

# Draft Technical Memorandum

April 23, 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; Amy Griffiths, PE; and Eza Gaigalas

RE: Task 5.1.3.1: Transportation Analysis Screening

## TABLE OF CONTENTS

Introduction.....	2
Overarching Solution Scenarios.....	5
Screening Summary .....	7
Pedestrian, Bicycle, and Transit Access .....	10
Year 2045 Traffic Operations .....	15
Emergency Response Access.....	35
Safety Improvements.....	37
Analysis Findings .....	40
Next Steps .....	44
References .....	44
Appendices .....	44

## INTRODUCTION

This memorandum summarizes the transportation system performance under potential Year 2045 Build Scenarios in the study area (see Figure 1) for the South Stage Road Extension Plan.

This analysis assesses if the three defined overarching solution scenarios meet the Purpose and Need Statement for the project and compares their performance against the 2045 no-build analysis (see Technical Memorandum (TM) #4.1.2: Future Year Background Traffic Analysis).

Figure 2 illustrates the alternatives development and recommendation process. The following alternative overarching solution scenarios are evaluated in this memorandum:

- Existing System Enhancement
- South Stage Overpass
- I-5/South Stage Interchange

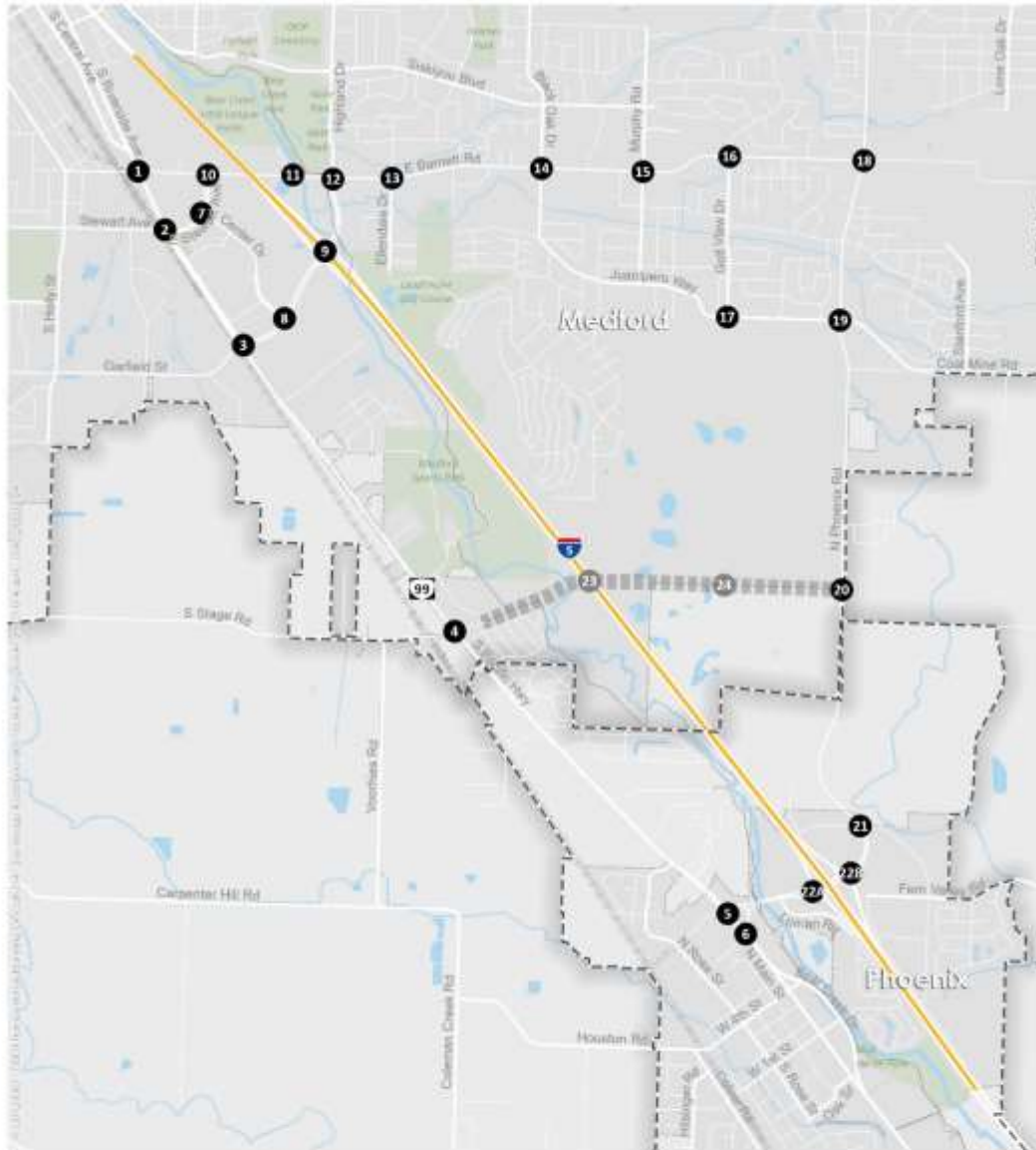
This planning document may be adopted in a subsequent environmental review process in accordance with 23 USC 168, Integration of Planning and Environmental Review,<sup>1</sup> and 23 CFR 450, Planning Assistance and Standards.<sup>2</sup>

---

<sup>1</sup> <https://www.govinfo.gov/app/details/USCODE-2022-title23/USCODE-2022-title23-chap1-sec168/summary>

<sup>2</sup> <https://www.govinfo.gov/app/details/CFR-2022-title23-vol1/CFR-2022-title23-vol1-part450>

Figure 1. Study Area



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

0 1 Miles

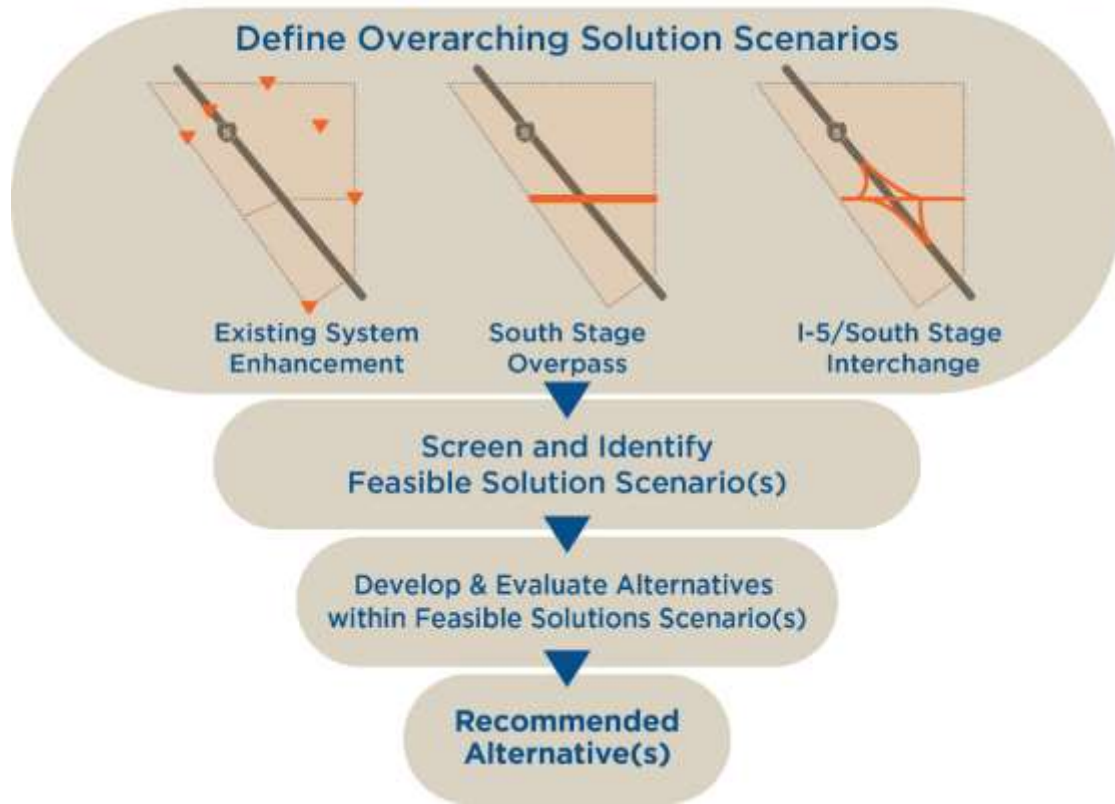
Figure 1

Study Area  
Jackson County, Oregon



Figure 2. Alternatives Development and Recommendation Process

### Alternatives Development and Recommendation Process

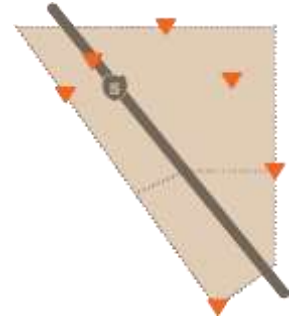


## OVERARCHING SOLUTION SCENARIOS

A description of each of the overarching solution scenarios identified in TM #2.1.3: Goals, Objectives, and Evaluation Criteria is provided below. Each scenario represents a grouping of the range of potential alternatives identified to date by the project team, Project Management Team, Project Advisory Committee, Project Development Team, and the community.

### Existing System Enhancement

Under this scenario, potential alternatives were developed that primarily improve existing transportation facilities to address gaps or deficiencies. These alternatives generally do not add new transportation system connections. This scenario was identified to understand if the goals and objectives of the City's Transportation System Plan and the goals and objectives of this study could be met without constructing facilities that cross Interstate 5 (I-5).

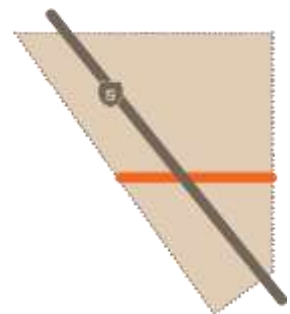


The following intersection projects were included in the Existing System Enhancement:

- I-5/South Medford Interchange: Implement the transportation projects identified in the Interchange Area Management Plan (IAMP), including widening the southbound off-ramp to allow 1,000-foot dual left-turn lanes and extending the ramp to 3,000 feet to accommodate queuing, widening the northbound off-ramp to accommodate a 1,000-foot left-turn lane, and installing ramp metering.
- OR99/N Phoenix-Bolz Road: Construct separated right- and left-turn lanes on the west leg of the intersection and a secondary right-turn lane on the south leg of the intersection.
- Barnett Road/Black Oak Drive: Construct a separate right-turn lane on the north leg of the intersection.
- Juanipero Way/Golf View Drive: Convert the intersection from two-way to all-way stop control.
- Future South Stage Road/N Phoenix Road: Convert the intersection to a roundabout or traffic signal.

### South Stage Overpass

This scenario includes potential alternatives that create a connection across (over or under) I-5 and Bear Creek between the South Medford and Phoenix interchange. The following intersection projects were included in the scenario version with enhancements to address the identified deficiencies identified in the Purpose and Need:



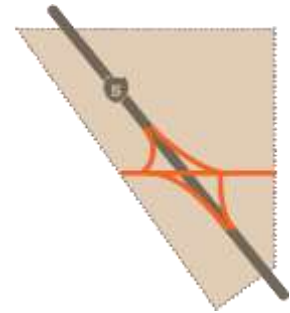
- I-5/South Medford Interchange: Implement the transportation projects identified in the IAMP, including widening the southbound off-ramp to allow 1,000-foot dual left-turn lanes and extending the ramp to 3,000 feet to accommodate queuing, widening the northbound off-ramp to accommodate a 1,000-foot left-turn lane, and installing ramp metering.
- OR99/N Phoenix-Bolz Road: Construct separated right- and left-turn lanes on the west leg of the intersection and a secondary right-turn lane on the south leg of the intersection.
- Juanipero Way/Golf View Drive: Convert the intersection from two-way to all-way stop control.
- Future South Stage Road/N Phoenix Road: Convert the intersection to a roundabout or traffic signal.
- Golf View Drive/future South Stage Road: Convert the intersection from two-way stop control to a roundabout.
- OR99/South Stage Road: Construct a separate right-turn lane on the east leg of the intersection.

## I-5/South Stage Interchange

This scenario includes potential alternatives that create a connection across I-5 and Bear Creek and add a new I-5 interchange between the South Medford and Phoenix interchange.

The following intersection projects were included in the scenario version with enhancements to address the identified deficiencies identified in the Purpose and Need:

- I-5/South Medford Interchange: Implement the transportation projects identified in the IAMP, including widening the southbound off-ramp to allow 1,000-foot dual left-turn lanes and extending the ramp to 3,000 feet to accommodate queuing, widening the northbound off-ramp to accommodate a 1,000-foot left-turn lane, and installing ramp metering
- OR99/N Phoenix-Bolz Road: Construct separated right- and left-turn lanes on the west leg of the intersection.
- Juanipero Way/Golf View Drive: Convert the intersection from two-way to all-way stop control.
- Future South Stage Road/N Phoenix Road: Convert the intersection to a roundabout or traffic signal.
- Golf View Drive/future South Stage Road: Convert the intersection from two-way stop control to a roundabout.
- OR99/South Stage Road: Construct a separate right-turn lane on the east leg of the intersection.



## SCREENING SUMMARY

Table 1 summarizes the screening of the solution scenarios based on the existing and future needs identified in Task 4.1.1.3: Existing Conditions Summary and Task 4.1.2: Future Year Background Traffic Analysis. Additional details are provided within this memorandum. A more detailed scoring according to TM #2.1.3: Goals, Objectives, Evaluation Criteria, and Performance Measures is provided in Table 13 at the end of this memorandum. Within Table 1:

- Red indicates that the scenario does not meet the identified need.
- Orange indicates that the scenario provides marginal benefits according to the identified need or that the identified need cannot be reasonably met and alternative mobility standards are required to address the need.
- Yellow indicates that the scenario provides moderate benefits according to the identified need but that other alternatives provide substantially higher benefits.
- Light green indicates that the scenario provides substantial benefits according to the identified need, but that another alternative may better meet the identified need.
- Dark green indicates that the scenario meets the identified need.

As shown, the Existing System Enhancement scenario does address some of the needs; however, it does not address the full Purpose and Need based on the documented existing and future system transportation needs on a standalone basis (i.e., without a crossing of I-5 and Bear Creek). Given the inability to meet the Purpose and Need, the screening demonstrates that this is not a viable scenario under which alternatives could be developed. The enhanced versions of the South Stage Overpass and I-5/South Stage Interchange scenarios both improve conditions and, at this screening level, show the potential to meet the Purpose and Need. Therefore, these scenarios should be the bases for developing specific alternatives for further evaluation.

**Table 1. Screening Summary**

Need	Existing	Year 2045 No-Build	Existing System Enhancement	South Stage Overpass (Enhanced)	I-5/South Stage Interchange (Enhanced)
Pedestrian, bicycle, and transit access	<ul style="list-style-type: none"> <li>There are limited bicycle, pedestrian, and transit facilities in the study area, particularly east of I-5.</li> <li>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 desired in the Medford Code and 3x greater than the average spacing between Central Point and Barnett Road.</li> <li>There are two locations where transit routes cross I-5 in the study area: Barnett Road and Garfield Street/Highland Road.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>No improvements to the gaps in pedestrian, bicycle, and transit access.</li> </ul>	<ul style="list-style-type: none"> <li>Provides an additional opportunity for bicyclists, pedestrians, and transit to cross I-5.</li> <li>Reduces the gap in crossing opportunities for pedestrians and bicyclists from 2.65 miles to 1.33 miles.</li> <li>Reduces the average gap in crossings between Barnett Road and Phoenix Road from 1.1 miles to 0.8 miles. This is approximately 4x greater than the desired distances identified in Medford Code Section 10.426 and 2x greater than the average crossing between Central Point and Barnett Road.</li> </ul>	<ul style="list-style-type: none"> <li>Provides an additional opportunity for bicyclists, pedestrians, and transit to cross I-5.</li> <li>Provides an additional opportunity for transit to access I-5.</li> <li>Reduces the gap in crossing opportunities for pedestrians and bicyclists from 2.65 miles to 1.33 miles.</li> <li>Reduces the average gap in crossings between Barnett Road and Phoenix Road from 1.1 miles to 0.8 miles. This is approximately 4x greater than the desired distances in Medford Code Section 10.426 and 2x greater than the average crossing between Central Point and Barnett Road.</li> </ul>
Intersections not meeting targets	<ul style="list-style-type: none"> <li>The I-5/South Medford Interchange operates at a volume-to-capacity (v/c) ratio of 0.89 (AM). The new operating standard for the South Medford Interchange is queuing, which is evaluated under Year 2045 volumes in the following columns.</li> </ul>	<ul style="list-style-type: none"> <li>I-5/South Medford Interchange queues meet the alternate mobility target with IAMP projects included.</li> <li>OR99/Garfield Street operates at a v/c ratio of 0.97 (PM).</li> <li>OR99/N Phoenix Road/Boltz Road operates at a v/c ratio of 0.98 (PM).</li> <li>Barnett Road/Black Oak Drive operates at level of service (LOS) E (PM).</li> <li>Juanipero Way/Golf View Drive operates at LOS F (PM).</li> <li>Phoenix Road/future South Stage Road operates at LOS E (PM).</li> </ul>	<ul style="list-style-type: none"> <li>All intersections are projected to meet mobility targets except for OR99/Garfield Street<sup>1</sup> which operates with a v/c of 0.97 in the PM peak hour. An alternate mobility target would be needed at this location.</li> </ul>	<ul style="list-style-type: none"> <li>All intersections are projected to meet mobility targets except for OR99/Garfield Street<sup>1</sup> which operates with a v/c of 0.96 in the PM peak hour. An alternate mobility target would be needed at this location.</li> </ul>	<ul style="list-style-type: none"> <li>All intersections are projected to meet mobility targets, except OR99/Garfield Street<sup>1</sup> which operates with a v/c of 0.94 in the PM peak hour. An alternate mobility target would be needed at this location.</li> </ul>
Queues exceeding storage (interchange ramps)	<ul style="list-style-type: none"> <li>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.</li> <li>Queues onto the I-5 mainline pose both a congestion issue and a safety concern for potential high-speed, rear-end collisions.</li> </ul>	<ul style="list-style-type: none"> <li>Queues from both the southbound and northbound ramp of the South Medford Interchange are accommodated by the IAMP projects. Without the IAMP projects the queues would be anticipated to spillback onto I-5 during the AM and PM peak hours.</li> </ul>	<ul style="list-style-type: none"> <li>The scenario does not substantially change northbound or southbound vehicle queue lengths at the South Medford Interchange; however, the additional queue storage is anticipated to accommodate vehicle queues.</li> </ul>	<ul style="list-style-type: none"> <li>The scenario does not substantially change northbound or southbound vehicle queue lengths at the South Medford Interchange; however, the additional queue storage is anticipated to accommodate vehicle queues.</li> </ul>	<ul style="list-style-type: none"> <li>The projected queue lengths are anticipated to be accommodated without extending the southbound off ramp.</li> </ul>
Freeway segments not meeting targets	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>The South Medford Interchange southbound off-ramp operates at a v/c ratio of 0.88 (AM).</li> </ul>	<ul style="list-style-type: none"> <li>No change. An alternative mobility target will be needed.</li> </ul>	<ul style="list-style-type: none"> <li>The v/c ratio increases to 0.90 during the AM peak hour. An alternative mobility target will be needed.</li> </ul>	<ul style="list-style-type: none"> <li>The v/c ratio decreases to 0.86 during the AM peak hour, which is still above the identified mobility target. An alternative mobility target will be needed.</li> </ul>
Out-of-direction travel	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Out-of-direction travel may increase with increased modal demand within the study area.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>Out-of-direction travel is anticipated to decrease by approximately 1,200 vehicles in the PM peak hour.</li> <li>Travel distance between OR99/Barnett and South Stage/ Phoenix Road will decrease by 0.7 miles.</li> <li>Travel distance between OR99/South Stage and South Stage/ Phoenix Road will decrease by 3.8 miles traveling north and 1.6 miles traveling south.</li> <li>The average crossing spacing of I-5 between Barnett Road and Phoenix Road will decrease by 0.6 miles for vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>Out-of-direction travel is anticipated to decrease for approximately 1,450 vehicles in the PM peak hour.</li> <li>Travel distance between OR99/Barnett and South Stage/ Phoenix Road will decrease by 0.7 miles.</li> <li>Travel distance between OR99/South Stage and South Stage/ Phoenix Road will decrease by 3.8 miles traveling north and 1.6 miles traveling south.</li> <li>The average crossing spacing of I-5 between Barnett Road and Phoenix Road will decrease by 0.6 miles for vehicles.</li> </ul>
Travel time	<ul style="list-style-type: none"> <li>Travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/South Stage Road is 6 minutes for the southern (most efficient) route.</li> </ul>	<ul style="list-style-type: none"> <li>Travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/South Stage Road is 7 minutes for the southern (most efficient) route.</li> </ul>	<ul style="list-style-type: none"> <li>Travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/South Stage Road is 6 minutes for the southern (most efficient) route.</li> </ul>	<ul style="list-style-type: none"> <li>Travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/South Stage Road is 3 minutes via the new, direct route.</li> </ul>	<ul style="list-style-type: none"> <li>Travel time (during the PM peak hour) between the intersection of South Stage Road/OR99 and the assumed future intersection of Phoenix Road/South Stage Road is 3 minutes via the new, direct route.</li> </ul>



Need	Existing	Year 2045 No-Build	Existing System Enhancement	South Stage Overpass (Enhanced)	I-5/South Stage Interchange (Enhanced)
Emergency response access	<ul style="list-style-type: none"> <li>- During emergency events, there are limited opportunities for emergency vehicles to detour due to congestion or other disruptions.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of redundant routes and increased congestion raise the potential for disruptive events identified in the existing year.</li> </ul>	<ul style="list-style-type: none"> <li>- Reduces travel time due to congestion.</li> </ul>	<ul style="list-style-type: none"> <li>- Increases redundant routes and reduces travel times/congestion to support emergency response access.</li> </ul>	<ul style="list-style-type: none"> <li>- Increases redundant routes and reduces travel times/congestion to support emergency response access.</li> <li>- Provides increased access to I-5 during emergency events.</li> </ul>
Safety	<ul style="list-style-type: none"> <li>- Barnett Road/Golf View Drive has a crash rate that exceeds the 90th percentile rate.</li> <li>- The following intersections exceed their corresponding critical crash rate: Garfield Street/Center Drive and Barnett Road/Golf View Drive.</li> <li>- The following intersections were identified in the top 85 percent of Safety Priority Index System (SPIS) scores in the SPIS 2021 list: OR99/Stewart Avenue, OR99/Garfield Street, and I-5/South Medford Interchange.</li> </ul>	<ul style="list-style-type: none"> <li>- Without future mitigation or changes by users, crash deficiencies may continue or potentially worsen with increased modal demand within the study area.</li> </ul>	<ul style="list-style-type: none"> <li>- Includes a project at OR99/Garfield Street to improve operations, which could improve safety at the intersection.</li> <li>- Interchange Area Management Plan (IAMP) projects are likely to improve safety operations at the South Medford Interchange related to queuing spillback onto I-5.</li> <li>- Ramp metering at the I-5/South Medford Interchange has a crash modification factor (CMF) of 0.59.</li> <li>- Constructing separate left- and right-turn lanes at OR99/N Phoenix-Bolz Road will have respective CMFs of 0.90 and 0.96.</li> <li>- Constructing a separate right-turn lane at Barnett Road/Black Oak Drive has a CMF of 0.96.</li> <li>- Converting the Juanipero Way/Golf View Drive intersection to an all-way stop has a CMF of 0.25.</li> <li>- Converting the future South Stage Road/N Phoenix Road intersection to a roundabout or traffic signal will have a CMF of 0.33 and 0.18, respectively.</li> </ul>	<ul style="list-style-type: none"> <li>- Reduces overall traffic volumes at Barnett Road/Golf View Drive, Garfield Street/Center Drive, OR99/Stewart Avenue, OR99/Garfield Street, and the South Medford Interchange. These reductions lead to lower vehicular demand at intersections with a high crash history.</li> <li>- Includes a project at OR99/Garfield Street to improve operations, which could improve safety at the intersection.</li> <li>- IAMP projects are likely to improve safety operations at the South Medford Interchange related to queuing spillback onto I-5.</li> <li>- Ramp metering at the I-5/South Medford Interchange has a CMF of 0.59.</li> <li>- Constructing separate left- and right-turn lanes at OR99/N Phoenix-Bolz Road will have respective CMFs of 0.90 and 0.96.</li> <li>- Converting the Juanipero Way/Golf View Drive intersection to an all-way stop has a CMF of 0.25.</li> <li>- Converting the future South Stage Road/N Phoenix Road intersection to a roundabout or traffic signal will have a CMF of 0.33 and 0.18, respectively.</li> <li>- Converting the future South Stage Road/Golf View Drive intersection to a roundabout has a CMF of 0.18.</li> <li>- Constructing a separate right turn lane at OR99/South Stage Road has a CMF of 0.96.</li> </ul>	<ul style="list-style-type: none"> <li>- Reduces overall traffic volumes at Barnett Road/Golf View Drive, Garfield Street/Center Drive, OR99/Stewart Avenue, OR99/Garfield Street, and the South Medford Interchange. These reductions lead to lower vehicular demand at intersections with a high crash history.</li> <li>- Includes a project at OR99/Garfield Street to improve operations, which could improve safety at the intersection.</li> <li>- IAMP projects are likely to improve safety operations at the South Medford Interchange related to queuing spillback onto I-5.</li> <li>- Ramp metering at the I-5/South Medford Interchange has a CMF of 0.59.</li> <li>- Constructing separate left- and right-turn lanes at OR99/N Phoenix-Bolz Road will have respective CMFs of 0.90 and 0.96.</li> <li>- Converting the Juanipero Way/Golf View Drive intersection to an all-way stop has a CMF of 0.25.</li> <li>- Converting the future South Stage Road/N Phoenix Road intersection to a roundabout or traffic signal will have a CMF of 0.33 and 0.18, respectively.</li> <li>- Converting the future South Stage Road/Golf View Drive intersection to a roundabout has a CMF of 0.18.</li> <li>- Constructing a separate right turn lane at OR99/South Stage Road has a CMF of 0.96.</li> </ul>

<sup>1</sup> Mobility targets could be met if an eastbound left and northbound through lane were added; however, these updates are unrealistic due to right-of-way and building constraints.

<sup>2</sup> South Stage Road is assumed to have a posted speed of 45 mph.

## PEDESTRIAN, BICYCLE, AND TRANSIT ACCESS

This section discusses the potential benefits each scenario provides for increased pedestrian, bicycle, and transit connectivity. As discussed below, the Existing System Enhancement scenario provides either no change or minimal benefits to pedestrian, bicycle, and transit connectivity, whereas the South Stage Overpass and I-5/South Stage Interchange scenarios improve connectivity for all modes.

### Transit Connectivity

Figure 3 illustrates the existing and planned 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 that would cross the Phoenix Interchange in the study area<sup>3</sup>. The only two existing east-west connections across I-5 in the study area are provided across Barnett Road and Garfield Street/Highland Road. The potential benefits to transit connectivity from the three overarching solution scenarios are shown in Table 2.

**Table 2. Evaluation Relative to Purpose and Need**

Scenario	Ability to Meet Purpose and Need
Existing System Enhancement	- This scenario does not provide additional opportunities for people taking transit to cross I-5 and the Bear Creek greenway.
South Stage Overpass (Enhanced)	- This scenario provides an additional opportunity for people taking transit to cross I-5 and the Bear Creek greenway.
I-5/South Stage Interchange (Enhanced)	- This scenario provides an additional opportunity for people taking transit to cross I-5 and the Bear Creek greenway and for the existing express transit route on I-5 to serve the area with a potential stop.

### Pedestrian and Bicycle Connectivity

The following facility gaps were identified along key routes in the study area.

#### PEDESTRIAN GAPS

- No sidewalks exist along either side of Phoenix Road between Juanipero Way and the Phoenix Interchange, but there is a 5-foot shoulder.
- There are gaps in sidewalks along the west side of OR99 between Stewart Avenue and the Phoenix Interchange and there is no shoulder.
- There are gaps in sidewalks along the east side of OR99 between Charolette Ann Road and Lowry Lane and between Alter Street and the Phoenix Interchange and there is no

<sup>3</sup> Rogue Valley Transit District has a master plan that identifies near-term (2027), mid-term (2037), and long-term (2042) transit service enhancements.

shoulder. Note that ODOT has a planned STIP project to install sidewalks between Phoenix Road and Glenwood Road.

- There are intermittent gaps in sidewalk facilities along one side of Juanipero Way,

## BICYCLE FACILITY GAPS

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

Additionally, I-5 and the Bear Creek greenway are barriers to east-west travel for people walking and biking. Medford Code Section 10.426 identifies a maximum block length standard of between 660 feet (0.13) and 940 feet (0.18 miles) depending on the adjacent land uses.<sup>4</sup> One of the main purposes of these maximums is to encourage pedestrian and no-auto connectivity, minimizing walking distances in a grid-system street network.

Today, 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

Figure 4 illustrates the existing pedestrian and bicycle crossing opportunities between Central Point and Phoenix. The approximate study area boundaries are shown in white for context. The average distance of available crossings between the Pine Street Interchange in Central Point and Barnett Road is 0.4 miles. The average distance between crossings from Barnett Road to 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. This average distance is also over six times higher than the maximum block length identified in 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. 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. In addition to this gap in facilities, existing routes are not all comfortable for users of most ages and abilities. For example, although there are bicycle

<sup>4</sup> According to 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."

facilities on Barnett Road west of Ellendale Drive, the City of Medford Transportation System Plan (Reference 1) identifies the segment as Bicycle Level of Traffic Stress 3, which is not comfortable for most users. The potential benefits the overarching solution scenario has on transit connectivity are shown in Table 3.

**Table 3. Evaluation Relative to Purpose and Need**

Scenario	Ability to meet Purpose and Need
Existing System Enhancement	<ul style="list-style-type: none"> <li>- This scenario does not provide additional opportunities for people walking or biking to cross I-5 and the Bear Creek greenway.</li> </ul>
South Stage Overpass (Enhanced)	<ul style="list-style-type: none"> <li>- This scenario provides an additional opportunity for people walking and biking to cross I-5 and the Bear Creek greenway. This reduces the gap in crossing opportunities for pedestrians and bicyclists from 2.65 miles to 1.33 miles. It reduces the average gap in crossings between Barnett Road and Phoenix Road from 1.1 miles to 0.8 miles. This is approximately 4x greater than desired in the Medford Code and 2x greater than the average crossing between Central Point and Barnett Road.</li> </ul>
I-5/South Stage Interchange (Enhanced)	<ul style="list-style-type: none"> <li>- This scenario provides an additional opportunity for people walking and biking to cross I-5 and the Bear Creek greenway and for the existing express transit routes on I-5 to serve the area with a potential stop. This reduces the gap in crossing opportunities for pedestrians and bicyclists from 2.65 miles to 1.33 miles. It reduces the average gap in crossings between Barnett Road and Phoenix Road from 1.1 miles to 0.8 miles. This is approximately 4x greater than desired in the Medford Code and 2x greater than the average crossing between Central Point and Barnett Road.</li> </ul>

Figure 3. Transit Connectivity

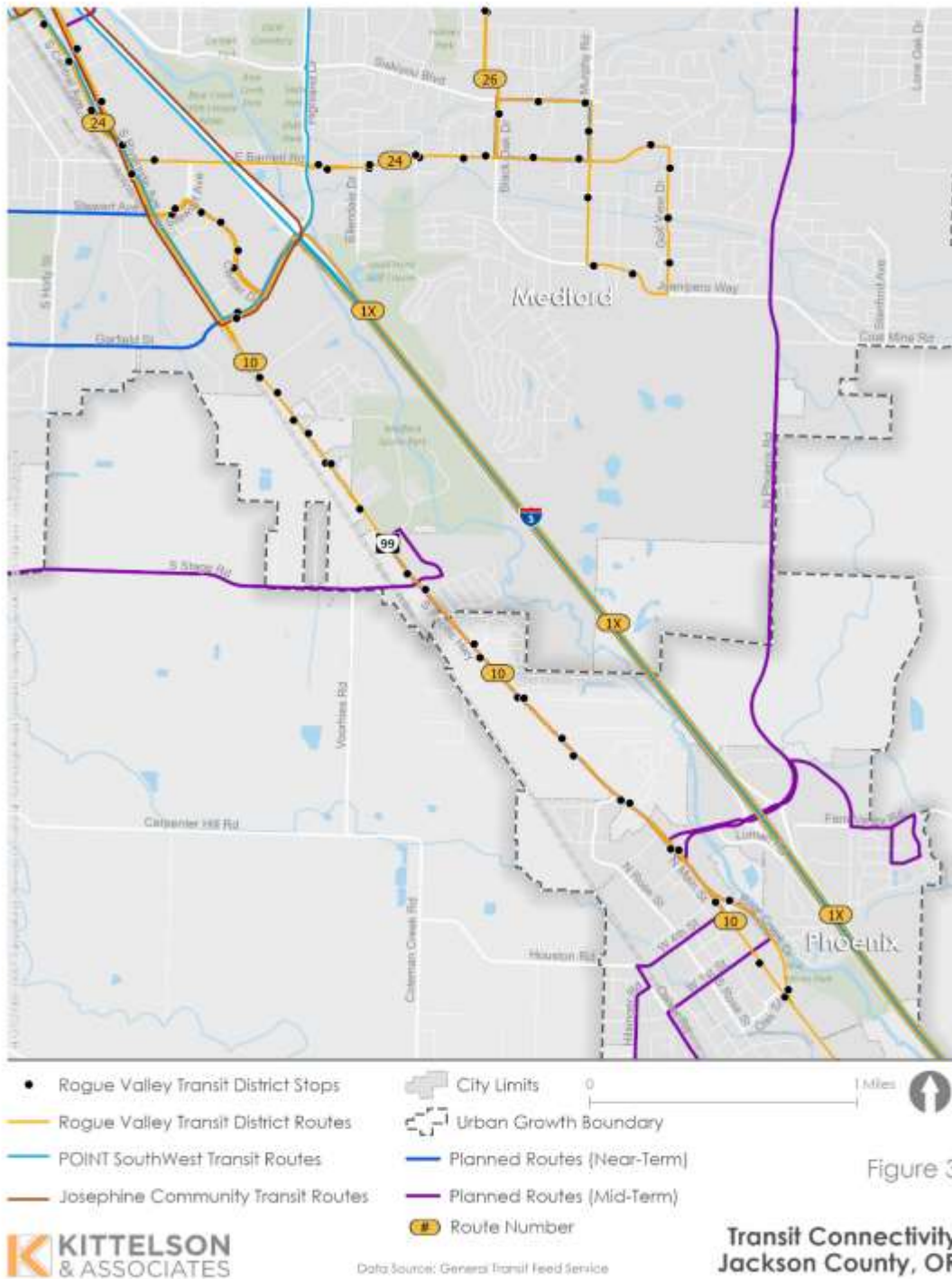


Figure 4. Pedestrian and Bicycle Connectivity



## YEAR 2045 TRAFFIC OPERATIONS

This section discusses the potential benefits each scenario provides to Year 2045 Traffic Operations. As discussed below, all scenarios involve similar improvements to intersections and queuing, with the need for alternate mobility targets at certain intersections/diverge locations. The Existing System Enhancement scenario provides minimal benefits to reduce out-of-direction travel and travel times; the South Stage Overpass and I-5/South Stage Interchange scenarios provide similar levels of improvement for both.

Future Year 2045 weekday AM and PM peak-hour operations were assessed at the study intersections for the No-Build and three solution scenarios being screened.

For both the South Stage Overpass and I-5/South Stage Interchange scenarios, intersection operations are presented that correspond to the street and intersection configurations included in the No-Build as well as an alternative in which the changes identified in the Existing System Enhancement scenario are implemented. The operational findings and summary figures associated with South Stage Overpass and I-5/South Stage Interchange scenarios without other system improvements are documented in Appendix A and B.

For the purposes of the intersection operations, future traffic volumes were developed for the study intersections and roadway segments based on information provided in ODOT's Southern Oregon Activity-Based Model (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.<sup>5</sup> Intersection turning movement volumes were derived from the traffic volume projections by applying the post-processing methodology identified in the ODOT Analysis and Procedures Manual.

The methodology derives forecast traffic volumes based on measured traffic volumes and base and future-year traffic volume projections. Engineering judgment and knowledge of the project study area gained by the project team over the past several decades were used to fine-tune the 2045 calculated intersection volumes. The Year 2045 traffic volume development worksheets and travel demand model outputs are provided in Appendix C. The South Stage Interchange and I-5/South Stage Overpass scenarios increase volumes at certain movements because they increase the convenience of different routes (e.g., the I-5/South Stage Interchange scenario introduces local trips on I-5 within Medford. The scenarios also show some reductions at intersections around the I-5/South Medford Interchange due to the introduction of jobs and services east of I-5 allowing alternative services to those along the OR99 corridor east of I-5.

---

<sup>5</sup> 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 Garfield 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.

The intersection operations analysis was conducted using PTV Vistro 2022, a software tool designed to assist with operations analyses per the methodologies of the *Highway Capacity Manual* from the National Academies of Sciences, Engineering, and Medicine (Reference 2). 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 per the methodologies outlined in the ODOT Analysis and Procedures Manual.

TM #3.1.3: Transportation Methodology and Assumptions provides additional details on the approach used to develop the Year 2045 volumes and the traffic operations analysis. The weekday PM peak hour is typically the controlling time period and was evaluated at all intersections. The weekday AM peak hour was analyzed at all ODOT intersections and new study intersections. Appendix A contains the operations analysis worksheets. Figures illustrating the assumed lane configurations<sup>6</sup> and Year 2045 traffic volumes for the enhanced scenarios are provided below and include the following:

- Figure 5 illustrates the assumed lane configurations for the No-Build scenario. Figure 6 and Figure 7 illustrate the Year 2045 weekday AM and PM peak hour traffic operations for the No-Build scenario.
- Figure 8 illustrates the assumed lane configurations for the Existing System Enhancement scenario. Figure 9 and Figure 10 illustrate the Year 2045 weekday AM and PM peak hour traffic operations for the Existing System Enhancement scenario.
- Figure 11 illustrates the assumed lane configurations for the South Stage Overpass Enhanced scenario. Figure 12 and Figure 13 illustrate the Year 2045 weekday AM and PM peak hour traffic operations for the South Stage Overpass Enhanced scenario.
- Figure 14 illustrates the assumed lane configurations for the I-5/South Stage Interchange Enhanced scenario. Figure 15 and Figure 16 illustrate the Year 2045 weekday AM and PM peak hour traffic operations for the I-5/South Stage Interchange Enhanced scenario.

---

<sup>6</sup> The figures with lane configuration and traffic control devices distinguish between planned improvements from the Transportation System Plan, planned improvements from development, and enhancements added due to this project. Each of these categories (TSP improvement, planned improvement from development, and enhancements added due to the project) has a different timing, funding, and responsibility associated with constructing the project.



Figure 5. Year 2045 No-Build Lane Configurations and Traffic Control Devices

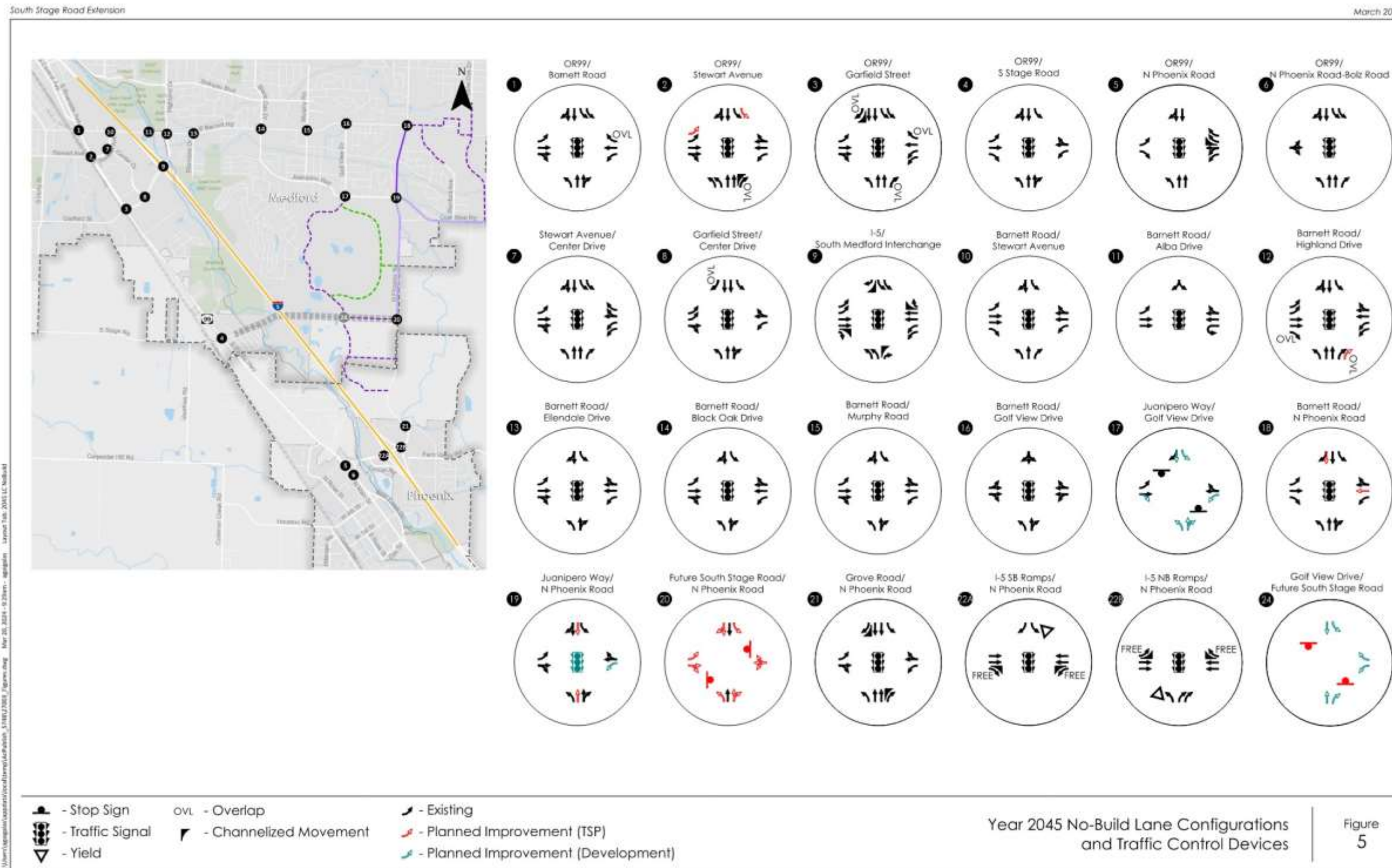


Figure 6. Year 2045 No-Build Traffic Conditions, Weekday AM Peak Hour

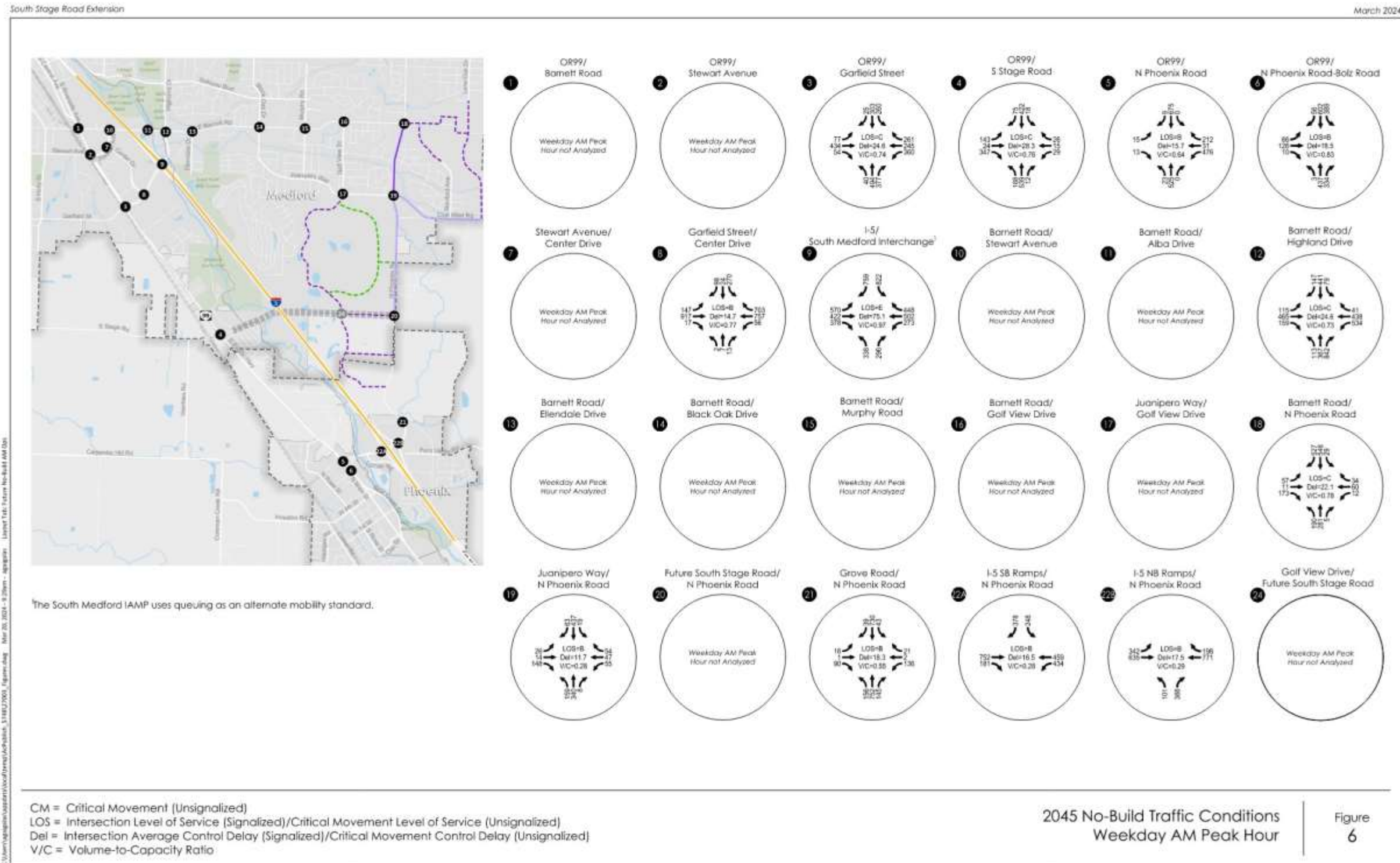


Figure 7. Year 2045 No-Build Traffic Conditions, Weekday PM Peak Hour

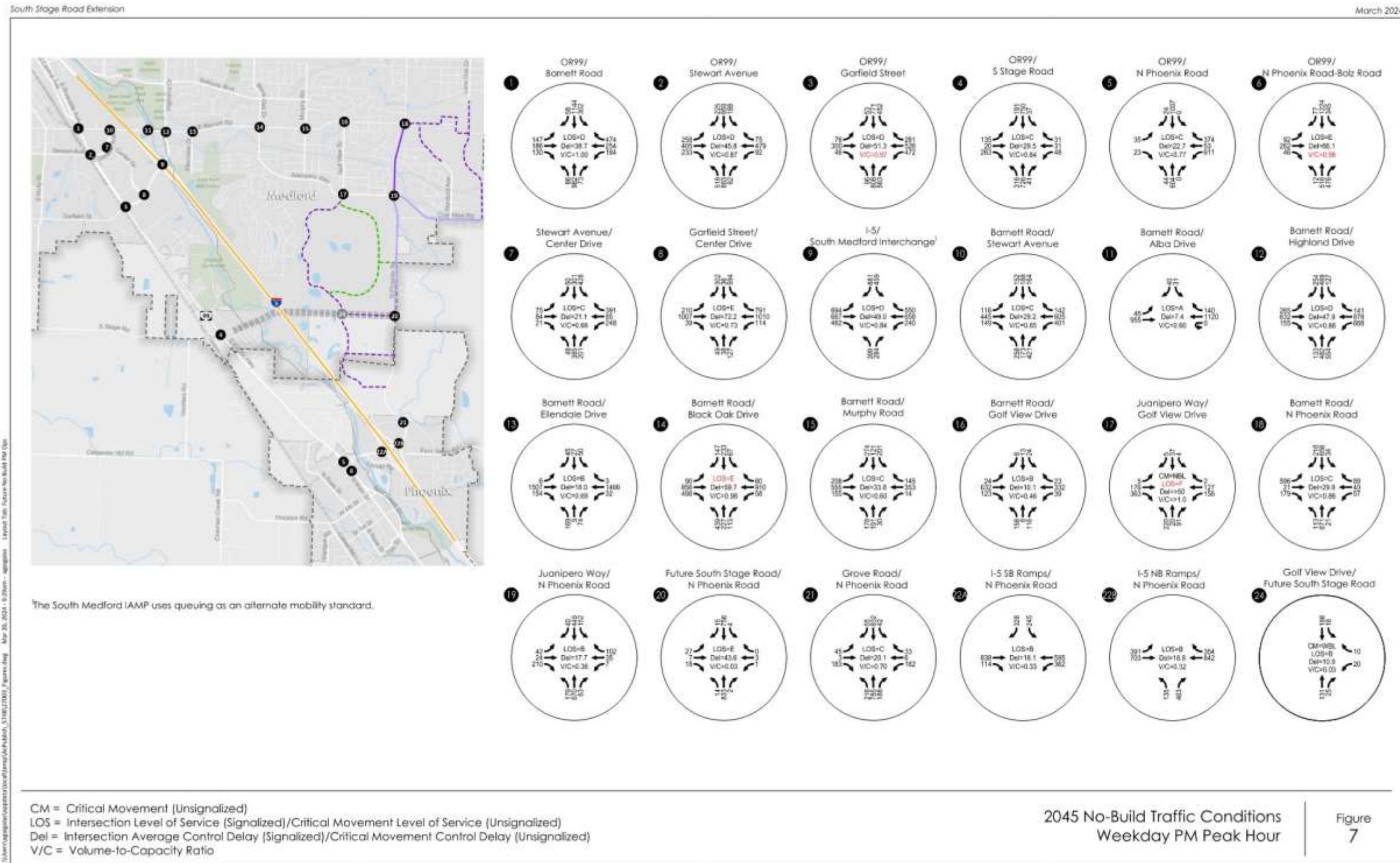


Figure 8. Year 2045 Build (Existing System Enhancement Scenario) Lane Configurations and Traffic Control Devices

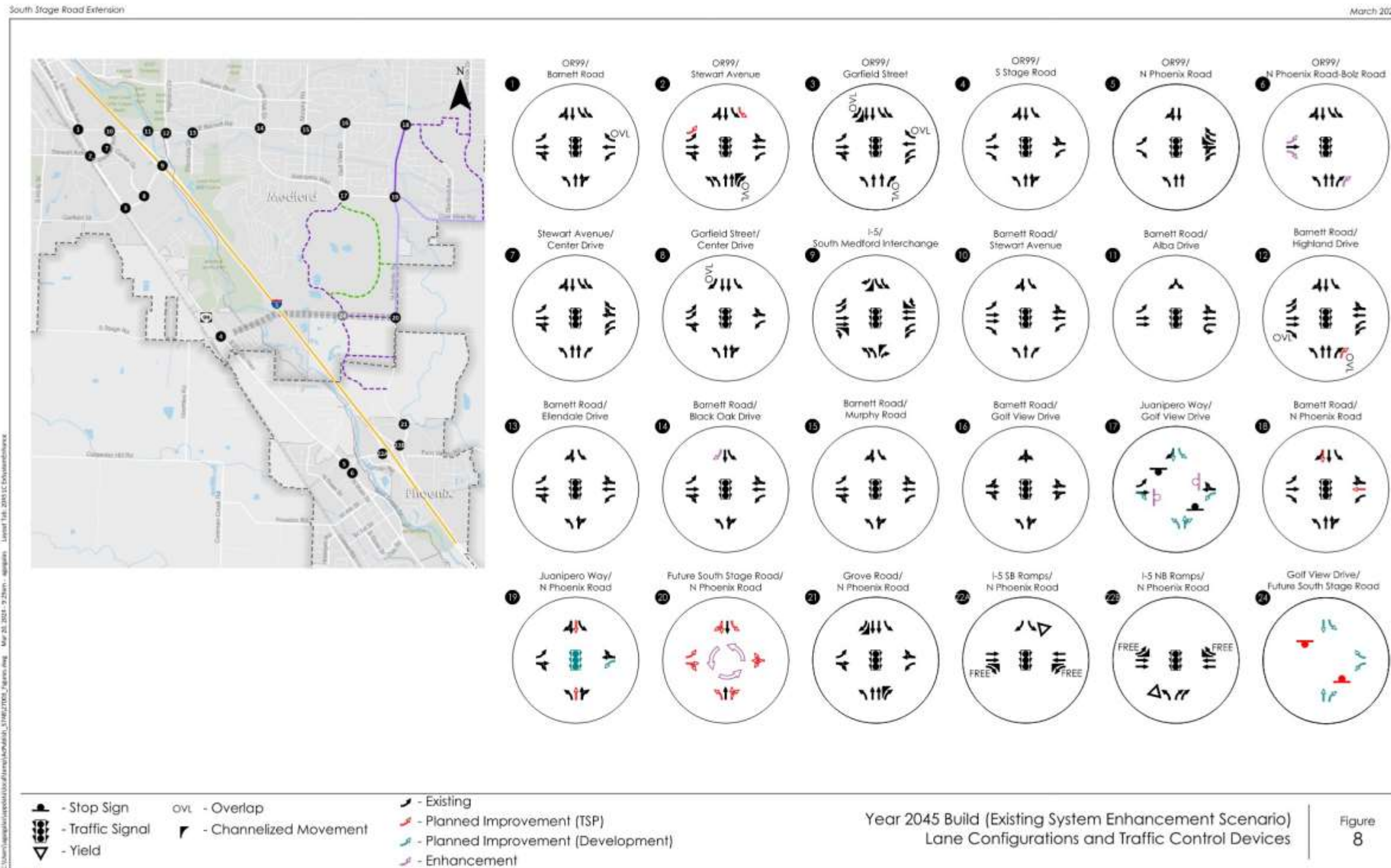


Figure 9. Year 2045 Build (Existing System Enhancement Scenario) Traffic Conditions, Weekday AM Peak Hour

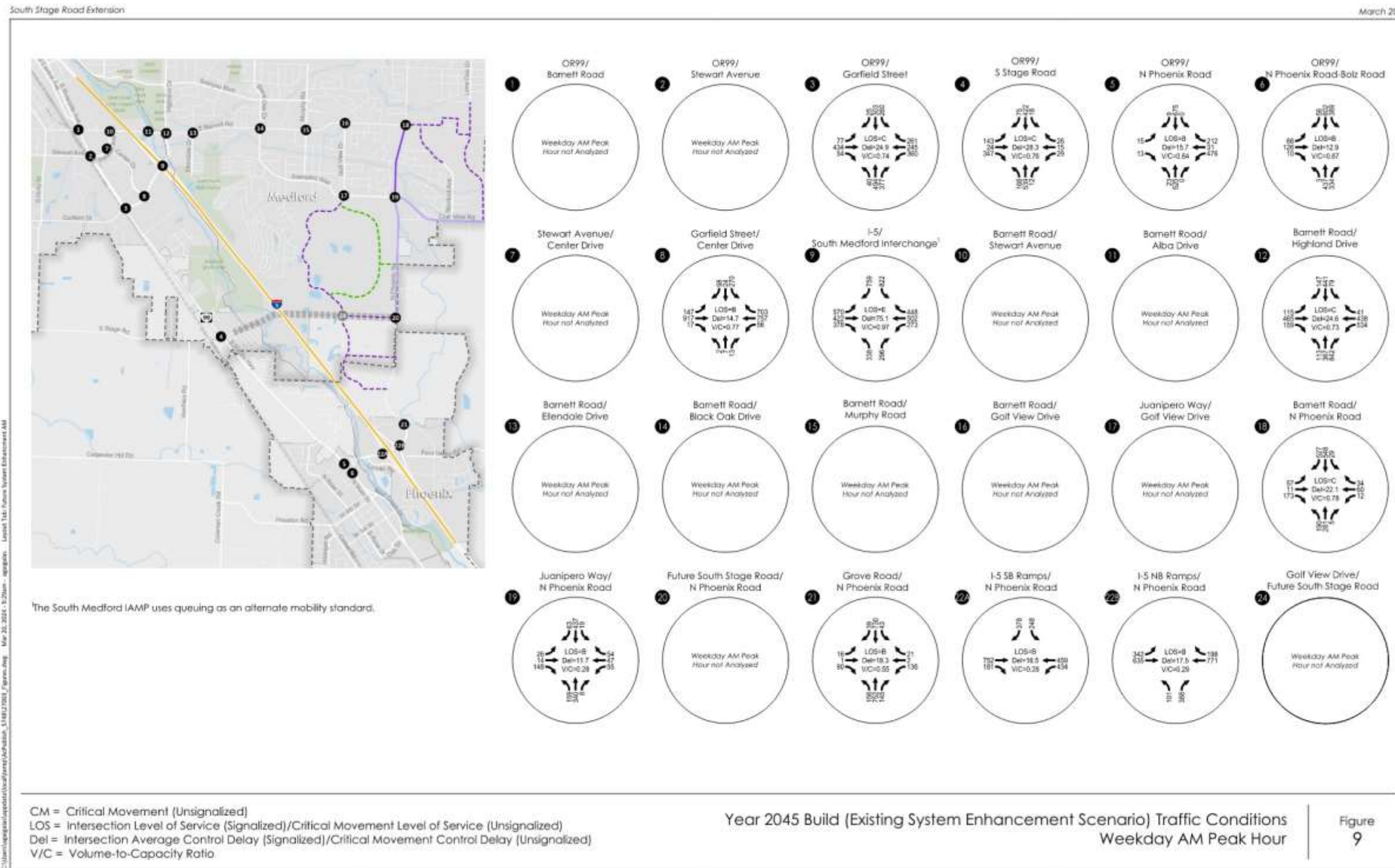


Figure 10. Year 2045 Build (Existing System Enhancement Scenario) Traffic Conditions, Weekday PM Peak Hour

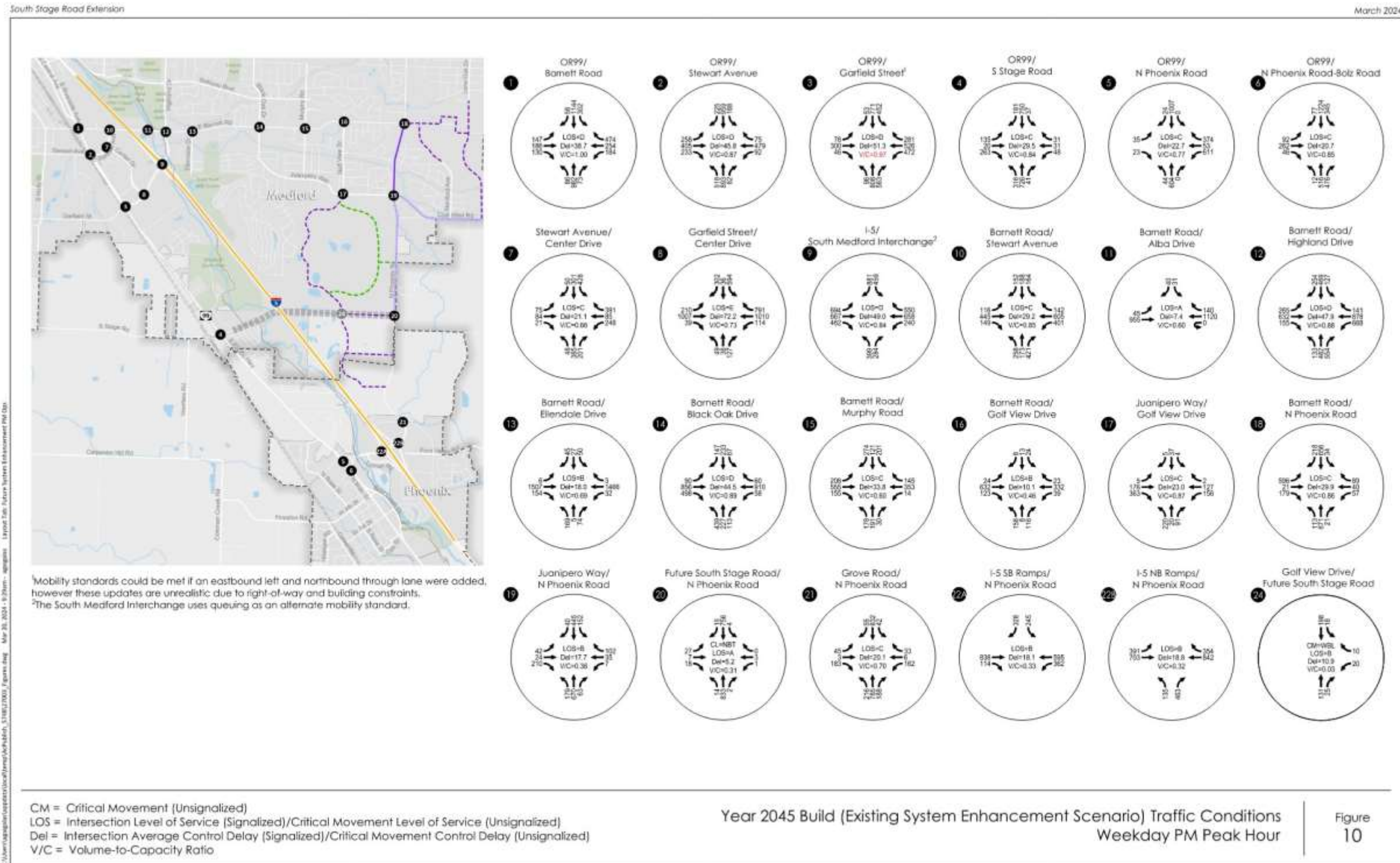




Figure 12. Year 2045 Build (South Stage Overpass Enhanced Scenario) Traffic Conditions, Weekday AM Peak Hour

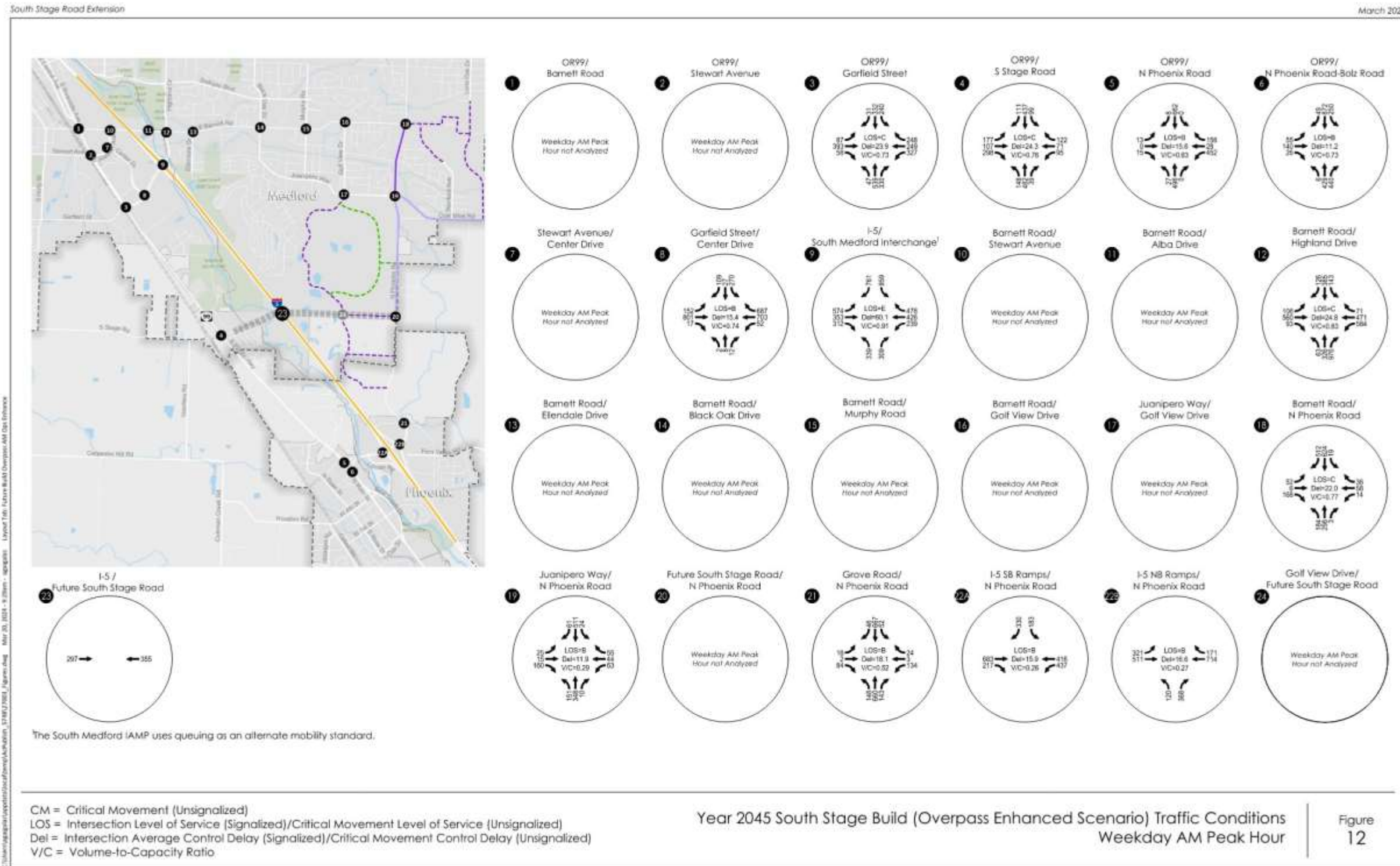




Figure 13. Year 2045 Build (South Stage Overpass Enhanced Scenario) Traffic Conditions, Weekday PM Peak Hour

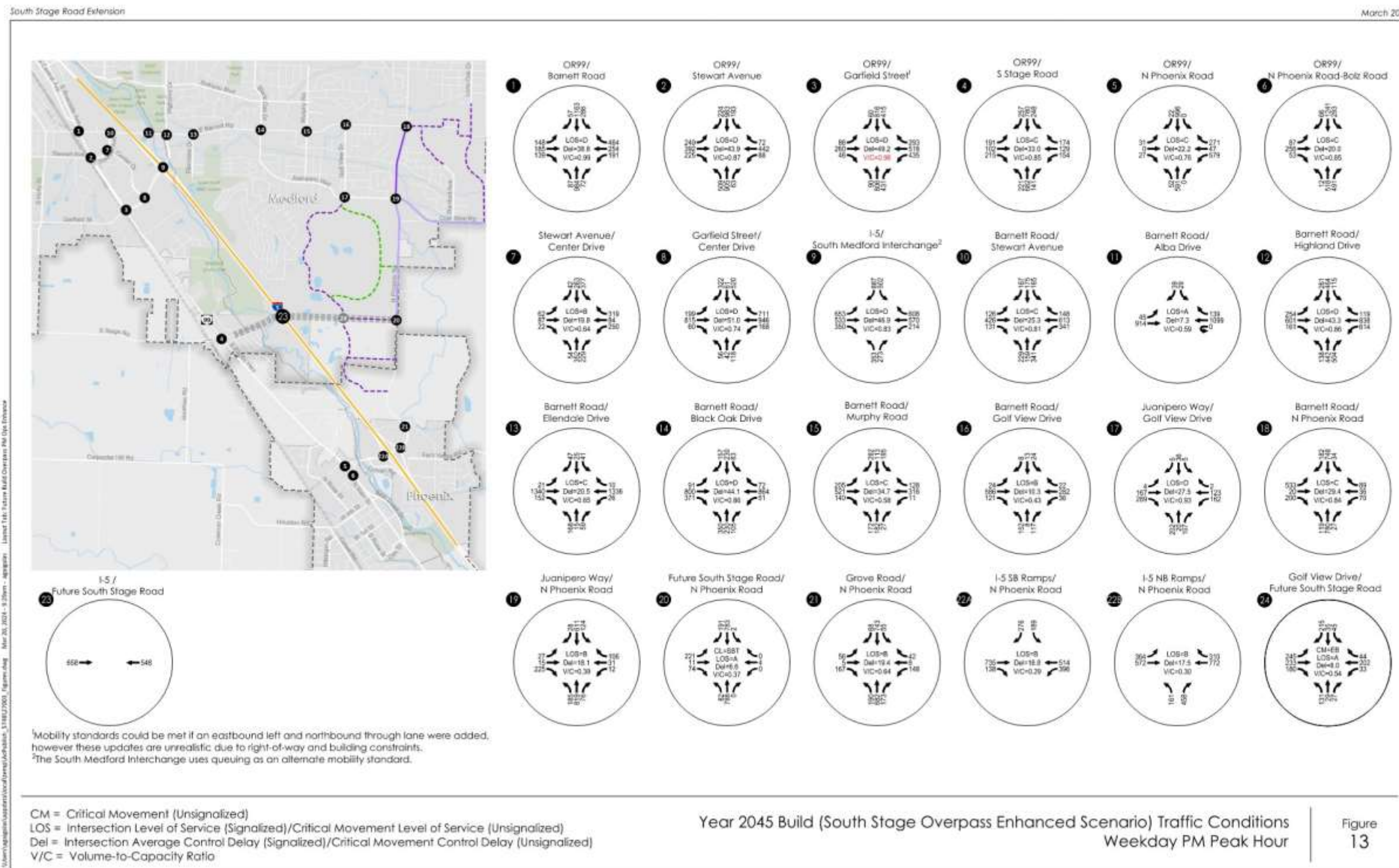


Figure 14. Year 2045 Build (I-5/South Stage Interchange Enhanced Scenario) Lane Configurations and Traffic Control Devices

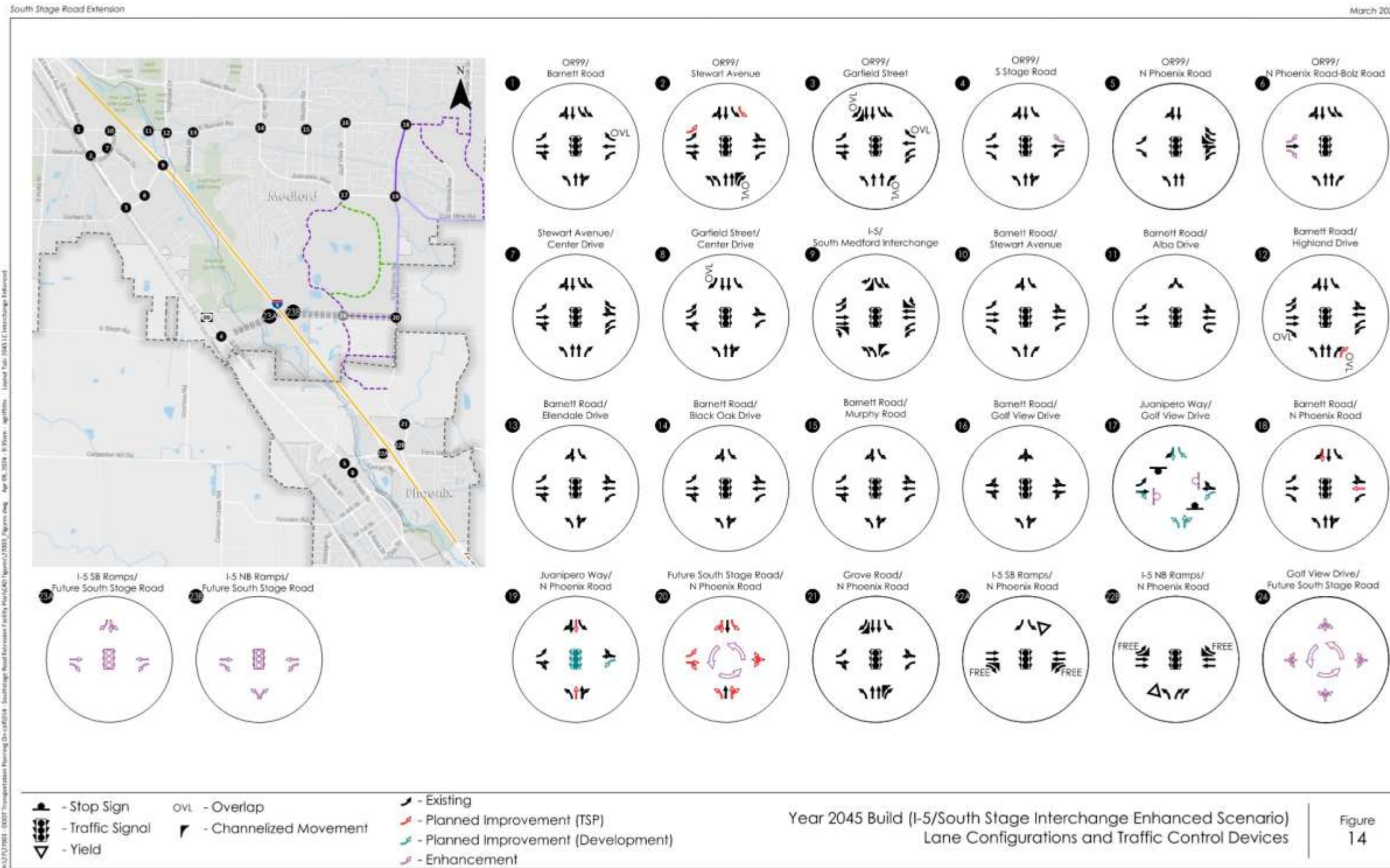


Figure 15. Year 2045 Build (I-5/South Stage Interchange Enhanced Scenario) Traffic Conditions, Weekday AM Peak Hour

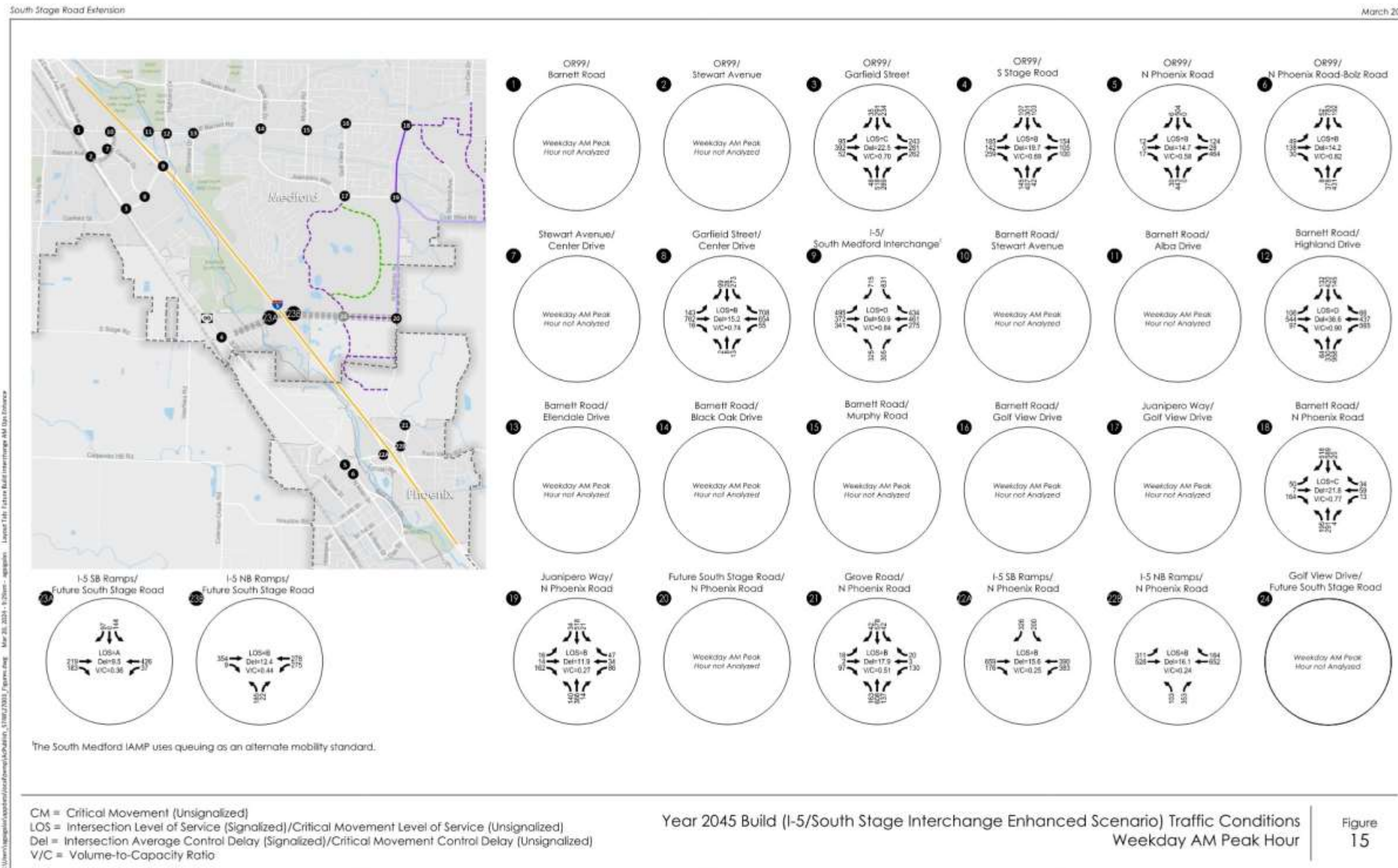
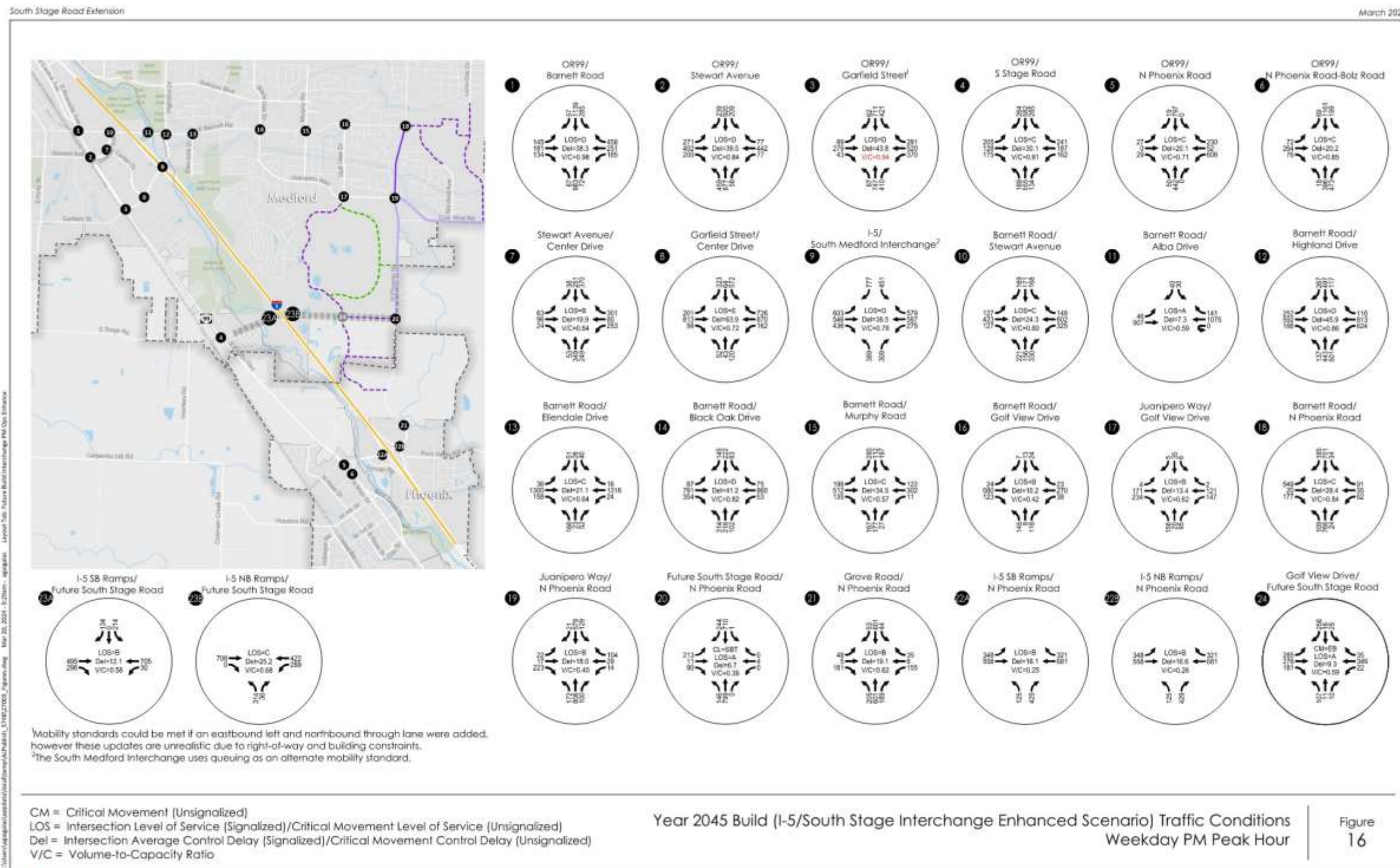


Figure 16. Year 2045 Build (I-5/South Stage Interchange Enhanced Scenario) Traffic Conditions, Weekday PM Peak Hour



## Intersections Not Meeting Targets

Table 4 and Table 5 document the operations for intersections not meeting mobility targets under Year 2045 AM and PM peak hours, respectively. Queuing was adopted as an alternate mobility standard for the South Medford Interchange; queuing results are documented in Table 6.

**Table 4. Intersection Operations, Year 2045 Weekday AM Peak Hour<sup>1</sup>**

#	Intersection	Lead Agency	Control Type	Operating Target	No-Build Scenario				Existing System Enhancement Scenario				South Stage Overpass Enhanced Scenario				I-5/South Stage Interchange Enhanced Scenario			
					CM	LOS <sup>2</sup>	Del <sup>3</sup>	v/c <sup>4</sup>	CM	LOS <sup>2</sup>	Del <sup>3</sup>	v/c <sup>4</sup>	CM	LOS <sup>2</sup>	Del <sup>3</sup>	v/c <sup>4</sup>	CM	LOS <sup>2</sup>	Del <sup>3</sup>	v/c <sup>4</sup>
9	I-5/South Medford Interchange	ODOT	Signal (SPI)	Queuing, See Table 6 <sup>5</sup>	-	E	75.1	0.97	-	E	75.1	0.97	-	E	60.1	0.91	-	D	50.9	0.84

<sup>1</sup> Intersections 14, 17, and 20 were excluded from the table because they are not studied in the AM Peak hour.

<sup>2</sup> Intersection LOS

<sup>3</sup> Intersection average vehicle delay (signal)

<sup>4</sup> Intersection v/c

<sup>5</sup> The South Medford Interchange uses queuing as an alternate mobility target.

CM = critical movement; Del = delay; LOS = level of service; SPI = single point interchange; TWSC = two-way stop-control; v/c = volume to capacity.

**Bold red text** indicates measurements not meeting targets.

**Table 5. Intersection Operations, Year 2045 Weekday PM Peak Hour**

#	Intersection	Lead Agency	Control Type	Operating Target	No-Build Scenario				Existing System Enhancement Scenario				South Stage Overpass Enhanced Scenario				I-5/South Stage Interchange Enhanced Scenario			
					CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>	CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>	CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>	CM	LOS <sup>1</sup>	Del <sup>2</sup>	v/c <sup>3</sup>
3	OR99/Garfield Street	ODOT	Signal	v/c ≤ 0.85 <sup>4</sup>	-	D	51.3	<b>0.97</b>	-	D	51.3	<b>0.97</b>	-	D	49.2	<b>0.96</b>	-	D	43.8	<b>0.94</b>
6	OR99/Phoenix Road-Bolz Road	ODOT	Signal	v/c ≤ 0.85 <sup>4</sup>	-	E	66.1	<b>0.98</b>	-	C	20.7	0.85	-	C	20.0	0.85	-	C	20.2	0.85
9	I-5/South Medford Interchange	ODOT	Signal (SPI)	Queuing, See Table 6 <sup>5</sup>	-	D	49.0	0.84	-	D	49.0	0.84	-	D	46.9	0.83	-	D	38.5	0.78
14	Barnett Road/Black Oak Drive	Medford	Signal	LOS D	-	<b>E</b>	59.7	0.98	-	D	44.5	0.89	-	D	48.1	0.90	-	D	41.2	0.82
17	Juanipero Way/Golf View Drive	Medford	Two-Way Stop-Control (TWSC) (No-Build)/All-Way Stop-Control (AWSC)(Enhanced)	LOS D	NBL	<b>F</b>	130.2	1.07	-	C	23.0	0.87	-	D	27.5	0.93	-	B	13.4	0.62
20	Phoenix Road/South Stage Road (Commercial Drive)	Medford (assumed)	TWSC (No-Build)/ Roundabout (Enhanced)	LOS D	WBL	<b>E</b>	43.6	0.03	-	A	5.2	0.31	-	A	6.6	0.37	-	A	6.7	0.39

<sup>1</sup> Intersection LOS (signal, AWSC), CM LOS (TWSC).

<sup>2</sup> Intersection average vehicle delay (signal), CM vehicle delay (TWSC).

<sup>3</sup> Intersection v/c (signal, AWSC), CM v/c (TWSC)++

<sup>4</sup> The operating target under Year 2045 No-Build is v/c ≤ 0.85 for OR99/Garfield Street and OR99/Phoenix Road-Bolz Road.

<sup>5</sup> The South Medford Interchange uses queuing as an alternate mobility target.

CM = critical movement; Del = delay; LOS = level of service; NBL = northbound left turn; 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 targets.

Alternative mobility standards should be sought at OR99/Garfield Street given the existing buildings and railroad crossing constraints.

## Queues Exceeding Storage (Interchange Ramps)

Based on the results of the Year 2045 no-build analysis (TM #4.1.2: Future Year Background Traffic Analysis), Year 2045 queues at the South Medford interchange were shown to back up onto I-5 for portions of the weekday AM and PM peak hours without the IAMP projects.<sup>7</sup> This queuing was assessed using SimTraffic as part of the South Medford Interchange Area Management Plan (IAMP, Reference 3). Volumes developed as part of the South Stage Road Extension Plan were input into the Synchro Model, and SimTraffic runs were produced to assess the differences in queues between different scenarios. The 95th percentile queue lengths at the South Medford Interchange with the IAMP projects are summarized in Table 6. As shown, the queue storage and projects identified in the IAMP can accommodate the queues for all scenarios. The South Stage Interchange Scenario could be accommodated without the IAMP ramp extension.

**Table 6. 95th Percentile Queue Lengths at the South Medford Interchange (with IAMP projects), Year 2045 No-Build Weekday AM and PM Peak Hours<sup>1</sup>**

Approach <sup>2</sup>	Ramp Length (ft) <sup>3</sup>	Deceleration Length (ft) <sup>3</sup>	Max Allowable Queue (ft) <sup>3</sup>	No-Build Scenario		Existing System Enhancement Scenario		South Stage Overpass Enhanced Scenario		I-5/South Stage Interchange Enhanced Scenario	
				Weekday AM <sup>4</sup>	Weekday PM <sup>4</sup>	Weekday AM <sup>4</sup>	Weekday PM <sup>4</sup>	Weekday AM <sup>4</sup>	Weekday PM <sup>4</sup>	Weekday AM <sup>4</sup>	Weekday PM <sup>4</sup>
SB	1,710 without IAMP extension; 3,000 with IAMP extension	640	2,360 with IAMP extension; 1,070 without IAMP extension	1,525	1,325	1,525	1,325	1,425	1,300	1,025	875
NB	1,470	740 <sup>5</sup>	730 (830 with speed reduction) <sup>5</sup>	200	350	200	350	225	150	200	175
EB	-			300	850	300	850	325	275	275	475
WB	-			575	275	575	275	375	250	500	225

<sup>1</sup> Queues highlighted in yellow require the IAMP ramp extension.

<sup>2</sup> IAMP considers ramps to be east/west at the interchange. Results were modified to be consistent with directions used in the South Stage Road Extension Plan analysis, where ramps are considered to be north/south.

<sup>3</sup> 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.

<sup>4</sup> Queues rounded to the nearest 25 feet.

<sup>5</sup> The City of Medford will continue to work with ODOT Region 3 Traffic Section to facilitate lowering the speed limit on the I-5 mainline to 55 miles per hour just south of the northbound off-ramp to reduce the deceleration length required to 640 feet.

EB = eastbound; IAMP = Interchange Area Management Plan; NB = northbound; SB = southbound; WB = westbound.

Appendix D contains the SimTraffic queuing worksheets.<sup>8</sup> Queuing is the identified mobility target identified in the IAMP, the queuing for all scenarios is accommodated within the maximum ramp queue length identified within this alternative mobility target.

<sup>7</sup> 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.

<sup>8</sup> IAMP considers ramps to be east/west at the interchange. Results shown in the table reflect the assumed direction of the South Stage Extension were modified to be consistent with directions used in the South Stage Extension analysis, where ramps are considered to be north/south.



## Freeway Segments Not Meeting Targets

Based on the results of Year 2045 no-build analysis (TM #4.1.2: Future Year Background Traffic Analysis), the I-5 South Medford southbound off-ramp exceeds the applicable operating target under the weekday AM peak hour. The South Stage Overpass and I-5/South Stage Interchange scenarios increase volumes at certain movements because they increase the convenience of different routes (e.g., the I-5/South Stage Interchange scenario introduces local trips on I-5 within Medford). The scenarios also show some reductions at intersections around the I-5/South Medford Interchange due to the introduction of jobs and services east of I-5 allowing alternative services to those along the OR99 corridor east of I-5.

Table 7 summarizes the operations results under the weekday AM peak hour at this location under each scenario. The v/c ratio is anticipated to continue to exceed targets under all alternative scenarios. An alternative mobility target will be needed.

**Table 7. I-5 Freeway Segment Operations, Year 2045 No-Build Weekday AM Peak Hour**

Segment	Direction	Type	Operating Target	No-Build Scenario	Existing System Enhancement Scenario	South Stage Overpass Enhanced Scenario	I-5/South Stage Interchange Enhanced Scenario
Garfield Street/I-5 SB off-ramp	SB	Diverge	v/c ≤ 0.85	<b>v/c = 0.88</b>	<b>v/c = 0.88</b>	<b>v/c = 0.90</b>	<b>v/c = 0.86</b>

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.

## Out-of-Direction Travel

To assess how the scenarios can help reduce out-of-direction travel for people in South Medford and North Phoenix, the screening evaluation considered travel distances experienced between South Stage Road (west of OR99) and N Phoenix Road and between OR99 (north of Barnett Road) and N Phoenix Road. With the anticipated development of the Centennial property, as well as other properties to the south, people experiencing out-of-direction travel in 2045 is expected to increase significantly.

- OR99/South Stage Road to N Phoenix Road/South Stage Road: Currently, people 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/South Stage Road: Currently, people traveling between these intersections must travel east on Barnett Road, or up to approximately 0.7 miles out-of-direction when accounting for a potential South Stage Road extension.

Projected (2045) traffic volumes on the South Stage Overpass and at the I-5/South Stage Interchange ramp terminals are used to estimate the reduction in out-of-direction travelers under those scenarios. The average spacing between crossings over I-5 between Barnett Road and Phoenix Road is also used to estimate reduction in out-of-direction travel. Table 8 summarizes those results.

**Table 8. Impact to Purpose and Need**

Scenario	Impact
Existing System Enhancement	<ul style="list-style-type: none"> <li>- This scenario does not impact out-of-direction travel.</li> <li>- The average crossing spacing of I-5 between Barnett Road and Phoenix Road is approximately 1.6 miles.</li> </ul>
South Stage Overpass (Enhanced)	<ul style="list-style-type: none"> <li>- This scenario reduces out-of-direction travel for approximately 1,200 people during the PM peak hour.</li> <li>- The average crossing spacing of I-5 between Barnett Road and Phoenix Road is approximately 1.0 miles.</li> </ul>
I-5/South Stage Interchange (Enhanced)	<ul style="list-style-type: none"> <li>- This scenario reduces out-of-direction travel for approximately 1,450 people during the PM peak hour.</li> <li>- The average crossing spacing of I-5 between Barnett Road and Phoenix Road is approximately 1.0 miles.</li> </ul>

## Travel Time Analysis

Table 9 documents the travel time estimates under existing and Year 2045 PM peak hour conditions for vehicles, pedestrians, and bicyclists. This analysis considers the amount of time it would take to travel those routes; however, as noted in the previous Pedestrian, Bicycle, and Transit Access section of this TM, these routes are not necessarily comfortable for users of most ages and abilities. Figure 17 illustrates the routes assumed in the travel time analysis.

Travel times shown in Table 9 are reflective of the average, per user, per trip time savings. Travel times compound when considering the number of people who benefit from reduced travel times over time.



**Table 9. Travel Time Analysis (PM Peak Hour)**

Route	Mode	Existing	Year 2045 No-Build	Year 2045 Existing System Enhancement	Year 2045 South Stage Overpass (Enhanced)	Year 2045 I-5/South Stage Interchange (Enhanced)
South Stage Road/OR99 to Phoenix Road/future South Stage Road (northern route)	Vehicle	14 minutes	16 minutes	15 minutes	3 minutes (via new, direct middle route)	3 minutes (via new, direct middle route)
	Pedestrian	112 minutes	114 minutes	113 minutes	29 minutes (via new, direct middle route)	29 minutes (via new, direct middle route)
	Bicyclist	32 minutes	34 minutes	33 minutes	8 minutes (via new, direct middle route)	8 minutes (via new, direct middle route)
South Stage Road/OR99 to Phoenix Road/future South Stage Road (southern route)	Vehicle	6 minutes	7 minutes	6 minutes	3 minutes (via new, direct middle route)	3 minutes (via new, direct middle route)
	Pedestrian	59 minutes	61 minutes	60 minutes	29 minutes (via new, direct middle route)	29 minutes (via new, direct middle route)
	Bicyclist	16 minutes	17 minutes	16 minutes	8 minutes (via new, direct middle route)	8 minutes (via new, direct middle route)
I-5 Northbound/Southbound to Asante Medical Center	Vehicle	6 minutes	7 minutes	6 minutes	6 minutes	6 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	10 minutes	10 minutes	10 minutes
	Pedestrian	57 minutes	58 minutes	58 minutes	58 minutes	57 minutes
	Bicyclist	18 minutes	19 minutes	19 minutes	19 minutes	18 minutes
South Medford Interchange to Phoenix Road/potential future South Stage intersection	Vehicle	6 minutes	7 minutes	6 minutes	6 minutes	4 minutes (via new route available along I-5)
	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	11 minutes	8 minutes (via new route available via OR99 and new South stage Road Extension)	8 minutes (via new route available via OR99 and new South stage Road Extension)
	Pedestrian	84 minutes	85 minutes	84 minutes	69 minutes	69 minutes
	Bicyclist	24 minutes	25 minutes	24 minutes	20 minutes	20 minutes

The South Stage Overpass and I-5/South Stage Interchange Scenarios provide the greatest opportunity to reduce travel times by providing more direct routes. Travel times along existing routes are similar under all build scenarios.



Figure 17. Travel Time and Out-of-Direction Travel Analysis



## EMERGENCY RESPONSE ACCESS

This section discusses the potential benefits each scenario has on emergency response access. The Existing System Enhancement scenario provides minimal benefits by reducing congestion; the South Stage Overpass and I-5/South Stage Interchange scenarios provide additional redundant routes and reduce congestion. The I-5/South Stage Interchange scenario provides increased access to I-5, which is especially helpful during emergency events.

Figure 18 illustrates the location of fire stations, police departments, and medical centers in the study area. Today, 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 periods of disruption to freeway flows and/or emergency events, the following routes would likely be used by emergency vehicles:

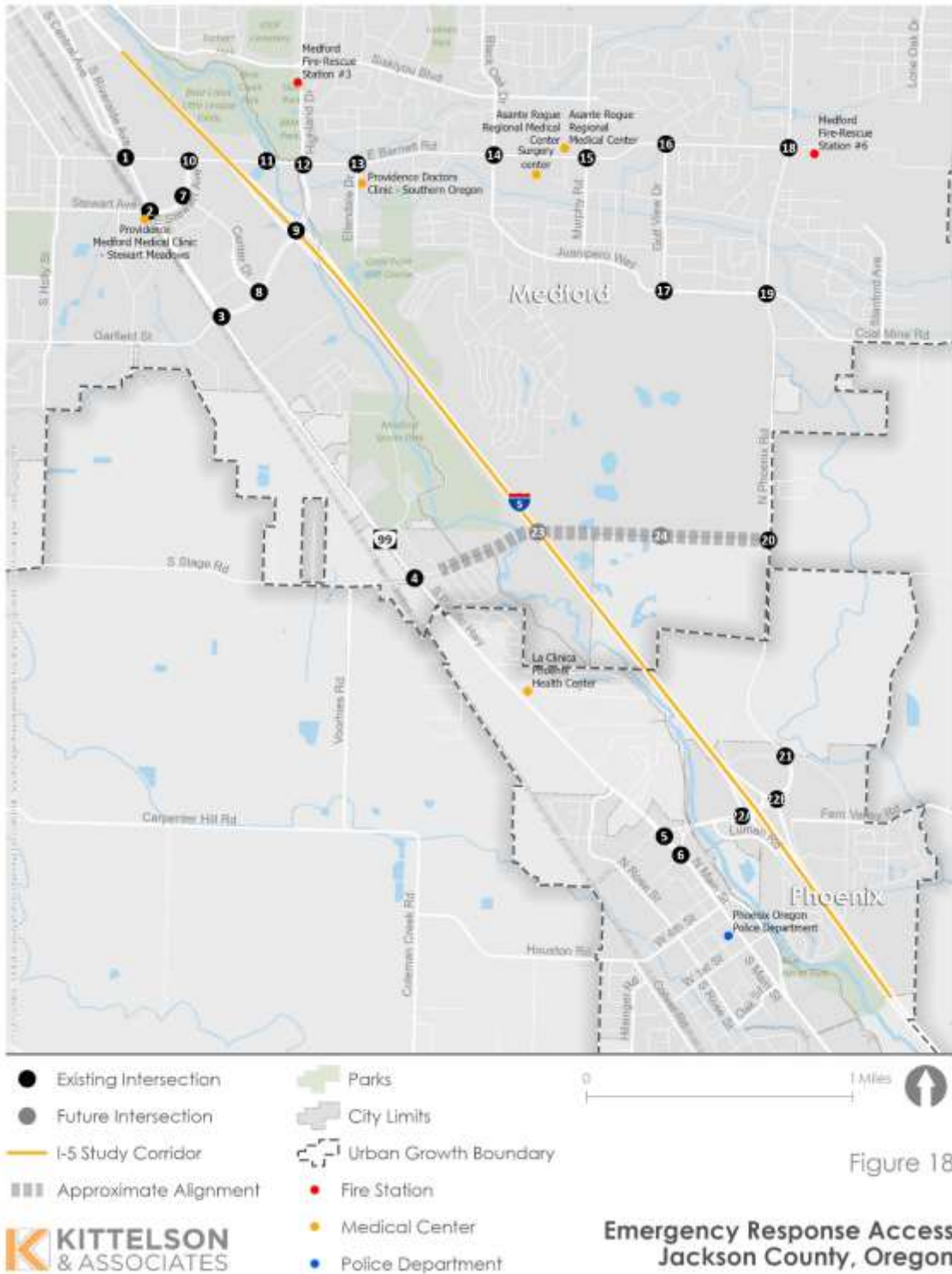
- If the South Medford Interchange is affected, emergency vehicles would need to reroute to travel east-west via OR99 or Phoenix Road to Barnett Road and the Phoenix Interchange.
- If Barnett Road is affected, emergency vehicles would need to reroute north via OR99 or Phoenix Road to Siskiyou Boulevard.
- If the Phoenix Interchange is affected, 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 delays in response times and affect the ability of emergency service providers to serve the needs of the community. Increased congestion in the future further exacerbates this situation. Table 10 summarizes the impacts each scenario has on emergency response access. Providing additional routes with shorter travel times would support emergency responsiveness, accessibility to the Asante Rogue Regional Medical Center on Barnett Road, and evacuation resiliency during wildfires or other natural disasters.

**Table 10. Potential Benefits to Emergency Response Access**

Scenario	Benefits
Existing System Enhancement	- Some benefit to reducing congestion issues.
South Stage Overpass (Enhanced)	- Increases redundant routes and reduces travel times/congestion to support emergency response access.
I-5/South Stage Interchange (Enhanced)	- Provides increased access to I-5 during emergency events. - Increases redundant routes and reduces travel times/congestion to support emergency response access.

Figure 18. Emergency Response Service Locations



## SAFETY IMPROVEMENTS

This section discusses the potential benefits each scenario has on safety. Table 11 illustrates the Crash Modification Factors (CMF) for intersection projects recommended to address operational deficiencies. CMFs are multiplicative factors used to compute the expected number of crashes after implementing a countermeasure on a road or intersection. The lower the CMF values, the higher the anticipated crash reduction. Generally, the CMFs under the three scenarios are the same, except for the following countermeasures:

- The construction of a separate right-turn lane on the north leg of Barnett Road/Black Oak Drive (with a 4 percent reduction in all crashes at all severities) would be needed only under the Existing System Enhancement scenario.
- Converting the intersection of Golf View Drive/future South Stage Road from two-way stop control to a roundabout (with an 82 percent reduction in all crashes at all injury severities) would be needed under the South Stage Overpass Enhanced and I-5/South Stage Interchange Enhanced Scenarios.
- The construction of a separate right-turn lane on the east leg of OR99/South Stage Road (with a 4 percent reduction in all crashes at all severities) would be needed under the South Stage Overpass Enhanced and I-5/South Stage Interchange Enhanced scenarios.

**Table 11. Crash Modification Factors for Intersection Projects Addressing Operations Needs**

Intersection	Projects	Crash Modification Factors (CMFs)	Applicable Scenarios
I-5/South Medford Interchange	Interchange Area Management Plan (IAMP) improvements: <ul style="list-style-type: none"> <li>- Widen the southbound off-ramp to allow 1,000-foot dual left-turn lanes.</li> <li>- Extend the southbound ramp to 3,000 feet to accommodate queuing.</li> <li>- Widen the northbound off-ramp to accommodate a 1,000-foot left-turn lane.</li> <li>- Ramp metering.</li> </ul>	<ul style="list-style-type: none"> <li>- Ramp metering: 0.59 (61% reduction in all crashes at all severities; <i>Source: CMF Clearinghouse – CMF IF 10555</i>).</li> <li>- Although there are safety benefits of extending the off-ramps, an applicable CMF representative of this adjustment is not available. However, the additional storage would lower the probability of high-speed rear-end collisions.</li> </ul>	<ul style="list-style-type: none"> <li>- Existing System Enhancement</li> <li>- South Stage Overpass</li> <li>- I-5/South Stage Interchange</li> </ul>
OR99/N Phoenix-Bolz Road	<ul style="list-style-type: none"> <li>- Construct separated right- and left-turn lanes on the west leg of the intersection and a secondary right-turn lane on the south leg of the intersection.</li> </ul>	<ul style="list-style-type: none"> <li>- Left-turn lane: 0.90 (10% reduction in all crashes at all severities; <i>Source: ODOT All Roads Transportation Safety Program (ARTS) – H12</i>).</li> <li>- Right-turn lane: 0.96 (4% reduction in all crashes at all severities; <i>Source: ARTS – H4</i>).<sup>9</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Existing System Enhancement</li> <li>- South Stage Overpass</li> <li>- I-5/South Stage Interchange<sup>10</sup></li> </ul>

<sup>9</sup> Does not apply to the secondary right-turn lane on the south leg of the intersection.

<sup>10</sup> Secondary right-turn lane on the south leg of the intersection not added for Interchange

Intersection	Projects	Crash Modification Factors (CMFs)	Applicable Scenarios
Barnett Road/Black Oak Drive	<ul style="list-style-type: none"> <li>Construct a separate right-turn lane on the north leg of the intersection.</li> </ul>	<ul style="list-style-type: none"> <li>0.96 (4% reduction in all crashes at all severities; Source: ARTS – H4).</li> </ul>	<ul style="list-style-type: none"> <li>Existing System Enhancement</li> </ul>
Juanipero Way/Golf View Drive	<ul style="list-style-type: none"> <li>Convert the intersection from two-way to all-way stop control.</li> </ul>	<ul style="list-style-type: none"> <li>0.25 (75% reduction in angle crashes at all severities; Source: ARTS – H20).</li> </ul>	<ul style="list-style-type: none"> <li>Existing System Enhancement</li> <li>South Stage Overpass</li> <li>I-5/South Stage Interchange</li> </ul>
Golf View Drive/future South Stage Road	<ul style="list-style-type: none"> <li>Convert the intersection from two-way stop control to a roundabout.</li> </ul>	<ul style="list-style-type: none"> <li>0.18 (82% reduction in all crashes at all injury severities; Source: ARTS – H18).</li> </ul>	<ul style="list-style-type: none"> <li>South Stage Overpass</li> <li>I-5/South Stage Interchange</li> </ul>
Future South Stage Road/N Phoenix Road	<ul style="list-style-type: none"> <li>Convert the intersection to a roundabout or traffic signal.</li> </ul>	<ul style="list-style-type: none"> <li>Traffic signal: 0.33 (67% reduction in angle crashes at all severities; Source: ARTS – H22)</li> <li>Roundabout: 0.18 (82% reduction in all crashes at all injury severities; Source: ARTS – H18).</li> </ul>	<ul style="list-style-type: none"> <li>Existing System Enhancement</li> <li>South Stage Overpass</li> <li>I-5/South Stage Interchange</li> </ul>
OR99/South Stage Road	<ul style="list-style-type: none"> <li>Construct a separate right-turn lane on the east leg of the intersection.</li> </ul>	<ul style="list-style-type: none"> <li>0.96 (4% reduction in all crashes at all severities; Source: ARTS – H4).</li> </ul>	<ul style="list-style-type: none"> <li>South Stage Overpass</li> <li>I-5/South Stage Interchange</li> </ul>

Table 12 illustrates the total entering vehicles under each scenario for intersections with existing safety needs. The total entering vehicles across all the intersections with identified safety needs in the aggregate is 5 percent lower for the South Stage Overpass scenario and 7 percent lower for the I-5/South Stage Interchange scenario.

**Table 12. Traffic Volumes at Intersections**

Intersection	Safety Need	Total Entering Vehicles (2045 PM Peak Hour)			
		No-Build	Existing System Enhancement	South Stage Overpass (Enhanced)	I-5/South Stage Interchange (Enhanced)
I-5/South Medford Interchange	<ul style="list-style-type: none"> <li>Safety Priority Index System (SPIS) 2021 List</li> </ul>	5,294	5,294; no change	4,943; 7% decrease	4,952; 6% decrease
Barnett Road/Golf View Drive	<ul style="list-style-type: none"> <li>Exceeds 90th percentile crash rate</li> <li>Exceeds critical crash rate</li> </ul>	1,500	1,500; no change	1,393; 7% decrease	1,371; 9% decrease
Garfield Street/Center Drive	<ul style="list-style-type: none"> <li>Exceeds critical crash rate</li> </ul>	4,317	4,317; no change	4,018; 7% decrease	4,004; 7% decrease
OR99/Stewart Avenue	<ul style="list-style-type: none"> <li>SPIS 2021 top 85% list</li> </ul>	4,387	4,387; no change	4,345; 1% decrease	4,231; 4% decrease

OR99/Garfield Street	- SPIS 2021 top 90% list	4,444	4,444; no change	4,256; 4% decrease	4,020; 10% decrease
TOTAL		19,942	19,942; no change	18,955; 5% decrease	18,578; 7% decrease

## ANALYSIS FINDINGS

Table 13 summarizes the scenario evaluation according to the evaluation criteria documented in TM #2.1.3: Goals, Objectives, Evaluation Criteria, and Performance Measures. The Existing System Enhancement scenario does not address the Purpose and Need based on the documented existing and future system transportation needs. Given the inability to meet the Purpose and Need, the screening demonstrates that this is not a viable scenario under which alternatives could be developed. The enhanced versions of the South Stage Overpass and I-5/South Stage Interchange scenarios both improve conditions and, at this screening level, show the potential to meet the Purpose and Need. Therefore, these scenarios should be considered in developing specific alternatives for further evaluation.

**Table 13. Existing and Future Needs Summary**

Related Need/Objective	Evaluation Criteria	Performance Measure	Year 2045 No-Build	Year 2045 Build Existing System Enhancement	Year 2045 Build – South Stage Overpass (Enhanced)	Year 2045 Build – I-5/South Stage Interchange (Enhanced)
<b>Purpose 1. Reduce out of direction travel by improving east-west multimodal connectivity across Interstate-5</b>						
Need 1A. I-5 creates a barrier to local east-west travel that limits local road connectivity.	For scenario screening: Does the alternative reduce the adt on Barnett, Garfield, and Phoenix Roads crossing I-5? For evaluation and narrowing: If so, by how much?	ADT on bridge for each overcrossing/interchange <sup>1</sup> (Phoenix Road, potential new location, Garfield, and Barnett) of I-5	South Medford Interchange Bridge: 37,610 <sup>1</sup>	South Medford Interchange: 37,610 (no change) <sup>1</sup>	South Medford Interchange: 33,460 (11% decrease) <sup>1</sup>	South Medford Interchange: 33,380 (11% decrease) <sup>1</sup>
			Phoenix Interchange: 20,555 <sup>1</sup>	Phoenix Interchange: 20,555 (no change) <sup>1</sup>	Phoenix Interchange: 18,515 (10% decrease) <sup>1</sup>	Phoenix Interchange: 16,625 (19% decrease) <sup>1</sup>
			Barnett Road: 21,690 <sup>1</sup>	Barnett Road: 21,690 (no change) <sup>1</sup>	Barnett Road: 20,655 (5% reduction) <sup>1</sup>	Barnett Road: 20,320 (6% decrease) <sup>1</sup>
			N/A	N/A	New location (overpass): 12,060 <sup>1</sup>	New location (interchange): 14,440 <sup>1</sup>
Need 1B. Out-of-direction travel.	For scenario screening: Does the alternative reduce the travel distance and out-of-direction travel? For evaluation and narrowing: If so, by how much? For scenario screening: Does the alternative reduce the 2.65-mile gap for pedestrians and bicycles crossing I-5 and Bear Creek? For evaluation and narrowing: If so, by how much?	Travel distance: - OR99/Barnett to South Stage/Phoenix - OR99/South Stage to South Stage/Phoenix  Average I-5 crossing spacing	Travel distance: - OR99/Barnett Road to South Stage Road/Phoenix Road: 4.0 miles - OR99/South Stage Road to N Phoenix Road/South Stage Road: 5.2 mi (north route) or 3.0 mi (south route)  Average I-5 crossing spacing between Barnett to Phoenix Road: 1.6 miles	Travel distance: - OR99/Barnett Road to South Stage Road/Phoenix Road: 4.0 miles - OR99/South Stage Road to N Phoenix Road/South Stage Road: 5.2 mi (north route) or 3.0 mi (south route)  Average I-5 crossing spacing between Barnett to Phoenix Road: 1.6 miles	Travel distance: - OR99/Barnett Road to South Stage Road/Phoenix Road: 3.2 miles - OR99/South Stage Road to N Phoenix Road/South Stage Road: 1.4 mi  Average I-5 crossing spacing between S Stage Road to Barnett Road: 1.0 miles	Travel distance: - OR99/Barnett Road to South Stage Road/Phoenix Road: 3.2 miles - OR99/South Stage Road to N Phoenix Road/South Stage Road: 1.4 mi  Average I-5 crossing spacing between S Stage Road to Barnett Road: 1.0 miles
			Need 1C. Poor east-west travel times.	For scenario screening: Does the alternative reduce travel times? For evaluation and narrowing: If so, by how much?	Travel time (vehicle/pedestrian <sup>2</sup> /bicycle <sup>2</sup> ): - OR99/Barnett to South Stage/Phoenix - OR99/South Stage to South Stage/Phoenix	Travel times for OR99/Barnett Road to South Stage Road/Phoenix Road (PM peak hour): - Vehicle: 11 min - Pedestrian: 85 min - Bicycle: 25 min  Travel times for OR99/South Stage Road to South Stage Road/Phoenix Road (PM peak hour): - Vehicle: 7 min - Pedestrian: 61 min - Bicycle: 17 min



Related Need/Objective	Evaluation Criteria	Performance Measure	Year 2045 No-Build	Year 2045 Build Existing System Enhancement	Year 2045 Build – South Stage Overpass (Enhanced)	Year 2045 Build – I-5/South Stage Interchange (Enhanced)
<b>Purpose 2. Reduce existing and projected congestion and related traffic safety issues in the vicinity of the Interstate-5 interchanges with Garfield St. and N. Phoenix Rd. and the adjacent local street network</b>						
<p>Need 2A. Congestion at the existing interchanges and the local roads accessing the interchanges in year 2045.</p>	<p>For scenario screening: Does the alternative allow the intersection, interchange, and freeway merge/diverge points to meet the mobility target or stay under capacity in the direction of the mobility targets (potential for an alternative mobility target)?</p> <p>For evaluation and narrowing: If so, by how much?</p>	<p>V/c ratio &amp; LOS</p>	<p>Most study intersections meet mobility targets, with the following exceptions:</p> <p>AM peak period</p> <ul style="list-style-type: none"> <li>- I-5/South Medford SB off-ramp diverge: v/c=<b>0.88</b></li> </ul> <p>PM peak period</p> <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.97</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=<b>0.98</b></li> <li>- Barnett Road/Black Oak Drive: LOS=<b>E</b></li> <li>- Juanipero Way/Golf View Drive: LOS=<b>F</b></li> <li>- Phoenix Road/future South Stage Road: LOS=<b>E</b></li> </ul>	<p>Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets.</p> <p>AM peak period</p> <ul style="list-style-type: none"> <li>- I-5 South Medford SB off-ramp diverge: v/c=<b>0.88</b></li> </ul> <p>PM peak period</p> <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.97</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=0.85</li> <li>- Barnett Road/Black Oak Drive: LOS=D</li> <li>- Juanipero Way/Golf View Drive: LOS=C</li> <li>- Phoenix Road/future South Stage Road: LOS=A</li> </ul>	<p>Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets.</p> <p>AM peak period</p> <ul style="list-style-type: none"> <li>- I-5 South Medford SB off-ramp diverge: v/c=<b>0.90</b></li> </ul> <p>PM peak period</p> <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.96</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=0.85</li> <li>- Barnett Road/Black Oak Drive: LOS=D</li> <li>- Juanipero Way/Golf View Drive: LOS=D</li> <li>- Phoenix Road/future South Stage Road: LOS=A</li> </ul>	<p>Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets.</p> <p>AM peak period</p> <ul style="list-style-type: none"> <li>- I-5 South Medford SB off-ramp diverge: v/c=<b>0.86</b></li> </ul> <p>PM peak period</p> <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.94</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=0.85</li> <li>- Barnett Road/Black Oak Drive: LOS=D</li> <li>- Juanipero Way/Golf View Drive: LOS=B</li> <li>- Phoenix Road/future South Stage Road: LOS=A</li> </ul>
<p>Need 2B. Reduce traffic volumes at intersections with high crash rates</p>	<p>For scenario screening: Does the alternative maintain or reduce traffic demand at identified high-crash locations?</p> <p>For evaluation and narrowing: If so, by how much?</p> <p>For scenario screening: Does the alternative modify the intersection and/or segment to reduce the identified crash types? For evaluation and narrowing: If so, by how much?</p>	<p>Total entering traffic (TET)</p> <p>Crash modification factor</p>	<p>The following intersections are identified as having safety deficiencies. PM peak hour TET is provided in parenthesis:</p> <ul style="list-style-type: none"> <li>- Barnett Road/Golf View Drive (1,500)</li> <li>- Garfield Street/Center Drive (4,317)</li> <li>- OR99/Stewart Avenue (4,387)</li> <li>- OR99/Garfield Street (4,444)</li> <li>- I-5/South Medford Interchange (5,294)</li> </ul>	<p>TET:</p> <ul style="list-style-type: none"> <li>- There are no changes to the TET at the intersections with identified safety deficiencies</li> </ul> <p>CMF:</p> <ul style="list-style-type: none"> <li>- Ramp metering at the I-5/South Medford Interchange has a CMF of 0.59</li> <li>- Constructing a separate left- and right-turn lane at OR99/N Phoenix-Bolz Road has a CMF of 0.90 and 0.96</li> <li>- Constructing a separate right-turn lane at Barnett Road/Black Oak Drive has a CMF of 0.96</li> <li>- Converting the Juanipero Way/Golf View Drive intersection to an all-way stop has a CMF of 0.25</li> <li>- Converting the future South Stage Road/N Phoenix Road intersection to a roundabout or traffic signal has a CMF of 0.33 and 0.18, respectively</li> </ul>	<p>TET decreases for all intersections with identified safety deficiencies:</p> <ul style="list-style-type: none"> <li>- Barnett Road/Golf View Drive (1,393; 7% decrease)</li> <li>- Garfield Street/Center Drive (4,018; 7% decrease)</li> <li>- OR99/Stewart Avenue (4,345; 1% decrease)</li> <li>- OR99/Garfield Street (4,256; 4% decrease)</li> <li>- I-5/South Medford Interchange (4,943; 7% decrease)</li> </ul> <p>CMF:</p> <ul style="list-style-type: none"> <li>- Ramp metering at the I-5/South Medford Interchange has a CMF of 0.59</li> <li>- Constructing a separate left- and right-turn lane at OR99/N Phoenix-Bolz Road has a CMF of 0.90 and 0.96</li> <li>- Converting the Juanipero Way/Golf View Drive intersection to an all-way stop has a CMF of 0.25</li> <li>- Converting the intersection of Golf View Drive/future South Stage Road to a roundabout has a CMF of 0.18</li> <li>- Converting the future South Stage Road/N Phoenix Road intersection to a roundabout</li> </ul>	<p>TET decreases for all intersections with identified safety deficiencies:</p> <ul style="list-style-type: none"> <li>- Barnett Road/Golf View Drive (1,371; 9% decrease)</li> <li>- Garfield Street/Center Drive (4,004; 7% decrease)</li> <li>- OR99/Stewart Avenue (4,231; 4% decrease)</li> <li>- OR99/Garfield Street (4,020; 10% decrease)</li> <li>- I-5/South Medford Interchange (4,952; 6% decrease)</li> </ul> <p>CMF:</p> <ul style="list-style-type: none"> <li>- Ramp metering at the I-5/South Medford Interchange has a CMF of 0.59</li> <li>- Constructing a separate left- and right-turn lane at OR99/N Phoenix-Bolz Road has a CMF of 0.90 and 0.96</li> <li>- Converting the Juanipero Way/Golf View Drive intersection to an all-way stop has a CMF of 0.25</li> <li>- Converting the intersection of Golf View Drive/future South Stage Road to a roundabout has a CMF of 0.18</li> <li>- Converting the future South Stage Road/N Phoenix Road intersection to a roundabout</li> </ul>

Related Need/Objective	Evaluation Criteria	Performance Measure	Year 2045 No-Build	Year 2045 Build Existing System Enhancement	Year 2045 Build – South Stage Overpass (Enhanced)	Year 2045 Build – I-5/South Stage Interchange (Enhanced)
					or traffic signal has a CMF of 0.33 and 0.18, respectively - Constructing a separate right-turn lane at OR99/South Stage Road has a CMF of 0.96	or traffic signal has a CMF of 0.33 and 0.18, respectively - Constructing a separate right-turn lane at OR99/South Stage Road has a CMF of 0.96
Need 2C. At the South Medford interchange, congestion is causing a bottleneck with southbound queues spilling back onto the I-5 mainline, which is not just a congestion issue, but also a safety concern for potential high-speed, rear-end collisions	For scenario screening: Does the alternative avoid potential spillback onto I-5? For evaluation and narrowing: If so, by how much?	Queue length	Queues are anticipated to spillback onto I-5	The scenario does not substantially change northbound or southbound vehicle queue lengths at the South Medford Interchange. However, the additional queue storage is anticipated to accommodate vehicle queues.	The scenario does not substantially change northbound or southbound vehicle queue lengths at the South Medford Interchange. However, the additional queue storage is anticipated to accommodate vehicle queues.	The scenario does not substantially change northbound or southbound vehicle queue lengths at the South Medford Interchange. However, the additional queue storage is anticipated to accommodate vehicle queues.
<b>Purpose 3. Support local system improvements associated with current and planned land uses as well as improved emergency preparedness in the rapidly urbanizing area of south Medford, Oregon and north Phoenix, Oregon</b>						
Need 3A. Local, adopted land use and transportation system plans identify South Stage Road as being needed to support future land development in the south Medford and north Phoenix areas.	For scenario screening: Does the alternative allow the intersection, interchange, and freeway merge/diverge points to meet the mobility target or stay under capacity in the direction of the mobility targets (potential for an alternative mobility target)? For evaluation and narrowing: If so, by how much?	V/c ratio & LOS	Most study intersections meet mobility targets, with the following exceptions: AM peak period - I-5 South Medford SB off-ramp diverge: v/c= <b>0.88</b>  PM peak period - OR99/Garfield Street: v/c= <b>0.97</b> - OR99/Phoenix Road-Bolz Road: v/c= <b>0.98</b> - South Medford Interchange: v/c= <b>0.84</b> - Barnett Road/Black Oak Drive: LOS= <b>E</b> - Juanipero Way/Golf View Drive: LOS= <b>F</b> - Phoenix Road/future South Stage Road: LOS= <b>E</b>	Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets. AM peak period - I-5 South Medford SB off-ramp diverge: v/c= <b>0.88</b>  PM peak period - OR99/Garfield Street: v/c= <b>0.97</b> - OR99/Phoenix Road-Bolz Road: v/c=0.85 - South Medford Interchange: v/c= <b>0.84</b> - Barnett Road/Black Oak Drive: LOS=D - Juanipero Way/Golf View Drive: LOS=C - Phoenix Road/future South Stage Road: LOS=A	Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets. AM peak period - I-5 South Medford SB off-ramp diverge: v/c= <b>0.90</b>  PM peak period - OR99/Garfield Street: v/c= <b>0.96</b> - OR99/Phoenix Road-Bolz Road: v/c=0.85 - South Medford Interchange: v/c= <b>0.83</b> - Barnett Road/Black Oak Drive: LOS=D - Juanipero Way/Golf View Drive: LOS=D - Phoenix Road/future South Stage Road: LOS=A	Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets. AM peak period - I-5 South Medford SB Off-Ramp Diverge: v/c= <b>0.86</b>  PM peak period - OR99/Garfield Street: v/c= <b>0.94</b> - OR99/Phoenix Road-Bolz Road: v/c=0.85 - South Medford Interchange: v/c= <b>0.78</b> - Barnett Road/Black Oak Drive: LOS=D - Juanipero Way/Golf View Drive: LOS=B - Phoenix Road/future South Stage Road: LOS=A
Need 3B. Without improved connectivity across and/or access to/from I-5, future congestion, safety conditions, emergency response times (for wildfire, medical, etc.) and travel times will worsen for all modes.	For scenario screening: Does the alternative allow the intersection, interchange, and freeway merge/diverge points to meet the mobility target or stay under capacity in the direction of the mobility targets (potential for an alternative mobility target)? For evaluation and narrowing: If so, by how much?	Average I-5 crossing spacing  v/c ratio & LOS	Average I-5 crossing spacing between Barnett Road and Phoenix Road - 1.6 miles  Most study intersections meet mobility targets, with the following exceptions: AM peak period - I-5 South Medford SB Off-Ramp Diverge: v/c= <b>0.88</b>  PM peak period - OR99/Garfield Street: v/c= <b>0.97</b> - OR99/Phoenix Road-Bolz Road: v/c= <b>0.98</b>	Average I-5 crossing spacing between Barnett Road and Phoenix Road: - 1.6 miles  Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets. AM peak period - I-5 South Medford SB off-ramp diverge: v/c= <b>0.88</b>	Average I-5 crossing spacing between Barnett Road and Phoenix Road: - 1.0 miles  Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets. AM peak period - I-5 South Medford SB off-ramp diverge: v/c= <b>0.90</b>	Average I-5 crossing spacing between Barnett Road and Phoenix Road: - 1.0 miles  Intersections that meet mobility standards under the No-Build scenario continue to meet mobility targets. The remaining intersections meet mobility targets, with the exceptions identified in <b>red</b> below. These intersections will need alternate mobility targets. AM peak period - I-5 South Medford SB off-ramp diverge: v/c= <b>0.86</b>

Related Need/Objective	Evaluation Criteria	Performance Measure	Year 2045 No-Build	Year 2045 Build Existing System Enhancement	Year 2045 Build – South Stage Overpass (Enhanced)	Year 2045 Build – I-5/South Stage Interchange (Enhanced)
			<ul style="list-style-type: none"> <li>- Barnett Road/Black Oak Drive: LOS=<b>E</b></li> <li>- Juanipero Way/Golf View Drive: LOS=<b>F</b></li> <li>- Phoenix Road/future South Stage Road: LOS=<b>E</b></li> </ul>	PM peak period <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.97</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=0.85</li> <li>- Barnett Road/Black Oak Drive: LOS=D</li> <li>- Juanipero Way/Golf View Drive: LOS=C</li> <li>- Phoenix Road/future South Stage Road: LOS=A</li> </ul>	PM peak period <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.96</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=0.85</li> <li>- Barnett Road/Black Oak Drive: LOS=D</li> <li>- Juanipero Way/Golf View Drive: LOS=D</li> <li>- Phoenix Road/future South Stage Road: LOS=A</li> </ul>	PM peak period <ul style="list-style-type: none"> <li>- OR99/Garfield Street: v/c=<b>0.94</b></li> <li>- OR99/Phoenix Road-Bolz Road: v/c=0.85</li> <li>- Barnett Road/Black Oak Drive: LOS=D</li> <li>- Juanipero Way/Golf View Drive: LOS=B</li> <li>- Phoenix Road/future South Stage Road: LOS=A</li> </ul>
Need 3C. Improve emergency response times via the existing interchanges and local street network accessing those interchanges	For scenario screening: Does the alternative reduce the travel time for emergency vehicles? For evaluation and narrowing: If so, by how much?	Travel time (vehicle) <ul style="list-style-type: none"> <li>- OR99/Barnett to South Stage/Phoenix</li> <li>- OR99 South Stage to South Stage/Phoenix</li> </ul>	Travel time for OR99/Barnett Road to South Stage Road/Phoenix Road (PM Peak Hour): 11 min Travel time for OR99/South Stage Road to South Stage Road /Phoenix Road (PM peak hour): 7 min	Travel time for OR99/Barnett to South Stage/Phoenix Road (PM Peak Hour): 11 min Travel time for OR99/South Stage Road to South Stage Road /Phoenix Road (PM peak hour): 6 min	Travel time for OR99/Barnett to South Stage/Phoenix Road (PM Peak Hour): 8 min Travel time for OR99/South Stage Road to South Stage Road/Phoenix Road (PM peak hour): 3 min	Travel time for OR99/Barnett to South Stage/Phoenix Road (PM Peak Hour): 8 min Travel time for OR99/South Stage Road to South Stage Road/Phoenix Road (PM peak hour): 3 min

ADT = average daily traffic; CMF = crash modification factor LOS = level of service; SB = southbound; TET = total entering traffic; v/c = volume to capacity

<sup>1</sup>ADT is estimated by multiplying the PM peak hour volume by 10. Bridge PM peak hour volumes are estimated by counting entering/exiting vehicles on the west leg of the intersection for the South Medford Interchange and as an average at the point between the ramps for the Phoenix and South Stage Interchanges. Barnett Road volumes were measured as an average of the entering/exiting volumes between the east leg of Intersection 10 and west leg of Intersection 11.

<sup>2</sup>For the purposes of estimating travel time, pedestrians are estimated to travel at an average speed of 3 mph, and bicyclists are assumed to travel at an average speed of 12 mph.

## NEXT STEPS

This memorandum will be shared with the Project Management Team, Project Development Team, and Project Advisory Committee for review and comment. Based on the comments, the project team will update this memorandum. Viable solution scenarios based on the transportation analysis screening, the environmental screening, and the land use screening will be refined and evaluated further to identify a recommended alternative.

## REFERENCES

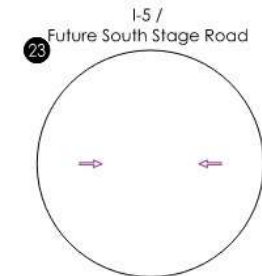
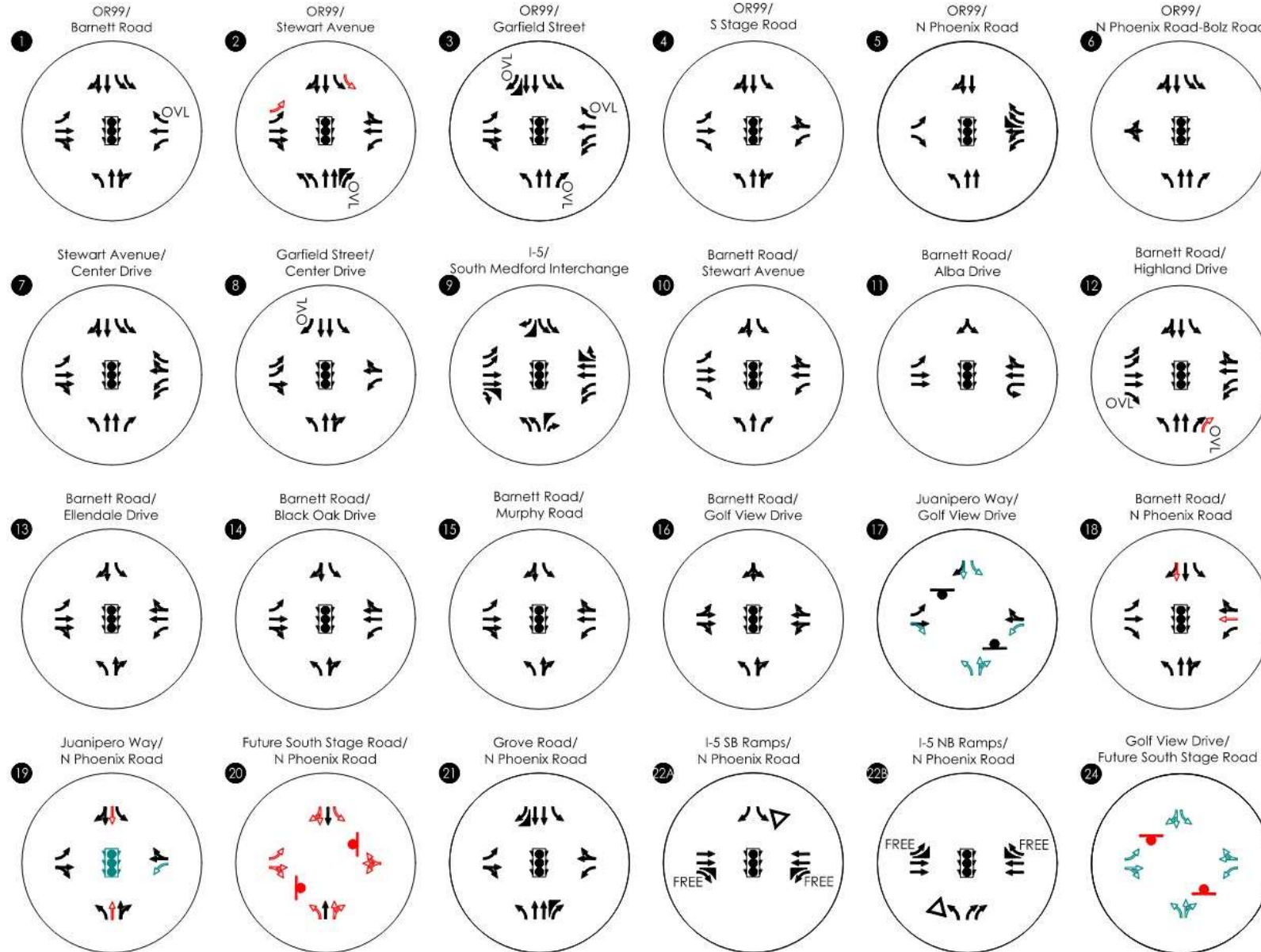
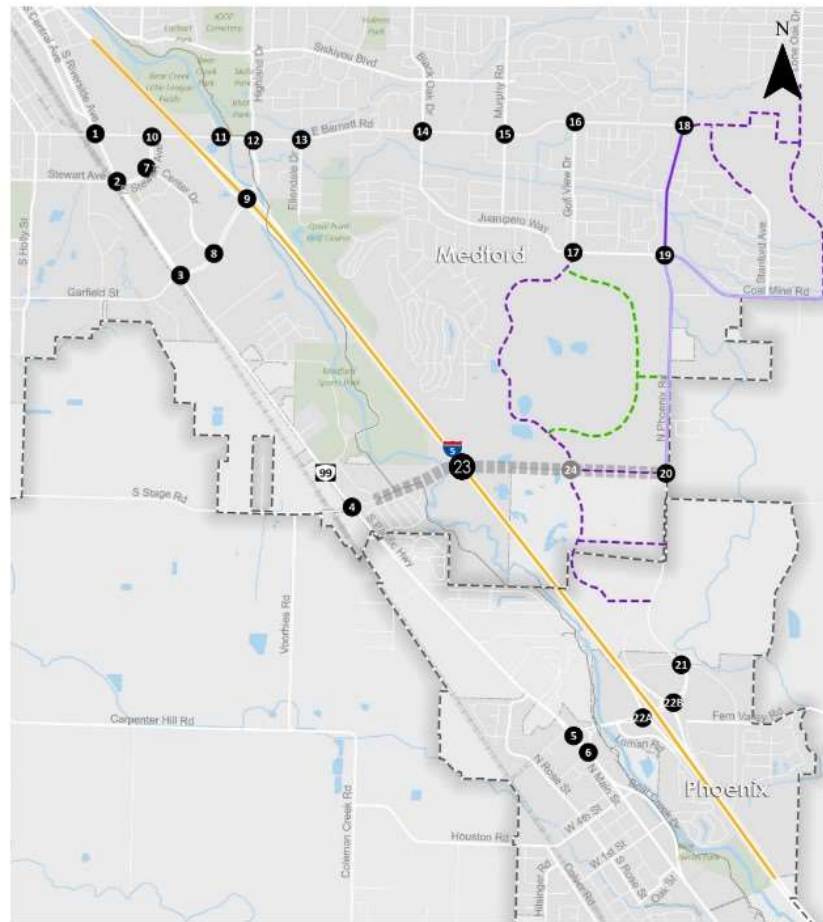
1. City of Medford. *Transportation System Plan*. 2018.
2. National Academies of Sciences, Engineering, and Medicine. *Highway Capacity Manual 7th Edition: A Guide for Multimodal Mobility Analysis*. 2022.
3. Oregon Department of Transportation. South Medford (Exit 27) Interchange Area Management Plan. 2023.

## APPENDICES

- Appendix A: Operations Analysis Worksheets
- Appendix B: South Stage Overpass and South Stage Interchange Basic Lane Configurations and Operations
- Appendix C: Future Year 2045 Traffic Volume Development and Model Outputs
- Appendix D: SimTraffic Reports

## Appendix A Operations Analysis Worksheets

Appendix B South Stage Overpass and  
South Stage Interchange Basic Lane  
Configurations and Operations

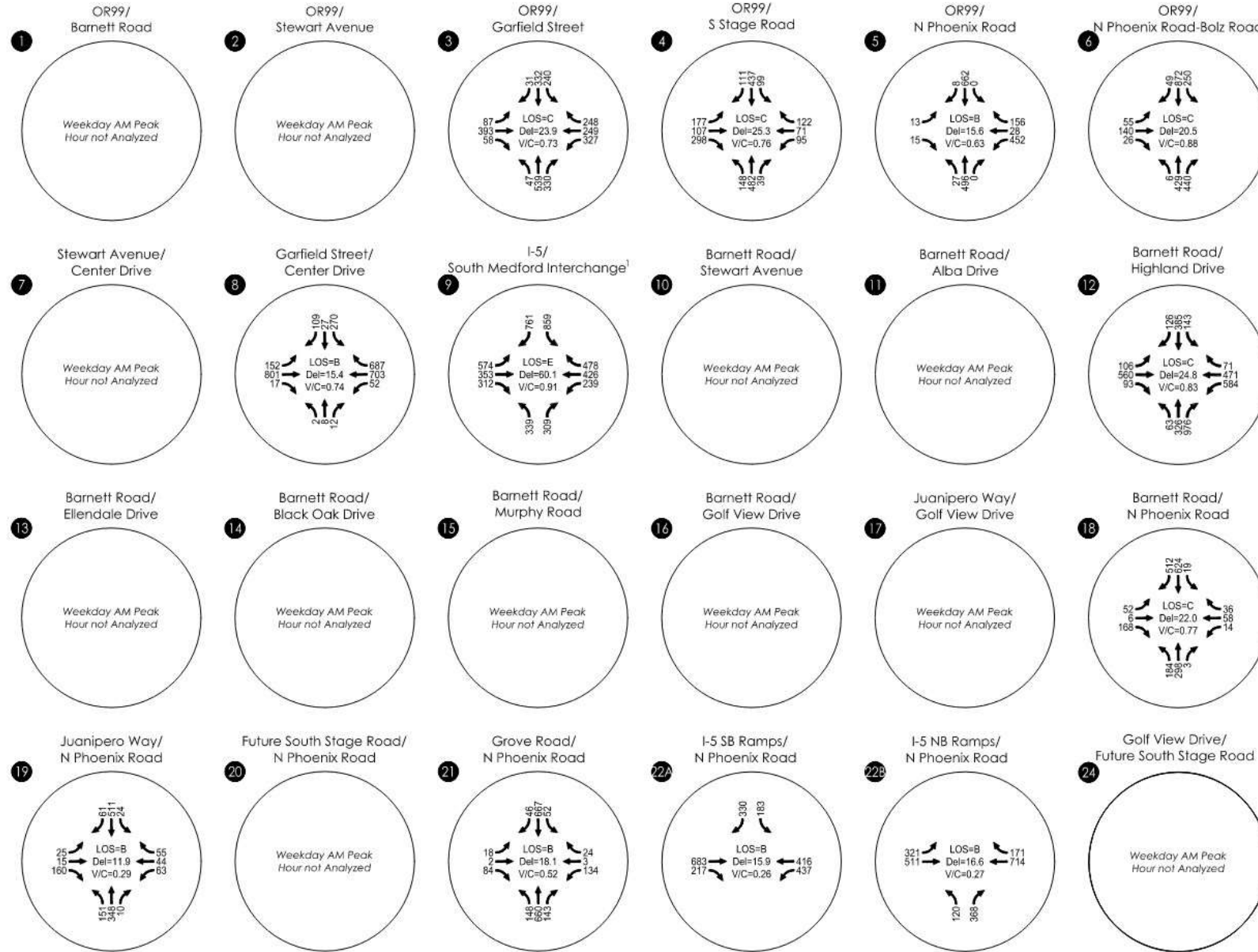
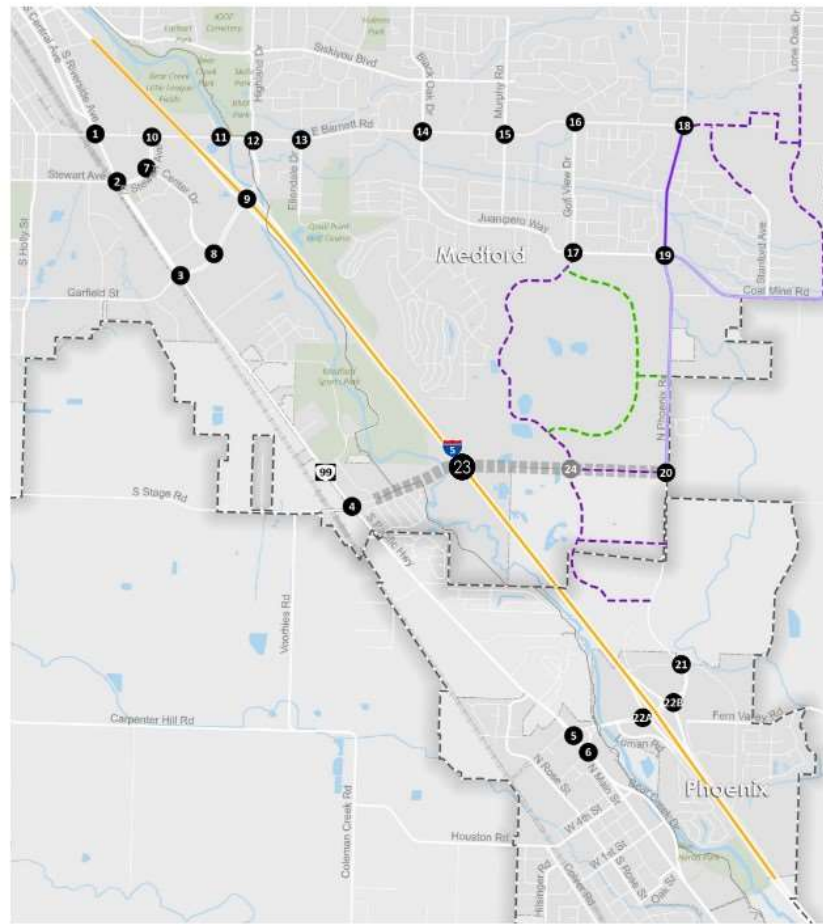


- Stop Sign
- Traffic Signal
- Yield
- Overlap
- Channelized Movement
- Existing
- Planned Improvement (TSP)
- Planned Improvement (Development)
- Enhancement

Year 2045 Build (South Stage Overpass Scenario)  
Lane Configurations and Traffic Control Devices

Figure B-1

C:\Users\agagalas\appdata\local\temp\AcPublish\_5748027003\_Figures.dwg Mar 20, 2024 - 9:29am - agagalas Layout Tab: 2045 LC Overpass Basic



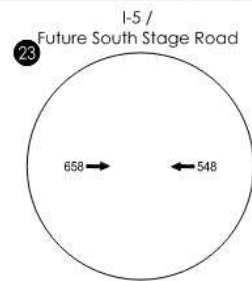
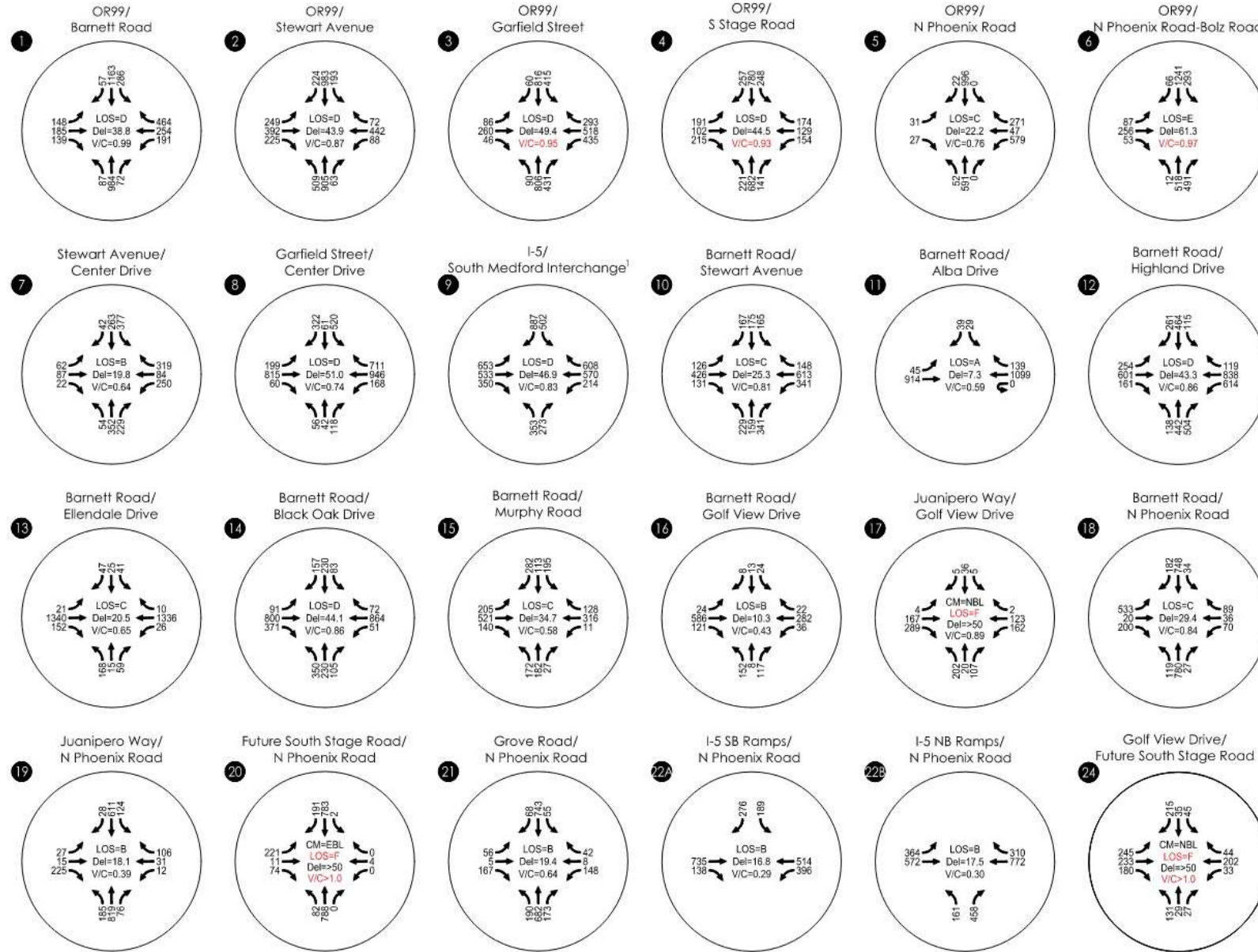
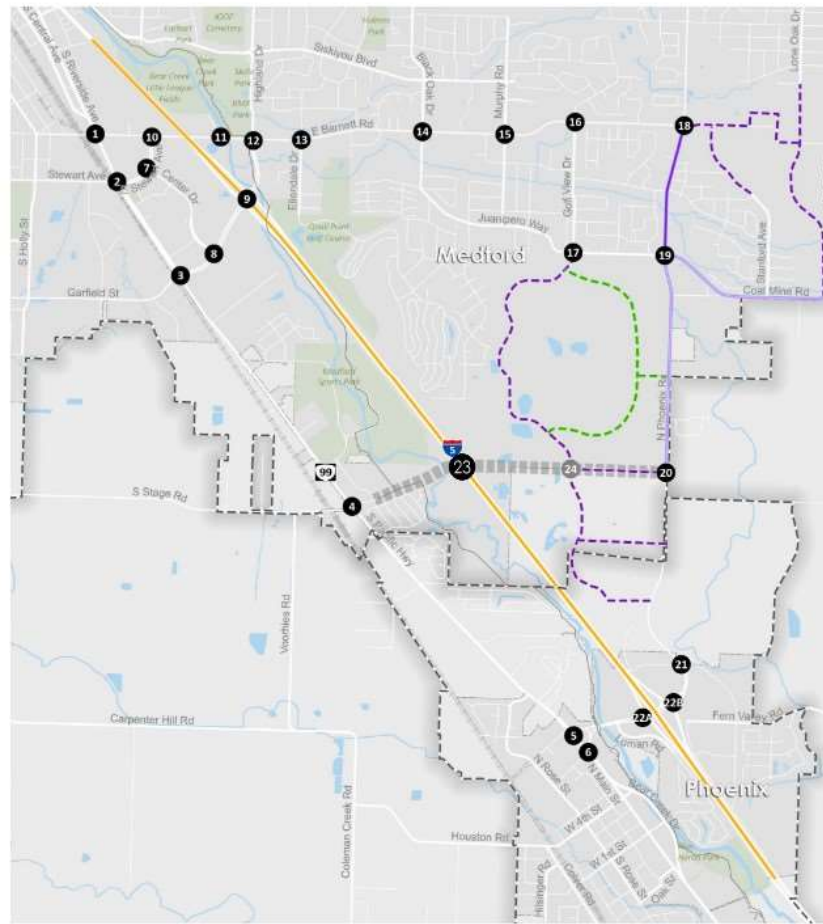
<sup>1</sup>The South Medford IAMP uses queuing as an alternate mobility standard.

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

Year 2045 Build (South Stage Overpass Scenario) Traffic Conditions  
 Weekday AM Peak Hour

Figure  
 B-2





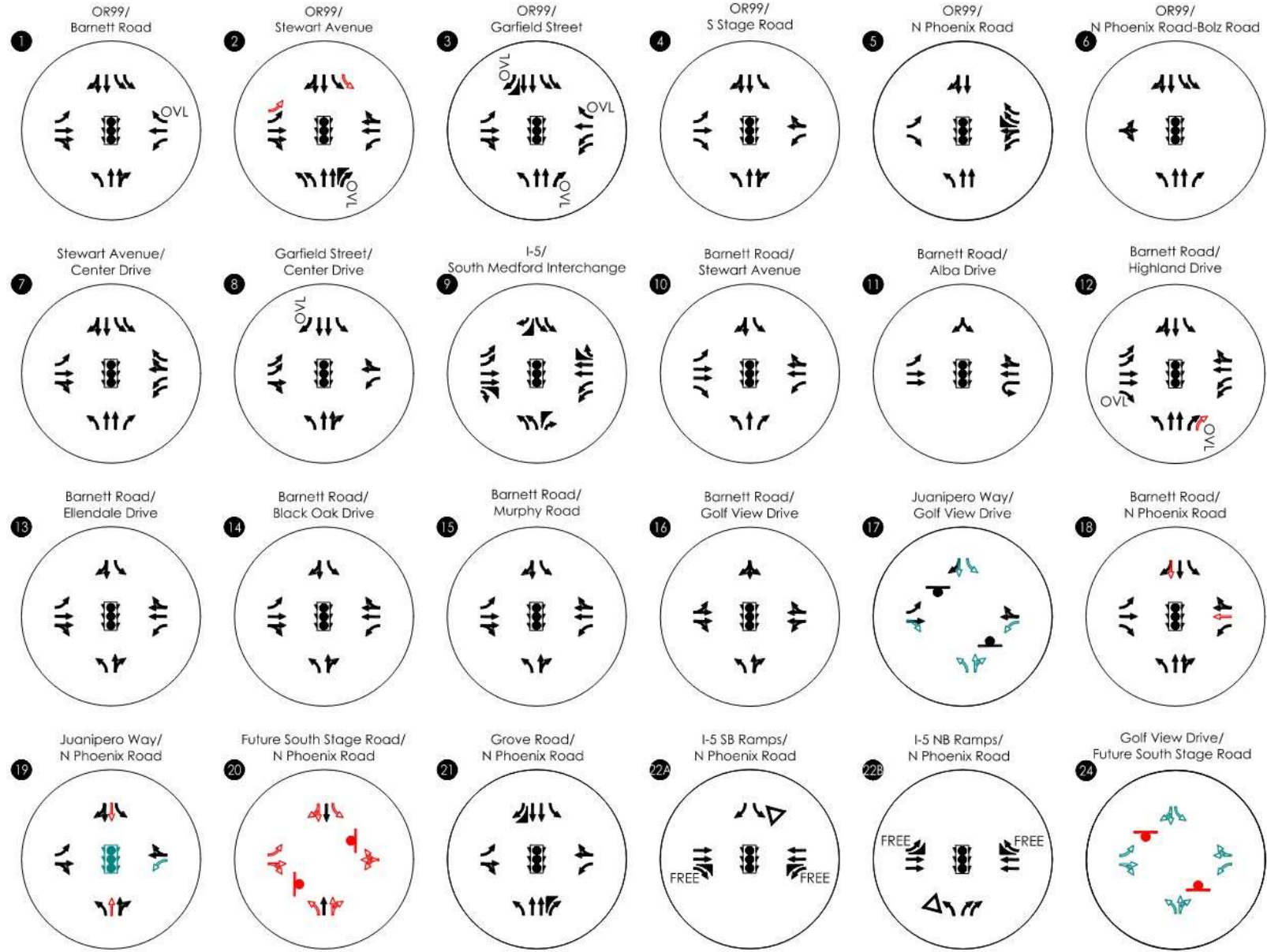
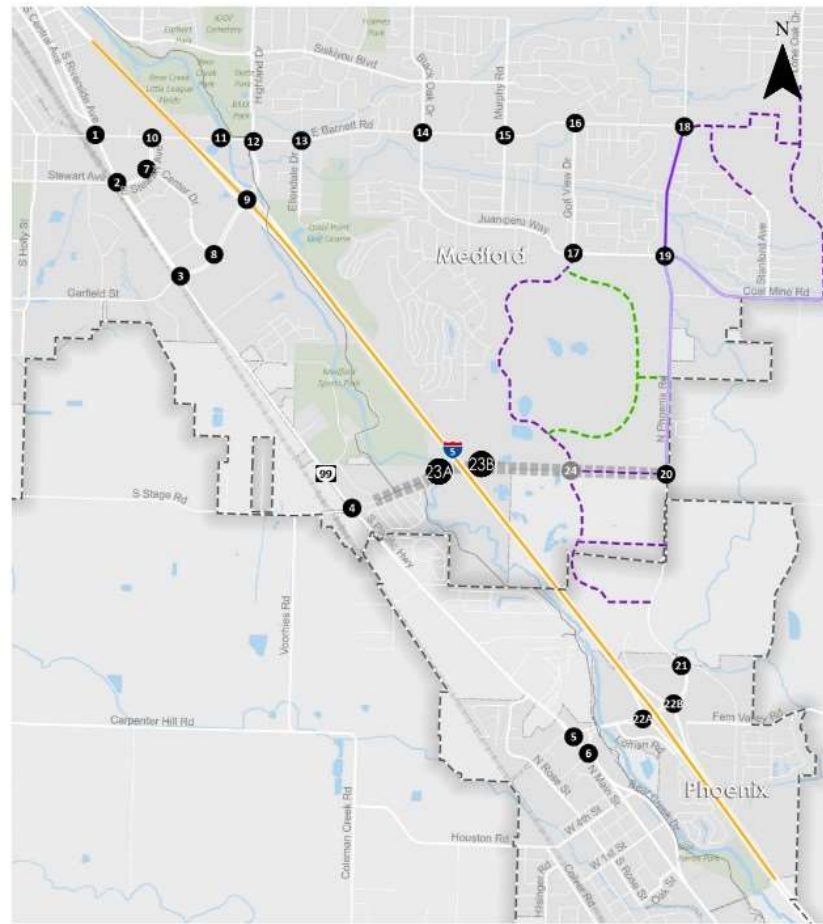
<sup>1</sup>The South Medford IAMP uses queuing as an alternate mobility standard.

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

Year 2045 Build (South Stage Overpass Scenario) Traffic Conditions  
 Weekday PM Peak Hour

Figure  
 B-3

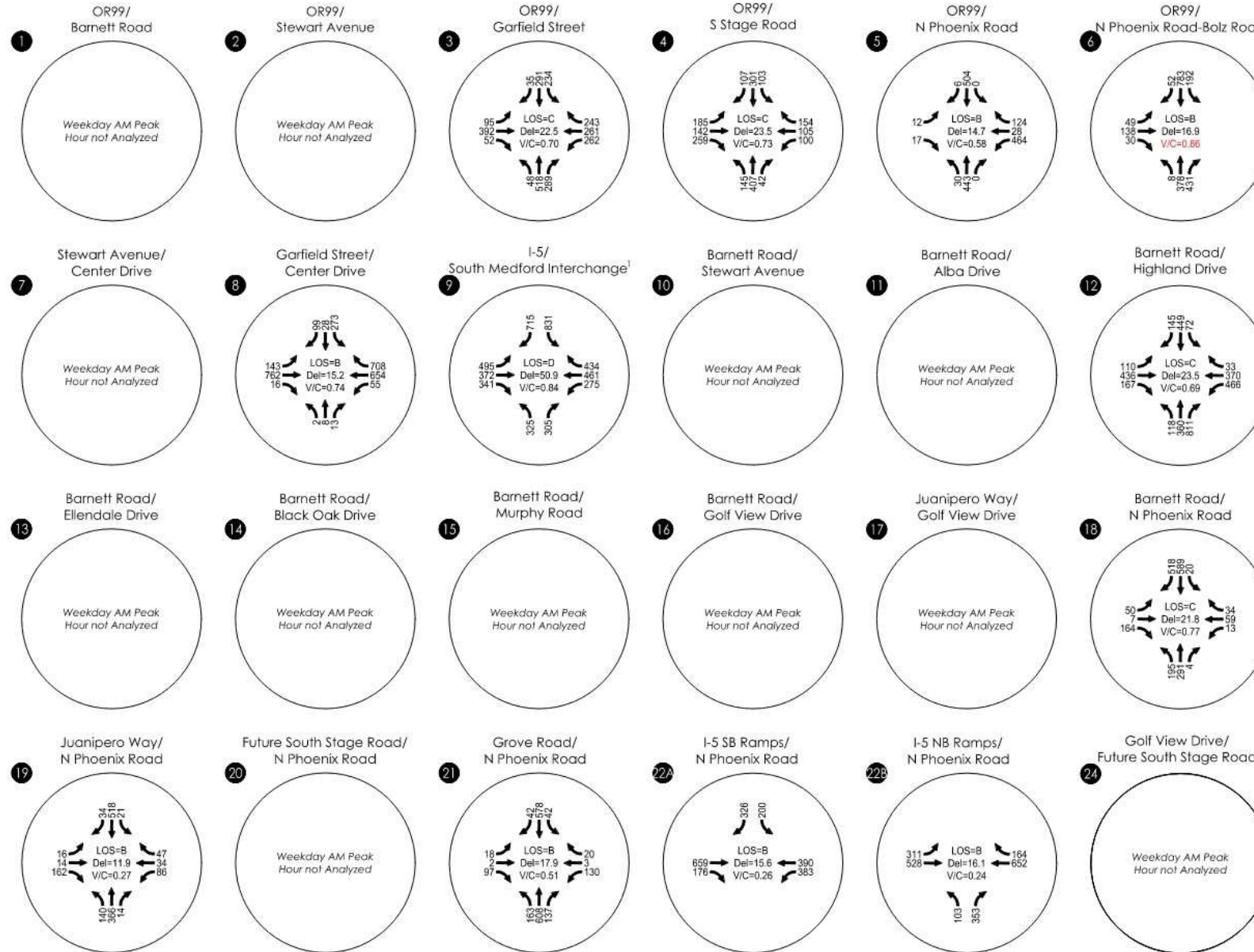
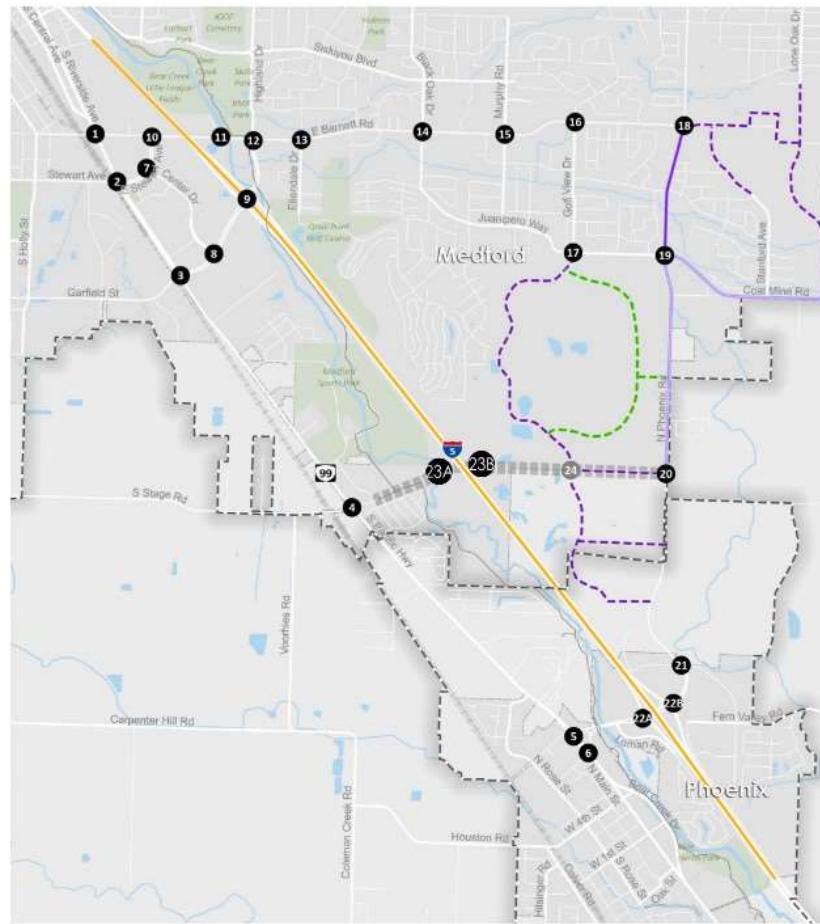
H:\2023\2003 - 0001 Transportation Planning On-call\014 - South Stage Road Extension Facility Plan\CAD Figures\27003\_Figures.dwg Apr 09, 2024 9:34am - agriffiths Layout Tab: 2045 LC Interchange Basic



- Stop Sign
- Traffic Signal
- Yield
- Overlap
- Channelized Movement
- Existing
- Planned Improvement (TSP)
- Planned Improvement (Development)
- Enhancement

Year 2045 Build (I-5/South Stage Interchange Scenario)  
Lane Configurations and Traffic Control Devices

Figure  
B-4

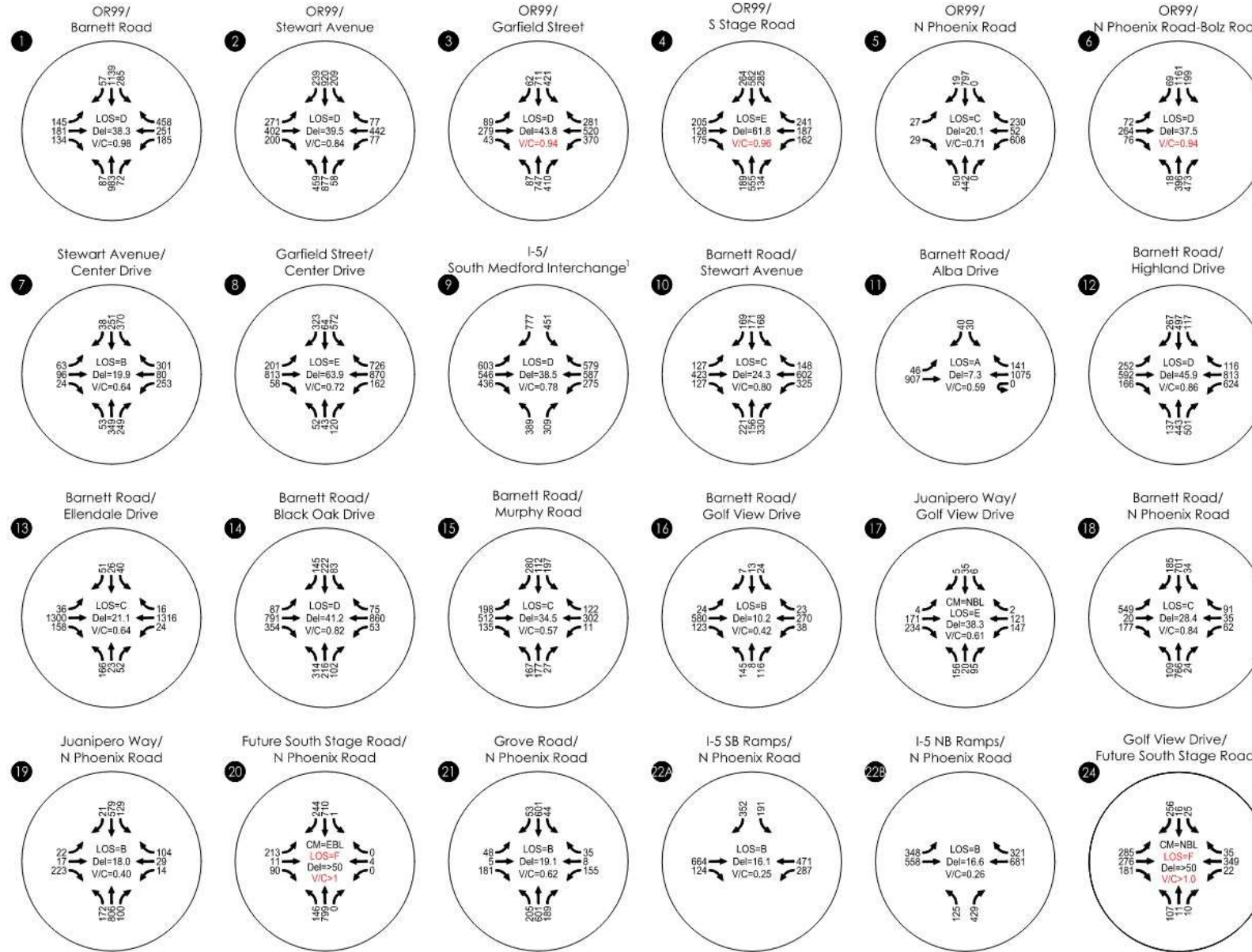
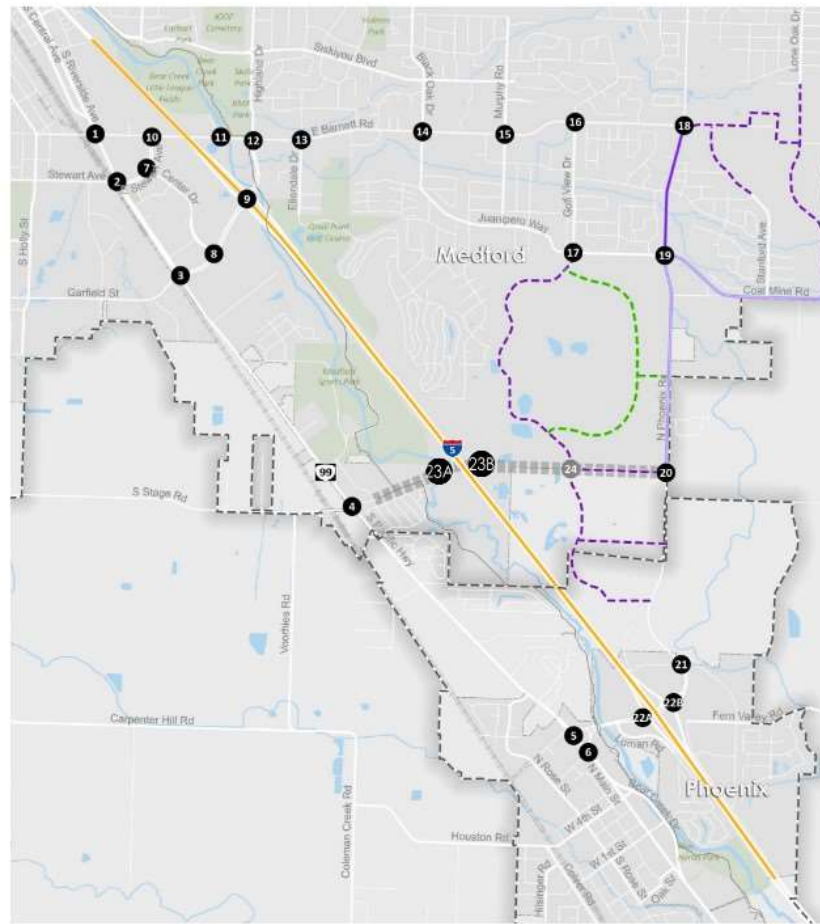


<sup>1</sup>The South Medford IAMP uses queuing as an alternate mobility standard.

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

Year 2045 Build (I-5/South Stage Interchange Scenario) Traffic Conditions  
 Weekday AM Peak Hour

Figure  
 B-5



<sup>1</sup>The South Medford IAMP uses queuing as an alternate mobility standard.

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

Year 2045 Build (I-5/South Stage Interchange Scenario) Traffic Conditions  
 Weekday PM Peak Hour

Figure  
 B-6

## Appendix C Future Year 2045 Traffic Volume Development and Model Outputs

## Appendix D SimTraffic Reports