TECH MEMO #4: FUTURE LAND USE AND TRANSPORTATION CONDITIONS

Date:	March 27, 2023
To:	Wendy Farley-Campbell, Shirley Gray, Erin Reynolds, and Mike Miller, City of Florence Michael Duncan, Oregon Department of Transportation
From:	Russ Doubleday, Matt Bell, Susan Wright, PE, PMP, Kittelson & Associates, Inc.
Project:	City of Florence Transportation System Plan Update
Subject:	Final Tech Memo #4: Future Land Use and Transportation Conditions

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Introduction

This memorandum summarizes future (no-build) transportation system conditions in Florence for the Florence Transportation System Plan (TSP) update. The information provided in this memorandum is based on population and employment forecasts developed for Florence and corresponding growth in traffic volumes throughout the city. The future deficiencies identified in this memorandum will serve as the basis for developing transportation system alternatives and improvement projects for the TSP update.

Population and Employment Forecasts

Population and employment forecasts were developed for Florence based on state and local data and an assessment of the capacity for additional growth and development within the current Urban Growth Boundary (UGB). The following provides a summary of the forecast. *A detailed summary of the forecast is provided in Attachment A.*

POPULATION FORECAST

Historic and projected population information for Florence was obtained from the Portland State University (PSU) Population Research Center (PRC). The PRC generates coordinated forecasts for Oregon counties and cities every four years. The most recent coordinated population forecast for Lane County was released in 2020. The 2020 report includes historic and projected population estimates for Lane County and Florence.

According to the report, the base year (2020) population for Florence is 11,182 persons. The population is expected to have an annual average growth rate of 1.0 percent per year between 2020 and 2045. Therefore, the end year (2045) population for Florence is expected to be 14,040 persons.

The household forecast assumes Florence household size will remain the same as the 2020 average household size of 1.9 persons per household throughout the planning horizon. Households were estimated by dividing population by the average household size. There is an estimated 5,877 households in the base year (2020) and 7,359 households in the end year (2045). The difference between the base year and end year is 1,482 households.

EMPLOYMENT FORECAST

The most recent industry employment data available for Lane County is provided from the Oregon Employment Department Workforce and Economic Research Division industry employment forecast. This data provides a ten-year forecast defined by regions as opposed to cities and organizes employment forecasts by primary industry. The employment forecast analysis assumes that employment growth in Florence will follow similar employment trends as the Oregon Employment industry employment forecast.

The most current employment data available for Florence is provided by the US Census American Community Survey (ACS) 5-year estimates. This data provides employment information by North American Industry Classification System (NAICS) sector. This data is used as the basis for estimating employment growth.

The NAICS data shows that base year (2020) employment for Florence is 3,648 jobs. Employment is expected to increase by an additional 2,754 jobs between 2020 and 2045, with higher increases in leisure and hospitality, private educational and health services, and trade, transportation, and utilities. Therefore, the end year (2045) employment for Florence is expected to be 6,402 jobs.

Table 1 summarizes the population, households, and employment data for year 2020 and forecast year 2045 conditions. As shown, employment is expected to grow at a higher rate than the population and households over the 25-year period.

Table 1: Population, Household, and Employment Summary

Land Use	2020	2045	Change	Percent Change
Population	11,182	14,040	2,861	26%
Households	5,877	7,359	1,482	25%
Employment	3,648	6,402	2,754	75%

The population, households, and employment data shown in Table 1 was distributed throughout the city based on current zoning designations and an evaluation of developable and re-developable lands. Based on the evaluation, there is adequate capacity within the City to accommodate the projected growth in population, households, and employment over the

planning horizon without changes to current zoning designations, development patterns, and/or the UGB.

Figures 1 and 2 illustrate the changes in households and employment by TAZ. The TAZs shown in Figures 1 and 2 were developed based on the current zoning designations and the location of major roadways and intersections throughout the city. The TAZs provide a convenient way of evaluating and summarizing the population and employment data for the city.

Planned Improvements

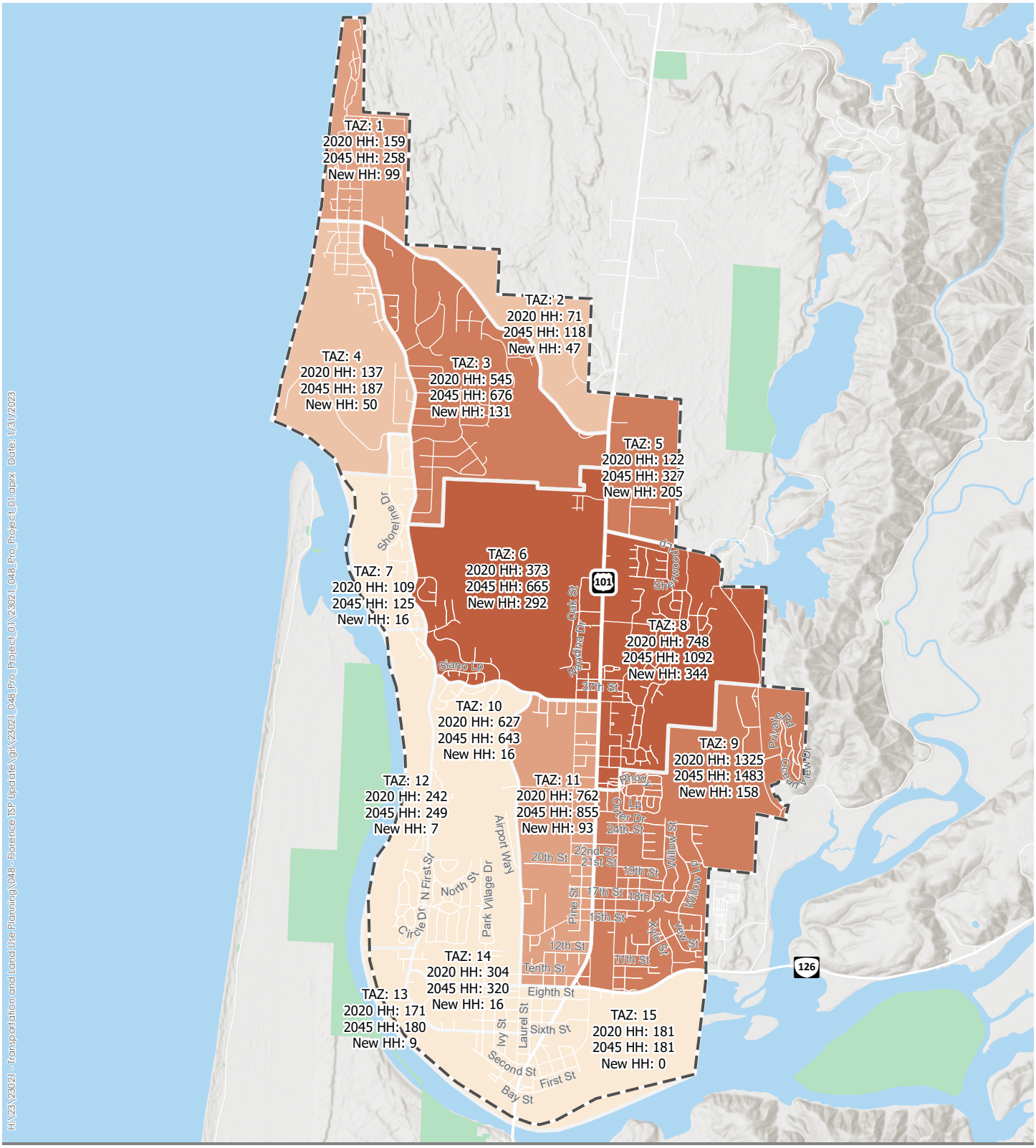
This section summarizes planned improvements identified in the Statewide Transportation Improvement Program (STIP) and the Florence Capital Improvement Program (CIP). One expected outcome of the Florence TSP update is the identification of projects for inclusion in updated/amended versions of the STIP and CIP.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM

The Statewide Transportation Improvement Program (STIP) is the Oregon Department of Transportation's (ODOT) capital improvement program for state and federally funded projects. The Oregon Transportation Commission (OTC) and ODOT develop the STIP in coordination with a wide range of stakeholders, including local jurisdictions and the public. The OTC allocates funding among the following categories:

- **Fix-it** programs fund projects that fix or preserve the state's transportation system, including bridges, pavement, culverts, traffic signals, and others.
- **Enhance it** programs fund projects that enhance or expand the transportation system, these are typically high-priority projects from state and local transportation plans, such as the Florence TSP.
- **Safety** programs reduce deaths and injuries on Oregon roads. This includes the All Roads Transportation Safety (ARTS) program, which includes projects on state highways and local roads.
- **Non-highway** programs fund bicycle and pedestrian projects and public transportation.
- **Local government** programs direct funding to local governments so they can fund projects.

The current STIP (2021-2024) include one project in Florence. Table 2 summarizes projects from the current STIP.



New Households

- 0 - 25
- 26 - 50
- 51 - 100
- 101 - 250
- 251 - 500
- Parks
- Water
- City Boundary
- Urban Growth Boundary

0 0.5 1 Miles

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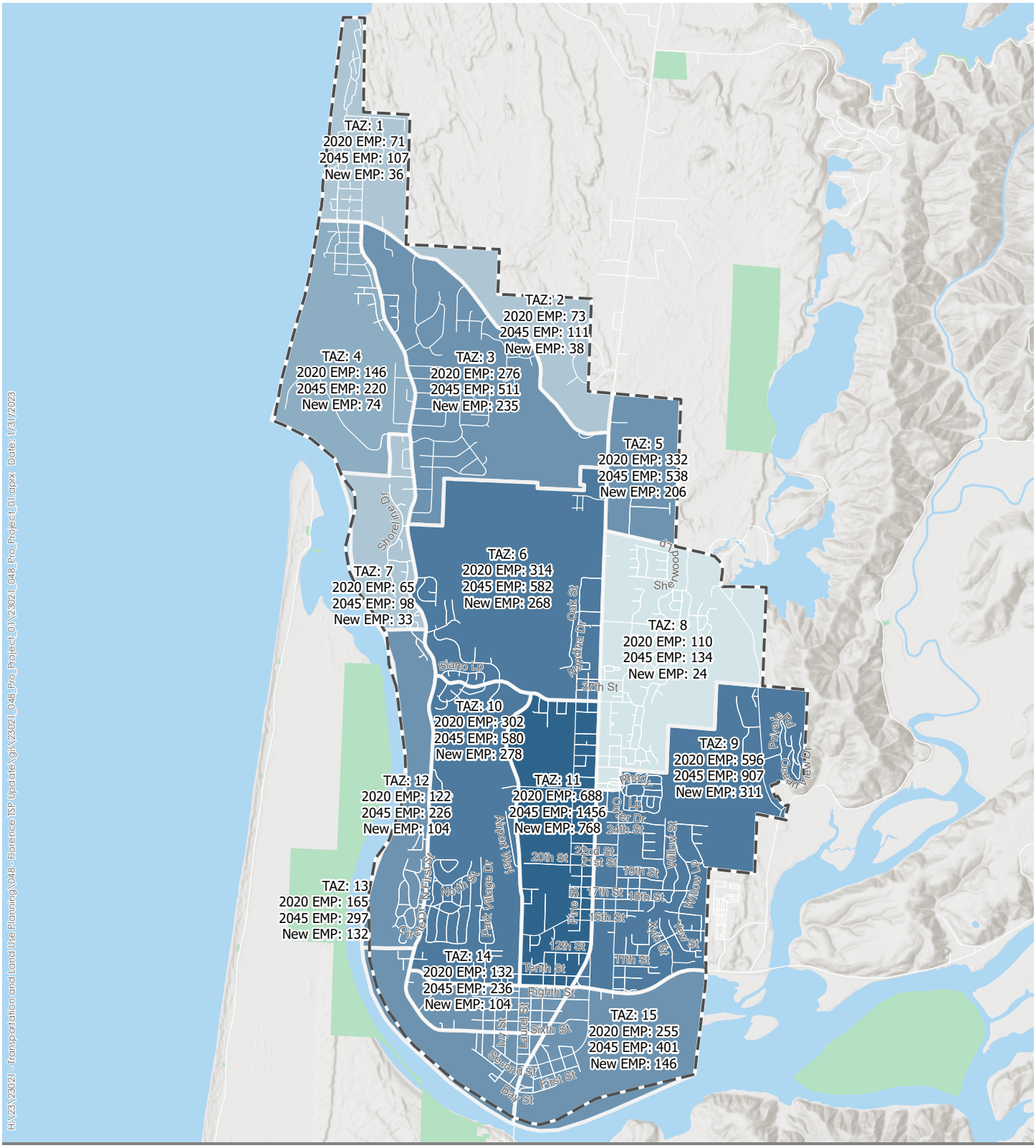
Figure 1

Household Growth by Transportation Analysis Zone (TAZ) Florence, Oregon



New Employment

- 0 - 25
- 26 - 50
- 51 - 100
- 101 - 250
- 251 - 500
- 501 - 768
- Parks
- Water
- City Boundary
- Urban Growth Boundary

0 0.5 1 Miles

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Figure 2

Employment Growth by Transportation Analysis Zone (TAZ) Florence, Oregon

Table 2: Statewide Transportation Improvement Program Projects for Florence

Key	Project Name	Description	Work Type	Status	Project Total
		2018-2021 STIP			
22539	Siuslaw Estuary Trail Phase 1	Construct a new trailhead and approximately 1,600 feet of multi-use trail	SPPROG	Project Under Construction	$208,700

The project shown in Table 2 will be considered in the future (no-build) traffic conditions analysis and further evaluated in the alternatives analysis summarized in Tech Memo 5. However, it will have limited to no impact on overall capacity within the UGB.

FLORENCE CAPITAL IMPROVEMENT PLAN

The Florence Capital Improvement Plan (CIP) establishes, prioritizes, and ensures funding for projects to improve existing infrastructure or to pave the way for new development. Projects generally increase functionality, efficiency, and capacity of the infrastructure, increase capacity to meet the demands of growth, or provide community livability and enhancement.

The current CIP identifies projects for Fiscal Year (FY) 2022-2023 through the FY 2037-2038. Table 3 summarizes the characteristics of the projects, including estimated cost and funding source.

Table 3: Florence Capital Improvement Plan

Fiscal Year	Fund	Projects	Estimated Cost	Funding Source
FY 2023-2024	Development	Munsel Lake Road West Extension	$312,000	Development Contributions
FY 2026-2027	Rates	Quince Street Reconstruction	$750,000	Rates
FY 2026-2027	SDC and ODOT	US 101/27th Street Traffic Signal	$500,000	SDC and ODOT
FY 2027- 2028	Development	US 101/Munsel Lake Road Traffic Signal	$1,000,000	Development Contributions
FY 2029 – 2030	ODOT	US 101/Quince Street Realignment	$650,000	ODOT
FY 2030-2031	SDC	27th Street Widening (US 101 to Oak Street)	$200,000	SDC
FY 2030 – 2031	SDC and Development	Oak Street Extension (46th Street to North Property Line of Fred Meyer)	$1,000,000	SDC and Development Contributions
FY 2031 - 2032	Development	Oak Street Extension (Munsel Lake to Heceta Beach Road)	$2,216,800	Development Contributions
FY 2032 – 2033	SDC	Kingwood Street/9th Street Traffic Signal or Roundabout	$1,200,000	SDC
FY 2035-2036	SDC and ODOT	US 101/15th Street Traffic Signal	$500,000	SDC and ODOT
FY 2036- 2037	SDC, ODOT, and Development	US 101/46th Street Traffic Signal	$490,000	SDC, ODOT, and Development Contributions
FY 2037 – 2038	Development	Spruce Street Extension (52nd to Heceta Beach Road)	$3,500,000	Development Contributions

The projects shown in Table 3 will be considered in the future (no-build) traffic conditions analysis and further evaluated in the alternatives analysis summarized in Tech Memo #5.

Future Traffic Volumes

Future traffic volumes were developed for the study intersections based on the Zonal Cumulative Analysis methodology described in ODOT's Analysis Procedures Manual (APM). This type of analysis combines growth in regional traffic volumes with growth in local traffic volumes associated with household and employment growth in the city. The traffic volume projection process includes three major steps: trip generation, trip distribution, and trip assignment. The process accounts for the following four categories of vehicle trips:

- **External-External (through trips):** vehicles with an origin and destination outside the UGB. An example of an external-external trip is someone traveling from Yachats to Reedsport or Eugene.
- **External-Internal (inbound trips):** vehicles with an origin outside the UGB and a destination inside the UGB. An example of an external-internal trip is someone who works in Reedsport and returns home to Florence during the evening peak hour.
- **Internal-External (outbound trips):** vehicles with an origin inside the UGB and a destination outside the UGB. An example of an internal-external trip is someone who works in Florence and returns home to Yachats during the evening peak hour.
- **Internal-Internal (local trips):** vehicles with an origin and destination inside the UGB. An example of an internal-internal trip is someone who travels from their home to the grocery store without leaving the UGB.

Using these vehicle trip types, the basic steps for a zonal cumulative analysis are:

- Develop regional growth rates for highway traffic volumes;
- Identify where household and employment growth is likely to occur in the community;
- Develop estimates of the number of vehicle trips associated with household and employment growth, and;
- Allocate those trips across the city to various growth areas.

An overview of each of these steps is presented below.

REGIONAL TRAFFIC GROWTH

ODOT's Future Volume Tables were used to develop regional growth rates for US 101 and OR 126. Based on the tables, traffic volumes along US 101 are expected to increase by approximately 16.2 percent north of the City limits and traffic volumes along OR 126 are expected to increase by approximately 15.6 percent east of the City limits over the 20-year planning horizon. These growth rates were applied to existing traffic volumes along US 101 and OR 126 to estimate growth in regional traffic volumes.

HOUSEHOLD AND EMPLOYMENT GROWTH

Projected household and employment growth also contribute to future growth in traffic volumes. Growth estimates were developed based on the PRC's Coordinated Population Forecast for Lane County, the Census Bureau's ACS 5-year estimates, and the Oregon Employment

Department's employment forecast analysis. The distribution of new households and employment within the city was determined based on an evaluation of developable and re-developable lands as well as a review of existing land use, zoning designations, and development patterns. *Additional information on projected household and employment growth is provided earlier in this memo and in Attachment A.*

TRIP GENERATION

The projected household and employment growth can be equated to increases in local traffic volumes by calculating the trip generation of the future uses. Trip generation estimates were prepared based on information provided in the standard reference, *Trip Generation Manual, 11th Edition*, published by the Institute of Transportation Engineers (ITE). *Table B-1 in Attachment B summarizes the total trips by TAZ.*

TRANSPORTATION ANALYSIS ZONE

The trips associated with the projected household and employment growth were distributed throughout the city based on the type of trips (i.e. external-internal, internal-external, internal-internal) and the location of the TAZs developed for the project. *Additional information on the TAZs is provided earlier in this memo and in Attachment A.*

Intersection Operations Analysis

The intersection operations analysis was conducted using Synchro 11, which is a software tool designed to assist with operations analyses in accordance with Highway Capacity Manual (HCM) methodologies. The analysis results include level-of-service (LOS), delay, and volume-to-capacity (v/c) ratios at all intersections, regardless of jurisdiction. The LOS, delay, and v/c ratios are reported for the overall intersection at signalized intersections and the critical movement at unsignalized intersections.

Figure 3 illustrates the location of the study intersections. Table 4 and Figure 4 summarize the results of the intersection operations analysis and compares the results to the applicable mobility standards and targets which were presented in the *Analysis Methodology and Assumptions Memorandum*.

Table 4: Intersection Operations, Weekday PM Peak Hour

Map ID	Intersection	Control Type[1]	Mobility Standard/Target[2]	Intersection Operations[3]			
				CM	LOS	Del	v/c
1	US 101/Heceta Beach Road	TWSC	V/C = 0.80/0.90	EB	F	89.7	0.52
2	US 101/Munsel Lake Road	TWSC	V/C = 0.85/0.90	WB	**F**	**> 100**	**> 1.0**
3	US 101/46th Street	TWSC	V/C = 0.85/0.90	EB	F	76.1	0.60
4	US 101/35th Street	Signal	V/C = 0.85	-	B	19.1	0.71
5	US 101/30th Street	TWSC	V/C = 0.90/0.95	EB	E	48.7	0.26
6	US 101/27th Street	TWSC	V/C = 0.90/0.95	EB	C	24.3	0.24
7	US 101/15th Street	TWSC	V/C = 0.90/0.95	EB	E	49.8	0.45
8	US 101/OR 126	Signal	V/C = 0.85	-	C	34.1	0.80
9	US 101/Rhododendron Drive	Signal	V/C = 0.90	-	B	10.8	0.60
10	US 101/2nd Street	TWSC	V/C = 0.90/1.0	WB	E	37.2	0.07

11	OR 126/Quince Street	TWSC	V/C = 0.85/0.95	NB	F	> 100	0.71
12	OR 126/Spruce Street	TWSC	V/C = 0.85/0.95	SB	E	41.1	0.63
13	OR 126/North Fork Siuslaw Road	TWSC	V/C = 0.70/0.75	SB	D	25.4	0.15
14	Rhododendron Drive/35th Street	TWSC	LOS D	WB	B	13.4	0.36
15	Rhododendron Drive/9th Street	TWSC	LOS D	WB	C	18.6	0.55
16	Rhododendron Drive/Heceta Beach Road	TWSC	LOS D	SB	B	11.9	0.28
17	Kingwood Street/35th Street	TWSC	LOS D	NB	**E**	**40.1**	**0.55**
18	Kingwood Street/27th Street	TWSC	LOS D	WB	B	10.9	0.07
19	Kingwood Street/15th Street	TWSC	LOS D	WB	B	11.6	0.13
20	Kingwood Street/9th Street	TWSC	LOS D	SB	C	19.6	0.44

1. TWSC = Two-way stop-control
2. State Highway V/C Ratio/Side-Street V/C Ratio
CM = Critical movement.
LOS = Intersection Level of Service (Signal); CM Level of Service (TWSC, AWSC).
Delay = Intersection average vehicle delay (Signal); CM vehicle delay (TWSC, AWSC).
v/c = Intersection v/c (Signal); CM v/c (TWSC, AWSC).

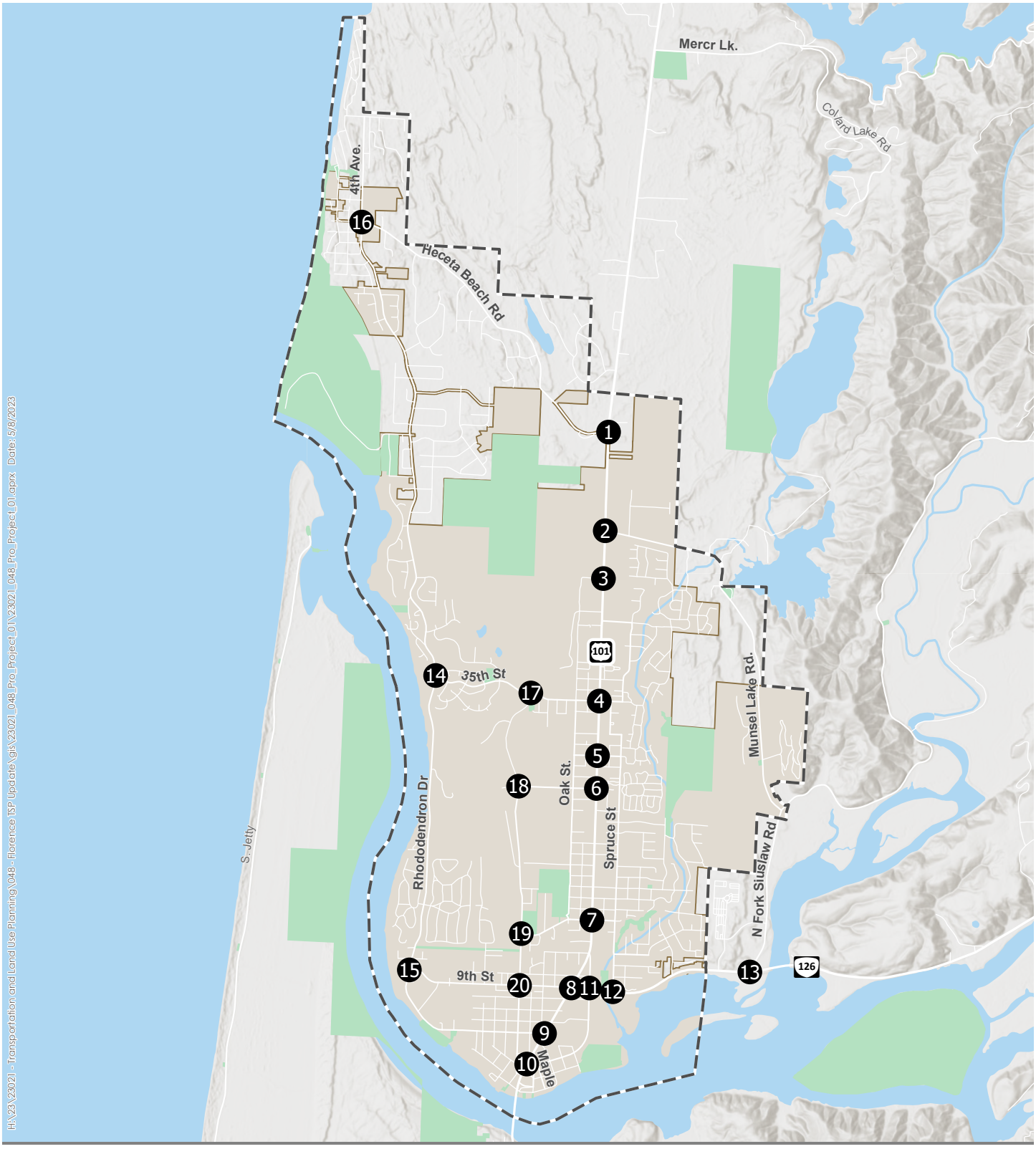
As shown in Table 4 and Figure 4, two intersections are forecast to exceed their applicable mobility targets in 2042 during the weekday PM peak hour. The intersections exceeding their applicable mobility standards and target include:

- **US 101/Munsel Lake Road** – The westbound approach to the intersection is forecast to operate at LOS F and above capacity (v/c > 1.0). This is primarily due to growth in TAZ 5,8, and 9 as well as growth in through traffic along US 101.
- **Kingwood Street/35th Street** – The northbound approach to the intersection is forecast to operate at LOS E. This is primarily due to growth in TAZs throughout the city. Many trips accessing the west side of Florence go through this intersection as 35th Street is a primary east-west connector.

Other intersections that may meet their applicable standards and target, but have relatively high level of delay include:

- **US 101/Heceta Beach Road** – the eastbound approach is forecast to operate at LOS F, but below capacity.
- **US 101/46th Street** – the eastbound approach is forecast to operate at LOS F, but below capacity.
- **OR 126/Quince Street** – the northbound approach is forecast to operate at LOS F, but below capacity.

All other study intersections are forecast to operate acceptably during the weekday PM peak hour with respect to their applicable mobility standards and targets. *Attachment C includes the intersection operations analysis worksheets.*



Study Intersections
Parks
Water
City Boundary
Urban Growth Boundary

0 0.5 1 Miles

Figure 3

Study Intersections
Florence, Oregon

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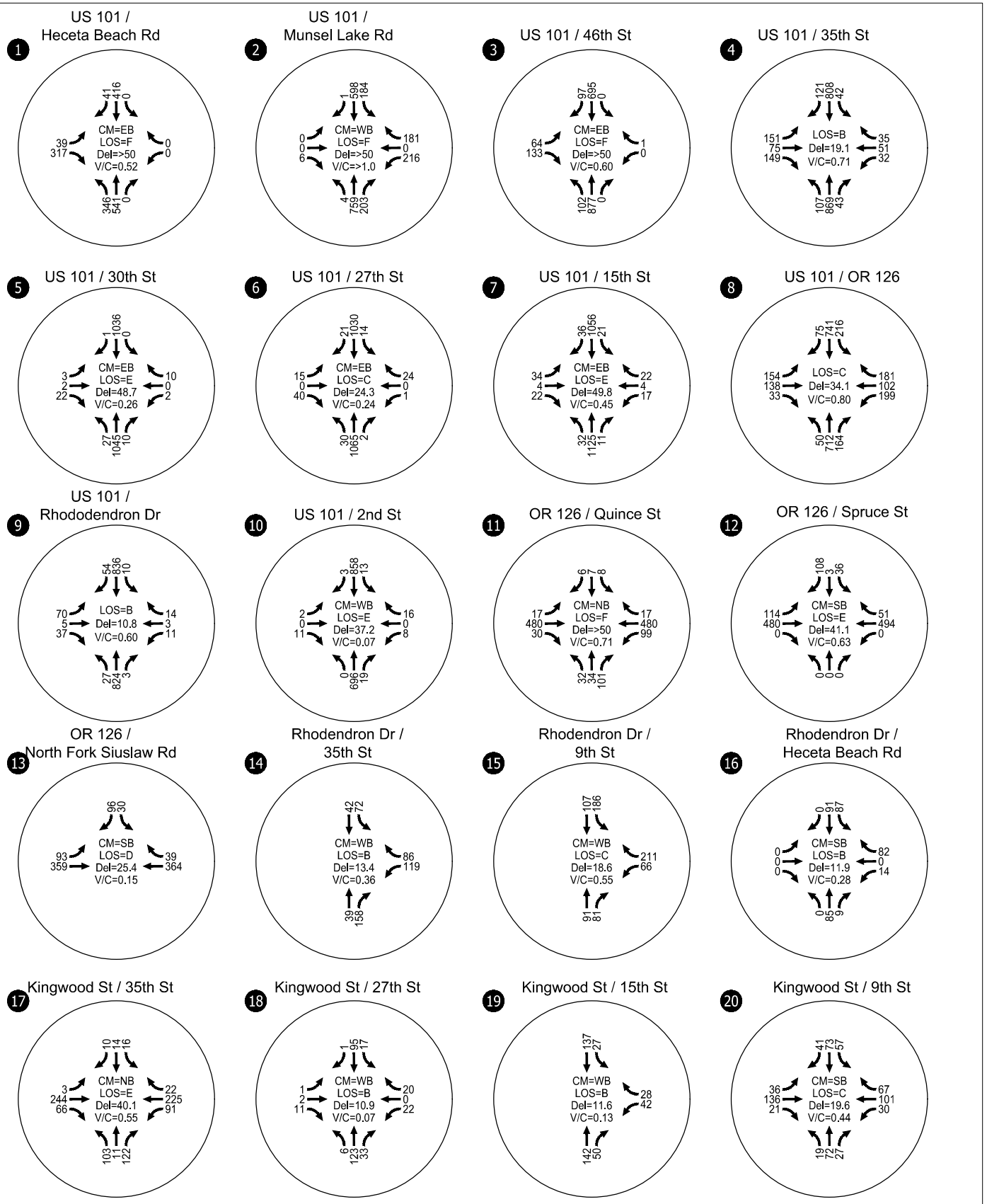

Year 2042 Traffic Conditions
Weekday PM Peak Hour
Florence, OR

Figure 4

QUEUEING ANALYSIS

A queuing analysis was conducted at the signalized study intersections using Synchro 11. Table 5 summarizes the 95th percentile queues during the weekday PM peak hour and indicates if existing storage can accommodate the queues. The vehicle queue and storage lengths were rounded up to the nearest 25-feet. The storage lengths reflect the striped storage for each movement.

Table 5: Queuing Summary, Weekday PM Peak Hour

Map ID	Intersection	Movement	Storage Length (feet)	95th Percentile Queue (feet)	Adequate?
4	US 101/35th Street	EBL	125	225	**No**
		WBL	150	50	Yes
		NBL	150	50	Yes
		SBL	100	<25	Yes
8	US 101/9th St-OR 126	EBL	100	250	**No**
		WBL	400	275	Yes
		NBL	125	125	Yes
		SBL	150	475	**No**
9	US 101/Rhododendron Drive	NBL	125	<25	Yes
		SBL	125	<25	Yes

EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, L = Left

As shown in Table 5, the striped storage lengths at the signalized study intersections are currently adequate for the 95th percentile queues except for the eastbound left-turn queue at the US 101/35th Street and the eastbound left-turn and southbound left-turn queue at the US 101/OR 126 intersections.

The storage length of the eastbound left-turn lane on 35th Street is restricted by pavement width between US 101 and Pine Street. The storage length of the eastbound left-turn lane on 9th Street is restricted by pavement width between US 101 and Nopal Street. The southbound left-turn lane on US 101 has additional two-left-turn storage from OR 126 to 10th Street. There is additional two-left-turn storage from 10th Street to 12th Street. *Attachment C contains the queuing analysis worksheets.*

Non-Automobile Transportation Analysis

TRANSIT QUALITATIVE MULTIMODAL ASSESSMENT

As described in *Technical Memorandum #3A: Existing Conditions Inventory,* public transit service in Florence is provided by Rhody Express, Link Lane, and Coos County Area Transit. These providers offer a mix of local and intercity bus service, and connections to other transit services outside of the city. The following summarizes planned updates to these services:

- **Rhody Express** recently updated the South Loop to provide service to the Three Rivers Casino. This update was considered in the existing conditions analysis and there are no other planned updates at this time.
- **Link Lane** is currently creating a Transit Development Plan (TDP) to better understand the transit needs between coastal communities and between these coastal communities and Eugene. While the project has yet to develop alternatives, it has discovered the

need to increase intercity service. As alternatives are developed to address this need, they will be incorporated into the Florence TSP Update.

- **Coos County Area Transit** completed a Transit Master Plan in 2021. The plan identifies updates to the service provided between Coos Bay and Florence. The plan calls for three runs four days a week (Monday through Friday), which is an update to existing service, which now operates two runs six days a week. Both existing service and planned service updates result in 12 runs per week, and fewer than four runs per day.

The transit qualitative multimodal assessment (QMA) uses several criteria to assess transit service for small cities, including service frequency, schedule speed/travel time, transit stop amenities, connecting pedestrian/bicycle network, and ADA accessibility. Given that Rhody Express does not have plans to update its service, potential updates to Link Lane service are still pending, and recent updates to Coos County do not measurably change the results of the analysis, the transit QMA results summarized in *Tech Memo 3B: Existing Conditions Analysis* remain the same under future (no-build) traffic conditions.

PEDESTRIAN LEVEL OF TRAFFIC STRESS

Pedestrian Level of Traffic Stress (PLTS) along roadway segments is determined based on sidewalk condition, physical buffer type, total buffering width, and general land use. Traffic volumes do not impact PLTS along roadway segments. Therefore, the forecast traffic volumes describe above are not expected to change the PLTS analysis results relative to existing conditions. In addition, none of the planned improvements identified in the STIP or the CIP are expected to change the factors that determine PLTS along roadway segments. Therefore, the PLTS analysis results summarized in *Tech Memo #3B: Existing Conditions Analysis* remain the same under future (no-build) traffic conditions.

BICYCLE LEVEL OF TRAFFIC STRESS

Bicycle Level of Traffic Stress (BLTS) along roadway segments is determined based on traffic volumes, travel speeds, the number of travel lanes per direction, the presence and width of on-street bicycle lanes and/or adjacent parking lanes, and several other factors. Given that increases in traffic volumes could impact BLTS on roadways with mixed traffic (e.g., shared lane pavement markings, no bicycle facilities), future traffic volumes were reviewed to determine if the increases result in changes in BLTS. Based on this review, there were several locations where traffic volumes increased; however, given the BLTS criteria the increases did not change the results of the analysis.

Table D-1 in Attachment D summarizes the BLTS analysis results under future (no-build) traffic conditions. Figure 5 illustrates the BLTS analysis results for arterial and collector streets. It is important to note that while some segments are shown as BLTS 3 or 4, they may have shorter segments with lower BLTS scores. As shown in Figure 5, several arterial and collector streets in Florence are forecast to have segments that are rated BLTS 3 or 4. These segments may have bike lanes that are too narrow for roadway conditions or may be shared roadways (i.e. *mixed traffic*) with relatively high traffic volumes.

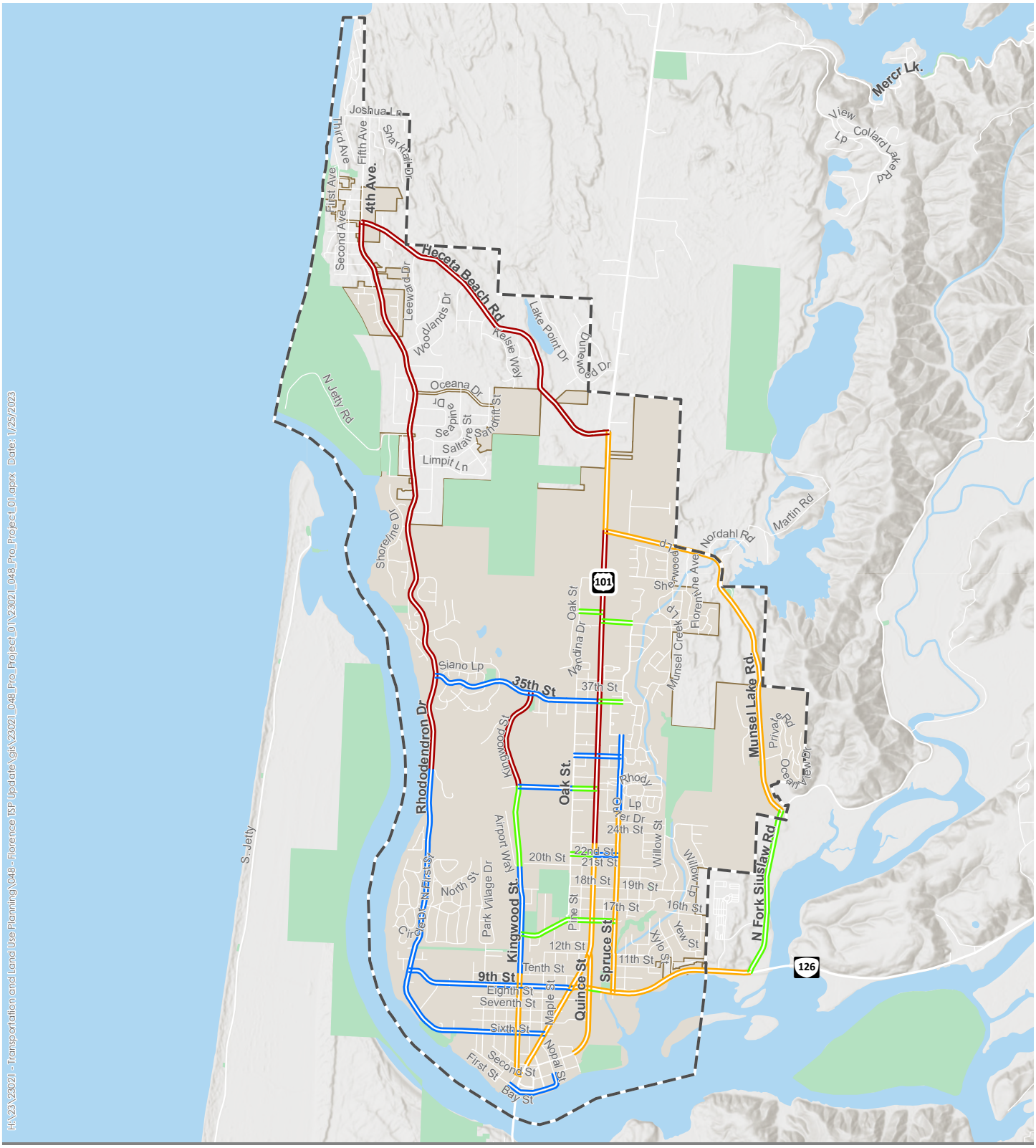

Figure 5

Future Bicycle Level of Stress
Florence, Oregon

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Future Parking Conditions

The population and employment forecasts summarized above and in Attachment A indicate that there will be a 26% increase in population and a 75% increase in employment over the next 20 years. These increases will rely on the development or redevelopment of residential and commercial properties throughout the city. Depending on the location and type of these developments, and the amount of off-street parking they provide, the increases could have a significant impact on the on-street parking supply. Without changes to existing parking management policies and strategies, areas that are a challenge today will likely continue to be a challenge in the future and other challenges (e.g., high parking demand, unbalanced parking demand, neighborhood spillover, etc.) are likely to arise.

The population and employment forecasts show that most growth is expected to occur east of US 101 and north of OR 126. Based on the parking analysis summarized in *Tech Memo 3B: Existing Conditions*, on- and off-street parking in these areas is well below the *effective capacity* of the parking supply. [1] Therefore, these areas could accommodate increases in on-street parking demand and may not require additional management strategies.

The population and employment forecasts also show that growth is expected to occur in Old Town where the parking analysis shows that on- and off-street parking demand currently exceeds the *effective capacity* of the parking supply. Therefore, growth in Old Town could have a significant impact on the on-street parking supply, particularly if the growth does not include sufficient off-street parking or the growth impacts the off-street parking supply (e.g., redevelopment of an existing off-street parking facility as retail/commercial use). Under this scenario, the total number of streets in Old Town with occupancy levels that exceed effective capacity is likely to increase and spread to adjacent streets, including residential streets. Therefore, Old Town could benefit from additional management strategies.

Future Deficiencies

The future deficiencies identified in this memorandum are summarized below. These deficiencies will be combined with the gaps and deficiencies in Tech Memo #3B: Existing Conditions and addressed in Tech Memo #5: Alternatives Analysis.

- The US 101/Munsel Lake Road and Kingwood Street/35th Street intersections are forecast to exceed their applicable mobility targets in 2042 during the weekday PM peak hour.
- The US 101/Heceta Beach Road, US 101/46th Street, and OR 126/Quince Street intersections are forecast to operate at LOS F but below capacity during the weekday PM peak hour.

[1] A parking system is generally considered to be full or at its *effective capacity* when parking occupancies reach or exceed 85% during peak periods. In retail areas and downtowns, occupancies of 85% are generally used to represent effective capacity because they reflect times when motorists may have difficulty finding a place to park and may add to congestion by circling the area in search of parking.

- The US 101/35th Street and US 101/9th St-OR 126, intersections are forecast to have 95th percentile queues that exceed striped storage lengths.
- Service frequency and schedule speed/travel speed on the Rhody Express is expected to continue to be *good*, while transit stop amenities and connecting pedestrian/bicycle networks is expected to be *fair*, and ADA accessibility is expected to be *poor*.
- Pedestrian level of traffic stress on several arterial and collector streets is expected to continue to be relatively high and suitable for some adults.
- Bicycle level of traffic stress on several arterial and collector streets is expected to continue to be relatively high and suitable for some adults.
- The total number of streets where on-street parking demand exceeds the *effective capacity* of the parking supply is expected to increase within Old Town, particularly with redevelopment of and existing off-street parking lots.

Attachments

A. Population and Employment Forecast Methodology Memorandum
B. Trip Generation Estimate
C. Future Traffic Operations and Queuing Analysis Worksheets
D. Future BLTS Analysis Results

Attachment A Population and Employment Forecast Methodology Memorandum

ATTACHMENT A: POPULATION AND EMPLOYEMENT FORECASTS

Date:	April 5, 2023
To:	Wendy Farley-Campbell, Shirley Gray, Erin Reynolds, Mike Miller, City of Florence Michael Duncan, Oregon Department of Transportation
From:	Darci Rudzinski, Clinton "CJ" Doxsee, and Brandon Crawford, MIG | APG
Project:	City of Florence Transportation System Plan Update
Project:	Final Tech Memo #4, Attachment A: Population and Employment Forecasts

Population and Employment Forecasts

This memorandum documents the methodology and results of the population and employment forecasts conducted as part of the City of Florence Transportation System Plan (TSP) Update. This forecast ultimately provides the following:

- Number of dwelling units in each Transportation Analysis Zone (TAZ), current year (2020) and end year (2045).
- Square footage of employment uses, current year and end year.

The forecast analysis is based on the best available population, employment, and land use data for the City of Florence and Lane County. As such, please note that the estimates are generalized approximations based on the available population and employment information.

PROJECTED POPULATION GROWTH PATTERNS

As of the 2020 census, Florence is home to an estimated 9,396 residents, and the Portland State University Population Research Center (PRC) estimates the City's 2020 population within the Urban Growth Boundary (UGB) at 11,182 residents.

Table 1 compares Florence's 20-year population growth with Lane County. Since 2020, Florence has experienced population growth at a higher rate than the rest of Lane County. Overall, Florence grew by about 25% since 2000, which represents an estimated 2,253 people.

Table 1. Florence and Lane County Population Growth

				2000-2020 Change	
Geography	**2000**	**2010**	**2020**	**Number**	**Percent**
Lane County	322,959	351,715	381,365	58,406	18.1%
Florence UGB	8,929	10,327	11,182	2,253	25.2%

Source: PSU Population Research Center

The PRC develops long-term coordinated population forecasts for Oregon's UGBs on a routine basis. PRC forecasted population figures for Florence and Lane County are provided in Table 2.

The PSU PRC population methodology addresses places within an urban growth boundary (UGB) individually. Florence is forecasted to grow at a faster rate than the County over the next 20 years.

Table 2. Florence Population Forecasts (% growth)

				2020-2045 Change	
Geography	2020	2045	2070	Number	Percent
Lane County	381,365	443,747	490,588	62,382	16.4%
Florence UGB	11,182	14,040	17,840	2,858	25.6%

Source: PSU Population Research Center

Table 3 shows the persons per household for Florence, which experienced a slight increase of 0.07 person per household (PPH) between the 2010 and 2020 census. The assumption for 2045 is that this ratio will remain the same throughout the planning horizon at approximately 1.9 PPH. Dividing the population by this number results in an estimated 5,885 households in 2020 and 7,389 households in the year 2045. The difference between the Base Year and End Year is an **additional 1,505 households.**[1] This is the overall growth in housing units estimated for Florence during the planning period.

Table 3: Persons per Household Change (PPH)

Geography	2010	2020	2010-2020 Change
Lane County	2.35	2.39	0.04
Florence	1.86	1.93	0.07

Source: US Census Table DP02

An inventory of undeveloped and underdeveloped land was produced as part of Technical Memorandum #3: Existing Conditions. The undeveloped/underdeveloped land inventory is used as the basis for determining future residential capacity in Florence. This analysis uses Zoning and Comprehensive Plan designations within the UGB to estimate residential capacity. Because the City's residential zones have corresponding Comprehensive Plan designations (low, medium, and high density), allowed density for residential zones were used as a proxy to estimate capacity in UGB areas. Minimum and maximum residential density is provided in Chapter 10 of the Florence Zoning Code (Title 10). A summary of the minimum and maximum allowed densities for residential zones is provided in Table 4, and a brief description of each residential zone is provided in Table 5. In addition, Table 5 includes a description of housing unit type mix assumptions for each zone. The unit mix assumptions for each zone are based on the approximate current mix of housing types that have been developed in each residential zone. These assumptions are rough approximations based on current available property tax assessor data.

1 Note that the population and household forecasts used here deviate slightly from forecast estimates used for TAZs in later tables. The slight deviation is due to differences in sources. Table 2 figures are derived from PSU Population Research Center Estimates, while population and household estimates for Table 7 are based on Census Block counts.

Table 4: Residential Density Standards

City of Florence Zones	Minimum (DU/acre)	Maximum (DU/acre)
Low Density Residential (LDR)	-	5.8 DU/acre
Medium Density Residential (MDR)	-	12
Mobile/Manufactured Home Residential (RMH)	-	12
High Density Residential	12	25

Table 5: Florence Zoning Designation Descriptions[2]

Zone	Zone Purpose	Unit Mix Assumption
Low Density Residential (LDR)	The Low Density Residential District is intended to provide a quality environment for low density, urban residential uses and other Planned Unit Development as determined to be necessary and/or desirable. This zone allows single-family detached dwellings and manufactured dwellings.	Assume 5 DU/acre at 95% single-family and 10 DU/acre at 5% duplex. Although duplexes are not currently allowed in the low density zone, the City will likely adopt amendments to allow this housing type in the near-future (within ~1 year) to comply with HB 2001, and duplexes are not subject to maximum density requirements per the state rules for middle housing compliance. This is a conservative (high) estimate to test the performance of the transportation system assuming maximum development.
Medium Density Residential (MDR)	The Medium Density Residential District is intended to provide a quality environment for medium density, urban residential uses and other compatible land uses determined to be necessary and/or desirable. This zone allows single-family attached dwellings, duplexes, and manufactured homes.	Assume 12 DU/acre at 95% single-family and 12 DU/acre at 5% duplexes/single-family attached (townhomes). Based on the current unit mix in this zone approximately 95% of residential parcels are single-family detached, while the remaining roughly 5% are duplexes or single-family attached.
Mobile Home/ Manufactured Home Residential (RMH)	The Mobile Home/Manufactured Home Residential District is intended to provide mobile home/manufactured homeowners and owners of other pre-manufactured homes an alternative	Assume 12 DU/acre at 95% single-family and 12 DU/acre at 5% duplexes/single-family attached (townhomes). For the purposes of this zone, manufactured/mobile homes

[2] The City also allows residential development in the Coast Village District (Chapter 29). However, per the BLI analysis, this small residential zone is completely built out, and therefore was not included in the future capacity analysis.

Zone	Zone Purpose	Unit Mix Assumption
	to renting space in a mobile home/manufactured home park.	are considered the same as single-family detached. Based on the current unit mix in this zone approximately 95% of residential parcels are single-family detached, while the remaining roughly 5% are duplexes or single-family attached.
High Density Residential (HDR)	The High Density Residential District is intended to provide a quality environment for high density, urban residential uses together with other compatible land uses determined to be necessary and/or desirable. This zone allows every housing type allowed in the city and permits single-family detached as a conditional use and multifamily (5+ units) through site plan review.	Assume 65% multi-family (3+ units), 30% duplexes/single-family attached, and 5% single-family detached, all at 25 DU/acre.

For the purposes of calculating capacity, the gross acreage was reduced by 25% to allow for dedications and improvements. Site-specific environmental constraints (i.e., floodplains and wetlands) were not factored into the capacity analysis. Multiplying these assumed densities by the remaining buildable acres identified in the vacant inventory map provides the expected capacity of households remaining within the UGB. Table 6 shows the estimated buildable acres and unit capacity by zone, and Figure 1 shows buildable lots (undeveloped or underdeveloped) by TAZ.

Table 6: Residential Capacity Summary

Zone	Net Buildable Acres	Assumed Density	Unit Capacity	Unit Split
Low-Density Residential	284.28	5.8 DU/acre	1,651	95% Single-family 5% Duplex/SFA
Medium-Density Residential	247.91	12 DU/acre	2,959	95% Single-family 5% Duplex/SFA
High-Density Residential	38.50	25 DU/acre	962	5% Single-family 30% Duplex/SFA 65% Multi-family
Mobile Home/ Manufactured Home	42.93	12 DU/acre	513	95% Single-family 5% Duplex/SFA
TOTAL	613.63		6,085	

Figure 1 Buildable Residential Lots by TAZ in Florence

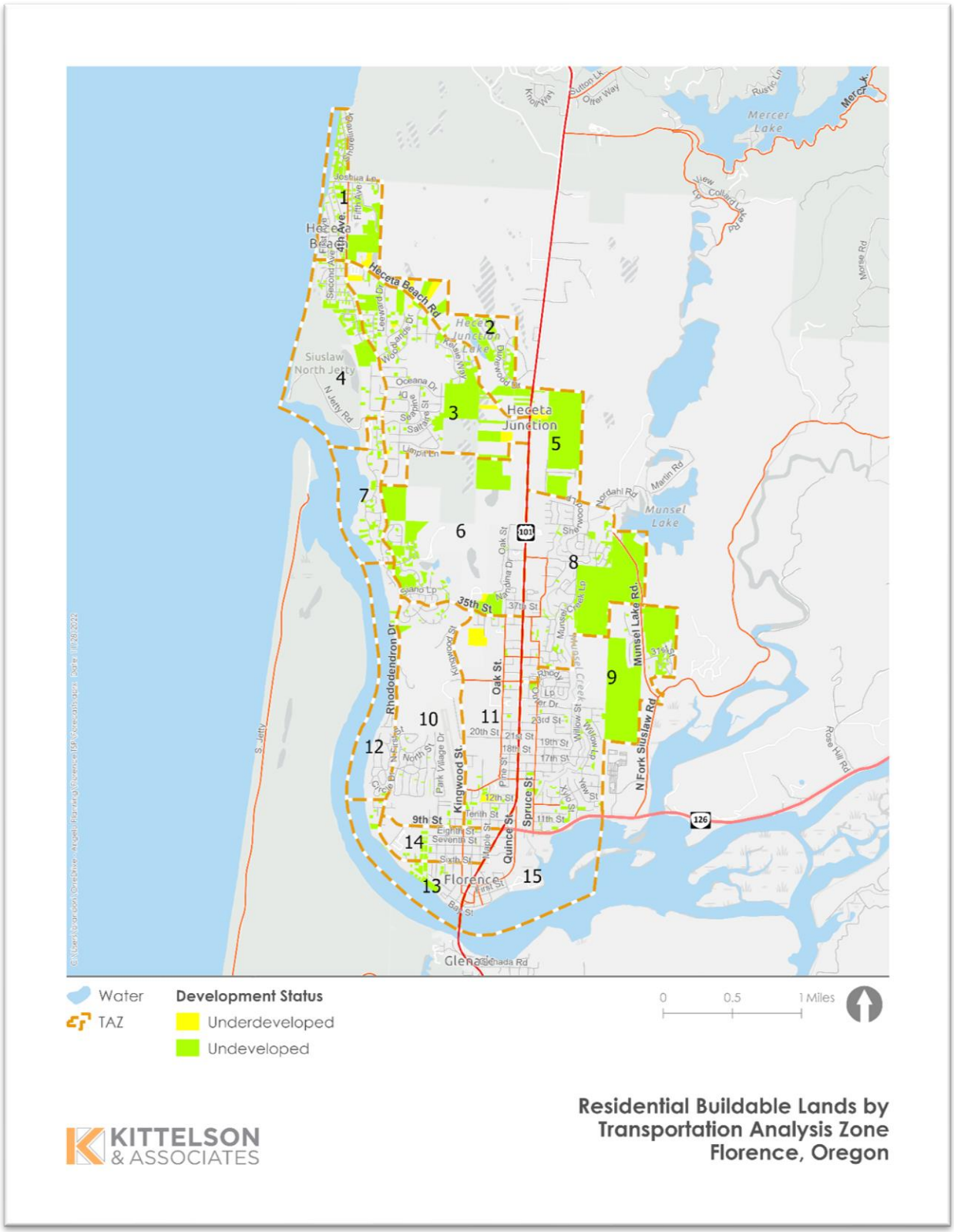


Table 7 shows the estimated population and number of households for all TAZs within the Florence UGB for 2020 and 2045. The populations for Census Blocks[3] that correspond with TAZs were used to estimate population growth within each TAZ by 2045. In addition, the average household size of 1.93 for 2020 was also assumed for 2045. Thus, the number of households for 2020 and 2045 was estimated by dividing the population estimate for each year by the 2020 average household size (1.93).

To account for housing capacity that is available to accommodate growth in Florence, the estimated city-wide population increase was redistributed among the TAZs based on the percentage of total housing capacity each TAZ contains. In other words, the projected population growth for each TAZ is proportionate to its housing capacity. As a result, TAZ 9, which currently has the highest population in the city, is projected to increase by about 300 people to a population of an estimated 2,862 people and is expected to remain the most populated TAZ. Meanwhile, TAZs 5, 6, and 8 are all expected to have the largest population increases. TAZ 5 is forecast to grow the most relative to its current population (it is projected to nearly triple) due to the TAZ's abundance of vacant residential land and capacity to accommodate growth. Table 8 shows each TAZ's estimated buildable land and housing capacity compared to their projected increase in number of households.

Table 7 also shows the assumed unit split for each TAZ. The unit split assumptions are based on the portion of residential zones in each TAZ. Most TAZs only have low-density or medium-density zoning designations and therefore reflect the unit split assumptions for those zones presented in Table 6. TAZ 11 mostly has high-density residential zoning, and therefore has the highest multi-family unit assumption (65%). A few TAZs have a small portion of high density residential (~5-10%), and therefore they are assumed to have a relatively small portion of multi-family housing (5%). Further, TAZs 14 and 15 have more even distributions of different residential zones (e.g., 50% high-density in TAZ 15), and therefore have a relatively more even mix of housing types compared to other TAZs.

Table 7: TAZ Population and Households

TAZ	2020 Population	2045 Population	Population Increase	2020 Households	2045 Households	Household Increase	Unit Split
1	307	497	190	159	258	98	95% Single-family 5% Duplex/SFA
2	138	229	91	71	118	47	95% Single-family 5% Duplex/SFA
3	1,051	1,305	254	545	676	131	95% Single-family 5% Duplex/SFA
4	265	361	96	137	187	50	95% Single-family 5% Duplex/SFA
5	236	630	394	122	327	204	95% Single-family 5% Duplex/SFA

[3] The 2020 population and households deviate from the estimates shown in Table 2 because the Census population estimates are slightly different from the PSU population estimates. The Census population estimates were used for the TAZ estimates because PSU only provides population estimates for the entire UGB, while Census block estimates can be extrapolated to the TAZ geography.

TAZ	2020 Population	2045 Population	Population Increase	2020 Households	2045 Households	Household Increase	Unit Split
6	720	1,283	563	373	665	292	90% Single-family 5% Duplex/SFA 5% Multi-family
7	210	242	32	109	125	16	95% Single-family 5% Duplex/SFA
8	1,444	2,108	664	748	1,092	344	95% Single-family 5% Duplex/SFA
9	2,557	2,862	305	1,325	1,483	158	90% Single-family 5% Duplex/SFA 5% Multi-family
10	1,210	1,241	31	627	643	16	90% Single-family 5% Duplex/SFA 5% Multi-family
11	1,470	1,650	180	762	855	93	5% Single-family 30% Duplex/SFA 65% Multi-family
12	467	481	14	242	249	7	95% Single-family 5% Duplex/SFA
13	330	347	17	171	180	9	95% Single-family 5% Duplex/SFA
14	587	618	31	304	320	16	50% Single-family 25% Duplex/SFA 25% Multi-family
15	350	350	--	181	181	-	25% Single-family 25% Duplex/SFA 50% Multi-family
TOTAL	11,342	14,204	2,861	5,877	7,359	1,482	

Figure 2 shows the location of Florence's projected 2045 population by TAZ.

Figure 2. Projected 2045 Florence Population by TAZ

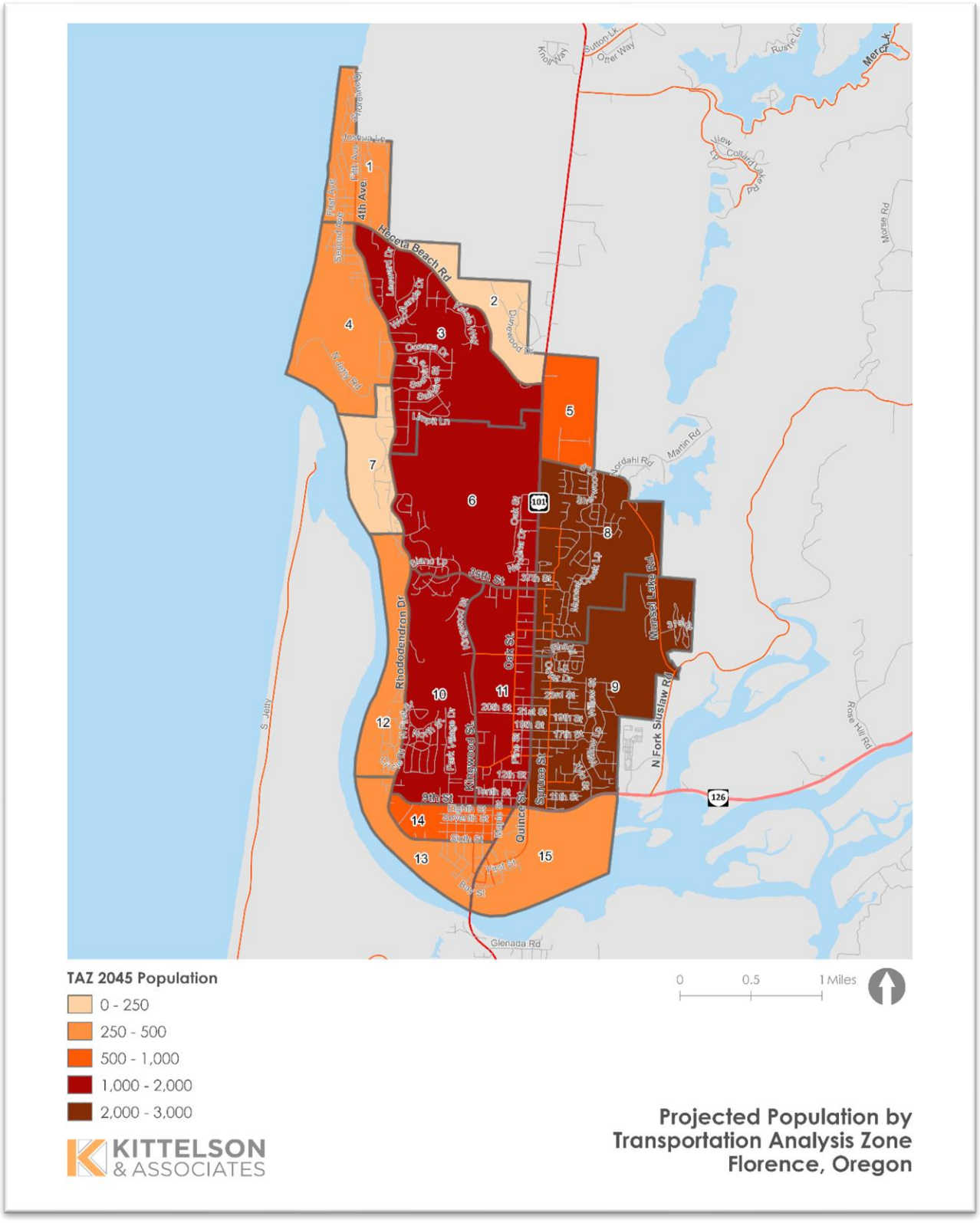
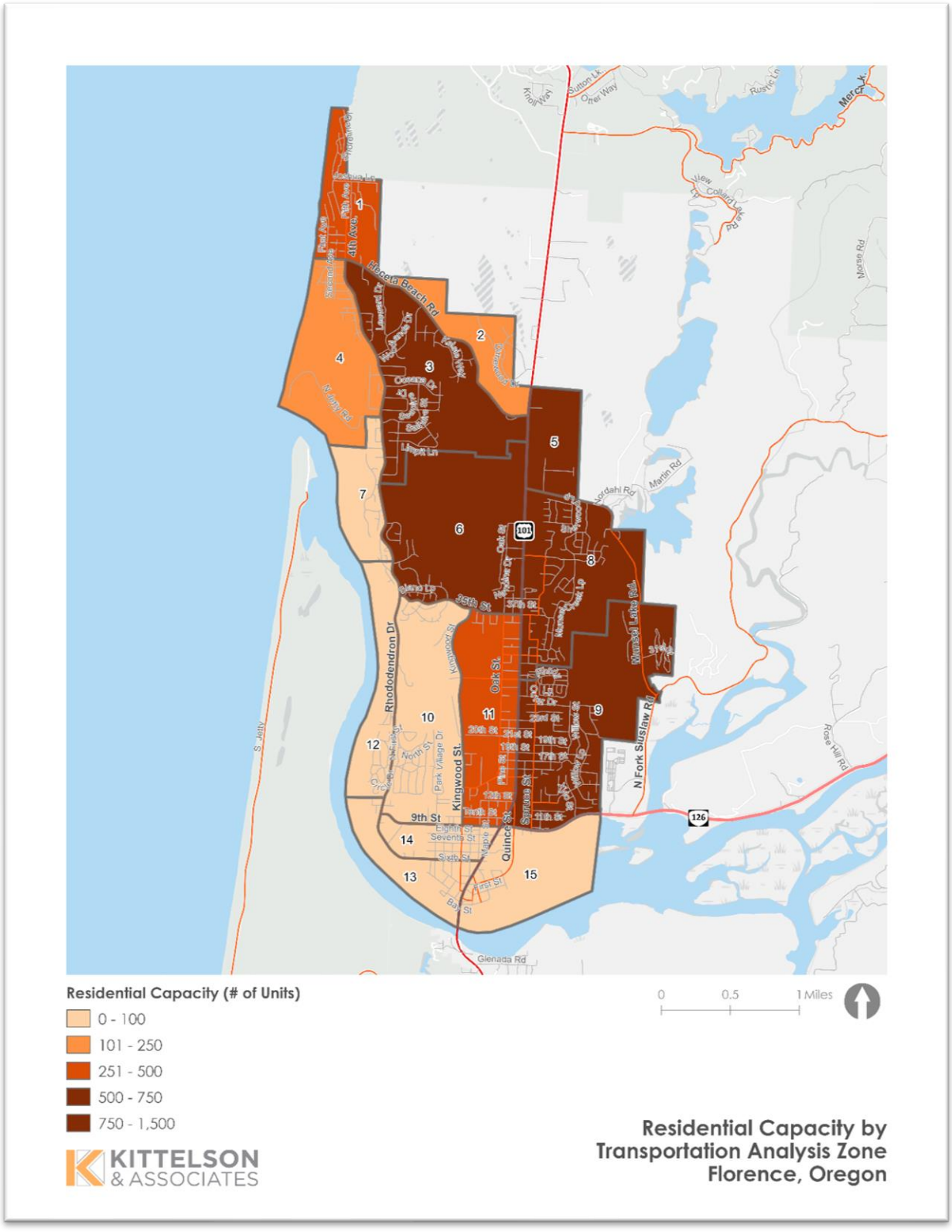


Table 8 shows the housing unit capacity and projected household increase by TAZ. Figure 3 shows the current housing capacity by TAZ. Based on current allowed density by residential zone and the City's supply of undeveloped and underdeveloped land, Florence's estimated current capacity to accommodate 6,085 units should be adequate to support an increase of approximately 1,500 households by 2045.

Table 8: TAZ Housing Capacity

TAZ	Net Buildable Acres	Housing Unit Capacity	Projected Household Increase	Single-family Detached	Duplex or Single-Family Attached	Multi-family
1	47.65	404	98	93	5	--
2	33.32	193	47	45	2	--
3	79.21	540	132	124	7	--
4	27.28	204	50	48	2	--
5	73.56	839	204	194	10	--
6	85.23	1,198	292	262	15	15
7	9.54	67	16	16	--	--
8	128.98	1,412	344	327	17	--
9	94.27	648	158	142	8	8
10	5.06	66	16	14	2	
11	16.19	382	93	5	28	60
12	2.50	29	7	7	--	--
13	5.97	37	9	9	--	--
14	4.86	66	16	8	4	4
15	--	--	--	--	--	--
TOTAL	613.63	6,085	1,482	1,294	100	87

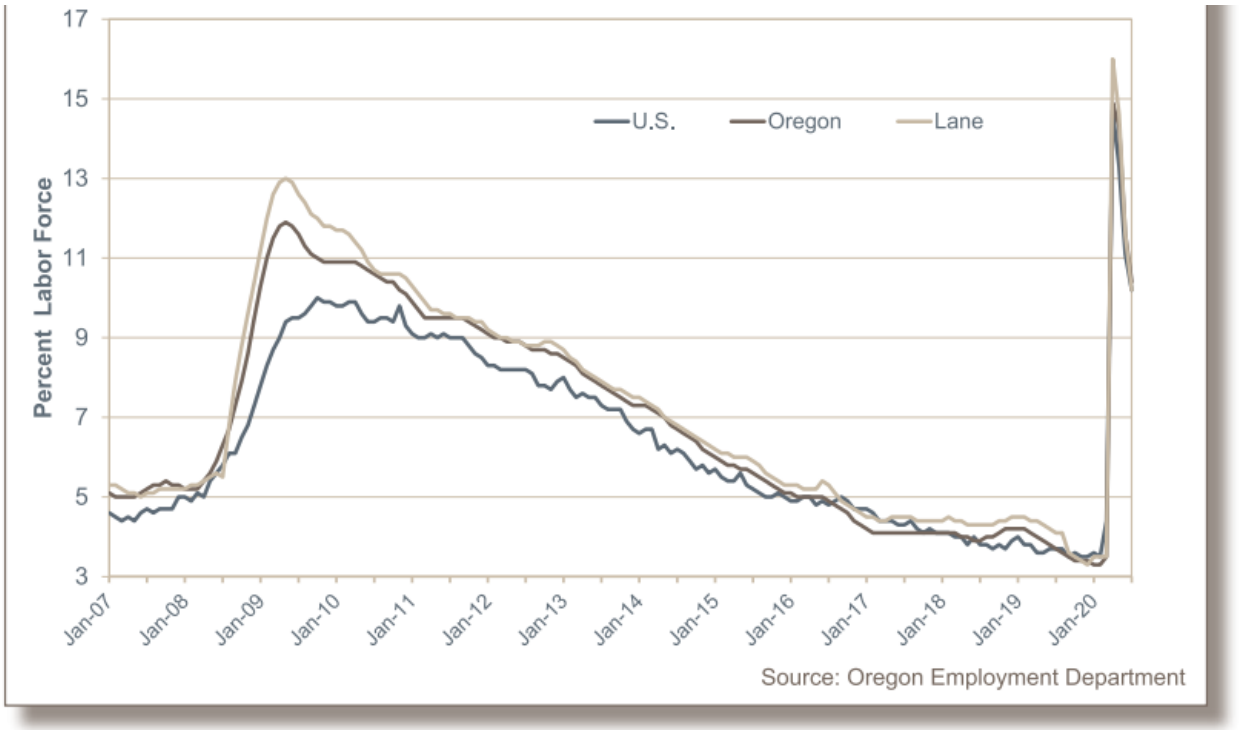
Figure 3. Current Housing Unit Capacity by TAZ



HISTORIC AND PROJECTED EMPLOYMENT GROWTH PATTERNS

This analysis evaluated historic and projected employment patterns in the Florence area to understand current and future transportation needs. The Oregon Employment Department (OED) publishes current employment trends specific to Lane County.[4] As shown Figure 4, unemployment rates in Oregon and Lane County spiked in 2020 because of the COVID-19 pandemic. Unemployment rates have been rapidly declining since the height of the pandemic, and if Lane County employment levels continue to increase, transportation needs within Florence may change.

Figure 4: Seasonally Adjusted Unemployment Rates, 2007 to Present – OED



PROJECTED EMPLOYMENT

The Oregon Employment Department Workforce and Economic Research Division publishes employment forecasts by industry. These ten-year forecasts are defined by regions (as opposed to counties or cities) and organize employment forecasts by primary industry. For Lane County, it is expected that the largest employment increases will occur in leisure and hospitality (44%) and accommodation and food services (44%). All industries are expected to experience an increase in employment except for federal government, as shown in the employment forecasts in Table 9.

[4] https://www.laneworkforce.org/wp-content/uploads/2020-State-of-the-Workforce.pdf

Table 9: Lane County Industry Employment Projections, 2020-2030[5]

Industry	2020	2030	Change	% Change
Total employment	162,100	186,000	23,900	15%
Total payroll employment	153,000	176,400	23,400	15%
Total private	126,100	147,300	21,200	17%
Natural resources and mining	2,500	2,600	100	4%
Mining and logging	800	800	0	0%
Construction	7,300	8,100	800	11%
Manufacturing	13,800	15,400	1,600	12%
Durable goods	8,900	9,900	1,000	11%
Wood product manufacturing	3,500	3,600	100	3%
Transportation equipment manufacturing	600	800	200	33%
Nondurable goods	4,900	5,500	600	12%
Trade, transportation, and utilities	28,500	31,700	3,200	11%
Wholesale trade	5,900	6,800	900	15%
Retail trade	19,300	21,000	1,700	9%
Transportation, warehousing, and utilities	3,300	3,900	600	18%
Information	2,000	2,100	100	5%
Financial activities	8,000	8,600	600	8%
Professional and business services	17,200	20,100	2,900	17%
Administrative and support services	7,500	9,000	1,500	20%
Private educational and health	28,000	33,100	5,100	18%
Private educational services	1,700	2,100	400	24%
Health care and social assistance	26,300	31,000	4,700	18%
Ambulatory health care services	20,300	24,100	3,800	19%
Leisure and hospitality	13,800	19,900	6,100	44%
Accommodation and food services	12,300	17,700	5,400	44%
Accommodation	1,300	2,100	800	62%
Food services and drinking places	11,000	15,600	4,600	42%
Other services	5,000	5,700	700	14%
Government	26,900	29,100	2,200	8%
Federal government	2,000	1,900	-100	-5%
State government	1,700	1,900	200	12%
Local government	23,200	25,300	2,100	9%
Local education	16,200	17,600	1,400	9%
Self-employment	9,100	9,600	500	5%

The most recent employment data by NAICS sector available for the City is provided from the American Community Survey (ACS) 5-year estimates of employment by industry, as shown in Table 10. This provides a general basis of comparison with the Oregon Employment

[5] Oregon Employment Department, Workforce and Economic Research Division

Department's employment forecast analysis. Florence employed 2,973 people in the year 2020. Over one-third of the jobs were related to education, health care, entertainment/recreation, or accommodation and food services.

Table 10: ACS Employment Estimates by Industry

Florence Jobs by Sector	2020
Civilian employed population 16 years and over	2,973
Agriculture, forestry, fishing and hunting, and mining	30
Construction	252
Manufacturing	193
Wholesale trade	9
Retail trade	392
Transportation and warehousing, and utilities	48
Information	25
Finance and insurance, and real estate and rental and leasing	149
Professional, scientific, and management, and administrative and waste management services	331
Educational services, and health care and social assistance	612
Arts, entertainment, and recreation, and accommodation and food services	696
Other services, except public administration	52
Public administration	184

Source: 2020 ACS 5-year Estimates, Table DP03

The following tables apply the State's growth forecast to employment and translates those employment figures to the amount of commercial and industrial building space needed using standard ratios of square feet per employee from the Urban Land Institute.

Table 11. Square Footage per Employee – Urban Land Institute

Employment Space Utilization							
	Commercial		Industrial				
				Avg. Space per Job			
Industry	Commercial Office Share	Avg. Space per Job	Industrial Share	Warehouse	General	Tech/ Flex	Weighted Avg.
Construction	2%	366	30%	0	400	117	517
Manufacturing	5%	366	95%	0	400	117	517
Wholesale Trade	5%	366	95%	1,350	0	47	1,397
Retail Trade	5%	366	0%	0	0	0	0
Transp. Warehouse. Util	30%	366	70%	2,000	0	0	2,000
Information	90%	366	10%	0	0	467	467

Employment Space Utilization							
	Commercial		Industrial				
				Avg. Space per Job			
Industry	Commercial Office Share	Avg. Space per Job	Industrial Share	Warehouse	General	Tech/ Flex	Weighted Avg.
Financial Activities	90%	366	0%	0	0	0	0
Professional & Business Services	90%	366	10%	0	0	467	467
Education & Health Services	40%	366	0%	0	0	0	0
Leisure & Hosp	25%	366	0%	0	0	0	0
Other Services	40%	366	60%	0	400	117	517
Government	85%	366	15%	675	0	234	909

The City of Florence is assumed to grow by an additional 1,862 jobs through the year 2045. This assumes that growth in Florence follows similar employment trends as forecasted in the State's Industry Employment Forecast. By applying the employment space utilization to the forecasted growth in employment, Florence is anticipated to increase its total office space by an additional 266,778 square feet and increase its total industrial space by an additional 122,855 square feet. The complete employment forecasts for each NAICS sector are shown in Table 12.

Table 12. Florence City-Wide Employment Forecasts

Jobs by NAICS Sector	2020 Jobs	2020 Commercial SF	2020 Industrial SF	2045 Jobs	2045 Commercial SF	2045 Industrial SF
Total, All	2,973	402,468	270,866	4,282	668,778	393,721
Agriculture, Forestry, Fishing, Hunting, and Mining	30	0	0	33	0	0
Construction	252	1,845	39,085	331	2,425	51,380
Manufacturing	193	3,532	94,792	287	5,252	140,966
Wholesale Trade	9	165	11,944	13	241	17,459
Retail Trade	392	7,174	-	488	8,930	-
Transportation, Warehousing, and Utilities	48	5,270	67,200	75	8,273	105,486
Information	25	8,235	1,168	28	9,329	1,323
Finance and Insurance	149	49,081	-	180	59,161	-
Professional, scientific, management, administrative, and Business Services	331	109,031	15,458	503	165,771	23,502

Jobs by NAICS Sector	2020 Jobs	2020 Commercial SF	2020 Industrial SF	2045 Jobs	2045 Commercial SF	2045 Industrial SF
Educational Services, health care, and social services	612	89,597	-	961	140,644	-
Arts, Entertainment, and Recreation, and accommodation and food services	696	63,684	-	2052	187,768	-
Other Services (excluding Public Administration)	52	7,613	16,130	74	10,777	22,835
Public Administration	184	57,242	25,088	226	70,208	30,771

Table 13 shows the estimated employment and industry square footage by TAZ. These figures include all employment estimates within the Florence UGB and are based on ACS Block Group employment estimates for 2020. Because these employment figures include UGB areas (i.e., areas outside the City limits and inside the UGB), the estimates are slightly higher than the City-wide estimates. In addition, the smallest geographic unit in which 2020 ACS employment data is available for Lane County is at the block group level. Block group boundaries do not perfectly align with the Florence TAZs, as several block groups extend beyond the UGB, thereby including employment figures outside of the study area. As a result, the employment estimates at the block group level will be slightly higher than the actual employment within the UGB.

Table 13. Forecasted Employment and Employment Square Footage by Transportation Analysis Zone

TAZ	2020 Employment	2045 Employment	2020 Square Footage	2045 Square Footage
1	71	107	14,047	20,766
2	73	111	14,531	21,482
3	276	511	89,715	139,056
4	146	220	28,945	42,790
5	332	538	90,311	133,087
6	314	582	102,114	158,274
7	65	98	12,889	19,054
8	110	134	15,163	18,498
9	596	907	171,860	254,298
10	302	580	51,722	88,054
11	688	1,456	130,290	228,605
12	122	226	21,453	35,587
13	165	297	26,022	43,851
14	132	236	20,618	34,692
15	255	401	53,329	78,795
TOTAL	3,648	6,402	843,008	1,316,890

Table 14 and Table15 further breakdown employment square footage by industry category by TAZ for 2020 and 2045. Office uses comprise the most square footage in most TAZs, and they are estimated to continue to be the most prominent employment type (in terms of area consumed) by 2045. TAZ 9 will continue to include most of the City's industrial employment activity.

Table 14. 2020 Estimated Employment Square Footage by Industry and TAZ

TAZ	Office	Institutional	FLEX	Gen. Industrial	Warehouse	Retail	*Total*
1	4,985	717	2,874	5,043	-	427	*14,047*
2	5,157	742	2,973	5,217	-	442	*14,531*
3	38,963	7,942	8,086	7,186	27,538	-	*89,715*
4	10,273	1,477	5,921	10,392	-	881	*28,945*
5	49,339	6,002	14,073	19,927	-	970	*90,311*
6	44,348	9,040	9,204	8,179	31,344	-	*102,114*
7	4,575	658	2,637	4,628	-	392	*12,889*
8	14,101	-	-	-	-	1,061	*15,163*
9	59,143	17,559	7,797	81,195	5,200	967	*171,860*
10	21,115	7,641	15,492	6,714	-	759	*51,722*
11	65,472	10,145	29,389	23,913	-	1,371	*130,290*
12	8,535	2,766	6,030	3,741	-	380	*21,453*
13	9,576	2,771	4,490	8,282	-	903	*26,022*
14	7,465	2,070	3,172	7,134	-	776	*20,618*
15	18,823	16,991	2,259	6,517	8,389	350	*53,329*
TOTAL	**361,870**	**86,522**	**114,396**	**198,069**	**72,470**	**9,681**	***843,008***

Table15.2045ForecastEstimatesforEmploymentSquareFootagebyIndustryandTAZ

TAZ	Office	Institutional	FLEX	Gen.Industrial	Warehouse	Retail	*Total*
1	6,589	1,125	5,177	7,342	-	532	*20,766*
2	6,817	1,164	5,356	7,595	-	550	*21,482*
3	50,602	12,467	22,532	10,227	43,228	-	*139,056*
4	13,578	2,319	10,668	15,128	-	1,096	*42,790*
5	66,192	9,422	27,496	28,769	-	1,207	*133,087*
6	57,595	14,191	25,646	11,640	49,202	-	*158,274*
7	6,046	1,033	4,751	6,737	-	488	*19,054*
8	17,177	-	-	-	-	1,321	*18,498*
9	83,041	27,563	15,989	118,339	8,162	1,204	*254,298*
10	29,741	11,994	36,171	9,204	-	945	*88,054*
11	89,962	15,926	86,650	34,360	-	1,706	*228,605*
12	11,894	4,342	13,623	5,256	-	474	*35,587*
13	13,782	4,350	12,625	11,970	-	1,124	*43,851*
14	10,782	3,250	9,354	10,340	-	967	*34,692*
15	23,290	26,672	6,662	8,568	13,168	436	*78,795*
TOTAL	**487,087**	**135,818**	**282,700**	**285,474**	**113,760**	**12,051**	***1,316,890***

Attachment B Trip Generation Estimate

Trip Generation Estimate

Trip generation estimates were prepared for the forecast household and employment growth based on information provided in the standard reference, *Trip Generation Manual, 11th Edition*, published by the Institute of Transportation Engineers (ITE). Table B-1 summarizes the total trips by Transportation Analysis Zone (TAZ).

Table B-1: Trip Generation Estimate – Net New Trips

	Households			Employment			Total		
TAZ	Total	In	Out	Total	In	Out	Total	In	Out
1	87	55	32	8	1	7	95	57	39
2	42	27	16	8	1	7	51	28	23
3	117	73	43	49	9	40	165	82	83
4	45	28	17	17	3	14	62	31	30
5	182	115	67	55	9	46	237	124	113
6	254	160	94	56	10	46	310	170	140
7	15	9	6	7	1	6	22	11	12
8	307	194	114	5	1	4	313	195	118
9	138	87	51	86	14	72	224	101	123
10	13	8	5	51	9	42	64	17	47
11	35	22	13	134	23	111	169	45	124
12	7	4	2	19	3	16	26	8	18
13	8	5	3	23	4	19	32	9	22
14	10	6	4	18	3	15	28	9	18
15	0	0	0	29	5	24	29	5	24
Total	1,261	794	466	566	98	468	1,827	892	935

Attachment C Future Traffic Operations and Queuing Analysis Worksheets

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	0	317	0	0	0	346	541	0	0	416	41
Future Vol, veh/h	39	0	317	0	0	0	346	541	0	0	416	41
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	125	-	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	39	0	19	0	0	0	19	28	0	0	20	23
Mvmt Flow	42	0	341	0	0	0	372	582	0	0	447	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1775	-	449	1966	1819	582	493	0	0	582	0	0
Stage 1	449	-	-	1326	1326	-	-	-	-	-	-	-
Stage 2	1326	-	-	640	493	-	-	-	-	-	-	-
Critical Hdwy	7.49	-	6.39	7.1	6.5	6.2	4.29	-	-	4.1	-	-
Critical Hdwy Stg 1	6.49	-	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.49	-	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.851	-	3.471	3.5	4	3.3	2.371	-	-	2.2	-	-
Pot Cap-1 Maneuver	52	0	576	48	79	517	988	-	-	1002	-	-
Stage 1	524	0	-	194	227	-	-	-	-	-	-	-
Stage 2	160	0	-	467	550	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 37	-	575	14	49	517	986	-	-	1002	-	-
Mov Cap-2 Maneuver	81	-	-	14	49	-	-	-	-	-	-	-
Stage 1	326	-	-	121	141	-	-	-	-	-	-	-
Stage 2	100	-	-	190	549	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.6	0	4.2	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	986	-	-	81	575	-	1002	-	-
HCM Lane V/C Ratio	0.377	-	-	0.518	0.593	-	-	-	-
HCM Control Delay (s)	10.8	-	-	89.7	20	0	0	-	-
HCM Lane LOS	B	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	1.8	-	-	2.2	3.9	-	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	75.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	6	216	0	181	4	759	203	184	598	1
Future Vol, veh/h	0	0	6	216	0	181	4	759	203	184	598	1
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	25	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	33	33	0	23	75	19	27	43	25	0
Mvmt Flow	0	0	6	232	0	195	4	816	218	198	643	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2072	2083	645	1976	1974	925	645	0	0	1034	0	0
Stage 1	1041	1041	-	933	933	-	-	-	-	-	-	-
Stage 2	1031	1042	-	1043	1041	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.53	7.43	6.5	6.43	4.85	-	-	4.53	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.43	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.43	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.597	3.797	4	3.507	2.875	-	-	2.587	-	-
Pot Cap-1 Maneuver	40	54	421	~ 38	63	298	672	-	-	537	-	-
Stage 1	280	310	-	281	348	-	-	-	-	-	-	-
Stage 2	284	309	-	243	310	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	10	34	421	~ 27	40	298	671	-	-	537	-	-
Mov Cap-2 Maneuver	~ -161	78	-	~ 99	129	-	-	-	-	-	-	-
Stage 1	278	195	-	279	346	-	-	-	-	-	-	-
Stage 2	98	307	-	~ 151	195	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	$ 400.5	0	3.7
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	671	-	-	421	99	298	537	-	-
HCM Lane V/C Ratio	0.006	-	-	0.015	2.346	0.653	0.368	-	-
HCM Control Delay (s)	10.4	-	-	13.7	$ 704.9	37.2	15.6	-	-
HCM Lane LOS	B	-	-	B	F	E	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0	20.8	4.2	1.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	1	133	0	0	1	102	877	0	0	695	97
Future Vol, veh/h	64	1	133	0	0	1	102	877	0	0	695	97
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	100	-	-	100	-	200
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	35	0	17	0	0	0	17	22	0	0	26	26
Mvmt Flow	67	1	139	0	0	1	106	914	0	0	724	101

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1853	1852	364	1489	1953	914	827	0	0	914	0	0
Stage 1	726	726	-	1126	1126	-	-	-	-	-	-	-
Stage 2	1127	1126	-	363	827	-	-	-	-	-	-	-
Critical Hdwy	7.825	6.5	7.155	7.3	6.5	6.2	4.355	-	-	4.1	-	-
Critical Hdwy Stg 1	7.025	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.625	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.8325	4	3.4615	3.5	4	3.3	2.3615	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 38	75	598	95	65	334	726	-	-	754	-	-
Stage 1	327	433	-	251	282	-	-	-	-	-	-	-
Stage 2	203	282	-	634	389	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 34	64	597	65	55	334	725	-	-	754	-	-
Mov Cap-2 Maneuver	112	168	-	65	55	-	-	-	-	-	-	-
Stage 1	279	432	-	214	241	-	-	-	-	-	-	-
Stage 2	173	241	-	486	388	-	-	-	-	-	-	-

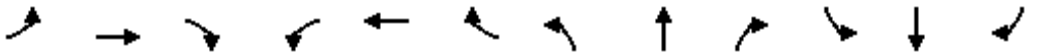
Approach	EB	WB	NB	SB
HCM Control Delay, s	33.4	15.8	1.1	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	725	-	-	112	597	334	754	-	-
HCM Lane V/C Ratio	0.147	-	-	0.595	0.232	0.003	-	-	-
HCM Control Delay (s)	10.8	-	-	76.1	12.8	15.8	0	-	-
HCM Lane LOS	B	-	-	F	B	C	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	2.9	0.9	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	75	149	32	51	35	107	869	43	42	808	121
Future Volume (vph)	151	75	149	32	51	35	107	869	43	42	808	121
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.94		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1330	1244		1163	1315		1341	2720		1539	2592	
Flt Permitted	0.70	1.00		0.44	1.00		0.18	1.00		0.25	1.00	
Satd. Flow (perm)	975	1244		540	1315		257	2720		397	2592	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	82	162	35	55	38	116	945	47	46	878	132
RTOR Reduction (vph)	0	58	0	0	20	0	0	3	0	0	11	0
Lane Group Flow (vph)	164	186	0	35	73	0	116	989	0	46	999	0
Confl. Peds. (#/hr)							1		1	1		1
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	25%	16%	32%	43%	32%	12%	24%	21%	26%	8%	25%	28%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	20.4	20.4		20.4	20.4		54.4	46.7		46.2	42.6	
Effective Green, g (s)	20.4	20.4		20.4	20.4		54.4	46.7		46.2	42.6	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.64	0.55		0.55	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	5.0		2.5	5.0	
Lane Grp Cap (vph)	234	299		130	316		263	1499		265	1303	
v/s Ratio Prot		0.15			0.06		c0.04	0.36		0.01	c0.39	
v/s Ratio Perm	c0.17			0.06			0.24			0.09		
v/c Ratio	0.70	0.62		0.27	0.23		0.44	0.66		0.17	0.77	
Uniform Delay, d1	29.4	28.7		26.1	25.9		8.3	13.4		9.3	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.5	3.5		0.8	0.3		0.9	1.4		0.2	3.3	
Delay (s)	37.8	32.2		26.9	26.1		9.1	14.8		9.5	20.3	
Level of Service	D	C		C	C		A	B		A	C	
Approach Delay (s)		34.5			26.3			14.2			19.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	84.7	Sum of lost time (s)	14.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	75	149	32	51	35	107	869	43	42	808	121
Future Volume (veh/h)	151	75	149	32	51	35	107	869	43	42	808	121
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1409	1532	1313	1163	1313	1586	1422	1463	1395	1641	1409	1368
Adj Flow Rate, veh/h	164	82	162	35	55	38	116	945	47	46	878	132
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	16	32	43	32	12	24	21	26	8	25	28
Cap, veh/h	281	111	219	150	173	119	280	1482	74	307	1210	182
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.06	0.55	0.55	0.03	0.52	0.52
Sat Flow, veh/h	1066	460	908	767	716	495	1355	2695	134	1563	2325	350
Grp Volume(v), veh/h	164	0	244	35	0	93	116	487	505	46	505	505
Grp Sat Flow(s),veh/h/ln	1066	0	1368	767	0	1211	1355	1390	1439	1563	1338	1336
Q Serve(g_s), s	11.8	0.0	13.0	3.5	0.0	5.0	3.1	19.2	19.2	1.1	23.0	23.0
Cycle Q Clear(g_c), s	16.8	0.0	13.0	16.5	0.0	5.0	3.1	19.2	19.2	1.1	23.0	23.0
Prop In Lane	1.00		0.66	1.00		0.41	1.00		0.09	1.00		0.26
Lane Grp Cap(c), veh/h	281	0	330	150	0	292	280	764	791	307	696	695
V/C Ratio(X)	0.58	0.00	0.74	0.23	0.00	0.32	0.41	0.64	0.64	0.15	0.73	0.73
Avail Cap(c_a), veh/h	293	0	346	159	0	306	539	1055	1092	652	1015	1014
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	27.7	35.3	0.0	24.7	12.0	12.3	12.3	10.1	14.6	14.6
Incr Delay (d2), s/veh	2.3	0.0	7.4	0.6	0.0	0.5	0.7	1.9	1.8	0.2	3.1	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	4.8	0.7	0.0	1.4	0.9	5.7	5.9	0.3	6.8	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	35.1	35.9	0.0	25.1	12.8	14.2	14.2	10.3	17.7	17.7
LnGrp LOS	C	A	D	D	A	C	B	B	B	B	B	B
Approach Vol, veh/h		408			128			1108			1056	
Approach Delay, s/veh		34.6			28.1			14.1			17.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.4	46.2		23.6	7.0	48.5		23.6				
Change Period (Y+Rc), s	4.5	5.0		4.5	4.5	5.0		4.5				
Max Green Setting (Gmax), s	20.0	60.0		20.0	20.0	60.0		20.0				
Max Q Clear Time (g_c+I1), s	5.1	25.0		18.5	3.1	21.2		18.8				
Green Ext Time (p_c), s	0.2	16.1		0.1	0.1	16.3		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		19.1	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	2	22	2	0	10	27	1045	10	0	1036	1
Future Vol, veh/h	3	2	22	2	0	10	27	1045	10	0	1036	1
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	2	2	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	33	50	19	0	0	14	4	23	50	0	26	0
Mvmt Flow	3	2	24	2	0	11	29	1136	11	0	1126	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1754	2335	565	1766	2330	576	1128	0	0	1149	0	0
Stage 1	1128	1128	-	1202	1202	-	-	-	-	-	-	-
Stage 2	626	1207	-	564	1128	-	-	-	-	-	-	-
Critical Hdwy	8.16	7.5	7.28	7.5	6.5	7.18	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	7.16	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.16	6.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.83	4.5	3.49	3.5	4	3.44	2.24	-	-	2.2	-	-
Pot Cap-1 Maneuver	39	19	427	54	38	431	604	-	-	615	-	-
Stage 1	171	195	-	199	260	-	-	-	-	-	-	-
Stage 2	371	175	-	483	282	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	18	427	44	36	430	603	-	-	614	-	-
Mov Cap-2 Maneuver	37	18	-	44	36	-	-	-	-	-	-	-
Stage 1	163	195	-	189	247	-	-	-	-	-	-	-
Stage 2	344	166	-	451	282	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	48.7	27.2	0.3	0
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	603	-	-	111	175	614	-	-
HCM Lane V/C Ratio	0.049	-	-	0.264	0.075	-	-	-
HCM Control Delay (s)	11.3	-	-	48.7	27.2	0	-	-
HCM Lane LOS	B	-	-	E	D	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1	0.2	0	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑↑↱		↰	↑↑↱	
Traffic Vol, veh/h	15	0	40	1	0	24	30	1065	2	14	1030	21
Future Vol, veh/h	15	0	40	1	0	24	30	1065	2	14	1030	21
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	21	0	32	0	0	25	18	17	0	38	24	40
Mvmt Flow	16	0	43	1	0	26	32	1133	2	15	1096	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1769	2338	560	1777	2348	569	1119	0	0	1136	0	0
Stage 1	1138	1138	-	1199	1199	-	-	-	-	-	-	-
Stage 2	631	1200	-	578	1149	-	-	-	-	-	-	-
Critical Hdwy	7.92	6.5	7.54	7.5	6.5	7.4	4.46	-	-	4.86	-	-
Critical Hdwy Stg 1	6.92	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.92	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.71	4	3.62	3.5	4	3.55	2.38	-	-	2.58	-	-
Pot Cap-1 Maneuver	43	37	403	53	37	411	535	-	-	440	-	-
Stage 1	185	279	-	200	261	-	-	-	-	-	-	-
Stage 2	392	261	-	474	275	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	34	403	44	34	411	534	-	-	440	-	-
Mov Cap-2 Maneuver	119	129	-	132	125	-	-	-	-	-	-	-
Stage 1	174	269	-	188	245	-	-	-	-	-	-	-
Stage 2	346	245	-	409	265	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.3	15.2	0.3	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	534	-	-	244	379	440	-	-
HCM Lane V/C Ratio	0.06	-	-	0.24	0.07	0.034	-	-
HCM Control Delay (s)	12.2	-	-	24.3	15.2	13.5	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	4	22	17	4	22	32	1125	11	21	1056	36
Future Vol, veh/h	34	4	22	17	4	22	32	1125	11	21	1056	36
Conflicting Peds, #/hr	4	0	0	0	0	4	2	0	3	3	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	20	67	10	46	0	56	27	20	25	15	21	19
Mvmt Flow	36	4	23	18	4	23	34	1184	12	22	1112	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1843	2444	577	1863	2457	605	1152	0	0	1199	0	0
Stage 1	1177	1177	-	1261	1261	-	-	-	-	-	-	-
Stage 2	666	1267	-	602	1196	-	-	-	-	-	-	-
Critical Hdwy	7.9	7.84	7.1	8.42	6.5	8.02	4.64	-	-	4.4	-	-
Critical Hdwy Stg 1	6.9	6.84	-	7.42	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.9	6.84	-	7.42	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.7	4.67	3.4	3.96	4	3.86	2.47	-	-	2.35	-	-
Pot Cap-1 Maneuver	38	12	440	27	31	329	478	-	-	510	-	-
Stage 1	176	161	-	125	244	-	-	-	-	-	-	-
Stage 2	375	141	-	359	262	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 31	11	439	22	27	327	477	-	-	509	-	-
Mov Cap-2 Maneuver	109	63	-	83	113	-	-	-	-	-	-	-
Stage 1	163	154	-	116	226	-	-	-	-	-	-	-
Stage 2	316	131	-	316	250	-	-	-	-	-	-	-

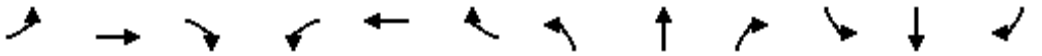
Approach	EB	WB	NB	SB
HCM Control Delay, s	49.8	42.5	0.4	0.2
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	477	-	-	141	140	509	-	-
HCM Lane V/C Ratio	0.071	-	-	0.448	0.323	0.043	-	-
HCM Control Delay (s)	13.1	-	-	49.8	42.5	12.4	-	-
HCM Lane LOS	B	-	-	E	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2	1.3	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	138	33	199	102	181	50	712	164	216	741	75
Future Volume (vph)	154	138	33	199	102	181	50	712	164	216	741	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1446	1391		1206	1336	1220	1299	2748	1097	1289	2697	
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1446	1391		1206	1336	1220	1299	2748	1097	1289	2697	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	160	144	34	207	106	189	52	742	171	225	772	78
RTOR Reduction (vph)	0	5	0	0	0	158	0	0	39	0	4	0
Lane Group Flow (vph)	160	173	0	153	160	31	52	742	132	225	846	0
Confl. Peds. (#/hr)	3		4	4		3	2		4	4		2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	15%	22%	21%	31%	18%	20%	28%	21%	34%	29%	22%	14%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8		4	4		1	6	4	5	2	
Permitted Phases						4			6			
Actuated Green, G (s)	22.8	22.8		23.0	23.0	23.0	8.6	44.1	67.1	31.3	66.8	
Effective Green, g (s)	22.8	22.8		23.0	23.0	23.0	8.6	44.1	67.1	31.3	66.8	
Actuated g/C Ratio	0.16	0.16		0.17	0.17	0.17	0.06	0.32	0.48	0.22	0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	2.0	2.5	1.5	2.0	
Lane Grp Cap (vph)	236	227		199	220	201	80	870	564	289	1294	
v/s Ratio Prot	0.11	c0.12		c0.13	0.12		0.04	c0.27	0.04	c0.17	0.31	
v/s Ratio Perm						0.03			0.08			
v/c Ratio	0.68	0.76		0.77	0.73	0.16	0.65	0.85	0.23	0.78	0.65	
Uniform Delay, d1	54.7	55.6		55.6	55.1	49.8	63.8	44.5	21.0	50.7	27.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.8	13.4		15.6	10.7	0.3	13.5	7.8	0.2	11.4	0.9	
Delay (s)	61.6	69.1		71.2	65.8	50.0	77.3	52.3	21.2	62.1	28.4	
Level of Service	E	E		E	E	D	E	D	C	E	C	
Approach Delay (s)		65.5			61.5			48.2			35.4	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	139.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	138	33	199	102	181	50	712	164	216	741	75
Future Volume (veh/h)	154	138	33	199	102	181	50	712	164	216	741	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1545	1450	1463	1327	1504	1477	1368	1463	1286	1354	1450	1559
Adj Flow Rate, veh/h	160	144	34	156	177	0	52	742	171	225	772	78
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	15	22	21	31	18	20	28	21	34	29	22	14
Cap, veh/h	239	183	43	198	236		60	869	510	247	1155	117
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.00	0.05	0.31	0.31	0.19	0.46	0.46
Sat Flow, veh/h	1472	1132	267	1264	1504	1252	1303	2780	1086	1290	2519	254
Grp Volume(v), veh/h	160	0	178	156	177	0	52	742	171	225	422	428
Grp Sat Flow(s),veh/h/ln	1472	0	1399	1264	1504	1252	1303	1390	1086	1290	1377	1396
Q Serve(g_s), s	10.4	0.0	12.5	12.1	11.5	0.0	4.0	25.5	10.1	17.4	24.4	24.4
Cycle Q Clear(g_c), s	10.4	0.0	12.5	12.1	11.5	0.0	4.0	25.5	10.1	17.4	24.4	24.4
Prop In Lane	1.00		0.19	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	239	0	227	198	236		60	869	510	247	631	640
V/C Ratio(X)	0.67	0.00	0.78	0.79	0.75		0.87	0.85	0.34	0.91	0.67	0.67
Avail Cap(c_a), veh/h	505	0	480	434	516		256	1636	810	380	811	822
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	41.0	41.3	41.0	0.0	48.3	32.9	17.0	40.3	21.6	21.6
Incr Delay (d2), s/veh	2.4	0.0	4.4	5.1	3.5	0.0	13.1	1.0	0.1	13.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	4.5	4.0	4.4	0.0	1.5	8.5	3.4	6.4	7.7	7.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	0.0	45.4	46.4	44.6	0.0	61.5	33.8	17.2	54.1	22.2	22.2
LnGrp LOS	D	A	D	D	D		E	C	B	D	C	C
Approach Vol, veh/h		338			333	A		965			1075	
Approach Delay, s/veh		44.1			45.4			32.4			28.9	
Approach LOS		D			D			C			C	

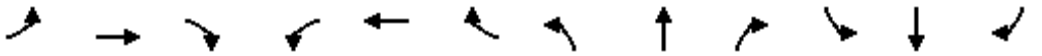
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.2	51.2		20.5	24.0	36.4		21.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	20.0	60.0		35.0	30.0	60.0		35.0				
Max Q Clear Time (g_c+I1), s	6.0	26.4		14.1	19.4	27.5		14.5				
Green Ext Time (p_c), s	0.0	4.0		1.1	0.2	4.3		1.1				

Intersection Summary	
HCM 6th Ctrl Delay	34.1
HCM 6th LOS	C

Notes

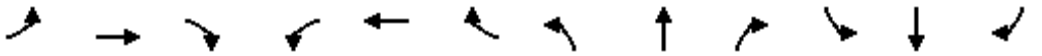
User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	5	37	11	3	14	27	824	3	10	836	54
Future Volume (vph)	70	5	37	11	3	14	27	824	3	10	836	54
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.93		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1273			1319		1351	2725		1495	2559	
Flt Permitted		0.79			0.88		0.24	1.00		0.29	1.00	
Satd. Flow (perm)		1040			1190		347	2725		453	2559	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	75	5	40	12	3	15	29	886	3	11	899	58
RTOR Reduction (vph)	0	14	0	0	12	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	106	0	0	18	0	29	889	0	11	953	0
Confl. Peds. (#/hr)	13		2	2		13	2		14	14		2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	21%	40%	34%	40%	0%	8%	23%	22%	0%	11%	29%	22%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		13.1			13.1		41.1	39.2		39.1	38.2	
Effective Green, g (s)		13.1			13.1		41.1	39.2		39.1	38.2	
Actuated g/C Ratio		0.19			0.19		0.61	0.58		0.58	0.57	
Clearance Time (s)		4.5			4.5		4.5	5.0		4.5	5.0	
Vehicle Extension (s)		2.5			2.5		2.5	4.5		2.5	4.5	
Lane Grp Cap (vph)		202			231		240	1589		277	1454	
v/s Ratio Prot							c0.00	0.33		0.00	c0.37	
v/s Ratio Perm		c0.10			0.02		0.07			0.02		
v/c Ratio		0.53			0.08		0.12	0.56		0.04	0.66	
Uniform Delay, d1		24.3			22.1		5.6	8.7		6.0	10.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9			0.1		0.2	0.6		0.0	1.3	
Delay (s)		26.2			22.2		5.8	9.3		6.1	11.3	
Level of Service		C			C		A	A		A	B	
Approach Delay (s)		26.2			22.2			9.2			11.2	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	5	37	11	3	14	27	824	3	10	836	54
Future Volume (veh/h)	70	5	37	11	3	14	27	824	3	10	836	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1463	1204	1286	1204	1750	1641	1436	1450	1750	1600	1354	1450
Adj Flow Rate, veh/h	75	5	40	12	3	15	29	886	3	11	899	58
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	21	40	34	40	0	8	23	22	0	11	29	22
Cap, veh/h	197	22	59	168	58	140	304	1604	5	357	1359	88
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.03	0.57	0.57	0.01	0.56	0.56
Sat Flow, veh/h	541	122	332	459	328	787	1368	2816	10	1524	2448	158
Grp Volume(v), veh/h	120	0	0	30	0	0	29	433	456	11	472	485
Grp Sat Flow(s),veh/h/ln	995	0	0	1573	0	0	1368	1377	1448	1524	1286	1319
Q Serve(g_s), s	5.3	0.0	0.0	0.0	0.0	0.0	0.5	11.5	11.5	0.2	15.0	15.0
Cycle Q Clear(g_c), s	6.5	0.0	0.0	0.9	0.0	0.0	0.5	11.5	11.5	0.2	15.0	15.0
Prop In Lane	0.62		0.33	0.40		0.50	1.00		0.01	1.00		0.12
Lane Grp Cap(c), veh/h	278	0	0	367	0	0	304	785	825	357	714	732
V/C Ratio(X)	0.43	0.00	0.00	0.08	0.00	0.00	0.10	0.55	0.55	0.03	0.66	0.66
Avail Cap(c_a), veh/h	440	0	0	606	0	0	740	1777	1868	864	1660	1702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	0.0	0.0	20.0	0.0	0.0	7.3	7.9	7.9	6.5	9.1	9.1
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.1	0.0	0.0	0.1	1.0	1.0	0.0	1.8	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.3	0.0	0.0	0.1	2.8	2.9	0.0	3.6	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	0.0	0.0	20.1	0.0	0.0	7.4	8.9	8.8	6.5	10.9	10.8
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	B	B
Approach Vol, veh/h		120			30			918			968	
Approach Delay, s/veh		23.0			20.1			8.8			10.8	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	37.3		14.9	5.2	38.1		14.9				
Change Period (Y+Rc), s	4.5	5.0		4.5	4.5	5.0		4.5				
Max Green Setting (Gmax), s	20.0	75.0		20.0	20.0	75.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	17.0		2.9	2.2	13.5		8.5				
Green Ext Time (p_c), s	0.0	15.3		0.1	0.0	13.5		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		10.8
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	11	8	0	16	0	696	19	13	858	3
Future Vol, veh/h	2	0	11	8	0	16	0	696	19	13	858	3
Conflicting Peds, #/hr	0	0	6	6	0	0	1	0	5	5	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	30	17	0	10	0	26	33	40	22	33
Mvmt Flow	2	0	11	8	0	16	0	710	19	13	876	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1260	1639	447	1195	1631	370	880	0	0	734	0	0
Stage 1	905	905	-	725	725	-	-	-	-	-	-	-
Stage 2	355	734	-	470	906	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	7.5	7.84	6.5	7.1	4.1	-	-	4.9	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.84	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.84	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.6	3.67	4	3.4	2.2	-	-	2.6	-	-
Pot Cap-1 Maneuver	129	101	489	126	103	605	777	-	-	657	-	-
Stage 1	302	358	-	350	433	-	-	-	-	-	-	-
Stage 2	641	429	-	505	358	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	98	486	120	100	602	776	-	-	654	-	-
Mov Cap-2 Maneuver	123	98	-	120	100	-	-	-	-	-	-	-
Stage 1	302	350	-	348	431	-	-	-	-	-	-	-
Stage 2	624	427	-	481	350	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	19.8	0	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	776	-	-	334	120	602	654	-	-
HCM Lane V/C Ratio	-	-	-	0.04	0.068	0.027	0.02	-	-
HCM Control Delay (s)	0	-	-	16.2	37.2	11.1	10.6	-	-
HCM Lane LOS	A	-	-	C	E	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	480	30	99	480	17	32	34	101	8	7	6
Future Vol, veh/h	17	480	30	99	480	17	32	34	101	8	7	6
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	19	28	14	19	25	31	35	28	27	38	29	17
Mvmt Flow	18	511	32	105	511	18	34	36	107	9	7	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	529	0	0	543	0	0	1303	1302	272	1040	1309	523
Stage 1	-	-	-	-	-	-	563	563	-	730	730	-
Stage 2	-	-	-	-	-	-	740	739	-	310	579	-
Critical Hdwy	4.385	-	-	4.385	-	-	7.825	6.92	7.305	7.87	6.935	6.455
Critical Hdwy Stg 1	-	-	-	-	-	-	7.025	5.92	-	6.67	5.935	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.625	5.92	-	7.07	5.935	-
Follow-up Hdwy	2.3805	-	-	2.3805	-	-	3.8325	4.266	3.5565	3.861	4.2755	3.4615
Pot Cap-1 Maneuver	941	-	-	929	-	-	102	136	665	159	133	518
Stage 1	-	-	-	-	-	-	416	458	-	348	378	-
Stage 2	-	-	-	-	-	-	348	376	-	596	448	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	941	-	-	929	-	-	85	117	665	91	115	517
Mov Cap-2 Maneuver	-	-	-	-	-	-	85	117	-	91	115	-
Stage 1	-	-	-	-	-	-	404	445	-	338	335	-
Stage 2	-	-	-	-	-	-	297	334	-	446	435	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.6	47.3	38
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	99	665	941	-	-	929	-	-	131
HCM Lane V/C Ratio	0.709	0.162	0.019	-	-	0.113	-	-	0.171
HCM Control Delay (s)	102	11.5	8.9	0.1	-	9.4	-	-	38
HCM Lane LOS	F	B	A	A	-	A	-	-	E
HCM 95th %tile Q(veh)	3.6	0.6	0.1	-	-	0.4	-	-	0.6

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	114	480	0	0	494	51	0	0	0	36	3	108
Future Vol, veh/h	114	480	0	0	494	51	0	0	0	36	3	108
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	23	30	0	0	26	19	0	0	0	21	0	21
Mvmt Flow	124	522	0	0	537	55	0	0	0	39	3	117

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	592	0	0	522	0	0	1395	1362	522	1335	1335	565
Stage 1	-	-	-	-	-	-	770	770	-	565	565	-
Stage 2	-	-	-	-	-	-	625	592	-	770	770	-
Critical Hdwy	4.33	-	-	4.1	-	-	7.1	6.5	6.2	7.31	6.5	6.41
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.31	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.31	5.5	-
Follow-up Hdwy	2.407	-	-	2.2	-	-	3.5	4	3.3	3.689	4	3.489
Pot Cap-1 Maneuver	889	-	-	1055	-	-	120	149	559	119	155	490
Stage 1	-	-	-	-	-	-	396	413	-	478	511	-
Stage 2	-	-	-	-	-	-	476	497	-	366	413	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	889	-	-	1055	-	-	80	128	559	106	133	490
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	128	-	106	133	-
Stage 1	-	-	-	-	-	-	341	356	-	412	511	-
Stage 2	-	-	-	-	-	-	360	497	-	315	356	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	0	41.1
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	889	-	-	1055	-	-	252
HCM Lane V/C Ratio	-	0.139	-	-	-	-	-	0.634
HCM Control Delay (s)	0	9.7	-	-	0	-	-	41.1
HCM Lane LOS	A	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0.5	-	-	0	-	-	3.9

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	359	364	39	30	96
Future Vol, veh/h	93	359	364	39	30	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	375	-	-	200	0	25
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	38	28	20	0	50	24
Mvmt Flow	99	382	387	41	32	102

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	428	0	-	0	967	387
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	580	-
Critical Hdwy	4.48	-	-	-	6.9	6.44
Critical Hdwy Stg 1	-	-	-	-	5.9	-
Critical Hdwy Stg 2	-	-	-	-	5.9	-
Follow-up Hdwy	2.542	-	-	-	3.95	3.516
Pot Cap-1 Maneuver	963	-	-	-	232	615
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	476	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	963	-	-	-	208	615
Mov Cap-2 Maneuver	-	-	-	-	208	-
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	476	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	963	-	-	-	208	615
HCM Lane V/C Ratio	0.103	-	-	-	0.153	0.166
HCM Control Delay (s)	9.2	-	-	-	25.4	12
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5	0.6

Intersection	
Int Delay, s/veh	6.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	119	86	39	158	72	42
Future Vol, veh/h	119	86	39	158	72	42
Conflicting Peds, #/hr	4	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	14	10	12	31	10	40
Mvmt Flow	140	101	46	186	85	49

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	362	141	0	0	232	0
Stage 1	139	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.54	6.3	-	-	4.2	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	614	886	-	-	1290	-
Stage 1	859	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	570	884	-	-	1290	-
Mov Cap-2 Maneuver	570	-	-	-	-	-
Stage 1	859	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	670	1290	-
HCM Lane V/C Ratio	-	-	0.36	0.066	-
HCM Control Delay (s)	-	-	13.4	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0.2	-

Intersection	
Int Delay, s/veh	9.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	66	211	91	81	186	107
Future Vol, veh/h	66	211	91	81	186	107
Conflicting Peds, #/hr	0	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	44	33	22	32	33	19
Mvmt Flow	74	237	102	91	209	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	686	150	0	0	193	0
Stage 1	148	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Critical Hdwy	6.84	6.53	-	-	4.43	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.896	3.597	-	-	2.497	-
Pot Cap-1 Maneuver	356	821	-	-	1215	-
Stage 1	787	-	-	-	-	-
Stage 2	509	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	290	819	-	-	1215	-
Mov Cap-2 Maneuver	290	-	-	-	-	-
Stage 1	787	-	-	-	-	-
Stage 2	415	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.6	0	5.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	571	1215	-
HCM Lane V/C Ratio	-	-	0.545	0.172	-
HCM Control Delay (s)	-	-	18.6	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.3	0.6	-

Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	0	0	0	14	0	82	0	85	9	87	91	0
Future Vol, veh/h	0	0	0	14	0	82	0	85	9	87	91	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	25	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	12	0	22	0	15	0	24	30	0
Mvmt Flow	0	0	0	16	0	92	0	96	10	98	102	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	1	0	0	130	125	6	137	79	46
Stage 1	-	-	-	-	-	-	1	1	-	78	78	-
Stage 2	-	-	-	-	-	-	129	124	-	59	1	-
Critical Hdwy	4.1	-	-	4.22	-	-	7.1	6.65	6.2	7.34	6.8	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.65	-	6.34	5.8	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.65	-	6.34	5.8	-
Follow-up Hdwy	2.2	-	-	2.308	-	-	3.5	4.135	3.3	3.716	4.27	3.3
Pot Cap-1 Maneuver	1515	-	-	1558	-	-	847	742	1083	786	761	1029
Stage 1	-	-	-	-	-	-	1027	870	-	879	778	-
Stage 2	-	-	-	-	-	-	880	769	-	900	842	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1515	-	-	1558	-	-	753	734	1078	692	753	1029
Mov Cap-2 Maneuver	-	-	-	-	-	-	753	734	-	692	753	-
Stage 1	-	-	-	-	-	-	1027	870	-	879	769	-
Stage 2	-	-	-	-	-	-	755	761	-	790	842	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	10.4	11.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	734	1078	1515	-	-	1558	-	-	722
HCM Lane V/C Ratio	0.13	0.009	-	-	-	0.01	-	-	0.277
HCM Control Delay (s)	10.6	8.4	0	-	-	7.3	0	-	11.9
HCM Lane LOS	B	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	0	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	244	66	91	225	22	103	11	122	16	14	10
Future Vol, veh/h	3	244	66	91	225	22	103	11	122	16	14	10
Conflicting Peds, #/hr	0	0	1	1	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	125	-	-	50	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	39	21	16	28	50	25	0	28	100	100	50
Mvmt Flow	4	287	78	107	265	26	121	13	144	19	16	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	291	0	0	366	0	0	842	840	327	905	866	279
Stage 1	-	-	-	-	-	-	335	335	-	492	492	-
Stage 2	-	-	-	-	-	-	507	505	-	413	374	-
Critical Hdwy	4.1	-	-	4.26	-	-	7.35	6.5	6.48	8.1	7.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	7.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	7.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.344	-	-	3.725	4	3.552	4.4	4.9	3.75
Pot Cap-1 Maneuver	1282	-	-	1119	-	-	259	304	658	177	206	658
Stage 1	-	-	-	-	-	-	633	646	-	413	415	-
Stage 2	-	-	-	-	-	-	508	544	-	461	477	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1282	-	-	1118	-	-	219	274	657	123	185	657
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	274	-	123	185	-
Stage 1	-	-	-	-	-	-	630	643	-	412	375	-
Stage 2	-	-	-	-	-	-	431	492	-	352	475	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2.3	25	31.7
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	589	1282	-	-	1118	-	-	181
HCM Lane V/C Ratio	0.553	0.266	0.003	-	-	0.096	-	-	0.26
HCM Control Delay (s)	40.1	13.3	7.8	-	-	8.6	-	-	31.7
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	3	1.1	0	-	-	0.3	-	-	1

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱		↰	↱	
Traffic Vol, veh/h	1	2	11	22	0	20	6	123	33	17	95	1
Future Vol, veh/h	1	2	11	22	0	20	6	123	33	17	95	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	125	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	50	38	0	11	33	15	29	25	13	100
Mvmt Flow	1	2	13	25	0	23	7	140	38	19	108	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	332	339	109	327	320	159	109	0	0	178	0	0
Stage 1	147	147	-	173	173	-	-	-	-	-	-	-
Stage 2	185	192	-	154	147	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.48	6.5	6.31	4.43	-	-	4.35	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.48	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.48	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.842	4	3.399	2.497	-	-	2.425	-	-
Pot Cap-1 Maneuver	625	586	829	563	600	863	1309	-	-	1270	-	-
Stage 1	860	779	-	752	760	-	-	-	-	-	-	-
Stage 2	821	745	-	770	779	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	599	574	829	544	588	863	1309	-	-	1270	-	-
Mov Cap-2 Maneuver	599	574	-	544	588	-	-	-	-	-	-	-
Stage 1	856	767	-	748	756	-	-	-	-	-	-	-
Stage 2	795	741	-	745	767	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	10.9	0.3	1.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	760	660	1270	-	-
HCM Lane V/C Ratio	0.005	-	-	0.021	0.072	0.015	-	-
HCM Control Delay (s)	7.8	-	-	9.8	10.9	7.9	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	28	142	50	27	137
Future Vol, veh/h	42	28	142	50	27	137
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	21	38	26	30	28	23
Mvmt Flow	47	31	160	56	30	154

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	404	190	0	0	218	0
Stage 1	190	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.61	6.58	-	-	4.38	-
Critical Hdwy Stg 1	5.61	-	-	-	-	-
Critical Hdwy Stg 2	5.61	-	-	-	-	-
Follow-up Hdwy	3.689	3.642	-	-	2.452	-
Pot Cap-1 Maneuver	568	768	-	-	1212	-
Stage 1	799	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	552	767	-	-	1210	-
Mov Cap-2 Maneuver	552	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	622	1210	-
HCM Lane V/C Ratio	-	-	0.126	0.025	-
HCM Control Delay (s)	-	-	11.6	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

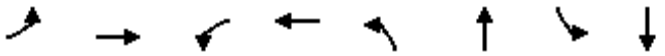
Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	36	136	21	30	101	67	19	72	27	57	73	41
Future Vol, veh/h	36	136	21	30	101	67	19	72	27	57	73	41
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	21	19	13	24	25	39	33	24	21	38	25	12
Mvmt Flow	40	151	23	33	112	74	21	80	30	63	81	46

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	187	0	0	176	0	0	524	498	168	517	472	150
Stage 1	-	-	-	-	-	-	245	245	-	216	216	-
Stage 2	-	-	-	-	-	-	279	253	-	301	256	-
Critical Hdwy	4.31	-	-	4.34	-	-	7.43	6.74	6.41	7.48	6.75	6.32
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.74	-	6.48	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.74	-	6.48	5.75	-
Follow-up Hdwy	2.389	-	-	2.416	-	-	3.797	4.216	3.489	3.842	4.225	3.408
Pot Cap-1 Maneuver	1281	-	-	1278	-	-	418	444	829	416	458	871
Stage 1	-	-	-	-	-	-	695	665	-	711	683	-
Stage 2	-	-	-	-	-	-	665	659	-	637	655	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1280	-	-	1276	-	-	322	415	825	324	428	870
Mov Cap-2 Maneuver	-	-	-	-	-	-	322	415	-	324	428	-
Stage 1	-	-	-	-	-	-	669	640	-	685	663	-
Stage 2	-	-	-	-	-	-	537	639	-	517	631	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	1.2	16.4	19.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	445	1280	-	-	1276	-	-	434
HCM Lane V/C Ratio	0.295	0.031	-	-	0.026	-	-	0.438
HCM Control Delay (s)	16.4	7.9	0	-	7.9	0	-	19.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.1	-	-	2.2



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	164	244	35	93	116	992	46	1010
v/c Ratio	0.68	0.67	0.27	0.27	0.44	0.65	0.15	0.79
Control Delay	48.6	32.5	36.4	24.9	10.8	15.2	6.2	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	32.5	36.4	24.9	10.8	15.2	6.2	22.0
Queue Length 50th (ft)	76	77	15	27	20	193	8	210
Queue Length 95th (ft)	#218	#231	51	83	38	262	18	299
Internal Link Dist (ft)		1885		563		1469		3402
Turn Bay Length (ft)	125		150		150		100	
Base Capacity (vph)	240	363	132	342	431	2007	536	1915
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.67	0.27	0.27	0.27	0.49	0.09	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	160	178	153	160	189	52	742	171	225	850
v/c Ratio	0.68	0.76	0.77	0.72	0.53	0.57	0.87	0.31	0.78	0.65
Control Delay	72.1	77.7	83.0	76.9	12.9	92.3	58.5	11.9	73.1	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	77.7	83.0	76.9	12.9	92.3	58.5	11.9	73.1	34.0
Queue Length 50th (ft)	136	148	138	144	0	46	327	44	192	306
Queue Length 95th (ft)	259	281	270	276	79	111	503	102	#468	532
Internal Link Dist (ft)		1368		448			1440			1918
Turn Bay Length (ft)	100		400			125		75	150	
Base Capacity (vph)	380	370	317	351	459	195	1239	661	290	1431
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.48	0.48	0.46	0.41	0.27	0.60	0.26	0.78	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	30	29	889	11	957
v/c Ratio	0.53	0.12	0.09	0.53	0.03	0.64
Control Delay	31.7	18.2	5.3	9.6	4.9	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	18.2	5.3	9.6	4.9	12.9
Queue Length 50th (ft)	30	4	3	80	1	91
Queue Length 95th (ft)	105	29	13	223	7	262
Internal Link Dist (ft)	2474	252		931		1440
Turn Bay Length (ft)			125		125	
Base Capacity (vph)	354	402	557	2634	637	2475
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.07	0.05	0.34	0.02	0.39

Intersection Summary

Attachment D Future BLTS Analysis Results

Future BLTS Analysis Results

Table D-1 summarizes the BLTS analysis results under future (no-build) traffic conditions. It is important to note that while some segments are shown as BLTS 3 or 4, they may have shorter segments with lower BLTS scores. As shown, several arterial and collector streets in Florence are forecast to have segments that are rated BLTS 3 or 4. These segments may have bike lanes that are too narrow for roadway conditions or may be shared roadways (i.e., mixed traffic) with relatively high traffic volumes.

Table D1: Future Bicycle Level of Traffic Stress (BLTS) Analysis Results

Street	From	To	Side	Facility Type	ADT	BLTS Criteria					BLTS
						Speed (mph)	Lanes per Direction	Bicycle Facility Width (feet)	Parking	Frequent Blockage	
US 101	Heceta Beach Rd	Munsel Lake Rd	West	Bike Lane	-	55	1	8	None	No	3
	Heceta Beach Rd	Munsel Lake Rd	East	Bike Lane	-	55	1	8	None	No	3
	Munsel Lake Rd	46th St	West	Bike Lane	-	40	2	7	None	No	4
	Munsel Lake Rd	46th St	East	Bike Lane	-	40	2	7	None	No	4
	46th St	37th St	West	Bike Lane	-	40	2	6	None	No	4
	46th St	37th St	East	Bike Lane	-	40	2	6	None	No	4
	37th St	31st St	West	Bike Lane	-	40	2	5	None	No	4
	37th St	31st St	East	Bike Lane	-	40	2	5	None	No	4
	31st St	27th St	West	Bike Lane	-	40	2	6	None	No	4
	31st St	27th St	East	Bike Lane	-	40	2	6	None	No	4
	27th St	22nd St	West	Bike Lane	-	40	2	6	None	No	4
	27th St	22nd St	East	Bike Lane	-	40	2	6	None	No	4
	22nd St	OR 126	West	Bike Lane	-	30	2	6	None	No	3
	22nd St	OR 126	East	Bike Lane	-	30	2	6	None	No	3
	OR 126	Rhododendron Dr	West	Bike Lane	-	30	2	6	None	No	3
	OR 126	Rhododendron Dr	East	Bike Lane	-	30	2	6	None	No	3
	Rhododendron Dr	2nd Street	West	Bike Lane	-	30	2	6	None	No	3
	Rhododendron Dr	2nd Street	East	Bike Lane	-	30	2	6	None	No	3
OR 126	US 101	Quince Street	North	Bike Lane	-	35	2	5	None	No	3
	US 101	Quince Street	South	Bike Lane	-	35	2	5	Yes	No	3
	Quince Street	Redwood St	North	Bike Lane	-	35	1	5	None	No	3
	Quince Street	Redwood St	South	Bike Lane	-	35	1	8	Yes	No	2
	Redwood St	Spruce St	North	Bike Lane	-	35	1	5	None	No	3
	Redwood St	Spruce St	South	Bike Lane	-	35	1	6	None	No	3

Street	From	To	Side	Facility Type	ADT	BLTS Criteria					BLTS
						Speed (mph)	Lanes per Direction	Bicycle Facility Width (feet)	Parking	Frequent Blockage	
	Spruce St	Xylo St	North	Bike Lane	-	35	1	5	None	No	3
	Spruce St	Xylo St	South	Bike Lane	-	35	1	6	None	No	3
	Xylo St	N Fork Siuslaw Rd	North	Bike Lane	-	35	1	5	None	No	3
	Xylo St	N Fork Siuslaw Rd	South	Bike Lane	-	35	1	6	None	No	3
9th St	Rhododendron Dr	US 101	North	Bike Lane	-	25	1	6	None	No	1
	Rhododendron Dr	US 101	South	Bike Lane	-	25	1	6	None	No	1
Rhododendron Dr	Heceta Beach Rd	Lighthouse Wy	West	Shoulder	-	40	1	3	None	No	4
	Heceta Beach Rd	Lighthouse Wy	East	Shoulder	-	40	1	3	None	No	4
	Lighthouse Wy	New Hope Ln	West	Shoulder	-	40	1	3	None	No	4
	Lighthouse Wy	New Hope Ln	East	Shoulder	-	40	1	3	None	No	4
	New Hope Ln	Greenwood St	West	Bike Lane	-	30	1	7	None	No	1
	New Hope Ln	Greenwood St	East	Bike Lane	-	30	1	7	None	No	1
	Greenwood St	US 101	North	Bike Lane	-	25	1	6	Yes	No	1
	Greenwood St	US 101	South	Bike Lane	-	25	1	6	None	No	1
Munsel Lake Rd	US 101	Ocean Dunes Dr	North	Mixed Traffic	>3,000	35	1	0	None	No	3
	US 101	Ocean Dunes Dr	South	Mixed Traffic	>3,000	35	1	0	None	No	3
	Ocean Dunes Dr	N Fork Rd	West	Mixed Traffic	>3,000	25	1	0	None	No	3
	Ocean Dunes Dr	N Fork Rd	East	Mixed Traffic	>3,000	25	1	0	None	No	3
N Fork Siuslaw Rd	Munsel Lake Rd	OR 126	West	Shoulder	-	25	1	3	None	No	2
	Munsel Lake Rd	OR 126	East	Shoulder	-	25	1	5	None	No	2
Heceta Beach Rd	US 101	Rhododendron Dr	North	Shoulder	-	40	1	4	None	No	4
	US 101	Rhododendron Dr	South	Shoulder	-	40	1	4	None	No	4
Kingwood St	35th St	27th St	West	Bike Lane	-	40	1	6	None	No	4
	35th St	27th St	East	Bike Lane	-	40	1	6	None	No	4
	27th St	Airport Ln	West	Bike Lane	-	40	1	6	Yes	No	2
	27th St	Airport Ln	East	Bike Lane	-	40	1	6	Yes	No	2
	Airport Ln	17th Pl	West	Bike Lane	-	30	1	6	None	No	1
	Airport Ln	17th Pl	East	Bike Lane	-	30	1	6	None	No	1
	17th Pl	15th St	West	Bike Lane	-	30	1	6	None	No	1
	17th Pl	15th St	East	Bike Lane	-	30	1	6	None	No	1
	15th St	10th St	West	Bike Lane	-	25	1	6	None	No	1
	15th St	10th St	East	Bike Lane	-	25	1	6	None	No	1
	10th St	Bay St	West	Mixed Traffic	1,500-≤3,000	25	1	0	None	No	3
	10th St	Bay St	East	Mixed Traffic	1,500-≤3,000	25	1	0	None	No	3
Quince St	US 101	Harbor St	West	Mixed Traffic	>3,000	25	1	0	None	No	3

Street	From	To	Side	Facility Type	ADT	BLTS Criteria					BLTS
						Speed (mph)	Lanes per Direction	Bicycle Facility Width (feet)	Parking	Frequent Blockage	
	US 101	Harbor St	East	Mixed Traffic	>3,000	25	1	0	None	No	3
Spruce St	32nd St	30th Way	West	Bike Lane	-	25	1	6	None	No	1
	32nd St	30th Way	East	Bike Lane	-	25	1	6	None	No	1
	30th Way	25th St	West	Bike Lane	-	25	1	6	None	No	1
	30th Way	25th St	East	Bike Lane	-	25	1	6	None	No	1
	25th St	17th St	West	Mixed Traffic	>3,000	25	1	0	Yes	No	3
	25th St	17th St	East	Mixed Traffic	>3,000	25	1	0	Yes	No	3
	17th St	15th St	West	Mixed Traffic	>3,000	25	1	0	Yes	No	3
	17th St	15th St	East	Mixed Traffic	>3,000	25	1	0	Yes	No	3
	15th St	OR 126	West	Mixed Traffic	>3,000	25	1	0	Yes	No	3
	15th St	OR 126	East	Mixed Traffic	>3,000	25	1	0	Yes	No	3
Bay St	Kingwood St	1st St	North	Mixed Traffic	≤750	25	1	0	Yes	No	1
	Kingwood St	1st St	South	Mixed Traffic	≤750	25	1	0	Yes	No	1
Airport Rd/15th St	Kingwood St	Nopal St	North	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	Kingwood St	Nopal St	South	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	Nopal St	US 101	North	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	Nopal St	US 101	South	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	US 101	Spruce St	North	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	US 101	Spruce St	South	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
21st St	Oak St	US 101	North	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	Oak St	US 101	South	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	US 101	Spruce St	North	Mixed Traffic	≤750	25	1	0	Yes	No	1
	US 101	Spruce St	South	Mixed Traffic	≤750	25	1	0	Yes	No	1
27th St	Kingwood St	Oak St	North	Bike Lane	-	25	1	6	None	No	1
	Kingwood St	Oak St	South	Bike Lane	-	25	1	6	None	No	1
	Oak St	US 101	North	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
	Oak St	US 101	South	Mixed Traffic	750 - ≤1,500	25	1	0	Yes	No	2
30th St	Oak St	Spruce St	North	Mixed Traffic	≤750	25	1	0	Yes	No	1
	Oak St	Spruce St	South	Mixed Traffic	≤750	25	1	0	Yes	No	1
35th St	Rhododendron Dr	Myrtle Loop	North	Bike Lane	-	25	1	6	None	No	1
	Rhododendron Dr	Myrtle Loop	South	Bike Lane	-	25	1	6	None	No	1
	Myrtle Loop	US 101	North	Bike Lane	-	25	1	6	None	No	1
	Myrtle Loop	US 101	South	Bike Lane	-	25	1	6	Yes	No	1
	US 101	Spruce St	North	Bike Lane	-	25	1	5	None	No	2
	US 101	Spruce St	South	Bike Lane	-	25	1	5	None	No	2

Street	From	To	Side	Facility Type	ADT	BLTS Criteria					BLTS
						Speed (mph)	Lanes per Direction	Bicycle Facility Width (feet)	Parking	Frequent Blockage	
42nd St/43rd St	Oak St	US 101	North	Mixed Traffic	750 - ≤1,500	25	1	0	None	No	2
	Oak St	US 101	South	Mixed Traffic	750 - ≤1,500	25	1	0	None	No	2
	US 101	Spruce St	North	Bike Lane	-	25	1	5	None	No	2
	US 101	Spruce St	South	Bike Lane	-	25	1	5	None	No	2