South Central Region

Planning Study

SR 224/SR 225/ I-82 Intersection
Benton City Vicinity
South Central Region
Yakima, Washington

Planning Study
SR 224/ SR 225/ I-82 Intersection
Benton City Vicinity

June 2009

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PLANNING STUDY
SR 224/SR 225/I-82 INTERSECTION
BENTON CITY VICINITY

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EXECUTIVE SUMMARY

The Vision

The Washington State Department of Transportation (WSDOT) began looking at the intersection of SR 224 and SR 225 in December, 2007 for the purpose of understanding the existing conditions and preparing an improvement plan that accommodates the goals, visions, and long term plans of the community of Benton City and Benton County. While WSDOT was the lead and primary funding source for the study, Benton County and Benton City contributed funding and were instrumental in determining the study’s vision and goals. Through a number of meetings prior to the start of the study, a vision statement was identified that WSDOT would use to guide the study decisions.

The intersection to Benton City and the Red Mountain American Viticulture Area (AVA) is a safe, easily maintainable, gateway that serves transportation needs and addresses the cultural and economic needs of the unique areas it serves.

WSDOT developed its recommendation on specific improvements that fulfilled the intent of this vision based on their knowledge of the communities involved, future plans, existing transportation deficiencies, and specific public input gathered during the course of the study. Because this intersection is located in the influence area of Exit 96, I-82 (Benton City) any improvements that might be required would also need the approval of FHWA. FHWA was brought in, through the WSDOT HQ Access office, to comment on their requirements and expectations.

This plan is to provide WSDOT, Benton County, and Benton City with a recommendation for improvements to the SR 224/SR 225 intersection. They will be able to determine the next steps to implement any improvement as well as be confident that they are consistent with the needs and concerns of the public.

The study area includes the intersection of SR 224/SR 225, SR 224 to the Kennedy Road intersection, and SR 225 to the Yakima River (not to include the bridge). SR 225 is the main entrance into Benton City, while SR 224 is the west entrance into West Richland. SR 224 will also serve the Red MountainAVA. A portion of the study area is Limited Access (Interchange), while the remaining is Access Managed.

The recommendation of this study is consistent with the vision, FHWA requirements, and addresses the concerns of the local communities.

The Study

The study process involved technical review and analysis, such as current and forecasted land uses, current and future traffic conditions, and the accident history of the study area. The study team recognized the need to identify stakeholders and address their concerns. Public outreach entailed meetings with several area interest groups, three stakeholder meetings and one public meeting.
Alternatives Studied

A traffic analysis and traffic forecast of the facility was developed for the purpose of this study. The technical analysis and the expected traffic volumes provided a level of service (LOS) measurement. Future volumes at the SR225 / SR224 intersection indicate a LOS “F”. The current (2010) volumes at this intersection indicate an LOC “D”. Common themes heard from the public were concerns for safety, access improvements, and the need for easier access to commercial properties.

While WSDOT had developed some alternatives during technical analysis, the public meetings and stakeholder meetings also identified some alternatives, or variations, that WSDOT analyzed. Different alternatives or variations were evaluated, including:

- Signal at SR 224/SR 225
- Four way stop
- Moving WB exit ramp to terminate at Kennedy Road on SR 224
- Roundabouts
  - Four, five, and six legged
  - With or without by-pass ramps

The Recommendation

The alternative that will meet all of the future transportation needs of the intersection, as well as the concerns of Benton City and the public, is the five legged, single lane roundabout at the intersection of SR 224/SR225. This improvement will provide WSDOT with the operating improvements needed to ensure a safe intersection that will accommodate the projected future growth in the area. In the future, a by-pass ramp may be necessary to accommodate increased traffic turning right onto SR225 traveling towards Benton City and possibly for traffic turning right onto SR 224 traveling towards West Richland and the Red Mountain area. However, other improvements, such as the Red Mountain Interchange, are being considered in the area which will have a direct impact on this intersection. The by-pass ramp can be reevaluated when, and if, the roundabout approaches failure. The roundabout will affect and alter the westbound on and off ramps of the interchange. Because of the impacts to the existing interchange, FHWA will require an Interchange Justification Report (IJR), or modified IJR before approval.

Considering the current economic climate, full funding for the roundabout solution may not be available. As mentioned in the signal option in Chapter 4, a lower cost interim solution does exist which will last for roughly 10 years. If necessary, the temporary signal option would be the best short term solution.

In any scenario, early acquisition of the commercial property located within the limited access area in the northwest quadrant of the SR224/SR225 intersection should be considered.

The next step following this study should be to begin work on the IJR. Much of the preliminary work has been done as part of this study, and the intersection improvements cannot be constructed without approval from FHWA. The agency(s) responsible for this work will be determined by available funding and resources. No funding for further design, right of way, or construction has been identified at the time of this study.
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Objective
The SR 224/225 Intersection Study began as a response to local safety, congestion, and economic concerns. The intersection is at the entrance to Benton City, via SR 225, and is perceived as having a high potential for collisions. Ten percent of Benton City’s commercial activity is located at this intersection. The intersection also provides access to the Red Mountain American Viticulture Area (AVA), the city of West Richland, and rural areas of Benton County.

Through a number of meetings prior to the start of the study, a vision statement was identified that WSDOT would use to guide the study decisions.

The intersection to Benton City and the Red Mountain American Viticulture Area (AVA) is a safe, easily maintainable, gateway that serves transportation needs and addresses the cultural and economic needs of the unique area it serves.

Through community and data input, alternatives were selected for analysis. Each alternative was examined to ensure that solutions provided at the intersection would:

- meet current design standards
- provide the least amount of impact to businesses
- address FHWA guidelines and concerns
- accommodate future growth

Study Area Limits
The scope of this study begins at the SR 224/SR 225 intersection. On SR 224 it includes the Westbound off and on-ramps of I-82 Exit 96 to Kennedy Road intersection (MP 0.24B). On SR 225 it begins at the intersection (MP 0.00) and extends to the Yakima River bridge (MP 0.03). The intersection is just north of I-82, Exit 96 at the entrance to Benton City, located in Benton County. SR 224 serves as the west entrance into the city of West Richland and is currently the main access point to the Red Mountain AVA.
**Public Involvement**

The study was designed from the beginning as a publicly driven process. Public meetings, local agency briefings, and informational articles via local papers kept local residents, officials, civic groups, and businesses involved in the study process while providing an avenue for feedback. Staff gave presentations at meetings with the City Council and Mayor of Benton City, Chamber of Commerce, Benton County Commissioners, Benton County Public Works Director, the Kiona-Benton School District Transportation Coordinator, and held a public meeting.

The varied involvement and representation allowed for easily available community contact to disseminate information as well as receive comments, concerns and suggestion. The study process, participants, and outcomes are discussed in detail in the following chapters.
Chapter 2  Study Area

Existing Conditions
The Study Area is situated in Benton County. Most of the area lies within the city limits of Benton City with the remainder in unincorporated Benton County. While the study area is focused on the intersection of State Route 225 (SR 225) and State Route 224 (SR 224) it includes the westbound on and off-ramps of Exit 96 on Interstate 82 (I-82) as well as the intersection of Kennedy Road and SR 224.

Land Use
Land use in the vicinity of the Study Route was determined using the Benton County Comprehensive Plan Land Use Map as amended September 10, 2003 and the Benton City Land Use Map dated September 25, 2008. Two zoning classifications lie within the study area. The area located along the Yakima River is designated as Parks while the remaining property is zoned Commercial. The south side of I-82 falls within the Benton City Urban Growth Area. The city has plans for increasing light industrial and commercial development in the area. (See Appendix B page B-3 & B-4 for maps).

Benton City has 40 businesses within the city limits with four of them located near the intersection, 10% of the commercial activity lies within the study area. There is potential for increasing light industrial and commercial development in this area. Residential and
commercial businesses are on both sides of SR224 near the intersection. The portion located in Benton County is zoned Rural Lands 2.5.

**Transportation Network**

SR 224 is designated as an east-west rural collector route in Benton County providing access through the Red Mountain Area from Benton City (MP 0.00B) on the west through West Richland and connecting to SR 240 (MP 9.90) on the east. The highway has two lanes with widths varying from 11 feet to 12 feet. The shoulder widths vary from four feet to eight feet. This route segment traverses through semi-arid rolling terrain.

State Route 225 is a north-south rural collector providing access to Benton City as their main street. State Route 224 is the primary roadway serving the Red Mountain area and the rural lands on the east side of Benton City. They both connect I-82 to SR 240 providing connectivity for local commercial, trucking, and recreational traffic. The study area is in close proximity to tourist attractions, farm lands, commercial, and residential areas.

**Route Classification**

Route classification plays an important role in determining appropriate levels of design standards, and it affects the funding mechanisms controlling the improvements that can take place on the highway. Table 2-1 summarizes the classification status of the study route. SR 224 and SR 225 have a Federal and State Functional Class of Rural Collector. See Appendix
A for more information about the classification systems and their relationship to funding and operations.

<table>
<thead>
<tr>
<th>Classification System</th>
<th>Current Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Functional Class</td>
<td>07 - Rural Collector</td>
</tr>
<tr>
<td>State Functional Class</td>
<td>R3 – Rural Collector</td>
</tr>
<tr>
<td>National Highway System (NHS)</td>
<td>Not included in NHS</td>
</tr>
<tr>
<td>Freight and Goods Trans. System (FGTS) Status</td>
<td>T3 – between 300,000 and 4,000,000 tons of freight are transported per year *</td>
</tr>
<tr>
<td>Terrain</td>
<td>Rolling and Level</td>
</tr>
<tr>
<td>Access Classification</td>
<td>SR 224 MP 0.0B – 0.06B Full Control</td>
</tr>
<tr>
<td></td>
<td>MP 0.06B – 0.09B Partial Control</td>
</tr>
<tr>
<td></td>
<td>MP 0.09B – 0.24B Class 3</td>
</tr>
<tr>
<td></td>
<td>SR 225 Class 5</td>
</tr>
</tbody>
</table>

* June 2003 Update WSDOT Freight & Goods Trans. System

**Access Classification**

SR 224 and SR 225 are Access Managed highways with the exception of a small portion of SR 224 from I-82 MP 0.00B to MP 0.06B where it is under Full Control Limited Access. In both urban and rural areas, full control limited access must be established at an interchange for a minimum distance of 300 feet beyond the centerline of the ramp or the end of the transition taper. Within the 300 feet distance from the westbound on ramp to I-82 is a commercial approach to the property lying west of SR 224. WSDOT was ordered by the courts to allow the non-conforming commercial approach to this property.

**Roadside and Terrain Classifications**

The roadside classification for SR 224 in the study area is classified rural, and SR 225 is classified as semi-urban, according to the WSDOT Roadside Classification Plan, 1996. The rural designation is characterized by natural-appearing landforms and native vegetation and/or non-native vegetation reflecting the land use, and may include meadows or agricultural crops associated with adjacent farming. Semi-urban is transitional in character having a variety of non-native and native plants including trees, large shrubs, mowed grass and some structures coordinated for visual continuity throughout the highway corridor.
The study area designated as rural is characterized by a mix of built and natural elements with the built elements encroaching on the natural environment and human manipulations evident on the land. The study area designated as semi-urban is characterized by contrasting natural elements and human constructed structures and landscapes.

The terrain surrounding the study area on SR 224 is classified as rolling and SR 225 is classified as level, according to the *WSDOT State Highway Log, 2007*.

**Physical Characteristics**

Physical characteristics provide valuable insight about how a system is functioning. The characteristics relate not only to the roadway itself – geometry, roadway section, horizontal and vertical alignments – but also to the surrounding area considering such elements as right-of-way and environmental resources. See Appendix B for charts and maps.

**Geometric Elements**

It is important to understand how a roadway functions to gain a better understanding of how it might be improved. Understanding roadway alignment, profile and section helps us to analyze the roadway. The WSDOT Transportation Data Office (TDO) manages statewide traffic roadway and collision data that provide us with meaningful information about a state route. The most current information about roadway geometry can be obtained from the Washington State Highway Log Planning Report, as well as other TDO data sources. Other WSDOT records and resources, such as as-built highway plans, are also used in this analysis.
Existing Roadway Section

The existing roadway section refers to the current width of the lanes and shoulders that make up the roadway. The lanes and shoulders on SR 224 and SR 225 in the study area currently meet WSDOT standards for these elements, based on current traffic volumes. Details about roadway section, including types of materials used in the construction of roadways and shoulders, and existing channelization can be found in Appendix B.

Existing Vertical and Horizontal Alignment

Existing Vertical and Horizontal Alignment data was analyzed to determine whether the alignments were acceptable for work related to new and/or existing alignments. SR 224 and SR 225 show no vertical curves on the roadway data. Two horizontal curves are within the project limits on SR 224 and none on SR 225.

Bridges and Structures

There are no bridges located within the project limits; however just at the edge of the project limits on SR 225 is bridge 225/1 over the Yakima River. The bridge was built in 1957 and is on the Washington Heritage Register and nominated for the National Register of Historic Places.

Traffic Control Measures

The intersections in the study area are controlled by stop signs. SR 224 and SR 225 westbound intersection has one stop sign. Kennedy Road at SR 224 has a stop sign with two flashing lights on top, and three stop signs are at the westbound off ramp of I-82 to SR 224.

*Photo – Looking west from the I-82 off ramp at Benton City, Washington*

Three stop signs on the ramp.
Right of Way

Existing right-of-way widths vary along the Study Route, from 60 feet to over 500 feet as a part of the interchange footprint. The right-of-way for SR 224 within the study area is from 100 feet to 170 feet total width and, in places, runs concurrently with the right-of-way for I-82. Within the State right-of-way for SR 224 and I-82 is property leased for the private operation of a gas station/mini mart. The lease for this property is based on an annual renewal agreement. The right-of-way width is an important consideration when contemplating improvements that require additional space. Right-of-way purchase can be a significant cost item. The right-of-way details can be seen on the photo under the “Existing Conditions” section of this chapter and the Right-of-way Plan sheet in Appendix B.

Environmental Resources

Environmental elements described in the Planning Study consist of general information collected to identify and document potential issues as part of the transportation study process. Specific impacts to environmental elements would be determined and associated permits obtained, when a project is funded for design and construction.

Wetlands

A wetland is an area of land consisting of soil that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetations typically adapted for life in saturated soils. Fish and Wildlife Service maintains a mapping website through their Wetlands Online Mapper site entitled National Wetlands Inventory which integrates resources showing where a wetland exists. Wetland filing along the study segment is regulated by Benton County, the US Army Corps of Engineers, and the Department of Ecology through Section 401 of the Clean Water Act. The study section has one wetland near the corridor. It is located in the northwest quadrant near milepost 0.25B extending to the Yakima River. As individual projects are developed from the study recommendations, wetland delineation should be done to determine the full extent of recorded wetlands. The area should also be examined to identify other wetlands that may not have been included on the maps. Wetlands should be avoided if possible when designing roadway improvements. If construction impacts are unavoidable, they should be minimized to the degree practicable, and any unavoidable impacts mitigated according to the WSDOT “no net loss” policy regarding wetland functions and values.
Fish Passage Barriers

At approximately MP 0.09B on SR 224 there is a large box culvert that appears in the 2003 – 2022 state highway system plan designated as a fish passage barrier. During investigation by South Central Region Environmental and consultation with Washington Department of Fish and Wildlife that the intermittent stream that flows through this culvert does not supply any fish habitat and therefore does not meet the criteria of a fish passage barrier. It is not identified in the 2007-2026 Highway System Plan.

Historical Resources

The Washington State Department of Archaeology & Historic Preservation is the office held with the task of listing the historically significant sites. Washington Heritage Register is the official site for these listings. The Register shows no properties within the study area qualified to be on the historical list. The only site in the Benton City area is the SR 225/1 Bridge over the Yakima River. The application for nomination to the National Register of Historic Places dated January 31, 2002 is also included in Appendix B. The bridge was built in 1957 and is the last of its kind in existence today. Page two of the Narrative Statement of
Significance describes the significant engineering features that qualify this bridge for the National Register. It reads: “Use of the towers and inclined “stays” enabled the designers to use an extremely shallow cross section for the superstructure of the bridge. A conventional concrete or steel girder bridge would have provided a depth/span ratio in the range of 1/15 to 1/25.(2). The Hadley Bridge provided a 170 foot span across the river with a 3 foot-3 inch deep section, for a depth/span ratio of 1/52.3. This was an extraordinary engineering achievement for the 1950s.”

The bridge has been ranked by WSDOT as Functionally Obsolete with a Sufficiency rating of 56.7. In order to prevent a negative impact on this functionally obsolete bridge, the ultimate solution should be built far enough away so traffic will not back up on the bridge causing undue traffic stress or load. FHWA defines a functionally obsolete bridge as one in which the deck geometry, load carrying capacity, clearance, or approach roadway alignment has reduced it’s ability to adequately meet the traffic needs.

![Photo – Yakima River Bridge at Benton City, Washington](image)

**Cultural Resources**

Conducting a cultural resource survey will be required before a project is started in the study area. The survey may include a literature search to determine if previously documented sites or resources exist in the vicinity, as well as a ground survey to determine the potential for encountering artifacts of an historic or archaeological nature during construction.

Consultation should be initiated with the Confederated Tribes and Bands of the Yakama Nation to determine if the project will impact any of their usual and accustomed areas when design of a project begins. The tribe should be invited to participate and identify resources of importance to them. Results of the determination of effects of the construction project require the State Historic Preservation Officer’s concurrence. The Ceded lands of the Confederated Tribes of the Umatilla Indian Reservation are outside the project limits, but the Tribe should be included in any discussions before a project is initiated.
Environmental Justice

Environmental Justice (EJ) refers to the adverse effects of transportation programs, projects or activities on the social, economic and health status of minority and low-income populations in a community. Environmental responsibility is one of WSDOT’s management principles and through which it is our procedure to avoid, minimize or mitigate disproportionate or adverse affects on these populations resulting from WSDOT activities in the area. To accomplish this, full and fair participation of potentially affected communities is sought throughout the transportation decision-making process. In preparation for the public involvement phase of this study, information about potential environmental justice communities was gathered using 2000 US Census Data. The census data shows that the Benton City area has higher minority and low-income residents than Benton County’s average. In order to reach this community, the public meeting notice was placed in the local Spanish paper, and a Hispanic interpreter attended the meeting.

Air Quality

The WSDOT’s GIS layer for air quality, information provided by the Washington Department of Ecology, was evaluated to determine if there are any air quality issues in the vicinity of the study route. State Route 224/SR 225 intersection area is not located in particulate, ozone or carbon monoxide non-attainment areas or maintenance areas. Currently the air quality meets state and federal standards.

Hazardous Materials

The Hazardous Sites list, toxic cleanup program, and the leaking underground storage tank databases maintained by the Washington State Department of Ecology were used to determine if there is known potential for encountering hazardous materials during construction of proposed improvements on the study route.

The Hazardous Sites List, toxic cleanup program, and the leaking underground storage tank databases contain no listings in the study area. (List last updated by the Washington State Department of Ecology, February 21, 2007)

Aquifer

The study area is not located in a Sole Source Aquifer or an area identified by the Benton County Critical Areas Ordinance as an Aquifer Recharge Area of concern. Standard WSDOT water quality/water quantity treatment practices should be adequate. In Benton County, storm water infiltration best management practices are encouraged to the maximum extent possible as the first priority in storm water management.

Environmental Resources

This study has identified one wetland site near the study area that could be impacted. During the design phase of a project, engineering staff should work closely with the staff of South Central Region Environmental Services office to determine the extent of unavoidable impacts and to find appropriate mitigation site locations.

Locating suitable mitigation sites is a high priority for projects that will displace wetlands or increase the impervious area of the highway. Some of the highway activities within this study
that might have a need for this mitigation are guardrail installation, slope flattening, excavation or fill, that alters the water table or flow to a wetland.

Mitigation for increased storm water runoff resulting from the addition of impervious surfaces can often take place within the highway right-of-way if sufficient area exists. Construction of swales and ponds is one example of such mitigation. Old alignments can be used as storm water treatment sites when alignments are changed due to construction projects. The appropriate level of storm water treatment can be determined using the *WSDOT Highway Runoff Manual*.

The cost for construction of wetland mitigation sites and storm water treatment facilities is considered when estimating overall project construction costs.

**Commercial Services**

**Transit**

Ben-Franklin Transit currently serves this study area as part of a community connector route. The current service runs along I-82 from Tri-Cities to Prosser and back to Tri-Cities with two stops at Benton City, with one of the stops being at the park-and-ride lot at the intersection of SR 224/SR 225. The Benton City route is set up as a loop route that starts at I-82 and proceeds up SR 225 through Benton City to the high school and back to I-82.

Ben-Franklin Transit’s goal is to provide a seamless transit connection for Benton County residents and for the residents of Prosser and Benton City to the Ben-Franklin Transit Center at the Richland Wye.

Benton City has two park-and-ride lots. One is in the center of Benton City on SR 225 and the other is on SR 224 and the intersection with SR 225 within the study area. The lot is heavily used and exhibits some access problems due to its close proximity to the intersection. The access to the lot is 50 feet from the intersection with SR 225. The transit stop is in the lanes on SR 224 at the west end of the park and ride lot, between the I-82 westbound off ramp and westbound SR 224 intersection.

**Rail**

A section of the Burlington Northern Santa Fe Railroad track runs along the south side of I-82 in the vicinity of the Kiona Interchange. This has no affect on the study area because the main north/south connecting road crosses under the railroad tracks.

**Utilities**

Current listings of franchises and franchise agreements along this Study Route are maintained at the WSDOT South Central Region Utilities Office. See a table of existing utility franchises in Appendix C.

**Traffic Analysis Method**

Determining the operating conditions for purposes of route planning requires reasonable estimates of current and future traffic volumes. The procedures described in the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000) were applied to the study’s traffic data. This approach provided analyses for the intersections within the study area. The results are presented in the terms of traffic volumes, Level of Service (LOS) measurements.
and intersection capacity. WSDOT used 2010 as the current year and 2030 for design year in the June 2009 Traffic Analysis.

## Traffic Volumes

Traffic conditions within the study area are analyzed using methods outlined in HCM (2000) Chapter 20. It’s expressed in vehicles per hour, and is commonly assessed as a percentage of the annual average number of vehicles using the facility each day, or Annual Average Daily Traffic (AADT).

Future traffic conditions were analyzed using a 20 year forecast assuming a 2010 year of construction. This is consistent with the Benton County Comprehensive Plan and the City of Benton City Comprehensive Plan. According to the US Census Bureau, the area in and around the town of Benton City has seen significant change in population. The population of the City of Benton City was 2624 in the year 2000. This is an increase of about 45% from the 1990 population (US Census Bureau). The AADT volume for this intersection has also changed significantly in the past few years.

Typically existing traffic data is obtained by the WSDOT. The estimated future year volumes, and build vs. no build volumes, may be available from MPO long-range forecasts, route corridor plans, developer impact documents, or other acceptable traffic analyses. This project is located on the edge of the Benton Franklin Council of Governments’ (MPO) model and projects a much higher growth rate than WSDOT currently anticipates. Therefore WSDOT used historic growth rates (1.5%) and best professional judgment to determine that a 3% growth rate is appropriate for the purpose of this planning study. Recent expansion of the urban area and a planned development on SR224 justify the 3% growth rate similar to what has been recently seen in the greater Tri-Cities area.

<table>
<thead>
<tr>
<th>TABLE 2-2</th>
<th>SR 224 &amp; SR 225 Traffic Volumes</th>
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<tbody>
<tr>
<td>Segment and MP</td>
<td>2007 AADT</td>
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<td>SR 224 MP 0.0B-0.06B</td>
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<tr>
<td>SR 224 MP 0.06B-0.24B</td>
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<tr>
<td>SR 225 MP 0.0</td>
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<tr>
<td>I-82 West bound off Ramp</td>
<td>2500</td>
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<td>I-82 West bound on Ramp</td>
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<tr>
<td>I-82 East Bound off Ramp</td>
<td>888*</td>
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<tr>
<td>I-82 East Bound on Ramp</td>
<td>2621*</td>
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</table>

Source: 2007 Annual Traffic Report and WSDOT TDO on GIS map
Intersection Capacity Analysis

Peak hour traffic volumes were collected by WSDOT for the AM and PM peaks in 2008. These volumes were used for the traffic analysis of the SR 224/SR 225 intersection. This analysis shows that the intersection will operate at a level of service (LOS) “F” in both the current year (2010) and the design year (2030). The westbound I-82 ramp intersection currently operates at an LOS “B” and is projected to operate at LOS “C” in 2030.

Intersection LOS is defined in terms of seconds of delay at the intersection (see table 2-3). The traffic analysis used LOS “D” as the minimum acceptable LOS for this intersection. The intersection of SR 224/SR 225 has a poor level of service due to the delay created by vehicles attempting to turn left. In 2010 the westbound left turn from SR 224 will have an average delay of 63.7 seconds per vehicle (s/veh) in the peak hour which equates to a level of service of “F”. By 2030 the delay on SR 224 is predicted to be 892 s/veh, which could result in 15 minute backups and vehicle queues up to 2030 feet long.

**TABLE 2-3**  
**SR 224 & SR 225**  
**LOS Criteria for Intersections**

<table>
<thead>
<tr>
<th>Level of Service (LOS)</th>
<th>Average Control Delay (s/veh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signalized / All-way stop or Roundabout</td>
</tr>
<tr>
<td>A</td>
<td>≤ 10</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 10 - 55</td>
</tr>
<tr>
<td>C</td>
<td>&gt; 20 - 70</td>
</tr>
<tr>
<td>D</td>
<td>&gt; 35 - 85</td>
</tr>
<tr>
<td>E</td>
<td>&gt; 55 – 80</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 80</td>
</tr>
</tbody>
</table>

*see Exhibit 16-2 and 17-2, HCM (2000)*

In addition to the existing conditions WSDOT analyzed each potential intersection improvement alternative. The analysis was performed using two main software models. AASIDRA Intersection 3.2 was used for roundabout analysis and Synchro 7 was used for signalized and unsignalized intersection analysis. A discussion of each alternative can be found in Chapter 4 of this document.

**Safety**

Several elements related to safety were considered over the course of the study. In addition to obtaining information about Collision Analysis Locations (CALs), and crash data, it was determined that this location does not meet WSDOT’s criteria for identifying safety needs.

WSDOT was also informed through the public involvement process of specific concerns and beliefs the public held about the study area. The public expressed concerns regarding difficult
turning movements. The solutions proposed to alleviate the mobility problems in this study should mitigate these concerns.

**Collision History**
The WSDOT Staff analyzed Washington State Patrol (WSP) data collected January 2000 to March 2009 and determined left turning movements are a contributing factor in the number of recorded collisions at the intersection. However most collisions were property damage only and there are no recorded fatalities or injury collisions related to either of the intersections in this study location.
Chapter 3  The Study Process

The Washington State Department of Transportation (WSDOT) staff held Stakeholder Committee meetings, community-based public meetings and used various methods of communication throughout the process. See Appendix E for submitted comments and meeting sign in lists.

Communication with the public was accomplished using meetings and the local newspapers. The Tri-City Herald and the Benton City Bulletin carried coverage of the study also. See Appendix D for news coverage, press releases and flyers covering the SR 224/SR 225/I-82 Intersection study.

Stakeholder Involvement

The WSDOT staff made a concerted effort to inform the community of the up-coming study. Staff gave a presentation at meetings with the City Council and Mayor of Benton City, Chamber of Commerce, Benton County Commissioners, Benton County Public Works Director, and Kiona-Benton School District Transportation Coordinator in an effort to publicize the study.

The WSDOT staff also made phone calls to emergency response agencies (Benton County Sherriff, Washington State Patrol, fire department), tribes, businesses, elected representatives, transit, school district, Department of Fish and Wildlife, bicycle clubs and others in an attempt to find individuals that could provide insight regarding their community and transportation issues along the route and serve on the Stakeholder Committee

Tribal Coordination

Two of Washington State’s twenty-nine federally recognized tribes were contacted to participate and contribute any information that they may have regarding sensitive cultural and historic locations within the study area, (Confederated Tribes and Bands of the Yakama Nation and the Umatilla Tribe). The Yakama Nation indicated that there were no areas of interest in the study area and the Umatilla Tribe did not respond.

Stakeholder Committee Meetings

The role of the Stakeholder Committee was to help build a vision, goals and objectives regarding the route’s development. The committee was to consider public input gathered at public meetings, and endorse final recommendations of the study.

The following vision statement and goals were endorsed during the course of this meeting:

The intersection to Benton City and the Red Mountain American Viticulture Area (AVA) is a safe, easily maintainable, gateway that serves transportation needs and addresses the cultural and economic needs of the unique area it serves.
The stakeholder committee established the criteria by which proposed solutions would be evaluated to determine how well each fulfills the goals of the study. The following is a list of each goal, and the prioritized criteria for that goal:

**Goal: Promote safe operation**
- Does the improvement address identified deficiencies?
- Does the improvement address non-motorized needs?
- Is the improvement easily maintained?
- Does the improvement support access management?
- Does the improvement conform to design standards?

**Goal: Provide excellent service to all traffic**
- Does the improvement alleviate seasonal traffic congestion?
- Does the improvement benefit tourist traffic?
- Does the improvement benefit freight traffic?
- Does the improvement meet 2030 level of service goals?

**Goal: Address local community needs**
- Does the improvement protect cultural and historic sites?
- Does the improvement enhance pedestrian movement?
- Does the improvement encourage tourism?
- Is the improvement consistent with regional plans?
- Would the improvement qualify for a grant?

**Public Meetings**
In the interest of gathering as much public input to this Planning Study various local organizations were contacted. Meetings were scheduled to give a power point presentation of the potential solutions for the congestion problems within the study area. Four meetings were held as follows:

- March 12, 2008   Red Mountain AVA Alliance group at Hedges Cellars winery
- March 25, 2008   Benton City Lions Club at their facility in Benton City
- April 2, 2008    Benton City American Legion Post
- April 7, 2008    Benton City Chamber of Commerce

We received numerous questions and comments, both negative and positive. Most of the comments were verbal, few were written. We made an effort to capture as many of the verbal comments as possible. See Appendix E for submitted comments and sign in sheets.

Two additional presentations were made to the Benton City Council and the Benton County Commission. No formal written comments were received from either of these bodies although many questions were asked.

One public open house meeting was held at the Kiona –Benton Junior High School in Benton City, Washington on May 14, 2008. The purpose of the meetings was to inform the community about the study and to present the recommendations of the WSDOT staff and the
Stakeholder Committee. The WSDOT staff presented the concepts being studied to the public, recorded their input and answered questions regarding the study. The WSDOT staff and the Stakeholder Committee developed recommendations for improving the study area based largely on information received through public involvement and traffic analysis.

**Consistency with Federal, State and Local Plans**

The SR 224/SR 225 I-82 Intersection Planning Study is consistent with the policies of the Benton City and Benton County Comprehensive Plans, and Benton Franklin Council of Governments Regional Transportation Plan.

The Benton City and Benton County Comprehensive Plans is a product of the statewide requirements for growth management planning. The Washington State Growth Management Act (GMA) (RCW 36.60A) is in effect in Benton County. It stipulates 14 goals that will serve as the guiding principles for planning land use. The comprehensive plan is a tool that is used to help communities resolve the balance of competing interests represented by these goals.

The transportation chapter of the Benton County Comprehensive Plan provides a long-range plan to meet the transportation demands of future growth in ways that support Benton County’s vision of the future.

The Benton Franklin Council of Governments Regional Transportation Planning (BFCOG RTP) process is designed to establish a consistent and meaningful method of making transportation decisions on a regional basis and to meet regional transportation needs by developing goals and policies that recognize both short-term (up to six years) and long-term (over six years) regional transportation network improvements.

The recommended solutions set forth in this Planning Study are consistent with the BFCOG RTP. The plan supports the transportation vision, “to develop an intermodal transportation network that accommodates efficiently and safely, the movement of goods and people throughout the Benton, Franklin and Walla Walla region.”

This Study is consistent with the City of Benton City’s Comprehensive Plan to help maintain the land use goals established by the City of protecting the rural atmosphere of the area.

The WSDOT staff met with the City of Benton City staff prior to beginning the study as well as several times throughout, to explain the study process, the purpose, keep them apprised, and present the study recommendations within the City of Benton City’s UGA. The city was also represented on the Stakeholder Committee.

Solutions set forth in this Planning Study are consistent with the action strategies and service objectives of the Washington Transportation Plan (WTP) and the Highway System Plan (HSP). The Planning Study is a long-range vision of a safe and efficient transportation system that identifies transportation issues, safety and mobility improvement opportunities and ultimately guides WSDOT investment in the corridor over the next 20 years. The 2007-2026 HSP lists a project in the vicinity of this study as a project requiring further analysis. This economic vitality project is listed as the "I-82 to Red Mountain Road" interchange and is located between MP 96 and MP 100. Recommendations generated from the Planning Study will be used to update the next HSP.
Chapter 4  Alternative Analysis

The team members examined the feedback from the public meeting and various presentations that were held. They worked to identify possible solutions (alternatives) for the varied concerns and issues. Working to consolidate the alternatives, they developed the following matrix that identifies the solutions and evaluates them based upon criteria that had been agreed upon. The alternatives analysis examined existing conditions and evaluated future intersection control that will enhance the safety and operation of the I-82 SR 224/SR 225 interchange (exit 96).

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Improved Mobility through 2030</th>
<th>Enhance Community Growth</th>
<th>Improved Bike/Ped Access</th>
<th>Improved Transit Access</th>
<th>Positive Impact to Local Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Signal</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>All way stop</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Single lane Roundabout at Kennedy Road</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Single lane Roundabout at SR224/SR 225 with off ramp at Kennedy Road</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Single lane Roundabout at SR224/SR 225</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Criteria definitions**

*Does it improve mobility through the intersection?*

The trip generators and growth in the area of the interchange determine whether the level of service will be improved by implementing operational changes that meet forecasted travel demand. The waiting time at the intersection is reduced to a basic free flow movement. A project that improves mobility will reduce the delay an average motorist experiences at the intersection after the project is built until 2030.

*Does it enhance community growth?*

The policies, goals and objectives of the Benton City and Red Mountain AVA local land use and transportation plan need to be supported. A project that enhances community growth will not only retain or improve the existing businesses, but may also encourage new business in the area.
**Does it improve Bike/Ped access?**
The movement of pedestrians and bicyclists through the intersection area is enhanced by providing safe crossings and highway connections to the local transportation network, including access to other modes (i.e. transit).

**Is transit access improved?**
A safe transit stop and easy access to the city is provided while still being able to move smoothly through the intersection. A project that improves transit will provide a stop that allows the bus to stop outside of the traveled way.

**Is safety improved?**
A project that improves safety is one that projects the number and severity of all types of collisions to decrease.

**Does it provide a benefit to the area businesses?**
The business will continue to prosper after the intersection solution is constructed. The suppliers and customers are able to enter and exit the business easily. A project that is a benefit to local businesses will retain all existing businesses, improve the access to the businesses for all modes of traffic and project fewer, less severe collisions.

**No Build**
**Does it improve mobility through the intersection?**
The existing configuration of SR 224/SR 225 and I-82 westbound ramp terminal intersections are closely spaced to each other. They are un-channelized intersections except for the westbound off ramp which has left and right turn tapers. An analysis shows that SR 224/SR 225 intersection functions at a level of service of “D” currently (2010) and LOS “F” in the design year 2030. Therefore, it will not improve mobility.
**Does it enhance community growth?**
The intersection serves as the gateway to Benton City and the Red Mountain AVA. They have a goal to continue to grow and attract community activities making Benton City a tourist destination as stated by the Red Mountain AVA Master Site Plan and Benton City Comprehensive Plan. As the community promotes the amenities of the city and surrounding area, this intersection plays a vital role in the attraction of the tourists driving on I-82. The current intersection configuration does not promote tourism and growth.

**Does it improve Bike/Ped access?**
The lack of roadway crossing opportunities place pedestrians at risk at this intersection and continues to be of concern. As the area continues to grow, this intersection will prevent non-motorized users from moving through it safely. Any intersection that provides access to pedestrians must also provide access for people with disabilities the same level of access. The design of the existing intersection does not provide a safe crossing for the disabled. The No Build solution does not improve the bike/pedestrian access for pedestrians or bicyclists.

**Is transit access improved?**
It is vital to the city to have a safe and efficient bus stop for the commuters that use the Park and Ride (P&R) lot. The Ben Franklin Transit bus serving Benton City does not have a designated stop in this area of the city. Commuters park at the P&R lot to use the bus. The bus stops on SR 224 in the roadway between the westbound ramp and the intersection in order to pick up or drop off the commuters. The east bound bus stop drops passengers off on the west side of SR 225 causing them to cross the highway to get to the P&R. The bus blocks traffic entering Benton City or I-82 while stopped in the lane. This creates extra congestion in the intersection area. The No Build solution does not improve access for the transit because it perpetuates the unofficial bus stop and continues adding to the congestion at the intersection. The transit users are not provided a safe area to board or exit the bus, or have a safe crossing on SR 224 to get to the P&R.

**Does it provide a benefit to the area businesses?**
The freight suppliers and users have difficulty making the turning movements into the mini-mart driveway. Many times the traffic is backed up on SR 224 so the users and suppliers of the mini-mart have a substantial wait to be able to get onto the highway. The distance between the driveway and the intersection is 175’ with the park and ride driveway 50’ from the intersection. The No Build does not provide the business owners with a facility that will accommodate their current use, and as growth continues, the existing configuration will negatively impact the business.

**Is safety improved?**
SR 225 is the main entrance for Benton City. This route is the facility used by all the local residents traveling to and from the city. The traffic in this intersection area is expected to increase significantly based on the traffic modeling conducted by BFCOG and traffic analysis performed by WSDOT.
Signal

Installing a traffic signal to control the westbound off ramp, SR 224 left turns, SR 225 left turns and through movements was proposed as an improvement for the area. Due to the physical constraints of the Yakima River Bridge on SR 225, left turn lanes were not considered on the north leg of the intersection with the signal alternative. The queue length indicates the traffic backup to be 660 feet in 2030 and this backs up traffic on to the bridge. The bridge is only 26 feet wide, thereby preventing the addition of a left turn lane. A left turn lane is required on the westbound leg of SR224.

The estimated cost is $2.0 million including engineering, right of way, and construction for this option. The right of way included in this option involves purchasing the commercial property located in the northwest corner of the intersection. An interim signal with timber poles and left turn channelization could be constructed for around $250,000, not including any right of way.

Does it improve mobility through the intersection?
Modeling the intersection for future traffic growth shows that the intersection with a traffic signal will cause it to function at LOS “C” in 2010 and LOS “E” in 2030. This signal will be operated at an LOS “C” and “D” until 2021 when it will operate at an LOS “F”. Therefore, a signal does not improve mobility for the full 20 years and this solution does satisfy the long term mobility criteria.

Does it enhance community growth?
The importance of this area to the community is described in the no-build option. The signal does not advance the goals of the community. The delay experienced due to a signalized intersection does not promote tourism and growth.
Does it improve Bike/Ped access?
The existing hindrances stated in the no-build option must be addressed in the signal option as well. A signalized intersection will improve the bike/pedestrian access because it will provide the traffic control needed to allow them to cross without having to compete with the vehicles.

Is transit access improved?
The no-build option describes the transit operation as it currently functions in the study area. Based on the current operation, the bus will be stopping in the area controlled by the signal if transit is not provided a specific place to stop off the traveled way. The signal solution does not improve access for the transit because an area where the bus can stop without interfering with the traffic signal or the vehicles using the highway is not provided in this option.

Does it provide a benefit to the area businesses?
Truck traffic and business user obstacles are described in the no-build option. The signal alternative does not provide the business owners with a configuration that will accommodate their current use. The signal option does not benefit the area businesses because it creates an operational problem for customers trying to ingress and egress the businesses due to the vehicles in the storage lane of SR 224.

Is safety improved?
The no-build option addresses the need for safety to be improved at the intersection. The signalization will reduce the number of collisions as a result of left turns, but may not reduce the number of rear-end collisions.

All Way Stop
Adding stop signs on SR 225 southbound near the intersection with SR 224, and one on northbound SR 225 near the I-82 westbound off ramp was proposed as the simplest solution to improve left turning movements. Just adding signage is not feasible because of the current intersection configuration. The two intersections essentially function as one five legged intersection and if additional stop control is added driver confusion would result. Drivers waiting at the stop sign on southbound SR225 would have to yield to both westbound SR224 traffic and the I-82 westbound off ramp. Therefore, the standard rules of the road would not apply and delays and accidents would result.

As a result, the only feasible stop control alternative would require all five legs to be reconfigured to meet at one location and that the property in the northwest quadrant be purchased for access control. The Park and Ride lot would also be affected and would be moved to a location east of the gas station/mini-mart. The reconfigured All Way Stop intersection would cost approximately $2.0 million for design, right of way, and construction.
Does it improve mobility through the intersection?
This configuration would result in the same level of service as the no build, LOS “C” in 2010. Modeling the intersection for future traffic growth shows that the intersections with additional stop signs will also function at a LOS of “F” in 2030. Therefore, it will not improve mobility.

Does it enhance community growth?
The importance of the intersection is addressed in this section of the no-build option. As the community promotes the amenities of the city and surrounding area, this intersection plays a vital role in the attraction of the tourists driving on I-82. The stop controlled intersection will not promote tourism and growth.

Does it improve Bike/Ped access?
Current design issues have been discussed in this section of the no-build option. The stop controlled intersections will improve the bike/pedestrian access for pedestrians or bicyclists. A stop controlled intersection will improve the bike/pedestrian access because it will provide the traffic control needed to allow them to cross without having to compete with the vehicles.

Is transit access improved?
This alternative would move the park & ride lot east, provides a stop for transit off the main entrance to Benton City, and will provide an easy connection to re-enter SR 224.

Does it provide a benefit to the area businesses?
As stated in the no-build, the trucks and other vehicles are faced with obstacles when entering the area. The stop controlled intersection alternative will not provide the business owners with a facility that will accommodate their current use, and as growth continues, it will negatively impact the businesses as well.
**Is safety improved?**
Collision problems are addressed in the no-build option. The stop controlled intersections may reduce the number of collisions as a result of left turns, but not reduce the number of rear-end collisions.

**Single Lane Roundabout at Kennedy Road**
The westbound off ramp exits to a single lane roundabout at Kennedy Road. The SR 224/SR 225 intersection would be eliminated by constructing a cul-de-sac. One leg of the roundabout would proceed to the existing ramp terminal intersection. This option was proposed as a possible way to avoid impacts to the existing gas station/mini-mart.

There are limited access issues associated with this alternative that would impact businesses and FHWA was not receptive to the plan when it was presented to them because it does not meet their requirements for a rural interchange. This option would cost approximately $7.4 million including design, right of way, and construction.

**Does it improve mobility through the intersection?**
The roundabout divides the traffic using the exit at Benton City and eliminates the intersection of SR 224/225. Based on the June 2009 WSDOT traffic analysis the roundabout at the SR224 / Kennedy Rd. intersection will operate at a LOS “B” in the current year of 2010, and a LOS “B” design year 2030. However the three way stop at the ramp terminal and SR 225 will operate at LOS “D” in the current year and LOS “F” in the design year. Therefore this option will not improve mobility. A signal could be installed at the ramp terminal and would have a LOS of “B” in the current year and LOS “B” in the design year. Therefore, this option with the addition of a signal would improve mobility but the additional cost of the signal would increase the cost of this solution and therefore was not considered.
Does it enhance community growth?
The goals for the city are stated in the no-build option. The Kennedy Road roundabout will move traffic away from the Benton City gateway, but closer to the Red Mountain AVA activities. While this alternative can possibly improve the growth in the county, it would have a negative impact for Benton City. Overall this project will hinder community growth.

Does it improve Bike/Ped access?
By eliminating the intersection, the bicycle and pedestrian users will have to cross at the ramp terminal to access the mini-mart. The cul-de-sac SR 224 will hinder and possibly worsen the bike/pedestrian access. This alternative will not improve Bike/Ped access.

Is transit access improved?
This alternative will move the park & ride lot east, provides a stop for transit off the main entrance to Benton City, and will provide an easy connection to re-enter SR 225. The cul-de-sac and roundabout proposed in this alternative will improve the conditions for the transit and the users of the traveled way.

Does it provide a benefit to the area businesses?
This alternative reduces some of the congestion on SR 224. The cul-de-sac/Kennedy Road roundabout alternative will not provide the business owners with a facility that will accommodate their current use. This alternative requires changing the current exit ramp into a two-way city street. While this proposal would function with an acceptable level of service, the FHWA has determined they are not willing to permit the change.

Is safety improved?
The WSDOT collision history indicates the primary cause for collisions in this intersection is the left turning movements. The cul-de-sac option of SR 224 eliminates the “T” intersection thereby eliminating the cause of collisions as recorded in the past.

Single Lane Roundabout at SR 224/SR 225 with off ramp at Kennedy Road

Another alternative requested was a study of adding another westbound exit ramp at a SR 224/Kennedy Road roundabout. The existing ramp would continue to service the traffic entering Benton City or the Kiona area. The roundabout could be five or six legs to service the ramps, SR 225 and SR 224 with the sixth leg being commercial. The initial thought was that it would avoid negative impacts on the existing gas station/mini-mart on the leased land between the ramp and SR 224. FHWA is not receptive to the plan because it does not conform to the standard design for a rural interchange. This option would cost approximately $6.0 million including design, right of way, and construction.
**Does it improve mobility through the intersection?**
This option adds an additional off ramp for the westbound traffic. It provides a direct ramp to SR 224/Kennedy Road intersection, while keeping the existing ramp. This option will eliminate the traffic exiting at the westbound off ramp and continuing on to SR 224/Kennedy Road intersection, reducing the vehicles exiting at SR 224/SR 225 by 18% percent. Based on the traffic analysis the roundabout at the SR224/SR225 intersection will operate at a LOS “A” in the current year of 2010, and a LOS “C” design year 2030. Additionally the four way stop at the ramp / Kennedy Rd. / SR224 intersection will operate at LOS “A” in the current year and LOS “C” in the design year. This will improve the mobility through the intersection by reducing the number of vehicles entering the SR 224 / SR225 intersection from the I-82 westbound off ramp.

**Does it enhance community growth?**
The community goals for this gateway are described in the no-build option. Converting from the stop controlled condition at SR 224/SR 225 intersection to a roundabout with pedestrian crossings and bicycle facilities will enhance the gateway vitality. Eighteen percent of the traffic exiting on the westbound ramp turn east on SR 224 according to the traffic counts. A certain portion of this traffic will bypass the gateway intersection thereby circumventing the local businesses. The roundabout will enhance the entrance to the community to Benton City, thereby attracting businesses to the area. The diversion of traffic exiting at Kennedy Road has a potential of reducing the amount of business conducted at the interchange area and as a consequence does not enhance community growth.

**Does it improve Bike/Ped access?**
Modern roundabouts by their design require motorists to slow down typically to less than 25 mph to continue though the intersection. Motorist and pedestrian safety is almost always improved when compared to conventional intersections. Splitter islands allow pedestrians to
cross one direction of traffic at a time. A cyclists safety is somewhat mixed. They can proceed through the roundabout either as a motor vehicle or as a pedestrian using the crosswalks. The single lane roundabout will improve the bike/ped access

Is transit access improved?
It is vital to the city to have an efficient bus stop for the commuters using the Park and Ride lot. Ben Franklin Transit bus serving Benton City stops in the traveled way on SR 224 at the parking lot between the westbound off ramp and SR 224/SR 225 intersection. This creates a safety problem as commuters are boarding and exiting the bus. Relocating the park and ride lot to the east of the mini mart and putting the transit stop in the lot will allow transit to exit I-82 and have easy access and exit to the transit stop. The roundabout will improve transit access to the community as easy access to the freeway on the return leg.

Does it provide a benefit to the area businesses?
Kennedy Road lies east of the SR 224/SR 225 Intersection and the area businesses at the gateway to Benton City. The split in traffic created by moving the exit ramp to Kennedy Road could result in reducing business in the interchange area and Benton City. Any reduction in business does not benefit the business community.

Is safety improved?
A roundabout is a one-way, circular intersection in which traffic flows around a center island. Roundabouts are recommended at appropriate intersections to reduce collisions and improve safety in the intersection. They are designed to meet the needs of all road users. The roundabout will eliminate most of the conflicts at the SR 224/SR 225 intersection. The roundabout will reduce the number of collisions as a result of left turns and stop condition, thereby improving the safety at the intersection.

**Single Lane Roundabout at SR 224/SR 225**
The team evaluated a centered single lane roundabout having the north and south legs align with SR 225 and offsetting it to the west. The property in the northwest quadrant is zoned commercial with a business currently operating on it. The parcel lies within the limited access area. To consider this roundabout configuration, the business will need to have access to the highway through the roundabout making the roundabout have six legs. Allowing a commercial access within the roundabout and limited access area is problematic with FHWA and WSDOT so the best solution would be for WSDOT to acquire the parcel and eliminate any vehicle access to it via SR 225. Construction of a by-pass ramp from westbound I-82 to SR 224 may be necessary in the future to accommodate increased traffic turning right onto SR 224 if the roundabout approaches failure. This alternative relocates the existing Park and Ride lot east of the mini-mart. Since the WSDOT already owns this parcel, no additional right of way acquisition will be required for the by-pass ramp and relocation of the park and ride lot. This option would cost approximately $4.5 million including design, right of way, and construction.
Does it improve mobility through the intersection?
The intersection has a history of delay that is preventable with a roundabout. Roundabouts are unique in that all vehicles entering the intersection must yield to the vehicles already in the intersection. Therefore, as vehicles turn into the roundabout, the vehicle can maintain a speed of approximately 25 mph, promoting the free flow movement desired. The traffic analysis indicated that traffic on SR225 will not backup onto the bridge in 2030. The LOS in the current year will be “A”, and LOS “C” in the design year 2030. A roundabout would reduce the delay experienced by the vehicles on SR 224, thereby improving mobility.

Does it enhance community growth?
The community’s vision for the intersection is addressed in the previous sections. Converting from the stop controlled condition at the SR 224/SR 225 intersection to a roundabout will add capacity to the intersection and allow for growth.

Does it improve Bike/Ped access?
Motorist and pedestrian safety is almost always improved when compared to conventional intersections based on the standard design of a roundabout. Splitter islands allow pedestrians to cross one direction of traffic at a time. A cyclists safety is somewhat mixed. They can proceed through the roundabout either as a motor vehicle or as a pedestrian using the crosswalks. The single lane roundabout will improve the bike/ped access.

Is transit access improved?
The need for the city to have a well functioning transit stop is addressed in the above options. The roundabout level of service is balanced for all users when the roundabout is in place. The park and ride lot will be relocated and allow for the bus to enter the lot to pick up and drop off passengers. The roundabout provides a safe place for transit to get out of the traveled way to pick up and drop off passengers.
Does it provide a benefit to the area businesses?
A roundabout can be designed with a commercial entrance as one of the legs and maintain its’ efficiency. The operational characteristics, low delay and improved safety, provides excellent mobility, equal ingress and egress for through, left turn movements and u-turns. When the driveways are in close proximity to an intersection, they are often blocked by the queuing of traffic waiting at the stop sign. Left turns from the mini-mart and shed driveways sometimes become impossible as well as unsafe as drives become impatient. The roundabout provides a benefit to the area businesses by allowing adequate ingress and egress to the sites without degrading the operations and safety.

Is safety improved?
A roundabout is a one-way, circular intersection in which traffic flows around a center island. Roundabouts are recommended at appropriate intersections to reduce collisions and improve safety in the intersection. They are designed to meet the needs of all road users. The roundabout will eliminate some of the conflicts at SR 224/SR 225 intersection (ie. left turns). The roundabout will reduce the number of collisions as a result of left turns and stop condition, thereby improving the safety at the intersection.

Other Considerations
During the course of the study the idea of a new interchange located approximately one half mile east of existing one, and tying into SR 224 at Demoss Road, was suggested. Benton City Economic Development Council sees the need for a second river crossing into the city. This option would assist in moving the traffic to a new east side crossing of the Yakima River to be built by the county and city in the future.

This alternative is outside of the scope of this study and therefore was not considered in the alternative analysis.

Conclusions
The Single lane Roundabout at SR 224/SR 225 is the preferred alternative. This roundabout configuration was selected because it meets the objective of the community in providing; “a safe, easily maintainable gateway that serves transportation needs and addresses the cultural and economic needs of the unique areas it serves.”

This roundabout supports immediate and future development, improves bike and pedestrian movements, transit operations, as well as improves the aesthetics to the gateway to Benton City and Red Mountain AVA. The Park and Ride lot will be relocated to the east of the mini-mart providing transit accommodation in the proximity of the lot.

The single lane roundabout will meet the need for the 20 year traffic growth, as well as create a safe, efficient, attractive gateway to the city and the AVA. It is also the most cost effective solution that will meet the need 20 year projected growth.

A benefit cost analysis was performed using the WSDOT Mobility Project Prioritization Process (MPPP) User Benefit Software. The recommend alternative has a B/C (Benefit/Cost) ratio of approximately 1.0. Benefit cost analysis was not preformed on any other option because all of the other options failed to meet the established goals of the study.
Considering the current economic climate, all of the funding for the roundabout solution may not be available. As mentioned in the signal option, a lower cost interim solution (temporary signal) does exist which will last for roughly 10 years.

The conclusions of this study are based on current information and any changes in the development of the area or local road network, including the Red Mountain Road Interchange would require a reevaluation of this intersection.

**Next Steps**

The next step following this study should be to begin work on an IJR. The IJR is needed in order to obtain FHWA approval for any changes to this intersection because of its influence on the Interstate. A Modified IJR may be allowed because I-82 mainline isn’t affected by the improvements, however, FHWA will need to be contacted at the beginning of the process to find out exactly what they will require. Also, they need to be involved in any IJR process early and often. It is anticipated that much of the preliminary work has been done as part of this study and will speed up the process regardless of whether it is a full or modified IJR.

This recommendation is provided to identify a solution that all stakeholders can endorse and seek funding for if they are able. Currently, the stakeholders all agree with this recommendation and are willing to move forward with the next steps. Each jurisdiction may (or may not) seek funding to begin the IJR either in collaboration or on their own. The agency(s) responsible for the next step will be determined by available funding and resources. No funding for further design, right of way, or construction has been identified at the time of this study.

In addition to beginning work on the IJR it is recommended that the commercial property in the northwest quadrant be acquired for any future solution since this parcel lies within limited access area of the interchange.
Appendix A  Route Classifications

Table 2-1 in this report lists various route classifications used by the Washington State Department of Transportation (WSDOT) and others in managing the state’s transportation system. Program funding, operations and maintenance are among the WSDOT functions affected by these classification programs. The following is a brief description of Functional Class, the Freight and Goods Transportation System ranking, and access control.

**Functional Class (Federal and State)**

Federal Functional Classification is one of the determining factors of eligibility for Federal Transportation Funding. The classification should reflect the residential, commercial and industrial uses served by the route, municipal boundaries, and the urbanized area designations of the U.S. Bureau of Census.

Federal and State functional classifications seek to group highways, roads and streets by the character of service they provide. The system was developed for transportation planning purposes. It recognizes the various roles that individual routes play in the transportation network. Functional classification at this level is used to identify how to direct travel through the transportation network in the most logical and efficient manner. State functional classifications in Washington are divided into two major divisions, Rural and Urban. For this division the Federal Aid Highway Urban (or Urbanized) Area Boundary is used to divide the route classifications.

State Route 224 and State Route 225 are classified as Rural Collectors. Routes in this classification generally serve travel of primarily intra-county rather than statewide importance and constitute those routes on which predominant travel distances are shorter than on principal or minor arterial routes. They link the locally important traffic generators with their rural lands. See “Functional Classification System Concepts, Criteria, and Procedures, FHWA 1989” for more information.
Freight and Goods Transportation System

In 1993 the Washington State Legislature passed RCW 47.05.021 directing the Transportation Commission to designate a freight and goods transportation system (FGTS). The FGTS is a roadway ranking system based on freight tonnage carried annually. It's an inventory of freight tonnage moving along the highways, streets and roads of Washington State. The system is affected by changes in the economy, truck travel patterns, cargoes and tonnage. Its purpose is to provide meaningful data for the use of planners and decision makers responsible for prioritizing route improvements.

State Routes 224 and 225 FGTS Ranking is classified as T-3. See below for FGTS Ranking-Freight tonnage Classifications.

<table>
<thead>
<tr>
<th>FGTS RANKING-Five Freight tonnage Classifications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• T-1 more than 10 million tons per year</td>
</tr>
<tr>
<td>• T-2 4 million to 10 million tons per year</td>
</tr>
<tr>
<td>• T-3 300,000 to 4 million tons per year</td>
</tr>
<tr>
<td>• T-4 100,000 to 300,000 tons per year</td>
</tr>
<tr>
<td>• T-5 20,000 tons in 60 days</td>
</tr>
</tbody>
</table>

Highway Access Control

WSDOT regulates the access to all state highways in order to provide a safe and efficient transportation system while, at the same time, providing property owners with reasonable access. They are regulated by the use of Limited Access, whereby access rights are acquired from property owners, and Access Management whereby the property owner’s access rights are controlled through an Access Connection Permit.

A limited access facility is established by the Transportation Commission to preserve the safety and efficiency of specific highways and to preserve the public investment. Limited access is achieved by acquiring access rights from abutting property owners, and by selectively limiting approaches to the highway.

Requirements for the establishment of limited access highways are set forth in RCW 47.52. Highways controlled by acquiring abutting property owners’ access rights are termed limited access highways and are further distinguished as having Full, Partial, or Modified control.
The Highway Classification System as set forth in WAC 468-52 determines the Access Management. See Table A-1 for the description of the five classes.

**Table A-1 WSDOT Access Classification**

<table>
<thead>
<tr>
<th>Class</th>
<th>Speed</th>
<th>Volume</th>
<th>Spacing – Approach</th>
<th>Spacing – Intersect.</th>
<th>Multilane Median</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High</td>
<td>High</td>
<td>1320 ft.</td>
<td>1 mile</td>
<td>Median is required</td>
<td>Longer trips - serves regional function.</td>
</tr>
<tr>
<td>2</td>
<td>Medium to High</td>
<td>Medium to High</td>
<td>660 ft.</td>
<td>0.5 mile</td>
<td>TWLTL* may be substituted if ADT &lt; 20,000</td>
<td>Longer trips. Direct access allowed only if no other alternative.</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>Medium</td>
<td>330 ft.</td>
<td>0.5 mile</td>
<td>Median not required</td>
<td>Shorter trips. Two way left turn lane allowed if warranted.</td>
</tr>
<tr>
<td>4</td>
<td>Medium</td>
<td>Medium</td>
<td>250 ft.</td>
<td>0.5 mile</td>
<td>Median not required</td>
<td>Short trips. Two way left turn lane is typical here.</td>
</tr>
<tr>
<td>5</td>
<td>Low to Medium</td>
<td>Medium to High</td>
<td>125 ft.</td>
<td>0.25 mile</td>
<td>Median not required</td>
<td>Short trips. Property access is emphasized.</td>
</tr>
</tbody>
</table>

*Two way left turn lane*
Roadway Alignment Analysis

Horizontal Alignment

The beginning milepost of the segment is 0.00B and the ending milepost is 0.24B on SR 224 and MP 00.0 to 0.09 on SR 225. The horizontal alignment data on SR 225 is not recorded at the intersection in the WSDOT Transportation Data Office (TDO). Table B-1 describes the horizontal alignment provided for SR 224.

Table B-1 SR 224 Horizontal Alignment Analysis

<table>
<thead>
<tr>
<th>MP</th>
<th>Curve Length</th>
<th>Curve Radius</th>
<th>Speed Limit</th>
<th>Distance Previous Curve (ft)</th>
<th>WSDOT Passing St. Dist.</th>
<th>MUTCD Passing Lane</th>
<th>Existing Passing Zone</th>
<th>10% Max Super 640.05(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.02B</td>
<td>276</td>
<td>409</td>
<td>35</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>none</td>
<td>OK</td>
</tr>
<tr>
<td>0.23B</td>
<td>64</td>
<td>2865</td>
<td>35</td>
<td>898</td>
<td>No</td>
<td>No</td>
<td>none</td>
<td>OK</td>
</tr>
</tbody>
</table>

Roadway Dimensions

Roadway Section Widths

Information regarding the configuration and composition of existing lanes and shoulders are shown in Table B-2 and B-3. This information indicates that not all of the existing route meets the Washington State Department of Transportation (WSDOT) standards for these elements based on current traffic volumes for these locations.

Table B-2 SR 224 Existing Roadway Section

<table>
<thead>
<tr>
<th>Begin SRMP</th>
<th>End SRMP</th>
<th>Left Shoulder Width</th>
<th>Lane Width</th>
<th>Right Shoulder Width</th>
<th>WSDOT Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00B</td>
<td>0.05B</td>
<td>8 ft asphalt</td>
<td>12 ft asphalt</td>
<td>8 ft asphalt</td>
<td>6’ shoulder, 12’ lane</td>
</tr>
<tr>
<td>0.06B</td>
<td>0.06B</td>
<td>4 ft asphalt</td>
<td>13 ft asphalt</td>
<td>4 ft asphalt</td>
<td>6’ shoulder, 12’ lane</td>
</tr>
<tr>
<td>0.08B</td>
<td>0.24B</td>
<td>8 ft asphalt</td>
<td>11 ft asphalt</td>
<td>8 ft asphalt</td>
<td>6’ shoulder, 12’ lane</td>
</tr>
<tr>
<td>0.24B</td>
<td>0.25B</td>
<td>8 ft asphalt</td>
<td>10.5 ft asphalt</td>
<td>8 ft asphalt</td>
<td>6’ shoulder, 12’ lane</td>
</tr>
</tbody>
</table>
Table B-3 SR 225 Existing Roadway Section

<table>
<thead>
<tr>
<th>Begin SRMP</th>
<th>End SRMP</th>
<th>Left Shoulder Width</th>
<th>Lane Width</th>
<th>Right Shoulder Width</th>
<th>WSDOT Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.02</td>
<td>6 ft asphalt</td>
<td>11 ft asphalt</td>
<td>6 ft asphalt</td>
<td>6' shoulder, 12' lane</td>
</tr>
<tr>
<td>0.03</td>
<td>0.04</td>
<td>6 ft asphalt</td>
<td>13 ft asphalt</td>
<td>6 ft asphalt</td>
<td>6' shoulder, 12' lane</td>
</tr>
</tbody>
</table>
SR 225 Bridge Data
United States Department of the Interior
National Park Service
National Register of Historic Places
Continuation Sheet

Section number 7. Narrative Description

Completed in 1957, the bridge carries State Route 225 (SR 225) across the Yakima River between the small towns of Benton City on the north, and Klona on the south. The two towns lie just to the west of Washington’s Tri-Cities area. Benton City, a cluster of homes and schools, is situated on a high bench where the Yakima River bends sharply to the north. Smaller Klona, across the river, retains well-tended homes but no commercial enterprises. (1)

SR 225 provides a north/south connection between SR 240, carrying traffic southeast through the U.S. Department of Energy’s Hanford Reservation to Richland, and Interstate 82, just south of the river.

The 400-foot long bridge consists of a 170-foot main span flanked at each end by two spans (measuring 54 feet and 53 feet) and an 8-foot cantilever at the bridge end. The main span is made up of a central 50-foot long "suspended span," supported by 55-foot long cantilever sections. At the bridge ends, a concrete slab sits on the end of the 8-foot cantilever to provide a transition to the roadway approach. The bridge carries one lane of traffic in each direction within a curb-to-curb width of 26 feet, plus two 3-foot-wide sidewalks.

With the exception of the "suspended span," the 34 foot 6 inch wide bridge spans are reinforced concrete, with a 3 foot 3 inch deep cross-section, consisting of a hollow box girder under each sidewalk, and two central tee-girders. Girder flanges provide a 6-inch thick roadway slab. The superstructure is continuous between the bridge end and the end of the "suspended span." Transverse crossbeams are provided at each pier and at cantilever ends, while transverse diaphragms are provided at the center of each span and at the center of the 65-foot cantilevers. The 60-foot long "suspended span" consists of 5 rolled steel wide-flange girders, with transverse cross-frames at the third points, supporting a 6-inch thickness reinforced concrete roadway slab.

All piers are reinforced concrete. Each main span pier consists of two hexagonal columns, 30 foot 6 inches center-to-center, connected by a 1-foot thick full height wall, founded on a spread footing and topped by a 4 foot 5 inch deep and 4-foot wide cap. A tapered concrete tower is supported on the cap, above each column, and extends about 28 feet above the roadway. A rectangular steel box strut, built from four steel plates extends over the roadway between towers to provide transverse stability. A rolled steel wide-flanged vertical column is embedded within each tower and acts compositely with the concrete in carrying applied loads. Inclined tie or "stay" members extend parallel to the bridge, from a location near the top of each tower, to an anchorage within the exterior box girder of each of the adjacent concrete spans. The "stays" are box sections constructed by welding steel plates to each side of a rolled wide-flange steel beam. Interior voids of the "stays" are filled with vermiculated concrete. The top of the "stays" have a have a riveted connection with the steel column within each tower. The "back stays" anchor to the approach spans just above the adjacent pier. The "fore stays" anchor just 6 feet back from the tip of the 55-foot cantilever to provide support for the suspended span.

Full-width concrete walls, founded on spread footings, provide support for the short cantilever span and first approach span at each end of the bridge. Piers shared by the two interior approach spans are full-width concrete walls on footings founded on multiple pre-stressed concrete piles.
The Benton City-Kiona Bridge is eligible for listing in the National Register of Historic Places under Criterion A for its association with bridge building in Washington in the 1950s as per the “Bridges and Tunnels Built in Washington State, 1951-1960” MPD. It is also eligible under Criterion C for its type, period, materials and method of construction. The bridge meets the threshold for eligibility established by Criteria Consideration G for properties not yet 50 years old for its exceptional engineering significance.

The significant engineering features of this bridge are its use of towers and inclined ties or “stays” to support a span suspended between two long span sections cantilevering from a main pier, and its innovative use of both concrete and steel components in the design. In their December 21, 1965, “Preliminary Layout” for the bridge, the designers, Hadley and Hadley, Consulting Engineers, from Seattle, called their bridge a “Tied-Cantilever Type.” This bridge was the first of its type in Washington, and remains the only one like this in the state.

Use of the towers and inclined “stays” enabled the designers to use an extremely shallow cross section for the superstructure of the bridge. A conventional concrete or steel girders bridge would have provided a depth/span ratio in the range of 1/15 to 1/25.[2] The Hadley bridge provided a 170-foot span across the river with a 3 foot-3 inch deep section, for a depth/span ratio of 1/52.3. This was an extraordinary engineering achievement for the 1950s.

Use of the pioneering “Tied-Cantilever” design enabled Hadley to provide a longer and shallower span and a very aesthetically pleasing crossing of the river. The longer span moved the main piers back out of the deeper section of the river, while the shallow section provided required clearance above the river’s record flood stage.

Historical Context:

On October 3, 1955, the Benton County Board of County Commissioners entered into an agreement with Homer M. Hadley, representing the Seattle consulting engineering firm of Hadley and Hadley, for preparation of plans and specifications for a bridge crossing the Yakima River between Benton City and Kiona.[3]

The bridge was to replace an earlier crossing of the river. After a study of several alternate sites, it was decided to locate the bridge 525 feet downstream and to the east of the existing bridge, a few hundred feet north of what was then Secondary State Highway 3 and U.S. Highway 410.[4] The bridge was to be constructed to provide clearance above the high water elevation at that location on record flood in 1933.

Design plans and specifications were prepared by Hadley and approved on August 13, 1956 by Dale E. Bean, Benton County Road Engineer. A contract for construction of the bridge was advertised by the county and awarded on September 17, 1956, to contractor Everett McKellar of Chelan, Washington, for a contract cost of just over $168,000.[5] Construction was completed in June 1957. The bridge has had no known alterations since construction.

On May 21, 1991, jurisdiction for the highway was transferred to the state and the route was designated as State Highway 225. This action was taken because the route provides a cross-connection between interstate and state highways, and because it provides access to the U.S. Department of Energy facilities at the Hanford Reservation.[6]

Engineering Context:

The Benton City-Kiona Bridge was an American prototype for what would later be called cable-stayed bridges. At least two earlier examples of the type existed in the remote rain forests of the Olympic Peninsula, but were probably unknown to engineers of the day. Hadley and Hadley must have known of these two log cable-stayed bridges constructed in 1950 and
National Register of Historic Places
Continuation Sheet

Section number 8. Narrative Statement of Significance

1952 over the Quinault River on the Quinault Indian Reservation. Neither of those bridges was designed by a professional engineer. They were built by a logging company superintendent, with no formal training in structural theory. The later of the two bridges, called the Chow Chow Bridge, was listed in the National Register of Historic Places and served logging truck traffic until the late 1980s.

Engineers had begun developing cable-stayed bridges in Germany in the late 1930s. In 1938, the German engineer, Professor F. Discher, began studies on cable-stayed bridges. However, it was not until 1955, that a contractor who had collaborated with Professor Discher, succeeded in getting acceptance for construction in Sweden of the first modern cable-stayed bridge in the world, the Stroeamsund Bridge. (7) Conceptually the German/Swedish and Hadley designs are similar. Hadley and Hadley used steel box sections, however, rather than cables, for the "stays."

The first modern cable-stayed bridge in North America, having a 450-foot main span, was built at Sitka Harbor, Alaska in 1972. In 1979, the first modern cable-stayed bridge built in Washington, having a main span of 970 feet, opened to carry traffic across the Columbia River between the cities of Pasco and Kennewick.

Section number 9. Major Bibliographical References

(3) Resolution for County Road Project No. 274, Benton County, Washington, October 3, 1955.
Table C-1 lists the approximate location of the utilities that exist within the study corridor, according to the Washington State Department of Transportation (WSDOT) South Central Region Utilities Office, as of August 20, 2008. Detailed research is required in each case to establish any prior rights by easement that may exist along the study area. The table below lists the utilities, franchise holder, and approximate milepost locations of the existing utilities.

### Table C-1  SR 224 Utilities

<table>
<thead>
<tr>
<th>Beginning MP</th>
<th>Ending MP</th>
<th>Utility</th>
<th>Franchise Holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>.11</td>
<td>0.11</td>
<td>Sanitary Sewer Line</td>
<td></td>
</tr>
<tr>
<td>.10</td>
<td>.23R</td>
<td>Aerial Power Cable</td>
<td>Benton Rural Electric</td>
</tr>
<tr>
<td>-.03</td>
<td>.11</td>
<td>Storm Sewer Line</td>
<td>City of Benton City</td>
</tr>
<tr>
<td>-0.05</td>
<td>.05</td>
<td>Water Line</td>
<td>City of Benton City</td>
</tr>
<tr>
<td>0.00</td>
<td>0.16</td>
<td>Buried sewer line</td>
<td>City of Benton City</td>
</tr>
<tr>
<td>-0.6</td>
<td>0.38</td>
<td>Telephone Cable</td>
<td>GTE Northwest, Inc.</td>
</tr>
<tr>
<td>0.15</td>
<td>0.15X</td>
<td>Water Line</td>
<td>James Harris</td>
</tr>
</tbody>
</table>

### Table C-2  SR 225 Utilities

<table>
<thead>
<tr>
<th>Beginning MP</th>
<th>Ending MP</th>
<th>Utility</th>
<th>Franchise Holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.16</td>
<td>Water Line</td>
<td>City of Benton City</td>
</tr>
<tr>
<td>0.00</td>
<td>0.11</td>
<td>Telecommunication Facility</td>
<td>Verizon Northwest</td>
</tr>
</tbody>
</table>
Appendix D

Newspaper Coverage, Press Releases and Flyers

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SR 224/SR 225 Intersection Improvement Study

WSDOT Planning, Benton County, and Benton City will be hosting an open house to discuss possible alternatives to improve the intersection at SR 224 and SR 225 near Benton City.

Open House
Wednesday, May 14
7 p.m. - 8:30 p.m.
Ki-Be
Middle School
1107 Grace
Benton City, WA 99320

Get first-hand information
WSDOT Planning staff and officials from Benton County and Benton City will be on hand to answer your questions and listen to your comments.
- What alternatives are being considered?
- How will this project improve safety?
- Will this project affect your business or property?

Come see for yourself
There will be no scheduled speaker so come at your convenience to learn about the project:
- Explore the benefits of each alternative.
- Provide feedback to the planning team.

For More Information
Bill Preston, Planning Engineer
PO Box 12560
Yakima, WA 98909-2560
(509) 577-1630
PrestoB@wsdot.wa.gov

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It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin and sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For Title VI complaint forms and advice, please contact OEO's Title VI Coordinator at (360) 705-7098. For language interpretation services contact Bill Preston at (509) 577-1630.

Americans with Disabilities Act (ADA) Information: The meeting site is accessible to persons with disabilities. Accommodations for people with disabilities can be arranged with advance notice by calling Bill Preston at (509) 577-1630.
Planning Study – March 2009
SR 224/SR 225/I-82 Intersection

Appendix D-2
I-82, SR 224, SR 225 Interchange options

Please review and give your comments to WSDOT by June 30.

SR 224/SR 225 Intersection Improvement Study

SR 224/SR 225 Intersection Improvement Study

Interchange Alternatives

Roundabout with off ramp at Kennedy Road – The existing off ramp from I-82 would be moved to the east approximately two miles and terminate at the intersection of SR 224 and Kennedy Road. The existing roundabout off ramp would be obliterated and the roundabout would be located at the existing SR 224/SR 225 intersection as a full leg roundabout.

Roundabout at SR 224 and Kennedy – The westbound off ramp from I-82 would be moved to the east approximately two miles and terminus at the roundabout. The existing SR 224 from the intersection of SR 225 to the intersection of Kennedy Road would end with a cut-off near the existing intersection and the existing SR 224 would be used as a local access road (city street). The fifth leg would be tied into the existing westbound off ramp and would become a two lane two way link that terminates at the current westbound exit ramp and SR 224. This proposal does not alleviate the stop delay at the existing intersection but only moves it to a different intersection.

Signal Option – The short distance between the off ramp and SR 224 and the river make channelization and left turn storage extremely difficult to accomplish. This option includes widening of the bridge and would fall before a properly designed roundabout. This location would likely require an additional signal for the eastbound ramps at some point in the future.

Roundabout with off ramp – This option considers the traffic impacts to this intersection if the Red Mountain interchange were constructed. Construction of the Red Mountain interchange would eliminate most large trucks so that the majority of vehicles passing through this roundabout would be passenger vehicles and smaller trucks. In the absence of the Red Mountain interchange the 18-40 trailer trucks would not be able to make the tighter curve without the aid of truck spurs on the outside of the roundabout. The access control plan is a result of this roundabout will also have an adverse impact on the existing gas station/bike trail.

Roundabout with slip ramp (a) – This option considers the traffic impacts to this intersection if the Red Mountain interchange were not constructed. It was assumed that the Red Mountain interchange would not be built most of the truck traffic as well as the already high volume of passenger vehicles would exit at exit 96. The slip ramps were developed to enable truck traffic making the westbound off to southbound SR 224 movement with minimum. The slip ramps also eliminate the need for truck spurs on the outside of the roundabout. The slip ramp has severe impacts to the existing gas station/bike trail.

Roundabout with slip ramp (b) – Same as alternative (a) except that there is no access to the northwest property.