DRAFT METHODOLOGY MEMORANDUM

| Date: | May 4, 2020 | Project \#: 22928 |
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|  | Don Morehouse, ODOT |  |
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| Project: | Jefferson County TSP Update |  |
| Subject: | Methodology Memorandum |  |

This memorandum documents the methodology and key assumptions to be used in preparation of the existing and future conditions and alternatives analyses for the Jefferson County Transportation System Plan (TSP) Update. The methodologies included in this memorandum are based on guidance provided in the Oregon Department of Transportation (ODOT) Transportation System Plan Guidelines and the Analysis Procedures Manual (APM), Versions 1 and 2 as they relate to rural counties in central Oregon. The methodology and assumptions described in this memorandum will be used to help identify potential gaps and deficiencies in the transportation system related to:

- Traffic operations at the TSP intersections;
- Traffic safety at the TSP intersections and along study area roadways;
- Facilities and performance of the bicycle and pedestrian network.

This information will serve as a baseline for identifying a list of needs (gaps and deficiencies) to be addressed as part of the TSP update. It will also serve as a baseline for identifying and evaluating potential solutions (projects, programs, policies, pilot projects, and studies) that address the needs, and to develop a prioritized list of improvements for the TSP update.

The remainder of this memorandum summarizes the following:

- Location of the TSP intersection and segments where safety and operations analyses will be conducted;
- Methodology for developing vehicular analyses volumes for existing and future conditions;
- Applicable vehicular performance targets and standards;
- Operational analyses parameters;
- Crash analyses procedures; and,
- Pedestrian and bicycle analyses parameters.


## STUDY AREA

The study area for the TSP update includes the areas within Jefferson Country that are outside the Madras Urban Growth Boundary (UGB) and the lands owned by the Confederated Tribes of Warm Springs. The Jefferson County TSP will address facilities that are under the jurisdiction of Jefferson County and ODOT. Roads on federal lands (i.e., U.S. Bureau of Land Management and the U.S. Forest Service) and lands owned by the Confederated Tribes of Warm Springs are not included in the study area and are instead under the jurisdiction of the corresponding agency.

## TSP Intersections and Segments

Tables 1 and 2 list the TSP intersections and segment locations that were identified for study by ODOT and the County. Table 1 summarizes the locations where turning movement counts were conducted by ODOT whereas Table 2 summarizes the locations where 24 -hour tube counts, including vehicle classification and speed data, were conducted by Quality Counts. Figure 1 shows the location of the intersections and segments. For the Existing Conditions analyses, the counts that were conducted in 2019 will be factored up to reflect 2020 conditions using the annual growth rates, as discussed in the Forecast Year Traffic Volume Development section of this memorandum on page 7.

## Traffic counts are provided here.

Table 1. Intersection Locations

| Intersection | East-West Road Name | North-South Road Name | Count Time Period |
| :---: | :---: | :---: | :---: |
| 4-hour Turning Movement Counts |  |  |  |
| 1 | OR361 | Iris Lane | August 2019 |
| 2 | US97 | Iris Lane |  |
| 3 | Feather Drive | Iris Lane |  |
| 4 | Cora Drive | US97 |  |
| 5 | US26 | Agency Hot Springs Road (to Kah-nee-ta) | 2 PM - 6 PM |
| 6 | US20 | Suttle Lake Road |  |
| 7 | US20 | FS Hwy 12 |  |
| 16-hour Turning Movement Counts |  |  |  |
| 8 | US26/Colfax Lane | US97 | August 2019 |
| 9 | OR293 | US97 |  |
| 10* | OR361 | US97 | 6 AM - 10 PM |
| 11* | US20 | Camp Sherman Road |  |

[^0]Table 2. Segment Locations (Counts Conducted in March 2020)

| Segment | East-West Road Name | North-South Road Name | Missing Data* |
| :---: | :--- | :--- | :--- |
| 12 | US26 | Lone Pine Road | SB approach |
| 13 | Jericho Lane | US97 |  |
| 14 | Adams Drive | Crestview Lane |  |
| 15 | Pony Butte Road | US97 |  |
| 16 | Jericho Lane | Feather Drive |  |
| 17 | Mountain View Drive | Round Butte Drive |  |
| 18 | Jordan Road | Mountain View Drive |  |
| 19 | Eureka Lane | OR361 |  |
| 20 | Jordan/Peck Road | Frazier Drive |  |
| 21 | Hilltop Lane | US97 | NB approach |
| 22 | Cherry Lane | US97 | NB and SB approaches |
| 23 | Bear Drive | US97 |  |
| 24 | -- | US97 at MP 98.7 - 98.8 | WB approach |
| 25 | Antelope Drive | Chinook Drive |  |
| 26 | Club House Road | Chinook Drive | WB approach |
| 27 | Mustang Road | Shad Road |  |
| 28 | US26 | Dogwood Lane |  |
| 29 | County Line | Quail Road |  |

*Missing Data indicates locations where data for an approach to the intersection is missing. This is due to tube counters that malfunctioned during data collection or that were torn up by streetsweepers. The data was collected one week prior to statewide school closures and shelter in place orders associated with the COVID-19 pandemic; therefore, traffic data could not be recollected immediately. As of May 1, 2020, schools are closed until at least Fall 2020 and businesses have yet to reopen. When businesses start to reopen at an undetermined date, it is likely that traffic patterns will not return to "normal" for at least several months. Due to these delays and the small number of locations missing data, the project team proposes to move forward using the data available as of May 1, 2020, as summarized in the tables above.


## Seasonal Adjustment Factor

Thirtieth $\left(30^{\text {th }}\right)$ highest hour design volumes will be based on applicable adjustment factors consistent with the methodology identified in the APM. Version 2 of the APM identifies three methods for identifying seasonal adjustment factors for highway traffic volumes. All three methods utilize information provided by Automatic Traffic Recorders (ATR) located in select locations throughout the State Highway System that collect traffic data 24 -hours a day/365 days a year. There are two permanent ATR stations (16-002 and 16-006) in Jefferson County and one station located on US20 in Deschutes County, near the Jefferson County line (09-014). ATR station 16-002 is located on US97 approximately 0.18 miles south of Madras along the Madras-Prineville Highway and had an AADT of approximately 15,200 vehicles in 2018. ATR station 16-006 is located on US26 approximately 4.54 miles northwest of the Dalles-California Highway US97 and had an AADT of approximately 8,400 vehicles in 2018. ATR station 09-014 is located on US20 near the Deschutes County/Jefferson County border and had an AADT of approximately 9,200 vehicles in 2018. There are multiple TSP intersections near these ATR stations; therefore we will use the on-site ATR method to develop seasonal adjustment factors for these locations.

## Seasonal adjustment calculations are provided in Attachment A.

## On-Site ATR Method

The On-Site ATR Method requires that the ATR be located within or near the project area. If the ATR is located outside the project area, there should be no major intersections between the ATR and the project area, and the Average Annual Daily Traffic (AADT) collected by the ATR must be within 10 percent of the AADT near the project area.

Per the APM guidance, Table 3 summarizes the TSP intersections and segments that are located along US97, US26, and US20 within proximity to the three ATR stations. The On-Site ATR method was used to identify the seasonal adjustment factors proposed for these locations. The seasonal factors identified in Table 3 will be applied to all legs of the intersections.

Table 3. Seasonal Adjustment Factors using the On-Site ATR Method

| ATR Station | Intersection/ Segment ID | Intersection Name | Count Month | Weekly Traffic Trend | Seasonal Adjustment Factor |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 16-002 | 2 | US97/Iris Lane | August | Weekday | 1.02 |
|  | 8 | US26/Colfax Lane/US97 | August | Weekday | 1.02 |
|  | 13 | Jericho Lane/US97 | March | Weekday | 1.29 |
|  | 23 | Bear Drive/US97 | March | Weekday | 1.29 |
|  | 24 | US97 at MP 98.7-98.8 | March | Weekday | 1.29 |
| 16-006 | 5 | US26/Agency Hot Springs Road (to Kah-nee-ta)* | August | Weekday | 1.02 |
|  | 28 | US26/Dogwood Lane | March | Weekday | 1.36 |
| 09-014 | 6 | US20/Suttle Lake Road | August | Weekday | 1.06 |
|  | 7 | US20/FS Hwy 12 | August | Weekday | 1.06 |

*The estimated daily volume on US26 at this intersection is more than 10 percent lower than the AADT at ATR 16-006. However, we believe this ATR station accurately reflects the seasonal highway characteristics at the TSP intersection.

## Seasonal Trend Method

The remaining TSP intersections are located on different highways, located on County roads, or have traffic volumes that are not within ten percent of the ATR volumes; therefore, the On-Site ATR method is not appropriate at these locations. For the remaining intersection locations, the Seasonal Trend Method will be applied. The ATR Characteristic Table method was considered for the state highway locations, but there were no sites that matched the appropriate characteristics (seasonal traffic trends, area type, number of travel lanes) and volume. Instead, the recommended seasonal adjustment factors using the Seasonal Trend Method are summarized in Table 4.

Table 4. Seasonal Adjustment Factors using the Seasonal Trend Method

| Trend | Intersection/ Segment ID | Intersection Name | Count Month | Seasonal <br> Adjustment Factor |
| :---: | :---: | :---: | :---: | :---: |
| Commuter | 14 | Adams Drive/Crestview Lane | March | 1.08 |
|  | 25 | Antelope Drive/Chinook Drive | March | 1.08 |
|  | 26 | Club House Road/Chinook Drive | March | 1.08 |
|  | 27 | Mustang Road/Shad Road | March | 1.08 |
|  | 29 | County Line/Quail Road | March | 1.08 |
| Summer | 9 | OR293/US97 | August | 1.03 |
|  | 15 | Pony Butte Road/US97 | March | 1.31 |
|  | 17 | Mountain View Drive/Round Butte Drive | March | 1.31 |
|  | 18 | Jordan Road/Mountain View Drive | March | 1.31 |
|  | 20 | Jordan/Peck Road/Frazier Drive | March | 1.31 |
| Summer/ Commuter | 1 | OR361/Iris Lane | August | 1.00 |
|  | 3 | Feather Drive/Iris Lane | August | 1.00 |
|  | 4 | Cora Drive/US97 | September | 1.05 |
|  | 12 | US26/Lone Pine Road | March | 1.17 |
|  | 16 | Jericho Lane/Feather Drive | March | 1.17 |
|  | 19 | Eureka Lane/OR361 | March | 1.17 |
|  | 21 | Hilltop Lane/US97 | March | 1.17 |
|  | 22 | Cherry Lane/US97 | March | 1.17 |

## Peak Hour Development

Due to the large, rural nature of the County, application of a County system-wide time period for assessing $30^{\text {th }}$ highest conditions is not appropriate. Instead, individual intersection peak hours will be applied, as measured between 4 and 6 PM. Table 5 indicates individual intersection PM Peak Hours to be analyzed. For study segments, the peak hour will be identified for each approach based on the total volume in both directions.

Table 5: Study Intersections Peak Hours

| Intersection ID | Intersection Name | Intersection Peak Hour |
| :---: | :---: | :---: |
| 1 | OR361/Iris Lane | $4: 45-5: 45$ PM |
| 2 | US97/Iris Lane | $4: 00-5: 00$ PM |
| 3 | Feather Drive/Iris Lane | $4: 45-5: 45$ PM |
| 4 | Cora Drive/US97 | $4: 00-5: 00$ PM |
| 5 | US26/Agency Hot Springs Road (to Kah-nee-ta) | $5: 00-6: 00$ PM |
| 6 | US20/Suttle Lake Road | $4: 00-5: 00$ PM |
| 7 | US20/FS Hwy 12 | $4: 00-5: 00$ PM |
| 8 | US26/Colfax Lane/US97 | $4: 00-5: 00$ PM |
| 9 | OR293/US97 | $4: 00-5: 00$ PM |

## Forecast Year Traffic Volume Development

Twenty-year growth factors were calculated from the available historical traffic volumes using a Level I trending forecast. For state highways, the Future Volume Tables available on Transportation Planning Analysis Unit's website was used. For County facilities, the Future Volume Tables will be used because many low volume district-level state highways have similar function to County facilities.

## Historical Trends Methods Using ODOT Future Volumes Tables

The ODOT APM recommends using the historical trends method, which relies on traffic volumes from previous years to develop a growth pattern for use in projecting future volumes. ODOT maintains Future Volumes Tables that summarize current and future year traffic volumes for state roadways.

Using methodology and guidance from the ODOT APM Section 6.5, Table 6 shows the annual growth rates that will be applied to each location. There are three highway corridors (US97 - Northeast of Madras, US26 - Northwest of Madras, US26 - between Madras and Prineville) without travel demand model data or a R-squared value above 0.75 . For US97, northeast of Madras, the future volume table included two data points with R-squared values close to 0.75 ( 0.74 and 0.72 ); these two rates were averaged to develop the growth rate for this corridor. For US26, Northwest of Madras, an average total growth rate of US97 and US20 was taken to reflect the characteristics of the US97 corridor and the mountain pass. US26 between Madras and Prineville will use the same rate as Culver Highway as the two highway segments likely exhibit similar traffic patterns. Because County facilities likely experience traffic patterns similar to district highways, the Culver Highway annual growth rate will be applied to all Country facilities in Jefferson County.

Attachment B includes the spreadsheet for developing growth rates based on the Future Volumes Table.

Table 6: Annual Growth Rates

| Location | Annual Growth Rate |
| :--- | :---: |
| US97, Northeast of Madras | $0.69 \%^{1}$ |
| US97, South of Madras | $2.20 \%$ |
| US20, West of Sisters | $1.04 \%$ |
| US26, Northwest of Madras | $1.62 \%^{2}$ |
| US26, between Madras and Prineville | $0.91 \%^{3}$ |
| Culver Highway | $0.91 \%$ |
| County Facilities | $0.91 \%^{4}$ |

${ }^{1}$ There were no sites with RSQ $>0.75$. An average of the two rates with the highest RSQ values ( 0.74 and 0.72 ) were used to develop this rate.
${ }^{2}$ Average of US97 and US20 rates due to no data with RSQ $>0.75$.
${ }^{3}$ Using the same rate as Culver Highway because no RSQ values $>0.75$.
${ }^{4}$ Using same rates as Culver Highway, the only district highway in Jefferson County.

## INTERSECTION OPERATIONAL STANDARDS

The following performance measures will be evaluated for the TSP intersections:

- Volume-to-capacity (v/c) ratio;
- Level-of-service (LOS);
- Delay; and,
- $95^{\text {th }}$ Percentile queuing (not-simulation based).

This information will be provided in tables, figures, and/or technical appendices, but where possible will be provided in figures to give the general public a more clear and relatable understanding of the analysis results.

## ODOT Facilities

ODOT assesses intersections operations based on mobility targets, as measured by the volume-tocapacity (V/C) ratio. Table 6 of the Oregon Highway Plan (OHP) provides mobility targets for facilities outside the Metro area. The OHP ratios are used to evaluate existing and future no-build conditions, while Table 10-2 of the ODOT 2012 Highway Design Manual (HDM) provides V/C ratios used to assist in evaluating future alternatives on state highways. Table 7 and 8 includes the mobility targets for the state facilities based on these two references.

Table 7. Oregon Highway Plan (OHP) Volume to Capacity Ratio Targets Outside Metro

| Highway/Category | Inside UGB |  |  |  | Outside UGB |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | STA | Non-MPO <br> outside of STAs <br> where nonfreeway <br> speed <= 35 mph , or a Designated UBA | Non-MPO <br> outside of STAs where nonfreeway speed > 35 mph but < 45 mph | Non-MPO <br> Where nonfreeway speed limit $>=45 \mathrm{mph}$ | Unincorporated Communities | Rural Lands |
| Statewide Expressway(US97 south of Madras and small section north of Madras) | N/A | 0.85 v/c | $0.80 \mathrm{v} / \mathrm{c}$ | $0.80 \mathrm{v} / \mathrm{c}$ | $0.70 \mathrm{v} / \mathrm{c}$ | 0.70 v/c |
| Statewide Highway (Freight Route) (US20, US97 north of Madras, US26 West of Madras) | $0.90 \mathrm{v} / \mathrm{c}$ | 0.85 v/c | $0.80 \mathrm{v} / \mathrm{c}$ | $0.80 \mathrm{v} / \mathrm{c}$ | 0.70 v/c | 0.70 v/c |
| Freight Route on a Regional Highway <br> (US 26-Madras-Prineville) | $0.95 \mathrm{v} / \mathrm{c}$ | 0.90 v/c | 0.85 v/c | $0.85 \mathrm{v} / \mathrm{c}$ | 0.75 v/c | 0.70 v/c |
| District/Local Interest Roads (OR 361) | $1.0 \mathrm{v} / \mathrm{c}$ | 0.95 v/c | 0.90 v/c | 0.90 v/c | $0.80 \mathrm{v} / \mathrm{c}$ | 0.75 v/c |

Table 8. 20-Year Highway Design Manual (HDM) Design Mobility Targets for State Facilities

|  | Inside UGB |  |  | Outside UGB |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Highway/Category | STA | Non-MPO outside of STAs where nonfreeway speed <45 mph | Non-MPO <br> Where nonfreeway speed limit >= 45 mph | Unincorporated Communities | Rural Lands |
| Statewide Expressway(US97 south of Madras and small section north of Madras) | N/A | 0.70 v/c | 0.65 v/c | 0.60 v/c | 0.60 v/c |
| Statewide Highway (Freight Route) (US20, US97 north of Madras, US26 West of Madras) | 0.85 v/c | 0.70 v/c | 0.70 v/c | 0.60 v/c | 0.60 v/c |
| Freight Route on a Regional Highway (US 26-Madras-Prineville) | $0.95 \mathrm{v} / \mathrm{c}$ | 0.75 v/c | 0.75 v/c | 0.70 v/c | 0.65 v/c |
| District/Local Interest Roads (OR 361) | 0.95 v/c | $0.80 \mathrm{v} / \mathrm{c}$ | 0.75 v/c | 0.75 v/c | 0.70 v/c |

Table 9 summarizes the mobility targets at each TSP intersection. For the unsignalized intersections, the $\mathrm{v} / \mathrm{c}$ ratio will be reported for only the critical lane group. For intersections number 12 through 29, turning movement counts are not available; instead, 24 -hour segment data is available on the approaches. The $\mathrm{v} / \mathrm{c}$ ratio of these segments will be analyzed.

Table 9: OHP Mobility Targets and Standards at ODOT Study Intersections

| Intersection ID | Study Intersection | Traffic Control | Mobility Target (v/c) |
| :---: | :---: | :---: | :---: |
|  | OR361/Iris Ln |  | $0.75 \mathrm{~N} / \mathrm{S} \mathrm{O.75} \mathrm{E/W}$ |
| 2 | US97/Iris Ln | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 4 | Cora Dr/ US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 5 | US26/ Agency Hot Springs Rd (to Kah-nee-ta) | TWSC | $0.75 \mathrm{~N} / \mathrm{S}, 0.70 \mathrm{E} / \mathrm{W}$ |
| 6 | US20/Suttle Lake Rd | TWSC | $0.75 \mathrm{~N} / \mathrm{S}, 0.70 \mathrm{E} / \mathrm{W}$ |
| 7 | US20/ FS Hwy 12 | TWSC | $0.75 \mathrm{~N} / \mathrm{S}, 0.70 \mathrm{E} / \mathrm{W}$ |
| 8 | US26/ US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.70 \mathrm{E}, 0.75 \mathrm{~W}$ |
| 9 | OR293/US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 12 | US26/Lone Pine Rd | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 13 | Jericho Ln/ US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 15 | Pony Butte Rd/ US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 19 | Eureka Ln/ OR361 | TWSC | $0.75 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 21 | Hilltop Ln/US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 22 | Cherry Ln/US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 23 | Bear Dr/ US97 | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 24 | 3457 US97 (MP 98.7-98.8) | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |
| 28 | US26/ Dogwood Ln | TWSC | $0.70 \mathrm{~N} / \mathrm{S}, 0.75 \mathrm{E} / \mathrm{W}$ |

TWSC = Two-way stop-control

## County Facilities

Section 3.3 of the County's current TSP states the County's desire to have all roads or intersections operate at LOS C or better. Per County policies, the TSP intersections that are located on County facilities will be subject to a LOS C or better as the performance threshold. The only TSP intersection that is not located on an ODOT facility is Feather Drive/Iris Lane (Intersection \#3).

For study segments, the V/C ratio will be presented for County facilities, consistent with analysis for state facilities.

## ANALYSIS PARAMETERS

## Analysis Model Parameters

Analyses of all state facilities will be conducted according to the most-recent version of the APM, as outlined below.

1. Intersection/Roadway Geometry (lane numbers and arrangements, cross-section elements, etc.) will be reviewed through aerial photography and confirmed through a field review.
2. Operational Data (such as posted speeds, intersection control, parking, right-turn on red, etc.) will be collected through Google Earth and field verified as needed. Data will be reviewed and supplemented by available GIS data, aerials, photos, and the traffic count videos.
3. Peak Hour Factors (PHF) will be calculated for each intersection and applied to the existing conditions analyses. PHFs of 0.95 will be used for the future analysis for high-order facilities (arterials), with 0.90 applied to medium-order facilities (collectors) and 0.85 applied to local roads. If the existing PHF is greater than these default future values, the existing PHF will be applied.
4. Traffic Operations
a. Highway Capacity Manual (HCM) $6^{\text {th }}$ Edition methodology will be used to analyze traffic operations at all study intersections.
b. Queuing analysis methodology will be based on Synchro $95^{\text {th }}$ percentile queue lengths as appropriate. Microsimulation is not proposed as part of the long-range planning effort.

## Traffic Analysis Software and Input Assumptions

Synchro software will be used for the intersection analysis. The reported results will be the level of service, intersection delay, $\mathrm{v} / \mathrm{c}$ ratios, and $95^{\text {th }}$ percentile queue lengths consistent with HCM $6^{\text {TH }}$ Edition. None of the study intersections are signalized intersections; therefore no parameters have been provided for signal timing. Analysis assumptions are listed in Table 10.

Table 10. Synchro Operations Parameters/Assumptions

| Arterial Intersection Parameters |  |
| :--- | :--- |
| Peak Hour Factor | From traffic counts |
| Conflicting Bikes and Pedestrian per Hour | From traffic counts, as available |
| Lane Width | 12 feet unless field observations suggest otherwise |
| Percent Heavy Vehicles | From traffic counts by movement, as available |
| Bus Blockages | Not applicable |
| 95th percentile vehicle queues | Synchro HCM summary output |

## CRASH ANALYSES

The most recent five years (2013 through 2017) of crash data will be reviewed at the TSP intersections and study segments. State highways in Jefferson County that are identified as a Safety Priority Index System (SPIS) site will be included in the crash data. The data will be analyzed for a variety of factors to include type, severity, general conditions, and location to identify potential crash patterns. Additional details will be provided on countywide crash trends and any issues that are identified through the overall review at the County, corridor/segment, and intersection level, and will include specific details on fatalities and crashes involving pedestrians and bicyclists.

Intersection crash rates will be calculated and compared to statewide crash rate performance thresholds to determine which segments or intersections have crash rates higher than similar facilities. Performance thresholds will include critical crash rate calculations and the $90^{\text {th }}$ percentile crash rates for statewide rural intersections by traffic control type as documented in Exhibit 4-1 of the APM. Crash patterns and potential countermeasures/safety improvements will be identified and presented at intersections that exceed the statewide crash rate performance threshold.

## MULTIMODAL TRANSPORTATION ANALYSIS

A review of the bicycle and pedestrian facilities along collector and arterial roadways will be reviewed to identify deficiencies based on available GIS data, field observations, and online mapping. A qualitative analysis will be completed for pedestrian and bicycle mobility and will include an assessment of gaps and opportunities using key analysis factors. This will include an inventory of existing facilities and planned improvements.

Factors to assess bicycle and pedestrian facilities and conditions include:

- Availability of sidewalks and bicycle lanes
- General condition of existing sidewalks and bicycle lanes, as available in GIS and verified by the County or ODOT
- Gaps in primary routes
- Proximity to transit stops
- Bicycle Level of Traffic Stress (for study segments only)
- High Risk Crossing Locations

Tables Table 11 and 12 identify the applicable level of traffic stress criteria.
Table 11. Rural Segment Criteria with Posted Speeds 45 mph or Greater (APM Exhibit 14-16)

| Daily Volume (vpd) |  | Paved Shoulder Width |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  |  | $\mathbf{2 - < 4}$ feet | $\mathbf{4 - < \mathbf { 6 } \text { feet }}$ | $\geq \mathbf{6}$ feet |  |
|  |  | LTS 2 | LTS 2 | LTS 2 |  |
| $400-1,500$ | LTS 3 | LTS 2 | LTS 2 | LTS 2 |  |
| $1,500-7,000$ | LTS 4 | LTS 3 | LTS 2 | LTS 2 |  |
| $<7,000$ | LTS 4 | LTS 4 | LTS 3 | LTS 3 |  |

Table 12. Unsignalized Rural Intersection Crossing with Posted Speeds 45 mph or Greater (APM Exhibit 14-17)

| Daily Volume (vpd) | $\leq 3$ lanes | $4-5$ lanes | $\geq 6$ lanes |
| :--- | :---: | :---: | :---: |
| $\langle 400$ | LTS 2 | $\mathrm{n} / \mathrm{a}$ | $\mathrm{n} / \mathrm{a}$ |
| $400-1,500$ | LTS 2 | $\mathrm{n} / \mathrm{a}$ | $\mathrm{n} / \mathrm{a}$ |
| $1,500-7,000$ | LTS 2 | LTS 3 | $\mathrm{n} / \mathrm{a}$ |
| $<7,000$ | LTS 3 | LTS 4 | LTS 4 |

Measuring transit level of service (LOS) will not be included as part of this TSP Update. However, transit facilities and services will be mapped and included in the existing conditions inventory to understand:

- Routes that connect Jefferson County to other Central Oregon communities
- Location of bus stops, shelters, and stations
- Frequency and span of service
- Ridership levels by route and stops
- Connectivity with other transit facilities and services
- Paratransit demand, accessibility, and community need


## NEXT STEPS

We would like to request concurrence from TPAU, ODOT Region 4, and County staff, on the methodology and key assumptions outlined in this memorandum. This memorandum is being provided prior to the existing conditions analysis and conforms to the TSP scope. Please contact us at (541) 6398615 with any questions or comments at your earliest convenience.

Attachment A: Seasonal Trend Table



Seasonal Trend Table factors are based on previous year ATR data. The table is updated y yarly.

| SEASONAL TREND TAELE ( Udadated: G62619) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| treno | 1Jan | 15.Jan | 1.-5b | 15.Fab | 1 -Mar | 15-Mar | 1.Apr | 15.Apr | ${ }^{1 \text {-May }}$ | 15.may | ${ }^{1 . J u n}$ | 15.un | 1.Ju1 | 15.Ju1 | 1-Aus | 15.aug | 1.Sep | 15.sep | 1.0ct | 15.oct | 1-Nov | 15-Nov | 1.Dec | 15.00c |  |  |  |  |
| NTERSTATE URBANIZ | 1.0419 | 1.0728 | 1.040 | 1.055 | 1.0259 | 0.9966 | 0.9896 | 0.9825 | 0.9768 | 0.9711 | 0.958 | 0.9404 | 0.9561 | 0.9778 | 0.988 | 0.8890 | 0.9860 | 0.9330 | 0.986 | 0.9897 | 1.0055 | 1.027 | 1.0436 |  |  |  |  |  |
| NT Comsiate | ${ }_{\text {1.2583 }}^{1.057}$ | ${ }^{1.3379} 1.1050$ | ${ }_{\text {l }}^{1.2982}$ | ${ }^{1.2645}$ |  | ${ }^{1.0060} 1$ | ${ }_{\text {1.0983 }}^{1.985}$ | ${ }^{1.0166}$ (1777 | ${ }^{0.9863}$ | ${ }^{0.9561}$ | ${ }^{0.9075}$ | ${ }^{0.85888}$ | ${ }_{\text {O. }}^{0.8422}$ | ${ }_{\text {O }}^{0.8256}$ | ${ }_{\substack{0.8355 \\ 0.592}}$ | 0.834 | ${ }_{0}^{0.8006}$ | ${ }^{0.9278}$ | ${ }_{\text {0.9559 }}^{0.973}$ | ${ }_{\text {0, }}^{\text {0.9900 }}$ | ${ }_{\text {1.0158 }}^{0.997}$ | ${ }_{\text {1.0416 }}^{1.0215}$ | ${ }_{\text {li.192 }}^{1.050}$ | ${ }^{1.1089} 1.085$ |  |  |  |  |
| Coastal besination |  |  |  | - | $\xrightarrow{\text { i.tione }}$ |  |  |  |  |  | ${ }_{\text {a }}^{0.9542}$ | $\xrightarrow{0.956}$ | ${ }_{\text {a }}^{0.5844}$ |  | $l$ | -0.8366 |  |  | ${ }_{\text {cose }}^{0.9588}$ |  |  |  |  |  |  |  |  |  |
| Coastal Desination route | ${ }_{\text {li, }}^{\substack{1,3788}}$ | ${ }_{1}^{1.5039}$ | ${ }_{\substack{1.4658 \\ 1.460}}$ | ${ }^{1.34871}$ | $\xrightarrow{1.2268} 1$ | ${ }_{\text {li.228 }}^{1.128}$ | ${ }_{\text {li.123 }}^{1.145}$ | ${ }_{\text {l }}^{1.1063}$ | ${ }_{\substack{1.0388 \\ 0.843}}^{\text {a }}$ | ${ }_{\text {O }}^{0.9478}$ | ${ }_{\text {O }}^{0.0931}$ | ¢ | $\xrightarrow{0.7889}$ | 0.6978 <br> 0.8089 |  | - ${ }_{\text {O.782 }}^{0.8140}$ | ${ }_{\substack{0.7832 \\ 0.784}}^{\text {are }}$ | ${ }^{0.8682}$ | ${ }^{0.9574}$ | $\xrightarrow{1.0466}$ |  | ${ }^{1.2037}{ }^{\text {2037 }}$ | ${ }_{\text {12, }}^{12369}$ | ${ }_{\text {1.3642 }}^{1.359}$ |  |  |  |  |
| RECREATONAL SUMMER | ${ }_{1}^{1.6744}$ | ${ }^{1.8739}$ | ${ }_{1}^{1.1051}$ | ${ }^{1.8403} 1$ | ${ }_{\text {l }}^{1.4889} 1$ | ${ }^{1.3375} 1$ | ${ }_{1}^{12842}$ | ${ }^{1.1909}$ | ${ }^{1.0325} 1140$ | ${ }_{\text {a }}^{0.8742}$ | ${ }^{0.8177}$ | ${ }_{0}^{0.7811}$ | ${ }^{0.7119}$ | ${ }^{0.6826}$ | ${ }^{0.6933}$ | ${ }_{0}^{0.7239}$ | ${ }_{0}^{0.7998}$ | ${ }_{\text {O }}^{0} \mathrm{O} 70957$ | ${ }^{0.8898}$ | ${ }_{\text {O }}^{0.9838}$ | ${ }^{1.1028}$ | ${ }_{1}^{122188}$ | ${ }_{1}^{1.3720}$ | ${ }^{1.522}$ |  |  |  |  |
| RECREATIONAL WNTER | 0.8178 | ${ }^{0.6528}$ | ${ }_{0}^{0.7315}$ | ${ }^{0.8102}$ | ${ }_{0}^{0.8326}$ | 0.5849 | ${ }_{1}^{1.0588}$ | ${ }_{1}^{12866}$ | ${ }^{1.1998}$ | ${ }^{1.12270}$ | ${ }_{1}^{1.1295}$ | ${ }^{1.1321}$ | 1.0004 | ${ }^{0.8887}$ | ${ }_{0}^{0.3344}$ | 1.001 | 1.0823 | ${ }^{1.1046}$ | ${ }_{1}^{12984}$ | ${ }_{1}^{1.3823}$ | ${ }_{1} 1.8885$ | 21047 | ${ }_{1}^{1.4326}$ | ${ }^{0.7605}$ |  |  |  |  |
| SSMMER C 2500 | ${ }_{1}^{12,207}$ | ${ }^{1.2609}$ |  | ${ }_{\text {\% }}^{1.2256}$ | ${ }^{1.15286}$ | ${ }^{1.14186}$ | ${ }_{\text {L }}^{1.00927}$ | $\frac{10252}{1.047}$ | ${ }^{0.9598}$ | $\xrightarrow{0.9386}$ | ${ }^{0.98016}$ | ${ }^{0.85755}$ | - | ${ }^{0.8332}$ | ${ }_{\text {O }}^{0.8537}$ | 0.8876 | ${ }_{0}^{0.8872}$ | 0,9868 | ${ }^{0.5002}$ | O.9991 | ${ }_{\text {1.023 }}^{1.023}$ | $\stackrel{1087}{10.087}$ | ${ }_{\text {I }}$ |  |  |  |  |  |
|  |  |  |  | ${ }^{1.1382}$ |  |  |  |  |  |  |  |  |  |  |  |  |  | ${ }^{0.4463}$ |  |  |  |  |  | ${ }^{1.11385}$ | ${ }^{0.8983}$ | ${ }^{1.1747}$ | ${ }^{1.0070}$ | ${ }^{1.0534}$ |

ATR 16-002; US97/US26 MP 97.11; THE DALLES-CALIFORNIA HIGHWAY NO. 4; 0.18 mile north of Madras-Prineville Highway No. 360 (US26)

| Year | January | February | March | April | May | June | July | August | Septembe | October | November | December |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2018 | 79 | 83 | 92 | 97 | 105 | 113 | 113 | 113 | 106 | 98 | 91 | 82 |
| 2017 | 66 | 80 | 91 | 98 | 107 | 112 | 118 | 122 | 108 | 99 | 90 | 87 |
| 2016 | 76 | 86 | 91 | 97 | 105 | 112 | 118 | 116 | 109 | 100 | 94 | 81 |
| 2015 | 78 | 87 | 93 | 97 | 103 | 111 | 118 | 112 | 107 | 101 | 89 | 84 |
| 2014 | 80 | 79 | 92 | 98 | 104 | 112 | 119 | 118 | 108 | 101 | 88 | 82 |
| Average | 77.7 | 83.0 | 91.7 | 97.3 | 104.7 | 112.0 | 118.0 | 115.7 | 107.7 | 100.0 | 90.0 | 82.7 |
| Count Adj | 1.52 | 1.42 | 1.29 | 1.21 | 1.13 | 1.05 | 1.00 | 1.02 | 1.10 | 1.18 | 1.31 | 1.43 |

Peak month
Min/Max removed from average

## ATR 16-006; MP 113.17; WARM SPRINGS HIGHWAY NO. 53; 4.54 miles northwest of The Dalles-California Highway No. 4 (US97)

| Year | January | February | March | April | May | June | July | August | September | October | November | December |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2018 | 73 | 73 | 85 | 88 | 101 | 106 | 111 | 110 | 103 | 92 | 89 | 81 |
| 2017 | 61 | 76 | 84 | 89 | 103 | 105 | 116 | 124 | 103 | 92 | 82 | 83 |
| 2016 | 70 | 81 | 84 | 90 | 103 | 104 | 115 | 113 | 102 | 90 | 86 | 74 |
| 2015 | 72 | 82 | 87 | 89 | 100 | 105 | 116 | 108 | 105 | 95 | 82 | 76 |
| 2014 | 74 | 72 | 86 | 90 | 102 | 107 | 119 | 116 | 104 | 97 | 83 | 78 |
| Average | 71.7 | 76.7 | 85.0 | 89.3 | 102.0 | 105.3 | 115.7 | 113.0 | 103.3 | 93.0 | 83.7 | 78.3 |
| Count Adj | 1.61 | 1.51 | 1.36 | 1.29 | 1.13 | 1.10 | 1.00 | 1.02 | 1.12 | 1.24 | 1.38 | 1.48 |

Peak month
Min/Max removed from average

## ATR 09-014; US20/OR126 MP 93.12; SANTIAM HIGHWAY NO.16; 0.31 south of Black Butte Ranch Road

| Year | January | February | March | April | May | June | July | August | September | October | November | December |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2018 | 54 | 54 | 68 | 71 | 95 | 111 | 129 | 119 | 104 | 83 | 70 | 63 |
| 2017 | 46 | 53 | 67 | 72 | 96 | 114 | 137 | 126 | 102 | 85 | 65 | 64 |
| 2016 | 50 | 59 | 68 | 75 | 94 | 110 | 130 | 121 | 105 | 79 | 68 | 58 |
| 2015 | 52 | 59 | 72 | 73 | 92 | 109 | 128 | 124 | 102 | 85 | 64 | 62 |
| 2014 | 52 | 48 | 68 | 71 | 94 | 108 | 133 | 130 | 103 | 84 | 67 | 63 |
| Average | 51.3 | 55.3 | 68.0 | 72.0 | 94.3 | 110.0 | 130.7 | 123.7 | 103.0 | 84.0 | 66.7 | 62.7 |
| Count Adj | 2.55 | 2.36 | 1.92 | 1.81 | 1.39 | 1.19 | 1.00 | 1.06 | 1.27 | 1.56 | 1.96 | 2.09 |

Peak month
Min/Max removed from average

## Attachment B: Future Volumes Table

| Site id | HWY | MP | DIR | HS | Description | 2016 | 2017 | 2018 | 2038 | RSQ | Use Data? (based on RSQ) | Annual Growth Rate | Average Annual Growth Rate for Site | Study Area Location |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 600 | 004 | 81.00 | 1 |  | 0.02 mile south of Old Highway 97 |  | 3800 |  | 4300 | 0.7435 | 0 | 0.63\% | 0.69\% | US97, northeast of Madras |
| 601 | 004 | 87.78 | 1 |  | 0.50 mile south of NE Elm Lane |  | 3800 |  | 4400 | 0.7238 | 0 | 0.75\% | 0.69\% | US97, northeast of Madras |
| 602 | 004 | 89.60 | 1 |  | 0.05 mile north of NE Cherry Lane |  | 4000 |  | 4300 | 0.4103 | 0 | 0.36\% | 0.69\% | US97, northeast of Madras |
| 16002 | 004 | 97.11 | 1 |  | Madras Automatic Traffic Recorder, Sta. 16-002, 0.18 mile north of MadrasPrineville Highway No. 360 (US26) |  | 15000 |  | 16000 | 0.4421 | 0 | 0.32\% | 2.20\% | US97, south of Madras and north of Culver |
| 619 | 004 | 97.31 | 1 |  | 0.02 mile south of Madras-Prineville Highway (US26) |  | 10500 |  | 10800 | 0.2068 | 0 | 0.14\% | 2.20\% | US97, south of Madras and north of Culver |
| 620 | 004 | 103.61 | 1 |  | 0.02 mile north of SW Iris Lane |  | 11600 |  | 12200 | 0.2090 | 0 | 0.25\% | 2.20\% | US97, south of Madras and north of Culver |
| 621 | 004 | 105.63 | 1 |  | 0.10 mile north of Culver Highway |  | 11100 |  | 13100 | 0.6288 | 0 | 0.86\% | 2.20\% | US97, south of Madras and north of Culver |
| 622 | 004 | 105.83 | 1 |  | 0.10 mile south of Culver Highway |  | 10200 |  | 15500 | 0.9830 | 0.983 | 2.47\% | 2.20\% | US97, south of Culver to County Line |
| 623 | 004 | 112.83 | 1 |  | At Jefferson-Deschutes County Line |  | 12900 |  | 18100 | 0.9361 | 0.9361 | 1.92\% | 2.20\% | US97, south of Culver to County Line |
| 1509 | 016 | 90.89 | 1 |  | 0.02 mile west of Camp Sherman Road | 6300 |  |  | 7400 | 0.7307 | 0 | 0.79\% | 1.04\% | US20, west of Sisters |
| 1510 | 016 | 90.93 | 1 |  | 0.02 mile east of Camp Sherman Road | 7000 |  |  | 8600 | 0.7850 | 0.785 | 1.04\% | 1.04\% | US20, west of Sisters |
| 2562 | 053 | 96.48 | 1 |  | At Wasco-Jefferson County Line |  |  | 4500 | 4900 | 0.1882 | 0 | 0.44\% | 1.62\% | US26, northwest of Madras |
| 2563 | 053 | 103.25 | 1 |  | 0.02 mile northwest of Agency-Hot <br> Springs Road |  |  | 4500 | 4600 | 0.1178 | 0 | 0.11\% | 1.62\% | US26, northwest of Madras |
| 2564 | 053 | 103.29 | 1 |  | 0.02 mile southeast of Agency-Hot Springs Road |  |  | 6900 | 7600 | 0.1931 | 0 | 0.51\% | 1.62\% | US26, northwest of Madras |
| 2565 | 053 | 107.30 | 1 |  | 0.52 mile north of NW Pelton Dam Road |  |  | 6900 | 7700 | 0.4369 | 0 | 0.58\% | 1.62\% | US26, northwest of Madras |
| 2567 | 053 | 111.76 | 1 |  | 0.02 mile northwest of NW Columbia Drive |  |  | 7000 | 7800 | 0.2661 | 0 | 0.57\% | 1.62\% | US26, northwest of Madras |
| 16006 | 053 | 113.17 | 1 |  | Warm Springs Automatic Traffic Recorder, Sta. 16-006, 4.54 miles northwest of The Dalles-California Highway No. 4 (US97) |  |  | 8400 | 8900 | 0.4867 | 0 | 0.30\% | 1.62\% | US26, northwest of Madras |
| 2569 | 053 | 113.93 | 1 |  | 0.02 mile northwest of NW Boise Drive |  |  | 7300 | 7800 | 0.1266 | 0 | 0.34\% | 1.62\% | US26, northwest of Madras |
| 2570 | 053 | 113.97 | 1 |  | 0.02 mile southeast of NW Boise Drive |  |  | 7600 | 8900 | 0.2838 | 0 | 0.86\% | 1.62\% | US26, northwest of Madras |
| 2571 | 053 | 115.91 | 1 |  | 0.05 mile southeast of NW Cherry Lane |  |  | 9200 | 10100 | 0.5180 | 0 | 0.49\% | 1.62\% | US26, northwest of Madras |
| 4405 | 360 | 0.23 | 1 |  | 0.02 mile southeast of The DallesCalifornia Highway (US97) |  |  | 2400 | 2600 | 0.5166 | 0 | 0.42\% | 0.91\% | US26 between Madras and Prineville (REGIONAL HIt |
| 4406 | 360 | 1.17 | 1 |  | 0.02 mile south of SW Dover Lane |  |  | 1900 | 2100 | 0.2698 | 0 | 0.53\% | 0.91\% | US26 between Madras and Prineville (REGIONAL HIt |
| 4407 | 360 | 1.57 | 1 |  | 0.02 mile south of Adams Drive |  |  | 2100 | 2400 | 0.4610 | 0 | 0.71\% | 0.91\% | US26 between Madras and Prineville (REGIONAL HI' |
| 4408 | 360 | 9.88 | 1 |  | 0.02 mile north of Ramms Road |  |  | 2000 | 2100 | 0.1469 | 0 | 0.25\% | 0.91\% | US26 between Madras and Prineville (REGIONAL HI' |
| 4409 | 360 | 9.92 | 1 |  | 0.02 mile south of Ramms Road |  |  | 1900 | 2000 | 0.0382 | 0 | 0.26\% | 0.91\% | US26 between Madras and Prineville (REGIONAL HI' |
| 4410 | 360 | 16.30 | 1 |  | At Jefferson-Crook County Line |  |  | 2100 | 2200 | 0.0729 | 0 | 0.24\% | 0.91\% | US26 between Madras and Prineville (REGIONAL HI' |
| 4418 | 361 | 0.02 | 1 |  | 0.02 mile west of The Dalles-California <br> Highway (US26/US97-NB) |  |  | 3400 | 3500 | 0.0148 | 0 | 0.15\% | 0.91\% | Culver Highway (DISTRICT HIGHWAY) |

$\left.\begin{array}{|l|r|r|c|c|l|l|l|l|l|l|}\hline 4419 & 361 & 0.07 & 1 & & \begin{array}{l}0.02 \text { mile west of The Dalles-California } \\ \text { Highway (US26/US97-SB) }\end{array} & & & 4400 & 4700 & 0.2524 \\ \hline 4421 & 361 & 0.35 & 1 & & 0.02 \text { mile southwest of Madison Street } & & & 4400 & 5200 & 0.7714 \\ \hline 4422 & 361 & 0.90 & 1 & & 0.02 \text { mile south of SW Belmont Lane } & & & 5100 & 5600 & 0.4193 \\ \hline 4423 & 361 & 2.25 & 1 & & 0.02 \text { mile northeast of SW Colfax Lane }\end{array}\right)$

| 0 | $0.34 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| :---: | :---: | :---: |
| 0.7714 | $0.91 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.49 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.13 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.12 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.13 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.14 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.16 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.16 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.16 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.19 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.19 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.17 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.19 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.21 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.22 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.24 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 | $0.45 \%$ | $0.91 \%$ Culver Highway (DISTRICT HIGHWAY) |
| 0 |  |  |


[^0]:    *Traffic counts at the intersections of OR361/US97 (located south of the Madras city limits) and US20/Camp Sherman Road were not available from ODOT. Traffic counts at the OR361/D Street/US 97 intersection (located inside the Madras city limits) were provided instead. Because traffic pattens are not currently reflective of typical conditions due to school closures and "Stay Home, Stay Safe" orders associated with the COVID-19 pandemic, traffic counts cannot currently be conducted at the two missing locations. Accordingly, these two intersections will be included in the crash analysis, but there will not be operations analysis conducted.

