2013 Astoria Transportation System Plan: Volume 1

Acknowledgements

Project Team

City of Astoria

Brett Estes, Community Development Director

Rosemary Johnson, Planner

Jeff Harrington, City Engineer

Nathan Crater, Assistant City Engineer

ODOT

Bill Johnston, Contract Manager

DKS Associates

Chris Maciejewski, Project Manager

Kevin Chewuk, Lead Transportation Planner

Ben Fuller, Assistant Transportation Planner

Acknowledgements

The 2013 Astoria Transportation System Plan was a collaborative process among various public agencies, key stakeholders and the community. Input, assistance and outreach by the following helped make the Plan possible:

Alta Planning

Matt Berkow

Drew Meisel

Angelo Planning Group

Matt Hastie

Shayna Rehberg

Project Advisory Committee Members

A list of PAC members is included in Volume 2 of the TSP.

A special acknowledgement goes out to all the Astoria residents, business owners, and visitors who attended community meetings or submitted comments on the project. Your input helped make this Plan possible.

Volume 1 Contents

Volume 2 Contents

Volume 2 of the TSP includes all background Memo's and technical data that was the basis for the 2013 Astoria TSP.

Figures and Tables

Section 1: The Setting

Section 1: The Setting

The Setting

Located at the mouth of the Columbia River, Astoria is a historic coastal town and is the oldest American Settlement west of the Rocky Mountains. With a population holding steady around 10,000 since the early 1950's, it is characterized by ground that rises sharply from the riverfront and downtown core to reach peaks of 500 feet, providing the setting for historic neighborhoods with Victorian homes and scenic views.

Its downtown core was rebuilt following a catastrophic fire in 1922. Reconstruction efforts involved a chair-wall foundation system that allowed the roadway and sidewalks to be elevated. Once the chair-wall was constructed, sidewalks were placed on concrete joists and piers. The area between the chair-walls was then filled in with dredge sands and concrete was poured over the sand to create a roadway surface. This once modern system is now showing signs of settlement in areas and may be susceptible to natural disasters or failure from vibration and fatigue.

Exposed Chair-wall System along 10th Street

In recent years, the City has made great strides at reinventing itself as more than a fishing/logging community. Astoria is becoming a regional medical services, recreational and arts destination that blends its historic river identity with a revitalized downtown core that embraces the riverfront and provides premier walking and biking opportunities. These characteristics make Astoria unique, but also define the key transportation issues that the City seeks to address.

The Challenge

Astoria, like many jurisdictions, faces the challenge of accommodating population and employment growth while maintaining acceptable service levels on its transportation network. Moreover, the City must also balance its investments to ensure that the transportation system adequately serves all members of the community and is well maintained.

The Setting

The Transportation System Plan

Astoria is aware of its challenges and strives to keep the City's Transportation System Plan (TSP) up to date in an effort to prepare for and accommodate the future growth within the Urban Growth Boundary (UGB) in the most efficient manner possible. Without the big picture that the TSP provides, maintaining acceptable transportation network performance could not be achieved in an efficient manner.

What is a TSP?

The TSP provides a long term guide for City transportation investments by incorporating the vision of the community into an equitable and efficient transportation system.

The plan evaluates the current transportation system and outlines policies and projects that are important to protecting and enhancing the quality of life in Astoria through the next 20 years. Plan elements can be implemented by the City, private developers, and State or Federal agencies. The TSP represents a collection of past and current ideas, incorporating projects, decisions and standards from past plans into a single document.

A TSP is required by the State of Oregon to help integrate local plans into the Statewide transportation system. The plan balances the needs of walking, bicycling, driving, transit and freight into an equitable and efficient transportation system. The TSP can also be a tool for reflecting community values and protecting what makes Astoria a great place to call home, do business, and visit.

Engaging the Public

The Astoria TSP Update was a collaborative process among various public agencies, key stakeholders and the community. Throughout this process, the project team took time to understand multiple points of view, obtain fresh ideas and resources, and encourage participation from the community.

Project staff hosted nine Project Advisory Committee meetings, met individually with eleven project stakeholders at two key stages during the process, held regular meetings with decision makers, and conversed informally with members of the community.

At key stages, project staff also held three community meetings and three neighborhood meetings that gave residents an opportunity to learn about the project and contribute their concerns on how the transportation system might be improved (as shown in Figure 1).

Goals and Objectives	Transportation Conditions	Alternatives Evaluation	Draft TSP	Final TSP
Develop project goals, objectives and evaluation criteria	Review the transportation system to identify current conditions and problems, and determine future needs through 2035	Identify and evaluate solutions and projects for the identified needs of the transportation system through 2035	The solutions and projects that best meet the project goals, objectives and evaluation criteria were incorporated into a	City adoption of Final TSP
	• Community Meeting #1 • Stakeholder Interviews	• Community Meeting #2 • Neighborhood Meetings • Stakeholder Interviews	• Community Meeting #3	• Public Hearings

Figure 1: The TSP Update Process

TSP Website

Throughout the project, a website was maintained for the TSP where all project news, documents and meeting notices were posted. The website also featured a comment map, where residents could tell the project team what they thought about the transportation system in the City. Nearly 50 comments and questions were submitted to the project team with this feature.

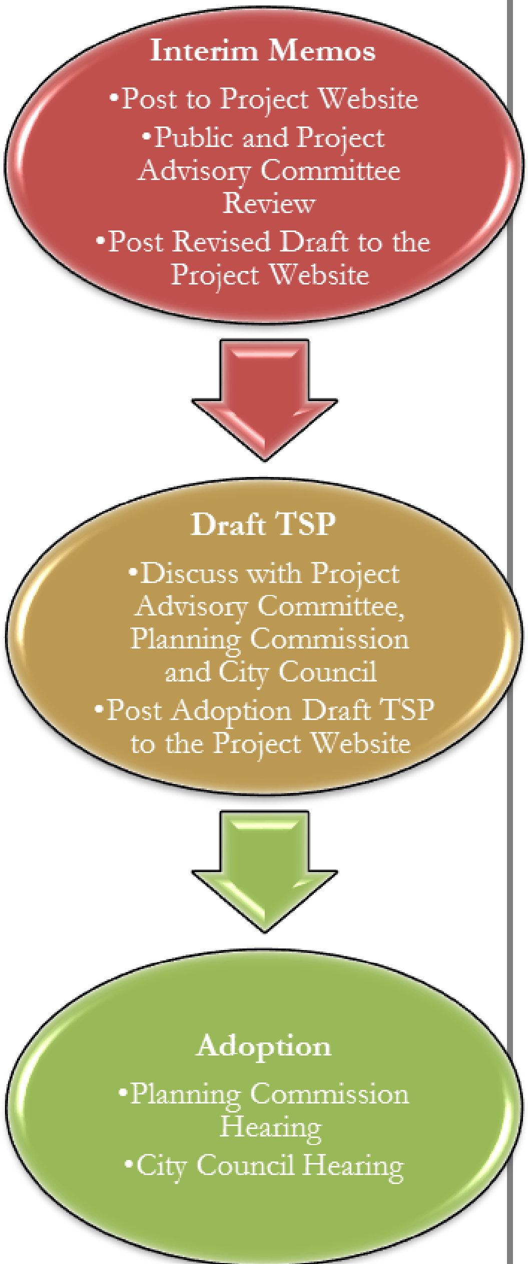


Figure 2: Public Review Process

The Public Review Process

The development of the Transportation System Plan involved gathering information and ideas from residents, business owners and stakeholders in Astoria.

The process was been broken into 13 manageable pieces. Each piece entailed a Technical Memorandum discussing specific topic areas and key findings ranging from existing transportation conditions to funding assumptions to transportation solutions.

Each memorandum was posted to the project website (as shown in Figure 2), giving residents an opportunity to provide feedback and keep up to date with the project.

A Project Advisory Committee comprised of agency technical staff, local residents, and business representatives, was also formed. These groups represented the interests and perspectives of their constituencies by reviewing and commenting on each of the memorandums and meeting with the project team at key stages during the project. These groups also helped the project team find agreement on project issues and alternatives.

The project team would then revise the Draft Memorandums based on the feedback received from these groups and the public and the documents were reposted to the TSP website. These memorandums were ultimately utilized to create the Draft TSP.

Subsequent public hearings with the Planning Commission and City Council on the Draft TSP ultimately led to the adoption of the 2013 Astoria Transportation System Plan.

Astoria Bypass Position

The Astoria Bypass, envisioned in past plans, was not assumed within the horizon of the 2013 TSP. ODOT does not foresee a revenue source for it over the next 20 years and therefore does not want to assume it for any transportation planning purposes. Projects within the TSP were identified without the bypass. It should be noted that the Astoria City Council continues to support the need for a bypass, despite what was assumed in the 2013 TSP.

Section 2: The Vision

Section 2: The Vision

The Vision

Astoria understands that transportation funding is limited and recognizes the importance in being fiscally responsible in its approach to enhancing the transportation system. In the past, a typical transportation planning response to congestion was to expand streets, creating significant barriers to walking and biking and detracting from the livability, health, safety and fiscal wellbeing of the community.

The Astoria approach for this update places more value on investments in smaller, cost-effective solutions for the transportation system rather than larger, more costly ones, where practical. The approach identifies solutions to accommodate future travel demand by following a four-step process (as shown in Figure 3) that considers solutions from top to bottom until a viable solution is identified.

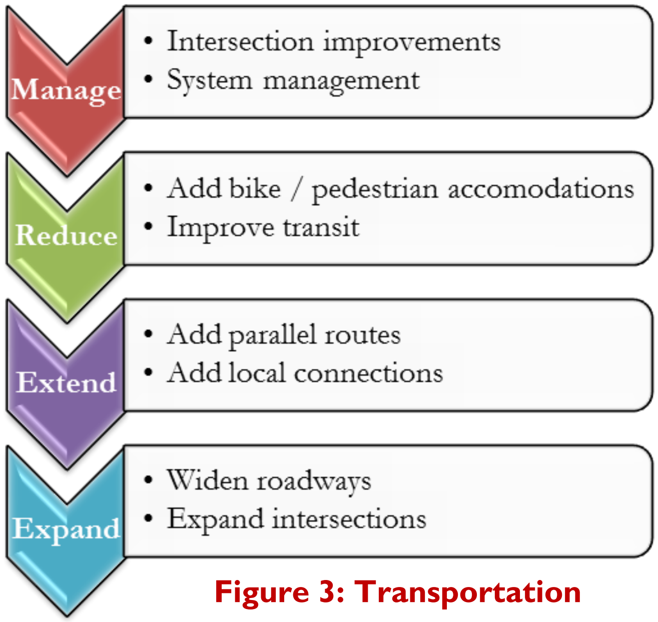


Figure 3: Transportation Solutions Identification Process

This enabled more cost-effective solutions to improve transportation system operations and helps to encourage multiple travel options, increase street connectivity and promote a more sustainable transportation system.

Realizing the Vision

Seven transportation goals and associated objectives were developed for the TSP to provide direction for the future of the transportation system. The goals were ranked by the Project Advisory Committee from most valuable to least valuable. Using the weighted goals, the transportation solutions were evaluated and compared to one another, placing more value on those the Project Advisory Committee felt were most important to the community.

Each transportation solution was assigned a time frame for the expected investment need, based on a project‘s contribution to achieving the transportation goals of Astoria.

Figure 4: Reflecting the Vision in the Plan

The transportation system in Astoria:

TSP Goals

The following seven transportation goals (listed in order of importance to the community), were utilized to assess the performance of the transportation solutions.

The transportation system in Astoria will:

Goal 1: Be well-connected and offer travel choices, reduce travel distance, improve reliability, and manage congestion for all modes.

Goal 2: Include solutions to suit the local context while providing a system that supports active transportation, promotes public health, facilitates access to daily needs and services, and enhances the livability of the Astoria neighborhoods and business community.

Goal 3: Maintain and improve individual health and safety by maximizing active transportation options, public safety and service access, and safe and smooth connections for all modes.

Goal 4: Support the development and revitalization efforts of the City, Region, and State economies and create a climate that encourages growth of existing and new businesses.

Goal 5: Protect and improve existing transportation assets while cost-effectively enhancing the total system while pursuing additional transportation funding.

Goal 6: Be sustainable and meet the needs of present and future generations and that is environmentally, fiscally and socially sustainable.

Goal 7: Be consistent with the City's Comprehensive Plan and is coordinated with County, State, and Regional plans.

Section 3: The Trends

Section 3: The Trends

The Trends

Before it was determined what investments were needed for the City's transportation system, the current travel conditions were reviewed and future growth and travel trends were forecasted through 2035. It was assumed that no further investments would be made to the transportation system for this assessment. Travel forecasts were developed for what would essentially represent the tenth busiest weekend of the year in Astoria. On average, nine weekends will have at least one hour of more traffic than represented in this plan.

Astoria in 2035

Today, Astoria is home to over 5,000 households and accounts for over 5,600 jobs. Between now and 2035, employment growth is expected to increase about one percent a year, slightly outpacing the rate of household growth over the same period (less than ½ percent). Astoria is expected to be home to about 5,400 households and over 6,300 jobs by 2035, a 7 and 13 percent increase respectively from 2011. With more people and more jobs in Astoria, in addition to increased port and tourism activity, the transportation network will face increased demand through 2035.

Population and Employment Growth

As shown in Figure 5, much of the employment growth is expected to occur north of US 101 (West Marine Drive) and population growth north of US 30 along the Columbia River. Employment growth is expected to be highest at the Port of Astoria in the Uniontown neighborhood in the northwestern corner of the City. High employment growth is also anticipated to occur along Exchange Street, generally between 14th Street and 23rd Street.

Household growth is expected to be highest just to the east of downtown Astoria, between US 30 and the Columbia River near Mill Pond. High household growth is also expected to occur on the east side of the City near Tongue Point, generally north of US 30 between 39th Street and Nimitz Drive-Maritime Road.

The Trends

More Travel

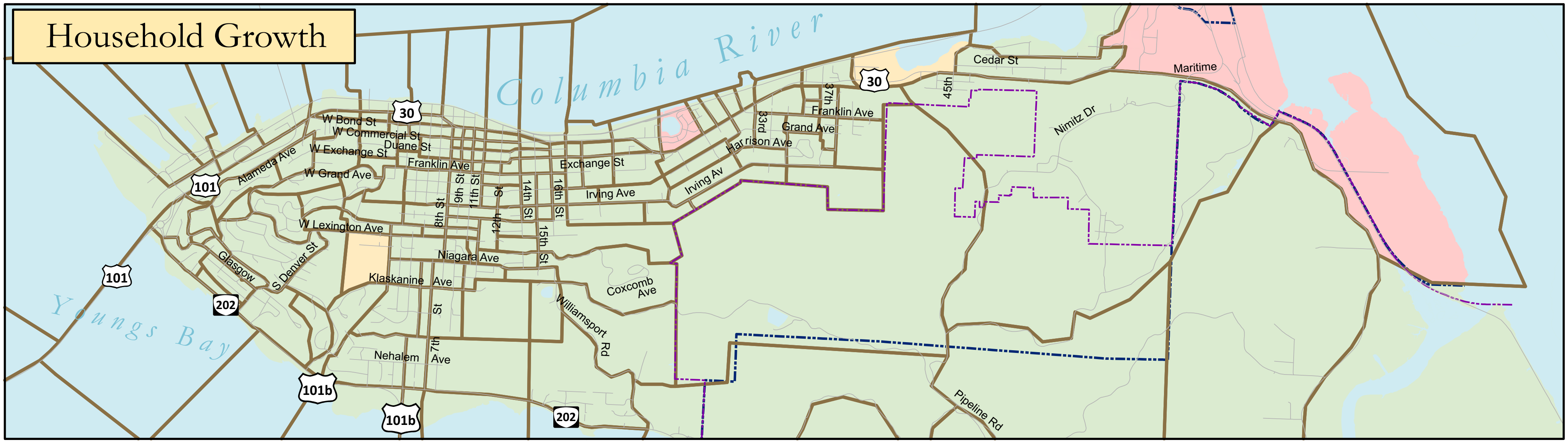
With more jobs and people, in addition to increased travel through the City, the street network in Astoria must cope with an additional 1,200 motor vehicle trips during the evening peak hour on an average weekday and 1,500 trips during the summer. Today, the street network in Astoria handles an estimated 8,200 average weekday and 9,900 summer evening peak hour trips. However, the evening peak hour motor vehicle trips are expected to increase about one percent a year, surpassing 9,400 average weekday and 11,400 summer trips by 2035. Much of the increased travel is expected to begin or end in major residential and/or employment growth areas, including around downtown Astoria and along US 30 just to the east and west of downtown.

More Congestion

An increase in motor vehicle travel leads to an increase in congestion. Travel activity, as reflected by evening peak hour motor vehicle trips beginning or ending in Astoria, is expected to increase by 15 percent through 2035. Through travel, or trips that do not begin or end in Astoria, is also expected to increase through 2035 and is generally representative of increased tourism activity and growth in neighboring cities such as Warrenton. As shown in Figure 6, most of the congestion is expected to occur at intersections along US 30 or US 101 outside of downtown Astoria, including the US 101/Hamburg Avenue and US 30/16th Street intersections. The bridges over Youngs Bay are also expected to be congested, including the New Youngs Bay Bridge (US 101) and Old Youngs Bay Bridge (US 101 Business).

More Walking, Biking and Transit Use

The future needs for walking, biking and transit in Astoria were determined by reviewing major growth areas of the City and seeing how they were served by existing facilities. In addition, the areas of the City in close proximity to key destinations (such as schools, parks, transit stops, shopping and employment) with potential to attract significant walking and biking trips and areas with existing deficiencies were identified and reviewed by the project team and the community to determine locations for prioritized walking, biking or transit investments.



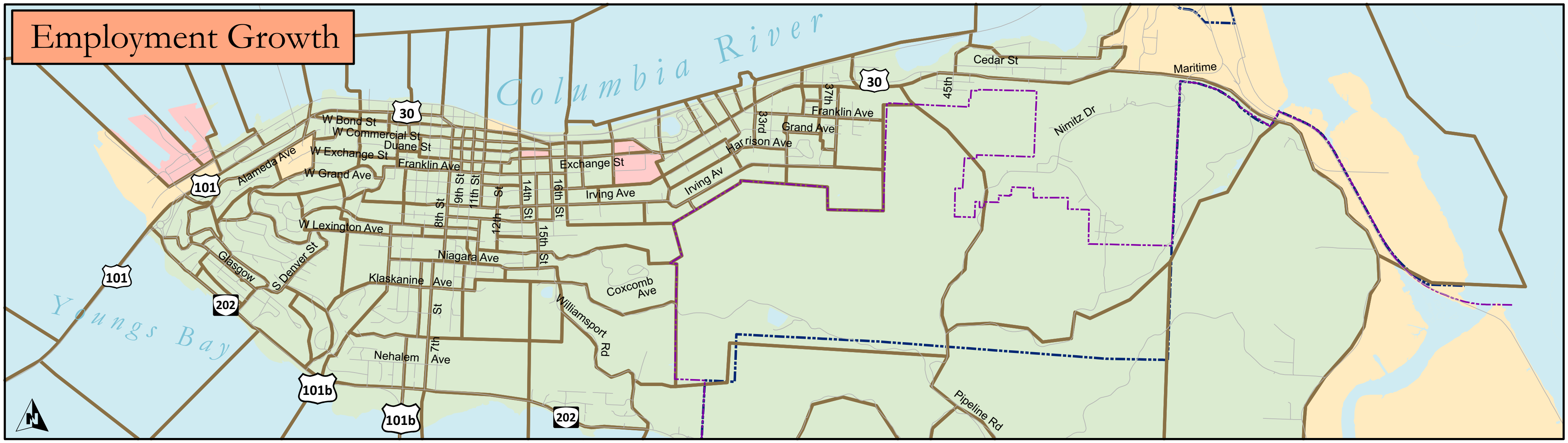


Figure 5 : Household and Employment Growth (2011 - 2035)

Legend

Household Growth between 2011 and 2035 (by Zone)
- Increase of less than 25 households
- Increase between 25 and 50 households
- Increase of more than 50 households

Employment Growth between 2011 and 2035 (by Zone)
- Increase of less than 25 jobs
- Increase between 25 and 50 jobs
- Increase of more than 50 jobs

- Astoria City Limit
- Astoria Urban Growth Boundary
- Traffic Analysis Zone

City of Astoria

Transportation System Plan

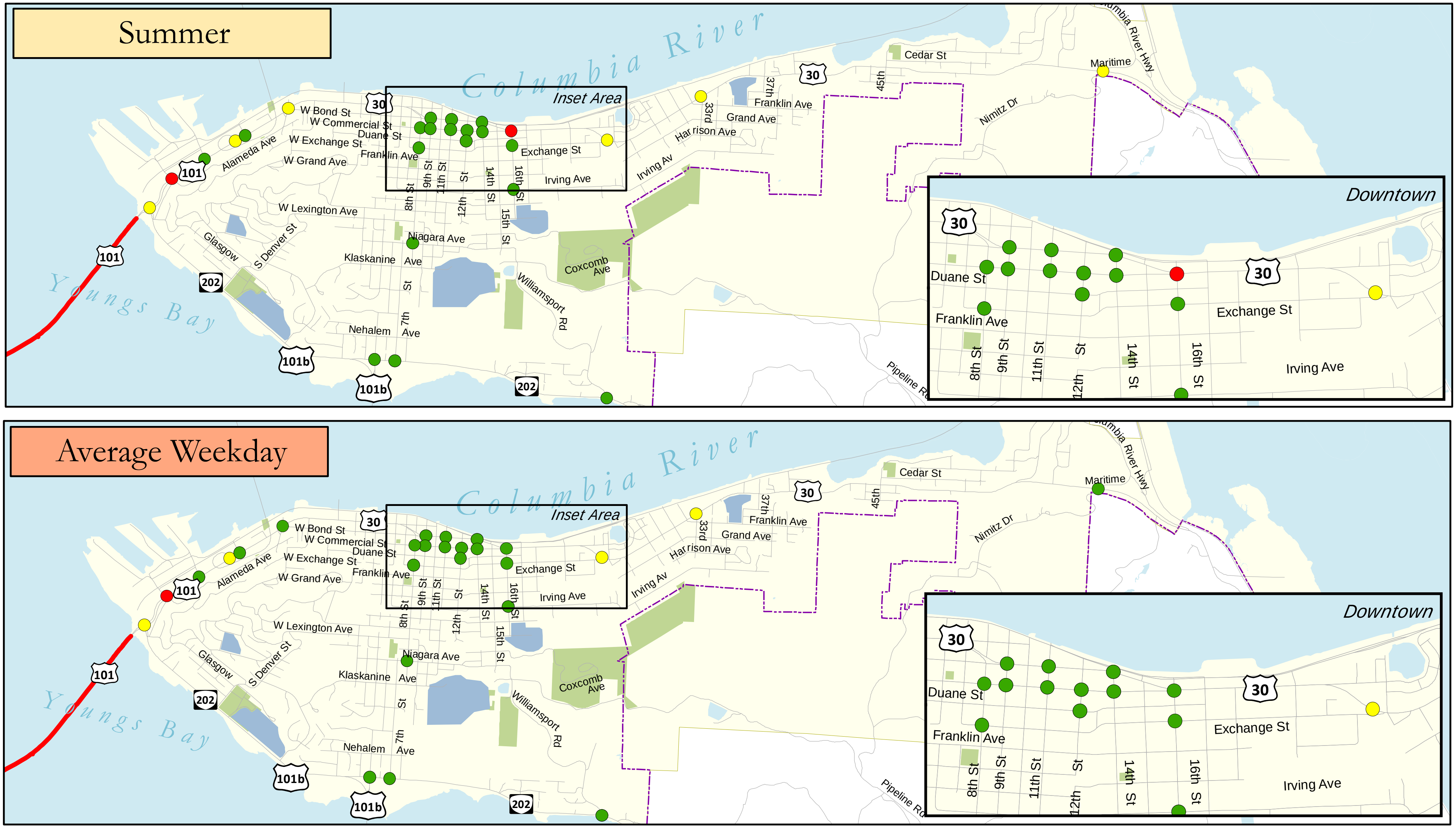


Figure 6: 2035 Motor Vehicle Operating Conditions (PM Peak)

City of Astoria

Transportation System Plan

Section 4: The Funding

Section 4: The Funding

The Funding

Astoria must make investment decisions to develop a set of transportation improvements that will likely be funded to meet identified needs through 2035. Overall, Astoria is expected to have a little over $6.4 million available for street improvement needs after reducing the estimated expenditures through 2035 (based on revenue and expenditures between 2007 and 2011).

Aspirational Projects

A set of transportation projects were developed assuming a reasonably unconstrained budget (referred to as aspirational projects) and used as the starting point to developing a set of likely funded transportation improvements. Taking a multi-modal, network-wide approach to identifying transportation system solutions, these projects fall within one of several categories:

- **Driving** projects to improve connectivity, safety and capacity throughout the City. Astoria identified 39 driving projects that will cost an estimated $35 million to complete.
- **Walking** projects for sidewalk infill, providing seamless connections for pedestrians throughout the City. Astoria identified 27 walking projects that will cost an estimated $12.7 million to complete.
- **Biking** projects including an integrated network of bicycle lanes and marked on-street routes that facilitates convenient travel Citywide. Astoria identified 42 biking projects that will cost an estimated $586,000 to complete.

- **Shared-Use Path** projects providing local off-street travel for walkers and cyclists. The Citywide shared-use path vision includes two projects totaling an estimated $218,000. These projects are in addition to those included in the Astoria Recreational Trails Master Plan, adopted in 2013.
- **Transit** projects to enhance the quality and convenience for passengers. Astoria identified two transit projects that will cost an estimated $175,000 to complete.

- **Crossing** project solutions, proving safe travel across streets along key biking and walking routes. A total of 18 crossing projects were identified, totaling an estimated $655,000.

Overall, Astoria identified 130 transportation solutions, totaling an estimated $49.2 million worth of investments. As shown in Figure 7, if every $100 was invested based on the total projects for each mode, most of the funding would be spent on non-driving modes (68 percent). However, if that same $100 was used to fund the entire cost of all 130 projects in the plan (would require additional funding), about 71 percent (or $71) of every $100 would be spent on driving projects and only 29 percent (or $29) of every $100 spent on other modes. In other words, driving projects alone cost more than double that of all the other projects combined in the plan, yet other modes represent nearly 70 percent of the projects.

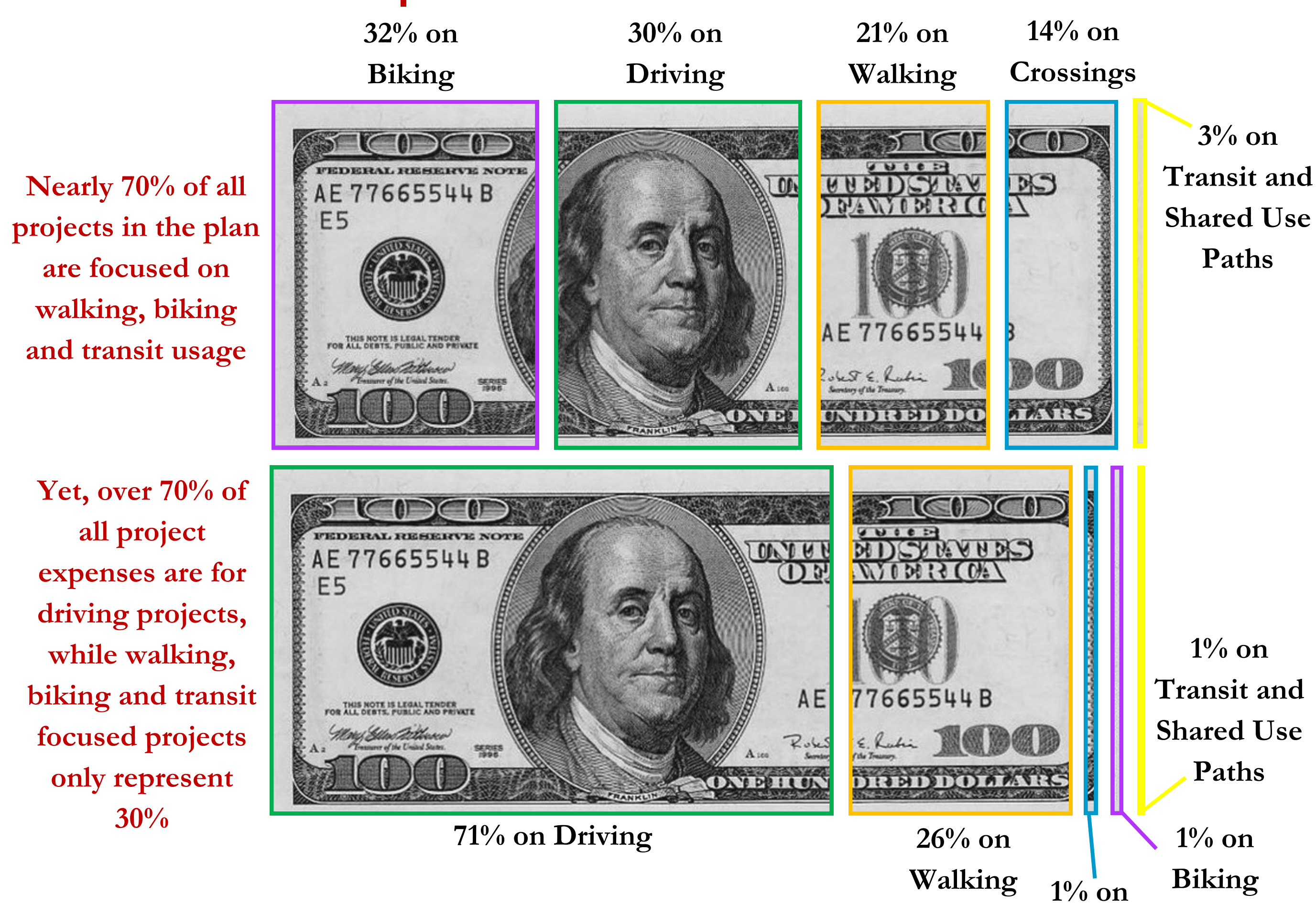


Figure 7: Aspirational Projects and Expenses in the Plan

The Funding

Funding Gap

The total cost of the aspirational transportation system projects is greater than the City's ability to raise funding. Unless additional funds are developed, Astoria will be expected to have a little over $6.4 million to cover the $49.2 million worth of projects included in the aspirational scenario of the plan, meaning $42.8 million worth of projects would be unfunded. As shown in Figure 8, about $87 of every $100 worth of plan expenses would be expected to be unfunded.

About $13 out of every $100 of the aspirational project expenses is expected to be funded

Figure 8: Funding Gap for Aspirational Projects

Potential Additional Funding Sources

The following sources have been used by cities to fund the capital and maintenance aspects of their transportation programs. All of these resources can be constrained based on a variety of factors, including the willingness of local leadership and the electorate to burden citizens and businesses; the availability of local funds to be dedicated or diverted to transportation issues from other competing City programs; and the availability of State and Federal funds. Nonetheless, it is important for the City to consider all opportunities for providing, or enhancing funding for the transportation improvements included in the TSP.

Local/Regional Fuel Tax

Fifteen cities (including Astoria) and two counties in Oregon have adopted local gas taxes ranging from one to five cents per gallon. The taxes are paid to the City monthly by distributors of fuel. Astoria's local gas tax is currently three cents per gallon, which brings in about $18,000 per month in revenue. The City may want to consider increasing the local gas tax or seasonally adjusting the rate. Newport, for example, increases its local gas tax during the summer months to place more of a burden on visitors stopping in the City and paying the local gas tax. This means some of the costs for the transportation improvements in the City would be shared by non-residents. Assuming Astoria increased its local gas tax to five

cents per gallon during the summer months (June through October); the local gas tax could bring an additional $12,000 per month during the summer, and $60,000 annually or $1.4 million through 2035. The process for presenting such a tax to voters would need to be consistent with Oregon State law as well as the laws of the City. The City may also want to pursue increasing the existing regional gas tax with the City of Warrenton to capture drivers traveling across the bridge.

Transportation Utility Fee

A transportation utility fee is a recurring monthly charge that is paid by all residences and businesses within the City. The fee can be based on the number of trips a particular land use generates or as a flat fee per unit. It can be collected through the City's regular utility billing. Existing law places no express restrictions on the use of transportation utility fee funds, other than the restrictions that normally apply to the use of government funds. Some cities utilize the revenue for any transportation related project, including construction, improvements and repairs. However, many cities choose to place self-imposed restrictions or parameters on the use of the funds.

Assuming a flat fee of $5.00 per month per water meter for both residential and commercial uses in the City (similar to the fee charged in Bay City), the City could collect an additional $8.0 million for transportation related expenses through 2035.

System Development Charges

System Development Charges (SDC) are fees collected from new development and used as a funding source for all capacity adding projects for the transportation system. The funds collected can be used to construct or improve portions of roadways impacted by applicable development. The SDC is collected from new development and is a one-time fee. The fee is based on the proposed land use and size, and is proportional to each land use's potential PM peak hour vehicle trip generation. The City of Astoria does not currently collect SDCs. The City may wish to pursue vehicle and/or pedestrian and bicycle SDC's to fund transportation projects for new developments. Many of the transportation improvements in the TSP would be 100 percent fundable through SDC's.

As of 2011, Astoria was the fourth largest city in the State without transportation SDC's. In addition, 30 cities in the State with fewer residents collected transportation SDC's. Astoria is expected to grow by about 400 households and 700 jobs through 2035. As an example of the revenue an SDC fee program could generate, an SDC rate of $2,500 per peak hour trip for driving (similar to the fee collected in Depoe Bay) and $500 per peak hour trip for walking and biking, the City could potentially collect an additional $3.6 million for driving projects and $254,000 for walking and biking projects. A typical residential dwelling unit would be expected to pay around $2,200 for driving and $450 for walking and biking SDC's. If an SDC rate program is desired, a rate study would be required to determine appropriate fees based on capacity projects costs, growth potential, and local preferences.

ODOT Statewide Transportation Improvement Program (STIP) Enhance Funding

ODOT has modified the process for selecting projects that receive STIP funding. The new process follows a jurisdictionally blind approach, meaning local agencies can receive funding for projects off the State system. Focus projects are expected to be those that enhance system connectivity and improve multi-modal travel options. With the updated TSP, the City will be prepared to apply for STIP funding.

ODOT Highway Safety Improvement Program (HSIP) Funding

With Oregon's funding under the HSIP increased significantly and direction from the Federal Highway Administration to address safety challenges on all public roads, ODOT will increase the amount of funding available for safety projects on local roads. Safety funding will be distributed to each ODOT region, which will collaborate with local governments to select projects that can reduce fatalities and serious injuries, regardless of whether they lie on a local road or a State highway. Funding for local roads will be allocated to primarily focus on a few systemic low cost fixes that can be implemented in the shorter timeframe.

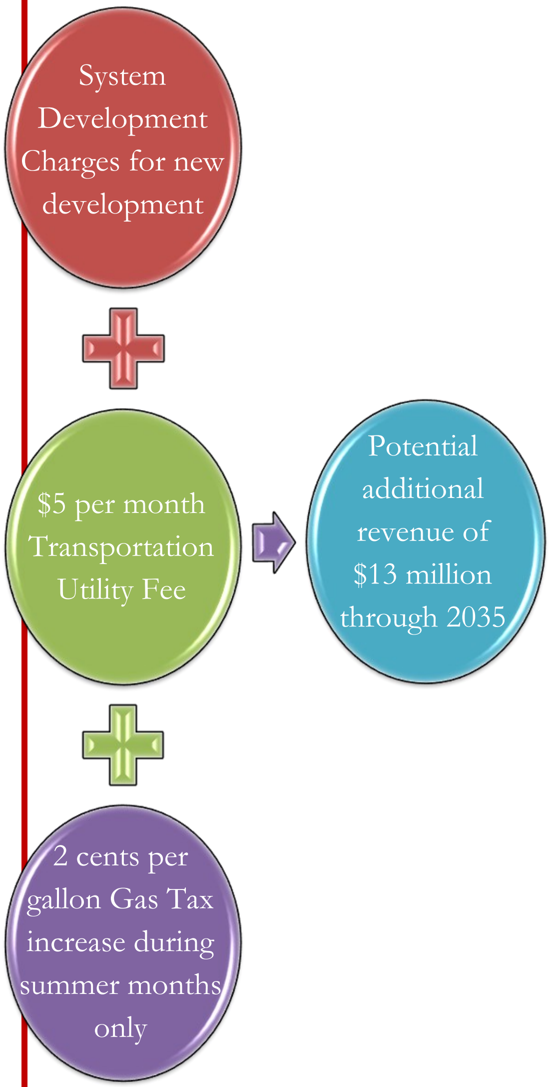


Figure 9: Potential Additional Revenue

Local Hotel/Lodging Tax

Many Oregon jurisdictions impose a local hotel tax, including Astoria which charges a ten percent lodging tax. Several jurisdictions in Oregon, including Lincoln City, dedicate some of the revenue from this tax to transportation projects. Astoria may choose to do the same to place some of the cost burden for the transportation improvements in the City on non-residents.

General Fund Revenues

At the discretion of the City Council, the City can allocate General Fund revenues to pay for its Transportation program (General Fund revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City). This allocation is completed as a part of the City's annual budget process, but the funding potential of this approach is constrained by competing community priorities set by the City Council.

Urban Renewal District

An Urban Renewal District (URD) would be a tax-funded district within the City. The URD would be funded with the incremental increases in property taxes that result from construction of applicable improvements. Improvements are funded by the incremental taxes, rather than fees. There are currently two Urban Renewal Districts in the City. The Astor-East Urban Renewal District includes of the area east of Downtown Astoria to 23rd Street and a small portion within the Downtown area, while the Astor-West Urban Renewal District includes the Port of Astoria/ Uniontown neighborhood.

Local Improvement Districts

Local Improvement Districts (LIDs) can be formed to fund capital transportation projects. LIDs provide a means for funding improvements that benefit a specific group of property owners. LIDs require owner/voter approval and a specific project definition. Assessments are placed against benefiting properties to pay for improvements. LIDs can be matched against other funds where a project has system wide benefit beyond benefiting the adjacent properties.

Section 5: The Investments

Section 5: The Investments

The Investments

With an estimated $49.2 million worth of aspirational transportation system projects identified, Astoria must make investment decisions to develop a set of transportation improvements that will likely be funded to meet identified needs through 2035. As detailed earlier in this document, the City is expected to have approximately $6.4 million to cover the $49.2 million in project costs. Unless the City expands its funding options, most of the aspirational transportation system projects identified for the City are not reasonably likely to be funded through 2035. For this reason, the transportation solutions were split into two categories. Those reasonably expected to be funded by 2035 were included in the Likely Funded Transportation System, while the projects that are not expected to be funded by 2035 were included in the Aspirational Transportation System.

Setting Priorities to the Investments

Using the seven TSP goals (detailed in the "Vision" section of the Plan), the aspirational transportation system projects were evaluated and compared to one another. Greater value was placed on the projects the Project Advisory Committee felt were most important to the community.

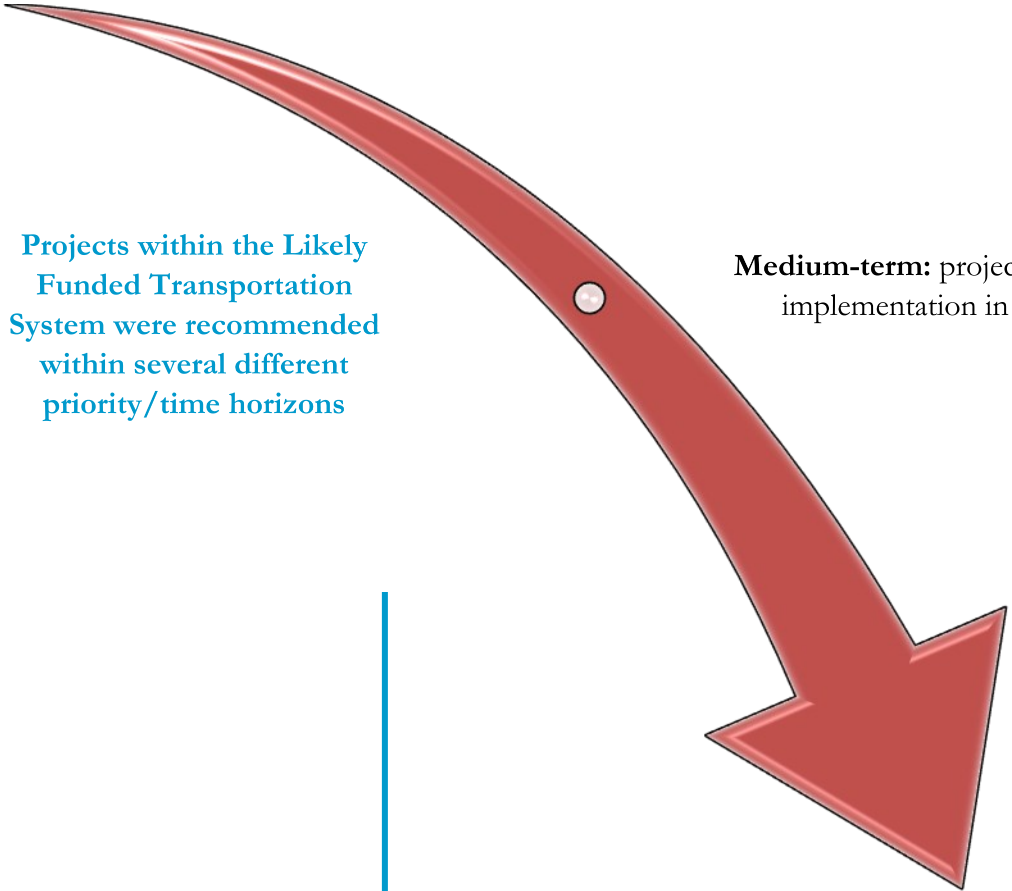
THE GARDEN OF SURGING WAVES

Each transportation solution was assigned a time frame for the expected investment need, based on a projects contribution to achieving the transportation goals of Astoria. The investment recommendations attempted to balance implementation considerations. Complex and costly capital projects were disfavored compared with implementation of low cost projects that can have more immediate impacts and can spread investment benefits Citywide.

The Likely Funded Plan

The Likely Funded Plan identifies the transportation solutions reasonably expected to be funded by 2035 and have the highest priority for implementation. Over $6.2 million worth of investments are included in the Likely Funded Transportation System. It should be noted that any investments to the state highway system will require ODOT approval prior to project design and construction.

Short-term: projects recommended for implementation in within 1 to 5 years.



Projects within the Likely Funded Transportation System were recommended within several different priority/time horizons

Medium-term: projects recommended for implementation in within 5 to 10 years.

Long-term Phase 1: projects likely to be implemented beyond 10 years from the adoption of this Plan. These projects are important for the development of the City transportation network, but are unlikely to be funded in the next 10 years.

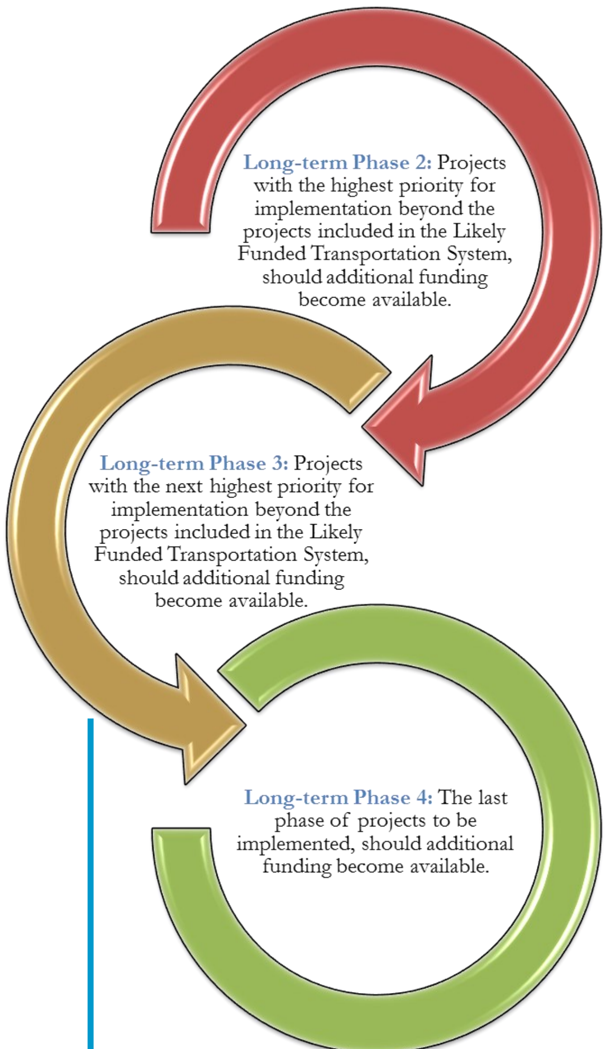
The Investments

The Aspirational Plan

The projects and actions outlined within the Likely Funded Plan will significantly improve Astoria's transportation system. If the City is able to implement a majority of the Likely Funded Plan, nearly two decades from now Astoria residents will have access to a safer, more balanced multimodal transportation network.

The Aspirational Transportation System identifies those transportation solutions that are not reasonably expected to be funded by 2035, but many of which are critically important to the transportation system. Some of the projects will require funding and resources beyond what is available in the time frame of this plan. Others are contingent upon grants or redevelopment that makes it possible to create currently missing infrastructure, such as sidewalk connections. The Aspirational Transportation System includes about $43 million worth of investments. It should be noted that any investments to the state highway system will require ODOT approval prior to project design and construction.

Projects within the Aspirational Transportation System were recommended within several different priority/time horizons:



Mapping the Projects

The Likely Funded and Aspirational Transportation solutions are illustrated in Figures 10 to 12. The projects numbered on Figures 10 to 12 correspond with the project numbers in Section A of the TSP Volume 2. The project numbers are denoted as follows:

- **Driving ("D")**
- **Walking ("W")**
- **Biking ("B")**
- **Shared-use path ("S")**
- **Transit ("T")**
- **Street crossing ("CR")**

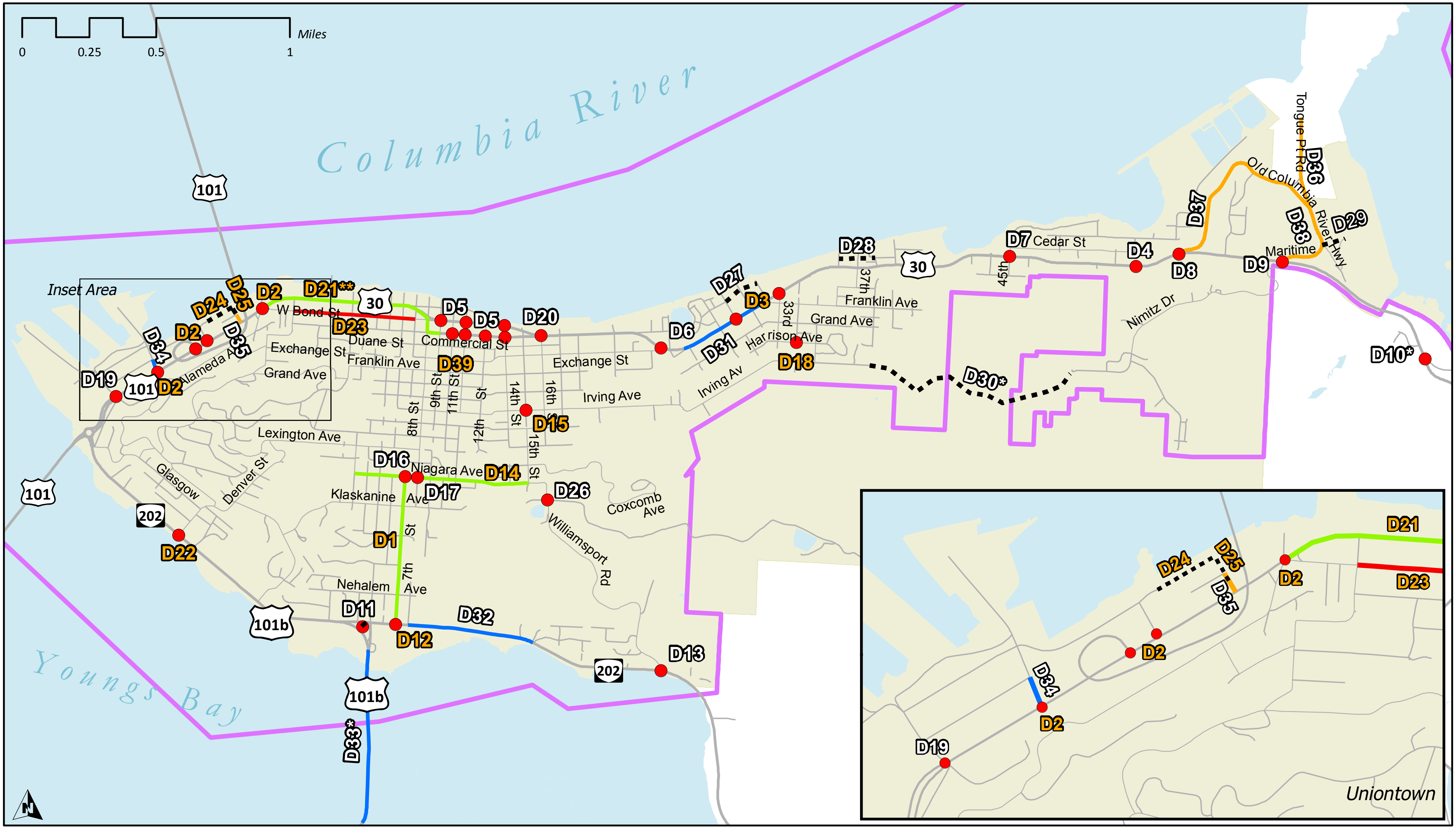


Figure 10 : Planned Driving Solutions

Note: This Figure includes all potential driving projects in the City, whether they are reasonably likely to be funded and constructed, or aspirational and conceptual (see the legend for more details).

City of Astoria

Transportation System Plan

Legend

Planned Driving Solutions

- Planned Intersection Improvement
- Planned Street Reconfiguration
- Planned Street Upgrade
- Planned Street Widening
- Planned Two-Way Street
- Planned Street

Likely Funded Transportation System Project # (See TSP Volume 2, Section A for more information)

Aspirational Transportation System Project # (See TSP Volume 2, Section A for more information)

City Limit

Urban Growth Boundary

* See TSP Volume 2, Section A for more information

** Planning concept potentially reduces vehicle-carrying capacity of the highway; further evaluation of the project design will be required at the time of implementation to ensure compliance with ORS 366.215.

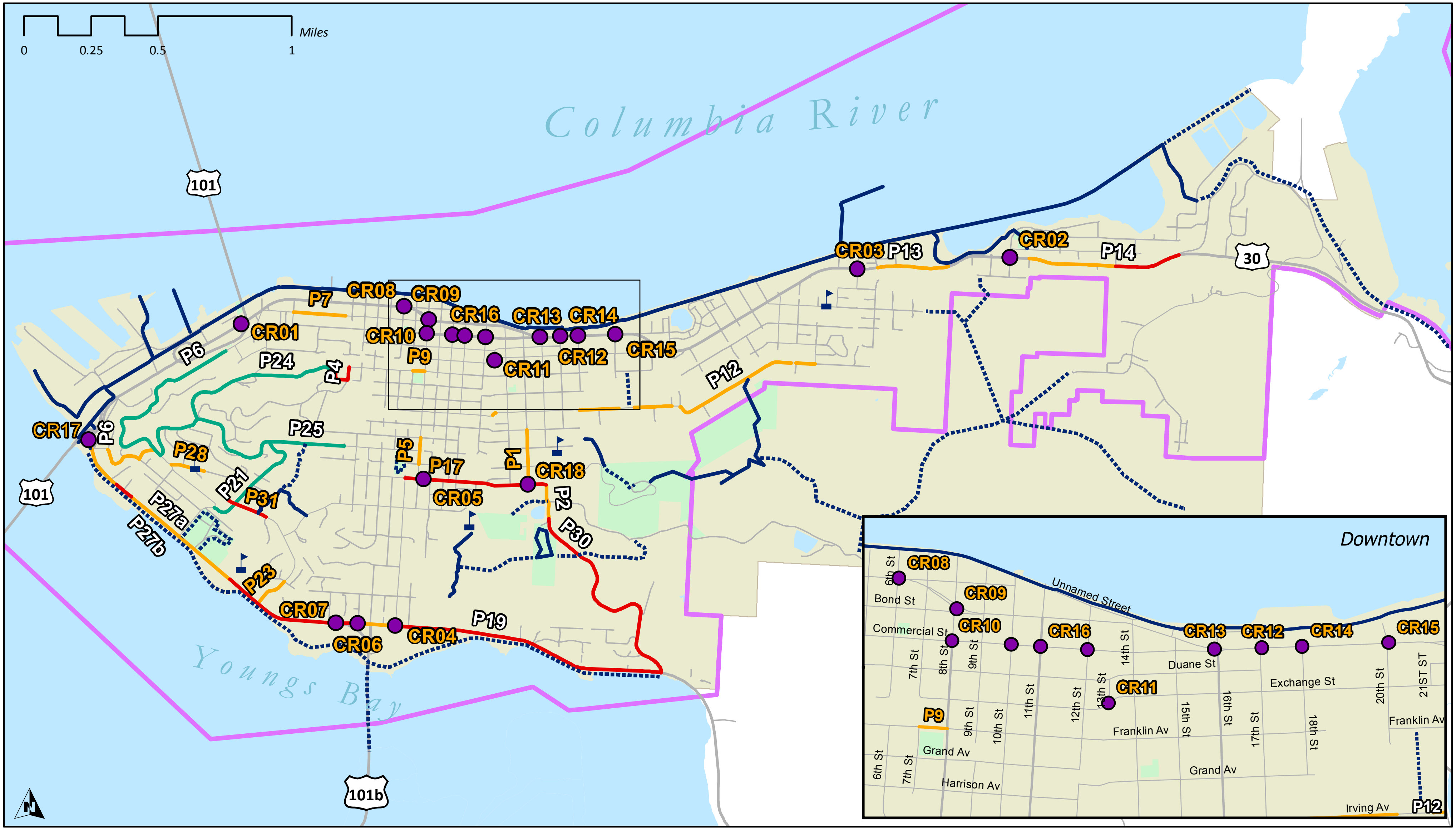


Figure 11 : Planned Walking and Crossing Solutions

City of Astoria

Transportation System Plan

Legend

Walking Projects

- Planned Sidewalk Infill (Both Sides)
- Planned Sidewalk Infill (One Side)
- Planned Community Based Solution
- Planned Crossing Improvement

Trail Projects (From Recreation Trails Master Plan)

- ExistingRecreation Trails
- Planned Recreation Trails

- # Likely Funded Transportation System Project # (See TSP Volume 2, Section A for more information)
- # Aspirational Transportation System Project # (See TSP Volume 2, Section A for more information)
- School
- Park
- City Limit
- Urban Growth Boundary

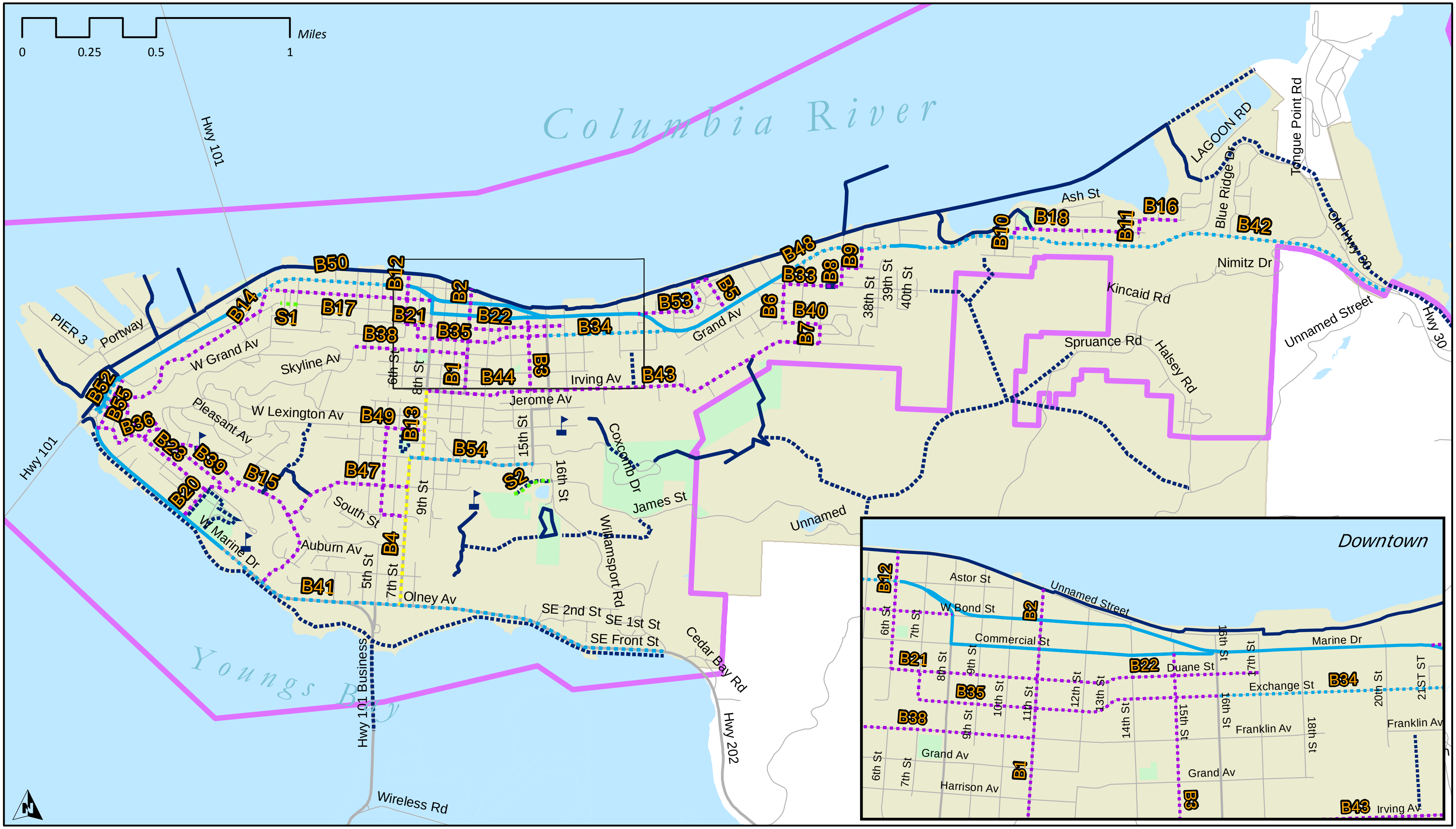


Figure 12 : Planned Biking Solutions

Legend

Existing Bike Lanes

Biking Projects

- Planned Bike Lanes
- Planned Shared Roadway
- Planned Uphill Bike Lane; Downhill Shared Lane Markings
- Planned Pedestrian and Bicycle Trail

Trail Projects (From RecreationTrails Master Plan)

- Existing RecreationTrails
- Planned Recreation Trails

B# Likely Funded Transportation System Project # (See Attachment 1 of Memorandum #12)

B# Not Likely Funded Transportation System Project # (See Attachment 1 of Memorandum #12)

School

Park

City Limit

Urban Growth Boundary

City of Astoria

Transportation System Plan

Section 6: The Standards

Section 6: The Standards

The Standards

Now that the vision and associated investments for the transportation system in Astoria have been established, standards and regulations must be developed to ensure future development or redevelopment of property is consistent.

Street System

Traditional roadway designs focus on the safety and flow of motor vehicle traffic. The one size fits all design approach is less effective at integrating the roadway with the character of the surrounding area and addressing the needs of other users of a roadway. For instance, the design of an arterial roadway through a commercial area has often traditionally been the same as one through a residential neighborhood, both primarily focused on the movement of motor vehicles without allowing flexibility in optimizing the street for walking and biking.

Astoria recognizes that all roadways within the City should be multi-modal or "complete streets", with each street serving the needs of the various travel modes. The City also realizes that not all streets should be designed the same. To account for this, Astoria classifies the street system into a hierarchy organized by function and street type (representative of their places). These classifications ensure that the streets reflect the neighborhood through which they pass, consisting of a scale and design appropriate to the character of the abutting properties and land uses. The classifications also provide for and balance the needs of all travel modes including pedestrians, bicyclists, transit riders, motor vehicles and freight. Within these street classifications, context sensitive design may result in alternative cross-sections.

Multi-Modal Street Function

Functional classification of roadways is a common practice in the United States. Traditionally, roadways are classified based on the type of vehicular travel it is intended to serve (local versus through traffic). In Astoria, the functional classification of a roadway (shown in Figure 13) determines the level of mobility for all travel modes, defining its level of access and usage within the City and region. The street functional classification system recognizes that individual streets do not act independently of one another but instead form a network that works together to serve travel needs on a local and regional level. From highest to lowest intended usage, the classifications are arterials, collectors and local streets. Roadways with a higher intended usage generally provide more efficient motor vehicle traffic movement (or mobility) through the City, while roadways with lower intended usage (local streets) provide greater access for shorter trips to local destinations.

Multi-Modal Street Type

Astoria further classifies the roadways within the City based on the neighborhood it serves and the intended function for pedestrians, bicyclists and transit riders in that specific area. Within the context of Astoria's "complete street" system that will serve all modes, the street type of a roadway defines its cross-section characteristics and determines how users of a roadway interact with the surrounding land use. Since the type and intensity of adjacent land uses and zoning directly influence the level of use by pedestrians, bicyclists and transit riders, the design of a street (including its target speed, intersections, sidewalks, and travel lanes) should reflect its surroundings.

The street types attempt to strike a balance between street functional classification, adjacent land use, zoning designation and the competing travel needs by prioritizing various design elements. Three street types and a constrained street option are described below for Astoria:

- **Mixed-Use Streets** typically have a higher amount of pedestrian activity and are often on a transit route. These streets should emphasize a variety of travel choices such as pedestrian, bicycle and transit use to complement the development along the street. Since Mixed-Use streets typically serve pedestrian oriented land uses, walking should receive the highest priority of all the travel modes. They should be designed with features such as wider sidewalks, pedestrian amenities, transit amenities, attractive landscaping, on-street parking, pedestrian crossing enhancements and bicycle lanes.

- **Residential Streets** are generally surrounded by residential uses, although various small shops may be embedded within the neighborhood. These streets often connect neighborhoods to local parks, schools and mixed-use areas. They should be designed to emphasize walking, while still accommodating the needs of bicyclists and motor vehicles. A high priority should be given to design elements such as traffic calming, landscaped buffers, walkways/pathways/trails, on-street parking and pedestrian safety enhancements.

- **Commercial/Industrial Streets** are primarily lined with retail and large employment complexes, and often serve industrial areas. These uses serve customers throughout the City and region and may not have a direct relationship with nearby residential neighborhoods. Buildings are typically set back behind parking lots. These streets are somewhat more auto-oriented, but should still accommodate pedestrians and bicyclists safely and comfortably. Roadway widths are typically wider to accommodate a high volume of large vehicles such as trucks, trailers and other delivery vehicles. Design features should include landscaped medians or a two-way left turn lane, sidewalks and bike lanes, pedestrian crossing enhancements and a buffer between the roadway and the sidewalk. On-street parking should be discouraged.

Any street type located in steep, environmentally sensitive, rural, historic, or development limited areas of the City may be considered a constrained street. These streets may require different design elements that may not be to scale with the adjacent land use. Constrained elements may include narrower or limited travel lanes, and pedestrian and bicycle facilities, or accommodations that generally match those provided by the surrounding developed land uses. To the extent possible, pedestrian and bicycle accommodations should be provided on an adjacent roadway, via a shared-use path or shared within the right-of-way using distinctive design details.

Design Types of Streets

Design of the streets in Astoria requires attention to many elements of the public right-of-way and considers how the street interacts with the adjoining properties. The four zones that comprise the cross-section of streets in Astoria, including the context zone, walking zone, biking/on-street parking zone and driving zone, are shown in Figure 14. The design of these zones varies based on the functional classification and street type. Overall, there are 6 different design types for streets, ranging from Mixed-Use Collector to Commercial/Industrial Local Street. Note that a design type is not available for Arterial Streets since they are State Highways and therefore are subject to the design criteria in the Oregon Highway Plan and ODOT Highway Design Manual. The design criteria for streets can be seen in Figure 15a, b, and c. The City may also reduce or eliminate lower-priority design elements of the street along constrained streets located in steep, environmentally sensitive, rural, historic, or development limited areas of the City.

- **Context Zone:** The context zone is the point at which the sidewalk interacts with the adjacent buildings or private property. The purpose of this zone is to provide a buffer between land use adjacent to the street and to ensure that all street users have safe interactions.
- **Walking Zone:** This is the zone in which pedestrians travel. The walking zone is determined by the street type and should be a high priority in mixed-use and residential areas. It includes a minimum five foot clear throughway for walking, an area for street furnishings, bike racks, or landscaping (e.g. benches, transit stops and/or plantings) and a clearance distance between curbside on-street parking and the street furnishing area or landscape strip (so parking vehicles or opening doors do not interfere with street furnishings and/or landscaping). Streets located along a transit route should incorporate furnishings to support transit ridership, such as transit shelters and benches, into the furnishings/landscape strip adjacent to the biking/on-street parking zone.

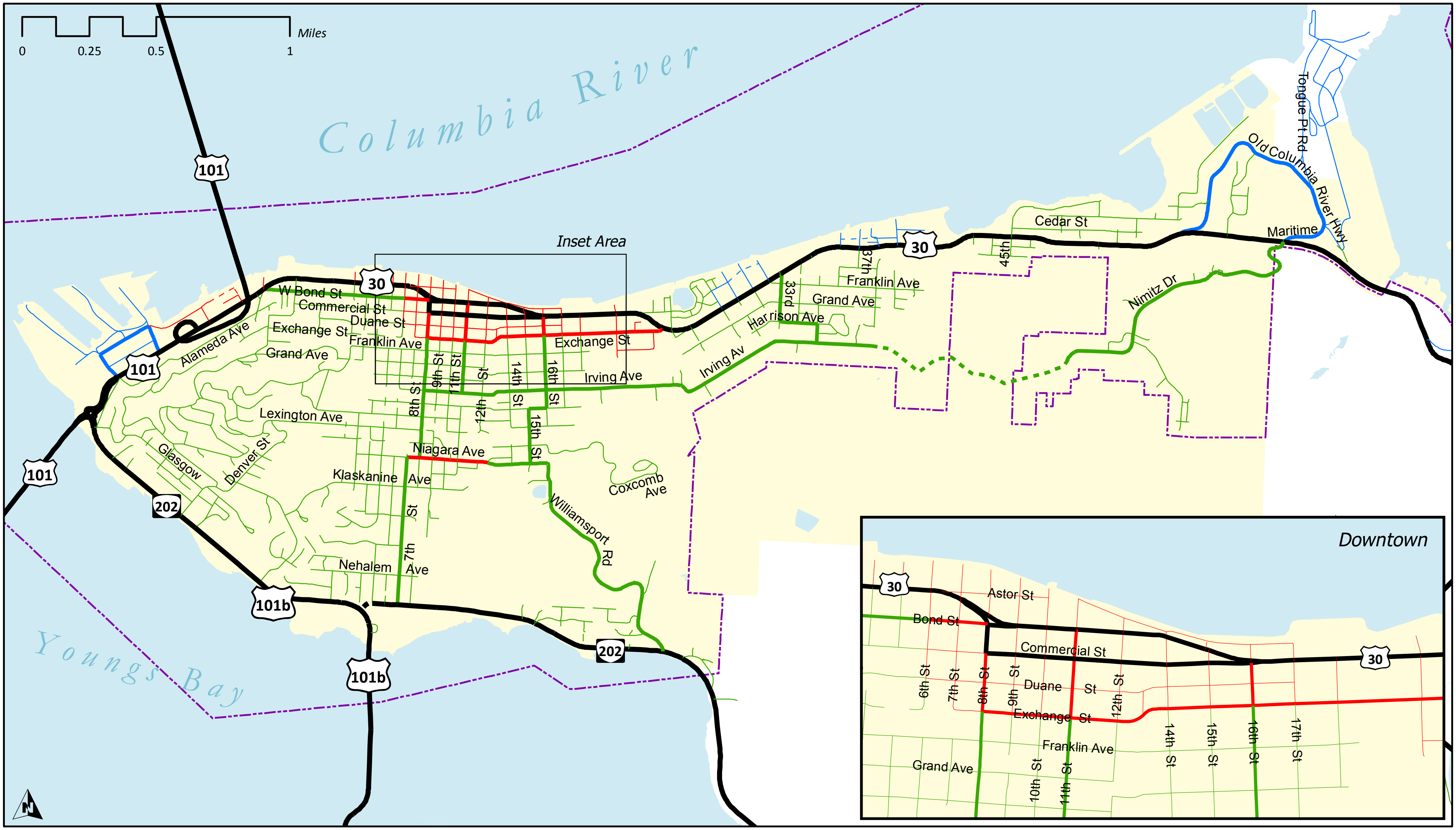


Figure 13 : Multi-Modal Street System

City of Astoria

Transportation System Plan

Legend

Multi-Modal Streets
- Residential Collector Street
- Residential Local Street
- Mixed-Use Collector Street
- Mixed-Use Local Street
- Commercial/Industrial Collector Street
- Commercial/Industrial Local Street

Planned Multi-Modal Streets (Conceptual Alignment)
- Planned Residential Collector Street
- Planned Mixed-Use Local Street
- Planned Commercial/Industrial Local Street

State Highways
- Arterial Street
- Planned Arterial Street

- Astoria City Limit
- Urban Growth Boundary

This page intentionally left blank

- **Biking/On-Street Parking Zone:** This is the zone for biking and on-street parking, and is the location where users will access transit. The biking/on-street parking zone is determined by the street type and should be a high priority in mixed-use and residential areas, which should include on-street parking with a minimum 6 foot striped bike lane or 5 foot bike lane with a 2 foot buffer. Streets in commercial/employment or industrial areas should include minimum 6 foot bike lanes or 5 foot bike lane with a 2 foot buffer, with no on-street parking.
- **Driving Zone:** This is the throughway zone for drivers, including cars, buses and trucks and should be a high priority in commercial/ employment and industrial areas. The functional classification of the street generally determines the number of through lanes, lane widths, and median and left-turn lane requirements. However, the route designations (such as transit street or freight route) take precedence when determining the appropriate lane width in spite of the functional classification. Wider lanes (between 13 to 14 feet) should only be used for short distances as needed to help buses and trucks negotiate right-turns without encroaching into adjacent or opposing travel lanes. Streets that require a raised median should include landscaping and a minimum 6 foot wide pedestrian refuge at marked crossings. Otherwise, the median can be reduced to a minimum of 4 feet at midblock locations, before widening at intersections for left-turn lanes (where required or needed).

Figure 14: Components of Astoria Streets

Determining the Design Types of Mixed-Use Streets

Step 1: Determine if the street is located along a transit route. If so, the through lane width should be a minimum of 11 feet, or the minimum lane width as shown in the optimum street design, whichever is higher.

Step 2: Determine if left-turn lanes are needed at intersections. Intersection design should generally try to minimize pedestrian crossing distance. If turn-lanes are warranted, consider the trade-offs between improved driving mobility and increased crossing distance.

Step 3: Compare the optimum street design to the available right-of-way. If the cross-section is wider than the right-of-way, identify whether right-of-way acquisition is necessary or reduce the width of or eliminate lower-priority elements as determined by the City.

Figure 15a: Optimum Street Design for Mixed-Use Collector Streets

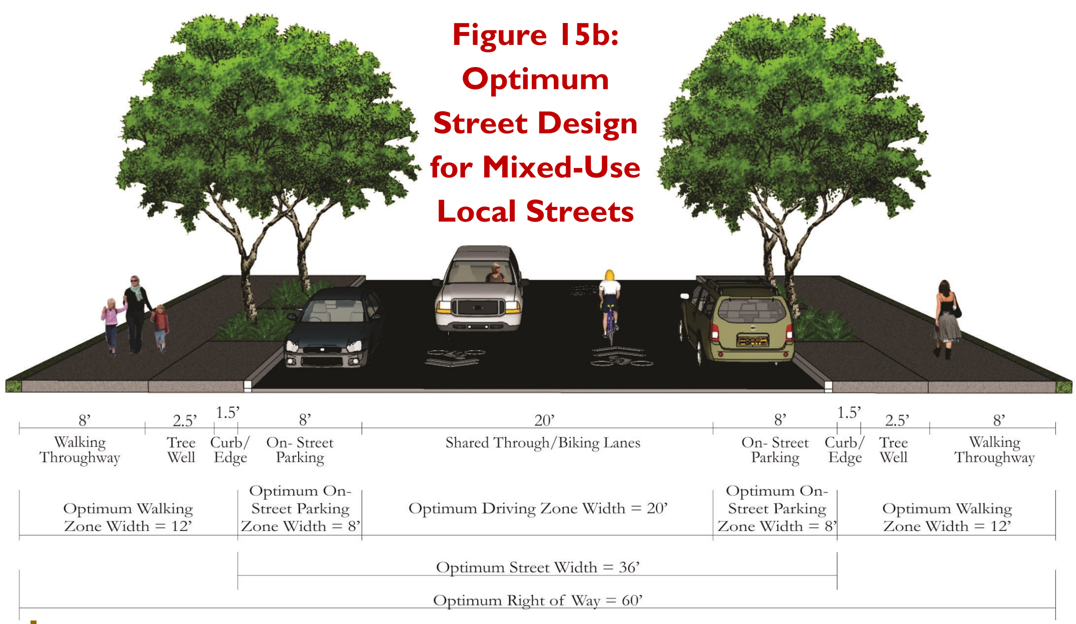


Figure 15b: Optimum Street Design for Mixed-Use Local Streets

Determining the Design Types of Residential Streets

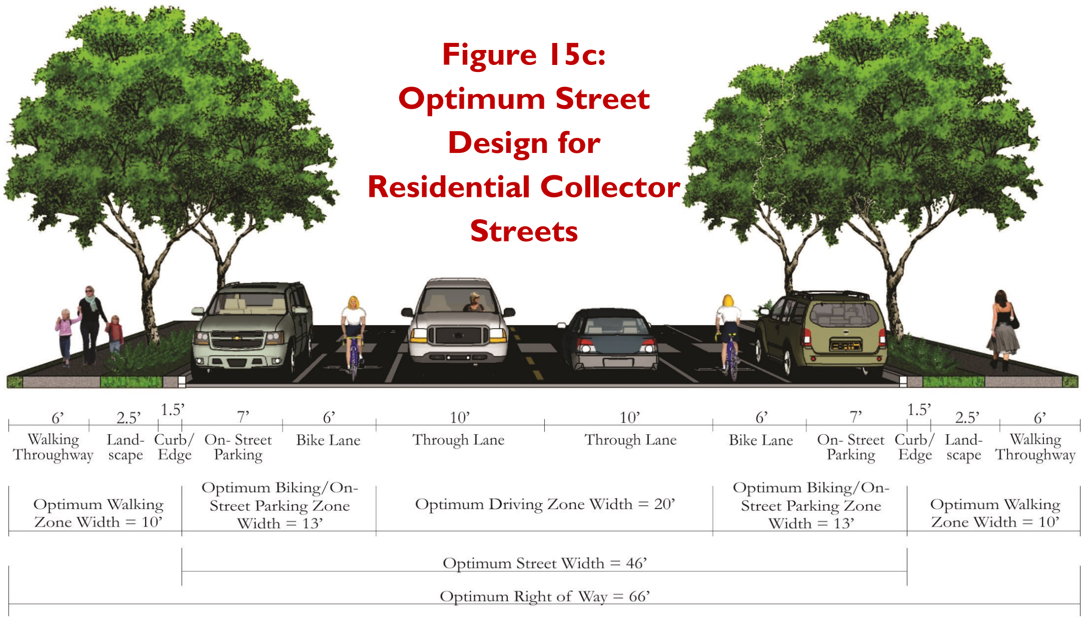


Figure 15c: Optimum Street Design for Residential Collector Streets

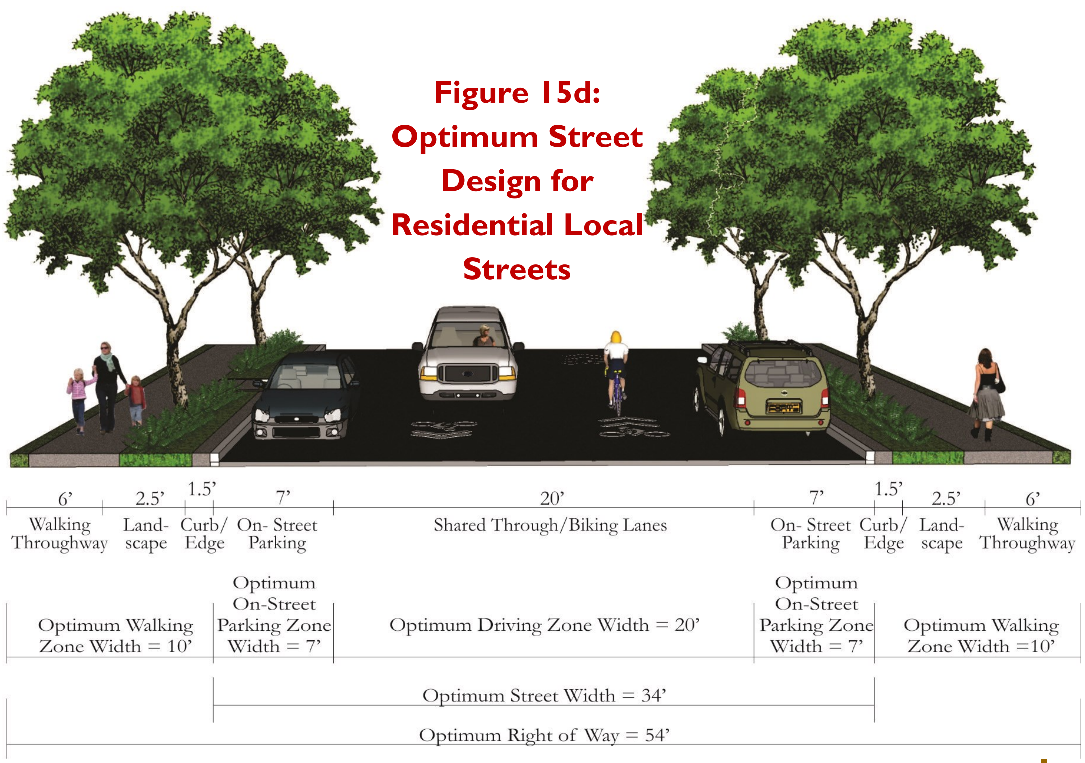


Figure 15d: Optimum Street Design for Residential Local Streets

Step 1: Determine if the street is located along a transit route. If so, the through lane width should be a minimum of 11 feet, or the minimum lane width as shown in the optimum street design, whichever is higher.

Step 2: Determine if left-turn lanes are needed at intersections. Intersection design should generally try to minimize pedestrian crossing distance. If turn-lanes are warranted, consider the trade-offs between improved driving mobility and increased crossing distance.

Step 3: Compare the optimum street design to the available right-of-way. If the cross-section is wider than the right-of-way, identify whether right-of-way acquisition is necessary or reduce the width of or eliminate lower-priority elements as determined by the City.

Determining the Design Types of Commercial/Industrial Streets

Step 1: Determine if left-turn lanes are needed at intersections. Intersection design should generally try to minimize pedestrian crossing distance. If turn-lanes are warranted, consider the trade-offs between improved driving mobility and increased crossing distance.

Step 2: Determine is wider travel lanes are needed to facilitate large vehicle turning movements. Wider lanes (between 13 to 16 feet) should only be used for short distances as needed to help buses and trucks negotiate right-turns without encroaching into adjacent or opposing travel lanes.

Step 3: Compare the optimum street design to the available right -of-way. If the cross-section is wider than the right-of-way, identify whether right-of-way acquisition is necessary or reduce the width of or eliminate lower-priority elements as determined by the City.

Figure 15e: Optimum Street Design for Commercial/Industrial Collector Streets

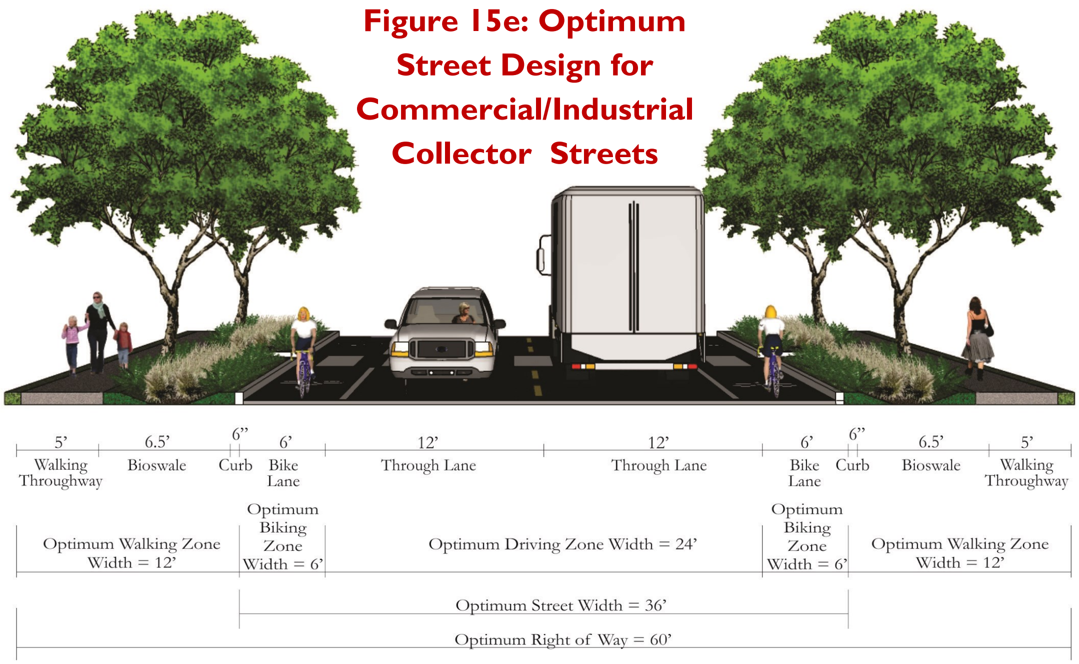
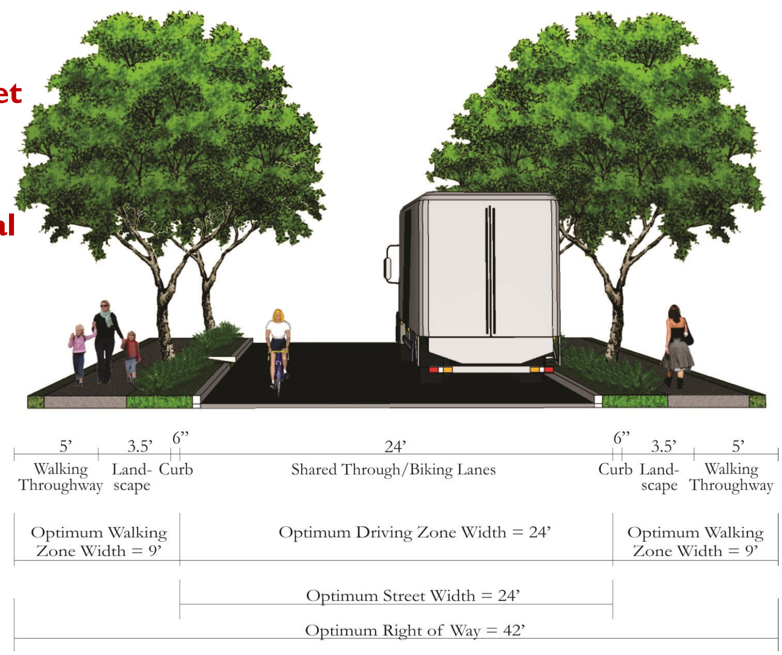


Figure 15f: Optimum Street Design for Commercial/ Industrial Local Streets



Spacing Standards

Access spacing along Astoria streets will be managed through access spacing standards. Access management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual destinations. Proper implementation of access management techniques will promote reduced congestion and accident rates, and may lessen the need for additional highway capacity.

Table 1 identifies the minimum and maximum public street intersection and minimum private access spacing standards for streets in Astoria. Within developed areas of the City, streets not complying with these standards could be improved with strategies that include shared access points, access restrictions (through the use of a median or channelization islands) or closed access points as feasible. New streets or redeveloping properties must comply with these standards, to the extent practical (as determined by the City).

Table 1: Spacing Standards

	Mixed-Use or Residential			Commercial/Industrial Streets		
	Arterial	Collect	Local	Arterial	Collector	Local
Maximum Block Size (Public Street to Public Street)*	See Oregon Highway Plan	530 ft.	530 ft.	See Oregon Highway Plan	530 ft.	530 ft.
Minimum Block Size (Public Street to Public Street)		250 ft.	150 ft.		300 ft.	150 ft.
Minimum Driveway Spacing (Public Street to Driveway and Driveway to Driveway)**		100 ft.	25 ft.		150 ft.	25 ft.

Note: Spacing standards are measured centerline to centerline
* If the maximum block size is exceeded, mid-block pedestrian and bicycle accessways must be provided at spacing no more than 330 feet, unless the connection is impractical due to existing development, topography, or environmental constraints.
**Each parcel is permitted one driveway regardless of the minimum driving spacing standard.

Traffic Calming

Traffic calming refers to street design techniques used to create safe, slow streets (primarily in residential and mixed-use areas) without significantly changing vehicle capacity and to mitigate the impacts of traffic on neighborhoods and business districts where a greater balance between safety and mobility is needed. Traffic calming seeks to influence driver behavior through physical and psychological means, resulting in lower vehicle speeds or through traffic volumes. Physical traffic calming techniques include:

- Narrowing the street by providing curb extensions or bulbouts, or mid-block pedestrian refuge islands.
- Deflecting the vehicle path vertically by installing speed cushions or raised intersections.
- Deflecting the vehicle path horizontally with chicanes, roundabouts, and mini-roundabouts.

Narrowing travel lanes and providing visual cues such as placing buildings, street trees, on-street parking, and landscaping next to the street also create a sense of enclosure that prompts drivers to reduce vehicle speeds.

Traffic calming measures must balance the need to manage vehicle speeds and volumes with the need to maintain mobility, circulation, and function for service providers (e.g. emergency response). Table 2 lists common traffic calming applications and suggests which devices may be appropriate along various streets in the City. Any traffic calming project should include coordination with emergency agency staff to ensure public safety is not compromised.

Table 2: Traffic Calming Measures by Street Functional Classification

Traffic Calming Measure	Is Measure Appropriate? (per Roadway Classification)**	
	Collector*	Local Street*
Narrowing travel lanes	Yes	Calming measures are generally supported on local streets that are lower priority emergency response routes that have connectivity (more than two accesses)
Placing buildings, street trees, on-street parking, and landscaping next to the street	Yes	
Curb Extensions or Bulbouts	Yes	
Roundabouts	Yes	
Mini-Roundabouts	Yes	
Medians and Pedestrian Islands	Yes	
Pavement Texture	Yes	
Raised Intersection or Crosswalk	No	
Speed Cushion (provides emergency pass-through with no vertical deflection)	Yes	
Choker	No	
Traffic Circle	No	
Diverter (with emergency vehicle pass through)	Yes	
Chicanes	No	

*Any traffic calming project should include coordination with emergency agency staff to ensure public safety is not compromised.
** Traffic calming may be considered for State highways but would be required to meet ODOT standards, including any ODOT approved design exceptions.

Mobility Targets

Establishing new mobility standards for streets and intersections in Astoria will help encourage a sustainable transportation system (consistent with the TSP Goal 6) by providing a metric to assess the impacts of new development on the existing transportation system.

The following mobility targets are recommended for non-State owned streets in Astoria. State owned streets should comply with the mobility targets included in the Oregon Highway Plan.

- **Signalized, All-way Stop, or Roundabout Controlled Intersections:** During the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4 and 6 p.m. during the spring or fall): Level of Service (LOS) "E" or better and a volume to capacity (v/c) ratio not higher than 0.85 will be required for the intersection as a whole.
- **Unsignalized Intersections:** During the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4 and 6 p.m. during the spring or fall): All movements serving more than 20 vehicles shall be maintained at LOS "E" or better and a v/c ratio not higher than 0.90. LOS "F" will be tolerated at movements serving no more than 20 vehicles during the peak hour.

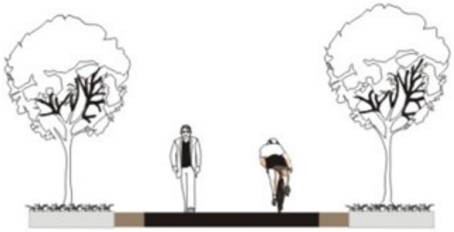


Figure 16: Design Criteria for Shared-Use Paths

Shared-Use Paths

Shared-use paths provide off-roadway facilities for walking and biking travel. Depending on their location, they can serve both recreational and general travel needs. Shared-use path designs vary in surface types and widths. Harder surfaces are generally better for bicycle travel. Widths should provide ample space for both walking and biking and should also be able to accommodate maintenance vehicles. The design criteria for shared-use paths can be seen in Figure 16. The City may reduce the width of the paved shared-use path to a minimum of eight feet in constrained areas located in steep, environmentally sensitive, rural, historic, or development limited areas of the City. In areas with significant walking or biking demand, the paved shared-use path should be 16 feet.

In addition, a variety of amenities can make a path inviting to the user. These could include features such as interpretive signs, water fountains, benches, lighting, maps, art, and shelters.

Street Crossings

Enhanced street crossings are generally required on roadways with high traffic volumes and/or speeds in areas with nearby transit stops, residential uses, schools, parks, shopping and employment destinations. These crossings should include treatments such as marked crosswalks, high visibility crossings, and curb extensions to improve the safety and convenience of street crossings. If the maximum block size shown in Table 2 is exceeded on City streets, mid-block pedestrian and bicycle accessways must be provided at spacing no more than 330 feet , unless the connection is impractical due to inadequate sight distance, high vehicle travel speeds, or other factors that may prevent the crossing (as determined by the City). Otherwise, the crossings should be provided consistent with the block spacing standards shown in Table 2.

Section 7: The Outcome

Section 7: The Outcome

The Outcome

How will investment decisions of the TSP, an estimated $49.2 million worth, improve the performance of the transportation network in Astoria? To answer this question, the Plan's investment decisions were evaluated against the future needs to identify long-term trends through 2035.

The Improved Transportation System

After reviewing the expected growth throughout the City and considering existing gaps and deficiencies of the transportation system, locations needing improvements were identified to meet the expected travel demand. Through 2035, the following trends will be expected:

- **Improved motor vehicle intersection operations:** The system would be expected to accommodate the expected travel demand through 2035.
- **Safer Streets:** By adding turns lanes, improving intersection geometrics and traffic control, and managing travel speeds, streets in Astoria will be safer
- **More sidewalks and bike lanes:** More residents and visitors will be able to walk and bike to destinations in Astoria with increased facilities.
- **Safer street crossings:** Investments in enhanced street crossings will reduce the existing barriers for those walking and biking.
- **Enhanced transit stop amenities:** Travel convenience and comfort via transit will be enhanced with increased amenities at bus stops.

The Community Based Solution Options for Astoria:

Designate a section of an existing street for walking

Designate an existing street for shared travel for bicyclists

Add pedestrian-only paths adjacent to streets

Add a curb -tight shared-use path

One-way street conversion to accommodate pedestrians and bicyclists

Implement Neighborhood Greenways

To the Planning Horizon and Beyond

In addition to the investment decisions of the 2013 Astoria TSP, further issues will need to be explored through 2035 and beyond.

Geologic Hazards

All proposed street extensions included in this Plan are shown with conceptual alignments. These conceptual street alignments represent a planning level illustration that street connectivity enhancements are needed in these areas. Before construction of any of the projects can begin, more detailed surveys will need to be undertaken to identify hydrologic, topographic or other geological constraints that could hinder the alignment of the planned streets. Final street alignments will be identified after these surveys have been completed.

Community Based Solutions

The Plan identified the need for walking and biking facilities on several streets with constrained right-of-way or other development limitations. Simply constructing sidewalks or bike lanes along these streets would likely be challenging, if not infeasible, given the steep slopes, environmentally sensitive, rural, historic, or development limited surroundings. In some of these cases with relatively low motor vehicle speeds (expected 85th percentile speed 28 mph or less) and volume (expected daily volume less than 1,000 vehicles), alternative accommodations (referred to as "Community Based Solutions") have been suggested as either short-term or permanent improvements to address the needs of the transportation system through 2035. The options are intended to provide Astoria residents the opportunity to collaborate and ultimately recommend an ideal cross-section for constrained streets.

Slow down or re-route drivers to enhance walking and bicycling