



THE DALLES TRANSPORTATION SYSTEM PLAN

Technical Memorandum #3: Existing Transportation Conditions

Date: December 16, 2015 Project #: 18495.0

To: Public and Technical Advisory Committee Members

CC: Project Management Team

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This memorandum documents the type, condition, and performance of facilities that provide transportation of people, goods, and services to and through The Dalles in 2015. From this inventory and analysis we have identified opportunities to improve transportation facilities, including roads, bridges, bike lanes, sidewalks, shared-use paths, rail lines, etc. The information documented in this memorandum relates to transportation goals, including: operations, safety, economic development, accessibility and connectivity. The following questions represent a few of the focus areas explored through the analysis:

- How have travel patterns changed since the 1999 Transportation System Plan (TSP) was adopted and can the existing transportation facilities accommodate those changes?
- Are any existing facilities in need of maintenance or replacement?
- Is economic development being limited by existing transportation facilities?
- Where have the most frequent and severe crashes been reported? What factors are contributing to crashes?

The findings of this inventory and analysis include a list of existing needs that reflect opportunities to improve the system. Improvements to the system are defined based on the goals and objectives outlined in Technical Memorandum #2. A summary of the key findings includes:

- The City has annexed 850-acres of residential and industrial land since 2005 and taken jurisdiction of several miles of roadways (W 6th Street and W 2nd Street). These roadways are not designed to current City and ADA standards, including provision for pedestrian and bicycle facilities.
- Vacant land is available within the Port of The Dalles and the Columbia Gorge Industrial Park that represents a significant opportunity for economic development and growth in traffic near the Chenoweth Interchange. The I-84 Chenoweth Interchange Area Management Plan (IAMP) was adopted in July 2010 to protect the function of the interchange to provide safe and efficient connections with the interstate to and from the city's industrial port area.

- Operational analysis of vehicle delay and capacity indicates that one intersection (US 197/I-84 EB Ramp) does not meet City delay standards. Other intersections are approaching City standards for delay and ODOT standards for capacity; these include: Thompson Street/E 10th Street/Old Dufur Rd, I-84 EB Ramps/W 6th Street, and US 197/Lone Pine Lane.
- A review of 5-year crash history at the study intersections identified several intersections with potential for crash reduction. More frequent and severe crashes were reported at these intersections than were reported at similar intersections in The Dalles or throughout Oregon. Countermeasures will be evaluated as part of the alternatives analysis element of the TSP.
- Several roadway segments have been reported with poor pavement conditions, per recent City and ODOT inventory. City and ODOT maintenance schedules will be reviewed and new pavement preservation projects will be included in the alternatives analysis element of the TSP.
- Bicycle and pedestrian facilities are provided on many roadways, but improvements to the existing facilities and construction of new facilities are needed to encourage more use of these modes of travel.
- A new transit center is being constructed near Chenoweth Loop Road and W 7th Street that will create new opportunities for carpooling and use of transit for local and regional trips.
- Bridge inventory conducted by ODOT identified a couple bridges that are weight restricted and/or have functional or structural issues. These include the W 6th Street Bridge over Mill Creek, the US 30 (Hwy 100) Bridge over Chenowith Creek, and the US 197 Bridge over the Columbia River.

The information in this memorandum will be reviewed by the Technical and Public Advisory Committees at a joint meeting on November 18, 2015. After incorporating their input, the project team will evaluate forecast traffic conditions in 2035 and identify what additional improvements will be necessary to satisfy system transportation goals for the next 20 years.

The analysis methodology and data was developed in accordance with guidance and direction provided by The City of The Dalles and the Oregon Department of Transportation (ODOT) Transportation Planning Analysis Unit (TPAU). *Additional information on the key assumptions and methodologies associated with this analysis is provided in Appendix A.*

This document is divided into the following sections.

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STUDY AREA

Figure 1 illustrates The Dalles TSP study area and study intersections. The study area includes all roadways within The Dalles Urban Growth Boundary (UGB). The study intersections were identified by City and ODOT staff as representing key intersections within the study area.

Based on the requirements of the *Oregon Transportation Planning Rule* (TPR – Reference 1), the study of roadways and intersections is generally limited to those with the highest classifications – collectors and arterials – as well as the Interstate. However, local street issues, such as street connectivity and safety are also discussed where appropriate.

EXISTING TRANSPORTATION FACILITY INVENTORY

The transportation facility inventory discussion that follows describes several topical areas by travel mode. The following sections were organized to provide an overview of existing land uses and focus on the functions of various transportation facilities in The Dalles:

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Lands and Population Inventory

The inventory of existing lands and population identifies factors that may influence existing travel patterns and growth patterns within The City of The Dalles over the next 20 years. The following sections describe: Zoning, Columbia River Gorge National Scenic Area, Developed and Vacant Land, Natural Resources and Hazards, Activity Centers, and Historic and Projected Population Growth.



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**Study Area and Intersections
The Dalles, Oregon**

**Figure
1**



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Zoning

Figure 2 provides the location of zoning districts within the City’s Urban Growth Boundary (UGB). There are eleven zones shown on the map, depicting commercial, industrial, residential, open space, parks, and right-of-way zone districts. The zoning map also includes a Neighborhood Center overlay zone wherein a mix of uses is allowed. Generally, industrial, open space, and recreational commercial zones are located between I-84 and the Columbia River. Commercial and residential zones, as well as Neighborhood Center overlay zones, are all located south of I-84.

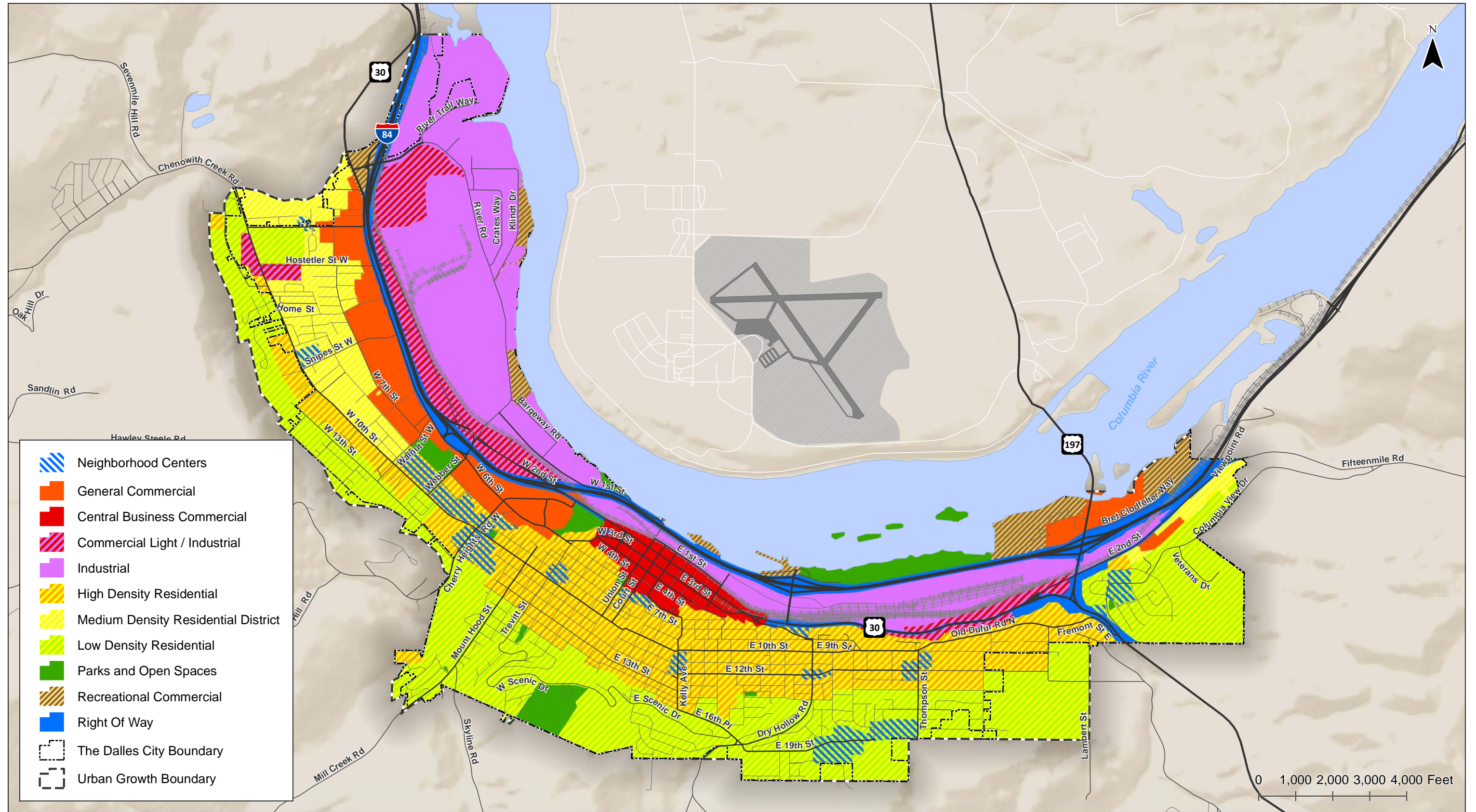
Development regulations for each of the City’s zones are provided for in Chapter 5 of the Land Use Development Ordinance (LUDO). Table 1 includes a list of the zones and a summary of the types of development permitted in each.

Table 1 - Zoning Districts

Zoning District	Zoning District Purpose
Residential	
RL – Low Density Residential	Allows for 0-6 single family dwelling units per gross acre
RM – Medium Density Residential	Allows for 7-17 single family and multi-family dwelling units per gross acre
RH – High Density Residential	Allows for 7-25 single family and multi-family dwelling units per gross acre
Commercial	
Central Business Commercial	Allows for commercial, civic, and residential uses subject to additional sub-district design standards
General Commercial	Allows for a wide range of retail, wholesale, and service business
Industrial	
Commercial Light/Industrial	Allows for commercial uses and certain light industrial uses
Industrial	Allows for a variety of commercial and industrial uses
Open Space	
Parks and Open Spaces	Insures sufficient open areas throughout the community to safeguard public needs and provide recreational activities
Recreational Commercial	Allows for mixed business, commercial, service, recreational, and light industrial uses
Overlay	
Neighborhood Centers	Allow for a mix of certain commercial, residential, civic, and light manufacturing within a single building or tax lot

Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area Management Plan (Management Plan) provides regulations and standards to preserve land for rural and natural uses within the Columbia River Gorge corridor and focus future growth and economic development within urban areas. The Management Plan is divided into three categories of land: Urban Areas, T Management Areas (SMAs), and General Management Areas (GMAs). A summary of GMA acreage within The Dalles TSP is provided in Table 2.



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City of The Dalles Zoning
The Dalles, Oregon

Figure
2



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County, 2013 ACS 5-Year Estimate
Sources: Esri, USGS, NOAA

Table 2 – Columbia River Gorge National Scenic Area Management Areas

Management Area	Acres Within The Dalles UGB	Acres within The Dalles City Limits
General Management Areas (GMAs)		
Residential (R-1, R-5)	70.6	18.0
Agricultural (A-1(40), A-1(160), A-2(40))	53.6	19.8
Open Space	3.9	-
Public Recreation	8.4	8.4
Special Management Areas (SMAs)		
Agriculture*	0.1	-
Open Space	9.9	9.9

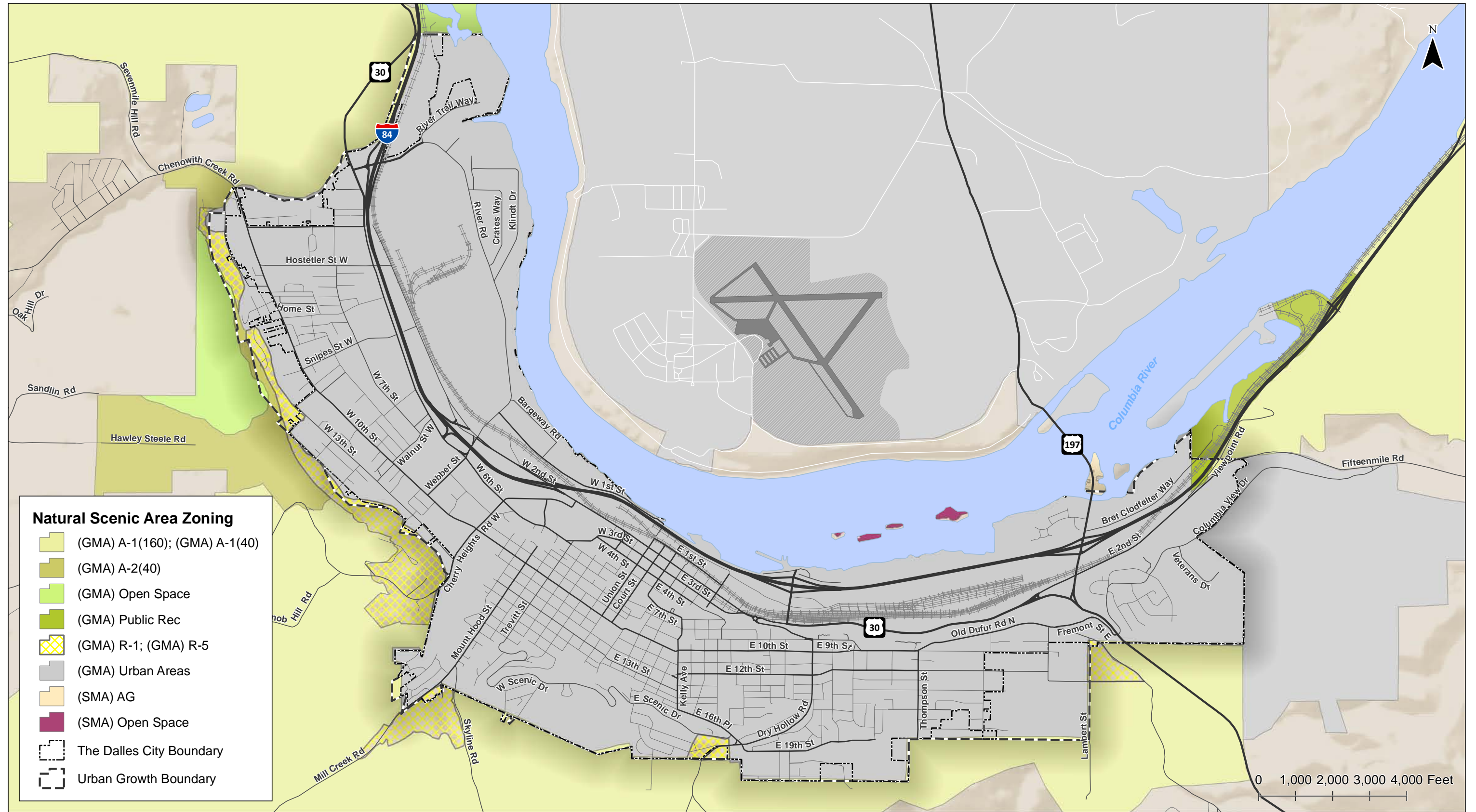
*also designated as a special agricultural area in the GMA.

The majority of the City of The Dalles is designated as an Urban Area and is exempt from the requirements of the management plan. However, as shown in Figure 3, there are limited areas within both the UGB and The Dalles city limits that are included in the management areas governed by the Management Plan. Relevant to land use and transportation planning, areas within the Residential GMA are subject to a review process and have additional criteria for the protection of scenic, cultural, natural, and recreation resources.

Developed & Vacant Land

An inventory of developed and vacant land was produced using assessor property classification data for tax lots within the UGB. Each parcel of property is classified in accordance with ORS 308.215 and, with the exception of specially-assessed properties, the classification is based upon the highest and best use of the property. Tax assessor information for parcels within The Dalles UGB provides a basic inventory of developed and vacant land, which is mapped in Figure 4.

A majority of vacant land available is zoned as Low Density Residential or Industrial, while a smaller portion of vacant land is zoned Recreational Commercial or General Commercial. Vacant Low Density Residential lands are generally characterized as small parcels and are located near the southern and western portion of the UGB. One notable exception to the size and locations of vacant Low Density Residential lands is located near the eastern portion of the UGB, which features large vacant parcels owned by the North Wasco County School District.



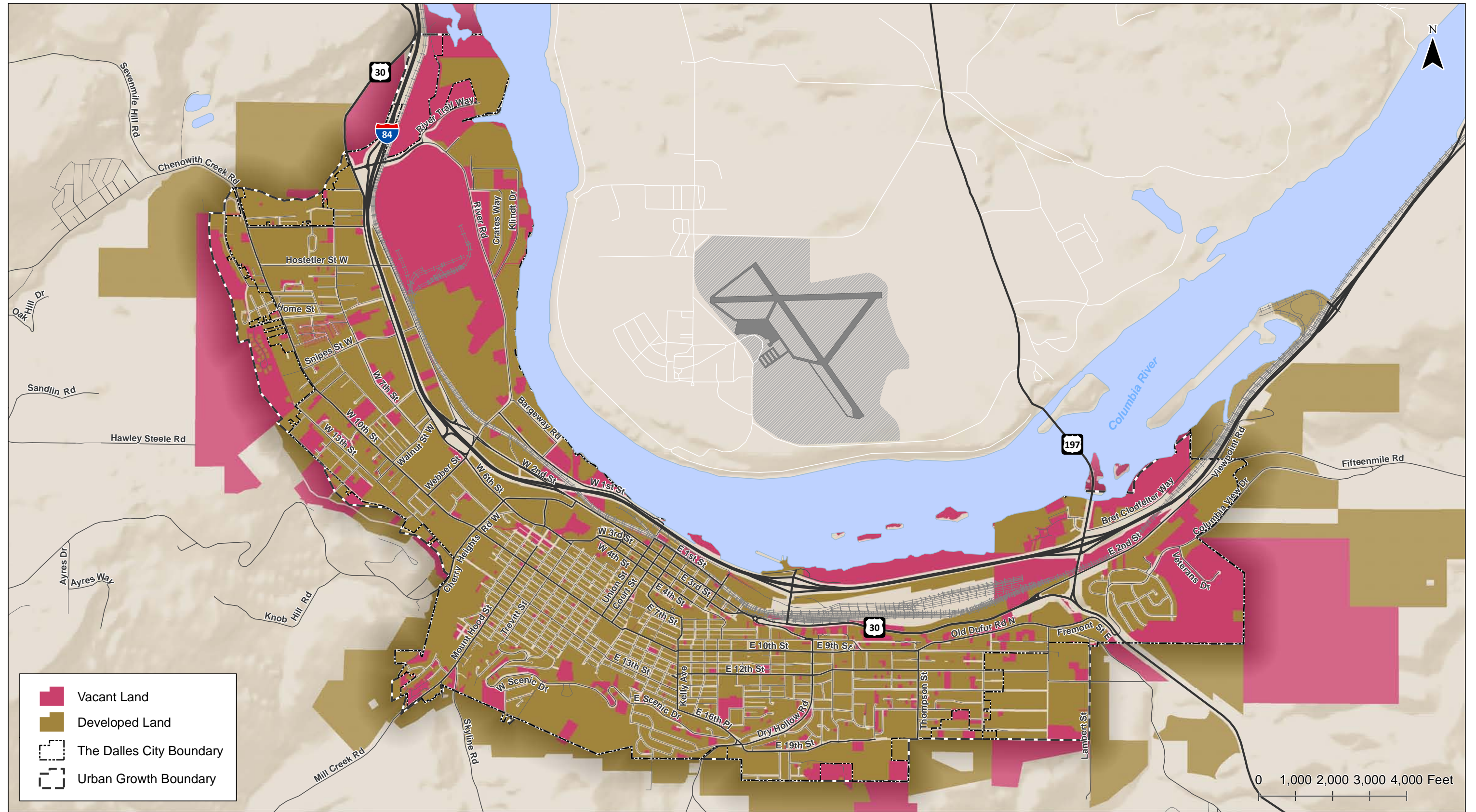
**Columbia Gorge Natural Scenic Area Zoning
The Dalles, Oregon**

**Figure
3**

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Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA



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**Vacant & Developed Land
The Dalles, Oregon**

**Figure
4**



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Vacant industrial land is predominantly located in the Chenoweth Industrial area, to the north, and near the I-84/US 197 Chenoweth interchange to the east. The Port of The Dalles is developing infrastructure to serve vacant industrial land in the Chenoweth industrial area, creating “shovel-ready” sites for future tenants (refer to Exhibit 1 and Exhibit 2). As of fall 2015, 26 shovel-ready sites were available in The Columbia Gorge Industrial Center. The vacant Recreational Commercial and General Commercial zoned land is located in the northeastern area of the UGB, concentrated near The Dalles Bridge.



Exhibit 1. Roadway Infrastructure Within the Columbia Gorge Industrial Center (as of 9/17/15)



Exhibit 2. Aerial Photo of the Columbia Gorge Industrial Center (Source: John Fulton)

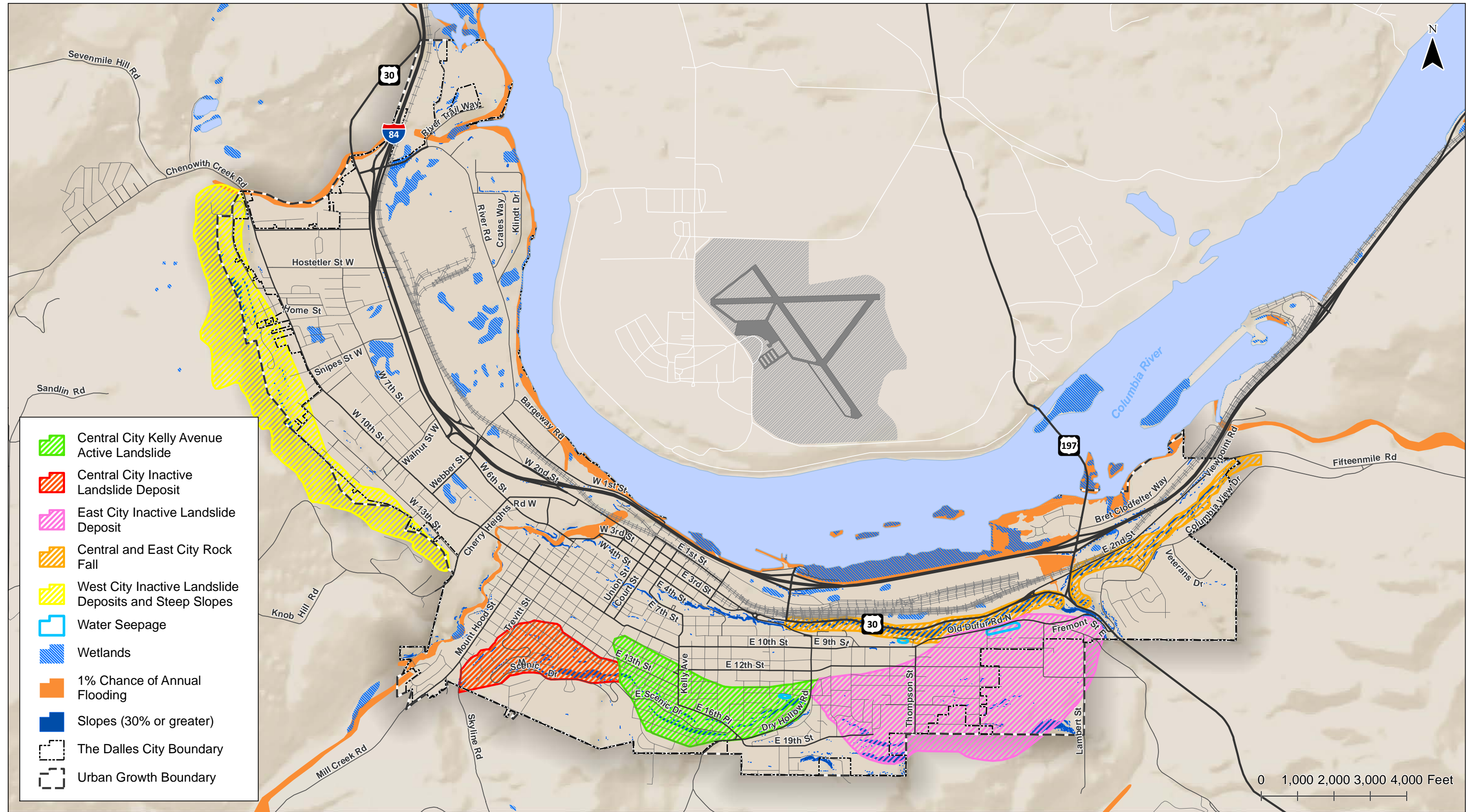
Natural Resources & Hazards

Figure 5 provides the general location of geologic hazards, steep slopes, wetlands and floodplains within The Dalles UGB that will limit development opportunities.

Wetlands

Wetlands identified in Figure 5 are based on data provided by the City of The Dalles. Wetlands are typically small and not concentrated in specific locations within the UGB. The exception is the largest wetland area, which is located between I-84 and the Columbia River on vacant land and zoned as Parks and Open Space. Detailed delineation reports for this area have been prepared by private property owners and The Port. These reports delineate areas that could be designated to mitigate wetland impacts associated with development of larger contiguous parcels.

The City of The Dalles shares a significant portion of its boundary with the Columbia River, an area that is subject to a 1% chance of annual flooding. Areas within floodplains zones, as identified in the Flood Insurance Rate Maps (FIRMS) by FEMA, are subject to LUDO Chapter 8.030 – Flood Control Provision, which contains specific development criteria for physical improvements in the overlay. Underlying land use zones adjacent to the river are primarily Industrial, with General and Recreational Commercial zones near The Dalles Bridge. All of the land zoned Parks and Open Space and adjacent to the river is identified as being within the Floodway zones.



Environmental Constraints: Geologic Hazards, Steep Slopes, Wetlands, & Floodplains
The Dalles, Oregon

Figure
5

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Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Three smaller river bodies travel through the City before connecting with the Columbia River, providing additional areas subject to 1-percent chance of annual flooding. Chenoweth Creek is located near the northern portion of The Dalles, travelling primarily near or through properties zoned Medium Density Residential, Recreational Commercial, and Industrial. Mill Creek is centrally located within the City, travelling primarily near properties zoned Low and Medium Residential, General Commercial, Central Business Commercial, and Parks and Open Space. Three Mile Creek is in the eastern portion of The Dalles and parallels US 197 until the US 30 junction, at which point it travels west of the Lone Pine development.

Hazards

The City of The Dalles identifies six geologic hazard zones within the UGB that make the ground potentially unstable, as depicted in Figure 5. Provisions for geologic hazard areas, found in LUDO Chapter 8.040, apply to all new development including, but not limited to, transportation facilities. All geologic hazard areas feature lands with slopes of 30 degrees or more. The majority of geologic hazard areas are located near the southern portion of the UGB in Medium and Low Density Residential areas. The exception is a geologic hazard area that exists on US 30 (Mosier-The Dalles Hwy/E. 2nd Street), generally located between Brewery Overpass Rd and US 197.

Activity Centers

It is important to provide safe and efficient multimodal connections to and between major activity centers in the community. The activity centers found in The Dalles include a variety of civic, educational, and recreational uses. As seen in Figure 6, activity centers are generally clustered around downtown and near arterials. Some prominent destinations outside of downtown include the community college and hospital, located near the southern portion of the UGB and outside of the geologic hazard areas. Key attractors in The Dalles include:

- Schools –North Wasco County School District operates three elementary, one middle-school, one high-school, and one community school in The Dalles. There are also three private academies and Columbia Gorge Community College.
- Parks – Developed and undeveloped parks within The Dalles include an aquatic center, Sorosis Park, and two riverfront parks (Kiwanis Park and Riverfront Park).

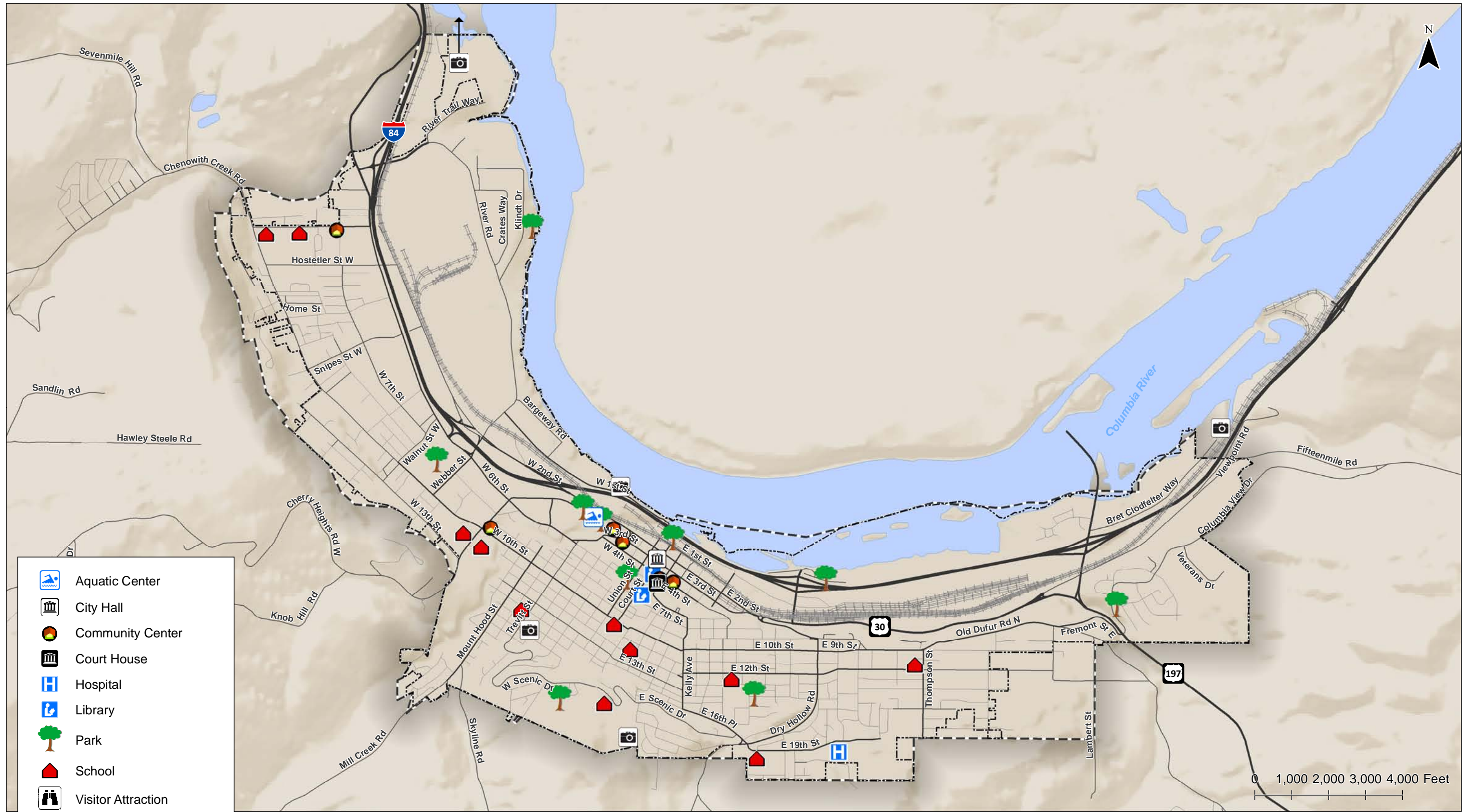


Exhibit 3. The Columbia Gorge Discovery Center and Museum (Source: www.gorgediscovery.org)

- Downtown – The Dalles’ downtown area includes most of the civic uses within the City, including the Wasco County Court House, The Dalles City Hall, Civic Auditorium, and Art Center, two libraries, and a museum.
- Mid-Columbia Medical Center – The Mid-Columbia Medical Center is located away from the downtown area and major highways. Primary access is provided via a single arterial, E. 19th Street.
- Columbia Gorge Discovery Center & Museum - The official interpretive center for the Columbia River Gorge National Scenic Area is located in the northwest corner of The Dalles. Access is provided via US 30. (See Exhibit 3)
- The Dalles Dam Visitor Center – The U.S. Army Corps of Engineers operates a visitor center and offers tours of The Dalles Dam daily from Memorial Day through Labor Day. Access is provided via Bret Clodfelter Way.
- Fort Dalles Readiness Center is located adjacent to the Columbia Gorge Community College campus and provides a venue for various public events.
- Fort Dalles Museum is located on Garrison Street, between W 15th and 16th Streets. (See Exhibit 4)



Exhibit 4. The Fort Dalles Museum (Source: Google Maps user Mahalofreddy)



**Activity Centers
The Dalles, Oregon**

**Figure
6**

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Historic and Projected Population Growth

According to the Population Research Center at Portland State University, the certified July 1, 2015 population estimate of The Dalles is 14,515 people. As shown in Table 3, the City experienced 34% population growth between 1980 and 2015 - faster than Wasco County (21%), but slower than the State as a whole (52%). Considering that The Dalles is the largest incorporated city within Wasco County, the historical trends support the idea that the general population is becoming comparatively more urbanized within the County.

Table 3 – The Dalles Historic Population Growth (1980-2015)

	Population					Change 1980 – 2015	
	1980	1990	2000	2010	2015	Number	Percent
Oregon	2,633,105	2,842,321	3,421,399	3,831,074	4,013,845	1,380,740	52.4
Wasco County	21,732	21,683	23,791	25,213	26,370	4,638	21.1
The Dalles	10,820	11,060	12,156	13,620	14,515	3,695	34.2

As shown in Table 4, The Dalles has fewer family households (63%) compared to Wasco County (65%). Of the family households, The Dalles has more households with children under 18 years of age. More details on age and distribution of youth (and seniors) can be found in the Environmental Justice section below.

Table 4 - 2010 Households by Type

Households by Type	Wasco County		The Dalles	
	Population	% of Population	Population	% of Population
Total households	10,031	100.0	5,472	100.0
Family households (families)*	6,540	65.2	3,441	62.9
With own children under 18 years	2,604	26.0	1,503	27.5
Nonfamily households*	3,491	34.8	2,031	37.1
Householder living alone	2,886	28.8	1,696	31.0
Male	1,328	13.2	693	12.7
65 years and over	384	3.8	186	3.4
Female	1,558	15.5	1,003	18.3
65 years and over	865	8.6	584	10.7

* "Family households" consist of a householder and one or more other people related to the householder by birth, marriage, or adoption. They do not include same-sex married couples even if the marriage was performed in a state issuing marriage certificates for same-sex couples. Same-sex couple households are included in the family households category if there is at least one additional person related to the householder by birth or adoption.

Population forecasts for The Dalles were completed in 2006 by ECONorthwest, providing an outlook to the year 2060. The 2006 forecast growth of up to 1.9% annually through 2025 with growth rates declining from 2025 through 2060. Recent data collected by the Portland State University Population

Research Center indicates the population forecasts contained in the 2006 ECONorthwest report exceed current expectations; the City has been using estimates of less than 1.9% annual growth. New population forecast data for The Dalles is being generated by ODOT as part of the network analysis to reflect updated population growth assumptions¹. Information on updated population growth forecasts will be provided in Technical Memorandum #4. It is expected that amendments to the City's policy documents, including the Comprehensive Plan, will need to be completed as a result of the updated population forecast data.

Street Network

The street network is the backbone of the transportation system in the City of The Dalles. Motor vehicle, bicycle, pedestrian, transit, and freight transportation all rely on the street network to some degree. The street network also provides motor vehicle, bicycle, pedestrian, and transit access to air and rail facilities. The following section describes the street network's jurisdiction, classifications, and characteristics.

Jurisdiction

Streets within The Dalles are owned and maintained by three separate jurisdictions, including the Oregon Department of Transportation (ODOT), Wasco County and the City of The Dalles. All Wasco County roads within The Dalles City Limits are expected to be transferred to The City of The Dalles in 2016. Each jurisdiction is responsible for determining the street's functional classifications, defining its major design and multimodal features, and approving construction and access permits. Coordination is required among the jurisdictions to ensure that the streets are planned, operated, maintained, and improved to safely meet public needs.

State Highways

ODOT owns the following highways within The Dalles:

- Interstate 84 (I-84) is a four-lane, limited access facility that connects The Dalles to Portland, located 85 miles to the west, and then passes through Idaho and Utah to the east. There are currently six interchanges with I-84 in The Dalles. These interchanges connect at several points along old US 30 and at US 197 where it crosses into Washington.
- US 197 (Highway 197) is a two-lane highway that connects to US 97 and Bend located 132 miles to the south. It extends northward into Washington, terminating at State Route 14.
- US 30 (Historic Columbia River Highway) is a two-lane scenic highway connecting Troutdale and The Dalles.

¹ The City of The Dalles has provided initial authorization and direction to use the updated assumptions in anticipation of population forecast data produced by Portland State University's Population Research Center.

- US 30 (The Dalles-Mosier Highway) is a two-lane highway that connects US 197 to Brewery Overpass Road within The Dalles.

Non-State Roads

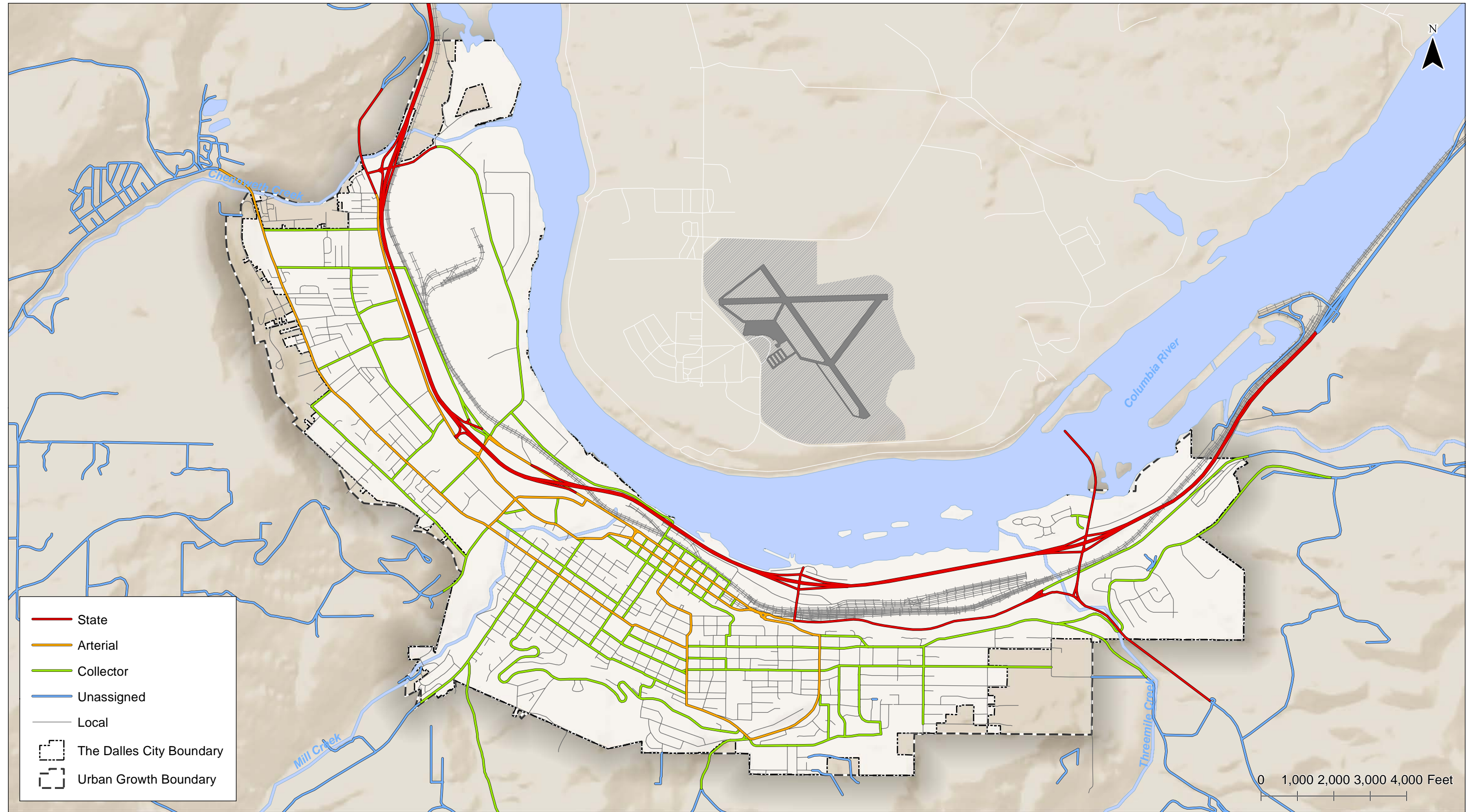
Non-state streets are maintained by the City, County, or private property owners. Local/Public Access Roads within the City that are under City jurisdiction are maintained by the adjacent property owners. Roadway names and lengths obtained from the City and Wasco County GIS are summarized in Appendix B.

Functional Classification

A roadway's functional classification is determined by several factors, including how the facility connects with the rest of the system, the volume of traffic (local or through) it is expected to carry, and the types of trips it is expected to carry. The functional classification considers the adjacent land uses and the kinds of transportation modes that should be accommodated. The public right-of-way should also provide sufficient space for utilities to serve adjacent land uses.

Figure 7 illustrates the Functional Classification of the roadways in the City. The roadways are categorized as Highways, Arterials, Collectors, Unassigned, or Local Streets or Roads. The following functional classifications are defined in the City's current TSP:

- **Highways:** Highways generally carry long-distance traffic through a region. Some of the traffic on interstate freeways may exit/enter to travel to/from the regional street system. Because of the access restriction, however, short-distance local trips are discouraged. Interstate 84 is the only freeway serving the City of The Dalles.
- **Arterial:** Arterial streets form the primary roadway network within and through a region. They provide a continuous road system that distributes traffic between neighborhoods and districts. Generally, arterial streets are high capacity roadways that carry high traffic volumes with minimal localized activity.
- **Collector:** The function of collector streets is equally divided between mobility and access. Collector streets connect local neighborhoods or district traffic to the arterial network. Generally, they do not connect together to form a continuous network because they are not designed to provide alternative routes to the arterial street system.
- **Local Street:** The function of local streets is to provide direct access to adjacent land uses; characterized by short roadway distances, slow speeds, and low volumes. Local streets typically offer a high level of accessibility; generally serving passenger cars, pedestrians, and bicycles, but not through trucks. Separate pedestrian sidewalk facilities are often provided in urban areas. Local streets generally convey low volumes of freight traffic.



H:\projects\116495 - The Dalles TSP\figs\07 Existing Functional Classifications.mxd - jommerville - 9:06 AM 11/22/2015



**Existing Functional Classifications
The Dalles, Oregon**

**Figure
7**



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Freight Routes

Motor Carrier Transportation Division (MCTD) Freight Routes

The MCTD division of ODOT promotes a safe, efficient, and responsible commercial transportation industry by simplifying compliance, reducing regulatory requirements, wherever appropriate, preserving the infrastructure, enhancing the private/public partnership, fostering effective two-way communication, and delivering superior customer service while recognizing the vital economic interests of the commercial transportation industry. One of MCTD's functions is to designate freight routes.

The MCTD-designated freight routes in The Dalles are shown in Figure 8. The following bullets provide a description of the different route characteristics assigned per the MCTD Freight Mobility Map (ranging from the most restrictive to the most accessible routes for movement of freight).

- Routes colored black and yellow are highly restricted to truck and oversize load traffic. These routes may be important for local freight access by permit, but not for general use. These routes should not be considered for use as a viable detour route for trucks.
- Routes colored magenta have some restrictions for both length and/or width. These routes will not be viable detour for all trucks/loads.
- Routes colored blue are unrestricted to standard freight truck traffic but are either weight or width restricted for non-divisible and/or heavy haul loads. These routes are viable detour routes for general freight trucks only, but will not accommodate certain oversize and overweight loads.
- Routes colored orange are generally available for use by unrestricted freight and oversize/overweight routes. These are typically the most heavily used truck routes in the state and also usually offer the most viable unrestricted detour route.

Major freight generators within The Dalles are generally located in the industrial areas within the Port of The Dalles and the Columbia Gorge Industrial Park. Access to these areas is primarily provided via River Road and connects to I-84 at the Chenoweth Interchange and the Webber Street Interchange.

Additional freight generators include industrial uses between I-84 and the railroad near the Brewery Overpass Road. This area has convenient access to I-84 via Brewery Overpass interchange terminals.

ORS 366.215 (No Reduction of Vehicle-Carrying Capacity)

Under ORS 366.215, the Oregon Transportation Commission (OTC) may not permanently reduce vehicle-carrying capacity of identified freight routes. Exceptions are allowed by statute if the exception is determined to be in the best interest of the state and freight route or for safety and access considerations. ORS 366.215 review shall be completed on any planning, design, or project development on state highways.

Roadway Characteristics

Existing Intersection Traffic Control and Lane Configurations

Of the 34 study intersections, four are signalized, five are two-way stop controlled, and four are all-way stop controlled. Figure 9 illustrates existing traffic control devices and lane configurations at the study intersections.



Motor Carrier Transportation Division Designations

- - - High Restrictions
- Non-Divisible
- Unrestricted
- The Dalles City Boundary
- Urban Growth Boundary

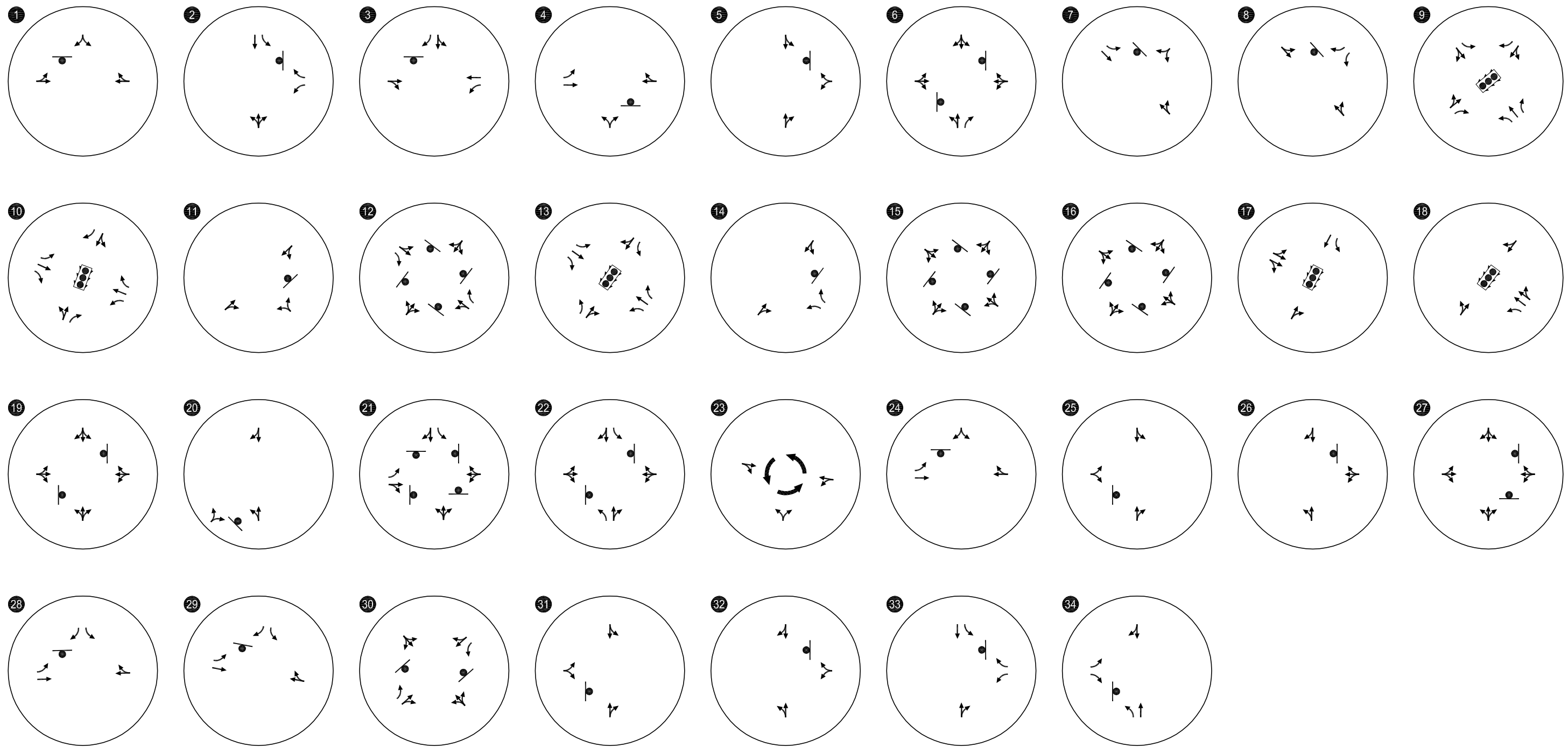
**MCTD Freight Mobility Map
The Dalles, Oregon**

**Figure
8**

H:\projects\118495 - The Dalles TSP\GIS\08 MCTD Freight Mobility Map.mxd - jsommerville - 9:05 AM 11/12/2015



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA



- Study Intersections
- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT

Existing Lane Configurations
& Traffic Control Devices
The Dalles, Oregon

Figure
9

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National Highway System Facilities

The National Highway System (NHS) consists of roadways that provide important connections for the nation's economy, defense, and mobility. NHS roadways can be interstates, other principal arterials, highways that are a part of the Strategic Highway Network (STRAHNET²), major connectors of the STRAHNET, and intermodal connectors. Interstate-84 is the only designated NHS Highway in The Dalles.

On-Street Parking Locations

On-street parking is provided on the majority of the streets within the downtown area and the residential areas south of downtown. Within downtown, parallel on-street parking is provided on the E 2nd Street and E 3rd Street couplet. In addition, a mix of parallel and angle parking is available on cross streets.

The local business community has experimented with a parklet on E 2nd Street between Laughlin and Federal Street. The parklet expands the sidewalk into one or more on-street parking spaces to create people-oriented places, as shown in Exhibit 5.



Exhibit 5. Existing Parklet on E 2nd Street between Laughlin and Federal Street

Pavement Type and Conditions

The majority of public roads in The Dalles are paved. The City implements a Pavement Condition Rating program utilizing the subjective Good-Fair-Poor (GFP) Rating Method. Existing pavement conditions for City roadways, based on 2013 inventory data, are shown in Figure 10.

² This is a network of highways which are important to the United States' strategic defense policy and which provide defense access, continuity and emergency capabilities for defense purposes.

ODOT conducts pavement condition surveys biennially on state-maintained roadways. It employs two separate and distinct pavement rating procedures. For I-84, the only NHS road in The Dalles, ODOT collects detailed data on pavement surface distress types, severity, and quantities. For non-NHS highways, the subjective Good-Fair-Poor (GFP) Rating Method is used, which relies on visual inspection of pavement surface and is rated from 1.0 to 5.0 based on the ride quality and surface distresses. The indexes resulting from both methodologies are then categorized into five conditions: “Very Good”, “Good”, “Fair”, “Poor” and “Very Poor.” Existing pavement conditions for ODOT roadways, based on 2014 ODOT inventory data, are shown in Figure 10.

ODOT monitors pavement conditions through its Pavement Management System. The Pavement Management System is a set of tools or methods that can assist decision makers in finding cost-effective strategies for providing, evaluating, and maintaining pavements in a serviceable condition.

As shown in Exhibit 6, ODOT applies preventative maintenance to roadways with fair or better ratings, but roadways with poor ratings require major rehab or reconstruction.

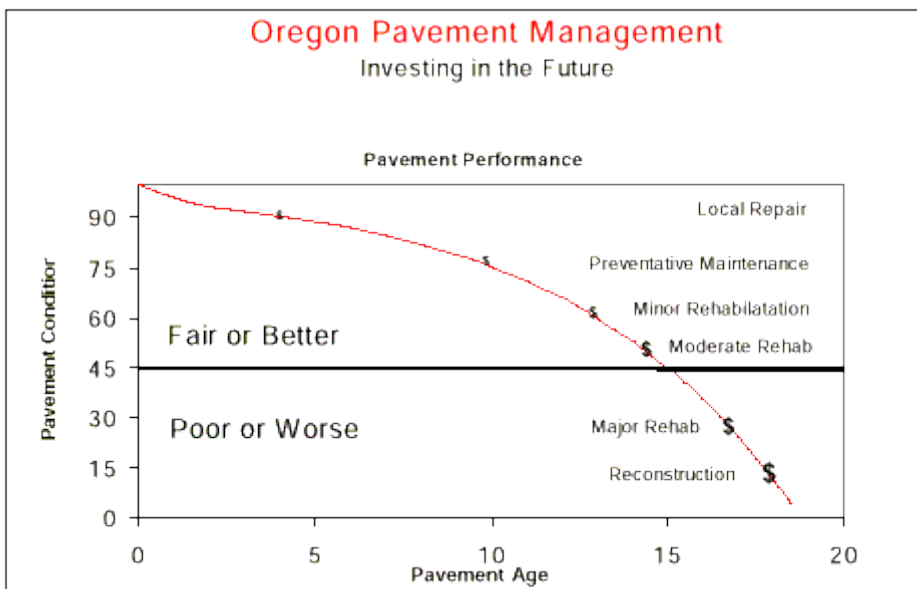
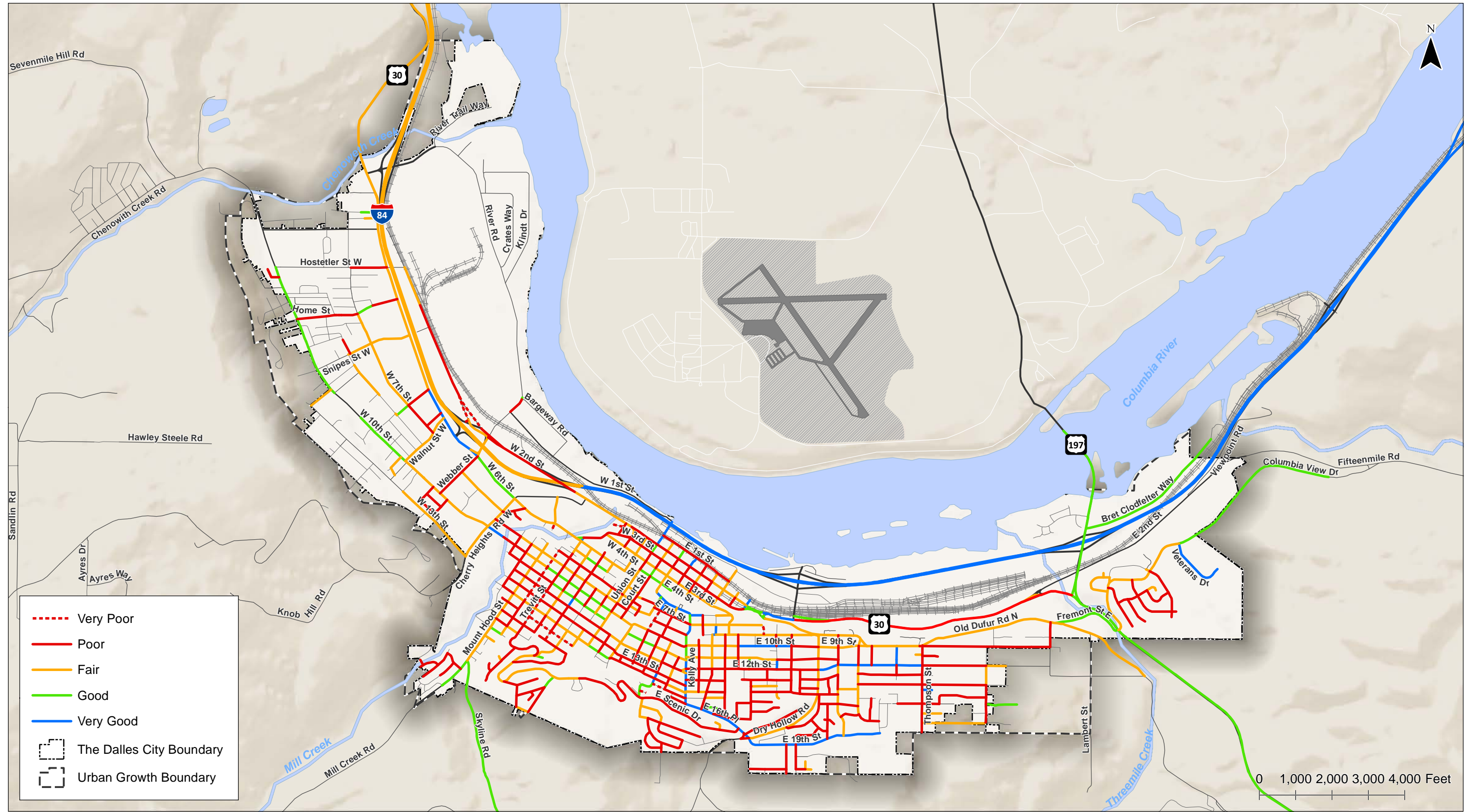


Exhibit 6. Oregon Pavement Management Strategy (Source: <http://www.oregon.gov/odot/>)

Based on the most recent survey data, US 30 from the Brewery Grade Overpass to US 197 and I-84 received a rating of “poor” within The Dalles. In 2015, ODOT repaved 3.8 miles of Interstate 84 from MP 84.3 (near the Union Pacific railroad overcrossing) to MP 88.1 (Fifteenmile Creek Bridge), to improve a section of pavement. The 2015-2018 Statewide Transportation Improvement Program (STIP) includes a project scheduled for 2016 to provide pavement overlay and median barrier replacement from I-84 milepoint 70.46 to 84.31.



Existing Roadway Pavement Conditions
The Dalles, Oregon

Figure
10

H:\projects\16495 - The Dalles TSP\figs\10 Existing Roadway Pavement Conditions.mxd - jsm/mml/b - 9:07 AM 11/12/2015



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County, The City of The Dalles, Oregon Department of Transportation
Sources: Esri, USGS, NOAA

Bicycle/Pedestrian Network

Provision of comprehensive pedestrian and bicycle facilities can enable people to walk and bike safely and efficiently between land uses. Within The Dalles, pedestrian and bicycle facilities primarily serve short trips to major attractors, such as schools, parks, and transit stops. However, bicycle travel can be a viable commuting option for The Dalles residents when supported by facilities such as bicycle lanes or paved shoulders, secure bicycle parking, work-place showers, and bus-mounted bicycle racks.

ODOT is currently in the process of updating the *Oregon Bicycle and Pedestrian Plan*. The Plan will provide a vision for the entire state system, including locally owned facilities, while defining the role of the State and ODOT. The Plan will inform decision making and guide investments strategies made through Transportation System Plans, Facility Plans, the Statewide Transportation Improvement Program and other programs, but will not include the identification of projects.

Pedestrian Facilities

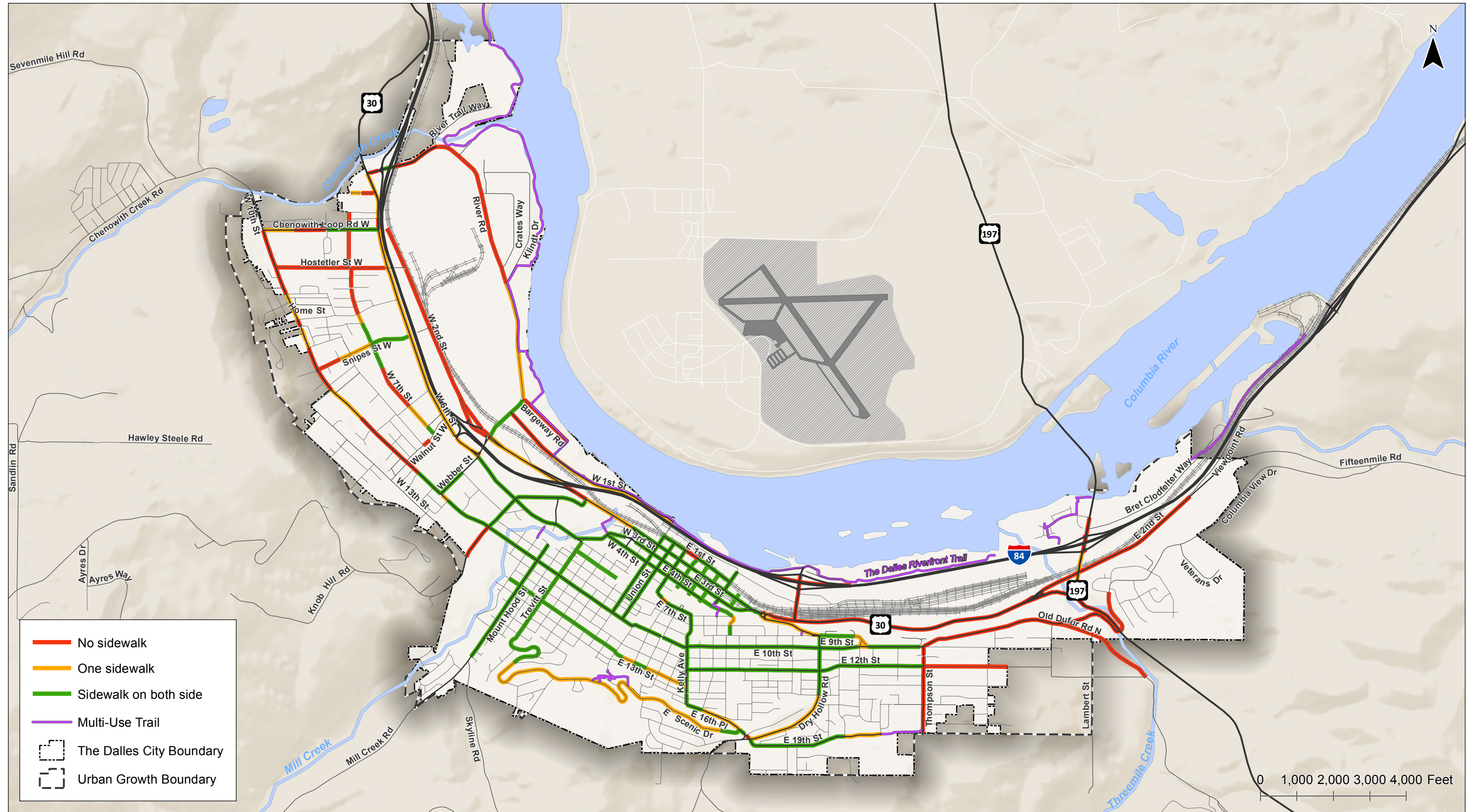
Walking can also be a viable commuting option when supported by facilities such as sidewalks, shared-use paths, and trails - or when mixed-use developments give people the option to live near their work.

The *Oregon Bicycle and Pedestrian Design Guide* (Reference 2) identifies two design treatments for accommodating pedestrians on roadways. These include:

Sidewalks — Sidewalks are typically located along roadways, separated with a curb and/or planting strip or swale, and have a hard, smooth surface.

Shared-use Paths — Paths are typically used by pedestrians, cyclists, skaters and joggers. Paths can be constructed with a variety of surface types, though materials that provide a relatively smooth and firm surface are typically required to comply with Americans with Disability Act (ADA) requirements.

Figure 11 illustrates the location and type of pedestrian facilities on The Dalles roadways. Generally, sidewalks are provided on both sides of the street throughout The Dalles Historic Downtown and the residential areas south of downtown. Areas to the northwest of Webber Street (south of I-84) and areas east of Thompson Street generally have the fewest pedestrian facilities. As shown in Figure 11, pedestrian facilities are particularly lacking along the 10th Street east-west arterial route.



Existing Sidewalks and Shared-use Paths
The Dalles, Oregon

Figure
11

\\ittelson.com\is\H_Portland\proj\1118495 - The Dalles TSP\fig11 Existing Sidewalks and Shared-Use Paths.mxd - mtlcde1 - 4:09 PM 11/18/2015



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Bicycle Facilities

The *Oregon Bicycle and Pedestrian Design Guide* (Reference 2) identifies four design treatments used to accommodate bicycle travel on roadways and one design treatment used to accommodate bicycle travel that is separated from the roadway. These design treatments are described below.

Shared Roadway — On a shared roadway, bicyclists and motorists share the same travel lanes. A motorist will usually have to cross over into the adjacent travel lane to pass a bicyclist. Shared roadways are common on neighborhood streets and on low volume rural roads and highways and may, or may not, include “sharrows” (pavement marking that indicate the shared use of the roadway). Generally, most collectors and some arterials in The Dalles carry less than 3,000 vehicles per day. Per the *Oregon Bicycle and Pedestrian Design Guide*, these roads could allow bicycle traffic to mix with automobile traffic.

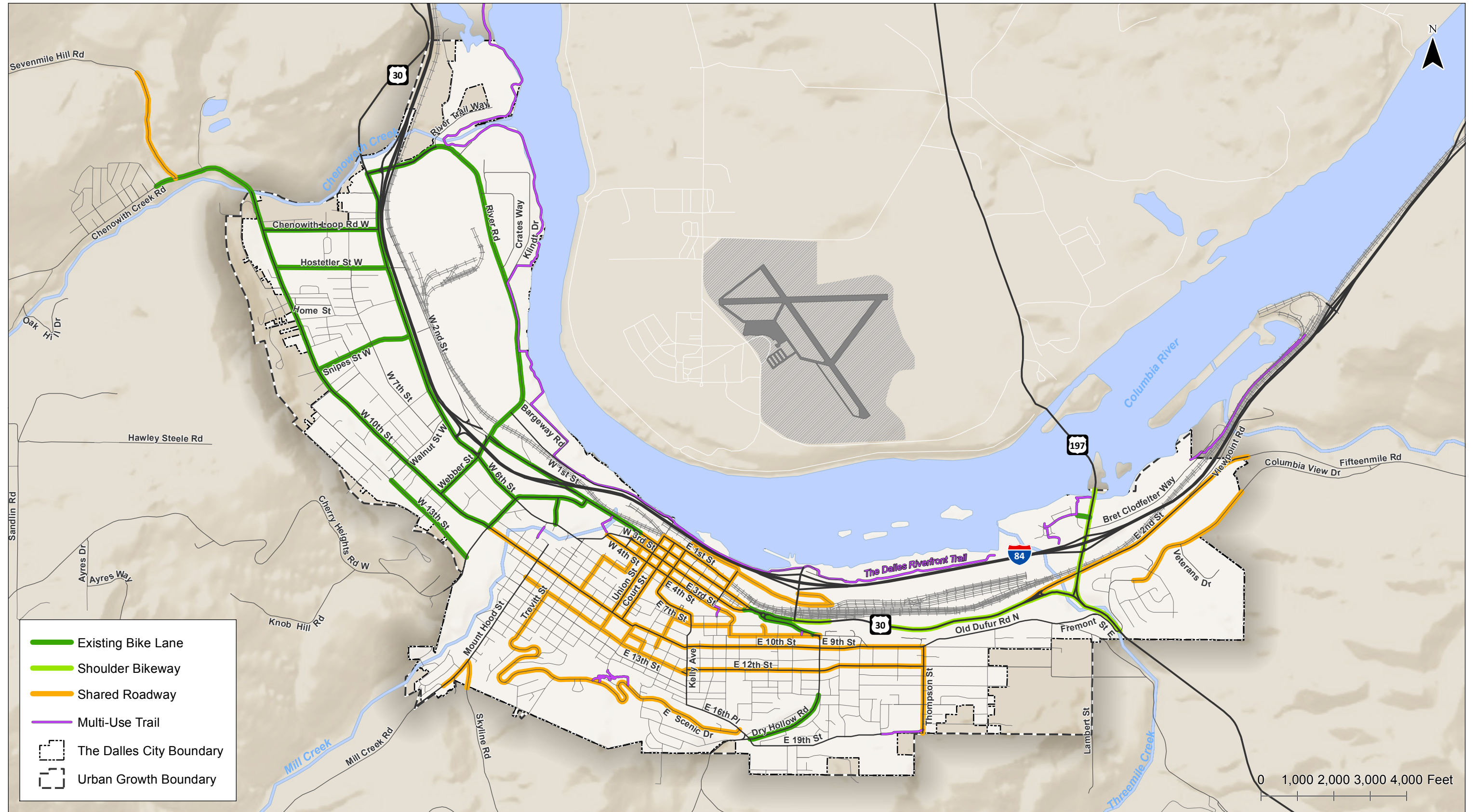
Bicycle Boulevard — The bicycle boulevard is a refinement of the shared roadway treatment. On bicycle boulevards, the typical operation of a local street is modified to function as a through street for bicyclist while maintaining local access for motor vehicles. Traffic calming devices reduce motor vehicle speeds and through trips and traffic controls limit the potential for conflicts between bicyclists and motorists.

Shoulder Bikeway — A shoulder bikeway is a paved shoulder that provides a suitable area for bicycling, reducing the potential for conflicts with motor vehicles. In The Dalles, this includes the roadways transitioning from urban to rural at the southern city limits.

Bike Lane — Some roadways dedicate a portion of the roadway for preferential use by bicyclists. Bike lanes are generally considered appropriate on urban arterials and major collectors where motor vehicle speeds are significantly higher than bicycle speeds. Bike lanes on local streets are appropriate where bicycle volumes are high, vehicle speeds are higher than 25 miles per hour, and/or poor sight distance exists. Bike lanes must always be well-marked to call attention to their preferential use by bicyclists.

Shared-Use Path — Shared-use paths are separated from the roadway by an open space or barrier. Shared-use paths are typically used by pedestrians and bicyclists as two-way facilities. Shared-use paths are appropriate in corridors with high traffic volumes not well served by the street system. Such paths can also be used to create pedestrian and bicycle short cuts and can serve as elements of a community recreational trail system.

The Dalles’ bicycle facilities were inventoried using data from Wasco County’s Geographic Information System (GIS) database, the current TSP, and visual inspection of facilities using Google Earth imagery. Figure 12 illustrates the location and type of bicycle facilities on City arterial and collector roadways.



\\kittelson.com\is\H_Portland\proj\118495 - The Dalles TSP\fig12 Existing Bicycle Facilities.mxd - mtsdel - 10:35 AM 12/3/2015



**Existing Bike Facilities
The Dalles, Oregon**

**Figure
12**



Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Riverfront Trail

The Riverfront Trail is a shared-use, paved trail that parallels the south bank of the Columbia River. Much of the Trail is ADA-accessible. When complete, the Riverfront Trail will span ten miles between The Discovery Center to the northwest and The Dalles Dam Visitor Center at the eastern terminus. Currently, there are missing segments of the trail just west of the Lone Pine Development, and east of US 197 to The Dalles Dam. The asphalt-paved trail is 8- to 12-foot wide, offering an attraction for bicyclists, walkers with dogs or strollers, joggers, and many others. The majority of the Riverfront Trail is ADA accessible.

Restrooms are available along the trail (the Pocket Park and The Dalles Dam Visitor Center) and the trail provides easy access to downtown and numerous benches. In the summer, kayak and bike rentals are available at The Kayak Shack in Riverfront Park, at the 6.5-mile point.

The Riverfront Trail has multiple access points within the first six miles between The Discovery Center and Riverfront Park. There are no access points between the Riverfront Park and the Lone Pine residential development, as the trail runs between I-84 and the Columbia River.

Other Shared-use Paths and Trails

Additional shared-use paths running north-south could provide a comprehensive (off-street) network for recreational and commuter use.

The 2006 TSP proposed two shared-use paths that follow Mill Creek and Chenoweth Creek. The path along the west bank of Mill Creek would connect with the street system at the Cherry Heights Road/13th Street intersection. The path along Chenowith Creek would run along the creek from W 10th Street to the Riverfront Trail, including an at-grade crossing of US 30 (Historic Columbia River Highway) and an undercrossing of I-84. Neither of these paths is currently available or funded for construction.

Public Transit Services Inventory

A new transit center, operated by the Mid-Columbia Council of Governments (MCCOG), is currently under construction on West 7th Street, near the Chenoweth interchange. The transit center is expected to be complete in 2016, with park-and-ride space³ and bus service provided by Columbia Area Transit, MCCOG's Link, and possibly Greyhound.

³ Park & ride lots are transit system components that provide patrons with a connection point to transit service. Patrons typically drive private automobiles (or ride bicycles) to a transit station, transit stop, or car/vanpool waiting area and park the vehicle in the area provided for that purpose.

Public transportation service within The Dalles includes a dial-a-ride, door-to-door service operated by the Mid-Columbia Council of Government's Transportation Network (The Link). In addition, ODOT provides public utility commission (PUC) licenses to private companies and charter service providers. Intercity transit service is provided by Greyhound, Columbia Area Transit, the Hood River County Transportation District and by Amtrak Thruway bus service.

Intercity Bus

Greyhound provides intercity bus service in The Dalles at one bus stop located at 201 Federal Street. Service is provided along I-84 daily. Columbia Area Transit also provides intercity bus service multiple times a day on weekdays along I-84 between the City of Hood River and The Dalles.

Hood River County Transportation District provides service to Hood River and Portland on Tuesdays and Thursdays except for major holidays and if weather conditions make it unsafe or hazardous to travel between The Dalles, Hood River and Portland.

Passenger Rail

Although a ticket office is not provided in The Dalles, Amtrak Thruway provides bus transportation from The Dalles (201 E Federal Street) to the nearest full service station (Portland). This service operates seven days a week, one bus in the morning, one in the afternoon and one in the evening. The next nearest train platforms are in Wishram, WA and Bingen, WA (White Salmon).

Specialized Transportation Services

The Mid-Columbia Council of Government's Transportation Network (The Link) offers Dial-A-Ride, door-to-door transportation services in Wasco County. Dial-A-Ride trips are scheduled in advance, and may include other passengers riding on the bus going to different destinations. The Transportation Network operates lift-equipped buses to serve customers who require the use of a wheelchair, or have difficulty negotiating steps.

Bridges

ODOT maintains an inventory of bridge conditions within The Dalles. State, County, and City owned facilities are assigned a sufficiency rating based on inspections conducted at regular intervals, usually every two years. The sufficiency rating is a measure between 0 and 100 calculated by the Federal Highway Administration (FHWA), based on factors such as condition, materials, load capacity, and geometry (i.e., dimensions). FHWA uses the rating as a tool to prioritize the allocation of funds for bridge repairs. In general, bridges with a sufficiency rating of less than 50 are given priority. The sufficiency rating is used to identify deficiencies, which may include structural issues or functional issues. For example, older bridges may be narrow and not designed to the same width or height clearance of today's standards. Therefore, a sufficiency rating does not necessarily indicate a structural issue as summarized below.

One bridge within The Dalles city limits and two within the Federal Aid Urban Boundary (outside of the city limits) have sufficiency ratings below 50.

- The Dalles City Limits
 - Structure 00464 - W 6th Street Bridge over Mill Creek (sufficiency rating 48.9). The bridge is open with posted weight restrictions. The bridge inspection report notes that there is “very heavy truck traffic on this bridge and there is a need for additional load posting signs outside of this bridge to limit heavy trucks at this location.”
- Federal Aid Urban Boundary
 - Structure 00506 – US 30 (Hwy 100) Bridge over Chenoweth Creek (sufficiency rating 38.2).
 - Structure 06635Q – US 197 Bridge over the Columbia River (sufficiency rating 33.4).

Appendix C includes bridge ratings for 26 bridges within The Dalles from the ODOT Bridge Working Database, and 4 bridges within the Federal Aid Urban Boundary. All bridges, except those noted above, received acceptable ratings.

Rail Inventory

The Union Pacific Railroad (UP) provides freight service along the I-84 corridor, known as the east-west transcontinental route linking Oregon with the mid-west and beyond. Locally, the transcontinental route operates between Portland and Hinkle Rail Yard (near Hermiston, OR) along the southern bank of the Columbia River. Hinkle Rail Yard is a junction point, and the location of UP’s primary carload classification yard in the Pacific Northwest. The route continues southeast from Hinkle to Granger, Wyoming and Ogden, Utah, connecting to UP’s historic Central Corridor that links the San Francisco Bay Area of California with Salt Lake City, Utah; Omaha, Nebraska; and, Chicago, Illinois.

UP’s network in Oregon is predominantly single track with passing sidings. Top inbound commodities include mixed freight handled in containers and trailers, recyclables/waste, fertilizers, soda ash and coal. Top outbound commodities were dominated by mixed freight handled in intermodal service, and lumber/building materials.

According to the *Oregon Rail Plan* (Reference 3), the Federal Railroad Administration (FRA) has established nine track classes, which set maximum speeds for freight and passenger trains, based on the track condition. UP track is maintained to FRA Class 1 conditions with no weight or dimensional restriction through The Dalles. In Oregon, Class 1 railroads have freight train speeds up to 60 mph and passenger speeds up to 79 mph. Within The Dalles, trains are restricted to 40 mph.

There are three at-grade crossings on major roads within the City, including: Webber Street, Union Street (See Exhibit 7), and Madison Street. At-grade crossings result in interaction between fixed-rail and other transportation system users. ODOT Rail regulates all public at-grade highway-railroad grade crossings in Oregon.

All three crossings feature “Active Control” crossings that communicate the presence or approach of a train using measures such as flashing lights, bells, and/or a gate system. However, due to geometry and limited spacing between the



Exhibit 7. Existing At-Grade Rail Crossing of Union Street

railroad tracks and 1st Street, the City and ODOT have noted a few potential conflicts. At the rail crossing on Madison Street, ODOT rail has expressed concern that eastbound left-turn traffic from 1st Street do not have a physical crossing barrier in place. This is due to the fact that 1st Street parallels the railroad tracks and 1st Street intersects with Madison Street at the crossing. Additional warning or other device may be needed to enforce the crossing warning system.

At the Union Street rail crossing, southbound traffic turning left onto 1st Street may create a queue across the railroad tracks during peak periods of vehicular traffic. There may be opportunities to encourage queued vehicles to stop in advance of the railroad crossing through signage or other low-cost treatments.

Air, Water, and Pipeline Inventories

Air

The Dalles is served by the Columbia Gorge Regional Airport, also known as The Dalles Airport. Table 5 summarizes the Columbia Gorge Regional Airport as described by the AirNav Airport Information Website.

Table 5 Air Transportation Inventory

Name	Use	Runway Dimension	Surface	# of Based Aircraft	Federal Aviation Administration (FAA) ID
Columbia Gorge Regional Airport	Public	5,097' x 100'	Asphalt	61	KDLS
		4,647' x 100'	Asphalt		

The *Oregon Aviation Plan* (Reference 4, prepared by the ODOT Aeronautics Division) assigns all statewide public use airports to the following five categories:

- **Category 1: Commercial Service Airports** – Scheduled commercial service.

- **Category 2: Business or High Activity General Aviation Airports** – 30,000 or more annual operations (i.e., take-offs and landings), of which a minimum of 500 are business-related (turbine) aircraft. Business-use heliports are also included in this category.
- **Category 3 – Regional General Aviation Airports** – Generally less than 30,000 annual operations and geographically significant location with multiple communities in the service area.
- **Category 4: Community General Aviation Airports** – 2,500 or more annual operations, or more than ten based aircraft.
- **Category 5: Low Activity General Aviation Airports** – Less than 2,500 annual operations and no more than ten based aircraft.

The Columbia Gorge Regional Airport is a Category 3 airport with two active runways on the airfield. The primary Runway 13-31 is 5,097 feet long and 100 feet wide and the secondary Runway 7-25 is 4,647 feet long by 100 feet wide.

The airport served 45 operations per day on average, with 59-percent of the operations transient general aviation, 29-percent local general aviation, 11-percent air taxi, and 5-percent military. Of the 61 aircraft based on the field, 60 are single-engine airplanes and 1 is a helicopter.

Water

The Columbia River serves as the northern boundary of The Dalles and provides a valuable resource to the City and the surrounding area. The river provides recreational opportunities and economic development opportunities such as the four private cruise lines that port at The Dalles Marine Terminal near the intersection of W 1st Street and Union Street. Cruises run from March to November each year and result in many passengers connecting to the pedestrian facilities in The Dalles or transferring to buses to visit local tourist destinations.

The Port of The Dalles Marina is located on the Columbia River at River Mile Post 190. The Marina provides space for 62 boathouses and approximately 30 open moorage positions that are leased on a monthly, 6-month or annual basis. A boat launch is located adjacent to the Marina to accommodate boat haul outs with trailers.

Pipeline and Transmission System

Northwest Natural Gas operates a major natural gas distribution line serving The Dalles. This distribution line extends southward from the main transmission line, which runs along the Washington side of the Columbia River Gorge. Northwest Pipeline Corporation operates the main transmission line.

Environmental Justice

Environmental Justice (EJ) populations are a special focus in transportation planning and project development. Identifying EJ populations early on is intended to make participation in transportation

planning and project development more inclusive of diverse communities. The analysis is also valuable in identifying the transportation needs that will provide the most benefits to EJ populations. Five population groups are considered for transportation impact susceptibility, representing those who may rely more heavily on public infrastructure or transit for access to day-to-day needs and jobs. They include minority groups, populations under 17 or over 64 years of age, low-income households, low-English proficiency households, and people with disabilities.

Demographic Summary

For EJ evaluation purposes, The Dalles has approximately 14,730 people living within City limits according to 2013 American Community Survey (ACS) 5-Year Estimates.⁴ The highest concentration of people is located in census block groups close together near the downtown area, with the highest density being close to 13 people per acre (see Appendix D). Most of the population density outside of the central area of the City is relatively low, ranging between 2-3 people per acre, with a notable exception in the northwest area of the City of 4-5 people per acre. Population and population density are important considerations when evaluating and comparing EJ populations. For example, a census block group may have high percentage of a specific population, but there are relatively fewer people in the area altogether. Conversely, a census block group may have a large concentration of a specific population that may not be as prominently featured in EJ maps (provided in Appendix D) relative to the overall population in that area.

The make-up of specific EJ populations of The Dalles is shown in Exhibit 8.⁵ Compared to the whole state of Oregon, The Dalles has a greater portion of people who are 65 or older (19%), 17 or younger (25%), or who are considered to be in poverty (43%). The Dalles has approximately 1% of low-English proficiency households, comparable to the State's figure of 3 percent.⁶ The portion of population within The Dalles with disabilities is similar to State of Oregon (approximately 13% and 12% respectively). General location for EJ groups varies as shown in Figures provided in Appendix D.

⁴ The US census is conducted once every 10 years to provide an official count of the entire U.S. population to Congress; the American Community Survey (ACS) is conducted every year to provide up-to-date information about the social and economic needs.

⁵ EJ population analysis for The Dalles consists entirely of 2013 ACS 5-Year Estimates data. This is the most recent data available to perform analysis at the smallest possible geography (census block group).

⁶ Care should be taken when evaluating available data for low-English households within The Dalles due to the small sample size and large margin of error. See the "Limited-English Proficiency" section in Appendix D for more details.

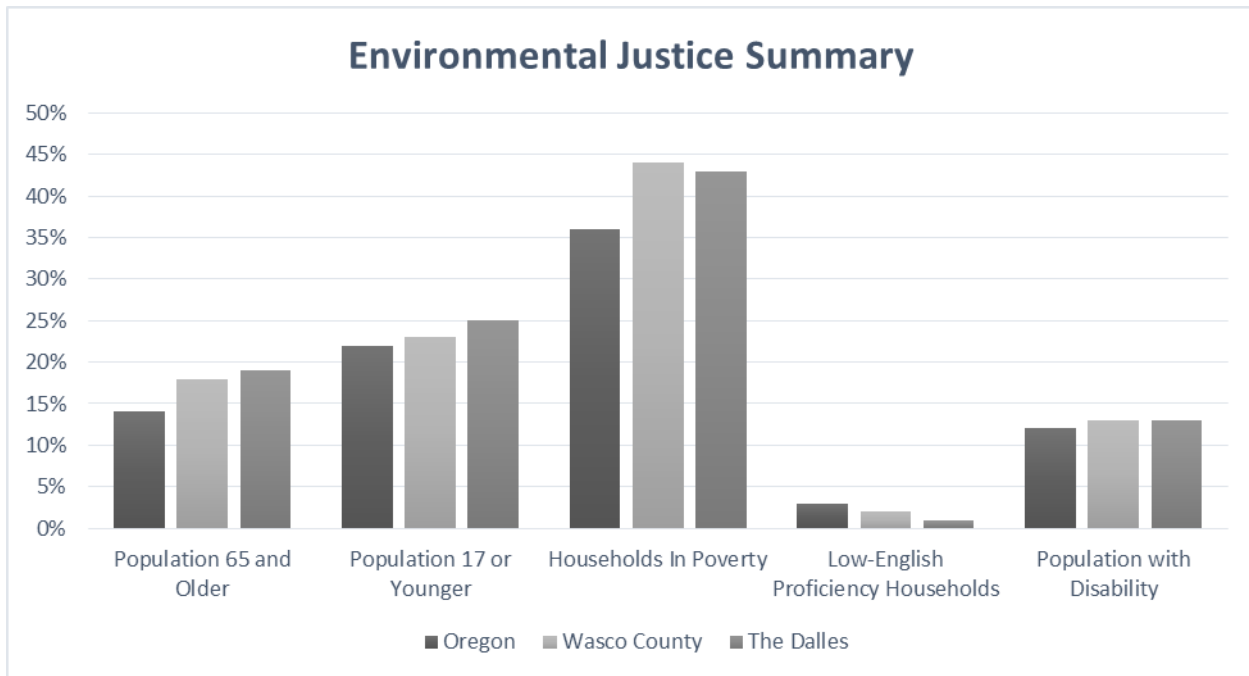


Exhibit 8. Environmental Justice Summary

[Appendix D](#) includes maps and statistics summarizing minority populations, low-income populations, persons 65 years and older, persons 17 years and younger, limited-English proficiency, and persons with disabilities within The Dalles relative to Wasco County and Oregon.

EXISTING TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

The existing transportation system operations analysis identifies how the study area’s transportation system currently operates based on year 2015 traffic volumes. This analysis includes an evaluation of traffic operations at the study intersections, including non-motorized (pedestrian and bicycle) operations.

Kittelson & Associates, Inc. (KAI) staff visited and inventoried the study area in October 2015. At that time, KAI collected information on existing transportation system conditions along key roadway corridors and at the study intersections.

Traffic Counts

Traffic counts were conducted at the study intersections in April and June 2015. Counts were conducted on typical mid-week days over various time periods (24-hour, 16-hour, or 3-hour). All counts include the total number of pedestrians, bicyclists, and motor vehicles that entered the respective intersections in 15-minute intervals during the evening (2:00 to 6:00 p.m.) peak time period. The traffic counts were reviewed to determine the system-wide peak hour for the operational analysis. The counts were also seasonally adjusted to reflect 30th highest hour traffic volumes and balanced consistent with the methodology provided in the ODOT Analysis Procedures Manual (APM). Figure 13 summarizes the

traffic counts at the study intersections during the weekday p.m. peak hour. *The traffic count worksheets are included in Appendix E.*

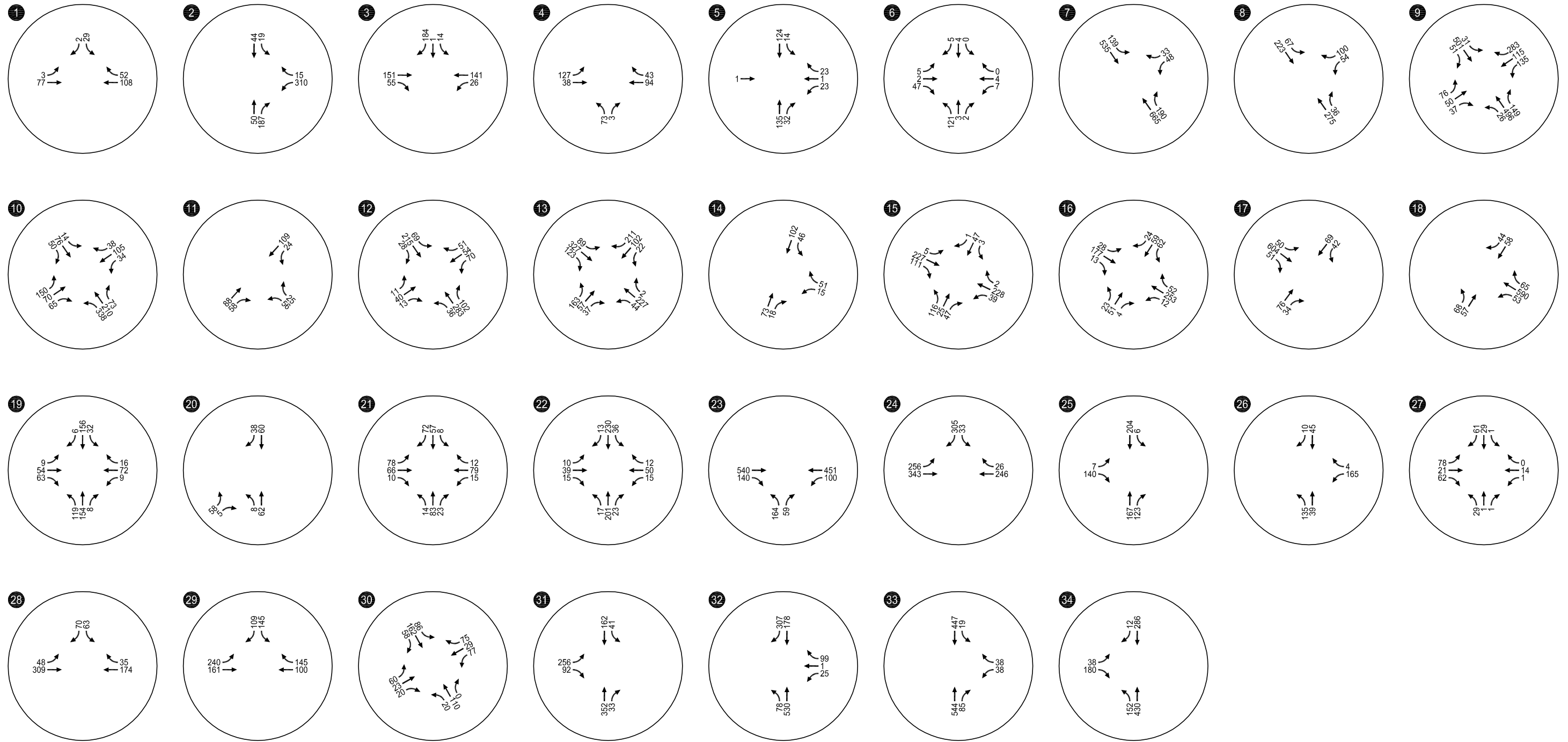
Analysis Methodology and Operational Standards

The intersection operations analysis was conducted using Synchro 8 software, which implements the methodologies outlined in the Highway Capacity Manual (HCM). Based on direction provided by TPAU, the HCM 2000 methodology was used to analyze traffic operations at the signalized intersections while the HCM 2010 methodology was used to analyze traffic operations at the unsignalized intersections.

The intersection operations analysis results were compared to City of The Dalles and ODOT performance standards to identify potential areas for improvement. Performance standards from each agency apply at intersections where the agency has jurisdiction over at least one approaching roadway. The City defines intersection performance based on Level of Service, which correlates with delay. ODOT performance targets are based on volume/capacity (v/c) ratios, a comparative measure of the volume of traffic entering an intersection to the theoretical intersection capacity. By way of example, a v/c ratio of 1.0 indicates that an intersection is operating at capacity while a v/c ratio over 1.0 indicates that the intersection's capacity is exceeded.

The City and ODOT performance thresholds are summarized below.

- The City's current TSP establishes a Level-of-Service D standard, which correlates to a maximum delay of 55 seconds/vehicle at signalized intersections and 35 seconds/vehicle on the minor street approach at unsignalized intersections.
- Table 6 of the *Oregon Highway Plan (OHP)* provides maximum v/c ratios for all signalized and unsignalized intersections located outside the Portland Metro area. The standards vary based on the classification of the roadway (Statewide Highway, Districts Highway, etc.), designation (Freight Route, Expressway, etc.), and posted speed. The intersections subject to ODOT v/c targets within the study area are located along I-84, US 197 and US 30.



- Study Intersections

Existing Traffic Volumes
Weekday PM Peak Hour
The Dalles, Oregon

Figure
13

\\kittelson.com\is\H_Portland\profile\18495 - The Dalles TSP\dwg\18495_Future_volumes.dwg Jan 18, 2016 - 8:59am - mldet Layout Tab: ExpM

Intersection Operations

The City of The Dalles intersection operation standards are LOS of D for signalized and unsignalized intersections. ODOT operation standards were found according to Table 6 of the Oregon Highway Plan. The traffic volumes shown in Figure 13 were used to analyze traffic operations at the study intersections. Figure 14 and Table 6 summarize the results of the traffic operations analysis at the study intersections for the weekday p.m. peak hour. Figure 14 illustrates study intersections with yellow circles that are nearing the applicable performance thresholds (within 0.05 of the V/C target or LOS D). All other intersections are shown by green circles, indicating they are operating well below the applicable performance thresholds. *HCM Existing Traffic Condition worksheets are included in Appendix F.* Key findings include:

- All study intersections currently operate acceptably according to their respective performance thresholds.
- The US 197/I-84 EB Ramp intersection currently satisfies applicable ODOT v/c targets during the weekday p.m. peak hour. The intersection has a v/c ratio of 0.79 and is approaching the 0.80 v/c target.
- Two other intersections, I-84 EB Ramps/W 6th Street and US 197/Lone Pine Lane operate at LOS D under existing conditions, which indicates that as volumes grow they will likely exceed the City's performance thresholds.

Intersection Queues

A queuing analysis was conducted at the five signalized study intersections using Synchro 8 software. Table 7 summarizes the 95th percentile queues for turning movements with exclusive lanes during the weekday p.m. peak hour, rounded to the nearest 25 feet (approximately 1 vehicle length). The available storage lengths reflect the striped storage for each movement at the intersections.



**Existing Traffic Conditions
Weekday PM Peak Hour
The Dalles, Oregon**

**Figure
14**

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Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Wasco County
Sources: Esri, USGS, NOAA

Table 6: Existing Intersection Operations – Weekday PM Peak Hour

Map ID	Intersection	Level of Service (LOS)	Delay (Sec)	Volume/Capacity (V/C)	Unsignalized Critical Movement	ODOT V/C Target	Meets Applicable Performance Thresholds?
1	Seven Mile Hill Rd/ Chenoweth Rd	B	10.1	0.05	SB	N/A	Yes
2	US 30/River Rd	B	12.7	0.43	WB	0.90	Yes
3	I-84 EB Ramps/River Rd	B	12.1	0.26	WBR/ SB	0.80	Yes
4	I-84 WB Ramps/River Rd	B	14.7	0.21	NB	0.80	Yes
5	W 10th St/Hostetler Rd	B	10.4	0.08	WB	N/A	Yes
6	W 2nd St/Hostetler Rd	B	11.6	0.02	WB	N/A	Yes
7	I-84 EB Ramps/W 6th St	D	25.2	0.33	WB	0.80	Yes
8	Webber St/W 10th St	C	16.0	0.15	WB	N/A	Yes
9	Webber St/W 6th St	C	21.8	0.66	Signalized	N/A	Yes
10	Webber St/W 2nd St	C	23.7	0.68	Signalized	N/A	Yes
11	Webber St/W 1st St	B	10.5	0.11	WB	N/A	Yes
12	Cherry Heights Rd/W 10th St	C	16.1	N/A	AWSC	N/A	Yes
13	Cherry Heights Rd/W 6th St	C	33.4	0.57	Signalized	N/A	Yes
14	Mt Hood St/Skyline Rd	B	10.5	0.06	NBR/ WB	N/A	Yes
15	Mt Hood St/Skyline Rd	C	18.0	N/A	AWSC	N/A	Yes
16	Union St/10th	B	10.7	N/A	AWSC	N/A	Yes
17	Union St/W 3rd St	C	37.5	0.40	Signalized	N/A	Yes
18	Union St/W 2nd St	B	13.0	0.36	Signalized	N/A	Yes
19	Kelly Ave/E 10th St	C	19.7	0.27	WB/NB	N/A	Yes
20	Dry Hollow Rd/3 Mile Rd	A	9.8	0.08	NE	N/A	Yes
21	Dry Hollow Rd/16th Pl/19th St	A	8.5	N/A	AWSC	N/A	Yes
22	Dry Hollow Rd/E 10th St	C	15.3	0.19	WB	N/A	Yes
23	Brewery Grade/US 30	C	20.0	0.80	EB	0.90	Yes
24	Brewery Overpass Rd/US 30	B	13.5	0.49	SB	0.90	Yes
25	Brewery Overpass Rd/ I-84 EB Ramps	B	10.9	0.22	EB	0.80	Yes
26	Brewery Overpass Rd/ I-84 WB Ramps	B	13.3	0.31	WB	0.80	Yes
27	Thompson St/E 10th St/ Old Dufur Rd	B	10.3	0.81	NB	N/A	Yes
28	E 2nd St/US 30	B	10.1	0.09	WBL	0.90	Yes
29	US 197/US 30	D	33.7	0.57	SBL	0.85	Yes
30	US 197/Fremont St/Columbia View Dr	C	19.2	0.43	EBL/ WBL	0.85	Yes
31	US 197/I-84 EB Ramps	E	36.0	0.79	EB	0.80	Yes
32	US 197/I-84 WB Ramps	B	12.1	0.21	WB	0.80	Yes
33	US 197/Bret Clodfelter Wy	C	15.3	0.19	WB	0.85	Yes
34	US 197/Lone Pine Ln	D	27.5	0.27	EB	0.85	Yes

AWSC = All-way stop control, N/A = Not applicable

Table 7: Existing Signalized 95th Percentile Queues – Weekday PM Peak Hour

Map ID	Intersection	Movement	Weekday PM Queue (feet)	Available Storage (feet)	Adequate?
9	Webber St/W 6th St	EBL	25	250	Yes
		EBT	350	705	Yes
		WBL	25	150	Yes
		WBT	300	> 500	Yes
		WBR	50	175	Yes
		NBT	125	495	Yes
		NBR	25	175	Yes
		SBT	225	585	Yes
		SBR	100	60	No
10	Webber St/W 2nd St	EBL	25	125	Yes
		EBT	125	430	Yes
		WBL	200	425	Yes
		WBT	150	635	Yes
		WBR	25	425	Yes
		NBT	225	585	Yes
		NBR	50	25	No
		SBT	150	810	Yes
13	Cherry Heights Rd/W 6th St	EBL	100	100	Yes
		EBT	350	> 500	Yes
		EBR	50	> 500	Yes
		WBL	50	965	Yes
		WBT	250	965	Yes
		WBR	0	75	Yes
		NBL	150	100	No
		NBT	100	360	Yes
		SBL	50	> 500	Yes
		SBT	325	> 500	Yes
17	Union St/W 3rd St	EBT	275	365	Yes
		NBT	100	> 500	Yes
		SBL	75	45	No
		SBT	50	205	Yes
18	Union St/W 2nd St	WBL	50	40	No
		WBT	150	390	Yes
		NBT	75	205	Yes
		SBT	50	385	Yes

As shown in Table 7, all of the signalized study intersections currently have one or more movements where the 95th percentile queues exceed the available storage for that movement. These intersections have the potential for queues to extend into the adjacent through lane and block traffic, with the exception of the southbound left-turn at the Union St/W 3rd St and westbound left-turn at the

Union St/ W 2nd St intersections which have queues that can be accommodated, but extend beyond the striped storage. The queues do not block the adjacent intersections. *The worksheets used to evaluate existing queuing at the signalized study intersections are included in Appendix G.*

Freeway Operations

Freeway operations analysis was conducted for the weekday p.m. peak hour at each merge and diverge location (on- and off-ramps) and each mainline segment of I-84 (no ramps). The analysis was based on HCM 2010 methodologies using HCS 2010 software. The analysis indicates that all segments of I-84 within The Dalles are operating at Level-of-Service A or B. The highest density of vehicles per mile per lane occurs in the eastbound direction at the 6th Street on-ramp and the mainline segment after the on-ramp.

A summary table of results and *worksheets used to evaluate existing freeway operations are included in Appendix H.*

Traffic Safety

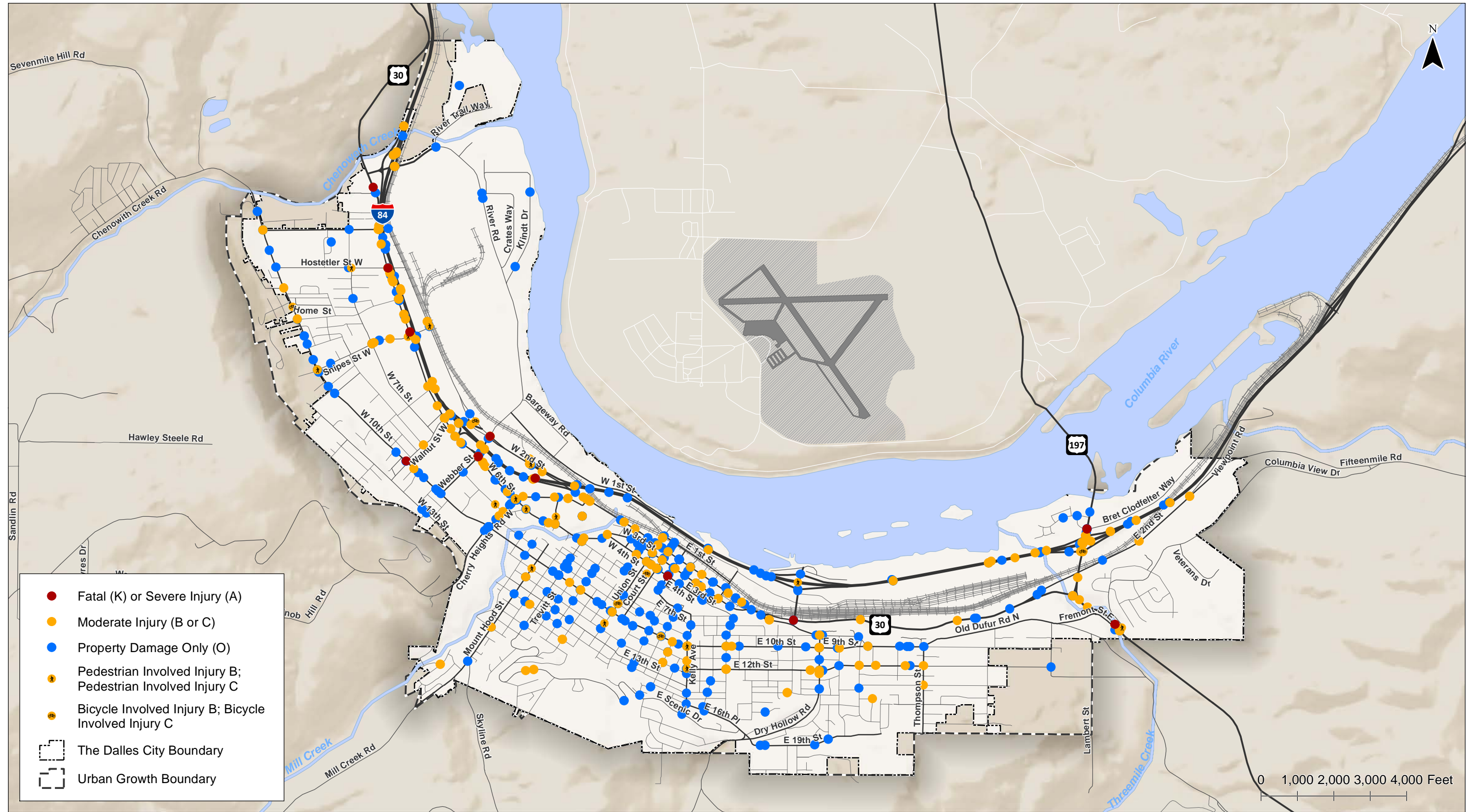
Reported crash data was analyzed at all study intersections in an effort to identify patterns and trends that may indicate an opportunity to reduce crash potential. The data was obtained from ODOT for the five-year period from January 1, 2010 through December 31, 2014. The data includes information about crash location, type, weather, roadway surface conditions, traffic control, and vehicle information. *A summary of the reported crashes by study intersection is provided in Appendix I.*

Figure 15 illustrates the location and severity of 709 reported crashes within the City over the five-year study period. The figure classifies crashes by severity and indicates whether a pedestrian or bicyclist was involved. Crash severity is defined using the KABCO injury-severity scale in the ODOT database. This scale was developed by the National Safety Council (NSC) and is frequently used by law enforcement for classifying injuries as:

- K – Fatal;
- A – Incapacitating injury;
- B – Non-incapacitating injury;
- C – Possible injury; and,
- O – No injury.

Current Federal legislation, Moving Ahead for Progress in the 21st Century Act (MAP-21), prioritizes funding for Fatal and Injury A crashes, shown in red, in Figure 15.

A fatal crash involving a train and a pedestrian was reported at the Union Street/1st Street intersection in 2015. Although outside of the study period, as defined above, this event will be reviewed to identify opportunities to reduce potential for similar events in the future.



Reported Crash History
January 1, 2010 to December 31, 2014
The Dalles, Oregon

Figure
15

H:\projects\116495 - The Dalles TSP\figs\15 Reported Crash History, November 1, 2009 to October 31, 2014.mxd - jsommerville - 9:07 AM 11/12/2015



Crash Type and Severity

Analysis of crash patterns is focused at study intersections, where the highest density of crashes exists. Figure 16 illustrates the frequency of crashes by study intersection. Table 8 summarizes the location, type, severity, and number of crashes that were reported at the study intersections.

Table 8 shows there are more angle and turning crashes than rear-end crashes at multiple intersections. Statewide ODOT research has shown that on average less than 45-percent of multiple vehicle crashes at 4-leg stop-controlled intersections or signals involve angle or turning movements.

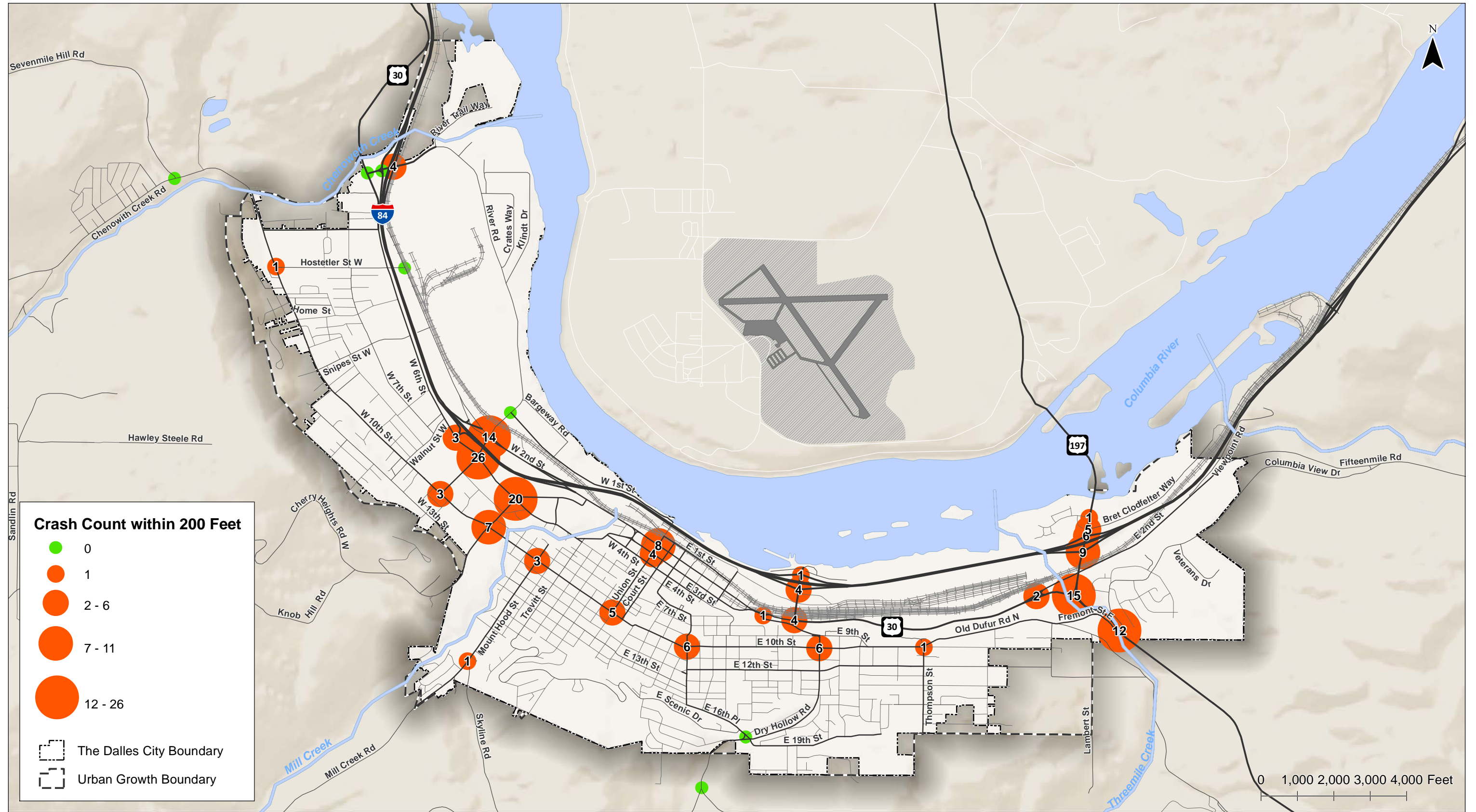
One signalized intersection and four stop-controlled intersections were identified as having over 50 percent of crashes from turning or angle collisions, including:

- #10 - Webber St/W 2nd St - A total of 14 crashes were reported at the intersection over the 5-year period, including 10 crashes caused by angle or turning movement. A majority of these crashes involve a northbound left-turn vehicle.
- #22 - Dry Hollow Road/E 10th Street - A total of 6 crashes were reported at the intersection over the 5-year period, all of them caused by angle or turning movement.
- #31 - US 197/I-84 EB Ramps - A total of 9 crashes were reported at the intersection over the 5-year period, including 6 caused by angle or turning movement. A majority of these crashes involve an eastbound left-turn from the I-84 ramp.
- #32 - US 197/I-84 WB Ramps - A total of 6 crashes were reported at this intersection over the study period, including 3 angle or turning movement collisions. In all three of the angle/turning crashes the driver was cited as not yielding right-of-way or driving recklessly.
- #33 - US 197/Bret Clodfelter Way - A total of 5 crashes were reported at this intersection over the study period, all of them including angle or turning movement collisions where the driver was cited as not yielding right-of-way.

Critical Crash Rate Comparisons

The critical crash rate method was used to identify study intersections that warrant further investigation and may represent opportunities to reduce crash frequency and severity. The Critical Crash Rate method is recommended by ODOT and is consistent with guidance in Part B of the Highway Safety Manual (HSM). The critical rate method establishes a threshold for comparison among intersections with similar numbers of approaches and similar traffic control.

Table 9 summarizes the study intersection crash rates calculated as the number of reported crashes relative to the amount of traffic at the intersection (measured per million entering vehicles). Other intersections were also studied, as requested by the Technical Advisory Committee. The critical crash rates are calculated based on the weighted average crash rate for all similar intersections in The Dalles. *Worksheets from the ODOT critical rate calculator used in this analysis are provided in Appendix J.*



**Crash Frequency by Study Intersection
The Dalles, Oregon**

**Figure
16**

H:\proj\11495 - The Dalles TSP\figs\16 Crash Frequency by Study Intersection.mxd - somerville - 9:08 AM 11/12/2015



Table 8: Reported Crashes by Study Intersection (1/1/2010 to 12/31/14)

Map ID	Intersection	Collision Type							Severity			Total
		Rear-End	Turning	Angle	Fixed-Object	Pedestrian/Bicycle	Sideswipe-meeting	Other	Fatal & Severe Injury (K+A)	Moderate & Minor Injury (B+C)	PDO ¹ (O)	
4	I-84 WB Ramps/River Rd	1	2		1				2	2		4
5	W 10th St/Hostetler Rd		1						1			1
7	I-84 EB Ramps/W 6th St		1					1	1	1		2
8	Webber St/W 10th St	1	2						3			3
9	Webber St/W 6th St	19	3	4					20	5	1	26
10	Webber St/W 2nd St	4	6	4					9	4	1	14
12	Cherry Heights Rd/W 10th St	1	1	2	1			2	7			7
13	Cherry Heights Rd/W 6th St	15	2		2	1			14	6		20
16	Union St/10th	2	1	2					4	1		5
17	Union St/W 3rd St		1	2	1				3	1		4
18	Union St/W 2nd St	1	2	2				3	7	1		8
19	Kelly Ave/E 10th St			4	1	1			2	4		6
22	Dry Hollow Rd/E 10th St		2	4					4	2		6
23	Brewery Grade/US 30	1					1		1	1		2
24	Brewery Overpass Rd/US 30	1	2	1					3		1	4
25	Brewery Overpass Rd/I-84 EB Ramps		1		2				3			3
26	Brewery Overpass Rd/I-84 WB Ramps			1					1			1
27	Thompson St/E 10th St/Old Dufur Rd				1				1			1
28	E 2nd St/US 30		1	1					2			2
29	US 197/US 30		14					1	11	4		15
30	US 197/Fremont St/Columbia View Dr		2	6	3	1			5	6	1	12
31	US 197/I-84 EB Ramps	3	3	2		1			2	7		9
32	US 197/I-84 WB Ramps	3	1	2					3	3		6
33	US 197/Bret Clodfelter Wy		3	2					4		1	5
34	US 197/Lone Pine Ln	1							1			1

¹ PDO = Property Damage Only

Table 9: Intersection Critical Crash Rate Comparison

Map ID	Intersection	AADT Entering Intersection	Total Crashes	Urban Intersection Population Type	Intersection Crash Rate*	Reference Population Crash Rate	Critical Rate	Exceeds Critical Rate?
4	I-84 WB Ramps/River Rd	3,780	4	4-leg Stop	0.58	0.41	0.88	No
5	W 10th St/Hostetler Rd	3,530	1	3-leg Stop	0.16	0.25	0.65	No
7	I-84 EB Ramps/W 6th St	16,100	2	3-leg Stop	0.07	0.25	0.42	No
8	Webber St/W 10th St	7,550	3	3-leg Stop	0.22	0.25	0.51	No
9	Webber St/W 6th St	19,500	26	4-leg Signal	0.73	0.57	0.79	No
10	Webber St/W 2nd St	12,230	14	4-leg Signal	0.63	0.57	0.85	No
12	Cherry Heights Rd/W 10th St	9,720	7	4-leg Stop	0.39	0.41	0.69	No
13	Cherry Heights Rd/W 6th St	19,420	20	4-leg Signal	0.56	0.57	0.79	No
16	Union St/10th	7,580	5	4-leg Stop	0.36	0.41	0.73	No
17	Union St/W 3rd St	9,260	4	4-leg Signal	0.24	0.57	0.90	No
18	Union St/W 2nd St	9,360	8	4-leg Signal	0.47	0.57	0.89	No
19	Kelly Ave/E 10th St	6,980	6	4-leg Stop	0.47	0.41	0.74	No
22	Dry Hollow Rd/E 10th St	6,610	6	4-leg Stop	0.50	0.41	0.75	No
24	Brewery Overpass Rd/US 30	6,470	4	4-leg Stop	0.34	0.41	0.76	No
25	Brewery Overpass Rd/I-84 EB Ramps	6,470	3	4-leg Stop	0.25	0.41	0.76	No
26	Brewery Overpass Rd/I-84 WB Ramps	3,430	1	4-leg Stop	0.16	0.41	0.91	No
27	Thompson St/E 10th St/Old Dufur Rd	3,260	1	4-leg Stop	0.17	0.41	0.92	No
28	E 2nd St/US 30	6,990	2	4-leg Stop	0.16	0.41	0.74	No
29	US 197/US 30	9,000	15	3-leg Stop	0.91	0.25	0.49	Yes
30	US 197/Fremont St/Columbia View Dr	7,200	12	4-leg Stop	0.91	0.41	0.74	Yes
31	US 197/I-84 EB Ramps	8,050	9	4-leg Stop	0.61	0.41	0.72	No
32	US 197/I-84 WB Ramps	12,180	6	4-leg Stop	0.27	0.41	0.65	No
33	US 197/Bret Clodfelter Wy	11,710	5	3-leg Stop	0.23	0.25	0.45	No
34	US 197/Lone Pine Ln	10,980	1	3-leg Stop	0.05	0.25	0.46	No

* Crash rates are reported as the number of crashes per million entering vehicles.

As shown in Table 9, two intersections exceed critical crash rates. One element that makes these two intersections unique compared to other study intersections in The Dalles is the speed of traffic on US 197 through these intersections. The following provides more detail on the reported crash history at these intersections:

- #29 - US 197/US 30 – A total of 15 crashes were reported at the intersection over the study period. Of the 15 crashes, 4 resulted in an injury B or C, and 11 resulted in PDO. 14 of the 15 reported crashes involved left-turns (primarily southbound left turns and eastbound left-turns). 11 crash reports involving a left-turn crash indicate that the driver did not yield right-of-away. Dedicated left-turn lanes are provided for the southbound and eastbound approaches at the intersection.
- #30 - US 197/Fremont St/Columbia View Drive - A total of 12 crashes were reported at the intersection over the study period. Of the 10 crashes, 1 resulted in an injury A, 6 resulted in an injury B or C, and 5 resulted in PDO. A majority of the crashes were reported as fixed object and turning movement crashes. Three fixed-object and four angle crashes resulted on snow or ice in October, November, and December; these were associated with one Injury A and four Injury C crashes. One crash involved a work zone collision with a worker.

90th Percentile Crash Rate Comparisons

A second method used to identify intersections with more crashes than should be expected is to compare the crash rate to the statewide 90th percentile rates for similar intersection types, as documented in Table 4-1 of the ODOT APM.

Three of the study intersections currently exceed the 90th percentile crash rates for similar intersections:

- #4 - I-84 EB Ramps/River Road – A total of 4 crashes were reported at the intersection over the 5-year period. Of the 4 crashes, 2 resulted in an injury B or C, and 2 resulted in property damage only. Two of the crashes were reported as turning movement, and crash reports indicate the driver didn't yield right-of-away.
- #19 - Kelly Avenue/E 10th Street - A total of 6 crashes were reported at the intersection over the 5-year period. Of the 6 crashes, 4 resulted in an injury B or C, and 2 resulted in property damage only. Four of the crashes were reported as angle and reported crash cause indicates "the driver passed the stop sign."
- #22 - Dry Hollow Road/E 10th Street - A total of 6 crashes were reported at the intersection over the 5-year period. Of the 6 crashes, 2 resulted in an injury B or C, and 4 resulted in property damage only. Four of the crashes resulted in angle collisions, and crash reports indicate the driver didn't yield right-of-away.

Opportunities to improve traffic operations and safety at these intersections, such as signing and striping, separate left- and right-turn lanes, signal timing and phasing, will be evaluated as part of the alternatives analysis and considered as part of the TSP.

Statewide Safety Priority Index System

The ODOT Statewide Priority Index System (SPIS) identifies sites along state highways where safety issues warrant further investigation. The SPIS is a method developed by ODOT for identifying hazardous locations on state highways through consideration of crash frequency, crash rate, and crash severity. There are no SPIS sites identified by ODOT within the top ten percent for 2014 (based on 2010-2013 crash data).

The ODOT All Roads Transportation Safety (ARTS) program has programmed three improvement projects within the City of The Dalles, including:

- 6th Street at Hostetler Way
 - Systemic Sign Upgrades
- US 197 (The Dalles-California Hwy) at the I-84 ramps, US 30, and Fremont Street
 - Systemic Sign Upgrades
- US 197 (The Dalles-California Hwy) at Bret Clodfelter Way
 - Illumination,
 - Systemic Sign Upgrades,
 - Provide a raised Median

These planned ARTS projects will be funded through the 2017-2019 Statewide Transportation Improvement Program (STIP). Additionally, minor signage and striping improvements may be implemented at the following intersections as part of the ARTS transition project:

- 6th Street at Webber Street
- 6th Street at Cherry Heights Road
- 2nd Street at Webber Street

Special Considerations

Based on discussions with City staff, the following issues were identified that may be contributing to crashes:

- Skewed intersection geometry at E 10th Street/Thompson Street
- Skewed intersection geometry and multiple points of conflict at E 2nd Street/US 30

These locations will be evaluated to identify alternatives that may reduce the skew angle and provide intersection traffic control that is consistent with driver expectations.

Bicycle Level of Traffic Stress

The ODOT APM provides a methodology for evaluating bicycle facilities within urban and rural environments that quantifies the perceived safety issue of being in close proximity to vehicles. This methodology, Bicycle Level of Traffic Stress (LTS), is based on the premise that as much as 60 percent of the population of a given City is “interested, but concerned” about cycling as a mode of transportation. The Bicycle LTS methodology seeks to identify road segments and routes that could be improved to remove the “concern” and encourage more bicycling as a mode of transportation.

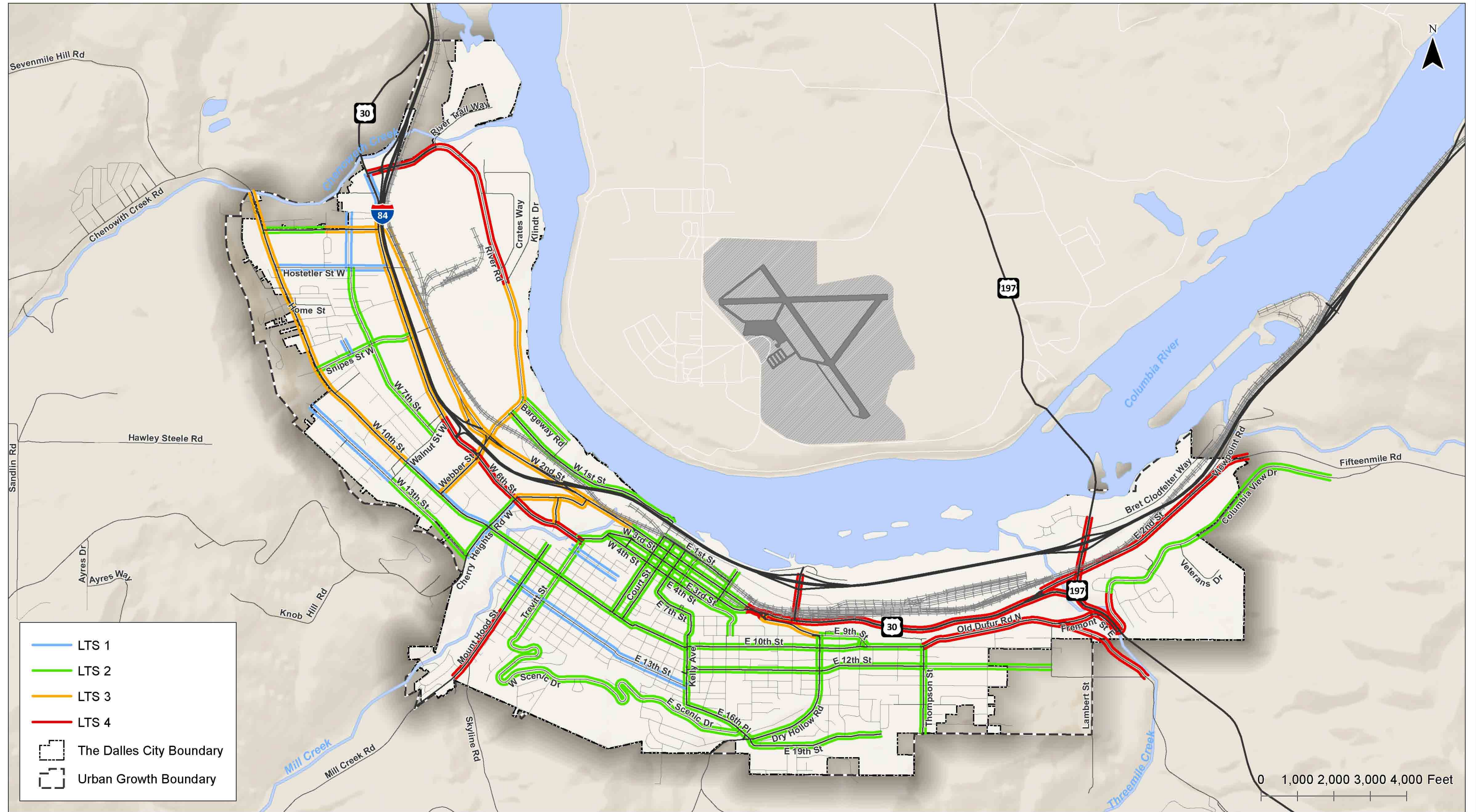
Existing Collector and Arterial streets were evaluated based on the Bicycle LTS methodology. As applied by ODOT, this methodology classifies four levels of traffic stress that a cyclist can experience on the roadway, ranging from LTS 1 (little traffic stress) to LTS 4 (high traffic stress). A road segment with a Bicycle LTS 1 rating generally has low traffic speeds and low volumes and is suitable for all cyclists, including children. A road segment with a Bicycle LTS 4 generally has high speeds, high volumes and is perceived as unsafe by most adults. Bicycle LTS 2 is considered appealing to a majority of the bike-riding population and therefore, is the desired target on most roadways.

Key characteristics that influence the bicycle LTS include:

- Number of lanes per direction
- Width of bike lane
- Separation between travel lane and bike lane (i.e., striped buffer zone or physical barrier such as on-street parking)
- On-street parking
- Posted or prevailing travel speed
- Intersection approach design of turn lanes
- Unsignalized intersection crossings

It is important to note the LTS of the whole segment is based on the worst LTS at any point along the segment because it is what will discourage ridership on the segment; therefore, LTS 3 or 4 segments may reflect the score of only a small portion of a given segment.

Figure 17 illustrates the results of the LTS analysis for The Dalles. Table 10 summarizes the segments with LTS 3 and 4 and provides a brief summary of the primary characteristics that informed the ratings.



- LTS 1
- LTS 2
- LTS 3
- LTS 4
- The Dalles City Boundary
- Urban Growth Boundary

0 1,000 2,000 3,000 4,000 Feet

**Existing Bicycle Level of Traffic Stress
Arterial and Collector Streets
The Dalles, Oregon**

Figure
17

H:\projects\16495 - The Dalles TSP\fig17_Existing Bicycle Level of Traffic Stress, Arterial and Collector Streets.mxd - Jommerville - 2:21 PM 11/12/2015



Table 10: Segments with Bicycle LTS 3 or 4 Rating

Roadway	LTS Rating	Segment Start-End	Posted Speed (mph)	Presence of Bike Lane
Brewery Overpass Road	4	I-84 WB Ramp to E 2nd Street/US 30	40	Yes
E 2nd Street	4	Brewery Overpass to 700 feet East	30	None
	4	Taylor Street to Brewery Overpass Road	40	None
US 30	4	700 feet East of Brewery Overpass to US 197	40	None
US 197	4	Lone Pine Drive to Fremont Street	45	None
River Road*	4	I-84 to Klindt Drive	40	Yes
	3	Klindt Drive to Bargeway Road	40	Yes
W 6th Street	3	Irvin St to Walnut Street	40	Yes
	4	Walnut Street to W 3rd Place/Trevitt Street	40	Yes
Mount Hood Street	4	Mill Creek Road to 16th Street	35	None**
Dry Hollow Road	4	E 16th Street to E 14th Street	35	Yes
Old Dufur Road	4	Thompson Street to Fremont Street	35	None
Fremont Street E	4	Old Dufur Road to US 197	35	None
W 2nd Street	3	Webber St to north end	30	None
Webber Street	3	Bargeway to 10 th Street	30	>7 ft
Cherry Heights Road	3	US 30 to 6th Street	30	Yes
Mountain Hood	3	Entire Roadway	30	Yes
W 6 th Street	3	Webber St to Lincoln Street	35	Yes
Brewery Grade	3	US 30 to 9th Street	30	None
Chenowith Loop Road	3	6th Street to 7 th Street	25	<5 ft

* The Riverfront Trail could serve as a parallel route

** Pavement width exists, but no bike lane striping is provided

The majority of segments with LTS 3 or 4 have a paved shoulder; however, according to the Bicycle LTS methodology, the bike lane widths are too narrow relative to the posted speeds. The Bicycle LTS methodology indicates that for these segments to be rated LTS 2 or 3 one of the following must occur:

- Provide a 7-foot wide buffered bike lane to give bicyclists a buffer distance between the bike lane and adjacent travel lane,
- Reduce the posted speed limits to 30 miles per hour (mph) or less,
- Provide a paved bike lane where one does not exist today, and/or
- Improve intersection approach design of turn lanes to reduce difficulty for a bicyclist to traverse the intersection without having to change multiple lanes on the approach.

Enhanced facilities, such as separated multi-use paths, may also be considered in some areas where traffic volumes and/or travel speeds are high. *Bicycle LTS analysis worksheets are included in Appendix K.*

Opportunities to improve the bicycle environment along the segments with an LTS 3 or 4, such as providing a buffered bike lane along roadways with posted speeds of 35 mph or higher, will be evaluated as part of the alternatives analysis and considered as part of the TSP update.

SUMMARY OF FINDINGS AND NEXT STEPS

The information provided in this memorandum summarizes the existing transportation facilities provided in The Dalles in terms of characteristics, connections, and function. Based on the information summarized above, we have identified the following opportunities that are expected to help The Dalles progress toward their transportation goals (outlined in Technical Memorandum #2).

Lands and Population Inventory

- Vacant land is available within the Port of The Dalles and the Columbia Gorge Industrial Park.
- Natural resources (floodplains and wetlands) and geologic hazards will influence where growth can occur.
- The Dalles experienced 34.2 percent growth from 1980 to 2015. Historic population growth will inform future population forecasts, which will be integrated with projected employment to estimate future traffic volume.

Street Network Inventory

- *Roadway Ownership:* ODOT, Wasco County, and The City of The Dalles own and maintain the roadways within the study area. The state-owned roadways are intended to serve regional, statewide, and interstate trips. The local roadways should provide off-highway connections for local trips (home-to-work, work-to-retail, retail-to-home, etc.)
- *Roadway Ownership:* All Wasco County roads within The Dalles City Limits are expected to be transferred to The City of The Dalles in 2016, increasing the number of miles of roadway maintained by the City.
- *Freight Routes:* I-84 and US 197 are the primary freight routes through The Dalles. US 197 restricts certain oversize and overweight loads. US 30 has high restrictions for freight and should not be considered for use as a detour route for any trucks.
- *On-street Parking:* The City has on-street parking in the downtown and on many residential streets. Downtown, the City has experimented with parklets, expanding the sidewalk into one or more on-street parking spaces to create people-oriented places.
- *Pavement:* Based on the most recent survey data, many miles of roadway in The Dalles are in need of pavement rehabilitation. City and ODOT maintenance schedules will be reviewed and new pavement preservation projects will be included in the alternatives analysis element of the TSP.
- *Pavement:* Several miles of pavement on I-84 were identified in “poor” condition in the 2014 inventory. In 2015, ODOT repaved 3.8 miles of Interstate 84 from MP 84.3 (near the Union Pacific railroad overcrossing) to MP 88.1 (Fifteenmile Creek Bridge), to improve a section of pavement. The 2015-2018 Statewide Transportation Improvement Program

(STIP) includes a project scheduled for 2016 to provide pavement overlay and median barrier replacement from MP 70.46 to 84.31.

- *Pedestrian Facilities:* Generally, sidewalks are provided on both sides of streets throughout The Dalles Historic Downtown and the residential areas south of downtown. Areas to the northwest of Webber Street (south of I-84) and areas east of Thompson Street are in greatest need of pedestrian facilities.
- *Pedestrian Facilities:* Given it is one of a few east-west arterials in The Dalles, pedestrian improvements to 10th Street may be prioritized to provide an east-west pedestrian route.
- *Bicycle Facilities:* Bicycle facilities in The Dalles include neighborhood streets where bicycles and vehicles can share the road, arterials and collectors with five-foot bicycle lanes, and paved shoulders near the edges of the UGB.
- *Shared-Use Paths:* The majority of The Dalles Riverfront Trail is completed, but a workgroup is tasked with identifying options to complete two short missing segments. Additional shared-use paths along Chenoweth Creek and Mill Creek, were identified in the 2006 TSP, but have not been completed.
- *Transit:* A new transit center is currently under construction on West 7th Street, near Chenoweth Loop Road. The transit center is expected to be complete in 2016, with park-and-ride space and bus service provided by Columbia Area Transit, MCOG's Link, and possibly Greyhound.
- *Bridges:* W 6th Street Bridge over Mill Creek is open with weight restrictions. The bridge inspection report notes that there is "very heavy truck traffic on this bridge and there is a need for additional load posting signs outside of this bridge to limit heavy trucks at this location."
- *Bridges:* The US 30 (Hwy 100) Bridge over Chenoweth Creek and the US 197 Bridge over the Columbia River have sufficiency ratings below 50, indicating a functional or structural issue.
- *Rail:* Concerns associated with specific vehicular movements have been identified at two rail crossings (Union Street and Madison Street). Options to improve the crossings as a proactive means to avoid conflicts will be considered.
- *Environmental Justice:* Compared to the whole state of Oregon, The Dalles has a greater portion of people who are 65 or older (19%), 17 or younger (25%), or who are considered to be in poverty (43%).
- *Environmental Justice:* The TSP will be take into account the areas in The Dalles with the highest proportion of minority groups, populations under 17 or over 64 years of age, low-income households, low-English proficiency households, and people with disabilities. The public involvement efforts will attempt to obtain input from these populations and alternatives developed as part of the TSP will attempt to minimize adverse impacts and maximize positive impacts to these populations.

Existing Transportation System Operations

- *Intersection Operations:* All of the study intersections currently operate acceptably, satisfying applicable performance thresholds.
- *Intersection Operations:* The US 197/I-84 EB Ramp intersection currently operates at a LOS “E”, but satisfies applicable ODOT v/c targets during the weekday p.m. peak hour. The intersection has a v/c ratio of 0.79 and is approaching the 0.80 v/c target during the weekday PM peak hour.
- *Intersection Operations:* While it does not exceed that City’s LOS standard, the northbound approach at the Thompson Street/E 10th Street/Old Dufur Rd intersection has a volume-to-capacity ratio of 0.81. This represents a condition where the northbound approach delay is likely to vary significantly and may exceed LOS D delay thresholds during portions of a typical day.
- *Intersection Operations:* Two other intersections, I-84 EB Ramps/W 6th Street and US 197/Lone Pine Lane operate at LOS D under existing conditions, indicating that as volumes grow they will likely exceed the City’s performance thresholds.
- *Intersection Operations:* One or more movements at all of the signalized study intersections have potential for queues to extend into the adjacent through lane and block traffic. Improvements to address the queue storage will take into account future forecast volumes and other intersection operational improvements.
- *Safety:* Several intersections have a greater proportion of angle and left-turn crashes than rear-end crashes, which can indicate an opportunity to reduce injury or fatal crashes by implementing engineering countermeasures. Countermeasures could include improving sight distance, modifying traffic control, or restricting turn movements.
- *Safety:* The crash rates at two intersections (US 197/US 30 and US 197/Fremont St/ Columbia View Drive) exceed critical crash rate thresholds. Crash patterns at these intersections have been evaluated and additional evaluation will be conducted to identify potential countermeasures. Both intersections are unsignalized and, have high-speed approaches (relative to other intersections in The Dalles).
- *Safety:* Three study intersections exceed the statewide 90th percentile crash rates for similar types of intersections. Countermeasures will be evaluated as part of the alternatives analysis element of the TSP.
- *Safety:* ODOT has programmed systemic safety improvement projects within the 2017-2019 STIP at:
 - 6th Street/Hostetler Way and
 - US 197 at Bret Clodfelter Way, I-84 ramps, US 30, and Fremont Street.

- **Safety:** The following locations have unique geometry and/or traffic control that may be contributing to crashes:
 - Skewed intersection geometry at E 10th Street/Thompson Street
 - Skewed intersection geometry and multiple points of conflict at E 2nd Street/US 30
 - E 16th Place and Dry Hollow Road

NEXT STEPS

Alternatives to address the existing conditions transportation needs identified in this memorandum will be documented in Technical Memorandum #5. The project Advisory Committees will have an opportunity to review the alternatives memorandum in January and February 2016.

APPENDICES

- Appendix A Methodology Memo**
- Appendix B Inventory of City Roadways**
- Appendix C ODOT Bridge Inventory**
- Appendix D Environmental Justice Maps and Tables**
- Appendix E Traffic Counts**
- Appendix F Existing Traffic Conditions Worksheets**
- Appendix G Queuing Worksheets**
- Appendix H Freeway Operations Summary and Worksheets**
- Appendix I Reported Crashes by Study Intersection**
- Appendix J ODOT Critical Crash Rate Calculator Worksheets**
- Appendix K Bicycle Level of Traffic Stress Worksheets**