

TECHNICAL MEMORANDUM

DATE: July 18, 2023
TO: Dana Nichols (City of Bandon)
FROM: Emily Welter, PE (Parametrix)
SUBJECT: Final Tech Memo #3: Analysis Methodology
CC: Tom Guevarra (ODOT)
PROJECT NUMBER: 274-2395-125
PROJECT NAME: City of Bandon TSP Update

This memorandum establishes the methods and assumptions that will be used to develop the existing conditions, future conditions, and alternatives transportation analysis for the City of Bandon Transportation System Plan (TSP). This memorandum summarizes the methodology and assumptions developed for the traffic operations analyses, safety analyses, and the multimodal operational analyses. The ODOT Analysis Procedures Manual (APM)¹ will guide the methodologies and assumptions used for these analyses.

STUDY AREA

The Bandon TSP will focus on 14 study intersections located within Bandon. The study intersection locations are shown in Figure 1.

TRAFFIC VOLUME DEVELOPMENT

Existing Traffic Volumes

Existing conditions traffic operations will be analyzed for the study intersections using 2022 volumes. Following Chapter 5 of the APM, the traffic operations will be analyzed using estimated 2022 30th highest annual hour of traffic (30 HV) conditions. The 30 HV development process for existing conditions includes determination of the system peak and seasonal adjustments. The 30 HV network needs to be balanced, per Section 5.6.1 of the APM.

The existing count date, type, and durations are summarized in Table 1. ODOT collected the turning movement counts (TMCs) at the 14 study intersections in July 2022. Average annual daily traffic (AADT) data is available at several locations along U.S. 101 within the study area, the most recent being from October 2022. ODOT also maintains an automatic traffic recorder (ATR) near the study area along U.S. 101, 1.02 miles south of 18th Street SW and 1,500 feet south of Seabird Drive (intersection 1).

¹ Analysis Procedures Manual Version 2, Oregon Department of Transportation, April 2023.

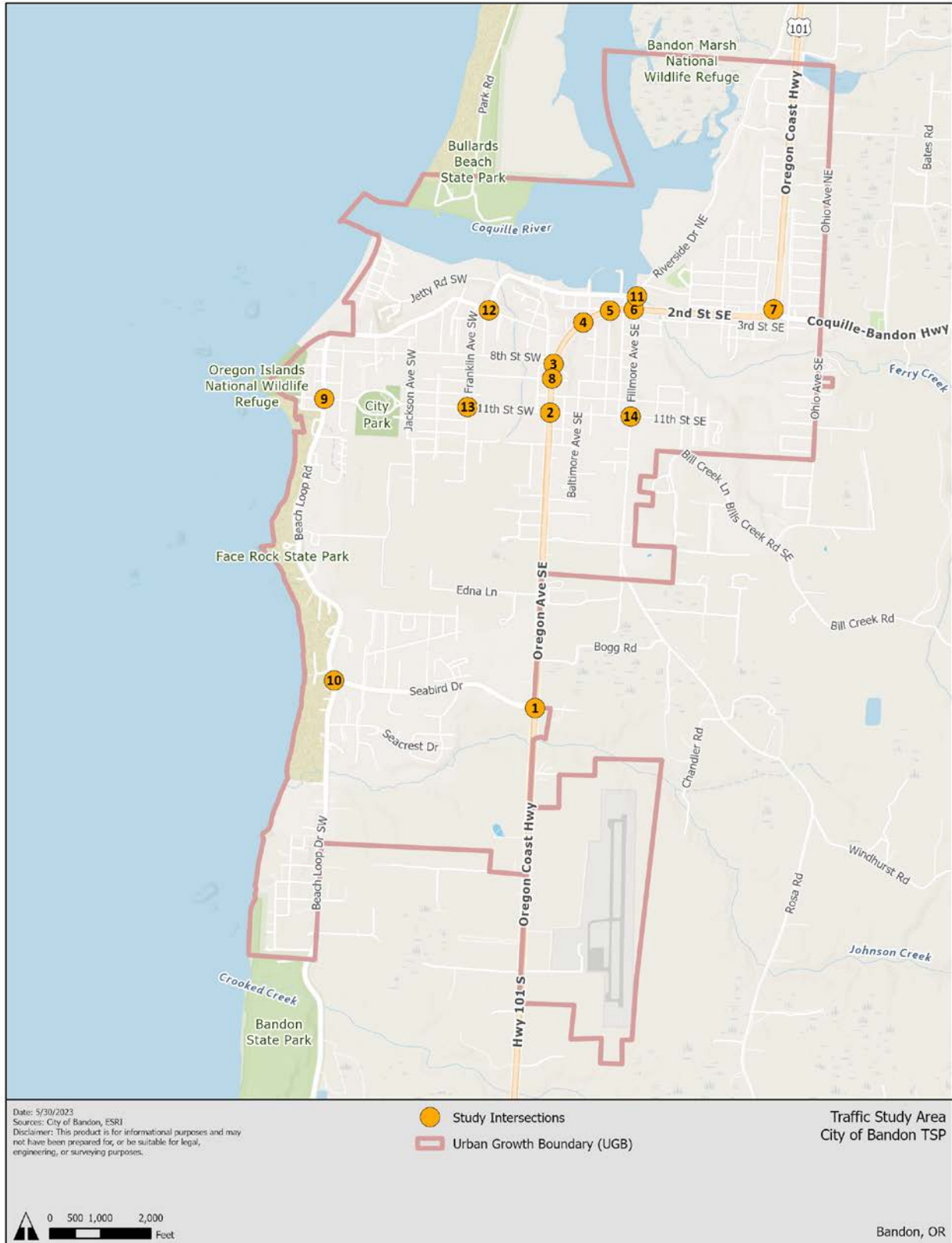


Figure 1. Study Area

Table 1. Study Intersection Locations

#	Location	Count Date	Type	Duration
1	U.S. 101 & Seabird Drive/Doberman Lane	July 18, 2022	TMC	16-hour
2	U.S. 101 & 11th Street SW/SE	July 12, 2022	TMC	16-hour
3	U.S. 101 & Oregon Avenue SE	July 12, 2022	TMC	16-hour
4	U.S. 101 & Chicago Avenue SE	July 12, 2022	TMC	16-hour
5	U.S. 101 & 2nd Street SE/Delaware Avenue SE	July 12, 2022	TMC	16-hour
6	U.S. 101 & Fillmore Avenue SE	July 12, 2022	TMC	16-hour
7	U.S. 101 & 1st Street SE/OR 42S	July 12, 2022	TMC	16-hour
8	U.S. 101 & 9th Street SW	July 12, 2022	TMC	16-hour
9	Beach Loop Drive & 11th Street SW	July 18, 2022	TMC	4-hour
10	Beach Loop Drive & Seabird Drive SW	July 18, 2022	TMC	4-hour
11	Riverside Drive/Fillmore Avenue SE & 1st Street SE	July 18, 2022	TMC	4-hour
12	Edison Avenue SW & 4th Street SW	July 18, 2022	TMC	4-hour
13	Franklin Avenue SW & 11th Street SW	July 18, 2022	TMC	4-hour
14	Fillmore Avenue SE & 11th Street SE	July 18, 2022	TMC	4-hour

Peak Hour Selection

The system-wide peak will be determined from the maximum hourly total intersection volumes. Coastal routes may have non-standard peak hours, but only one peak hour will be analyzed for this TSP. The system peak hour will be used at each individual intersection to compare to mobility targets for current and future conditions.

Seasonal Factors

As shown in Table 1 above, the traffic counts in the study area were collected on two weekdays in July 2022. This time may represent a period where traffic volumes are lower than the 30 HV conditions, so adjustments may be required to develop 30 HV for the traffic analysis, as outlined in Chapter 5 of the APM. ODOT maintains ATR location 06-004 near Bandon, so an on-site ATR method was used to determine the seasonal adjustment factor.

The weekday average is larger than the daily average at ATR 06-004, so percentages of weekday ADT were evaluated between 2017 and 2021. The highest and lowest count month and peak month percentages were eliminated to account for construction activity that may have occurred in the vicinity during the five-year period. An average percent of weekday ADT was then calculated for the remaining three years. The percentages of weekday ADT for the count month and peak month were both 132 percent, so no seasonal adjustment factor will be applied to the July 2022 counts when developing the 2022 30 HV intersection volumes.

Future Traffic Volumes

Future traffic forecasts for the horizon year 2045 will be developed using a linear growth factor for all movements. This growth factor was calculated using 2021 and 2041 volumes provided in the ODOT Future Highway Volume Table. Based on these volumes along U.S. 101 between MP 261.51 and 275.87, the average annual growth rate for the study area is +0.06%. An overall growth rate of +1.38%, or +0.06% over 23 years, will be applied to all 2022 30 HV intersection volumes to develop the 2045 intersection volumes.

TRAFFIC ANALYSIS METHODOLOGY

Intersection Operations

Traffic operations will be analyzed for all study intersections under existing (2022) and future (2045) conditions using the design hour volumes. Synchro 11 and SimTraffic will be used to analyze all intersections. Results will be reported using Highway Capacity Manual (HCM) 6th Edition methodology. If HCM 6th Edition results cannot be reported due to intersection geometry or other limitations, HCM 2000 will be used. Synchro will be used to report volume-to-capacity (v/c) ratios, level of service (LOS), and delay. SimTraffic will be used to report 95th percentile queue lengths. Additionally, the SimTraffic static graphics will be used to check percent time blocked for storage lanes, which will be reported if any issues exist. Since the SimTraffic model is only being used for queue lengths, the model will not be calibrated.

Intersection Mobility Targets

State highway mobility targets were developed for the 1999 Oregon Highway Plan (OHP)² as a method to gauge reasonable and consistent targets for traffic flow along state highways. The ODOT v/c targets are based on highway classification and posted speeds. The City of Bandon did not identify mobility targets for its local streets as part of its 2000 TSP, so the ODOT mobility targets for local streets will be applied at all intersections under the City’s jurisdiction.

The mobility targets from the OHP will be used in this study for the existing and future no-build mobility targets. The future build mobility targets are from Table 1200-1 of the Highway Design Manual³ and are considered guidelines, as there is a design exception process.

U.S. 101 (State Highway 009) is classified as a statewide highway with a posted speed limit of 30 mph between 17th Street SE and 1st Street SE/OR 42S and 45 mph south of 17th Street SE. U.S. 101 (State Highway 009) is a Reduction Review Route but for purposes of mobility targets, is not classified as a freight route. The City streets being studied are classified as district/local roads with posted speed limits of 35 mph or less. All study intersections are within the urban growth boundary.

Table 2. Intersection Mobility Targets

#	Intersection	Jurisdiction	Control*	Existing and Future No-Build Mobility Target	Future Build Mobility Target
1	U.S. 101 & Seabird Drive/Doberman Lane	ODOT/City	TWSC	v/c < 0.80	v/c < 0.70
2	U.S. 101 & 11th Street SW/SE	ODOT/City	Signal	v/c < 0.90	v/c < 0.75
3	U.S. 101 & Oregon Avenue SE	ODOT/City	TWSC	v/c < 0.90	v/c < 0.75
4	U.S. 101 & Chicago Avenue SE	ODOT/City	TWSC	v/c < 0.90	v/c < 0.75
5	U.S. 101 & 2nd Street SE/Delaware Avenue SE	ODOT/City	TWSC	v/c < 0.90	v/c < 0.75
6	U.S. 101 & Fillmore Avenue SE	ODOT/City	Signal	v/c < 0.90	v/c < 0.75
7	U.S. 101 & 1st Street SE/OR 42S	ODOT/City	Signal	v/c < 0.90	v/c < 0.75
8	U.S. 101 & 9th Street SW	ODOT/City	TWSC	v/c < 0.90	v/c < 0.75
9	Beach Loop Drive & 11th Street SW	City	AWSC	v/c < 0.95	v/c < 0.80

² 1999 Oregon Highway Plan including amendments November 1999 through January 2023, Oregon Department of Transportation, January 2023.

³ Highway Design Manual, Oregon Department of Transportation, 2023.

#	Intersection	Jurisdiction	Control*	Existing and Future No-Build Mobility Target	Future Build Mobility Target
10	Beach Loop Drive & Seabird Drive SW	City	TWSC	v/c < 0.95	v/c < 0.80
11	Riverside Drive/Fillmore Avenue SE & 1st Street SE	City	TWSC	v/c < 0.95	v/c < 0.80
12	Edison Avenue SW & 4th Street SW	City	AWSC	v/c < 0.95	v/c < 0.80
13	Franklin Avenue SW & 11th Street SW	City	AWSC	v/c < 0.95	v/c < 0.80
14	Fillmore Avenue SE & 11th Street SE	City	TWSC	v/c < 0.95	v/c < 0.80

*AWSC = all-way stop control, TWSC = two-way stop control

Safety Analysis

Collision trends will be identified by analyzing the most recent five years of available crash data (2017-2021) for roadways within Bandon. Analysis will include calculation of critical crash rates and excess proportion of specific crash types at all study intersections, as outlined in Chapter 4 of the APM. Intersection crash rates will be compared to critical crash rates based on the method outlined in Part B of the Highway Safety Manual⁴. If a critical crash rate cannot be calculated due to limited data, the published 90th percentile rates in Table 4-1 of the APM will be used. Project-area K-factors from the available AADT will be used to convert short duration counts to daily traffic approach volumes. The crash rates will be compared to the 2020 Crash Rate Table II in the State Highway Crash Rate Book to identify locations and intersections with more crashes than other similar facilities in Oregon. Top 10% ODOT Safety Priority Index System (SPIS) sites from 2019, 2020, and 2021 will also be identified for further review.

The collision analysis will be used to identify crash patterns and suggest potential countermeasures at locations that exceed the published intersection or segment crash rates, the calculated critical crash rate, or SPIS sites. Crash modification factors (CMFs) will be identified for each countermeasure to provide an estimate of the potential change in crash frequency based on CMFs from the Highway Safety Manual, the ODOT All Roads Transportation Safety (ARTS) Crash Reduction Factor List, or the Federal Highway Administration’ (FHWA) Crash Modification Factors Clearinghouse. When using the FHWA CMF Clearinghouse, it is recommended to select CMFs with a rating of three stars or better.

Multimodal Analysis

The project team will analyze transit, bicycle, and pedestrian operations in the study area using the level of traffic stress (LTS) for bicycles and pedestrians and the qualitative multimodal assessment (QMA) for transit as outlined in Chapter 14 of the APM for arterial and collector streets. LTS will be evaluated on arterial and collector streets only. Local streets will be discussed qualitatively. The assessment will also include identification of key origins and destinations (e.g., schools) for cycling and pedestrian trips and a discussion of the quality and comfort of routes between origins and destinations. Analysis will identify safety concerns and barriers such as system gaps or challenging topography.

Transit analysis will use available data and information from the City’s Dial-A-Ride service and The Coastal Express.

⁴ Highway Safety Manual 1st Edition, American Association of State Highway and Transportation Officials (AASHTO), 2010.