

# Transportation System Solutions Report: City of Vernonia Transportation System Plan Update

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COPIES: Vernonia TSP Update PMT and PAC

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This memorandum documents the transportation improvement alternatives that will be considered by the City of Vernonia Transportation System Plan (TSP) update technical team. The basis for these concepts came from a brainstorming session with the Project Management Team (PMT), were further refined at a Community Workshop held on January 13, 2011, discussed at the Community Briefing on February 16, 2011 and the Joint Planning Commission and City Council worksession on March 3, 2011.

## Introduction

This memorandum provides a range of alternatives for addressing deficiencies and needs identified in Technical Memo #2 (Existing Conditions and Deficiencies) and Technical Memo #4 (Future Conditions and Deficiencies). Per the scope of work, two packages of solutions were developed: a low-cost package of solutions and a high-cost package. These two packages were chosen because existing and future conditions analysis determined that the operation of the transportation system did not warrant capacity improvements. Long-term aspirational improvement alternatives were included in the high-cost package, while short- and medium-term improvement alternatives that are more likely to be funded in the short-term were included in the low-cost package. The PMT and Project Advisory Committee (PAC) will prioritize and determine appropriate time frames for implementation of the recommended solutions in the TSP update document, though some of the following projects include a discussion of priority related to other recommended projects.

Both packages include multimodal transportation improvement alternatives that would address existing and future needs and deficiencies. These potential projects are a result of school and business relocations, as prompted by floods and an increase in the City's commercial land inventory. Both packages also identify planning-level cost estimates, and potential funding sources.

The following alternatives were analyzed for potential environmental constraints, and impacts to Goal 5 resources (natural resources, scenic and historic areas, and open spaces). Before more detailed design and construction of the individual alternatives, additional surveying and environmental work may need to be completed.

## Consistency with Goals, Policies, and Plans

Alternatives were developed with the project goals, plans and policies in mind. An in-depth discussion of the applicable goals and policies is included in Technical Memorandum #1 (Goals, Policies, and Plans).

The applicable goals and policies from the 1999 TSP are noted below:

- Goal 2: Operation and Safety – Preserve and improve the function, capacity, level of service, and safety of the roadway system
- Goal 3: Transportation Alternatives – Support the use of other modes of transportation (bicycles, pedestrians, equestrians, and transit) through effective transportation improvements
- Goal 5: Finance – Use a sound fiscal approach to financing transportation system improvements.

Project goals for this TSP update include:

- Operation and Safety
  - Preserve and Improve the function, capacity, and level of service and safety of the roadway system
- Transportation Alternatives
  - Support the use of other modes, especially bicycles and pedestrians, including transit
  - Support Safe Routes to Schools programming and projects
  - Receive input on airport operations and expansion
- Finance
  - Create a sound fiscal approach to financing transportation system improvements

These goals will need to be included in the Vernonia Comprehensive Plan once the TSP update is adopted.

## Overview of Existing and Future Deficiencies and Needs

The analysis of existing and future transportation conditions showed that no expansion of State or City owned roadways was needed, because there are and would be no capacity or operational deficiencies. However, several city streets are in need of repair and maintenance, and the street network would benefit from better connectivity. City

street design standards are in need of revision to be consistent throughout the applicable standards documents, and should be modified to better reflect the existing street right-of-way widths, and the local character of the streets within the City. Some areas of Highway 47 and Bridge Street could be improved to increase sight distance and enhance safety. New sources of funding for street maintenance and upgrades need to be identified, and priorities determined for project funding.

Existing conditions, deficiencies, and needs in the City are included below:

### Land Use Inventory

- Most land in Vernonia is zoned residential.
- There are some buildable lands still available for development, mostly in residentially zoned areas, with some zoned light industrial.

### Traffic Operations

- All 10 study area intersections operate within State and City standards.
- There are currently no vehicle queues that exceed available storage capacity.
- There is little off-highway network connectivity throughout the city.
- The intersection of Rose Avenue/Bridge Street can be confusing for visitors.

### Bicycle and Pedestrian Facilities

- There is a bike lane for approximately one third of a mile along OR 47 within the City Limits. The highway lacks shoulders through central Vernonia between O-A Hill and Rose Street due to topographical constraints and on-street parking.
- Cyclists share the travel lane over Rock Creek and Nehalem River Bridges.
- Most local streets could be considered shared roadways due to their low speeds and low traffic volumes.
- There are some newly developed areas with sidewalks, though these are not always continuous.
- Downtown and adjacent streets have a connected network of sidewalks with pedestrian amenities.
- Maple Street, Cougar Street, and Weed Avenue are lacking sidewalks near the downtown area.
- O-A Hill is the main obstacle to east-west pedestrian movement within Vernonia; a sidepath along the south side of OR 47 is the only option for pedestrians
- There are very few sidewalks between O-A Hill and the Nehalem River.
- Mist drive north of Bridge Street does not have any dedicated pedestrian facilities.

A summary of the future conditions and needs is included below:

## Future Land Use

- With current zoning, the buildable land supply will be more than adequate to meet both residential and industrial land needs through 2031. However, the supply of buildable commercial land is not sufficient to meet the projected commercial land demand.
- Vacant Industrial land development is constrained by a lack of public facilities and services and the high cost to provide those services
- The alternative land use scenario would add 9 acres of commercial land to the Downtown (DT) commercial district. Under this scenario, the buildable land supply within Vernonia would be adequate to meet residential, commercial, and industrial land needs through 2031.

## Future Traffic and Transportation

- All study intersections are anticipated to operate within acceptable mobility standards in the Year 2031 PM peak hour.
- Several left turn lane warrants were met for eastbound and westbound left turn movements along Bridge Street. No right turn lane warrants were met at any study intersections for the PM peak hour.

Technical Memorandums 2 (Existing Conditions), 4 (Future Conditions), and 5 (Safe Routes to New Schools) provide additional details of existing and future conditions.

In addition to the existing and future needs described above, the City indicated that the street standards need to be revised to provide consistency between the public works standards and the previous TSP adopted in 1999. This TSP update will create consistent street standards for the City to use, supplanting the existing inconsistent standards.

Concurrent with the TSP update, the City and School District are in the process of constructing new elementary, middle, and high schools to replace the existing schools which are currently located within the floodplain. Part of the TSP process will suggest projects and programs to create safe routes to the new schools.

Both the updated street standards and the Safe Routes to Schools work will address bicycle and pedestrian facilities, with an emphasis on the network near the new school site.

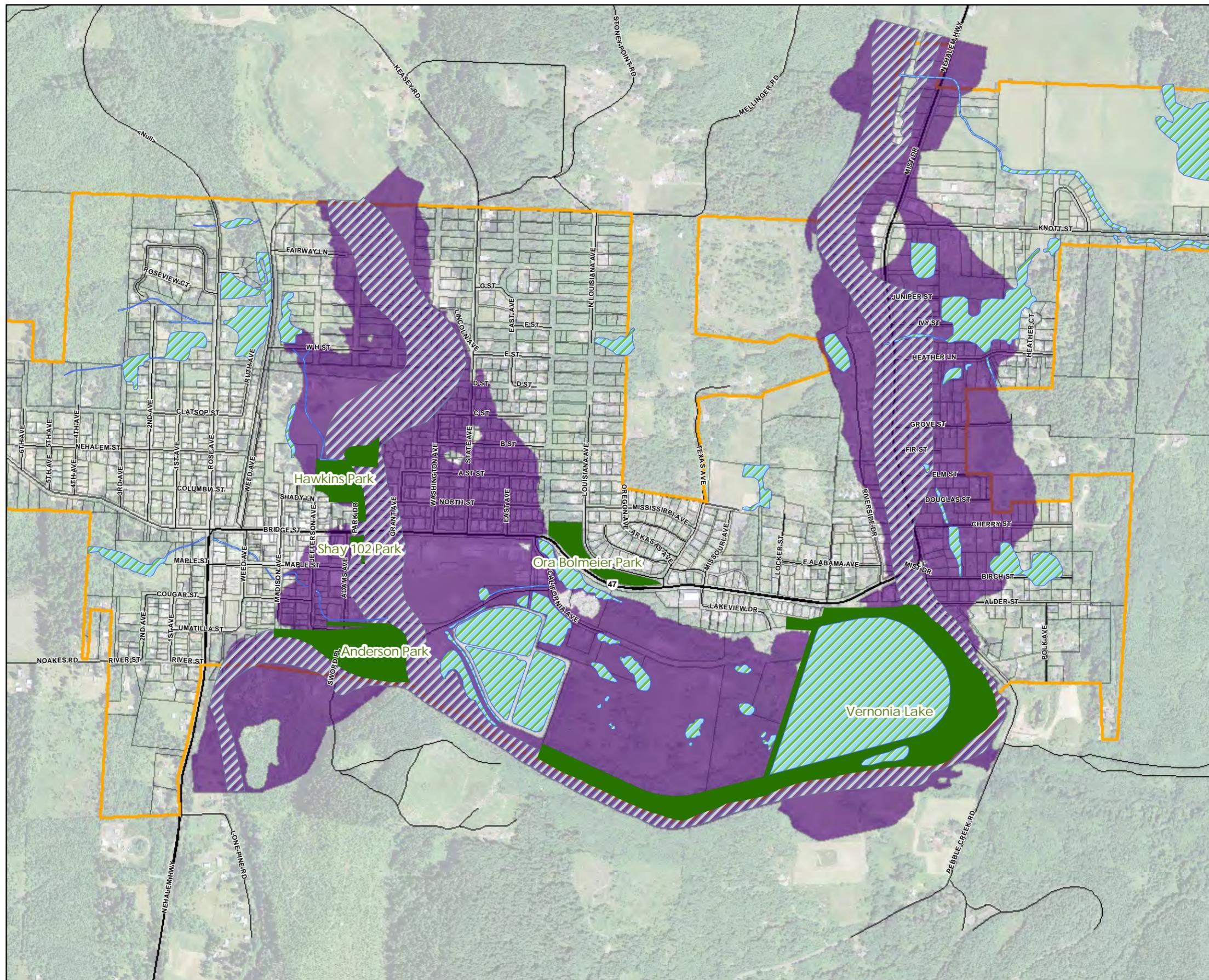
## Environmental Considerations

Potential Goal 5 resource impacts and environmental constraints in Vernonia are shown on Figure 1. Goal 5 resources include natural resources, parks, open spaces, historic buildings, and scenic vistas in the city. These include the Nehalem River, Rock Creek, Vernonia Lake, Anderson Park, Hawkins Park, Memorial, Pioneer, and Hall-Tipton cemeteries, and views along the Banks-Vernonia Trail. Environmental issues of concern are identical for both alternative packages. These concerns include changes to drainage flows resulting from transportation improvements that could contribute to flooding of roadways and other public lands and private properties. Hydraulic engineering for the designed improvements are anticipated to resolve these concerns. Environmental

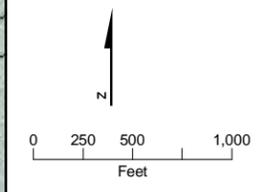
constraints affecting the development and implementation of transportation improvement projects in Vernonia include wetlands and floodplain scattered throughout the UGB, and topography such as O-A Hill and Corey Hill.

The floodplain and floodway are serious constraints within the City, including impacting the downtown core and the two bridges along OR 47. The 100 year floodplain and floodway encompasses the majority of Mist Drive north of Bridge Street.

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- LEGEND**
- Study Area
  - LocalWetlandsInventory2001
  - Parks
  - State Highway
  - Streets
  - 100 year Floodway
  - 100 Year Inundated
  - LocalWetlandsInventory2001



**FIGURE 1**  
**Goal 5 Resources**  
 Vernonia Transportation System Plan  
 City of Vernonia, Oregon

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## High-Cost Build Alternatives

Figure 2 identifies potential alternatives for the high-cost package. These high cost projects are in no particular order of priority or timing. Projects will be grouped into high, medium and low priorities along with suggested implementation timing for the TSP update document. High-cost alternatives include:

### 1. Widen OR 47 – Provide a Bicycle/Pedestrian Path on Both Sides

OR 47 along O-A Hill currently has a bicycle and pedestrian path along the south side on the outside of the guardrail. The highway is very narrow around O-A Hill, and with the current configuration, there is no room for pedestrians or bicyclists on the north side of the highway. This alternative would widen the highway, which would require improvements to the existing retaining wall and potentially some additional cutting into the slope north of the highway.

This alternative would reduce the number of times students and other bicyclists and pedestrians who live north of OR 47 would need to cross the highway to access sidewalks when walking or bicycling along OR 47/Bridge Street to the new school site off of Missouri Street. Currently students who live north of OR 47/Bridge Street would need to cross the highway a total of four times a day to access the sidepath on the south side of O-A Hill to get to and from school. This is out of direction and a potential safety issue as there is no formal crosswalk on the west side of O-A Hill. There will be a formal crosswalk on the east side of Missouri Avenue to access the new schools. Many students currently cross the highway at a diagonal or use the informal narrow path along the north side of the highway adjacent to the slope when walking to the current school site from east of O-A Hill.

Alternative 1 could affect trees on O-A Hill for the expansion of the highway and potential retaining wall on the north side. Impacts to trees will need to be considered during the design phase.

### 2. Create a Pedestrian and Bicycle Connection between California Avenue and Missouri Avenue

Improving California Avenue would provide an off-highway route for students south of OR 47 to get around O-A Hill to connect to Missouri Avenue. The right of way for California Avenue is currently platted, and part of the road currently exists, but it does not connect to Missouri Avenue. This alternative would connect the end of California Avenue to Lakeview Drive and Missouri Avenue as a pedestrian and bicycle path. There is a large change in elevation that will need to be addressed between the currently platted California Avenue and Bridge Street.

Alternative 2 could have some impacts on environmental resources. California Avenue is currently located within the 100 year inundated floodplain, and there are a number of wetlands on either side of the platted street.

### 3. Create Bicycle and Pedestrian Bridge over the Nehalem River

This project would create a new bicycle and pedestrian bridge over the Nehalem River north of Bridge Street. This would allow students who live near Mist Drive to cross the

river and access the new schools site without having to use the Green Bridge and the associated narrow pedestrian and bicycle facilities. This should also be connected with a bicycle and pedestrian path to link to other safe routes to school, providing a continuous and safe way for students to bicycle or walk to school. The narrowest part of the floodplain over the Nehalem River is in the vicinity of Alabama Avenue; however, further design and information is needed before an exact location is determined.

Alternative 3 could impact the floodway and floodplain, however, a bicycle and pedestrian bridge has different requirements than roadway bridges with respect to the floodplain.

#### 4. Connect Future Crown-Zellerbach Trail to the Banks-Vernonia Trail

This alternative would create an off-street shared-use path connection between the end of the Banks-Vernonia Trail near Vernonia Lake, and the future Crown-Zellerbach Trail to Scappoose that would enter Vernonia from the east. Rather than provide an on-street connection via OR 47/Mist Drive and Knott Street, this path connection would turn south from Knott along an existing power line alignment and cross the Nehalem River with the construction of a new bicycle and pedestrian bridge near Mist Drive and Polk Avenue. There are currently a number of organizations working to complete and connect the two trails. This project would coordinate with those groups to ensure that the two trails are able to connect.

Alternately, as houses are vacated and sold to the City on the east side of Mist Drive, it is possible to create a linear park north-south through the “tree streets.” The Crown-Zellerbach trail could connect to this linear park, and use the alignment to travel south to the Banks-Vernonia Trail.

Alternative 4 may have some environmental impacts to floodplain and wetlands, but the nature of the trail and the recreational use is not expected to have any significant impacts.

#### 5. Reconfigure the Mist Drive/Bridge Street Intersection

The current Mist Drive/Bridge Street Intersection is confusing for travelers, as most of the vehicles turn north to follow the highway. The existing intersection is configured as a “Y”, with a triangular curb area separating north and southbound traffic on Mist Drive south of the intersection with the highway. There are signs in the intersection, but they do not provide enough warning for drivers unfamiliar with the area to determine which direction is appropriate to follow the highway.

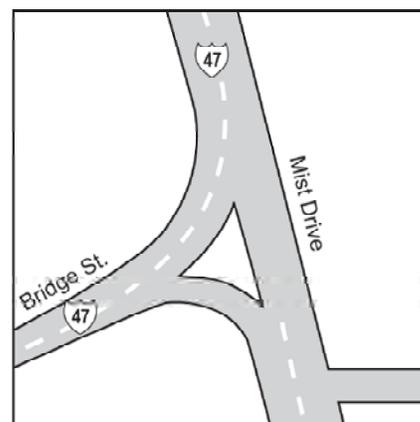
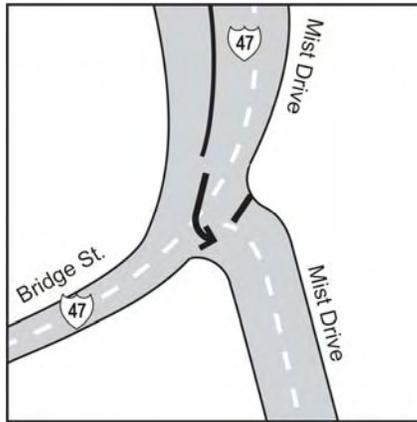


Exhibit 1  
Existing Bridge Street and Mist Drive Intersection



*Exhibit 2  
Intersection Alignment Alternative*

Reconfiguring the intersection would provide more certainty for all drivers and reduce confusion at this intersection.

This alternative would realign Mist Drive south of the highway, creating one connection with the northbound curve of the highway. This would provide certainty for drivers that the highway continues to the north, and Mist Drive south of Bridge Street is a local street. Exhibit 2 shows the approximate realignment.

Alternative 5 is located within the floodway and floodplain, but there are no additional environmental considerations.

## **6. Create a Bicycle/Pedestrian Connection to the New School from Riverside Drive**

This facility would connect the new Vernonia Schools site to Riverside Drive to the east with a new off-street shared use path. The school site plan already includes a path heading east from school property. This path would connect to the planned school path and allow students living in the future Nehalem View estates or along Riverside Drive to access the new school sites without having to walk along Bridge Street/OR 47. The path would extend down Riverside Drive towards Bridge Street. The intersection of Bridge Street and Riverside Drive was identified as a dangerous one for bicyclists and pedestrians trying to cross the highway. This crossing and the access to Vernonia Lake would need to be addressed when this project is implemented. This alternative could be implemented in phases to help reduce project costs, and tied to future development along Riverside Drive.

Alternative 6 could have some impacts to a wetlands area adjacent to the new schools; however, the nature of the bicycle and pedestrian connection would allow the design to minimize environmental impacts.

## **7. Potential Street Connections to Improve Connectivity**

There is limited connectivity both east-west and north-south throughout the City. Because of this, many local trips use OR 47 to reach various destinations throughout town. While there are currently no operational issues along the highway, providing options for traffic to use local streets as opposed to the highway would allow residents to bicycle and walk on local streets instead of OR 47. Providing a choice of routes for road users could decrease traffic on the highway and reduce pressure to widen the highway in the future. There are a number of places where connectivity improvements are being suggested, and all future connection designs are dependent upon further engineering and environmental studies. Potential connectivity improvements are described below:

### ***7a. North-South Pedestrian and Bicycle Connection East of Mist Drive***

This would connect the “tree streets” east of Mist Drive with a north-south trail or linear park connection. There is no City right of way platted in this area, but many of the houses east of Mist Drive have been or are actively being purchased by the City because they are located in the flood zone. Prior to construction, the City would need to coordinate the property buy-out, and determine where the path/linear park should be located.

Alternative 7a has a number of potential environmental considerations; the area is largely within the 100 year floodplain, and there are several identified wetlands within the approximate location of any north-south connection. The nature of the trail connection would minimize impacts to floodplains and wetlands.

***7b. East-West Road Connection North of Knott Avenue***

This connection would serve the future industrial land in the northeast of the City. The future street would provide an alternate access to the industrial parcel, and could connect to Knott Street. Development of this street connection could occur at the same time the industrial parcel develops. There are no platted streets in the vicinity, and any connection would require the City to obtain an easement or purchase right of way from adjacent landowners.

Alternative 7b would be partially located within the 100 year floodplain and could potentially impact wetlands or a small creek. During design, environmental considerations should be taken into account.

***7c. North-South Road Connection to Complete Louisiana Avenue***

Currently, Louisiana Avenue does not connect for through traffic between the northern and southern parts of the road. The connection is graveled and restricted to pedestrian use by large cement bollards, and there are approximately two blocks where the street does not go through. Opening the street to through traffic would allow those who live along Louisiana to have a choice when leaving the neighborhood, and would provide an alternate route to OR 47. During discussions with the PMT and PAC groups, this was identified as a low priority for the TSP update.

Alternative 7c could potentially impact documented wetlands, and there are additional topographical constraints to consider during design.

***7d. North-South Connection between Texas Avenue and Mellinger Road***

Currently, Texas Avenue ends at the Urban Growth Boundary (UGB) just north of the new school site. Mellinger Road is located to the north, along the northern UGB boundary. Connecting the two roads would allow additional access into the future Nehalem View Estates and could provide a northern connection to the new school site. There are a number of issues with this connection: it would require the road to be, in part, outside of the UGB, and would connect to a roadway that is largely outside of the UGB. Coordination with Columbia County would need to occur for this connection to be approved and constructed. There are no roads platted in this area, and the City would need to obtain an easement or purchase right of way from adjacent landowners.

This project could be phased depending on how and when the Nehalem View Estates are developed. Phase I would connect the development south to Texas Avenue. As more

houses are constructed in the development, the connection could be extended north to connect to Mellinger

Alternative 7d would be located outside of the City's UGB, and potentially in an area with topographical constraints. There are no identified potential environmental considerations associated with the potential roadway connection.

## 8. Potential Transit Improvements

During the first PMT/PAC meeting, the committee members discussed adding a formalized park and ride area. Currently the Columbia County Rider busses stop near City Hall to pick up riders, and there are no established stops within Vernonia.

Public transit improvements are dependent upon demand and funds available to Columbia County. Potential improvements include additional park-and-ride facilities. Park and ride facilities could be located near the former school sites or the former WOE site once those have been vacated, but will need to take into account floodplain restrictions. No cost estimate is provided for a park-and-ride lot, because it would likely use existing facilities.

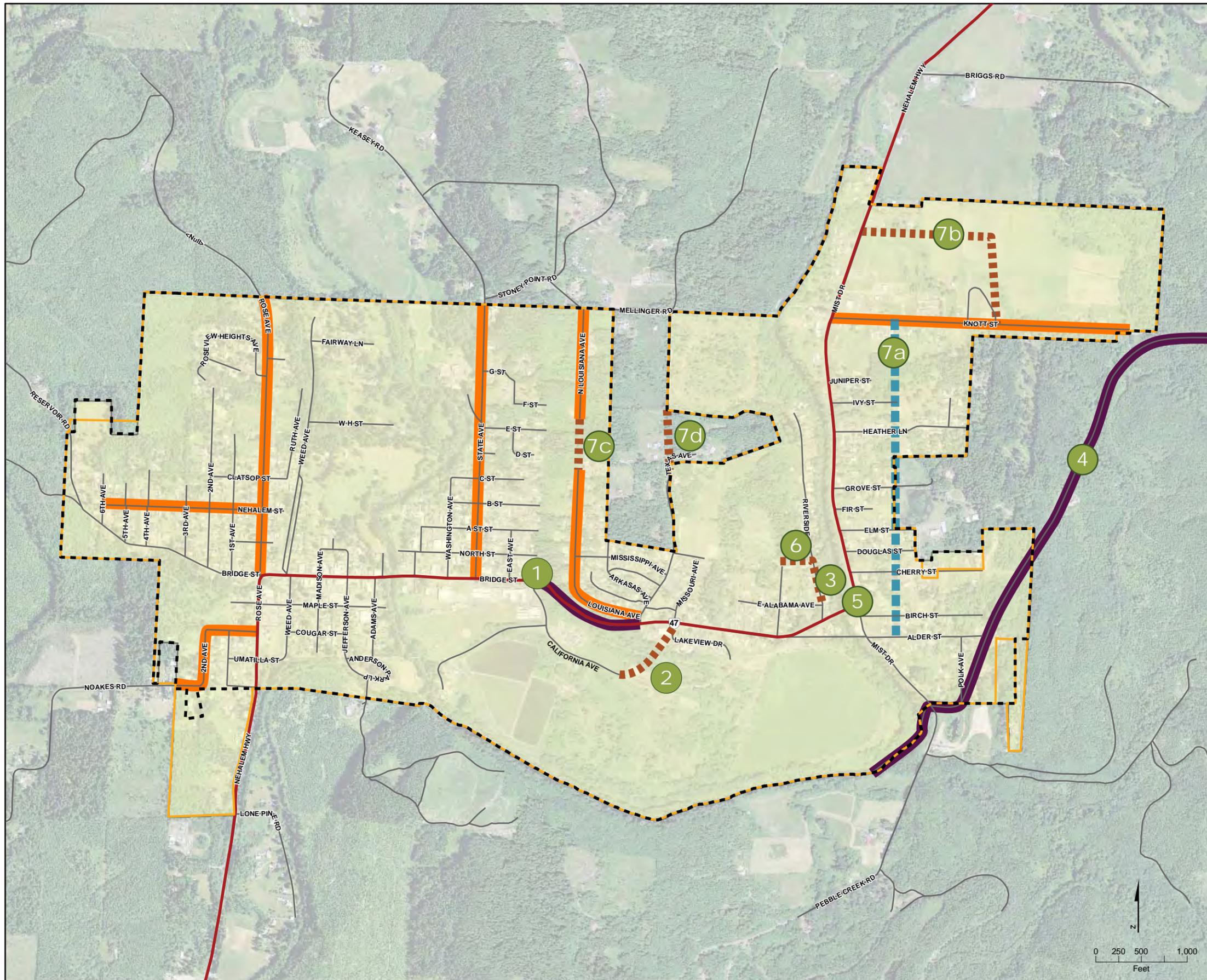
Alternative 8 could have environmental considerations depending on where the park-and-ride is located. One option would create a gravel parking area once the current schools are vacated.

## Other Recommendations

In addition to the physical improvements suggested above, the PAC and PMT recommended a further study of east-west connectivity between Weed Avenue and Ruth Street, and how to utilize the currently vacant railroad grade north of Bridge Street. There is little connection between Ruth and Weed and the surrounding neighborhood. The PAC and PMT expressed interest in studying further concepts to connect the area and provide alternate access to Bridge Street.

Table 1 lists the planning level cost estimates and potential funding sources for each alternative.

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- LEGEND**
- State Highway
  - Streets
  - City Limits
  - Urban Growth Boundary
  - Study Area
  - Collector Streets
  - Recommended Street Connections
  - Linear Park/Trail Through City-Owned Properties
- 1 Widen OR47; add bicycle/pedestrian path on both sides.
  - 2 Pedestrian and bicycle connection between California and Missouri Avenues.
  - 3 Add a dedicated bicycle/pedestrian bridge adjacent to the Green Bridge. Exact location to be determined.
  - 4 Connect future Crown-Zellerbach Trail to the Banks-Vernonia Trail.
  - 5 Reconfigure the Mist Drive/Bridge Street intersection.
  - 6 Create a bicycle and pedestrian connection to the new school from Riverside Drive.
  - 7 Potential Connectivity Improvements
    - 7a. Pedestrian/bicycle trail only. Could connect to the future Crown-Zellerbach Trail.
    - 7b – 7d. Roadway connections.

Note: Location of street and path connections are approximate and subject to design review process and environmental considerations

**High-Build (Long Term) Options**  
 Vernonia Transportation System Plan  
 City of Vernonia, Oregon

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TABLE 1  
Summary of High-Cost Alternatives  
Cost Estimates and Potential Funding Sources

Number	Alternative	Estimated Cost	Potential Funding	Comments
1	Widen OR 47, add bicycle and pedestrian path on both sides	\$8,463,000	ODOT Transportation Enhancements (TE), ODOT Modernization, ODOT Bicycle and Pedestrian Program	This alternative would require improving the existing retaining wall on the south side of the highway, and could require additional cut to the O-A Hill adjacent to the highway.
2	Create a Pedestrian and Bicycle Connection between California Avenue and Missouri Avenue	\$450,000	City System Development Charges, Local Improvement District (LID)	There is a difference in elevation between California Avenue and Bridge Street – this concept would need to address the height difference.
3	Create a bicycle/pedestrian bridge over the Nehalem River in the vicinity of Alabama Avenue.	\$1,689,000		
4	Connect Future Crown-Zellerbach Trail to Banks-Vernonia Trail	\$1,710,000	Oregon State Parks Recreational Trails Grant; Land and Water Conservation Fund; Urban Trails Fund; ODOT Transportation Enhancements (TE)	Cost estimate reflects 5,700 feet of 12' shared-use path and a 14' wide, 200' long prefabricated steel truss bridge.
5	Reconfigure the Mist Drive/Bridge Street intersection	\$369,000	ODOT Modernization, ODOT operations	This would "T" up the south leg of Mist Drive to the curve as Bridge Street transitions into Mist Drive. This would require a southbound turn lane onto southbound Mist Drive south of Bridge Street, and some widening of the highway on Mist Drive north of the intersection.
6	Create a Bicycle/Pedestrian Connection to the New Schools from Riverside Drive	\$230,000	Community Development Block Grants (CDBG); Developer Contribution; Local Improvement District (LID)	Cost estimate reflects 1,450 feet of 12' shared-use path. This follows the edge of the school lot from Riverside to Missouri, though the last segment near Missouri may be unnecessary, in future parking lot.
7a	Add a pedestrian/bicycle trail north-south east of Mist Drive/OR 47 to connect the "tree streets"	\$452,000	Oregon State Parks Recreational Trails Grant; Land and Water Conservation Fund; Urban Trails Fund; ODOT Transportation Enhancements (TE)	
7b	Add an east-west local street north of Knott Street to provide additional access to the light industrial parcel east of Mist Drive/OR 47	\$2,647,000		Would connect down to Knott Street
7c	Connect the north and south sections of Louisiana Avenue	\$358,000	City System Development Charges, Local Improvement District (LID)	Would improve the existing gravel
7d	Connect Texas Avenue to Mellinger Road at the north of the City's UGB	\$1,445,000		
8	Potential Transit Improvements –park and ride facilities	N/A	Transit System Advertising, ODOT Public Transportation Programs (Capital Investment)	Could use existing facilities, design and placement would need to consider ADA and floodplain requirements and restrictions.

Note: Costs are planning-level and do not include right of way acquisition. Alternatives are generally long-term.

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## Low-Cost Build Alternatives

Figure 3 identifies proposed alternatives for the low-cost build package. They include:

### A. Improve Signage at OR 47 and Rose Avenue

The intersection of OR 47 and Rose Avenue is confusing for visitors. The majority of traffic follows the highway and turns right at Bridge Street, and the green turn arrow indicates that it is free flow. A flashing red light requires northbound traffic to stop on Rose Avenue before proceeding through the intersection.

This alternative would increase the signage and visibility of the intersection, and would provide a visual cue for drivers that they need to turn right to follow the state highway.

Alternative A is not expected to have any significant environmental impacts.

### B. Improve Pedestrian Crossing at OR 47 – Access to Sidepath on O-A Hill

This project would improve crossing conditions for pedestrians and bicyclists accessing the current sidepath on the south side of OR 47/Bridge Street to traverse O-A Hill, which is a key route to the new Vernonia Schools site. The exact location of the crossing would need to be determined with input from the school and ODOT, as O-A Hill topography could impact speeds and safety at a crossing at the base of the hill.

Treatments for the crossing include new sidewalks along the north side of Bridge Street, new sidewalks to connect with the side path, a crosswalk, warning signage, and curb ramps.

Alternative B is not expected to have any significant environmental impacts.

### C. Add Sidewalk along OR 47/Mist Drive on the East Side

A sidewalk along the east side of OR 47/Mist Drive would provide a pedestrian connection to the Green Bridge for residents living on the east side of the Nehalem River. This is a lower priority as the pedestrian and bicycle path connecting the “tree streets” (Project 7a) is preferred by both the PMT and the PAC.

Alternative C would require adding pavement or asphalt along Mist Drive/OR 47 to construct a pedestrian sidewalk. Much of this section of the highway is located within both the 100 year floodway and floodplain.

### D. Add Sidewalks or Connect Existing Sidewalks and Bicycle Facilities along Collector Streets

Collector Streets within Vernonia include Knott Street, Louisiana Avenue, State Avenue, Rose Avenue north of Bridge Street, Nehalem Street west of Rose Avenue, and the Cougar Street connection to 2<sup>nd</sup> Avenue in the southwest part of the City. These collector streets do not have consistent sidewalks or bicycle facilities, but are meant to carry higher traffic volumes than local streets. It is important to ensure that they accommodate all users. These improvements are consistent with the recommended street standards that will be included in the TSP update and included below.

Many of the collector roads are located within the 100 year floodplain and improving these streets for bicycles and pedestrians could have environmental considerations;

however, the improvements are not expected to significantly impact environmental resources as the roadways already exist.

### **E. Add Bicycle and Pedestrian Connection between New Schools and Nehalem View Subdivision**

This facility would connect the new Vernonia Schools site to the Nehalem View residential development north of the school, with a new off-street shared use path. This project serves a similar purpose of connecting Texas Avenue to the Nehalem View Estates development (Project 7d). If the roadway connection is developed first, this project will take a lower priority, and should be reevaluated to see if it is needed.

Alternative E is not expected to have any significant environmental impacts.

### **F. Restricting Parking at Corners on OR 47**

Within the downtown core of Vernonia, between Rose Avenue and the Rock Creek Bridge, parking is allowed on both sides of Bridge Street/OR 47, though restricted at street corners by curb bulb-outs and yellow striping. However, the yellow striping is often ignored, and parked cars adjacent to the corners make it difficult to determine if there is oncoming traffic when attempting to pull out onto Bridge Street from a driveway or local road. Striping at corners, creating curbed bioswales, installing pavement bumps, or extending the curb bulb-outs would enforce no parking near street corners. This would increase the distance drivers are able to see, and would allow them to safely pull out onto the highway. Current public works standards restrict parking within 30 feet and 45 feet of the curb return on local and collector streets, respectively. There are no standards for parking at corners along Bridge Street/OR 47, the only arterial road within Vernonia. Restricting parking at corners along Bridge Street/OR 47 in the downtown core especially could reduce on-street parking. A parking inventory or study is recommended prior to implementation, working with local businesses to ensure adequate parking supply.

Alternative F is not expected to have any significant environmental impacts.

### **G. Safe Routes to School Connection Improvement Alternatives**

These improvement alternatives are targeted at areas near the new school site to help enhance the bicycling and pedestrian environment for students who live in Vernonia. Improvements include adding a 6 foot sidewalk on one side of the street with no dedicated curb or gutter. Specific streets are identified below for improvements:

#### ***G1. Safe Routes to School Connection – Alabama Avenue***

This project would create an improved bicycle and pedestrian route between the new schools site and Bridge Street near the Nehalem River Bridge. Currently Alabama Avenue is approximately 20 feet wide no dedicated bicycle or pedestrian facilities and a narrow shoulder. The street is a direct, lower traffic volume street for non-motorized users that avoids potential conflicts and higher traffic volumes on Bridge Street. The proposed 6 foot sidewalks on one side of the street would provide a separate area for students to walk and bicycle to school.

#### ***G2. Safe Routes to School Connection – Mississippi Avenue***

This project would create an improved bicycle and pedestrian route between the new schools site and Ora Bolmeier Park, accessing a soft-surface trail up O-A Hill. Currently Mississippi Avenue is approximately 20 feet wide no dedicated bicycle or pedestrian facilities and a narrow shoulder. The street is a direct, lower traffic volume street for non-motorized users that avoids potential conflicts and higher traffic volumes on Bridge Street. The proposed 6 foot sidewalks on one side of the street would provide a separate area for students to walk and bicycle to school.

### ***G3. Safe Routes to School Connection – Texas Avenue***

This project would create an improved bicycle and pedestrian route between the new schools site and Bridge Street. Texas is an alternate, parallel route to Missouri Avenue, and is a direct, lower traffic volume street for non-motorized users that avoids potential conflicts and higher traffic volumes on Missouri Avenue. Currently Texas Avenue is approximately 20 feet wide no dedicated bicycle or pedestrian facilities and a narrow shoulder. The proposed 6 foot sidewalks on one side of the street would provide a separate area for students to walk and bicycle to school.

## **H. Soft-surface Trail Improvement Alternative up O-A Hill**

This proposed trail would formalize the existing demand paths that run up and down the west side of O-A Hill between Ora Bolmeier Park and the ends of North Street and A Street. This project would eliminate steeper routes, mitigate erosion issues, and consolidate the existing paths into a single-track trail following a moderate slope up O-A Hill, with a spur connecting to the north side of Bridge Street across from California Avenue.

Alternative H could have impacts to the Ora Bolmeier Park; however, the nature of the soft-surface pedestrian connection would allow the design to minimize environmental impacts.

## **I. Designate Cougar Street East of Rose Avenue as a Collector Street**

Extend the existing Collector Street designation on Cougar Street east of Rose Avenue to Jefferson Avenue. Currently Cougar Street is only a collector on the west side of Rose Avenue. This project would change the designation of Cougar Street east of the highway to Jefferson Avenue. Collector Street standards would be applied to Cougar Street from 2<sup>nd</sup> Avenue to Jefferson Avenue.

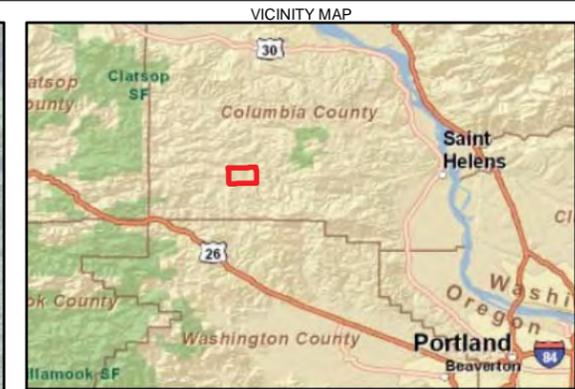
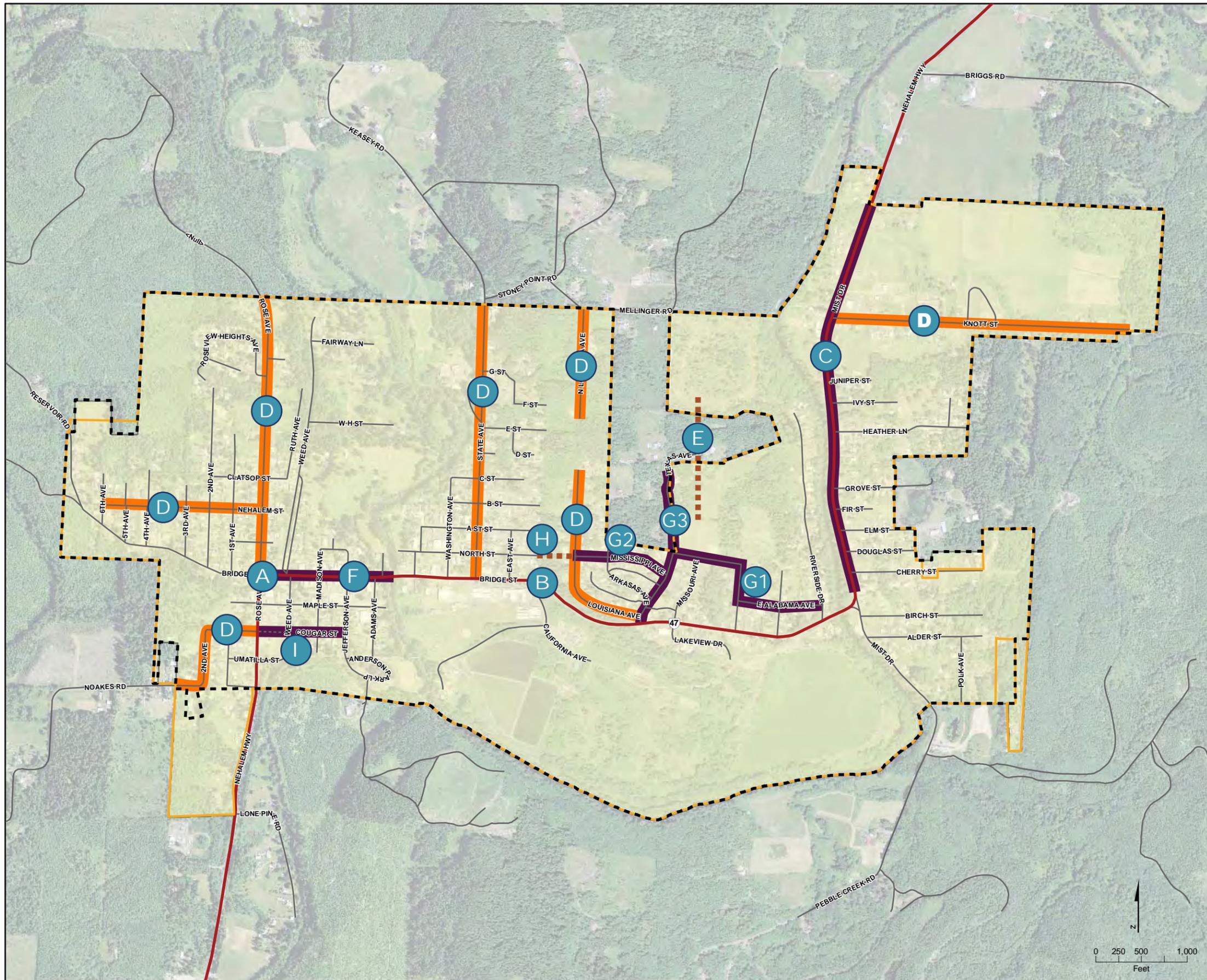
There are no anticipated environmental impacts or costs associated with this project. It is a designation change only.

## **Other Alternatives Considered**

One high-cost alternative considered but not carried forward was a couplet for traffic in the downtown area, using Maple Street and linking Bridge Street near or on California Avenue. This alternative would require significant property acquisition for the connection to OR 47, and it would cross into floodplain and across a creek to the east and south of the old schools site. Because this alternative would have major changes to the circulation and parking in the downtown area and along Bridge and Maple Streets,

this alternative would be more appropriately and thoroughly considered as part of revisions to the Downtown Plan at a later date.

Table 2 lists the planning level cost estimates and potential funding sources for each alternative.



**LEGEND**

- State Highway
  - Streets
  - City Limits
  - Urban Growth Boundary
  - Study Area
  - Collector Streets
- A** Improve signage at OR47 and Rose Avenue.
  - B** Improve pedestrian crossing at OR47 to access the side path on O-A Hill. Exact location to be determined.
  - C** Add sidewalk along OR47/Mist Drive (east side).
  - D** Add sidewalks or connect existing sidewalks along collector streets. Add bicycle facilities or shared lane markings.
  - E** Add bicycle and pedestrian connection between new schools and future Nehalem View development. Exact location to be determined.
  - F** Consider striping, longer curb bulb-outs, and/or bioswales to increase sight distance at corners in the downtown core.
  - G** Safe routes to school connection improvements (on Alabama Avenue, Mississippi Avenue, and Texas Avenue)
  - H** Soft-surface trail improvements up O-A Hill. Exact location to be determined.
  - I** Extend Cougar East of Rose Avenue as a collector street

**Low-Build (Short Term) Options**  
 Vernonia Transportation System Plan  
 City of Vernonia, Oregon

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TABLE 2  
Summary of Low-Cost Alternatives  
Cost Estimates and Potential Funding Sources

Letter	Alternative	Estimated Cost	Potential Funding	Comments
A	Improve signage at OR 47 and Rose Avenue	\$10,000	ODOT Transportation Enhancements (TE)	
B	Improve Pedestrian Crossing on OR 47/Bridge Street to Access O-A Hill Sidepath	\$50,000	Highway Safety Improvement Program; ODOT Statewide Transportation Improvement Program (STIP); ODOT Bicycle and Pedestrian Program; ODOT Transportation Enhancements (TE)	Cost estimate reflects 225' of 6' sidewalk with curb and gutter, two ADA-compliant curb ramps and crosswalk striping and signs.
C	Construct Sidewalk Along OR 47/Mist Drive	\$750,000	ODOT Bicycle and Pedestrian Program; ODOT STIP; ODOT TE	Cost estimate reflects 4,600' of 6' sidewalk with curb and gutter.
D	Construct Sidewalks and Bicycle Facilities on Collector Streets	\$5,480,000	Community Development Block Grant (CDBG); LID	Cost estimate reflects 29,800 feet of 6' sidewalk with curb and gutter, and 16,000 centerline feet of bike lanes in both directions (bike lanes assume existing adequate roadway width).
E	Bicycle/Pedestrian Connection From Vernonia Schools to Nehalem View Development	\$210,000	Community Development Block Grant (CDBG); Developer Contribution; LID	Cost estimate reflects 1,300 feet of 12' shared-use path.
F	Bridge Street signing and Striping, potential bioswales, concrete bumps or curb bulb-out extensions	\$13,000-\$15,000 each corner	ODOT Transportation Enhancements (TE); Highway Safety Improvement Program; ODOT Bicycle and Pedestrian Program;	Estimates are for each individual corner to provide flexibility (bioswales vs. curb extension). Eleven corners on Bridge Street are assumed to need this treatment: The southeast and southwest corner of Bridge Street at Weed Avenue. All four corners at both Madison Avenue and Jefferson Avenue intersections with Bridge Street, and the southwest corner of Bridge Street and Adams Avenue.
G1	Safe Routes to School Connection – Alabama Avenue	\$150,000	CDBG; LID	Cost estimate reflects 1,750 feet of 6' detached curbless sidewalk without drainage improvements.
G2	Safe Routes to School Connection – Mississippi Avenue	\$110,000	CDBG; LID	Cost estimate reflects 1,200 feet of 6' detached curbless sidewalk without drainage improvements.
G3	Safe Routes to School Connection – Texas Avenue	\$80,000	CDBG; LID	Cost estimate reflects 900 feet of 6' detached curbless sidewalk without drainage improvements.
H	Soft-Surface Trail Improvements up O-A Hill	\$60,000	Oregon State Parks Recreational Trails Grant; Land and Water Conservation Fund; Urban Trails Fund; ODOT Transportation Enhancements (TE)	Cost estimate reflects 2,250 feet of soft surface trail in difficult terrain.
I	Designate Cougar Street East of Rose Avenue as a Collector Street	N/A		This changes the roadway designation, does not require any infrastructure improvements.

Note: Costs are planning-level. Funding is constrained or probable. Alternatives are generally short- and medium-term.

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# Street Design Standards

## Existing Street Standards

There are no consistent street design standards for the City to use when new development is proposed within the City. The existing TSP has one set of standards, and the public works department has another. These standards are included in Appendix A. The TSP includes both urban and rural standards; a distinction that the PMT noted is a source of confusion and uncertainty for developers. The PMT suggested consolidating the standards and having a range of standards for collector and local streets depending on available width instead of maintaining the urban/rural distinction.

The rows highlighted in black with white text are the recommended standards. Some of the sidewalk and shared-use path standards are based on the existing right-of-way of the street: appropriate and flexible cross-sections are recommended to be consistent with the feel of the individual neighborhoods.

Current standards and the recommendations are as follows:

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**TABLE 3**  
 Current City of Vernonia Roadway Standards  
 Public Works and 1999 TSP Standards Comparison

Standard Source	Local Road	Collector Road	Arterial Road
Public works Standards - Parking	2 parking lanes No parking within 30' of curb return	2 parking lanes When bike lanes are present, the city can prohibit parking No parking within 45' of the curb return	no parking lanes
TSP Standards - Urban Parking	New Local - 5' both sides Preferred Retrofit - 6' One side	8' one side	8' both sides
TSP Standards - Rural Parking	None	6' One side	None
<b>Recommended Parking Standards</b>	<b>None for minimum gravel cross-section 8' one side for 40' right-of-way 8' both sides for 47' right-of-way</b>	<b>8' both sides, all right-of-way widths</b>	<b>Downtown Core – 8' both sides None outside of the downtown core</b>
Public works Standards - Sidewalks	5' residential 5' (40' R/W residential) 6' Commercial/Industrial	5' Residential 6' Commercial/Industrial	6'
TSP Standards - Urban Sidewalks	Preferred retrofit - 5' both sides Minimum retrofit - 5' one side	6' both sides	10' both sides (downtown), can be reduced to 6' both sides outside of downtown
TSP Standards - Rural Sidewalks	None	5' both sides	5' both sides
<b>Recommended Sidewalk Standards</b>	<b>11' shared-use path for 40' right-of-way Two 6' sidewalks for 47' right-of-way</b>	<b>8' shared-use path for 40' right-of-way 8' shared-use path and 6' sidewalk for 55' right-of-way</b>	<b>Minimum – 6' both sides Maximum – 12' both sides</b>
Public Works - Public street with a dedicated Bikeway	8'	8'	8'
TSP Standards - Urban Bikeways	None	5' both sides	5' both sides
TSP Standards - Rural Bikeways	None	5' both sides	5' both sides
<b>Recommended Bikeway Standards</b>	<b>None – See sidewalk standards for shared-use-path. On Local roads, bicyclists are assumed to be able to share the travel lane or use the shared-use path</b>	<b>None – See sidewalk standards for shared-use-path</b>	<b>6' both sides</b>
TSP Standards - Urban lanes	2 - 9'	2 - 10'	2 - 11'
TSP Standards - Rural lanes	2 - 9'	2 - 10'	2 - 12'
<b>Recommended Lane widths</b>	<b>2 – 8' for minimum gravel cross section 2 – 10' for 40' and 47' total right-of-way</b>	<b>2 – 10' for all right-of-way widths</b>	<b>2 – 12' travel lanes, and one 14' center turn lane</b>
TSP Standards - Total Pavement – Urban	28' - New local 24' Preferred Retrofit 18' Minimum Retrofit	38'	48'
TSP Standards - Total Pavement – Rural	18'	36'	24'
TSP Standards - Urban Unpaved Shoulders	5' both sides	None	None
TSP Standards - Rural Unpaved Shoulders	2' both sides	4' both sides	4' both sides
<b>Recommended Shoulders</b>	<b>2' for minimum gravel cross-section</b>	<b>None</b>	<b>None</b>

**TABLE 3**  
Current City of Vernonia Roadway Standards  
*Public Works and 1999 TSP Standards Comparison*

Standard Source	Local Road	Collector Road	Arterial Road
TSP Standards - Urban Planting Strip	New Local 5' both sides Preferred retrofit 5' both sides	5' both sides	None
<b>Recommended Planting Strips</b>	<b>None</b>	<b>6' Planter/Drainage for 50' right-of-way 8' Planter/Drainage for 55' right-of-way</b>	<b>Downtown core – 4' furniture zone, both sides. Can include street trees.</b>
TSP Standards - Urban ROW	New local - 50' Preferred Retrofit - 46' Minimum Retrofit - 25'	62'	70'
TSP Standards - Rural ROW	30'	62'	60'
<b>Available ROW</b>	<b>40' 47'</b>	<b>50' 55'</b>	<b>60' Minimum 75' Maximum</b>

Rows in Grey - Section 6.0000 – Streets City of Vernonia Public Works Design Standards  
From City of Vernonia Transportation System Plan, July 1999  
**Rows in black – TSP Update Recommended Standards**

## Existing Local Street Right-of-Way Widths

Table 4 shows the approximate right-of-way widths platted for City streets. New streets and streets undergoing upgrades would need to comply with the appropriate street standards in the TSP.

The following right-right-of-way widths were provided from City records:

TABLE 4  
City of Vernonia Local Street Widths

70'+	60'	50'	Less than 50'
Rose Avenue	A – I Streets	Idaho Avenue	Spencer Avenue
Weed Avenue (parts)	1 <sup>st</sup> -3 <sup>rd</sup> Streets	Alabama Avenue	All "tree streets" except Heather
	Washington Avenue	Texas Avenue	Riverside Drive
	Jefferson Avenue	Mississippi Avenue	Roseview Heights Avenue
	Madison Avenue	Arkansas Avenue	Cedar Street
	North Street	Louisiana Avenue – south segment	Ruth Avenue
	State Avenue	Fairway Lane	
	East Avenue	Heather Street	
	California Avenue	Columbia Street	
	Noakes Road /River Street	Nehalem Street	
	Umatilla Street	Clatsop Street	
	Cougar Street		
	Maple Street (parts)		
	Bridge Street (east of Rose)		
	Pebble Creek Road		
	Louisiana Avenue – north segment		
	Knott Street		

City of Vernonia, 2011, communication with City Planner, Carole Connell January 20, 2011.

## Recommended Street Standards

The updated standards were presented at the Community Workshop and subsequently refined based on feedback gathered at the open house and Community Briefing. The proposed street standards to simplify and provide consistency throughout the City are as follows.

## Arterial Roads (OR 47)

Currently, there are no operational issues, nor are there any future projected congestion or queuing issues on OR 47 through Vernonia. OR 47 starts as Rose Avenue from the southern city limits, continues along Bridge Street through most of downtown, and turns north along Mist Drive to the northern city limits. The highway is a two lane roadway through most of the City, with parallel parking on both sides through the downtown core (approximately Rose Avenue to the Rock Creek Bridge). The current cross section is adequate to serve existing and future needs. As part of the school relocation project, a turn lane will be added west of Missouri Avenue and extend almost back to the O-A Hill to provide an area for vehicles turning down Missouri Avenue to access the new school site.

The PMT suggested creating a cross section standard for OR 47 that includes a center two-way turn lane or a center median. This cross section would allow the City and State to require adequate right-of-way along the highway as development occurs and ensure that a center turn lane could be implemented as needed at a future date. A minimum (63-foot width) and maximum (75-foot width) three lane cross-section is shown in Figure 4.

A median was suggested by the PAC/PMT groups for the section of the highway along Rose Avenue in the southwest corner of the City. This would allow for traffic calming, provide a “gateway feature” to greet visitors coming to the City. The cross section would need to allow left turns at select cross-streets, and would be 14 feet in width.

Additionally, the Downtown cross-section was found in the Downtown Plan for Vernonia, and includes 8-foot parking on both sides, a 4-foot “street furniture” zone and a 6-foot sidewalk. It is recommended that these street standards are adopted in the TSP update so they are included in the City’s Comprehensive Plan.

## Collector Roads

Collector roads within Vernonia include Knott Street, Louisiana Avenue, State Avenue, Rose Avenue north of Bridge Street, Nehalem Street west of Rose Avenue, and Cougar Street connection to 2<sup>nd</sup> Avenue in the southwest part of the city. The right-of-way varies from 50 feet to 60+ feet throughout the city. The range of cross section opportunities and existing collector street widths is shown in Figure 5.

Collector roads have moderate traffic volumes and relatively low speeds (35 mph or slower) within Vernonia. The standards assume two travel lanes and a shared use path along one side that would accommodate bicyclists and pedestrians. Where the path is not separated from the travel lane by drainage or a planting strip, it would have a curb to ensure separation of the travel modes. Total right-of-way widths vary between 50 and 60 feet, and parking is recommended on both sides of the street. The wider cross section can accommodate both a shared use path and a planter on one side and a standard sidewalk on the other side of the street for a maximum of 55 feet. While the right of way may be wider than 55 feet on some collectors, feedback from the public and the Project Advisory Committee suggested that utilizing the entire width of the road would not be consistent of the feel of the community.

## Local Roads

Local roads include all other roadways within Vernonia that are not described above. They generally are low volume, low speed facilities where bicycles are assumed to be able to share a lane. The local road cross sections include shared-use paths or sidewalks, have 10 foot travel lanes, and parking and drainage depending on available width. There is also a minimum gravel cross-section standard that is meant to provide flexibility for developers building a limited number of residences, and where the limited development may not justify a fully paved cross section. Further discussion of the number of residences served will be included in the policy language provided in the TSP update. Figure 6 shows recommended local street cross-sections.

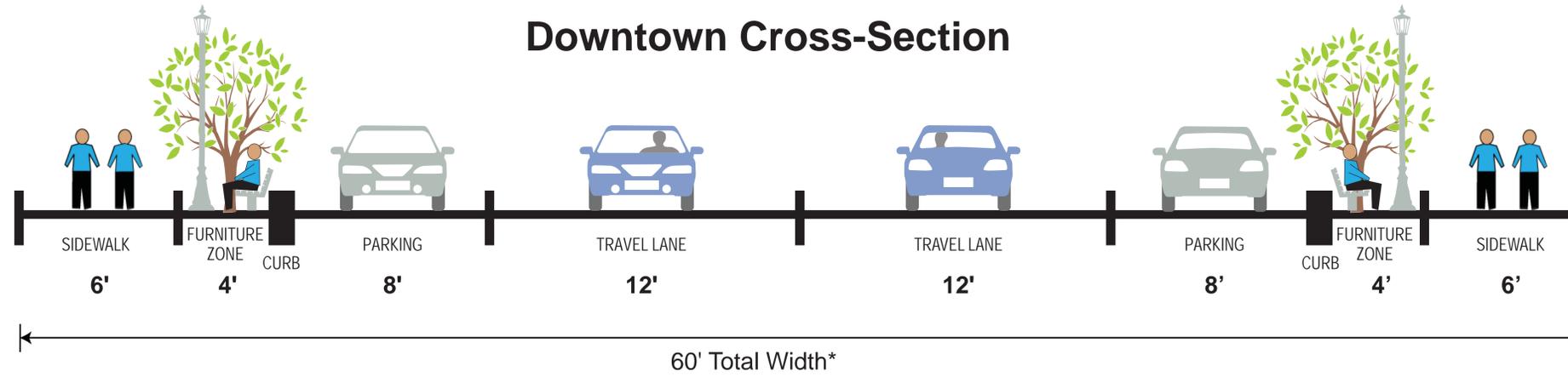
## Next Steps

This draft Transportation System Solutions Report, the Safe Routes to New Schools Report, and the associated chapters in the TSP were reviewed by the Project Advisory Committee (PAC) and the Project Management Team (PMT). The recommended transportation package will be developed and prioritized with input from the PMT, the PAC, and the community. These reports and TSP chapters also will be the subject of two community briefings and two joint Planning Commission and City Council work sessions. This report will be revised to address issues and concerns prior to presentation to the Planning Commission and City Council for adoption. Public hearings will be held as part of the adoption process, as is appropriate for a TSP update and amendments to the City's Comprehensive Plan.

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# OR47 (Arterial Road) Range of Cross-Sections

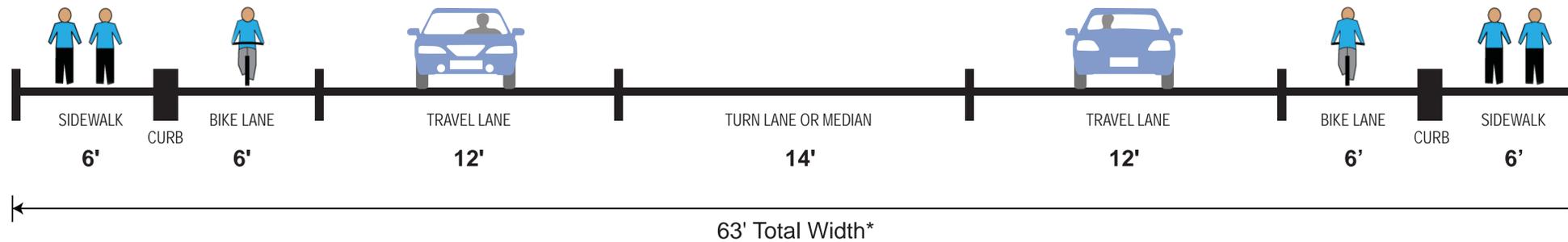
## Downtown Cross-Section



60' Total Width\*

\* 1' for curb

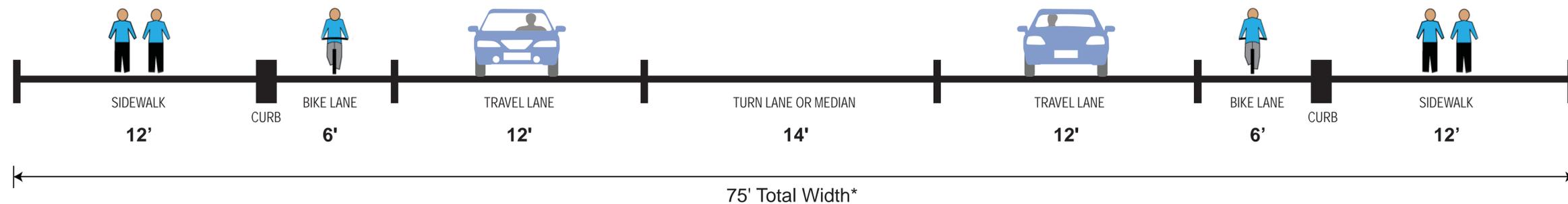
## Minimum Cross-Section



63' Total Width\*

\* 1' for curb

## Maximum Cross-Section

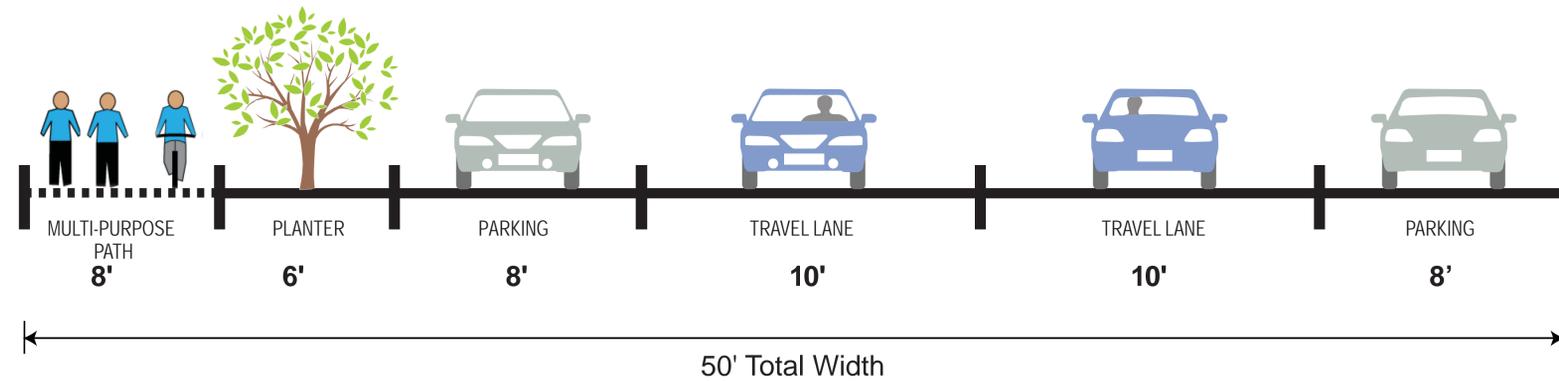


75' Total Width\*

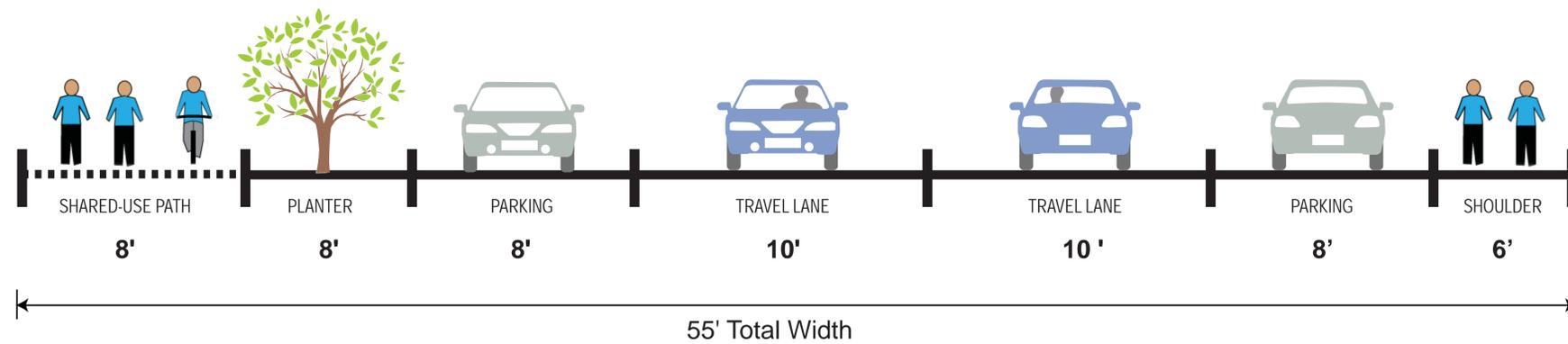
\* 1' for curb

# Range of Collector Road Cross-Sections

## Minimum Cross-Section: Shared-Use Path on One Side



## Maximum Cross-Section: Pedestrian Facilities and Parking on Both Sides

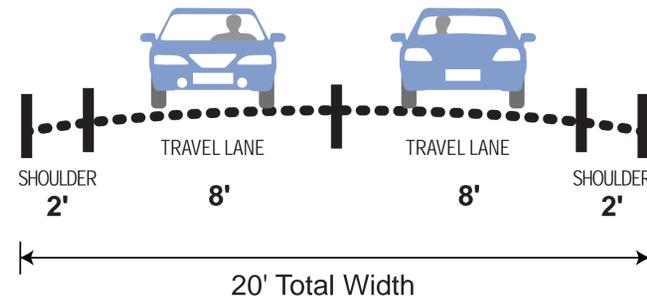


### Collector Streets are:

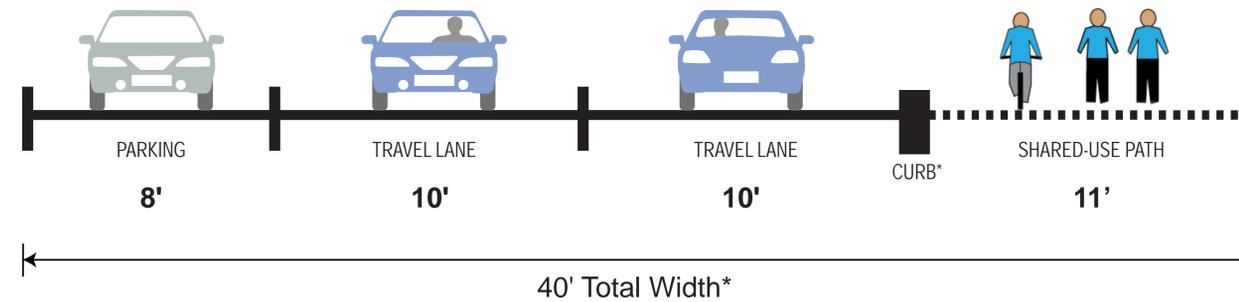
- Rose Ave (North of Bridge St), 75' ROW
- Nehalem St (West of Rose Ave), 50' ROW
- State Ave, 50' ROW
- Louisiana Ave (South Segment), 50' ROW
- Louisiana Ave (North Segment), 60' ROW
- Knott St, 60' ROW
- Cougar St (West of Rose Ave), 60' ROW

# Range of Local Road Cross-Sections

## Minimum Cross-Section: Gravel



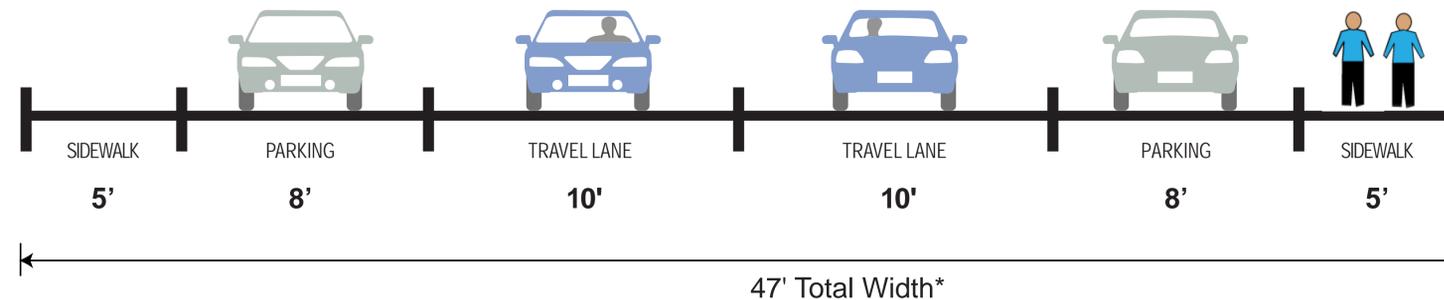
## Intermediate Cross-Section: Shared Use Path with Curb, Parking One Side



\* 1' for curb

NOTE:  
On local streets, bicycles are assumed to be able to share the travel lane or the shared-use path.

## Maximum Cross-Section: Sidewalk and Parking Both Sides



\* Also an option for a wide path and planter on one side

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**NOTICE:**

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

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# Appendix A: Existing City Street Design Standards

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# CITY OF VERNONIA PUBLIC WORKS DESIGN STANDARDS

## SECTION 6.0000 - STREETS

### 6.0010 - GENERAL DESIGN REQUIREMENTS

**Performance Standards** - All street designs shall provide for the safe and efficient travel to the motoring public. Streets shall be designed to carry the recommended traffic volumes identified for each street classification. Street classifications are set forth in Section **6.0110** STREET SYSTEM DESCRIPTION AND FUNCTION.

Streets shall be designed to meet or exceed minimum guidelines. These guidelines are set forth in the "AASHTO Policy on Geometric Design of Highways and Streets" (latest edition). Traffic Control Devices shall conform to the "Manual on Uniform Traffic Control Devices for Streets and Highways," Federal Highway Administration, with Oregon Supplements, Oregon Dept. of Transportation's (latest edition).

All vertical and horizontal curves shall meet the guidelines of the AASHTO Policy and the design speed for each street classification. Where practical, the Design Engineer shall provide the desirable stopping sight distance set forth in the AASHTO Policy. But in no case shall it be less than the minimum stopping sight distance given be permitted.

**Standard drawings relevant to this section may be found in the most current edition of the APWA Standard Specifications for Public Works Construction, Oregon Chapter.**

### 6.0011 - RIGHT-OF-WAY AND PAVEMENT WIDTH

Right-of-way and minimum pavement widths for each street classification shall be as defined in City ordinances:

### 6.0012 - ACCESS

All development shall be provided public street access. Access roads - public and/or private, driveways, and easements shall be as set forth in other sections of these Design Standards.

### 6.0013 - TRAFFIC ANALYSIS

The Superintendent of Public Works will require a traffic analysis report as determined by the type of development and its potential impact to existing street systems. A traffic analysis may be required for a development 1) when it will generate 1,000 vehicle trips per weekday or more, or 2) when a development's location, proposed site plan, traffic characteristics could affect traffic safety, access management, street capacity, or known traffic problems or deficiencies in a development's study area.

The report will be prepared by a licensed traffic engineer in the State of Oregon. At a minimum, the report shall contain the following:

1. Purpose of Report and Study Objectives

A discussion of key traffic issues to be addressed and the transportation system and development objectives related to a specific development.

General transportation system objectives are:

- o to maintain easy and safe traffic flow on surrounding street system

- o to provide effective and safe transfer of vehicle traffic between the site and the street system to provide convenient, safe and efficient on-site and off-site movement of vehicles, pedestrians, transit, service and delivery vehicles, and bicycle
- o to effectively mitigate adverse site-generated traffic impacts on affected streets and intersections. Site-specific objectives may be established by the City for each study.

2. Executive Summary

A concise summary of the study purpose/objectives, site location and study area, development description, key assumptions, findings, conclusions and recommendations.

3. Description of Site and Study Area Roadways

A description of the site and study area, existing traffic conditions in the study area, and anticipated nearby development and committed roadway improvements which would affect future traffic in the study area.

The study area will be defined by:

All roads, ramps and intersections through which peak hour site traffic composes at least 5% of the existing capacity of an intersection approach, or roadway sections on which accident character or residential traffic character is expected to be significantly impacted.

**On-site Traffic Evaluation**

An evaluation of the proposed (and alternative) site access locations, the adequacy of access drive depth, driveway lanes, and queuing storage, the safety and efficiency of proposed vehicular circulation, parking layout, pedestrian and service vehicle routes/facilities, together with recommendations for on-site traffic markings and controls.

1. Technical Appendix

A technical appendix including work sheets, charts, traffic count, drawings to support findings as described in the body of the report.

2. Recommendations for Public Improvements

Recommendations should be made for external roadway improvements, such as additional through lanes and turn lanes, and traffic control devices necessitated as a result of the development. Recommended improvements to transit facilities, and pedestrian and bike circulation should also be reported.

The recommendations should specify the time period within which improvements should be made, particularly if improvements are associated with a phased development, the estimated cost of improvements, and any monitoring of operating conditions and improvements that may be needed. If needed street improvements, unrelated to the development, are identified during the analysis, such improvements should be reported.

3. Access Management

On sites with arterial and collector street frontages, the report shall evaluate and recommend the use of access management plans or techniques:

To separate basic conflict areas. Reduce number of driveways or increase spacing between driveways and intersections.

To remove turning vehicles or queues from the through lanes. (Reduce both the frequency and severity of conflicts by providing separate paths and storage area for turning vehicles and queues.) These techniques may include turn restrictions, striping, medians, frontage roads, channeling of lanes or driveways, shared driveways and access between similar uses, access consolidation, lanes for left or right turns, and other transportation system management (TSM) actions.

4. A review of alternative access points for site access to highways, city streets, and county roads.
5. The analysis of alternate access proposals should include:
  - a. Existing daily and P. M. peak hour counts, by traffic movements, at intersections effected by generated traffic from the development. (Use traffic flow diagrams).
  - b. Projected daily and P.M. peak hour volumes for these same intersections and proposed access points when the development is in full service. (Use traffic flow diagrams.)
  - c. A determination of the existing levels of service and projected levels of service at each intersection and access points studied.
  - d. A discussion of the need for traffic signals. This should include a traffic warrant computation based on the National Manual on Uniform Traffic Control Devices.
    1. The recommendations made in the report should be specific, and should be based on a minimum level of service when the development is in full service. As an example, if a traffic signal is recommended, the recommendation should include the type of traffic signal control and what movements should be signalized. If a storage lane for right turn or left turn is needed, the recommendation should include the amount of storage needed. If several intersections are involved for signalization, and an interconnect system is considered, specific analysis should be made concerning progression of traffic between intersections.
    2. The report should include a discussion of bike and pedestrian usage and the facilities provided along with the availability of mass transit to serve the development, if appropriate.

#### 6.0014 - INTERSECTIONS

Connecting street intersections: shall be located to provide for traffic flow, safety, and turning movements, as conditions warrant.

Arterial Intersections: Exclusive left and right turn lanes will be provided, bus turnouts will be provided if traffic flow and safety conditions warrant and designated crosswalks will be provided at controlled locations and street alignments across intersections shall be continuous.

Collector and Local Street Intersections: Street and intersection alignments should facilitate local circulation but avoid alignments that encourage non-local through traffic.

Streets shall be aligned so as to intersect at right angles (90°). Angles of less than 75° will not be permitted. Intersection of more than two streets at one point will not be permitted.

New streets shall intersect with existing street intersections so that centerline is not offset, except as provided below. Where existing streets adjacent to a proposed development do not align properly, conditions may be required of the development to provide for proper alignment.

For intersections which are not directly aligned with street centerline, the centerline spacing must meet the following minimum separation distance:

<u>Street Class</u>	<u>Intersection Spacing (ft)</u>
Arterial	500*
Collector	400*
Local	300*
Cul-de-sac	150

\* The Superintendent of Public Works may permit a minimum spacing of not less than 300 feet (Arterial), 200 feet (Collector), 200 feet (Local), when findings are made to establish that:

- a. Without the change, there could be no public street access from the parcel(s) to the existing street, and
- b. All other provisions of the street design requirements can be met.

#### 6.0015 - HALF-STREET CONSTRUCTION

Half-street construction is generally not acceptable. Where such a Street is justified, the right-of-way and pavement width will be approved by the Superintendent of Public Works. In no case shall the pavement width required be less than that required to provide two lanes of traffic to pass at a safe distance. For a 32-foot local street the half-street pavement width will be 20-feet. Half-streets will only be approved when the abutting or opposite frontage property is undeveloped and the full improvement will be provided with development of the abutting or opposite (upon right-of-way dedication) frontage property.

Half-street improvements shall include curb, sidewalk and storm drainage on one side of the street. When a half-street improvement is required, the entire street shall be designed

A development on an unimproved street shall be responsible for constructing a continuous City standard street to a connection with the nearest standard (publicly-maintained) street.

#### 6.0016 - STREET CLASSIFICATION

All streets within the City shall be classified as listed in Section **6.0110** STREET SYSTEM DESCRIPTION AND FUNCTION. The classification for any street not listed shall be that determined by the Superintendent of Public Works.

#### 6.0017 - DESIGN SPEED

Design speeds for classified streets shall be as follows:

Arterial	35-45 mph
Collector	30-40 mph
Local	25 mph
Cul-de-sac	25 mph

#### 6.0020 - HORIZONTAL/VERTICAL CURVES, AND GRADES

##### 6.0021 - HORIZONTAL CURVES

Horizontal curve radius (on centerline) for each street classification shall be designed according to the roadway design speed. The radius shall not be less than the following:

Arterial	415-600'
Collector	165-275'
Local	100'
Cul-de-sac	100'

### 6.0022 - VERTICAL CURVES

Vertical curve length shall be based on the design criteria which includes: (1) design speed, (2) crest vertical curve, and (3) sag vertical curve. Stopping sight distance for crest and sag vertical curves shall be based on sight distance and headlight sight distance, respectively.

All vertical curves shall be parabolic and the length shall be computed for each location.

### 6.0023 - GRADES

Maximum grades for each street classification shall be as follows:

Arterial	0.060 ft/ft
Collector	0.080 ft/ft
Local	0.100 ft/ft
Cul-de-sac	0.120 ft/ft

Local and cul-de-sac streets may exceed 12%, but in no case permitted to exceed 16%. The Superintendent of Public Works may approve a grade greater than 12% when all of the following conditions exist:

1. Topographic constraints do not allow the development to be served by a street with a maximum grade of 12% without causing de-stabilization of soils by excessive cuts and fills.
2. There is no access to the property being developed through adjacent properties at a maximum 12% grade.
3. The section of local street will not exceed a combination of length, horizontal alignment, and/or grades exceeding 12% which will create hazardous traffic conditions.
4. In no case shall the maximum street grade exceed 16%.

Minimum grade for all streets shall be 0.0050 feet per foot (0.50%) however, in all cases, street grades shall allow for proper and adequate drainage. Cul-de-sac "bulbs" shall have a minimum slope of 0.0060 feet per foot (0.60%).

Street cross-slopes shall be two (2) percent. Where there are site constraints the cross slope can vary from one (1) to three (3) percent.

### 6.0030 - PAVEMENT DESIGN

In general, all streets shall be constructed with asphaltic concrete type "C"; however, Portland Cement Concrete (PCC) streets are permitted as approved by the Superintendent of Public Works.

Typical flexible pavement thicknesses will be as shown in the. This will apply only to local streets and lower classifications.

The Engineer will provide a street structural design section for all roadways classified Neighborhood Collector and higher, and local streets in industrial zones. A structural design section will also be required when the soils report indicates poor soil.

### 6.0040 - CONCRETE CURB

All development projects will be required to construct street improvements with concrete curbs. Standard Curb shall only be used on streets classified Collector and lower when the longitudinal street grade is 0.10 feet per foot (1.0%) or greater. All others curbs and sidewalks shall be abutting. Monolithic Curb and Gutter shall be used on streets classified Collector and higher and when the longitudinal street grades less than 1.0%. Curb exposure for Standard Curb is seven (7) inches, and nine (9) inches at catch inlets. Curb exposure for monolithic curb and gutter shall be

six (6) inches, and eight (8) inches at catch insets. Joint spacing in curbs shall be 15-foot maximum for contraction joints and 45-foot maximum for expansion joints. In addition, expansion joints shall be located at all curb return Points and at driveway curb drop transition points.

A minimum of two drainage block-outs to accommodate 3" drain pipe shall be provided for each lot. Typically, these block-outs are located five feet (5') from each side property line.

**6.0041 - CURB RETURN RADIUS**

Curb return radius at street intersections shall be designed to accommodate all expected traffic. Minimum curb radius required shall be as follows:

<u>Intersection</u>	<u>Radius</u>
Local/Cul-de-sac with Local/Cul-de-sac	20'
Local/Cul-de-sac with Collector	20'
Local/Cul-de-sac with Collector or Arterial	30'
Collector with Collector or Arterial	30'
Collector/Arterial with Collector/Arterial	30'

Streets serving commercial/industrial properties may be required to install larger curb radius as required for vehicle movements.

**6.0050 - PARKING**

<u>Street Class</u>	<u>Parking Lanes</u>	<u>Parking Required</u>
Arterial	None	May be allowed in some areas
Collector	2	Variable (a)(b)
Local	2	Yes (c)(d)
Cul-de-sac	2	Yes (c)(d)

- a. Where bike lanes exist on collectors, parking may be prohibited.
- b. Collector - No parking within 45' of curb return.
- c. Local - No parking within 30' of curb return.
- d. Local Streets and Cul-de-sacs which are approved for reduced 40 feet right-of-way and 28 feet pavement, will be required to have one parking lane to assure that on-street parking is adequate for adjacent uses, a reduced street design will consider clustered parking bays adjacent to the street, if needed. Parking will not be allowed in a reduced radius cul-de-sac bulb.

For streets designated collector and below, the Superintendent of Public Works may consider design modifications to conserve major trees in the public right-of way. Subject to approval by the Superintendent of Public Works, parking lanes may be removed on one or on both sides of a street.

Design standards - parking and loading.

- a. Scope.
  - 1. These design standards shall apply to all parking, loading and maneuvering areas.
  - 2. All parking and loading areas shall provide for the turning, maneuvering and parking of all vehicles in the lot.

## 6.0060 - SIDEWALKS

In general, new sidewalks are required for all development requiring a development permit.

### Minimum Sidewalk Width

<u>Street Class/Location</u>	<u>Includes 6" curb</u>	
Arterial	6'	
Collector	5' 6'	Residential Commercial/Industrial
Local	5' 5' 6'	Residential 40' R/W - Residential Commercial/Industrial
Cul-de-sac	5' 5' 5'	Residential 40' R/W - Residential Commercial/Industrial

Sidewalks include a six inch curb as a portion of the minimum width. Sidewalks may be required to meander within the dedicated right-of-way or outside of the right-of-way within an easement with the approval of the Superintendent of Public Works.

For streets designated collector and below, the Superintendent of Public Works may consider design modifications to conserve major trees in the public right-of-way. Subject to approval by the Superintendent of Public Works, sidewalks may be deleted on one side of a street.

## 6.0061 - WHEELCHAIR RAMPS

Each corner at all intersections shall contain wheelchair ramps for handicapped access located within the curb return. Ramps shall also be located wherever an accessible route crosses a curb. In residential areas the ramp will be located at the midpoint of the curb return. On streets classified above local or cul-de-sac, ramps may be required at different locations within the curb return. It may also be required to construct two (2) ramps at a curb return when a different location is required.

Locations of sidewalk ramps shall be designed with regard to storm water flows, street grades, and pole locations. Other factors may also dictate sidewalk ramp location.

## 6.0070 - BIKEWAYS

This summarizes the City's policy and implementation strategies for bike ways within the City and for connection with metropolitan bike ways. The City's plan has adopted both AASHTO and ODOT standards and criteria as the minimum guidelines for bike way design, construction and control.

The City's adopted guidelines for bike ways consist of the following:

1. Guide for Development of New Bicycle Facilities 1981
2. AASHTO, Oregon Supplements and Exceptions to AASHTO Guide
3. Manual on Uniform Traffic Control Devices with Oregon supplements by Oregon Transportation Commission

b. Access.

1. Where a parking or loading area does not abut directly on a public street there shall be provided an unobstructed drive and not less than 20 feet in width for two-way traffic, leading to a public street, and traffic directions shall be plainly marked.

Parking area improvements. All public or private parking areas which contain three or more parking spaces and outdoor vehicle areas shall be improved according to the following.

- a. All parking areas shall have durable, dust free surfacing of asphaltic concrete, Portland cement concrete or other approved materials. The design section shall conform to the use and the soils report. All parking areas, including those in conjunction with a single family or two-family dwelling, shall be graded so as not to drain excess storm water over the public sidewalk or onto any abutting public or private property.
- b. All parking areas, except those required in conjunction with single family or two-family dwellings or vehicle sales areas, which abut a residential district, shall conform to the screening requirements as set forth in the city's site design ordinance.
- c. All parking areas, except those required in conjunction with single family or two-family dwellings or vehicle sales areas may contain a maximum of 25% of the parking spaces sized for compact vehicles.
- d. All required handicapped parking space shall conform to ORS 447.210 and shall be a minimum of 14 feet in width.
- e. All parking areas, except those required with single family or two family dwellings or vehicle sales areas, shall have physically marked individual parking spaces such as painted lines, lettering, curbs and landscaping.

Table of Standards. The following table provides the minimum dimensions of parking stall's, length and width, aisle width and maneuvering space, of public or private parking areas. All parking facilities shall meet these minimum standards. The width of each parking space includes a four inch (4") wide stripe which separates each space. Compact spaces are noted in parenthesis:

Angle from Curb	Stall Width "A"	Channel Width "B"	Aisle Width "C"	Curb Length per stall "D"
Parallel	9' 0" (8'6")	9' 0" (8' 6")	12' 0" (12' 0")	23' 0" (20' 0")
30°	9' 0" (8'6")	16' 10" (14' 10")	12' 0" (12' 0")	18' 0" (17' 0")
45°	9' 0" (8'6")	19' 1" (16' 7")	14' 0" (14' 0")	12' 9" (12' 0")
60°	9' 0" (8'6")	20' 1" (17' 3")	18' 0" (18' 0")	10' 5" (10' 3")
90°	9' 0" (8'6")	18' 0" (15' 0")	24' 0" (24' 0")	9' 0" (8' 6")

Street lighting shall be provided as part of the street design process. Design illumination levels shall be in accordance with the recommendations of the "Illuminating Engineering Society" and are summarized in the following table.

**RECOMMENDATIONS FOR ROADWAY AVERAGE  
MAINTAINED HORIZONTAL ILLUMINATION**

<u>Roadway Classification</u>	<u>Commercial</u>	<u>Urban Intermediate</u>	<u>Residential</u>
	<u>Foot Candles</u>		
Highway	1.4	1.2	1.0
Arterial	2.0	1.4	1.0
Collector	1.2	.9	.6
Local/Cul de sac	-	.9	.6

The average-to-minimum uniformity ratios for roadways in commercial and intermediate areas shall be 4:1 or better. In residential areas this uniformity ratio shall be 6:1 or better.

The street lighting system shall be provided using high pressure sodium vapor luminaires. The design average horizontal illumination and uniformity ratio shall be obtained by considering together the factors of lamp wattage, pole support spacing, maintaining height and luminaire of the street lights to locate poles at lot line extensions and not in the middle of a lot, and to locate poles at corners.

**6.0092 - STREET NAMES AND TRAFFIC CONTROL**

Street names for all new development will be approved by the City prior to recording of any maps or plats. The development shall pay for all street name and traffic control signage prior to the signing of the final plat or map by the City. All new Signage will be provided by the developer and installed by the City in new developments.

Street names shall conform with the established grid system(s) in the City and its UGB. No new street name shall be used which will duplicate or be confused with the name of existing streets in the UGB area.

Building numbering will be issued by the City of Vernonia.

**6.0100 - MAILBOXES**

Joint mailbox facilities shall be provided in all residential developments, with each joint mailbox serving at least two (2) dwelling units.

1. Joint mailbox structures shall be placed adjacent to roadway curbs.
2. Proposed locations of joint mailboxes shall be designated on as part of the development plan, and shall be approved by the Superintendent of Public Works.
3. Plans for the joint mailbox structure to be used shall be submitted as part of the development plan for approval by the Superintendent of Public Works.

**6.0110 - STREET SYSTEM DESCRIPTION AND FUNCTION**

**6.0111 - GENERAL GUIDELINES**

The urban boundary map, policies and access requirements for various land uses, as adopted by the Comprehensive Plan and Zoning Ordinance, shall serve as guidelines for the functional classifications, definitions and standards requirements and rules adopted under this chapter.

**TABLE 6 - 1**  
**Driveway Widths (Min-Max)**

<u>Street Class.</u>	<u>Residential</u>	<u>Commercial</u>	<u>Industrial</u>	<u>No. Allowed</u>
Arterial	12/24(2)	12/36	12/36	Res.-1/250' frontage Com.- 1/250' frontage
Collector	12/24(2)	12/36	12/36	Res.-1/frontage Com.- 1/frontage(5)
Local	12/24(2)	12/36	(4)	Res.-1/frontage(3) Com.-1/frontage
Cul-de-sac	12/24(2)	12/36	12/36	Res.-1/frontage(3) Com.- 1/frontage

Res. = Residential Zone      Com.= Commercial Zone      Ind.= Industrial Zone

- Notes:** (1) Special conditions may warrant access.  
(2) 28' maximum with 3 car garage.  
(3) Frontage greater than 130' permitted one additional curb cut.  
(4) Build to Collector standard.  
(5) Certain businesses may warrant one additional curb cut for service driveways.

**TABLE 6 - 2**  
**Driveway Locations (minimum distance to curb return)**

<u>Street Classification</u>	<u>Residential</u>	<u>Commercial</u>	<u>Industrial</u>
Arterial	100' (1)(3)	100'	100'
Collector	45'(3)	100'	100'
Local	45'(2)	45'	45'
Cul-de-sac	45'(2)	45'	45'

- Notes:** (1) Minimum distance from curb return unless this prohibits access to the site.  
(2) 25 feet will be allowed for corner lots with limited frontage where distance requirements cannot be met.  
(3) Direct access to this street will not be allowed, if an alternative exists or is planned.

For classification of Collector and above, driveways adjacent to street intersections shall be located beyond the required queue length for traffic movements at the intersection. If this requirement prohibits access to the site, a driveway with restricted turn movements may be allowed.

Within commercial, industrial and multi-family areas shared driveways and internal access between similar uses are encouraged to reduce the access points to the higher classified roadways, to improve internal site circulation, and to reduce local trips or movements on the street system. Shared driveways or internal access between uses will be established by means of common access easements at the time of development.

Driveway grades shall not exceed twelve percent (12%) from the curb line to the property line.

**6.0090 - STREET LIGHTING, NAMES AND SIGNAGE**

**6.0091 - STREET LIGHTING**

A complete street lighting system shall be the responsibility of the development. All streets fronting the property shall be provided with adequate lighting. Developer is required to provide lighting for public convenience and safety. For lighting requirements, all developments will be required to submit three (3) copies of the final plat (residential and major land partitions) to the Superintendent of Public Works. Commercial and industrial developments, in addition to the above requirement, shall submit three (3) copies of the site plan to the Superintendent of Public Works.

**6.0071 - BIKEWAY LOCATION, WIDTH**

<u>Bikeway Location</u>	<u>Minimum Width</u>	<u>Comments</u>
Public Street (designated bike lane)	8' **	Each direction of travel
Public Street (non designated bike lane)		One way pavement width greater than 12' - desirable one way pavement width is 14' or greater
Off-Street Bicycle Path	5' *	One-Way Travel
Off-Street Bicycle Path	8'-10' *	Two-Way Travel
Off-Street Bicycle Path (Shared with Pedestrians)	12**	Two-Way Travel
Off-Street Bicycle Path (Shared with Pedestrians)	7**	One-Way Travel

\* Paths are constructed with 2' gravel shoulders on both sides.

\*\* An eight-foot section is required unless this width is not practical because of physical or economic constraints. A minimum width of four feet may be designated as a bicycle lane.

**6.0072 - DESIGN CRITERIA**

In general, bikeway design shall meet the adopted standards referred to in Section 6.0060.

All bike ways shall have a minimum cross-slope of two percent (2%) and a maximum cross-slope of five percent (5%). On curved alignments, the cross-slope shall be to the inside of the curve.

Bikeway curvature will be based on a minimum design speed of 20 mph. Bikeway grades shall be limited to a maximum of five percent (5%). Where topography dictates, grades over five percent (5%) are acceptable when a higher design speed is used and additional width is provided.

**6.0073 - CONSTRUCTION**

Off-street bike ways shall be constructed for two different situations. The two situations are: Where limited maintenance vehicle (City-owned) use will occur, and where heavy maintenance vehicle use will occur. In both cases, sub grade preparation will require removal of existing organic material and compaction.

<u>Use</u>	<u>Bikeway Thickness</u>	
	<u>Asphalt</u>	<u>Aggregate</u>
Limited	2"	6"
Heavy	3"	8"

When drainage, such as side ditches, is required parallel with the bike way, the ditch centerline shall be at least five feet (5') from the edge of the pavement. Ditch side slope adjacent to the bike way shall be no steeper than 2:1 when measuring the horizontal distance to the vertical distance.

When culverts cross bike ways, the ends of the pipe shall be no closer than five feet (5') from the edge of the bike way.

#### 6.0074 - LIGHTING

Lighting should be included in the bikeway design when nighttime security could be a problem and a high nighttime use is expected (i.e., paths serving students, commuters). The horizontal illumination levels shall be .05 foot candle (5 lux) to 2 foot candles (22 lux) except when security problems exist. Higher illumination levels should be considered in these locations. The placement of the light standards (poles) shall meet all vertical and horizontal clearances.

#### 6.0075 - DETERRING MOTOR VEHICLE USE

Bike paths intersecting with roadways require physical barriers to deter use by unauthorized motor vehicles. A lockable, removable post(s) may be used to discourage such use and still permit authorized vehicles to access the paths. The post shall be brilliantly colored and permanently reflectorized. If more than one (1) post is required, the spacing shall not exceed a separation of more than five (5) feet.

An alternative to deterring the motor vehicles is to design two (2) five (5) foot wide lanes separated by low landscaping at the intersection.

#### 6.0080 - DRIVEWAYS

Access to private property shall be permitted with the use of driveway curb cuts. The access points with the street shall be the minimum necessary to provide access while not inhibiting the safe circulation and carrying capacity of the street.

On Collector streets and above, one driveway per site frontage will be the normal maximum number. Double frontage lots and corner lots on these streets may be limited to access from a single street, usually the lower classification street. If additional driveways on a frontage are approved by the Superintendent of Public Works, a finding shall be made that no eminent traffic hazard would result and impacts on through traffic would be minimal. Restrictions may be imposed on additional driveways, such as limited turn movements, shared access between uses, closure of existing driveways, or other access management actions.

Driveway approach types, Residential Driveway, Commercial/Industrial Driveways, must be approved by the Superintendent of Public Works.

Should the length of a driveway be greater than fifty (50) feet in length and the driveway has only one (1) access to the street or does not loop to the street, a turnaround shall be provided. The minimum inside radius of the turn around shall be fifteen (15) feet with a width at the turnaround point of thirty (30) feet for maneuvering.

## 6.0112 - FUNCTIONAL CLASSIFICATIONS

Functional classification categorizes roads and streets by their operational purpose. Some of the key factors considered when adopting the functional classifications were the following:

- a. Relation between street traffic and land use of the abutting properties;
- b. Volume and kinds of traffic;
- c. Relative origins and destinations of traffic and lengths of trips.

The basic hierarchy of functional classification is Arterial streets, Collector streets and Local/Cul-de-sac streets. These categories are defined as follows:

**Arterial streets:** Arterial streets carry higher volumes of traffic, usually over 4,000 vehicles/day and are generally consist of three or more lanes, with the third lane being a common turn lane. Their function is to serve intra-county trips; that is, trips which have at least one end trip within the county.

**Collector streets:** Collector streets gather area traffic from local streets within a one-half mile radius and connect it to the arterial system. They are not intended to serve through traffic, and they are the lowest order of streets designed to carry transient vehicles. Collector streets generally have a traffic volume rate of 1,000 to 4,000 vehicles/day. Abutting land uses are generally residential.

**Local streets:** Local streets provide access to abutting property and do not serve to move through traffic. Local streets standards will be further categorized by adjacent land use into residential, commercial and industrial local streets.

**Local streets - (Commercial/Industrial):** Within the local street classification, there may be considerable difference between the kind of improvement specified where commercial or industrial land uses access a local street, as compared to the kind of improvement specified for residential access. Generally, a local street classification in commercial or industrial areas will require an improvement equal to that specified for a collector classification.

**Cul-de-sac streets:** Cul-de-sac streets provide access to abutting property only and will be as short as possible, in no event shall a Cul-de-sac be more than 400' in length.

The length of a Cul-de-sac shall be measured along the centerline of the roadway from the near side of the intersecting street to the farthest point of the Cul-de-sac. All Cul-de-sac streets shall terminate in a circular turnaround.

## 6.0120 - PERMANENT DEAD-END STREETS

A standard cul-de-sac turnaround shall be provided at the end of a permanent dead-end street that does not provide looped circulation. Permanent dead-end streets shall be limited to serving no more than twenty-five dwellings and shall not exceed six hundred feet in length from the point of the nearest centerline/centerline intersection.

A permanent dead-end street is measured from the right-of-way line at the nearest intersecting street, which has at least two points of access, to the right of way line at the furthest end of the dead-end street.

An existing dead-end street system which is more than 600 feet long or which serves more than 25 dwelling units may be terminated in a cul-de-sac if no Future Street Plan has been adopted and the following criteria are met:

- a. Alternative emergency vehicle access or fire protection is provided satisfactory to the local Fire Authority and,
- b. Neighborhood traffic circulation needs are not adversely impacted by the proposed cul-de-sac termination of the street.

Temporary dead-end streets more than one-hundred-fifty (150) feet in length shall be provided with an approved turn-around for emergency vehicles.

#### 6.0130 - ALLEYWAYS AND PRIVATE RESIDENTIAL STREETS/ACCESS WAYS

##### 6.0131 - ALLEYWAYS

Alleyways may be provided in commercial and industrial developments with approval by the Superintendent of Public Works. When approved, alleyways shall be dedicated to the city. The right of way width shall be 20 feet with a 20 foot pavement width.

Design for alleyways shall meet the same criteria as other public streets. The exceptions to those criteria may be centerline radius and design speed. Generally, alleyways shall be designed for one-way operations.

##### 6.0132 - PRIVATE RESIDENTIAL ACCESS WAYS

In general, private residential streets and access ways shall be provided for multi-family developments such as condominiums and apartments. Interior design for private access ways in a manufactured home park shall meet standards for private residential access ways include:

1. Dead-end access ways shall not exceed 600 feet in length nor serve more than 25 dwellings units. Dead-end access ways which exceed 150 feet in length shall be provided with an approved turnaround.
2. "Private Street" Signage and driveway approach shall be placed at the intersection with the public street to clearly identify the private access way.
3. Private maintenance of the private streets/access ways shall be provided by a Homeowner's Association or other appropriate entity. Maintenance shall insure continual emergency access at all times.
4. Location of private access ways shall meet the Uniform Fire Code and meet the minimum pavement section of local residential streets.
5. Private residential access ways shall not be allowed in Manufactured Home Parks or Subdivisions.

##### 6.0133 - PAVEMENT CUTS

Where pavement is installed next to existing pavement and at all trench cuts, the existing pavement shall be saw cut. The face of the joint between the new and existing pavement shall be coated with asphalt emulsion and the surface of the joint shall be sand sealed.

##### 6.0134 - SHOULDERS

Where sidewalks and pavement end or where there is no curb and sidewalk (such as half-street improvements) shoulder rock shall be provided to grade with the pavement. Shoulder rock shall be a minimum of six (6") inches in depth, thirty six inches (36") wide and shall be 3/4-inch minus crushed.

**TABLE 3-1.  
PROPOSED ROADWAY DESIGN STANDARDS**

Street Type	Travel Lanes	Parking	Bikeways	Total Pavement	Unpaved Shoulders	Planting Strip	Sidewalks	Right of Way <sup>a</sup>
<b>Urban (Fig. 2-1)</b>								
New Local	2 - 9'	5' both sides	—	28'	—	5' both sides	5' both sides	50'
Local Preferred Retrofit	2 - 9'	6' one side	—	24'	—	5' both sides	5' both sides	46'
Local Minimum Retrofit	2 - 9'	—	—	18'	—	—	5' one side	25'
Collector	2 - 10'	8' one side <sup>a</sup>	5' both sides	38'	—	5' both sides	6' both sides	62'
Arterial	2 - 11'	8' both sides <sup>a</sup>	5' both sides	48'	—	—	10' both sides <sup>b</sup>	70'
<b>Rural (Fig. 2-1)</b>								
Local	2 - 9'	—	—	18'	2' both sides	—	—	30'
Collector	2 - 10'	6' one side	5' both sides	36'	4' both sides	—	5' both sides	62'
Arterial	2 - 12'	—	5' both sides	34'	4' both sides	—	5' both sides	60'

a. Required right of way is the total of pavement, shoulders, planting strip, and sidewalks, plus 2 feet for urban roadways and 8 feet for rural roadways.

b. Standards for urban arterials and collectors require 8-foot parking lanes in the downtown area, where storefront commercial land uses make on-street parking desirable. The urban and rural standards application areas are defined by Figure 2-1. Outside of downtown, parking lanes may be excluded if adjacent land uses do not support the need (for instance, if buildings are set back from the right-of-way and have off-street parking). Where on-street parking is eliminated, total pavement width shall be reduced by the same amount.

c. The 10-foot arterial sidewalk is for the downtown area and may be reduced to 6 feet elsewhere.

## ROADWAY OPERATIONS

### Roadway Levels of Service

The 2018 traffic projections reflect a significant increase in traffic on Highway 47 through central Vernonia. The lack of a parallel east-west collector street on the north side of Vernonia forces traffic from the north to travel into downtown Vernonia and then backtrack to access new residential areas on the north side of the City. Also travel from residential



## Appendix B: Cost Estimate Backing Sheets



**CH2M HILL**  
**SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE SUMMARY**

<b>PROJECT:</b> Vernonia TSP	<b>DATE:</b>	<b>SHEET:</b>
<b>DESIGN LEVEL:</b> Conceptual Level Estimates	2/23/2011	1 of 1

ALTERNATIVE	IMPROVEMENT	PROJECT COST
HB-1	PROJECT: High Build #1 - Widen OR 47	\$ 8,831,000
HB-2	PROJECT: High Build #2 - California Bike/Ped Improvements	\$ 450,000
HB-3	PROJECT: High Build #3 - New Bike/Ped Bridge	\$ 1,689,000
HB-5	PROJECT: High Build #5 - Mist Drive Intersection Improvements	\$ 369,000
HB-7a	PROJECT: High Build #7a - North/South Shared Use Path	\$ 452,000
HB-7b	PROJECT: High Build #7b - E/W Industrial Connector	\$ 2,647,000
HB-7c	PROJECT: High Build #7c - Louisiana Connection	\$ 358,000
HB-7d	PROJECT: High Build #7d - Texas Avenue Extension	\$ 1,445,000
LB-A	PROJECT: Low Build A - OR 47 @ Rose Signing	\$ 10,000
LB-Fa	PROJECT: Low Build G - Bridge Street Curb Extension	\$ 13,000
LB-Fb	PROJECT: Low Build G - Bridge Street Bioswale	\$ 15,000

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**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #1 - Widen OR 47			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Walls, Earthwork, Drainage			LENGTH (MILE): 0.34	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	0.34	\$1,230,200.00	\$418,268
2	Shared Use Path	Mi.		\$187,800.00	\$0
3	New Roadway - State Highway	Lane-Mi.	0.44	\$457,100.00	\$201,124
4	Overlay Existing Roadway	Lane-Mi.	0.57	\$91,900.00	\$52,383
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY	6,250	\$30.00	\$187,500
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.	0.34	\$338,000.00	\$114,920
15	Landscaping	Mi.		\$235,000.00	\$0
16	Bridges	SF		\$150.00	\$0
17	Barrier	LF	1,200	\$1,750.00	\$2,100,000
18	Walls	SF	9,050	\$150.00	\$1,357,500
<b>SUBTOTAL</b>					<b>\$4,431,695</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$88,600
	TP & DT	3.0-8.0%	8.0%		\$354,500
	Mobilization	8.0-10.0%	10.0%		\$443,200
	Erosion Control	0.5-2.0%	2.0%		\$88,600
	Contingency	30-40%	40.0%		\$1,772,700
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$7,179,295</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$933,300
	Construction Engineering	10.0%	10.0%		\$717,900
<b>TOTAL PROJECT COST</b>					<b>\$8,831,000</b>

Notes:

- Existing Roadway Width - 34'; 12' lanes, 10' shared use shoulder
- Proposed roadway width - 49'; 12' lanes, 6' bikes, 6.5' sidewalk (.5' curb)
- Widening is to north side only. Existing retaining wall is repaired/maintained and retrofit with concrete barrier
- 5' average height cut wall north (L=1,150')
- 10' average height (15' width) cut north
- Illumination included along corridor improvements
- Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

<b>PROJECT:</b> High Build #2 - California Bike/Ped Improvements		<b>PREPARED BY:</b> Darren Hippenstiel		<b>DATE:</b> 03/02/2011	
<b>DESIGN LEVEL:</b> Planning Level					
<b>KIND OF WORK:</b> Roadway, Earthwork, Drainage		<b>LENGTH (MILE):</b> 0.22		<b>SHEET:</b> 1 of 1	
<b>NO.</b>	<b>ITEM</b>	<b>UNIT</b>	<b>QUANTITY</b>	<b>UNIT COST</b>	<b>COST</b>
1	Sidewalk & Drainage	Mi.		\$1,198,100.00	\$0
2	Shared Use Path	Mi.		\$187,800.00	\$0
3	New Roadway - Local Roads	Lane-Mi.	0.22	\$269,700.00	\$59,334
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY	1,533	\$30.00	\$45,990
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.	0.22	\$338,000.00	\$74,360
15	Landscaping	Mi.	0.22	\$235,000.00	\$51,700
16	Bridges	SF		\$150.00	\$0
17	Walls	SF		\$55.00	\$0
<b>SUBTOTAL</b>					<b>\$231,384</b>

	<b>ADDITIONAL CONST. COSTS</b>	<b>SUGGESTED</b>	<b>PERCENTAGE</b>		<b>COST</b>
	Construction Surveying	1.0-2.5%	2.0%		\$4,600
	TP & DT	3.0-8.0%	4.0%		\$9,300
	Mobilization	8.0-10.0%	10.0%		\$23,100
	Erosion Control	0.5-2.0%	2.0%		\$4,600
	Contingency	30-40%	40.0%		\$92,600
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$365,584</b>

	<b>ENGINEERING COSTS</b>	<b>SUGGESTED</b>	<b>PERCENTAGE</b>		<b>COST</b>
	Design Engineering	13.0%	13.0%		\$47,500
	Construction Engineering	10.0%	10.0%		\$36,600
<b>TOTAL PROJECT COST</b>					<b>\$450,000</b>

**Notes:**

- Proposed 12' width shared use path, 2" AC/10" Agg base
- Improvement limits from the west beginning of California to Missouri Intersection
- 2' average height earthwork
- Illumination and landscaping included along corridor improvements
- Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #3 - New Bike/Ped Bridge			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Walls, Earthwork, Drainage, Structures			LENGTH (MILE): 0.10	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.		\$1,230,200.00	\$0
2	Shared Use Path	Mi.	0.07	\$187,800.00	\$13,146
3	New Roadway - State Highway	Lane-Mi.		\$457,100.00	\$0
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY	1,750	\$30.00	\$52,500
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.	0.10	\$338,000.00	\$33,800
15	Landscaping	Mi.	0.10	\$235,000.00	\$23,500
16	Bridges	SF	3,000	\$225.00	\$675,000
17	Walls	SF	900	\$55.00	\$49,500
<b>SUBTOTAL</b>					<b>\$847,446</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$16,900
	TP & DT	3.0-8.0%	8.0%		\$67,800
	Mobilization	8.0-10.0%	10.0%		\$84,700
	Erosion Control	0.5-2.0%	2.0%		\$16,900
	Contingency	30-40%	40.0%		\$339,000
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$1,372,746</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$178,500
	Construction Engineering	10.0%	10.0%		\$137,300
<b>TOTAL PROJECT COST</b>					<b>\$1,689,000</b>

Notes:

- Proposed 12' width shared use path, 2" AC/10" Agg base; length of improvements 550' (350' path)
- 200' length clear span, 15' wide bridge (12' path, 1.5' rails)
- Concrete girder type bridge assumed.
- 5' average height fill and wing walls at bridge approaches
- 5' average height fill approaching bridge
- Illumination included along corridor improvements
- Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #5 - Mist Drive Intersection Improvements			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Drainage			LENGTH (MILE): 0.04	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	0.04	\$1,216,700.00	\$48,668
2	Shared Use Path	Mi.		\$187,800.00	\$0
3	New Roadway - Collector	Lane-Mi.	0.14	\$339,100.00	\$47,474
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA	1	\$75,400.00	\$75,400
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY		\$30.00	\$0
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.	0.04	\$338,000.00	\$13,520
15	Landscaping	Mi.		\$235,000.00	\$0
16	Bridges	SF		\$200.00	\$0
17	Walls	SF		\$55.00	\$0
<b>SUBTOTAL</b>					<b>\$185,062</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$3,700
	TP & DT	3.0-8.0%	8.0%		\$14,800
	Mobilization	8.0-10.0%	10.0%		\$18,500
	Erosion Control	0.5-2.0%	2.0%		\$3,700
	Contingency	30-40%	40.0%		\$74,000
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$299,762</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$39,000
	Construction Engineering	10.0%	10.0%		\$30,000
<b>TOTAL PROJECT COST</b>					<b>\$369,000</b>

Notes:

Improvements consolidate intersection of Mist Dr. and OR47 to one location  
 Roadway approaches widened along OR47 for SB left turn lane to Mist Drive  
 200' reconstruction along Mist Dr, width 50'; 11' lanes, 8' swale, 8' parking, 12' shared use

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #7a - North/South Shared Use Path			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Drainage			LENGTH (MILE): 0.66	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.		\$875,600.00	\$0
2	Shared Use Path	Mi.	0.7	\$187,800.00	\$123,948
3	New Roadway - Local Roads	Lane-Mi.		\$269,700.00	\$0
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY	1,950	\$30.00	\$58,500
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.		\$338,000.00	\$0
15	Landscaping	Mi.		\$235,000.00	\$0
16	Bridges	SF		\$150.00	\$0
17	Walls	SF		\$55.00	\$0
18	Wetland Mitigation	LS	1	\$50,000.00	\$50,000
<b>SUBTOTAL</b>					<b>\$232,448</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$4,600
	TP & DT	3.0-8.0%	4.0%		\$9,300
	Mobilization	8.0-10.0%	10.0%		\$23,200
	Erosion Control	0.5-2.0%	2.0%		\$4,600
	Contingency	30-40%	40.0%		\$93,000
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$367,148</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$47,700
	Construction Engineering	10.0%	10.0%		\$36,700
<b>TOTAL PROJECT COST</b>					<b>\$452,000</b>

Notes:

- Proposed 12' width shared use path, 2" AC/10" Agg base
- 1' earthwork assumed for fill/cut/stabilization
- Illumination and landscaping not included along corridor improvements
- Reduced TP&DT for off-alignment work
- Alignment crosses wetlands, mitigation assumed
- Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #7b - E/W Industrial Connector			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Drainage			LENGTH (MILE): 0.47	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.	0.47	\$875,600.00	\$411,532
2	Shared Use Path	Mi.		\$187,800.00	\$0
3	New Roadway - State Highway	Lane-Mi.	1.49	\$457,100.00	\$681,079
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY		\$30.00	\$0
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.	0.47	\$338,000.00	\$158,860
15	Landscaping	Mi.	0.47	\$235,000.00	\$110,450
16	Bridges	SF		\$150.00	\$0
17	Walls	SF		\$55.00	\$0
<b>SUBTOTAL</b>					<b>\$1,361,921</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$27,200
	TP & DT	3.0-8.0%	4.0%		\$54,500
	Mobilization	8.0-10.0%	10.0%		\$136,200
	Erosion Control	0.5-2.0%	2.0%		\$27,200
	Contingency	30-40%	40.0%		\$544,800
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$2,151,821</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$279,700
	Construction Engineering	10.0%	10.0%		\$215,200
<b>TOTAL PROJECT COST</b>					<b>\$2,647,000</b>

Notes:

Roadway is new alignment east/west collector to future industrial connection to Knott Rd.  
Proposed roadway width - 60'; 12' lanes, 8' parking, 14' shared use (no curb), 6' shoulder  
Use state pavement section industrial area  
Improvements are at grade with negligible cut/fill  
Illumination and landscaping included along corridor improvements  
Reduced TP&DT for off-alignment work  
Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #7c - Louisiana Connection			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Drainage			LENGTH (MILE): 0.10	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.	0.10	\$956,200.00	\$95,620
2	Shared Use Path	Mi.		\$187,800.00	\$0
3	New Roadway - Local Roads	Lane-Mi.	0.23	\$269,700.00	\$62,031
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY	880	\$30.00	\$26,400
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.		\$338,000.00	\$0
15	Landscaping	Mi.		\$235,000.00	\$0
16	Bridges	SF		\$150.00	\$0
17	Walls	SF		\$55.00	\$0
<b>SUBTOTAL</b>					<b>\$184,051</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$3,700
	TP & DT	3.0-8.0%	4.0%		\$7,400
	Mobilization	8.0-10.0%	10.0%		\$18,400
	Erosion Control	0.5-2.0%	2.0%		\$3,700
	Contingency	30-40%	40.0%		\$73,600
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$290,851</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$37,800
	Construction Engineering	10.0%	10.0%		\$29,100
<b>TOTAL PROJECT COST</b>					<b>\$358,000</b>

Notes:

- Roadway utilizes existing graded north/south connection
- Proposed roadway width - 40'; 10' lanes, 8' parking, 11' shared use
- Roadway section assumes full reconstruction
- 1' average earthwork assumed for widening and grading
- No illumination or landscaping
- Reduced TP&DT for off-alignment work
- Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: High Build #7d - Texas Avenue Extension			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Roadway, Drainage			LENGTH (MILE): 0.31	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.	0.31	\$1,198,100.00	\$371,411
2	Shared Use Path	Mi.		\$187,800.00	\$0
3	New Roadway - Local Roads	Lane-Mi.	0.72	\$269,700.00	\$194,184
4	Overlay Existing Roadway	Lane-Mi.		\$91,900.00	\$0
5	Reconstruct Existing Roadway	Lane-Mi.		\$304,900.00	\$0
6	Intersection Widening	EA		\$75,400.00	\$0
7	Large Roundabouts	EA		\$1,100,000.00	\$0
8	Small Roundabouts	EA		\$400,000.00	\$0
9	Interconnect Signal	LS		\$35,000.00	\$0
10	New Signal	EA		\$300,000.00	\$0
11	Signal Modifications	EA		\$65,000.00	\$0
12	Earthwork (See Note)	CY		\$30.00	\$0
13	Traffic Calming	5-10%		-	\$0
14	Illumination	Mi.	0.31	\$338,000.00	\$104,780
15	Landscaping	Mi.	0.31	\$235,000.00	\$72,850
16	Bridges	SF		\$70.00	\$0
17	Walls	SF		\$55.00	\$0
<b>SUBTOTAL</b>					<b>\$743,225</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$14,900
	TP & DT	3.0-8.0%	4.0%		\$29,700
	Mobilization	8.0-10.0%	10.0%		\$74,300
	Erosion Control	0.5-2.0%	2.0%		\$14,900
	Contingency	30-40%	40.0%		\$297,300
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$1,174,325</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$152,700
	Construction Engineering	10.0%	10.0%		\$117,400
<b>TOTAL PROJECT COST</b>					<b>\$1,445,000</b>

Notes:

- Roadway is new north extension of Texas Avenue
- Proposed roadway width - 60'; 10' lanes, 8' parking/swale both sides, 12' shared use both sides
- Improvements are at grade, earthwork is negligible
- Illumination and landscaping included along corridor improvements
- Reduced TP&DT for off-alignment work
- Cost associated for right-of-way and environmental documentation are not included

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: Low Build A - OR 47 @ Rose Signing			PREPARED BY: Darren Hippenstiel	DATE: 03/02/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Signing			LENGTH (MILE):	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Signs	SF	100	\$25.00	\$2,500
2	Posts	Foot Board	90.0	\$7.00	\$630
<b><i>SUBTOTAL</i></b>					<b>\$3,130</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$1,000
	TP & DT	3.0-8.0%	4.0%		\$1,000
	Mobilization	8.0-10.0%	10.0%		\$1,000
	Erosion Control	0.5-2.0%	2.0%		\$0
	Contingency	30-40%	40.0%		\$1,300
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b><i>TOTAL CONSTRUCTION COST</i></b>					<b>\$7,430</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$1,000
	Construction Engineering	10.0%	10.0%		\$700
<b><i>TOTAL PROJECT COST</i></b>					<b>\$10,000</b>

Notes:

New signage at OR 47 and Rose Avenue intersection  
Assumes 5 total signs with new wood posts

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: Low Build F - Bridge Street Curb Extension			PREPARED BY: Darren Hippenstiel	DATE: 03/03/2011	
DESIGN LEVEL: Planning Level					
KIND OF WORK: Signing and Striping			LENGTH (MILE):	SHEET: 1 of 1	
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Signs	SF	1.5	\$25.00	\$38
2	Posts	Foot Board	18	\$7.00	\$126
3	Curb	LF	28	\$15.00	\$420
4	Sidewalk	SF	160	\$5.00	\$800
5	Inlet/Cath Basin	EA	1	\$1,500.00	\$1,500
6	12 Inch Storm Sewer Pipe, 5' deep	LF	20	\$80.00	\$1,600
<b>SUBTOTAL</b>					<b>\$4,484</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$1,000
	TP & DT	3.0-8.0%	4.0%		\$1,000
	Mobilization	8.0-10.0%	10.0%		\$1,000
	Erosion Control	0.5-2.0%	2.0%		\$500
	Contingency	30-40%	40.0%		\$1,800
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$9,784</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$1,300
	Construction Engineering	10.0%	10.0%		\$1,000
<b>TOTAL PROJECT COST</b>					<b>\$13,000</b>

Notes:

- Curb extension includes new curb and sidewalk for the first parking space adjacent to intersection
- Parking space is MUTCD standard 8'x20'
- Assume 1 signs per corner; 1.5 SF and one post per sign
- Drainage impacts and revisions are assumed

**CH2M HILL - ORDER OF MAGNITUDE ESTIMATE**  
**City of Vernonia Transportation System Plan**

PROJECT: Low Build F - Bridge Street Bioswale		PREPARED BY: Darren Hippenstiel	DATE: 03/03/2011		
DESIGN LEVEL: Planning Level					
KIND OF WORK: Signing and Striping		LENGTH (MILE):	SHEET: 1 of 1		
NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Signs	SF	1.5	\$25.00	\$38
2	Posts	Foot Board	18	\$7.00	\$126
3	Bioswale Planting	SF	160	\$12.00	\$1,920
4	Curb	LF	56	\$15.00	\$840
5	Inlet/Cath Basin	EA	1	\$1,500.00	\$1,500
6	12 Inch Storm Sewer Pipe, 5' deep	LF	20	\$80.00	\$1,600
<b>SUBTOTAL</b>					<b>\$6,024</b>

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		\$1,000
	TP & DT	3.0-8.0%	4.0%		\$1,000
	Mobilization	8.0-10.0%	10.0%		\$1,000
	Erosion Control	0.5-2.0%	2.0%		\$500
	Contingency	30-40%	40.0%		\$2,400
	Escalation (per year)	0.5-2.0%	2.0%		\$0
	<i>Estimate Year</i>		2011		
	<i>Construction Year</i>		2011		
<b>TOTAL CONSTRUCTION COST</b>					<b>\$11,924</b>

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		\$1,600
	Construction Engineering	10.0%	10.0%		\$1,200
<b>TOTAL PROJECT COST</b>					<b>\$15,000</b>

Notes:

- Bioswale includes new curb and planting for the first parking space adjacent to intersection
- Parking space is MUTCD standard 8'x20'
- Assume 1 signs per corner; 1.5 SF and one post per sign
- Drainage impacts and revisions are assumed
- Bioswale planting includes grading, engineered soil, planting and irrigation
- Costs for bioswale planting provided by Alta Planning + Design

## Unit Costs (Based on Development Pricing)

### Curb, Gutter, Sidewalks, & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF	10,560	\$15.00	\$158,400.00	For Both Sides of Rdwy
Concrete Sidewalk	SF	95,040	\$5.00	\$475,200.00	For Both Sides of Rdwy, 9' Avg. Wide
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	\$85.00	\$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	\$3,000.00	\$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	42	\$1,500.00	\$63,000.00	Every 250' (21 in a mile*2 for both sides= 42)
<b>SUBTOTAL</b>				<b>\$1,208,400.00</b>	
Clearing and Grubbing - 0.6%				\$7,250.40	
Removal of Structures - 1.2%				\$14,500.80	
<b>TOTAL UNIT COST</b>				<b>\$1,230,200.00</b>	

### Curb, Gutter, Sidewalk (1 Side), & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF	5,280	\$15.00	\$79,200.00	One Side Only
Concrete Sidewalk	SF	108,240	\$5.00	\$541,200.00	One Side Only, 20.5' width
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	\$85.00	\$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	\$3,000.00	\$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	42	\$1,500.00	\$63,000.00	Every 250' (21 in a mile*2 for both sides= 42)
<b>SUBTOTAL</b>				<b>\$1,195,200.00</b>	
Clearing and Grubbing - 0.6%				\$7,171.20	
Removal of Structures - 1.2%				\$14,342.40	
<b>TOTAL UNIT COST</b>				<b>\$1,216,700.00</b>	

### Sidewalk (at grade), & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF		\$15.00	\$0.00	No Curbs
Concrete Sidewalk	SF	126,720	\$5.00	\$633,600.00	For Both Sides of Rdwy, 12' Wide
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	\$85.00	\$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	\$3,000.00	\$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	21	\$1,500.00	\$31,500.00	Every 250' (21 in a mile located in swale)
<b>SUBTOTAL</b>				<b>\$1,176,900.00</b>	
Clearing and Grubbing - 0.6%				\$7,061.40	
Removal of Structures - 1.2%				\$14,122.80	
<b>TOTAL UNIT COST</b>				<b>\$1,198,100.00</b>	

### Sidewalk (at grade), & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF		\$15.00	\$0.00	No Curbs
Concrete Sidewalk	SF	63,360	\$5.00	\$316,800.00	12'; One side
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	\$85.00	\$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	\$3,000.00	\$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	21	\$1,500.00	\$31,500.00	Every 250' (21 in a mile located in swale)
<b>SUBTOTAL</b>				<b>\$860,100.00</b>	
Clearing and Grubbing - 0.6%				\$5,160.60	
Removal of Structures - 1.2%				\$10,321.20	
<b>TOTAL UNIT COST</b>				<b>\$875,600.00</b>	

### Sidewalk, Curb one side & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF	5,280	\$15.00	\$79,200.00	Curb One Side
Concrete Sidewalk	SF	63,360	\$5.00	\$316,800.00	12'; One side
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	\$85.00	\$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	\$3,000.00	\$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	21	\$1,500.00	\$31,500.00	Every 250' (21 in a mile located in swale)
<b>SUBTOTAL</b>				<b>\$939,300.00</b>	
Clearing and Grubbing - 0.6%				\$5,635.80	
Removal of Structures - 1.2%				\$11,271.60	
<b>TOTAL UNIT COST</b>				<b>\$956,200.00</b>	

**Shared Use Path (Unit: Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	802	\$85.00	\$68,151.11	12' path, 5280' long, depth=2 IN, density=2.050 TN/CY
Aggregate Base	TN	4,341	\$22.00	\$95,509.33	12' Lane, 5280' long, depth=12 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 5' deep	LF	260	\$80.00	\$20,800.00	Lateral Culverts: 20' long, every 400 LF (13/mile)
			<b>SUBTOTAL</b>	<b>\$184,460.44</b>	
Clearing and Grubbing - 0.6%				\$1,106.76	
Removal of Structures - 1.2%				\$2,213.53	
			<b>TOTAL UNIT COST</b>	<b>\$187,800.00</b>	

**New Roadway - State Highway (Unit: Lane-Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	3,207	\$85.00	\$272,604.44	12' Lanes, 5280' long, depth=8 IN, density=2.050 TN/CY
Aggregate Base	TN	5,065	\$22.00	\$111,427.56	12' Lanes, 5280' long, depth=12 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 10' deep	LF	273	\$80.00	\$21,840.00	Lateral Culverts: 13' per lane, every 250 LF (21/mile)
Excavation	CY	-	\$15.00	\$0.00	
Embankment	CY	-	\$15.00	\$35,200.00	See Below For Earthwork
Thermoplastic Pavement Striping	LF	5,280	\$1.50	\$7,920.00	1 solid stripe per lane
			<b>SUBTOTAL</b>	<b>\$448,992.00</b>	
Clearing and Grubbing - 0.6%				\$2,693.95	
Removal of Structures - 1.2%				\$5,387.90	
			<b>TOTAL UNIT COST</b>	<b>\$457,100.00</b>	

**New Roadway - Collector Roads (Unit: Lane-Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	2,405	\$85.00	\$204,453.33	12' Lanes, 5280' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN	2,894	\$22.00	\$63,672.89	12' Lanes, 5280' long, depth=8 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 10' deep	LF	273	\$80.00	\$21,840.00	Lateral Culverts: 13' per lane, every 250 LF (21/mile)
Excavation	CY	-	\$15.00	\$0.00	
Embankment	CY	-	\$15.00	\$35,200.00	See Below For Earthwork
Thermoplastic Pavement Striping	LF	5,280	\$1.50	\$7,920.00	1 solid stripe per lane
			<b>SUBTOTAL</b>	<b>\$333,086.22</b>	
Clearing and Grubbing - 0.6%				\$1,998.52	
Removal of Structures - 1.2%				\$3,997.03	
			<b>TOTAL UNIT COST</b>	<b>\$339,100.00</b>	

**New Roadway - Local Roads (Unit: Lane-Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	1,604	\$85.00	\$136,302.22	12' Lanes, 5280' long, depth=4 IN, density=2.050 TN/CY
Aggregate Base	TN	2,894	\$22.00	\$63,672.89	12' Lanes, 5280' long, depth=8 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 10' deep	LF	273	\$80.00	\$21,840.00	Lateral Culverts: 13' per lane, every 250 LF (21/mile)
Excavation	CY	-	\$15.00	\$0.00	
Embankment	CY	-	\$15.00	\$35,200.00	See Below For Earthwork
Thermoplastic Pavement Striping	LF	5,280	\$1.50	\$7,920.00	1 solid stripe per lane
			<b>SUBTOTAL</b>	<b>\$264,935.11</b>	
Clearing and Grubbing - 0.6%				\$1,589.61	
Removal of Structures - 1.2%				\$3,179.22	
			<b>TOTAL UNIT COST</b>	<b>\$269,700.00</b>	

**Overlay Existing Roadway (Unit: Lane-Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	802	\$85.00	\$68,151.11	12' Lanes, 5280' long, depth=2 IN, density=2.050 TN/CY
Cold Plane Pavement Removal	SF	15,840	\$1.00	\$15,840.00	12' Lanes, 5280' long, 25% of extg. rdwy.
Thermoplastic Pavement Striping	LF	5,280	\$1.50	\$7,920.00	1 solid stripe per lane
			<b>TOTAL UNIT COST</b>	<b>\$91,900.00</b>	

**Reconstruct Existing Roadway (Unit: Lane-Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Excavation	CY	3,520	\$10.00	\$35,200.00	Removal of 4in. AC and 14in Aggregate Base
New Roadway	-	-	-	\$269,700.00	See 'New Roadway' Sheet for Cost Breakdown
			<b>TOTAL UNIT COST</b>	<b>\$304,900.00</b>	

**Intersection Widening (Unit: Each)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	296	\$85.00	\$25,169.44	26' of widening per approach, 2 approaches, 150' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN	624	\$22.00	\$13,717.41	26' of widening per approach, 2 approaches, 150' long, depth=14 IN, density=1.850 TN/CY
Concrete Curb and Gutter	LF	600	\$15.00	\$9,000.00	300' per approach, 2 approaches
Sidewalk	SF	4,200	\$5.00	\$21,000.00	300' per approach, 2 approaches, 7' Wide
Demolition of Extg. Curb/Sidewalk	CY	200	\$15.00	\$3,000.00	300' per approach, 2 approaches, 9' Wide, 1' Deep
Thermoplastic Pavement Striping	LF	1,200	\$1.50	\$1,800.00	2 solid stripes per lane, 4 new lanes, 150' long
<b>SUBTOTAL</b>				<b>\$73,686.85</b>	
Clearing and Grubbing - 0.6%				\$442.12	
Removal of Structures - 1.2%				\$884.24	
Landscaping - 0.5%				\$368.43	
<b>TOTAL UNIT COST</b>				<b>\$75,400.00</b>	

**Large Roundabouts (Unit: Each)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN		\$85.00	\$0.00	26' of widening per approach, 2 approaches, 150' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN		\$22.00	\$0.00	26' of widening per approach, 2 approaches, 150' long, depth=14 IN, density=1.850 TN/CY
Concrete Curb and Gutter	LF		\$15.00	\$0.00	300' per approach, 2 approaches
Concrete Sidewalk	SF		\$5.00	\$0.00	300' per approach, 2 approaches, 7' Wide
Concrete Islands	SF		\$12.00		
Demolition of Extg. Curb/Sidewalk	CY		\$15.00	\$0.00	300' per approach, 4 approaches, 9' Wide, 1' Deep
Thermoplastic Pavement Striping	LF		\$1.00	\$0.00	2 solid stripes per lane, 4 new lanes, 150' long
<b>SUBTOTAL</b>				<b>\$0.00</b>	
Clearing and Grubbing - 0.6%				\$0.00	
Removal of Structures - 1.2%				\$0.00	
Landscaping - 0.5%				\$0.00	
Roundabout OLD	EA	1	\$1,100,000.00	\$1,100,000.00	Includes all costs associated with the construction of a One Lane Roundabout where an existing intersection is located. Cost per Rick Kuehn.
<b>TOTAL UNIT COST</b>				<b>\$1,100,000.00</b>	

**Small Roundabouts (Unit: Each)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN		\$85.00	\$0.00	26' of widening per approach, 2 approaches, 150' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN		\$21.00	\$0.00	26' of widening per approach, 2 approaches, 150' long, depth=14 IN, density=1.850 TN/CY
Concrete Curb and Gutter	LF		\$15.00	\$0.00	300' per approach, 2 approaches
Concrete Sidewalk	SF		\$5.00	\$0.00	300' per approach, 2 approaches, 7' Wide
Concrete Islands	SF		\$12.00		
Demolition of Extg. Curb/Sidewalk	CY		\$15.00	\$0.00	300' per approach, 4 approaches, 9' Wide, 1' Deep
Thermoplastic Pavement Striping	LF		\$1.00	\$0.00	2 solid stripes per lane, 4 new lanes, 150' long
<b>SUBTOTAL</b>				<b>\$0.00</b>	
Clearing and Grubbing - 0.6%				\$0.00	
Removal of Structures - 1.2%				\$0.00	
Landscaping - 0.5%				\$0.00	
Roundabout OLD	EA	1	\$1,100,000.00	\$400,000.00	Includes all costs associated with the construction of a One Lane Roundabout in virgin ground. Cost per Rick Kuehn.
<b>TOTAL UNIT COST</b>				<b>\$400,000.00</b>	

**Restriping Existing Roadway (Unit: mi)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Stripe Removal	LF	1	\$0.65	\$0.65	1 solid stripe removed per lane
Thermoplastic Pavement Striping	LF	1	\$1.00	\$1.00	1 solid stripe per lane
<b>TOTAL UNIT COST</b>				<b>\$1.65</b>	

**Interconnect Signal (Unit: Lump Sum)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Interconnect Signal System	LS	1	\$35,000.00	\$35,000.00	Includes all costs to interconnect
<b>TOTAL UNIT COST</b>				<b>\$35,000.00</b>	

**New Signal (Unit: Each)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
New Signal	LS	1	\$300,000.00	\$300,000.00	Includes signal system and all appurtenances (pole, wiring, detection devices, etc.) for 1 intersection
<b>TOTAL UNIT COST</b>				<b>\$300,000.00</b>	

**Signal Modifications (Unit: Each)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Modify Signal	LS	1	\$65,000.00	\$65,000.00	Includes all evaluations and modifications to the signal at one intersection
<b>TOTAL UNIT COST</b>				<b>\$65,000.00</b>	

**Earthwork (Unit: Lane-Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Excavation	CY	1,173	\$15.00	\$17,600.00	Length=5280/2=2640LF, Max depth = 2'
Embankment	CY	1,173	\$15.00	\$17,600.00	Length=5280/2=2640LF, Max height = 2'
<b>TOTAL UNIT COST</b>				<b>\$35,200.00</b>	

**Earthwork Estimated (Unit: CY)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Earthwork (Cut/Fill)	CY	1	\$30.00	\$30.00	Rock excavation
<b>TOTAL UNIT COST</b>				<b>\$30.00</b>	

**Illumination (Unit: Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Luminaire and appurtenances	EA	52	\$ 6,500.00	\$338,000.00	Luminaire, pole, wiring, etc (1 pole on each side every 200'=52 poles)
<b>TOTAL UNIT COST</b>				<b>\$338,000.00</b>	

**Landscaping (Unit: Mile)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Landscaping	LS	1	\$ 235,000.00	\$235,000.00	Plantings, Trees, Topsoil, and Irrigation sums up to approximately \$235,000 per mile (for both sides of roadway)
<b>TOTAL UNIT COST</b>				<b>\$235,000.00</b>	

**Bridges (Unit: Square Foot)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
				\$0.00	The cost of this item is project dependent; see note 3 of the directions tab for more information
<b>TOTAL UNIT COST</b>				<b>\$0.00</b>	

**Walls (Unit: Square Foot)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Standard Retaining Wall	LS	1	\$55.00	\$55.00	Soil Nail Wall with facing
<b>TOTAL UNIT COST</b>				<b>\$55.00</b>	

**Right-of-Way (Unit: Square Foot)**

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Right-of-Way Acquisition	LS	1	\$10.00	\$10.00	ROW acquisition cost is approx. \$10/SF
<b>TOTAL UNIT COST</b>				<b>\$10.00</b>	

Facility		Bike Lane (Roadway Expansion)	Bike Lane (Restriping)	Sharrows	Bike Boulevard	Multi-Use Path (12', asphalt)	Access-way	Natural Surface Trail (6', difficult terrain)	Multi-Use Path Bridge (14')	Sidewalk (6')	Sidewalk Widening (SF)	Crosswalks (EA)	Signs (EA)	Stop Bar (EA)	Median Refuge Island (EA)	Curb Extension (EA)	Curb Ramp (EA)	Pedestrian Countdown Signal (EA)
Raw Construction Cost		\$48.78	\$23.00	\$3.00	\$10.27	\$89.65	\$43.43	\$15.00	\$4,000.00	\$92.67	\$5.00	\$500	\$200	\$150	\$15,000	\$7,500	\$1,500	\$1,000
Contingency	30%	\$14.63	\$6.90	\$0.90	\$3.08	\$26.90	\$13.03	\$4.50	\$1,200.00	\$27.80	\$1.50	\$150.00	\$60.00	\$45.00	\$4,500.00	\$2,250.00	\$450.00	\$300.00
Engineering/Design	20%	\$9.76	\$4.60	\$0.60	\$2.05	\$17.93	\$8.69	\$3.00	\$800.00	\$18.53	\$1.00	\$100.00	\$40.00	\$30.00	\$3,000.00	\$1,500.00	\$300.00	\$200.00
Construction Overhead, Mobilization	15%	\$7.32	\$3.45	\$0.45	\$1.54	\$13.45	\$6.51	\$2.25	\$600.00	\$13.90	\$0.75	\$75.00	\$30.00	\$22.50	\$2,250.00	\$1,125.00	\$225.00	\$150.00
Project Administration	10%	\$4.88	\$2.30	\$0.30	\$1.03	\$8.97	\$4.34	\$1.50	\$400.00	\$9.27	\$0.50	\$50.00	\$20.00	\$15.00	\$1,500.00	\$750.00	\$150.00	\$100.00
<b>Full Burden</b>	<b>75%</b>	<b>\$85.37</b>	<b>\$40.25</b>	<b>\$5.25</b>	<b>\$17.98</b>	<b>\$156.89</b>	<b>\$75.99</b>	<b>\$26.25</b>	<b>\$7,000.00</b>	<b>\$162.17</b>	<b>\$8.75</b>	<b>\$875.00</b>	<b>\$350.00</b>	<b>\$262.50</b>	<b>\$26,250.00</b>	<b>\$13,125.00</b>	<b>\$2,625.00</b>	<b>\$1,750.00</b>

4) Connect Future Crown-Zellerbach Trail to Banks-Vernonia Trail

Facility	Length	14'		Raw	Rounded
		Multi-Use Path	Bridge		
CZ-BV Trail	5700	\$157	\$4,043	\$894,289	\$900,000
Nehalem River Bike Ped Bridge	250		200	\$808,500	\$810,000
<b>Total:</b>				<b>\$1,702,789</b>	<b>\$1,710,000</b>

6) Bicycle/Pedestrian Connection From Vernonia Schools to Riverside Drive

Facility	Length	Multi-Use Path		Raw	Rounded
		\$157			
MUP	1450	1450		\$227,494	\$230,000
				<b>\$227,494</b>	<b>\$230,000</b>

*following edge of school lot from  
 riverside to missouri (last segment  
 near missouri may be unnecessary,  
 in future parking lot)*

B) Improve Pedestrian Crossing at California Avenue and OR 47/Bridge Street to Access O-A Hill Sidepath

Facility	Length	Multi-Use Path	Crosswalk	Curb Ramp	Signs	Sidewalk	Raw	Rounded
		\$157	\$875	\$2,625	\$350	\$162		
Sidewalk on N side of Bridge Street	175					175	\$28,379	\$30,000
Sidewalk around SE corner	50					50	\$8,108	\$10,000
Crosswalk	1		1				\$875	\$10,000
Curb Ramps	2			2			\$5,250	\$10,000
Signs	2				2		\$700	\$10,000
							<b>\$43,313</b>	<b>\$50,000</b>

C) Construct Sidewalk Along OR 47/Mist Drive

Facility	Length	Sidewalk		Raw	Rounded
			\$162		
Sidewalk	4600		4600	\$745,967	\$750,000
				<b>\$745,967</b>	<b>\$750,000</b>

D) Add sidewalks or connect existing sidewalks along collector streets

Facility	Length	Bike Lanes (restripe)	Sidewalk (both sides)	Raw	Rounded
		\$40	\$324		
State	3,000	3,000	1,900	\$736,983	\$740,000
Nehalem	1,700	1,700	1,700	\$619,792	\$620,000
Rose	3,100	3,100	3,100	\$1,130,208	\$1,140,000
2nd Ave	1,500	1,500	1,500	\$546,875	\$550,000
Louisiana	2,000	2,000	2,000	\$729,167	\$730,000
N Louisiana	1,200	1,200	1,200	\$437,500	\$440,000
Knott	3,500	3,500	3,500	\$1,276,042	\$1,280,000
		16,000	29,800	<b>\$5,476,567</b>	<b>\$5,480,000</b>

E) Bicycle/Pedestrian Connection From Vernonia Schools to Nehalem View Development

Facility	Length	Multi-Use Path		Raw	Rounded
			\$157		
	1300		1300	\$203,961	\$210,000
				<b>\$203,961</b>	<b>\$210,000</b>

G1) Safe Routes to School Connection – Alabama Avenue

Facility	Length	Sidewalk (6' one side, no C&G)	Raw	Rounded
	1750	\$84	1750	\$147,000
			<b>\$147,000</b>	\$150,000
				<b>\$150,000</b>

G2) Safe Routes to School Connection – Mississippi Avenue

Facility	Length	Sidewalk (6' one side, no C&G)	Raw	Rounded
	1200	\$84	1200	\$100,800
			<b>\$100,800</b>	<b>\$110,000</b>

G3) Safe Routes to School Connection – Texas Avenue

Facility	Length	Sidewalk (6' one side, no C&G)	Raw	Rounded
	900	\$84	900	\$75,600
			<b>\$75,600</b>	<b>\$80,000</b>

H) Soft-Surface Trail Improvements up O-A Hill

<b>Segment</b>	<b>Crow-Flies Length</b>	<b>Low Elevation</b>	<b>High Elevation</b>	<b>Slope</b>	<b>Adjusted Length (to make 8%)</b>	<b>Cost</b>	
Top Park Loop	400	670	728	14.5%	725	\$19,031	
Main Slope	336	626	696	20.8%	875	\$22,969	
To Bridge Street	265	622	650	10.6%	350	\$9,188	
To North Street	228	624	647	10.1%	287.5	\$7,547	<b>Rounded</b>
<b>Total:</b>						<b>\$58,734</b>	<b>\$60,000</b>