Existing and Future Conditions Report

July 15, 2020

Project Objective

The TV Highway corridor has been the subject of substantial local planning work to identify locations for access and safety improvements as well as the potential for future high-capacity transit service. The Tualatin Valley (TV) Trail Concept Plan will study and select a preferred trail alignment that will help meet the connectivity, access and mobility needs for people walking, biking and rolling within the TV Highway corridor between SW Cornelius Pass Road and SW 160th Avenue. The TV Trail is a key part of a larger vision for a Turf-to-Surf Trail, which will connect the Portland region with the Oregon Coast via the Council Creek and Salmonberry Trails. In order to realize the vision of the Turf-to-Surf trail, a key objective of this concept plan is to connect TV Trail to the regional trail network. There are several regional trails that a future TV Trail could align with on the east and west including the Westside Trail and Beaverton Creek Trail on the east and TV Trail and/or Reedville (Pearl-Keeler Powerline) Trail on the west.

The railroad, owned by Union Pacific Railroad, seen as a divider of the community and barrier to travel within the corridor may present an opportunity as the TV Trail has been envisioned as a potential rail with trail in previous planning efforts. Understanding a rail with trail alignment alternative presents numerous challenges, this effort will explore several other alignment alternatives in the corridor including Johnson Street, Alexander Street, Shaw Street and Blanton Street. This project will evaluate alternative alignments for the trail, identify a preferred alignment, develop a conceptual design and planning-level cost estimate, and recommend implementation strategies for phased development of a regional trail. This report details the applicable plans and policy context for trail development and details the existing conditions within the corridor along potential alignment alternatives.

Project Area Overview

The study area for the TV Trail alignment alternatives within the Aloha-Reedville area of urban unincorporated Washington County is bound by Cornelius Pass Road (on the west) and SW 160th Avenue/Millikan Way (on the east) – a distance of approximately 3 miles. The northern and southern limits of the study area are bound by Johnson Street and Blanton Street, respectively. Figure 1 illustrates the TV Trail project study area in relation with the overall Turf-to-Surf Trail and includes existing and planned regional trails in the Aloha-Reedville area for context. Figure 2 depicts the Turf-to-Surf Trail from Tillamook to Lake Oswego in greater detail.

Figure 1. Project Study Area and Local Regional Trail Network

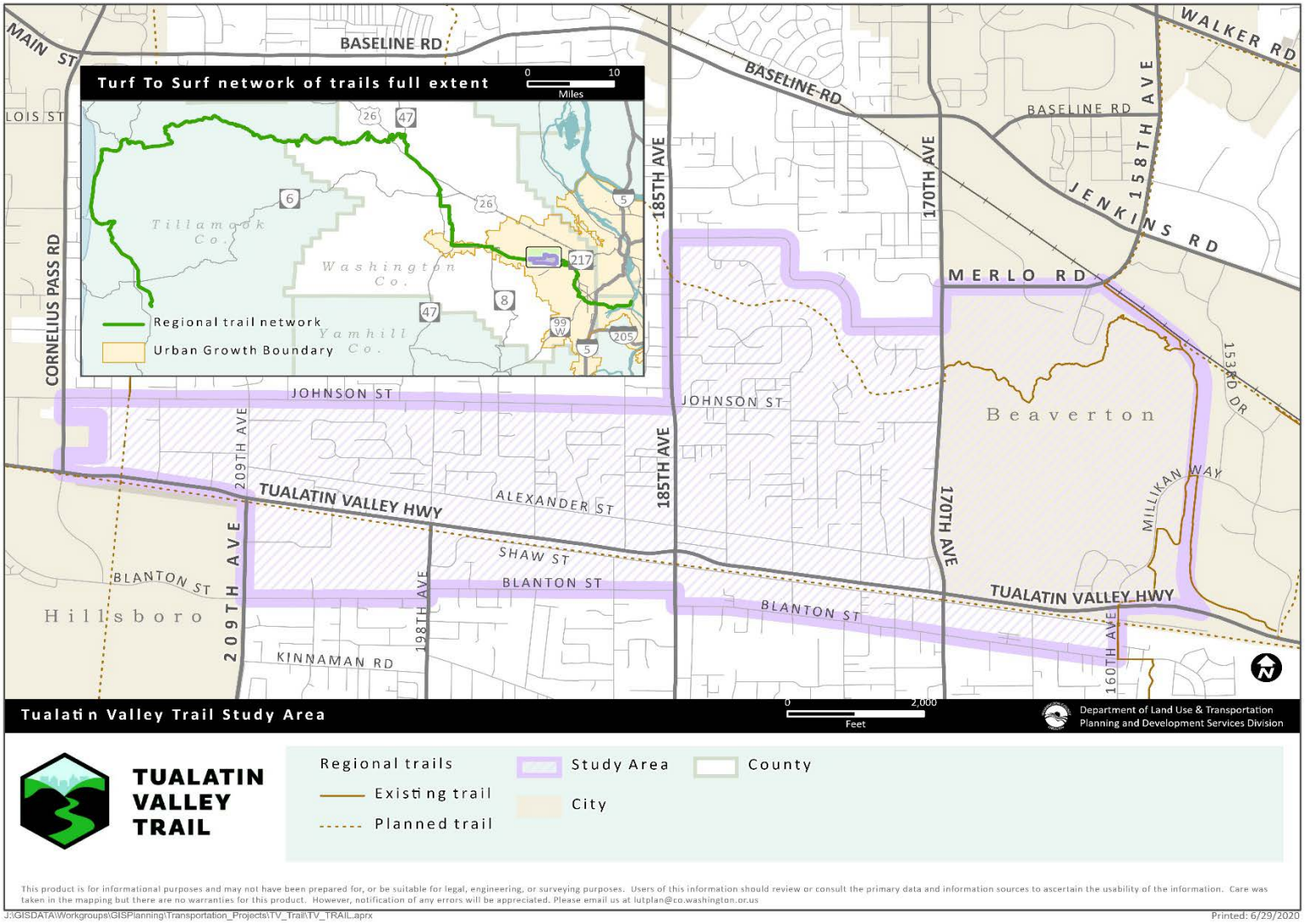


Figure 2. Turf to Surf Network of Trails

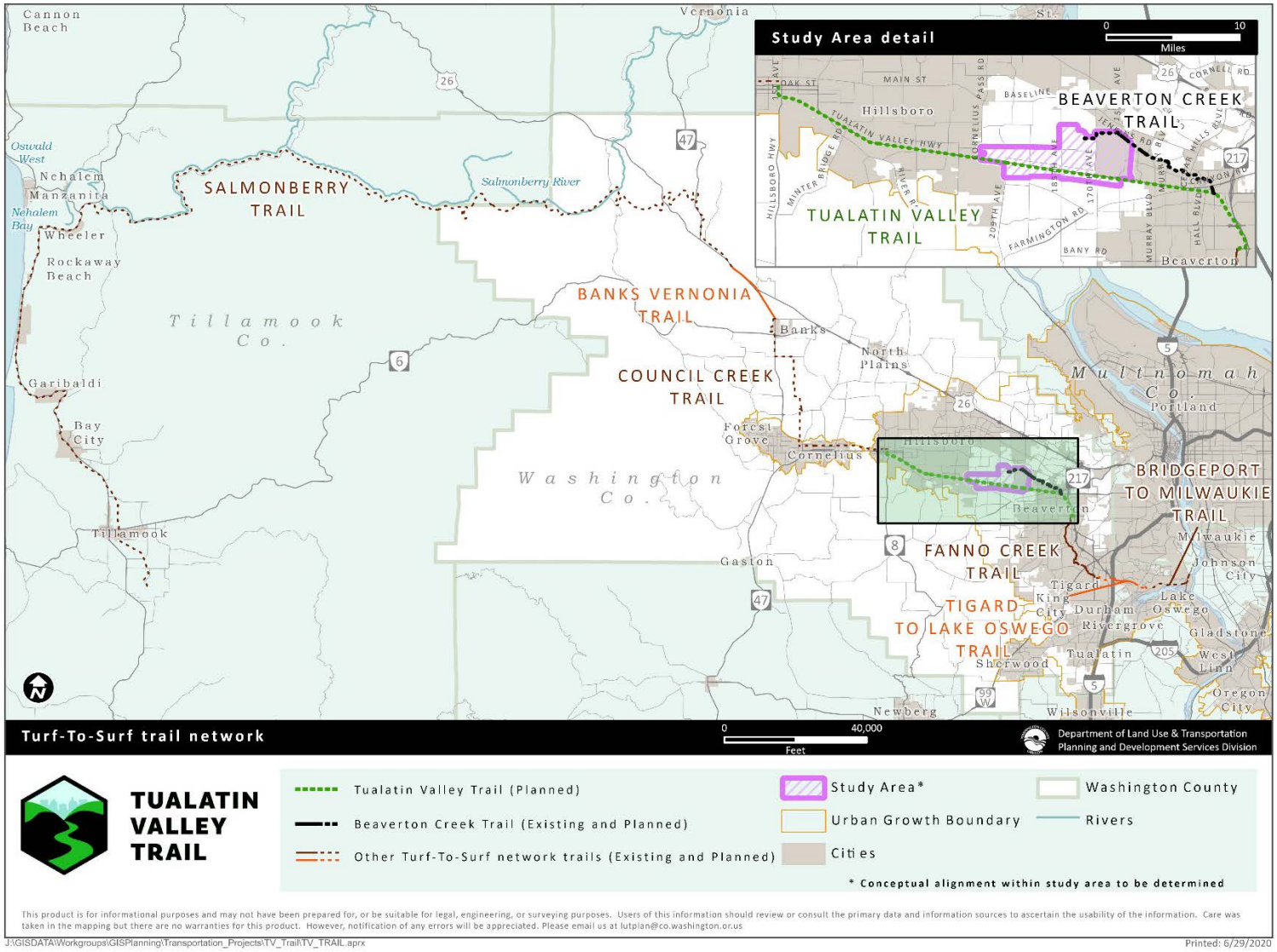
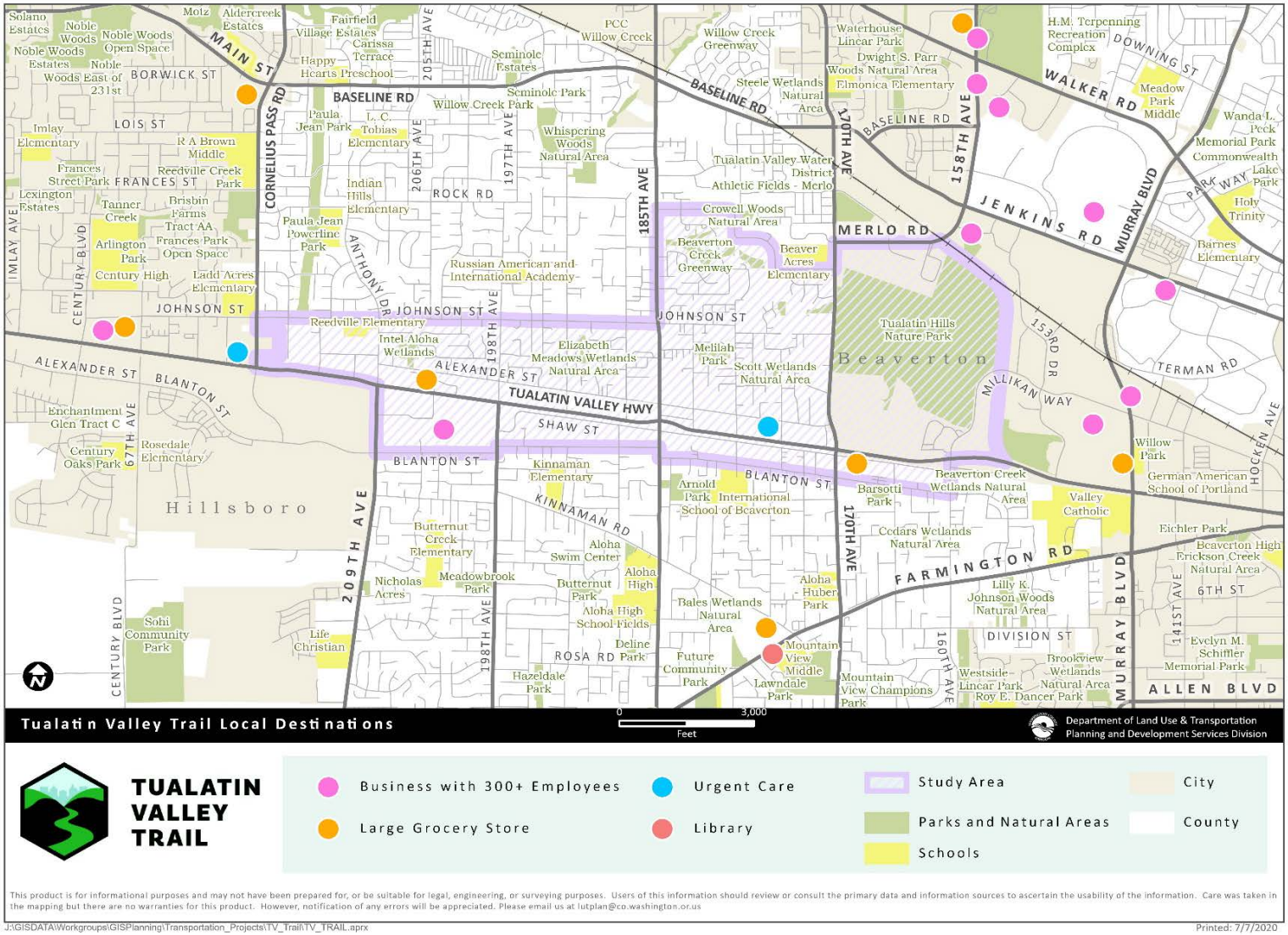


Figure 3. Local Destinations near Project Study Area



Land Use Patterns and Local Destinations

The TV Highway corridor developed over many decades. Today, the corridor is characterized by automobile-oriented commercial strip development interspersed with multi- and single-family housing. Intel, the largest employer in the study area, operates a large fabrication facility located on TV Highway near SW 198th Avenue. Smaller businesses are located on stand-alone properties or within suburban-format shopping centers. The central portion of the study area (around TV Highway and SW 185th Avenue, from SW 192nd Avenue to SW 170th Avenue) is within the Town Center designated by Metro in 1995 and in the 2040 Growth Concept. The remainder of TV Highway is designated as a 2040 Corridor. Within the vicinity of the project study area, there are several notable destinations in this area, including schools, parks, grocery stores, urgent care facilities and large employment sites (over 300 employees). The Tualatin Hills Nature Park, Intel Aloha campus, Market Centre shopping center are located along TV Highway, while the Aloha Library, Portland Community College Willow Creek campus and other major employers such as Nike and Tektronix are just beyond the study area. Figure 3 highlights the location of these local destinations.

Demographics

The Aloha-Reedville community is comprised of approximately 65,000 residents. In addition, there are almost 30,000 jobs.[1] In comparison to the Portland Metropolitan region and County as a whole, communities in the study area have above average concentrations of low-income population, people of color, limited English language proficiency residents, and youth populations. Nearly sixty percent of the 30,000 jobs earn less than $40,000 per year. Forty-five percent of the households are below 200 percent of the poverty line. Hispanic/Latino residents are the dominant people of color group (accounting for more than 25 percent of the residents in certain Census Block Groups in the area), followed by residents of Korean, Somali, Vietnamese, and African-American descent.

Existing Infrastructure Conditions

Over half of all public streets south of TV Highway and 20 percent of streets north of TV Highway are lacking sidewalks. The safety concerns are most acute on arterials and collectors that lack sidewalks where traffic speeds and volumes are heaviest. Patchwork development patterns have resulted in sidewalks that stop and start multiple times in a block, while open drainage ditches force pedestrians to walk in the roadway and are expensive to retrofit. Figure 5 depicts bicycle, pedestrian and transit infrastructure within the study area, including the location of existing signalized crossings.

Crossing arterial corridors safely is a major impediment to walking and bicycling, with TV Highway highlighted for especially treacherous conditions. Signalized crossings of this high-volume corridor are spaced approximately every third of a mile, but the density of bus stops, intersecting streets and commercial destinations creates additional crossing demand between those signals. This results in pedestrians often crossing TV Highway at uncontrolled locations to reach a bus stop, including at night when the largely unlit corridor poses visibility problems.

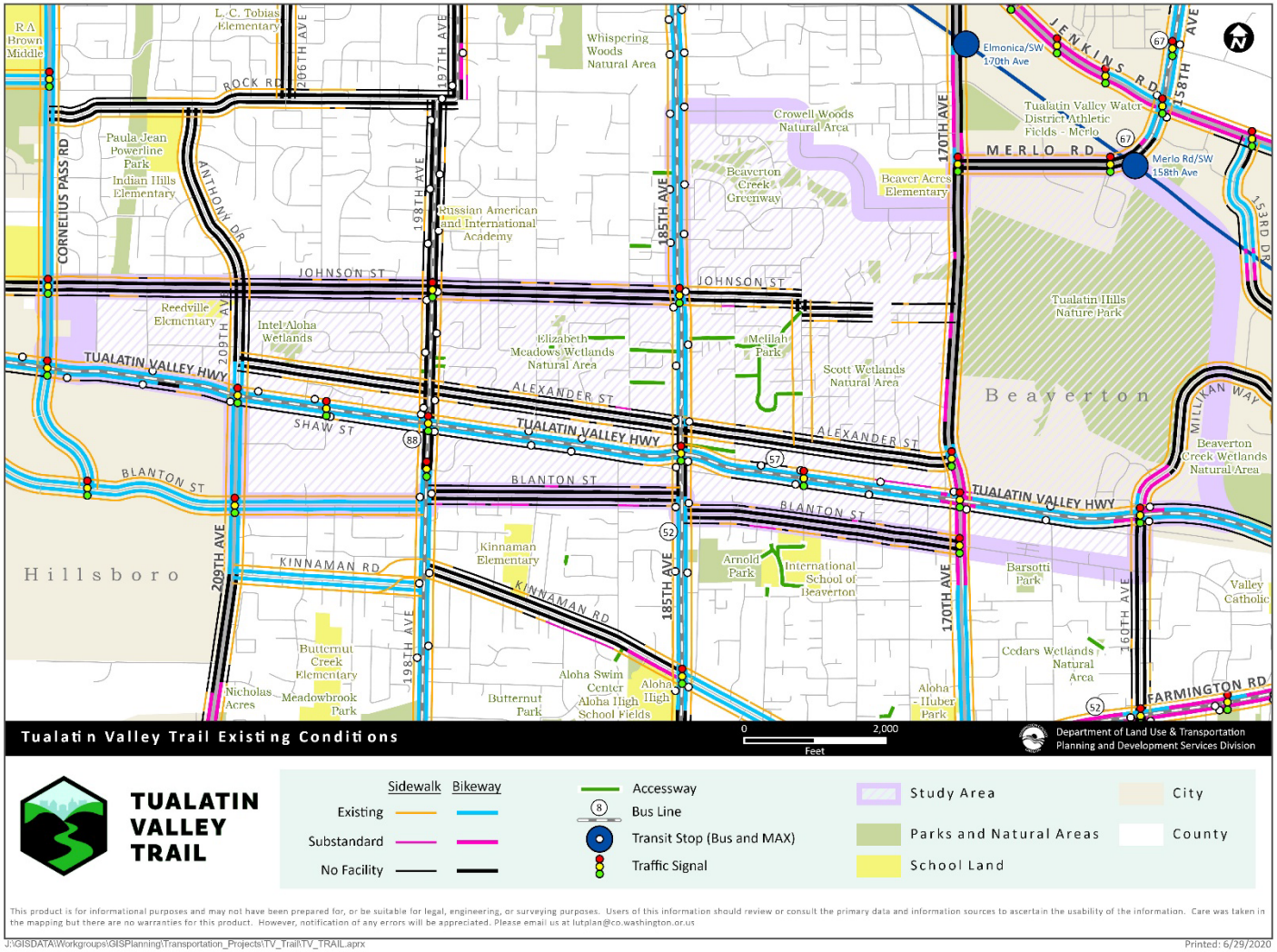
[1] Source: 2015 American Community Survey 5-year estimates and Census Longitudinal Employer-Household Dynamics

The location of the Portland and Western Railroad (PNWR) line creates additional challenges for transportation improvements and the ability to improve street design on the south side of TV Highway. It creates a barrier to creating connections to neighborhoods on the south side of TV Highway, where residents have limited options to cross the rail line to access TV Highway or transit.

Bicycle connectivity remains a concern for the Aloha-Reedville area, as bike lanes (required on all new or reconstructed arterial and collector roads by state and county policy) are absent on 25 percent of arterials and more than 90 percent absent on collectors. Gaps of particular concern include 170th Avenue (between Merlo Road and Alexander Street), Kinnaman Road and 198th Avenue. In other cases where bicycle lanes do exist, prevailing travel speeds and heavy volumes do not create an encouraging environment for children, older adults or inexperienced cyclists – TV Highway and 185th Avenue included.

TUALATIN VALLEY TRAIL

Figure 4. Project Area Existing Conditions



Future Infrastructure Conditions

Since 2015 over $100M in infrastructure investments have been funded that will address many of the gaps and barriers identified in the Aloha-Reedville Livable Community Plan. These priority improvements were selected through the lens of providing more safe, affordable travel options for everyone, economic development, community placemaking, and transportation equity. Figure 5 provides a breakdown of allocated funding by phase of completed and committed projects, with roughly a quarter either completed or under construction, and slightly under half currently in the design phase. Figure 6 and Table 1 provides a complete list of funded projects.

Figure 5: Breakdown of Completed and Committed Projects in Aloha-Reedville

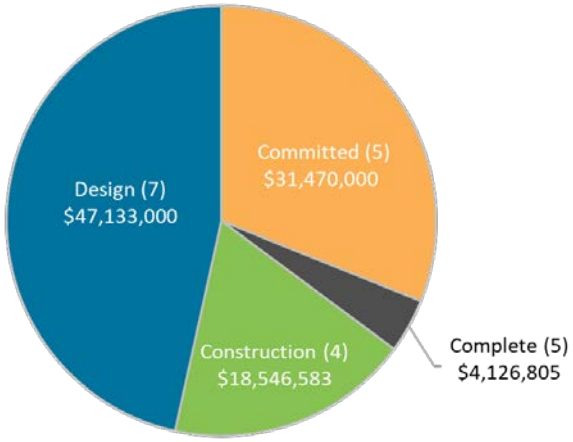


Figure 6. Committed and Completed Transportation Projects in Study Area Vicinity

Table 1. **Committed and Completed Transportation Projects in Study Area Vicinity**

Project Index Data as of May, 2020.

DRAFT

Department of Land Use & Transportation
Planning and Development Services Division

Map #	Street Name	Description	Cost ($)*	Completion Date*
4	Alexander St	Add sidewalks, lightning, streetscape features, bike boulavard treatments, signal at 185th ave, turn lanes at major intersections.	3,000,000	6/28/2025
6	SW 209th Ave; Johnson St.	Half-Street Improvement (South)	1,655,519	8/31/2019
7	Augusta Ln	Ped/bike bridge and approach pathways	1,550,000	12/31/2020
8	SW 192nd Ave.	Sidewalk along 192nd Avenue, between Tualatin Valley Highway and Trelane Street	880,000	12/31/2021
9	SW Blanton St.	Sidewalk along Blanton Street, between 185th and 198th avenues.	2,435,000	12/31/2022
11	209th Ave	Construct a pedestrian path on the east side of 209th Ave. between just north of Blanton St. and just south of the railroad tracks	303575	4/29/2016
16	TV Hwy	Install traffic separator and countdown pedestrian crossing signals, add street lighting, replace signage, and realign right turn island on southeast corner of 185th intersection.	500,000	5/31/2018
17	TV Hwy	Bike lane from 182nd to 153rd and enhanced pedestrian crossing at 174th and TV Hwy.	370,000	12/31/2024
18	TV Hwy	Sidewalk infill and improvements, bus stop relocations, bus pads, mobility improvements and enhanced pedestrian crossing.	1,700,000	12/31/2019
19	170th Ave	Widen to 4/5 lanes, protected bike lanes, sidewalks, pedestrian crossings to nature park, roundabout at Merlo, contribution to Augusta Lane ped/bike bridge.	22,000,000	6/28/2025
25	178th Ave	Sidewalks on both sides	1,339,711	4/29/2016
28	198th Ave	Add sidewalks, bike lanes, lighting, turn lanes at major intersections.	17,085,871	12/31/2020
29	Cornelius Pass Rd	Widen to 5 lanes and Add WB right turn lane at TV Hwy.	19,540,000	6/30/2023
30	SW Augusta Ln	Add a sidewalk or pedestrian pathway	101,000	12/31/2020
33	SW 209th Ave	Widen to 5 lanes with signal at Blanton.	22,627,000	8/17/2022
35	Johnson St	Sidewalk infill project,	529,000	8/1/2020
36	214th Ave	Construction of 1,000 feet of 5-foot-wide sidewalk.	328,000	10/12/2018
41	SW 192nd, 187th, 182nd, 174th	Sidewalk infill along 174th, 182nd, 187th, and 192nd avenues and install pedestrian signal at 185th and Cascade Dr.	4,400,000	12/31/2026
44	Various	ADA Ramp Package - 28 Locations	531,187	2/29/2020
48	Various	ADA Ramp Package - 15 Locations	400,525	5/31/2020
49	Various	Arterial Pedestrian Crossing Project – design (8 sites)	TBD	TBD

*Estimate and subject to change for ongoing projects.

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Tualatin Valley Trail History

The railroad that parallels Tualatin Valley Highway was originally constructed in 1871 by the Oregon Central Railroad (later the Oregon & California Railroad) between Portland and Hillsboro as one of the state's first rail lines, connecting Portland to prime logging and agricultural lands on the Oregon Coast and Willamette Valley. Southern Pacific Railroad assumed control of the line in 1887 and organized the corridor as part of their Westside Branch connecting Portland to McMinnville via Forest Grove, continuing further south to Corvallis. The trackage between Beaverton and Hillsboro was later referred to as the Tillamook Branch, and passenger service was introduced in 1914 as part of the Red Electric interurban railway. Along with the Oregon Electric Forest Grove branch (now the MAX Light Rail system), the Red Electrics contributed to the growth of Washington County in the early 20th century. Interurban stations within the study area were located at Reedville (SW 211th), Tobias (SW 198th), Aloha (SW 185th) and Huber (SW 170th). In 1918, Front Avenue in Reedville was subsumed into the TV Highway, a new two-lane cement road for automobiles between Beaverton and Hillsboro, replacing an earlier dirt road that traveled along today's Farmington and Kinnaman roads. Due to rising expenses and increased competition from the automobile, passenger rail service would cease operations in 1929 after only 15 years, and from then on, the Tillamook Branch would revert to freight-only operations.

TV Highway was improved in 1933 by the Federal Emergency Relief Administration, and then expanded to four lanes by the Oregon State Highway Commission in 1958. In 1995, the Portland & Western Railroad (PNWR) was created as a subsidiary of Genesee & Wyoming Inc. to take over operations of the former Southern Pacific's branch lines under a 20-year lease agreement (subsequently renewed in 2015), including the Tillamook District which extends as far west as Banks. Today, the line is owned by the Union Pacific Railroad and manages the right-of-way jointly with PNWR, while PNWR operates rail service and maintains railroad infrastructure along the line, including signals, bridges and culverts. The Beaverton to Hillsboro segment still sees sporadic freight activity today, with 1-2 daily round trip trains transporting wood products from Stimson Lumber mill near Hagg Lake and Hampton Lumber mill in Banks.

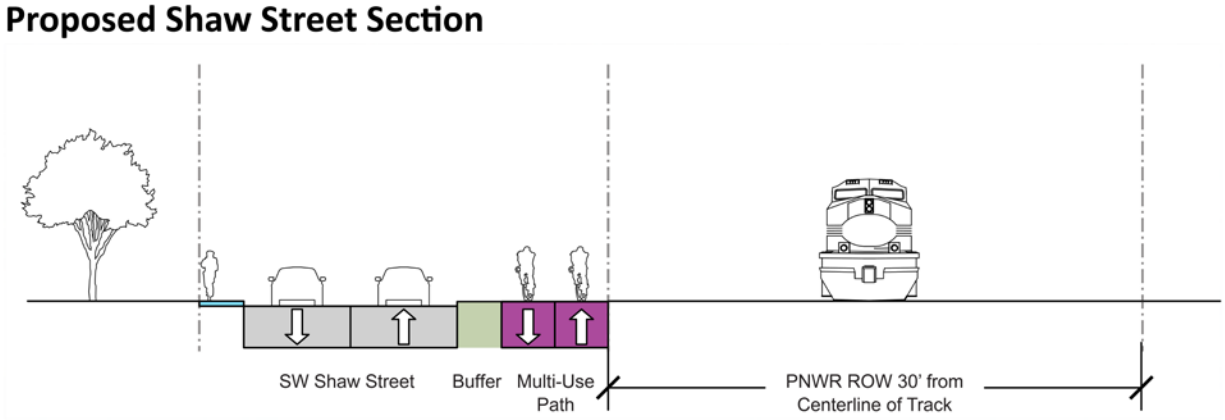
The vision of a trail connecting the Portland region and the Oregon Coast has been proposed and studied for several decades as part of a "Path to the Pacific" that utilizes the Council Creek Trail, Banks-Vernonia Trail and the future Salmonberry Trail along the former Port of Tillamook Bay rail line. A multi-use path along the PNWR Tillamook District rail line would extend this trail corridor into the communities of Hillsboro, Aloha-Reedville and Beaverton, and has been characterized as part of a "Turf to Surf Rail with Trail" running from downtown Lake Oswego to the Oregon coast and utilizing portions of the Fanno Creek Trail. The trail was first added in Metro's Regional Trails and Greenways Plan update in July 2002, nominated for inclusion by former Metro Councilor Bill Atherton. This was followed shortly by the Washington County 2020 Transportation Plan, adopted in October 2002, and then in the 2004 amendment to the 2000 Regional Transportation Plan, which showed the corridor as a future trail in the bicycle system.

TUALATIN VALLEY TRAIL

Tualatin Valley Trail in Plans

The **TV Highway Corridor Plan** (2013) was the first to explore the Tualatin Valley Trail proposal in detail since Metro added it to the regional trails map. The plan identified a potential 14' wide multi-use path located between the highway and railroad, including fencing and bus stop improvements. The final recommendation included a trail feasibility study be completed to determine the preferred alignment for the Turf-to-Surf Trail as part of a list of near-term actions, with trail implementation to take place beyond the planning horizon (15 years or more). Other plans which incorporate the trail included the **THPRD Trail Master Plan** (2006) and subsequent **Trails Functional Plan** (2016), the **Hillsboro Parks & Trails Master Plan** (2009 and 2015) and the Portland-Vancouver Bi-State Regional Trails System Plan (2010) as part of the "Path to the Pacific." The trail appeared as a project for the first time in the **Regional Transportation Plan** (2014). In 2017, Washington County completed initial conceptual design and cost estimates for a two-way 12' wide multi-use path with landscaped buffer on the north side of Shaw Street (outside of the railroad ROW) between SW 160th and 198th avenues as part of **Aloha Tomorrow** (2018). Figure 7 depicts the conceptual cross-section for the Shaw Street Trail. The benefit of this alignment is that it would provide more flexibility for future high capacity transit on TV Highway and a more comfortable experience for trail users. The proposal included trail overcrossings at SW 170th and 185th avenues for a total estimated construction cost of approximately $12M. See Appendix A and B for a complete list and description of planning partners, relevant plans and design guidance.

Figure 7. Shaw Street Trail Conceptual cross-section from Aloha Tomorrow



TV Trail Corridor Alignment Alternatives

The following section describes important transportation characteristics of potential east-west and north-south street alignments that will be evaluated during the study as main corridors for the TV Trail, along with impressions from a member of the project team that went bicycling along several of the study corridors in April 2020. Please note that this study area tour occurred after the onset of the COVID-19 pandemic where traffic volumes were significantly reduced from normal conditions. Also included are recent daily traffic volume and speed counts collected by local and state roadway authorities.

Primary Study Corridors

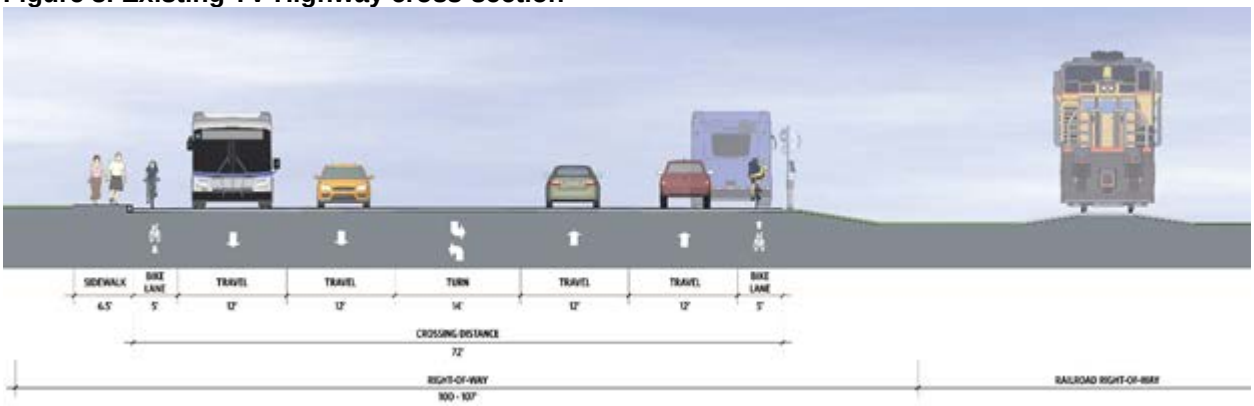
The following east-west streets represent the primary study corridors within the project study area, connecting South Hillsboro with the Westside or Beaverton Creek trails depending on the chosen preferred alternative.

Tualatin Valley Hwy

TV Highway is a 5-lane arterial owned and maintained by the Oregon Department of Transportation. The average volume on the corridor is 32,000 to 40,000 vehicles per day (2018) between Cornelius Pass Road and 160th Avenue, with the highest volumes observed at 170th Avenue. No speed data is available, but there is a posted speed of 35-45 mph depending on the corridor context. The north side of the TV Highway is developed and includes sidewalks, curbs and drainage, while the south side is undeveloped except for short stretches near 185th Avenue and near transit stops. The Portland & Western Railroad (PNWR) runs parallel and adjacent to TV Highway. The PNWR poses accessibility and connectivity challenges for neighborhoods to the south of TV Highway, and right-of-way restrictions for improvements to TV Highway itself. TV Highway is a designated Enhanced Major Streets Bikeway and Pedestrian Parkway along its entire corridor and is also a designated Streetscape Overlay corridor from 178th to 192nd avenues. TriMet's Line 57 (a frequent service line with the highest ridership of any bus line in Washington County) operates along TV Highway, linking central Forest Grove to central Beaverton. This line has the highest ridership among TriMet's bus routes in Washington County, and carries an average of 7,500 passengers on weekdays, 5,820 on Saturdays and 4,710 on Sundays (Spring 2016, TriMet).

TV Highway is a regional high-crash corridor with a crash rate nearly three times the statewide and 2.5 times the regional average. A significant majority of pedestrian crashes along the corridor were located 250 feet of a study area corridor bus stop. Nearly half of the study corridor lacks sidewalks, including most of the south side adjacent to the rail line, and there are striped bicycle lanes in both directions. Figure 8 illustrates the existing TV Highway section. There are existing signals at Cornelius Pass Road, 209th Avenue, Market Centre/Intel Aloha, 198th Avenue, 185th Avenue, 178th Avenue, 170th Avenue and 160th Avenue. The Statewide Transportation Improvement Program includes committed funding for pedestrian access to transit and safety improvements including sidewalk infill on north side of TV Highway near 182nd Avenue, crossing improvements at 192nd Avenue, and potential crossing improvements at 174th and 214th avenues.

Figure 8. Existing TV Highway cross-section



Study Area Tour Impressions

TV Highway has high vehicle speeds and volumes, which makes riding the standard striped bicycle lanes a stressful experience. Existing and committed signalized intersections along the corridor could allow trail users to cross the roadway to access destinations on the north side of the street. A potential trail along the south side of TV Highway would have to negotiate several constraints, including the 25-foot minimum setback required by the railroad and the elevation difference in locations where the railroad is on an embankment. There are also a high number of transit stops along the corridor that must be taken into account when potentially designing a trail.

Daily Traffic Volume and 85th Percentile Speed Counts (2018) – Collected by ODOT

- East of 170th Avenue: 40,500 ADT, no speed data available
- West of 170th Avenue: 33,600 ADT, no speed data available
- East of 185th Avenue: 33,000 ADT, no speed data available
- West of 185th Avenue: 34,200 ADT, no speed data available
- East of 209th Avenue: 32,400 ADT, no speed data available
- East of Cornelius Pass Road: 33,500 ADT, no speed data available

Alexander Street

Alexander Street runs parallel to TV Highway approximately 400 feet north, running between SW 170th and 209th avenues. This County designated collector road is signed for 25 mph and has volumes ranging from 2,000-3,800 vehicles per day with the highest traffic at 170th Avenue. The 85th percentile speed ranged from 27-33 mph at these locations. The Major Streets Transportation Improvement Program includes funding for design and right-of-way to create a pedestrian-scale "Main Street" environment that would anchor a Town Center in the vicinity of TV Highway and 185th Avenue, which was a key outcome of the Aloha Tomorrow project. Sidewalks are discontinuous along the corridor, and there are currently no bicycle facilities. There is an Urban Road Maintenance District sidewalk improvement project in development between 198th and 209th avenues. At 185th Avenue, there is no legal bicycle or pedestrian crossing and vehicles are unable to cross 185th Avenue or turn left from 185th Avenue northbound (but can turn left from 185th Avenue southbound) due to access management. Alexander Street is a designated Streetscape Overlay corridor from 178th to 192nd avenues in Washington County

Transportation System Plan, which looks to create more pedestrian-friendly streets. There is an existing signal at the intersection with 170th Avenue.

Study Area Tour Impressions

Alexander Street is a relatively direct east-west street located one block north of TV Highway. However, there are issues at 185th Avenue due to a concrete median blocking through access and signage banning pedestrians from crossing at the intersection. In addition, there is a high-volume southbound left turn movement and observed high speeds along 185th Avenue that make crossing difficult or impossible. Traffic volumes were also observed to be higher on Alexander Street compared to some alternatives.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- West of 198th Avenue: 2,552 ADT, 32 mph
- West of 185th Avenue: 1,979 ADT, 27 mph
- East of 185th Avenue: 3,265 ADT, 28 mph
- West of 170th Avenue: 3,835 ADT, 33 mph

Johnson Street

Johnson Street is an east-west County-designated collector road between 170th Avenue and Cornelius Pass Road located approximately a half mile north of TV Highway. The street is signed for 25 mph and has volumes ranging from 3,500-5,000 vehicles per day west of 182nd Avenue with the highest traffic at Cornelius Pass Road. The 85th percentile speed ranged from 32-34 mph at these locations. The roadway is a designated Neighborhood Bikeway and has sharrows but no other bicycle facilities. Sidewalks are discontinuous along the corridor, although there are URMD projects for sidewalk infill at 178th and 214th avenues. There is an existing signal at 185th Avenue.

Alexander Street is a relatively quiet and direct street located one block north of TV Highway. However, there are issues at 185th Avenue due to a concrete median blocking through access and signage banning pedestrians from crossing at the intersection. In addition, there is a high-volume southbound left turn movement and observed high speeds along 185th Avenue that make crossing difficult or impossible.

Study Area Tour Impressions

Johnson Street provides a continuous east-west connection that was observed as the lowest-stress alternative among the primary study corridors due to its low vehicle volumes and the presence of signalized and stop-controlled intersections facilitating key crossings at major roadways. The presence of sharrow markings and lack of a centerline contributed to the street feeling like a neighborhood greenway or bicycle boulevard. However, volumes may have been lower than normal because of the ongoing COVID-19 pandemic, which fundamentally altered traffic patterns during the stay-at-home order.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- East of Cornelius Pass Road: 5,091 ADT, 32 mph
- East of 198th Avenue: 3,770 ADT, 34 mph
- East of 185th Avenue: 3,471 ADT, 33 mph

- *Recommended Inclusion: 178th Avenue*

Blanton Street

Blanton Street is an east-west County road located approximately a quarter mile south of TV Highway. It is designated as a collector between 170th and 209th avenues, and as a neighborhood route between 160th and 170th avenues. The street is signed for 25 mph along the entire corridor and has traffic volumes ranging from 2,600-5,500 ADT with the highest volumes at 170th Avenue. The 85th percentile speed ranged from 31-33 mph at these locations. The roadway is a designated Neighborhood Bikeway but there are no bicycle facilities and discontinuous sidewalks, and off-set intersections at 185th and 209th avenues which can be difficult to navigate for all modes. There is an URMD project in process to add sidewalks between 185th and 198th avenues, and a funded MSTIP High-Growth project to add sidewalks and turn lanes from 198th to 209th. There are existing signals at 209th Avenue and 170th Avenue.

Study Area Tour Impressions

Blanton Street is similar in characteristic to Johnson Street with intermittent sidewalks, lack of dedicated bicycle lanes and no centerline striping. There are signals at 170th and 209th avenues to help people walking and biking cross the street, however the off-set unsignalized intersections at 185th and 198th represent significant barriers. Further west, Blanton Street has been extended by City of Hillsboro into the South Hillsboro development, which is located outside of the project study area. The City has constructed the extension with dedicated cycle tracks, which provide separation from the roadway. However, these facilities had collected a fair amount of debris in the bikeway, and the score lines in the concrete surface caused a rough ride. The concrete also made it difficult to visually distinguish the cycle track from the sidewalk, which were not physically separated in some locations.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- East of 209th Avenue: 3,232 ADT, 33 mph
- West of 185th Avenue: 2,603 ADT, 32 mph
- West of 170th Avenue: 5,562 ADT, 31 mph
- *Recommended Inclusion (in Order of Priority): 160th Avenue, 198th Avenue*

Shaw Street

Shaw Street is an east-west County neighborhood route that runs parallel to TV Highway immediately south of the PNWR line between 160th and 198th avenues. The street is signed for 35 mph along the entire corridor. The most recent volume count available is from 2009 where 850 vehicles per day were recorded at 178rd Avenue. There are discontinuous sidewalks and no bicycle facilities. At 170th and 185th avenues, there is no legal pedestrian crossing and all traffic is right-in/right-out due to the adjacent railroad crossing. There is an existing signal at 198th Avenue.

Study Area Tour Impressions

Shaw Street has a higher speed limit compared to most other corridor alternatives, but the street resembles a bicycle boulevard due to low observed traffic volumes and lack of a centerline, except for the portion closest to 198th Avenue. While Shaw Street only extends to 198th, there is a potential opportunity to use existing public right-of-way between the railroad and Intel Aloha campus to connect to 209th Avenue. Key constraints include the presence of concrete median barriers at 170th and 185th avenues designed to reduce traffic conflicts with the adjacent railroad line, which also prevent pedestrians and vehicles on Shaw Street from crossing at those locations. This means that users must divert to TV Highway to legally cross those streets, crossing the rail tracks twice at each location. There are no legal crossings of the railroad between 170th and 198th avenues except at 185th Avenue (approximately ¾ mile between crossings), making it difficult to access destinations north of TV Highway from the facility. However, there are several existing unauthorized crossings along the corridor, generally where bus stops are located along TV Highway. There are also elevation differences between the railroad and Shaw Street, which may prevent locating a trail on north side of the roadway.

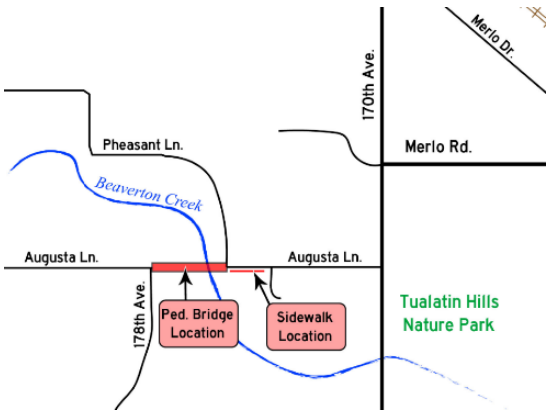
Daily Traffic Volume and 85th Percentile Speed Counts (2009)

- West of 178th Avenue: 848 ADT, no speed available
- *Recommended Inclusion (in Order of Priority): 192nd Avenue, 178th Avenue, 165th Avenue*

Augusta Lane

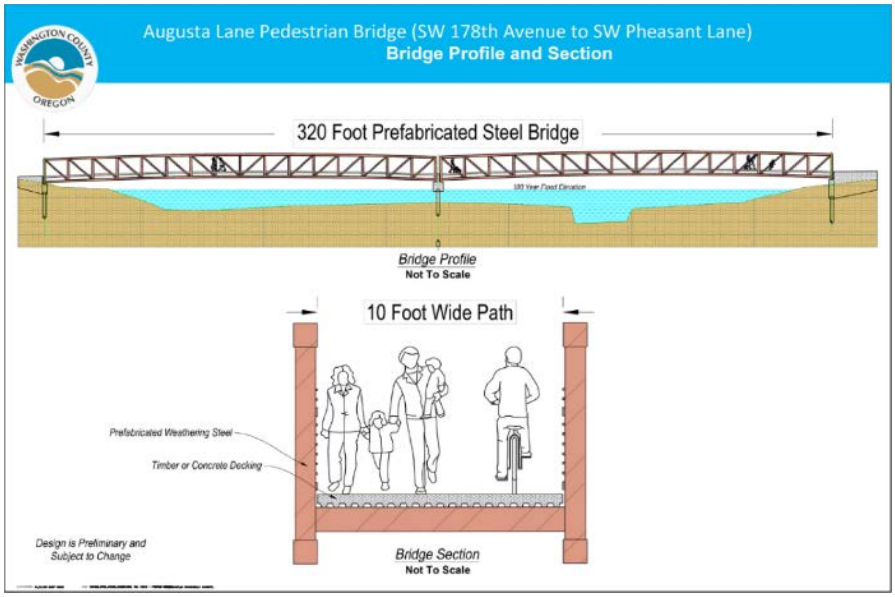
Augusta Lane is an east-west County neighborhood route located in the northeast part of the study area towards Merlo Station. The road has a 20 mph school zone speed limit from 7am-5pm on school days and a 25 mph speed limit during other times There are no traffic counts available for this section, but there were approximately 800 vehicles recorded on Pheasant Lane further west in 2012. Augusta Lane is a designated Neighborhood Bikeway but the street lacks sidewalks beyond Beaver Acres Elementary School and does not include bike facilities. There is a bicycle/pedestrian bridge currently under development to be funded by MSTIP as part of the Beaverton Creek Trail. Figure 9 to the right shows the general location of the bridge.

Figure 9. Location of Augusta Lane Bicycle/Pedestrian Bridge



This section of Augusta Lane could connect Merlo Station to the TV Trail alignment via 178th Avenue depending on which corridor alignment is chosen. Figure 10 details the bridge profile and section for the Augusta Lane

Figure 10. Augusta Lane Bicycle/Pedestrian Bridge Profile and Section



Daily Traffic Volume and 85th Percentile Speed Counts

- None
- *Potential Inclusion: 170th Avenue*

North-South Connections

The following streets are potential north-south corridors that can provide connections between the main study alignments, in case a mix of alignments needs to be explored for a preferred alternative.

160th Avenue

160th Avenue is a north-south collector road maintained by City of Beaverton between TV Highway and Shaw Street, and by Washington County from Shaw Street to Farmington Road and further south. The street is signed for 35 mph and has volumes ranging from 8,000-10,500 vehicles per day with the highest traffic at the northern end. The 85th percentile speed ranged from 35-38 mph at these locations. The Westside Trail utilizes 160th Avenue as an interim routing as far south as Blanton Street, however, there are no bicycle facilities on 160th Avenue, and sidewalk facilities are also discontinuous along the corridor. There are existing signals at TV Highway and Farmington Road.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- South of Shaw Street: 10,577 ADT, 35 mph
- North of Farmington Road: 7,920 ADT, 38 mph

170th Avenue

170th Avenue is a north-south arterial road maintained by Washington County for its entire length within the project study area. The street is signed for 40 mph and has volumes ranging from 17,000-20,000 vehicles per day with the highest traffic just north of Johnson Street. The 85th percentile speed ranged from 42-44 mph at these locations. There are discontinuous sidewalks and no bicycle facilities north of Alexander Street, however, there are bicycle lanes south of Alexander Street. There is a committed project to design and acquire right-of-way for a widening to five lanes, sidewalks and bicycle lanes from Merlo Road to Alexander Street as part of the MSTIP 3e funding program. 170th Avenue is a designated Enhanced Major Streets Bikeway along its entire corridor within the study area and is also a designated Streetscape Overlay corridor from Alexander to Blanton streets. There are existing signals at Alexander Street, TV Highway, Blanton Street and Farmington Road.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- North of Johnson Street: 20,098 ADT, 44 mph
- North of Farmington Road: 17,234 ADT, 42 mph
- *Recommended Inclusion: TV Highway*

178th Avenue

178th Avenue is a north-south County neighborhood route in Aloha-Reedville that connects Augusta Lane to TV Highway, and from Shaw Street to Blanton Street. The posted speed limit is 25 mph, and volumes range from 1,800-2,100 ADT south of Johnson Street and less than 500 ADT north of Johnson Street based on historical traffic counts. There are sidewalks on at least one side of the street from Johnson Street to TV Highway. However, there are no sidewalks between Johnson Street and Augusta Lane. The facility has no existing bicycle facilities but is a designated neighborhood bikeway from Augusta Lane to Arnold Park, including a missing segment across the PNWR line. While the bicycle/pedestrian crossing has been proposed in various studies, there are no committed plans to complete this project. 178th Avenue is a designated Streetscape Overlay between Alexander Street and TV Highway, where there is an existing signal.

Daily Traffic Volume and 85th Percentile Speed Counts

- North of Arabela Court: 1,823 ADT, no speed available (2012)
- South of Augusta Lane: 239 ADT, no speed available (2004)
- North of Johnson Street: 347 ADT, no speed available (2004)
- South of Wakem Street: 2,096 ADT, no speed available (2011)
- *Potential Inclusion: Johnson Street*

192nd Avenue

192nd Avenue is a north-south County neighborhood route in Aloha-Reedville that connects Johnson Street to TV Highway. The posted speed limit is 25 mph, and there were 1,800 vehicles per day measured south of Johnson Street in 2005. There are discontinuous sidewalks and no bicycle facilities along the corridor. The Statewide Transportation Improvement Program includes committed funding for pedestrian access to transit and safety improvements along TV Highway including crossing

improvements at 192nd Avenue. In addition, there is an URMD sidewalk improvement project in development between TV Highway and Trelane Street, and additional regional flexible funds committed towards sidewalk construction north to Johnson Street. While a bicycle/pedestrian crossing at the PNWR line has been proposed in various studies, there are no committed plans to complete this project. 192nd Avenue is a designated Streetscape Overlay between Alexander Street and TV Highway.

Daily Traffic Volume and 85th Percentile Speed Counts (2005)

- South of Johnson Street: 1,782 ADT, no speed available
- *Potential Inclusion: Alexander Street*

198th Avenue

198th Avenue is a north-south collector road maintained by Washington County for its entire length within the project study area. The street is signed for 35 mph and has volumes ranging from 9,500-15,500 vehicles per day with the highest traffic just south of TV Highway. The 85th percentile speed ranged from 33-37 mph at these locations. There are continuous sidewalks between Johnson Street and Shaw Street, with discontinuous or complete lack of sidewalks further south and no bicycle facilities anywhere within the project study area. However, there is an on-going project to design and construct a widening to three lanes, sidewalks and bicycle lanes from Blanton Street to Farmington Road as part of the MSTIP 3e funding program and a separate project to realign and signalize the offset intersection at Kinnaman Road as part of the MSTIP High Growth program. There are existing signals at TV Highway and Shaw Street.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- South of Johnson Street: 9,468 ADT, 37 mph
- North of Shaw Street: 15,564 ADT, 33 mph
- South of Blanton Street: 12,400 ADT, 37 mph

Market Center/Intel Aloha Driveway

This private driveway connects Alexander Street to TV Highway through the Market Center shopping plaza, and continues south to the Intel Aloha campus using an existing signal and PNWR crossing. The street is signed for 25 mph north of TV Highway and 15 mph through the Intel campus, but there is no speed or volume information available. While the section through the Intel campus is signed as No Thru Traffic, there is a connection available to Blanton Street via 203rd Avenue. This corridor is a designated Neighborhood Bikeway, which extends further north to Johnson Street via Alexander Street, 202nd Avenue, Almond Street, Pecan Street, Clarion Street and 201st Avenue.

Daily Traffic Volume and 85th Percentile Speed Counts

- None
- *Potential Inclusion: TV Highway*

209th Avenue

209th Avenue is a north-south County road maintained by Washington County for its entire length within the project study area. The street is a designated collector north of TV Highway, where it is signed for 25

mph. There are approximately 4,800 vehicles per day travelling this section at an 85th percentile speed of 29 mph. South of TV Highway, it is an arterial signed for 45 mph and volumes in this section range from 8,100-15,500 ADT with 85th percentile speeds between 39-43 mph. This section is designated an Enhanced Major Streets Bikeway, although the entire corridor lacks continuous sidewalks and bicycle facilities. There is an on-going project to design and construct a widening to five lanes, sidewalks and bicycle lanes from TV Highway to Kinnaman Road as part of the MSTIP 3e and MSTIP High Growth funding programs. There are existing signals at TV Highway and Blanton Street.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

- North of Alexander Street: 4,845 ADT, 29 mph
- South of TV Highway: 8,161 ADT, 39 mph
- South of Blanton Street: 15,541 ADT, 43 mph

214th Avenue

214th Avenue is a local north-south County road in Aloha-Reedville that connects Johnson Street to TV Highway. The posted speed limit is 25 mph, but there is no volume or speed information available. A recent URMD pedestrian improvement project mostly completed sidewalks on one side of the street, but there are no bicycle facilities along the corridor. The Statewide Transportation Improvement Program includes committed funding for pedestrian access to transit and safety improvements along TV Highway including potential crossing improvements at 214th Avenue. While a bicycle/pedestrian crossing at the PNWR line has been proposed in various studies, there are no committed plans to complete this project.

Daily Traffic Volume and 85th Percentile Speed Counts

- None
- *Potential Inclusion: Johnson Street*

Reedville Trail

Reedville Trail (or Pearl-Keeler Powerline Trail) is a planned regional trail along the Bonneville Power Administration powerline right-of-way from Rock Creek to Tualatin River. A small portion exists between Augusta Street and Johnson Street to the north. This facility would potentially include a grade-separated crossing of TV Highway and the PNWR line, however, there is no funding committed for this portion of the trail.

Cornelius Pass Road

Cornelius Pass Road is a north-south County arterial road maintained by Washington County for its entire length within the project study area. The roadway was recently extended to Blanton Street as part of the South Hillsboro development (a portion of which is maintained by the City of Hillsboro, with a new railroad crossing south of TV Highway. A small portion of this extension is maintained by the City of Hillsboro. The street is signed for 35 mph, with 19,500 vehicles per day measured south of Johnson Street and an 85th percentile speed of 37 mph. This section from TV Highway to Johnson Street has continuous sidewalks and bicycle lanes, and there is an on-going project to design and construct a

widening to five lanes, sidewalks and bicycle lanes from TV Highway to Frances Street as part of the MSTIP 3e High Growth funding program. There are existing signals at TV Highway and Johnson Street.

Daily Traffic Volume and 85th Percentile Speed Counts (2019)

South of Johnson Street: 19,417 ADT, 37 mph

Study Area Priority Safety Locations

The TV Highway corridor is identified in Washington County's Transportation Safety Action Plan as a high injury corridor. ODOT maintains a Safety Prioritization Index System (SPIS) that classifies roadway segments into Categories 1 through 5 (with 5 having the worst safety record). TV Highway is designated as a Category 5 road, which equates to more than 10 crashes per 5-mile segment over a 3-year period. Approximately one-third of all fatal and serious injury crashes along the TV Highway corridor involved a person walking or bicycling; these crashes most commonly occurred between SW 170th and 198th avenues. The 5-year average crash rate along TV Highway was 30 percent higher than crash rates for similar ODOT facilities throughout the rest of the state.

Washington County also maintains a SPIS list for intersections where the county has jurisdiction over at least one approaching segment. Table 1 shows intersections ranking in the top 50 measured in the County SPIS. These locations are ranked according to crash frequency, crash rate (per entering vehicles) and crash severity. During the 2014-2016 period, 8 of the top 50 ranked intersections in the county were located within the study area, all but one of which are along TV Highway. Other safety concerns are more difficult to measure, such as the lack of pedestrian or bicycling activity in locations where there are no designated facilities or existing facilities are perceived as unsafe or uncomfortable. In these cases, statistics may not show a record of pedestrian or bicycle crashes, but the lack of safe facilities creates a condition that needs to be addressed. Approximately 84% of all pedestrian crashes occurred within 250 feet of a study area corridor bus stop, suggesting the importance of safety improvements for pedestrians to access transit.[2]

Table 1. Study Area Intersections in County SPIS (2014-2016)

SPIS Rank	Primary Street	Cross Street
3	TV Highway	198th Avenue
6	TV Highway	185th Avenue
18	TV Highway	178th Avenue
25	TV Highway	209th Avenue
38	TV Highway	Cornelius Pass Rd
39	TV Highway	170th Avenue
41	Cornelius Pass Rd	Johnson Street
46	TV Highway	192nd Avenue

Study Area Traffic Conditions

Existing and future traffic conditions are important to review within the study area as they relate to likely impacts to trail alignment alternatives. This section provides a qualitative review of existing and projected future traffic conditions within the study area. Additional analysis will be conducted for future

[2] Finding from Moving Forward TV Highway (2019)

phases of the project, including identifying potential impacts to traffic operations as a results of alternative trail alignments.

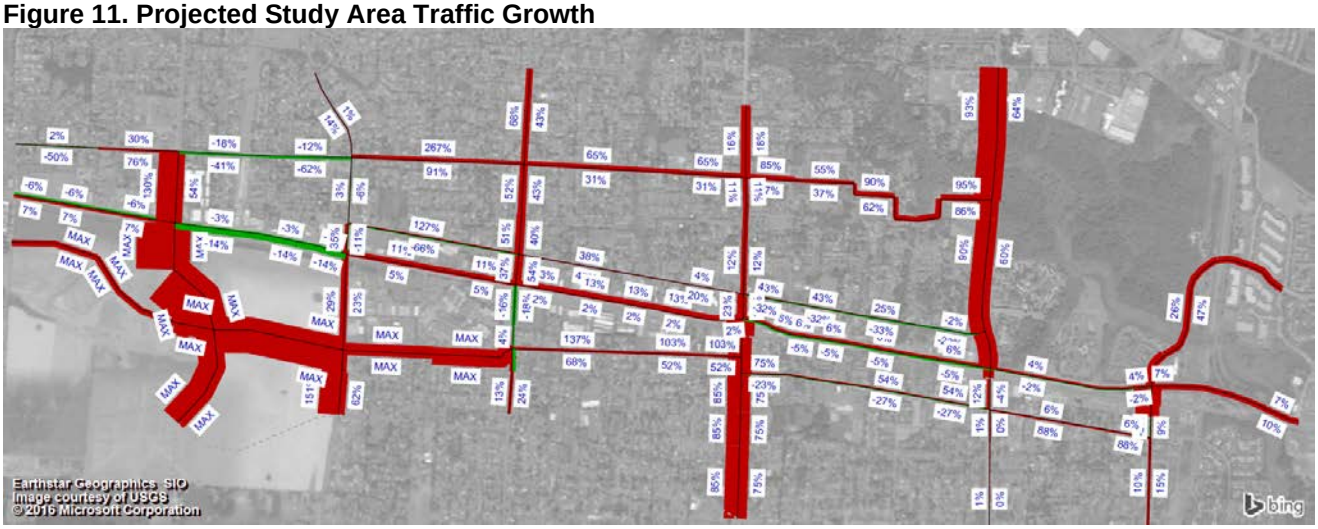
The intersection with the highest overall entering volumes in the p.m. peak hour was TV Highway at 170th Avenue, with over 5,000 vehicles. The segment of TV Highway between 160th Avenue and 170th Avenue carried the highest volumes, with over 2,000 in the peak (westbound) direction. Future growth within the study area was assessed using Washington County's west side p.m. peak hour model, which has a base year of 2015 and a future horizon year of 2035. A plot showing traffic growth within the study area between 2015 and 2035 is shown in Figure 11. As a percentage traffic growth in the study area is highest on segments of facilities that run parallel to TV Highway such as:

- Johnson Street
- Blanton Street

The greatest volume growth is on facilities that connect to TV Highway such as:

- 170th Avenue north of TV Highway
- 185th Avenue south of TV Highway
- New network connections in the South Hillsboro area, south of the Cornelius Pass Road intersection with TV Highway.

Figure 11. Projected Study Area Traffic Growth



Growth on TV Highway itself is limited in the model because even under base year conditions, it is operating near capacity. Traffic growth is highest westbound between 185th Avenue and 198th Avenue, with about 13% growth between 2015 and 2035.

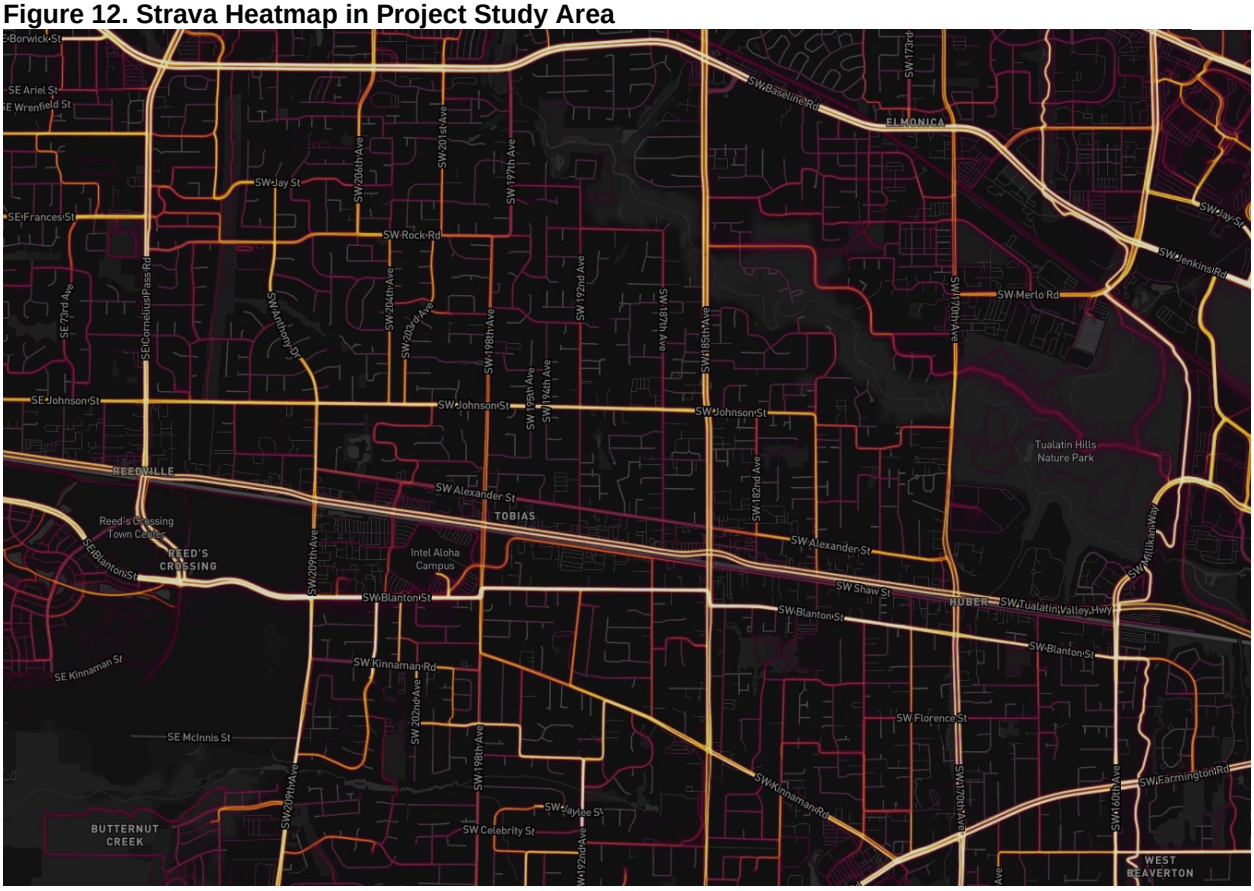
Bicycle Volumes (Strava Heatmap)

Strava is an activity sharing website that allows users to track and upload running and cycling trips using GPS data, either from Strava's dedicated smartphone app or a third-party GPS bike computer. The project team retrieved a screenshot of the bicycle heatmap for the project study area, shown in Figure 12. The heatmap shows "heat" made by aggregated, public (bicycle) activities over the last two years,

updated on a monthly basis. The brighter the line on the map, the more activity on those streets, and areas with very little activity show little or no “heat”.

It’s important to note that because the Strava software is geared towards recreational riders and requires some combination of a smartphone, computer, and/or a GPS watch, the heatmap does not show a representative sample of bicycle travel in the project study area. However, it can provide insights into the relative usage of various roadways in the area.

Figure 12. Strava Heatmap in Project Study Area



For east-west routes, the heatmap indicates higher levels of activity on Baseline Road north of the study area and Blanton Street and Farmington Road at the south end, with TV Highway, Kinnaman Road, Merlo Road, Rock Road and Johnson Street showing lower levels of activity. Shaw Street and Alexander Street register limited activity except for a few short sections, as does Augusta Lane which does not yet connect across Beaverton Creek.

North-south routes show high activity levels on Cornelius Pass Road, 158th Avenue, 160th Avenue/Millikan Way and Westside Trail, while 185th and 209th avenues show lower levels of activity and 198th Avenue registers limited activity. 170th Avenue shows higher usage south of TV Highway where there are bicycle lanes compared to the section to the north that lacks dedicated facilities. 178th Avenue also sees some usage connecting Johnson Street to TV Highway.

Appendix A
Trail Planning Partners

Table 2 provides an overview of trail planning partner agencies important to TV Trail and relevant design guidance.

Table 2. Trail Planning Partners and Relevant Policy and Design Guidance

Trail Partner	Description	Relevant Policy and Design Guidance
City of Beaverton	• Located entirely within THPRD's ultimate service area. • Local transportation planning agency, including bicycle and pedestrian systems identified in the city's transportation plan and Active Transportation Plan (2017). • Provides regulatory guidance/standards for trail design and development when located in the public right of way and as part of the development review process. • Provides funding and/or other assistance for trail design and development through local funding programs and/or capital improvement projects, such as bike lanes or widened sidewalks. • Coordinates with THPRD to ensure compatibility between trails and transportation.	• Tualatin Valley Trail is unnamed and only mapped as a planned trail alignment along TV Hwy in Active Transportation Plan. • Active Transportation Plan provides the following policy guidance: 1) work to address lighting standards on regional transportation corridors; 2) work to improve trail crossings of streets to allow for comfortable, safe, and convenient movement for trails users; 3) construct trails that serve users of all ages and abilities and meet ADA guidance; and 4) look for opportunities to pursue grant funding in partnership.
Clean Water Services (CWS)	• Local environmental agency for water quality protection and enhancement. • Provides mitigation/enhancement requirements for impacts to vegetated corridors as a result of trail development.	• Provides regulatory guidance/standards for trail design and development located within vegetated corridors adjacent to creeks, stream and wetlands.
City of Hillsboro	• Located on the west side of THPRD's ultimate service area and study area boundary • Local trails and transportation planning agency, including its Trails Master Plan (2015), Transportation System Plan and South Hillsboro Community Plan, • Design guidance for Multi-Use Trail, Inside Road Right-of-Way and Rail-with-trail (RWT) facility design	• Tualatin Valley Trail is mapped as a Regional Trail (209th Ave-1st Ave) in Trails Master Plan with the following description: *The Tualatin Valley Trail is located along TV Highway and would provide an efficient connection to downtown Hillsboro. Upgrades to the highway, including bicycle, pedestrian, and trail improvements are being planned by ODOT.* • Defines alignment and design guidance.

Trail Partner	Description	Relevant Policy and Design Guidance
		• Describes TV Trail as rail with trail, 12-foot wide asphalt multi-use path with fencing.
Metro	• Regional trails and transportation planning agency, including the regional trails and greenspaces the plan, regional transportation plan and the regional active transportation plan. • Provides technical assistance for trail design and development. • Provides funding for trail planning, design and development through regional and federal grants and funding programs. • Coordinates with state and local agencies to ensure compatibility between trails and transportation. • Administers a number of data collection, analysis and distribution programs on the regional trail system, including land acquisition, planning, implementation, monitoring and maintenance.	Regional trails should adhere to the follow design principles: • Serve the anticipated users • Provide safety and security • Integrate trails with the street system and neighborhoods • Fit the land use context • Respect the natural environment
Tualatin Hills Parks and Recreation District	• THPRD's ultimate service area includes portions of urbanized, unincorporated Washington County in Aloha. • Provides regulatory guidance/standards for trail design and development when located in the public right of way and its own right of way separated from roads and streets. • Trails Functional Plan includes trail prioritization criteria • Potential funding and/or other assistance for trail design and development	• Tualatin Valley Trail classified as a Regional Trail (Reedville Trail to Beaverton Creek Trail) in THPRD Trails Functional Plan • Defines five trail segments of the TV Trail • Regional Trail Design guidance on material (paved), width (12 feet with 2 foot gravel shoulder), vertical clearance (10 feet from top of trail) and horizontal clearance (2 feet from edge of shoulder)
Oregon Parks & Recreation Department (OPRD)	• Statewide recreational trails planning and development agency. • Provides technical assistance for trail design and development. • Provides funding for trail development and construction through state and federal grant programs. • Supports bicycle and pedestrian tourism. • Coordinates with ODOT to ensure compatibility between trails and transportation.	
Oregon Department of	• Statewide transportation planning and development agency.	• Owns and maintains Tualatin Valley Highway.

Trail Partner	Description	Relevant Policy and Design Guidance
Transportation (ODOT)	• Provides technical assistance for trail design and development whenever located within a state right of way or on federally funded trail projects. • Provides regulatory guidance/standards for trail design and development when located in the public right of way in accordance with the Blueprint for Urban Design (2020, interim). • Provides regulatory guidance/standards within and in close proximity to rail corridors • Coordinates with railroad. • Provides funding for trail design and development through state and federal grants and funding programs. • Coordinates with OPRD to ensure compatibility between trails and transportation.	• Oregon Pedestrian and Bicycle Plan, specifically Policy 2.1/Strategy 2.1B (providing a parallel bike route in lieu of on-highway facilities), Policy 2.5 (supporting off-street walkways and bikeways), and Policy 3.2/Strategy 3.2D (which recommends looking beyond an individual roadway when planning for walkways/bikeways).

TUALATIN VALLEY TRAIL

Appendix B
Existing Plans, Policies and Design Guidance
(summaries to be included in final report)

- Washington County Transportation System Plan (2015)
- TV Highway Corridor Plan (2013)
- Aloha-Reedville Study and Livable Communities Plan (2014)
- Aloha Tomorrow (2017)
- Moving Forward TV Highway (2019)
- Washington County Bicycle and Pedestrian Improvement Project (2013)
- Washington County Neighborhood Bikeway Plan (2014)
- Washington County Bicycle Facility Design Toolkit (2012)
- Washington County School Access Improvement Study (2016)
- Beaverton Active Transportation Plan
- THPRD Trails Functional Plan
- Hillsboro Trails Master Plan
- TriMet Pedestrian Network Analysis Report (2011)
- TriMet Bike Plan (2016)
- Oregon Bicycle and Pedestrian Plan and Implementation Work Program (2016)
- Metro Regional Transportation Plan (2018)
- Metro Regional Designing Livable Streets and Trails Guide (2018)
- Oregon Pedestrian and Bicycle Safety Implementation Plan (2014)
- Oregon Bicycle and Pedestrian Design Guide
- ODOT Region 1 Active Transportation Inventory (ongoing)

TUALATIN VALLEY TRAIL

Appendix C
Bicycle Model Outputs

Bicycle Model Data

Metro's regional transportation model includes a bicycle routing tool that helps measure route attractiveness by considering a multitude of network attributes in assessing the relative desirability of travel by bicycle between origins and destinations throughout the region. The dedicated bicycle network contains all streets and off-street paths in the region, with a routing algorithm used to determine the most logical path between each origin-destination pair in the network, and the relative attractiveness of each path is then quantified according to a relative valuation of network attributes: distance, facility type, auto traffic volume, uphill slope, major bridge crossings, turn frequency, and intersection control. The resulting "route experience measure" is passed into the regional transportation model's mode choice model, which considers bicycle alongside all other potential modes in estimating travel decisions. Upon completion of the mode choice step, the number of daily bicycle trips between each origin-destination pair is known. This demand, which is separated into commute and non-commute categories, is subsequently assigned to the bicycle network for the purposes of flow visualization and further analysis.

The bicycle model outputs displaying daily bicycle volumes through the network have been generated for current year (2015), as well as the financially constrained network in 2027 and 2040 that reflects future projects including bicycle lanes on Alexander and Blanton streets within the study area. The current-year model is currently missing bicycle volumes on streets such as Johnson and Blanton streets that currently lack facilities. While the modeled volumes are likely higher than actual bicycle counts, the current year model demonstrates TV Highway being the main east-west conduit in the project study area, with Farmington and Kinnaman roads also showing significant volumes. 185th Avenue, Westside Trail, and Cornelius Pass Road are the preferred links among north-south routes, with 198th and 170th also showing volume even though part or all of these routes lack dedicated facilities. In the 2027 financially constrained network, volumes are more evenly spread along the network, with TV Highway remaining the primary east-west facility for bikes, and the addition of significant bicycle travel on Alexander and Blanton streets (the latter providing a new connection through South Hillsboro). 170th, 198th and 209th avenues also see substantial increases after complete street upgrades in the Aloha-Reedville area. The TV Trail is open in the 2040 financially constrained network and becomes the dominant east-west facility, particularly west of 198th Avenue. The construction of the Beaverton Creek Trail leads to extremely high volumes along Merlo Road and Augusta Lane, as well as increased usage of 170th Avenue. The Reedville Trail also provides a new north-south connection on the west side of the study area and is shown as a preferred alternative to Cornelius Pass Road. Johnson Street and Kinnaman Road also see increased usage in this model.

There are also flowbundle diagrams created showing the current movement of bicycle users traveling on TV Highway at 185th Avenue in both directions through the network. Towards the east, these diagrams show that people riding bicycles on TV Highway are largely originating from or heading to downtown Beaverton, and then fanning further out towards Sunset Transit Center/US 26 bicycle path, Raleigh Hills,

Fanno Creek Trail and Washington Square. In the west, riders are modeled originating from or heading to downtown Hillsboro, the Intel Aloha campus and Rood Bridge Park.

Figures 13-17 show bike model outputs for the current and forecast year, including the flowbundle diagrams.

Figure 13. 2015 Bike Model Network in Project Study Area

Figure 14. 2027 Financially Constrained Bike Model Network in Project Study Area

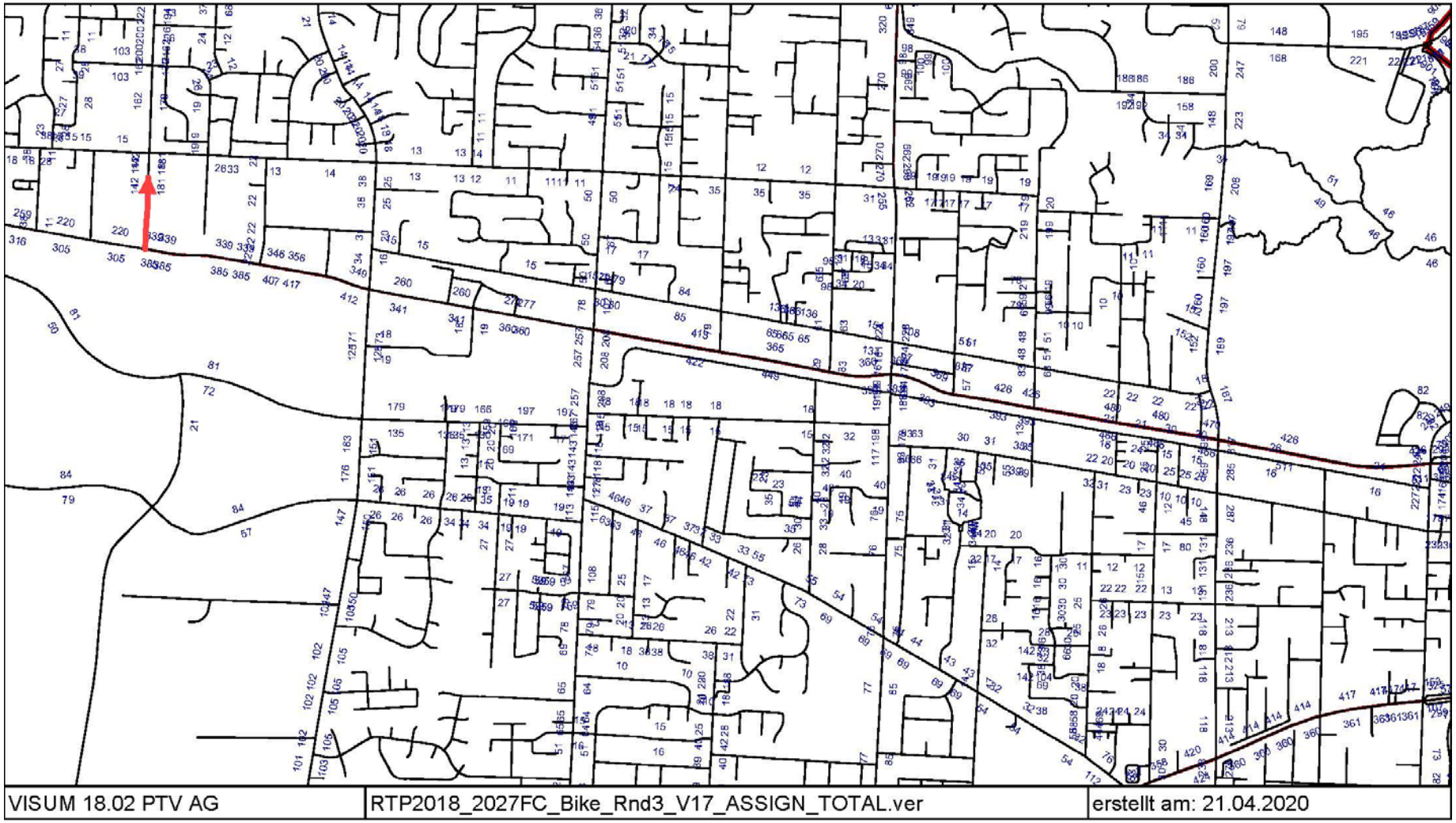


Figure 15. 2040 Financially Constrained Bike Model Network in Project Study Area

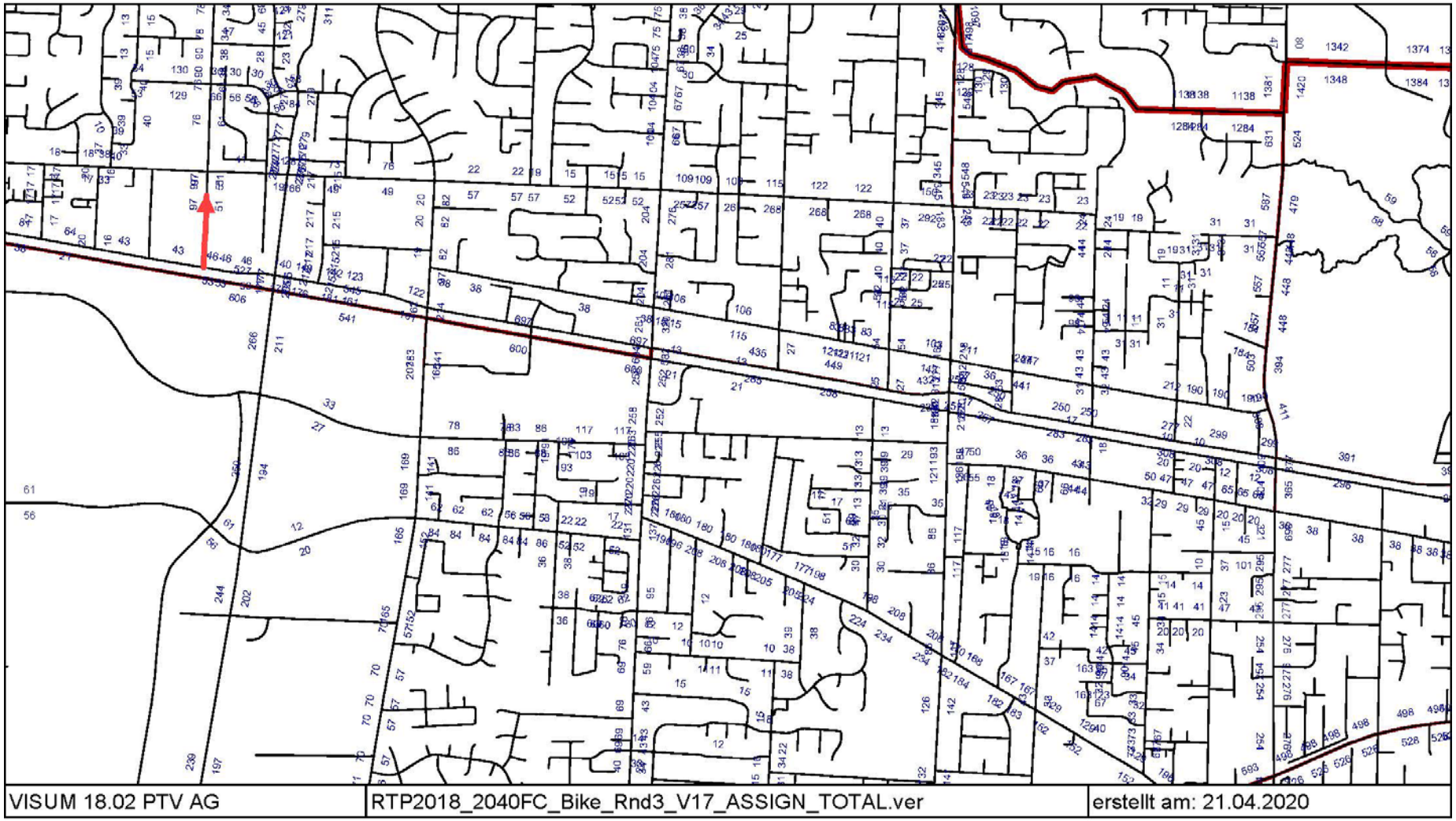


Figure 16. 2015 TV Highway at 185th Avenue Westbound Flow Bundle

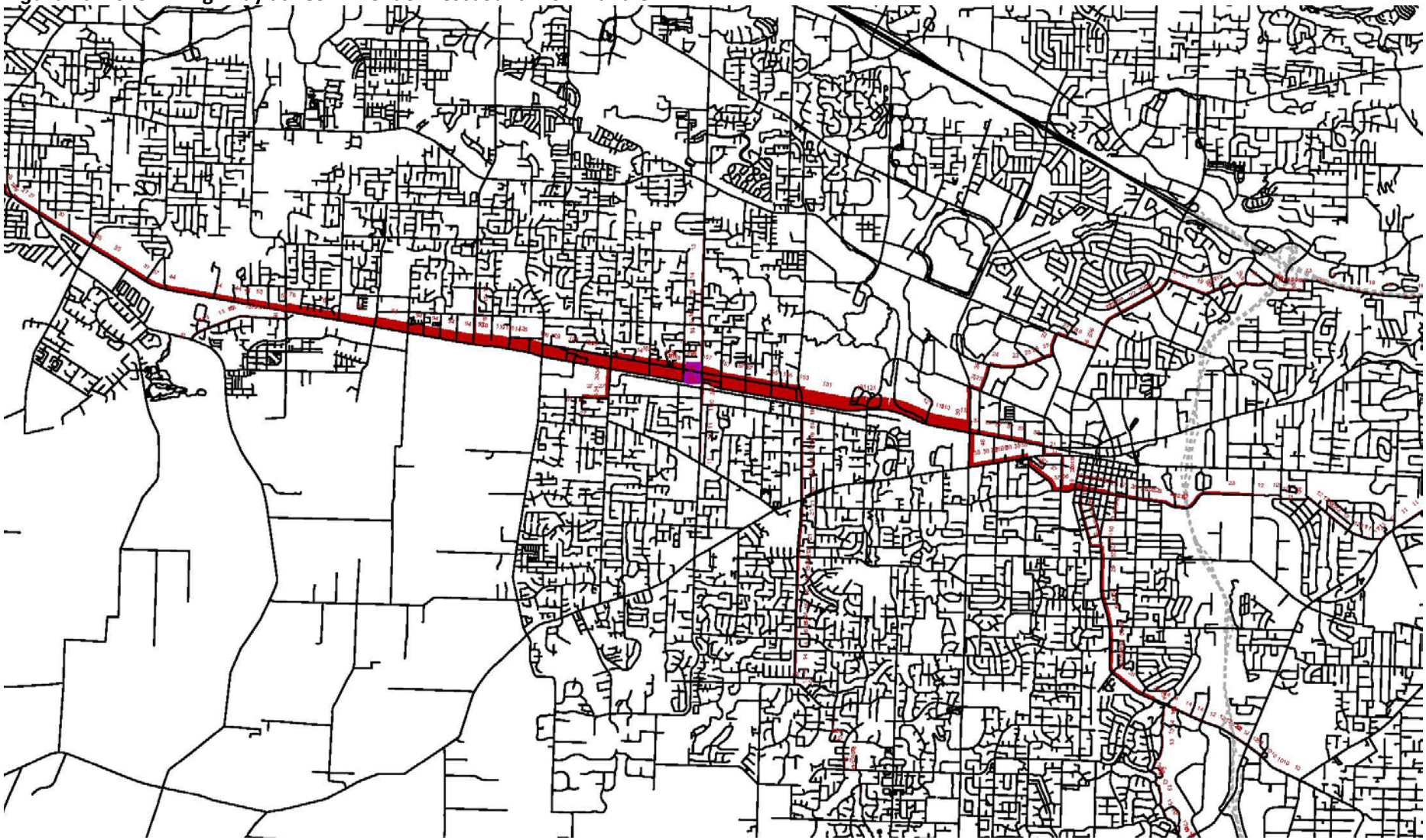


Figure 17. 2015 TV Highway at 185th Avenue Eastbound Flow Bundle