



Technical Memorandum #8: Investment Strategy

U.S. 20 Bend Facility Plan
Bend, Oregon

March 21, 2025



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Acronyms and Abbreviations

City	City of Bend
LPI	Leading Pedestrian Intervals
MUT	Median U-Turns
ODOT	Oregon Department of Transportation
Plan	U.S. 20 Bend Facility Plan
RCUT	Restricted Crossing U-Turns
ROW	Right-of-Way
HCM	Highway Capacity Manual
LOS	Level of Service
LBI	Leading Bicycle Intervals
LTS	Level of Traffic Stress

Introduction

The US 20 corridor improvement study is focused on enhancing safety, mobility, and active transportation along the US 20 corridor as shown in Figure 1. The study includes active transportation network improvements, as well as signalized intersection improvements. Intersection alternatives were evaluated in a multi-step process, starting with a design workshop to determine how potential options scored against project objectives.

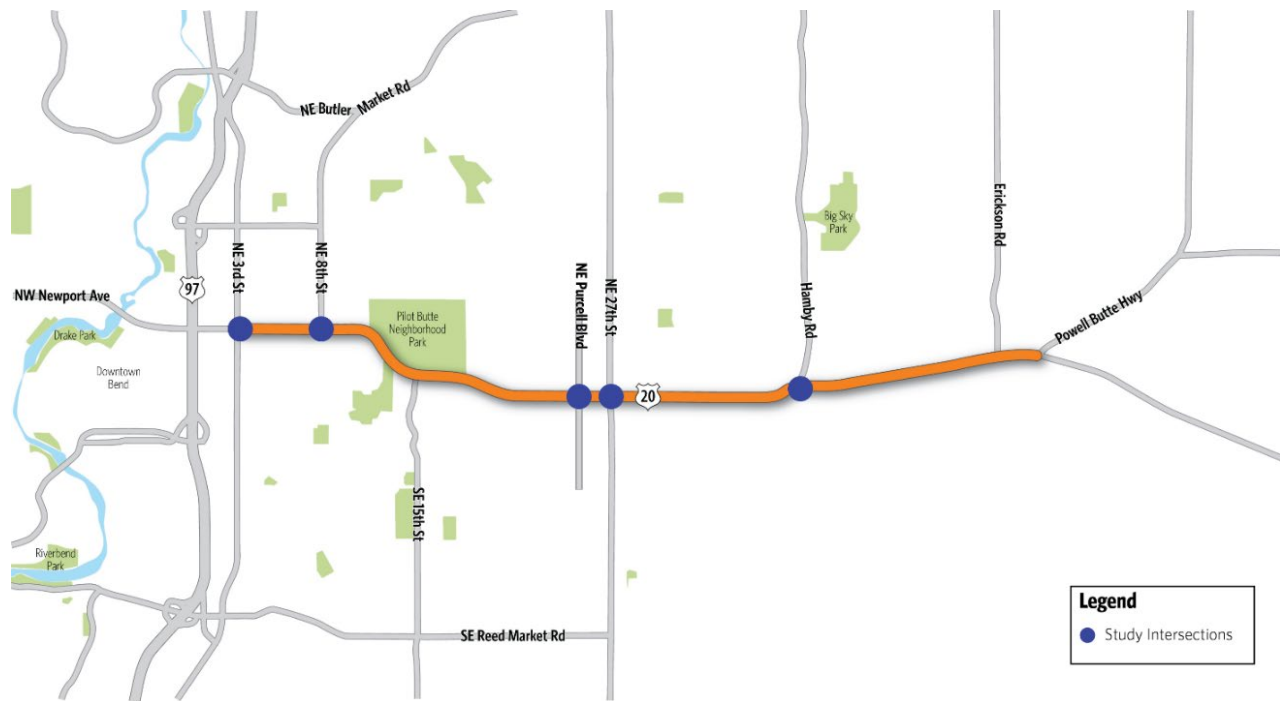


Figure 1. Study Area

This memo builds on the alternatives to establish an order of implementation for improvements.

Evaluation Process

First Level Screening

Evaluation metrics

Each intersection was evaluated based on the following metrics, which are described in more detail in Memo 5.

- Increase system functionality
 - Provide for efficient travel for traffic utilizing U.S. 20.
 - Reduce U.S. 20's barrier effect by enhancing walking and bicycling accessibility along and across the corridor.

- Enhance transit mobility and accessibility.
- Improve safety for vulnerable users
 - Reduce serious injuries and fatalities.
 - Maximize safety and comfort for vulnerable roadway users.
 - Increase pedestrian access across U.S. 20 to meet ODOT's adopted access spacing standards along U.S. 20 where feasible.
- Support economic development
 - Maintain effective access to properties along U.S. 20 in a manner that supports the economic development objectives of existing and future businesses.
 - Provide for efficient freight movement throughout the corridor.
- Protect livability and ensure equity and access
 - Incorporate a complete streets and complete network approach on U.S. 20 and other study area corridors.
 - Reduce the burden of regional motor vehicle traffic on adjacent residential neighborhoods.
 - Strive for people of all income levels and abilities to have access to the transportation options that best meet their daily needs.
- Steward of the environment
 - Reduce vehicle emissions through reduction of vehicular delay, improved connections in the local system, and the use of alternative travel modes.
 - Prioritize solutions that avoid or minimize adverse environmental impacts.
- Develop solutions that are cost-effective and implementable
 - Prioritize lower cost, high benefit solutions.
 - Prioritize solutions that leverage partnerships, existing planned projects, and programs.
 - Develop solutions that are constructable in phases and can be reasonably maintained.

Second Level Screening

Evaluation Process

During the second level screening, intersection concepts were advanced to determine feasibility as well as delve further into how well they achieved the goals of the project. Projects were evaluated based on geometry and design, ROW impacts, cost, overall impacts, and potential benefits. Concepts were rejected if they had a large ROW impact, did not provide enough benefit to multimodal users or decreased user comfort, or only served to increase vehicular throughput which contradicted the previously stated goals. The full results of the second level screening are reported in Memo 7 with figures included in Appendix A, but are summarized as follows:

- **3rd Street** – This concept reduces the number of westbound through lanes at the 3rd Street intersection by one, with the second through lane dropping as a right turn only lane. This concept will match the existing plan for the Greenwood Ave undercrossing to the west of the intersection that is currently in development.
- **8th Street** – Bike and pedestrian crossing improvements, but maintains the same lane configuration.
- **Purcell Street** – Minor widening to provide right turn lane.
- **27th Street** – Minor Widening to provide an eastbound and northbound right turn lane.
- **Hamby/Ward Rd Roundabout** – This concept extends the capacity life of the roundabout by adding a northbound right turn bypass lane.

In addition to these improvements at the signalized intersection, improvements to the existing bike network were determined. They are presented here, in addition to other improvements identified as part of different studies. Figure 2 presents an overview of the study area and identifies potential pedestrian, bicycle and transit improvement concepts. Table 1 summarizes the concepts by location. Most concepts located along U.S. 20 focus on reducing the corridor's barrier effect in the form of improved multimodal crossings, including new crossings as well as enhancements to existing crossings. As a result, most corridor segments would fall within the BUD's target pedestrian crossing spacing parameters. It should be noted that, given the multitude of new or improved crossings, Figure XX identifies priority locations for which ODOT and its partners may elect to focus nearer-term investments.

While this Plan generally identifies opportunities for enhanced crossings, the following should be considered as projects advance toward implementation:

- Further engineering analysis will be necessary to determine particular crossing enhancements and design elements at most locations; this subsequent analysis

should consider criteria set forth in ODOT's Traffic Manual, Traffic Line Manual, Signal Policy, Sign Policy and ODOT overall engineering judgement

- Depending on circumstances, Region or State Traffic/Roadway Engineer approval will be necessary for most concept elements presented in Table 1.

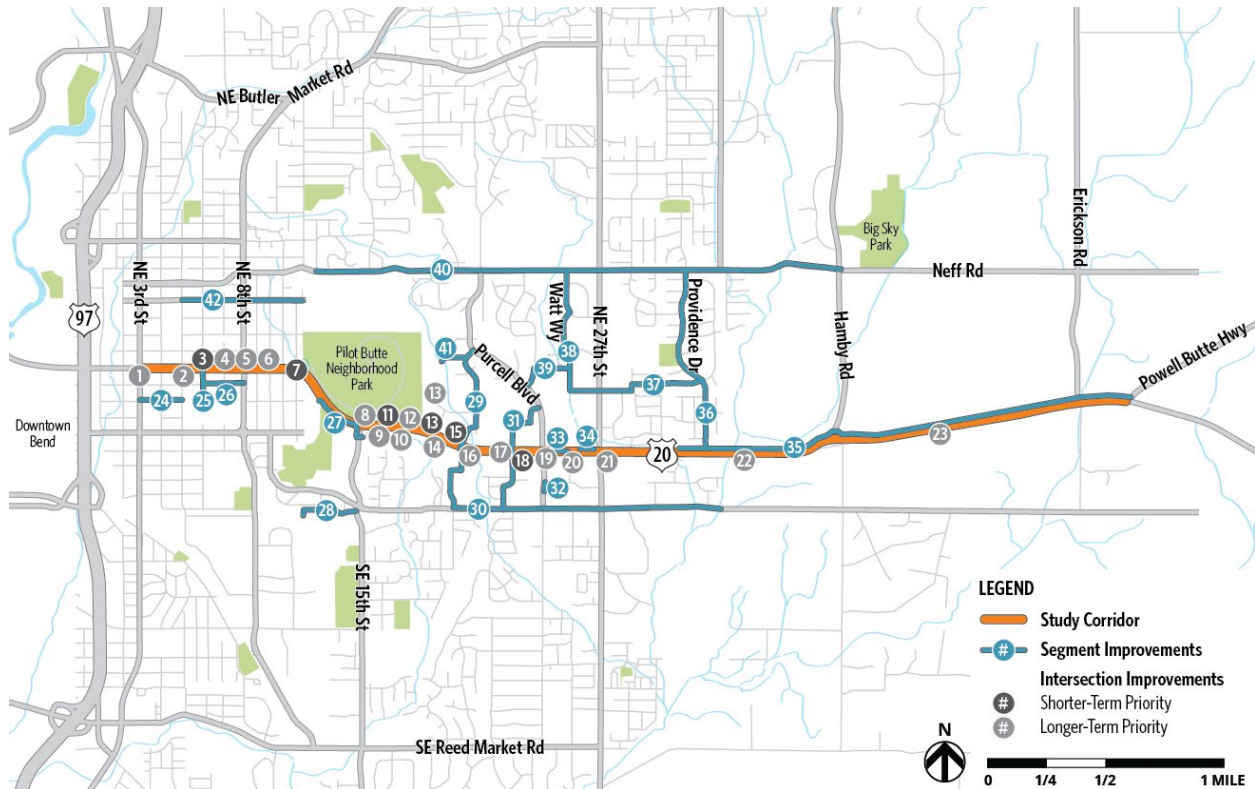


Figure 2. Location of proposed Bike and Ped Improvements

As U.S. 20 is a Statewide Freight Route and a Reduction Review Route, engagement with ODOT's Mobility Advisory Committee may be necessary.

The improvements in Table 1 can be categorized into short term and long term investments. Short term investments would require no public outreach and minimal construction requirements such as only paint or small curb construction. Projects that currently have funding as part of the TSP can also be considered short term improvements. Long term improvements were designated as projects that would require ROW, significant changes to curb line, or a more significant investment. The following assumptions were used to determine which improvements are considered 'long term' and which are 'short term'.

- Short Term
 - Consolidation or moving of transit stops
 - Median refuge modifications
 - Low impact improvements such as restriping
 - Projects already designated as part of the TSP
- Long Term
 - Signal Modifications
 - Enhanced crossings
 - Adding lanes or width to the roadway cross section
 - ROW impacts
 - Significant trail extensions or connections

Table 1: Pedestrian, Bicycle and Transit Improvement Concepts

Reference/Location		Description	Prioritization
1	U.S. 20 at 3rd Street	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - Leading Pedestrian Intervals (LPIs) on all legs (subject to analysis relative to ODOT Signal Policy) - Warning signage on all approaches (Turning Vehicles Yield to Bikes/Peds) (per Bend Safety Implementation Plan) - Right-turn-on-red prohibition (per 2012 Multimodal Traffic Safety Assessment) <p>Transit treatments</p> <ul style="list-style-type: none"> - Transit signal priority implemented with ATC upgrade 	Long Term
2	U.S. 20 at 5th Street	<p>Pedestrian Crossing Improvements Including (Per Table 310.3-A, ODOT Traffic Manual):</p> <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Pedestrian refuge island (at least 6 ft wide) - Traffic signal or pedestrian hybrid beacon (PHB) 	Long Term
3	U.S. 20 at 6th Street	<p>Per Bend Safety Implementation Plan:</p> <ul style="list-style-type: none"> - Modified median refuge to include bicycle cut-through(s) - Rectangular Rapid Flashing Beacon 	Short Term
4	U.S. 20 at 7th Street	<p>Pedestrian Crossing Improvements Including:</p> <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Pedestrian refuge island (at least 6 ft wide) - Traffic signal or pedestrian hybrid beacon (PHB) 	Long Term

Reference/Location		Description	Prioritization
5	U.S. 20 at 8th Street	<p>Pedestrian Treatments</p> <p>LPIs on all legs (subject to analysis relative to ODOT Signal Policy)</p> <ul style="list-style-type: none"> - Warning signage on all approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> - NB and SB approaches: green bike lanes (solid fill) immediately upstream from intersection - All approaches: green bike lane conflict markings traversing the first lane of cross-street traffic (subject to ODOT approval) <p>Transit treatments</p> <ul style="list-style-type: none"> - Transit signal priority (to be implemented upon completion of ATC upgrade) <p>Note: TSP Project #C-30 (details not specified)</p>	Long Term
6	U.S. 20 at 10th Street	<p>Pedestrian Crossing Improvements Including:</p> <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Pedestrian refuge island (at least 6 ft wide) - Traffic signal or pedestrian hybrid beacon (PHB) 	Long Term
7	U.S. 20 at 12th Street	Modified median refuge to include bicycle cut-through(s)	Short Term
8	U.S. 20 at 15th Street	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - LPIs on all legs (subject to analysis relative to ODOT Signal Policy) - Warning signage on EB and NB approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> - EB approach: green bike lane conflict markings immediately upstream from EB right turn lane (subject to ODOT approval) - NB approach: shared lane marking in NB left turn lane <p>Transit treatments</p> <ul style="list-style-type: none"> - Transit signal priority (to be implemented upon completion of ATC upgrade) 	Long Term
9	Larkspur Trail Stairway Connection	Consider adding stairway along existing demand path to streamline pedestrian connections between U.S. 20 and the Larkspur Trail (note: may require supplemental ADA-accessible ramp connection)	Long Term

Reference/Location		Description	Prioritization
10	Larkspur Trail Bicycle Connection	Add ramp to facilitate direct linkage between Larkspur Trail south of US 20 and the U.S. 20 EB bike lane	Long Term
11	EB Transit Stop Consolidation	Consider removal of existing EB transit stop, and consolidate with existing EB transit stops at 15th Street and/or Azure Drive	Short Term
12	Larkspur Trail Bicycle Connection	Add ramp to facilitate direct linkage between Larkspur Trail north of US 20 and the U.S. 20 WB bike lane	Long Term
13	WB Transit Stop Consolidation	Consider removal of existing WB transit stop, and consolidate with existing WB transit stops at Azure and/or 15th Street	Short Term
14	U.S. 20 at Arnett Way	Pedestrian Crossing Improvements Including: <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Rectangular rapid flashing beacon (RRFB) 	Long Term
15	WB Transit Stop Enhancement	Lengthen existing concrete pad to serve rear-door passenger alighting	Short Term
16	U.S. 20 at Azure Drive	Pedestrian Crossing Improvements Including: <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Pedestrian refuge island (at least 6 ft wide) - Traffic signal or pedestrian hybrid beacon (PHB) 	Long Term
17	U.S. 20 at Dean Swift Road	Pedestrian Crossing Improvements Including: <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Pedestrian refuge island (at least 6 ft wide) - Traffic signal or pedestrian hybrid beacon (PHB) 	Long Term
18	EB Transit Stop Consolidation	Consider removal of existing EB transit stop, and consolidate with existing EB transit stops at Azure Drive and/or Purcell Boulevard	Short term

Reference/Location		Description	Prioritization
19	U.S. 20 at Purcell Boulevard	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - LPIs on all legs (subject to analysis relative to ODOT Signal Policy) - Dual curb ramps on NW corner - Warning signage on all approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> - SB approach: green bike lane conflict markings immediately upstream from SB right turn lane pending required approvals - EB and WB approaches: green bike lanes (solid fill) immediately upstream from intersection, and green bike lane conflict markings traversing the first lane of cross-street traffic (subject to ODOT approval) <p>Transit treatments</p> <ul style="list-style-type: none"> - Upgrades to existing SB transit stop (upstream from intersection) (per Cascades East Transit) - Transit signal priority (to be implemented upon completion of ATC upgrade) 	Long Term
20	U.S. 20 at Windy Knolls Drive	<p>Pedestrian Crossing Improvements Including:</p> <ul style="list-style-type: none"> - Continental-style crosswalk markings, parking restrictions, lighting - Wide advance stop bar with signage - Pedestrian refuge island (at least 6 ft wide) - Traffic signal or pedestrian hybrid beacon (PHB) 	Long Term
21	U.S. 20 at 27th Street	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - LPIs on east, north and south legs (subject to analysis relative to ODOT Signal Policy) - Audible pedestrian signals - Dual curb ramps on NE and SE corners - Warning signage on EB, NB, WB approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> - SB approach: green bike lane conflict markings on SB slip lane - EB, NB, WB approaches: green bike lanes (solid fill) immediately upstream from intersection, and green bike lane conflict markings traversing the first lane of cross-street traffic (subject to ODOT approval) 	Long Term

Reference/Location		Description	Prioritization
		Transit treatments <ul style="list-style-type: none"> - Transit signal priority (to be implemented upon completion of ATC upgrade) - New EB transit stop immediately east of intersection Note: Specific design elements to be coordinated with the City of Bend's pending project to develop a shared use path on 27 th between U.S. and Bear Creek Rd.	
22	U.S. 20 at Future "Hanson to Big Sky Trail" Crossing	Future trail undercrossing (to be confirmed upon finalizing trail alignment) (per Bend Park and Recreation District Comprehensive Plan)	Long Term
23	U.S. 20 at Future Trans-Canada Trail Crossing-	Future trail crossing (specific crossing type to be confirmed upon finalizing trail alignment) (per Bend Park and Recreation District Comprehensive Plan)	Long Term
24	Hawthorne Neighborhood Greenway	Hawthorne Neighborhood Greenway (portion of TSP Project #R6-A)	Short Term
25	6th Street Neighborhood Greenway Extension	Extend Neighborhood Greenway south to Juniper Swim and Fitness Center	Long Term
26	Irving Avenue	Neighborhood Greenway	Long Term
27	Larkspur Trail/Hawthorne Neighborhood Linkage	Shared use path linking the Larkspur Trail and Hawthorne Neighborhood Greenway (project includes new crosswalk at 15th)	Long Term
28	Bear Creek Safe Routes to Schools	Larkspur Trail/Coyner Trail Connection (TSP Project #R2-D)	Short Term
29	Cessna Drive/Azure Drive/ Savannah Drive	Enhanced bikeway	Long Term
30	Bear Creek Road	Shared use path adjacent to roadway; sidewalk infill (TSP project #R2-E)	Short Term
31	Dean Swift Road	Enhanced bikeway	Long Term
32	Purcell Boulevard	Sidewalk Infill	
33	Ped Crossing Enhancement	Remove EB deceleration lane, tighten EB turn radius (pending engineering study)	Long Term
34	Bike Lane Gap Closure	Remove WB deceleration lane, tighten WB turn radius, add WB bike lane (pending engineering study)	Long Term

Reference/Location		Description	Prioritization
35	U.S. 20 Shared Use Path	Shared use path (north or south side of U.S. 20) between Bend city limits vicinity and Powell Butte Hwy.	Long Term
36	Providence Drive	Enhanced bikeway	Long Term
37	Forum Drive/Locksley Drive	Enhanced bikeway	Long Term
38	Forum Drive /Watt Way/Medical Center	Enhanced bikeway (corridor identified as Key Walking/Bicycling Route in Bend TSP)	Long Term
39	Paula Drive/Donagon Road	Enhanced bikeway	Long Term
40	Neff Road	Shared use path adjacent to roadway; sidewalk infill (TSP Project # R3-C)	Short Term
41	Parkview Court	Shared use path connection to Larkspur Trail; enhanced bikeway on Parkview	Long Term
42	Norton Avenue Neighborhood Greenway	Neighborhood Greenway (TSP Project #R-3A)	Short Term

Revised Investment Strategy

The City of Bend Transportation System Plan identifies projects based on a prioritization criteria. According to the TSP, project categorization considered the following:

- Which projects most meaningfully address the project and program prioritization criteria?
- What is the likely funding available for each of the phasing categories and how can the City “right-size” the project and program list to best match the funding sources?
- What projects and programs build upon and/ or rely on synergies provided by other capital improvements projects within each timing phase?¹

With these questions in mind, cross section improvements along the corridor were divided into ‘longer term enhancements’ and ‘shorter term enhancements’

- **“Shorter-term enhancements”:**
 - To minimize costs, these enhancements would maintain the outside curb lines while remaining within the existing right-of-way. Improvements would primarily consist of striping modifications to widen the existing bike

¹ <https://www.bendoregon.gov/city-projects/transportation-system-plan>

lanes or add delineated buffers. In the rural segment of U.S. 20 (east of Providence Drive, a shared use path on one side would serve foot and bicycle traffic. These shorter-term enhancements would be compatible with the crossing upgrades described earlier in this memo.

- **“Longer-term/aspirational enhancements”**

- While remaining within the existing right-of-way, these enhancements would involve more substantial cross-section adjustments to improve vulnerable roadway user comfort and safety, notably the creation of physically-separated shared use paths.

After categorizing projects into short term and long term, they can be further qualitatively ordered into a prioritization order. The ranking is ordered from most easily implementable based on investment, design engineering, and relative impact. In the following table, small transit improvement projects were ranked first, crossing and median modification projects were ranked second, and route connectors, sidewalk infill, and neighborhood greenways were ranked third,

Table 2: Prioritization Ranking of Short Term Improvements

Ranking/Location		No.	Justification
1	WB Transit Stop Enhancement	15	Lengthen existing concrete pad to serve rear-door passenger alighting <ul style="list-style-type: none"> • Requires minimal investment, design, and time • Is a small improvement to greatly assist transit passengers
1	EB Transit Stop Consolidation	11	Consider removal of existing EB transit stop, and consolidate with existing EB transit stops at 15th Street and/or Azure Drive <ul style="list-style-type: none"> • Requires minimal investment, design, and time • Is a small improvement to greatly assist transit passengers
1	WB Transit Stop Consolidation	13	Consider removal of existing WB transit stop, and consolidate with existing WB transit stops at Azure and/or 15th Street <ul style="list-style-type: none"> • Requires minimal investment, design, and time • Is a small improvement to greatly assist transit passengers
1	EB Transit Stop Consolidation	18	Consider removal of existing EB transit stop, and consolidate with existing EB transit stops at Azure Drive and/or Purcell Boulevard <ul style="list-style-type: none"> • Requires minimal investment, design, and time • Is a small improvement to greatly assist transit passengers
5	U.S. 20 at 6th Street	3	Per Bend Safety Implementation Plan: <ul style="list-style-type: none"> - Modified median refuge to include bicycle cut-through(s) Rectangular Rapid Flashing Beacon <ul style="list-style-type: none"> • Minimal ROW impacts • Low investment
5	U.S. 20 at 12th Street	7	Modified median refuge to include bicycle cut-through(s) <ul style="list-style-type: none"> • Median already exists, so this would require minimal work or impact to U.S. 20

Ranking/Location		No.	Justification
			Would help provide North/South bike connection across U.S 20 and to the multiuse path on the north side.
7	U.S. 20 at Future "Hanson to Big Sky Trail" Crossing	22	Future trail undercrossing (to be confirmed upon finalizing trail alignment) (per Bend Park and Recreation District Comprehensive Plan) <ul style="list-style-type: none"> Moderate investment and ROW impacts, but will connect pedestrian facilities.
7	U.S. 20 at Future Trans-Canada Trail Crossing-	23	Future trail crossing (specific crossing type to be confirmed upon finalizing trail alignment) (per Bend Park and Recreation District Comprehensive Plan) <ul style="list-style-type: none"> Requires more design before implementation
7	Hawthorne Neighborhood Greenway	24	Hawthorne Neighborhood Greenway (portion of TSP Project #R6-A) <ul style="list-style-type: none"> Relatively low investment, but might require additional public outreach and involvement
7	Larkspur Trail/Hawthorne Neighborhood Linkage	27	Shared use path linking the Larkspur Trail and Hawthorne Neighborhood Greenway (project includes new crosswalk at 15th) <ul style="list-style-type: none"> Moderate investment and ROW impacts, but will connect pedestrian facilities.
7	Bear Creek Safe Routes to Schools	28	Larkspur Trail/Coyner Trail Connection (TSP Project #R2-D)
7	Bear Creek Road	30	Shared use path adjacent to roadway; sidewalk infill (TSP project #R2-E) <ul style="list-style-type: none"> Moderate investment and ROW impacts, but will connect pedestrian facilities.
7	Neff Road	40	Shared use path adjacent to roadway; sidewalk infill (TSP Project #R3-C) <ul style="list-style-type: none"> Moderate investment and ROW impacts, but will connect pedestrian facilities.
7	Norton Avenue Neighborhood Greenway	42	Neighborhood Greenway (TSP Project #R-3A) <ul style="list-style-type: none"> Relatively low investment, but might require additional public outreach and involvement

Table 3: Prioritization Order of Long Term Projects

Ranking/Location		No.	Justification
1	U.S. 20 at 10th Street	6	New enhanced crossing at (or in vicinity of) intersection
1	U.S. 20 at 5th Street	2	New enhanced crossing at (or in vicinity of) intersection
1	U.S. 20 at 7th Street	4	New enhanced crossing at (or in vicinity of) intersection

Ranking/Location		No.	Justification
			<ul style="list-style-type: none"> Enhanced crossings are a relatively low investment for improving bike and pedestrian comfort and safety, and improving north/south access across U.S. 20
1	U.S. 20 at Azure Drive	16	<p>New enhanced crossing at (or in vicinity of) intersection</p> <ul style="list-style-type: none"> Enhanced crossings are a relatively low investment for improving bike and pedestrian comfort and safety, and improving north/south access across U.S. 20
1	U.S. 20 at Dean Swift Road	17	<p>New enhanced crossing at (or in vicinity of) intersection</p> <ul style="list-style-type: none"> Enhanced crossings are a relatively low investment for improving bike and pedestrian comfort and safety, and improving north/south access across U.S. 20
1	U.S. 20 at Arnett Way	14	<p>New enhanced crossing at (or in vicinity of) intersection; potential to leverage existing pedestrian cut through on west leg</p> <ul style="list-style-type: none"> Enhanced crossings are a relatively low investment for improving bike and pedestrian comfort and safety, and improving north/south access across U.S. 20
1	U.S. 20 at Windy Knolls Drive	20	<p>New enhanced crossing at (or in vicinity of) intersection</p> <ul style="list-style-type: none"> Enhanced crossings are a relatively low investment for improving bike and pedestrian comfort and safety, and improving north/south access across U.S. 20
8	Cessna Drive/Azure Drive/Savannah Drive	29	<p>Enhanced bikeway</p> <ul style="list-style-type: none"> Enhanced bikeways are a relatively low investment, but likely need to be included as part of a separate project or improvement.

Ranking/Location		No.	Justification
8	Dean Swift Road	31	Enhanced bikeway <ul style="list-style-type: none"> Enhanced bikeways are a relatively low investment, but likely need to be included as part of a separate project or improvement.
8	Providence Drive	36	Enhanced bikeway <ul style="list-style-type: none"> Enhanced bikeways are a relatively low investment, but likely need to be included as part of a separate project or improvement.
8	Forum Drive/Locksley Drive	37	Enhanced bikeway <ul style="list-style-type: none"> Enhanced bikeways are a relatively low investment, but likely need to be included as part of a separate project or improvement.
8	Forum Drive /Watt Way/Medical Center	38	Enhanced bikeway (corridor identified as Key Walking/Bicycling Route in Bend TSP) <ul style="list-style-type: none"> Enhanced bikeways are a relatively low investment, but likely need to be included as part of a separate project or improvement.
8	Paula Drive/Donagon Road	39	Enhanced bikeway <ul style="list-style-type: none"> Enhanced bikeways are a relatively low investment, but likely need to be included as part of a separate project or improvement.

Ranking/Location		No.	Justification
14	Purcell Boulevard	32	<p>Sidewalk Infill</p> <ul style="list-style-type: none"> Sidewalk Infill can require ROW, trigger ADA improvements, but will strengthen the City of Bend pedestrian network.
15	Larkspur Trail Stairway Connection	9	<p>Consider adding stairway along existing demand path to streamline pedestrian connections between U.S. 20 and the Larkspur Trail (note: may require supplemental ADA-accessible ramp connection)</p> <ul style="list-style-type: none"> Connecting different trail systems enhances the current bike network, and helps to guide users to more friendly and comfortable spaces Relatively low investment, but might require ROW or public involvement.
15	Larkspur Trail Bicycle Connection	10	<p>Add ramp to facilitate direct linkage between Larkspur Trail south of US 20 and the U.S. 20 EB bike lane</p> <ul style="list-style-type: none"> Connecting different trail systems enhances the current bike network, and helps to guide users to more friendly and comfortable spaces Relatively low investment, but might require ROW or public involvement.
15	Larkspur Trail Bicycle Connection	12	<p>Add ramp to facilitate direct linkage between Larkspur Trail north of US 20 and the U.S. 20 WB bike lane</p> <ul style="list-style-type: none"> Connecting different trail systems enhances the current bike network, and helps to guide users to more friendly and comfortable spaces Relatively low investment, but might require ROW or public involvement.
15	Larkspur Trail/Hawthorne Neighborhood Linkage	27	<p>Shared use path linking the Larkspur Trail and Hawthorne Neighborhood Greenway (project includes new crosswalk at 15th)</p> <ul style="list-style-type: none"> Connecting different trail systems enhances the current bike network, and helps to guide users to more friendly and comfortable spaces Relatively low investment, but might require ROW or public involvement.

Ranking/Location		No.	Justification
15	Parkview Court	41	<p>Shared use path connection to Larkspur Trail; enhanced bikeway on Parkview</p> <ul style="list-style-type: none"> Connecting different trail systems enhances the current bike network, and helps to guide users to more friendly and comfortable spaces Relatively low investment, but might require ROW or public involvement.
20	Ped Crossing Enhancement	33	Remove EB deceleration lane, tighten EB turn radius (pending engineering study)
20	Bike Lane Gap Closure	34	Remove WB deceleration lane, tighten WB turn radius, add WB bike lane (pending engineering study)
22	U.S. 20 at Future "Hanson to Big Sky Trail" Crossing	22	<p>Future trail undercrossing (to be confirmed upon finalizing trail alignment) (per Bend Park and Recreation District Comprehensive Plan)</p> <ul style="list-style-type: none"> A trail undercrossing will be more expensive than a surface connection, but will assist in closing trail gaps.
22	U.S. 20 at Future Trans-Canada Trail Crossing-	23	<p>Future trail crossing (specific crossing type to be confirmed upon finalizing trail alignment) (per Bend Park and Recreation District Comprehensive Plan)</p> <ul style="list-style-type: none"> More engineering and design will need to occur before this is implementable.
24	6th Street Neighborhood Greenway Extension	25	<p>Extend Neighborhood Greenway south to Juniper Swim and Fitness Center</p> <ul style="list-style-type: none"> Neighborhood Greenways are low investment, but can require public involvement and engineering when closing or rerouting vehicular access
24	Irving Avenue	26	<p>Neighborhood Greenway</p> <ul style="list-style-type: none"> Neighborhood Greenways are low investment, but can require public involvement and engineering when closing or rerouting vehicular access
26	U.S. 20 at 8th Street	5	<p>Pedestrian Treatments</p> <p>LPIs on all legs (subject to analysis relative to ODOT Signal Policy)</p> <ul style="list-style-type: none"> Warning signage on all approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> NB and SB approaches: green bike lanes (solid fill) immediately upstream from intersection All approaches: green bike lane conflict markings traversing the first lane of cross-street traffic (subject to ODOT approval) <p>Transit treatments</p> <ul style="list-style-type: none"> Transit signal priority (to be implemented upon completion of ATC upgrade)

Ranking/Location		No.	Justification
			Note: TSP Project #C-30 (details not specified)
26	U.S. 20 at 15th Street	8	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - LPIs on all legs (subject to analysis relative to ODOT Signal Policy) - Warning signage on EB and NB approaches (Turning Vehicles Yield to Bikes/Peds) Bicycle treatments - EB approach: green bike lane conflict markings immediately upstream from EB right turn lane (subject to ODOT approval) - NB approach: shared lane marking in NB left turn lane <p>Transit treatments</p> <p>Transit signal priority (to be implemented upon completion of ATC upgrade)</p>
26	U.S. 20 at 3rd Street	1	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - Leading Pedestrian Intervals (LPIs) on all legs (subject to analysis relative to ODOT Signal Policy) - Warning signage on all approaches (Turning Vehicles Yield to Bikes/Peds) (per Bend Safety Implementation Plan) - Right-turn-on-red prohibition (per 2012 Multimodal Traffic Safety Assessment) <p>Transit treatments</p> <p>Transit signal priority implemented with ATC upgrade</p>
26	U.S. 20 at Purcell Boulevard	19	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - LPIs on all legs (subject to analysis relative to ODOT Signal Policy) - Dual curb ramps on NW corner - Warning signage on all approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> - SB approach: green bike lane conflict markings immediately upstream from SB right turn lane pending required approvals - EB and WB approaches: green bike lanes (solid fill) immediately upstream from intersection, and green bike lane conflict markings traversing the first lane of cross-street traffic (subject to ODOT approval) <p>Transit treatments</p> <ul style="list-style-type: none"> - Upgrades to existing SB transit stop (upstream from intersection) (per Cascades East Transit) - Transit signal priority (to be implemented upon completion of ATC upgrade)

Ranking/Location		No.	Justification
26	U.S. 20 at 27th Street	21	<p>Pedestrian Treatments</p> <ul style="list-style-type: none"> - LPIs on east, north and south legs (subject to analysis relative to ODOT Signal Policy) - Audible pedestrian signals - Dual curb ramps on NE and SE corners - Warning signage on EB, NB, WB approaches (Turning Vehicles Yield to Bikes/Peds) <p>Bicycle treatments</p> <ul style="list-style-type: none"> - SB approach: green bike lane conflict markings on SB slip lane - EB, NB, WB approaches: green bike lanes (solid fill) immediately upstream from intersection, and green bike lane conflict markings traversing the first lane of cross-street traffic (subject to ODOT approval) <p>Transit treatments</p> <ul style="list-style-type: none"> - Transit signal priority (to be implemented upon completion of ATC upgrade) - New EB transit stop immediately east of intersection <p>Note: Specific design elements to be coordinated with the City of Bend's pending project to develop a shared use path on 27th between U.S. and Bear Creek Rd.</p>
31	U.S. 20 Shared Use Path	35	<p>Shared use path (north or south side of U.S. 20) between Bend city limits vicinity and Powell Butte Hwy.</p> <ul style="list-style-type: none"> • This would require extensive engineering and investment, due to the many homes, businesses, and other private parcels adjacent to U.S 20 in this area.

Summary

Many of the projects identified as part of this study fall into longer term improvements due to funding, design, and public involvement limitations but this designation can change as new funding opportunities arise. This document can help identify which projects can be accomplished with different levels of investment and can aid in informing decision makers as to which projects should be included as part of different funding and grant packages.

Appendix A – Intersection Improvement Figures

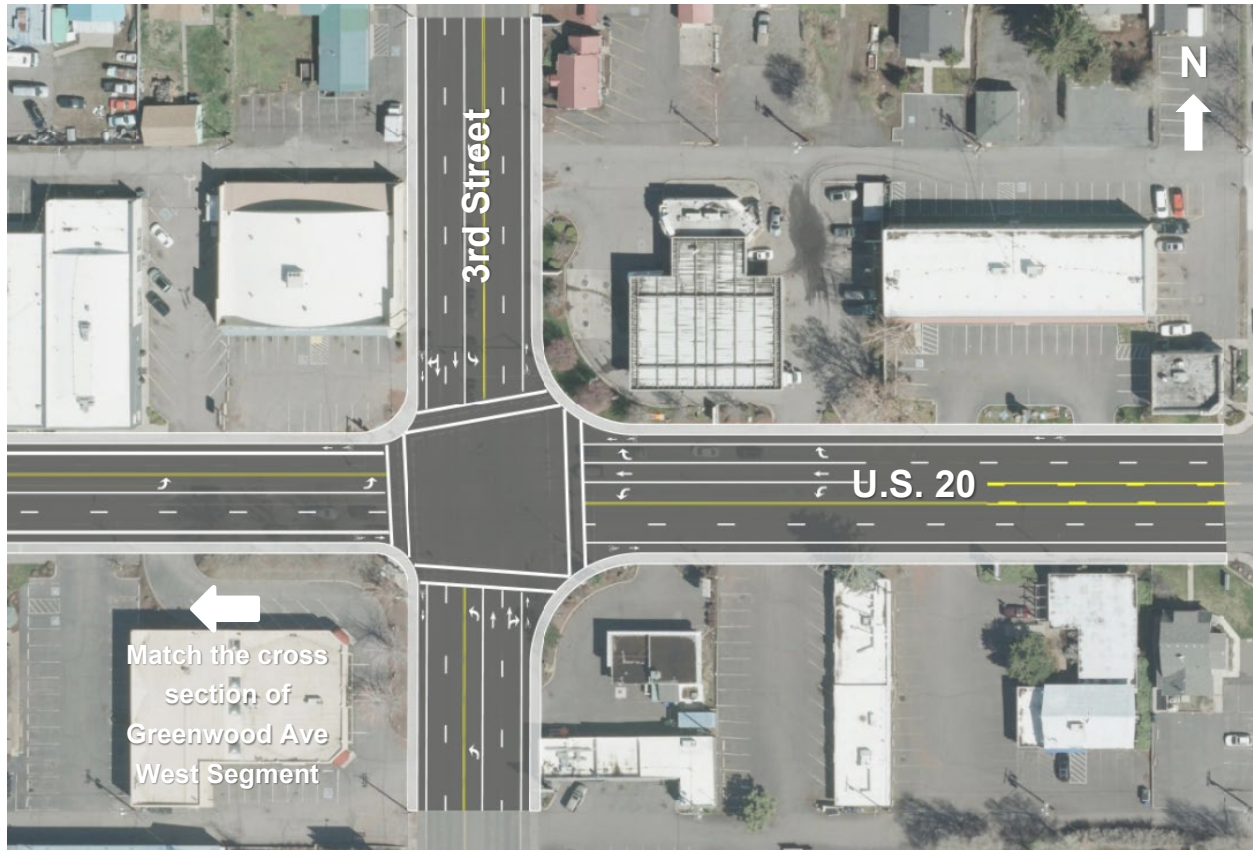


Figure 3: Proposed Alternative at NE 3rd Street and US 20/Greenwood Ave



Figure 4: Proposed Alternative at NE 8th Street and US 20

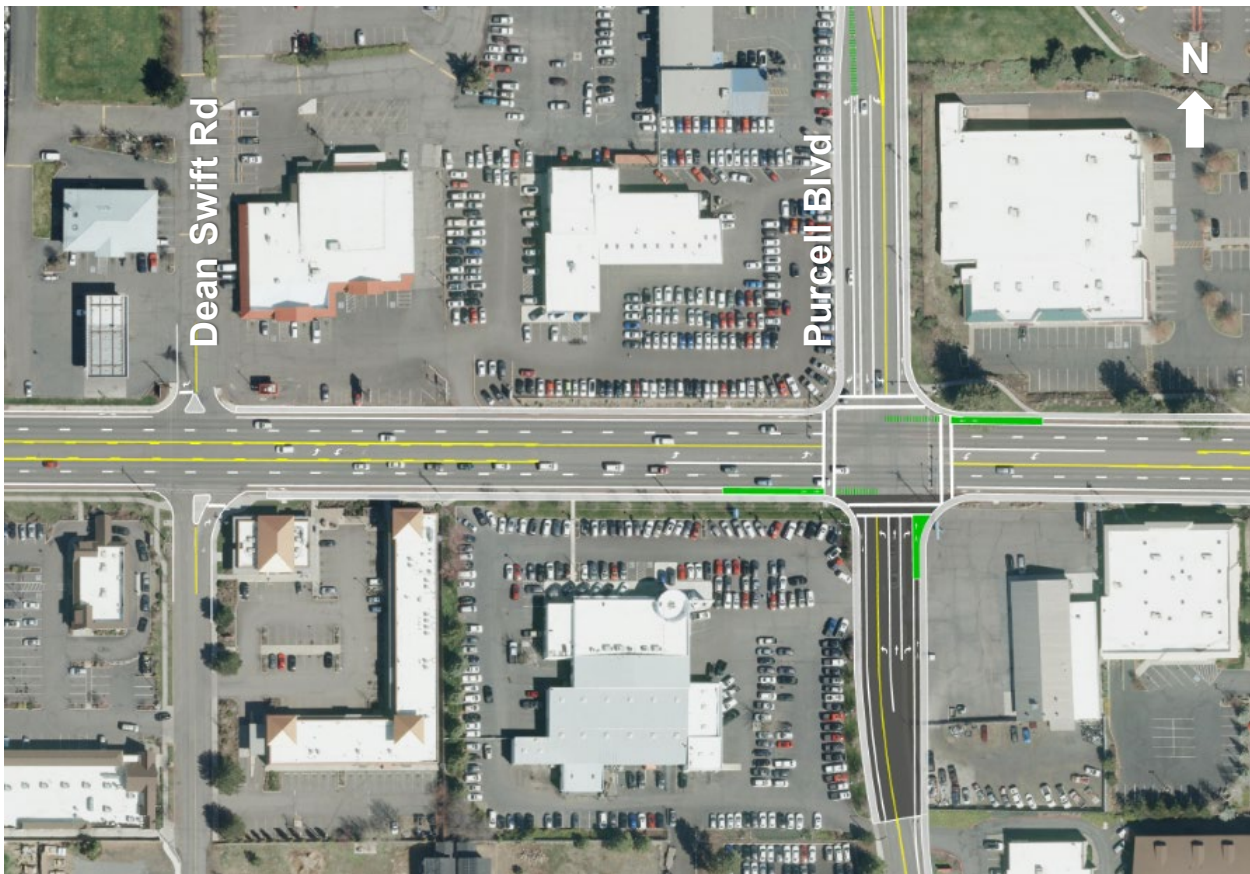


Figure 5: Proposed Alternative at NE Purcell Blvd

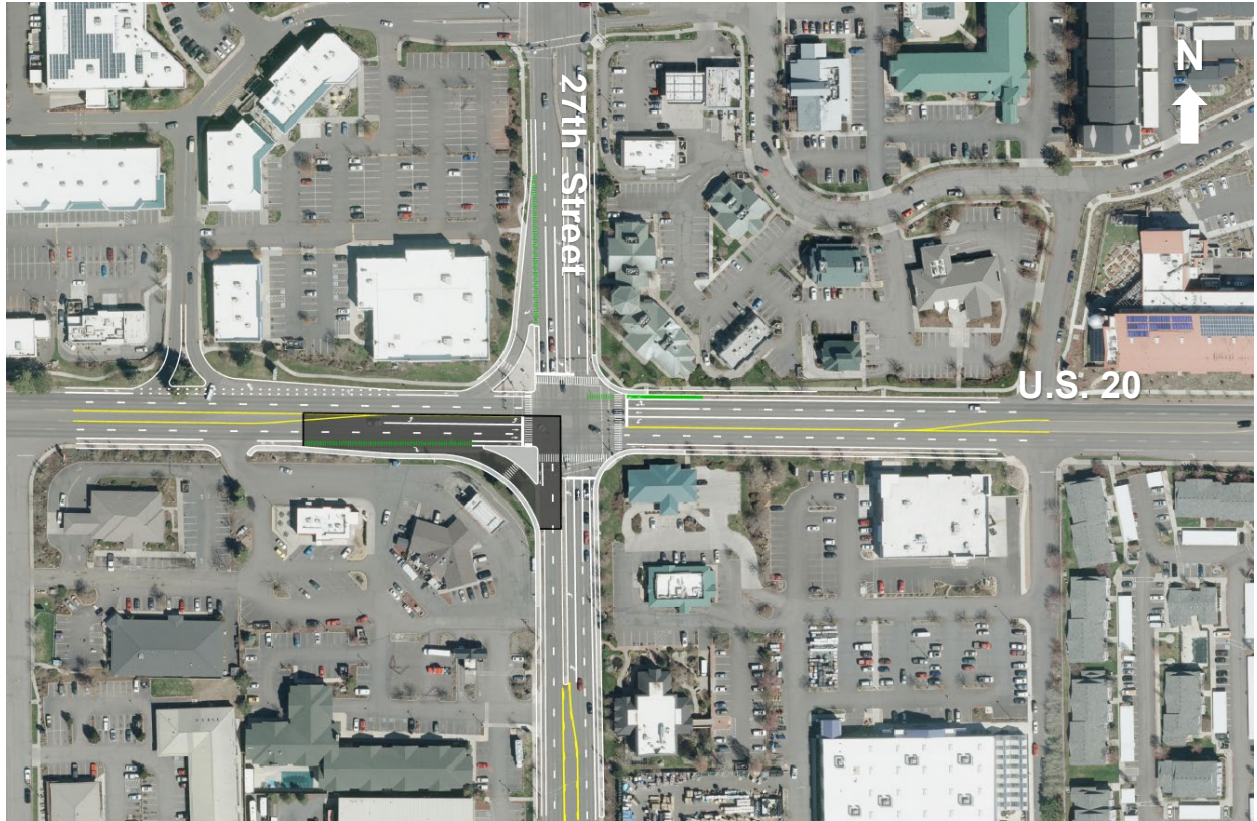


Figure 6: Proposed Alternative at NE 27th Street



Figure 7: Proposed Alternative at Hamby Road