include pavement markings and signage that directs bicyclists through the intersection. Potential long-term roadway improvements include provision of a separate westbound right-turn lane, at which time the westbound approach could be restriped to accommodate a bicycle lane between the through and right-turn lanes.

TSP-recommendations for multi-use paths and trails include replacement of the existing path along Old Portland Road with separated bicycle lanes, curb, and sidewalk and provision of a new multi-use path on Old Portland Road south of Gable Road. The County's recently adopted TSP includes a project to study the feasibility of constructing an off-street trail from the St. Helens south city limits to Scappoose along US 30. The project is included in the County's financially constrained and aspirational project list.

Exhibit 2: TSP Proposed Bicycle Improvement Projects

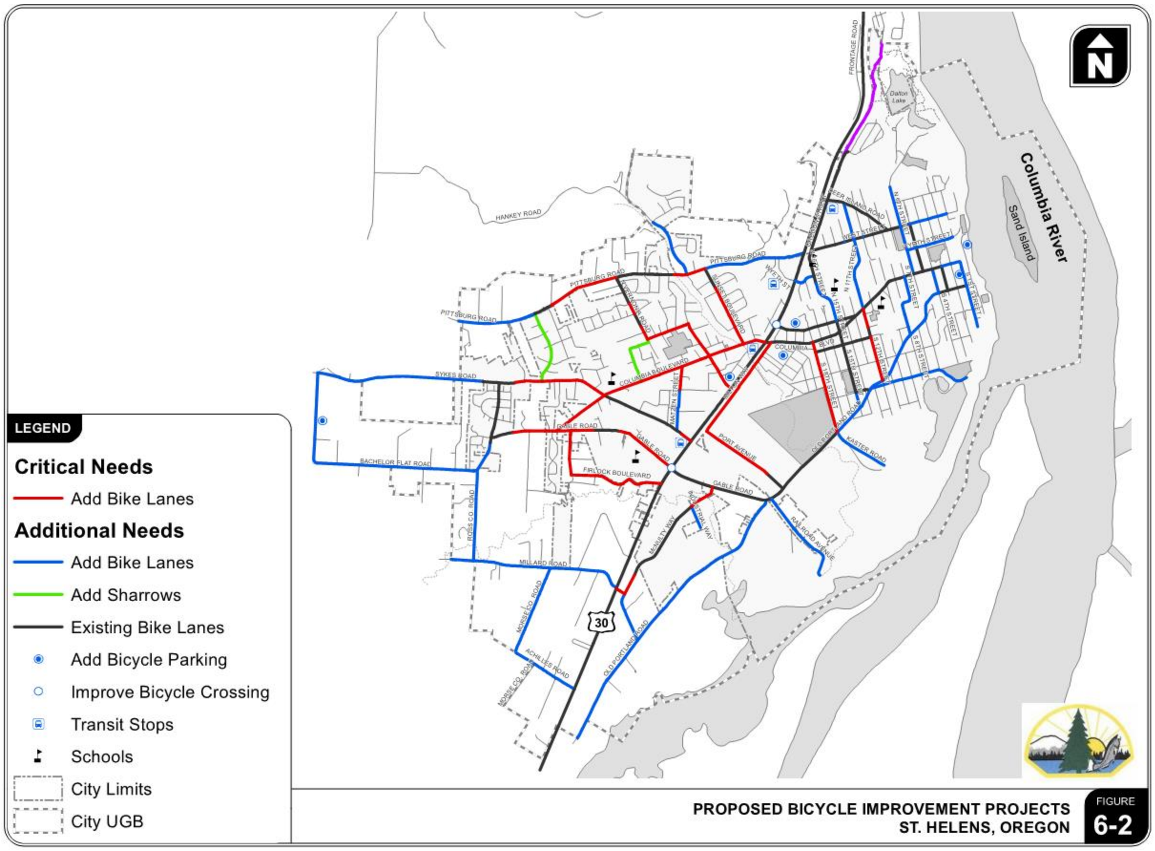


Image Source: St Helens Transportation System Plan, Ordinance 3150

TRANSIT IMPROVEMENTS

No additional planned and funded transit improvements were identified within the study area. The CC Rider Transit Center is located on Deer Island Road near US 30 and several park-and-ride lots are located along US 30. Study roadway segments serve as pedestrian, bicycle, and vehicle routes between these locations and the Riverfront area.

FUTURE BASELINE 2031 CONDITIONS

Future conditions were assessed based on planned improvements and forecasts of the study area. Vehicle volume development, vehicle traffic operations, pedestrian level of traffic stress, and bicycle level of traffic stress are described below.

VEHICLE CONDITIONS

The following sections summarize the future traffic volume development and future vehicle operations for the study area.

Traffic Volume Development

Traffic volumes were developed based on TSP forecasted traffic volume growth, updated land use forecasts, and rerouted volumes due to the US 30/Millard Road intersection signalization.

TSP Forecasted Growth

2031 traffic volume forecasts were developed as part of the TSP. These forecasts included:

- Growth rate projections for highway traffic volumes,
- Household and employment growth and where it is likely to occur,
- Vehicle trip estimates associated with the household and employment growth, and
- Allocating those trips across the city to various growth areas.

The TSP identifies existing (2011) traffic counts at the US 30/Gable Road and US 30/Millard Road intersections. The 2011 turning movements to and from the side streets are similar to traffic counts collected in 2017, indicating the TSP-forecast growth has not yet been realized. Therefore, the entirety of the forecasted traffic volume growth was applied to the 2017 counts. For study intersections not evaluated under the TSP, trips were distributed from the US 30/Gable Road, US 30/Millard Road, and Columbia Boulevard/S 12th Street intersections based on existing traffic patterns, including vehicles entering and exiting the study corridor at intermittent driveways. Figure 1 shows the TSP-forecast traffic volume growth during the weekday p.m. peak hour.

Updated Land Use Forecasts

Land use forecasts were updated based on the results of the Waterfront Redevelopment Project and recent developments within the City, detailed in *Technical Memorandum #4: Land Use and Urban Design*. Changes in trip patterns associated with the updated land use assumptions were allocated to a travel model used in the TSP development that tracked trips by subareas.

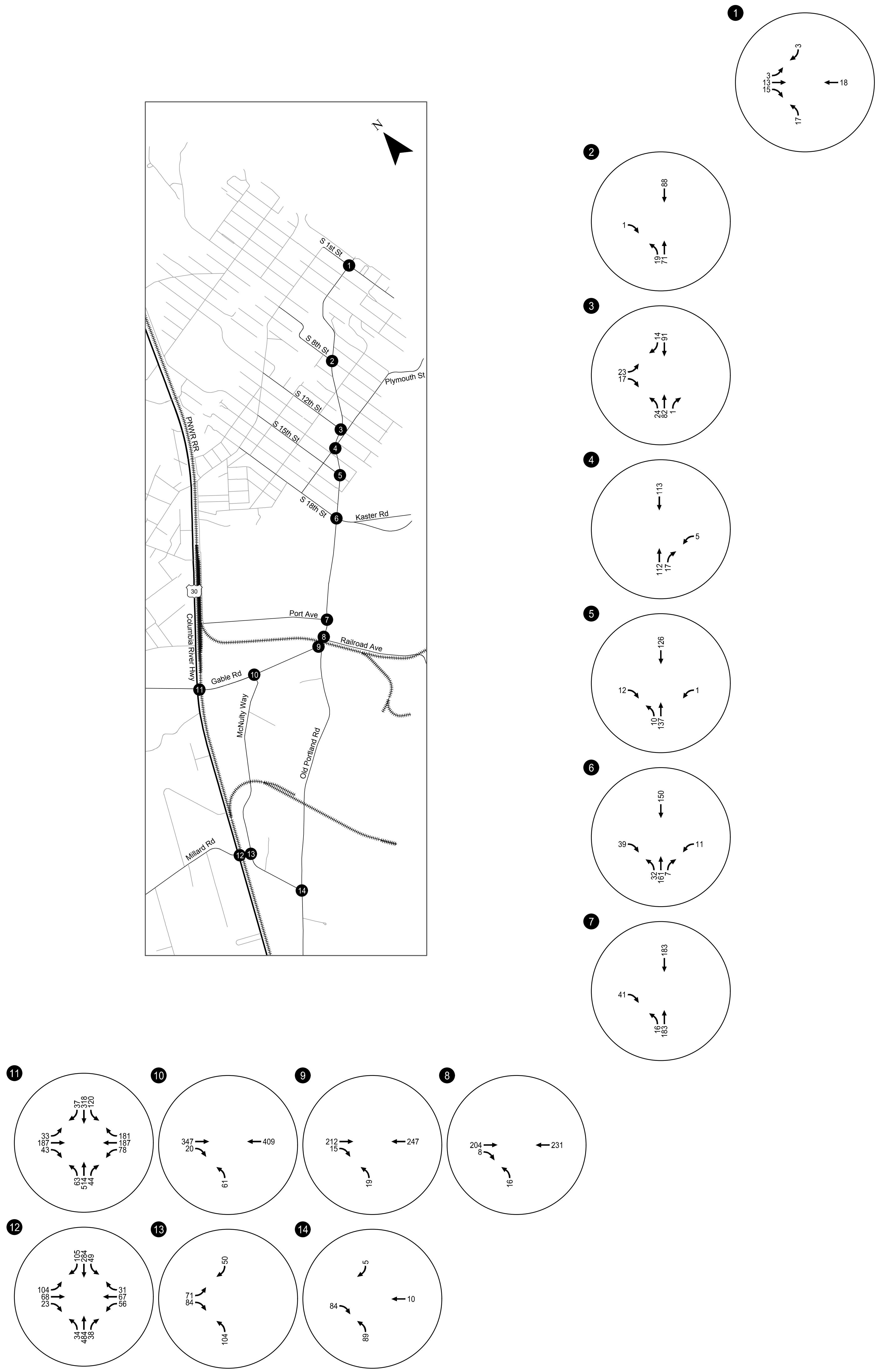
Transportation Analysis Zone (TAZ) 6 encompasses the Riverfront study area. Information provided for TAZ 6 indicates a reduction in the number of single-family homes, an increase in multi-family homes, an increase in retail uses, an increase in commercial uses, and a slight reduction in industrial and institutional land uses. The projected reductions in industrial and institutional land uses have already occurred and are reflected within the 2017 traffic counts.

Trip generation estimates were developed for the residential, retail, and commercial land use changes. Trip generation was calculated based on the rates from *Trip Generation Manual*, 10*th* *Edition*, published by the Institute of Transportation Engineers (ITE – Reference 3). Table 1 shows the trip generation estimate for the updated land use forecasts.

Table 1: Trip Generation for Updated Land Use Forecasts

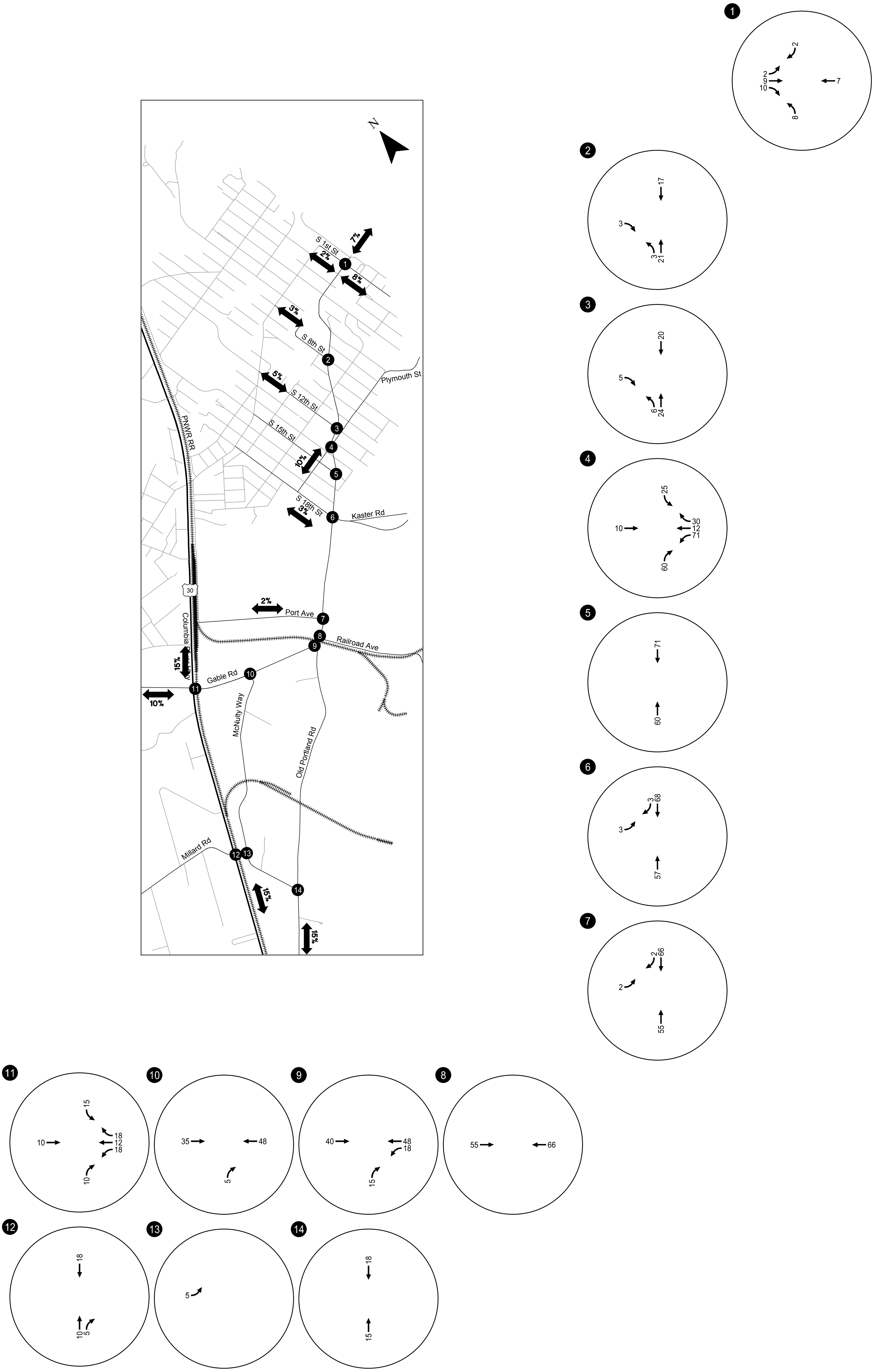
Land Use	ITE Code	Size	Daily Trips	Weekday PM Peak Hour		
				Total	In	Out
Apartment	220	136	987	78	49	29
General Office Building	710	39,537	431	47	8	39
Shopping Center	820	9,368	1,202	94	45	49
Total New Trips			**2,620**	**219**	**102**	**117**
Single-Family Detached Housing	210	*-10*	*-125*	*-11*	*-7*	*-4*
Net New Trips			**2,495**	**208**	**95**	**113**

The distribution of trips onto the study area roadway system was estimated based on existing traffic patterns and adjacent land uses. Figure 2 shows the trip distribution and assignment to study intersections during the weekday p.m. peak hour.



TSP Forecasted Growth
Weekday PM Peak Hour
St. Helens, OR

Figure
1



Updated Land Use Forecast Additional Trips
Weekday PM Peak Hour
St. Helens, OR

Figure
2

Millard Signalization Reroute

ODOT is planning to install a traffic signal at the US 30/Millard Road intersection in 2019. Detailed design information on the traffic signal was limited at the time this report was prepared; however, given the proximity of the US 30/Millard Road intersection to other signalized intersections along the US 30 corridor, the new signal is expected to operate actuated-uncoordinated with protected-permissive northbound and southbound left-turn movements and permissive westbound and eastbound left-turn movements. The new signal is expected to result in a shift in existing traffic volumes and projected growth from the US 30/Gable Road intersection to the US 30/Millard Road intersection, particularly the eastbound and westbound through and left-turn movements. Based on a review of the street network and the expected capacity of the new signal, 10 percent of the eastbound and westbound through movements and 20 percent of the eastbound and westbound left-turn movements were rerouted from the US 30/Gable Road intersection to the US 30/Millard Road intersection during the weekday p.m. peak hour. The rerouted trips during the weekday p.m. peak hour are shown in Figure 3.

2017 to 2031 Total Growth

TSP forecasted growth (Figure 1), updated land use forecasted growth (Figure 2), and Millard signalization rerouted trips (Figure 3) were added to arrive at the 2017 to 2031 total growth. Total growth is shown in Figure 4.

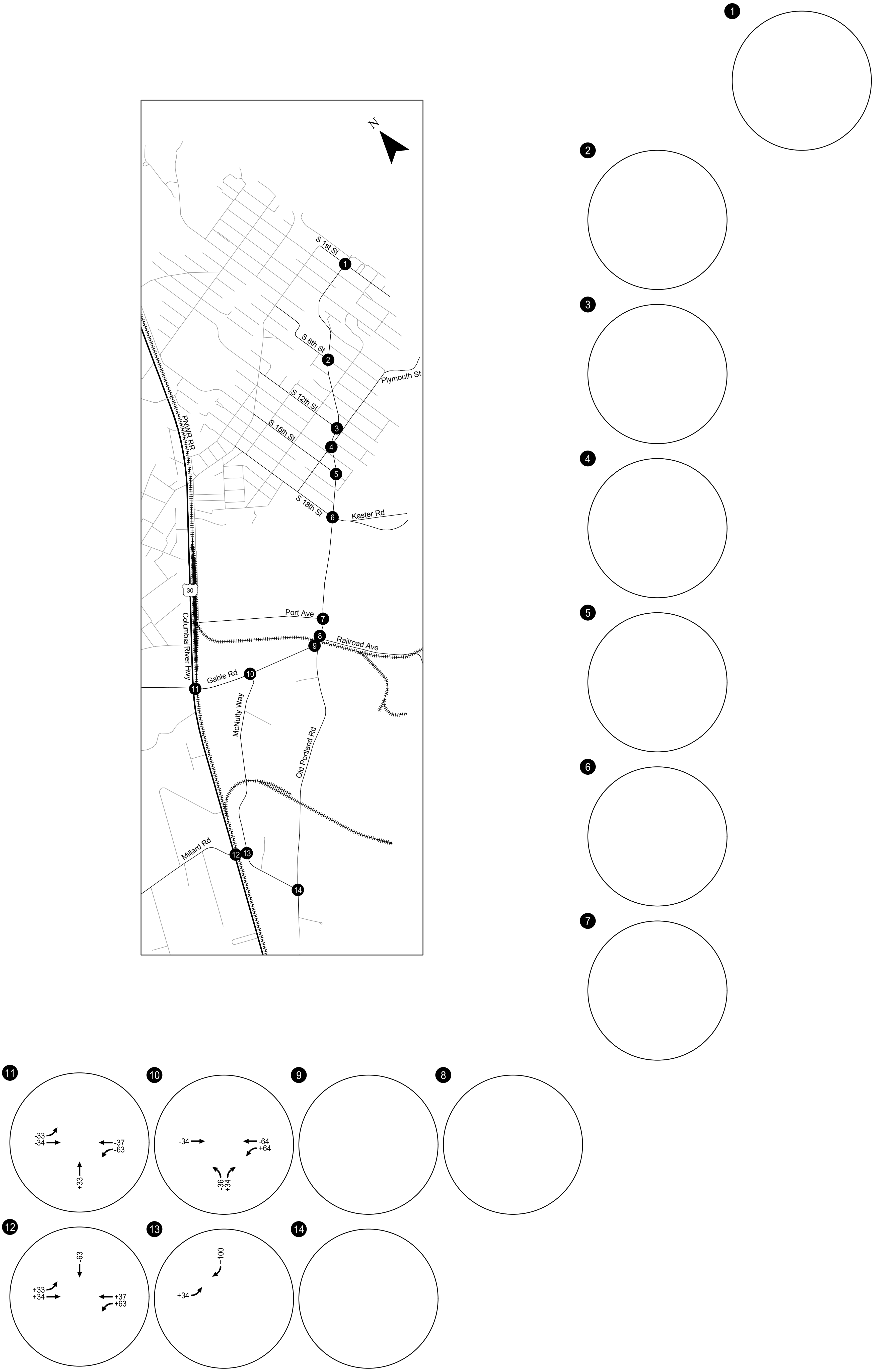
Vehicle Operations

Future traffic conditions were assessed using the operations analysis methodology and compared to jurisdictional operating standards and thresholds established in Technical *Memorandum #2: Existing Conditions*.

Future Levels of Service

The total growth volumes in Figure 4 were added to 2017 existing volumes, resulting in the 2031 traffic volumes. Figure 5 summarizes the results of the future traffic conditions analysis. The following intersections are projected to exceed jurisdictional operating standards during the weekday p.m. peak hour:

- Old Portland Road/Plymouth Street
- Old Portland Road/S 15th Street
- Old Portland Road/S 18th Street/Kaster Road
- Old Portland Road/Railroad Avenue
- Old Portland Road/Gable Road
- McNulty Way/Gable Road
- US 30/Gable Road
- US 30/Millard Road



Millard Signalization Rerouted Trips
Weekday PM Peak Hour
St. Helens, OR

Figure
3

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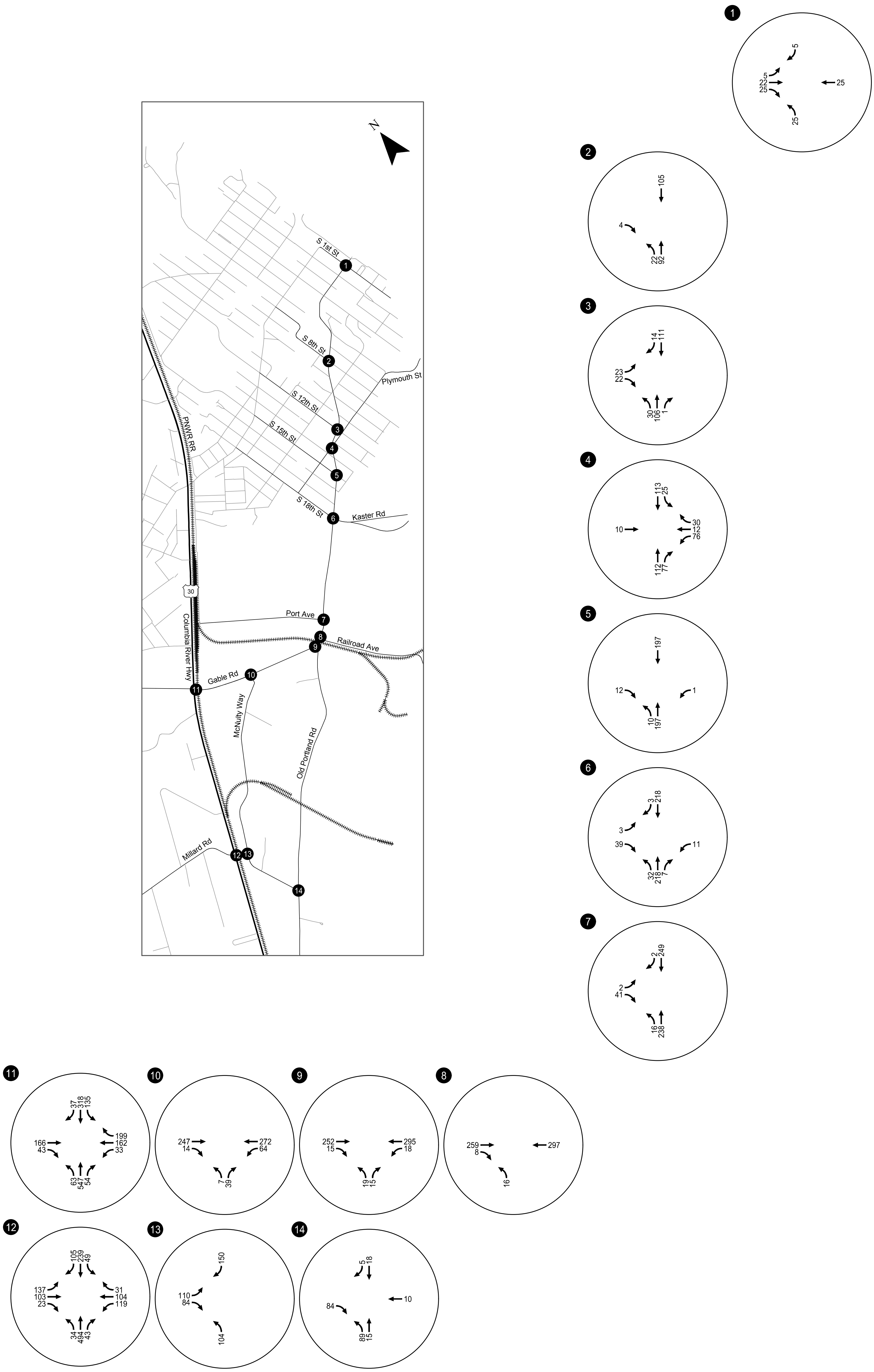
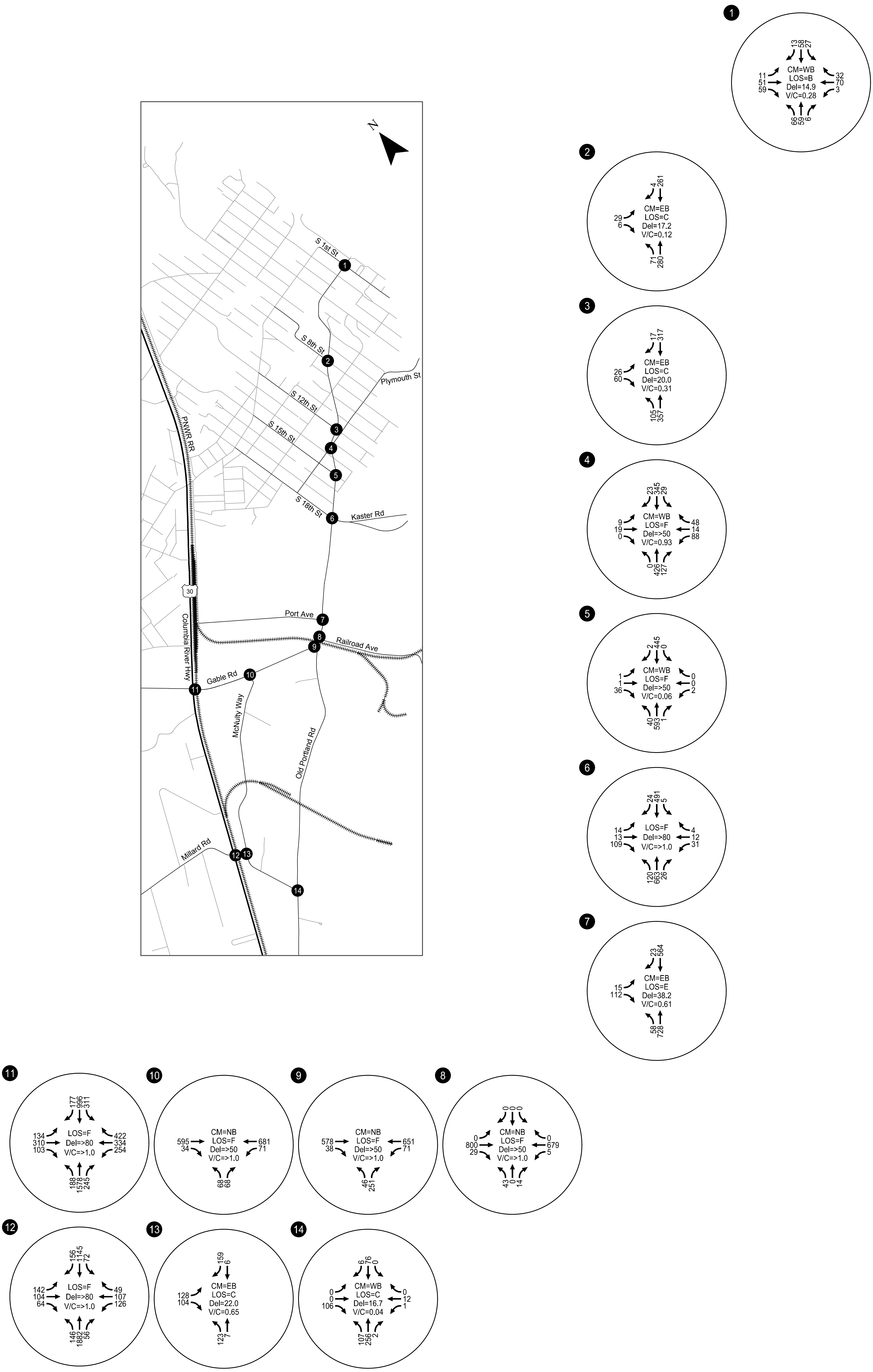
KITTELSON & ASSOCIATES



2017 to 2031 Total Growth
Weekday PM Peak Hour
St. Helens, OR

Figure
4



Future Traffic Conditions
Weekday PM Peak Hour
St. Helens, OR

Figure
5

The 2011 TSP also forecasted US 30/Gable Road and US 30/Millard Road to exceed jurisdictional operating standards under future conditions. All remaining study intersections are projected to operate acceptably during the weekday p.m. peak hours. Appendix "A" includes the worksheets used to evaluate future traffic conditions at the study intersections. Summaries of the individual intersection needs follow. Mitigation options were assessed separately in subsequent phases of the project.

Old Portland Road/Plymouth Street

The westbound left-turn movement at the Old Portland Road/Plymouth Street intersection is expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. This is primarily due to the increase in volume associated with the Waterfront Redevelopment Plan. As indicated above, several alternatives have been considered for improving the intersection, including:

- reconfiguring the intersection to emphasize movement from Old Portland Road to Plymouth Road
- reconfiguring the intersection as dual single-lane roundabout
- reconfiguring the intersection as a five-leg roundabout

Further evaluation of these alternatives is included in subsequent analyses.

Old Portland Road/S 15th Street

The westbound left-turn movement at the Old Portland Road/S 15th Street intersection is expected to operate at level of service "F", but below capacity during the weekday p.m. peak hour. No alternatives have been considered as part of previous efforts to improve the intersection; however, preliminary signal warrants indicate that a signal is not warranted. Potential mitigation options include multiway stop-control and roundabout intersections. Further evaluation of these alternatives is included in subsequent analyses.

Old Portland Road/S 18th Street/Kaster Road

The northbound approach to the Old Portland Road/S 18th Street/Kaster Road intersection is expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. As indicated above, two alternatives have been identified to address future traffic conditions at the intersection, including:

- Reconfiguring the intersection with stop control
- Upgrading the signal to current standards

Further evaluation of these alternatives is included in subsequent analyses.

Old Portland Road/Railroad Avenue

The northbound approach to the Old Portland Road/Railroad Avenue intersection is expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. No alternatives have been considered as part of previous efforts to improve the intersection; however, preliminary signal warrants indicate that a signal is not warranted. Potential mitigation options include multiway stop-control and roundabout intersections. Further evaluation of these alternatives is included in subsequent analyses.

Old Portland Road/Gable Road

The northbound approach to the Old Portland Road/Gable Road intersection is expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. As indicated above, several alternatives previously have been considered for improving the intersection, including:

- reconfiguring the intersection to emphasize the through movement on Old Portland Road
- realigning Old Portland Road so that it connects with Gable Road further to the west, providing greater separation from Railroad Avenue
- reconfiguring the intersection to emphasize the through movement on Old Portland Road, realigning Gable Road to intersection with Old Portland Road further to the west, and installing a traffic signal

Further evaluation of these alternatives is included in subsequent analyses.

McNulty Way/Gable Road

The northbound approach to the McNulty Way/Gable Road intersection is expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. Installation of a westbound left-turn lane has previously been identified as a potential mitigation. The westbound left-turn lane could be designed as a center-two way left-turn lane that in concept would allow motorists from McNulty way to complete a two-stage left-turn movement.

US 30/Gable Road

Multiple approaches to the US 30/Gable Road intersection are expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. Note: this analysis reflects installation of a traffic signal at the US 30/Millard Road intersection and a shift in traffic volumes from US 30/Gable Road to US 30/Millard Road. The TSP identified installation of a westbound right-turn as one potential mitigation alternative, however, this improvement alone may not be sufficient. A grade-separated intersection may be explored as a long-term vision for US 30/Gable Road.

The TSP also identifies a potential overpass at the US 30/Millard intersection as a long-term vision for St. Helens; one that would not be completed within the 20-year planning horizon of the TSP.

US 30/Millard Road

Multiple approaches to the US 30/Millard Road intersection are expected to operate at level of service "F" and above capacity during the weekday p.m. peak hour. Note this analysis assumes installation of a traffic signal at the US 30/Millard Road intersection and a shift in traffic volumes from US 30/Gable Road to US 30/Millard Road.

PEDESTRIAN GAPS AND DEFICIENCIES

Pedestrian gaps and deficiencies were identified in *Technical Memorandum #2: Existing Conditions* using ODOT Analysis Procedures Manual (APM – Reference 4) methodology. Key findings were as follows:

- Several arterial and collector streets do not currently provide sidewalks along one or two sides of the roadway, including segments of Old Portland Road, Gable Road, Millard Road, Plymouth Street, and McNulty Way.
- Many sidewalks throughout the City do not provide sufficient width to accommodate pedestrian activity or are in a state of disrepair.
- Many sidewalks and pedestrian ramps throughout the City are not constructed to current handicapped accessible standards (ADA compliant).
- There are several major (and minor) intersections that do not provide marked pedestrian crossings.

TSP-standard roadway cross sections include 5-foot wide sidewalks for local streets and 6-feet wide sidewalks with a 5-foot landscaping buffer for collectors and arterials. Assuming adequate illumination and good pavement conditions, these cross sections result in the following:

- **PLTS 2** on US 30, Gable Road, and Old Portland Road (S 18th Street to Millard Road) due to physical buffer type and total buffering width.
- **PLTS 1** on Millard Road, Old Portland Road (S 18th Street to S 1st Street), Plymouth Street, and McNulty Way.

The PLTS results above do not consider the general land use criteria, which affects the desired walkability of a segment. Industrial and lower-density areas would result in higher PLTS rating whereas residential and/or higher density areas would maintain lower PLTS ratings.

BICYCLE GAPS AND DEFICIENCIES

Bicycle gaps and deficiencies were also identified in *Technical Memorandum #2: Existing Conditions* using ODOT Analysis Procedures Manual (APM – Reference 4) methodology. Key findings were as follows:

- There are several study roadways that currently do not provide on-street bike lanes. These roadways include segments of Old Portland Road, Millard Road, Plymouth Street, and McNulty Way. Bike lanes would need to be installed at 5.5 feet width for 30 mph and slower roadways or at 7 feet for 35 mph roadways to achieve a BLTS 2 rating.
- There are several study roadways whose bike lanes are too narrow or adjacent speeds are too high to provide a comfortable riding experience. These streets include US 30, Gable Road, and segments of Old Portland Road. Bike lanes would either need to be widened to 7

feet and/or the posted speed limit would need to be reduced to as low as 35 mph to achieve a BLTS 2 rating.

- There are several study area roadways with mixed traffic where posted speed limits are too high. These roadways include Millard Road and segments of Old Portland Road. Bike lanes or a separated bike path would need to be provided and/or the posted speed limit would need to be reduced to as low as 25 mph or the centerline stripe would need to be removed to achieve a BLTS 2 rating.

Citywide, TSP-standard cross sections include mixed traffic for local streets and 6-foot wide marked bicycle lanes for collectors and arterials. If constructed, these cross sections result in the following results:

- **BLTS 4** on US 30, Gable Road, and Old Portland Road (S 18th Street to Millard Road) due to a lack of buffer and speeds at or above 40 mph.
- **BLTS 1** on Millard Road, Old Portland Road (S 18th Street to S 1st Street), Plymouth Street, and McNulty Way.

Bike lane buffers and/or lower speeds would be needed to decrease BLTS on US 30, Gable Road, and Old Portland Road.

NEXT STEPS

The information presented in this document was used to assist in the identification of near-term transportation improvement needs as well as for comparison to future conditions.

REFERENCES

1. City of St. Helens. *City of St. Helens Transportation System Plan*. 2011.
2. City of St. Helens. *Waterfront Redevelopment Project*. 2013.
3. Institute of Transportation Engineers. *Trip Generation, 10th Edition*. 2017.
4. Oregon Department of Transportation. *Analysis Procedures Manual*. December 2017 update.

Appendix A Future Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	51	59	3	70	32	66	59	6	27	58	13
Future Volume (Veh/h)	11	51	59	3	70	32	66	59	6	27	58	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	15	68	79	4	93	43	88	79	8	36	77	17
Pedestrians		2			9			8				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		0			1			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	508	432	96	546	436	92	96			96		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	508	432	96	546	436	92	96			96		
tC, single (s)	7.3	6.9	6.4	8.1	6.7	6.4	4.3			4.3		
tC, 2 stage (s)												
tF (s)	3.7	4.4	3.4	4.4	4.2	3.5	2.4			2.4		
p0 queue free %	96	84	91	98	79	95	94			97		
cM capacity (veh/h)	334	418	918	239	435	905	1406			1369		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	162	140	175	130
Volume Left	15	4	88	36
Volume Right	79	43	8	17
cSH	551	504	1406	1369
Volume to Capacity	0.29	0.28	0.06	0.03
Queue Length 95th (ft)	30	28	5	2
Control Delay (s)	14.2	14.9	4.1	2.3
Lane LOS	B	B	A	A
Approach Delay (s)	14.2	14.9	4.1	2.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	6	71	280	261	4
Future Volume (Veh/h)	29	6	71	280	261	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	33	7	82	322	300	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	788	302	305			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	788	302	305			
tC, single (s)	6.7	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.3			
p0 queue free %	89	99	93			
cM capacity (veh/h)	300	742	1191			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	404	305
Volume Left	33	82	0
Volume Right	7	0	5
cSH	335	1191	1700
Volume to Capacity	0.12	0.07	0.18
Queue Length 95th (ft)	10	6	0
Control Delay (s)	17.2	2.2	0.0
Lane LOS	C	A	
Approach Delay (s)	17.2	2.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	60	105	357	317	17
Future Volume (Veh/h)	26	60	105	357	317	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	33	76	133	452	401	22
Pedestrians				2		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1130	414	423			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1130	414	423			
tC, single (s)	6.7	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.8	3.4	2.3			
p0 queue free %	81	88	88			
cM capacity (veh/h)	172	624	1070			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	585	423
Volume Left	33	133	0
Volume Right	76	0	22
cSH	347	1070	1700
Volume to Capacity	0.31	0.12	0.25
Queue Length 95th (ft)	33	11	0
Control Delay (s)	20.0	3.2	0.0
Lane LOS	C	A	
Approach Delay (s)	20.0	3.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	19	0	88	14	48	0	426	127	29	345	23
Future Volume (Veh/h)	9	19	0	88	14	48	0	426	127	29	345	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	11	23	0	109	17	59	0	526	157	36	426	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1184	1195	440	1128	1130	604	454			683		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1184	1195	440	1128	1130	604	454			683		
tC, single (s)	7.2	6.8	6.2	7.2	6.5	6.4	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.6	4.2	3.3	3.6	4.0	3.5	2.2			2.4		
p0 queue free %	91	86	100	28	91	87	100			96		
cM capacity (veh/h)	126	161	621	151	196	470	1117			811		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	185	683	490
Volume Left	11	109	0	36
Volume Right	0	59	157	28
cSH	148	198	1117	811
Volume to Capacity	0.23	0.93	0.00	0.04
Queue Length 95th (ft)	21	188	0	3
Control Delay (s)	36.5	96.5	0.0	1.2
Lane LOS	E	F		A
Approach Delay (s)	36.5	96.5	0.0	1.2
Approach LOS	E	F		

Intersection Summary			
Average Delay	14.2		
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (veh/h)	1	1	36	2	0	0	40	593	1	0	445	2
Future Volume (Veh/h)	1	1	36	2	0	0	40	593	1	0	445	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	1	1	46	3	0	0	51	751	1	0	563	3
Pedestrians					3							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								962				
pX, platoon unblocked	0.56	0.56		0.56	0.56	0.56				0.56		
vC, conflicting volume	1418	1422	564	1468	1422	754	566			755		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1352	1359	564	1441	1360	157	566			158		
tC, single (s)	8.1	6.5	6.3	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	4.4	4.0	3.4	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	98	99	91	94	100	100	94			100		
cM capacity (veh/h)	42	78	506	53	78	495	893			794		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	48	3	803	566
Volume Left	1	3	51	0
Volume Right	46	0	1	3
cSH	377	53	893	794
Volume to Capacity	0.13	0.06	0.06	0.00
Queue Length 95th (ft)	11	4	5	0
Control Delay (s)	15.9	77.0	1.5	0.0
Lane LOS	C	F	A	
Approach Delay (s)	15.9	77.0	1.5	0.0
Approach LOS	C	F		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	162	37	19	963	620
v/c Ratio	0.47	0.21	0.08	1.27	0.65
Control Delay	11.3	21.6	16.6	150.3	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	21.6	16.6	150.3	11.5
Queue Length 50th (ft)	8	10	4	~403	110
Queue Length 95th (ft)	44	29	17	#545	176
Internal Link Dist (ft)	578		441	1146	882
Turn Bay Length (ft)					
Base Capacity (vph)	348	177	233	757	947
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.21	0.08	1.27	0.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	13	109	31	12	4	120	663	26	5	491	24
Future Volume (vph)	14	13	109	31	12	4	120	663	26	5	491	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.89		1.00	0.96			1.00			0.99	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1329		1203	1217			1538			1629	
Flt Permitted		0.96		0.74	1.00			0.83			0.99	
Satd. Flow (perm)		1287		941	1217			1291			1615	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	17	15	130	37	14	5	143	789	31	6	585	29
RTOR Reduction (vph)	0	105	0	0	4	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	57	0	37	15	0	0	961	0	0	617	0
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	9%	54%	26%	50%	50%	50%	24%	20%	63%	20%	16%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		10.0		10.0	10.0			31.0			31.0	
Effective Green, g (s)		10.0		10.0	10.0			31.0			31.0	
Actuated g/C Ratio		0.19		0.19	0.19			0.58			0.58	
Clearance Time (s)		6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)		242		177	229			755			944	
v/s Ratio Prot					0.01							
v/s Ratio Perm		c0.04		0.04				c0.74			0.38	
v/c Ratio		0.23		0.21	0.07			1.27			0.65	
Uniform Delay, d1		18.2		18.2	17.7			11.0			7.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		2.3		2.7	0.5			133.0			3.5	
Delay (s)		20.5		20.8	18.2			144.0			10.9	
Level of Service		C		C	B			F			B	
Approach Delay (s)		20.5			19.9			144.0			10.9	
Approach LOS		C			B			F			B	

Intersection Summary			
HCM 2000 Control Delay	83.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	112	58	728	564	23
Future Volume (Veh/h)	15	112	58	728	564	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	19	138	72	899	696	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1753	710	724			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1753	710	724			
tC, single (s)	6.6	6.5	4.4			
tC, 2 stage (s)						
tF (s)	3.7	3.6	2.5			
p0 queue free %	75	65	91			
cM capacity (veh/h)	75	390	767			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	157	971	724
Volume Left	19	72	0
Volume Right	138	0	28
cSH	259	767	1700
Volume to Capacity	0.61	0.09	0.43
Queue Length 95th (ft)	90	8	0
Control Delay (s)	38.2	2.6	0.0
Lane LOS	E	A	
Approach Delay (s)	38.2	2.6	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	800	29	5	679	0	43	0	14	0	0	0
Future Volume (Veh/h)	0	800	29	5	679	0	43	0	14	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	0	988	36	6	838	0	53	0	17	0	0	0
Pedestrians								8			3	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	841			1032			1864	1867	1014	1876	1885	841
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	841			1032			1864	1867	1014	1876	1885	841
tC, single (s)	4.1			4.1			7.5	6.5	6.8	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.8	4.0	3.8	3.5	4.0	3.3
p0 queue free %	100			99			0	100	93	100	100	100
cM capacity (veh/h)	801			676			44	72	227	50	70	367

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	1024	6	838	70	0
Volume Left	0	6	0	53	0
Volume Right	36	0	0	17	0
cSH	801	676	1700	55	1700
Volume to Capacity	0.00	0.01	0.49	1.27	0.00
Queue Length 95th (ft)	0	1	0	154	0
Control Delay (s)	0.0	10.4	0.0	335.9	0.0
Lane LOS		B		F	A
Approach Delay (s)	0.0	0.1		335.9	0.0
Approach LOS				F	A

Intersection Summary			
Average Delay	12.2		
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	578	38	71	651	46	251
Future Volume (Veh/h)	578	38	71	651	46	251
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	696	46	86	784	55	302
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			749		1682	726
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			749		1682	726
tC, single (s)			4.3		6.7	6.4
tC, 2 stage (s)						
tF (s)			2.4		3.8	3.5
p0 queue free %			89		29	23
cM capacity (veh/h)			767		77	390

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	742	86	784	357
Volume Left	0	86	0	55
Volume Right	46	0	0	302
cSH	1700	767	1700	240
Volume to Capacity	0.44	0.11	0.46	1.49
Queue Length 95th (ft)	0	9	0	525
Control Delay (s)	0.0	10.3	0.0	278.5
Lane LOS		B		F
Approach Delay (s)	0.0	1.0		278.5
Approach LOS				F

Intersection Summary			
Average Delay	50.9		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	595	34	71	681	68	68
Future Volume (Veh/h)	595	34	71	681	68	68
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	735	42	88	841	84	84
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			779		1775	758
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			779		1775	758
tC, single (s)			4.5		6.7	6.4
tC, 2 stage (s)						
tF (s)			2.6		3.8	3.5
p0 queue free %			87		0	78
cM capacity (veh/h)			681		66	377

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	777	929	168
Volume Left	0	88	84
Volume Right	42	0	84
cSH	1700	681	112
Volume to Capacity	0.46	0.13	1.50
Queue Length 95th (ft)	0	11	305
Control Delay (s)	0.0	3.6	336.1
Lane LOS		A	F
Approach Delay (s)	0.0	3.6	336.1
Approach LOS			F

Intersection Summary			
Average Delay	31.9		
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	434	267	796	198	1661	258	327	1048	186
v/c Ratio	0.75	1.14	0.89	0.88	0.28	1.48	0.46	0.51	0.98	0.39
Control Delay	72.6	130.6	80.1	51.2	21.1	252.4	7.6	27.3	65.3	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.6	130.6	80.1	51.2	21.1	252.4	7.6	27.3	65.3	13.1
Queue Length 50th (ft)	106	~395	203	560	91	~932	7	170	422	28
Queue Length 95th (ft)	171	#602	#349	#872	145	#1071	74	254	#629	96
Internal Link Dist (ft)		1174		1250		3769			940	
Turn Bay Length (ft)	135		175		135		450	125		140
Base Capacity (vph)	250	380	313	903	765	1123	559	644	1066	482
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	1.14	0.85	0.88	0.26	1.48	0.46	0.51	0.98	0.39

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	310	103	254	334	422	188	1578	245	311	996	177
Future Volume (vph)	134	310	103	254	334	422	188	1578	245	311	996	177
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.97	1.00	1.00	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	0.96		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1397	1417		1833	2997		1655	3596	1252	1493	3426	1250
Flt Permitted	0.95	1.00		0.95	1.00		0.11	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	1397	1417		1833	2997		1655	3596	1252	1493	3426	1250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	326	108	267	352	444	198	1661	258	327	1048	186
RTOR Reduction (vph)	0	10	0	0	36	0	0	0	168	0	0	94
Lane Group Flow (vph)	141	424	0	267	761	0	198	1661	90	327	1048	92
Confl. Peds. (#/hr)	3		17	17		3			4	4		
Heavy Vehicles (%)	19%	18%	18%	23%	23%	23%	12%	23%	15%	26%	26%	19%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	16.2	31.4		19.6	34.8		51.1	37.5	37.5	50.9	37.4	37.4
Effective Green, g (s)	16.2	31.4		19.6	34.8		51.1	37.5	37.5	50.9	37.4	37.4
Actuated g/C Ratio	0.13	0.26		0.16	0.29		0.43	0.31	0.31	0.42	0.31	0.31
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.1	4.1	2.3	4.1	4.1
Lane Grp Cap (vph)	188	370		299	869		704	1123	391	633	1067	389
v/s Ratio Prot	0.10	c0.30		c0.15	c0.25		0.03	c0.46		c0.06	0.31	
v/s Ratio Perm							0.09		0.07	0.16		0.07
v/c Ratio	0.75	1.15		0.89	0.88		0.28	1.48	0.23	0.52	0.98	0.24
Uniform Delay, d1	50.0	44.3		49.2	40.5		26.8	41.2	30.5	35.7	41.0	30.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.4	93.1		26.4	9.6		0.1	220.4	1.4	0.4	23.6	1.4
Delay (s)	64.3	137.4		75.6	50.2		27.0	261.7	31.9	36.2	64.6	32.1
Level of Service	E	F		E	D		C	F	C	D	E	C
Approach Delay (s)		119.5			56.6			211.7			54.8	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	124.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	136.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	262	68	248	52	155	2002	60	77	1218	166
v/c Ratio	1.02	0.17	1.35	0.14	0.89	1.27	0.09	1.03	0.83	0.22
Control Delay	111.4	7.4	228.4	3.8	64.4	158.2	5.8	162.9	34.7	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.4	7.4	228.4	3.8	64.4	158.2	5.8	162.9	34.7	3.7
Queue Length 50th (ft)	~265	0	~316	0	70	~1298	7	~45	506	5
Queue Length 95th (ft)	#454	32	#498	16	#174	#1432	28	#160	615	41
Internal Link Dist (ft)	619		227			891			3769	
Turn Bay Length (ft)		250		135	120		195	150		260
Base Capacity (vph)	258	395	184	385	175	1571	640	75	1468	744
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.17	1.35	0.14	0.89	1.27	0.09	1.03	0.83	0.22

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	104	64	126	107	49	146	1882	56	72	1145	156
Future Volume (vph)	142	104	64	126	107	49	146	1882	56	72	1145	156
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1701	1153		1248	1118	1330	2725	1078	1163	2703	1240
Flt Permitted		0.50	1.00		0.48	1.00	0.12	1.00	1.00	0.05	1.00	1.00
Satd. Flow (perm)		871	1153		622	1118	162	2725	1078	64	2703	1240
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	151	111	68	134	114	52	155	2002	60	77	1218	166
RTOR Reduction (vph)	0	0	48	0	0	37	0	0	19	0	0	71
Lane Group Flow (vph)	0	262	20	0	248	15	155	2002	41	77	1218	95
Heavy Vehicles (%)	0%	0%	29%	25%	50%	33%	25%	22%	38%	43%	23%	20%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		44.5	44.5		44.5	44.5	86.5	86.5	86.5	81.5	81.5	81.5
Effective Green, g (s)		44.5	44.5		44.5	44.5	86.5	86.5	86.5	81.5	81.5	81.5
Actuated g/C Ratio		0.30	0.30		0.30	0.30	0.58	0.58	0.58	0.54	0.54	0.54
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
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)		258	342		184	331	175	1571	621	75	1468	673
v/s Ratio Prot							0.06	c0.73		0.04	c0.45	
v/s Ratio Perm		0.30	0.02		c0.40	0.01	0.45		0.04	0.52		0.08
v/c Ratio		1.02	0.06		1.35	0.05	0.89	1.27	0.07	1.03	0.83	0.14
Uniform Delay, d1		52.8	37.8		52.8	37.6	24.4	31.8	14.0	68.2	28.5	16.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		60.1	0.1		188.1	0.1	37.3	128.6	0.0	111.5	4.0	0.1
Delay (s)		112.8	37.8		240.8	37.7	61.7	160.3	14.0	179.7	32.5	17.0
Level of Service		F	D		F	D	E	F	B	F	C	B
Approach Delay (s)		97.4			205.6			149.5			38.5	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	111.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	128	104	123	7	6	159
Future Volume (Veh/h)	128	104	123	7	6	159
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Hourly flow rate (vph)	206	168	198	11	10	256
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	417	10	266			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	417	10	266			
tC, single (s)	6.8	6.7	4.5			
tC, 2 stage (s)						
tF (s)	3.8	3.7	2.5			
p0 queue free %	53	82	82			
cM capacity (veh/h)	436	959	1120			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	374	209	10	256
Volume Left	206	198	0	0
Volume Right	168	0	0	256
cSH	577	1120	1700	1700
Volume to Capacity	0.65	0.18	0.01	0.15
Queue Length 95th (ft)	117	16	0	0
Control Delay (s)	22.0	8.5	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	22.0	8.5	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay	11.8		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	106	1	12	0	107	256	2	0	76	6
Future Volume (Veh/h)	0	0	106	1	12	0	107	256	2	0	76	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	115	1	13	0	116	278	2	0	83	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	604	598	86	712	601	279	90			280		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604	598	86	712	601	279	90			280		
tC, single (s)	7.1	6.5	6.6	7.1	7.0	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.7	3.5	4.5	3.3	2.5			2.2		
p0 queue free %	100	100	87	100	96	100	91			100		
cM capacity (veh/h)	374	382	875	283	325	765	1331			1294		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	115	14	396	90
Volume Left	0	1	116	0
Volume Right	115	0	2	7
cSH	875	322	1331	1294
Volume to Capacity	0.13	0.04	0.09	0.00
Queue Length 95th (ft)	11	3	7	0
Control Delay (s)	9.7	16.7	2.9	0.0
Lane LOS	A	C	A	
Approach Delay (s)	9.7	16.7	2.9	0.0
Approach LOS	A	C		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

RIVERFRONT CONNECTOR PLAN

APPENDIX 6:

TECHNICAL MEMORANDUM #4

Land Use and Urban Design

ST. HELENS RIVERFRONT CONNECTOR PLAN

February 2018 DRAFT

CONTENTS

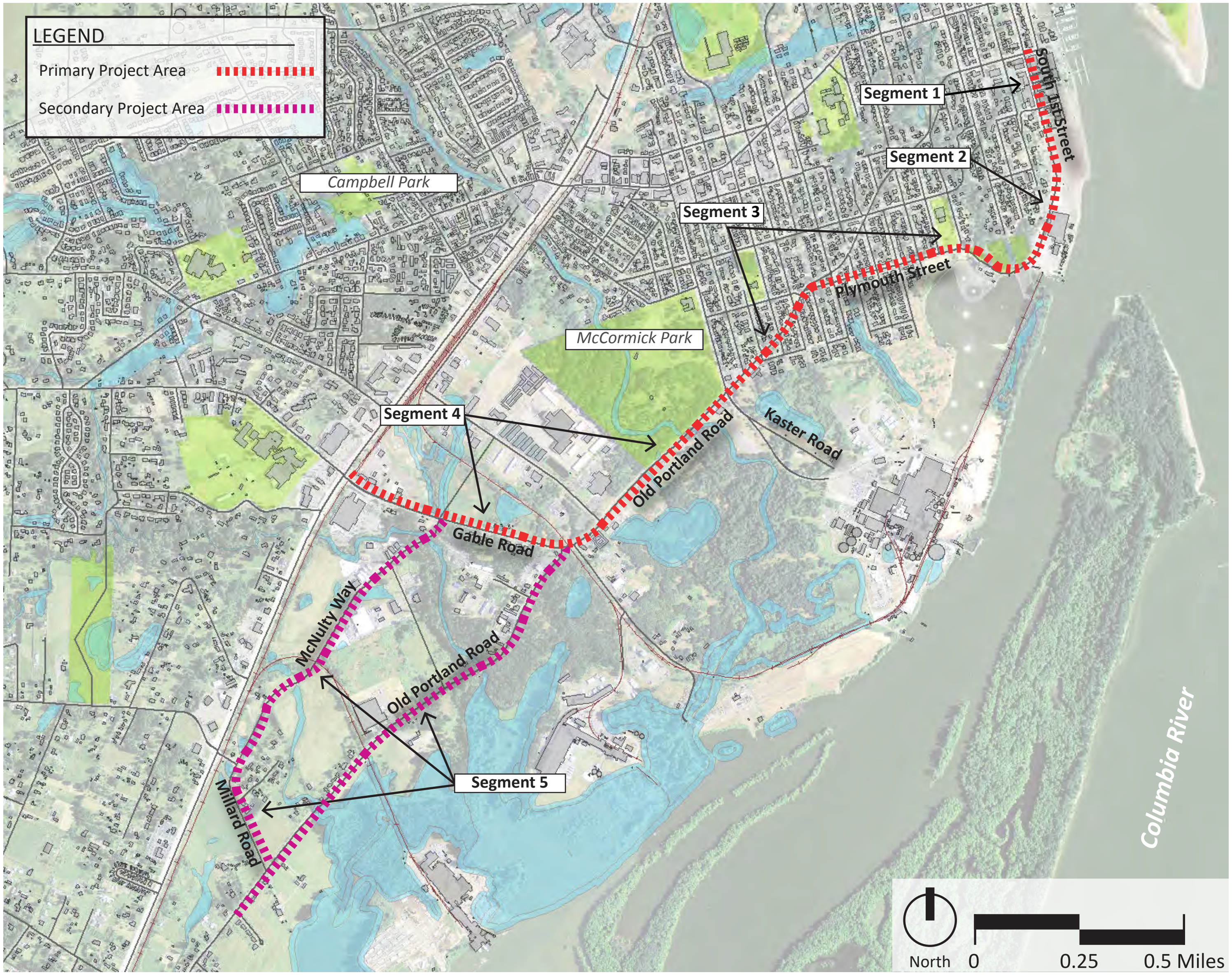
Introduction

This memorandum provides a land use and urban design analysis of the existing and future conditions within the St. Helens Riverfront Connector Project Area. The Project Area is shown in Figure 1 and encompasses the Waterfront Redevelopment Project Area as well as several key intersection areas along Old Portland Road, Gable Road, McNulty Way, Millard Road, and US 30.

The Project Area is divided into two major sections: the Primary Project Area (shown in red in Figure 1) and the Secondary Project Area (shown in purple). The Primary Project Area is the main focus of this project, while the Secondary Project Area represents key alternative routes from US 30 to the Waterfront Redevelopment Project Area and will be considered in less detail throughout this process.

The Project Area is further divided into five segments, which are addressed individually in later portions of this memorandum.

Figure 1. Project Area



Existing Conditions

The intent of this section is to provide a general understanding of the physical and environmental characteristics that could impact the community vision for the future of each corridor segment. This vision will inform the development of planning, design, and implementation standards to facilitate the revitalization of each segment as a viable, aesthetically pleasing, safe and sustainable multi-modal corridor.

A description of each corridor segment is provided based on the roadway configuration, pedestrian realm, and adjacent development.

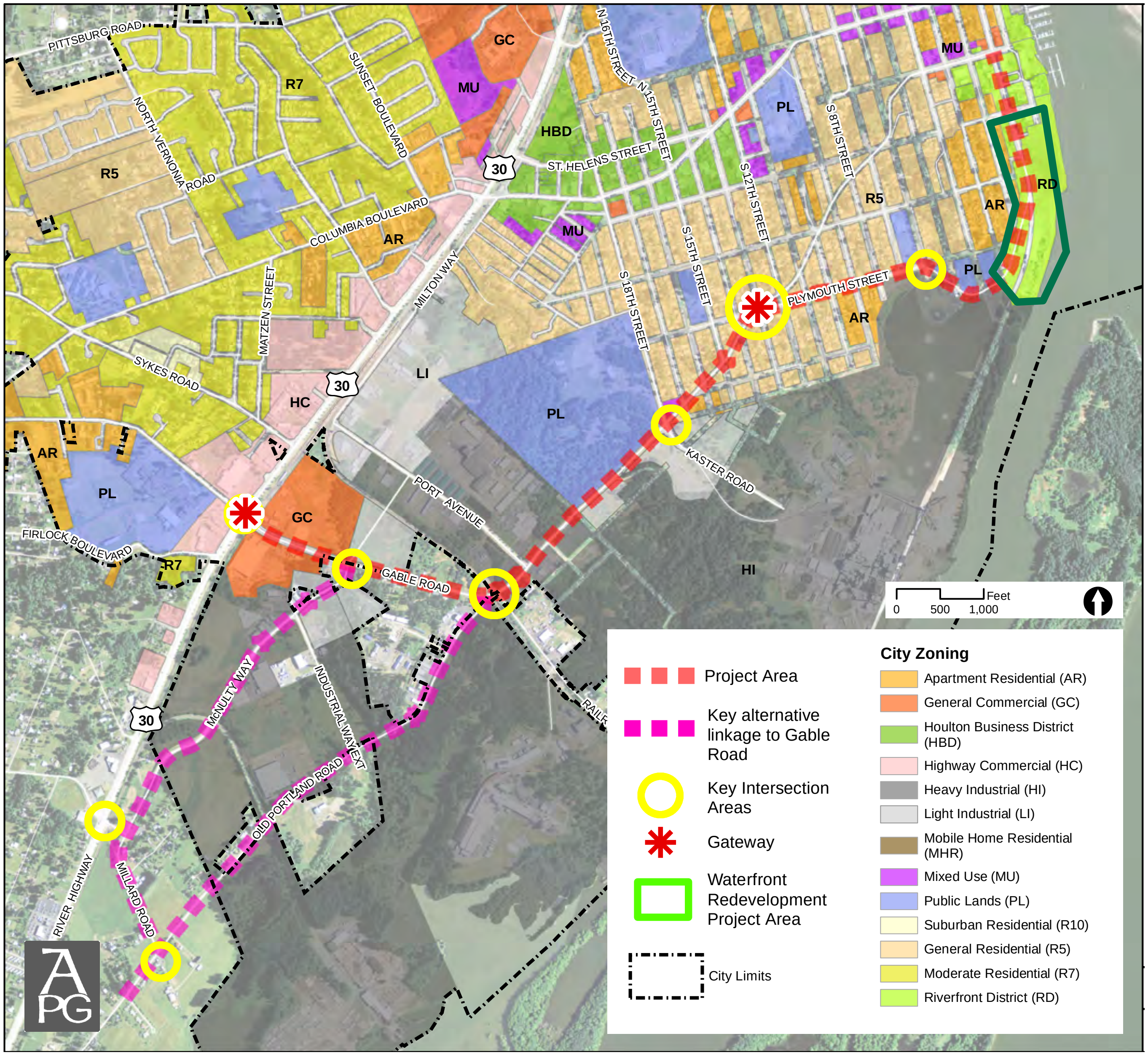
The images and graphics that follow show the typical conditions observed in each corridor segment, providing a visual analysis of the relationships between each of these spaces.

PROJECT AREA ZONING

Figure 2 shows the zoning designations throughout the Project Area, which encompasses land both inside and outside the St. Helens city limits. Land outside the city limits does not have a zoning designation, but does have a comprehensive plan designation that determines the zone that would be applied upon annexation (shown in the following figures).

As seen in Figure 2, the corridor traverses a variety of zones, from mixed use to medium- and high-density residential to industrial and commercial. The following pages describe the zoning, land uses, and existing conditions of the built environment for segments of the Primary and Secondary Project Areas in greater detail.

Figure 2. Project Area Zoning



RIVERFRONT AREA

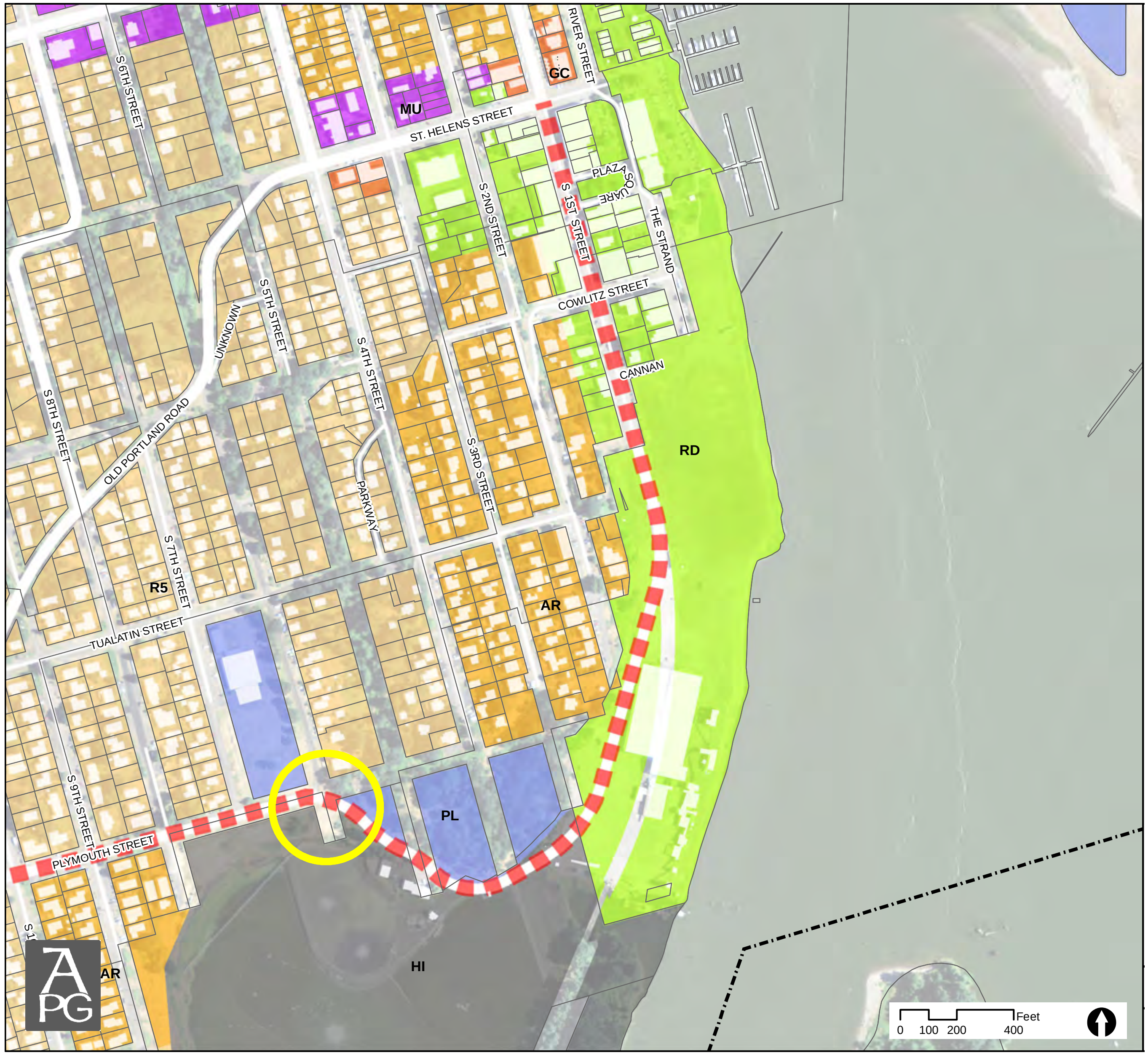
(South 1st Street to South 6th Street and Plymouth Street; Segments 1 and 2)

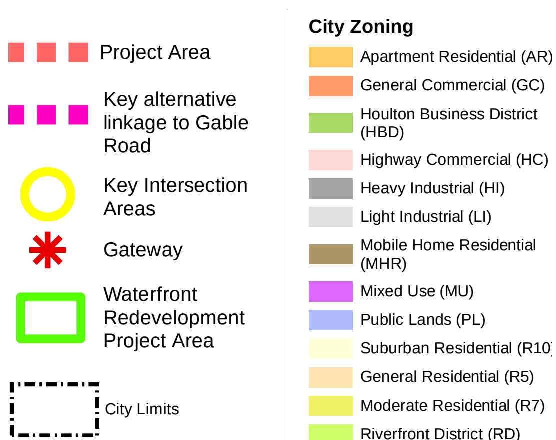
This segment begins at the intersection of South 1st Street and St. Helens Street, running south through the Waterfront Redevelopment Project Area (where there is no roadway currently) and connecting to Plymouth Street near the Nob Hill Nature Park.

Land along South 1st Street is zoned Riverfront District (RD). A variety of commercial uses are located north of the Waterfront Redevelopment Project Area, including the Columbia Theater, legal offices, a brewery, and gift stores. Plaza Square is also located along this corridor segment east of South 1st Street between St. Helens Street and Cowlitz Street. Homes and restaurants are located south of Cowlitz Street.

The existing street dead-ends at the Waterfront Redevelopment Project Area and begins again to the South, adjacent to Nob Hill Nature Park to the north and a City-owned wastewater treatment facility to the south. Land north of the corridor at this location is zoned Public Lands (PL), and the facility to the south is zoned Heavy Industrial (HI).

Figure 3. Riverfont Area (Segments 1 and 2)





Segment 1 – South 1st Street

Roadway Configuration

The South 1st Street segment north of Cowlitz Street is a 80-foot collector street located in close proximity to City Hall in the core of the downtown area. It has two lanes of traffic and is bordered by angled parking to the west and parallel parking to the east. The road is paved with degrading asphalt and concrete curbs. Concrete sidewalks that abut adjacent developed properties are provided on both sides of the street.

Pedestrian Realm

Both sidewalks consist primarily of cracked and deteriorating concrete and are limited in providing streetscape amenities such as benches, decorative lighting, or trees. The curb-tight sidewalk located on the west side of the street is of ample width for pedestrians movement; however, there are utility poles within the sidewalk zone and power lines hanging overhead. The eastern sidewalk is a similar width, but is interrupted by a seven-foot-wide amenity zone containing square-shaped pavers with a few street trees, planting pots, trash receptacles, and benches. In one area of the zone, the pavers have been removed to provide a planting area. Overall, there is no unifying palette of site furnishings or paving materials that are typically used to distinguish or provide identity for a street.

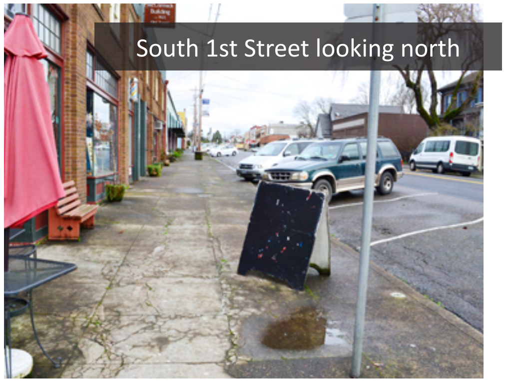
Adjacent Development

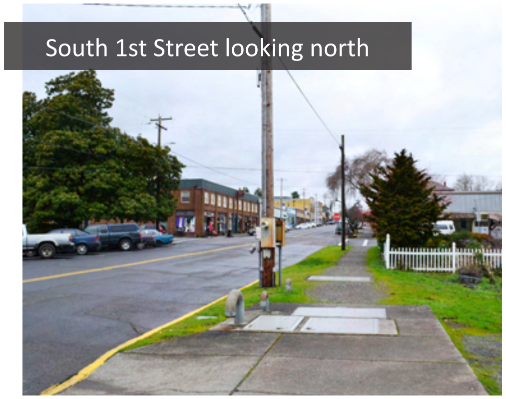
There are one- and two-story buildings containing small retail and office spaces along both sides of South 1st Street. Materials such as plaster, corrugated metal panels, and reddish-brown brick define the form of the building façades. Many of the commercial spaces have storefronts approximately 20 to 30 feet in width and containing street-facing glass windows and doors. Several entrances have overhead awnings defining individual establishments. Amongst these buildings, one residential home remains set back from the sidewalk by approximately 20 feet and has a decorative metal fence separating the front yard from the pedestrian realm.


South 1st Street looking north


South 1st Street looking south

South 1st Street looking north


South 1st Street looking north


South 1st Street looking north


South 1st Street looking south


South 1st Street looking south

Segment 2 – Riverfront District Area

Roadway Configuration

The South 1st Street segment south of Cowlitz Street is a collector street with a generally 80-foot ROW located at the southern end of the downtown area. It has two lanes of traffic and is bordered by angled parking to the west and parallel parking to the east. The road is paved with degrading asphalt and concrete curbs. Concrete sidewalks and gravel paths are provided along several areas of the street. South 1st Street ends at the edge of the former Veneer Property in the Waterfront Redevelopment Project Area.

Pedestrian Realm

A 15-foot-wide curb-tight concrete sidewalk runs along the west side of the street for half a block. A narrower 8-foot concrete path, separated from the concrete curb by a seven-foot landscape area, continues south from the western sidewalk and terminates where the road comes to a dead-end. On the eastern side of South 1st Street a gravel path—approximately two to three feet in width—begins just south of Cowlitz Street and connects to a concrete driveway and eight-foot-wide sidewalk. The concrete sidewalk on the east terminates where it abuts the former Veneer Property. Both sidewalks have evidence of deterioration and cracking. Several utility poles supporting power lines are scattered throughout both sides of the street within the sidewalk zone. There are no street trees or identifiable planting areas except for those located on adjacent properties. Additionally, no site furnishings (such as trash receptacles, ornamental pedestrian lights, or benches) are located within the pedestrian realm along this corridor segment.

Adjacent Development

Adjacent properties include a several residential homes, one of which is currently used as a single-occupant office building. There are also two restaurants in this corridor segment, one of which includes an outdoor patio surrounded by a white-picket-style fence. Near the southern end of the corridor segment the former Veneer Property is surrounded by a chain-link fence, with the exception of one opening that provides the opportunity for pedestrians to enter the open area and traverse a gravel path toward the southernmost end of the property. This area is also surrounded by a chain-link fence and has a secured gate at the end of Plymouth Street, as well as a wooden staircase leading to Nob Hill Nature Park.

South 1st Street looking south

Existing Undeveloped Waterfront Area

The St. Helens Waterfront Framework Plan (adopted in 2016) provides a conceptual design for the extension of South 1st Street to Plymouth Street. For the purposes of this project, the conceptual design (see below) will serve as a starting point for this project and be reviewed and recommendations or alterations to the design will be provided. Proposed designs of the street will maintain its designation as a collector per the City's 2011 Transportation System Plan (TSP).

Existing waterfront area

Proposed South 1st Street conceptual design

Potential pedestrian connection to the future waterfront area

Existing staircase & trail to Nob Hill Nature Park

South end of the waterfront area at Plymouth Street


Rendering of future St. Helens waterfront

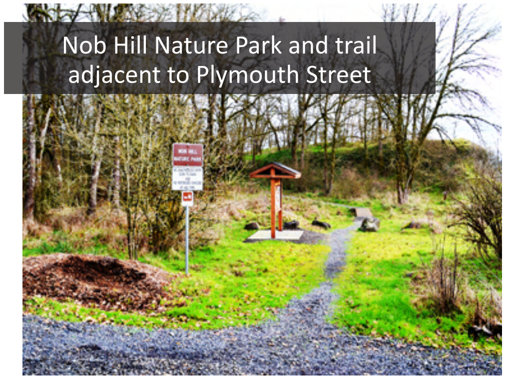

View of existing waterfront area

RESIDENTIAL AREA

(Plymouth Street and Old Portland Road to Kaster Road; Segment 3)

This segment of Old Portland Road and Plymouth Street traverses residential lands with General Residential (R5), Apartment Residential (AR), and some Mixed Use (MU) zoning. Johnny's Bar and Grill at South 18th Street and the National Guard building at South 7th Street are the only non-residential uses along this corridor segment; the remainder of the uses are residential and include single-family homes and apartments.

Figure 4. Residential Area (Segment 3)


Nob Hill Nature Park and trail adjacent to Plymouth Street


Plymouth Street looking toward the waterfront area


Residential area along Plymouth Street

Segment 3 – Plymouth Street and Old Portland Road

Roadway Configuration

Segment 3 includes portions of Plymouth Street (east of Old Portland Road), a collector with an 80-foot ROW, and Old Portland Road (between Plymouth Street and Kaster Road), a 60-foot minor arterial. The majority of this corridor segment resides within a residential area consisting of mostly single-family homes, with several multi-family buildings. The asphalt roadway consists of two travel lanes with no curb-tight sidewalks except in front of one home that has been converted to a child care facility. Several residential driveways connect to the street, which vary in both width and materials, including gravel, concrete, and asphalt. The road terminates near the St. Helens Sewage Treatment Facility and the southern end of the former Veneer Property. There are no designated or defined parking areas; however, vehicles can occasionally be found parked along the side of the road.

Pedestrian Realm

Pedestrian facilities are mostly non-existent with the exception of a partial gravel and asphalt path located on the south side of the street. The path is not clearly defined or maintained and is not ADA compliant. On the north side of the street pedestrians and cyclists typically navigate along the edge of the road through gravel and lawn or within the travel lane. Utility poles, traffic signs, and individual residential mailboxes are scattered throughout the area adjacent to the street. Cobra-style street lights provide the primary source of illumination for the pedestrian realm.

Adjacent Development

Adjacent properties consist of single- and multi-family residences. Most structures are set back from the existing road at least 30 feet and are separated by a gravel or lawn area. Frequently, these areas are used by residents as impromptu parking spaces, as well as for landscaping and fencing. Similar to Segment 2, a portion of the corridor on Plymouth Street is bordered by Nob Hill Nature Park. A trail leading out of the park ends at a gravel shoulder adjacent to the road. One business establishment—a restaurant—resides at the southernmost end of Old Portland Road at Kaster Road and is set back approximately 50 feet. The establishment is easily accessible from the road and has an asphalt driveway with a designated parking area.

Plymouth Street looking east

INDUSTRIAL AND COMMERCIAL AREA

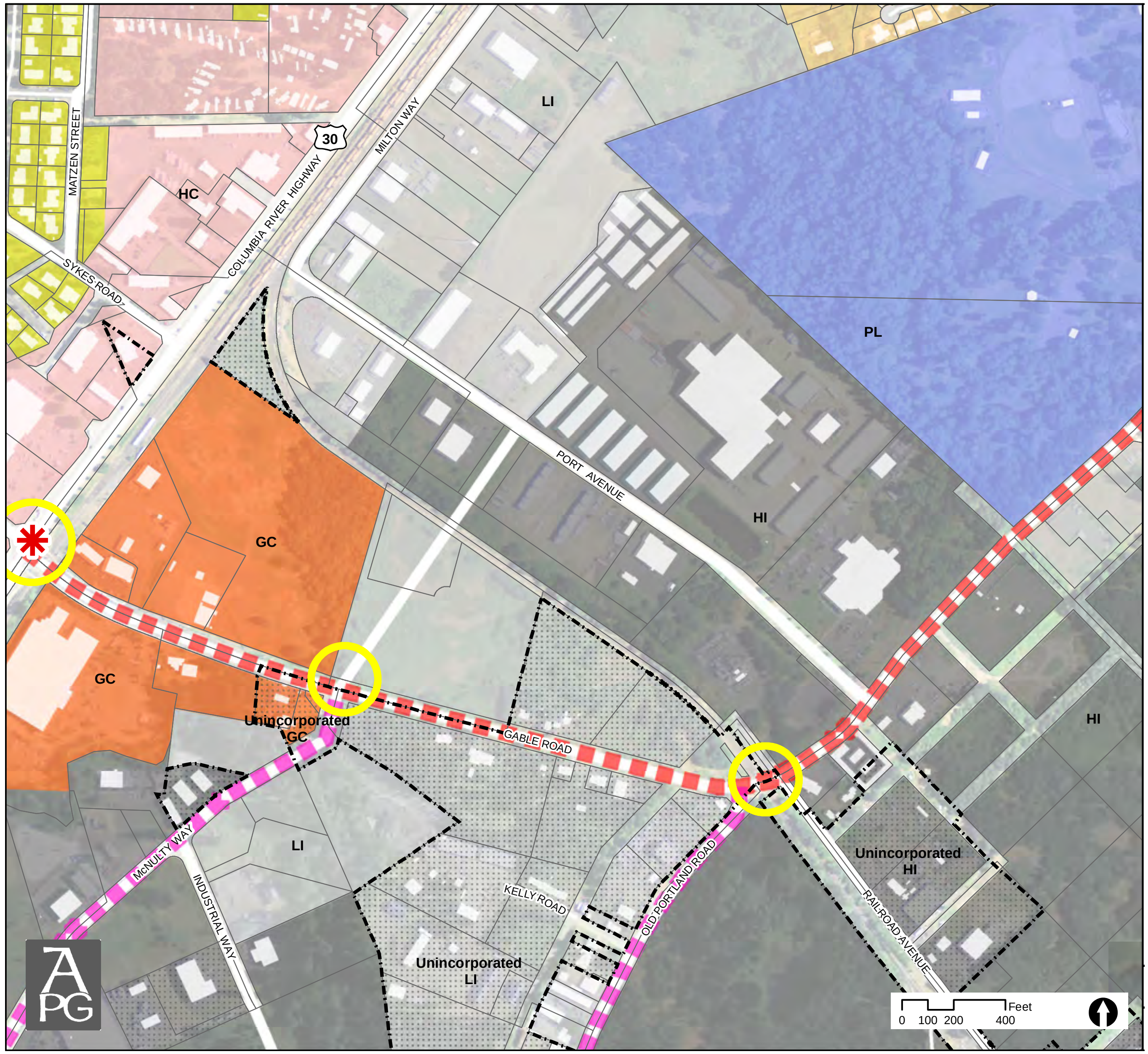
(Old Portland Road and Gable Road to US 30; Segment 4)

Land along Gable Road/Old Portland Road from US 30 to Kaster Road contains a mix of General Commercial (GC), incorporated and unincorporated Light Industrial (LI), High Industrial (HI), and Public Land (PL) designations. Commercial uses are located near US 30 and include Walmart, a strip mall, at least one residence, and what appears to be an industrial trucking facility.

Land zoned LI and HI is located to the east of the McNulty Way. Uses include the McNulty Creek Industrial Park, a battery and auto parts sales location, a bar, several homes, a self-storage facility, and the Columbia County Sherriff's Office. Port Avenue provides access to large industrial uses located to the northwest.

McCormick Park is located to the north of Gable Road, though there is no access from Old Portland Rd.

Figure 5. Industrial and Commercial Area (Segment 4)



Project Area

Key alternative linkage to Gable Road

Key Intersection Areas

Gateway

Waterfront Redevelopment Project Area

City Limits

City Zoning

- Apartment Residential (AR)
- General Commercial (GC)
- Houlton Business District (HBD)
- Highway Commercial (HC)
- Heavy Industrial (HI)
- Light Industrial (LI)
- Mobile Home Residential (MHR)
- Mixed Use (MU)
- Public Lands (PL)
- Suburban Residential (R10)
- General Residential (R5)
- Moderate Residential (R7)
- Riverfront District (RD)


Curb-tight concrete sidewalk and bike lane on Old Portland Road looking north


Bike path and bridge over Milton Creek


Grass conveyance ditch and bike lane on Gable Road looking north

Segment 4 – Old Portland Road and Gable Road

Roadway Configuration

Old Portland Road (south of Kaster Road) and Gable Road to US 30 are both minor arterials with a ROW generally greater than 60 feet. Old Portland Road and Gable Road both have two lanes of traffic and are bordered by a five-foot shoulder designated as a bike lane. Curb-tight concrete sidewalks are provided on both sides of the street where Gable Road meets US 30, and north of Port Avenue on the west side. There are two railroad crossings: one at the intersection of Old Portland Road and Railroad Avenue, and the other at Gable Road before it crosses US 30. The street is typically bordered by gravel, lawn, or low-lying shrubs. Stormwater runoff from the road tends to collect in these areas, with the exception of a few conveyance ditches adjacent to several developed properties. Along Old Portland Road, south of Kaster Road, a bridge with separated bicyclee and pedestrian paths crosses Milton Creek.

Pedestrian Realm

Few sidewalks or other pedestrian facilities exist along the majority of this corridor segment, and there are no street trees or landscaped areas. Pedestrians are forced to navigate within a dedicated asphalt bike lane or along grass or gravel shoulders. Cobra-style lighting provides the only form of illumination throughout the pedestrian realm. Utility poles, signage, and mailboxes reside in the realm, and in some locations impede pedestrian travel.

Adjacent Development

Development within this segment is a mixture of light industrial buildings, a public park, an institutional facility, and several single-family homes, as well as an area of concentrated retail near the intersection with US 30. A majority of the buildings are set back from the street edge by anywhere from 25 to 100, and often have gravel or asphalt driveways for vehicular travel. Several businesses also have chain-link fencing surrounding their properties providing visual barriers from the road. A small commercial development exists on the north side of Gable Road near the intersection of Old Portland Road and US 30. The development, set back 70 or more feet from the road, consists of several small businesses and includes an asphalt parking lot surrounded by narrow landscaping. Across Gable Road from the development is a large retail store set back about 50 feet, which includes a large asphalt parking lot surrounded by landscaping and existing patches of mature trees. McCormick Park borders the corridor along Old Portland Road, although there is no vehicle access from Old Portland Road. The Columbia County Jail and Sheriff's Office are also located near this area and are set back 150 feet from the road.

Intersection of Old Portland Road, Gable Road, and railway

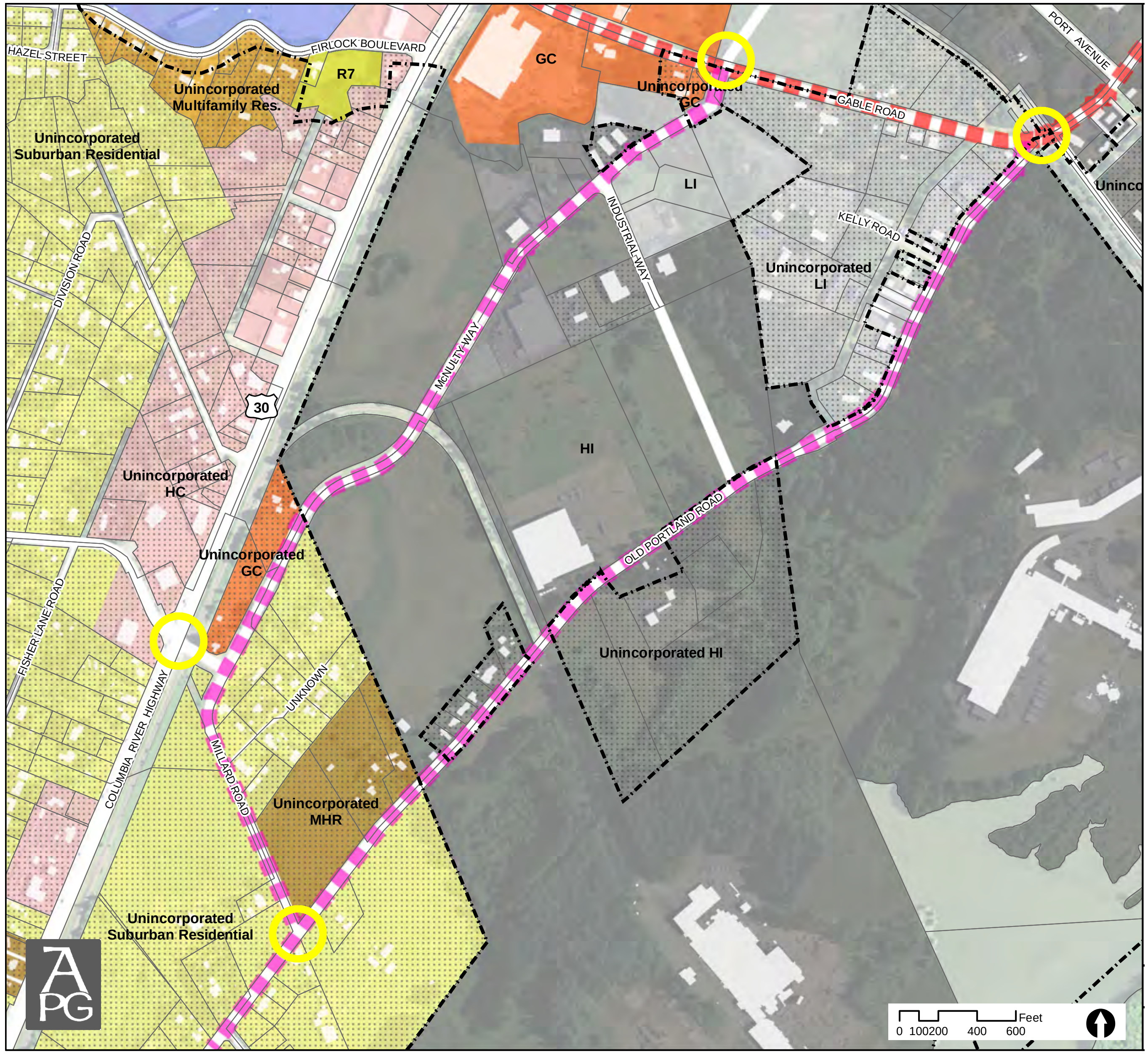
LINKAGE AREA

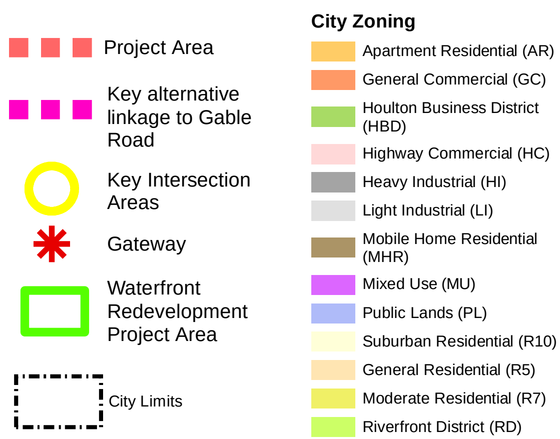
(McNulty Way, Millard Road, and Old Portland Road south of Gable Road; Segment 5)

Land south of Gable Road is a mix of Light Industrial (LI) and Heavy Industrial (HI) zones, both inside and outside city limits. These parcels are largely vacant, and much of the land southeast of Old Portland Road in this corridor segment is located near or within the floodplain. Typical land uses include self-storage facilities, appliance sales and services, manufacturing, and the Columbia Drainage Vector Control District offices. Several homes are located along Old Portland Road on unincorporated HI land.

The current city limits lie at the southern end of this segment near the intersection of Millard Road and US 30, and unincorporated Suburban Residential and Mobile Home Residential lands are present. Much of this land appears vacant. Unincorporated land near US 30 and Millard Road is zoned General Commercial (GC) and contains homes and small pastures.

Figure 6. Industrial and Commercial Area (Segment 5)






Conveyance ditch on Old Portland Road


Gravel shoulder on Old Portland Road


Bike lanes on McNulty Way

Segment 5 – Old Portland Road, McNulty Way, and Millard Road

Roadway Configuration

The three sections of road in this corridor segment each consist of two travel lanes. There are two railroad crossings: one on McNulty Way, and the other on Old Portland Road. McNulty Way is the only road with dedicated bike lanes, which are accessible along a majority of the street. It is also the most developed street, and includes curb-tight sidewalks or concrete curbs. Stormwater runoff is captured by catch basins located along both sides of the street in the concrete curbs and then conveyed into a storm drainage system. Millard Road and Old Portland Road contain no sidewalks or paths for safe pedestrian or bicycle travel, and have stormwater ponds on both sides of the road.

Pedestrian Realm

McNulty Way is the only road that provides concrete sidewalks for pedestrian travel; however, the sidewalks are fragmented and not continuous throughout the street. Street trees are absent from the area, with only a few that are minimally landscaped located along the corridor segment. On the west side of the road cobra-style lights are regularly spaced and serve as the only form of illumination. There is no source of lighting for any type of pedestrian or bicycle travel along Millard Road or Old Portland Road in this corridor segment.

Adjacent Development

On the northern end of McNulty Way and Old Portland Road adjacent development is a mix of single-story commercial and light industrial buildings. Setbacks for development in this area are typically greater than ten feet and consist primarily of minimally-landscaped front yards and parking areas. Architecturally, these buildings are utilitarian in function. Most have asphalt driveways or gravel areas for vehicle access or parking. At the southern end of McNulty Way and Old Portland Road, and along Millard Road, residential homes of various sizes and characteristics populate the area. Most are set back at least 20 feet from the road and have asphalt or gravel driveways.

Millard Road at Old Portland Road

SUMMARY OF DEVELOPMENT CODE REQUIREMENTS

Table 1 below presents a summary of the types of uses permitted outright and conditionally for zones within the Project Area. The use provisions specify that non-residential zones are subject to site development provisions in St. Helens Municipal Code (SHMC) Chapter 17.96, as well as several other supplemental development regulations in the code (with some exceptions). Conditional uses are subject to the provisions found in SHMC Chapter 17.100.

The use provisions outlined in Table 1 compare in the following ways between zones:

- **Riverfront Zones**. The Riverfront District (RD) zone represents land along the St. Helens waterfront that is not designated principally as industrial or residential. This land is intended to provide for a mix of uses, and generally offers greater public access and interaction with the Columbia River or Multnomah Channel. The Riverfront District is comprised of three subdistricts, two of which are located in the Project Area. The Riverfront Plaza (RD-Plaza) subdistrict is intended to provide a mix of residential and commercial uses to revitalize the City's historic core. The Riverfront Mill (RD-Mill) subdistrict is applied to the vacant mill property, formerly the Veneer Property, to allow it to develop with a new mix of uses.
- **Residential Zones**. Uses permitted outright are the same for the General Residential (R)5 and Apartment Residential (AR) zones with the exception of multi-family dwellings, which are permitted outright in the AR zone but only conditionally in the R5 zone. Additional uses are permitted conditionally in the AR zone as well, including schools, hospitals, and care facilities.
- **Mixed Use Zone.** The Mixed Use (MU) zone blends City's commercial and residential zones. It permits commercial uses similar to those in the General Commercial (GC) zone. These uses do not need to be vehicle- or motorist-oriented to be permitted outright, as is required in the Highway Commercial (HC) zone. Like the R5 zone, the MU zone permits multi-family dwellings and auxiliary dwelling units conditionally; however, like other commercial zones, multi-family dwellings are permitted outright when located over ground floor non-residential uses.
- **Industrial Zones**. The Light Industrial (LI) and Heavy Industrial (HI) zones are intended to provide appropriate locations for industrial uses. The LI zone limits uses to those that have fewer nuisance characteristics, while the HI zone allows for more impactful uses.

Building Height

Building heights, in conjunction with building setbacks, help provide a sense of enclosure and place along a corridor. Limiting building heights to a more human scale and orientation contributes to the character of an area, and offers a more traditional small-town feel. As shown in Table 2, maximum building heights in the Project Area are generally limited to three to four stories for commercial and mixed use zones (GC, MU, and RD), and two to three stories in residential zones (R5 and AR). Building heights are determined on an individual basis in more specialized zones such as Public Lands (PL).

SHMC 17.68.040 establishes additional limitations and exceptions to building height regulations for individual zones. These provisions include building height criteria related to scenic resources, which only affect the riverfront segment of the Project Area. These requirements specify that no new development over one story (or 15 feet in height) located on a lot that fronts South 2nd Street, North or South 1st Street, or River Street shall significantly obstruct views of the Columbia River. Building height criteria for scenic resources do not apply to the Riverfront Mill subdistrict.

Another set of height-related development regulations are the City's vision clearance area regulations (SHMC Chapter 17.76). These provisions more directly address the streetscape. They create a triangular area at the intersection of streets, railroads, and driveways in which there shall be no obstructions taller than three feet, except "the occasional utility pole" and trees whose branches must be removed up to eight feet in height.

Building Setbacks

As noted in the previous section, building setbacks—particularly front and side setbacks—can play a significant role in the sense of enclosure and place experienced on the sidewalk and the street. This is of particular importance in the downtown and riverfront areas, where the City aims encourage redevelopment. Building setbacks for zones in the Project Area are summarized in Table 2.

Lot Coverage and Landscaping

Similar to the way that setback requirements regulate where buildings will be located on a site, lot coverage requirements regulate the extent to which buildings can cover a site. Like setbacks, this also influences how people experience buildings from the sidewalk and street. The commercial and mixed use zones in the Project Area (GC, MU, and RD) allow for relatively high lot coverages. In the RD-Plaza zone, where the City wants to encourage development and redevelopment and reinforce a traditional small-town look and feel, 100% lot coverage is permitted in exchange for a fee that is put toward the district's capital improvement accounts (SHMC 17.32.170 and SHMC 17.32.175).

Landscaping requirements are related to lot coverage standards in the City's code and can also affect the look and feel of development in an area. As seen in Table 2, any part of the lot that is not covered by a building should be landscaped. City landscaping and screening provisions (SHMC Chapter 17.72) apply both to the construction of new structures and to changes in use for existing structures, with the exception of single-family and two-family dwellings or other uses that do not require site design review or a conditional use permit. Landscaping and screening provisions primarily address on-site requirements. Landscaping in the right-of-way (such as street trees or planters) is considered part of the streetscape. SHMC Chapter 12.06 (Street Trees and Street Improvements) and SHMC 17.72.030 (Street trees) specify the conditions under which the City and property owners must provide street trees, as well as exceptions to those conditions.

OTHER DEVELOPMENT REQUIREMENTS

Vehicle Parking and Loading

Minimum off-street parking requirements are established according to land uses found in SHMC 17.80. Parking issues that have the most impact on the streetscape include whether parking is permitted between the building and the sidewalk (in the front yard setback) and the extent to which parking requirements must be met on-site (i.e. how much of the site must be devoted to parking).

Bicycle Parking

The provision of bicycle parking is an important aspect of encouraging biking in a community, and can also be a contributing element of the streetscape. Currently, bicycle parking is required for multi-family dwellings and for commercial, civic and institutional, and industrial uses in St. Helens, pursuant to SHMC 17.80.020(15). The minimum number of required bicycle parking spaces is generally scaled to the number of required vehicle parking spaces. Bicycle parking must be constructed within 50 feet of primary building entrances and not within landscaped areas or pedestrian ways. Covered bicycle parking should be provided where possible.

ALLOWED USES

Table 1 below describes the typical uses allowed for zones within the Project Area. As development and redevelopment occurs within St. Helens, these are the types of uses that would be expected.

Table 1. Allowed Uses

Zone	Uses Permitted Outright	Uses Permitted Conditionally
R5	• Single-dwelling unit, detached • Single-dwelling units, attached (five units maximum) • Duplex dwelling units • Public parks • Residential facilities and homes • Minor public facilities	• Auxiliary dwelling units • Multi-dwelling units • Bed and breakfast and boarding houses • Children's day care/nursery • Elderly/convalescent home • Private parks and commercial recreation facilities • Cultural exhibits and library services • Religious assembly • Neighborhood stores/plazas • Major public facilities
AR	• Single-dwelling unit, detached • Single-dwelling units, attached (five units maximum) • Duplex dwelling units • Multi-dwelling units • Public parks • Residential facilities and homes • Minor public facilities	• Auxiliary dwelling units • Multi-dwelling units • Hospitals and care homes • Schools and related facilities • Bed and breakfast and boarding houses • Children's day care/nursery • Private parks and commercial recreation facilities • Cultural exhibits and library services • Civic/Religious Assembly • Neighborhood stores/plazas • Parking facilities • Major public facilities
MU	• Retail sales establishments • Offices • Personal and business services • Eating and drinking establishments • Small equipment sales, rental and repairs • Retail product maintenance and repair • Cultural and library services • Produce stands • Dwellings: single-dwelling detached or attached, duplexes, and multi-dwelling above permitted uses • Residential facilities and homes • Minor public facilities	• Drive-up businesses and services • Parking lots • Vehicle repair, service, and sales • Transit and rail stations • Bars • Bed and breakfast facilities and boarding houses • Child care facility/nursery • Hospitals and senior or convalescent care facilities • Residential facilities and homes • Multi-dwelling units • Auxiliary dwelling units • Dwellings on same level as nonresidential use • Parks and recreational facilities • Schools • Religious assembly • Major public facilities

Zone	Uses Permitted Outright	Uses Permitted Conditionally
RD-Plaza	• Residential units above a permitted nonresidential use (single-family, duplex, townhouse, and multi-family dwellings) • Public and institutional uses, historic/cultural facilities, civic assembly • Educational facilities, libraries, schools • Government administrative facilities/offices • Lodge, fraternal and civic assembly • Parking lots, public • Major and minor public facilities • Public or private parks and recreation facilities • Public safety and support facilities • Workshops, art studios and galleries • Hotels, motels, and bed and breakfast facilities • Business and personal services • Eating and drinking establishments, bars • Offices, financial institutions • Health and fitness clubs • Repair and maintenance facilities/shops • Retail sales (without outdoor storage) • Trade and skilled services without outdoor storage • Transient housing • Watercraft sales, rental, charters, without outdoor storage	• Bus and train stations/terminals • Business with outdoor storage (those businesses permitted in permitted uses) • Child care facilities • Hospitals and medical facilities • Laundromats and dry cleaners • Marijuana dispensary • Religious assembly excluding cemeteries • Private parking lots/facilities
RD-Mill	• Dwellings (duplex, townhouse, and multi-family dwellings), • Dwellings above nonresidential permitted use (single-family, duplex, townhouse, and multi-family dwellings) • Public and institutional uses, historic/cultural facilities, civic assembly • Educational facilities, libraries, schools • Government administrative/office • Public parking lots • Major and Minor public facilities • Parks, recreation facilities • Public safety and support facilities • Workshops, art studios and galleries • Medical facilities • Hotels, Bed and breakfasts • Offices, business and personal services • Eating and drinking establishment • Retail sales establishments without outside storage • Marina, Docks, Boat launching, moorage facilities, and charter services • Houseboats and Boathouses • Marina commercial, boat or marine equipment sales, service, storage, rental or repair	• Bus and train stations/terminals • Business with outdoor storage (those businesses permitted in permitted uses) • Child care facilities • Hospitals and medical facilities • Laundromats and dry cleaners • Religious assembly excluding cemeteries • Private parking lots/facilities • Postal services • Communication services • Boat building
PL	• Cultural exhibits and library services • Parks and playgrounds • Schools and colleges • Minor public facilities	• Hospitals • Major public facilities

Zone	Uses Permitted Outright	Uses Permitted Conditionally
GC	• Retail sales establishments • Offices • Personal and business services • Dwellings above permitted uses • Eating and drinking establishments • Small equipment sales, rental and repairs • Retail product maintenance and repair • Cultural and library services • Produce stands • Minor public facilities	• Drive-up businesses and services • Parking lots • Vehicle repair, service, and sales • Transit and rail stations • Bars • Bed and breakfast facilities and boarding houses • Child care facility/nursery • Hospitals and senior or convalescent care facilities • Residential facilities • Multi-dwelling units • Parks and recreational facilities • Schools • Civic assembly • Religious assembly • Major public facilities
HI	• Agricultural supplies/sales, machinery sales and repairs, heavy equipment sales and service, motor vehicle sales and service, slaughterhouses or tanneries (carried out in an enclosed building) • All manufacturing, repairing, compounding, research, assembly, fabricating, or processing activities without off-site impacts • Building material sales including outdoor storage • Commercial gasoline stations • Nursery/greenhouse • Public facility, minor • Transmitting and/or receiving towers • Wholesaling and warehousing	• Caretaker dwelling • Adult entertainment • Hazardous waste collection and/or treatment site • Manufacture, repair, etc., with some off-site impact • Sand, gravel, and mining operation and related storage • On-site retailing of product manufactured on site • Permitted uses which require special permits from the Oregon Department of Environmental Quality • Public parks • Public facilities, major • Public safety and support facilities • Recycling collection center, waste disposal or transfer • Storage of hazardous items • (n) Storage facilities such as personal lockers/garages and for recreational-type vehicles • Travel trailer parks • Wrecking and junkyards
LI	• Manufacturing, repairing, compounding, research, assembly, fabricating, or processing activities of prepared materials, without off-site impacts • Laboratories and research services • Warehousing, enclosed • Wholesale trade • Equipment sales, storage, repair, and rentals • Building supply including outdoor storage • Mini storage and storage site • Vehicle sales, service, repair, and painting • Parking lots • Minor public facilities	• Manufacturing, repairing, compounding, research, assembly, fabricating, processing or packing of resource materials, with some off-site impacts • Industrial park to combine light manufacturing, offices, and complementary related commercial uses • Wrecking and junkyards • Eating and drinking establishments and bars • Child care facilities • Public parks and public and private recreational and amusement facilities • Major public facilities

Building Design

There are no building design standards or guidelines in the City of St. Helens. However, the City has adopted architectural design guidelines that apply within the RD-Plaza and RD-Mill subdistricts in order to support development and design that is complementary to existing historic buildings and the traditional feel of the district—particularly in terms of building materials, scale, features, and orientation. Guidelines and a review process have been adopted into the City's code. The guidelines address awnings and canopies, building façades and entries, building lighting, building signage, and building setback, orientation, and bulk. Historic photos are included in the guidelines for reference.

Table 2. Summary of St. Helens Development Regulations

Zone	Building Height (Maximum)	Building Setback (Minimum / Maximum)	Lot Coverage (Maximum)	Landscaping (Minimum)
GC	45'	No setbacks specified[a]	90%	10%
LI	75' (35' within 100' of residential zones)	Standards shall be determined by proximity to residential zones, anticipated off-site impacts, and other supplemental code chapters		
HI	75' (35' within 100' of residential zones)	The standards for the HI zone shall be determined by the proximity to residential zones and the anticipated off-site impacts.		
R5	35'	Front: 20 feet Side: 5 feet (SFR and duplex), 10 feet (MFR and corner lots) Rear: 10 feet	35% (SFR Detached) 50% (SFR attached and MFR)	25%[b]
AR	35'	Front: 20' Side: 5 feet (SFR detached), 10 feet (SFR attached, duplex, MFR, and corner lots) Rear: 10 feet	50%	25%[b]
MU	45'	Buffer and screening requirements	90% (non-residential), 35% (SFR) 50% (multi-family)	-
PL	-	Standards shall be determined by proximity to residential zones, anticipated off-site impacts, and other supplemental code chapters		
RD-Mill	55'	No minimum, except where abutting residential districts.	90%	10%
RD - Plaza	45'	No minimum, zero maximum front setback, except where abutting residential districts.	90%, or 100% with payment of fee.	10%

a Proposed setbacks are subject to site development review, SHMC Chapter 17.96.

b Except for multi-family dwellings. SHMC 17.64.030 establishes special development standards for multi-dwelling housing.

NONCONFORMING USES AND CODE VIOLATIONS

A “Nonconforming Use” is something that is not allowed by a property’s current zoning. Typically, these uses predate the zoning applied to the property. A nonconforming use may face difficulty expanding or redeveloping, and may cause other issues for planning staff and property owners.

- There are several residential uses along Old Portland Road (South of Gable Road) in areas that have an industrial zoning or comprehensive plan designation. Residential uses are extremely limited in the City’s industrial zones; only a caretaker dwelling related to another principle (and allowed) use are permitted.
- There are nonconforming dwellings in commercial and industrial areas) along the south side of Gable Road. Sanitary sewer is a challenge here.
- Industrial parks are a conditional use in the LI zone. A conditionally-approved industrial park is located at the southeastern corner of the McNulty Way and Industrial Way intersection, and Lower Columbia Engineering was permitted as an industrial park within this zone. However, the development does not meet the code’s intent for an industrial park.[1] As the properties develop further, the City wishes to better implement the code’s stated intent for industrial parks.

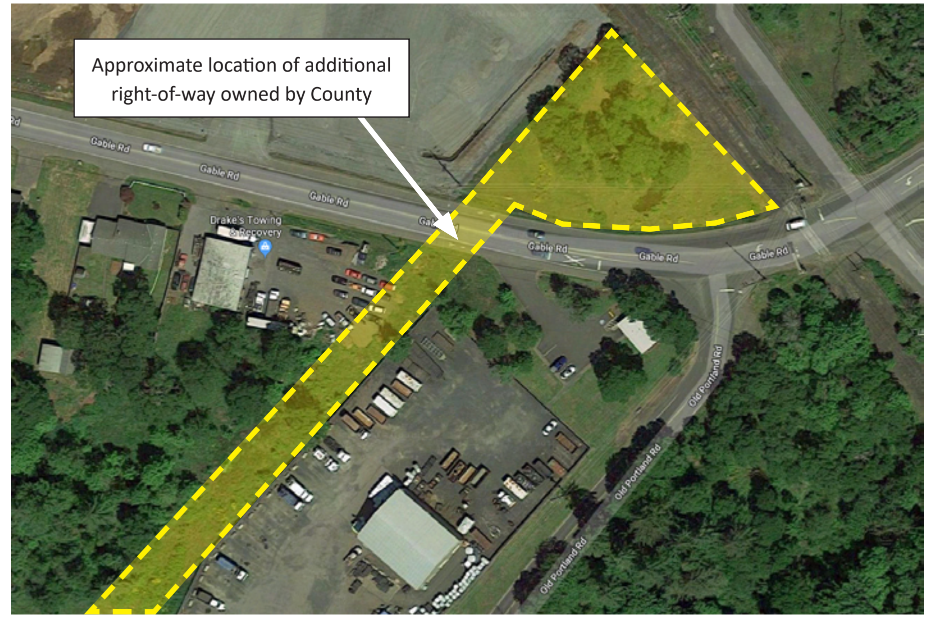
Residential uses with industrial or Commercial zoning on the south side of Gable Road

Conditionally-approved industrial park with nonconforming development at McNulty Way and Industrial Way

Residential uses with industrial zoning on Old Portland Road

1 The definition for Industrial park is “a tract of land that has been planned, developed and operated as an integrated facility for several individual uses, with special attention to circulation, parking, utility needs, aesthetics, and compatibility.” St. Helens Municipal Code 17.16.010

- The County owns right-of-way parallel to Old Portland Road south of Gable Road. It is largely undeveloped but has the potential to be used to help solve the issues at the intersections of Gable and Old Portland Road and Gable and Railroad Avenue. However, there is some encroachment of uses in the right-of-way that will need to be addressed.
- The towing business along Gable Road began storing vehicles on this site around 2012. The City argued that it was a new use subject to land use review and standards such as screening, but these issues have yet to be resolved. This is an example of overall tension along this corridor between important existing industrial uses and the desire to create an attractive gateway to downtown St. Helens.



Towing business along Gable Road

Land Use Forecast

For this analysis, future land uses are based on assumptions used in developing the 2011 Transportation System Plan (TSP), updated based on the results of the 2016 Waterfront Framework Plan and recent developments within the City.

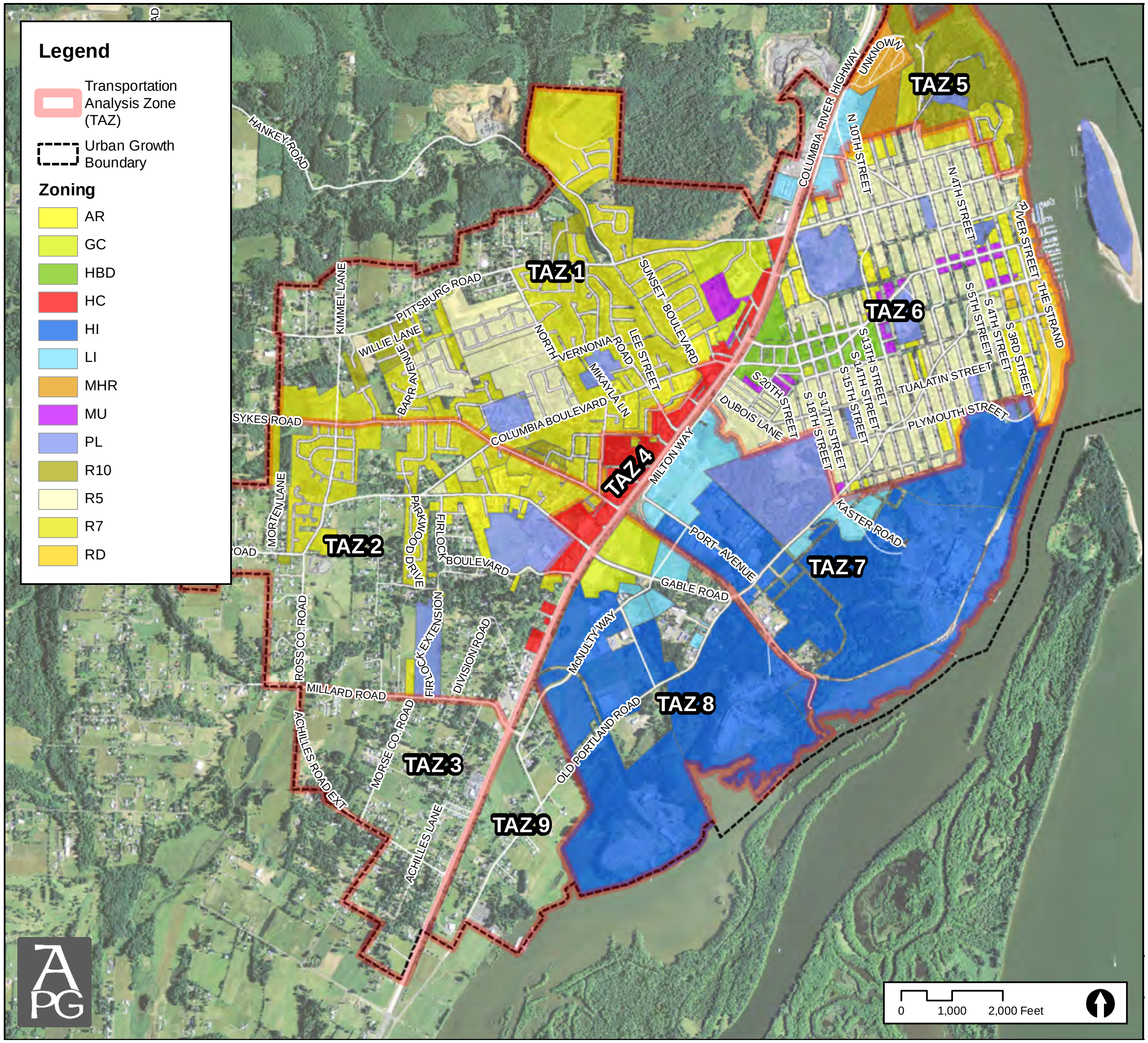
Figure 7 shows the Transportation Analysis Zones (TAZs) used in the 2011 TSP. This process is primarily concerned with TAZ 6, 7, and 8. Of these, only TAZ 6 is expected to differ from the forecasted growth assumed for the 2011 TSP, due to the redevelopment of the Waterfront Area. The City has established new mixed-use districts intended to create an area of residential and commercial activity that provides access and interaction with the Columbia River or Multnomah Channel.

While the final mix of developments in the waterfront area has yet to be determined, the project team has made the following assumptions in TAZ 7 for planning purposes:

- Less industrial and institutional uses of the area, due to new zoning designations and intent to redevelop the area
- Additional multifamily housing, office uses, and retail uses, based on preliminary discussions with interested developers.
- Slightly less detached single-family housing, as future growth has more opportunity to occur within multifamily developments.

These assumptions are the source of updated trip generation forecasts used for transportation modeling in Technical Memorandum 3: Future Conditions.

Figure 7. St. Helens Transportation Analysis Zones



Conclusions

RIVERFRONT AREA

The Riverfront Area includes existing businesses and residences, as well as land planned for significant new residential and employment growth. The streetscape here must accommodate vehicles, pedestrians, and bicycles moving along the corridor and accessing local businesses and recreational facilities. Streetscape improvements in this area should include:

- Signage guiding people toward downtown and the Columbia River
- Improved facilities for bicyclists and pedestrians
- On- and off-street parking that suits the needs of existing and future land uses and businesses
- Lighting

The Waterfront Framework Plan provided a conceptual design for the extension of South 1st Street to Plymouth Street that includes wide sidewalks with planters or tree wells, bike lanes, on-street parking, curb cut-outs, and clearly marked pedestrian crossings.

RESIDENTIAL AREA

Plymouth Road and Old Portland Road run through this area, which is zoned mostly R5 and AR, with a small piece of MU land as well. There are very few pedestrian facilities on this segment. Improvements to the streetscape should provide good pedestrian and bicycle mobility while moving traffic to and from the riverfront. Safe and visible crossings will be very important through this corridor segment. Lighting is also an important safety issue in this area.

INDUSTRIAL AND COMMERCIAL AREA

The intersection of Gable Road and US 30 is very busy and is expected to become even more so in the future. At a minimum, improvements in this area should include:

- Wayfinding toward the riverfront area and downtown
- Sidewalks to connect major land uses, such as connecting Walmart to nearby homes
- Likely rebuilding of the Old Portland Road bridge outh of McCormick Park
- Additional pedestrian crossings, particularly where needed to access key community destinations

LINKAGE AREA

This area consists mostly of rural streets with no pedestrian or bicycle facilities, with the exception of some concrete sidewalks along McNulty Way. The intersection of Millard Road and US 30 will eventually be signalized, and wayfinding toward downtown and the riverfront will be important. The improved sections of McNulty Way may serve as a starting point for standards for future improvements in this area. The County expects to design and construct improvements to Millard Road between US 30 and McNulty Way, and this project represents an opportunity to develop a conceptual design for those improvements.

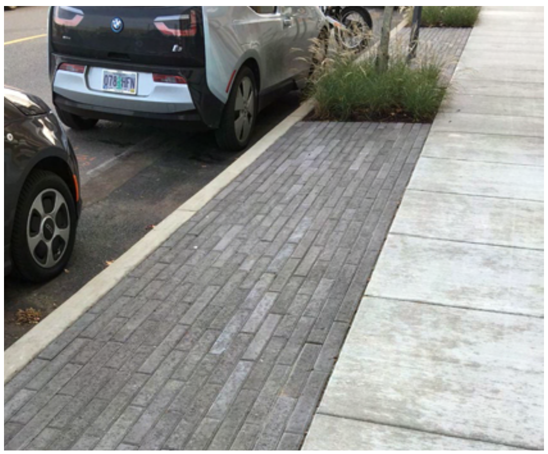
RIVERFRONT CONNECTOR PLAN

APPENDIX 7:

TECHNICAL MEMORANDUM #5

Streetscape Design Toolkit

ST. HELENS - RIVERFRONT CONNECTOR PLAN
May 1, 2018



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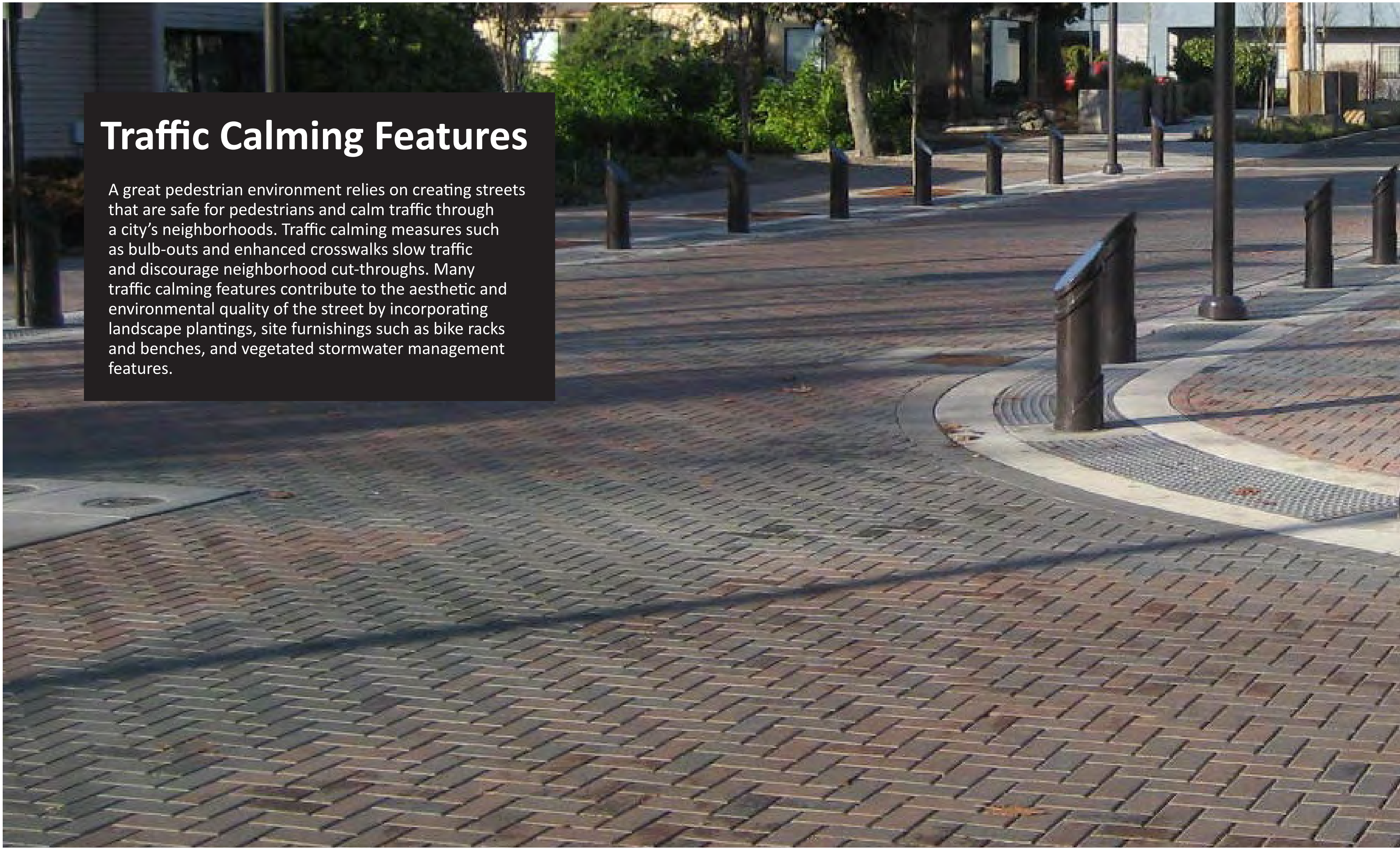
About This Report

A successful streetscape is a place that helps foster strong, livable communities, is physically comfortable and safe, bolsters economic growth and stability, and helps improve our environment. It is accessible to everyone, it can facilitate chance meetings, and it promotes activities that bring people together. It should accommodate different modes of transportation and ease traffic congestion. It should reflect the spirit and identity of a community.

This document is intended to be used as a project resource to spark creative ideas for developing planning, design, and implementation standards to facilitate the orderly redevelopment of the St. Helens project area as a well-connected, inviting, safe and sustainable multi-modal facility.

The document provides the user with a Streetscape Design Toolkit, which is broken into five sections: Traffic Calming Features, Pedestrian Amenities, Bicycle Facilities, Civic Identity and Wayfinding, and Green Street Strategies. Each of these sections provide descriptions and photos of physical elements that, when used together, can make a great street.

Streetscape Design Toolkit



Traffic Calming Features

A great pedestrian environment relies on creating streets that are safe for pedestrians and calm traffic through a city's neighborhoods. Traffic calming measures such as bulb-outs and enhanced crosswalks slow traffic and discourage neighborhood cut-throughs. Many traffic calming features contribute to the aesthetic and environmental quality of the street by incorporating landscape plantings, site furnishings such as bike racks and benches, and vegetated stormwater management features.

Curb Extensions (Bulb-Outs)

Curb extensions (also known as bulb-outs) extend the sidewalk into the parking lane to narrow the roadway and provide additional pedestrian space at critical locations. They improve pedestrian safety by increasing pedestrian visibility, slowing vehicular traffic, and shortening crossing distance.

Curb extensions can be located at street corners, or mid-block, and can be lengthened along the roadway to increase usable public space for community gathering and socializing. They can also accommodate transit shelters, benches, landscaping, and other pedestrian furnishings and amenities.

Other additional benefits of curb extensions include a reduction in illegally parked cars at corners and crosswalks, an increased ability to provide two curb ramps per corner, and potential for tightening corner curb radii that slow turning vehicles.

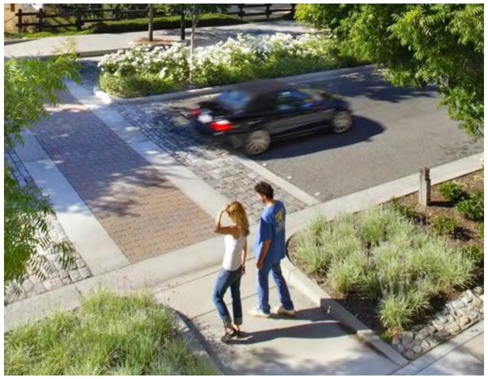
Many potential locations for curb extensions exist throughout the project area, primarily at block corners. Strategic planning could determine feasible mid-block curb extension locations. Curb extensions are only appropriate on streets with on-street parking.

Bulb-out with stormwater facility and crosswalk

Neighborhood planter in curb extension

Landscaping and signage in bulb-out

Seating area located in curb extension



Change of materials in crosswalk area

Creative use of paint at crossing

Striping and material change to indicate crossing

Mid-Block Crossings

Streets with long block faces and widely-spaced intersections sometimes limit crossing opportunities for pedestrians. Mid-block crossings can provide convenient crossing opportunities for pedestrians when other crossing opportunities are distant, or where a destination creates a high crossing demand.

Mid-block crossings should be highly visible, and employ markings or materials with high contrast that clearly delineate the edge of the pedestrian zone. Signage and/or signalization, flashing beacons, or other special treatments like special paving materials or raised crossings help increase visibility of crossings.

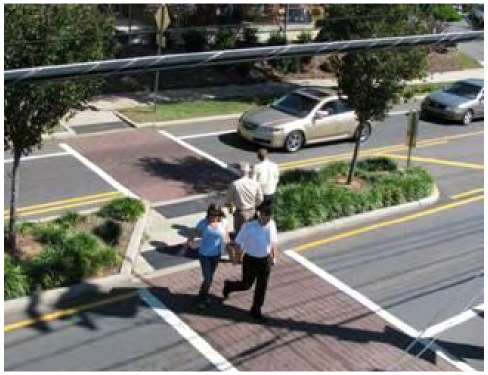
Site specific analysis and planning would determine feasible locations for mid-block crossings throughout the project area, and should consider whether it could contribute to traffic congestion or delay issues.

Bollards, stone markers and the use of brick makes a mid-block crossing in Lake Oswego, OR more noticeable

Crosswalk Enhancements

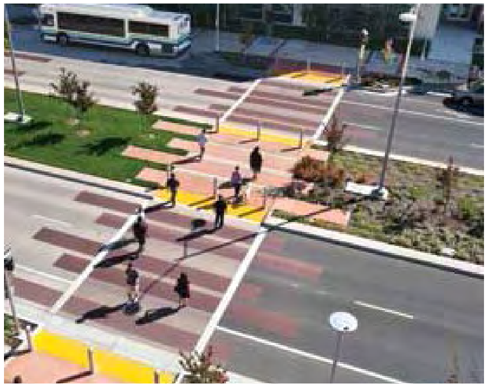
Special paving materials, articulated scoring patterns, integral concrete colors, bollards, lighting, and landscape plantings can significantly enhance the pedestrian experience along a streetscape. These enhancements visually break the monotony of asphalt streets, extend the pedestrian realm, and highlight key civic and commercial areas.

Enhancements should use textures, patterns, and colors to articulate the crossings, but should be slip-resistant, and avoid creating an uncomfortable surface for those using wheelchairs or other mobility devices. Pedestrian crossings should be designed and constructed with paving materials that contrast in color and texture to clearly designate pedestrian paths of travel.

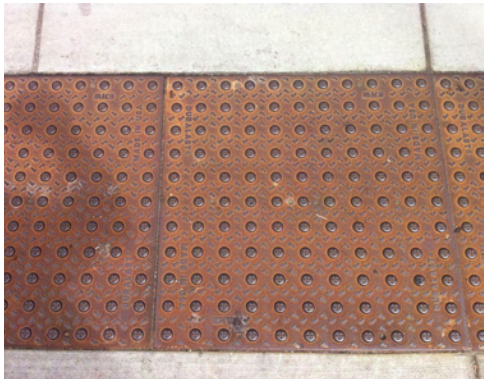


Brick, striping, signage and planters to indicate crossing

Brick and paving bands suggest a change of conditions



Crosswalk enhanced with creative use of color



Detectable warning

Intersection Treatments

Like crosswalk enhancements, intersection treatments can highlight key civic and commercial locations. They can include special paving materials, color, and patterns, and can be combined with crosswalk enhancements.

Since they are typically more costly to build than standard roadway treatments, intersection treatments could be considered at key locations important to a city grid pattern, along commercial corridors at key intersections, at mid-block crosswalks, or at key civic locations such as civic buildings or entrances to open spaces.

Decorative intersection in Seattle, WA

Change of materials at intersection in Washougal, WA

Intersection treatment in Eugene, OR

Change of color and materials mark this intersection

Roundabouts

Roundabouts can improve safety, reduce congestion, encourage a steady flow and calm traffic, relative to stop-controlled intersections. Roundabouts consist of a center island that vehicles drive clockwise around at a slow speed until they reach their desired exit. The raised center island is an ideal location for landscaping, art or a gateway monument.

Because of their design, roundabouts significantly reduce the speed at which traffic travels, decrease the need to install signaled four-way intersections and decrease the likelihood of head-on collisions. Roundabouts can be designed to accommodate trucks with trailers and other large vehicles.

Pedestrians benefit from roundabouts due to the shorter crossing distances, reduced waiting times to cross, and the need to cross only one direction of traffic at a time. Bicycle users and pedestrians both benefit from increased yeilding rates, and all users benefit from reduced frequency and severity of crashes.

Sculptural art in roundabout

Art and landscaping featured in a roundabout located in Bend, OR

Landscaping in roundabout

Rural roundabout in Oregon City, OR

Other Traffic Controls

Marked crosswalk

Marked Crosswalks

Marked crosswalks are painted roadway markings that indicate the location of a crosswalk to motorists. Marked crosswalks can be accompanied by signs, curb extensions and/or median refuge islands, and may occur at intersections or at mid-block locations. Research has shown that marked crosswalks in certain situations do not improve pedestrian safety and can even make it worse. Recent research indicates that on multi-lane roadways (more than two lanes), marked crosswalks should not be installed without accompanying treatments, such as Rectangular Rapid Flash Beacons (RRFBs) or Pedestrian Hybrid beacons.

Crossing with Rectangular Rapid Flashing Beacon

Rectangular Rapid Flashing Beacon (RRFB)

RRFBs are user-actuated amber lights that have an irregular flash pattern similar to emergency flashers on police vehicles. These supplemental warning lights are used at unsignalized intersections or mid-block crosswalks to improve safety for pedestrians using a crosswalk. RRFBs could be used at any unsignalized intersection or mid-block crossing that warrants require a higher level of crosswalk protection.

Crossing with Pedestrian Hybrid Beacon

Pedestrian Hybrid Beacon

A Pedestrian Hybrid Beacon (sometimes called a HAWK signal) is a user-actuated signal that is unlit when not in use. It begins with a yellow light alerting drivers to slow, and then displays a solid red light requiring drivers to remain stopped while pedestrians cross the street. The beacon then shifts to flashing red lights to signal that motorists may proceed, after stopping, and after pedestrians have completed their crossing. A Pedestrian Hybrid Beacon can be used at mid-block crossings or, in some cases, at unsignalized intersections (the MUTCD suggests that the beacons be located at least 100-feet from an intersection). Pedestrian Hybrid Beacons could be used at any unsignalized intersection or mid-block crossing where warrants require a higher level of crosswalk protection.

Traffic Signals

Traffic signals allow opposing streams of traffic to proceed in an alternating pattern. National and state guidance indicates when it is appropriate to install traffic signals at intersections. When used, traffic signals can effectively manage high traffic volumes and provide dedicated times in which pedestrians and bicyclists can cross roadways. Because they continuously draw from a power source and must be periodically re-timed, signals typically have higher maintenance costs than other types of intersection control. Signals can improve safety at intersections where signal warrants are met, however, they may result in an increase in rear-end crashes compared to other solutions. Signals have a significant range in costs depending on the number of approaches, how many through and turn lanes each approach has, and, if it is in an urban or rural area. The cost of a new traffic signal ranges from approximately $450,000 in rural areas to $850,000 in urban areas.

Intersection with traffic signal

Pedestrian Amenities

Streetscape enhancements like special sidewalk paving, street furnishings, pedestrian-scale lighting, and awnings or building overhangs are important features for pedestrians to feel welcome and that the street is a comfortable place to be. Building overhangs and awnings additionally provide protection from the elements during the wet season. These kinds of amenities add functionality and vitality to the pedestrian realm, and provide visual interest. A vibrant pedestrian realm can increase public safety, enhance the value of adjacent real estate, and sustain the health of local businesses. These kinds of streetscape features can be installed by the City, neighborhood or local business associations, or by individual property owners.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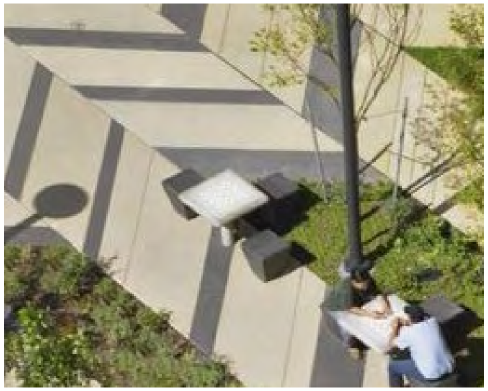
190

Sidewalk Paving Materials: Concrete

Concrete sidewalks continue to be the default sidewalk surfacing employed in most right-of-way development projects throughout the United States. Compared to asphalt, concrete is comparable in cost, is more durable and attractive than asphalt, can be formed and scored in virtually any pattern, and is more reflective and, therefore, does not contribute as much to urban heat islands.

Additionally, concrete paving can be articulated with different textured finishes (stamped, lightly broomed, floated, exposed aggregate, etc.), which also add a degree of slip-resistance. Integral color concrete is another method for highlighting special pavement areas.

Concrete sidewalks are appropriate throughout the entire project area, though specially articulated concrete is most appropriate along downtown, commercial, and other special or small streets.



Integral color concrete bands

Scored concrete paving

Concrete and aggregate paving

Decorative concrete paving

Sidewalk Paving Materials: Unit Pavers

Special paving treatments can significantly enhance the aesthetics of public spaces in a city, give circulation areas a strong sense of place, and establish a hierarchy of public spaces.

Unit pavers can be selected from a range of options, and include natural stone pavers, concrete unit pavers, asphalt pavers, and clay brick pavers. All of these pavers are typically available in a number of different shapes, colors, and textures. Regardless of the material, unit pavers are typically installed in either sand-set or mortar-set applications.

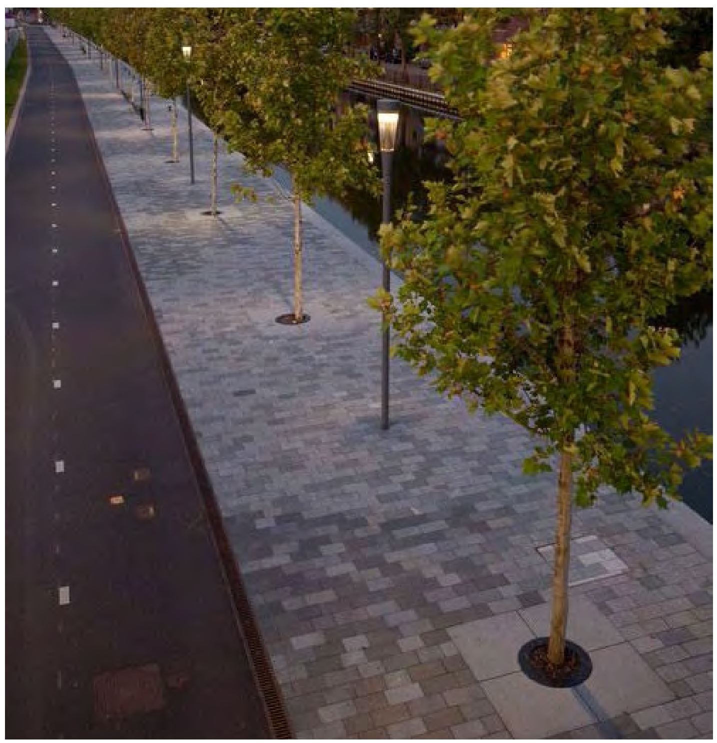
Permeable concrete unit pavers can provide both functional and aesthetic appeal in that they can help manage and treat stormwater runoff. These pavers often have wider joints and thus a more variable surface and should be avoided along primary public circulation routes.

Unit pavers could be employed in a variety of configurations and at a number of different locations in sidewalks and crosswalks throughout the project area.

Concrete unit pavers and cobblestones

Brick unit pavers

Natural stone unit pavers



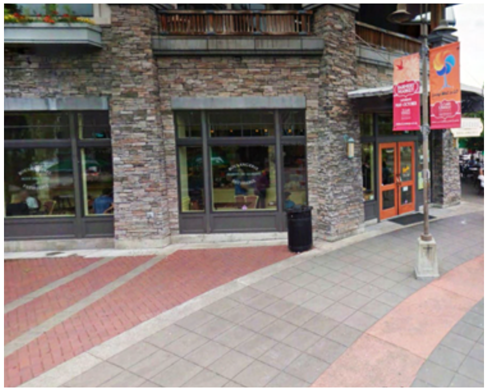
Clay brick pavers

Concrete and stone unit pavers

Sidewalk Paving Materials: Combinations

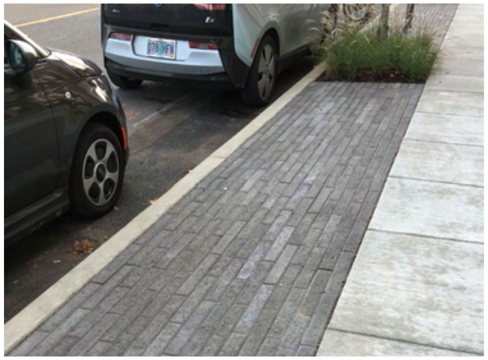
Utilizing special paving treatments like unit pavers or stamped/colored concrete, with standard concrete is another effective tool in improving the sidewalk aesthetics and creating sense of place in public areas while minimizing costs. The combinations can be employed to create a pattern that helps to break up the scale of larger streets to a more pedestrian-scaled experience. The pattern can be informed by other repetitious streetscape elements such street trees and seating areas, or can help to reinforce a "theme" established in certain downtown districts.

Paving surfaces that integrate unit pavers into the design and layout must address potential ADA-related issues regarding slip or trip hazards, potential for vibratory effects on those in wheelchairs, and clarity of the paving surface for those with visual impairment.



Brick and concrete paving

Unit pavers and concrete paving in Pendleton, OR



Concrete and unit pavers

Brick and concrete paving

Sidewalk Paving Materials: Artistic

Pavement with innovative and artistic patterns stamped or painted on the surface can highlight significant civic and/or cultural locations, create a varied and pleasant pedestrian experience, and be expressive of a city's historical or cultural heritage or physical setting.

Stamped concrete paving

Painted asphalt

Stamped concrete paving

Stenciled concrete paving

Pedestrian Lighting

Pedestrian lighting primarily functions to illuminate pedestrian areas such as sidewalks, are less than 18’ tall, and typically supplements roadway lighting, which is oriented towards illuminating the roadway, intersections, and crosswalks.

There are a number of benefits associated with pedestrian lighting in the public right-of-way. It can be a key organizing streetscape element that defines a positive daytime and nighttime character of public urban spaces. Well-lit streetscapes can extend the hours that a business district is active, which can promote economic growth and stability. It can provide for better visibility and safety during nighttime hours, improving safety for vehicles and pedestrians. Additionally, it can encourage walking as part of an active lifestyle, and improve access to transit and other services.

The styles and designs of pedestrian light poles and fixtures are virtually limitless, and can help reinforce a neighborhood, district or civic identity.

Pedestrian lighting can be implemented to help bring the scale down to a pedestrian level in the project areas, encouraging pedestrians to engage with their environment, defining pedestrian routes, and increasing safety.

Custom light fixture in Sisters, OR

Traditional light fixture in furnishing zone

Modern light fixture


Modern seatwall and bench combination


Steel bench with back support and arms


Custom steel bench in St. Helens, OR

Seating: Benches & Seatwalls

An abundance of pedestrian seating fixtures and seating areas along a streetscape creates a comfortable, usable, and active public realm where people can meet and socialize, rest, read, or people-watch. It is a fairly simple and straightforward element that can significantly help to create a sense of place, and encourages people to linger, which is a definitive characteristic of a successful streetscape.

Benches are typically “off the shelf” products purchased from manufacturers in multiple quantities, and are distributed evenly along a streetscape corridor outside of a path of travel, or clustered at a determined special location. They can be made out of wood, metal, precast concrete, or stone, or customized in a variety of ways as a functional art element, or to help reinforce a civic or neighborhood identity. Often times the style of bench in a downtown district belongs to a larger “family” of site furnishings, which include lighting, bike racks, bollards, and waste receptacles that, when used collectively, further unify a streetscape. In other areas, individual benches may be more unique and feature artistic seating created specifically by and for the community of St. Helens. Examples of custom benches can be found in St. Helens along Columbia Blvd. and St. Helens St.

Seatwalls are typically constructed with a concrete or concrete masonry unit (CMU) base, and can either have an articulated concrete surface, or be clad with other materials such as wood, stone, or precast concrete slabs. They can also be very expressive, and can be functional artistic elements in the landscape that help define pedestrian seating areas. Seating surfaces with dark colors or rough materials should be avoided.

Benches and seatwalls are appropriate along corridor segments, and should be located outside of the path of travel, at transit stops, and at special locations within the project area.


Wood bench with back support and arms

Street Furnishings: Bicycle Racks

Bicycle racks are an essential functional element for those who travel by bike for protections against theft. Additionally, they are an effective aesthetic element that can help visually unify a streetscape. Ample bicycle parking encourages ridership and facilitates a healthy lifestyle. It is most effective when it is located close to destinations, is easy to find, not hidden from public view, and is accessible.

Bicycle racks should be located with ample area for bike parking (typically 2-feet wide by 6-feet deep) on each side of the rack. More space may be needed if the city desires to accommodate larger bicycles (e.g., “cargo bikes”). They should be located in areas that provide enough room for riders to dismount and manage their cargo, and do not conflict with pedestrian through zones. They are typically constructed of metal, and should be designed and detailed in a way that supports the bicycle, will not damage it with sharp corners, and will fit most U-bar style bike locks. Options for customizing the rack to reflect civic or neighborhood character are available on most bike rack designs.

Bike rack with detail

Custom bike rack

Modern circular steel bike racks

Traditional U-shaped bike racks

Modern steel receptacle

Street Furnishings: Waste Receptacles

Trash and recycling receptacles in the pedestrian right-of-way are essential to maintaining a clean, healthy city. Their presence discourages littering, thereby improving the aesthetics of a streetscape. Though these elements are utilitarian, attention to their design and integration into the overall streetscape character, in addition to careful placement, can enhance the public realm and adds to a sense of place.

Waste receptacles should be considered as one of a "family" of streetscape furnishings, which may also include benches, bike racks, and street lights. They should be made from durable, high quality materials, and should be graffiti resistant as is feasible.

Waste receptacles are appropriate throughout the project area. They should be located close to intersections, out of the pedestrian through zone, as well as high activity areas and gathering areas. A maximum of one receptacle every 200 feet along a block face, and a maximum of 4 receptacles per intersection (one per corner) is recommended.

Custom waste receptacle

Modern wood receptacle

Wood receptacle with planter

Street Furnishings: Drinking Fountains

Drinking fountains provide drinking water for pedestrians, offer hydration and nourishment, and encourage a healthy lifestyle. They are also an environmentally sound alternative to bottled water, which requires much more energy and materials to distribute.

Drinking fountains should be considered as one of a "family" of streetscape furnishings, which may also include waste receptacles, bike racks, and benches. They should be made from durable, high quality materials, and should be graffiti resistant as is feasible. They should also consider additional bowls that are accessible by those in wheelchairs, as well as optional dog bowls.

Drinking fountains are most appropriate along commercial streets with a pedestrian presence. They should be located within the furnishing zone, outside of the path of travel, and should be located with enough space around them to accommodate wheelchairs. Drinking fountains should also be provided in areas that host special events such as community festivals or activities during warmer months.

Combined drinking and bottle fill station

Artistic fountain

Multi-level fountain

Traditional fountain

Street Furnishings: Bollards

A bollard is a short vertical post or similar element that is most often used to separate pedestrians from a vehicular environment. They can be used to add color and visual interest to streetscapes, and are most effective when used in multiples and lined up to discourage vehicles from encroaching on pedestrian spaces like sidewalks or plazas. They are most often used when the surface of the pedestrian zones are at the same elevation as the adjacent vehicular areas, without curb separation.

Traditional bollards

Wood bollards

Removable bollards

Modern bollards in planting area

Street Furnishings: Tree Grates

Trees need air, soil, water, and space to grow. Unfortunately, soil conditions in most urban environments lack each of these critical elements trees need to thrive. Tree grates provide space for tree roots to grow while allowing pedestrian traffic over the tree planting area, which is particularly effective along narrow sidewalks where pedestrian space can be limited. They also help to suppress weed growth and trash accumulation in the tree planting areas. Tree grates come in a large array of shapes, sizes, and materials, but should all be ADA-compliant while allowing for air and moisture to enter the tree planting area.

Certain site characteristics such as shallow bedrock may limit the locations of where street trees could be located throughout the project area. Where street trees are feasible, tree grates should be considered.

Decorative steel tree grate

Removable cobblestone tree ring

Planting and low barrier

Concrete tree grate

Planting Areas

Planting areas along streetscape corridors is an effective, attractive way to enhance the pedestrian experience, improve adjacent property values, and indicate a sense of civic care for a neighborhood. Some planting areas can manage stormwater runoff, as described in the last section of this document.

Like street trees, planting areas can take many forms. They can exist at-grade, visually breaking up the paving area and providing focal points of interest, or they can be raised above the grade of the sidewalk in planters to elevate the green to the pedestrian's eye and help to create distinct spaces. They can be containerized, either in pots on or adjacent to sidewalks or elevated in planter baskets that hang off of other streetscape elements like light posts or wayfinding signs. Examples of container planting on the sidewalk can be found in St. Helens along Columbia Blvd. and St. Helens St. Plantings can also be located in roadway medians at busy highway intersections or crosswalks to help with traffic calming and pedestrian safety. As with installing street trees, certain site conditions may limit the ability to implement planting areas. Shallow basalt bedrock, vehicular sight lines, and narrow rights-of-way all have an impact on where and how planting areas might be located.

Decorative planters

Foundation planting and street trees

Hanging planters

Russellville Commons planter in Portland, OR

Street Trees

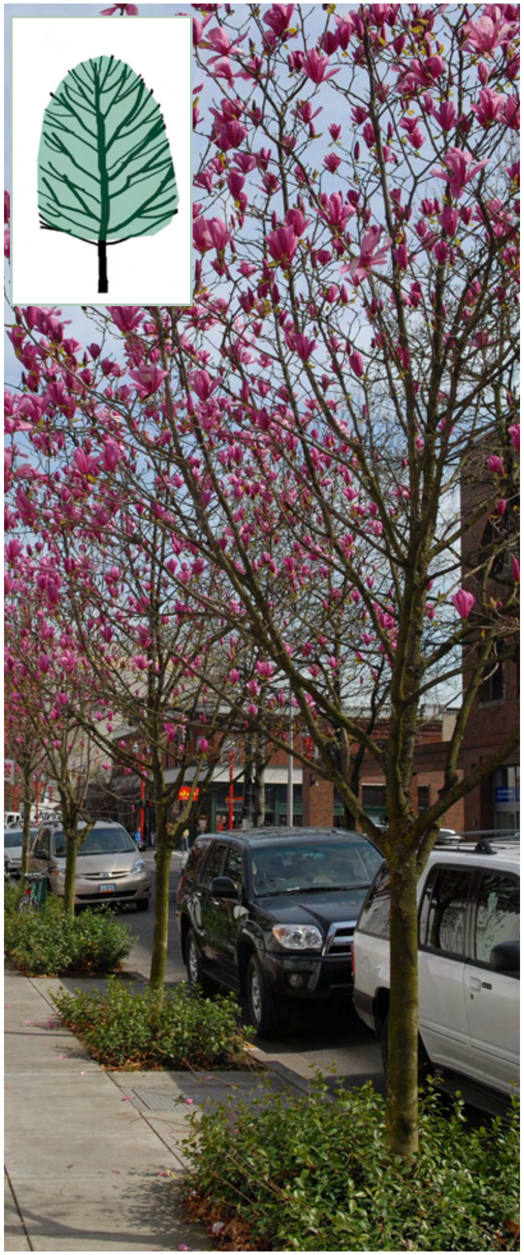
Street trees are an integral component of a successful, vibrant, pedestrian friendly streetscape. Their social, economic, and environmental benefits are innumerable, and include softening hard urban edges, shading streets and buildings, enhancing neighborhood beauty, filtering the air, and absorbing carbon dioxide. Trees have also been proven to reduce crime, improve public health, reduce energy consumption, and improve adjacent real estate values.

Street trees come in many shapes, sizes, colors, and textures, and can be used in a variety of ways in groups and as individual specimens to reflect a city's natural setting, create focal points, establish visual rhythm, and provide needed shade in areas with excessive pavement.

Site characteristics can significantly impact the ability to accommodate street trees. Narrow rights-of-way and sidewalks can limit tree placement and form. Overhead utility lines and underground utility pipes present additional challenges to locating street trees. Additionally, areas of shallow basalt bedrock impacts the feasibility of installing new street trees without proper preparation and consideration. Shallow basalt is found in the St. Helens study area and should be assessed further to inform a successful street tree plan.

In the project areas an analysis of where basalt bedrock is most shallow could provide insight into feasible areas to plant. Additionally, "building up" planting areas in raised planters could provide additional opportunity to implement an effective street tree program. Special attention should be given to potential "nuisances" created by certain species such as excessive leaf litter, or berries or fruit that either stain concrete or other surfaces or attract unwelcome animals.

Some trees suitable for urban environments may have rooting systems that are shallower than most, making them potential candidates for planting in areas with shallow bedrock. Since shallow-rooting trees are more likely to heave and crack sidewalks than deeper-rooted trees, however, ample planting area must be given to allow root growth, increases in trunk diameter, and root crown flare.



Common street trees and forms. From L to R: Red Maple, Magnolia, Ginkgo, Honey Locust and Japanese Zelkova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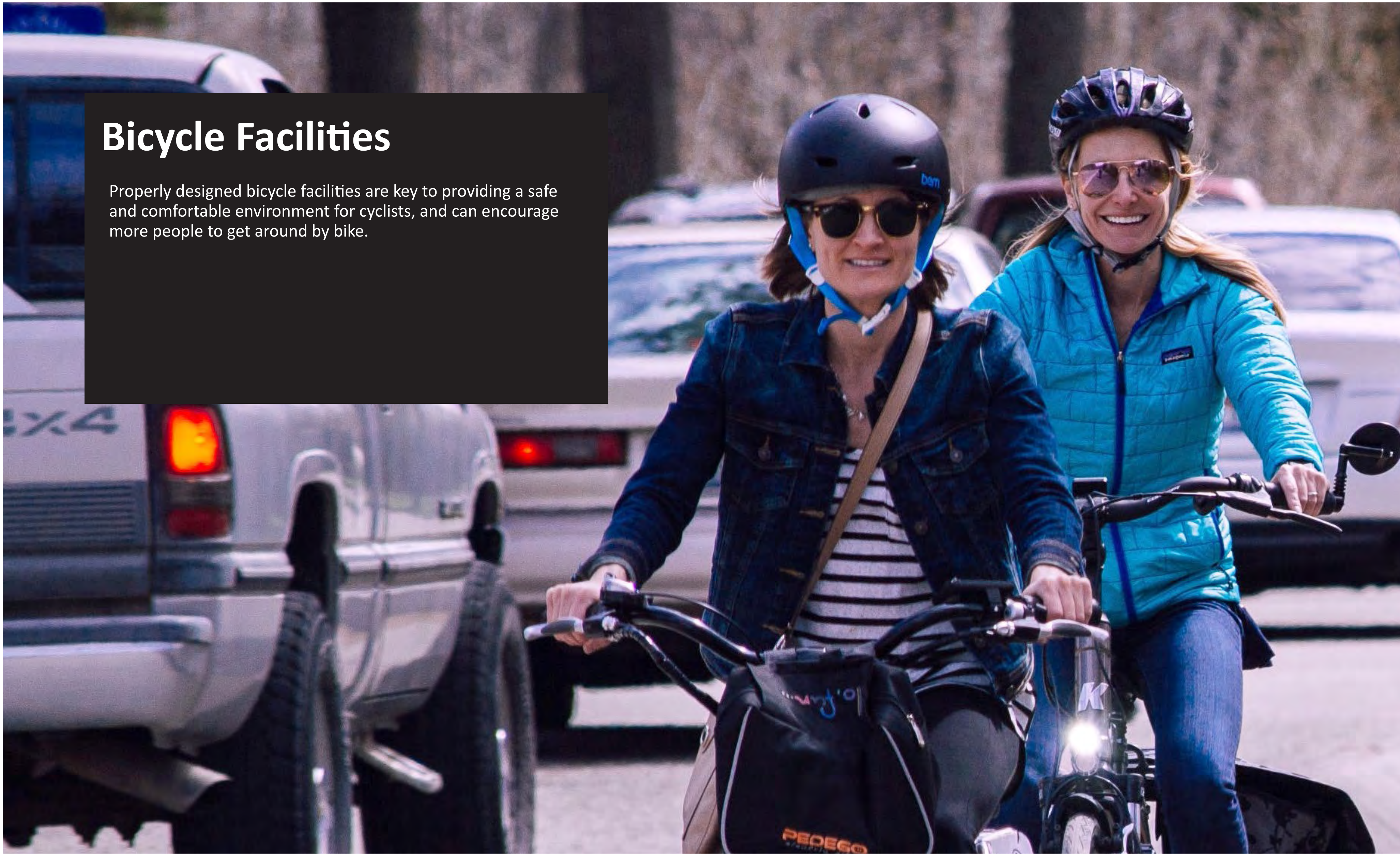
24
HOURS
extra



Bicycle Facilities

Properly designed bicycle facilities are key to providing a safe and comfortable environment for cyclists, and can encourage more people to get around by bike.


TOW
AWAY
ZONE

Shared-use Paths and Trails

Shared-use paths and trail are improved (i.e. paved) and unimproved (i.e. dirt and gravel) facilities that serve bicyclists and pedestrians. Shared-use paths and trails can be constructed adjacent to roadways where the topography, right-of-way, or other issues don't allow for the construction of sidewalks and bike facilities. A minimum width of 10 feet is recommended for low-pedestrian/bicycle-traffic contexts; 12 to 20 feet should be considered in areas with moderate to high levels of bicycle and pedestrian traffic. Shared-use paths and trails can be used to create longer-distance links within and between communities and provide regional connections. They play an integral role in recreation, commuting, and accessibility due to their appeal to users of all ages and skill levels.

Shared-use path

Separated Bike Lanes

Separated bike lanes (often called "cycle tracks") are bicycle lanes that are physically separated from motor vehicle traffic by a vertical element such as a planter, flexible post, parked car, or a mountable curb. One-way separated bike lanes are typically found on each side of the street, like conventional bike lanes, while two-way separated bike lanes are typically found on one side of the street.

Separated bike lane

Buffered Bike Lanes

Buffered bike lanes are enhanced versions of conventional on-street bike lanes that include an additional striped buffer of typically 2-3 feet between the bicycle lane and the vehicle travel lane and/or between the bicycle lane and the vehicle parking lane. They are typically located along streets that require a higher level of separation to improve the comfort of bicycling.

Buffered bike lane

On-street bike lane

On-Street Bike Lanes

On-street bike lanes are striped lanes on the roadway dedicated for the exclusive use of cyclists. Bike lanes are typically placed at the outer edge of pavement (but to the inside of right-turn lanes and/or on-street parking). Bicycle lanes can improve safety and security of cyclists and (if comprehensive) can provide direct connections between origins and destinations.

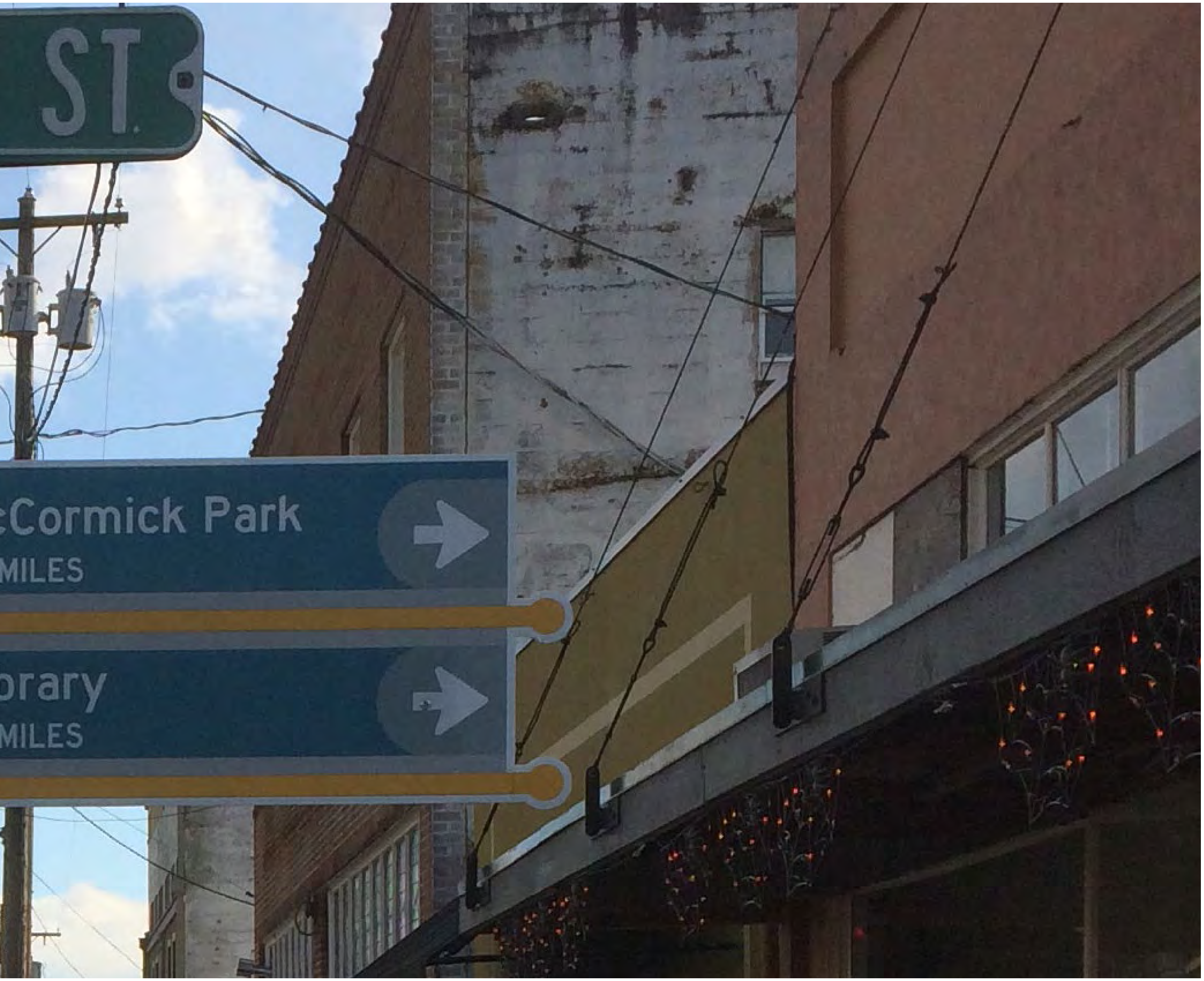
Street with sharrows

Shared Lane Pavement Markings

Shared lane pavement markings (often called "sharrows") are not themselves a bicycle facility, but a tool designed to accommodate bicyclists on roadways where bike lanes are desirable but infeasible to construct. Sharrows indicate a shared roadway space for cyclists and motorists and are typically centered in the roadway or approximately four feet from the edge of the travel lane and are recommended to be spaced approximately 50 to 250-feet apart dependent on the levels of traffic volume. Sharrows are suitable on roadways with relatively low travel speeds (<35 mph) and low ADT (<3,000 ADT); however, they may also be used to transition between discontinuous bicycle facilities.

Civic Identity & Wayfinding

Cities thrive when they capitalize on their unique strengths. The manner in which these strengths are represented -- either through gateway monuments, public art, or wayfinding signs -- can strengthen civic identity which gives added value to a downtown area beyond the physical elements that make up that area. A successful civic identity and wayfinding system enhances the visitor's relationship to those downtown areas, resulting in frequent visitation, loyalty, and an ongoing interest in the vitality of that downtown.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Gateway Monuments

Gateway monuments are elements that mark the entrance to a district or neighborhood. They are typically larger in scale, are highly visible, and can take many different forms. Typical gateway monuments range from arched gateway markers that span over the roadway, to sculptural or iconic elements, to expansive landscape areas that visitors pass through. They are typically more sculptural in form and function at a district or neighborhood scale.

Gateway markers should be located at entry points to districts or neighborhoods or at transitions between one roadway or land use type to another. They should be highly visible and attract attention, and integrate culturally relevant elements that are appropriate for the area. The 2017 *City of St. Helens Branding & Wayfinding Master Plan* recognizes Colombia Boulevard at Milton Way (which is outside the project area) as a prime location for a gateway sign and should be referenced when considering other gateway monument locations and design.

A previous gateway sign to St. Helens, OR

Existing gateway artwork in St. Helens, OR

Landscaped gateway in Pendleton, OR

Gateway structure in Atlanta, GA

Interpretive element

Trailhead signage

Existing entrance signs in St. Helens, OR

Signage & Trailheads

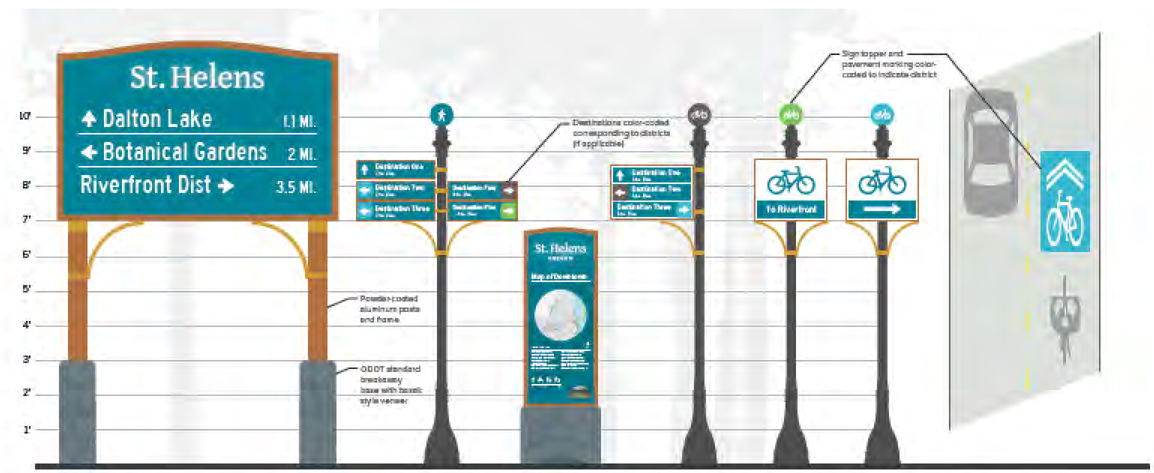
Streetscape signage can be an effective tool in unifying the character of a neighborhood or district. They can mark entry points or neighborhood edges, give directions to destinations, include maps and directories, and include relevant neighborhood information. Streetscape signage types include neighborhood orientation signs, directions signs, and interpretive signs, and can significantly enhance a visitor's experience in a downtown area.

Neighborhood orientation signs have a distinctive design and offer neighborhood information including maps and directories that guide people to various neighborhood amenities such as historic buildings and sites, cultural institutions, shopping centers, recreation facilities, and public services such as parking and rest rooms.

Directional signs can include typical street signs and wayfinding signs, and help orient pedestrians to significant destinations. They should include local destination names and directional arrows or markers, and often have maps that clearly show the current location. Furthermore, they should maintain a simple, and coordinated design, be legible from a distance, and reflect the character of the surrounding neighborhood or district.

Interpretive signs provide information about nearby significant cultural, natural, historical, or architectural features or icons. They can be made of many different materials including metal, wood, stone, or acrylic, can be sculptural in form, be a traditional sign, or be installed flush with the paving surface. They should be unique and eye-catching, and capture the character and spirit of the area.

Signage elements are appropriate throughout the St. Helens project areas. They should be located at key intersections and at areas of interest such as McCormick Park and Nob Hill Nature Park. They should be easy to see from a traveling vehicle but also are intended to be viewed by pedestrians in close proximity. Wayfinding signs could also be used at strategic locations to direct people towards destinations both within and outside the connector planning area. The 2017 *City of St. Helens Branding & Wayfinding Master Plan* should be referenced when determining sign placement and design especially along 1st St. and at Plaza Square.



Signage designs from the 2017 City of St. Helens Branding & Wayfinding Master Plan

Banners

Banners can enhance civic identity by adding festiveness and variety to commercial and arterial roadways. They can help distinguish specific neighborhoods, promote cultural awareness, or provide information on civic events.

Banners are typically hung on street lights or utility poles, but can also be mounted on freestanding poles. They should be made of durable, UV-resistant materials such as vinyl or acrylic fabric, though they can also be made out of metal if there is a desire for a customized or artistic appearance.

Banners currently exist in St. Helens, and could be further enhanced with additional locations and/or a coordinated design/layout. New banners should be made of a durable material that will not easily damage or wear to prevent frequent replacement.

Existing banner in St. Helens, OR

Banners assist with wayfinding in San Francisco, CA

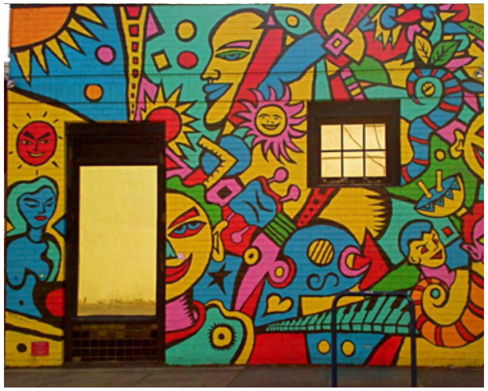
Banner in Lake Oswego, OR

Public Art

Public art can be a significant streetscape component by enhancing civic identity at multiple scales. At the larger scale, it can help to unify an entire district or neighborhood. At the pedestrian scale, it can add aesthetic interest and also functional benefits if incorporated into pedestrian furnishings such as seating or lighting.

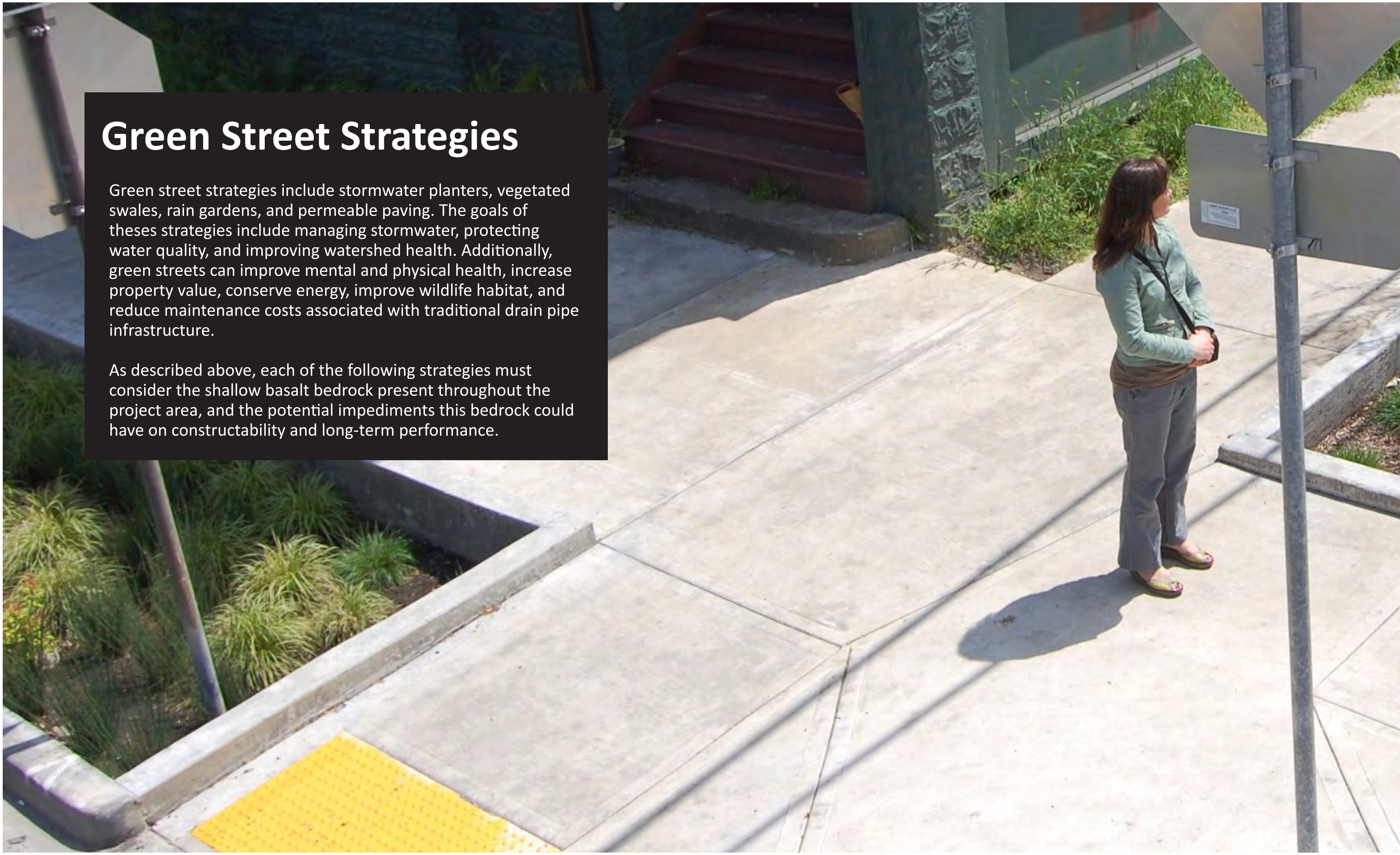
Appropriate locations for public art exist in a number of locations and capacities in the project area. Depending on the proposed art piece, a suitable site should be vetted and analyzed for its feasibility. Public art could be located at key intersections, and be of a larger or smaller scale that is consistent with the scale of the space in which it is placed. In small areas the art can embody the spirit of each neighborhood. In larger areas or along streets art can be of a larger scale and used as an icon for the town.

Existing public art in St. Helens, OR



Alberta Street Mural in Portland, OR

Windscape installation in Portland, OR enhances identity and place



Green Street Strategies

Green street strategies include stormwater planters, vegetated swales, rain gardens, and permeable paving. The goals of theses strategies include managing stormwater, protecting water quality, and improving watershed health. Additionally, green streets can improve mental and physical health, increase property value, conserve energy, improve wildlife habitat, and reduce maintenance costs associated with traditional drain pipe infrastructure.

As described above, each of the following strategies must consider the shallow basalt bedrock present throughout the project area, and the potential impediments this bedrock could have on constructability and long-term performance.

Stormwater Planters

Stormwater planters typically have vertical walls, and can be located between the curb and sidewalk or in curb extensions. They can either be constructed with "open" bottoms to allow stormwater to infiltrate into native soil ("infiltration planters"), or be lined with an impervious bottom and constructed as a container to temporarily store stormwater to filter sediments and pollutants down through the planter ("flow through planters"). Site conditions will dictate which type of stormwater planter is appropriate.

Stormwater planter with railing in Lake Oswego, OR

Planters and hardscape along SW 12th Avenue in Portland, OR

NE Siskiyou Street planter in Portland, OR

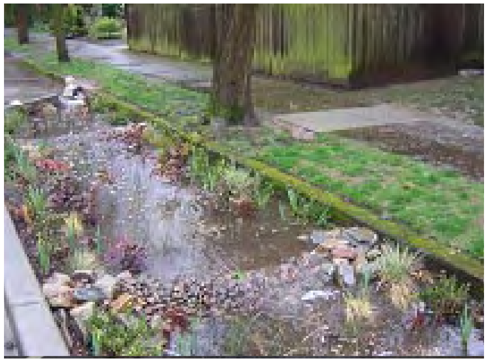
Mature stormwater planter along Water Avenue

Large vegetated swale in north Portland, OR

Vegetated Swales & Conveyance Channels

Vegetated swales are gently sloping, linear depressions planted with dense vegetation that treat stormwater runoff from adjacent roadways, sidewalks, and other impermeable surfaces. They typically accept runoff and allow it to infiltrate, but like stormwater planters, where soils drain poorly, slopes are too steep, or space is confined, swales can be lined and convey runoff to another, different type of drainage facility. Due to their bermed, gently sloping sides, swales can look like typical landscaped areas.

Conveyance Channels move stormwater from one location to another allowing time for water to permeate into the ground without causing erosion or flooding. Conveyance Channels may be lined with vegetation or a permeable material such as river rock and can add to the aesthetic of the overall streetscape.



Swale retaining rainwater after a storm event

Artful rainwater conveyance in Melbourne, Australia

Trees and planting in a stormwater swale enhance the pedestrian experience in Portland, OR

Rain Gardens & Stormwater Basins

Where space permits, rain gardens and stormwater basins provide opportunities to treat stormwater in larger depressions, and can offer opportunities to incorporate other materials such as boulders or large cobbles, small pedestrian foot bridges, art or other interpretive elements to further enhance these facilities. These larger stormwater features typically capture larger volumes of stormwater runoff, and provide opportunities for education and public awareness about their significance.

Rain garden along NE Sandy Boulevard in Portland, OR

The Warner Milne Rain Garden in Oregon City collects stormwater and runoff from adjacent surfaces

Mature swale plantings

Tiered rainwater basin

Permeable Pavement

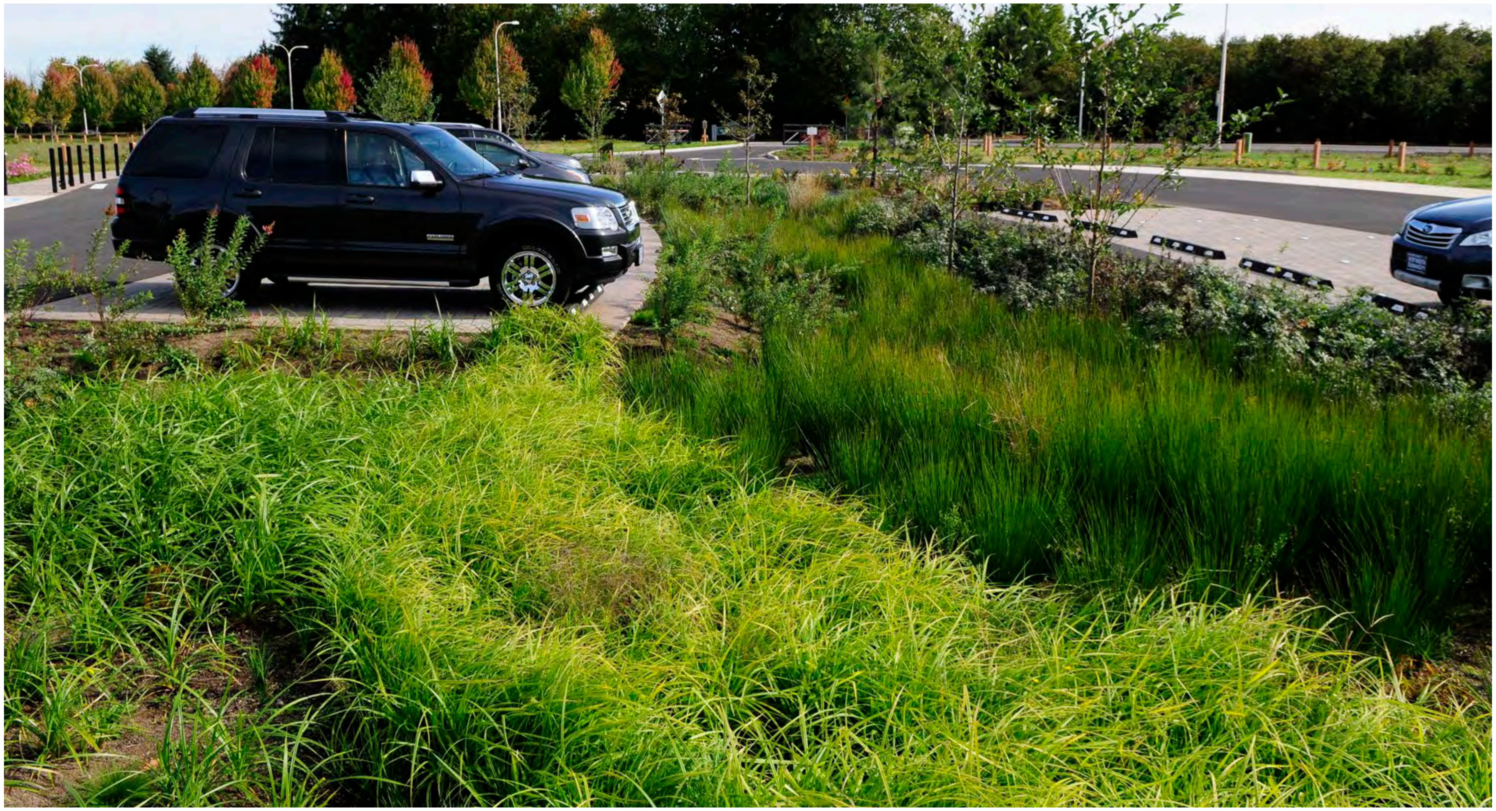
Permeable (or "pervious") pavement allows stormwater to infiltrate directly through the paving medium into a reservoir base of crushed rock and eventually into native soil below. Permeable pavement types include pervious asphalt, pervious concrete, and permeable concrete unit pavers. These pervious materials resemble conventional pavement materials, but contain more air space to allow stormwater to infiltrate through, and are typically thicker as a result to support the same loads.

Permeable pavement is ideal in low traffic areas such as parking areas, highway shoulders, roadway medians, emergency access roads, and patios. Pervious concrete is best used in sidewalks, however, permeable concrete unit pavers should be avoided since they do not meet ADA requirements. Permeable pavement should not be used within 4' of bedrock or a water table's high point, within 100' of a well, near building foundations, on slopes that exceed 5%, or within close proximity to contaminant sources such as gas stations.

Porous pavement

Permeable pavers

Crush rock paving



Permeable paving parking stalls at Graham Oaks Nature Park in Wilsonville, OR

RIVERFRONT CONNECTOR PLAN

APPENDIX 10:

ENGINEER’S CONCEPTUAL ESTIMATE

St. Helens Riverfront Connection

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin	*Date: 05/01/2019*			
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:	**3C**	*(See rating scale guide below.)*		
ITEM	**TOTAL CONSTRUCTION COST**	**30% CONTINGENCY**	**ENGINEERING & CONSTRUCTION MANAGEMENT**	**TOTAL ESTIMATED PROJECT COST**
Intersection				
Plymouth St. & 6th St.	$139,060	$41,720	$34,770	$215,550
Old Portland Rd. & Plymouth St.	$1,206,820	$362,050	$301,710	$1,870,580
Old Portland Rd. & Kaster Rd.	$1,350,280	$405,090	$337,570	$2,092,940
Old Portland Rd. & Port Ave.	$558,490	$167,550	$139,630	$865,670
Old Portland Rd. & Gable Rd.	$604,740	$181,430	$151,190	$937,360
Gable Rd. & McNulty Way	$310,048	$93,020	$77,520	$480,588
Gable Rd. & US 30	$1,706,030	$511,810	$426,510	$2,644,350
Segment				
Segment 1: South 1st Street	$1,867,260	$560,180	$466,820	$2,894,260
Segment 2.1: Veneer Property	$2,240,300	$672,090	$560,080	$3,472,470
Segment 2.2: Plymouth Street	$907,320	$272,200	$226,830	$1,406,350
Segment 3: Plymouth Street	$2,286,620	$685,990	$571,660	$3,544,270
Segment 4.1: Old Portland Road	$4,874,500	$1,462,350	$1,218,630	$7,555,480
Segment 4.2: Gable Road	$3,642,480	$1,092,750	$910,620	$5,645,850
Segment 5: Old Portland Road	$5,726,160	$1,717,850	$1,431,540	$8,875,550
Segment 5: McNulty Way	$4,518,640	$1,355,600	$1,129,660	$7,003,900
Segment 5: Millard Road	$1,968,180	$590,460	$492,050	$3,050,690

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Intersection: Plymouth Street & South 6th Street

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$12,000	$12,000
Traffic Control	LS	ALL	$7,000	$7,000
Erosion Control	LS	ALL	$2,000	$2,000
Removal of Structures and Obstructions	LS	ALL	$3,000	$3,000
Clearing and Grubbing	LS	ALL	$3,000	$3,000
General Earthworks	CY	400	$25	$10,000
Asphalt Roadway - Full Depth	SF	4,300	$7	$29,240
Subgrade Geotextile	SY	480	$1	$480
Concrete Curbs - Standard Curb & Gutter	LF	300	$32	$9,660
Concrete Walks	SF	1,200	$7	$8,640
Detectable Warnings	EA	2	$500	$1,000
Pedestrian Ramps	EA	2	$5,000	$10,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$25,000	$25,000
Permanent Landscaping	SF	700	$4	$2,590
Irrigation, Complete	SF	700	$3	$1,750
Pavement Markings, Complete	LS	ALL	$2,000	$2,000
Signage, Complete	LS	ALL	$2,000	$2,000
Illumination System, Complete	LS	ALL	$9,700	$9,700
			TOTAL CONSTRUCTION COST $	**139,060**
			30% Contingency $	**41,720**
			TOTAL ESTIMATED PROJECT COST $	**180,780**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Intersection: Old Portland Road & Plymouth Street

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$96,000	$96,000
Traffic Control	LS	ALL	$145,000	$145,000
Erosion Control	LS	ALL	$11,000	$11,000
Removal of Structures and Obstructions	LS	ALL	$21,000	$21,000
Clearing and Grubbing	LS	ALL	$19,000	$19,000
General Earthworks	CY	2,800	$25	$70,000
Asphalt Roadway - Full Depth	SF	31,000	$7	$210,800
Subgrade Geotextile	SY	3,500	$1	$3,500
Concrete Curbs - Standard Curb	LF	350	$29	$10,010
Concrete Curbs - Standard Curb & Gutter	LF	1,650	$32	$53,130
Raised Concrete Island	SF	2,000	$11	$21,400
Truck Apron (Concrete)	SF	2,150	$16	$35,260
Concrete Walks	SF	11,300	$7	$81,360
Detectable Warnings	EA	16	$500	$8,000
Pedestrian Ramps	EA	16	$5,000	$80,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$201,000	$201,000
Permanent Landscaping	SF	6,300	$4	$23,310
Irrigation, Complete	SF	6,300	$3	$15,750
Pavement Markings, Complete	LS	ALL	$12,000	$12,000
Signage, Complete	LS	ALL	$9,000	$9,000
Illumination System, Complete	LS	ALL	$80,300	$80,300
			TOTAL CONSTRUCTION COST $	**1,206,820**
			30% Contingency $	**362,050**
			TOTAL ESTIMATED PROJECT COST $	**1,568,870**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Intersection: Old Portland Road & Kaster Road

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin	*Date: May 3, 2019*
Reviewed By: Jamestaun Kraupp, PE	
This Estimate has a Rating of:	**3C** *(See rating scale guide below.)*

ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
Mobilization	LS	ALL	$107,000	$107,000
Traffic Control	LS	ALL	$163,000	$163,000
Erosion Control	LS	ALL	$11,000	$11,000
Removal of Structures and Obstructions	LS	ALL	$24,000	$24,000
Clearing and Grubbing	LS	ALL	$21,000	$21,000
General Earthworks	CY	2,800	$25	$70,000
Asphalt Roadway - Full Depth	SF	28,500	$7	$193,800
Subgrade Geotextile	SY	3,200	$1	$3,200
Concrete Curbs - Standard Curb	LF	800	$29	$22,880
Concrete Curbs - Standard Curb & Gutter	LF	1,900	$32	$61,180
Raised Concrete Island	SF	5,400	$11	$57,780
Truck Apron (Concrete)	SF	3,100	$16	$50,840
Concrete Walks	SF	12,800	$7	$92,160
Detectable Warnings	EA	16	$500	$8,000
Pedestrian Ramps	EA	16	$5,000	$80,000
Bike Ramps	EA	5	$2,500	$12,500
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$224,000	$224,000
Permanent Landscaping	SF	5,700	$4	$21,090
Irrigation, Complete	SF	5,700	$3	$14,250
Pavement Markings, Complete	LS	ALL	$13,000	$13,000
Signage, Complete	LS	ALL	$10,000	$10,000
Illumination System, Complete	LS	ALL	$89,600	$89,600
TOTAL CONSTRUCTION COST			**$**	**1,350,280**
30% Contingency			**$**	**405,090**
TOTAL ESTIMATED PROJECT COST			**$**	**1,755,370**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection
Intersection: Old Portland Road & Port Avenue
City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$48,000	$48,000
Traffic Control	LS	ALL	$25,000	$25,000
Erosion Control	LS	ALL	$6,000	$6,000
Removal of Structures and Obstructions	LS	ALL	$11,000	$11,000
Clearing and Grubbing	LS	ALL	$10,000	$10,000
General Earthworks	CY	1,500	$25	$37,500
Asphalt Roadway - Full Depth	SF	17,650	$7	$120,020
Subgrade Geotextile	SY	2,000	$1	$2,000
Concrete Curbs - Standard Curb	LF	270	$29	$7,722
Concrete Curbs - Standard Curb & Gutter	LF	900	$32	$28,980
Raised Concrete Island	SF	640	$11	$6,848
Concrete Walks	SF	5,700	$7	$41,040
Detectable Warnings	EA	8	$500	$4,000
Pedestrian Ramps	EA	8	$5,000	$40,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$101,000	$101,000
Permanent Landscaping	SF	2,900	$4	$10,730
Irrigation, Complete	SF	2,900	$3	$7,250
Pavement Markings, Complete	LS	ALL	$6,000	$6,000
Signage, Complete	LS	ALL	$5,000	$5,000
Illumination System, Complete	LS	ALL	$40,400	$40,400
			TOTAL CONSTRUCTION COST $	**558,490**
			30% Contingency $	**167,550**
			TOTAL ESTIMATED PROJECT COST $	**726,040**

Scope Accuracy:
Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:
Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Intersection: Old Portland Road & Gable Road

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$52,000	$52,000
Traffic Control	LS	ALL	$27,000	$27,000
Erosion Control	LS	ALL	$6,000	$6,000
Removal of Structures and Obstructions	LS	ALL	$12,000	$12,000
Clearing and Grubbing	LS	ALL	$10,000	$10,000
General Earthworks	CY	1,500	$25	$37,500
Asphalt Roadway - Full Depth	SF	16,100	$7	$109,480
Subgrade Geotextile	SY	1,800	$1	$1,800
Concrete Curbs - Standard Curb	LF	500	$29	$14,300
Concrete Curbs - Standard Curb & Gutter	LF	850	$32	$27,370
Raised Concrete Island	SF	1,100	$11	$11,770
Concrete Walks	SF	7,300	$7	$52,560
Detectable Warnings	EA	10	$500	$5,000
Pedestrian Ramps	EA	10	$5,000	$50,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$109,000	$109,000
Permanent Landscaping	SF	3,800	$4	$14,060
Irrigation, Complete	SF	3,800	$3	$9,500
Pavement Markings, Complete	LS	ALL	$7,000	$7,000
Signage, Complete	LS	ALL	$5,000	$5,000
Illumination System, Complete	LS	ALL	$43,400	$43,400
			TOTAL CONSTRUCTION COST $	**604,740**
			30% Contingency $	**181,430**
			TOTAL ESTIMATED PROJECT COST $	**786,170**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Intersection: Gable Road & McNulty Way

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$25,000	$25,000
Traffic Control	LS	ALL	$38,000	$38,000
Erosion Control	LS	ALL	$3,000	$3,000
Removal of Structures and Obstructions	LS	ALL	$6,000	$6,000
Clearing and Grubbing	LS	ALL	$5,000	$5,000
General Earthworks	CY	800	$25	$20,000
Asphalt Roadway - Full Depth	SF	8,960	$7	$60,928
Asphalt Cycle Track	SF	1,500	$3	$4,650
Subgrade Geotextile	SY	1,200	$1	$1,200
Concrete Curbs - Standard Curb	LF	500	$29	$14,300
Concrete Curbs - Standard Curb & Gutter	LF	400	$32	$12,880
Raised Concrete Island	SF	1,100	$11	$11,770
Concrete Walks	SF	1,500	$7	$10,800
Detectable Warnings	EA	2	$500	$1,000
Pedestrian Ramps	EA	2	$5,000	$10,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$52,000	$52,000
Permanent Landscaping	SF	1,100	$4	$4,070
Irrigation, Complete	SF	1,100	$3	$2,750
Pavement Markings, Complete	LS	ALL	$3,000	$3,000
Signage, Complete	LS	ALL	$3,000	$3,000
Illumination System, Complete	LS	ALL	$20,700	$20,700
			TOTAL CONSTRUCTION COST $	**310,048**
			30% Contingency $	**93,020**
			TOTAL ESTIMATED PROJECT COST $	**403,068**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection
Intersection: Gable Road & US 30
City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: Tony Roos, PE*		
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$148,000.00	$148,000.00
Traffic Control	LS	ALL	$75,000.00	$75,000.00
Erosion Control	LS	ALL	$4,000.00	$4,000.00
Removal of Structures and Obstructions	LS	ALL	$33,000.00	$33,000.00
Clearing and Grubbing	LS	ALL	$5,000.00	$5,000.00
General Earthworks	CY	500	$25.00	$12,500.00
Asphalt Roadway - Full Depth	SF	2,700	$7.50	$20,250.00
Concrete Roadway - Full Depth	SF	1,800	$9.60	$17,280.00
Subgrade Geotextile	SY	300	$1.00	$300.00
Concrete Curbs - Standard Curb & Gutter	LF	900	$34.20	$30,780.00
Raised Concrete Island	SF	2,000	$10.70	$21,400.00
Concrete Walks	SF	2,350	$7.20	$16,920.00
Detectable Warnings	EA	5	$500.00	$2,500.00
Pedestrian Ramps	EA	5	$5,000.00	$25,000.00
Guardrail System, Complete	LF	100	$125.00	$12,500.00
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$52,000.00	$52,000.00
Pavement Markings, Complete	LS	ALL	$3,000.00	$3,000.00
Signage, Complete	LS	ALL	$6,000.00	$6,000.00
Illumination System, Complete	LS	ALL	$20,600.00	$20,600.00
RxR Crossing Replacement	LS	ALL	$750,000.00	$750,000.00
Traffic Signal System, Complete	LS	ALL	$450,000.00	$450,000.00
			TOTAL CONSTRUCTION COST $	**1,706,030**
			30% Contingency $	**511,810**
			TOTAL ESTIMATED PROJECT COST $	**2,217,840**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segment 1: South 1st Street (St. Helens St. to End of Existing South 1st St.)

City of St. Helens

KITTELSON & ASSOCIATES

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$160,000	$160,000
Traffic Control	LS	ALL	$82,000	$82,000
Erosion Control	LS	ALL	$26,000	$26,000
Removal of Structures and Obstructions	LS	ALL	$35,000	$35,000
Clearing and Grubbing	LS	ALL	$31,000	$31,000
General Earthworks	CY	3,400	$50	$170,000
Asphalt Roadway - Full Depth	SF	64,000	$7	$435,200
Subgrade Geotextile	SY	7,200	$1	$7,200
Concrete Curbs - Standard Curb	LF	2,600	$29	$74,360
Concrete Walks	SF	22,500	$7	$162,000
Detectable Warnings	EA	18	$500	$9,000
Pedestrian Ramps	EA	18	$5,000	$90,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$332,000	$332,000
Permanent Landscaping	SF	14,000	$4	$51,800
Irrigation, Complete	SF	14,000	$3	$35,000
Pavement Markings, Complete	LS	ALL	$19,000	$19,000
Signage, Complete	LS	ALL	$15,000	$15,000
Illumination System, Complete	LS	ALL	$132,700	$132,700
			TOTAL CONSTRUCTION COST $	**1,867,260**
			30% Contingency $	**560,180**
			TOTAL ESTIMATED PROJECT COST $	**2,427,440**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segment 2.1: Veneer Property (End of Existing 1st St. to Lagoon Dam)

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$191,000	$191,000
Traffic Control	LS	ALL	$98,000	$98,000
Erosion Control	LS	ALL	$45,000	$45,000
Removal of Structures and Obstructions	LS	ALL	$42,000	$42,000
Clearing and Grubbing	LS	ALL	$37,000	$37,000
General Earthworks	CY	6,000	$50	$300,000
Asphalt Roadway - Full Depth	SF	78,000	$7	$530,400
Subgrade Geotextile	SY	8,700	$1	$8,700
Concrete Curbs - Standard Curb	LF	3,000	$29	$85,800
Concrete Walks	SF	24,000	$7	$172,800
Detectable Warnings	EA	6	$500	$3,000
Pedestrian Ramps	EA	6	$5,000	$30,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$396,000	$396,000
Permanent Landscaping	SF	16,500	$4	$61,050
Irrigation, Complete	SF	16,500	$3	$41,250
Pavement Markings, Complete	LS	ALL	$23,000	$23,000
Signage, Complete	LS	ALL	$17,000	$17,000
Illumination System, Complete	LS	ALL	$158,300	$158,300
			TOTAL CONSTRUCTION COST $	**2,240,300**
			30% Contingency $	**672,090**
			TOTAL ESTIMATED PROJECT COST $	**2,912,390**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segment 2.2: Playmouth Street (Lagoon Dam to South 6th St.)

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$107,000	$107,000
Traffic Control	LS	ALL	$73,000	$73,000
Erosion Control	LS	ALL	$15,000	$15,000
Removal of Structures and Obstructions	LS	ALL	$16,000	$16,000
Clearing and Grubbing	LS	ALL	$14,000	$14,000
General Earthworks	CY	1,900	$50	$95,000
Asphalt Roadway - Full Depth	SF	24,200	$7	$164,560
Subgrade Geotextile	SY	2,700	$1	$2,700
Concrete Curbs - Standard Curb	LF	1,100	$29	$31,460
Concrete Walks	SF	11,000	$7	$79,200
Guardrail System, Complete	LF	1,100	$75	$82,500
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$131,000	$131,000
Pavement Markings, Complete	LS	ALL	$11,000	$11,000
Signage, Complete	LS	ALL	$9,000	$9,000
Illumination System, Complete	LS	ALL	$75,900	$75,900
			TOTAL CONSTRUCTION COST $	**907,320**
			30% Contingency $	**272,200**
			TOTAL ESTIMATED PROJECT COST $	**1,179,520**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segment 3: Playmouth Street (South 6th St. to Old Portland Rd.)

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$196,000	$196,000
Traffic Control	LS	ALL	$100,000	$100,000
Erosion Control	LS	ALL	$34,000	$34,000
Removal of Structures and Obstructions	LS	ALL	$43,000	$43,000
Clearing and Grubbing	LS	ALL	$38,000	$38,000
General Earthworks	CY	4,500	$50	$225,000
Asphalt Roadway - Full Depth	SF	46,800	$7	$318,240
Subgrade Geotextile	SY	5,200	$1	$5,200
Concrete Curbs - Standard Curb	LF	3,900	$29	$111,540
Concrete Walks	SF	35,100	$7	$252,720
Detectable Warnings	EA	46	$500	$23,000
Pedestrian Ramps	EA	46	$5,000	$230,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$408,000	$408,000
Permanent Landscaping	SF	15,600	$4	$57,720
Irrigation, Complete	SF	15,600	$3	$39,000
Pavement Markings, Complete	LS	ALL	$24,000	$24,000
Signage, Complete	LS	ALL	$18,000	$18,000
Illumination System, Complete	LS	ALL	$163,200	$163,200
			TOTAL CONSTRUCTION COST $	**2,286,620**
			30% Contingency $	**685,990**
			TOTAL ESTIMATED PROJECT COST $	**2,972,610**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segement 4.1: Old Portland Road (Plymouoth St. to Gable Rd.)

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin			*Date: May 3, 2019*	
Reviewed By: Jamestuan Kraupp, PE				
This Estimate has a Rating of:			**3C**	*(See rating scale guide below.)*
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$417,000	$417,000
Traffic Control	LS	ALL	$213,000	$213,000
Erosion Control	LS	ALL	$79,000	$79,000
Removal of Structures and Obstructions	LS	ALL	$90,000	$90,000
Clearing and Grubbing	LS	ALL	$80,000	$80,000
General Earthworks	CY	10,500	$50	$525,000
Asphalt Roadway - Full Depth	SF	108,000	$7	$734,400
Asphalt Cycle Track	SF	54,000	$3	$167,400
Subgrade Geotextile	SY	18,000	$1	$18,000
Concrete Curbs - Standard Curb	LF	18,000	$29	$514,800
Concrete Walks	SF	54,000	$7	$388,800
Detectable Warnings	EA	16	$500	$8,000
Pedestrian Ramps	EA	16	$5,000	$80,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$853,000	$853,000
Permanent Landscaping	SF	45,000	$4	$166,500
Irrigation, Complete	SF	45,000	$3	$112,500
Pavement Markings, Complete	LS	ALL	$49,000	$49,000
Signage, Complete	LS	ALL	$37,000	$37,000
Illumination System, Complete	LS	ALL	$341,100	$341,100
			TOTAL CONSTRUCTION COST $	**4,874,500**
			30% Contingency $	**1,462,350**
			TOTAL ESTIMATED PROJECT COST $	**6,336,850**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segment 4.2: Gable Road (Old Portland Rd. to US 30)

City of St. Helens

KITTELSON & ASSOCIATES

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$311,000	$311,000
Traffic Control	LS	ALL	$159,000	$159,000
Erosion Control	LS	ALL	$66,000	$66,000
Removal of Structures and Obstructions	LS	ALL	$68,000	$68,000
Clearing and Grubbing	LS	ALL	$60,000	$60,000
General Earthworks	CY	8,800	$50	$440,000
Asphalt Roadway - Full Depth	SF	110,200	$7	$749,360
Asphalt Cycle Track	SF	34,800	$3	$107,880
Subgrade Geotextile	SY	3,900	$1	$3,900
Concrete Curbs - Standard Curb	LF	5,800	$29	$165,880
Concrete Walks	SF	34,800	$7	$250,560
Detectable Warnings	EA	14	$500	$7,000
Pedestrian Ramps	EA	14	$5,000	$70,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$629,000	$629,000
Permanent Landscaping	SF	29,000	$4	$107,300
Irrigation, Complete	SF	29,000	$3	$72,500
Pavement Markings, Complete	LS	ALL	$43,000	$43,000
Signage, Complete	LS	ALL	$33,000	$33,000
Illumination System, Complete	LS	ALL	$299,100	$299,100
			TOTAL CONSTRUCTION COST $	**3,642,480**
			30% Contingency $	**1,092,750**
			TOTAL ESTIMATED PROJECT COST $	**4,735,230**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection
Segment 5: Old Portland Road (Gable Rd. to Millard Rd.)
City of St. Helens

KITTELSON & ASSOCIATES

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$489,000	$489,000
Traffic Control	LS	ALL	$250,000	$250,000
Erosion Control	LS	ALL	$99,000	$99,000
Removal of Structures and Obstructions	LS	ALL	$106,000	$106,000
Clearing and Grubbing	LS	ALL	$94,000	$94,000
General Earthworks	CY	13,200	$50	$660,000
Asphalt Roadway - Full Depth	SF	134,400	$7	$913,920
Subgrade Geotextile	SY	15,000	$1	$15,000
Concrete Curbs - Standard Curb	LF	11,200	$29	$320,320
Concrete Walks	SF	100,800	$7	$725,760
Detectable Warnings	EA	12	$500	$6,000
Pedestrian Ramps	EA	12	$5,000	$60,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$946,000	$946,000
Permanent Landscaping	SF	72,800	$4	$269,360
Irrigation, Complete	SF	72,800	$3	$182,000
Pavement Markings, Complete	LS	ALL	$68,000	$68,000
Signage, Complete	LS	ALL	$51,000	$51,000
Illumination System, Complete	LS	ALL	$470,800	$470,800
			TOTAL CONSTRUCTION COST $	**5,726,160**
			30% Contingency $	**1,717,850**
			TOTAL ESTIMATED PROJECT COST $	**7,444,010**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection

Segement 5: McNulty Way (Gable Rd. to Millard Rd.)

City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$386,000	$386,000
Traffic Control	LS	ALL	$197,000	$197,000
Erosion Control	LS	ALL	$82,000	$82,000
Removal of Structures and Obstructions	LS	ALL	$84,000	$84,000
Clearing and Grubbing	LS	ALL	$74,000	$74,000
General Earthworks	CY	10,900	$50	$545,000
Asphalt Roadway - Full Depth	SF	147,600	$7	$1,003,680
Subgrade Geotextile	SY	16,400	$1	$16,400
Concrete Curbs - Standard Curb	LF	8,200	$29	$234,520
Concrete Walks	SF	49,200	$7	$354,240
Detectable Warnings	EA	6	$500	$3,000
Pedestrian Ramps	EA	6	$5,000	$30,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$766,000	$766,000
Permanent Landscaping	SF	41,000	$4	$151,700
Irrigation, Complete	SF	41,000	$3	$102,500
Pavement Markings, Complete	LS	ALL	$56,000	$56,000
Signage, Complete	LS	ALL	$42,000	$42,000
Illumination System, Complete	LS	ALL	$390,600	$390,600
			TOTAL CONSTRUCTION COST $	**4,518,640**
			30% Contingency $	**1,355,600**
			TOTAL ESTIMATED PROJECT COST $	**5,874,240**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

St. Helens Riverfront Connection
Segment 5: Millard Road (US 30 to Old Portland Rd.)
City of St. Helens

Engineer's Conceptual Estimate

Prepared By: Dimitryan Shadrin		*Date: May 3, 2019*		
Reviewed By: Jamestaun Kraupp, PE				
This Estimate has a Rating of:		**3C**	*(See rating scale guide below.)*	
ITEM	**UNIT**	**TOTAL QUANTITY**	**UNIT PRICE**	**TOTAL COST**
Mobilization	LS	ALL	$168,000	$168,000
Traffic Control	LS	ALL	$86,000	$86,000
Erosion Control	LS	ALL	$38,000	$38,000
Removal of Structures and Obstructions	LS	ALL	$37,000	$37,000
Clearing and Grubbing	LS	ALL	$33,000	$33,000
General Earthworks	CY	5,000	$50	$250,000
Asphalt Roadway - Full Depth (8" AC, 12" Agg)	SF	61,200	$7	$416,160
Subgrade Geotextile	SY	6,800	$1	$6,800
Concrete Curbs - Standard Curb	LF	3,400	$29	$97,240
Concrete Walks	SF	20,400	$7	$146,880
Detectable Warnings	EA	12	$500	$6,000
Pedestrian Ramps	EA	12	$5,000	$60,000
Storm Water System & Water Quality Treatment, Complete	LS	ALL	$345,000	$345,000
Permanent Landscaping	SF	17,000	$4	$62,900
Irrigation, Complete	SF	17,000	$3	$42,500
Pavement Markings, Complete	LS	ALL	$20,000	$20,000
Signage, Complete	LS	ALL	$15,000	$15,000
Illumination System, Complete	LS	ALL	$137,700	$137,700
			TOTAL CONSTRUCTION COST $	**1,968,180**
			30% Contingency $	**590,460**
			TOTAL ESTIMATED PROJECT COST $	**2,558,640**

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

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CHAPTER 10.04
TRAFFIC CONTROL

[...]

10.04.230 Bicycle Operating Rules.

[...]

(2) Not ride a bicycle upon a sidewalk within the City of St Helens. This does not include facilities including but not limited to shared-use paths and cycle tracks per SHMC 17.16.010 that are intended for bicycle use.

[...]

CHAPTER 17.16
GENERAL AND LAND USE DEFINITIONS

[...]

17.16.010 General and land use definitions.

[...]

"Cul-de-sac" means the turnaround at the end of a dead-end street (includes hammerhead and dead-end road ends).

"Cycle tracks," also known as separated bicycle facilities, means an exclusive bikeway separated from vehicle travel lanes, parking lanes and sidewalks by a curb, landscaping area or other barrier. A cycle track can be one- or two-way in direction and can be even with the street, the sidewalk, or somewhere between. Intersections of cycle tracks and roadways require crossing treatments that are well-marked and highly visible to vehicles and cycle track users.

"De novo" means that the proceeding will be held anew, without deference to any prior record or rulings.

[...]

"Frontage" means the property line fronting on one side of a street between intersecting or intercepting streets or between a street and a right-of-way, waterway, and/or dead-end street, measured along the street line. An intercepting street shall determine only the boundary of the frontage on the side of the street which it intercepts.

“Frontage improvements” means any improvement within the right-of-way along the frontage of a parcel of land, including but not limited to construction or widening of travel lanes, on-street parking areas, sidewalks, bicycle lanes, multi-use paths, landscaping strips, street trees, stormwater treatment facilities, or other utilities located within the right-of-way.

“Funeral home” means a building used for the preparation of the deceased for burial or cremation and the display of the deceased and ceremonies connected therewith before burial or cremation.

[...]

Multifamily Dwelling. See “dwelling: multidwelling unit, apartment (multifamily).”

“Multi-Use Path.” See “shared-use path.”

“Net buildable area of a lot” means the area of the lot excluding those features or areas which this Development Code excludes from the calculations.

[...]

“Setback” means the minimum allowable horizontal distance from a given point or line of reference, which shall be the property line unless otherwise stated to the nearest foundation wall of a building or structure.

“Shared-use path” means combined bicycle and pedestrian facilities separated from motor vehicle traffic by an open space or barrier such as but not limited to a curb, landscaping strip, or other barrier or space, either within the roadway right-of-way or within an independent right-of-way. Shared-use paths may be used by bicyclists and pedestrians as one- or two-way facilities. Intersections of shared-use paths and roadways require crossing treatments that are well-marked and highly visible to vehicles and trail users. The paths can be made of a variety of surface types, provided they are smooth and firm enough to meet Americans with Disability Act (ADA) requirements.

“Shopping center” means a group (at least eight business units) of commercial establishments planned, constructed and managed as a total entity with customer and employee parking provided on site, provision for goods delivery separated from customer access, aesthetic considerations and protection from the elements (also “mini mall”).

[...]

CHAPTER 17.152
STREET AND UTILITY IMPROVEMENT STANDARDS

[...]

17.152.030 Streets.

[...]

(5) Minimum Rights-of-Way and Street Widths. Unless otherwise indicated on an approved street plan or adopted corridor plan, or as needed to continue an existing improved street, street right-of-way and roadway widths shall not be less than the minimum width described in Figure 19. Where a range is indicated, the width shall be determined by the decision-making authority based upon anticipated average daily traffic (ADT) on the new street segment. (The city council may adopt, by resolution, design standards for street construction and other public improvements. The design standards will provide guidance for determining improvement requirements within the specified ranges.) (See "City of St. Helens Engineering Department Public Facilities Construction Standards Manual.")

[...]

(28) Special Street Designs. Adopted corridor plans and other planning efforts have yielded special street designs intended to apply along specific street segments within the City. An applicant may request, or the Director may require, these designs be utilized in other parts of the City where transportation conditions and street functional classifications are the same as those within the plan area.

[...]

17.152.060 Sidewalks and other frontage improvements.

(1) Sidewalks and frontage improvements shall be constructed, replaced or repaired to city design standards as set forth in the standard specifications manual and located as follows:

(a) On both sides of arterial and collector streets to be built at the time of street construction;

(b) On both sides of all other streets and in pedestrian easements and rights-of-way, except as provided further in this section or per SHMC 17.152.030(1)(d), to be constructed along all portions of the property designated for pedestrian ways in conjunction with development of the property.

(2) A planter/landscape strip separation of at least five feet between the curb and the sidewalk shall be required in the design of any arterial or collector street, except where the following conditions exist: there is inadequate right-of-way; the curbside sidewalks already exist on predominant portions of the street; it would conflict with the utilities; or as indicated otherwise by the transportation systems plan (TSP) (see TSP Figures 7-2 and 7-3) or an adopted street plan.

(3) Maintenance. Maintenance of sidewalks, curbs, and planter/landscape strips is the continuing obligation of the adjacent property owner.

(4) Application for Permit and Inspection. If the construction of a sidewalk and frontage improvements ~~is~~ are not included in a performance bond of an approved subdivision or the performance bond has lapsed, then every person, firm or corporation desiring to construct sidewalks and frontage improvements as provided by this chapter shall, before entering upon the

work or improvement, apply for a street opening permit to the engineering department to so build or construct:

(a) An occupancy permit shall not be issued for a development until the provisions of this section are satisfied or a fee in lieu has been paid to the city pursuant to subsection (6) of this section;

(b) The city engineer may issue a permit and certificate allowing temporary noncompliance with the provisions of this section to the owner, builder or contractor when, in his <u>or her</u> opinion, the construction of the sidewalk <u>or frontage improvements</u> is impractical for one or more of the following reasons:

(i) Sidewalk grades have not and cannot be established for the property in question within a reasonable length of time;

(ii) Forthcoming installation of public utilities or street paving would be likely to cause severe damage to the new sidewalk <u>and frontage improvements</u>;

(iii) Street right-of-way is insufficient to accommodate a sidewalk on one or both sides of the street; or

(iv) Topography or elevation of the sidewalk base area makes construction of a sidewalk impractical or economically infeasible;

(c) The city engineer shall inspect the construction of sidewalks <u>and frontage improvements</u> for compliance with the provision set forth in the standard specifications manual.

(5) Council Initiation of Construction. In the event one or more of the following situations are found by the council to exist, the council may adopt a resolution to initiate construction of a sidewalk <u>and other frontage improvements</u> in accordance with city ordinances:

(a) A safety hazard exists for children walking to or from school and sidewalks are necessary to eliminate the hazard;

(b) A safety hazard exists for pedestrians walking to or from a public building, commercial area, place of assembly or other general pedestrian traffic, and sidewalks are necessary to eliminate the hazard;

(c) Fifty percent or more of the area in a given block has been improved by the construction of dwellings, multiple dwellings, commercial buildings or public buildings and/or parks; and

(d) A criterion which allowed noncompliance under subsection (4)(b) of this section no longer exists and a sidewalk could be constructed in conformance with city standards.

(6) Fee in Lieu Option. An applicant may request or the city may require the applicant to pay a fee in lieu of constructing sidewalks <u>and frontage improvements</u> to be approved by the city engineer.

(a) A fee in lieu may be approved given conditions including but not limited to the following:

(i) There is no existing or planned sidewalk network in the area.

(ii) There is a planned sidewalk or multi-use pathway in the vicinity of the site, or an existing multi-use pathway stubbing into the site, that would provide better pedestrian connectivity.

(iii) When physical improvements are present along an existing or proposed street that would prevent a reasonable installation within the right-of-way.

(iv) When sidewalks <u>and other frontage improvements</u> would be located on land with cross slopes greater than nine percent, or other conditions that would create a potential hazard.

(v) Other situations unique to the site.

(b) The fee shall be not less than 125 percent of the cost to perform the work, as determined by the city engineer, based on the applicable city standards in effect at the time of application. Or the city engineer may require the applicant's engineer to provide a cost estimate subject to review and approval by the city, to determine the cost to perform the work. The fee shall be paid prior to plat recording or issuance of a building or development permit.

(c) All fees paid shall be used for construction of a sidewalk and/or other related frontage improvements or multi-use pathway or repair and maintenance of an existing sidewalk and/or related frontage improvements or pathway within the city of St. Helens.

[...]

CHAPTER 19.08
GENERAL GOALS AND POLICIES

[...]

19.08.040 Transportation Goals and Policies.

[...]

(3) Policies. It is the policy of the city of St. Helens to:

[...]

(q) Provide flexibility in roadway design within the Riverfront District in order to allow for innovative, pedestrian-friendly spaces that provide adequate transportation capacity and service for all modes of travel, allow for financially feasible development of land, and offer public benefits to St. Helens residents, business owners, and visitors.

[...]

CHAPTER 19.12
SPECIFIC LAND USE GOALS AND POLICIES

[...]

19.12.010 Urban growth boundary goals and policies.

[...]

(3) Policies. It is the policy of the city of St. Helens to:

[...]

(e) Review all subdivision plats, land partitions, lot line adjustments and development proposals in the growth area to ensure the establishment of a safe and efficient road system consistent with planning efforts in the growth area to date.

[...]

CHAPTER 19.36
RIVERFRONT CONNECTOR PLAN

Sections:

19.36.010 Riverfront Connector Plan adoption by reference.

19.36.010 Riverfront Connector Plan adoption by reference.

(1) The city hereby adopts the St. Helens Riverfront Connector Plan, attached to the ordinance codified in this chapter as Attachment "A" and made part of this reference, as an addendum to the St. Helens Comprehensive Plan (this title).

(2) Where goals, policies, or regulations differ between the Riverfront Connector Plan, the Waterfront Development Prioritization Plan (Chapter 19.28 SHMC), or the Riverfront Framework Plan (Resolution 1765), the Riverfront Connector Plan shall apply.

CITY OF ST. HELENS PLANNING DEPARTMENT
FINDINGS OF FACT AND CONCLUSIONS OF LAW
Comprehensive Plan & Development Code Amendments CPZA.2.19

APPLICANT: City of St. Helens
PROPOSAL: Adopt a Riverfront Connector Plan as an addendum to the Comprehensive Plan, and adopt related text amendments to the Community Development Code (Title 17 SHMC), Comprehensive Plan (Title 19 SHMC) and other parts of the St. Helens Municipal Code (SHMC).

The 120-day rule (ORS 227.178) for final action for this land use decision is **not applicable**.

BACKGROUND

The City acquired approximately 230 acres of predominately industrial land in 2015 in order to facilitate redevelopment. This purchase included an approximately 25-acre parcel of mostly Heavy Industrial zoned waterfront property which was previously used as a veneer manufacturing plant. The remaining 200+ acres of Heavy Industrial zoned property, previously the location of a paper mill, is mostly underutilized, with manufacturing occurring only on a small portion of the site. In August 2015, the City was awarded an EPA Brownfields Area-Wide Planning Grant for $200,000 to develop a framework plan for the waterfront. The Waterfront Redevelopment Framework Plan (Resolution No. 1765), which focused on redevelopment of the 25-acre parcel, was adopted in December 2016. Initial transportation analysis in the Framework Plan identified deficiencies along key intersections leading to the Waterfront Redevelopment Project area.

In 2017, the City received a Transportation and Growth Management (TGM) grant, which is a joint grant program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. The City previously used this program to update the Transportation Systems Plan (TSP) and to develop the US 30 & Columbia Blvd./St. Helens Street Corridor Master Plan. This time, the grant was used to develop a Riverfront Connector Plan to identify and study the transportation deficiencies along the route leading from US 30 to the Waterfront Redevelopment Project area. The Riverfront Connector Plan completes the City's Business loop planning concept included in the Corridor Master Plan, adopted in 2015 (Ord. No. 3181), and City's Transportation System Plan (TSP), adopted in 2011 (Ord. No. 3150). The Riverfront Connector Plan identifies streetscape and intersection improvements to create a cohesive, multi-modal, inviting loop through the downtown, along the waterfront, and to US 30. The project area includes South 1st Street (south of St. Helens Street), Plymouth Street, Old Portland Road (south of Plymouth Street), McNulty Way, Millard Road (east of US 30) and Gable Road (East of US 30.

PUBLIC HEARING & NOTICE

Hearing dates are **May 14, 2019** before the Planning Commission and **June 5, 2019** before the City Council.

At their May 14, 2019 hearing, the Planning Commission unanimously recommended approval of this proposal.

Notice was published in The Chronicle on **May 1, 2019**. Notice was sent to the Oregon Department of Land Conservation and Development on **April 9, 2019**.

APPLICABLE CRITERIA, ANALYSIS & FINDINGS

SHMC 17.20.120(1) – Standards for Legislative Decision

The recommendation by the commission and the decision by the council shall be based on consideration of the following factors:

(a) The statewide planning goals and guidelines adopted under ORS Chapter 197;
(b) Any federal or state statutes or guidelines found applicable;
(c) The applicable comprehensive plan policies, procedures, appendices and maps; and
(d) The applicable provisions of the implementing ordinances.
(e) A proposed change to the St. Helens zoning district map that constitutes a spot zoning is prohibited. A proposed change to the St. Helens comprehensive plan map that facilitates a spot zoning is prohibited.

(a) Discussion: This criterion requires analysis of the applicable statewide planning goals. The potentially applicable goals in this case are: Goal 1, Goal 2, Goal 9, Goal 11 and Goal 12.

> ***Statewide Planning Goal 1: Citizen Involvement.***
> *Goal 1 requires the development of a citizen involvement program that is widespread, allows two-way communication, provides for citizen involvement through all planning phases, and is understandable, responsive, and funded*

Generally, Goal 1 is satisfied when a local government follows the public involvement procedures set out in the statutes and in its acknowledged comprehensive plan and land use regulations.

The City's Development Code is consistent with State law with regards to notification requirements. Pursuant to SHMC 17.20.080 at least one public hearing before the Planning Commission and City Council is required. Legal notice in a newspaper of general circulation is required too. The City has met these requirements and notified DLCD of the proposal.

The Plan itself was developed with an extensive public engagement process. An Advisory Committee, the Committee Overseeing Overt Long-range Passageway Planning (COOLPPL), included broad membership from the County, the Port, residents, staff, and City Council. The COOLPPL met five times throughout the planning process. The Planning Commission reviewed and provided input four times and the City Council provided input six times throughout the planning process. All of these meetings were advertised and open to the public. In addition, one online survey and two neighborhood meetings targeting residents within the affected corridor were conducted to gather additional input. Physical mailed notices were sent to residents within the affected corridor (over 215 property owners) announcing the project and upcoming meetings. Throughout the length of the project, an interactive website (www.riverfrontconnectorplan.com) was available to solicit public comment and provided an easy method of sharing resources about the Plan's development.

Finding: Given the public vetting for the plan, scheduled public hearings, and notice provided, Goal 1 is satisfied.

> ***Statewide Planning Goal 2: Land Use Planning.***
> *This goal requires that a land use planning process and policy framework be established as a basis for all decisions and actions relating to the use of land. All local governments and state agencies involved in the land use action must coordinate with each other. City, county, state and federal agency and special districts plans and actions related to land use must be consistent with the comprehensive plans of cities and counties and regional plans adopted under Oregon Revised Statues (ORS) Chapter 268.*

This proposal involves an addendum and amendments to the Comprehensive Plan. It will expand the information and guidance of the Comprehensive Plan, which can be used as a basis for future land use decisions, plans, and other actions (e.g., development and budgeting).

It is also consistent with federal, state and regional documents, as they, along with City level documents, provide the framework for transportation planning in the City.

Comprehensive Plan consistency is addressed further below.

Finding: Given the inclusion of local, state, regional and federal documents, laws, participation and opportunity for feedback as applicable, Goal 2 is satisfied.

> ***Statewide Planning Goal 9: Economic Development.***
> *This goal requires that local comprehensive plans and policies contribute to a stable and healthy economy in all regions of the state.*

The Riverfront Connector Plan's goal was to refine planned improvements for the City's transportation system which are necessary to facilitate City's economic development-related goals for the redevelopment of the waterfront.

Finding: Given the significance of the Waterfront Redevelopment Project to the City's long-term economic development goals, the Riverfront Connector Plan satisfies Goal 9.

> ***Statewide Planning Goal 11: Public Facilities and Services.***
> *Goal 11 requires cities and counties to plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development. The goal requires that urban and rural development be "guided and supported by types and levels of urban and rural public facilities and services appropriate for, but limited to, the needs and requirements of the urban, urbanizable and rural areas to be served."*

Transportation facilities are considered a primary type of public facility. Since the waterfront site is a new area to be served and growth is expected to change mobility patterns in and around the site, the Riverfront Connector Plan was created in order to facilitate an orderly and efficient arrangement of transportation facilities.

Finding: Goal 11 is satisfied.

> ***Statewide Planning Goal 12: Transportation.***
> *Goal 12 requires cities, counties, metropolitan planning organizations, and ODOT to provide and encourage a "safe, convenient and economic transportation system." This is accomplished through development of Transportation System Plans based on inventories of local, regional and state transportation needs. Goal 12 is implemented through OAR 660, Division 12, also known as the Transportation Planning Rule ("TPR"). The TPR contains numerous requirements governing transportation planning and project development. A major purpose of the Transportation Planning Rule (TPR) is to promote more careful coordination of land use and transportation planning, to ensure that planned land uses are supported by and consistent with planned transportation facilities and improvements.*

Finding: Goal 12 is satisfied as the City is refining its TSP with the Riverfront Connector Plan, which implements the TPR as applicable.

(b) Discussion: This criterion requires analysis of any applicable federal or state statutes or guidelines. There are no federal level statutes or guidelines that where specifically analyzed, except where already incorporated in state level statutes or guidelines.

The first applicable state level statutes/guideline is ORS 227.186(2), which states:

> *All legislative acts relating to comprehensive plans, land use planning or zoning adopted by a city shall be by ordinance.*

Finding*:* The Riverfront Connector Plan and all related amendments and implementation law will be adopted by ordinance in compliance with this statute.

The other applicable state level statutes/guidelines include: the Oregon Transportation Plan (2006), 1999 Oregon Highway Plan and amendments, 2016 Oregon Bicycle & Pedestrian Plan, 2012 Highway Design Manual and amendments, 2016 ODOT Traffic Manual, Oregon Administrative Rules Chapter 734 Division 20 - Traffic Control and Division 51 - Access Management Rule. Since some of these documents relate minimally to the Riverfront Connector Plan, a detailed description of their relevance and consistency is included in in Appendix 3: Technical Memo #1 of the Riverfront Connector Plan.

Finding: Based on Technical Memo #1, the Riverfront Connector Plan and related amendments complies with applicable federal and state statutes and guidelines.

(c) Discussion: This criterion requires analysis of applicable comprehensive plan policies, procedures, appendices and maps. The following is a list of the relevant adopted local plans, some of which are not incorporated into the Comprehensive Plan.

Transportation Systems Plan (2011)

The City adopted an updated TSP in 2011 (Ord. No. 3150 and amended by Ord. No. 3181). This updated the original TSP from 1997 (Res. No. 1247). The Riverfront Connector Plan refined TSP recommendations regarding streetscape design and developed a detailed vision for the study area. Traffic analyses conducted for the TSP were updated based on changes in projected or planned developments since 2011.

US 30 & Columbia Boulevard / St. Helens Street Corridor Master Plan (2015)

The project area for the Riverfront Connector Plan abuts the project area for the Corridor Master Plan. The Riverfront Connector Plan completes the City's business loop planning concept included in the Corridor Master Plan and TSP. Streetscape recommendations in the Riverfront Connector Plan are consistent with the Corridor Master Plan.

St. Helens Waterfront Framework Plan (2016)

The Waterfront Framework Plan guides implementation of the City's waterfront, including the former veneer plant property. The Riverfront Connector Plan used the proposed cross-section design for S. 1st Street that runs through the former veneer plant property as a starting point for streetscape design recommendations. The Riverfront Connector Plan also incorporated the anticipated growth of the waterfront area into intersection and cross-section design recommendations.

St. Helens Branding & Wayfinding Master Plan (2017)

Although not part of the Comprehensive Plan, the Branding & Wayfinding Master Plan provides guidance on, sign placement, route prioritization, and a preferred design for wayfinding signage. The Riverfront Connector Plan included recommendations for location and content of proposed new wayfinding signage within the study area using the guidelines from the adopted Wayfinding Master Plan. The important aspects of the Branding & Wayfinding Master Plan will be incorporated into the Comprehensive Plan.

St. Helens Urban Renewal Plan & Urban Renewal Report (2017)

The Urban Renewal Plan set the parameters for investments in the City's waterfront, commercial business districts, centrally-located brownfield sites, and surrounding industrial properties. The adoption of the Plan created an Urban Renewal Area (URA) to capture revenues from growth to reinvest in projects that will achieve the public vision for the area. The primary purposes of the Plan are to cure blight within the URA, assist with implementation of the US 30 & Columbia Blvd./St. Helens St. Corridor Master Plan and the Waterfront Framework Plan. A large portion of the Riverfront Connector Plan study area is located within the URA boundary. The Urban

Renewal Plan includes several specific recommendations for corridors in the Riverfront Connector Plan. The Riverfront Connector Plan is consist with these recommendations.

St. Helens Strategic Plan (2005)

The St. Helens Strategic Plan was developed to guide Council and staff in strategic projects and establish a Mission Statement for the City. Of relevance to this project is the *Strategic Focus Area #9 - Business Development* which states, "The City's Old Town [Riverfront District] and Waterfront become an exciting, dynamic, and successful cultural, government, recreational, and business district; the highway strip is attractive and functional; and the Mid-Town area is a vibrant area of many uses." Suggested measures to achieve this desired outcome include river-oriented tourism, recreational uses, and a master planned waterfront area. Proposed streetscape designs and improvements in the Riverfront Connector Plan support these objectives.

St. Helens Economic Development Plan (2007)

The Economic Development Plan was developed to implement the Strategic Plan and the Comprehensive Plan. The Economic Development Plan identifies the Old Towne district (Riverfront District) as one of the City's greatest assets and identifies key recommendations and principles to guide future planning efforts in the District. These recommendations have been incorporated into the Riverfront Connector Plan.

A Vision for St. Helens in the Year 2020 (1997)

The Vision for St. Helens in the Year 2020 includes several statements that relate to the Riverfront Connector Plan study area, including:

"A Historic Waterfront Redevelopment Plan has united both public and private resources of the community to create a new focus and center for the entire St. Helens area. The Old Town area has been revitalized with historic building restorations and construction of new buildings in a manner consistent with the area's historic character.
[...]
People are guided to both the Old Town [Riverfront District] and Uptown areas by gateway parks, created on Highway 30 and the Columbia River, as well as tree-lined boulevards and other urban design amenities.
[...]
Emphasis is given throughout the community to pedestrian and bicycle connections to keep the scale of development small and residences in close proximity to work, school, and play. Views of the river, mountains, and other vistas seen from public property are protected."

The Riverfront Connector Plan supports these elements of the Vision.

Finding: The Riverfront Connector Plan incorporates and facilitates elements of the **many** applicable local comprehensive plan policies, procedures, appendices, maps, and other adopted plans.

(d) Discussion: This criterion requires analysis of the applicable provisions of the implementing ordinances.

Development Code (SHMC Title 17)
Ordinances to implement the St. Helens Corridor Master Plan consist primarily of amendments to the City of St. Helens Community Development Code, which is Title 17 in the St. Helens Municipal Code (SHMC). However, changes to other parts of the SHMC are proposed where appropriate. Amendments to the SHMC are proposed to advance the Riverfront Connector Plan.

(e) Discussion: This criterion confirms that the change in zoning and comprehensive plan map are not considered spot zoning.

Finding: This is not applicable to this proposal.

CONCLUSION & DECISION

Based upon the facts and findings herein, the City Council approves this Comprehensive Plan addendum and related text amendments to the Community Development Code (Title 17 SHMC), the Comprehensive Plan (Title 19 SHMC) and other parts of the St. Helens Municipal Code (SHMC), provided:

1. **In addition to appendix 1-8, that the plan include Appendix 9 (alternative cross section for segment 2.1, and Appendix 10 (cost estimates); and**

2. **A comment be added to the plan that notes its flexibility and ability to amend in the future.**

Rick Scholl, Mayor

8/7/19
Date