SWEET HOME TSP METHODS AND ASSUMPTIONS (DRAFT)

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TO: Project Management Team

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SUBJECT: Task 2.3 Sweet Home TSP Methods and Assumptions   Project #20020-015

INTRODUCTION

The purpose of this memorandum is to establish the methods and assumptions to be used for the existing and future conditions transportation analysis for the Sweet Home Transportation System Plan Update. The following sections summarize the study intersections and describe the proposed methodology to calculate and analyze the existing 2021 and future 2045 traffic volumes, existing and future traffic operations, crash history and safety performance, and qualitative multi-modal analyses.

STUDY AREA

The Study Area is the land within City's Urban Growth Boundary, approximately shown in **Figure 1.** The North Sweet Home Area ("NSHA") as referenced in this document is shown in **Figure 2**.
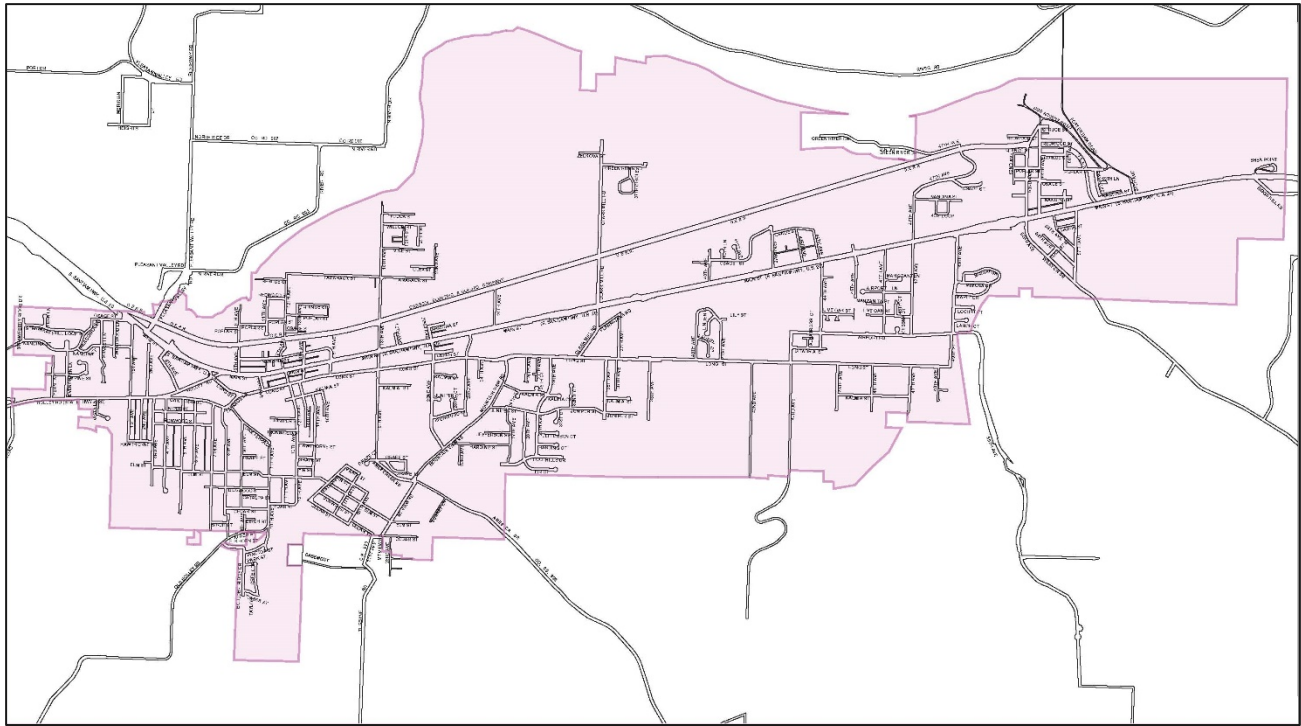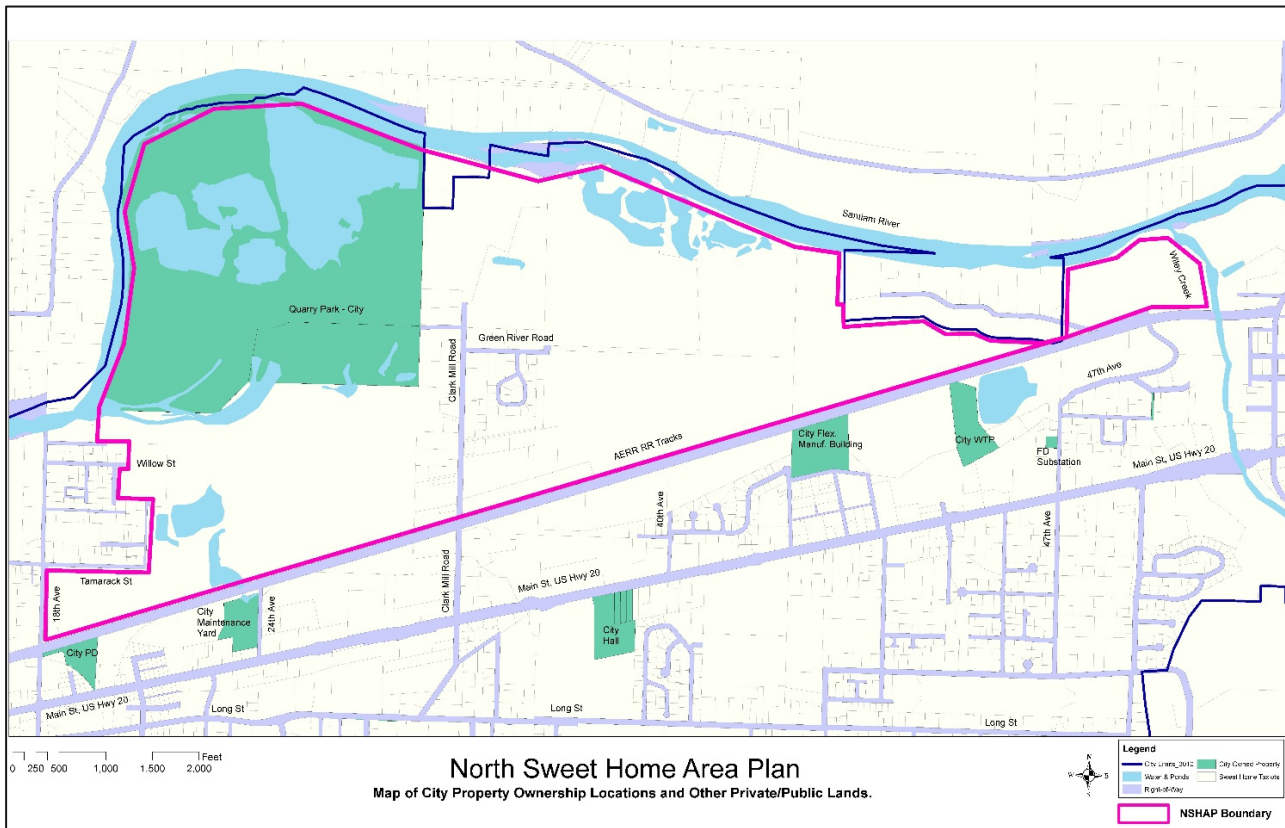
FIGURE 1: STUDY AREA BOUNDARY

FIGURE 2: NORTH SWEET HOME AREA

STUDY INTERSECTIONS

A total of 19 study intersections have been identified, which are listed in **Table 1**. All traffic counts were provided by ODOT and collected June 3, 2021.

TABLE 1: STUDY INTERSECTIONS

#	INTERSECTION	COUNT DATE	TYPE	DURATION
1	Main Street (Hwy 20) and Pleasant Valley Road	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
2	Main Street (Hwy 20) and Holley Road (Hwy 228)	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
3	Main Street (Hwy 20) and 12th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
4	Main Street (Hwy 20) and 15th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
5	Main Street (Hwy 20) and 18th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
6	Main Street (Hwy 20) and 22nd Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
7	Main Street (Hwy 20) and 24th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
8	Main Street (Hwy 20) and Clark Mill Road	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
9	Main Street (Hwy 20) and 44th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
10	Main Street (Hwy 20) and 47th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
11	Main Street (Hwy 20) and 49th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
12	Main Street (Hwy 20) and 53rd Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
13	Main Street (Hwy 20) and 54th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
14	Main Street (Hwy 20) and 60th Avenue (Foster Dam Road)	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
15	Holley Road (Hwy 228) and 1st Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
16	Holley Road (Hwy 228) and Oak Terrace	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
17	Long Street and 18th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
18	Long Street and 43rd Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)
19	Elm Street and 10th Avenue	6/03/2021	TMC	16 Hour (6 a.m. – 10 p.m.)

TRAFFIC VOLUME DEVELOPMENT

Study intersection traffic operations will be analyzed using estimated 30th highest hour traffic volume (30 HV) conditions.

PEAK HOUR SELECTION

A singular system peak hour will be used to derive intersection traffic volumes for traffic analysis. The peak hour for the study intersections was identified using the Oregon Traffic Monitoring System MS2 platform, which determined the system p.m. peak hour to be 4:15 to 5:15 p.m. This peak hour will be used to compare operational results to ODOT and City mobility targets/operating standards. The individual (local) peak hours for each study intersection are listed in **Table 2**.

TABLE 2: P.M. PEAK HOURS AT STUDY INTERSECTIONS

#	INTERSECTION	P.M. PEAK HOUR
1	Main Street (Hwy 20) and Pleasant Valley Road	4:15 - 5:15
2	Main Street (Hwy 20) and Holley Road (Hwy 228)	4:15 - 5:15
3	Main Street (Hwy 20) and 12th Avenue	3:45 - 4:45
4	Main Street (Hwy 20) and 15th Avenue	4:00 - 5:00
5	Main Street (Hwy 20) and 18th Avenue	3:15 - 4:15
6	Main Street (Hwy 20) and 22nd Avenue	3:45 - 4:45
7	Main Street (Hwy 20) and 24th Avenue	3:30 - 4:30
8	Main Street (Hwy 20) and Clark Mill Road	4:30 - 5:30
9	Main Street (Hwy 20) and 44th Avenue	4:30 - 5:30
10	Main Street (Hwy 20) and 47th Avenue	4:45 - 5:45
11	Main Street (Hwy 20) and 49th Avenue	3:15 - 4:15
12	Main Street (Hwy 20) and 53rd Avenue	3:15 - 4:15
13	Main Street (Hwy 20) and 54th Avenue	3:30 - 4:30
14	Main Street (Hwy 20) and 60th Avenue (Foster Dam Road)	3:45 - 4:45
15	Holley Road (Hwy 228) and 1st Avenue	4:30 – 5:30
16	Holley Road (Hwy 228) and Oak Terrace	4:30 – 5:30
17	Long Street and 18th Avenue	3:00 – 4:00
18	Long Street and 43rd Avenue	3:00 – 4:00
19	Elm Street and 10th Avenue	4:45 – 5:45

SEASONAL ADJUSTMENT FACTOR

A seasonal adjustment factor is required to reach the desired conditions using methodology from the ODOT Analysis Procedures Manual (APM). The adjustment factor will be applied to all study intersections, including local street intersections.[1]

To determine when seasonal traffic conditions occur along Highway 20 in Sweet Home, the On-Site Automatic Traffic Recorder (ATR) Method has been used. We propose using ATR #22-013 (SE of Sodaville-Waterloo Drive, southeast of Lebanon [0.38 mile]). This ATR is located at Mile Point (MP) 19.05, and is representative of Sweet Home since:

- Located 7.5 miles from the study area boundary with no major intersections between.

- The traffic counts for the study area are within 10% of the ATR location[2]

Count month and peak month percentages AADT have been obtained from the ATR summaries in the Traffic Volume Tables (TVT) for the past five years. The peak month for this ATR has been identified as July, and the highest and lowest percentages have been eliminated, and an average percentage of AADT has been calculated for both peak month and count month.

Based on the values in **Table 3**, the seasonal adjustment factor is calculated to be 1.04.[3]

TABLE 3: SEASONAL ADJUSTMENT USING ATR #22-013

	2017	2018	2019	2020	2021
PEAK MONTH (JULY)	116%	113%	114%	120%	119%
COUNT MONTH (JUNE)	112%	111%	113%	113%	117%

HISTORICAL GROWTH ADJUSTMENT

Traffic volumes will assume a base year of 2021, the year that traffic volumes were counted. Therefore, no historical growth adjustment will be applied to the turning movement counts.

COVID ADJUSTMENT FACTOR

Traffic counts were collected in June 2021. The AADT trends from 2018 to 2021 for ATR #22-013 indicated that traffic volumes were reduced in 2020, but generally recovered to be consistent with 2018 and 2019 trends by 2021. The June 2021 average of 16,351 is higher than the projected value based on the 2018 to 2019 growth trend. Based on this, no Covid adjustment factor is proposed for the 2021 traffic volumes.

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[1] Analysis Procedures Manual, Oregon Department of Transportation, Updated 2020.

[2] A study area traffic count of 13,176 was collected on April 9, 2019 on Highway 20 west (north) of Pleasant Valley Road. The average weekday count for ATR station 22-013 is 14,142 in April 2019, which is within 7 percent.

[3] (116+114+119)/(112+113+113) = 1.0356

Table 4 and **Figure 3** show the weekday and daily AADT trends at the ATR.

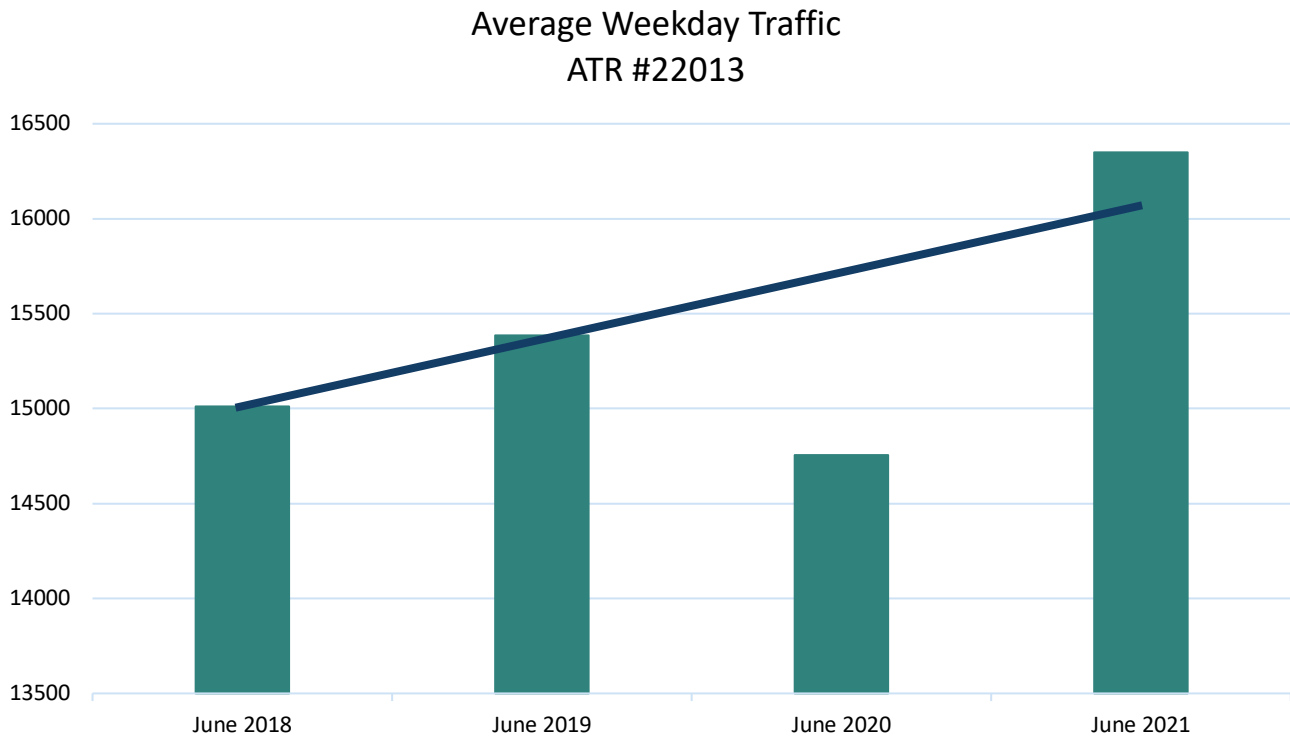| MONTH-YEAR	WEEKDAY		DAILY	
	AVERAGE	%AADT	AVERAGE	%AADT
JUNE 2021	16,351	117	15,788	113
JUNE 2020	14,754	113	13,935	107
JUNE 2019	15,385	113	15,085	111
JUNE 2018	15,011	111	14,758	109

Average Weekday Traffic
ATR #22013

FIGURE 3: AVERAGE WEEKDAY TRAFFIC AT TRAFFIC COUNTER #22-013

FUTURE 2045 TRAFFIC VOLUME FORECASTING

The 2045 traffic forecasts will be developed using the enhanced zonal cumulative analysis ("EZCA") process to develop a travel forecast tool that covers the street system within the Sweet Home UGB. The EZCA process will be documented further in a future memorandum and will:

- Estimate land use and trip changes within Sweet Home
- Consider external growth factors
- Assign existing and future traffic to a street network

TRAFFIC ANALYSIS

Traffic operations (LOS and v/c) will be analyzed for all study intersections under existing (2021) and future (2045) baseline conditions. The Highway Capacity Manual (HCM), 6th Edition methodology will be used for signalized and unsignalized intersection analyses.[4]

INTERSECTION MOBILITY TARGETS/OPERATING STANDARDS

All study intersections mobility targets/operating standards are based on jurisdictional ownership. The intersections under state jurisdiction must comply with the v/c ratios in the Oregon Highway Plan (OHP). The ODOT v/c targets are based on the highway category, location, and posted speeds. The highways have the following characteristics:

- US 20,
    - classified as a Regional Highway
    - is a freight route
    - within a non-MPO UGB,
    - varies in speed from 25 MPH to 45 MPH within the study area
    - Mobility target: v/c of 0.90 (speeds under 45 mph), v/c of 0.85 (speeds 45 mph and higher)
- HWY 228
    - classified as a District Highway
    - within a non MPO UGB
    - a posted speed of 35 mph within Sweet Home City Limits
    - Mobility target: v/c of 0.95

The City of Sweet Home uses LOS mobility standard on City roadways and defines LOS D as the minimum acceptable design standard.

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[4] Highway Capacity Manual, 6th Edition, Transportation Research Board, 2016.

TABLE 5: STUDY INTERSECTION MOBILITY TARGETS/OPERATING STANDARDS

	INTERSECTION	JURISDICTION	INTERSECTION CONTROL	MOBILITY TARGET/ OPERATING STANDARD
1	Main Street (Hwy 20) and Pleasant Valley Road	ODOT	Signal	v/c ≤ 0.90
2	Main Street (Hwy 20) and Holley Road (Hwy 228)	ODOT	Signal	v/c ≤ 0.90
3	Main Street (Hwy 20) and 12th Avenue	ODOT	Signal	v/c ≤ 0.90
4	Main Street (Hwy 20) and 15th Avenue	ODOT	Signal	v/c ≤ 0.90
5	Main Street (Hwy 20) and 18th Avenue	ODOT	Signal	v/c ≤ 0.90
6	Main Street (Hwy 20) and 22nd Avenue	ODOT	Two-Way Stop	v/c ≤ 0.90
7	Main Street (Hwy 20) and 24th Avenue	ODOT	Two-Way Stop	v/c ≤ 0.90
8	Main Street (Hwy 20) and Clark Mill Road	ODOT	Two-Way Stop	v/c ≤ 0.85
9	Main Street (Hwy 20) and 44th Avenue	ODOT	Two-Way Stop	v/c ≤ 0.85
10	Main Street (Hwy 20) and 47th Avenue	ODOT	Two-Way Stop	v/c ≤ 0.85
11	Main Street (Hwy 20) and 49th Avenue	ODOT	Two-Way Stop	v/c ≤ 0.85
12	Main Street (Hwy 20) and 53rd Avenue	ODOT	Two-Way Stop	v/c ≤ 0.85
13	Main Street (Hwy 20) and 54th Avenue	ODOT	Two-Way Stop	v/c ≤ 0.85
14	Main Street (Hwy 20) and 60th Avenue (Foster Dam Road)	ODOT	Two-Way Stop	v/c ≤ 0.85
15	Holley Road (Hwy 228) and 1st Avenue	ODOT	Two-Way Stop	v/c ≤ 0.95
16	Holley Road (Hwy 228) and Oak Terrace	ODOT	Two-Way Stop	v/c ≤ 0.95
17	Long Street and 18th Avenue	City	AWSC	LOS D
18	Long Street and 43rd Avenue	City	AWSC	LOS D
19	Elm Street and 10th Avenue	City	Two-Way Stop	LOS D

SAFETY ANALYSIS

Crash trends will be identified by analyzing the most recent five years of available crash data for all roadways within the Urban Growth Boundary. Crash data will be obtained from the most recent available 5 years of complete crash data from ODOT's Crash Analysis and Reporting Unit in the Project area. An inventory and identification of collisions and crash patterns on the transportation system for all users will be assembled. Collisions that do not involve vehicles, such as pedestrian tripping and falling on poor condition sidewalks, will also be assessed as data is available. The analysis will commence once the final 2021 crash database is available and will evaluate 2017-2021 crashes. Data for State Highways will include but is not limited to locations of Top 5% or 10% Safety Priority Index System sites.

Crash inventory will include, but is not limited to the following:

- Location;
- Crash type and characteristics;
- Severity (property damage, injury and level of injury, or fatality);
- Summary review of pedestrian and bicycle crashes; including bicycle or pedestrian present; and
- Summary review of fatal and serious injury crashes.

The analysis will include the calculation of critical crash rates at all study intersections as outlined in ODOT's Analysis Procedures Manual. Intersection crash rates will be compared to critical crash rates and the excess proportion of specific crash types based on the methods outlined in Part B of the Highway Safety Manual. If a critical crash rate or excess proportions cannot be calculated due to limited data or inadequate reference populations, crash rates must be compared to the published 90th percentile rates in Table 4-1 of the APM. Project Area K-Factors will be calculated from 12+ hour counts to convert short duration counts to daily traffic approach volumes. Crash rates will be compared to Table II in the statewide Crash Rate Book to identify locations and intersections with more crashes than other similar facilities in Oregon.

MULTI-MODAL ANALYSIS

Analysis of primary non-motorized transportation on collector and arterial roadways will include, but is not limited to availability of sidewalks, bicycle facilities, transit routes and facilities, and gaps in primary routes and multimodal opportunities based on available GIS data and online mapping.

Multi-Modal transportation analysis will include the following:

- Availability of sidewalks and bicycle lanes;
- General condition of existing American with Disabilities Act ("ADA") compliant ramps (as data is available), sidewalks and bicycle facilities;
- Pedestrian and bicycle level of traffic stress as per agency's Analysis Procedure Manual V2;
- Qualitative (multimodal) assessment for transit modes (guidance is available in agency's Analysis Procedure Manual V2);
- A qualitative assessment of transit service and identification of underserved areas; and
- Gaps in intermodal connectivity.

Future conditions for bicycles and pedestrians will be estimated based on future traffic operation conditions, expected growth projections, the City's Comprehensive Plan, development of planned facilities, and the application of the existing code.