



## DRAFT Technical Memorandum #3- Alternatives Analysis

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Project #: 18974

To: Technical Advisory Committee & Citizen Advisory Committee

From: Ashleigh Griffin, Nick Foster, AICP, and Marc Butorac, PE, PTOE; Kittelson & Associates  
Jeremy Morris, PE; Adkins Consulting Engineering

Subject: Klamath Falls Urban Trail Master Plan – Alternatives Analysis

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This memorandum provides an assessment of project alternatives to be included in the Klamath Falls Urban Trail Master Plan. It concludes with the project team's preliminary recommendation for the final set of projects to be included in the plan.

### BACKGROUND

The Klamath Falls Urban Trail Master Plan will identify and coordinate opportunities to create seamless connections between the urban trails and nearby attractions as well as nearby pedestrian and bicycle facilities. The intent of the Klamath Falls Urban Trail Plan is to identify key pedestrian and bicycle connections to the existing trail system and to identify key gaps and deficiencies of the trail system. The Plan is not a full pedestrian and bicycle plan; gaps in the pedestrian and bicycle system that do not relate to trail access are not included in this study.

### PLAN ELEMENTS

The final Klamath Falls Urban Trail Master Plan will include the following elements, which will be prioritized in the final Plan:

- **Projects** – capital investment made to improve the existing trail system and the bicycle and pedestrian system that connect to it. Examples include new shared-use paths, bicycle lanes, sidewalks, and crosswalks. In some cases, these projects could be implemented as pilot, or test, projects for a certain time period and then modified based on the evaluation during this period for final implementation.
- **Policies** – statements adopted in the Klamath Falls Urban Trail Plan that are intended to influence and guide decisions and actions related to pedestrian and bicycle planning. As an example, policies could relate to requirements for new developments to incorporate bicycle parking or provide pedestrian and bicycle facilities.
- **Programs** – plans of action aimed at accomplishing an identified County or City goal(s) that commonly include details on what work is to be done, by whom, when, and the intended

outcome of the action. An example is implementing a program to install wayfinding signage at all trail crossings and trailheads.

- **Future Studies** – research and investigation to be completed after the Klamath Falls Urban Trail Master Plan is completed. Such studies will not be done during the Urban Trail Master Plan process due to lack of available data, a need for guidance and/or analysis from responsible agencies, and/or the need for a focused public involvement and analysis process beyond the Urban Trail Master Plan scope of work and budget.

Note that the term “project” is used throughout this memorandum to refer to plan elements for ease and brevity. For example, the “projects” for evaluation described in the next section include all elements of the Plan, including capital projects, policies, programs, and future studies.

## ALTERNATIVES EVALUATION

Projects have been developed to address the gaps and deficiencies identified in Technical Memorandum #2. These gaps and deficiencies were identified from feedback from the general public and project advisory committees and the project team’s evaluation. In many instances, multiple alternative projects for a single gap or deficiency are presented in this memorandum, along with the project team’s assessment of the options. Project alternatives are based on feedback from the advisory committee and the general public, the 2012 Klamath Falls Urban Area Transportation System Plan, and the project team’s experience with developing bicycle and pedestrian projects.

The project team’s recommendations include specific projects (e.g. stripe a bicycle lane, add beacons to a crosswalk) whenever possible. However, there are instances when more information is needed that is beyond the scope of this area-wide plan and the recommendation is for further study.

The recommendations were selected based on the overall project goal of identifying low-cost, easy to implement solutions that provide comfortable and convenient access to the trail system for a wide range of people. For instance, the recommended projects for improving the bicycle system are only those types of facilities that most adults would feel comfortable bicycling on (i.e. Level of Traffic Stress 1 or 2). Table 1 summarizes the potential types of bike facilities that would be required to meet this objective on different types of roads. Note that the table provides general guidelines and site specific characteristics (e.g., number and type of driveways, traffic volumes) are also considered in our recommendations.

**Table 1 Bicycle Facility Suitability Matrix**

Speed Limit	# of Lanes	Suitable Bike Facility Types				
		Shared Lane <sup>1</sup>	Bike Lane	Buffered Bike Lane	Protected Bike Lane	Shared-use Path
<=25 MPH	2-3	Y	Y	Y	Y	Y
	>3	-	-	Y	Y	Y
30 MPH	2-3	M <sup>2</sup>	Y	Y	Y	Y
	>3	-	-	Y	Y	Y
35 MPH <sup>3</sup>	2-3	-	-	Y	Y	Y
	>3	-	-	Y	Y	Y
>=40 MPH <sup>3</sup>	2-3	-	-	-	Y	Y
	>3	-	-	-	Y	Y

<sup>1</sup>Includes streets with sharrows

<sup>2</sup>Suitable treatment only if traffic volumes are low and there is no centerline on the roadway

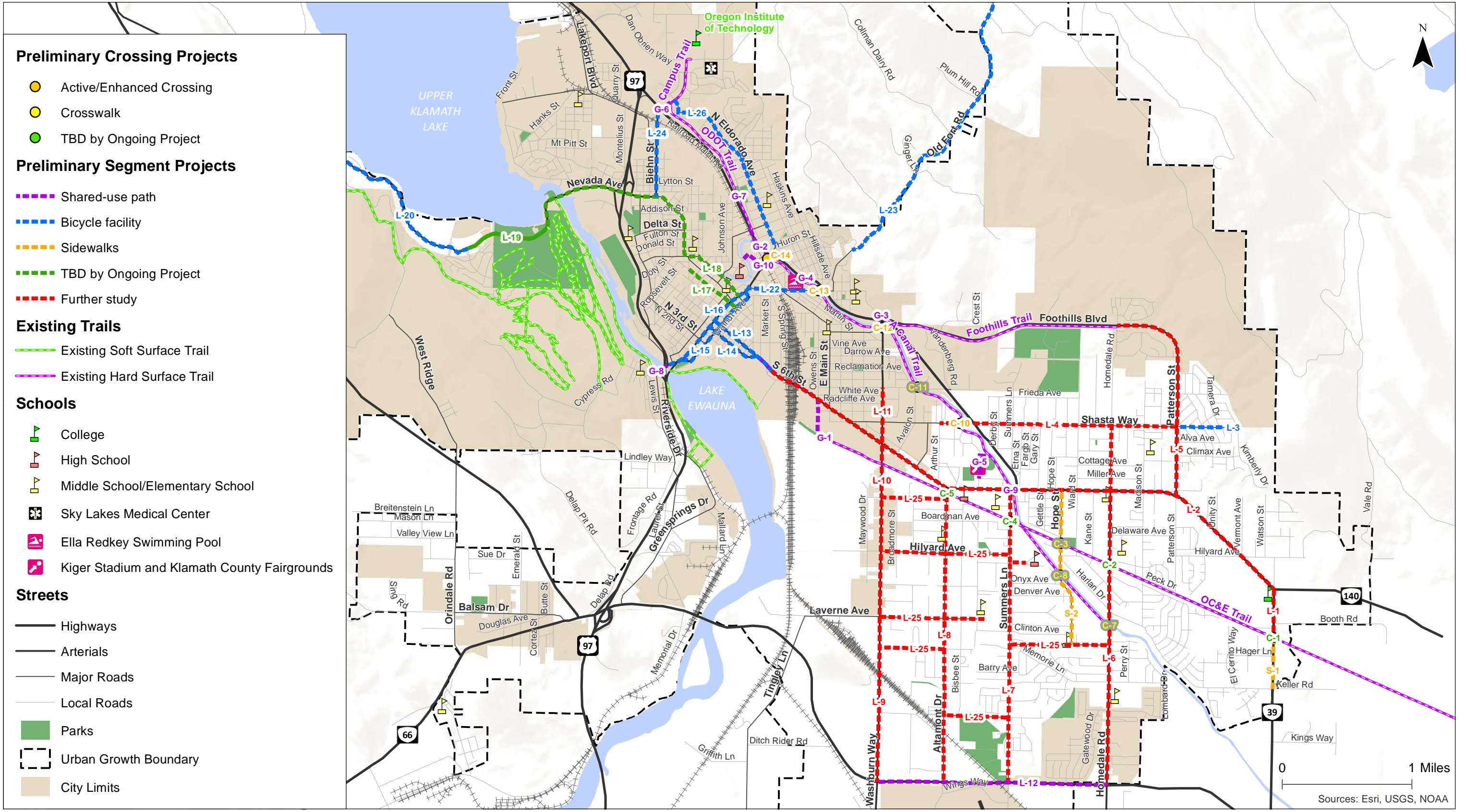
<sup>3</sup>On higher speed roadways where a protected bike lane is not feasible and/or desirable, the best option may be to provide a parallel route on lower speed roadways

Further, whenever possible, the lowest cost means to implement a project is recommended. This consideration typically occurs when evaluating how to install some type of bike lane or provide an enhanced crossing. Restriping a roadway to provide a bike lane, as opposed to widening the roadway, is generally recommended. Instances where restriping may necessitate the removal of a motor vehicle travel lane or center turn lane will likely require further study and detailed public involvement before they can be implemented.

## PROPOSED PROJECT LIST

Table 2 summarizes the preliminary project list. The locations of each project are shown in Figure 1. The complete evaluation matrix, which includes all alternatives that were considered, is provided in *Attachment A*. The columns in the table below describe:

- **ID:** unique identifying number assigned to each proposed project, corresponding to the need identified in Technical Memorandum #2.
- **Location Name/Description:** general description of the location of the issue, including the boundary of the issue.
- **Issue:** description of the issue (gap, deficiency, etc.)
- **Project Description:** a description of the proposed project with key elements identified
- **Category:** projects are classified into general categories based on plan element type, with capital projects further categorized into shared-use path, crossing, bicycle facility, and sidewalk.
- **Benefits:** a brief discussion of the benefits of the proposed project.
- **Cost estimate:** planning-level cost estimate, intended to provide a sense of magnitude.
- **Considerations:** other site-specific characteristics or factors that warrant unique consideration in the project development phase.



**Preliminary Projects  
Klamath Falls, Oregon** Figure  
**1**

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**Table 2 Preliminary Project List**

ID*	Location	Issue	Project Description	Category	Benefits	Cost Estimate^	Considerations
G-1	End of the OC&E Trail to Downtown Klamath Falls	Trail ends without obvious connection to downtown.	Connect the trail via 6th Street bridge by widening sidewalk to provide for shared-use path.	Shared-use path; crossing	Lower cost and easier to implement than dedicated bridge.	\$507,000	May require the crossing of 6 <sup>th</sup> Street and ramps on/off the bridge; Requires trail users to travel to 6 <sup>th</sup> Street.
G-2	Connecting the "A" Canal Trail to the ODOT Trail	There is currently a ¼-mile gap between these two trails and a crossing of Crater Lake Parkway.	Connect the trail using US 97 by widening the sidewalks to provide for shared-use path.	Shared-use path	Lower cost to implement and maintain.	\$68,000	Requires crossing Crater Lake Highway; Requires a trail crossing of Esplanade Avenue; Requires widening the sidewalk on the bridge to connect the A Canal Trail to the signalized intersection.
G-3	Connecting the "A" Canal Trail to the Foothills Trail	The Foothills Trail ends at the intersection of Foothills Boulevard/Crater Lake Parkway, and there is a gap between the intersection and the "A" Canal trail south of the canal.	Widen the sidewalk on one side (east) of the bridge to provide a shared use path between the intersection and the "A" Canal trail, and install an enhanced trail crossing of Washburn Way where the "A" Canal trail crosses. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	Shared-use path; crossing	This option uses the existing signalized crossing as well as sidewalks and bike lanes south of OR 39 to complete the transition. By expanding the sidewalk to a path on the east side, it allows southbound bicyclists to continue from the Foothills Trail to the "A" Canal trail eastbound with only one crossing. Project could be phased in. Tightening the curb radius will slow down right-turn making the crossing more comfortable.	\$60,000	Accommodating the shared-use path on the bridge may require either removing the bike lanes or lane width reductions; Requires a trail crossing of Washburn Way.
G-4	Connecting the "A" Canal Trail to the Ella Redkey Swimming Pool	The trail is grade separated from the pool.	Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	Shared-use path	Low cost, short trail connection needed.	\$15,000	May require right-of-way or an easement.
G-5	Connecting the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds	The trail is grade separated from these locations.	Install a shared-use path from the "A" Canal Trail to Crest Street (just north of the Kiger Stadium parking lot) with a short connection to Kiger Stadium, and continue the shared use path south along Crest Street to the fairgrounds.	Shared-use path	Provides facility for both pedestrians and bicyclists; Separates pedestrians and bicyclists from vehicles at Kiger Stadium.	\$145,000	May require right-of-way or an easement to reach Crest Street; More costly than only connecting to the Stadium.
G-6	Campus Trail to Biehn Street Connection	There is a gap between the Campus Trail and the bike lane on Biehn Street, which connects to Oregon Avenue and downtown Klamath Falls.	Widen the sidewalk on the south side of Campus Drive to complete the shared-use path connection.	Shared-use path	This connection would also connect with the ODOT trail; Uses the existing intersection of Crater Lake Parkway/Biehn Street to complete the highway crossing.	\$47,000	Southbound cyclists coming from the Campus Trail would use the crosswalks at the signalized intersection to transition to bike lanes; Modifications to the Crater Lake Parkway intersection may be required to create a comfortable crossing.
G-7	Connecting the ODOT Trail to Kit Carson Park	The ODOT Trail travel adjacent to the park, but a fence separates the park from the trail.	Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	Shared-use path	Low cost, short trail connection needed.	\$18,000	May require right-of-way or an easement.
G-8	Veteran's Park Trail Connections	There are no bicycle connections between Veteran's Park and the Link River Trail.	Widen the sidewalk on the north side of Main Street to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path.	Shared-use path; crossing	Provides a separated facility for pedestrians and bicyclists between two popular destinations.	\$51,000	Lanes will have to be narrowed on the bridge to accommodate the shared-use path; An additional crossing of Main Street may be needed on the west side of the bridge.
G-9	"A" Canal Trail Crossing at SW 6th Street	The trail crosses SW 6th Street approximately 40 feet east of the crosswalk at the signalized intersection of Summers Lane/SW 6th Street.	Widen the sidewalk on the south side of SW 6th Street to better accommodate bicyclists connecting to the signalized crossing.	Shared-use path	Low cost; requires minimal out of direction travel.	\$7,000	Will need to verify there is sufficient right-of-way.
G-10	"A" Canal Trail Connection to Klamath Union High School	There is no connection for bicyclists between the "A" Canal Trail and the high school.	Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school.	Shared-use path	There appears to be adequate width available under the railroad bridge to complete the widening. Provides connection for bicyclists between the trail and high school.	\$127,000	The trail will likely need to come in through the schools' ball fields on the peninsula due to limited width on the southern section of Esplanade. ROW/easement will be needed from the school. The bridge will need to be used to complete the crossing from this direction.
G-11	Trail Signing/Wayfinding	Wayfinding and trail signs are generally absent, including near the OC&E trailheads. Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	Program	Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	--	Will need to determine who is responsible for the signs.
G-12	Bicycle Parking	Bicycle parking is absent from many destinations, including some parks.	Develop policy that requires bicycle parking to be provided at key locations and pursue grant funding to provide it at key locations where it is missing.	Policy/Program	The policy would help future developments or redevelopment locations obtain bicycle parking. Pursuing grant funding for existing locations in need will help fill-in existing gaps.	--	
C-1	OR 39: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study	Crossing			
C-2	Homedale Road: OC&E	This crossing is currently not marked or signed. The NCHRP 562	TBD by ongoing ODOT and Oregon Parks study	Crossing			

ID*	Location	Issue	Project Description	Category	Benefits	Cost Estimate^	Considerations
	Trail Crossing	treatment recommendation is a crosswalk.					
C-3	Hope Street: OC&E Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install striped crosswalk and appropriate signage.	Crossing	Low cost.	\$2,000	Consider installing illumination at the crossing as well (it is currently located nearby but not at the crossing).
C-4	Summers Lane: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study	Crossing			
C-5	Altamont Drive: OC&E Trail Crossing		TBD by ongoing ODOT and Oregon Parks study				
C-7	Homedale Road: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Crossing	Low cost.	\$2,000	Consider installing illumination at the crossing as well (there is not existing illumination on Homedale Road in the crossing vicinity).
C-8	Hope Street: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Crossing	Low cost.	\$2,000	Consider installing illumination at the crossing as well (there is no existing illumination in the vicinity); Sight distance from the south should be verified.
C-10	Shasta Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Install pedestrian refuge island and RRFBs where the trail crosses.	Crossing	Provides a refuge for pedestrians; Does not require out of direction travel to use the crossing; Existing pavement width would accommodate the refuge.	\$46,000	Would likely require closing the westbound left-turn lane.
C-11	Eberlein Avenue: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Crossing	Low cost.	\$2,000	
C-12	Washburn Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. However, it is in close proximity to a traffic signal. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Install enhanced crossing with refuge island and RRFBs at the trail crossing (near-term). Install grade-separated crossing (long-term).	Crossing	Does not require out of direction travel to use the crossing.	\$56,000	Would restrict the length of the northbound left-turn lane at the intersection of Washburn Way/OR 39 if a pedestrian refuge island is installed; Advanced RRFBs may installed to warn vehicles turning onto Washburn Way when a pedestrian has activated the RRFB.
C-13	Main Street: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Install enhanced crossing with refuge island and RRFBs at the trail crossing (near-term). Install grade-separated crossing (long-term).	Crossing	Does not require out of direction travel to use the crossing.	\$56,000	The 4-lane cross section is approximately 60-ft of pavement, which may provide adequate width to widen for a refuge island; Queuing from the intersection of Main Street/OR 39 may block the crossing at times; Advanced RRFBs may installed to warn vehicles turning from Crater Lake Parkway onto Main Street when a pedestrian has activated the RRFB.
C-14	Esplanade Avenue: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Install enhanced crossing with refuge island and RRFBs at the trail crossing (near-term). Install grade-separated crossing (long-term).	Crossing	Provides a direct crossing. The island provide the potential for a two-stage crossing.	\$56,000	Advanced RRFBs may be needed on OR 39. Queuing from the intersection of Esplanade Avenue/OR 39 may block the crossing at times. The left-turn lane on Esplanade Avenue may need to be shortened to accommodate a refuge island.
L-3	Shasta Way (Patterson Street to Kimberly Drive)	This segment has a LTS of 4. It is currently a two-lane road with a marked centerline and pavement width of approximately 22 feet.	Install sharrows and traffic calming.	Bicycle Facility	Width is not sufficient for bike lanes. Appears to be relatively low-volume street. The sharrows would alert vehicles that bicyclists share the road. Does not require roadway widening.	\$43,000	Sharrows alone will not do much for the comfort of people bicycling. Traffic calming will also be required to lower the speed people are driving.
L-12	OR 140 (Washburn Way to Homedale Road)	This segment has a LTS of 4.	Install shared-use path.	Shared-use path	Installing it along the north side of the road would minimize the number of bicycle crossings of OR 140. Provides physical separation between bikes and vehicles. Provides facility for pedestrians too.	\$820,000	One crossing of the railroad is involved. Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps). May require purchasing right-of-way. Treatments may be needed at crossings with minor streets.
L-13	6th Street (Market Street to Main Street)	This segment has a LTS of 3. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 46 feet. In the downtown area there are turn lanes and on-street parking.	Install bike lane.	Bicycle Facility	No roadway widening is required.	\$8,000	One side of on-street parking may need to be removed.
L-14	5th Street (Main Street to 6th Street)	This segment has a LTS of 4. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 45 feet. In the downtown area there are turn lanes and on-street parking.	Install bike lane.	Bicycle Facility	No roadway widening is required.	\$9,000	
L-15	Klamath Avenue (Conger Avenue to Commercial Street)	This segment has a LTS of 3. This is a one-way eastbound segment with no bike lanes.	Install bike lanes.	Bicycle Facility	No roadway widening is required.	\$15,000	May require the removal of on-street parking on at least one side of the road to accommodate the bike lane width.
L-16	Main Street (Esplanade Avenue to Mill Street)	This segment has a LTS of 3. This is a one-way westbound segment with no bike lanes.	Install bike lanes.	Bicycle Facility	No roadway widening is required.	\$15,000	
L-17	9th Street (Klamath Avenue to Prospect Street)	This segment has a LTS of 3. There are no bicycle lanes; the 2-way roadway has a minimum pavement width of 26 feet.	TBD by ongoing project				
L-18	N 11th Street (Oregon Avenue to Klamath)	This segment has a LTS of 3. There are no bicycle lanes. The 2-lane roadway has a minimum pavement width of 25 feet.	TBD by ongoing project				

ID*	Location	Issue	Project Description	Category	Benefits	Cost Estimate <sup>^</sup>	Considerations
	Avenue)						
L-19	Oregon Avenue (Moore Park to Upham Street)	The segment has a LTS of 3. Although there are bike lanes, they are narrow. Actual traffic speeds are expected to be higher than posted.	TBD by ongoing project				
L-20	Lakeshore Drive (Lynnewood Blvd to West UGB)	The segment has a LTS of 3. There are no shoulders or bike lanes.	Widen the pavement to accommodate shoulders or bike lanes.	Bicycle Facility	Provides a facility for bicyclists.	\$1,860,000	The road will need to be widened to accommodate paved shoulders, and the some earthwork is likely to be needed with the widening. There may be some ROW impacts associated with roadway widening.
L-22	Main Street (Esplanade Avenue to Crater Lake Parkway)	The segment has an LTS of 4. The eastern portion of the corridor is 4 lanes and 58-60 feet wide. Aerial images indicate this area is also used for on-street parking. The western portion of the corridor is approximately 54 feet wide and has two travel lanes with two sides of on-street parking. (This is also a potential connection that is relevant to project G-1. The undercrossing below the railroad tracks requires cyclists to ride in the lanes or use the narrow tunnel.)	Install bike lanes.	Bicycle Facility	Provides a facility for bicyclists.	\$19,000	Between Spring Street and Crater Lake Parkway, elimination of the on-street parking or a road diet would be required to accommodate the bike lanes. The eastbound bike lane would require a transition treatment where E Main Street turns off of Main Street. The pavement width is not adequate for adding a bicycle lane under the railroad, so the sidewalk would need to be widened to accommodate bikes. A transition between the bike lanes and sidewalks would also be needed.
L-23	Old Fort Road (Loma Linda Drive to UGB)	The LTS is 4. The road is higher speed and lacks bike lanes and shoulders. This is a popular recreational route.	Widen the road to add paved shoulders or bike lanes.	Bicycle Facility	The road appears to have some gravel shoulders today, so the additional widening may be minimal.	\$2,668,000	This is a long distance to pave (high cost).
L-24	Biehn Street (Crater Lake Parkway to Oregon Avenue)	The road is part of an important link between OIT and downtown. The existing bike lanes are narrow.	Widen the bike lanes by restriping the roadway.	Bicycle Facility	No pavement widening is required.	\$22,000	
L-25	East-West Routes in Southeast Klamath Falls	These streets connect neighborhoods to the north-south routes that connect to the trail system.	Review routes to identify which should receive shared lane markings, wayfinding, and/or traffic calming	Bicycle Facility	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.
L-26	N Eldorado Avenue	This road lacks bicycle facilities and sidewalks on one side of the road. This road is a popular commute route to the hospital, and also connects student apartments to the campus.	Install sharrows and traffic calming.	Bicycle Facility	Posted speed limit indicates that a shared-roadway would be sufficient. The sharrows would alert vehicles that bicyclists share the road. No roadway widening is required.	\$23,000	This project does not provide any new pedestrian facilities, but sidewalks exist on one side of the road.
S-1	OR 39 (OC&E trail to Keller Road)	There are no sidewalks.	Install sidewalks on both sides of the road.	Sidewalks		\$396,000	May require ROW.
S-2	Hope Street (Bristol Avenue to SW 6th Street)	There are no sidewalks on Hope Street, with the exception of those around Denver Avenue.	Install sidewalks on both sides of the road.	Sidewalks	Provides connection for pedestrians between Peterson Elementary school and the OC&E and A Canal trails. The bridge over the canal already includes sidewalks.	\$1,170,000	May require ROW.
<b>Total Cost</b>						<b>\$8,335,000</b>	

\*The prefix on the ID numbers refers to the category of the issue: "G-" refers to general gaps or deficiencies; "L-" refers to segments that were identified due to having a bicycle Level of Traffic Stress (LTS) greater than 2; "C-" refers to locations with crossings that were identified for improvements; and "S-" refers to gaps in the sidewalk system.

<sup>^</sup>Please note the costs outlined above are for 2015 and are planning level estimates only that do not include right-of-way. An annual inflation rate of 3 to 5 percent should be applied when projecting costs to the future.

## 'A' Canal Trail Crossings

The 'A' Canal Trail crosses Washburn Way, Main Street, and Esplanade Avenue in close proximity to the Crater Lake Parkway (OR 39). None of these crossings are currently marked and require trail users to divert to the nearest signal or other location to use a marked crossing. The close proximity of the trail to the Crater Lake Parkway can present the following challenges to installing a direct crossing at the trail location:

- The crossing may require shortening the left-turn lane for traffic turning onto the highway from the street being crossed, which could cause queues of left-turning traffic to block the through travel lane.
- Right-turning traffic from the highway onto the street being crossed may be traveling at a relatively high speed and not expecting to have to stop for a person crossing the road. This is particularly a concern at Main Street, where the right-turn from the highway is channelized and not controlled by the signal.

For these locations, especially Main Street, the ideal solution would be a grade-separated crossing (e.g. a bridge over the roadway). This is our ultimate recommendation for these crossings. However, we recognize that building these grade separated crossings is likely cost-prohibitive in the near or intermediate terms and that there is a near-term desire for better crossings. Therefore, our recommendations include providing enhanced at-grade crossings, generally crossings with a median refuge island and rectangular rapid flash beacons (RRFBs) with accompanying features designed to mitigate the two challenges above. These features include advanced RRFB beacons to alert turning traffic the crossing is being used, potentially reconfiguring the free right-turn onto Main Street, and studying the locations further to determine what impact the refuge island may have on left-turn storage and whether the impact can be mitigated with signal timing modifications.

## Locations for Further Study

Table 3 summarizes the locations that were identified for further study. These locations include streets where a motor vehicle travel lane or center turn lane will need to be removed in order to provide the recommended bicycle facility. A more detailed technical analysis will better identify the specific impacts such a change would have and a focused public involvement effort will determine the community's preference. In some cases, the result may be that it is more desirable to provide a parallel route on lower speed and lower volume streets that provides a similar level of connectivity.



**Table 3 Locations for Further Study**

ID	Location	Issue
L-1	OR 39 (OC&E Trail to OR 140)	This segment has a LTS of 3. There are no existing bicycle lanes.
L-2	6th Street (Market Street to OR 39)	This segment has a LTS of 4. This is a four-lane road with a center turn lane. There are no bike lanes.
L-4	Shasta Way (Patterson Street to Crater Lake Parkway)	This segment has a LTS of 4. No bike lanes are present, and the existing pavement width is approximately 37' wide with one travel lane in each direction and center turn lanes throughout.
L-5	Patterson Street (6 <sup>th</sup> Street to Foothill Boulevard)	The segment has a LTS of 4. There are no existing bicycle lanes.
L-6	Homedale Road (OR 140 to Shasta Way)	This segment has a LTS of 4. The 3-lane cross section is approximately 37' wide throughout.
L-7	Summers Lane (OR 140 to SW 6th Street)	This segment has a LTS of 4. The 3-lane cross section is approximately 37' wide throughout.
L-8	Altamont Drive (OR 140 to OC&E Trail)	This segment has a LTS of 4. The pavement width is approximately 28' with two travel lanes.
L-9	Washburn Way (Crosby Avenue to OR 140)	This segment has a LTS of 4. Five-foot wide bike lanes are present and the cross section is 5-lanes. The pavement width is 70' wide.
L-10	Washburn Way (OC&E Trail to Crosby Avenue)	This segment has a LTS of 3. Five-foot wide bike lanes are present and the cross section is 5-lanes. The pavement width is 68' wide.
L-11	Washburn Way (Eberlein Avenue to OC&E Trail)	This segment has a LTS of 3. South of OR 39, bike lanes exist. North of OR 39, bike lanes end, and the section is 5-lanes wide (60' of pavement).

## Parallel Routes

In instances where a parallel route is determined to be the most desirable way forward, wayfinding signage should be used to direct trail users to the route and to destinations along the route. Appropriate crossings of major streets should also be provided. Enhancing the route for bicycle travel through traffic calming and/or diversion measures should also be considered.

## East-West Routes in Southeast Klamath Falls

East-west routes in southeastern Klamath Falls (i.e., the area roughly bounded by OR 140 to the south, Washburn Way to the west, Homedale Road to the east, and the OC&E Trail to the north) were not analyzed in Technical Memorandum #2 primarily because these routes do not provide direct trail connections. At the request of Advisory Committee members, we have reviewed the major east-west routes in this area, shown as project L-25 in Figure 1, for this memorandum. These streets generally have one travel lane in each direction, sidewalks, and posted speed limits of 25 MPH.

Given these conditions, these streets are likely to operate comfortably for many adults as shared streets for bicycling. Shared lane markings (i.e., sharrows) along with wayfinding signage would be an appropriate treatment for these routes. Traffic calming measures (e.g., bulb-outs, chicanes) could also be deployed on these streets if people are driving faster than the posted 25 MPH speed limit.

## NEXT STEPS

This memorandum and preliminary project list will be reviewed by the Technical Advisory Committee (TAC) and Citizen Advisory Committee (CAC) at the next meeting on October 21, 2015. TAC and CAC

members will be invited to comment on the project list, suggest any additional alternatives that should be considered, suggest any changes to the preliminary project list, and provide their input on priorities. The project team will update this memorandum and the project list based on their feedback.

Attachment A Alternatives Evaluation Matrix

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
G-1	End of OC&E Trail to Downtown Klamath Falls	Trail ends without obvious connection to downtown	Extend the trail over RR tracks to downtown, as planned for in 2012 TSP	Direct connection Keeps trail users separate from high-speed/high-volume streets	\$5.5 Million (TSP)	High Cost	Connect the trail by widening the sidewalk on the 6th Street bridge to accommodate a path.	
			Connect the trail via 6th Street Bridge by widening sidewalk to provide for shared-use path	Lower cost and easier to implement than dedicated bridge	\$507,000	May require crossings of 6th Street and ramps on/off bridge. Requires trail users to travel on 6th Street.		
			Connect the trail via Main Street undercrossing	Lower cost and easier to implement than dedicated bridge Only interaction with 6th Street is a signalized crossing	\$107,000	Out-of-direction to most of downtown. Requires trail users to ride in traffic under the railroad bridge or use sidewalk too narrow for people biking and walking to comfortably share. Main Street does not have bicycle lanes. The width would allow it, but it requires the removal of on-street parking.		
G-2	Connecting the "A" Canal Trail to the ODOT Trail	There is currently a ¼-mile gap between these two trails and a crossing of Crater Lake Parkway.	Connect the trail via Crater Lake Parkway by widening the sidewalks to provide for shared-use path.	Lower cost to implement and maintain.	\$68,000	Requires crossing Crater Lake Parkway. Requires a trail crossing of Esplanade Avenue. Requires widening the sidewalk on the bridge for a shared-use path to connect the A Canal trail to the intersection of Esplanade Avenue/Crater Lake Parkway.	Connect the trail via Crater Lake Parkway by widening the sidewalks to provide for shared-use path	
			Connect the trail by constructing a new shared-use path along the railroad tracks.	Requires fewer conflicts with local streets than using the Crater Lake Parkway sidewalks. The crossing of Crater Lake Parkway would occur at the signal of Esplanade Avenue/Crater Lake Parkway. Provides a connection to the school ballfields area.	\$819,000	Would require separate bridge at the river crossing. Requires a trail crossing of Esplanade Avenue. Requires expanding the sidewalk to accommodate a shared-use path under the railroad tracks. Would likely require ROW or an easement from the railroad.		
			Connect the "A" Canal trail to the school using the school's canal bridge and a new shared-use trail connect, and then connect to Upham Street and Crescent Street.	Provides a connection to the school. Uses an existing bridge to cross the canal. Uses the crossing of Crater Lake Highway at Portland Street to complete the connection to the ODOT Trail, but may also provide a connection to the bike lanes on Oregon Avenue via Upham Street.	\$206,000	Requires expanding the sidewalk to accommodate a shared-use path under the railroad tracks. Requires a trail crossing of Esplanade Avenue. May require ROW from the school.		
G-3	Connecting the "A" Canal Trail to the Foothills Trail	The Foothills Trail ends at the intersection of Foothills Boulevard/Crater Lake Parkway, and there is a gap between the intersection and the "A" Canal trail south of the canal.	Widen the sidewalk on one side (east) of the bridge to provide a shared use path between the intersection and the "A" Canal trail, and install an enhanced trail crossing of Washburn Way where the "A" Canal trail crosses. Tighten the curb radius for NB right-turns onto Crater Lake Parkway	This option uses the existing signalized crossing as well as sidewalks and bike lanes south of OR 39 to complete the transition. By expanding the sidewalk to a path on the east side, it allows southbound bicyclists to continue from the Foothills Trail to the "A" Canal trail eastbound with only one crossing. Project could be phased in. Tightening the curb radius will slow down right-turns making the crossing more comfortable	\$60,000	Accommodating the shared-use path on the bridge may require either removing the bike lanes or lane width reductions Requires a trail crossing of Washburn Way. Would require out-of-direction travel if the sidewalk is not widened to a shared-use path	Widen the sidewalk on one side (east) of the bridge to provide a shared use path between the intersection and the "A" Canal trail, and install an enhanced trail crossing of Washburn Way where the "A" Canal trail crosses. Tighten the curb radius for NB right-turns onto Crater Lake Parkway.	
G-4	Connecting the "A" Canal Trail to the Ella Redkey Swimming Pool	The trail is grade separated from the pool.	Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	Would provide a direct connection between the trail and a popular destination	\$15,000	May require right-of-way or an easement.	Connect the trail by installing a shared-use path between the parking lot/front entrance to the pool and the existing "A" Canal Trail.	
G-5	Connecting the "A" Canal Trail to the Kiger Stadium and Klamath County Fairgrounds	The trail is grade separated from these locations.	Connect the Kiger Stadium parking lot to the "A" Canal Trail with a shared-use path, and connect the Kiger Stadium to the Fairgrounds with sharrows on Crest Street.	Lower cost, short trail connection needed. Uses existing pavement as much as possible.	\$19,000	May require right-of-way or an easement at Kiger Stadium. If through ped/bike traffic uses the route during events at Kiger Stadium, they are not separated from vehicles in the parking lot. Does not provide connection between Kiger Stadium and Fairgrounds for pedestrians.	Install a shared-use path from the "A" Canal Trail to Crest Street (just north of the Kiger Stadium parking lot) with a short connection to Kiger Stadium, and continue the shared use path south along Crest Street to the fairgrounds.	
			Install a shared-use path from the "A" Canal Trail to Crest Street (just north of the Kiger Stadium parking lot) with a short connection to Kiger Stadium, and continue the shared use path south along Crest Street to the fairgrounds.	Provides facility for both pedestrians and bicyclists. Separates pedestrians and bicyclists from vehicles at Kiger Stadium.	\$145,000	May require right-of-way or an easement to reach Crest Street More costly than connecting to only the stadium		

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
G-6	Campus Trail to Biehn Street Connection	There is a gap between the Campus Trail and the bike lane on Biehn Street, which connects to Oregon Avenue and downtown Klamath Falls.	Widen the sidewalk on the south side of Campus Drive to complete the shared-use path connection.	This connection would also connect with the ODOT trail.	\$47,000	Southbound cyclists coming from the Campus Trail would use the crosswalks at the signalized intersection to transition to bike lanes.	Widen the sidewalk on the south side of Campus Drive to complete the shared-use path connection.	
				Uses the existing intersection of Crater Lake Parkway/Biehn Street to complete the highway crossing.		Modifications of the Crater Lake Parkway intersection may be required to create a comfortable crossing		
			Provide bike lanes on Campus Drive	Same as above	\$4,000	Modifications of the Crater Lake Parkway intersection may be required to create a comfortable crossing		
						Requires southwest-bound bicyclists to transition from the shared use path to the bicycle lane, likely at the intersection with Dahlia Street. The bike lanes would need to be buffered or protected to bring the LTS below 3.		
G-7	Connecting the ODOT Trail to Kit Carson Park	The ODOT Trail is adjacent to the park, but a fence separates the park from the trail.	Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	Low cost, short trail connection needed.	\$18,000	May require right-of-way or an easement.	Construct a connection between the trail and the parking lot or existing sidewalk connecting the street to the park.	
G-8	Veteran's Park Trail Connections	There are no bicycle connections between Veteran's Park and the Link River Trail.	Widen the sidewalk on the north side of Main Street to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of the park road's access to Main Street to connect Veteran's Park with the path.	Provides a separated facility for pedestrians and bicyclists between two popular destinations	\$51,000	Lanes will have to be narrowed to 12' on the bridge to accommodate the shared-use path.	Widen the sidewalk on the north side to provide for a shared use path to connect Veteran's Park with the Link River Trail. Install a crossing across Main Street west of Klamath Avenue to connect Veteran's Park with the path.	
				An additional crossing of Main Street may be needed on the east side of the bridge (west of Klamath Avenue).				
G-9	"A" Canal Trail Crossing at SW 6th Street	The trail crosses SW 6 <sup>th</sup> Street approximately 40 feet east of the crosswalk at the signalized intersection of Summers Lane/SW 6 <sup>th</sup> Street.	Widen the sidewalk on the south side of SW 6th Street to better accommodate bicyclists connecting to the signalized crossing.	Low cost; requires minimal out of direction travel.	\$7,000	Will need to verify there is sufficient right-of-way.	Widen the sidewalk on the south side of SW 6th Street to better accommodate bicyclists connecting to the signalized crossing.	
G-10	"A" Canal Trail Connection to Klamath Union High School	There is no connection for bicyclists between the "A" Canal Trail and the high school.	Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school.	Provides connection for bicyclists between the trail and high school.	\$127,000	Should be completed in conjunction with the crossing in project C-14.	Widen the sidewalk on the north side of Esplanade Avenue to provide a shared-use path to the high school.	
				There appears to be adequate width available under the railroad bridge to complete the widening.		The trail will likely need to come in through the schools's ball fields on the peninsula due to limited width on the southern section of Esplanade. ROW/easement will be needed from the school. The bridge will need to be used to complete the crossing from this direction.		
G-11	Trail Signing/Wayfinding	Wayfinding and trail signs are generally absent, including near the OC&E trailheads. Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	Signage provides an opportunity to increase awareness and use of the trail system for residents and visitors.	Program	Will need to determine who is responsible for the signs.	Develop a program to install and maintain wayfinding signage at all trailheads and trail crossings of public streets.	
G-12	Bicycle Parking	Bicycle parking is absent from many destinations, including some parks.	Develop policy that requires bicycle parking to be provided at key locations when new development or redevelopment occurs and pursue grant funding to provide it at key locations where it is missing.	The policy would help future developments or redevelopment locations obtain bicycle parking. Pursuing grant funding for existing locations in need will help in-fill existing gaps.	Policy/Program		Develop policy that requires bicycle parking to be provided at key locations when new development or redevelopment occurs and pursue grant funding to provide it at key locations where it is missing.	
C-1	OR 39: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-2	Homedale Road: OC&E Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is a crosswalk.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-3	Hope Street: OC&E Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install striped crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (it is currently located nearby but not at the crossing).	Install striped crosswalk and appropriate signage.	
C-4	Summers Lane: OC&E Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-5	Altamont Drive: OC&E Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	TBD by ongoing ODOT and Oregon Parks study.				TBD by ongoing ODOT and Oregon Parks study.	
C-7	Homedale Road: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (there is not existing illumination on Homedale Road in the crossing vicinity).	Install marked crosswalk and appropriate signage.	
C-8	Hope Street: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Low cost.	\$2,000	Consider installing illumination at the crossing as well (there is no existing illumination in the vicinity). Sight distance from the south should be verified.	Install marked crosswalk and appropriate signage.	
C-10	Shasta Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Install refuge island and RRFBs where the trail crosses.	Provides a refuge for people crossing the road	\$46,000	Would likely require closing the westbound left-turn lane into Crest Street	Install pedestrian refuge island and RRFBs where the trail crosses.	
				Direct crossing				
				Existing pavement width would accommodate the refuge.				
			Install marked pedestrian crossing with RRFBs at the intersection of Shasta Way/Crest Street.	May permit the westbound left-turn lane to remain.	\$40,000	Requires out of direction travel.		
	Lower cost	Sidewalks between crossing and trail may need to be widened to accommodate pedestrians and bicyclists.						

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C-11	Eberlein Avenue: A Canal Trail Crossing	This crossing is currently marked with a sign. The NCHRP 562 treatment recommendation is a crosswalk.	Install marked crosswalk and appropriate signage.	Low cost.	\$2,000		Install marked crosswalk and appropriate signage.	
C-12	Washburn Way: A Canal Trail Crossing	This crossing is currently only marked with a sign. However, it is in close proximity to a traffic signal. The NCHRP 562 treatment recommendation is an Active/Enhanced crossing.	Install enhanced crossing with refuge island and RRFBs at the trail crossing.	Direct crossing	\$56,000	Would restrict the length of the northbound left-turn lane at the intersection of Washburn Way/OR 39 if a pedestrian refuge island is installed.	Install enhanced crossing with refuge island and RRFBs at the trail crossing (near-term). Install grade-separated crossing (long-term).	
			Install grade-separated crossing of Washburn Way.	Provides separation between vehicles and bicyclists/pedestrians without requiring out of direction travel.		\$800,000		
			Provide connections to the traffic signal to encourage crossing there.	Provides a protected crossing without restricting the left-turn lane at the intersection.	\$36,000	Requires out of direction travel of approximately 500 feet. Would require widening the sidewalks to accommodate shared-use paths (for 2-way bike travel) between the trail and the intersection.		
C-13	Main Street: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Install activated crossing with refuge island at the trail crossing.	Direct crossing	\$56,000	The 4-lane cross section is approximately 60-ft of pavement, which may provide adequate width to widen for a refuge island.	Install enhanced crossing with refuge island and RRFBs at the trail crossing (near-term). Install grade-separated crossing (long-term).	
				Island provides the potential for a two-stage crossing		Queuing from the intersection of Main Street/OR 39 may block the crossing at times.		
			Install grade-separated crossing of Main Street.	Provides separation between vehicles and bicyclists/pedestrians without requiring out of direction travel.	\$800,000	High cost.		
			Provide connections to the traffic signal to encourage crossing there.	Would not impact or be impacted by the intersection queuing.	\$46,000	Requires out of direction travel, and we received an online comment that users do not like the out of direction travel currently required to use the crossing. May require sidewalk widening to accommodate transporting bicyclists and pedestrians to the signalized crossing.		
C-14	Esplanade Avenue: A Canal Trail Crossing	This crossing is currently not marked or signed. The NCHRP 562 treatment recommendation is an Active/Enhanced Crossing.	Install activated crossing with refuge island at the trail crossing.	Direct crossing	\$56,000	Advanced RRFBs may be needed on OR 39.	Install enhanced crossing with refuge island and RRFBs at the trail crossing (near-term). Install grade-separated crossing (long-term).	
				Island provides the potential for a two-stage crossing		Queuing from the intersection of Esplanade Avenue/OR 39 may block the crossing at times.		
			Install grade-separated crossing of Esplanade Avenue.	Provides separation between vehicles and bicyclists/pedestrians without requiring out of direction travel.	\$800,000	High cost.		
L-1	OR 39 (OC&E Trail to OR 140)	This segment has a LTS of 3. There are no existing bicycle lanes.	Install buffered bicycle lanes or protected bicycle lanes.	By widening existing shoulders and narrowing lanes/center turn lanes, sufficient width for bicycle lanes may exist using existing pavement. However, additional pavement may be needed for buffered bike lane or protected bike lanes.	\$12,000	Additional treatments such as colored pavement markings should be considered at the junction of OR 140/OR 39.	Install buffered or protected bicycle lanes on OR 39 with colored pavement treatment at the intersection of OR 39/OR 140.	Further study needed to determine whether buffered bike lane or protected bike lane is the treatment

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L-2	6th Street (Market Street to OR 39)	This segment has a LTS of 4. This is a four-lane road with a center turn lane. There are no bike lanes.	Install buffered or protected bicycle lanes in both directions.	The buffered facility would provide separation between bicyclists and vehicles.  All of the major roads that are crossed by 6th Street are controlled with a signal.	\$72,000	There are many driveways along this corridor, and access will need to be maintained with the buffered bike lanes.  The existing pavement width is not wide enough to install protected bike lanes without widening the road or removing an existing lane(s). Widening may not be possible due to existing building locations. A buffered bike lane may be possible. Existing inside lanes are approximately 12' wide, with a 16' center turn lane. The outer travel lanes are approximately 15' wide. No additional shoulders exist.	Protected/buffered bike lanes or parallel routes	Further study to evaluate the trade-offs or buffered or protected bike lanes, or to determine the best parallel routes.
			Widen existing sidewalk on both sides of the road to become a shared-use path and accommodate pedestrians and bicyclists.	Provides a separated facility for bicyclists.	\$3,240,000	Creates a potential conflict area between pedestrians and bicyclists.		
			Parallel routes. Potentially: Wantland Ave to Applewood Street to Eberlein Ave to Avalon Street to Shasta Way to Homedale Road.	Requires additional treatments at driveways and minor street intersections		Requires additional treatments at driveways and minor street intersections		
				Parallel routes would be more comfortable than the high-speed/high-volume road		May still require narrowing of lanes to fit extra path width. Alternatively, ROW impacts may exist if the City builds the paths away from the street.		
			Parallel routes. Potentially: Wantland Ave to Applewood Street to Eberlein Ave to Avalon Street to Shasta Way to Homedale Road.	Parallel routes would be more comfortable than the high-speed/high-volume road	\$365,000	Some bicyclists may continue to use 6th Street if it is more direct.  Still requires the use of the 6th Street bridge over the railroad tracks (or Main Street) to connect to downtown.		
L-3	Shasta Way (Patterson Street to Kimberly Drive)	This segment has a LTS of 4. It is currently a two-lane road with a marked centerline and pavement width of approximately 22 feet.	Install sharrows and traffic calming.	Width is not sufficient for bike lanes. Appears to be relatively low-volume street. The sharrows would alert vehicles that bicyclists share the road.  Does not require roadway widening.	\$43,000	Sharrows alone will not do much for the comfort of people bicycling. Traffic calming will also be required to lower the speed people are driving.	Install sharrows and traffic calming	Outreach to neighborhood to determine support for traffic calming measures.
L-4	Shasta Way (Patterson Street to Crater Lake Parkway)	This segment has a LTS of 4. No bike lanes are present, and the existing pavement width is approximately 37' wide with one travel lane in each direction and center turn lanes throughout.	Widen the roadway to include buffered or protected bicycle lanes.	Provides on-street bicycle facility that does not require out-of-direction travel by cyclists.	\$5,204,000	Roadway widening may have ROW impacts. Roadway widening may be minimized if turn lanes can be eliminated throughout the corridor and/or sidewalk widths are reduced.		Further study to determine what the impacts of removing the center turn lane would be.
			Remove the center turn lane and provide buffered or protected bicycle lanes	Provides on-street bicycle facility that does not require out-of-direction travel by cyclists.  Fewer right-of-way impacts	\$50,000	The removal of the center turn lane could increase motor vehicle crashes at driveways and intersections and increase delay for people driving		
L-5	Patterson Street (6th Street to Foothills Boulevard)	This segment has a LTS of 4. There are no existing bicycle lanes. The pavement width is approximately 38' for most of the segment, and the cross section is one-lane in each direction with a center turn lane. When the road reduces to two lanes (and transitions to Foothills Blvd), it has paved shoulders of approximately 7 feet in width.	Install buffered or protected bicycle lanes by restriping to remove center turn lane.	Provides a comfortable space for people to bicycle in  Pedestrians are accommodated using the sidewalks on Patterson Street between 6th Street and Church Hill Drive, and then pedestrians must use the residential neighborhood streets to connect west to Homedale Road.	\$37,000	Even if the center turn lane is removed, some additional widening may be needed to provide protected or buffered bike lanes. Because the posted speed limit is 35 mph, installing a bike lane with no buffer will not bring the LTS below 3.		Further study to determine what the impacts of removing the center turn lane would be.
			Widen one side sidewalk to accommodate shared-use path, and install shared use path on north end where the sidewalk ends to connect to Foothills trail.	Provides separated bicycle facility.	\$247,000	The bicycle facilities need to connect with the end of the Foothills Trail, which would require a transition from one path, to bike lanes, and back to another path, unless the Patterson Street path continued all the way around the corner, increasing the cost of the project.		
				Could connect with Foothills trail without crossing any major roads.		The intersections with local streets on the corridor would need treatments to alert drivers of potential cyclists from either direction.		
						Creates potential conflicts between bicyclists and pedestrians on the path.  Will likely have ROW impacts since widening will likely have to be done away from the road, and the northern section of trail will likely have ROW impacts.		

ID	Location	Issue	Potential Project	Benefits	Cost Estimate	Considerations	Recommended Project	Recommended for Further Analysis
L-6	Homedale Road (OR 140 to Shasta Way)	This segment has a LTS of 4. The 3-lane cross section is approximately 37' wide throughout.	Install protected or buffered bicycle lanes by removing the center turn lane.	The existing bridges have adequate width if the center turn lane is dropped at the bridge. Roadway can be restriped with 7.5' buffered or protected bike lane and 11' travel lanes.	\$88,000	Installing bicycle lanes here may be done in conjunction with signage to direct vehicles to other routes. (prioritizing bikes on this road and vehicles on other roads)	Install protected or buffered bike lanes.	Further study needed to determine whether buffered bike lane or protected bike lane is needed.
L-7	Summers Lane (OR 140 to SW 6th Street)	This segment has a LTS of 4. The 3-lane cross section is approximately 37' wide throughout.	Alternate/parallel route.	Providing east-west connections to Homedale Road and prioritizing improvements on Homedale Road may serve as an alternate route for Summers Lane.	TBD after further study of best parallel routes	Some cyclists would likely continue using this route due to convenience.		Further study needed to evaluate the trade-offs of protected/buffered bike lanes, or to determine the best parallel routes.
			Install protected or buffered bicycle lanes by removing the center turn lane.	The existing canal bridge is wide enough to support bike lanes (potentially not buffered on the bridge) if the center turn lane is removed here.	\$72,000	Signage would be needed to encourage cyclists to use the parallel routes. Would require roadway widening or removal of center turn lane.		
L-8	Altamont Drive (OR 140 to OC&E Trail)	This segment has a LTS of 4. The pavement width is approximately 28' with two travel lanes.	Install buffered or protected bike lanes by widening the roadway.	Separates bicyclists from vehicles.	\$3,273,000	Would require roadway widening and may have ROW impacts.		Further study to evaluate the trade-offs of protected/buffered bike lanes, or to determine the best parallel routes.
			Parallel routes	Parallel low volume/low speed routes could be comfortable as a shared space	TBD after further study of best parallel routes	Would need to further consider the route and crossing treatments		
L-9	Washburn Way (Crosby Avenue to OR 140)	This segment has a LTS of 4. Five-foot wide bike lanes are present and the cross section is 5-lanes. The pavement width is 70' wide.	Encourage Altamont Drive as alternate/parallel route.		TBD after further study of best parallel routes	Some cyclists would likely continue using this route due to convenience.	Buffered/Protected Bicycle Lane or Parallel Routes	Further study to evaluate trade-offs of protected/buffered bicycle lane impacts and parallel routes.
			Install buffered or protected bicycle lanes in both directions by widening the road..	Provides separated bicycle facility.	\$2,353,000	Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps), dependent upon treatment for OR 140 too. Would likely require roadway widening. The existing travel lanes and sidewalks likely cannot be reduced in width.		
				The bridge over the railroad is constrained and would not accommodate buffered bike lanes and sidewalks. This would likely need to have the sidewalk widened on both sides to create paths but there is very limited width to do so.				
L-10	Washburn Way (OC&E Trail to Crosby Avenue)	This segment has a LTS of 3. Five-foot wide bike lanes are present and the cross section is 5-lanes. The pavement width is 68' wide.	Connect Maywood drive north to the OC&E Trail, and promote Maywood drive as an alternate route north of Hilyard Avenue.	Removes bicyclists from the 5-lane busy road.	\$124,000	Some cyclists may continue using Washburn Way. Would likely require ROW or an easement to complete the new trail connection.	Buffered/protected bicycle lane or parallel Routes, including using Crosby to connect to Altamont drive	Further study to evaluate trade-offs of protected/buffered bicycle lane impacts and parallel routes.
			Widen existing sidewalk to become shared-use path.	Provides separated bicycle facility.	\$102,000	This project should be consistent with L-9. Driveways along the corridor would need treatment.		
			Install buffered or protected bicycle lanes in both directions by restriping to remove the center turn lane.	Provides separated bicycle facility.	\$8,000	This project should be consistent with L-9. Further evaluation of impacts associated with removing the center turn lane is needed.		
L-11	Washburn Way (Eberlein Avenue to OC&E Trail)	This segment has a LTS of 3. South of OR 39, bike lanes exist. North of OR 39, bike lanes end, and the section is 5-lanes wide (60' of pavement).	Install buffered or protected bicycle lanes in both directions by restriping to remove the center turn lane.	Provides separation between vehicles and bicyclists. Would provide continuity between the existing bike lanes south of OR 39 and north of Eberlein.	\$19,000	Driveways and local streets access may need treatments.	Buffered or protected bike lanes, or parallel routes.	Further study needed to evaluate the trade-offs of protected/buffered bicycle lanes (removal of center turn lane and impacts to vehicle traffic) and parallel routes.
			Parallel routes to connect to Altamont Drive.	Removes bicyclists from the 5-lane busy road.	Further study needed to determine best route.	Some cyclists would likely continue using this route due to convenience.		
L-12	OR 140 (Washburn Way to Homedale Road)	This segment has a LTS of 4.	Install buffered or protected bicycle lanes in both directions by widening the existing shoulders.	Provides some separation between vehicles and bikes.	\$1,279,000	One crossing of the railroad is involved. Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps). Requires widening, which may have ROW impacts.	Shared-use path	
			Installed shared-use path.	Installing it along the north side of the road would minimize the number of bicycle crossings of OR 140. Provides physical separation between bikes and vehicles. Provides facility for pedestrians too.	\$820,000	One crossing of the railroad is involved. Requires some type of transition between OR 140 and Washburn Way (which is connected by on/off ramps). Requires widening, which may have ROW impacts. Treatments may be needed at crossings with minor streets.		
L-13	6th Street (Market Street to Main Street)	This segment has a LTS of 3. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 46 feet. In the downtown area there are turn lanes and on-street parking.	Install bicycle lane. (A buffered/protected bike lane is not needed on this section due to the lower speed.)	No roadway widening is required.	\$8,000	One side of on-street parking may need to be removed.	Bike Lane	
L-14	5th Street (Main Street to 6th Street)	This segment has a LTS of 4. There are no existing bicycle facilities on the road. The road is one-way with two travel lanes and a total pavement width of 45 feet. In the downtown area there are turn lanes and on-street parking.	Install bicycle lane.	No roadway widening is required.	\$9,000		Bike Lane	



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L-15	Klamath Avenue (Conger Avenue to Commercial Street)	This segment has a LTS of 3. This is a one-way eastbound segment with no bike lanes.	Install bike lanes.	No roadway widening is required.	\$15,000	Would require consideration of on-street parking impacts in the design. May require the removal of on-street parking or a travel lane to accommodate the bike lane width.	Bike Lane	
L-16	Main Street (Esplanade Avenue to Mill Street)	This segment has a LTS of 3. This is a one-way westbound segment with no bike lanes.	Install bike lanes.	No roadway widening is required.	\$15,000		Bike Lane	
L-17	9th Street (Klamath Avenue to Prospect Street)	This segment has a LTS of 3. There are no bicycle lanes; the 2-way roadway has a minimum pavement width of 26 feet.	TBD by ongoing study.				TBD by ongoing project.	TBD by ongoing project
L-18	N 11th Street (Oregon Avenue to Klamath Avenue)	This segment has a LTS of 3. There are no bicycle lanes. The 2-lane roadway has a minimum pavement width of 25 feet.	TBD by ongoing study.				TBD by ongoing project.	TBD by ongoing project
L-19	Oregon Avenue (Moore Park to Upham Street)	The segment has a LTS of 3. Although there are bike lanes, they are narrow. Actual traffic speeds are expected to be higher than posted.	TBD by ongoing study.				TBD by ongoing project.	TBD by ongoing project
L-20	Lakeshore Drive (Lynnewood Blvd to West UGB)	The segment has a LTS of 3. There are no shoulders or bike lanes.	Widen the pavement to accommodate shoulders or bike lanes.	Provides a facility for bicyclists.	\$1,860,000	The road will need to be widened to accommodate paved shoulders, and the some earthwork is likely to be needed with the widening. There may be some ROW impacts associated with roadway widening.	Bike Lanes	
L-21	Crater Lake Highway (Main Street to Portland Street)	This segment has a LTS of 4. The cross-section varies between four and five lanes and carries high traffic volumes. No bicycle lanes exist. The total pavement width varies between approximately 66 and 77 feet.	Included in project G-2				Included in project G-2	
L-22	Main Street (Esplanade Avenue to Crater Lake Parkway)	The segment has an LTS of 4. The eastern portion of the corridor is 4 lanes and 58-60 feet wide. Aerial images indicate this area is also used for on-street parking. The western portion of the corridor is approximately 54 feet wide and has two travel lanes with two sides of on-street parking. (This is also a potential connection that is relevant to project G-1. The undercrossing below the railroad tracks requires cyclists to ride in the lanes or use the narrow tunnel.)	Install bike lanes	Provides a facility for bicyclists.	\$19,000	The on-street parking may need to be reconfigured between Spring Street and Esplanade Avenue to accommodate the bike lane. Between Spring Street and Crater Lake Parkway, elimination of the on-street parking or a road diet would be required to accommodate the bike lanes. The eastbound bike lane would require a transition treatment where E Main Street turns off of Main Street. The pavement width is not adequate for adding a bicycle lane under the railroad, so the sidewalk would need to be widened to accommodate bikes. A transition between the bike lanes and sidewalks would also be needed.	Bike lanes	
L-23	Old Fort Road (Loma Linda Drive to UGB)	The LTS is 4. The road is higher speed and lacks bike lanes and shoulders. This is a popular recreational route.	Widen the road to add paved shoulders or bike lanes. Install a shared-use path to accommodate cyclists and pedestrians.	The road appears to have some gravel shoulders today, so the additional widening may be minimal.	\$2,668,000 \$1,710,000	This is a long distance to pave (high cost). May require ROW. The number of pedestrians in this area is likely very low.	Bike lanes	
L-24	Biehn Street (Crater Lake Parkway to Oregon Avenue)	The road is part of an important link between OIT and downtown. The existing bike lanes are narrow.	Widen the bike lanes by restriping the roadway.	No pavement widening is required.	\$22,000		Widen the bike lanes	
L-25	East-West Routes in Southeast Klamath Falls	These streets connect neighborhoods to the north-south routes that connect to the trail system.	Review routes to identify which should receive shared lane markings, wayfinding, and/or traffic calming	Low cost improvements that could enhance comfort for people bicycling and increase the use of the trail system.	TBD	Further neighborhood outreach and speed studies may be necessary to identify specific treatments.	Review routes to identify which should receive shared lane markings, wayfinding, and/or traffic calming	Further neighborhood outreach may be needed.
L-26	N Eldorado Avenue	This road lacks bicycle facilities and sidewalks on one side of the road. This road is a popular commute route to the hospital, and also connects student apartments to the campus.	Install sharrows and traffic calming.	Posted speed limit indicates that a shared-roadway would be sufficient. The sharrows would alert vehicles that bicyclists share the road. No roadway widening is required.	\$23,000	This project does not provide any new pedestrian facilities, but sidewalks exist on one side of the road.	Install sharrows and traffic calming.	
S-1	OR 39 (OC&E trail to Keller Road)	There are no sidewalks.	Install sidewalks on both sides of the road.		\$396,000	May require ROW.	Sidewalks	
S-2	Hope Street (Bristol Avenue to SW 6th Street)	There are no sidewalks on Hope Street, with the exception of those around Denver Avenue.	Install sidewalks on both sides of the road.	Provides connection for pedestrians between Peterson Elementary school and the OC&E and A Canal trails. The bridge over the canal already includes sidewalks.	\$1,170,000	May require ROW.	Sidewalks	