OR 99 Corridor Plan

DRAFT Technical Memorandum #5
Concept Development and Evaluation

Prepared for

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5. CONCEPT DEVELOPMENT AND EVALUATION

This memorandum presents the preliminary improvement concepts developed to address long-range deficiencies in the OR 99 corridor. The goal of the identified improvement concepts is to help achieve the goals and objectives set forth for this project, while addressing identified deficiencies for all modes.

After concepts are selected for further analysis, they will be combined to create comprehensive improvement strategies. Then, additional analysis will be conducted to ensure the improvements work well together.

5.1. Concept Development

Each improvement concept was developed to address specific deficiencies, safety issues, or access concerns. These concepts were developed based upon available standards, warrants, perceived need, safety data, traffic operations, and community livability. Concepts were not limited to roadway issues, and include many bicycle and pedestrian-related projects.

The concepts were developed keeping in mind the four goals identified for the OR 99 Corridor Plan:

- **Goal 1 – Mobility**: Improve the OR 99 corridor and identify potential local system enhancements that link communities, neighborhoods, and businesses and address the existing and future transportation needs of moving both people and goods throughout the corridor.
- **Goal 2 – Multimodal System**: Provide a multimodal transportation system that accommodates the needs of all users.
- **Goal 3 – Livability**: Provide a transportation system that enhances community livability and promotes economic development while minimizing environmental impacts.
- **Goal 4 – Safety**: Promote the safety of current and future travel modes for all users.

This memorandum considers changes/improvements in the following categories:

- **Roadway Segment Improvements** – These concepts consider systematic improvements throughout each segment of the corridor, including a variety of new cross sections that provide continuous bicycle and pedestrian facilities.
- **Safety Improvements** – These concepts are targeted at locations with a high frequency of crashes, fatal and serious injuries, or at locations with roadway attributes and environmental factors that may contribute to future crashes.
- **Pedestrian Improvements** – These concepts offer pedestrian improvements to link continuous sidewalks with regular crossing opportunities and access to transit throughout the corridor.

- **Bicycle Facility and Shoulder Improvements** – These concepts offer bicycle improvements to link continuous bicycle lanes/shoulders with regular crossing opportunities throughout the corridor.
- **Operational Improvements** – The concept proposed under this category focuses at the one intersection that fails to meet operational standards by our horizon year; although, many of the concepts proposed under the safety improvement category will have operational affects.

The concepts identified in this memorandum are above and beyond any other projects that have been identified for implementation along the corridor either through ODOT's 2011-2013 Statewide Transportation Improvement Program (STIP), the Regional Transportation Plan (RTP), and City and County Transportation System Plans (TSPs).

The improvement concept categories often overlap or complement each other. For instance, a roadway segment improvement may include strategies to improve safety and could be combined with a number of pedestrian improvements. Linkages between concepts are discussed in the evaluations.

5.1.1. Roadway Segment Improvements

Although other improvement categories consider concepts at spot locations, the roadway segment improvements consider systematic improvements through a segment of the corridor. Potential road segment cross-sections were identified during the concept development process to increase capacity, provide additional bicycle/pedestrian facilities, or address safety concerns. These improvements are consistent with all four goals of the Corridor Plan.

Roadway cross sections along the corridor were developed using three hierarchical strategies:

- Provide on-street bike lanes throughout the corridor within the available right of way (ROW), by restriping the roadway to provide more narrow travel lanes. No additional pavement would be added to the roadway under this strategy. Additionally, sidewalks would be upgraded or added, where missing, along easements or by purchasing ROW within these areas. Most of these concepts would require design exceptions for implementation.
- Provide on-street bike lanes and other roadway or safety improvements by widening the paved roadway surface but minimizing the width of improvements. Sidewalks would be upgraded, added, or relocated as required. Most of these concepts would require design exceptions for implementation.
- Provide on-street bike lanes and sidewalks while meeting design standards. These concepts require widening the pavement and relocating existing sidewalks. Most would require additional ROW along much of the corridor.

5.1.2. Safety Improvements

Improving safety throughout the OR 99 corridor has been identified as a priority, and is consistent with Goal 4 of this plan. A roadway characteristics audit[1] was performed in conjunction with a detailed crash history analysis[2] to identify measures at specific locations or general strategies for improving overall safety. While some improvement concepts are targeted at locations with either a high frequency of crashes, or fatal and/or serious injuries, some concepts were identified due to roadway attributes and environmental factors that may contribute to future crashes.

The safety of a roadway is closely related to the location, orientation, and frequency of access points. Research has clearly shown a direct correlation between the number of access points and collision rates. Typically, as the number of access points increases, so do collision rates. Although a systematic access management plan will be developed later in this project, several targeted improvements and closures are addressed in the proposed concepts.

5.1.3. Pedestrian Improvements

In alignment with Goals 2 and 3 of this plan, the proposed pedestrian improvements provide continuous sidewalks and regular crossing opportunities throughout the corridor. Pedestrian improvements were considered in two separate categories that are closely related:

- Sidewalks/pathways adjacent to OR 99
- Crosswalks and informal crossing opportunities across OR 99

Because sidewalk improvements adjacent to OR 99 are identified in the roadway segment concepts section, this section covers the proposed spot improvements and crossing opportunities. Crossing improvements are targeted at locations with a moderate to high demand, such as near transit stops, routes to and from school, or adjacent to large employers.

In addition, improvement concepts are targeted at locations with reported pedestrian crashes, where there is an opportunity to reduce the exposure of pedestrians at conflict points, or improve visibility and awareness between modes. There were four pedestrian-related crashes reported throughout the study corridor from 2005 through 2009, each of which resulted in injuries. The crossing improvements proposed include pedestrian-activated rectangular rapid flashing beacons (RRFB), striped crosswalks, pedestrian refuge islands (with striped or unstriped crossings), pathway connections, and other spot improvements.

5.1.4. Bicycle Facility and Shoulder Improvements

The bicycle system has numerous segments that are discontinuous or deficient throughout the corridor.

[1] The roadway characteristics audit was performed using aerial imagery and ODOT Video Log.

[2] The crash data used in this safety investigation was from the most recent five-year period available (January 1, 2005 to December 31, 2009).

The Oregon Bicycle and Pedestrian Plan recommends shoulders that are 6 feet wide for bicycle use, although a minimum 4-foot shoulder is considered adequate when there are physical width limitations. In rural sections of OR 99 with a posted speed of 55 mph, the Highway Design Manual would require 8-foot wide paved shoulders. Wider shoulders allow a cyclist to ride far enough from the edge of pavement to avoid debris and conflicts with passing vehicles. Applicable guidelines, standards, environmental constraints, and costs were considered in the development of bicycle/shoulder improvements throughout the corridor.

Although bicycle facility improvements are identified in the roadway segment concepts section, this section covers the proposed spot improvements such as crossings and trail connections.

5.1.5. Operational Improvements

Traffic operations were evaluated for concepts that were identified to address operational deficiencies. Along this corridor, only one location has an identified operational deficiency, S Valley View Road, which has planned but unfunded improvements.

Several of the other categories may also have operational benefits such as the roadway segment improvements, safety improvements, and even the shoulder improvements.

5.2. Concept Evaluation

Not all of the concepts proposed in this memorandum will be recommended for implementation. Each improvement concept will be evaluated with regard to applicable impacts (e.g. traffic operations, safety, environmental, etc.), feasibility, stakeholder feedback, and ability to meet the goals of the corridor plan.

The concept analysis included traffic operations, road geometries and ROW requirements, environmental and land use consequences, and cost opinions.

5.2.1. Traffic Operations and Safety

Traffic operations were evaluated for concepts that were identified to address operational deficiencies. Along this corridor, only one location has an identified operational deficiency, S Valley View Road, which does not have a funded improvement by our horizon year.

The operational assessment focuses on the volume-to-capacity (v/c) ratio and level of service (LOS) for the 2034 future condition.

At intersections where potential changes in traffic control or turn lanes were considered, the procedures in the ODOT Analysis Procedures Manual (APM) were followed. For potential turn

lanes on the rural sections of the highway, the APM turn lane criteria[3] were evaluated. Existing traffic volumes were applied to determine if warrants for turn lanes might be met today.

Some improvements are focused on addressing safety concerns or may address safety as well as traffic operations deficiencies. Crash patterns from the five-year analysis period (2005 through 2009) are discussed for those improvements that address safety.

5.2.2. Basic Roadway Geometries and Right-of-Way Requirements

Illustrations of basic roadway geometry and ROW needs were developed for concepts that involve infrastructure improvements. The drawings approximate roadway centerlines, edge of roadway and ROW using available base mapping.

5.2.3. Environmental and Land Use Assessment

Impacts to resources were qualitatively assessed based on the data assembled for the environmental and land use reconnaissance. The level of analysis of the study area is designed to identify those areas judged to have considerable potential for conflict.

5.2.4. Concepts Cost Opinions

Rough order of magnitude cost opinions were developed using present day dollars and are consistent with standard estimating methods. The estimates include a contingency factor but do not include ROW costs. The cost opinions are intended to help differentiate alternatives by approximating the relative costs of each concept.

5.3. Organization of Improvement Concepts

The OR 99 corridor is more than 11 miles long and31 improvement concepts have been developed at various locations. For discussions purposes in this memorandum, the concepts have been grouped by segments discussed in previous memoranda. There were six segments originally identified but the South Medford and the Medford to Phoenix transition segments were combined for the evaluation as several of the concepts extend through both areas.

The roadway segments in the concept analysis are:

South Medford and Transition to Phoenix Segments - Garfield Street to Phoenix North City Limits (North of Cheryl Avenue)

- 7 improvement concepts

Phoenix Segment - North City Limits (North of Cheryl Avenue) to South City Limits (North of Cabbage Lane)

- 12 improvement concepts

[3] Section 7.2 Turn Lane Criteria, Analysis Procedures Manual, April 2006, Updated January 2011, online reference: http://www.oregon.gov/ODOT/TD/TPAU/docs/A_APM/APM.pdf. Note: These criteria are also consistent with the criteria in Appendix F of the Highway Design Manual.

Phoenix to Talent Transition Segment - Phoenix South City Limits (North of Cabbage Lane) to Talent North City Limits (Colver/Suncrest Road)

- 2 improvement concepts proposed

Talent Segment - Talent North City Limits (Colver/Suncrest Road) to South City Limits (South of Creel Road)

- 4 improvement concepts proposed

Talent to North Ashland Transition Segment– Talent South City Limits (South of Creel Rd) to North Ashland (S Valley View Road)

- 6 improvement concepts proposed

The improvement concepts have various strategies to consider. Many of the concepts can be combined with others; some provide different solutions to address the same issue. Within several of the concepts, there may be different options. The 31 concepts are discussed in the next five sections.

5.4. South Medford and Transition to Phoenix Segments

As the northernmost segment of the study area along OR 99, the south Medford segment extends from the Garfield Street intersection through South Stage Road. This section of OR 99 is a typical five-lane urban arterial with a center left-turn lane, traffic signals at several intersections, and a posted speed of 45 miles per hour (mph).The current ADT is approximately 17,500 vehicles per day (vpd), while the forecast ADT for year 2035 is approximately 21,000 vpd.

The transitional section of OR 99 between the Medford and Phoenix urban areas remains similar to the South Medford segment but with some differences in adjacent land uses. The current ADT ranges from approximately 14,000 to 16,000 vpd, while the forecast ADT for year 2035 ranges from approximately 17,000 to 19,000 vpd.

There are seven improvement concepts in this segment, several of which have varying strategies to consider. A brief summary of the concepts are presented in Table 5-1 with concept locations identified in Figure 5-1. The following sections discuss in detail potential changes and improvements that are specific to this corridor segment.

Table 5-1. South Medford to Phoenix Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
1	Garfield St to Charlotte Ann Rd (MP 8.56-8.75)	Construct sidewalks along the west side of OR 99 with fencing to separate from the railroad tracks	Provide facilities along OR 99 for all modes of travel	Pedestrian
2	Garfield St to Phoenix North City Limits (MP 8.56-11.03)	Install roadway lighting at key locations	Enhance visibility and safety in corridor	Safety

Table 5-1. South Medford to Phoenix Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
3	Charlotte Ann Rd to Fern Valley Interchange Project Boundary (MP 8.75-11.04)	Modify roadway cross section to better serve bicycles and pedestrians ▪ Option A: Modify striping of existing 5-lane roadway cross section to add bike lanes and construct continuous sidewalks ▪ Option B: Widen existing 5-lane roadway cross section to add bike lanes and construct continuous sidewalks	Provide facilities along OR 99 for all modes of travel	Roadway Segment
4	Spot Locations between Charlotte Anne Rd and Cheryl Ave (MP 8.75-11.11)	Install median islands ▪ Near Charlotte Anne Rd (MP 8.81) ▪ Near Alder St (MP 10.03) ▪ Near Birch St (MP 10.35) ▪ Near Northridge Terrace (MP 10.58) ▪ Near Walnut Way (MP 10.91)	Enhance safety for pedestrians crossing OR 99	Pedestrian
5	South Stage Rd (MP 9.79)	Modify traffic signal timing ▪ Add clearance intervals to traffic signal ▪ Provide protected left-turn phases on South Stage Rd	Address existing safety concerns	Safety
6	Northridge Terrace (MP 10.58)	Improve turning radius at Northridge Terrace	Address existing safety concerns	Safety
7	North of Rose St to 42nd Ave (MP 10.84-10.98)	Reduce the number of conflicting turning movements: ▪ Close residential access (west side) at MP 10.84 and connect to Rose St for access to OR 99 ▪ Close Park St (west side) at MP 10.92 (access OR 99 via 42nd Ave at MP 10.98) ▪ Close Royal Rd (east side) at MP 10.94 (access OR 99 via Walnut Way at MP 10.91) ▪ Close Acorn Ave (east side) at MP 10.94 (access OR 99 via Walnut Way at MP 10.91)	Address existing safety concerns	Safety

5.4.1. Concept 1 – Garfield Street to Charlotte Anne Road

Currently, sidewalks are present on the east side but not present on the west side of this segment. There is no highway-facing development on this segment and the railroad tracks create a barrier to development further west. However, there is a transit stop on the west side of OR 99 opposite Charlotte Anne Road with no connecting pedestrian facilities.

Concept 1 would construct sidewalks along the west side of OR 99 with fencing to separate it from the railroad tracks.

Concept 1 – Traffic Operations and Safety

Sidewalks would improve safety of pedestrians along the corridor and access to the existing transit stop. A fence would be located between the sidewalk and railroad tracks to separate pedestrians from rail traffic and discourage them from crossing the tracks.

Concept 1 – Basic Roadway Geometries and Right-of-Way Requirements

Existing curbs and drainage are in place already so Concept 1 would construct 6-foot sidewalks adjacent to the curb. Fencing would provide a barrier between pedestrians and the adjacent railroad tracks.

Concept 1 – Environmental and Land Use Assessment

No environmental or land use impacts.

Concept 1 – Cost Opinions

The cost for this concept is estimated at $165,000.

5.4.2. Concept 2 – Garfield Street to Phoenix North City Limits – Add Roadway Lighting at Key Locations

Roadway lighting provides increased visibility for all modes and helps minimize conflicts between modes. While some street lighting exists in the corridor, Concept 2 would install additional lighting at key locations between Garfield Street and the Phoenix north city limits (MP 8.56-11.03) to improve safety. Specific locations have not been identified but lighting should be considered at transit stops and higher volume unsignalized intersections.

Concept 2 – Traffic Operations and Safety

Lighting can improve safety at locations where there are likely conflicts between vehicles, pedestrians, and bicycles. The greatest benefits are offered where surrounding facilities currently provide little light across the roadway.

Concept 2 – Basic Roadway Geometries and Right-of-Way Requirements

Depending on the location of utility poles and other roadway features, some ROW impacts may exist.

Concept 2 – Environmental and Land Use Assessment

There are not any anticipated environmental or land use impacts associated with the proposed lighting improvements.

Concept 2 – Cost Opinions

The estimated cost of the proposed lighting improvements will be dependent on the number of locations identified and what other improvements might also be happening in the corridor.

Specific recommendations and cost opinions for additional illumination will be determined as the preferred concept is identified.

5.4.3. Concept 3 – Charlotte Anne Road to Cheryl Avenue – Add Bike Lanes and Sidewalks

The south Medford to Phoenix section of OR 99 is a typical five-lane urban arterial with a center left-turn lane, a posted speed 45 mph, limited bicycle facilities, and intermittent pedestrian facilities adjacent to the roadway.

Very few blocks have paved standard-width sidewalks and are generally limited to areas surrounding Garfield Street, South Stage Road, and new developments. The roadway concepts provide adjacent pedestrian facilities via ROW or easements. The majority of the pedestrian access in this segment is provided by narrow paths (gravel, dirt, and paved), parking lots, local circulation roads, or no path at all. For these sections, additional ROW or easements will be needed to provide a continuous pedestrian facility. In the locations where sidewalks are present, deterioration has been observed.

Currently, bicycle facilities along this segment of OR 99 are only located between Garfield Street and Charlotte Ann Road. This lack of bicycle facilities generally deters bike traffic, or forces users to ride along the edge of the outside travel lane. Bike lanes would clearly designate a lane for bicyclists on the roadway. It must be wide enough to allow a bicyclist to ride far enough from the edge of pavement to avoid debris and avoid conflicts with passing vehicles.

The purpose of this improvement concept is to provide facilities for all modes of travel along OR 99 from just north of Charlotte Anne Road (MP 8.75) to the improvements associated with the Fern Valley interchange (MP 11.03), as illustrated in Figure 5-2. This improvement concept has two separate cross section options to consider:

- **Option A**: Minimizes the associated impacts by restriping the existing roadway to provide narrower travel lanes to include bicycle lanes within the existing pavement width, while providing additional ROW (or easements) for sidewalks. This option would require a design exception.
- **Option B**: Meet design standards by widening the roadway and ROW to include bicycle lanes and sidewalks, while maintaining the current width of travel lanes.

Concept 3 – Traffic Operations and Safety

Current traffic demand in this segment ranges from 17,000 vpd at the north end in Medford and 14,000 vpd at the south end near Phoenix. The 2034 forecast demand is expected to range from 22,000 vpd in Medford to 19,000 vpd near Phoenix.

Concept 3, Option A would result in minor changes to vehicular capacity due to narrower travel lanes. The addition of 5-foot wide bicycle lanes would provide a clearly defined travel way for bicyclists, allowing enough space from passing vehicles to avoid conflicts. The addition of

continuous 6-foot wide sidewalks would improve safety and mobility for pedestrians while improving access to and attractiveness of transit. Narrower travel lanes would likely have a negligible change to vehicular safety, with a possibility of decreasing travel speeds. Even with reduced widths, the bike lane combined with the travel lanes would still provide a 27- to 28-foot "hole in the air" to accommodate specialized freight needs.

Concept 3, Option B: would not result in changes to vehicular capacity, as travel lanes would remain the same. The addition of 6-foot wide bicycle lanes would provide a clearly defined travel way for bicyclists, allowing additional space from passing vehicles to avoid conflicts. Similar to Option A, the addition of continuous 6-foot wide sidewalks would improve safety and mobility for pedestrians while improving access to and attractiveness of transit. The addition of bicycle lanes and sidewalks has potential to decrease vehicular travel speeds.

Concept 3 – Basic Roadway Geometries and Right-of-Way Requirements

Both options for Concept 3 add bicycle and pedestrian facilities to the existing roadway while maintaining existing number of vehicular travel lanes. The highway ROW in this segment is as wide as 100 feet at some locations but much of the segment appears to have only 70 feet of ROW, which is barely sufficient for the existing paved surface. The posted speed is 45 mph.

Concept 3, Option A would decrease lane widths from a 14-foot median and 12-foot travel lanes to a 12-foot median and 11- to 12-foot travel lanes. Five-foot wide bike lanes would be striped on both sides of the roadway. The paved roadway width would remain the same (66 to 72 feet wide). Six-foot sidewalks would also be constructed, where missing, or upgraded, where deficient on both sides of the roadway. At some locations, it may be necessary to have a narrower sidewalk because of the proximity of existing structure to the edge of pavement. The addition of sidewalks would require culvert extension in some locations. Up to 16 feet of additional ROW or easements would be required to provide sidewalks. Because of the narrowed lane widths, a design exception would be required for this concept. Consideration should be given to reducing the posted speed from 45 mph to 40 mph on the section with 11-foot travel lanes, as recommended in the Oregon Bicycle and Pedestrian Design Guide.

Concept 3, Option B would maintain 12-foot travel lanes and a 14-foot painted median, and increase the overall pavement width to 74 feet (from 66 to 72 feet) to include 6-foot bicycle lanes on both sides of the roadway. With the roadway widening, new curbs and 6-foot sidewalks would need to be constructed on both sides of the roadway. The increased pavement width and new sidewalks would require more extensive culvert extensions than required in Option A. Up to 20 feet of additional ROW would be required at some locations to accommodate pavement widening, although sidewalks could be accommodated in easements.

Concept 3 – Environmental and Land Use Assessment

Because the ROW is relatively narrow (70 feet) for much of the segment considered with this concept, many of the buildings are now located very near the existing edge of pavement.

Concept 3 – Cost Opinions

The estimates for this concept with different cross-sections are:

- Concept 3, Option A: $3.5 million
- Concept 3, Option B: $9.7 million

The cost for Option A is considerably lower than Option B because it only includes pavement restriping and sidewalks while Option B widens the roadway and constructs new curbs and sidewalks. Neither of these costs includes utility relocation or acquisition of additional ROW. Costs associated with these elements would increase the gap between project costs for these cross-sections.

5.4.4. Concept 4 – Charlotte Anne Road and Cheryl Avenue – Install Median Islands

Protected crossing opportunities are primarily limited to the five signalized intersections in this 1.8 mile segment. Many of the signals are aligned with one or more transit stops. There are currently 9 bus stops along this segment of roadway which are not located at or near a signalized intersection. Most bus riders will need to cross the highway at either the beginning or end of a round trip made by transit (e.g., if a worker is traveling northbound in the morning, he or she would board the bus on the east side of the highway, but when they return from work on a southbound bus they will deboard on the west side of the highway).

Median islands would enhance safety for all users and provide transit users or other pedestrians with the opportunity to break up the crossing movement into two stages. In the first stage, the pedestrian would cross two lanes of traffic from the curb to the median refuge island. While waiting in the median, pedestrians can look for an opportunity to complete the second stage of the trip crossing from the refuge island to the curb on the other side of the highway. This two-stage process requires that the pedestrians only cross two lanes of traffic at a time with traffic traveling in only one direction.

Concept 4 would enhance safety for pedestrians crossing OR 99 at locations with a moderate to high crossing demand, such as near transit stops, or adjacent to large employers. Additional opportunities to cross OR 99 have been recommended near these five locations:

- Charlotte Anne Road (MP 8.81),
- Alder Street (MP 10.03)
- Birch Street (MP10.35)
- Northridge Terrace (MP 10.58)
- Walnut Way (MP 10.91)

These crossing locations are located near existing transit stops and would reduce the distance between crossing opportunities to approximately one-quarter mile. If a median island is installed at intersections, it could be considered part of the de facto crosswalks that are present

on any leg of an intersection and may or may not be striped. If a median island is to be located midblock, two options are available. It can be incorporated into other access management measures, where a striped pedestrian crosswalk does not need to be included with the improvement. However, if the sole purpose of the median island is to provide mid-block pedestrian refuge, it must be combined with a striped crosswalk and be approved by the State Traffic Engineer.

Pedestrian crossing demand has not been measured in the corridor; however, it is unlikely that all of these locations would have sufficient demand to warrant striped crosswalks. Therefore, any median island installation will need to be installed at an intersection where de facto crossings are assumed or as part of an overall access management plan for the corridor. An access management plan will be developed once a set of preferred corridor improvements has been identified. Access management medians will be considered as part of that plan and the pedestrian crossing benefits at these locations will be considered.

Concept 4 – Traffic Operations and Safety

There are no vehicular operation impacts associated with this concept along OR 99. The location of median islands would need to be coordinated with other future access management measures.

One collision involving a pedestrian, which resulted in injuries, was reported throughout this segment during a 5-year analysis period. The proposed improvements are targeted at locations where roadway attributes and environmental factors may contribute to future crashes. Depending on the exact location of the median islands, transit stop relocation may need to be considered.

Concept 4 – Basic Roadway Geometries and Right-of-Way Requirements

Median islands would be installed in the existing striped center median. They would need a 2-foot minimum shy distance from the adjacent travel lane. If implemented in the existing 14-foot center median, the median island could be 10 feet wide. If implemented in a reduced with median, as proposed under Concept 3, Option A, the refuge island could be 8 feet wide, which is the minimum width recommended in the Bicycle and Pedestrian Design Guide. There would not be any anticipated roadway or ROW impacts as a result of the proposed median island improvements.

Concept 4 – Environmental and Land Use Assessment

There would not be any anticipated environmental impacts associated with the conceptual median island improvements. Some land use impacts may result if the median islands are installed to limit access movements to right-in/right-out.

Concept 4 – Cost Opinions

The estimated cost of Concept 4 is approximately $50,000 per median island, which includes island installation and signage. Some cost savings could be incurred if several median islands are constructed concurrently.

5.4.5. Concept 5 – South Stage Road Intersection – Modify Traffic Signal Timing

The purpose of this improvement concept is to address existing safety concerns at South Stage Road, which have been identified by recent turning and angle collisions. Signal timing changes would include:

- Adding or increasing clearance intervals for appropriate traffic phases
- Providing protected left-turn phases on South Stage Road

Concept 5 – Traffic Operations and Safety

There have been five reported turning collisions and two reported angle collisions at South Stage Road during the analysis period from 2005 through 2009. The addition of all-red clearance intervals for all movements, and protected left-turn phases for the South Stage Road approaches would potentially decrease the number of angle and turning-related collisions. The signal timing changes may increase the overall v/c ratio for this intersection, but operations are still expected to meet OHP mobility standards in year 2035.

Concept 5 – Basic Roadway Geometries and Right-of-Way Requirements

The addition of left-turn phases would require installing additional signal heads for the South Stage Road approaches. The addition or extension of all-red clearance intervals would not require any infrastructure changes. There would not be any anticipated roadway or ROW impacts as a result of the proposed signal phasing improvements.

Concept 5 – Environmental and Land Use Assessment

There would not be any anticipated environmental or land use impacts associated with the proposed signal phasing improvements.

Concept 5 – Cost Opinions

The cost of the signal improvements in Concept 5 is estimated at$20,000.

5.4.6. Concept 6 – Northridge Terrace – Improve Turning Radius

The current geometric configuration of the ORR 99 at Northridge Terrace intersection requires vehicles making a northbound right turn to either decelerate to nearly a full stop or swing wide to turn, which can result in rear-end collisions. The purpose of this improvement concept is to enhance safety for turning vehicles, specifically in regards to the existing turn radius at the southeast corner of OR 99 and Northridge Terrace (MP 10.58).The improvement would reduce

the sharpness of the curve, allowing vehicles to maneuver the turn at a higher speed while remaining in the appropriate lane.

Concept 6 – Traffic Operations and Safety

Nine crashes were reported at this location in the 5-year analysis period, including two rear end collisions involving vehicles making the northbound right-turn movement. This location challenges driver because the corner turning radius is very tight.

Increasing the turning radius on the corner would improve safety by allowing vehicles to navigate the turn at a higher speed while remaining in the appropriate lane. There would be operational benefits for both the turning and through vehicles through reduced delays.

A northbound deceleration lane was also considered at this location but it would impact several residences and require closing the primary access to the Rogue Valley Mobile Village; therefore, this improvement was not evaluated further.

Concept 6 – Basic Roadway Geometries and Right-of-Way Requirements

The improvement would modify the southeast corner of the intersection to increase the turning radius. Because of an existing residence in close proximity to the corner, the turning radius can be improved from about 10 feet to about 25 feet without impacting the building, which can be considered acceptable for a low-volume, residential roadways. Some ROW take from this property would be required.

Concept 6 – Environmental and Land Use Assessment

This concept would impact property in the southeast quadrant of the OR 99 and Northridge Terrace intersection.

Concept 6 – Cost Opinions

The estimated cost of Concept 6 is approximately $125,000 without the cost of acquiring the ROW from the property on the corner.

5.4.7. Concept 7 – Rose Street to 42nd Avenue – Reduce Turning Conflicts

Sixteen crashes occurred along this segment of roadway within the 5-year analysis period, many of which were turning related. The purpose of this improvement concept is to enhance safety for turning vehicles, specifically in regards to the closely spaced access points from north of Rose Street to 42nd Avenue (MP 10.84-10.98). The proposed concept would:

- Close residential access (west side) at MP 10.84 and connect to Rose Street for access to OR 99
- Close Park Street (west side) at MP 10.92 (access OR 99 via 42nd Avenue at MP 10.98)
- Close Royal Road (east side) at MP 10.94 (access OR 99 via Walnut Way at MP 10.91)

- Close Acorn Ave (east side) at MP 10.94 (access OR 99 via Walnut Way at MP 10.91)

These modifications would address the high frequency of turning-related crashes in the area by concentrating where vehicles enter and exit the highway and reducing the potential for head on collisions.

Concept 7 – Traffic Operations and Safety

Sixteen crashes were reported during the 5-year analysis period, which were mostly turning-related collisions. Reducing the number of accesses would reduce the number of conflict points, thus reducing overall collision potential. As a result of the proposed modifications, traffic operations are anticipated to be smoother on both side streets and the mainline. At each location, relatively convenient alternative access routes are available, with potential to maintain the existing emergency and pedestrian access.

Concept 7 – Basic Roadway Geometries and Right-of-Way Requirements

Currently there are seven access points in a 750-foot segment of the highway, with close spacing adjacent to and across from each other. This proximity creates a high number of conflict points including several locations where traffic from opposing directions may enter the center median at the same location when trying to turn left from OR 99 into one of these accesses. The proposed concept would reduce the number of access points to three, and would only require a small portion of additional ROW north of Rose Street. This would allow the residential street immediately north of Rose Street to use Rose Street as its connection to OR 99.

Concept 7 – Environmental and Land Use Assessment

This concept would impact property in the northwest quadrant of the OR 99 and Rose Street intersection, but would impact structures.

Concept 7 – Cost Opinions

The estimated cost of Concept 7 is approximately $350,000 for the construction barriers and the new connection between the residential community and Rose Street. This estimate includes ROW acquisition in the northwest quadrant of the OR 99 and Rose Street intersection.

5.5. Phoenix Segment

Phoenix is the next community encountered along OR 99 and it extends from north of Fern Valley Road to north of Cabbage Lane. OR 99 transitions from a five-lane arterial (45 mph) north of Fern Valley Road to a downtown one-way couplet system (30 mph southbound, 40 mph northbound) and back to a four-lane arterial (40 mph). High density residential and commercial business parks are the primary use in the northern half of the segment. The downtown core of Phoenix serves mixed use and office/commercial development as well as the Bear Creek Greenway. OR 99 splits traffic through the downtown core via a couplet with two southbound lanes of traffic on N Main Street and two northbound lanes of traffic on Bear Creek

Drive. Part of the downtown core has been identified as a Special Transportation Area (STA), which allows for different access and performance measures to be applied. South of the Phoenix downtown core and couplet, OR 99 is a four-lane facility abutted by high-density residential and commercial land uses. Phoenix residents and businesses have access to I-5 at Interchange 24 via Fern Valley Road. The current ADT is ranges from 17,000 vpd just south of Fern Valley Road to approximately 10,000 vpd south of the couplet, while the forecast ADT for year 2035 is ranges from approximately 24,000 vpd to 14,000 vpd, respectively.

There are 12 improvement concepts in this segment, several of which have various strategies to consider. A brief summary of the concepts is presented in Table 5-2 with concept locations identified in Figure 5-3. The following sections discuss potential changes and improvements in detail that are specific to this corridor segment.

Table 5-2. Phoenix Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
8	Fern Valley Interchange Project Boundary to South End of Couplet (MP 11.33-11.93)	Relocate utility poles outside of the sidewalk area or widen sidewalks to provide a travel width of 6' around utility poles in coordination with other planned projects or new development	Enhance functionality of pedestrian facilities	Pedestrian
9	Downtown Phoenix at North (MP 11.37) & South (MP 11.93) Ends of Couplet	Add gateway treatments at the north and south end of the couplet to emphasize upcoming downtown area	Reduce travel speeds and enhance downtown environment	Safety
10	Downtown Phoenix on N Main St (MP 11.37-11.93)	Restripe existing 2-lane roadway cross section to add bike lanes and define parking areas	Provide facilities along OR 99 for all modes of travel and enhance downtown environment	Roadway Segment
11	Downtown Phoenix on Bear Creek Dr (MP 11.37-11.96)	Improve sight distance in corridor by removing some roadside foliage and relocating signs that restrict sight lines	Enhance visibility and address existing safety concerns	Safety
12	Downtown Phoenix on N Main St (MP 11.37-11.93)	Stripe crosswalks on the north side of intersection at 5th St, 4th St, 1st St, and Oak St ▪ Option A: Crosswalk striping only ▪ Option B: Curb extensions and crosswalk striping	Enhance opportunities to cross OR 99 and enhance downtown environment	Pedestrian
13	Bear Creek Dr at 4th and Oak Streets (MP 11.33-11.92)	Enhance connections to Bear Creek Greenway Trail to provide parallel and convenient bicycle and pedestrian facilities along Bear Creek Dr: ▪ North Connection: Pave connection from Greenway Trail to Bear Creek Dr at 4th St ▪ South Connection: Create a more direct multi-use path connection from Bear Creek Dr to Greenway Trail at Oak St	Provide facilities along OR 99 for all modes of travel	Pedestrian & Bicycle
14	Downtown Phoenix on Bear Creek Dr (MP 11.49-11.92)	Stripe crosswalks on south side of intersection at 4th St and Blue Heron Park entrance	Enhance opportunities to cross OR 99	Pedestrian

Table 5-2. Phoenix Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
15	Downtown Phoenix on N Main St and Bear Creek Dr at 4th St (MP 11.49)	Install pedestrian-activated crossing device such as the Rectangular Rapid Flashing Beacon (RRFB) with crosswalk striping (see Concepts 12 & 14 for additional guidance on locations of crosswalks)	Increase the safety of pedestrian crossings	Pedestrian & Safety
16	Downtown Phoenix on N Main St at Oak St (MP 11.85) and Bear Creek Dr at Blue Heron Park Entrance (MP 11.92)	Install pedestrian-activated crossing device such as the Rectangular Rapid Flashing Beacon (RRFB) with crosswalk striping (see Concepts 12 & 14 for additional guidance on locations of crosswalks)	Increase the safety of pedestrian crossings	Pedestrian & Safety
17	Bear Creek Dr @1st St (MP 11.68)	Add emergency vehicle traffic control signal with advanced warning along Bear Creek Dr at 1st St	Reduce response time and improve safety of emergency responders	Safety
18	South End of Couplet to South Phoenix City Limits (MP 11.96-12.36)	Modify roadway cross section to better serve bicycles and pedestrians ▪ Option A: Widen existing 4-lane roadway to include center median lane and bike lanes but minimize pavement cross-section and construct continuous sidewalks ▪ Option B: Widen existing 4-lane roadway to include standard center median lane and bike lanes and construct continuous sidewalks	Increase capacity, improve safety, and provide facilities along OR 99 for all modes of travel	Roadway Segment
19	South End of Couplet to Phoenix South City Limits (MP 11.96-12.36)	Install roadway lighting at key locations	Enhance visibility and safety in corridor	Safety

5.5.1. Concept 8 – Fern Valley Interchange Project Boundary to South End of Couplet– Address Utility Poles Obstructing Sidewalks

Currently there are sidewalks on both sides of N Main Street varying from 4 to 6 feet in width. Utilities poles are also located along this segment of roadway, often times in the middle of the sidewalk facilities. The ODOT standard for sidewalks is 6 feet with no obstructions, which allows two pedestrians (or someone in a wheelchair) to walk next to each other or pass each other in opposite directions. The Oregon Bicycle and Pedestrian Design Guide states that “at no point should the pedestrian zone be less than 4 feet wide at pinch points, such as around poles.”

The purpose of this concept is to enhance the functionality of the existing pedestrian facilities by addressing utility pole obstructions in the corridor over time. The obstructions could be addressed by either relocating the utility poles outside of the sidewalk or widening the sidewalk to provide a 6-foot clear pedestrian zone around the poles. If a 6-foot clear zone cannot be

provided because of building or other significant obstructions, a narrower zone (not less than 4 feet) could be provided.

Concept 8 – Traffic Operations and Safety

This concept would result in no changes to vehicular capacity along N Main Street. It would increase width of functional sidewalk and improve the safety for pedestrians by eliminating the need to travel on the roadway in order to pass around a utility pole.

Concept 8 – Basic Roadway Geometries and Right-of-Way Requirements

Although there are no changes within the roadway, sidewalks could be widened a few feet at certain locations. Relocation of existing utility poles behind the sidewalk or sidewalk widening could likely be accomplished within the existing ROW but an easement or ROW require might be needed at some locations. This improvement should be coordinated with other planned projects and new development.

Concept 8 – Environmental and Land Use Assessment

No environmental impacts have been identified for this concept, though adjacent properties may be impacted. City code modification/stipulations for light/utility placement may be needed.

Concept 8 – Cost Opinions

Costs for this concept will be incorporated into other infrastructure or development projects.

5.5.2. Concept 9 – Downtown Phoenix – Install Gateway Treatments

One of the comments received repeatedly during stakeholder and public meetings is that traffic doesn't slow down enough along the N Main Street/Bear Creek Drive couplet in downtown Phoenix. The purpose of this improvement concept is to cue drivers to reduce travel speeds and enhance the downtown environment by building awareness as vehicles enter the Downtown Phoenix area at the north (MP 11.37) and south ends of the (MP 11.93) couplet. This concept would add gateway treatments at both ends of the couplet to emphasize a change in the roadway environment. The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Concept 9 – Traffic Operations and Safety

The primary focus of this improvement is to increase driver's awareness of changing environments, while potentially reducing travel speeds and improving safety. Gateway features must be carefully designed to attract the driver's attention but not interfere with visibility of other vehicles or pedestrians and must accommodate the needs of freight traveling through the corridor.

Concept 9 – Basic Roadway Geometries and Right-of-Way Requirements

Improvements involved with this concept would be targeted within ODOT or City ROW, and would not have any anticipated impacts to the current roadway design.

Concept 9 – Environmental and Land Use Assessment

There would not be any anticipated environmental or land use impacts associated with the proposed gateway enhancements.

Concept 9 – Cost Opinions

The estimated cost of Concept 9 is approximately $100,000.

5.5.3. Concept 10 – Downtown Phoenix on N Main Street – Restripe Travel Lanes

Currently, N Main Street has a single stripe down the center of the road. On-street parking is permitted but when parking activity is low, OR 99 appears to have two 22-foot wide travel lanes. These wide travel lanes provide drivers with no visual cues that they are traveling in a downtown corridor or that they should be traveling at a slower speed than elsewhere in the corridor.

Concept 10 would restripe the existing roadway to maintain two 12-foot travel lanes, add a 5- to 6-foot bike lane on the west side of the roadway, and define the on-street parking lanes (7 feet) on either side of the roadway. The purpose of this improvement concept is to provide bicycle facilities along southbound OR 99 through downtown Phoenix (MP 11.37 to 11.93) and enhance the downtown environment. The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Concept 10 – Traffic Operations and Safety

This concept would not result in significant changes to intersection operations although the restriping may encourage slower travel speeds through downtown. The addition of a 5- to 6-foot bicycle lane would provide a clearly defined travel way for bicyclists, allowing enough space from passing vehicles to avoid conflicts and adequate clearance from vehicles parked on the side.

The proposed striping of the bike lane combined with the travel lanes would still provide a 30-foot “hole in the air” to accommodate specialized freight needs.

Concept 10 – Basic Roadway Geometries and Right-of-Way Requirements

Restriping the roadway would not require any roadway widening or ROW acquisition. The new roadway cross-section would include two 12-foot travel lanes with a 5- to 6-foot bike lane on the right (west) side of the through lanes, and 7-foot parking lanes on each side of the street. This option may require a design exception for the 7-foot parking lane widths.

Concept 10 – Environmental and Land Use Assessment

There would not be any anticipated environmental or land use impacts associated with this concept.

Concept 10 – Cost Opinions

The estimated cost of Concept 10 is approximately $50,000 for the pavement restriping.

5.5.4. Concept 11 – Downtown Phoenix on Bear Creek Drive – Improve and Maintain Sight Distance

The curvature of Bear Creek Drive means that drivers at the 1st Street and 4th Street approaches must look across some landscaped and natural areas to see oncoming traffic traveling northbound. While the roadway curvature makes it difficult to determine which lane an oncoming vehicle may be traveling in, summer foliage and a few signs can also interfere with sight lines in the corridor.

Concept 11 would maximize available sight distance in the corridor by removing some roadside foliage and relocating signs that restrict sight lines. There have been numerous angle- and turning-related collisions that may, in part, be attributed to limited visibility of oncoming traffic.

Concept 11 – Traffic Operations and Safety

There were 16 reported crashes along this segment between 1st and 4th Streets in the 5-year analysis period, mostly involving angle- and turning-related collisions. This concept would maximize the available sight line in the corridor to improve the visibility of oncoming traffic for drivers waiting at cross streets, and vice versa.

Concept 11 – Basic Roadway Geometries and Right-of-Way Requirements

There would not be any anticipated roadway or ROW impacts as a result of the proposed improvements; however, roadside foliage maintenance will be an ongoing effort and should be performed during seasons when trees and bushes are carrying leaves. Signs that may block sight lines will need to be identified and relocated. These may include both public and private signage in the corridor.

Concept 11 – Environmental and Land Use Assessment

The corridor includes scrub-shrub wetland west of the couplet that would be affected. Regulations generally allow trimming and tree removal with some restrictions regarding soil removal and the overstory that shades the stream.

Concept 11 – Cost Opinions

The estimated cost of Concept 11 is approximately $15,000.

5.5.5. Concept 12 – Downtown Phoenix on N Main Street – Enhance Crossing Opportunities

OR 99/N Main Street runs through downtown Phoenix, serving as both a through street and a local street for adjacent businesses. Community members rely on access to businesses, homes, school, work, and recreation on a daily basis yet there is only one marked crosswalk along N Main Street in the six block couplet, located on the south side of 3rd Street.

Concept 12 would add striped crosswalks on the north side of four of the remaining blocks (5th Street, 4th Street, 1st Street, Oak Street) of N Main Street as well as crosswalk along the side streets (for connection to N Main Street crossings). The purpose of this improvement concept is to improve opportunities to cross southbound OR 99 and enhance the downtown environment through the Phoenix couplet (MP 11.37-11.93). The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

This concept would provide additional marked crosswalks at:

- 5th Street
- 4th Street
- 1st Street
- Oak Street

Providing marked crosswalks requires meeting/exceeding minimum pedestrian thresholds along a facility under state jurisdiction. Currently the couplet is still under ODOT jurisdiction; however, the City of Phoenix expects to take over jurisdiction after the completion of the Fern Valley interchange improvements via a jurisdictional transfer.

This improvement concept has two options to consider:

- Option A - Crosswalk striping
- Option B - Curb extensions and striping to maximize the crosswalk visibility as vehicles approach.

Concept 12 – Traffic Operations and Safety

Both Options A and B would stripe crosswalks to identify the presence of pedestrian activity in the area and encourage pedestrians to cross where they are most visible to motorists turning from the side streets. The north side of each intersection is preferred because of the one-way southbound flow of traffic on N Main Street. Motorists at the side street approaches will be looking to the north for suitable gaps in the oncoming southbound traffic stream and they often fail to look to the south to see if the roadway is clear of obstacles (including pedestrians) before executing their turns. The addition of more frequent marked crosswalks would improve safety and mobility for pedestrians while improving access to local businesses, transit, and the Bear Creek Greenway Trail. Clearly defined and frequent crosswalks may encourage slower travel speeds through downtown.

The striping of the crosswalks themselves should have no impact on vehicular capacity since motorists are supposed to yield to pedestrians crossing the roadway even at intersection locations where a crosswalk is not striped. However, driver compliance may be greater with the striped crosswalks which may result in a negligible reduction in vehicular capacity.

Concept 12, Option B also includes curb extensions to shorten the crossing distance for pedestrians and increase visibility of pedestrians. With the striping improvements in Concept 10, curb extension of 5 to 6 feet could be installed which would reduce the overall crossing width from 44 feet to as little as 32 feet. The curb extensions may also provide the perception of narrower lanes with a possibility of decreasing travel speeds.

Note: Curb extensions could also be installed at other crossing locations without striping crosswalks.

Concept 12 – Basic Roadway Geometries and Right-of-Way Requirements

There would not be any anticipated roadway or ROW impacts as a result of the enhancements associated with the proposed enhanced crossing opportunities of Concept 12, Option A except for a short sidewalk connection which would be required on the east side of the 5th Street crossing location.

The curb extensions in Option B would require extending the raised surface 5 to 6 feet from the existing curb line for a length that can accommodate a 10-foot wide crosswalk. The transition to the curb on the parking side must facilitate parking maneuvers. Providing adequate drainage is a key element to successfully installing curb extensions. There would not be any ROW impacts as a result of the enhancements associated with Option B.

Concept 12 – Environmental and Land Use Assessment

The existing City of Phoenix zoning is City Center and the enhanced crossing would be consistent with the uses associated with that designation. There would be no environmental or natural resource impacts as a result of the enhancements associated with either Option A or Option B.

Concept 12 – Cost Opinions

The estimates for this concept are:

- Concept 12, Option A: $15,000
- Concept 12, Option B: $90,000

5.5.6. Concept 13 – Bear Creek Drive at 4th and Oak Streets – Enhanced Connections to Bear Creek Greenway Trail

Bear Creek Drive is constructed on fill that raise it above nearby Bear Creek and surrounding wetlands. The roadway has a 32-foot paved width with two 12-foot travel lanes and guardrail

on both sides of the roadway. Widening the roadway to add bike lanes or even sidewalks would be extremely costly as well as difficult because of the nearby natural resources.

The Bear Creek Greenway Trail runs parallel to Bear Creek Drive but existing trail connections do not facilitate its use for bicycle or pedestrian traffic on the east side of OR 99. At its north end, the trail connection is gravel. At the south end, users must travel out-of-direction into Blue Heron Park to access the trail. Blue Heron Park and the Greenway Trail are both subject to time of day usage restrictions which currently limit the viability of the trail as an adjacent route to northbound OR 99/Beak Creek Drive.

Concept 13 would enhance connections at each end of the couplet so that the Greenway Trail could effectively provide a convenient, parallel route to Bear Creek Drive. The northern connection would occur at 4th Street with paved access provided between the Greenway Trail and Bear Creek Drive. Sidewalks on the east side of OR 99 would also be added from the trail connection to link with the improvements associated with the Fern Valley Interchange. The southern access would occur at approximately the access to Blue Heron Park and include a more direct multi-use path from Bear Creek Drive to the Greenway Trail. Twenty-four hour access to this section of the trail would maximize the benefits of this improvement but even with nighttime usage restrictions, the trail connections would benefit most potential users. The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Concept 13 – Traffic Operations and Safety

There are no changes to the traffic operations along Bear Creek Drive. The connection and use of the multi-use trail would provide accommodations to modes currently not well served. The separation of bicyclists and pedestrians from vehicles in this area would improve safety for these users; though it will add travel time for the bicyclists compared to traveling along Bear Creek Drive.

Concept 13 – Basic Roadway Geometries and Right-of-Way Requirements

There would not be any anticipated roadway impacts as a result of the enhancements associated with the proposed connection the Greenway Trail. The northern connection would include a 12-foot paved surface at 4th Street between Bear Creek Drive and the Greenway Trail. Sidewalks would be 6 feet with new curb construction as well. The southern connection, at the Blue Heron Park entrance would also include a 12-foot paved surface. On the southern end, short retaining walls and protective railing would be needed to transition from the grade of the roadway to that of the Greenway. Currently, there is existing street lighting provided along Bear Creek Drive that spills over onto the path providing some illumination after sunset.

Concept 13 – Environmental and Land Use Assessment

The northern connection would not have any anticipated environmental or land use impacts associated with the proposed connection to the Greenway Trail. The southern Greenway Trail connection is though wetlands and would require mitigation.

Concept 13 – Cost Opinions

The estimated cost of Concept 13 is approximately $400,000.

5.5.7. Concept 14 – Downtown Phoenix on Bear Creek Drive – Enhance Crossing Opportunities

OR 99/Bear Creek Drive runs along the eastern edge of downtown Phoenix. There are no marked crosswalks along Bear Creek Drive effectively isolating the City of Phoenix from their local recreational opportunities at Blue Heron Park and the Bear Creek Greenway Trail.

Concept 14 would add striped crosswalks on the south side of Bear Creek Drive at two locations: 4th Street and the entrance to Blue Heron Park (adjacent to Oak Street). Additionally, crosswalks along the side streets that intersect Bear Creek Drive should also be striped for connection to Bear Creek Drive crossings. The purpose of this improvement concept is to improve opportunities to cross northbound OR 99 and enhance the downtown environment through the Phoenix couplet (MP 11.37-11.93). The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Providing marked crosswalks requires meeting/exceeding minimum pedestrian thresholds along a facility under state jurisdiction. Currently the couplet is still under ODOT jurisdiction; however, the City of Phoenix expects to take over jurisdiction after the completion of the Fern Valley interchange improvements via a jurisdictional transfer.

Concept 14 – Traffic Operations and Safety

Concept 14 would stripe crosswalks to identify the presence of pedestrian activity in the area and encourage pedestrians to cross where they are most visible to motorists turning from the side streets. The south side of each intersection is preferred because of the one-way northbound flow of traffic on Bear Creek Drive. Motorists at the side street approaches will be looking to the south for suitable gaps in the oncoming northbound traffic stream and they often fail to look to the north to see if the roadway is clear of obstacles (including pedestrians) before executing their turns. In the case of the crossing at the Blue Heron Park entrance, the crosswalk would likely connect to the existing refuge island that divides inbound and outbound traffic and connects the existing crosswalks across the park entrance.

The addition of more frequent marked crosswalks would improve safety and mobility for pedestrians while improving access to local businesses, transit, and the Bear Creek Greenway Trail. Clearly defined and frequent crosswalks may encourage slower travel speeds through downtown.

The striping of the crosswalks themselves should have no impact on vehicular capacity since motorists are supposed to yield to pedestrians crossing the roadway even at intersection locations where a crosswalk is not striped. However, driver compliance may be greater with the striped crosswalks which may result in a negligible reduction in vehicular capacity.

Concept 14 – Basic Roadway Geometries and Right-of-Way Requirements

There would not be any anticipated roadway or ROW impacts as a result of the enhancements associated with the proposed enhanced crossing opportunities. The crosswalk at the Blue Heron Park entrance would require some modifications to the existing median.

Concept 14 – Environmental and Land Use Assessment

The existing City of Phoenix zoning is City Center and the enhanced crossing would be consistent with the uses associated with that designation. Though wetlands are located adjacent to Bear Creek Drive, there would be no environmental or natural resource impacts as a result of the enhancements associated with the proposed enhanced crossing opportunities.

Concept 14 – Cost Opinions

The estimated cost of Concept 14 is approximately $50,000, which includes the crosswalks and reconstruction of the existing median at the entrance to Blue Heron Park.

5.5.8. Concept 15 – Install Pedestrian Activated Crossing Device-4th Street

The purpose of this improvement concept is to increase the safety of the pedestrian crossings along N Main Street and Bear Creek Drive at 4th Street, identified in Concepts 12 and 14. This improvement concept would install a pedestrian-activated crossing device such as the Rectangular Rapid Flashing Beacon (RRFB) in addition to the crosswalk striping. This device is activated by the pedestrian via a pushbutton. Activation triggers the advanced signage, if present, and then the yellow/amber rectangular light-emitting-diode (LED) lights that strobe (similar to an emergency vehicle). The lights are only activated when a pedestrian is present, but do not require the vehicles to stop. The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Providing marked crosswalks as well as installation of an RRFB requires meeting/exceeding minimum pedestrian thresholds along a facility. Currently, the pedestrian volume data is insufficient for this evaluation.

Concept 15 – Traffic Operations and Safety

The use of an RRFB increases driver awareness of when pedestrians are present at a crossing location. While there are other means to accomplish a similar level of awareness (flashing beacons or hybrid beacons), RRFBs have a higher compliance with vehicles stopping for pedestrians than a striped crosswalk alone or no crosswalk at all, which may result in a negligible reduction in vehicular capacity.

Concept 15 – Basic Roadway Geometries and Right-of-Way Requirements

Each intersection would receive two RRFB signs to be placed for the directional traffic. One sign would be placed on each side of the one-way roadway and synchronized to act together via interconnect. If desired, an overhead sign could be provided by a mast arm.

There would be no anticipated roadway or ROW impacts as a result of the proposed installation of pedestrian activated crossing devices.

Concept 15 – Environmental and Land Use Assessment

There would be no anticipated environmental or natural resource impacts as a result of the enhancements associated with the proposed installation of pedestrian activated crossing devices.

Concept 15 – Cost Opinions

The estimated cost of Concept 15 is approximately $25,000 dollars per pair of RRFBs, $50,000 total for this concept. The estimate includes a pair of signs at each intersection as well as interconnection to synchronize the signs. An overhead sign mounted on a mast arm would increase costs by approximately $50,000 per location.

5.5.9. Concept 16 – Install Pedestrian Activated Crossing Device-Oak Street/Blue Heron Park Entrance

The purpose of this improvement concept is to increase the safety of the pedestrian crossings at the intersections of N Main Street/Oak Street and Bear Creek Drive/entrance to Blue Heron Park, identified in Concepts 12 and 14. This improvement concept would install a pedestrian-activated crossing device such as the Rectangular Rapid Flashing Beacon (RRFB) in addition to the crosswalk striping. A description of the RRFB is provided in Concept 15.

Providing marked crosswalks as well as installation of an RRFB requires meeting/exceeding minimum pedestrian thresholds along a facility. Currently, the pedestrian volume data is insufficient for this evaluation. The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Concept 16 – Traffic Operations and Safety

The general benefits of the RRFB along with the negligible impacts to traffic flow are described in Concept 15. In addition to installing the RRFBs at the crosswalks, installation of advance signage with a third beacon for the traffic traveling northbound should be considered. The Blue Heron Park entrance is only ½ mile north of the Phoenix city limits where the posted speed transitions from 55 mph to 40 mph. Not all drivers make the speed transition immediately and many comments have been received through stakeholder and public meetings about northbound travel speeds coming into the couplet at Bear Creek Drive. This higher speed coupled with the roadway curvature may justify the additional beacon.

Concept 16 – Basic Roadway Geometries and Right-of-Way Requirements

As described in Concept 15, each intersection would receive two RRFB signs to be placed for the directional traffic. One sign would be placed on each side of the one-way roadway and synchronized to act together via interconnection. A third beacon is recommended with the

advance signage on the northbound approach to the Park Entrance because of the higher travel speeds and roadway curvature. If desired, an overhead sign could be provided by a mast arm.

There would be no anticipated roadway or ROW impacts as a result of the enhancements associated with the proposed installation of pedestrian activated crossing devices.

Concept 16 – Environmental and Land Use Assessment

There would be no anticipated environmental or natural resource impacts as a result of the enhancements associated with the proposed installation of pedestrian activated crossing devices.

Concept 16 – Cost Opinions

The estimated cost of Concept 16 is approximately $20,000 dollars per pair of RRFBs. A cost of $20,000 is also estimated for the advance beacon and interconnection on the northbound approach. Altogether, the estimated cost for this concept is $60,000. An overhead sign mounted on a mast arm would increase costs by approximately $50,000 per location.

5.5.10. Concept 17 – Bear Creek Drive at 1st Street – Install Emergency Vehicle Traffic Signal

The purpose of this improvement concept is to reduce response time and improve safety for emergency responders as they navigate the intersection of northbound OR 99/Bear Creek Drive and 1st Street (MP 11.68). The vehicles from the Fire District 5 station on 2nd Avenue must travel through this intersection to head northbound on OR 99. This concept would add an emergency vehicle traffic control signal at northbound OR 99/Bear Creek Drive and 1st Street with advanced warning signage and lights along Bear Creek Drive. This signal would only be activated by emergency response vehicles. The location of this concept, along with other downtown concepts, is illustrated in Figure 5-4.

Concept 17 – Traffic Operations and Safety

The Manual of Uniform Traffic Control (MUTCD) guidelines for emergency vehicle traffic control signal with advanced warning focus primarily on access points for emergency vehicle egress and provide little guidance on the applicability at a location several blocks from a fire station. Criteria outlined in the MUTCD must be assessed in further detail before installation and consultation and support from all levels of staff will be needed to move this project forward.

Factors to be considered for this type of signal include delay, traffic volumes, and safety. Currently, delays of 15 seconds are typical for traffic on 1st Street during busy traffic periods while delays are expected to almost double over the next 20 years. The roadway curvature of Bear Creek Drive makes it difficult for drivers stopped at 1st Street to determine which lane oncoming vehicles are using, which can add delay that is not easily accounted for in operational analysis.

The primary focus of this improvement is to improve emergency response time and safety for roadway users. Because the signal would only be activated by emergency response vehicles, there are no anticipated impacts to traffic operations. However, one safety concern about traffic signals with low activation rates is that they can have lower driver compliance because drivers get used to not stopping and become "blind" to the signal.

Concept 17 – Basic Roadway Geometries and Right-of-Way Requirements

Depending on the signal design, there may be some roadway or ROW impacts as a result of the proposed signal installation. Advance warning signage should be considered with installation of the signal.

Concept 17 – Environmental and Land Use Assessment

Depending on the signal design, there may be some environmental or ROW impacts as a result of the proposed signal installation.

Concept 17 – Cost Opinions

The estimated cost of Concept 17 is approximately $250,000.

5.5.11. Concept 18 –South end of Couplet to South Phoenix City Limits – Add Center Median, Bike Lanes, and Sidewalks

The southern section of the Phoenix segment along OR 99 is a four-lane arterial in an urban area with a posted speed of 40 mph and narrow shoulders. This section of roadway has no median and utilizes the shoulders for bicycle and pedestrian modes. There is a short section of roadway just south of the couplet that includes 10-foot shoulders, although the majority of the shoulder widths are narrow at just 2-foot. The inner travel lanes are 12 feet wide, while the outer lanes vary between 11 and 12 feet in width.

Concept 18 widens the roadway to five lanes providing a center median lane, bike lanes, and adjacent, continuous sidewalks to provide facilities for all modes of travel along OR 99 from the south end of the couplet (MP 11.96) to the Southern Phoenix City Limits (MP 12.36), as illustrated in Figure 5-5. For these sections, additional ROW or easements will be needed to provide continuous sidewalks.

This improvement concept has two separate cross section options to consider:

- **Option A**: Widen to five lanes including a median lane and bike lanes but minimize the pavement cross-section and construct continuous sidewalks.
- **Option B**: Widen the roadway and ROW to five lanes to include median, bicycle lanes, and sidewalks while meeting design standards.

Concept 18 – Traffic Operations and Safety

Current traffic demand in this segment ranges from 12,000 vpd at the south end of the Phoenix couplet and 10,000 vpd at the south Phoenix City Limits. The 2034 forecast demand is expected to range from 18,000 vpd in Phoenix to 15,000 vpd at the southern Phoenix City Limits.

Concept 18, Option A would result in an increase in capacity from the center median lane, which would reduce delay from left-turning vehicles, as well as some minor benefits due to uniform 12-foot travel lanes, an increase in some areas. The addition of 5-foot bike lanes would provide a clearly defined travel way for bicyclists, allowing enough space from passing vehicles to avoid conflicts. The addition of continuous 6-foot wide sidewalks would improve safety and mobility for pedestrians while improving access to and attractiveness of transit. The combination of the through travel lanes and bike lane would provide a 29-foot "hole in the air" to accommodate specialized freight needs.

Concept 18, Option B would have the same capacity benefits as Options A with a greater margin of safety associated with the wider median and bike lanes. The combination of the through travel lanes and bike lane would provide a 30-foot "hole in the air" to accommodate specialized freight needs.

Concept 18 – Basic Roadway Geometries and Right-of-Way Requirements

Both options for Concept 18 add a center median and bicycle and pedestrian facilities to the existing roadway while maintaining existing number of through travel lanes.

Concept 18, Option A would widen the existing paved surface from 50 feet to 70 feet in an urban section that includes curbs, drainage, and sidewalks. To minimize the impact of the roadway widening, 12-foot travel lanes, 5-foot bike lanes, and a 12-foot center median would be provided with the improvement. The widening would require extending existing culverts under the roadway. Up to 9 feet of additional ROW or easements would be required to provide sidewalks. Because of the narrowed bike and center median lane widths, a design exception would be required for this concept.

Concept 18, Option B would widen the existing paved surface from 50 feet to 74 feet in an urban section that includes curbs, drainage, and sidewalks. The roadway improvement would be a standard urban section with 12-foot travel lanes, 6-foot bike lanes, and a 14-foot center median. Up to 13 feet of additional ROW or easements would be required to provide sidewalks. The widening would require longer culvert extensions than Option A.

Concept 18 – Environmental and Land Use Assessment

The widening of the overall roadway cross-section will affect the adjacent businesses and parcels in the corridor.

Concept 18, Option A would have some potential impacts to adjacent properties (including parking areas), although there are no anticipated impacts to buildings. The proposed changes will likely require improved definition of access points in some areas.

Concept 18, Option B would have more extensive impacts to adjacent properties than Option A. As with Option A, the proposed changes will likely require improved definition of access points in some areas.

Concept 18 – Cost Opinions

The estimates for this concept with different cross-sections are:

- Concept 18, Option A: $2.3 million
- Concept 18, Option B: $2.5 million

Neither of these costs includes utility relocation or acquisition of additional ROW.

5.5.12. Concept 19 – South End of Couplet to Phoenix South City Limits – Add Roadway Lighting at Key Locations

Roadway lighting provides increased visibility for all modes and helps minimize conflicts between modes, as discussed in Concept 2. While street lighting is present in much of Phoenix, Concept 19 would install additional lighting at key locations between the south end of the downtown couplet and the Phoenix south city limits (MP 11.96-12.36) to improve safety. Specific locations have not been identified but lighting should be considered at transit stops and higher volume unsignalized intersections

The general benefits and impacts of street lighting were detailed in Concept 2. These considerations are the same for all corridors. The estimated cost of the proposed lighting improvements will be dependent on the number of locations identified and what other improvements might also be happening in the corridor. Specific recommendations and cost opinions for additional illumination will be determined as the preferred concept is identified.

5.6. Phoenix to Talent Transition Segment

The area between Phoenix and Talent is primarily farmland and supported by freight traffic along the OR 99 corridor. Some rural residential is also located along this segment. The roadway is a four-lane rural facility with a posted speed of 55 mph.

There are two improvement concepts in this segment, one of which has various strategies to consider. A brief summary of the concepts is presented in Table 5-3 with concept locations identified in Figure 5-6. The following sections discuss in detail potential changes and improvements that are specific to this corridor segment.

Table 5-3. Phoenix to Talent Transition Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
20	Phoenix South City Limits to Colver/ Suncrest Rd (MP 12.36-13.86)	Modify roadway cross section to better serve bicycles and pedestrians ▪ Option A: Widen existing 4-lane roadway to provide wider shoulders (6') and painted median (2') ▪ Option B: Widen existing 4-lane roadway to increase striped median width (4') and provide standard width shoulders (8')	Provide facilities along OR 99 for all modes of travel	Roadway Segment
21	Phoenix South City Limits to Colver/ Suncrest Rd (MP 12.36-13.86)	Install roadway lighting at key locations	Enhance visibility and safety in corridor	Safety

5.6.1. Concept 20 – Phoenix South City Limits to Colver/Suncrest Road – Widen Shoulders

The section of OR 99 between the South City Limits of Phoenix and Colver/Suncrest Road is a four-lane arterial through a rural area with a posted speed of 55 mph. This section of roadway has no median and shoulder widths are narrow at 2 feet for most of the segment, widening to 6 feet near the Colver/Suncrest Road intersection. The travel lanes are 12 feet wide for the majority of the section, though there are 14-foot lanes in the northbound direction just north of Colver/Suncrest Road. Because of the narrow shoulders, bicyclists (and pedestrians) must use the outer lane to travel through the area.

Concept 20 includes providing wider shoulders and some median separation for bi-directional travel, as illustrated. The concept would require additional ROW. The improvement concept has two separate cross section options to consider:

- **Option A**: Widen the pavement cross-section to include 6-foot shoulders and a 2-foot median separation for bi-directional traffic.
- **Option B**: Widen the pavement cross-section to include 8-foot shoulders and a 4-foot median separation for bi-directional traffic.

The existing cross-section and the two concept options are illustrated in Figure 5-7.

Concept 20 – Traffic Operations and Safety

Current traffic demand in this segment is approximately 10,000 vpd. The 2034 forecast demand is expected to be approximately 15,000 vpd. Nineteen collisions have been reported in this segment during the 5-year analysis period.

Concept 20, Option A would not result in changes to vehicular capacity, though safety would be improved with the increased median separation of the bi-directional traffic. A uniform 6-foot

shoulder width would provide a clearly defined travel way for bicyclists and pedestrian use. It would also provide space for vehicles to pull off the road in the event of a breakdown.

Concept 20, Option B would have similar capacity and safety benefits as Options A with a greater margin of safety associated with the wider median and shoulders.

Concept 20 – Basic Roadway Geometries and Right-of-Way Requirements

Both options for Concept 20 add a center median and wider shoulder widths to the existing roadway while maintaining the existing number of through travel lanes. The existing ROW varies between 70 and 130 feet, while the paved roadway width is approximately 50 feet (48 and 52 feet).

Concept 20, Option A would widen the existing paved surface from approximately 50 feet to 62 feet in the rural section. To minimize the impact of the roadway widening a 6-foot shoulder and 2-foot median would be provided with the improvement. The widening would require extending existing culverts under the roadway and relocating parallel culverts at access points along the road. Significant excavation for ditches would be needed. Although the existing ROW would be adequate to accommodate the wider roadway, additional ROW would be needed in some locations to include slopes and drainage. The ideal minimum ROW for Option A of this concept is 85-95 feet.

Concept 20, Option B would widen the existing paved surface from approximately 50 feet to 68 feet in the rural section. The roadway improvement would be a standard rural section with 12-foot travel lanes, 4-foot painted median and 8-foot shoulders. The widening would require longer culvert extensions than Option A, but other needs (relocation of parallel culverts and excavation) would be similar. The existing ROW could accommodate the roadway surface but additional ROW would be needed in some locations to include slopes and drainage. The ideal minimum ROW for Option B of this concept is 90-100 feet.

Concept 20 – Environmental and Land Use Assessment

The widening of the overall roadway cross-section would affect the adjacent business, parcels, existing Jackson County zoning (exclusive farm use-EFU), and some wetlands in the corridor. At milepoint 12.79, OR 99 crosses Phoenix Canal.

Concept 20, Option A could have some potential impacts to adjacent wetlands. The proposed changes need to take into consideration of the Statewide Planning Goals when impacting EFU zones.

Concept 20, Option B could have more extensive impacts to adjacent wetlands than Option A. As with Option A, the proposed changes need to take into consideration of the Statewide Planning Goals when impacting EFU zones.

Concept 20 – Cost Opinions

The estimates for this concept with different cross-sections are:

- Concept 20, Option A: $4.5 million
- Concept 20, Option B: $5.6 million

Neither of these costs includes utility relocation or acquisition of additional right of way.

5.6.2. Concept 21 – Phoenix South City Limits to Colver/Suncrest Rd – Add Roadway Lighting at Key Locations

Roadway lighting provides increased visibility for all modes and helps minimize conflicts between modes. No street lighting exists in this rural corridor. Concept 21 would install lighting at key locations between the Phoenix south city limits and the Talent north city limits (MP 12.36-13.86) to improve safety. Specific locations have not been identified, and are expected to be very limited, as lighting should only be considered at transit stops and higher volume unsignalized intersections

The general benefits and impacts of street lighting were detailed in Concept 2. These considerations are the same for all corridors. However, additional light in rural areas can be construed as a potential impact to surrounding development, which supports careful selection of additional light locations.

The estimated cost of the proposed lighting improvements will be dependent on the number of locations identified and what other improvements might also be happening in the corridor. Specific recommendations and cost opinions for additional illumination will be determined as the preferred concept is identified.

5.7. Talent Segment

The Talent segment extends from Colver/Suncrest Road to south of Creel Road. The northern end serves High-Density Residential and the Central Business District (CBD) while commercial uses along OR 99 are more linear and less densely developed in southern Talent. Between Colver/Suncrest Road and Rapp Road, OR 99 was recently improved to provide a five-lane facility with a two-way center left-turn lane or a raised landscaped median, a posted speed of 40 mph, and bicycle lanes and sidewalks are located on both sides. The improvements end south of Rapp Road and the facility tapers to four lanes. Talent residents and businesses have access to I-5 at Interchange 21 via West Valley View Road.

There are four improvement concepts in this segment, one of which has various strategies to consider. A brief summary of the concepts is presented in Table 5-4 with concept locations identified in Figure 5-8. The following sections discuss in detail potential changes and improvements that are specific to this corridor segment.

Table 5-4. Talent Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
22	Colver/Suncrest Rd to Rapp Rd (MP 13.86-14.59)	Upgrade or fill in missing sidewalks along OR 99	Complete pedestrian system on both sides of OR 99	Roadway Segment
23	Colver/Suncrest Rd through Creel Rd (MP 13.86-15.34)	Install roadway lighting at key locations	Enhance visibility and safety in corridor	Safety
24	W Valley View Rd (MP 14.20)	Modify traffic signal timing ▪ Add clearance intervals to traffic signal ▪ Provide protected left-turn phases on W Valley View Rd	Address existing safety concerns	Safety
25	South of Rapp Rd through Creel Rd (MP 14.71-15.34)	Continue 5-lane cross-section from Rapp Road through Creel Road	Provide facilities along OR 99 for all modes of travel and improve safety	Roadway Segment

5.7.1. Concept 22 – Colver/Suncrest Road to Rapp Road – Complete Sidewalk System

Currently there is ROW designated for sidewalks on both sides of OR 99 from Colver/Suncrest Road to Rapp Road. As development has occurred spot locations have been paved to standard sidewalk width while the remainder of the area is filled with dirt or asphalt. The purpose of this concept is to complete the pedestrian system on both sides of OR 99 by upgrading or filling missing sections.

Concept 22 – Traffic Operations and Safety

This concept would result in no changes to vehicular capacity along OR 99. It would upgrade the existing sidewalk and improve the safety for pedestrians.

Concept 22 – Basic Roadway Geometries and Right-of-Way Requirements

Sidewalk infill is the only improvement in this concept and would not require additional ROW.

Concept 22 – Environmental and Land Use Assessment

There are no environmental or land use impacts as part of this concept.

Concept 22 – Cost Opinions

The sidewalk infill is expected to occur over time as adjacent parcels develop or redevelop over time. Costs for this concept are assumed to be incurred by the developer.

5.7.2. Concept 23 – Colver/Suncrest Road through Creel Road – Add Roadway Lighting at Key Locations

Roadway lighting provides increased visibility for all modes and helps minimize conflicts between modes, as discussed with other concepts. While some street lighting exists along OR 99 in Talent, Concept 23 would install additional lighting at key locations (MP 13.86 to 15.34) to improve safety. Specific locations have not been identified but lighting should be considered at transit stops and higher volume unsignalized intersections.

The general benefits and impacts of street lighting were detailed in Concept 2. These considerations are the same for all corridors. The estimated cost of the proposed lighting improvements will be dependent on the number of locations identified and what other improvements might also be happening in the corridor. Specific recommendations and cost opinions for additional illumination will be determined as the preferred concept is identified.

5.7.3. Concept 24 – W Valley View Road Intersection – Modify Traffic Signal Timing

The purpose of this improvement concept is to address existing safety concerns at W Valley View Road, which have been identified by recent turning and angle collisions. Signal timing changes would include:

- Adding or increasing clearance intervals for appropriate traffic phases
- Providing protected left-turn phases on W Valley View Road

Concept 24 – Traffic Operations and Safety

There were eight reported turning collisions and three reported angle collisions at W Valley View Road during the analysis period from 2005 through 2009. The addition of all-red clearance intervals for all movements, and protected left-turn phases for the W Valley View Road approaches would potentially decrease the number of angle and turning-related collisions. The signal timing changes may increase the overall v/c ratio for this intersection, but operations are still expected to meet OHP mobility standards in year 2035.

Concept 24 – Basic Roadway Geometries and Right-of-Way Requirements

The addition of left-turn phases would require installing additional signal heads for the W Valley View Road approaches. The addition or extension of all-red clearance intervals would not require any infrastructure changes. There would not be any anticipated roadway or ROW impacts as a result of the proposed signal phasing improvements.

Concept 24 – Environmental and Land Use Assessment

There would not be any anticipated environmental or land use impacts associated with the proposed signal phasing improvements.

Concept 24 – Cost Opinions

The cost of the signal improvements in Concept 24 is estimated at$20,000. This cost assumes two new signal heads and use of the existing mast arms.

5.7.4. Concept 25 – Rapp Road through Creel Road – Continue 5-lane Cross-Section

OR 99 has already been widened to five lanes with bike lanes and sidewalks (primarily on the west side) from Colver/Suncrest Road through Rapp Road. ODOT has allocated funding to extend the five-lane section from Rapp Road through Creel Road and will be including the project in the STIP (Key Number 17478).

The prospectus for the project includes a 76-foot paved section with 12-foot travel lanes, a 16-foot center median, 6-foot bike lanes, and 6-foot sidewalks. Improvements at Creel Road will also include a southbound right-turn deceleration lane, a center median refuge island on OR 99 on the north side of Creel Road, and a traffic signal. Access management measures will also be a component of the project but are not defined at this time. The prospectus includes pavement preservation (grinding and overlay) from end of urban section south to connect with recent pavement improvements.

Concept 25 – Traffic Operations and Safety

The current ADT on this section of roadway is approximately 11,000 vpd and is expected to increase to about 16,000 vpd by the year 2034. Seventeen crashes occurred during the 5-year analysis period including 6 rear end collisions, 6 turning collisions, and 1 collision with a bicyclist that resulted in a severe injury.

The addition of a center lane for turning vehicles would both increase the capacity of this roadway segment as well as improve the safety of both through and turning traffic. The right-turn deceleration lane at Creel Road will have a similar benefit. A review of traffic volumes at Arnos Road indicates that a right-turn deceleration lane should be considered at that location as well.

Both pedestrians and bicyclists would also benefit from the improvements. Clearly defined travel ways will separate the bicyclist from higher speed through traffic. The sidewalks provide a safe area for pedestrian travel and access to local businesses. The median on the north side of Creel Road would provide a mid-street refuge for pedestrians even if the traffic signal is not installed.

A traffic signal is identified in the prospectus but existing volumes do not appear to meet warrants. The addition of a traffic signal has both benefits and impacts. Benefits include reduced side street delays and protection for turning movements onto the mainline roadway and pedestrian crossing, with fewer turning and angle collisions expected. The impacts are primarily to the mainline traffic where delays will increase and rear end collision rates typically go up as more vehicles are forced to stop.

Concept 25 – Basic Roadway Geometries and Right-of-Way Requirements

As described above, the project includes a 76-foot paved section with 12-foot travel lanes, a 16-foot center median, 6-foot bike lanes, and 6-foot sidewalks with additional improvements focused at Creel Road. It also includes pavement preservation from end of urban section south to connect with recent pavement improvements.

Arnos Road may also have additional improvements, specifically a right-turn deceleration lane. Additional roadway width and ROW may be needed.

Concept 25 – Environmental and Land Use Assessment

Existing City of Talent zoning is a mix of residential and industrial uses along the corridor. Most of the developed properties will benefit from the improved safety in the corridor but some property impacts (including parking) are expected with the widening. No building impacts appear likely. Better access definition will be part of the improvements as well, which may include turn restriction for some private accesses.

Additional ROW at some locations would be needed.

Concept 25 – Cost Opinions

The prospectus has an estimate of $3.1 million which includes ROW acquisition.

5.8. Talent to Ashland Transition Segment

The area between Talent and Ashland is primarily rural in nature with forest and commercial land uses. The roadway is a rural four-lane highway with a posted speed of 55 mph. At the intersection with South Valley View Road, OR 99 begins the transition from a rural to urban arterial with a speed reduction to 45 mph and a five-lane cross-section. South Valley View Road also provides access to I-5 at Interchange 19.

There are four improvement concepts in this segment, some of which have varying strategies to consider. A brief summary of the concepts is presented in Table 5-5 with concept locations identified in Figure 5-9. The following sections discuss in detail potential changes and improvements that are specific to this corridor segment.

Table 5-5. Talent to North Ashland Transition Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
26	Talent South City Limits to Talent Ave (MP 15.45-16.26)	Modify roadway cross section to better serve bicycles and pedestrians ▪ Option A: Widen existing 4-lane roadway to provide wider shoulders (6’) and painted median (2’) ▪ Option B: Widen existing 4-lane roadway to increase striped median width (4’) and provide standard width shoulders (8’)	Provide facilities along OR 99 for all modes of travel	Roadway Segment

Table 5-5. Talent to North Ashland Transition Segment Improvement Concepts

ID	Location	General Description	Purpose	Category
27	Talent South City Limits to S Valley View Rd (MP 15.45-17.02)	Install roadway lighting at key locations	Enhance visibility and safety in corridor	Safety
28	Talent Ave Intersection (MP 16.26)	Provide a northbound left-turn lane and an island just north of Talent Ave to serve as a refuge for pedestrians crossing the highway	Improve safety of all travel modes and connect to Bear Creek Greenway Trail	Safety
29	Talent Ave to Bear Creek Greenway Trail Connection (MP 16.26-16.38)	Provide multi-use path on east side of OR 99 connecting Talent Ave crossing to Bear Creek Greenway Trail	Provide facilities along OR 99 for all modes of travel	Roadway Segment
30	Talent Ave to Entrance to Jackson Hot Springs (MP 16.26-16.92)	Modify roadway cross section to better serve bicycles and pedestrians - northbound from MP 16.26 to 16.38 (Greenway Trail) and southbound from MP 16.26 to 16.92 (entrance to Jackson Hot Springs) ▪ Option A: Widen existing 4-lane roadway to provide wider shoulders (6') and painted median (2') ▪ Option B: Widen existing 4-lane roadway to increase striped median width and provide standard width shoulders (8')	Provide facilities along OR 99 for all modes of travel	Roadway Segment
31	S Valley View Rd Intersection (MP 17.02)	Widen S Valley View Rd to provide dual westbound left-turn lanes at OR 99	Increase capacity and improve safety	Operational

5.8.1. Concept 26 – Talent South City Limits to Talent Avenue – Widen Shoulders

The section of OR 99 between the South City Limits of Talent and Talent Avenue is a four-lane arterial through a rural area with a posted speed of 55 mph. The travel lanes are 12 feet wide with narrow 1-foot shoulders. Because of the narrow shoulders, bicyclists (and pedestrians) must use the outer lane to travel through the area. Two collisions have been reported in this segment during the 5-year analysis period.

Concept 26 includes providing wider shoulders and some median separation for bi-directional travel. The purpose of the improvement is to provide facilities for all modes of travel. The improvement concept has two separate cross section options to consider, one of which may require additional ROW:

- **Option A**: Widen the pavement cross-section to include 6-foot shoulders and a 2-foot median separation for bi-directional traffic.

- **Option B**: Widen the pavement cross-section to include 8-foot shoulders and a 4-foot median separation for bi-directional traffic.

Concept 26 – Traffic Operations and Safety

Current traffic demand in this segment is approximately 10,000 vpd. The 2034 forecast demand is expected to be approximately 13,500 vpd.

Concept 26, Option A would not result in changes to vehicular capacity, though safety would be improved with the increased median separation of the bi-directional traffic. A uniform 6-foot shoulder width would provide a clearly defined travel way for bicyclists and pedestrian use with the added benefit of connecting the urban section of OR 99 in Talent with the Bear Creek Greenway Trail opposite Talent Avenue. It would also provide space for vehicles to pull off the road in the event of a breakdown.

Concept 26, Option B would have similar capacity and safety benefits as Options A with a greater margin of safety associated with the wider median and shoulders.

Concept 26 – Basic Roadway Geometries and Right-of-Way Requirements

Both options for Concept 26 would maintain four 12-foot travel lanes while adding a center median and wider shoulder widths. The existing ROW varies between 95 and 120+ feet, while the paved roadway width is approximately 50 feet.

Concept 26, Option A would widen the existing paved surface from 50 feet to 62 feet in the rural section. To minimize the impact of the roadway widening a 6-foot shoulder and 2-foot median would be provided with the improvement. In order to avoid the steep slopes on the northeast side widening would need to occur to the southwest. The concept would involve significant ditch excavation, extensions of cross culverts and relocation of all parallel culverts. In addition to the increased paved width and culvert extensions additional ROW would be needed in some locations. The ideal minimal ROW for Option A of this concept is 85 to 95 feet.

Concept 26, Option B would widen the existing paved surface from approximately 50 feet to 68 feet in the rural section. The roadway improvement would be a standard rural section with 12-foot travel lanes, 4-foot painted median and 8-foot shoulders. Similar to Option A, widening would need to occur on the southwest side and ditch excavation, cross culvert extensions, relocation of parallel culverts, and additional ROW would be needed. The ideal minimal ROW for Option B of this concept is 90 to100 feet.

Concept 26 – Environmental and Land Use Assessment

The widening of the overall roadway cross-section would affect the adjacent parcels, existing Jackson County zoning (EFU), and wetlands in the corridor. Bear Creek runs parallel to OR 99 through this segment; however, the roadway crosses one tributary.

Concept 26, Option A would have some impacts to EFU land, but no impacts to Bear Creek. This concept needs to take into consideration the Statewide Planning Goals when impacting EFU zones.

Concept 26, Option B would have more extensive impacts to adjacent EFU land than Option A. As with Option A, the proposed changes need to take into consideration the Statewide Planning Goals when impacting EFU zones.

Concept 26 – Cost Opinions

The estimates for this concept with different cross-sections are:

- Concept 26, Option A: $2.9 million
- Concept 26, Option B: $3.6 million

Neither of these costs includes utility relocation or acquisition of additional right of way.

5.8.2. Concept 27 – Talent South City Limits to S Valley View Road – Add Roadway Lighting at Key Locations

As noted with other concepts, roadway lighting provides increased visibility for all modes and helps minimize conflicts between modes. No street lighting exists in this rural corridor. Concept 27 would install lighting at key locations between the Talent south city limits and the signalized intersection at S Valley View Road (MP 15.45-17.02) to improve safety. Specific locations have not been identified, and are expected to be very limited, as lighting should only be considered at transit stops and higher volume unsignalized intersections.

The general benefits and impacts of street lighting were detailed in Concept 2. These considerations are the same for all corridors. However, additional light in rural areas can be construed as a potential impact to surrounding development, which supports careful selection of additional light locations.

The estimated cost of the proposed lighting improvements will be dependent on the number of locations identified and what other improvements might also be happening in the corridor. Specific recommendations and cost opinions for additional illumination will be determined as the preferred concept is identified.

5.8.3. Concept 28 – Talent Avenue Intersection – Add Northbound Left-Turn Lane

OR 99 is a four-lane facility with a posted speed of 55 mph through the Talent Avenue intersection. Talent Avenue provides access to OR 99 for adjacent neighborhoods and the RVTD route #10. Additionally, an entrance to the Bear Creek Greenway Trail is located directly opposite Talent Avenue. Many modes converge at this intersection and need to be safely served.

Concept 28 would provide a northbound left-turn lane and add a median island on the north side of the intersection opposite the left-turn lane that could serve as a refuge for pedestrians

crossing the highway. The purpose of this concept is to provide improved safety for all modes and the connection to the Greenway Trail.

Concept 28 – Traffic Operations and Safety

Existing traffic volumes on OR 99 are about 9,000 vpd with future (2034) volumes estimated at 12,000 vpd. Adding the left-turn lane would increase the through capacity for this demand by separating the left-turning movements from the through movements. The left-turn lane criteria were evaluated and met for the northbound left-turn movement.

Two rear end collisions occurred at the intersection during the five-year analysis period. Both involved vehicles traveling northbound where one vehicle, slowing to make a left turn, was hit by a following vehicle. A left-turn lane would separate the left-turning vehicles from the through traffic and improve the safety of the intersection.

The median island would be installed on the north side lining up opposite the striped left-turn lane. It could provide a mid-street refuge and improve safety for pedestrians crossing the roadway. Pedestrian crossing demand was measured for a 16-hour period (no hour data) at this location resulting in 17 crossings; however, it is unlikely that this location would have sufficient demand to warrant striped crosswalks.

Concept 28 – Basic Roadway Geometries and Right-of-Way Requirements

The existing roadway width is 50 feet with the ROW varying between 95 and 120 feet. The northbound left-turn lane width would be 16 feet with an additional 8-foot shoulder widening (see concept 26) adding 24 feet to the overall pavement width. The median island would be provided on the southbound approach, opposite the northbound left-turn lane. The pavement width can be accommodated within the existing ROW; however steep slopes and topographic constraints may make the footprint of this concept much larger.

Concept 28 – Environmental and Land Use Assessment

Bear Creek is located to the northeast side of OR 99 through this section down a steep embankment. Significant excavation would be needed to construct the widening necessary for this concept. Existing Jackson County zoning in this area includes general commercial, rural residential and EFU. Statewide Planning Goals would need to be considered when impacting EFU zones.

Concept 28 – Cost Opinions

The estimated cost of Concept 28 is approximately $1.6 million and does not include ROW acquisition or utility relocation.

5.8.4. Concept 29 – Talent Avenue to Bear Creek Greenway Trail Connection – Add Multi-Use Path

The Bear Creek Greenway Trail runs immediately adjacent to OR 99 for almost its entire length between S Valley View to Talent Avenue. It veers away from the highway about 600 feet south of Talent Avenue as Bear Creek meanders away from the highway. Bicyclists (or pedestrians) traveling northbound on the trail who want to continue travel on OR 99 must wind downhill along the creek and then climb back up to grade on a trail connection at Talent Avenue. Southbound bicyclists (or pedestrians) who cross the highway to use the Greenway Trail must also travel downhill and then uphill again on the more circuitous route the Greenway access area.

Concept 29 would construct a multi-use path on the east side of OR 99 that connects from the trail access point opposite Talent Avenue approximately 600 feet to where the Greenway Trail connects back to the highway.

Concept 29 – Traffic Operations and Safety

The multi-use path would shorten the travel distance for bicyclists and pedestrians by about 300 feet. It would also reduce the grade differential between the Greenway Trail, where it departs from the OR 99 and Talent Avenue intersection because users would not be traveling downhill and then uphill again.

Concept 29 – Basic Roadway Geometries and Right-of-Way Requirements

Concept 29 would construct a 10-foot bi-directional multi-use path separated from roadway by minimum of 5 feet. It may require additional fill if the multi-use path is combined with northbound left-turn lane at Talent Avenue (Concept 28). The path may also result in reconstruction of some portion of the Talent Avenue connection to the Greenway Trail.

Concept 29 – Environmental and Land Use Assessment

The path would be constructed parallel to OR 99 and is not anticipated to have any land use or natural resource impacts.

Concept 29 – Cost Opinions

The estimated cost of Concept 29 is approximately $300,000 and does not include ROW acquisition or utility relocation.

5.8.5. Concept 30 – Talent Avenue to Entrance to Jackson Hot Springs – Widen Shoulders

The section of OR 99 between Talent Avenue and the entrance to Jackson Hot Springs is a four-lane arterial in a rural area with no median, narrow shoulders, and a posted speed of 55 mph. In the northbound direction bicyclists (and pedestrians) use the Bear Creek Greenway Trail while in the southbound direction they must use the outer travel lane because of the narrow 1-

foot shoulders. Four collisions have been reported in this segment during the 5-year analysis period.

Concept 30 includes providing a wider shoulder on sections of each side of the roadway in addition to median separation for bi-directional vehicular travel. In the northbound direction this concept is being considered between Talent Avenue and the Greenway Trail (MP 16.26 to 16.38) to provide a more direct route for users continuing northbound on OR 99 rather than winding downhill along the creek and then having to climb back up to grade on a trail connection at Talent Avenue. The southbound direction is considering a longer section for the shoulder widening concept, between Talent Avenue and the entrance to Jackson Hot Springs (MP 16.26 to 16.92).

The purpose of the improvement is to provide facilities for all modes of travel. The improvement concept (for either direction of travel) has two separate cross section options to consider, one of which may require additional ROW:

- **Option A**: Widen the pavement cross-section to include 6-foot shoulders and a 2-foot median separation for bi-directional traffic.
- **Option B**: Widen the pavement cross-section to include 8-foot shoulders and a 4-foot median separation for bi-directional traffic.

Concept 30 – Traffic Operations and Safety

Current traffic demand in this segment is 9,000 vpd. The 2034 forecast demand is expected to be approximately 12,000 vpd.

Concept 30, Option A would not result in changes to vehicular capacity, though safety would be improved with the increased median separation of the bi-directional traffic. A uniform 6-foot shoulder width would provide a clearly defined travel way for bicyclists and pedestrian use with the added benefit of connecting Talent Avenue to the Bear Creek Greenway Trail (northbound) and multi-modal facilities in the Ashland area (southbound). The additional shoulder width would improve safety and mobility for non-vehicular uses as well as improving access to and attractiveness of transit.

Concept 30, Option B would have similar capacity and safety benefits as Options A with a greater margin of safety associated with the wider median and shoulders.

Concept 30 – Basic Roadway Geometries and Right-of-Way Requirements

Both options for Concept 30 would maintain four 12-foot travel lanes while adding a center median and wider shoulder widths. The existing ROW varies between 80 and 270+ feet, while the paved roadway width is approximately 50 feet.

Concept 30, Option A would widen the existing paved surface from 50 feet to 62 feet where shoulder improvements are implemented on both sides of the roadway (Greenway Trail to Talent Avenue assumes both northbound and southbound shoulder widening). The roadway

cross-section would be only 56 feet wide where shoulder widening was limited to just the southbound direction. The concept would involve significant ditch excavation, extensions of cross culverts and relocation of all parallel culverts on the west (southbound) side of the roadway. The improvement on the east (northbound) side would have minimal excavation needs and no culvert impacts. The ideal ROW for Option A shoulder widening on both sides of the roadway is 85-95 feet.

Concept 30, Option B would widen the existing paved surface from approximately 50 feet to 68 feet for the short section of roadway with shoulder improvements on both sides. The roadway cross-section would be only 60 feet wide where shoulder widening was limited to just the southbound direction. Similar to Option A, widening would need to occur on the southwest side and ditch excavation, cross culvert extensions, relocation of parallel culverts, and additional ROW would be needed. The ideal ROW for Option B shoulder widening on both sides of the roadway is 90-100 feet.

Concept 30 – Environmental and Land Use Assessment

Existing Jackson County zoning is rural residential, open space reserve, or EFU. Bear Creek runs near OR 99 to the northeast.

Concept 30, Option A would have some impacts to EFU land, but no impacts to Bear Creek. This concept needs to take into consideration the Statewide Planning Goals when impacting EFU zones.

Concept 30, Option B would have more extensive impacts to adjacent EFU land than Option A. As with Option A, the proposed changes need to take into consideration of the Statewide Planning Goals when impacting EFU zones.

Concept 30 – Cost Opinions

Concept 30, Option A improvements are estimated at $200,000 for the northbound shoulder widening and $1.2 million for the southbound shoulder widening. The total cost opinion is $1.4 million.

Concept 30, Option B improvements are estimated at $300,000 for the northbound shoulder widening and $1.5 million for the southbound shoulder widening. The total cost opinion is $1.8 million.

Neither of these costs includes utility relocation or acquisition of additional right of way.

5.8.6. Concept 31 – S Valley View Road Intersection – Increase Capacity

The S Valley View Road intersection is expected to have operational issues in the future as demand in the area increases. Operational analysis indicates that dual westbound left-turn lanes on S Valley View Road are the most effective improvement to address operational deficiencies. This finding is consistent with conclusions in the RTP and the Jackson County TSP.

Concept 31 would widen the westbound approach of S Valley View Road to three lanes including dual left-turn lanes and a full-length right-turn lane. This improvement would require widening the bridge over Bear Creek that begins immediately east of OR 99. The RTP includes a similar project: Tier 2 (Unfunded) Project 940 - Realign Valley View Drive at OR 99 and replace the bridge. The Jackson County TSP includes the following project: Tier 1 Long Term Project 34 - Widening S Valley View Road to 5 lanes with bike lanes and sidewalks.

Concept 31 – Traffic Operations and Safety

With the additional turn lanes on S Valley View Road, operations would meet state mobility standards. Current operations would improve from a v/c ratio of 0.76 to a v/c ratio of 0.62. Future operations would improve from a v/c ratio of 0.87 to 0.62.

Improved operations may also result in fewer crashes as queues would be much shorter and traffic would flow more smoothly with fewer stopped vehicles. S Valley View approaches OR 99 on a structure that would need replacement to widen the roadway.

Concept 31 – Basic Roadway Geometries and Right-of-Way Requirements

Because of its proximity to Bear Creek, improvement to the S Valley View Road intersection with OR 99 is a far more complex project than typical intersection improvements. Any improvement at the intersection is likely to be part of a larger improvement along a longer portion of S Valley View Road that takes into account what is happening at I-5 Interchange 19, development in the surrounding area, and local network development. As noted above, projects that encompass these elements are already identified in the RTP and the Jackson County TSP. No additional geometric assessment has been prepared.

Concept 31 – Environmental and Land Use Assessment

Existing Jackson County zoning is open space reserve and EFU in the vicinity of the intersection and the S Valley View Bridge crosses Bear Creek and the Greenway Trail. Many environmental and land use issues would need to be addressed with improvements at this location.

Concept 31 – Cost Opinions

The RTP cost estimate for Project 940 (Realign Valley View Drive at OR 99 and replace bridge) is $20 million. The Jackson County TSP estimates Project 34 (Widening S Valley View Road to 5 lanes with bike lanes and sidewalks) at $8 million.

Attachments:

Figure 5-1. Concept Locations – South Medford and Transition to Phoenix Segments
Figure 5-2. Concept 3 – Location and Cross-Sections
Figure 5-3. Concept Locations – Phoenix Segment
Figure 5-4. Overview of Downtown Phoenix Potential Improvement Concepts
Figure 5-5. Concept 18 – Location and Cross Sections
Figure 5-6 .Concept Locations – Phoenix to Talent Transition Segment
Figure 5-7. Concept 20 – Rural Cross-Sections
Figure 5-8. Concept Locations – Talent Segment
Figure 5-9. Concept Locations – Talent to North Ashland Transition to Phoenix Segment