South Stage Road
Extension Plan

Technical Memorandum

March 1, 2024 Project# 27003.014

To: Lisa Cornutt, Oregon Department of Transportation (ODOT)

Karl MacNair, City of Medford

From: Marc Butorac, PE, PTOE, PMP; Matt Bell; Kelly Lausten, PE; Amy Griffiths, PE, and Eza Gaigalas

RE: Task 4.1.2: Future Year Background Traffic Analysis

Contents

INTRODUCTION

This memorandum summarizes the Future Year 2045 No-Build Conditions in the study area for the South Stage Extension Plan. It assumes South Stage Road maintains its existing terminus just east of OR99, along with an additional section of South Stage Road between the future extension of Golf View Drive and N Phoenix Road (see below). Further information on the methodology and assumptions behind the analysis is provided in Technical Memorandum #3.1.3: Transportation Methodology and Assumptions.

This planning document may be adopted in a subsequent environmental review process in accordance with 23 USC 168, Integration of Planning and Environmental Review,[1] and 23 CFR 450, Planning Assistance and Standards.[2]

PROJECT BACKGROUND

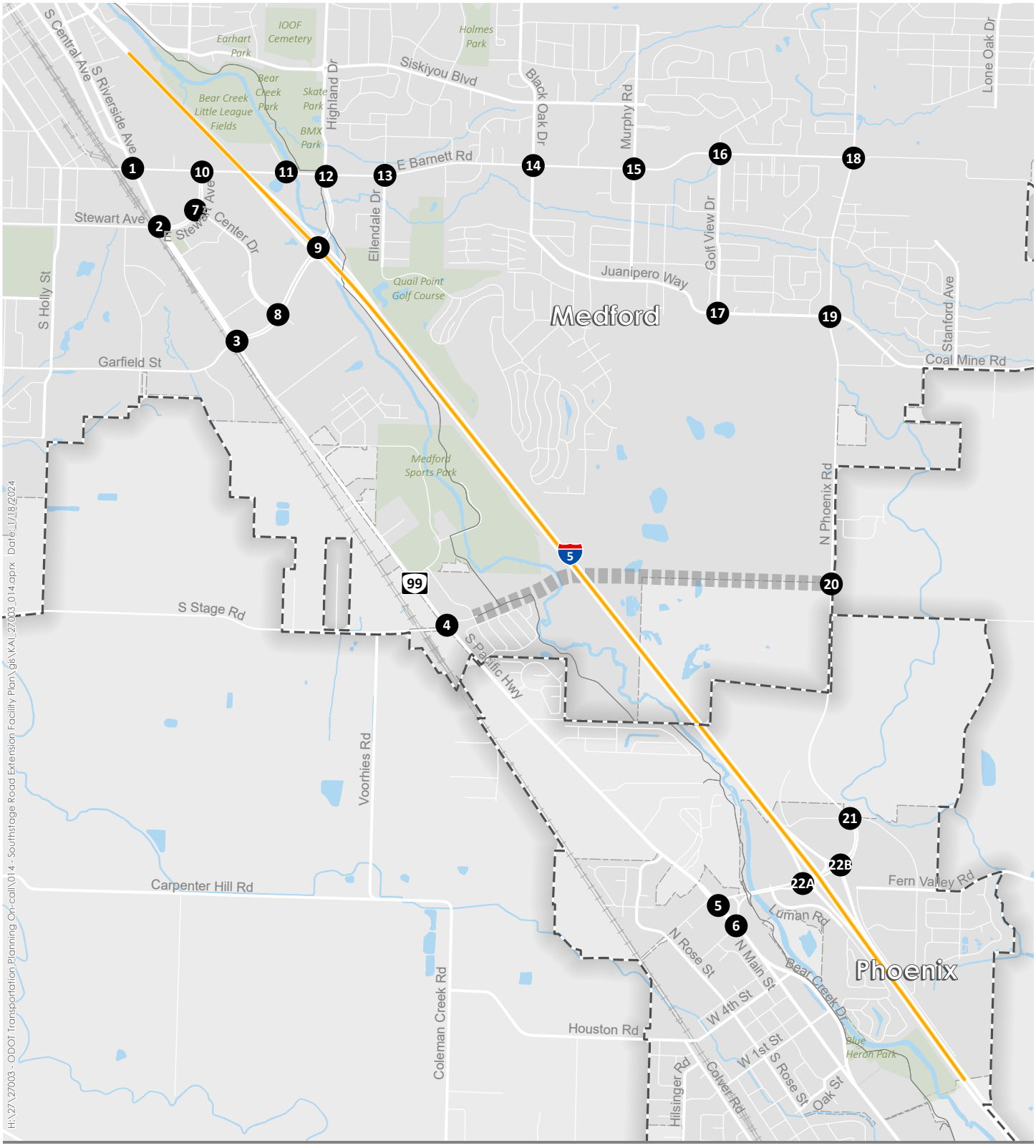
The City of Medford is interested in extending South Stage Road over I-5 and Bear Creek to N Phoenix Road between the South Medford Interchange at Exit 27 and the Phoenix/Fern Valley Interchange (Phoenix Interchange) at Exit 24. The South Stage Extension Plan project is part of the adopted City of Medford Transportation System Plan (TSP; Projects 537A and 537B).

The South Stage Extension Plan evaluates potential system improvements within the study area and improvements across I-5 between the South Medford and Phoenix interchanges. It includes identifying potential alternatives that satisfy the purpose and need for the project and to address capacity and congestion identified in the future year traffic analysis and safety-related concerns identified in the existing conditions analysis. The alternatives will be screened and a preferred alternative refined and documented.

Study Area

The project study area is bounded by Barnett Road to the north, OR99 to the west, and North Phoenix Road to the east and south. It includes the I-5 corridor between the South Medford Interchange to the north at Exit 27 and Phoenix Interchange to the south at Exit 24, as well as roadways and intersections that could be affected by a new potential overcrossing of South Stage Road and/or interchange at I-5. The analysis includes an operational analysis at key study intersections and the I-5 mainline and merge/diverge locations associated with the South Medford and Phoenix interchanges. The study area and intersections are illustrated in Figure 1, as well as the approximate alignment of the potential South Stage Road extension.

[1] https://www.govinfo.gov/app/details/USCODE-2022-title23/USCODE-2022-title23-chap1-sec168/summary
[2] https://www.govinfo.gov/app/details/CFR-2022-title23-vol1/CFR-2022-title23-vol1-part450



Existing Intersection
I-5 Study Corridor
Bear Creek Greenway
Approximate Alignment
Parks
City Limits
Urban Growth Boundary

0 1 Miles

Figure 1

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Study Area
Jackson County, Oregon

YEAR 2045 TRANSPORTATION SYSTEM

This section documents the planned transportation facilities within the study area that were assumed for the Year 2045 No-Build Conditions analysis.

Motor Vehicle System

Planned improvements to the motor vehicle system were identified based on the City of Medford Transportation System Plan (TSP, Reference 1) and confirmed with the Project Management Team (PMT). No planned improvements were identified in the City of Phoenix TSP or Jackson County TSP that are expected to influence conditions within the study area. Table 1 summarizes the planned improvements that are accounted for in the Year 2045 No-Build Conditions analysis. Figure 2 illustrates the location and type of planned improvements. Projects outside of the study area were included as they have the potential to affect travel assignments within the study area.

Table 1. Motor Vehicle System Planned Improvements

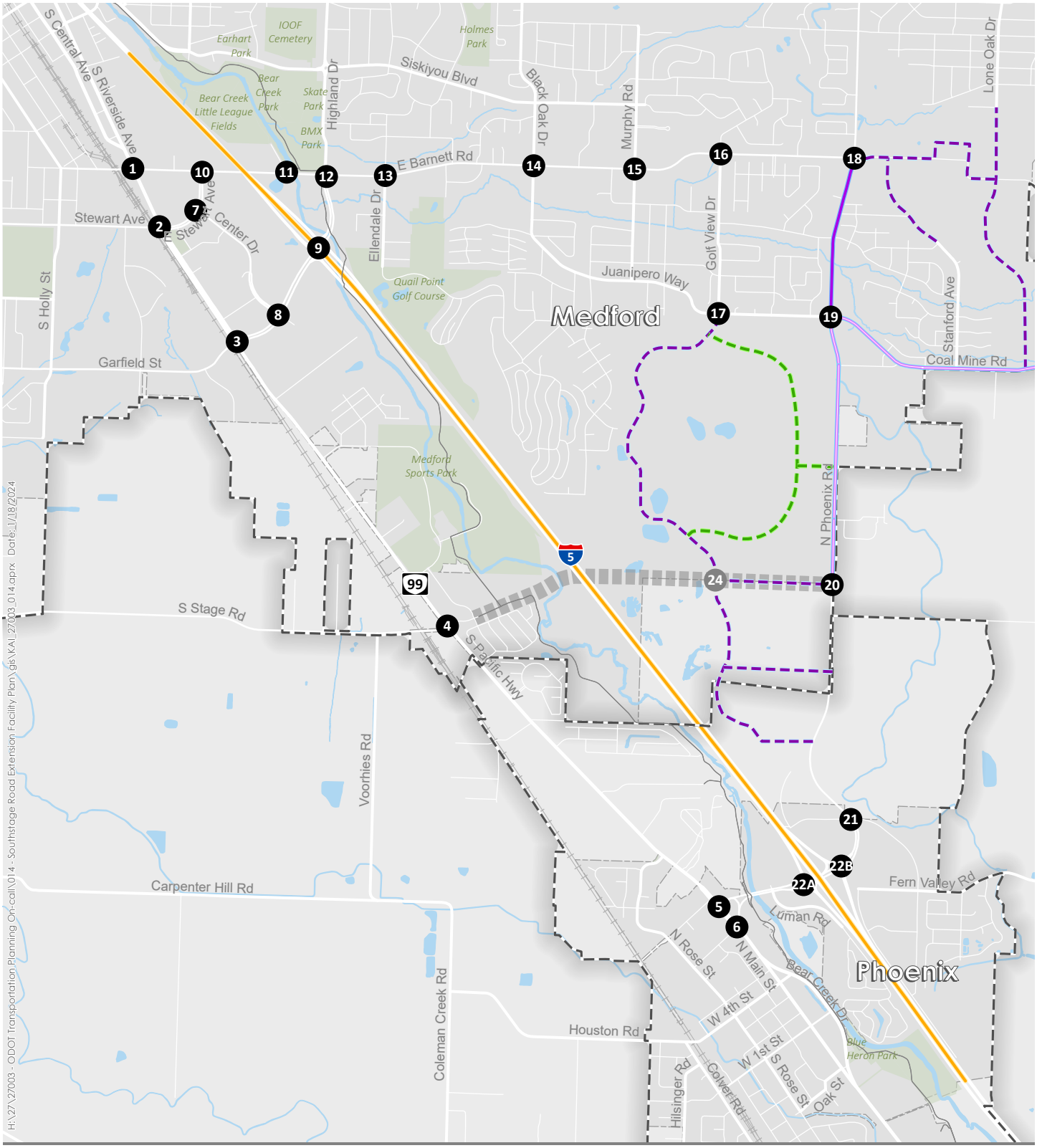
Project #	Location	Project Type	Description	Tier
469[1]	Foothill Road, Hillcrest Road to McAndrews Road	Urban upgrade	Upgrade to regional arterial standard (includes two lanes in each direction, center-turn lane, bike facilities, and sidewalks) – Project us under construction	1 (short-term)
481	Coal Mine Road (realigned), North Phoenix Road to Santa Barbara Drive	Urban upgrade	Realign and upgrade to major collector standard (includes one lane in each direction, center-turn lane, bike facilities, and sidewalks)	2[2]
484	Stanford Avenue, Barnett Road to Coal Mine Road	New roadway	Construct new major collector roadway (includes center turn-lane, bike facilities, and sidewalks)	2[2]
535	Barnett Road, North Phoenix Road to Lone Oak Drive	New roadway	Realign and construct new minor arterial roadway (includes center turn-lane, bike facilities, and sidewalks)	2[2]
537	South Stage Road, South Pacific Highway to North Phoenix Road	New roadway	Construct new minor arterial roadway (includes center turn-lane, bike facilities, and sidewalks) and overcrossing/extension/interchange of I-5 (part of the N Phoenix/Foothill and South Stage corridor). *The Year 2045 No-Build Analysis assumes that the extension terminates at the intersection of South Stage Road/Golf View Drive, as shown in the purple line of Figure 2. This South Stage connection between Phoenix Road and Golf View Drive is being constructed by the BUILD grant and private development.*	1 (long-term)
611	North Phoenix Road from Barnett Road to Juanipero Way	Widening	Widen to regional arterial standard (includes two lanes in each direction, center turn-lane, bike facilities, and sidewalks. Part of the N Phoenix/Foothill and South Stage corridor.)	1 (long-term)

Project #	Location	Project Type	Description	Tier
677	Golf View Drive, Juanipero Way to southern expansion boundary	New roadway	Construct new major collector (minor collector south of South Stage Road extension) roadway (includes center turn-lane, bike facilities, and sidewalks)	2[2]
678	East-West collector along southern UGB, Golf View Drive to North Phoenix Road	New roadway	Upgrade to minor collector standard (includes one lane in each direction, bike facilities, and sidewalks)	2[2]
705	Lone Oak Drive Extension	New roadway	Construct new major collector standard (includes center turn-lane, bike facilities, and sidewalks)	2[2]
721	N Phoenix Road, Juanipero Way to South UGB	Urban upgrade	Upgrade to regional arterial standard (includes two lanes in each direction, center-turn lane, bike facilities, and sidewalks. Part of the N Phoenix/Foothill and South Stage corridor.)	1 (long-term)
I-13[1]	Creek View Drive and North Phoenix Road	Intersection	Install traffic signal when warranted. Remove traffic signal at Albertson's access and convert to right-in/right-out only (part of the N Phoenix/Foothill and South Stage corridor. Also, see SE Plan.)	1 (long-term)
I-16[1]	South Pacific Highway and South Stage Road	Intersection	Update signal timing and phasing to add clearance intervals and protected left-turn phases in the east-west direction and to monitor the continued pattern of turning and angle collisions in the east-west direction (see OR99 Rogue Valley Corridor Plan)	ODOT (mid-term)
I-17	South Pacific Highway and Stewart Avenue	Intersection	Intersection improvements such as a second southbound left lane and second eastbound left-turn lane	1 (long-term)
I-22[1]	McAndrews Road at Foothill Road Ramps	Intersection	Install traffic signals	1 (mid-term)
I-24	Phoenix Road and Barnett Road	Intersection	Intersection improvements such as second SBTH lane, WBTH lane, and phasing all lefts as protected/permitted (part of the N. Phoenix / Foothill and South Stage Corridor)	1 (long-term)
I-54	Juanipero Way and North Phoenix Road	Intersection	Install traffic signal or roundabout when warranted	2[2]
I-78	Highland Drive and Barnett Road	Intersection	Intersection improvements such as a second northbound right-turn lane (protected) – Project is in the current STIP	1 (mid-term)

[1]Project not shown in Figure 2 or Figure 3 because project is outside of the study area. In addition, the Year 2045 network assumed that South Stage Road is constructed between the Golf View Drive Extension and Phoenix Road as a three-lane collector roadway. The Year 2045 roadway network is shown in Figure 2.

[2]These projects are anticipated to be constructed by private developers within the 20-year horizon.

The planned improvements in Table 1 and Figure 2 were incorporated in the travel demand modeling work done to generate future traffic volumes (discussed in Appendix A: 2045 Southern Oregon Activity-Based Model [SOABM] Travel Demand Model No-Build Refinements and South Stage Build Scenarios Requests) and assumed in the operational analysis conducted at the study intersections. The Year 2045 lane configurations and traffic control devices assumed at the study intersections are shown in Figure 3.



Existing Intersection

Future Intersection

I-5 Study Corridor

Approximate Alignment

New Roadway (Development)

New Roadway (TSP)

Urban Upgrade (TSP)

Widening (TSP)

Parks

City Limits

Urban Growth Boundary

0 0.5 Miles

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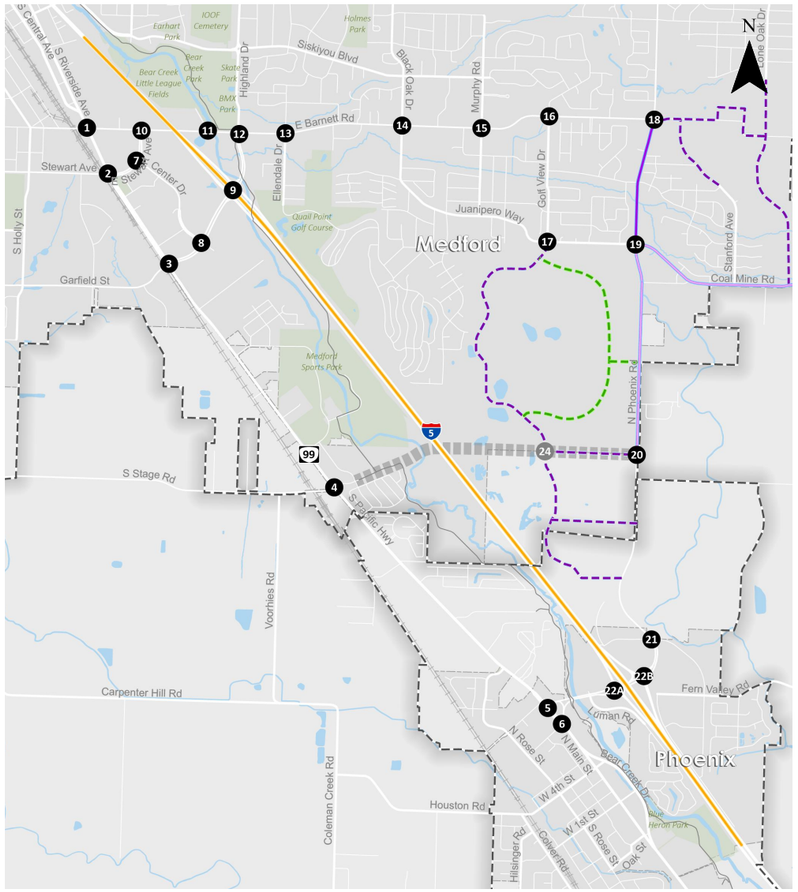
Figure 2

Year 2045 Roadway Network
Jackson County, Oregon



1 OR99/ Barnett Road

2 OR99/ Stewart Avenue

3 OR99/ Garfield Street

4 OR99/ S Stage Road

5 OR99/ N Phoenix Road

6 OR99/ N Phoenix Road-Bolz Road

7 Stewart Avenue/ Center Drive

8 Garfield Street/ Center Drive

9 I-5/ South Medford Interchange

10 Barnett Road/ Stewart Avenue

11 Barnett Road/ Alba Drive

12 Barnett Road/ Highland Drive

13 Barnett Road/ Ellendale Drive

14 Barnett Road/ Black Oak Drive

15 Barnett Road/ Murphy Road

16 Barnett Road/ Golf View Drive

17 Juanipero Way/ Golf View Drive

18 Barnett Road/ N Phoenix Road

19 Juanipero Way/ N Phoenix Road

20 Future South Stage Road/ N Phoenix Road

21 Grove Road/ N Phoenix Road

22A I-5 SB Ramps/ N Phoenix Road

22B I-5 NB Ramps/ N Phoenix Road

24 Golf View Drive/ Future South Stage Road

- Stop Sign
- Traffic Signal
- Yield

OVL - Overlap

- Channelized Movement

- Existing
- Planned Improvement (TSP)
- Planned Improvement (Development)

Year 2045 No-Build Lane Configurations and Traffic Control Devices

Figure 3

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OR99 ROGUE VALLEY CORRIDOR PLAN

The OR99 Corridor Plan identifies improvements to OR99 that address highway deficiencies; improve the multimodal functionality of the corridor; and allow the corridor to accommodate traffic, including freight, safely and efficiently into the future. In addition to the highway improvements, other management actions are included to protect and extend the life of the corridor and provide for incremental implementation of highway improvements. These actions include Transportation System Management (TSM) Measures, Transportation Demand Management (TDM) Measures, Bicycle and Pedestrian Facilities, and Transit Operations. The projects planned within the South Stage Extension Study Area (and their corresponding Concept IDs) are as follows:

- **1** – OR99 – Garfield Street to Charlotte Ann Road (8.56-8.75): Construct sidewalks along the west side of OR99 (medium priority).
- **2** – OR99 – Charlotte Ann Road to Coleman Creek (8.75-11.03): Modify striping of the existing five-lane roadway cross-section to add bike lanes (high priority) – this project is not feasible as described; however, it will be addressed by STIP project #22384.
- **3** – OR99 – Charlotte Ann Road to Coleman Creek (8.75-11.03): Construct continuous sidewalks on both sides of OR99 (medium priority) – addressed by STIP project #22384.
- **4** – OR99 – Charlotte Ann Road to Coleman Creek (8.75-11.03): Install median islands at multiple locations where pedestrian crossings occur (medium priority) – this project is addressed by STIP project #22384.
- **5** – OR99/Northridge Terrace Intersection (10.58): Improve the turning radius on the southeast corner and sight distance for exiting traffic (medium priority) – this project is addressed by STIP project #22384.
- **6** – OR99/Coleman Creek Culvert (11.03-11.04): Modify striping of existing roadway to add bike lanes and sidewalks while maintaining four through-travel lanes (interim) (high to medium priority) – This project is complete.
- **7** – OR99/Coleman Creek Culvert (11.03-11.04): Replace culvert and widen roadway to add bike lanes and sidewalks (high to medium priority) – this project is complete.
- **20** – Bear Creek Greenway (8.56-17.02): Enhance connections to OR99 throughout the corridor with wayfinding signage for other amenities (high priority).
- **TSM1** – OR99 Corridor (8.56-17.02): Develop a traffic operations emergency plan (high priority).
- **TSM2** – OR99 Corridor (8.56-17.02): Conduct speed zone studies to reassess posted speeds when lane restriping, lane conversion, or pedestrian crossing projects are implemented (ongoing).
- **TSM3** – OR99/South Stage Road Intersection (9.79): Modify traffic signal timing to add protected left-turn phases in the east-west direction (high priority).
- **TSM4** – OR99 – Northridge Terrace to Coleman Creek (10.58-11.04): Evaluate potential access modifications to address high crash frequency (high priority).

The South Stage Extension Plan will use the OR99 Rogue Valley Corridor Plan as a resource for transportation decision-making involving OR99, particularly those decisions affecting the relationship between planned projects of the OR99 Rogue Valley Corridor Plan and the corresponding surrounding streets/areas. It should be noted that only project TSM3 from the OR99 Corridor Plan has the potential to affect vehicular operations, and current timing shows implementation of this project (all approaches have protected-permitted phasing). The remaining improvements primarily are associated with pedestrian and bicycle facility enhancements and safety and emergency planning opportunities.

SOUTH MEDFORD (EXIT 27) INTERCHANGE AREA MANAGEMENT PLAN

The South Medford (Exit 27) Interchange Area Management Plan (IAMP) identifies improvements to the South Medford interchange and several intersections and roadway segments within the interchange management study area (IMSA). The improvements are intended to address increased traffic volumes that are expected to adversely impact interchange safety and operations and roadway segment multimodal level-of-service for bicyclists and pedestrians. Traffic safety issues identified in the IAMP include motor vehicle queues that back-up onto the I-5 mainline on weekdays during the AM peak hour and high traffic volumes from several major attractors/generators travelling north on Garfield Street-Highland Drive and turning right (east) on Barnett Road. The IAMP identifies the following traffic safety and operations projects at the ramp terminal and multimodal and transit improvements in the IMSA.

- **M3b** – Barnett Road/Highland Drive Intersection – add dual northbound right turn lanes
- **M5a2** – South Medford (Exit 27) SPUI – lengthen/widen southbound off-ramp (lengthened to 3,000 feet)
- **M5b** – South Medford (Exit 27) SPUI – widen northbound off-ramp
- **M5f** – North Medford (Exit 30 Southbound On-Ramp) and Phoenix (Exit 24 Northbound On-Ramp) Ramp Metering
- **M8b** – OR 99/Garfield Street Intersection – restripe east leg (westbound) left, left, through, through/right
- **B1** – Multi-modal path along OR 99
- **B2a** – Add buffered bike lanes along Garfield Road-Highland Drive segment between OR99 and Barnett Road
- **B5** – Connect Highland Drive using the undercrossing to Larsen Creek/Bear Creek
- **T1** – Move transit stop on eastbound Barnett Road between Highland Drive and Ellendale Drive
- **T3** – TDM Solutions

The projects shown above will serve as a resource in the South Stage Extension Plan for transportation decision-making involving the South Medford interchange as well as other intersections and roadway segments within the IMSA. It should be noted that project M3b is

included in the Medford TSP as a financially constrained project, and therefore will be included in the year 2045 (no-build) traffic analysis. All other projects will be considered and evaluated in the year 2045 (build – overpass and interchange) analysis as part of enhancements to the transportation system. Other improvements, such as pedestrian and bicycle facility enhancements, will be considered an evaluated as improvements to the multimodal system.

Public Transportation System

The future public transportation system in the study area is described in the City of Medford TSP, Jackson County TSP, and the Rogue Valley Transit District (RVTD) 2040 Transit Master Plan (Reference 2), each discussed below.

CITY OF MEDFORD TSP

The City of Medford TSP incorporates the RVTD 2040 Transit Master Plan by reference, and includes the following objectives for the city's transit system:

- Create more transit-supportive areas
- Coordinate with RVTD and other partners to enhance transit service
- Improve traffic operations for buses on transit routes
- Improve access to existing and future transit routes for pedestrians and bicyclists

JACKSON COUNTY TSP

The Jackson County TSP includes "projects identified under the roadway element and the bicycle and pedestrian element [that] will improve access to the public transportation network. These projects include bringing the roadways up to standard and installing shoulders in the rural areas and bike lanes and sidewalks in the urban areas." The TSP also identifies roadway segments where the County should work with RVTD and the Rogue Valley Council of Governments (RVCOG) to improve stop amenities and install bus pull-outs and pedestrian crossings.

RVTD 2040 TRANSIT MASTER PLAN (2019)

The RVTD 2040 Transit Master Plan, adopted in 2019, reviews the transit services and facilities provided in the Rogue Valley Service Area. The plan identifies near-, mid-, and long-term services for the existing RVTD service area and the surrounding areas into which the RVTD may extend. The plan provides a framework for providing transit and transit-related services to the Rogue Valley and guides decisions by RVTD staff related to identifying new services, establishing policies, and achieving significant progress in RVTD departments.

The plan identifies the southwest corner of the intersection of E Barnett Road and N Phoenix Road as a transit-oriented development area. The plan also lists areas within Rogue Valley with

the greatest growth projections, including east and north Medford and the area north of Phoenix. A list of planned system enhancements is as follows:

- Increase RVTD routes to 15-minute or 20-minute frequency.
- Increase weekday service by 2 to 4 additional hours.
- Increase Saturday service to weekday service hours.
- Add Sunday service.

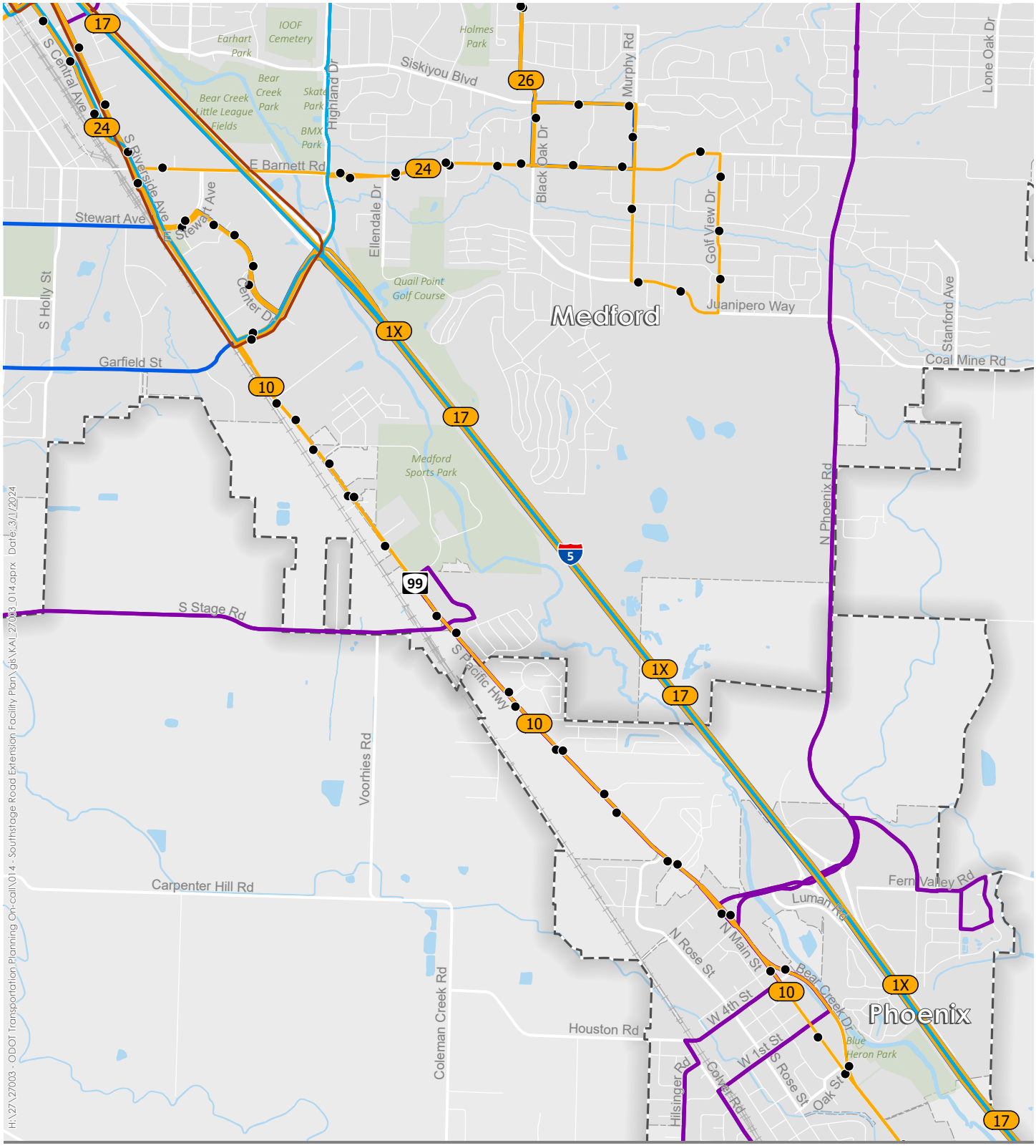
RVTD plans to add new transit routes on a short-, mid-, and long-term basis. The following enhancements within the study area include:

- Route 1X is a short-term planned bus route traveling along I-5 from the South Medford interchange to south Ashland – this route is currently in service.
- Route 9 is a mid-term bus route planned to travel along N Phoenix Road, across OR99, to South Stage Road.
- Route 23 is a proposed mid-term 14.2-mile bus route that provides service throughout southwest Medford, including South Stage Road.
- Route 10X is a proposed long-term proposed high-capacity transit corridor along OR99.

The RVTD 2040 Transit Master Plan will act as a resource for the planned/existing transit projects within the scope of the South Stage Extension Plan. The plan provides information valuable for understanding the impact of the South Stage Extension Plan on transit projects within Rogue Valley as well as important aims of the transit district that will be supported throughout project development and implementation. These planned enhancements, once funded, provide the opportunity for potential modal shifts within the study area.

TRANSIT CONNECTIVITY

Figure 4 illustrates the existing public transit routes and stops within the study area. There is limited existing transit service east of I-5; however, there are mid-term plans for transit service along N Phoenix Road in the study area. The only two existing east-west connections across I-5 in the study area are provided across Barnett Road and Garfield Street/Highland Road. A route that crosses the Phoenix Interchange is planned in the future.



- Rogue Valley Transit District Stops
- Rogue Valley Transit District Routes
- POINT SouthWest Transit Routes
- Josephine Community Transit Routes
- City Limits
- Urban Growth Boundary
- Planned Routes (Short-Term)
- Planned Routes (Mid-Term)

0 — 1 Miles

Figure 4

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Data Source: General Transit Feed Service

Transit Connectivity
Jackson County, OR

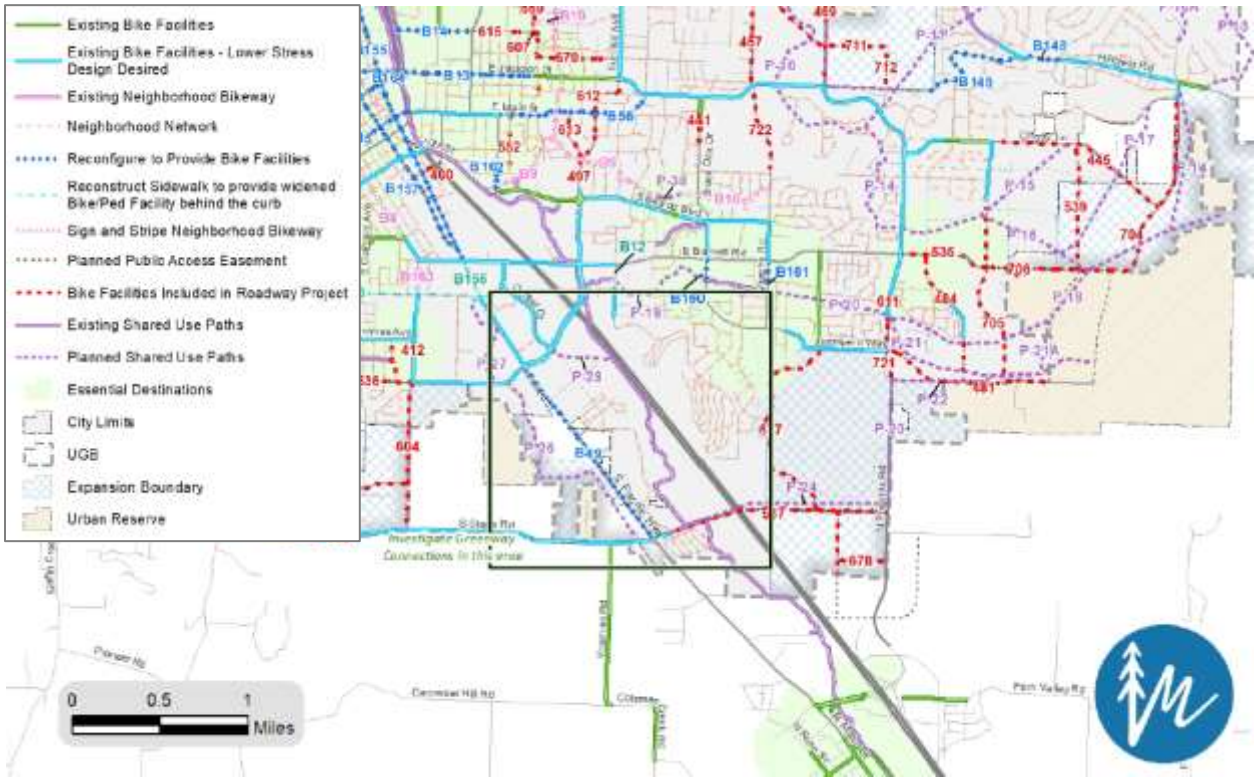
Pedestrian and Bicycle System

The future pedestrian and bicycle system in the South Stage Extension Plan study area is described in the City of Medford TSP, Jackson County TSP, and the Rogue Valley Active Transportation Plan (RVATP; Reference 3). Based on these plans, the South Stage Road extension is envisioned to provide high-quality pedestrian and bicycle facilities with a target level of traffic stress (LTS) 2. This could include separated bicycle lanes and sidewalks with a planter strip.

CITY OF MEDFORD TSP

The pedestrian plan in the City of Medford TSP includes sidewalk and shared-use path projects based on the gaps identified in the existing conditions and future needs assessment. The bicycle plan includes neighborhood bikeway projects, urban upgrade projects, and other bicycle facility projects. Bicycle projects and the future bicycle network in the study area are shown in Figure 5.

Figure 5. City of Medford Bicycle Plan (Source: Medford TSP)



The TSP identifies the South Stage Extension as a minor arterial or major arterial, based on whether an interchange is provided at I-5. The City's standard cross-sections indicate that 7-foot separated bicycle lanes are the preferred option to achieve an LTS 2. Six-foot sidewalks with a 7-foot planter strip are preferred. However, the TSP also includes a shared-use path project along the South Stage Road extension (P-24). This path is also shown in the City's Leisure Services Plan. The City's code section 10.503 states that shared-use paths on arterial streets shall follow the cross-sections with separated bike facilities.

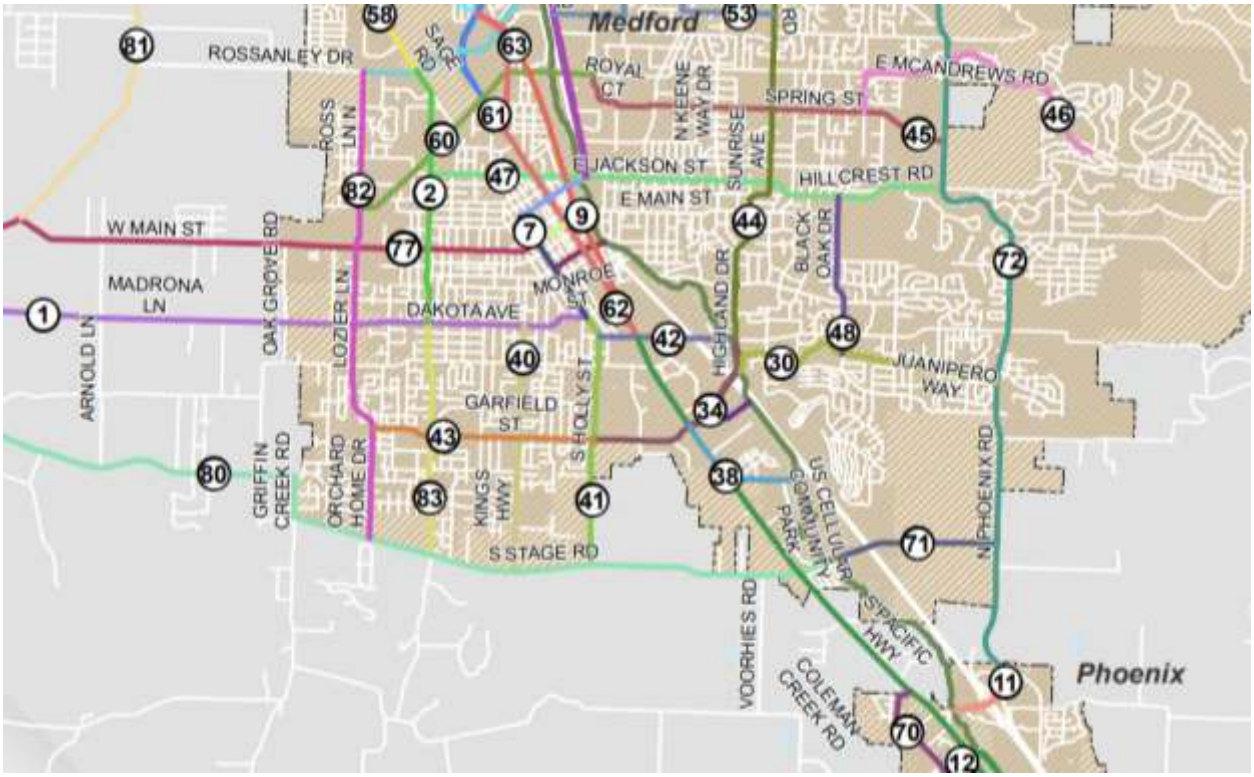
JACKSON COUNTY TSP

The Jackson County TSP includes a bicycle and pedestrian plan that highlights where improvements are needed. It designates South Stage Road as a County Bikeway. It defines bikeways as "designated bike routes that provide space for cyclists to travel outside of the vehicle travel lane. This could include continuous shoulder bikeways on both sides of the road, uphill climbing lanes, intermittent shoulders in low visibility areas, or bike pull-out areas."

ROGUE VALLEY ACTIVE TRANSPORTATION PLAN (2021)

The RVATP serves as a guide for investment and active transportation facility design on respective facilities. Ongoing and planned projects are listed in the RVATP and categorized as low, medium, or high priority according to an analysis based on factors such as safety, existing conditions, connectivity, equity, and opportunity. Projects numbered 30, 34, 38, 42, 48, 72, and 80 are located within the study area of the South Stage Extension Plan. The South Stage Extension Plan is listed as Project 71 and categorized as a low-priority project. Projects that involve Black Oak Drive (48), N Phoenix Road (72), and South Stage Road – E California Street (80) are identified as medium-priority projects. High-priority projects include 30, 34, 38, and 42. The plan includes the conceptual design for Project 38, which is the planned development of a shared-use path along OR99 in the 0.5-mile stretch from Garfield Street to Lowry Lane. Figure 5 illustrates the RVATP projects in the study area for the South Stage Extension Plan.

Figure 6. Rogue Valley Active Transportation Plan Projects (Source: RVATP)



OR99 ROGUE VALLEY CORRIDOR PLAN

The OR99 Corridor Plan as described previously identifies improvements to OR99 that address highway deficiencies; improve the multimodal functionality of the corridor; and allow the corridor to accommodate traffic, including freight, safely and efficiently into the future.

PEDESTRIAN AND BICYCLE CONNECTIVITY

The criteria in the City of Medford Code Section 10.426 identify maximum block length between 660 feet (0.13) and 940 feet (0.18 miles) depending on the land use[3]. The primary purpose of these maximums is to encourage connectivity, minimizing travel distances for all modes in a grid-system street network. Longer travel distances are particularly impactful for non-auto modes and can discourage walking, biking, and other active modes. Pedestrians and bicyclists can cross I-5 and Bear Creek at the following locations in the study area:

- Barnett Road
- South Medford Interchange
- Bear Creek Greenway (approximately 1/10 of a mile south of the South Medford Interchange)
- Phoenix Interchange

[3] According to City of Medford Code Section 10.426(b), "the approving authority may find that proposed blocks that exceed the maximum block…standards are acceptable when there is… proximity to state highways, interstate freeways,…or similar barriers that make street extensions in one or more directions impractical."

illustrates the existing pedestrian and bicycle crossing opportunities between Central Point and Phoenix. The average crossing spacing between the Pine Street Interchange in Central Point and Barnett Road is 0.4 miles. The average crossing spacing between Barnett Road and the Phoenix Interchange is approximately 1.1 miles, which is approximately three times greater than the spacing between Pine Street Interchange in Central Point and Barnett Road and over six times higher than the maximum block length identified in City of Medford Code Section 10.426.

There is a gap in crossing opportunities of approximately 2.65 miles between the Bear Creek Greenway and the Phoenix Interchange crossing opportunities. This is the longest gap in pedestrian and bicycle crossings of I-5 and Bear Creek between Central Point and Phoenix, creating a barrier in pedestrian and bicycle access.

PEDESTRIAN, BICYCLE, AND TRANSIT ACCESS

The study area has limited bicycle, pedestrian, and transit facilities, particularly east of I-5. Only four pedestrian/bicycle crossing opportunities exist, with a 2.65-mile gap between the Bear Creek Greenway undercrossing and the Phoenix Interchange. This gap is six times greater than the maximum block length that would typically be allowed by City code and three times greater than the average spacing of pedestrian/bicycle crossing of I-5 between Central Point and Phoenix. Transit users have a 2.75-mile gap in east-west crossings of I-5 and Bear Creek.

Figure 7. Pedestrian and Bicycle Connectivity

In addition to the I-5 and Bear Creek north-south barrier, the following facility gaps exist:

Pedestrian Gaps

- No sidewalks along both sides of Phoenix Road between Juanipero Way and the Phoenix Interchange
- Gaps in sidewalks along the west side of OR99 between Stewart Ave and the Phoenix interchange. Gaps in sidewalks along the east side ofOR99 between Charolette Ann Road and Lowry Lane and between Alter Street and the Phoenix Interchange.
- There are intermittent gaps in sidewalk facilities along one side of Juanipero Way,

Bicycle Facility Gaps

- No dedicated bicycle facilities along Barnett Road between Ellendale Drive and Phoenix Road.
- No Dedicated bicycle facilities along OR99 between Garfield Street and the Phoenix Interchange.

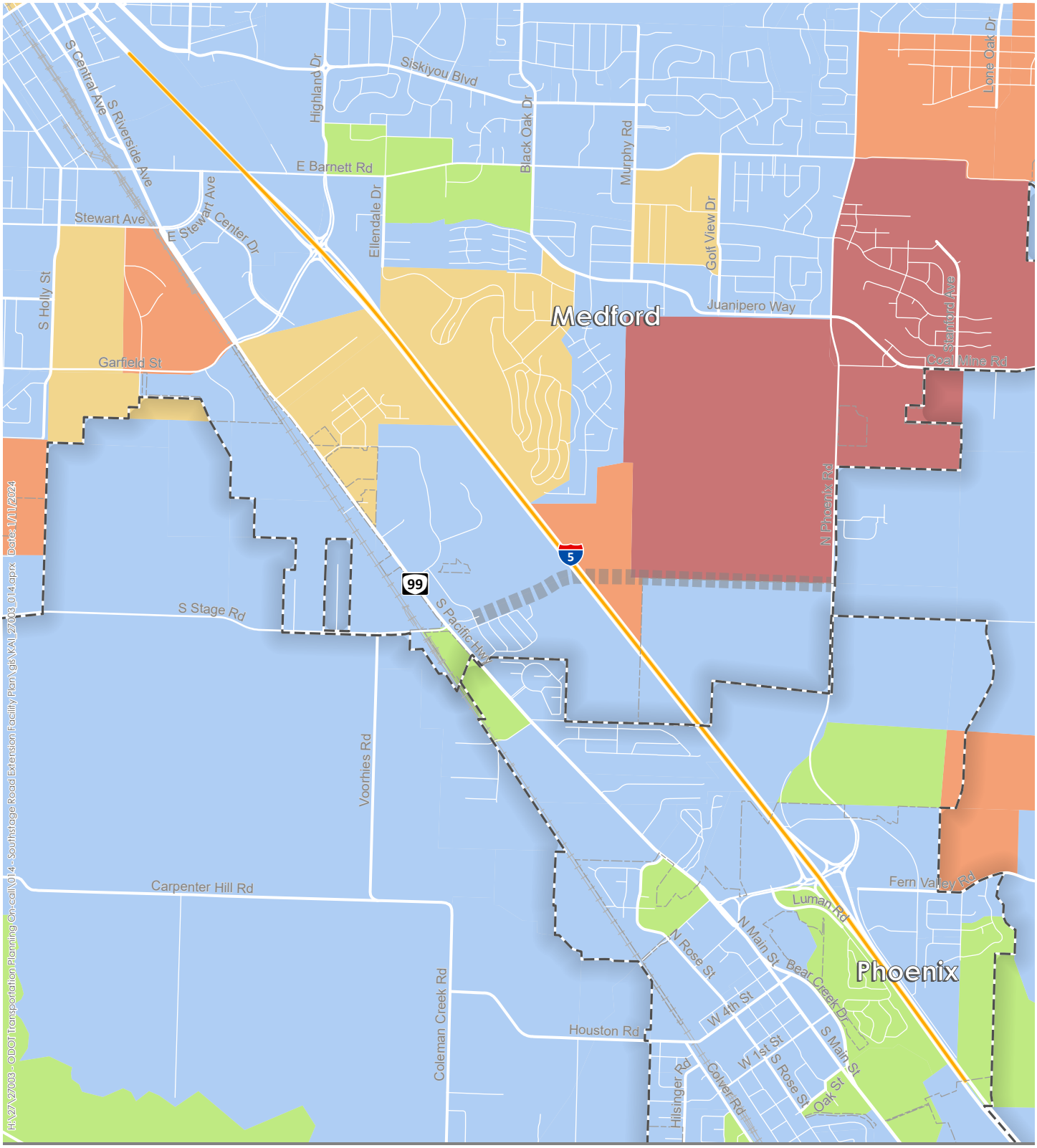
YEAR 2045 LAND USE

The future year analysis includes the land use changes assumed in the 2045 Southern Oregon Activity Based Model (SOABM), which is based on planned land use, population, and zoning. The future housing and employment assumed in the SOABM by transportation analysis zone (TAZ) were reviewed with the PMT and some modifications made to reflect anticipated development patterns. Notable changes between the base 2017 and future no-build 2045 land use assumptions in the SOABM include the following:

- Partial build-out of the Centennial Golf Course property located in the South Medford UGB and bounded by Juanipero Way (north), North Phoenix Road (east), South Stage Road (south) and I-5, and Rogue Valley Manor (west). Per the Centennial Golf Course Properties Master Plan, this property could develop into a mix of residential and commercial uses.
- Partial build-out of the remaining properties in the South Medford UGB, bounded by South Stage Road (north), North Phoenix Road (east), Medford/Phoenix UGB (south), and I-5 (west). Per the City of Medford, these properties could develop into a mix of general industrial and service commercial uses.
- Partial build-out of the properties within the north Phoenix UGB, bounded by the Medford/Phoenix UGB (north and east), Phoenix city limits (south), and I-5 (west). Per the City of Phoenix, these properties could develop into a mix of residential, general commercial, general industrial, and open space.

The build-out assumptions in the SOABM for the areas described above were compared to potential build-out scenarios developed to reflect the underlying zoning and comprehensive plan designations. The comparison shows that the SOABM assumes approximately 77 percent of potential households and 26 percent of potential jobs in south Medford and approximately 55 percent of potential households and 60 percent of potential jobs in north Phoenix. The results of the comparison were reviewed with the PMT, and it was decided that a sensitivity analysis will be conducted to determine if full build-out in these areas will have a significant effect on the development of transportation alternatives.

Figure 8 and Figure 9 show the anticipated increase in households and employment (jobs) in the study area for the South Stage Extension Plan, including the build-out assumptions of the areas described above.



Approximate Alignment

City Limits

Urban Growth Boundary

Increase in Households

- 0 - 24
- 25 - 74
- 75 - 149
- 150 - 299
- 300 - 1700

0 1 Miles

Figure 8

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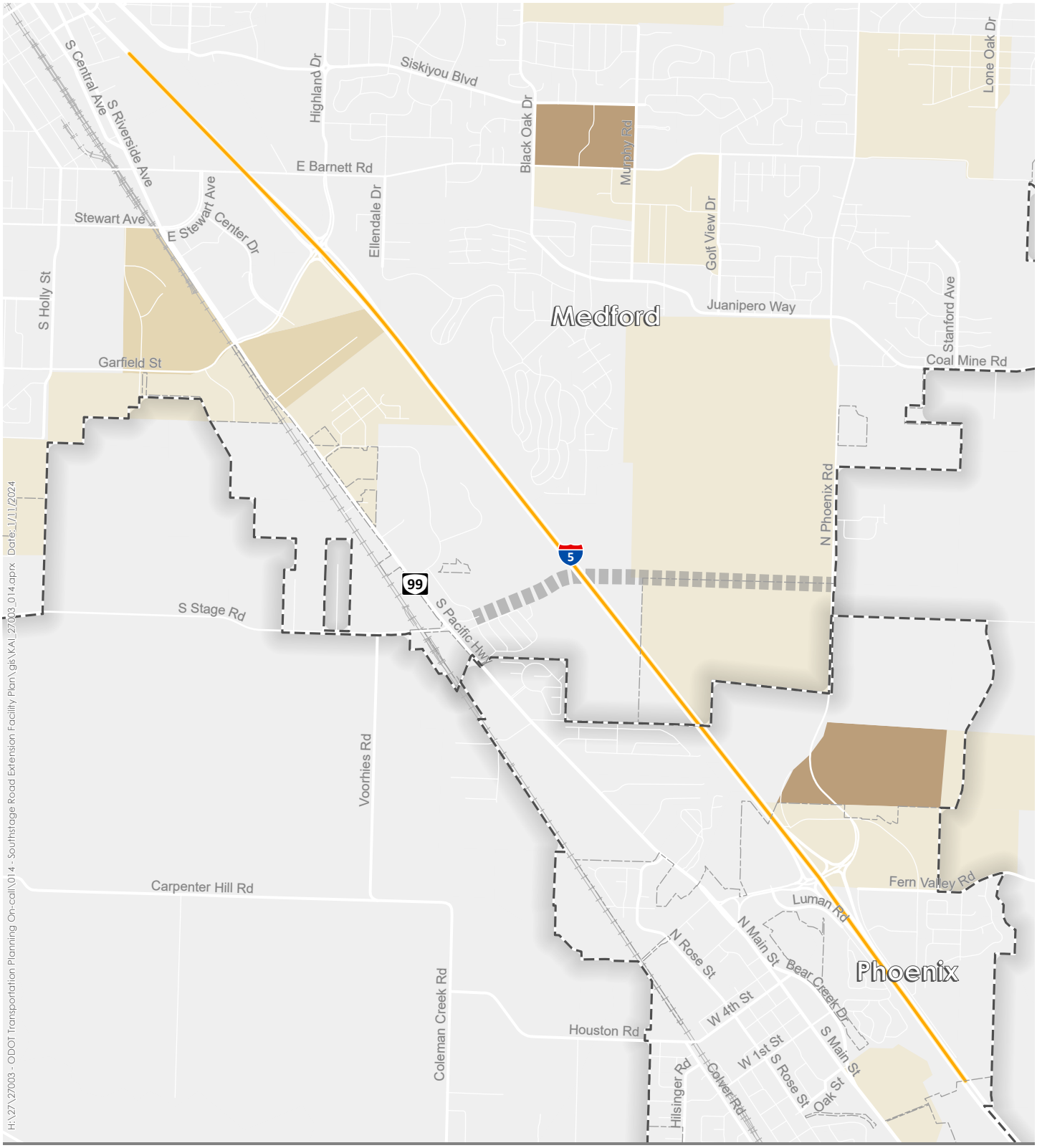
Household Growth
Jackson County, Oregon



Approximate Alignment

City Limits

Urban Growth Boundary

Employee Increase by MAZ

0 - 99

100 - 299

300 - 499

500 - 799

800 - 1002

0 1 Miles

Figure 9

KITTELSON & ASSOCIATES

Employment Growth
Jackson County, Oregon

YEAR 2045 VOLUMES

Future traffic volumes were developed for the study intersections and roadway segments based on information provided in ODOT's SOABM, which covers the Rogue Valley Metropolitan Planning Organization (RVMPO) area. The SOABM provides base (2021) and future (2045) traffic volume projections that reflect anticipated land use changes and planned transportation improvements within the RVMPO area.[4] Intersection turning movement volumes were derived from the traffic volume projections by applying the post-processing methodology identified in the National Cooperative Highway Research Program (NCHRP) Report 765, *Analytical Travel Forecasting Approaches for Project-Level Planning and Design* (Reference 4), which is an update to NCHRP Report 255, *Highway Traffic Data for Urbanized Area Project Planning and Design*. The methodology derives forecast traffic volumes based on the existing traffic volumes and base and future year traffic volume projections in the model. Engineering judgment was used to fine-tune the forecast traffic volumes for new street connections in the future model.

Volumes on the I-5 mainline and at merge/diverge locations were developed by applying the NCHRP Report 765 methodology to the I-5 mainline volume between the interchanges and developing the remaining mainline, merge, and diverge volumes by balancing with the interchange ramp terminals.

The Year 2045 traffic volume development worksheets and travel demand model outputs are provided in Appendix B.

YEAR 2045 TRAFFIC OPERATIONS

Operations were assessed at the study intersections, as well as along the I-5 mainline and merge/diverge locations for the Year 2045 No-Build Conditions scenario. The Year 2045 No-Build Conditions scenario reflects the future year 2045 transportation system and land use previously described. It does not include the extension of South Stage Road from its existing terminus just east of OR99 to the Golf View Drive Extension.

The intersection operations analysis was conducted using PTV Vistro 2022, a software tool designed to assist with operations analyses in accordance with Highway Capacity Manual (HCM, Reference 5) 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

[4] Within this model, there is a decrease in traffic volumes at certain locations in the Year 2045 model compared to the 2017 base model, including at the South Medford Interchange. This decrease reflects a projected shift in travel patterns due to increased capacity along certain roadways (e.g. Phoenix Road) from planned projects and capacity constraints at other intersections.

movement at unsignalized intersections in accordance with the methodologies outlined in ODOT's *Analysis Procedures Manual* (APM, Reference 6).

Technical Memorandum #3.1.3: Transportation Methodology and Assumptions provides more details on the approach used for the traffic operations analysis.

Intersection Operations

Table 2, Figure 10, and Figure 11 summarize the results of the Year 2045 No-Build Conditions intersection operations analysis and compare the results to the applicable mobility standards and targets. Constrained conditions at the I-5/South Medford interchange under Year 2045 No-Build Conditions would result in significant shifts in traffic volumes from the South Medford Interchange to the south, impacting operations at the Phoenix interchange as well as the surrounding network, including segments of OR99 and Phoenix Road.

As shown in Table 2, Figure 10, and Figure 11, most intersections meet operating standards under Year 2045 No-Build Conditions except for the following intersections:

- OR99/Garfield Street
- OR99/Phoenix Road-Bolz
- I-5/South Medford Interchange
- Barnett Road/Black Oak Drive
- Juanipero Way/Golf View Drive
- Phoenix Road/Future South Stage Road (Commercial Drive)

Appendix C contains the Year 2045 No-Build intersection operations analysis worksheets.

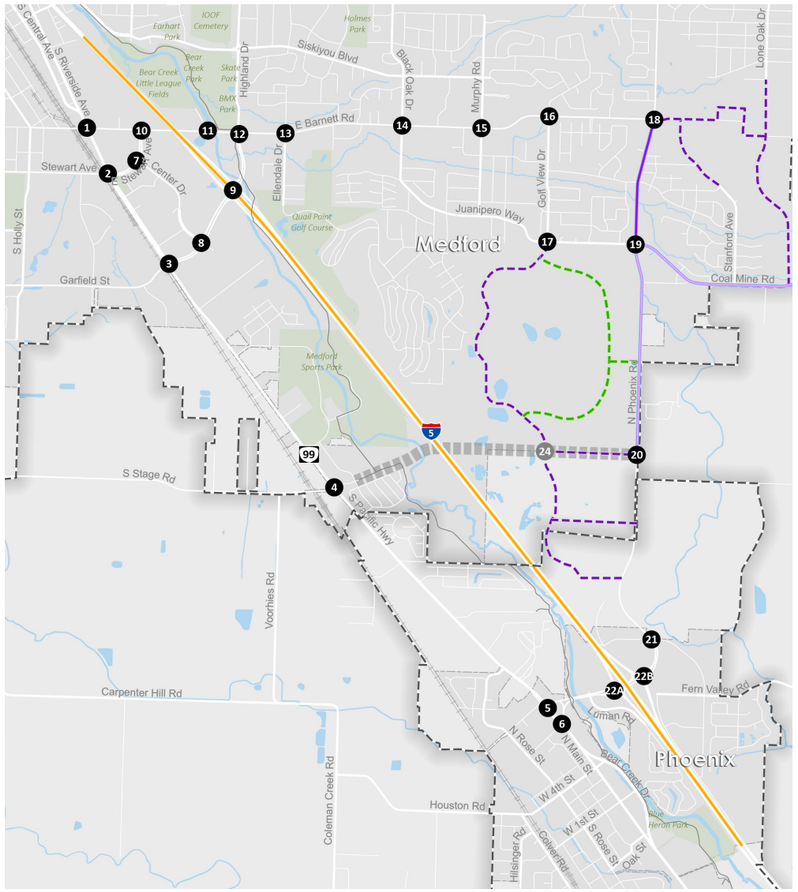
Table 2. Intersection Operations, Year 2045 No-Build Conditions Weekday AM and PM Peak Hours

#	Intersection	Lead Agency	Control Type	Operating Standard	Weekday AM Peak Hour Intersection Operations				Weekday PM Peak Hour Intersection Operations			
					CM	LOS[1]	Del[2]	v/c[3]	CM	LOS[1]	Del[2]	v/c[3]
1	OR99/Barnett Road	Medford	Signal	LOS D	-	-	-	-	-	D	38.7	1.00
2	OR99/Stewart Avenue	Medford	Signal	LOS E	-	-	-	-	-	D	45.8	0.87
3	OR99/Garfield Street	ODOT	Signal	v/c ≤ 0.85	-	C	24.9	0.74	-	D	51.3	**0.97**
4	OR99/South Stage Road	ODOT	Signal	v/c ≤ 0.85	-	C	28.3	0.76	-	C	29.5	0.84
5	OR99/Phoenix Road	ODOT	Signal	v/c ≤ 0.85	-	B	15.7	0.64	-	C	22.7	0.77
6	OR99/Phoenix Road-Bolz Road	ODOT	Signal	v/c ≤ 0.85	-	B	18.5	0.83	-	E	66.1	**0.98**
7	Stewart Avenue/Center Drive	Medford	Signal	LOS D	-	-	-	-	-	C	21.1	0.66
8	Garfield Street/Center Drive	ODOT	Signal	v/c ≤ 0.85	-	B	14.7	0.77	-	E	72.2	0.73
9	I-5/South Medford Interchange	ODOT	Signal (SPI)	v/c ≤ 0.75	-	E	75.1	**0.97**	-	D	49.0	0.84
10	Barnett Road/Stewart Avenue	Medford	Signal	LOS D	-	-	-	-	-	C	29.2	0.85
11	Barnett Road/Alba Drive	Medford	Signal	LOS D	-	-	-	-	-	A	7.4	0.60
12	Barnett Road/Highland Drive	Medford	Signal	LOS E	-	C	24.6	0.73	-	D	47.9	0.88
13	Barnett Road/Ellendale Drive	Medford	Signal	LOS D	-	-	-	-	-	B	18.0	0.69
14	Barnett Road/Black Oak Drive	Medford	Signal	LOS D	-	-	-	-	-	**E**	59.7	0.98
15	Barnett Road/Murphy Road	Medford	Signal	LOS D	-	-	-	-	-	C	33.8	0.60
16	Barnett Road/Golf View Drive	Medford	Signal	LOS D	-	-	-	-	-	B	10.1	0.46
17	Juanipero Way/Golf View Drive	Medford	TWSC	LOS D		-	-	-	NBL	**F**	130.2	1.07
18	Barnett Road/Phoenix Road	Medford	Signal	LOS D	-	C	22.1	0.78	-	C	29.9	0.86
19	Juanipero Way/Phoenix Road	Medford	TWSC	LOS D	-	B	11.7	0.28	-	B	17.7	0.36

#	Intersection	Lead Agency	Control Type	Operating Standard	Weekday AM Peak Hour Intersection Operations				Weekday PM Peak Hour Intersection Operations			
					CM	LOS[1]	Del[2]	v/c[3]	CM	LOS[1]	Del[2]	v/c[3]
20	Phoenix Road/Future South Stage Road (Commercial Drive)[4]	Medford (assumed)	TWSC (assumed)	LOS D		-			WBL	**E**	43.6	0.03
21	Phoenix Road/Grove Road	ODOT	Signal	v/c ≤ 0.85	-	B	18.3	0.55	-	C	20.1	0.70
22A	I-5/N Phoenix Road Interchange (SB ramps)	ODOT	Signal (DDI)	v/c ≤ 0.75	-	B	16.5	0.28	-	B	18.1	0.33
22B	I-5/N Phoenix Road Interchange (NB ramps)	ODOT	Signal (DDI)	v/c ≤ 0.75	-	B	17.5	0.29	-	B	18.8	0.32
24	Golf View Drive/Future South Stage Road	Medford (assumed)	TWSC (assumed)	LOS D	-	-	-	-	WBL	B	10.9	0.03

[1] Intersection LOS (signal), CM LOS (TWSC)
[2] Intersection average vehicle delay (signal), CM vehicle delay (TWSC)
[3] Intersection v/c (signal), CM v/c (TWSC)
[4] Intersection is assumed to align with driveway to evaluate the worst-case scenario.
CM = critical movement; DDI = diverging diamond interchange; Del = delay; LOS = level of service; NBL = northbound left turn; SBT = southbound through ; SPI = single point interchange; TWSC = two-way stop-control; v/c = volume to capacity; WBL = westbound left turn.

Bold red text indicates measurements not meeting standards.



1 OR99/ Barnett Road

Weekday AM Peak Hour not Analyzed

2 OR99/ Stewart Avenue

Weekday AM Peak Hour not Analyzed

3 OR99/ Garfield Street

LOS=C
Del=24.9
V/C=0.74

77 434 54 — 261 245 360 — 40 494 377 — 25 303 260

4 OR99/ S Stage Road

LOS=C
Del=28.3
V/C=0.76

143 24 347 — 26 15 29 — 168 539 12 — 75 422 18

5 OR99/ N Phoenix Road

LOS=B
Del=15.7
V/C=0.64

15 13 — 212 31 476 — 23 525 0 — 9 975 0

6 OR99/ N Phoenix Road-Bolz Road

LOS=B
Del=18.5
V/C=0.83

66 126 10 — 3 437 334 — 56 602 389

7 Stewart Avenue/ Center Drive

Weekday AM Peak Hour not Analyzed

8 Garfield Street/ Center Drive

LOS=B
Del=14.7
V/C=0.77

147 917 17 — 703 757 56 — 27 13 — 98 221 270

9 I-5/ South Medford Interchange

LOS=E
Del=75.1
V/C=0.97

570 422 378 — 448 502 273 — 338 296 — 759 822

10 Barnett Road/ Stewart Avenue

Weekday AM Peak Hour not Analyzed

11 Barnett Road/ Alba Drive

Weekday AM Peak Hour not Analyzed

12 Barnett Road/ Highland Drive

LOS=C
Del=24.6
V/C=0.73

115 465 159 — 41 438 534 — 113 367 842 — 147 441 79

13 Barnett Road/ Ellendale Drive

Weekday AM Peak Hour not Analyzed

14 Barnett Road/ Black Oak Drive

Weekday AM Peak Hour not Analyzed

15 Barnett Road/ Murphy Road

Weekday AM Peak Hour not Analyzed

16 Barnett Road/ Golf View Drive

Weekday AM Peak Hour not Analyzed

17 Juanipero Way/ Golf View Drive

Weekday AM Peak Hour not Analyzed

18 Barnett Road/ N Phoenix Road

LOS=C
Del=22.1
V/C=0.78

57 11 173 — 34 60 12 — 190 281 5 — 527 548 29

19 Juanipero Way/ N Phoenix Road

LOS=B
Del=11.7
V/C=0.28

26 14 148 — 54 47 55 — 159 340 8 — 63 437 19

20 Future South Stage Road/ N Phoenix Road

Weekday AM Peak Hour not Analyzed

21 Grove Road/ N Phoenix Road

LOS=B
Del=18.3
V/C=0.55

16 1 90 — 21 2 136 — 156 752 1445 — 39 730 43

22A I-5 SB Ramps/ N Phoenix Road

LOS=B
Del=16.5
V/C=0.28

752 181 — 459 434 — 378 248

22B I-5 NB Ramps/ N Phoenix Road

LOS=B
Del=17.5
V/C=0.29

342 635 — 198 771 — 101 388

24 Golf View Drive/ Future South Stage Road

Weekday AM Peak Hour not Analyzed

CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized)/Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized)/Critical Movement Control Delay (Unsignalized)
V/C = Volume-to-Capacity Ratio

2045 No-Build Traffic Conditions
Weekday AM Peak Hour

Figure 10

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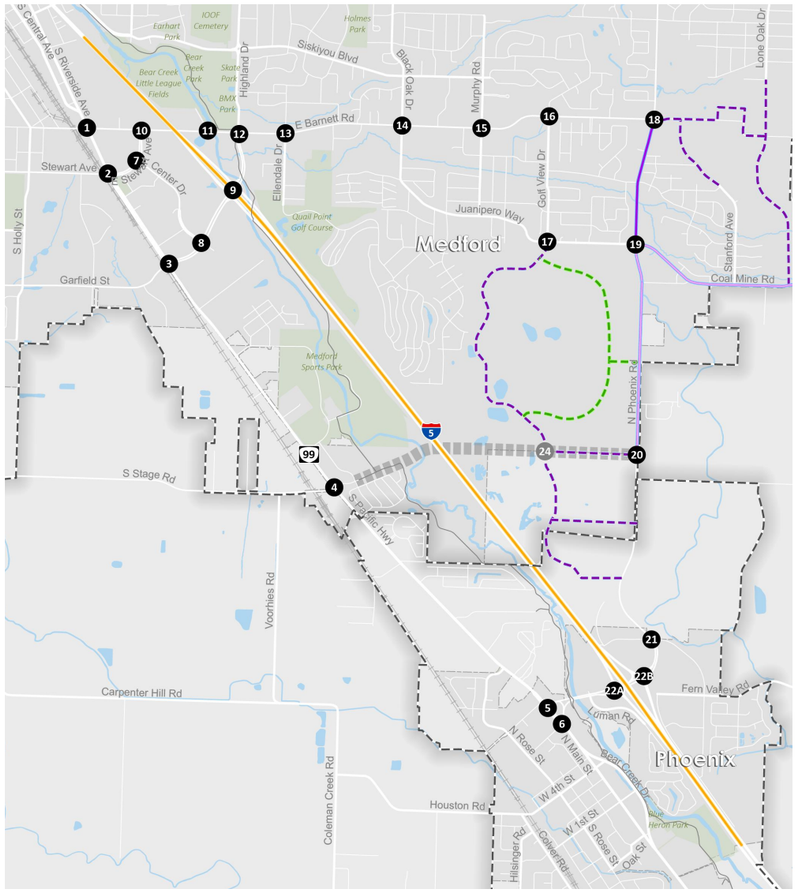

1 OR99/ Barnett Road
LOS=D
Del=38.7
V/C=1.00
EB 147 186 130
WB 474 254 184
NB 58 1144 302
SB 86 982 73

2 OR99/ Stewart Avenue
LOS=D
Del=45.8
V/C=0.87
EB 258 405 233
WB 75 479 92
NB 225 958 188
SB 518 893 62

3 OR99/ Garfield Street
LOS=D
Del=51.3
V/C=0.97
EB 76 300 46
WB 281 526 472
NB 53 771 452
SB 96 808 563

4 OR99/ S Stage Road
LOS=C
Del=29.5
V/C=0.84
EB 135 20 263
WB 31 31 48
NB 191 750 37
SB 316 726 41

5 OR99/ N Phoenix Road
LOS=C
Del=22.7
V/C=0.77
EB 35 23
WB 374 53 611
NB 24 1007 0
SB 44 604 0

6 OR99/ N Phoenix Road-Bolz Road
LOS=E
Del=66.1
V/C=0.98
EB 92 262 46
NB 77 1224 345
SB 12 516 476

7 Stewart Avenue/ Center Drive
LOS=C
Del=21.1
V/C=0.66
EB 75 84 21
WB 391 85 248
NB 50 301 428
SB 48 385 201

8 Garfield Street/ Center Drive
LOS=E
Del=72.2
V/C=0.73
EB 210 1007 39
WB 791 1010 114
NB 302 359 594
SB 49 98 127

9 I-5/ South Medford Interchange
LOS=D
Del=49.0
V/C=0.84
EB 694 667 462
WB 550 658 240
NB 881 459
SB 389 284

10 Barnett Road/ Stewart Avenue
LOS=C
Del=29.2
V/C=0.85
EB 116 445 149
WB 142 605 401
NB 152 188 164
SB 258 173 421

11 Barnett Road/ Alba Drive
LOS=A
Del=7.4
V/C=0.60
EB 45 955
WB 140 1120 0
NB 40 31

12 Barnett Road/ Highland Drive
LOS=D
Del=47.9
V/C=0.88
EB 265 632 155
WB 141 878 668
NB 254 469 127
SB 133 482 554

13 Barnett Road/ Ellendale Drive
LOS=B
Del=18.0
V/C=0.69
EB 6 1507 154
WB 3 1466 32
NB 45 27 50
SB 169 5 74

14 Barnett Road/ Black Oak Drive
LOS=E
Del=59.7
V/C=0.98
EB 90 856 498
WB 60 910 58
NB 147 233 67
SB 439 427 113

15 Barnett Road/ Murphy Road
LOS=C
Del=33.8
V/C=0.60
EB 208 555 155
WB 145 353 14
NB 274 121 201
SB 178 191 30

16 Barnett Road/ Golf View Drive
LOS=B
Del=10.1
V/C=0.46
EB 24 632 123
WB 23 332 39
NB 8 13 24
SB 158 8 116

17 Juanipero Way/ Golf View Drive
CM=NBL
LOS=F
Del=>50
V/C=>1.0
EB 5 176 363
WB 2 127 156
NB 57 4
SB 220 20 91

18 Barnett Road/ N Phoenix Road
LOS=C
Del=29.9
V/C=0.86
EB 596 21 179
WB 89 40 57
NB 218 656 34
SB 113 671 21

19 Juanipero Way/ N Phoenix Road
LOS=B
Del=17.7
V/C=0.36
EB 42 24 210
WB 102 35 7
NB 40 445 152
SB 179 670 63

20 Future South Stage Road/ N Phoenix Road
LOS=E
Del=43.6
V/C=0.03
EB 27 7 18
WB 0 3 1
NB 15 756 4
SB 14 833 2

21 Grove Road/ N Phoenix Road
LOS=C
Del=20.1
V/C=0.70
EB 45 3 183
WB 33 6 162
NB 55 832 42
SB 216 785 188

22A I-5 SB Ramps/ N Phoenix Road
LOS=B
Del=18.1
V/C=0.33
EB 838 114
WB 595 362
NB 328 245

22B I-5 NB Ramps/ N Phoenix Road
LOS=B
Del=18.1
V/C=0.33
EB 391 703
WB 354 842
SB 135 463

24 Golf View Drive/ Future South Stage Road
CM=WBL
LOS=B
Del=10.9
V/C=0.03
WB 10 20
NB 198 18
SB 131 25

CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized)/Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized)/Critical Movement Control Delay (Unsignalized)
V/C = Volume-to-Capacity Ratio

2045 No-Build Traffic Conditions
Weekday PM Peak Hour

Figure 11

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TRAVEL TIME ANALYSIS

Table 3 documents the baseline travel time analysis under existing and Year 2045 No-Build PM peak hour conditions. This analysis considers the amount of time it would take to travel those routes, however as noted in the Pedestrian, Bicycle, and Transit Access section of the report these routes are not necessarily comfortable for users of most ages and abilities. Figure 12 illustrates the routes assumed in the travel time analysis.

Table 3. Baseline Travel Time Analysis (PM Peak Hour)

Route	Mode	Existing	Year 2045 No-Build
South Stage Road/OR99 to Phoenix Road/Future South Stage Road (Northern route)	Vehicle	14 minutes	16 minutes
	Pedestrian	112 minutes	114 minutes
	Bicyclist	32 minutes	34 minutes
South Stage Road/OR99 to Phoenix Road/Future South Stage Road (Southern route)	Vehicle	6 minutes	7 minutes
	Pedestrian	59 minutes	61 minutes
	Bicyclist	16 minutes	17 minutes
I-5 Northbound/Southbound to Asante Medical Center	Vehicle	6 minutes	7 minutes
	Pedestrian	N/A – Pedestrians and bicyclists do not travel northbound or southbound on I-5	
	Bicyclist		
Barnett Road/Phoenix Road to OR99/Garfield Street	Vehicle	9 minutes	11 minutes
	Pedestrian	57 minutes	58 minutes
	Bicyclist	18 minutes	19 minutes
South Medford Interchange to Phoenix Road/Potential Future South Stage intersection	Vehicle	6 minutes	7 minutes
	Pedestrian	N/A – Pedestrians and bicyclists do not travel northbound or southbound on I-5	
	Bicyclist		
OR99/Barnett Road to Phoenix Road/Future South Stage Road	Vehicle	10 minutes	11 minutes
	Pedestrian	84 minutes	85 minutes
	Bicyclist	24 minutes	25 minutes

Under Year 2045 No-Build PM peak hour conditions, travel is estimated to take approximately 1-2 minutes longer via the analyzed routes.[5] These increased travel times will impact emergency

[5] Travel times were estimated by adding the average delay at each intersection (including the South Stage Road/OR99 and Phoenix Road/Future South Stage Road [Commercial Drive] intersections) and an estimate for the travel time of each segment (calculated by taking the distance of the roadway segment and dividing it by the posted speed). Pedestrians are estimated to travel at an average speed of 3mph and bicyclists are assumed to travel at an average speed of 12mph.

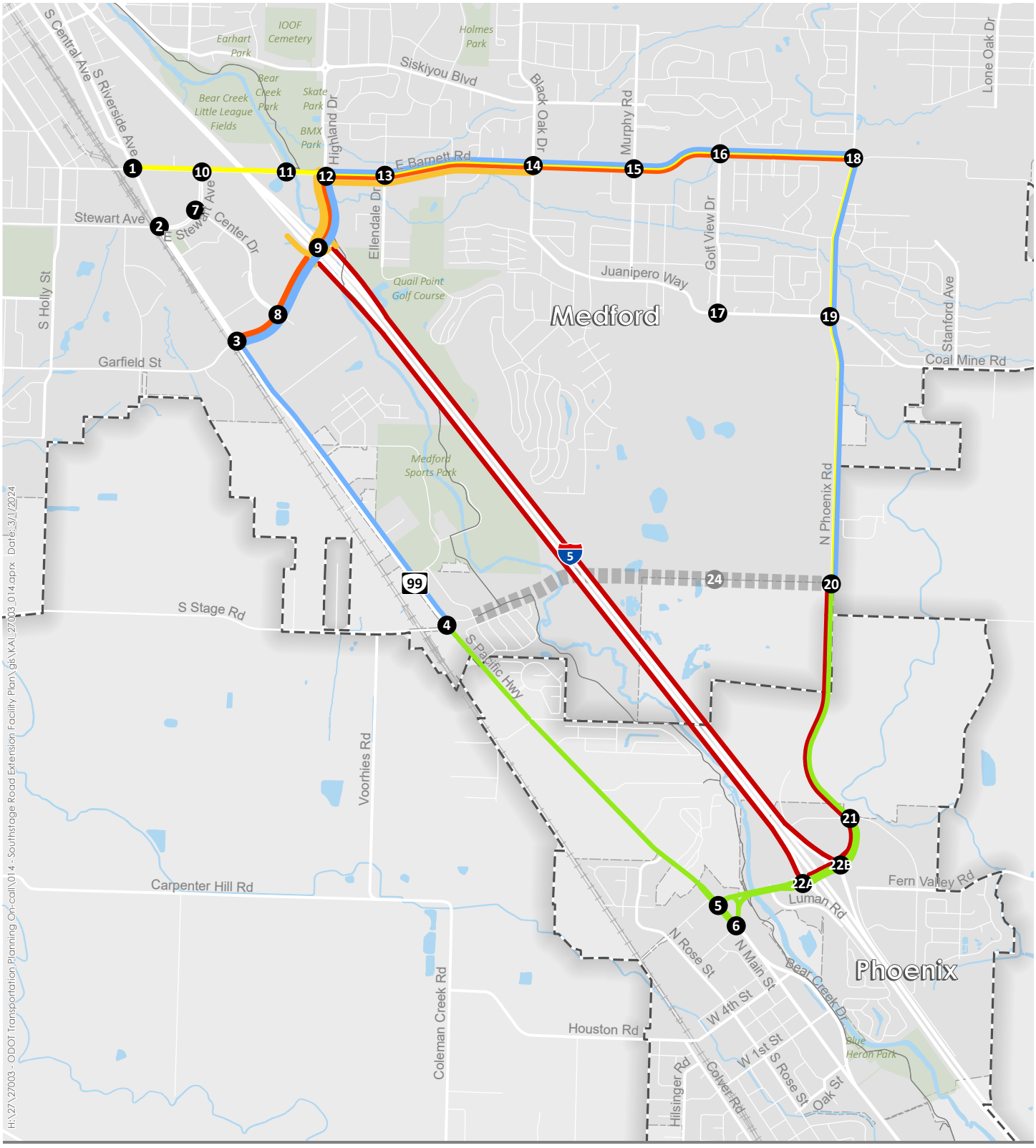
responsiveness, accessibility to the hospital on Barnett Road, and evacuation resiliency during wildfires or other natural disasters.

OUT-OF-DIRECTION TRAVEL

The current configuration of the transportation system in south Medford and north Phoenix results in out of direction travel for residents, particularly those traveling between South Stage Road (west of OR99) and N Phoenix Road and those traveling between OR99 (north of Barnett Road) and N Phoenix Road. With anticipated development of the Centennial property, as well as other properties to the south, out-of-direction travel is expected to increase significantly.

- OR99/South Stage Road to N Phoenix Road/Future South Stage Road – currently, motorists traveling between these intersections must travel north on OR99 and east on Barnett Road, or approximately 3.8-miles out-of-direction when accounting for a potential South Stage Road extension. Alternatively, motorists could travel south on OR99 and east on N Phoenix Road, or approximately 1.6-miles out-of-direction.
- OR99/Barnett Road to N Phoenix Road/Future South Stage Road – currently, motorists traveling between these intersections must travel east on Barnett Road, or up to approximately 0.8-miles out-of-direction when accounting for a potential South Stage Road extension.

The volumes developed using the SOABM will be used to estimate the number of people an interchange or an overpass reduces out-of-direction travel for.



South Stage Road/OR99 to Phoenix Road/Future South Stage Road (Northern route)

OR99/Barnett Road to Phoenix Road/Future South Stage Road

Barnett Road/Phoenix Road to OR99/Garfield Street

South Stage Road/OR99 to Phoenix Road/Future South Stage Road (Southern route)

I-5 Northbound/Southbound to Asante Medical Center

Phoenix Road/Future South Stage Intersection to South Medford Interchange

0 0.5 Miles

Figure 12

Out-of-Direction / Travel Time Routes
Jackson County, Oregon

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Queueing at Interchange Ramps

PTV Vistro 2023 was used to assess 95th percentile queue lengths at the Phoenix Road interchange ramps, with the results shown in Table 4.

Table 4. 95th Percentile Queue Lengths at Phoenix Interchange, Year 2045 No-Build Weekday AM and PM Peak Hours

Intersection	Ramp	Movement	Queue Storage (feet)[1,2]	95th Percentile Queue (feet)	
				Weekday AM	Weekday PM
I-5/N Phoenix Road Interchange	I-5 NB off-ramp	NBL	1,575	25	50
		NBR	1,575	125	100
	I-5 SB off-ramp	SBL	1,275	175	300
		SBR	1,275	75	125

[1] Queue storage measured to the gore point.
[2] Storage length and queues rounded to the nearest 25 feet.
NBL = northbound left turn; NBR = northbound right turn; SBL = southbound left turn; SBR = southbound right turn.

As shown in Table 4, 95th percentile queues at the Phoenix Interchange ramps do not currently exceed the available ramp storage. Appendix C contains the Year 2045 No-Build intersection operations analysis worksheets.

Queueing at the I-5/South Medford Interchange was assessed as part of the South Medford Interchange Area Management Plan (IAMP), reflecting Year 2045 weekday AM and PM peak hour conditions. The analysis was done using SimTraffic. The queue lengths and blockages from the IAMP at the South Medford Interchange are summarized in Table 5. As shown, queues from both the southbound and northbound ramp are reported to back up onto I-5 for portions of the weekday AM peak hour, and queues from the southbound ramp are reported to back up onto I-5 for portions of the weekday PM peak hour.[6]

Table 5. 95th Percentile Queue Lengths at South Medford Interchange, Year 2045 No-Build Weekday AM and PM Peak Hours

Intersection	Approach[1]	Ramp Length (ft)[2]	95th Percentile Queue (ft)[3]		Upstream Blockage[4]
			Weekday AM	Weekday PM	
I-5/South Medford Interchange	SB	1,710	2,250	2150	AM, 47%, PM 35% SB I-5
	NB	1,470	1,875	750	AM, 56%, NB I-5
	EB	-	1,575	525	AM, 37%, Center Drive
	WB	-	1275	775	AM 4%. Barnett Road

[6] There are IAMP projects to lengthen/widen the southbound off-ramp to 3,000 feet and widen the northbound off-ramp, which would likely address the queue storage deficiency if constructed.

Source: South Medford IAMP (Reference 7)
[1] IAMP considers ramps to be east/west at the interchange. Results were modified to be consistent with directions used in the South Stage Extension analysis, where ramps are considered to be north/south.
[2] Ramp length includes both queue storage and deceleration length. IAMP assumes a deceleration length of 640 feet for the southbound off-ramp and 740 feet for the northbound off-ramp.
[3] Queues rounded to the nearest 25 feet.
[4] AM or PM, % time, intersection blocked.
EB = eastbound; NB = northbound; SB = southbound; WB = westbound.

Freeway Mainline, Merge, and Diverge Operations

Operations were assessed on the I-5 mainline and at merge/diverge locations associated with the South Medford and Phoenix interchanges and compared to ODOT's operating standards, as shown in Table 6.

Table 6. I-5 Mainline, Merge, and Diverge Operations, Year 2045 No-Build Weekday AM and PM Peak Hours

Segment	Direction	Type	Operating Standard	Weekday AM		Weekday PM	
				LOS	v/c	LOS	v/c
North of South Medford Interchange	SB	Mainline	v/c ≤ 0.85	D	0.81	D	0.77
Garfield Street/I-5 SB Off-Ramp	SB	Diverge	v/c ≤ 0.85	D	0.88	D	0.78
Between Garfield Street Ramps	SB	Mainline	v/c ≤ 0.85	B	0.40	B	0.41
Garfield Street/I-5 SB On-Ramp	SB	Merge	v/c ≤ 0.85	C	0.54	C	0.57
Garfield Street to Phoenix Road	SB	Mainline	v/c ≤ 0.85	C	0.53	C	0.58
Phoenix Road /I-5 SB Off-Ramp	SB	Diverge	v/c ≤ 0.85	C	0.54	C	0.58
Between Phoenix Road Ramps	SB	Mainline	v/c ≤ 0.85	B	0.43	B	0.41
Phoenix Road /I-5 SB On-Ramp	SB	Merge	v/c ≤ 0.85	C	0.61	C	0.56
South of Phoenix Road Interchange	SB	Mainline	v/c ≤ 0.85	C	0.56	C	0.54
North of South Medford Interchange	NB	Mainline	v/c ≤ 0.85	D	0.67	D	0.84
Garfield Street/I-5 NB Off-Ramp	NB	Diverge	v/c ≤ 0.85	C	0.48	D	0.70
Between Garfield Street Ramps	NB	Mainline	v/c ≤ 0.85	B	0.35	C	0.52
Garfield Street/I-5 NB On-Ramp	NB	Merge	v/c ≤ 0.85	C	0.73	D	0.84
Garfield Street to Phoenix Road	NB	Mainline	v/c ≤ 0.85	B	0.50	C	0.69
Phoenix Road /I-5 NB Off-Ramp	NB	Diverge	v/c ≤ 0.85	C	0.44	D	0.64
Between Phoenix Road Ramps	NB	Mainline	v/c ≤ 0.85	A	0.31	B	0.46
Phoenix Road /I-5 NB On-Ramp	NB	Merge	v/c ≤ 0.85	B	0.53	C	0.70
South of Phoenix Road Interchange	NB	Mainline	v/c ≤ 0.85	B	0.44	C	0.64

LOS = level of service; NB = northbound; SB = southbound; v/c = volume-to-capacity ratio.
For merge/diverge segments, the reported v/c indicates the worst case for either the ramp or mainline facility.

As shown in Table 6, all merge and diverge movements are projected to meet mobility standards except the Garfield Street/I-5 SB off-ramp.

Appendix E of this memorandum contains the Year 2045 No-Build freeway operations analysis worksheets.

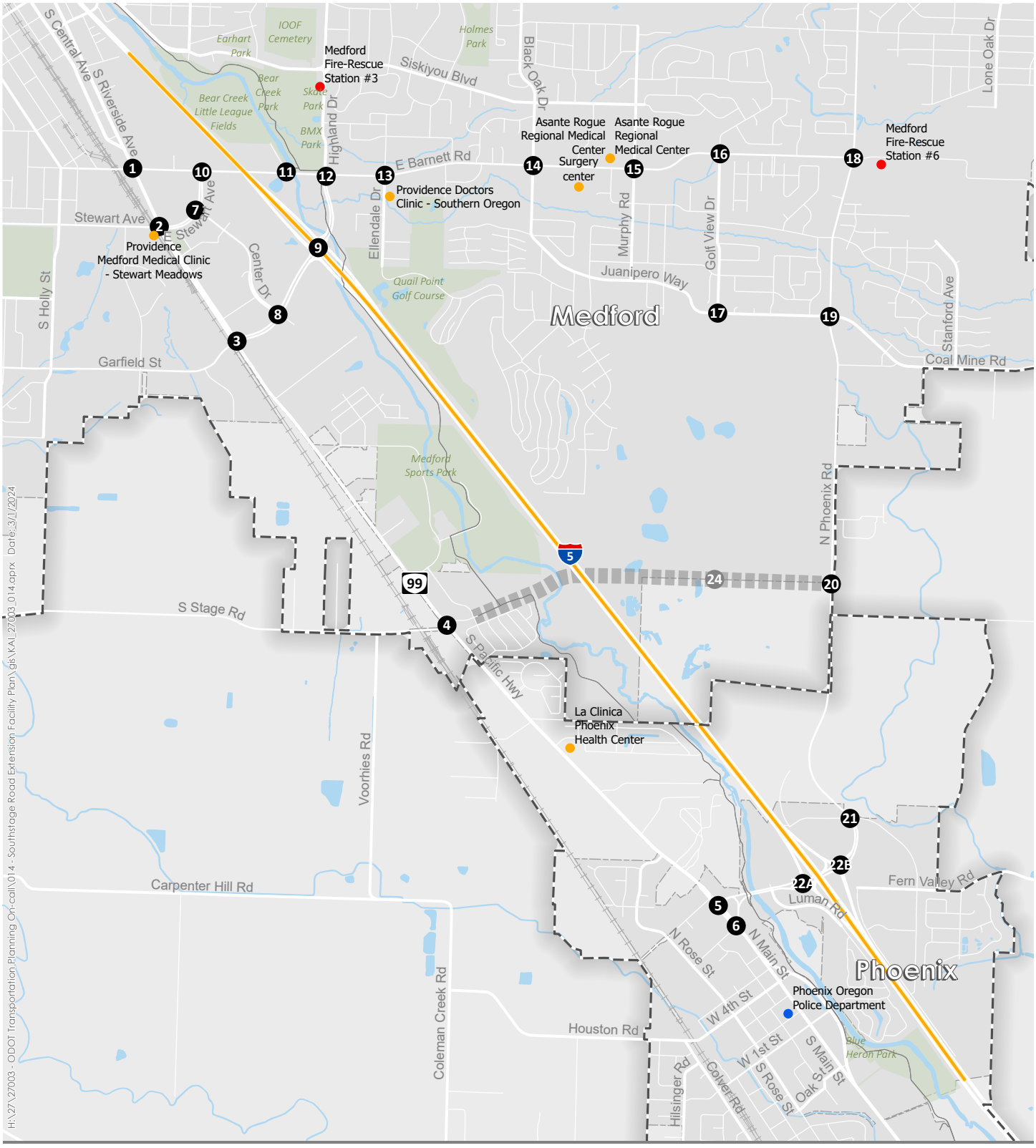
Emergency Response Access

Figure 13 illustrates the location of fire stations, police departments, and medical centers in the study area.

No roads cross Bear Creek and I-5 between the South Medford Interchange and the Phoenix Interchange, a distance of approximately 2.8 miles. During emergency events, there are limited opportunities for emergency vehicles to detour due to congestion or other disruptions.

- If the access at the South Medford Interchange is disrupted, emergency vehicles would need to reroute for east-west access via OR99 or Phoenix Road to Barnett Road and the Phoenix Interchange.
- If the access along Barnett Road is disrupted, emergency vehicles would need to reroute north via OR99, I-5, or Phoenix Road to Siskiyou Boulevard.
- If access at the Phoenix Interchange is disrupted, emergency vehicles would need to reroute north to the South Medford Interchange or south via OR99 or Phoenix/Fern Valley/Payne Road to Suncrest Road.

The lack of redundant routes and increased travel times associated with normal peak conditions will lead to degradation in the response times and ability of service providers to access services and citizens in need during emergencies.



Existing Intersection

Future Intersection

I-5 Study Corridor

Approximate Alignment

Parks

City Limits

Urban Growth Boundary

Fire Station

Medical Center

Police Department

0 1 Miles

Figure 13

KITTELSON & ASSOCIATES

Emergency Response Access
Jackson County, Oregon

EXISTING AND FUTURE NEEDS

Table 7 summarizes the existing and future gap and deficiencies in the transportation system under the Year 2045 No-Build scenario. These needs will be considered when developing and evaluating build alternatives and addressing the purpose and need for the South Stage Extension Plan.

Table 7. Existing and Future Needs Summary

Need	Existing	Year 2045 No-Build
Pedestrian, bicycle, and transit access	– There are limited bicycle, pedestrian, and transit facilities in the study area, particularly east of I-5. – There are four opportunities for pedestrians and bicyclists to cross I-5 in the study area, with a 2.65-mile gap between the Bear Creek Greenway undercrossing and the Phoenix Interchange. The average gap between Barnett Road and Phoenix road is 6x greater than the desired in the Medford code and 3x greater than the average spacing between Central Point and Barnett Road. – There are two locations where transit routes cross I-5 in the study area: Barnett Road and Garfield Street/Highland Road.	– There are additional pedestrian, bicycle, and transit facilities on both sides of I-5, and a planned transit route that will cross at the Phoenix Interchange. However, that is still a 2.65-mile gap in crossing opportunities for people walking and biking and a 2.75-mile gap in crossing opportunities for people taking transit.
Intersections not meeting standards	– I-5/South Medford Interchange operates at a volume-to-capacity (v/c) ratio of 0.89 (AM).	– I-5/South Medford Interchange operates at a v/c ratio of 0.97 (AM). – OR99/Garfield Street operates at a v/c ratio of 0.97 (PM). – OR99/N Phoenix Road/Boltz Road operates at a v/c ratio of 0.98 (PM). – Barnett Road/Black Oak Drive operates at level of service LOS E (PM). – Juanipero Way/Golf View Drive operates at LOS F (PM). – Phoenix Road/Future South Stage Road operates at LOS E (PM).
Queues exceeding storage (interchange ramps)	– Queues from both the southbound and northbound ramp of the South Medford Interchange are reported to back up onto I-5 for portions of the weekday AM peak hour. – Queues onto the I-5 mainline pose both a congestion issue and a safety concern for potential high-speed, rear-end collisions.	– Queues from both the southbound and northbound ramp of the South Medford Interchange are anticipated to back up onto I-5 for portions of the weekday AM peak hour. – Queues from the southbound ramp of the South Medford Interchange are anticipated to back up onto I-5 for portions of the weekday PM peak hour. – Queues onto the I-5 mainline pose both a congestion issue and a safety concern for potential high-speed, rear-end collisions.
Freeway segments not meeting standards	– None	– The Garfield Street/I-5 southbound off-ramp operates at a v/c ratio of 0.88 (AM).

Need	Existing	Year 2045 No-Build
Out-of-Direction Travel	– Motorists traveling on South Stage Road must travel up to 3.8 miles out-of-direction to reach N Phoenix Road without a South Stage Road extension. – The volumes developed using the SOABM will be used to estimate the number of people an interchange or an overpass reduces out-of-direction travel for.	– Out-of-direction travel may increase with increased modal demand within the study area.
Travel time	– Vehicle travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/Future South Stage Road is 6 minutes for the southern route and 14 minutes for the northern route.	– Vehicle travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/Future South Stage Road is 7 minutes for the southern route and 16 minutes for the northern route.
Emergency response access	– During emergency events, there are limited opportunities for emergency vehicles to detour due to congestion or other disruptions.	– Lack of redundant routes and increased congestion raises the potential for disruptive events identified in the existing year.
Crash history	– Barnett Road/Golf View Drive has a crash rate that exceeds the 90th percentile rate. – The following intersections exceed their corresponding critical crash rate: Garfield Street/Center Drive and Barnett Road/Golf View Drive. – The following intersections were identified in the top 85 percent of SPIS scores in the SPIS 2021 list: OR99/Stewart Avenue, OR99/Garfield Street, and I-5/South Medford Interchange.	– Without future mitigation or changes by users, the crash deficiencies may continue or potentially worsen with increased modal demand within the study area.

NEXT STEPS

This memorandum was shared with the PMT, Project Development Team (PDT), Project Advisory Committee (PAC), and the community for review and comment. Based on the comments, the project team updated this memorandum and the Purpose and Need Statement Framework (Technical Memorandum 2.1.2). Once the Purpose and Need Statement is finalized, alternatives will be developed that satisfy the purpose and need for the project and are anticipated to involve potential system improvements, additional I-5 crossings and/or interchange concepts, and strategies to address capacity and congestion identified in the future year traffic analysis and safety-related concerns identified in the existing conditions analysis. The alternatives will be screened and a preferred alternative refined and documented.

REFERENCES

1. City of Medford. *Transportation System Plan 2018-2038*. 2018.
2. Rogue Valley Transportation District. *2040 Transit Master Plan*. 2019.
3. *Rogue Valley Active Transportation Plan*. March 2021.

4. National Academies of Sciences, Engineering, and Medicine. *NCHRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design*. 2014.
5. National Academies of Sciences, Engineering, and Medicine. *Highway Capacity Manual 7th Edition: A Guide for Multimodal Mobility Analysis.* 2022
6. Oregon Department of Transportation. *Analysis Procedures Manual, Version 2*. 2023.
7. Oregon Department of Transportation. South Medford (Exit 27) Interchange Area Management Plan. 2023.

APPENDICES

- Appendix A: 2045 SOABM Travel Demand Model No-Build Refinements and South Stage Build Scenarios Requests
- Appendix B: Future Year 2045 Traffic Volume Development and Model Outputs
- Appendix C: Future Year 2045 No-Build Intersection Operations Analysis Worksheets
- Appendix D: Future Year 2045 No-Build Freeway Operations Analysis Worksheets