Memorandum

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To: City of Tualatin Project Team

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Subject: Transportation System Plan Update: Existing Conditions Inventory Technical Memorandum

Introduction

The City of Tualatin is updating its Transportation System Plan (TSP), through a process that will establish a shared understanding of how the transportation system operates today, identify needed improvements, and create a vision for enhancing community mobility in Tualatin.

To achieve the first goal of establishing a shared understanding of how the transportation system operates, document existing transportation infrastructure, and identify current infrastructure gaps or deficiencies in the transportation system, the TSP update began with development of an Existing Conditions Report.

This memorandum is intended to support the Existing Conditions Report and includes additional documentation of transportation assets in Tualatin, an overview of the methodology used to complete traffic operations and safety analysis, and a summary of existing deficiencies identified through the existing conditions inventory.

Consistent with the Existing Conditions Report, this technical memorandum provides additional information for the following topic areas:

- Demographics in Tualatin
- The existing transportation system in Tualatin, including the roadway network, transit service, pedestrian, and bicycle facilities
- Identification of basic facilities and operations for truck freight, rail, and marine transportation modes serving Tualatin
- An overview of pipeline resources that should be considered in the identification and evaluation of transportation solutions

- Base year transportation conditions, including traffic operations on key corridors, a summary of collision patterns, and pedestrian, bicycle, and truck traffic on the roadways

Tualatin Demographics

Demographic information plays a crucial role in shaping an effective transportation system by providing essential insights into the characteristics and behaviors of a population. Understanding demographic data, such as population density, age distribution, income levels, and employment patterns, will allow the project team to evaluate potential solutions with an eye towards equity and ultimately recommend transportation infrastructure improvements that meet the diverse needs of different groups within a community. This information also helped to inform the development of an inclusive public engagement plan and will be used to evaluate how effective efforts to engage historically underrepresented groups in the planning process are.

As shown in **Table 1**, there are several key demographics where Tualatin differs from the Metro region overall. Those demographic areas are shown in bold text in the table below.

Table 1. Current City and Regional Demographics

	Tualatin		Metro Region	
Race and Language				
Total Population	27,821		2,493,429	
Non-White	7,552	27%	469,429	19%
Hispanic or Latino	5,986	22%	326,336	13%
Speak a Language Other than English	5,926	22%	431,434	18%
Age				
Under Age 18	6,537	23%	410,824	16%
65 and Over	3,522	13%	294,303	12%
Other Demographics				
Income Below Poverty Level (in last 12 months)	2,811	10%	247,359	10%
Disability	2,387	9%	236,085	9%
No Vehicle Available	526	5%	80,387	8%
Housing				
Total Housing Units	11,171		1,033,420	
Occupied Housing Units	10,835	97%	979,213	95%

Table 1. Current City and Regional Demographics

	Tualatin		Metro Region	
Vacant Housing Units	336	3%	54,207	5%
Total Households	10,737		1,001,094	
Owner-Occupied Households	5,851	**55%**	620,678	62%
Renter-Occupied Households	4,886	**45%**	380,416	38%

Notes:
The Metro Region is comprised of the Portland-Vancouver-Hillsboro, OR-WA Metro Area.
Bold text indicates a greater than 5% variance from the Metro Region.

Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates

Existing System Inventory

Roadway Network

The roadway network serves as the backbone of Tualatin's multi-modal transportation system. These facilities must accommodate many travel modes within their rights of way and users' experience are shaped not only by the roadway design itself but also by the surrounding land use. The following section documents the current state of the network for each mode of travel.

Lane Width

Travel lane width, or how wide the striped lanes on a roadway are, is a key characteristic for roadways. Roads that are designed to serve larger vehicles such as trucks carrying freight or buses, often have wider lanes. As more narrow lanes can help to lower vehicle speeds, roadways with on-street bicycle lanes may have narrower lanes to improve safety and comfort for those users or to take advantage of the limited right-of-way available. Within Tualatin, most arterials and collectors have lane widths between 10 and 12.5 feet.

Roadway Design Standards

In Tualatin, street design standards are based on the functional and operational characteristics of streets including travel volume, capacity, operating speed, and safety. This section summarizes design standards that apply to transportation facilities in Tualatin. **Table 2** summarizes design standards for roadway cross-section elements, which are included in Chapter 74 of the City of Tualatin's Development Code. **Table 3** summarizes Metro's roadway design guidance from the 2018 Regional Transportation Plan (RTP). This guidance applies to roadways that fall under Metro's Regional Motor Vehicle Network (RMVN).

Table 2. Roadway Design Standards, Tualatin's Development Code

Roadway Element	Design Characteristic
Minimum and preferred vehicle lane widths	• Major arterial: 12 feet minimum, 12 feet preferred • Minor arterial: 12 feet, 12 feet preferred • Major collector: 11 feet minimum, 12 feet preferred • Minor collector: 11 feet minimum, 12 feet preferred • Local: 14 feet minimum, 16 feet preferred • With multi-use path: 12 feet minimum, 12 feet preferred
Minimum and preferred number of lanes	• Major arterial: 3 lanes minimum, 5 lanes preferred • Minor arterial: 2 lanes minimum, 3 lanes preferred • Major collector: 2 lanes minimum, 3 lanes preferred • Minor collector: 2 lanes minimum, 2 lanes preferred • Local: 2 lanes minimum, 2 lanes preferred • With multi-use path: 2 lanes minimum, 3 lanes preferred
Minimum and preferred sidewalk widths	• Major arterial: 5 feet minimum, 6 feet preferred • Minor arterial: 5 feet minimum, 6 feet preferred • Major collector: 5 feet minimum, 6 feet preferred • Minor collector: 5 feet minimum, 6 feet preferred • Local: 5 feet minimum, 5 feet preferred
Minimum and preferred on-street parking widths	• Minor collector: 8 feet minimum, 8 feet preferred • With multi-use path: 8 feet minimum, none preferred
Minimum and preferred bicycle lane widths	• Major arterial: 5 feet minimum, 6 feet preferred • Minor arterial: 5 feet minimum, 6 feet preferred • Major collector: 5 feet minimum, 6 feet preferred • Minor collector: 5 feet minimum, 6 feet preferred

Table 3. Roadway Design Suggested Guidance, 2018 Regional Transportation Plan

Roadway Element	Design Standard
Maximum number of travel lanes	• Freeway: No maximum • Throughway: 6 lanes • Major Arterial: 4 lanes • Minor Arterial: 4 lanes
Median requirements	• Appropriate for roadways with 4 or more lanes
Street corner radii	• Tight Corner Radii (5 to 15 feet): preferred on regional and community boulevards • Wide Corner Radii (greater than 15 feet): preferred on highways and industrial streets

Table 3. Roadway Design Suggested Guidance, 2018 Regional Transportation Plan

Roadway Element	Design Standard
Preferred lane widths	• Freeway: 12 feet • Highway: 12 feet • Regional Boulevard: 10 feet • Community Boulevard: 10 feet • Regional Street: 10 to 11 feet • Community Street: 10 to 11 feet • Industrial Street: 11 to 12 feet

Access Management

The Oregon Transportation Planning Rule (TPR) defines "Access Management" as "...measures regulating access to streets, roads and highways from public roads and private driveways." A requirement of the TPR is that new connections to both arterials and state highways must follow designated access management categories. Typically, existing accesses can remain as long as the land use does not change.

In Tualatin, access management standards for driveways are based on use. In general, as the number of units or parking spaces increases, the number of and approach width for driveways increases. **Table 4** shows the City of Tualatin's access for driveway standards from Chapter 75.040 of the Tualatin Development Code.

Table 4. City of Tualatin Driveway Standards

Land Use Classification	Minimum Driveway Approach Width	Maximum Driveway Approach Width
Single-Family Residential, Duplexes, Triplexes, Quadplexes, Townhomes, Cottage Clusters	10 feet	26 feet for one or two car garages 37 feet for three or more car garages

Table 4. City of Tualatin Driveway Standards

Land Use Classification	Minimum Driveway Approach Width	Maximum Driveway Approach Width
Multi-family	5-49 Units = 24 feet 50-499 = 32 feet Over 500 = as required by the City Manager	May provide two 16 foot one-way driveways instead of one 24-foot driveway May provide two 24-foot one-way driveways instead of one 32-foot driveway
Commercial	1-99 Parking Spaces = 32 feet 100-249 Parking Spaces = two approaches each 32 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
Industrial	36 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
Institutional	1-99 Parking Spaces = 32 feet 100-249 Parking Spaces = two approaches each 32 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet

Washington County has access standards which are established in the Washington County Community Development Code, in Section 501-8.5(A) entitled "Roadway Access." Projects being considered on County facilities will need to refer to these standards.

The Oregon Highway Plan (OHP) includes access management spacing standards for highways owned and operated by the Oregon Department of Transportation (ODOT). The access management spacing standards were amended in 2005. Interstate 5 (I-5), I-205, Highway 99W and freeway interchange areas are under ODOT management and must follow OHP standards. The OHP access management spacing standards as applied to I-5 and I-205 are shown in **Table 5**.

Table 5. OHP Access Spacing Standards

Roadway	Speed Limit	Spacing Standard
Freeway interchanges	30 mph	250 feet
I-5	55 mph or higher	1320 feet
I-205	55 mph or higher	1320 feet

Spacing for Connectivity

While access management standards establish minimum distances between intersections to maintain safe and efficient operations, this must be balanced with the need for a connected street network. The Metro RTP identifies connectivity as a system of major arterials spaced no more than one mile apart and minor arterials or collectors spaced no more than a half-mile apart. While these guidelines were established to encourage efficient mobility through the City, they also acknowledge that the realities of natural barriers (e.g., waterways and topography), major infrastructure (e.g., highways), and the built environment (e.g., established neighborhoods) may not make it possible to always meet these connectivity goals. The presence of I-5 serves as a major connectivity barrier in Tualatin. The interchanges are spaced about one mile apart (in Northern Tualatin; three miles apart in Southern Tualatin) and are among very few ways to cross the highway on foot or in a vehicle.

Parking

There is significant off-street parking for many of the retail uses throughout Tualatin, specifically in the Bridgeport Village area and many of the retail areas along Tualatin-Sherwood Road and Nyberg Street. There are also several City-owned parking lots in the Downtown area near the Tualatin Commons and the Library.

On-street parking is typically not allowed along major roadways (Arterials and Major Collectors) in Tualatin but is often allowed on Local Streets and Minor Collectors in neighborhoods and in retail areas.

Transit System

The location of transit routes that service Tualatin are shown on **Figure 19** in the Existing Conditions report. Frequency and hours of operation for each route are shown in **Table 6**.

Table 6. Transit Routes

Route	Service Type	Agency	Origin	Destination	Frequency	Service Span	Days	Fare
Shuttle (Red)	Local	Ride Connection	South Tualatin		50 minutes	5:15 – 8:45 AM / 3:30 – 7:45 PM	Monday – Friday	Fare-free
Shuttle (Green)	Local	Ride Connection	Tualatin P&R	Rolling Hills Church	1 hour	5 – 9:30 AM / 12:15 - 7:15 PM	Monday – Friday	Fare-free
Shuttle (Blue)	Local	Ride Connection	North Tualatin		45 minutes	5:40 - 10:00 AM / 3:00 - 7:00 PM	Monday – Friday	Fare-free
37	Regional	TriMet	Tualatin Park & Ride	Lake Oswego Transit Center	45 minutes during AM and 1 hour during PM	7:10 AM – 9:20 AM / 3:40 – 5:50 PM	Monday – Friday	$2.50
38	Regional	TriMet	Tualatin Park & Ride	Portland City Center	1 hour	6:45 AM – 10 AM / 3:30 – 7 PM	Monday – Friday	$2.50
76	Regional	TriMet	Beaverton Transit Center	Tualatin	15 minutes	6 A.M. to Midnight	Monday – Saturday	$2.50
96	Regional	TriMet	Commerce Circle	Portland City Center	1 hour, 30 minutes during AM & PM peak	5 A.M. to 9 P.M.	Monday – Friday	$2.50

Table 6. Transit Routes

Route	Service Type	Agency	Origin	Destination	Frequency	Service Span	Days	Fare
97	Regional	TriMet	Tualatin	Sherwood	1 hour during the AM / 1:10 during the PM	6:15 - 9:30 / 3:30 - 7	Monday – Friday	$2.50
2X	Regional	SMART	Wilsonville Transit Center	Tualatin Park & Ride	1 hour, 30 minutes during PM peak	5 A.M. to 9 P.M.	Monday – Saturday	Fare-free
Cascade	Regional	POINT	Eugene	Portland	Not standard	7 A.M. - 0:00 SB 8 A.M. - 9 P.M. NB	Monday – Saturday	$4
WES	Regional	TriMet	Wilsonville WES Station	Beaverton TC WES Station	45 minutes	5:30 AM – 8:45 AM 3:30 PM – 7 PM	Monday - Friday	$2.50

Park & Ride

Tualatin offers four Park & Ride locations, three of which are served by transit six days per week, as shown in **Table 7**.

Table 7. Park & Ride Locations in Tualatin

Lot Name	Address	Parking Spaces	Bike Racks	Transit Connections	Days
Mohawk	SW Mohawk St & Martinazzi Ave, Tualatin, 97062	232	Yes	96 - 76	Monday-Saturday
Tualatin	SW 72nd Avenue & Bridgeport Road, Tualatin 97062	368	Yes	36 - 37 - 38 - 76 - 96 - 2X - Point	Monday-Saturday
Tualatin South	18955 SW Boones Ferry Rd, Tualatin 97062	147	Yes	WES - 76 - 97 - Tualatin Shuttle	Monday-Saturday
Boones Ferry Community Church of Christ	20500 SW Boones Ferry Rd, Tualatin, 97062	20	No	96	Monday-Friday

Pedestrian System and Bicycle System

This section provides an overview of the existing City of Tualatin pedestrian and bicycle networks to inform transportation planning and development strategies that promote sustainable modes of transportation. The overview includes information on the current state of the pedestrian and bicycle network, including where infrastructure exists, where it is and is not comfortable to walk and bike, and locations of collisions. These existing conditions details will be used to identify gaps in the network and areas where improvements are needed.

Existing Pedestrian Network and Inventory

In Tualatin, sidewalks and trails play an important role in the pedestrian network. In many parts of Tualatin, trails help to connect residential areas to parks and greenspaces in places where there are no roads or sidewalks. Trails also augment the sidewalk network and bridge barriers presented by large roadways, as in the case of the recently completed link of the Tualatin River Greenway under I-5.

Figure 20 in the Existing Conditions report shows all sidewalks and trails in Tualatin, as well as the streets where sidewalks are missing on one or both sides. The condition of sidewalks is shown in **Figure 21**. Documenting all walkable facilities helps identify where gaps remain in the pedestrian network and establishes a baseline for future planning efforts. (Note: The Existing Pedestrian Network map, included in the Existing Conditions Report reflects facilities as of November 2023 based on data provided by Metro and the City of Tualatin and the latest information about the City's capital projects.)

As part of the existing conditions inventory, the consultant team prepared a detailed Pedestrian System Inventory, incorporating details on facility types and road characteristics consistent with state standards (OAR Chapter 660 Division 12) and the requirements of the Climate-Friendly and Equitable Communities (CFEC) Program. These data are compiled in a GIS database and corresponding table containing detailed inventories of crosswalks, curb ramps, and sidewalks across the City. They contain information on the width and condition of sidewalks, crosswalk types, and curb ramp locations. Note that speed, volume, and road width data are the same as is detailed in the bicycle system inventory. Another important component of the pedestrian network is the spacing between crossings which is inventoried in **Figure 22**.

The pedestrian network of sidewalks and trails that provide routes for people to walk to their destinations is also reliant on infrastructure at intersections. **Figure 21** illustrates aspects of intersections and street crossings, such as signalized crosswalks and refuge islands, and rapid flashing beacons that have been installed to help people cross busy streets.

Sidewalk Conditions, Crosswalk Types, and Curb Ramp Inventory

Figure 21 shows the varying quality and condition of sidewalks across Tualatin. Vertical deflections, cracks, and obstructions all contribute to the quality of the sidewalk. This information is not only important for planners to understand where maintenance needs are, but also to locate areas that may be inaccessible for people who use mobility devices.

The sidewalk conditions map reflects facilities as of 2017 based on data provided by Metro and the City of Tualatin. Note that several sidewalks have been built since condition data has been collected. They are shown in the pedestrian network map (Figure 20).

For Further Study and Consideration

Understanding where sidewalk conditions are insufficient and where safe crossings are located is critical for creating a more accessible transportation system for vulnerable communities. As the project moves forward we will be considering places where access to walking and biking opportunities is hindered by difficulty crossing major roadways.

Distance Between Marked Pedestrian Crossings

In addition to street crossing inventories, OAR rules mandate that Pedestrian System Inventories must also include the spacing between crossings. **Figure 22** illustrates the distance between marked crosswalks that cross arterial and major collector streets in Tualatin.

Multi-lane roadways can be difficult to cross, so every improved crossing helps to make the sidewalk and trail network more accessible for people walking. To create this map, residential streets and interstates were removed to leave arterials and collectors. Then, road segments with the same name were combined into single features, and divided into segments that correspond to the distances between crosswalks.

For Further Study and Consideration

The crossing spacing analysis shows the potential gaps between existing crossings and highlights priority locations for additional crossings. Thus, it will be important to understand how these crossing locations relate to places where people frequently need to cross the street, including transit stops, parks, neighborhoods, and schools.

Pedestrian Level of Traffic Stress (PLTS)

The purpose of the PLTS analysis, shown in **Figure 23,** is to classify streets in Tualatin based on how comfortable they are for walking. The analysis highlights the overall comfort of different segments of the pedestrian network and is required for Transportation System Plans in Oregon[1]. The results offer greater insight into the pedestrian experience than simply whether or not a sidewalk is present. The scores show the elements that may be missing from a street that could make pedestrians feel more comfortable, such as greater separation from traffic, wider sidewalks, smoother sidewalks, crosswalk and refuge availability, and other factors.

The analysis scores streets on a scale from 1 to 4, from most comfortable to least comfortable. In summary, the scores indicate the following conditions:

- PLTS 1- Due to the presence of sidewalks that are not adjacent to high volumes of traffic, people walking feel little to no traffic stress, requiring most people to pay little attention to the traffic situation around them.
- PLTS 2 – People feel some traffic stress; walking along this street requires more attention to the traffic situation than that of which young children may be capable. This would be suitable for children over 10, teens, and adults.
- PLTS 3 - People feel moderate stress; the facility is suitable for adults.
- PLTS 4 - People feel high traffic stress. Only able-bodied adults with limited route choices would typically use this facility.

It is important to note that roadways can score poorly even when they include a sidewalk. For example, if the sidewalk is narrow, cracked, adjacent to multi-lane roadway, it is rated as a higher PLTS. Additionally, if a road scores poorly for one criterion but better on another, the resulting score is the lowest among both – so the PLTS results reflect the worst measure, not an average of all measures. If a street has a nice sidewalk on one side, but no sidewalk on the other, it is automatically scored as a PLTS 4, reflecting the experience for pedestrians on the missing side.

For Further Study and Consideration

Understanding what factors (e.g., vehicle speed, landscape buffer, etc.) contribute to each street's PLTS score is critical to identifying future improvements that would lower the level of traffic stress for pedestrians and thereby encourage increased levels of walking for transportation. Identifying patterns among the scores will help the City use design standards to systematically improve the pedestrian experience.

Bicycle System Inventory

In accordance with the requirements of the CFEC Program and consistent with state standards (OAR Chapter 660 Division 12), the consultant team compiled a bicycle system inventory in GIS that documents facility types and road characteristics of the existing bicycle system. The dataset and corresponding table include information on the width, type, and condition of various bicycle facilities, as well as speed, volume, separation, and road width data.

Existing Bicycle Network

The bicycle facility inventory, illustrated in **Figure 24**, shows all of the designated on-street and off-street bicycle facilities in Tualatin. In Tualatin, bike facilities include striped bike lanes, striped buffered bike lanes, low-traffic-volume streets, and off-street trails and paths. Each of these facilities offers a different level of separation from traffic and are therefore more or less comfortable for riders of varying confidence and ability.

In Tualatin, low-traffic-volume streets (shown in gray) are streets where people must bike in mixed traffic and are mostly located on residential streets.

Bike lanes (shown in light blue) are found on most collectors and arterials in the city and are usually about six feet wide and defined by a wide painted stripe and bike symbol. Buffered bike lanes (shown in dark blue) increase the amount of separation between the bike lane and vehicle traffic, typically with a second painted line as a way to further delineate the space for people biking. Finally, off-street trails offer the highest level of separation from vehicle traffic. There are not currently any physically protected bike lanes in Tualatin.

Accounting for the location of all bike facilities helps identify where gaps remain in the bicycle network and establishes a baseline for future bikeway planning. This map reflects facilities as of November 2023 based on data provided by Metro and the City of Tualatin and latest information about the City's capital projects.

For Further Study and Consideration

As the city plans for additional bikeways that are accessible for riders of all ages and abilities, it will be important to understand how trails relate to enhanced crossings of major streets. It will also be important to consider how low-traffic-volume streets could be enhanced for bicyclists, such as designating key routes as bicycle boulevards or neighborhood greenways.

Bicycle Level of Traffic Stress (BLTS)

Figure 25 and the BLTS analysis classifies streets in Tualatin based on how comfortable they are to travel by bicycle. The analysis is a tool for examining the overall comfort of the bicycle network and is required for Transportation System Plans in Oregon[2]. The results offer insight into the experience of biking in the city, rather than simply whether or not a street has a bike lane. The scores identify elements, such as greater separation from traffic, lower speeds, and turn box availability, that may be missing from a street that would make biking feel more comfortable.

The analysis scores streets on a scale from 1 to 4, from most comfortable to least comfortable. In summary, the scores indicate the following conditions:

- LTS 1- Due to the separation of people biking from moving cars and trucks, this score represents little traffic stress. Since traveling by bike requires the rider to pay little attention to traffic, it is suitable for use by people of all ages and abilities.
- LTS 2 - People feel some traffic stress. Biking on the street requires more attention to traffic conditions than young children would be expected to deal with, so is suitable for teens and adults with adequate bike handling skills.
- LTS 3 - People feel moderate stress when biking because they need to pay attention to and interact with surrounding traffic. Suitable for most adults with experience biking.
- LTS 4 – Most people feel high levels of stress due to the proximity to and interactions with traffic. Only suitable for skilled adults with experience biking.

If a segment scores poorly for one criterion but better on another, the resulting score is the lowest among both - so the BLTS results reflect the worst measure, not an average of all measures.

For Further Study and Consideration

Understanding how the bike network interfaces with the BLTS scores provides insight into the improvements necessary for increasing levels of biking for transportation.

For Tualatin, a recurring theme is that left turn lanes often cause a roadway to score lower than it would otherwise. However, after discussions with the project team, this criteria table was omitted from the analysis due to widespread inflation of scores. Still, the issue of left turns remains, and ODOT recommends that left turn lane LTS scores can be improved to LTS 1 by providing two-stage left turns with regular and left-turn queue bike boxes. Identifying locations where cyclists are likely to make left turns to continue onto the bike network would help prioritize locations for bike turn boxes and would lower the LTS score for the roadway.

Recognizing that many destinations are located and surrounded by high-stress roadways, including Boones Ferry Road, Tualatin Sherwood Road, and SW Nyberg Street, underscores the importance of reviewing these locations for opportunities to improve facilities and establish low-stress routes. This proactive approach is essential to ensure the safety and well-being of the community.

Truck Freight

The freight network in Tualatin is comprised of local freight routes and state and federal truck routes, as highlighted in **Figure 27** in the Existing Conditions document. I-5 is part of the National Highway Freight Network Critical Urban Corridors. I-5 can have freight bottlenecks, within the Portland Metro, that affect Tualatin.

Marine

Many companies in Tualatin produce goods that are transported by ship, or receive goods transported by ship. The viability of marine transport (shipping) to and from the Portland area affects businesses in Tualatin. The closest major marine ports are the Port of Portland and Port of Vancouver, both approximately 22 miles north of Tualatin.

Within Tualatin, marine travel is limited to the Tualatin River which has recreational boat ramps and launch platforms at the following parks:

- Jurgens Park
- Tualatin Community Park
- Browns Ferry Park

Rail

There are two rail lines in Tualatin, as seen in **Table 8**. Rail in Tualatin is important to businesses and the regional economy as it transports people and goods. However, rail can potentially cause congestion and extended blockages of crossings on the city's roadways and create safety concerns at crossings, all of which should be considered as future projects are developed in areas where rail is present.

Table 8. Rail Lines in Tualatin

Route	Direction	Type of Service	Owners	Classification
Westside Express Service Commuter (WES)	North – South	Transit, Freight	TriMet	I
Portland & Western (PNWR)	Northeast – Southwest	Freight	PNWR	II

1.

Pipeline

There is a natural gas pipeline, operated by Northwest Natural Gas Company, that runs north to south from Bridgeport Village through Lower Boones Ferry Road and then through Service Road OR 141. The pipeline has terminals in Durham, Oregon, and Wilsonville, Oregon.

Operations and Safety

The following section discusses the traffic operations on the existing network. The analysis evaluates the demand for the network for vehicles and how well the existing system serves the residents of Tualatin.

Existing Traffic Conditions

The evaluation of existing traffic conditions focuses on daily volumes along key corridors in Tualatin, along with afternoon peak-hour operations at 21 intersections in the City.

Intersection Operations

One way to quantify delay experienced by drivers is through intersection operations analysis. As part of the existing conditions inventory, 21 key intersections in Tualatin were evaluated during the evening commute hour to identify locations where congestion occurs on the existing transportation system during peak travel hours.

Level of Service and Delay

Level of Service (LOS) is a standard method for characterizing delay at an intersection. For signalized and all-way stop controlled (AWSC) intersections, the LOS is based on the average delay for all approaches. For two-way stop controlled (TWSC) intersections, the movement with the highest delay is used.

Table 9 summarizes the LOS and delay thresholds specified in the 6th Edition Highway Capacity Manual (HCM), which is a standard methodology for measuring intersection performance.

Table 9. Level of Service Definitions

Level of Service	Description	Signalized Intersection Delay (seconds/vehicle)	Unsignalized Intersection Delay (seconds/vehicle)
A	Free-flowing Conditions	≤ 10	0-10
B	Stable Flow (slight delays)	>10-20	>10-15
C	Stable Flow (acceptable delays)	>20-35	>15-25
D	Approaching Unstable Flow (tolerable delay)	>35-55	>25-35
E	Unstable Flow (intolerable delay)	>55-80	>35-50
F	Forced Flow (congested and queues fail to clear)	>80	>50

Source: 6th Edition Highway Capacity Manual, 2016

For most of the study intersections, traffic operations were analyzed using Synchro 11 software. For a few locations, described in more detail below, SimTraffic was used to better reflect congested conditions known to occur. The Synchro network reflects the existing roadway network including intersection geometry, signal timing, and vehicle and pedestrian/bicycle volumes.

The City has set LOS standards of D and E for signalized and unsignalized intersections respectively in Tualatin, as seen in TDC 74.440(3)(e).

Delay

Delay is a direct calculation of the wait time in seconds experienced by motorized vehicles at the intersections. Delay can be calculated for each vehicle, by approach or by intersection. The delay includes the queue delay and the control delay. Queue delay is experienced by vehicles waiting in traffic before getting through the intersection. Control delay is the wait time of vehicles at the intersections exerted by the signalized intersections alone.

Simtraffic Calibration

As described above, isolated intersection analysis using the Synchro software resulted in LOS/delay results that were found to match field observations and known congestion levels at most of the intersections. For two intersections, SW Boones Ferry Road & SW Tualatin-Sherwood Road and SW Boones Ferry Road & SW Martinazzi Avenue, a more detailed operational analysis was required to better reflect existing conditions. For these intersections, microsimulation using the SimTraffic software was used to better reflect the impact on operations of spillback between intersections and closely spaced intersections.

The Simtraffic network was calibrated using video from the traffic count collection data and data available from Washington County's INRIX portal. INRIX data, which uses vehicle data gathered from GPS devices, was used to confirm delay experienced by movement at these intersections, while video data was used to estimate the true vehicle demand for these intersections compared to the number of vehicles that could be served during the peak hour.

To calibrate the SimTraffic network to existing conditions, delay reported by SimTraffic was compared to the delay reported by INRIX for individual movements at each intersection. For movements where SimTraffic was found to report lower delay than the delay reported by INRIX and what was observed in the field, video data was referenced to understand how volume should be adjusted to account for demand not being served.

At the intersection of SW Boones Ferry Road & SW Tualatin-Sherwood Road, the southbound left-turn onto SW Tualatin-Sherwood Road was the primary movement where calibration was needed. Calibration of this movement included increasing volume on this movement by 20% to match demand for the movement. With this change, LOS for this movement was degraded to LOS F, which matches field observations and delay reported in INRIX. Other movements at this intersection that operate with high levels of delay include: the left-turn movements on the eastbound, westbound, and northbound approaches, and the northbound through movement. Queueing was also observed to occur on the northbound approach at this intersection and while not included in this analysis, interactions with the SW Tonka Street intersection, approximately 150 feet south of the intersection, also contribute to queueing at this location. Based on SimTraffic results, the intersection as a whole operates at LOS D during the PM peak hour. This was confirmed with INRIX data, which also reports LOS D for this intersection. This is a result of prioritizing operations for the eastbound and westbound through movements, which have the highest volume, and experience the lowest amount of delay.

The other intersection evaluated in SimTraffic was the SW Boones Ferry Road & SW Martinazzi Avenue intersection. When using SimTraffic, delay at this intersection was found to correlate to LOS D operations. As data available in INRIX indicates that this intersection generally operates at LOS C, no additional adjustments were made at this intersection. The movement found to operate with the highest delay both in SimTraffic and based on data reported by INRIX is the southbound left-turn.

Summary of Existing Deficiencies

As shown in **Table 10**, there is one study intersection with an LOS E, indicating a high amount of delay. This intersection is at SW 65th and SW Borland Road.

Table 10. Intersection Level of Service (LOS)

ID	Name	Control	LOS / Delay	Worst Mvmt	HCM
1	SW 124th Ave & Hwy 99W	Signal	B/19	-	HCM 2000
2	SW 124th Ave & SW Tualatin Rd	Signal	C/21	-	HCM 2000
3	SW 124th Ave & SW Herman Rd	Signal	B/18	-	HCM 6th
4	SW Cipole Rd & SW Herman Rd	AWSC	B/11	-	HCM 6th
5	SW 124th Ave & Tualatin-Sherwood Rd[1]	Signal	/	-	
6	SW Tonquin Rd & SW Grahams Ferry Rd	TWSC	B/15	EBL	HCM 6th
7	SW Ibach St & SW Boones Ferry Rd	Signal	C/34	-	HCM 6th
8	SW Avery St & SW Teton Ave	AWSC	B/14	-	HCM 6th
9	SW Sagert St & SW Boones Ferry Rd	Signal	C/28	-	HCM 6th
10	SW 90th Ave & SW Tualatin-Sherwood Rd	Signal	D/42	-	HCM 6th
11	SW Boones Ferry Rd & SW Tualatin-Sherwood Rd[2]	Signal	D/48	-	-
12	SW Martinazzi Ave & Tualatin-Sherwood Rd[1]	Signal	/	-	
13	SW Nyberg St & I-5 SB Ramps[1]	Signal	/	-	
14	SW Nyberg St & I-5 NB Ramps[1]	Signal	/	-	
15	SW 65th Ave & SW Borland Rd	Signal	E/60	-	HCM 6th
16	SW 65th Ave & SW Sagert St	Signal	C/23	-	HCM 6th
17	SW Tualatin Rd & SW Boones Ferry Rd	Signal	C/28	-	HCM 2000
18	SW Martinazzi Ave & SW Boones Ferry Rd[2]	Signal	D/54	-	-
19	SW Bridgeport Rd & SW Lower Boones Ferry Rd[1]	Signal	D/37	-	HCM 6th
20	SW Lower Boones Ferry Rd & I-5 SB Ramps	Signal	B/15	-	HCM 6th
21	SW Lower Boones Ferry Rd & I-5 NB Ramps	Signal	B/18	-	HCM 6th

Note:
[1] Intersection is currently under construction and was therefore not analyzed in the existing conditions. These will be included in the future conditions analysis.
[2] Intersection analyzed using microsimulation, this represents to intersection average, see text for additional information on movements operating with high delay.

Safety

The collision data and analysis described below is derived from ODOT collision data from 2017 to 2021.

Collision Summary

Around 80% of collisions in Tualatin occurred on arterials, with many of these collisions occurring on SW Tualatin Sherwood Road. Boones Ferry Road also had a significant numbers of crashes. Over half of collisions for all modes are rear-ends, as seen in **Table 11**. Around 17% and 11% of collisions occurred due to turning movements and overtaking, respectively. The most common cause of bicycle-involved collisions was from vehicles making turning movements.

Table 11. Types of Vehicular Collisions

Type of Collision	Percentage
Angle	2%
Backing	1%
Fixed Object or Other Object	8%
Head-On	0%
Miscellaneous	1%
Non-collision	0%
Parking Maneuver	0%
Pedestrian	1%
Rear-End	57%
Sideswipe - Meeting	1%
Sideswipe - Overtaking	11%
Turning movement	17%

Source: ODOT Collision Data, 2017-2021

Bicycle and Pedestrian *Collisions*

Figure 32 documents collision locations and the frequency of collisions in Tualatin. Knowing what factors affect crash risk is an important step to implementing changes to the transportation system that might mitigate them. The map illustrates collision locations and frequency. Knowing what factors affect crash risk is an important step to implementing mitigation measures.

The collision data and analysis presented in the bicyclist and pedestrian-involved collision map are derived from ODOT records from 2017 to 2021. The yellow rings around crash locations indicate that more than one crash occurred in that location. **Table 12** provides a summary of reported pedestrian and bicycle-related injuries and fatalities from 2017-2021.

Table 12. Bicyclist and Pedestrian-Involved Collisions (2017-2021)

Year	Bicyclist-Involved	Pedestrian-Involved	Year Total
2017	7	5	12
2018	8	3	11
2019	3	5	8
2020	4	4	8
2021	1	4	5
Total	23	20	44

For Further Study and Consideration

Safety needs for pedestrians and bicyclists span the extent of the city. Identifying priority areas with higher crash frequencies and severities, whether in proximity to high equity need areas, school zones, parks, or at other locations, can help to identify near term investments.

ODOT SPIS

A Safety Priority Index System (SPIS) identifies and ranks intersections and roadway segments that are most likely to benefit from crash reduction countermeasures. Typically, a SPIS considers linear crash data along roadway and excludes side-street crashes at intersections. Most SPISs use three-years of crash data and provide SPIS scores that range between 0 (least severe) and 100 (most severe) based on crash frequency, crash rate, and crash severity. ODOT publishes a statewide SPIS and an SPIS for each region, which includes all ODOT owned roadways and highways.

According to 2021 SPIS reports, there are 33 ODOT owned intersections and roadway segments in Tualatin that fall in the 95th percentile of SPIS scores. Of those, the top ten scores occur along I-5 and at Nyberg Road at the I-5 interchange.

Washington County SPIS

The Washington County SPIS identifies and ranks intersections similarly to the ODOT SPIS. The Washington County SPIS analyzes intersections, rather than roadway segments. Of the hundred highest ranking intersections in Washington County by SPIS (2018-2020) score, the intersections within Tualatin city limits are #2 Tualatin-Sherwood Rd at 124th Ave; #21 Tualatin-Sherwood Rd at Boones Ferry Rd; #64 Tualatin-Sherwood Rd at Teton Ave; #68 Tualatin-Sherwood Road at Nyberg Rd (and shopping center accesses); and #93 Lower Boones Ferry Rd at 72nd Ave and Bridgeport Rd.

Transportation Demand Management

Transportation Demand Management (TDM) is the application of strategies and policies to redistribute demand from single-occupancy vehicles to alternative modes of travel to lower vehicle miles traveled (VMT).

One strategy is Employee Commute Options, a mandatory program for large employers. Under the Department of Environmental Quality's (DEQ) ECO Program, employers with more than 100 employees must provide commute options to employees designed to reduce the number of cars driven to work in Portland and surrounding areas.

In and around Tualatin, there are around 4,013 employees that are ECO eligible and around 109 incentives available to encourage use of alternative modes, including bike lockers, showers, subsidized TriMet passes, and more. The Tualatin Shuttle, by Ride Connection, provides transportation for commuters to and from the Tualatin WES Commuter Rail Station.

Transportation Systems Management and Operations

Transportation Systems Management and Operations (TSMO) is a set of strategies that focus on operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed. These cost-effective strategies include things like smarter signal timing, coordinated traffic incident response and traveler information. In Tualatin, some of the traffic signals on Tualatin-Sherwood Road and Nyberg Road at the I-5 interchange use adaptive signal timing to optimize the traffic flows.

Access to Schools

There are 19 schools within the City of Tualatin, ranging from elementary school to college and both publicly and privately run. There is a Safe Routes to School (SRTS) program for the Tigard-Tualatin School District that encourages active transportation to and from schools. Some schools are located near collision hot spots. Additionally, schools are often not located near completed sidewalk segments, making it difficult for students to walk to school safely.