

EXECUTIVE SUMMARY

A regional highway under the state highway classification system, Highway 138 is a vital link between the I-5 corridor and greater Roseburg to key destinations in central Oregon. The alignment of the State corridor through downtown Roseburg requires maneuvering a frequently congested and circuitous course of sharp turn movements with tight turning radii (see Figure ES-1). The role of the regional highway is to efficiently serve both freight and through travel. However, Highway 138 through Roseburg also functions as a main street, providing access to local businesses and residential neighborhoods. As the corridor has experienced continual increases in traffic volumes, these conflicting functions have led to inefficient travel for through traffic and congested and unsafe access for local businesses and pedestrians.

The City of Roseburg has teamed with Oregon Department of Transportation (ODOT) Region 3 to explore options to remedy problems occurring along the corridor. Hence, the *Highway 138 Corridor Solutions Study* is the next logical step toward resolving pertinent planning issues involved that will enable a project proposal to ultimately become eligible for funding under the Statewide Transportation Improvement Program (STIP).

Study Process

The *Highway 138 Corridor Solutions Study* was structured to move smoothly into the project development process outlined in the National Environmental Policy Act (NEPA), and the guidelines provided by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for User (SAFETEA-LU). Purpose and Need statements and Goals and Objectives were established for the project, baseline environmental and land use data were collected, and initial screening of concepts were performed followed by more detailed evaluations of remaining alternatives and final recommendations – concluding in the case of Highway 138 with a series of recommended alternatives to be carried forward through the National Environmental Protection Act (NEPA) process.

Because construction of any build alternative would likely require the use of Federal Highway Administration (FHWA) funds, the next phase of this project will be the completion of an Environmental Assessment to identify a preferred alternative and determine whether the effects of the preferred alternative would be considered significant from a NEPA perspective.

The study included the following major work tasks:

- 2006 Existing Condition – The evaluation of existing conditions (Section 2) includes an update of traffic counts since the Transportation System Plan (TSP) was completed, additional analysis of crash history, collection of data to gain an understanding of the different travel flows through the area, and identification of system operational and safety deficiencies. Some baseline environmental and land use data was collected and other plans reviewed to identify potential impacts and conflicts in the alternatives screening and evaluation process.

- 2030 No Build Condition – The No Build evaluation (Section 3) was based on a year 2030 forecast of traffic demand in the study area and compared with a transportation system that includes improvements which are planned and funded throughout the city but no projects which specifically address deficiencies in the Highway 138 corridor.
- Concept Development and Screening – A total of seventeen initial improvement concepts were developed and screened based on the Goals and Objectives for the project (Section 4). From this group, six build alternatives were identified for more detailed evaluation. Two additional concepts were screened later in the process and forwarded for further analysis.
- Alternatives Evaluation – The six (to eventually expand to eight) build alternatives that advanced through the screening process were evaluated at a more detailed level as described in Section 5. The evaluation included traffic volume forecasting, operational analysis, qualitative assessment of environmental and land use impacts, basic geometric design to determine general footprint, and planning-level cost estimates.
- Alternative(s) Recommendation – Following the introduction of two additional alternatives, a total of three alternatives were recommended for further refinement based on the outcome of the evaluation described in Section 5.

Public Involvement

Public involvement played an important role throughout the study process. Three committees developed to provide varying levels of input and decision-making met a total of seven times throughout the course of the study. In addition, four public open houses were held during the study process. Lastly, project team leaders presented the study before the Collaborative Environmental and Transportation Agreement for Streamlining (CETAS) committee. The purpose and roles of the various public outreach efforts is described below:

- Citizen Advisory Committee (CAC): Formed to enable interested citizens, property owners, business representatives and other stakeholders to learn about the project and key issues, the primary duty of the CAC is to provide recommendations to the Technical Advisory Committee (TAC) and the Steering Committee (SC). The CAC also provided a supplemental, informal avenue for sharing information and receiving input from the community.
- Technical Advisory Committee (TAC): Provided technical and policy guidance during the study. Members included public works officials from the City of Roseburg and Douglas County, ODOT representatives, and railroad interests. The TAC served as the primary body tasked with making recommendations about the project.
- Steering Committee (SC): Formed to provide policy guidance and to make decisions on land use, transportation facilities, access management, and plan and ordinance amendments based upon recommendations from the TAC and CAC. The committee was composed of members from the Douglas County Board of Commissioners, Roseburg City Council, Cow Creek Band of Umpqua Tribe of Indians, plus staff from ODOT and the Federal Highway Administration (FHWA).

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- Public Open Houses: Public meetings held on January 30th, April 11th, and June 13th of 2007 and February 6, 2008 provided opportunities for the project team and general public to exchange information on the project and discuss the screening, analysis, and ultimately the selection of preferred alternatives.
- CETAS Presentation: Project team leaders gave a presentation before a panel of CETAS members on May 15, 2007. Comprised of environmental regulatory agencies, including the Environmental Protection Agency, Army Corps of Engineers, National Oceanic & Atmospheric Administration, and Department of State Lands, the CETAS Group was formed by the Federal Highway Administration in an effort to streamline the permitting process and improve early agency coordination for major transportation projects.

Purpose and Need

The purpose of the *Highway 138 Corridor Solutions Study* was to address mobility, safety, connectivity, and multi-modal needs on Highway 138 between Interstate 5 Exit 124 and Fulton Street. Four needs statements were developed in support of the project purpose. These statements summarize the major concerns in the corridor.

1. Highway 138 experiences congestion both downtown and along Stephens Street which also serves as a major north-south commute route paralleling I-5.
2. East-west travel across the railroad tracks is effectively shut down when trains pass through the at-grade railroad crossings which impacts vehicular, freight, transit, and other non-auto modes causing congestion as well as giving rise to safety issues and potential delay for emergency vehicles. Four to six trains pass through the city during a typical 24-hour period.
3. Freight movement within the study area is impacted by some of the tight turning curb radii in downtown Roseburg causing some trucks to choose other roads, such as the congested Garden Valley Road corridor, as an alternative to access Highway 138.
4. Existing gaps in the bicycle and pedestrian transportation system result in a dysfunctional network that makes travel difficult and unsafe.

Existing Conditions

Base data collection was conducted for the study that included a review of existing plans and policies, environmental reconnaissance, land use and community facility summary, existing traffic operations analysis, and safety analysis.

Environmental Reconnaissance

Information taken primarily from published documents and maps, GIS data, and conversations with appropriate professional contacts were used to summarize existing environmental conditions and potential constraints within the study Area. Resources assessed are listed below:

- Goal 5: Resources include South Umpqua River and Deer Creek

- Federal Emergency Management Act (FEMA) Floodplain/Floodway: Portions of the study area are categorized as Special Flood Hazard Areas Inundated by 100-Year Flood.
- Threatened and Endangered Species: The Deer Creek and South Umpqua River are habitat for the Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*). Although not originally listed when the study began, the OC coho salmon is now listed as *Threatened* under the federal Endangered Species Act (ESA). The study area contains no other species that are either proposed or candidates for listing as threatened or endangered under the ESA as administered by the National Oceanic and Atmospheric Administration (NOAA) Fisheries. The Oregon National Heritage Information Center (ONHIC) database indicates that Franklin's bumblebee (*Bombus franklini*) was documented as a federal *Species of Concern*.
- Historic and Archaeological: Three properties are listed *likely eligible* and eight as *possibly eligible* for inclusion on the National Register of Historic Places (NRHP) within the study area. The State Historic Preservation Office (SHPO) lists eleven properties within or near the study area that are on the National Register List. Roseburg also contains three historic districts on the SHPO National Register.
- Air Quality: Not enough data is available to determine whether to designate the Roseburg area as in attainment or non-attainment area. However, based on communication with the Ambient Air Quality Coordinator, Roseburg is an attainment for National Ambient Air Quality Standards (NAAQS) adopted by the Oregon Department of Environmental Quality (DEQ).
- Socioeconomic and Environmental Justice: Based on the U.S. Census, the City of Roseburg experienced a 17.5 percent population increase from 1990 to 2000. The most recent data from the Population Research Center at Portland State University places Roseburg's population at 21,050 as of July 2006. The Douglas County population tends to be older than the state average with a median family income approximately \$10,000 lower than and unemployment two percentage points higher than the state average. Several tribal properties held in trust are situated within downtown Roseburg. These properties would require consent of tribal leaders and Bureau of Indian Affairs (BIA) for easements.
- Hazardous Materials: Assessment performed in 2006 determined there to be no potential sources of contamination.
- Wetlands: Two major water sources, the South Umpqua River and Deer Creek, are within the area of potential project impact.

Existing Land Uses

Land uses surrounding Highway 138/Diamond Lake Boulevard are primarily commercial and industrial. Most of this land was developed or is being held for commercial and industrial expansion. It is anticipated that as the Diamond Lake Boulevard corridor is further developed, industrial property owners will request zone changes to Mixed Use (MU) to permit a greater range of uses when marketing them for redevelopment (ODOT and City of Roseburg, 2003). Land uses surrounding the I-5 portion of the study area are primarily Public Reserve (PR), with

Single and Multi-Family Residential parcels fronting the southern bank of the South Umpqua River. The Public Reserve classification is intended to “establish districts within which a variety of public service activities may be conducted without interference from inappropriate levels of residential, commercial, or industrial activities.”

Existing Traffic Analysis

The process of analyzing existing transportation operations and facilities within the study area involved assessments by the project team of nine roadways and sixteen intersections. Traffic data collection included turning movement counts and origin-destination analysis through downtown. Results of the analysis are summarized below:

- **Origin-Destination:** Approximately 22-27 percent of the recorded traffic crossing the Oak/Washington Avenue bridges were destined to, or originated from points south of downtown Roseburg, 16-21 percent to/from points east of downtown, and 15-20 percent to/from points north of downtown. Based on the survey, Diamond Lake Boulevard attracts 11-12 percent of the traffic crossing the bridge. This percentage is likely higher during summer months and on weekend when recreational traffic using Highway 138 is higher.
- **Existing Traffic Operations:** The westbound right turn from Winchester Street to Stephens Street has a volume-to-capacity (v/c) ratio that exceeds the standard. However, both field observations and simulations indicate that this movement is not congested as implied by the v/c ratio. Existing queues do not consistently extend from one intersection to the next. The only location where the 95th percentile queue was shown to spill back into the upstream intersection was Washington Avenue at Pine Street, where the distance to Stephens Street is shorter than other locations because this is where the Highway 138 couplet begins at the north end of downtown.
- **Safety Analysis:** Crash history indicates a high number of crashes in the analysis area. Over three-quarters of the crashes are angle type or turning type. The third most common crash type is rear end collisions. A quarter of all recorded crashes within the study area occurred at the intersection of Oak Avenue and Pine Street.

2030 No Build Traffic Operations

The project team assessed how the study area transportation system is expected to function under the future year 2030 traffic operations assuming No Build conditions with projected traffic volumes if no transportation system changes occur other than those improvements already scheduled and funded. The simulation model suggests that nine of the sixteen study area intersections would fail to meet applicable mobility standards. The increase between the 2006 and 2030 traffic volumes overwhelms many of these intersections. The intersections of Stephens Street at Winchester Street, Stephens Street at Diamond Lake Boulevard, Diamond Lake Boulevard at Fulton Street, Washington Avenue at Spruce, Harvard Avenue at Madrone Street, and Harvard Avenue at the High School/I-5 Northbound off ramps not only will fail to meet mobility standards, but will likely have one or more movements that exceed capacity.

Queuing would be occurring along westbound Diamond Lake Boulevard, starting at Stephens Street and extending through the intersections with Winchester Street, almost to Fulton Street. Likewise, northbound Stephens Street would experience queuing, which would start at the intersection with Diamond Lake Boulevard and extend through Douglas, Washington, and Oak Avenues. This queuing would also contribute to the large queues along eastbound Oak Avenue. These predominant queue patterns would cause delay along the Highway 138 route.

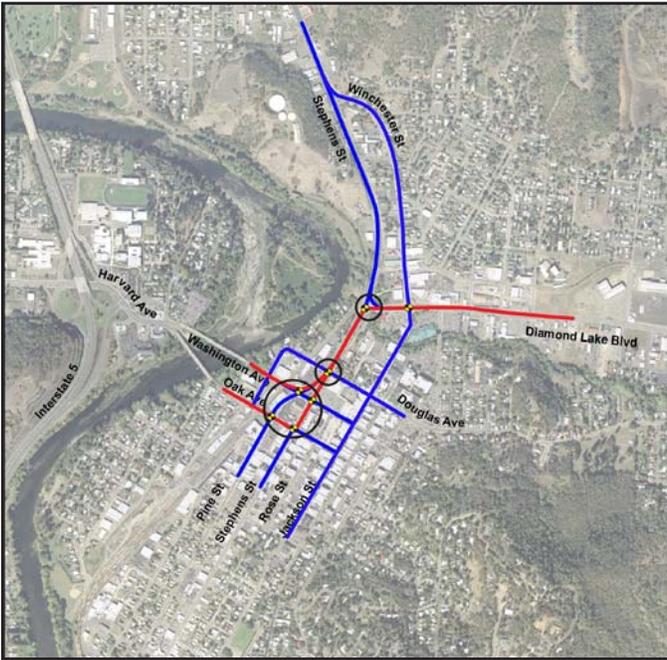
In situations with extreme queue length, like those indicated in the simulation model, drivers will begin to look for alternate routes. This often means intrusion into the neighborhoods adjacent to the congested roadways as traffic cuts through to bypass congested areas. The increased traffic on these streets may result in busier neighborhood roads, reduced traffic operations, and a decrease in safety. Long queues may also give rise to more aggressive behaviors as drivers become impatient with long delays. The result can exacerbate existing safety problems and create new ones such as red light running, queue spillback into intersections (gridlock), and unexpected lane changes.

Initial Concept Development and Screening

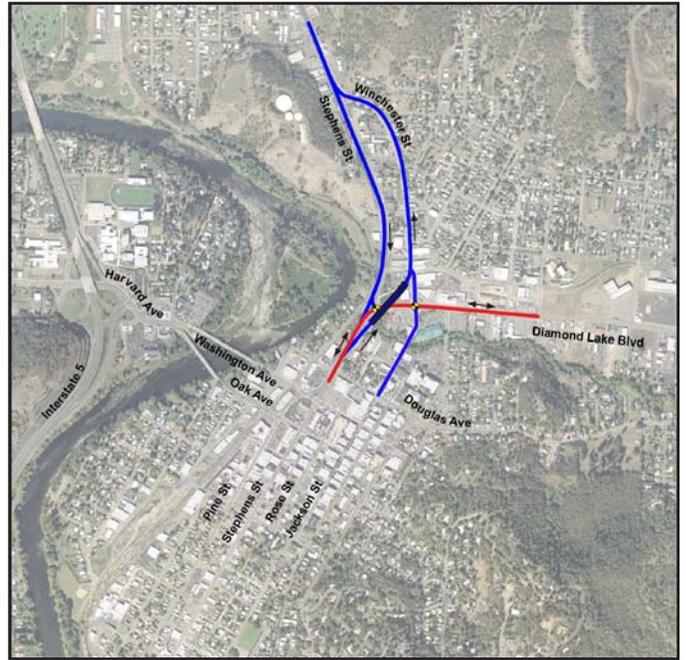
The project team and oversight committees developed 19 design options that can be categorized under six concepts. The Concept 1 design options attempt to enhance the existing corridor to the greatest extent possible. Concepts 2 through 4 all reroute the corridor from its current alignment and are differentiated by whether they keep the alignment largely in the vicinity of downtown (Concept 2), provide a direct Harvard Avenue to Diamond Lake Boulevard connection (Concept 3), or utilize existing uphill topography north of Diamond Lake Boulevard to ensure a grade separation of the railroad line (Concept 4). Concept 5 introduces a new bridge over the South Umpqua River south of downtown and outside the study area boundaries aligned with Portland Avenue, which connects with Interstate 5 at Exit 123. The screening process was revisited later during the course of the study when two additional design options were forwarded for consideration. These two design options form Concept 6 – a couplet system in the northern section of the study area with Diamond Lake Boulevard and Odell Avenue forming the east-west couplet, and Stephens Street and Winchester Street forming north-south.

Concept 1: Existing Corridor Alignment with Intersection Capacity Improvements

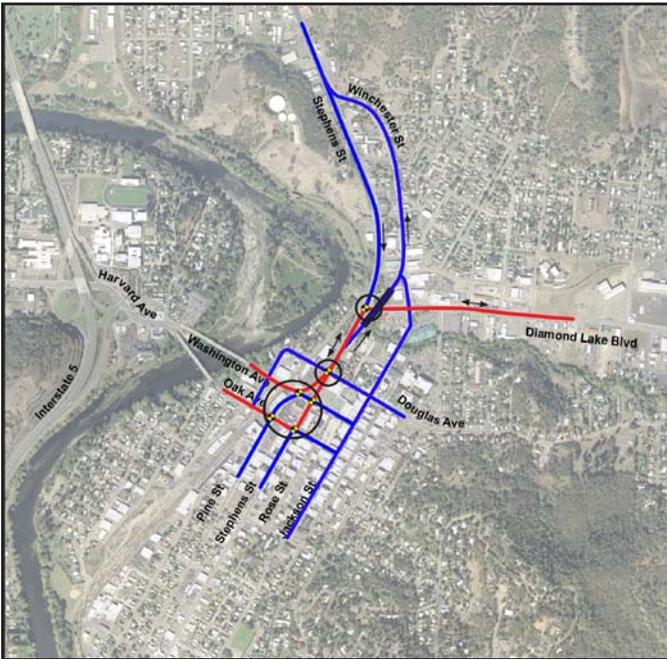
Design options under Concept 1 preserve the existing Highway 138 corridor alignment by implementing improvements to the system designed to maximize its efficiency (see Figure ES-2). The three design options could be incorporated individually or in tandem with each other or some of the other concepts described in this section.



Concept 1a: *Intersection Capacity Enhancements*



Concept 1b: *Winchester/Stephens Couplet*



Concept 1c: *Combine Capacity Enhancements and Couplet (1a and 1b)*

Legend

-  Highway 138 Alignment
-  Surrounding Streets
-  Bridge
-  Traffic Signal



Highway 138 Corridor Solutions Study
Roseburg, Oregon

Figure ES-2

Existing Corridor Improvements

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Concept 2: Downtown Realignment

The varying design options discussed under this concept incorporate a new Highway 138 alignment into the existing downtown grid – placing prioritization of traffic flow through downtown on the newly realigned highway. As displayed in Figure ES-3, the design options utilize the existing couplet bridges or build a parallel new bridge aligned with or in proximity to Douglas Avenue. The section of the realigned downtown highway between the bridges and where it arcs northward towards Diamond Lake Boulevard could potentially be a five-lane corridor with center turn lane or perhaps comprise four-lanes with a boulevard style landscaped median. All design options discussed below utilize the Oak Avenue Bridge and corridor as a secondary two-way auxiliary roadway providing direct access into and out of downtown and points south. None of the design options provide a grade separated crossing of the railroad line. Finally, all options would require some degree of reconfiguring existing streets in the downtown vicinity.

Concept 3: Direct Alignment

The Direct Alignment design options that comprise Concept 3 all are configured to provide the most direct link between Harvard Avenue west of the South Umpqua River to Diamond Lake Boulevard on the east side of the river (see Figure ES-4). The central feature of all four design options is a new bridge crossing diagonally over the South Umpqua River and southern portion of Elk Island. The Washington Avenue Bridge would likely need to be vacated under all four options. The options are differentiated primarily by whether and how they provide a grade separated crossing over the railroad line. Three of the four design options do provide a grade separated crossing, either by flying over the existing railroad alignment, relocating the railroad, or by elevating the existing railroad line to enable streets to traverse under the line. Currently unknown is whether the Oak Avenue Bridge will need to be widened to four lanes (two lanes in each direction) under all design option scenarios. If the new alignment flies over Stephens and Winchester Street with no access as with Design Option 3(b), the required bridge widening will be a certainty. Otherwise, widening of the Oak Avenue Bridge is an unknown with regards to the other three design options.

Concept 4: Northern Grade-Separated Alignment

Design options under Concept 4 attempt to utilize the existing topography to align a new bridge that crosses over the railroad line (see Figure ES-5). North of Diamond Lake Boulevard, the railroad line stays along the level banks of the South Umpqua River while Stephens Street and the surrounding landscape east of the corridor ascend uphill – thus enabling a bridge to cross over the railroad with shorter distances to descend onto the surface streets. All design options under consideration incorporate bridges over the river and Elk Island to align north and parallel to the existing Highway 138 route along Diamond Lake Boulevard, reconnecting with the existing corridor at a point east of Jackson Street. The design options would also require vacating the Washington Avenue Bridge and widening Oak Avenue Bridge to four-lane, two-way traffic due to access limitations with some of the new bridge configurations.

Concept 5: Portland Avenue Bridge

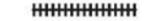
This concept, displayed in Figure ES-6, has only one option which would construct a new bridge across the South Umpqua River and CORP Railroad line aligned along Portland Avenue. The bridge would enable direct access from Stephens Street south of downtown to Interstate 5 via Exit 123. The natural topography would enable the new bridge to fly over the railroad while connecting with Stephens Street at grade. This concept would also require reconstruction of the 1-5 interchange and Portland Avenue (Interchange 123 IAMP).

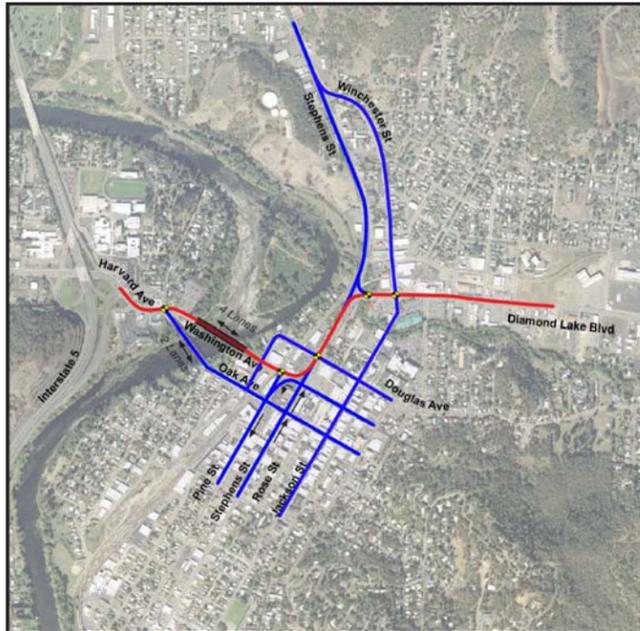
Concept 6: Diamond Lake – Odell Couplet

The options under Concept 6 incorporate an east-west and north-south couplet system north of downtown Roseburg. Both design options, displayed in Figure ES-7 would convert Diamond Lake Boulevard to an eastbound one-way street and create an Odell Avenue alignment forming a one-way roadway in the westbound direction. The eastern terminus of the couplet would be west of Fulton Street while Stephens Street would form the western end. Meanwhile, Stephens Street and Winchester Street would form a north-south couplet system between Diamond Lake Boulevard to the south and the Stephens-Winchester merge to the north. Stephens Street would convert to one-way southbound traffic while Winchester Street would carry northbound traffic. Topography and infrastructure constraints (Deer Creek and existing bridge) would force the Odell Avenue alignment to be directed northward at Atlanta Street and run perpendicular to Jackson Street before turning back to a roughly parallel direction with Diamond Lake Boulevard east of Winchester Street.

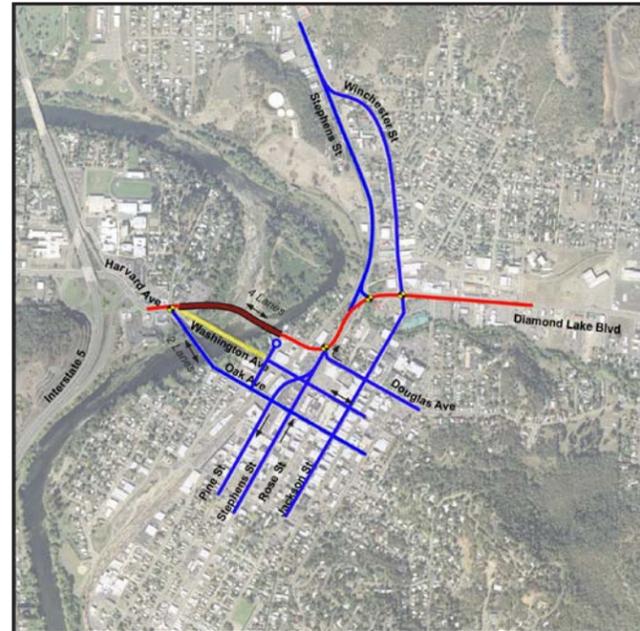
Highway 138 Corridor Solutions Study
Roseburg, Oregon

Legend

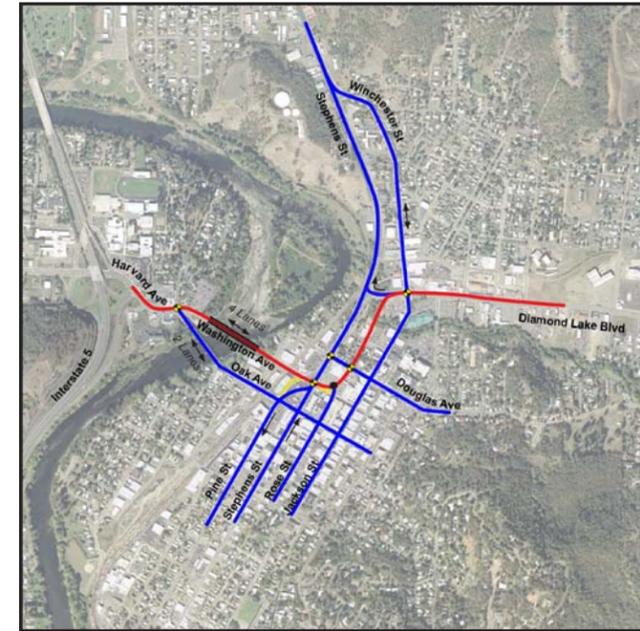
-  Highway 138 Alignment
-  Surrounding Streets
-  Railroad
-  Bridge
-  Vacated Streets
-  Traffic Signal



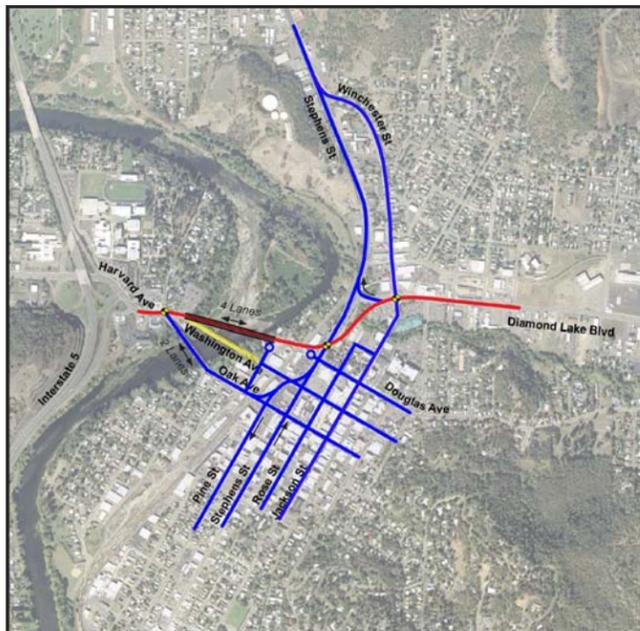
Concept 2a: Widen Washington Avenue Bridge:
 Washington - Stephens - Diamond Lake Alignment



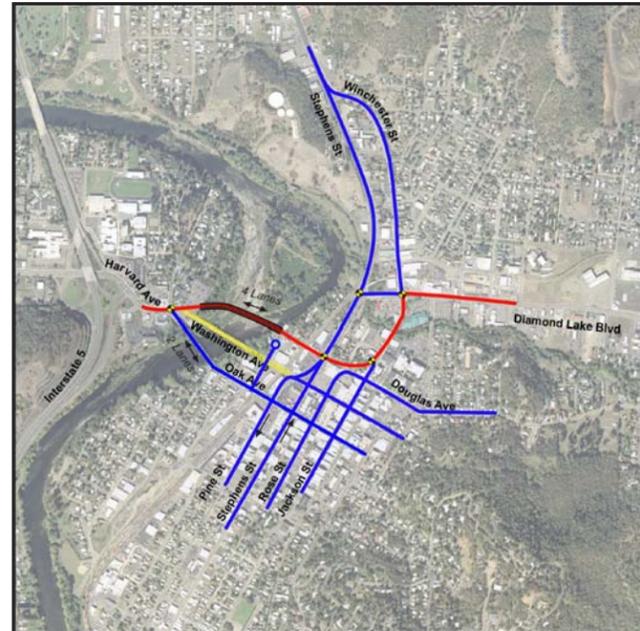
Concept 2b: New Bridge: Douglas - Stephens -
 Diamond Lake Alignment



Concept 2c: Widen Washington Avenue Bridge:
 Washington - Rose - Diamond Lake Alignment



Concept 2d: New Bridge: Sweeping Curve to Diamond
 Lake

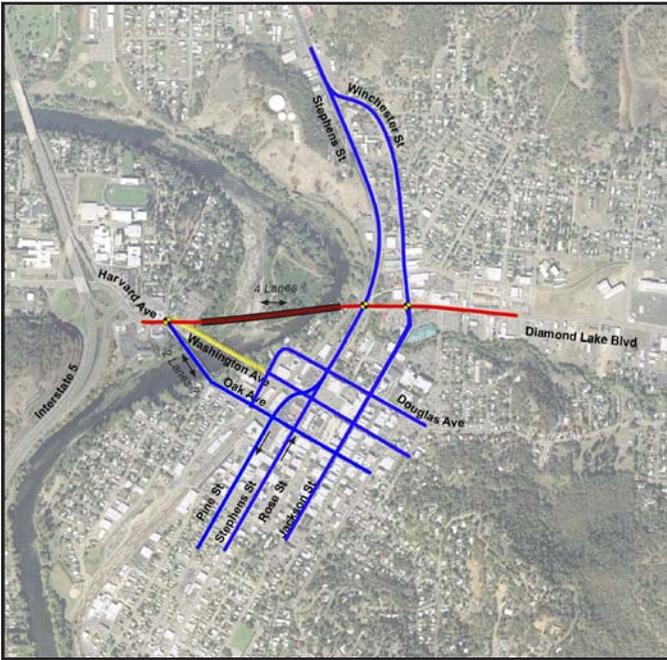


Concept 2e: New Bridge: Douglas - Jackson - Diamond
 Lake Alignment

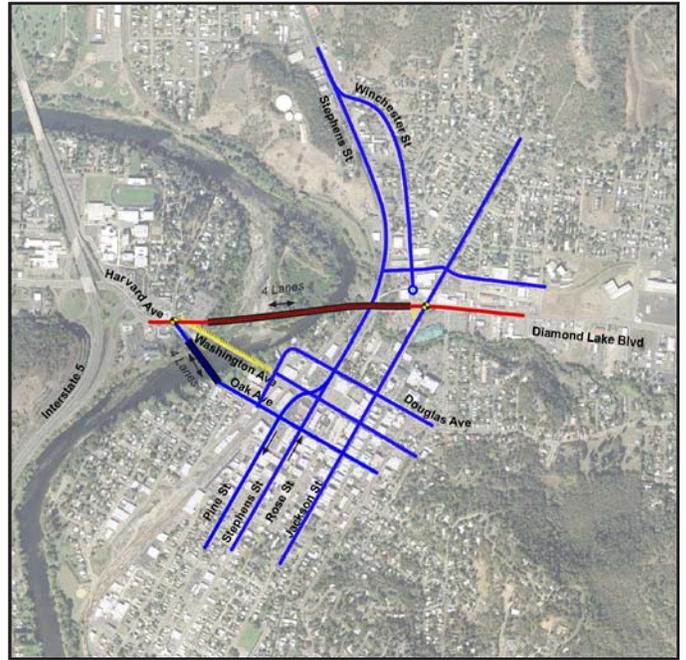


Figure ES-3
 Downtown Realignments

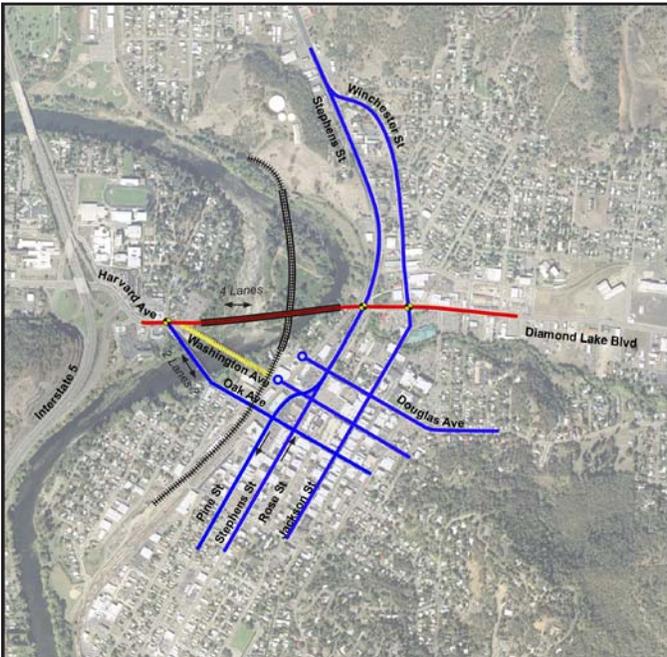
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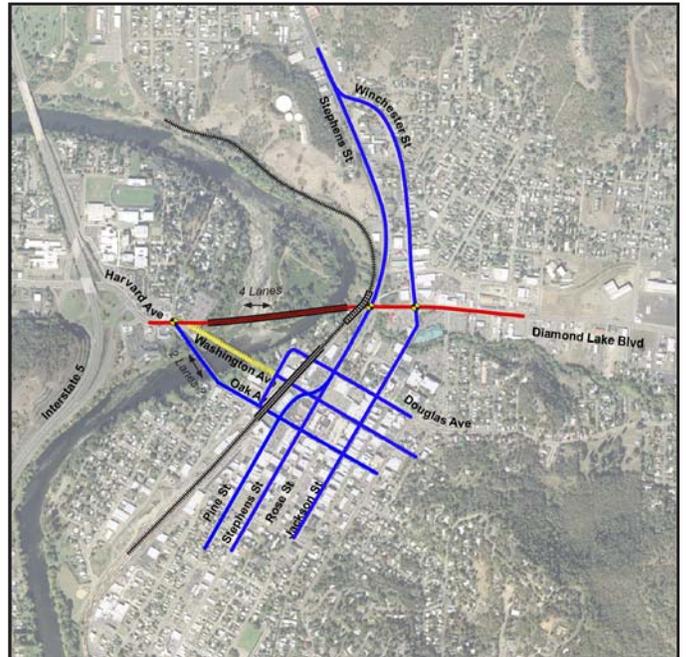
Concept 3a: New Bridge: Harvard - Diamond Lake At-Grade Crossing at Railroad/Stephens



Concept 3b: New Bridge: Harvard - Diamond Lake Grade Separated Flyover Crossing at Railroad/Stephens



Concept 3c: New Bridge: At-Grade Harvard - Diamond Lake at Stephens Supplemented by Railroad realignment



Concept 3d: New Bridge: Harvard - Diamond Lake Elevated Railroad

Legend

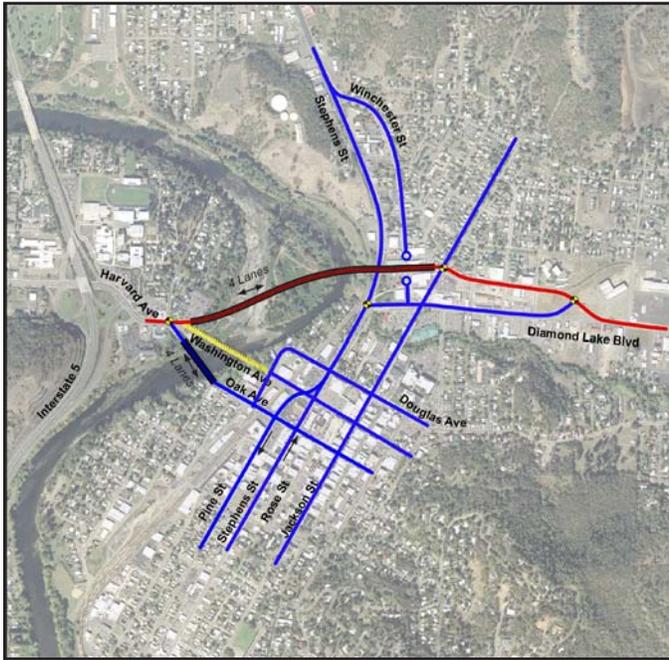
-  Highway 138 Alignment
-  Surrounding Streets
-  Railroad
-  Bridge
-  Vacated Streets
-  Traffic Signal



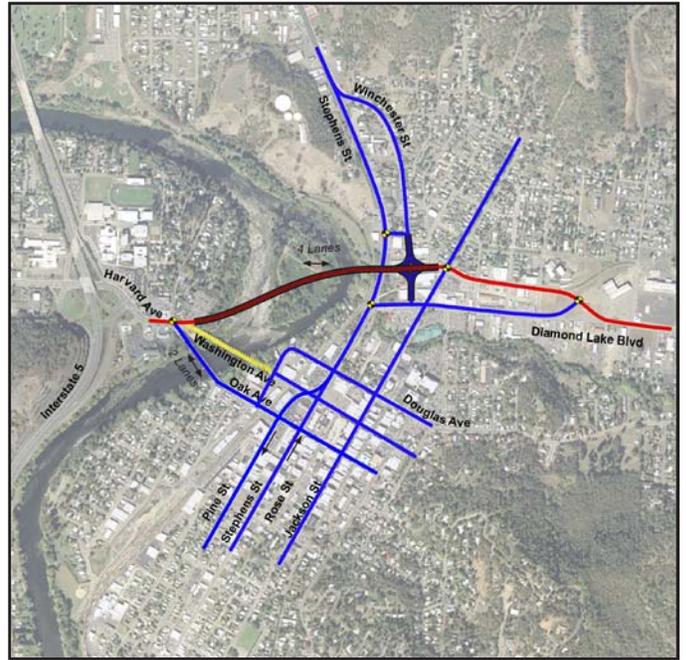
Highway 138 Corridor Solutions Study
Roseburg, Oregon

Figure ES-4
Direct Alignments

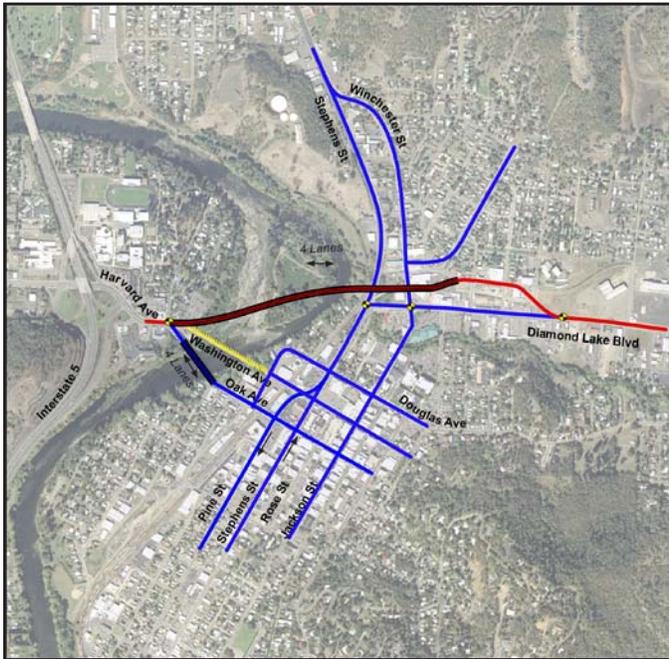
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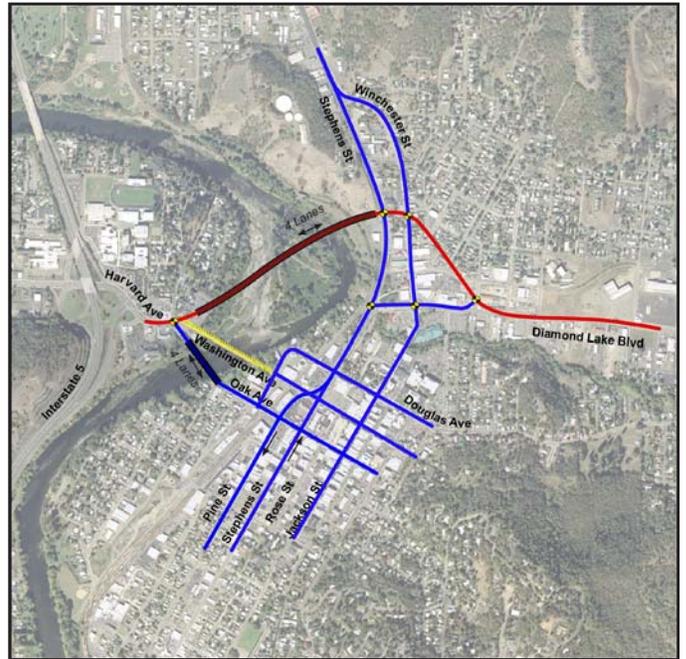
Concept 4a: New Bridge: Access via Jackson



Concept 4b: New Bridge: Right-In/Right-Out Access Ramps



Concept 4c: New Bridge Flyover Railroad/Stephens/Winchester



Concept 4d: New Bridge: Wright - Washington - Odell Alignment

Legend

-  Highway 138 Alignment
-  Surrounding Streets
-  Bridge
-  Vacated Streets
-  Traffic Signal

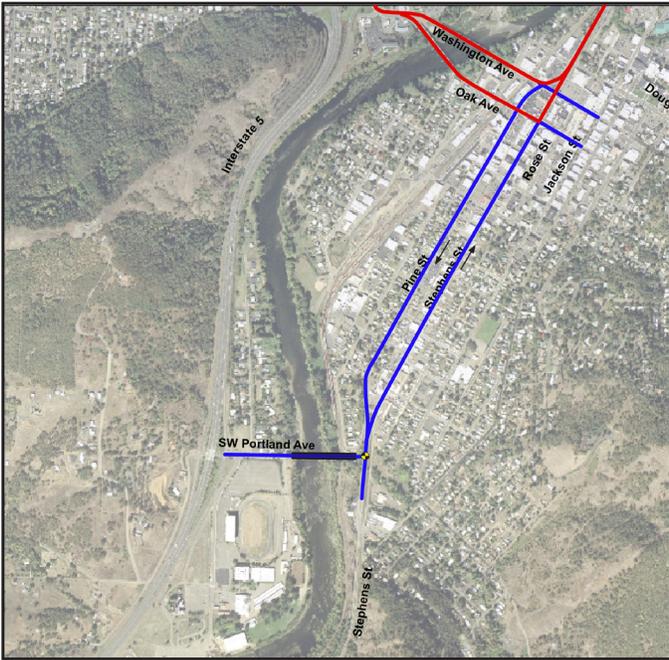


Highway 138 Corridor Solutions Study
Roseburg, Oregon

Figure ES-5

North Grade-Separated Alignments

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Concept 5: *Grade Separated Railroad Crossing*

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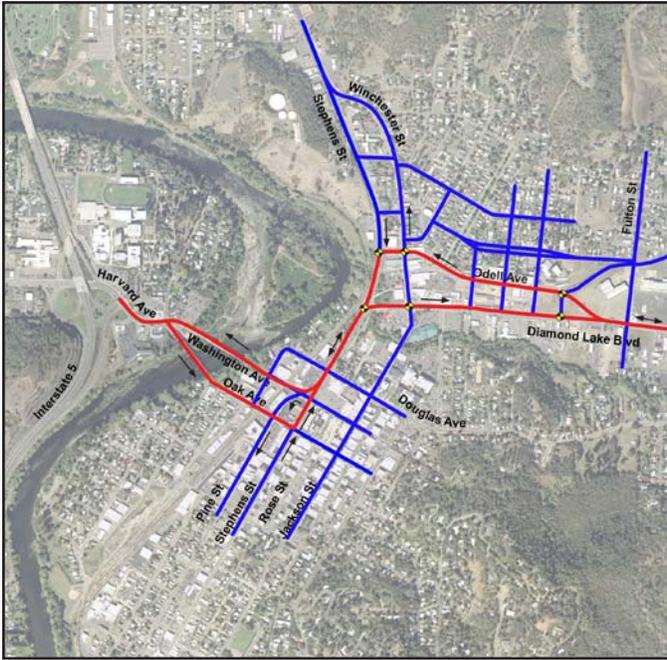
- Highway 138 Alignment
- Surrounding Streets
- Traffic Signal



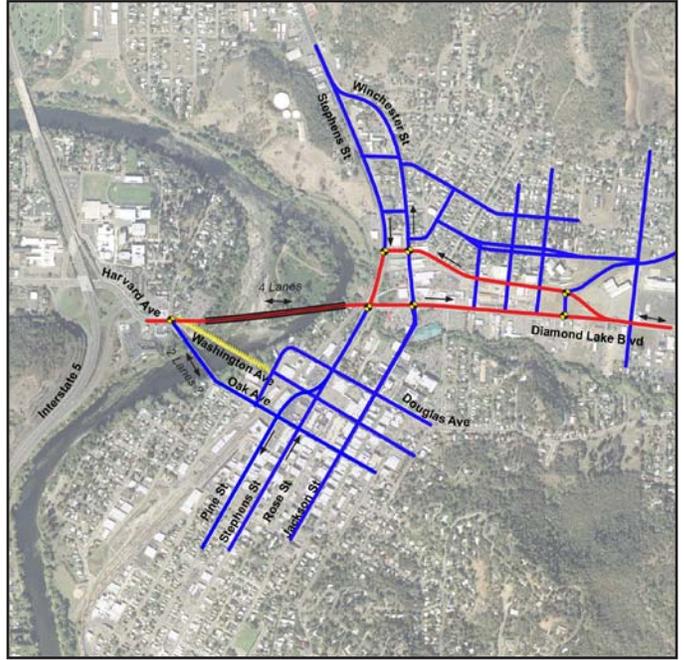
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Roseburg, Oregon

Figure ES-6
Portland Avenue Bridge

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Concept 6a: *Diamond Lake - Odell Couplet*



Concept 6b: *Diamond Lake - Odell Couplet with Direct Connection*

Legend

-  Highway 138 Alignment
-  Surrounding Streets
-  Bridge
-  Vacated Streets
-  Traffic Signal



Highway 138 Corridor Solutions Study
Roseburg, Oregon

Figure ES-7
Diamond Lake - Odell Couplet

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Screening Criteria

The screening criteria used to identify alternatives for more detailed evaluation reflect the projects Purpose and Need statements plus Goals and Objectives. The Initial Circulation Option Screening Matrix displayed in Exhibit ES-1 indicates how the various concepts and design options were assessed based on the extent to which they were considered to meet the criteria. The screening criteria are divided into seven categories plus a relative cost assessment as follows:

- **Project Purpose:** To what extent do the concept and design options address the mobility, safety, connectivity, and multi-modal needs of Highway 138 within the study area?
- **Traffic Flow:** The concepts and design options are assessed on whether they provide a solution that meets future regional and through travel demand along the corridor, whether it adheres to State, County, and local planning efforts, and whether they enhance local freight access.
- **Connectivity:** Under this category, the matrix indicates the concepts and design options that provide a grade-separated railroad crossing versus those that do not, assesses the extent to which they protect access and minimize disruption to existing circulation in the downtown vicinity, and considers whether they provide a solution that could enhance economic development.
- **Environmental Impacts:** To what extent do the concepts and design options avoid or impact wetlands and aquatic/terrestrial wildlife habitat?
- **Cultural Impacts:** Under this category, the concepts and design options are assessed based on the extent to which they impact recreational resources, properties listed or eligible for listing on the National Register of Historic Places, the Downtown, Laurelwood, and Mill-Pine Historic Neighborhoods, known archaeological resources, and the extent to which the concepts and options protect and enhance existing neighborhoods and businesses.
- **Safety:** The concepts and design options are assessed based on whether they mitigate safety problems on Highway 138.
- **Multi-Modal:** To what extent do the concepts and design options improve linkages for non-auto travel modes?

Based on the screening criteria and a fatal flaw analysis, eight of the original nineteen design options were recommended for further assessment as build alternatives:

1. Design Option 1(a): Intersection Capacity Enhancements
2. Design Option 2(a): Widen Washington Avenue Bridge (Washington-Stephens-Diamond Lake Alignment)
3. Design Option 2(c): Widen Washington Avenue Bridge (Washington-Rose-Diamond Lake Alignment)

4. Design Option 3(a): New Bridge (Harvard-Diamond Lake with At-Grade Crossing at Railroad/Stephens)
5. Design Option 3(d): New Bridge (Harvard-Diamond Lake with Elevated Railroad)
6. Design Option 4(a): New Bridge (Flyover Railroad/Access via Jackson Street)
7. Design Option 6(a): Diamond Lake – Odell Couplet
8. Design Option 6(b): Diamond Lake – Odell Couplet with Direct Connection

Exhibit ES-1. Initial Circulation Options Screening Matrix

	DESIGN CONCEPTS																		
	Existing Corridor Improvements			Downtown Realignment					Direct Realignment				Northern Grade Separated Realignment				Portland Ave. Bridge	Diamond Lake - Odell Couplet	
	1a	1b	1c*	2a	2b	2c	2d	2e	3a	3b	3c	3d*	4a	4b	4c	4d	5	6a	6b
PROJECT PURPOSE																			
Does the concept address mobility, safety, connectivity, and multi-modal needs on Highway 138 between I-5 Exit 124 and Fulton Street?	●	○	*	●	●	●	●	●	●	●	●	*	●	●	●	●	○	●	●
TRAFFIC FLOW																			
Does the concept provide a solution that meets the future demand for regional and through travel to/from and between I-5 and the North Umpqua Highway (OR 138)?	●	○	*	●	●	●	●	●	●	●	●	*	●	●	●	●	○	●	●
Does the concept provide a transportation solution in keeping with State, County, and City planning efforts?	⊙	○	*	⊙	⊙	⊙	⊙	⊙	●	⊙	⊙	*	⊙	⊙	⊙	⊙	⊙	⊙	⊙
Does the concept improve freight access to and from I-5 to Highway 138?	⊙	○	*	●	●	●	●	●	●	●	●	*	●	●	●	●	○	⊙	●
CONNECTIVITY																			
Does the concept provide relief from restricted east-west travel when trains pass through?	○	○	*	○	○	○	○	○	○	●	●	*	●	●	●	●	●	○	○
Does the concept provide a solution that protects access and minimizes disruption to existing circulation to and within the downtown?	⊙	⊙	*	⊙	⊙	⊙	●	●	●	○	●	*	○	⊙	⊙	●	●	⊙	⊙
Does the concept provide a solution that enhances economic development opportunities?	⊙	○	*	●	●	⊙	●	⊙	●	●	●	*	●	●	●	●	○	●	●
ENVIRONMENTAL IMPACTS																			
Does the concept avoid or minimize impacts to wetlands and Waters of the State or US?	●	●	*	⊙	○	⊙	○	○	○	○	○	*	○	○	○	○	○	●	○
Does the concept avoid or minimize impacts to aquatic and terrestrial wildlife habitat?	●	●	*	⊙	○	⊙	○	○	○	○	○	*	○	○	○	○	○	●	○
CULTURAL IMPACTS																			
Does the concept avoid or minimize adverse impacts to Section 4(f) resources?	●	●	*	●	○	⊙	○	○	⊙	●	○	*	●	●	●	●	?	●	⊙
Does the concept avoid adverse impacts to properties listed, or eligible for listing, on the National Register of Historic Places?	●	●	*	●	○	⊙	○	○	⊙	●	○	*	●	●	●	●	?	●	●
Does the concept avoid adverse impacts to the historic neighborhood districts?	Downtown			⊙	●	*	⊙	⊙	⊙	○	○	*	●	●	●	●	⊙	⊙	⊙
	Laurelwood			●	●	*	●	●	●	●	●	*	⊙	⊙	⊙	⊙	●	●	●
	Mill-Pine			●	●	*	●	●	●	●	●	*	●	●	●	●	⊙	●	●
Does the concept avoid adverse impacts to archaeological resources?	●	●	*	●	●	●	●	●	●	●	●	*	●	●	●	●	?	●	●
Does the concept provide a transportation solution that protects and enhances existing neighborhoods and businesses?	●	○	*	⊙	⊙	⊙	○	○	●	○	⊙	*	○	○	⊙	○	●	○	○
SAFETY																			
Does the concept mitigate safety impacts on Highway 138?	●	○	*	●	●	●	●	●	●	●	●	*	●	●	●	●	○	●	●
MULTI-MODAL																			
Does the concept improve linkages for non-auto travel modes (e.g. bicycle, pedestrian, transit)?	○	○	*	⊙	⊙	⊙	⊙	⊙	●	●	●	*	●	●	●	●	●	●	●
RELATIVE COST (\$, \$\$, \$\$\$, \$\$\$\$)	\$	\$	*	\$\$	\$\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	*	\$\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$\$	\$	\$\$\$\$
CONCEPTS RECOMMENDED FOR MODELING	YES			YES		YES			YES			YES	YES						

* Proposed during the TAC meeting, not assessed for compliance with screening criteria

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Analysis of Conceptual Circulation and Design Alternatives

The build alternatives that advanced through the screening process were then refined from the initial concepts through the development of volume forecasts, subsequent traffic analysis, and application of appropriate roadway geometrics. The traffic forecasts reflect the shifts in traffic volumes both within the project area and from roadways outside the project area.

Lane configurations designed to meet Highway Design Manual (HDM) standards, along with horizontal and vertical geographic data were used to develop approximate roadway and right-of-way for each design alternative. Transportation, environmental and land use impacts of the improvements were then identified along with conceptual cost estimates.

Improvements under each alternative were developed keeping in mind that the Interchange Area Management Plan (IAMP) for I-5 Exit 124 is also underway. The proposed lane configurations should be compatible with recommendations for Harvard Avenue as a seven-lane roadway but do not attempt to incorporate the various interchange options considered for the IAMP.

Evaluation Matrix

An evaluation matrix was developed from the analysis to compare the six alternatives. Criteria used in the matrix were developed from the project goals and objectives. A description of each criterion is presented below with the evaluation matrices for alternatives recommended and not recommended for further consideration presented as Exhibit ES-2 and Exhibit ES-3 respectively.

Transportation

The transportation evaluation addressed traffic operations, traffic flow, and the impacts to other modes of travel. Future year 2030 traffic operations were assessed using design hourly traffic volumes. Criteria used to evaluate transportation impacts are:

- **Mobility Standards:** Does the alternative meet State and City mobility standards with respect to v/c ratio and level of service (LOS) for 2030 traffic demands through the study area?
- **Signalized Intersections:** How many signalized intersections would the alternative require and at what complexity?
- **Traffic Flow:** To what extent would the alternative change the existing roadway alignment? What new facilities would be required and what would need to be closed?
- **Bridges:** Would the alternative incorporate a new bridge structure or utilize existing facilities?
- **Queuing:** Would the alternative reduce overall queue lengths and delay at the primary intersections throughout the study area? What are the specific locations of projected queuing problems for each alternative?
- **Grade Separation between OR 138 and Railroad:** Will the alternative provide a grade-separated crossing of the railroad?

- **Bicycle and Pedestrian Facilities:** Does the alternative provide bicycle and pedestrian facilities that would meet ODOT and local standards?
- **Transit Facilities:** Does the alternative maintain or enhance existing and planned public transit transportation services? Does the alternative provide for bus ingress and egress and accommodate pedestrians?

Environmental and Land Use

Potential environmental and land use impacts were assessed based on mapping and previous data collected throughout the study area (see Section 2 of the report) and basic roadway geometrics and right-of-way needs. Criteria used to evaluate traffic operations are:

- **Goal 5 Resources:** To what extent are identified natural resources, historic areas, and open spaces impacted by the alternative?
- **FEMA Floodplain:** To what extent are Zone AE Floodway Areas and Zone X Flood Areas impacted by the alternative?
- **Natural Heritage Database/Threatened & Endangered (T&E) Listed Species:** The Deer Creek and South Umpqua River are habitat for the OC coho salmon (*Oncorhynchus kisutch*). Although not originally listed when the study was underway, the OC coho salmon is now listed as *Threatened* under the federal ESA. Therefore, this criterion is applicable.
- **Historic Resources:** To what extent are historic resources impacted by the alternative? What are the specific sites impacted?
- **Potential Archaeology Sites:** No impacts are identified based on available data.
- **Known Hazardous Materials Locations:** No impacts based on available information.
- **Potential Wetlands/Riparian Corridor and Jurisdictional Area of South Umpqua River and Deer Creek:** In addition to Goal 5 Resource impacts, are there additional impacts to palustrine wetland areas surrounding the South Umpqua River/Deer Creek confluence area?
- **Parks and Recreation, Section 4(f) and 6(f) Resources:** In addition to Historic Resource impacts, what additional impacts are associated with the alternatives pertaining to parks, bike paths, etc.
- **Community Features:** To what extent do the alternatives impact existing and planned public facilities?
- **Socioeconomics and Environmental Justice:** From the standpoint of the corridor study, socioeconomics addresses impacts associated with right-of-way takes on businesses and residential relocation. Environmental justice focuses on assessing the extent of disproportionate adverse affects to minority and low income residents.

Exhibit ES-2: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Forwarded		
	3(a) Harvard-Diamond Lake Alignment (Railroad At Grade)	6(a) Diamond Lake – Odell Couplet	6(b) Diamond Lake – Odell Couplet with Direct Connection
Transportation			
Mobility Standards	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Highway Design Manual, Oregon Highway Plan, and city mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards
Signalized Intersections	<ul style="list-style-type: none"> Three signals in both directions along OR 138 between Madrone and Fulton New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Eight eastbound and seven westbound signals along OR 138 between Madrone and Fulton New signals at Odell & Stephens, Odell & Winchester, and Douglas & Jackson Signal phasing changes at Diamond Lake & Stephens and Diamond Lake & Winchester 	<ul style="list-style-type: none"> Three eastbound and four westbound signals along OR 138 between Madrone and Fulton New signals at Odell & Stephens, Odell & Winchester, and Douglas & Jackson Signal phasing changes at Diamond Lake & Stephens and Diamond Lake & Winchester
Traffic Flow	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd Washington Avenue would be closed at Spruce St 	<ul style="list-style-type: none"> Stephens St would be one-way southbound from Winchester St to Diamond Lake Blvd Winchester St would be one-way northbound from Diamond Lake Blvd to Stephens St Diamond Lake Blvd would be one-way eastbound from Stephens St to new Odell Ave connection Odell Ave would be one-way westbound from Diamond Lake Blvd connection to Stephens St Downtown accessibility via Jackson St more limited 	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd Stephens St would be one-way southbound from Winchester St to Diamond Lake Blvd Winchester St would be one-way northbound from Diamond Lake Blvd to Stephens St Diamond Lake Blvd would be one-way eastbound from Stephens St to new Odell Ave connection Odell Ave would be one-way westbound from Diamond Lake Blvd connection to Stephens St Downtown accessibility via Jackson St more limited
Bridges	<ul style="list-style-type: none"> New bridge would serve traffic to/from north and Diamond Lake Blvd with added demand from south if Oak Ave bridge is one-way Oak Ave bridge could be one-way or two-way and mostly serve downtown and to/from south Washington Ave bridge would be closed Stephens and Diamond Lake bridges over Deer Creek would be widened 	<ul style="list-style-type: none"> Existing Oak and Washington Ave bridges would continue to serve as OR 138 	<ul style="list-style-type: none"> New bridge would serve traffic to/from north and Diamond Lake Blvd Oak Ave bridge would become two-way and mostly serve downtown and to/from south Washington Avenue bridge would be closed
Queuing	<ul style="list-style-type: none"> Moderate queuing at Stephens/ Diamond Lake intersection Westbound traffic along Oak Ave bridge would queue across river to Spruce with two-way travel Long queues on Diamond Lake at Winchester intersection without additional lane improvements 	<ul style="list-style-type: none"> Two-way couplet and additional travel lanes at existing intersections would generally reduce queues 	<ul style="list-style-type: none"> Moderate queuing at Stephens/ Diamond Lake intersection with addition of new bridge Westbound traffic along Oak Ave bridge would queue across river to Spruce
Grade Separation between OR 138 and Railroad	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Bicycle and Pedestrian Facilities	<ul style="list-style-type: none"> New facilities added with bridge directly to Diamond Lake Blvd Large intersections could disrupt bike/ped traffic flow (may explore below grade crossing) 	<ul style="list-style-type: none"> Bikes and enhanced sidewalks added on Diamond Lake Blvd east of Winchester and on Odell Avenue 	<ul style="list-style-type: none"> New facilities added with bridge directly to Diamond Lake Blvd Bikes and enhanced sidewalks added on Diamond Lake Blvd east of Winchester and on Odell Ave
Transit Facilities	<ul style="list-style-type: none"> More direct route to Diamond Lake Blvd available, although not necessarily desirable from a transit standpoint (more stops to pick up riders) 	<ul style="list-style-type: none"> Existing routes would be split over couplets Some bus pullouts could be added Potentially longer distances to some bus stops 	<ul style="list-style-type: none"> Existing routes would be split over couplets More direct route to Diamond Lake Blvd available although not necessarily desirable Some bus pullouts could be added Potentially longer distances to some bus stops
Environmental and Land Use			
Goal 5 Resources Natural Resources, Scenic and Historic Areas, and Open Spaces	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally. Significant impact to Deer Creek due to reconstruction and widening of DLB and Stephens Bridges. 	<ul style="list-style-type: none"> No to minimal impact to the South Umpqua River (no bridge construction or reconstruction) Moderate to significant impact to Deer Creek depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally. Significant impact to Deer Creek due to reconstruction and widening of DLB and Stephens Bridges.

Exhibit ES-2: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Forwarded		
	3(a) Harvard-Diamond Lake Alignment (Railroad At Grade)	6(a) Diamond Lake – Odell Couplet	6(b) Diamond Lake – Odell Couplet with Direct Connection
FEMA Floodplain	<ul style="list-style-type: none"> • Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally • Significant impact to floodplain areas due new bridge construction over river embankment and reconstruction and widening of DLB and Stephens Bridges over Deer Creek 	<ul style="list-style-type: none"> • No to minimal impact to Zone AE floodway areas (South Umpqua River/Deer Creek) • Moderate impact to Zone X 100-year floodplain areas depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> • Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally • Significant impact to floodplain areas due new bridge construction over river embankment and reconstruction and widening of DLB and Stephens Bridges over Deer Creek
Natural Heritage Database/ Threatened & Endangered (T&E) Listed Species	<ul style="list-style-type: none"> • No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> • No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> • No T&E listed species documented in the project area.
Historic Resources	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Indirect impacts from increased noise to Laurelwood historic district • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Some roadway widening in downtown historic district 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Indirect impacts from increased noise to Laurelwood historic district • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area
Potential Archeology Sites	<ul style="list-style-type: none"> • No impact based on available information 	<ul style="list-style-type: none"> • No impact based on available information 	<ul style="list-style-type: none"> • No impact based on available information
Known Hazardous Materials Locations	<ul style="list-style-type: none"> • No to minimal impact based on available information 	<ul style="list-style-type: none"> • No to minimal impact based on available information 	<ul style="list-style-type: none"> • No to minimal impact based on available information
Potential Wetlands/ Riparian Corridor and Jurisdictional Area of South Umpqua River and Deer Creek	<ul style="list-style-type: none"> • See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted. 	<ul style="list-style-type: none"> • See impacts under Goal 5 Resources category 	<ul style="list-style-type: none"> • See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted.
Parks and Recreation, Section 4(f) and 6(f) Resources	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing South Umpqua River bike path impacted by construction and placement of new at-grade five lane roadway connecting Harvard Avenue to DLB • No to minimal impact to parks 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • No to minimal impact to parks or bike paths 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing South Umpqua River bike path impacted by construction and placement of new at-grade five lane roadway connecting Harvard Avenue to DLB • No to minimal impact to parks
Community Features	<ul style="list-style-type: none"> • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area 	<ul style="list-style-type: none"> • No to minimal impact to community features 	<ul style="list-style-type: none"> • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area
Socioeconomic and Environmental Justice	<ul style="list-style-type: none"> • Minimal impact to tribal properties held in trust (unless the Oak Avenue Bridge requires widening) 	<ul style="list-style-type: none"> • Minimal impacts expected to Cow Creek tribal properties held in trust. 	<ul style="list-style-type: none"> • Minimal impact to tribal properties held in trust (unless the Oak Avenue Bridge requires widening)
Air Quality	<ul style="list-style-type: none"> • No conflict anticipated 	<ul style="list-style-type: none"> • No conflict anticipated 	<ul style="list-style-type: none"> • No conflict anticipated
Existing Land Uses	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Properties around Stephens/Diamond Lake intersection would be impacted by widening and realignment to north • Significant short term economic development stimulus • Significant potential long term economic development stimulus 	<ul style="list-style-type: none"> • Potential disruption to downtown businesses if downtown turning radii are widened along the designated Hwy 138 route • Demolition of properties in the Odell alignment • Disruption expected in vicinity of DLB and Stephens • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Demolition of properties in the Odell alignment • Properties around Stephens/Diamond Lake intersection would be impacted by widening and realignment to north • Significant short term economic development stimulus • Significant potential long term economic development stimulus
Applicable Land Use Plans, Policies, Studies and Reports	<ul style="list-style-type: none"> • Alternative is listed in the Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • In keeping with applicable plans 	<ul style="list-style-type: none"> • Alternative is listed in the Roseburg Comprehensive Plan (TSP)
Land Use Goal Exceptions	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project
Visual Resources	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island. 	<ul style="list-style-type: none"> • Visual impact to Diamond Lake Boulevard and Odell Avenue 	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island. • Visual impact to Diamond Lake Boulevard and Odell Avenue
Noise Impacts	<ul style="list-style-type: none"> • New bridge directly to Diamond Lake Blvd will move traffic noise further north and closer to the Laurelwood neighborhood 	<ul style="list-style-type: none"> • Residences north of Diamond Lake Boulevard and east of Stephen Street will be impacted 	<ul style="list-style-type: none"> • New bridge directly to Diamond Lake Blvd will move traffic noise further north and closer to the Laurelwood neighborhood • Residences north of Diamond Lake Boulevard and east of Stephen Street will be impacted
Cost Opinions (2007 Dollars)			
	• \$74 million	• \$14 million	• \$82 million

Exhibit ES-3: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Transportation					
Mobility Standards	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards Two signalized intersections with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards Three unsignalized intersections would have movements that fail (only one would fail if Oak Avenue Bridge is two-way) 	<ul style="list-style-type: none"> All signalized intersections would meet Oregon Highway Plan and city mobility standards One signalized intersection with capacity improvements would not meet the Highway Design Manual mobility standards 	<ul style="list-style-type: none"> Two signalized intersections would not meet state and city mobility standards
Signalized Intersections	<ul style="list-style-type: none"> Seven eastbound and five westbound signals along OR 138 between Madrone and Fulton No changes in signal phasing required New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Five signals for both directions along OR 138 between Madrone and Fulton Changes in traffic flow would require more complex signal phasing downtown New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Six signals for both directions along OR 138 between Madrone and Fulton Changes in traffic flow would require more complex signal phasing downtown New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Three signals in both directions along OR 138 between Madrone and Fulton New signal at Douglas & Jackson 	<ul style="list-style-type: none"> Two signals in both directions along OR 138 between Madrone and Fulton New signal at Douglas & Jackson
Traffic Flow	<ul style="list-style-type: none"> Traffic patterns would remain the same as existing 	<ul style="list-style-type: none"> Southbound traffic flow on Stephens/Pine would require left-turn at Washington/Pine intersection Washington Ave would not continue through at Pine St 	<ul style="list-style-type: none"> North-south traffic flow would be split over Stephens and Rose St Washington Ave would not continue through at Stephens St New connection between Stephens and Rose needed for southbound traffic destined for Diamond Lake Blvd 	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd Washington Avenue would be closed at Spruce St 	<ul style="list-style-type: none"> New direct connection from Harvard Ave to Diamond Lake Blvd but no direct connection to Stephens Winchester closed at new bridge with no through movement Washington Avenue would be closed at Spruce St
Bridges	<ul style="list-style-type: none"> Existing Oak and Washington Ave bridges would continue to serve as OR 138 Stephens and Diamond Lake bridges over Deer Creek would be widened 	<ul style="list-style-type: none"> Oak Ave bridge would serve most of downtown and traffic to/from south Washington Ave bridge widened to four lanes and would serve traffic to/from north and Diamond Lake Blvd Stephens and Diamond Lake bridges over Deer Creek would need to be either widened or replaced 	<ul style="list-style-type: none"> Oak Ave bridge could be one-way or two-way and mostly serve downtown and to/from south Washington Ave bridge widened to four lanes and would serve traffic to/from north and Diamond Lake Blvd with added traffic demand from south if Oak Ave bridge remains one-way New bridge over Deer Creek aligned with Rose Street 	<ul style="list-style-type: none"> New bridge would serve traffic to/from north and Diamond Lake Blvd with added demand from south if Oak Ave bridge is one-way Oak Ave bridge could be one-way or two-way and mostly serve downtown and to/from south Washington Ave bridge would be closed Stephens and Diamond Lake bridges over Deer Creek would be widened 	<ul style="list-style-type: none"> New bridge would serve some traffic to/from Diamond Lake Blvd and potentially some traffic to/from north Oak Ave bridge would be widened to four lanes and would serve most traffic except to/from Diamond Lake Washington Ave bridge would be closed Stephens bridges over Deer Creek would be widened
Queuing	<ul style="list-style-type: none"> Additional travel lanes at existing intersections would generally reduce queues 	<ul style="list-style-type: none"> Westbound traffic along Oak Ave bridge would queue across river Long queues would develop on Diamond Lake at Winchester intersection without additional lane improvements 	<ul style="list-style-type: none"> Westbound traffic along Oak Ave bridge would queue across river to Spruce with two-way travel Many downtown blocks require widening to accommodate two-way travel and queues would be present from one intersection to the next 	<ul style="list-style-type: none"> Moderate queuing at Stephens/Diamond Lake intersection Westbound traffic along Oak Ave bridge would queue across river to Spruce with two-way travel Long queues on Diamond Lake at Winchester intersection without additional lane improvements 	<ul style="list-style-type: none"> Westbound traffic along Oak Ave bridge would queue across river to Spruce
Grade Separation between OR 138 and Railroad	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Four crossings: Oak Avenue, Washington Avenue, Douglas Avenue, Diamond Lake Boulevard 	<ul style="list-style-type: none"> One crossing: Diamond Lake Boulevard

Exhibit ES-3: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Bicycle and Pedestrian Facilities	<ul style="list-style-type: none"> Some facilities may be added with improvements to Stephens/ Diamond Lake intersection 	<ul style="list-style-type: none"> Some facilities may be added with roadway improvements Bike lanes may be extended across Washington Ave bridge with widening or addition of second structure Complex and wide intersections would make bike/ped travel more difficult 	<ul style="list-style-type: none"> Some facilities may be added with roadway improvements Bike lanes may be extended across Washington Ave bridge with widening or addition of second structure Complex and wide intersections would make bike/ped travel more difficult 	<ul style="list-style-type: none"> Railroad viaduct may disrupt pedestrian crossing except at grade-separated crossings Large intersections could disrupt bike/ped traffic flow (may explore below grade crossing) Disruption along Mosher Avenue due to elevated at-grade crossing New facilities added with bridge directly to Diamond Lake Blvd 	<ul style="list-style-type: none"> New facilities added with new bridge Closure of Winchester St to accommodate new bridge would also interrupt pedestrian and bicycle travel
Transit Facilities	<ul style="list-style-type: none"> No disruption to existing transit routes Some bus pullouts could be added where roadway widening would occur 	<ul style="list-style-type: none"> Changes in downtown circulation could affect existing transit routes Some bus pullouts could be added where roadway widening would occur 	<ul style="list-style-type: none"> Changes in downtown circulation would affect existing transit routes Some bus pullouts could be added where roadway widening would occur 	<ul style="list-style-type: none"> More direct route to Diamond Lake Blvd possible available, although not necessarily desirable from a transit standpoint (more stops to pick up riders) 	<ul style="list-style-type: none"> More direct route to Diamond Lake Blvd possible
Environmental and Land Use					
Goal 5 Resources <ul style="list-style-type: none"> Natural Resources, Scenic and Historic Areas, and Open Spaces 	<ul style="list-style-type: none"> No to minimal impact to the South Umpqua River (no bridge construction or reconstruction) Moderate to significant impact to Deer Creek depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to the South Umpqua River due to widening and reconstruction of the Washington Avenue Bridge Moderate to significant impact to Deer Creek depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to the South Umpqua River due to widening and reconstruction of the Washington Avenue Bridge Significant impact to Deer Creek due to construction of new bridge aligned with Rose Street and bridge reconstruction on DLB 	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally Significant impact to Deer Creek due to reconstruction and widening of DLB and Stephens Bridges Railroad viaduct crossing Deer Creek 	<ul style="list-style-type: none"> Significant impact to the South Umpqua River due to construction of new and longer span bridge crossing the river diagonally Significant impact to Deer Creek due to new bridge crossing over vicinity where the creek empties into the South Umpqua River
FEMA Floodplain	<ul style="list-style-type: none"> No to minimal impact to Zone AE floodway areas (South Umpqua River/Deer Creek) Moderate impact to Zone X 100-year floodplain areas depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to floodway areas due to widening and reconstruction of the Washington Avenue Bridge Moderate impact to floodplain areas depending upon the extent of improvements at the Stephens/DLB intersection 	<ul style="list-style-type: none"> Moderate impact to floodway areas due to widening and reconstruction of the Washington Avenue Bridge Significant impact to floodplain areas due to construction of new bridge aligned with Rose Street and bridge reconstruction on DLB 	<ul style="list-style-type: none"> Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally Significant impact to floodplain areas due new bridge construction over river embankment and reconstruction and widening of DLB and Stephens Bridges over Deer Creek Railroad viaduct impacts to Deer Creek floodway and floodplain 	<ul style="list-style-type: none"> Significant impact to the floodway areas due to construction of new and longer span bridge crossing the river basin diagonally Significant impact to floodplain area due to new bridge crossing over vicinity where the creek empties into the South Umpqua River
Natural Heritage Database/ Threatened & Endangered (T&E) Listed Species	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area. 	<ul style="list-style-type: none"> No T&E listed species documented in the project area.

Exhibit ES-3: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Historic Resources	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Some roadway widening in downtown historic district 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Some roadway widening in downtown historic district • Construction phase impacts expected at Douglas County Health Department. 	<ul style="list-style-type: none"> • Some roadway widening and new roadway construction in downtown historic district • Construction phase impacts expected at Douglas County Health Department 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area • Significant impact to Downtown and Mill-Pine Historic Districts due to elevated RR facility • Significant impact to bike path leading to historic and potential historic homes adjacent to the railroad line • Impact to restored railroad station from elevated tracks • Indirect impacts from increased noise to Laurelwood historic district 	<ul style="list-style-type: none"> • Potential impact to one site (236 SE Stephens St.) categorized as Eligible for NRHP list • Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area • Indirect impacts from increased noise to Laurelwood historic district
Potential Archeology Sites	• No impact based on available information	• No impact based on available information	• No impact based on available information	• No impact based on available information	• No impact based on available information
Known Hazardous Materials Locations	• No to minimal impact based on available information	• No to minimal impact based on available information	• No to minimal impact based on available information	• No to minimal impact based on available information	• No to minimal impact based on available information
Potential Wetlands/ Riparian Corridor and Jurisdictional Area of South Umpqua River and Deer Creek	• See impacts under Goal 5 Resources category	• See impacts under Goal 5 Resources category	• See impacts under Goal 5 Resources category.	• See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted.	• See impacts under Goal 5 Resources category. Additionally, palustrine areas surrounding the South Umpqua River/Deer Creek confluence significantly impacted.
Parks and Recreation, Section 4(f) and 6(f) Resources	<ul style="list-style-type: none"> • See impacts under Historic Resources category • No to minimal impact to parks or bike paths 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing bike path on Washington Avenue bridge impacted due to widening and reconstruction • Some potential impact to Riverside Park due to widening the Washington bridge 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Existing bike path on Washington Avenue bridge impacted due to widening and reconstruction • Some potential impact to Riverside Park due to widening the Washington bridge 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Significant impact to Deer Creek Park • Significant impact to South Umpqua River bike path 	<ul style="list-style-type: none"> • See impacts under Historic Resources category • Significant construction impact to Deer Creek Park and bike path • Completed bridge project would be above park and bike path, thus minimal impact other than visual and noise
Community Features	• No to minimal impact to community features	• Construction phase impacts expected at Douglas County Health Department.	• Construction phase impacts expected at Douglas County Health Department	• Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area	• Significant impacts at Douglas County Health Department due to new bridge structure encroaching on parking area
Socioeconomic and Environmental Justice	• Minimal impacts expected to Cow Creek tribal properties held in trust.	• Significant impact to Cow Creek tribal properties held in trust due to construction and widening of Washington Avenue Bridge	• Significant impact to Cow Creek tribal properties held in trust due to construction and widening of Washington Avenue Bridge	• Substantial impact to Cow Creek tribal properties held in trust due to raised railroad viaduct alongside parcels	• Significant impact to Cow Creek tribal properties held in trust due to construction and widening of Oak Avenue Bridge
Air Quality	• No conflict anticipated	• No conflict anticipated	• No conflict anticipated	• No conflict anticipated	• No conflict anticipated

Exhibit ES-3: ALTERNATIVES EVALUATION MATRIX

Evaluation Criteria	Alternatives Not Forwarded				
	1(a) Existing Alignment Improvements	2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	2(c) Harvard-Washington-Rose-Diamond Lake Alignment	3(d) Harvard-Diamond Lake Align. (Railroad Above Grade)	4(a) Northern Alignment Flyover (Railroad Below Grade)
Existing Land Uses	<ul style="list-style-type: none"> • Potential disruption to downtown businesses if downtown turning radii are widened along the designated Hwy 138 route • Disruption expected in vicinity of DLB and Stephens • Moderate short term economic development stimulus • Minimal potential long term economic development stimulus 	<ul style="list-style-type: none"> • Properties between Douglas and Washington impacted between Rose Street and Railroad • Disruption expected in vicinity of DLB and Stephens • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • Properties between Washington and Oak impacted between Pine and Stephens • Properties between Douglas and Washington impacted between Rose and Stephens • Planned future public safety center impacted • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Properties around Stephens/Diamond Lake intersection would be impacted by widening and realignment to north • Raising railroad would impact adjacent properties • Significant short term economic development stimulus • Moderate potential long term economic development stimulus 	<ul style="list-style-type: none"> • See Community Features, Historic Resources and Parks and Recreation • Businesses along DLB in vicinity of Stephens/Winchester impacted • Downtown businesses impacted due to widening of Oak Avenue Bridge • Significant short term economic development stimulus • Moderate potential long term economic development stimulus
Applicable Land Use Plans, Policies, Studies and Reports	<ul style="list-style-type: none"> • In keeping with applicable plans 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP) 	<ul style="list-style-type: none"> • Alternative not proposed in Roseburg Comprehensive Plan (TSP)
Land Use Goal Exceptions	<ul style="list-style-type: none"> • No goal exception requirement anticipated 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project 	<ul style="list-style-type: none"> • No goal exception required provided Comprehensive Plan (TSP) is amended to include project
Visual Resources	<ul style="list-style-type: none"> • No to minimal impacts expected 	<ul style="list-style-type: none"> • Vantage point from Riverside Park would be altered due to widened Washington Avenue Bridge 	<ul style="list-style-type: none"> • Vantage point from Riverside Park would be altered due to widened Washington Avenue Bridge 	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island • Visual impact of railroad viaduct on surrounding historic neighborhood and structures 	<ul style="list-style-type: none"> • Visual impact of new bridge spanning across Elk Island. • Visual impact of new bridge spanning above Stephens Street and Winchester Street
Noise Impacts	<ul style="list-style-type: none"> • No diversion of traffic and noise to other routes. 	<ul style="list-style-type: none"> • Noise levels would be slightly higher along Washington Avenue due to wider bridge and higher volumes. 	<ul style="list-style-type: none"> • New traffic route along Rose Street would increase noise in this corridor • Noise levels would be slightly higher along Washington Avenue due to wider bridge and higher volumes 	<ul style="list-style-type: none"> • Noise generated from the railroad viaduct through downtown would travel further due to elevation above streets and many buildings • New bridge directly to Diamond Lake Blvd will move traffic noise north and closer to the Laurelwood neighborhood 	<ul style="list-style-type: none"> • New bridge to Diamond Lake Blvd will move traffic noise further north and closer to the Laurelwood neighborhood
Cost Opinions (2007 Dollars)					
	• \$9 million	• \$20 million	• \$21 million	• \$350 million	• \$95 million

- **Air Quality:** As mentioned in Section 2 of the report, Roseburg is in attainment for (NAAQS). None of the build alternatives under consideration are expected to conflict with those standards.
- **Existing Land Uses:** What are the benefits and disruptions to area businesses, residential neighborhoods, economic development, and planned developments?
- **Applicable Land Use Plans, Policies, Studies and Reports:** Is the proposed build alternative in keeping with existing plans and polices?
- **Land Use Goal Exceptions:** This pertains primarily to Goal 5 (Natural Resources, Scenic and Historic Areas and Open Spaces).
- **Visual Resources:** What are the visual impacts from key vantage points associated with the build alternatives?
- **Noise Impacts:** What are the noise level impacts associated with the build alternatives and where would they occur?

Cost Opinions

The cost opinions expressed in current (2007) dollars are the last criterion included in the matrix. Conceptual cost estimates for each of the eight build alternatives demonstrate Alternative 1(a) to be the least costly and 3(d) the most expensive options under consideration. The cost estimates were calculated based on itemization of mobilization and traffic control; roadwork, drainage and sewers; bridge costs; bases; wearing surfacing; permanent traffic control and guidance devices; and right of way and development control. The cost estimates displayed in Table ES-1 are based on 2007 dollars and thus, are not adjusted for inflation.

Table ES-1. Build Alternative Cost Estimates

Build Alternative	Cost Estimate (2007 dollars)
1(a) Existing Alignment Improvements	\$9 Million
2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	\$20 Million
2(c) Harvard-Washington-Rose-Diamond Lake Alignment	\$21 Million
3(a) Harvard-Diamond Lake Bridge Connection (RR at-grade)	\$74 Million
3(d) Harvard-Diamond Lake Bridge Connection (RR above-grade)	\$350 Million
4(a) Northern Alignment Flyover (RR below-grade)	\$95 Million
6(a) Diamond Lake Boulevard – Odell Avenue Couplet	\$14 Million
6(b) Couplet with Direct Connection	\$82 Million

Analyses by Oversight Committees

The three oversight committees reviewed future year 2030 traffic operations and impacts based on the evaluation criteria of the initial six build alternatives, compared them against the no-build option and forwarded recommendations of preferred alternatives. Prior to the SC convening, the

CAC and TAC advanced their prospective recommendations, with the CAC opting for Alternatives 1(a), 2(a) and 3(a) to be initially forwarded for further study. Members of the TAC selected 3(a) and 4(a). The SC had the final recommendation on which alternatives would advance for further analysis; members chose Build Alternatives 1(a) and 3(a) for further study. Following introduction and review of the Concept 6 Design Options, Alternatives 6(a) and 6(b) were subsequently forwarded for further study as well. Although originally forwarded for consideration, it was determined that components of Alternative 1(a) would instead be incorporated into 6(a). The final votes and results from all three oversight committees are summarized in Table ES-2.

Table ES-2. Preferences by Oversight Committees

Build Alternative	CAC	TAC	SC
1(a) Existing Alignment Improvements	Yes	No	Yes
2(a) Harvard-Washington-Stephens-Diamond Lake Alignment	Yes	No	No
2(c) Harvard-Washington-Rose-Diamond Lake Alignment	No	No	No
3(a) Harvard-Diamond Lake Bridge Connection (RR at-grade)	Yes	Yes	Yes
3(d) Harvard-Diamond Lake Bridge Connection (RR above-grade)	No	No	No
4(a) Northern Alignment Flyover (RR below-grade)	No	Yes	No
6(a) Diamond Lake Boulevard – Odell Avenue Couplet	Yes	Yes	Yes
6(b) Couplet with Direct Connection	No	Yes	Yes

Conclusion

Alternatives 1(a) and 3(a) were initially advanced for further study. Following the subsequent introduction of Build Alternatives 6(a) and 6(b), it was determined that components of 1(a), such as downtown turning radii improvements, could be folded into 6(a). Consequently, Alternative 1(a) is no longer recommended for further study as a stand alone option. Tables ES-3 and ES-4 summarize the strengths and weaknesses associated with the four recommended alternatives (including No-Build) and five alternatives not recommended respectively by the oversight committees.

The three build alternatives recommended effectively address three of the four Needs statements. The project team and committees explored options that could effectively remedy the issue of east-west travel being effectively shut down when trains pass through the at-grade railroad crossings. Not only does this condition impact vehicular, freight, transit, and other non-auto modes, it is also a safety issue causing delay of movement for emergency vehicles. However, due to topographic and infrastructure constraints, all options explored were deemed too expensive and/or pose substantial and unacceptable impacts to the community and circulation into and out of downtown and surrounding neighborhoods. Nonetheless, implementation of a grade separated railroad crossing should continue to be a top priority for the Roseburg Transportation System Plan and appropriate locations should be actively explored that have fewer constraints than those posed along the Highway 138 corridor.

The Highway 138 Corridor Solutions Study identified several current and future transportation problems within the study area, and developed and initially refined a range of conceptual

solutions. Based on traffic, land use, socioeconomic and population data analysis; this study also determined that a limited project consisting of minor improvements on the existing corridor is unlikely to provide a solution that meets city and state traffic standards in the 20-year planning horizon.

In order to be eligible for funding through the FHWA, any proposed project in the study area will need to comply with requirements of NEPA and FHWA regulations (40 CFR 1500 and 23 CFR 771). This study concludes that suitable solutions to the problems identified in the corridor will likely require the completion of an Environmental Assessment (Class 3 project under NEPA) to be eligible for funding through FHWA.

The Environmental Assessment process will build on the information gathered in this study with a more detailed analysis of the natural, social, and engineering issues and opportunities within the study area. Based on the information gathered and analyzed in this study and during the EA process, FHWA will select a preferred alternative or make a determination that significant impacts would occur and preparation of an Environmental Impact Statement is required (23 CFR 771).

The NEPA process is expected to begin in fall 2008, and will consider the conceptual alternatives determined to be potentially viable that were developed during this study, in addition to other alternatives developed or submitted during the EA project. Additional public input and involvement opportunities will occur throughout the duration of the EA project.

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Table ES-3. Strengths and Weaknesses of Recommended Alternatives

Alternative	Strengths	Weaknesses	Comments
No-Build	<ul style="list-style-type: none"> No capital investment necessary No right-of-way property acquisition necessary 	<ul style="list-style-type: none"> Nine of sixteen study area intersections would fail to meet applicable mobility standards Queuing along primary arterials, including Diamond Lake Blvd., Stephens St., Oak Ave., and Winchester St. would cause delay along the Highway 138 route Potential worsening safety problems associated with aggressive driving behaviors (red light running, queue spillback into intersections, and unexpected lane changes) 	<p>The National Environmental Policy Act (NEPA), Oregon Department of Transportation (ODOT), and Federal Highway Administration (FHWA) guidelines require that a no-build option be evaluated.</p>
3(a) Harvard-Diamond Lake Bridge Connection (RR At-Grade)	<ul style="list-style-type: none"> Project purpose and most of the project needs addressed Direct connection between Harvard Ave. and Diamond Lake Blvd. Highway 138 through traffic routed out of downtown Enhanced opportunity for economic development along the Diamond Lake Blvd. corridor Potential for access to new recreational areas (e.g. Elk Island) Enhanced regional connectivity Bicycle and pedestrian facilities included on new bridge 	<ul style="list-style-type: none"> No grade-separated rail crossing Costly (aesthetic design considerations would likely inflate the costs further) Potential visual and noise impact to the Laurelwood neighborhood Environmental impacts associated with a new bridge crossing the South Umpqua River and in the vicinity of the Deer Creek confluence with the South Umpqua River. High cost on a regional highway (ODOT prioritization) likely to make funding more difficult without contribution from local community 	<p>The option was viewed as achieving the purpose and addressing most of the deficiencies, goals and objectives discussed in Section 1.</p>
6(a) Diamond Lake – Odell Couplet	<ul style="list-style-type: none"> Project purpose and most of the project needs addressed Less costly than most other alternative Relatively easy to implement Minimal physical impact Would bring intersection operations close to ODOT standards Enhanced opportunity for economic development along the Diamond Lake Blvd. and possibly Odell Ave. corridor Improved bicycle and pedestrian facilities in several corridors 	<ul style="list-style-type: none"> Would not resolve direct connection (Diamond Lake Blvd. to Harvard Ave.) that may be needed to support economic growth in the Diamond Lake corridor Would shift traffic from existing arterials to other roadways that currently carry lower volumes Downtown accessibility via Jackson St. would be more limited Would not adequately address downtown circulation issues Would not provide a grade-separated rail crossing 	<p>Viewed favorably by ability to solve existing problems with Diamond Lake Blvd. intersections at Stephens St. and Winchester St., to improve traffic operations without new bridge or widening of existing bridges, and to incorporate multi-modal facilities into the improvements. Enables direct river crossing at a later date if deemed necessary.</p>
6(b) Diamond Lake – Odell Couplet w/ Direct Connection	<ul style="list-style-type: none"> Project purpose and most of the project needs addressed Direct connection between Harvard Ave. and Diamond Lake Blvd. Highway 138 through traffic routed out of downtown Potential for access to new recreational areas (e.g. Elk Island) Enhanced regional connectivity Would bring intersection operations close to ODOT standards Enhanced opportunity for economic development along the Diamond Lake Blvd. and possibly Odell Ave. corridor Improved bicycle and pedestrian facilities in several corridors 	<ul style="list-style-type: none"> No grade-separated rail crossing Costly (aesthetic design considerations would likely inflate the costs further) Potential visual and noise impact to the Laurelwood neighborhood Environmental impacts associated with a new bridge crossing the South Umpqua River and in the vicinity of Deer Creek confluence with the South Umpqua River. High cost on a regional highway (ODOT prioritization) likely to make funding more difficult without contribution from local community Would shift traffic from existing arterials to other roadways that currently carry lower volumes Downtown accessibility via Jackson St would be more limited 	<p>Forwarded for further consideration, acknowledging that Alternative 6(a) does not preclude a future direct Harvard Ave. to Diamond Lake Blvd. bridge connection if deemed necessary.</p>