



TECHNICAL MEMORANDUM #4

Exit 124 & 125 IAMP

Future Baseline Conditions

Date: January 5, 2015 Project #:13049.6
To: Project Management Team, TAC, CAC
From: Matt Hughart, AICP, Anais Malinge, Hermanus Steyn, P.E.
cc: Darci Rudzinski, Angelo Planning Group

This memorandum provides a review of future land uses, transportation facilities, and traffic operations within the vicinity of the Exit 124 and Exit 125 interchanges in Roseburg, Oregon. The information summarized in this memorandum is intended to identify future deficiencies, opportunities and constraints within the site vicinity, later to be addressed in the Exit 124 & 125 Interchange Area Management Plan (IAMP).

OVERVIEW

The analysis of future land uses within the Interchange Management Study Area (IMSA) was focused on continued local/regional growth and areas that are expected to have new activity, new development, or redevelopment potential that would generate traffic at the two study interchanges. Based on discussions with City of Roseburg and ODOT staff, these areas of new traffic generating potential are anticipated to include the following:

- **General** local/regional traffic growth.
- **US Veterans Administration (VA) Facility.** The site has existing housing, employment, and open space. Per feedback from VA staff, long-term expansion and facility enhancements are likely.
- **Former Roseburg Hospital Site.** This site is located in the northwest quadrant of the Exit 124 interchange and is a significant redevelopment opportunity site. The site is currently being considered for reuse as well as a potential rezone from Public Reserve to C3, thereby affecting its future development potential.

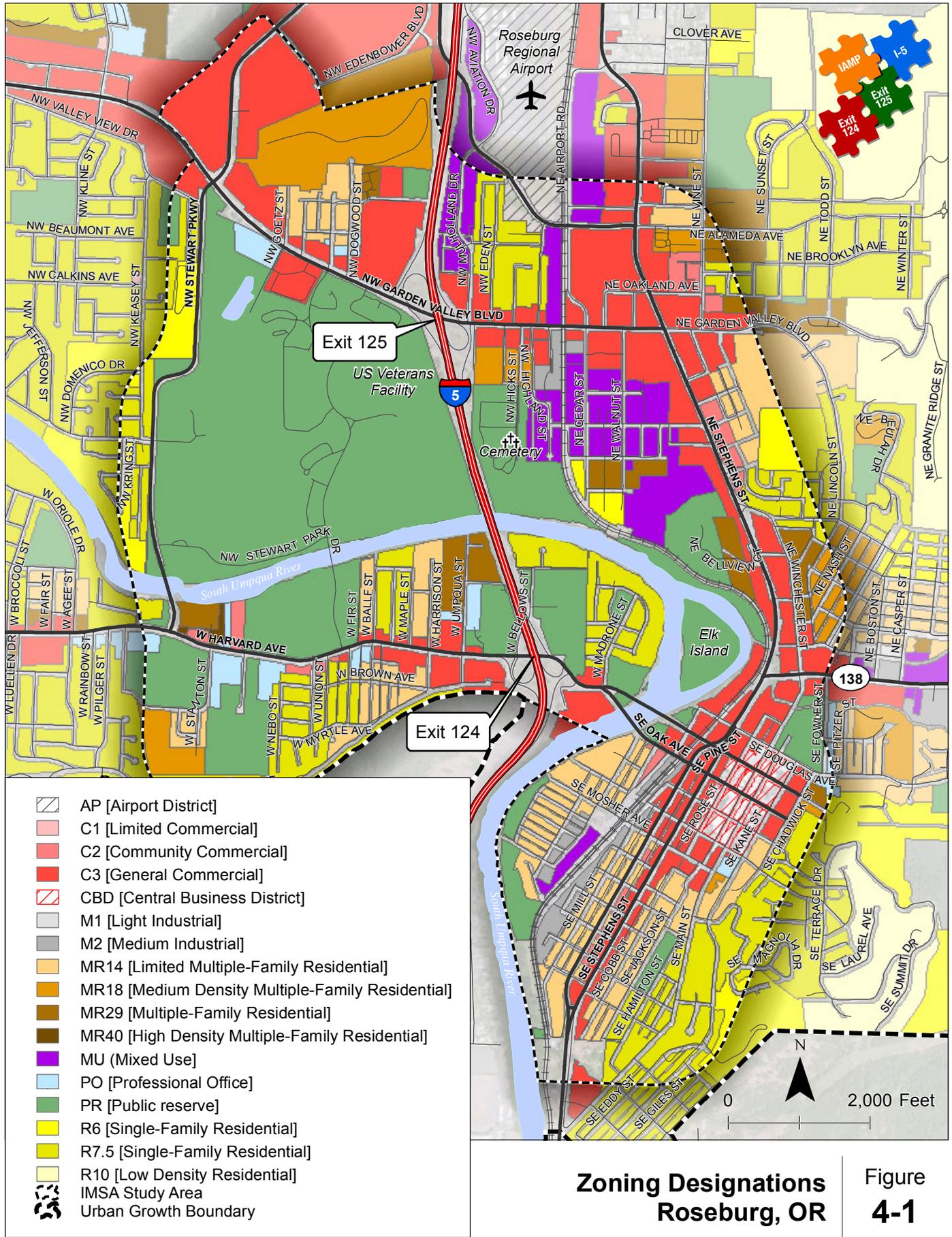
FUTURE SYSTEM INVENTORY

This section presents land use information for the I-5/Exit 124 and I-5/Exit 125 Interchange Area Management Plan (124/125 IAMP). A brief review of existing land use and zoning designations previously presented in Technical Memorandum #2/#3 is outlined below followed by a more detailed assessment of potential future land uses.

Existing Land Use and Zoning Designations

As presented in Technical Memorandum #2/#3, land in the IMSA around Exit 124 is primarily designated commercial near the interchange and through the core of Downtown with residential designations largely surrounding these commercial areas. There are significant amounts of land also designated for public/semi-public uses directly east and west of the interchange.

Land in the IMSA around Exit 125 is largely designated public/semi-public/open space with significant amounts of land designated for commercial, industrial, and residential uses. Zoning in the IMSA is shown in Figure 4-1.



**Zoning Designations
Roseburg, OR**

**Figure
4-1**

H:\profile\13049 - IAMP 124 & 125\gis\Task 6 Maps\4-01 Zoning Designations.mxd - jsoemerville - 1:40 PM 8/28/2014

Potential Future Land Uses

Existing land uses in the IMSA, discussed in Technical Memorandum #2/#3, were explored through a combination of aerial maps, Douglas County Tax Assessor records, and discussion with City staff. The IMSA is relatively built-out and developed uses are largely consistent with existing zoning, however, there are still opportunities for new development and redevelopment in the IMSA.

Given the large size of the IMSA, potential redevelopment areas were discussed with City staff to identify particular potential future uses that may have a significant impact on the interchanges and transportation facilities serving the interchanges. Future uses were identified and discussed within the various IMSA sub-areas; IMSA sub-areas are mapped in Figure 4-2.¹ An overview of potential future uses is provided by IMSA sub-area in Table 4-1. Significant existing and potential future land use are illustrated in Figure 4-3.

¹ IMSA sub-areas were created at the beginning of the project to help organize discussions about land use. They were generally based on areas of similar zoning and bounded by major transportation facilities. The sub-areas consist of a few Transportation analysis zones (TAZs) on average; TAZs are used in Transportation Planning and Analysis Unit (TPAU) modeling.



H:\profile\13049 - IAMP 124 & 125\GIS\Task 6 Maps\4-02 IMSA Sub Areas.mxd - j.sommerville - 1:43 PM 8/28/2014

Table 4-1 Potential Future Land Uses by IMSA Sub-Area

IMSA Sub-Area	Overview of Potential Future Land Uses	Impact to Future Baseline Conditions
1	A planned unit development may be proposed on an undeveloped hillside area in the vicinity of NW Dogwood Street and adjacent to NW Goetz Street right-of-way. The zoning is residential and no rezoning is needed.	Build-out potential of site is reflected in the 2035 TPAU model run; no TAZ modifications are needed.
2	<p>The US Veterans Administration (VA) Facility is the site of existing housing, employment, and open space; this site has capacity for facility expansion. The VA site is federally owned land that is not subject to local zoning. Recent and anticipated future development includes:</p> <ul style="list-style-type: none"> • A 55-unit multi-family housing development was completed in Fall 2013. • One of two future Veterans Homes in Oregon is planned to be located in Roseburg. It has been estimated that the home would begin with 100-150 beds with room for expansion, potentially up to 300-400 beds.¹ • There are plans for new/expanded care facilities including 20,000 square feet for protective care, 17,000 square feet for acute psychiatric care, and 18,000 square feet for substance abuse rehabilitation. 	Build-out potential of VA site is not reflected in 2035 TPAU model run. Additional trips from this use have been estimated and distributed across the study area network on top of the 2035 model run as documented later in this memorandum.
3	The owner of the Coca Cola bottling facility on NW Mulholland Drive northeast of Exit 125 has reported tentative plans to redevelop the site for employment and visitor services (e.g., hotel).The bottling site plus 15 small lots to the south (most of which are currently developed with houses) make up almost six acres. The zoning is mixed use and no rezoning is needed.	Build-out potential of site is reflected in the 2035 TPAU model run; no updated TAZ information needed. Change in use may result in decreased freight activity at the Exit 125 interchange.
4	The Cow Creek Tribe has reported general plans to the City regarding a combination of residential, office, and retail development on approximately 16-17 acres of land northwest of NE Bellevue Court. The land is under federal jurisdiction and also is not subject to local zoning This type of development is permitted by the existing mixed use zoning; however, access may be an issue due to the intensity and location of potential growth in this area.	Build-out potential of site is reflected in the 2035 TPAU model run; no updated TAZ information needed.
5	New residential development (an unspecified number of units) could occur east of NE Stephens Street, south of NE Garden Valley Boulevard. The zoning is residential and no rezoning is needed.	Build-out potential of site is reflected in the 2035 TPAU model run; no updated TAZ information needed.
6	<p>A former hospital site directly northwest of Exit 124 is a significant redevelopment opportunity site. The existing building has recently been determined to be structurally sound and is suitable for re-use. The site is currently zoned Public Reserve. The site is one of three sites being considered for a 60,000 square-foot Oregon Department of Human Services (DHS) facility. Future development possibilities on this site include:</p> <ul style="list-style-type: none"> • Scenario A: The building can be re-used for office/employment uses under existing zoning, and the rest of the site could be partitioned and rezoned C3 for general commercial uses. • Scenario B: The building can be re-used in part for the DHS facility; an expansion of the existing building or additional buildings would be needed to provide a total of 60,000 square feet. The remainder of the site could be partitioned and rezoned C3 for general commercial uses. • Scenario C: The entire site is rezoned C3 for general commercial uses (approximately 8 acres). 	Scenario A is reflected in the 2035 TPAU model run and no updated TAZ information is needed. Southern Oregon Transportation Engineering, LLC has prepared a transportation impact analysis to determine network impacts assuming the worst-case (Scenario B). ²
7	No expected change to current growth assumptions are expected in this sub-area.	No change.
8	Douglas County Health Department is a major employer in the sub-area, located off of W Madrone Street, east of Exit 124. This one of three possible sites for the DHS facility. The existing building and zoning can accommodate the DHS facility, so no building expansion, new building, or rezoning is needed.	Build-out potential of site is reflected in the 2035 TPAU model run; no updated TAZ information needed.

IMSA Sub-Area	Overview of Potential Future Land Uses	Impact to Future Baseline Conditions
9	A former Safeway site in Downtown (north of SE Washington Avenue and east of SE Stephens Street) is one of three possible sites for the DHS facility. The existing, 40,000 square foot grocery store building is being considered for the facility. Building expansion and/or new buildings would be needed to provide a total of 60,000 square feet to house the DHS facility. The zoning is commercial and no rezoning is needed.	Build-out potential of site is reflected in the 2035 TPAU model run; no updated TAZ information needed.

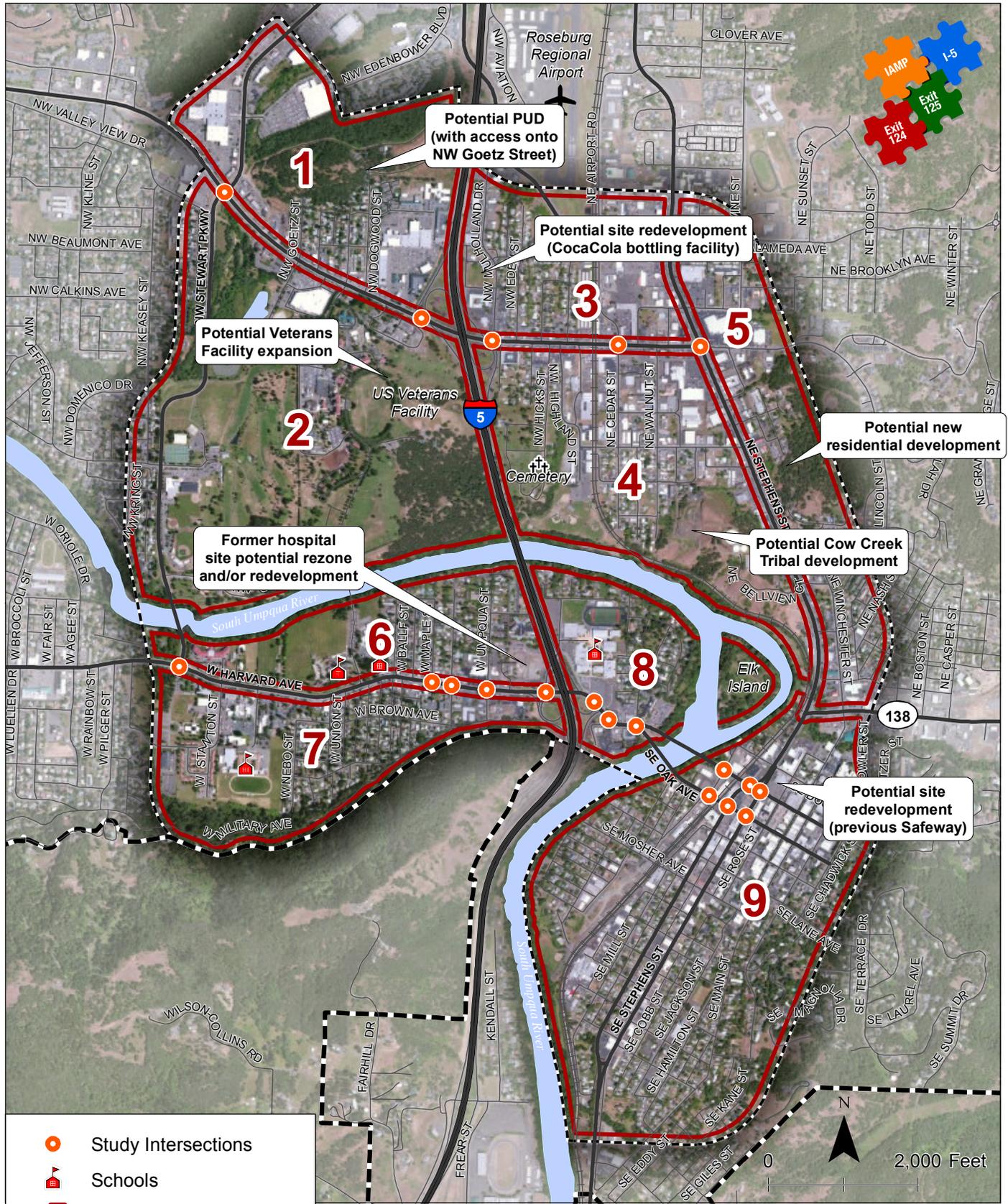
¹ Per a local KPIC news article, April 16, 2010 (<http://www.kpic.com/news/local/91031389.html>), the two homes are expected to eventually provide up to 800 beds. A fact sheet for the Lebanon Veterans Home shows initial plans for 11 small houses with 14 beds each, or 154 beds total (<https://olis.leg.state.or.us/liz/2013R1/Downloads/CommitteeMeetingDocument/27412>).

² The C3 rezone has not been adopted; however, an analysis assuming a rezone has been completed to determine potential impacts to the system, if any.

ODOT’s Transportation and Planning Analysis Unit (TPAU) has conducted preliminary modeling of increases in households and employment from 2014-2034. The modeling is based on projected development in the next 20 years given existing zoning. Projections are organized by transportation analysis zones (TAZs), which are essentially sub-units of the sub-areas in the IMSA.

Preliminary TPAU modeling potentially does not account for the following elements of potential future land uses presented in Table 4-1.

- **VA site** – Although no rezoning is needed, recent residential development, projected residential development (Veterans Home), and projected employment and patient growth from a new/expanded mental health facility on the VA site needs to be accounted for.
- **Former hospital site** – Each of the three potential development/redevelopment scenarios for the site involve rezoning (in varying acreages) and at least one of the scenarios involves expansion of existing buildings or new buildings.



**Notable Potential Future Land Uses
Roseburg, OR**

**Figure
4-3**

H:\projfiles\13049 - IAMP 124 & 125\gis\Task 6 Maps\4-03 Notable Potential Future Land Uses.mxd - jsmmerville - 1:53 PM 8/29/2014

Future Street Network

This section summarizes transportation improvement projects to the roadway, pedestrian, bicycle, and public transportation systems. Included below are all of the identified roadway/intersection improvement projects from the City of Roseburg 2025 Transportation System Plan (TSP) that are within the Exit 124 & 125 IAMP sit vicinity. A notation is included that identifies if the project is currently funded on the City's Capital Improvement Plan (CIP) or the State Transportation Improvement Plan (STIP).

Roadway Facilities

An updated description of the nine roadway projects applicable to the Exit 124 & 125 IAMP study area are provided below with their applicable intersection lane additions reflected in Figure 4-4.

- **Stewart Parkway Improvements.** Widen to four lanes between Harvey Avenue and Garden Valley Parkway, straighten S-curves, build new bridge over South Umpqua River, and install new sidewalks and new bike lanes. A portion of this improvement (roadway realignment and widening from Valley View Drive to Harvey Court) is on the City's 2014-2018 CIP.
- **Garden Valley Boulevard/Stewart Parkway.** Add eastbound double left-turn lanes, a separate eastbound right-turn lane, and a separate northbound right-turn lane. This is currently an unfunded project and it is likely that some or all of the improvements will occur as a result of future private development in the area.
- **Cedar Street/Garden Valley Boulevard.** Add a second northbound left-turn lane, and a separate southbound right-turn lane. This is currently an unfunded project and it is likely that some or all of the improvements will occur as a result of future private development.
- **Garden Valley Boulevard/Mulholland Drive/I-5 Northbound Off-Ramp.** Add a westbound right-turn lane, northbound double left-turn lanes, and a channelized southbound right-turn lane. This is currently an unfunded project.
- **Garden Valley Boulevard/Stephens Street.** Add a separate southbound right-turn lane. This is currently an unfunded project and it is likely that it may occur as a result of future private development.
- **Stewart Parkway/Harvard Avenue.** Add a second southbound left-turn lane. This is currently an unfunded project.
- **Harvard Avenue/Bellows Street.** This project calls for a roadway study which will be satisfied through this Exit 124 & 125 IAMP. An interim solution suggested in the TSP will be considered in the alternatives analysis. Add westbound double left-turn lanes, a westbound right-turn lane, an eastbound right-turn lane, northbound double left-turn lanes, and a southbound left-turn lane.
- **Stephens Street/Oak Avenue.** Add a northbound right-turn lane. This is an unfunded project.

- **Spruce Street/Oak Avenue.** Realign north leg with south leg to create four-legged intersection, and add bike lanes on Spruce Street in both the northbound and southbound directions. This project is funded and will occur as part of the OR 138E improvement project.
- **Pine Street/Oak Avenue.** Change eastbound through-right lane to a dedicated right-turn lane, and add a southbound bike lane on Pine Street. This project is funded and will occur as part of the OR 138E improvement project.
- **Washington Street/Stephens Street.** Consolidate the Washington Street/Pine Street and Washington Street/Stephens Street intersections. Install two channelized southbound right-turn lanes, two southbound through lanes, and two northbound left-turn lanes. This project is funded and will occur as part of the OR 138E improvement project.

Pedestrian and Bicycle Facilities

A description of the three pedestrian and bicycle projects applicable to the Exit 124 & 125 IAMP study area are provided below. The majority of these projects are not currently funded.

- **Roseburg Multi-Use Path Network.** The following multi-use paths within the IAMP study area include:
 - Adjacent to Harvard Avenue between Lookingglass Road and east of Interstate 5.
 - Aadjacent to I- 5 between Edenbower Road and Garden Valley Boulevard.
 - Adjacent to Stewart Parkway from the Fir Grove School to South Umpqua River.
- **Bicycle Lanes.** Add bicycle lanes to Harvard Avenue from Bellows street to Lookingglass Road, Stephens Street from Garden Valley Boulevard and Douglas Avenue, Spruce Street from Douglas Avenue and Mosher Avenue, Airport Road from Stewart Parkway and Garden Valley Boulevard, Pine Street from Mosher Avenue and Oak Avenue, and Garden Valley Boulevard from Stephens Street and Mulholland Drive.
- **Sidewalks.** Add sidewalks on Stewart Parkway north of Harvey Avenue.

Given the increase in network volumes, existing bicycle and pedestrian deficiencies, as documented in Technical Memorandum 2/3, will persist in the future.

Future Public Transportation Facilities

Public transportation in Roseburg is provided by U-Trans, which provides fixed route, commuter, and paratransit bus service. Douglas County revised the *Coordinated Public Transit Human Services Transportation Plan* in July 2013, which guides future public transportation. Goals specific to U-Trans are to improve access to bus service by locating bus stops in areas with a high proportion of transit dependent residents, to expand hours of operation and introduce weekend service, to reduce

headways throughout the system, and to encourage ridership through partnerships with businesses, agencies, and the public.

FUTURE BASELINE TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

Based on the noted potential levels of development and redevelopment in the IMSA, and factoring in regional growth from outside the IMSA, future year 2035 traffic conditions were estimated along the study area interchanges, roadways, and intersections.

Year 2035 Total Traffic Scenario

A detailed summary of the traffic operations analysis procedures is included in Appendix A of this memorandum. This procedures memorandum was reviewed and approved for use in the traffic operations analysis by ODOT’s Transportation Planning Analysis Unit (TPAU).

Year 2035 Background Growth Assumptions

As documented in earlier sections of this report, there are two main potential future trip generators in the site vicinity. Each of these sites are discussed in detail below as they relate to additional trip generation in the site vicinity.

US Veterans Administration (VA) Facility

Per growth assumptions stipulated by the City of Roseburg and confirmed by VA Facility staff, a trip generation estimate for the growth potential was completed using the trip rates found in the Institute of Transportation Engineers *Trip Generation, 9th Edition*. Table 4-2 shows the trip generation estimates during weekday a.m. and p.m. peak periods.

Table 4-2 Estimate VA Facility Trip Generation for Potential Future Growth

Proposed Facility	ITE Land Use	LU Code	Size	Weekday Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
					In	Out	Total	In	Out	Total
Eagle Landing	Senior Adult Housing - Attached	252	55 units	185	4	7	11	8	7	15
State Veterans Home	Nursing Home	620	150 units	411	13	13	26	11	22	33
Protective Care	Clinic	630	20,000 sq. ft.	629	31	31	62	31	31	62
Acute Psych	Clinic	630	17,000 sq. ft.	535	27	26	53	27	26	53
Substance Abuse Rehabilitation Facility	Clinic	630	18,000 sq. ft.	566	28	28	57	28	28	57
Net-New Trips				2,326	103	106	209	105	115	221

The estimated trip generation potential of future growth within the VA Facility supplemented the predicted growth assumed in the TPAU travel demand model. As such, a trip distribution consistent with existing travel patterns was used to assign these future trips to the roadway network. Appendix C shows the trip distribution and assignment of the VA Facility trip generation during both the weekday a.m. and p.m. peak periods.

Former Hospital Site

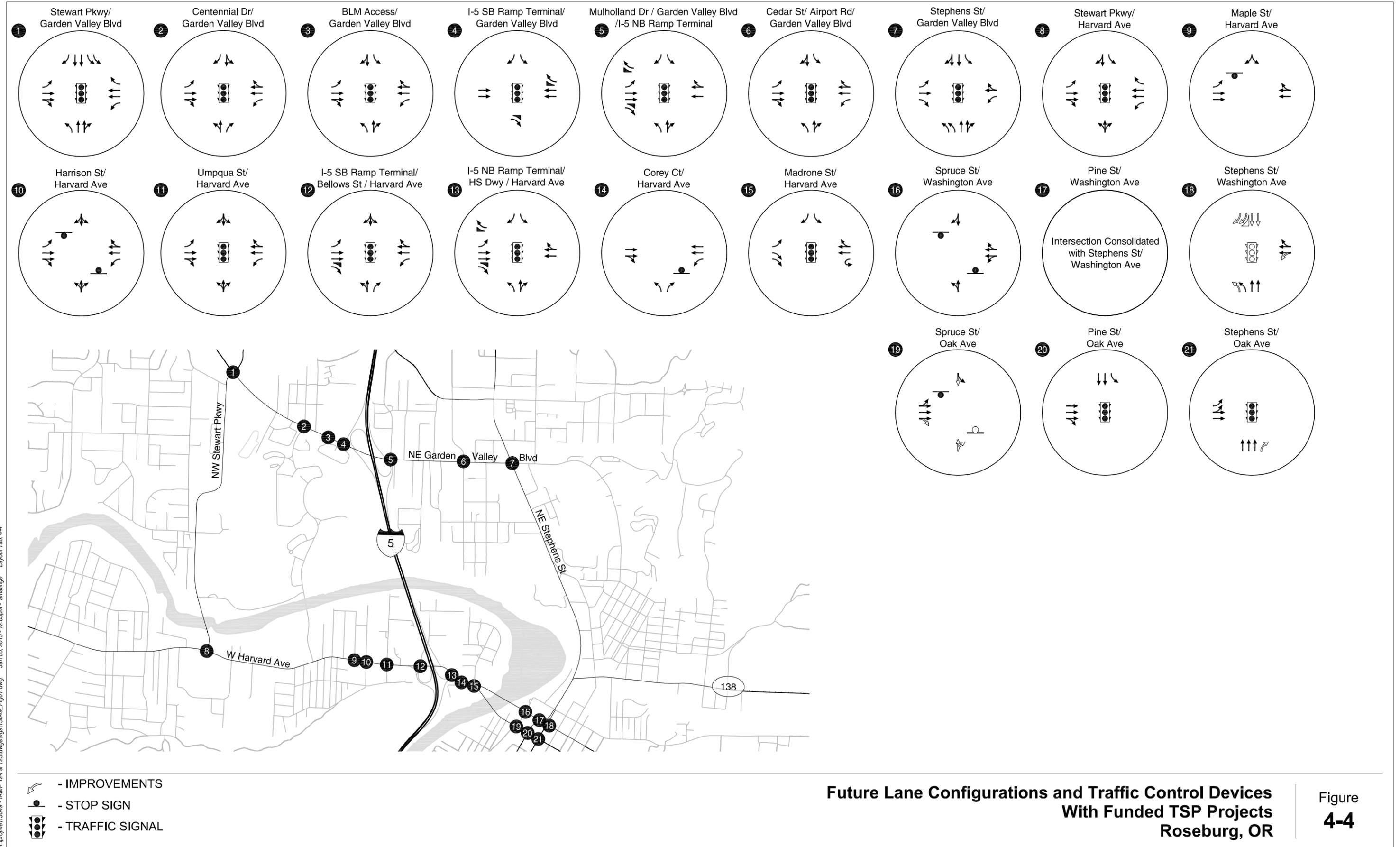
A former hospital site directly northwest of Exit 124 is a significant redevelopment opportunity site. The existing building has recently been determined to be structurally sound and is suitable for re-use. The site is currently zoned Public Reserve. The site is one of three sites being considered for a 60,000 square-foot Oregon Department of Human Services (DHS) facility. Only approved and adopted rezone applications can be analyzed in the completion of an IAMP. As such, this memorandum only analyzes the build-out potential of the hospital site assuming existing zoning, as modeled and reflected in the TPAU travel demand model. However, considering the impending rezone application, Appendix D shows the future year 2035 traffic operations assuming rezone of the hospital site for those intersections studied as part of the transportation impact analysis. As shown in Figure C-1, the 2035 traffic conditions are similar with and without the proposed hospital site rezone.

Intersection Delay and Capacity Analysis Results

Level-of-service (LOS) and volume-to-capacity (v/c) ratios were calculated for each of the study intersections based on the parameters outlined in the traffic operations procedures memorandum. These operations were prepared under the following two scenarios:

- Scenario “A” – Assumes only those previously identified future roadway/intersection improvements that are currently funded will be in place through the 2035 study horizon year.
- Scenario “B” – For comparison purposes and for assessing previous planning efforts, scenario “B” assumes that all of the previously identified roadway/intersection improvement projects will be in place regardless if they are currently funded or not.

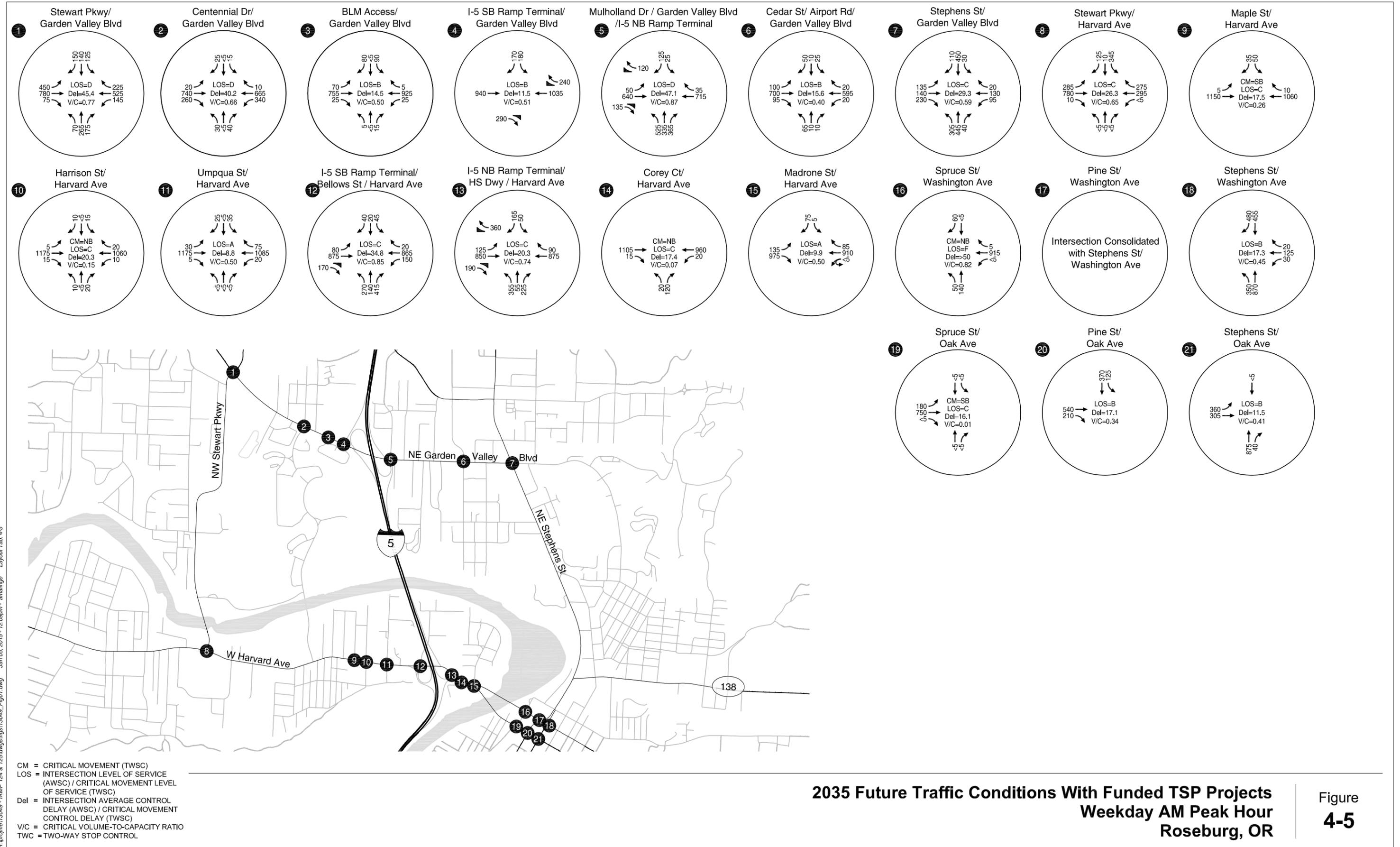
Figures 4-4 through 4-9 show the future lane configurations, traffic control, and operational analysis results of the study intersections during the weekday a.m. and p.m. peak hours for these two scenarios.



Future Lane Configurations and Traffic Control Devices With Funded TSP Projects Roseburg, OR

Figure **4-4**

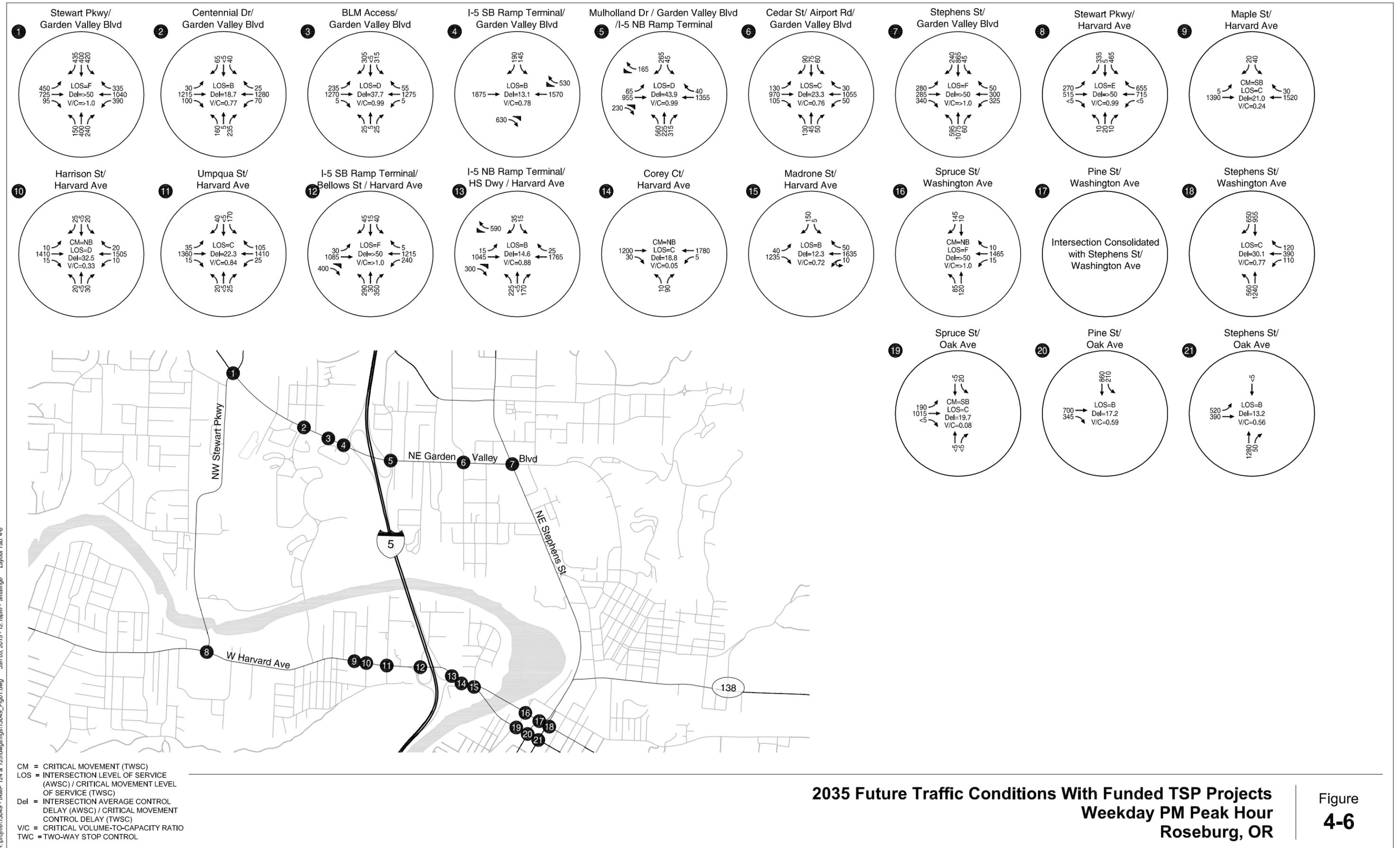
H:\projects\13049 - IAMP 124 & 125\dwg\figs\13049_Fig01.dwg Jan 05, 2015 - 12:05pm - amalinge Layout Tab: 4-4



H:\proj\13049 - IAMP 124 & 125\dwg\figs\13049_Fig01.dwg Jan 05, 2015 - 12:09pm - amalinge Layout Tab: 4-5

CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWC = TWO-WAY STOP CONTROL

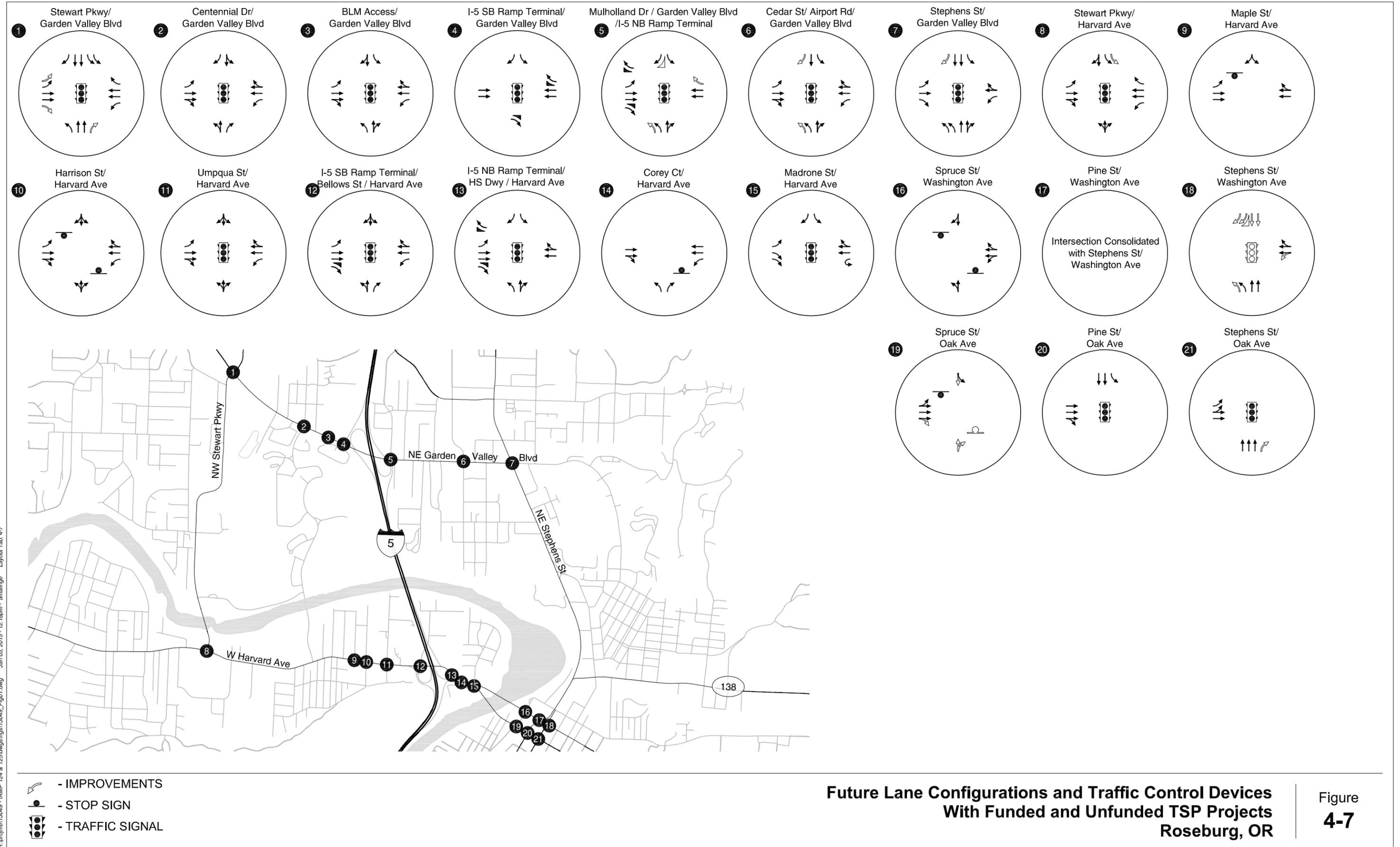
**2035 Future Traffic Conditions With Funded TSP Projects
Weekday AM Peak Hour
Roseburg, OR** Figure 4-5



**2035 Future Traffic Conditions With Funded TSP Projects
 Weekday PM Peak Hour
 Roseburg, OR**

Figure
4-6

H:\proj\13049 - IAMP 124 & 125\dwg\figs\13049_Fig01.dwg Jan 05, 2015 - 12:18pm - amalinge Layout Tab: 4-6



**Future Lane Configurations and Traffic Control Devices
With Funded and Unfunded TSP Projects
Roseburg, OR**

Figure
4-7

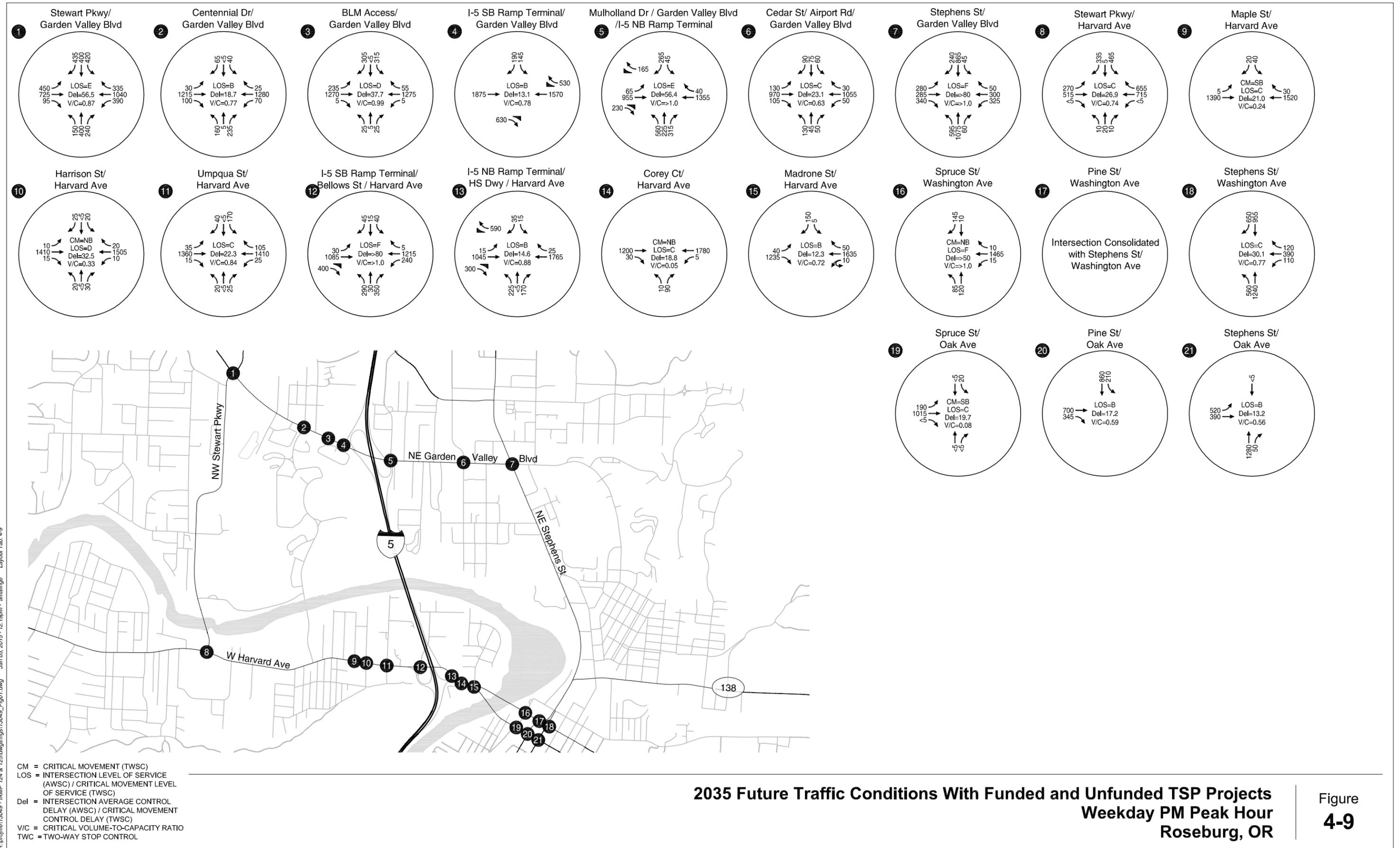
H:\projects\13049 - IAMP 124 & 125\dwgs\figs\13049_Fig01.dwg Jan 05, 2015 - 12:16pm - amalinge Layout Tab: 4-7



CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWC = TWO-WAY STOP CONTROL

**2035 Future Traffic Conditions With Funded and Unfunded TSP Projects
 Weekday AM Peak Hour
 Roseburg, OR**

Figure
4-8



**2035 Future Traffic Conditions With Funded and Unfunded TSP Projects
 Weekday PM Peak Hour
 Roseburg, OR**

Figure
4-9

H:\proj\13049 - IAMP 124 & 125\dwg\figs\13049_Fig01.dwg Jan 05, 2015 - 12:19pm - amalinge Layout Tab: 4-9

Table 4-3A summarizes the results from Figures 4-5 and 4-6. As shown, the following study intersections are forecast to exceed OHP mobility targets or City of Roseburg v/c ratio/LOS standards:

- The Garden Valley Blvd/ Stewart Pkwy intersection during the weekday p.m. peak hour (v/c = 1.10). This does not include the intersection capacity enhancements identified in the TSP.
- The Garden Valley Blvd/ BLM Access intersection during the weekday p.m. peak hour (v/c = 0.99).
- The I-5 NB Ramp Terminal/NW Garden Valley Blvd intersection during both the weekday a.m. (v/c=0.87) and p.m. (v/c=0.99) peak hours. This does not include the intersection capacity enhancements identified in the TSP.
- The Garden Valley Blvd/ Stephens St intersection during the p.m. peak hour (v/c=1.15). This does not include the southbound right-turn lane improvement identified in the TSP.
- The Harvard Ave/Stewart Pkwy intersection during the p.m. peak hour (v/c=0.99). This does not include the second southbound left-turn lane improvement identified in the TSP.
- The I-5 SB Ramp Terminal/Harvard Ave/Bellows St intersection during both the weekday a.m. (v/c = 0.85) and p.m. (v/c=1.10) peak hours.
- The I-5 NB Ramp Terminal/Harvard Ave intersection during p.m. peak hour (v/c = 0.88).
- The Washington St/Spruce St (OR 138) intersection during p.m. peak hour (v/c=2.51).

Appendix E includes the future traffic conditions operations worksheets.

Table 4-3A: 2035 Future Traffic Operations Summary (With Only Funded TSP Improvements)

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Performance Target	Meets Target?
	LOS	V/C	LOS	V/C		
NW Garden Valley Blvd/NW Stewart Pkwy	D	0.77	F	1.10	0.85/LOS D	No
NW Garden Valley Blvd/Centennial Dr	D	0.66	B	0.77	0.85/LOS D	Yes
Nw Garden Valley Blvd/BLM Access	B	0.50	D	0.99	0.85/LOS D	No
I-5 SB Ramp Terminal/NW Garden Valley Blvd	B	0.51	B	0.78	0.85	Yes
Mulholland Dr/I-5 NB Ramp Terminal/NW Garden Valley Blvd	D	0.87	D	0.99	0.85	No
Cedar St NW/NE Airport Rd/Garden Valley Blvd/	B	0.40	C	0.76	0.85/LOS D	Yes
NW Garden Valley Blvd/NE Stephens St	C	0.59	F	1.15	0.85/LOS D	No
W Harvard Ave/NW Stewart Pkwy	C	0.65	E	0.99	0.85/LOS D	Yes
W Harvard Ave/Maple St	C	0.26	C	0.24	LOS E	Yes
W Harvard Ave/Harrison St	C	0.15	D	0.33	LOS E	Yes
W Harvard Ave/Umpqua St	A	0.50	C	0.84	0.85/LOS D	Yes
I-5 SB Ramp Terminal/Harvard Ave/Bellows St	C	0.85	F	1.10	0.85	No

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Performance Target	Meets Target?
	LOS	V/C	LOS	V/C		
I-5 NB Ramp Terminal/Harvard Ave	C	0.74	B	0.88	0.85	No
Harvard Ave/Corey Ct (OR 138)	C	0.07	C	0.05	0.90	Yes
Harvard Ave/Madrona St (OR 138)	A	0.50	B	0.72	0.90	Yes
SE Washington St/SE Spruce St (OR 138)	F	0.82	F	2.51	0.90	No
SE Washington St/SE Pine St (OR 138)	-	-	-	-	0.90	NA
SE Washington St/SE Stephens S (OR 138)	B	0.45	C	0.77	0.90	Yes
SE Oak St/SE Spruce St (OR 138)	C	0.01	C	0.08	0.90	Yes
SE Oak St/SE Pine St (OR 138)	B	0.34	B	0.59	0.90	Yes
SE Oak St/Stephens St (OR 138)	B	0.41	B	0.56	0.90	Yes

Table 4-3B summarizes the results presented in Figures 4-8 and 4-9. As shown, the following study intersections are forecast to exceed OHP mobility targets or City of Roseburg v/c ratio/LOS standards:

- The Garden Valley Blvd/ Stewart Pkwy intersection during the p.m. peak hour (v/c = 0.87). This includes the unfunded intersection capacity enhancements identified in the TSP.
- The Garden Valley Blvd/ BLM Access intersection during the weekday p.m. peak hour (v/c = 0.99).
- The I-5 NB Ramp Terminal/NW Garden Valley Blvd intersection during both the weekday a.m. (v/c = 0.84) and p.m. (v/c>1.0) peak hours. This includes the unfunded intersection capacity enhancements identified in the TSP.
- The Garden Valley Blvd/ Stephens St intersection during the p.m. peak hour (v/c > 1.0). This includes the unfunded southbound right-turn lane improvement from the TSP.
- The I-5 SB Ramp Terminal/Harvard Ave/Bellows St intersection during both the weekday a.m. (v/c = 0.85) and p.m. (v/c=1.04) peak hours.
- The I-5 NB Ramp Terminal/Harvard Ave intersection during p.m. peak hour (v/c = 0.88).
- The Washington St/Spruce St (OR 138) intersection during p.m. peak hour (v/c=2.51).

Appendix E includes the future traffic conditions operations worksheets.

Table 4-3B: 2035 Future Traffic Operations Summary (With All Identified TSP Improvements)

Intersection	Weekday AM Peak Hour		Weekday PM Peak Hour		Performance Target	Meets Target?
	LOS	V/C	LOS	V/C		
NW Garden Valley Blvd/NW Stewart Pkwy	C	0.65	E	0.87	0.85/LOS D	No
NW Garden Valley Blvd/Centennial Dr	D	0.66	B	0.77	0.85/LOS D	Yes
Nw Garden Valley Blvd/BLM Access	B	0.50	D	0.99	0.85/LOS D	No
I-5 SB Ramp Terminal/NW Garden Valley Blvd	B	0.51	B	0.78	0.85	Yes
I-5 NB Ramp Terminal/NW Garden Valley Blvd	C	0.84	E	1.04	0.85	No
NW Garden Valley Blvd/NE Airport Rd/Cedar St	B	0.37	C	0.63	0.85/LOS D	Yes
NW Garden Valley Blvd/NE Stephens St	C	0.53	F	1.27	0.85/LOS D	No
W Harvard Ave/NW Stewart Pkwy	B	0.51	C	0.74	0.85/LOS D	Yes
W Harvard Ave/Maple St	C	0.26	C	0.24	LOS E	Yes
W Harvard Ave/Harrison St	C	0.15	D	0.33	LOS E	Yes
W Harvard Ave/Umpqua St	A	0.50	C	0.84	0.85/LOS D	Yes
I-5 SB Ramp Terminal/Harvard Ave/Bellows St	C	0.85	F	1.10	0.85	No
I-5 NB Ramp Terminal/Harvard Ave	C	0.74	B	0.88	0.85	No
Harvard Ave/Corey Ct (OR 138)	C	0.07	C	0.05	0.90	Yes
Harvard Ave/Madrone St (OR 138)	A	0.50	B	0.72	0.90	Yes
SE Washington St/SE Spruce St (OR 138)	F	0.82	F	2.51	0.90	No
SE Washington St/SE Pine St (OR 138)	-	-	-	-	0.90	NA
SE Washington St/SE Stephens S (OR 138)	B	0.45	C	0.77	0.90	Yes
SE Oak St/SE Spruce St (OR 138)	C	0.01	C	0.08	0.90	Yes
SE Oak St/SE Pine St (OR 138)	B	0.34	B	0.59	0.90	Yes
SE Oak St/Stephens St (OR 138)	B	0.41	B	0.56	0.90	Yes

Freeway Mainline Analysis

Freeway mainline analyses were done for the northbound and southbound segments of I-5 south of the Exit 124 interchange, between the Exits 124 and 125 interchanges, and north of the Exit 125 interchange. A summary of the results is provided in Table 4-4. While the HCM Methodology uses level of service as a performance measure, volume to capacity ratios were calculated from this analysis for comparison against ODOT’s mobility standards. The steps to convert from LOS to a v/c ratio are provided in the ODOT *Analysis and Procedures Manual (APM)* (Reference 1). As seen in the table, all

freeway segments are operating at a v/c ratio equal to or less than 0.74, and therefore are within the OHP target (v/c = 0.80). Output for this analysis can be found in Appendix F.

Table 4-4: Merge/ Diverge Analysis

Freeway Direction - Segment	V/C Ratio	
	Weekday AM Peak Hour	Weekday PM Peak Hour
NB - north of Exit 125	0.37	0.42
SB - north of exit 125	0.42	0.52
NB - between exit 124 & 125	0.63	0.61
SB - between exit 124 & 125	0.47	0.74
NB - south of Exit 124	0.55	0.48
SB - south of Exit 124	0.30	0.73

Weaving Analysis

A weaving analysis was also completed for I-5 between the Exit 124 and 125 interchanges in the northbound and southbound directions, for the weekday a.m. and p.m. peak periods. A summary of the results is presented in Table 4-5. As demonstrated, the mainline has level-of-service B and a volume-to-capacity ratio less than 0.80 in both directions and during both peak hours, except for the southbound direction during the weekday p.m. peak period (v/c = 1.25). Therefore, this portion of I-5 does not meet OHP targets. Output for the weaving analysis can be found in Appendix G.

Table 4-5: I-5 Weaving Analysis Between Exit 124 and Exit 125

Direction	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	V/C	LOS	V/C
Northbound	B	0.76	B	0.71
Southbound	B	0.74	F	1.25

Merge and Diverge Analysis

Merge and diverge analyses were done for all ramps at the Exit 124 and 125 interchanges. A summary of the results is presented in Table 4-6. ODOT uses the volume to capacity ratio for the merge and diverge areas to evaluate performance. The methodology used to calculate the v/c ratio is provided in the ODOT Analysis and Procedures Manual (APM) (Reference 1). As shown, all ramps are projected to operate at a v/c ratio of 0.80 or less and therefore are within the OHP target. Output for this analysis can be found in Appendix H.

Table 4-6: Merge/ Diverge Analysis

I-5 Interchange/Ramp	V/C Ratio	
	Weekday AM Peak Hour	Weekday PM Peak Hour
Exit 124 Interchange		
NB Off-Ramp Diverge	0.55	0.51
NB On-Ramp Merge (via WB ramp)	0.63	0.62
NB On-Ramp Merge (via EB loop ramp)	0.54	0.46
SB Off-Ramp Diverge	0.47	0.79
SB On-Ramp Merge (via EB ramp)	0.30	0.55
Exit 125 Interchange		
NB Off-Ramp Diverge	0.63	0.65
NB On-Ramp Merge (via WB ramp)	0.37	0.43
NB On-Ramp Merge (via EB loop ramp)	0.34	0.39
SB Off-Ramp Diverge	0.42	0.55
SB On-Ramp Merge (via WB loop ramp)	0.39	0.58
SB On-Ramp Merge (via EB ramp)	0.54	0.75

Intersection Queuing Analysis

A 95th percentile queuing analysis was performed at the study intersections. The 95th percentile queue length reported are from those calculated using SimTraffic software, which applies the 2000 Highway Capacity Manual methodology. Table 4-7 summarizes intersection approaches and associated movements where the 95th percentile queues for the impact area closest to the I-5 freeway interchanges, with movements that either exceed available storage or extend beyond the nearest upstream intersection highlighted in light grey. The available storage lengths were measured based on turn bay lengths, the nearest public or private access point, and railroad crossing distance. Appendix I includes the 95th percentile queuing analysis worksheets.

Table 4-7: 95th Percentile Queuing Analysis

Study Intersection	Approach	Movement	95 th Percentile Queue (ft)		Available Storage (ft)
			Weekday AM Peak Hour	Weekday PM Peak Hour	
Garden Valley Blvd/Estelle St	EB	Left	75	100	150
		Through	275	400	650
		Through/Right	300	400	650
	WB	Left	200	100	200
		Through	550	150	550
		Through/Right	250	150	550
	NB	Left/Through	75	275	150
		Right	50	150	150
	SB	Left/Through	50	75	100
		Right	50	75	100
NW Garden Valley Blvd/ BLM Access	EB	Left	125	200	200
		Through	150	425	550
		Through/Right	175	400	550
	WB	Left	175	50	150
		Through	375	275	300
		Through/Right	325	300	300
	NB	Left	25	50	50
		Through/Right	50	75	50
	SB	Left	100	125	50
		Through/Right	100	275	200
I-5 SB Ramp Terminal/ NW Garden Valley Blvd	EB	Through	150	350	300
	WB	Through	1,350	375	>1,000
	SB	Left	1,100	200	650
		Right	700	275	650
I-5 NB Ramp Terminal/ Garden Valley Blvd/ Mulholland Dr ¹	EB	Left	100	100	200
		Through	250	375	>1,000
	WB	Through	500	1,300	>1,000
		Through/Right	500	1,275	>1,000
	NB	Left	900	900	1,000
		Through/Right	1,125	1,125	1,000
	SB	Left	100	100	250
		Right	225	275	650
W Harvard Ave/Umpqua St	EB	Left	75	100	200
		Through	275	325	450
		Through/Right	225	325	450
	WB	Left	75	125	200
		Through	300	400	700
		Through/Right	300	400	700
	NB	Left/Through/Right	25	75	350
	SB	Left/Through/Right	125	300	>300
I-5 SB Ramp Terminal/ Harvard Ave/Bellows St	EB	Left	175	100	300
		Through	450	550	700
	WB	Left	250	250	300

Study Intersection	Approach	Movement	95 th Percentile Queue (ft)		Available
		Through	450	350	600
		Through/Right	425	350	600
	NB	Left/Through	375	325	150
		Right	275	300	150
	SB	Left/Through/Right	175	125	550
I-5 NB Ramp Terminal/ Harvard Ave	EB	Left	75	50	200
		Through	525	150	600
	WB	Through	300	300	500
		Through/Right	350	350	500
	NB	Left	600	400	300
		Through/Right	425	150	300
	SB	Left	125	50	100
		Right	200	75	100
Harvard Ave/Madrona St	EB	Left	125	75	200
		Through	250	150	500
	WB	Through	375	975	>1,000
		Through/Right	475	975	>1,000
	SB	Through	25	25	250
		Right	75	125	250

¹ 95th Percentile queuing distances assumes no improvement to intersection.

FINDINGS

As documented herein, the following are estimated and projected year 2035 deficiencies within the site vicinity of Exit 124 and Exit 125.

Intersection Delay and Capacity Deficiencies

- The Garden Valley Blvd/ Stewart Pkwy intersection does not operate acceptably per the OHP mobility target during the p.m. peak hour:
 - $v/c > 1.0$ with funded TSP improvements
 - $v/c = 0.87$ with funded and unfunded TSP improvements
- The Garden Valley Blvd/ BLM Access intersection during the weekday p.m. peak hour ($v/c = 0.99$).
- The I-5 NB Ramp Terminal/NW Garden Valley Blvd intersection does not operate acceptably per the OHP mobility target:
 - $v/c = 0.99$ during the weekday p.m. peak hour with funded TSP improvements
 - $v/c > 1.0$ during the weekday p.m. peak hour with funded and unfunded TSP improvements

- The Garden Valley Blvd/ Stephens St intersection does not operate acceptably per the OHP target:
 - $v/c > 1.0$ during the p.m. peak hour with funded TSP improvements
 - $v/c > 1.0$ during the p.m. peak hour with funded and unfunded TSP improvements
- The I-5 SB Ramp Terminal/Harvard Ave/Bellows St intersection does not operate acceptably per the OHP target during the weekday p.m. peak hour ($v/c > 1.0$).
- The I-5 NB Ramp Terminal/Harvard Ave intersection does not operate acceptably per the OHP target during p.m. peak hour ($v/c = 0.88$).
- The Washington St/Spruce St (OR 138) intersection does not operate acceptably per the OHP target during p.m. peak hour ($v/c > 1.0$).

Freeway Mainline Deficiencies

- The southbound direction during the weekday p.m. peak period has a v/c of 1.25.

REFERENCES

1. ODOT. *Analysis Procedures Manual*. 2006.