



Scenario Evaluation Overview for CTAC

PREPARED FOR: Citywide Transportation Advisory Committee (CTAC)

PREPARED BY: DKS Associates
City of Bend Staff

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Introduction

On December 4th, CTAC will review the scenario evaluation and develop a preliminary Citywide Hybrid Scenario. The team will refine the Hybrid Scenario to bring back to CTAC on December 11. At that meeting CTAC will create a recommendation for the Steering Committee’s review and approval in January 2019¹. Figure 1 describes the steps in the scenario evaluation process. Steps 1 and 2 from Figure 1 have been completed. CTAC will be asked to discuss and take action on the following (Step 3):

- Confirm Foundational Projects to add to the Baseline Projects
- Confirm Projects/Needs to address outside of the Citywide framework (in Phase 2, or as policy) or to remove from further consideration
- Provide direction on how to address needs that have significant options

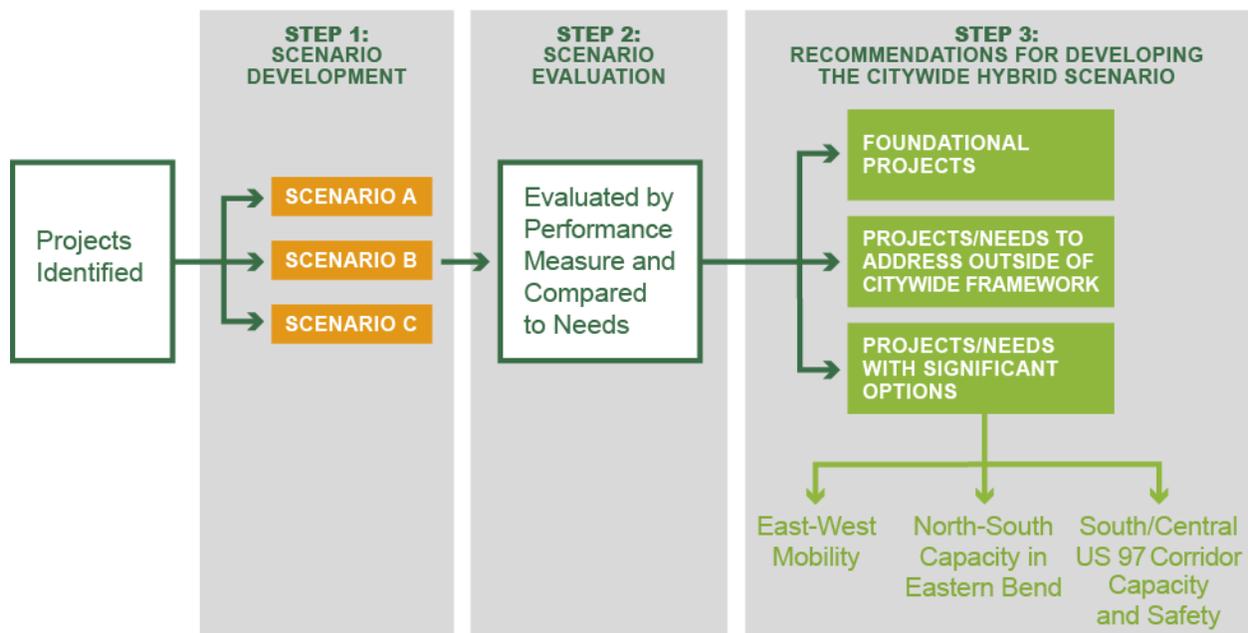


Figure 1: Process to Recommend Projects for the Citywide Hybrid Scenario

¹ As a reminder, CTAC will weigh in on project prioritization and matching funding sources to projects in spring/summer 2019. Not all projects in the Citywide framework will be funded in the next twenty years.

Step 1: Scenario Development

To help shape the Citywide transportation framework, CTAC and then the Steering Committee approved three transportation scenarios to address future needs,² each representing a different investment strategy. All scenarios included the Baseline Projects, comprised of the City of Bend 5-year Capital Improvement Program, Metropolitan Transportation Plan financially-constrained project list and Bend Urban Area Transportation System Plan.³ The Baseline Projects include roadway capacity and safety enhancements as well as modernization projects to provide walking and biking connections to the Urban Growth Boundary (UGB) expansion areas (Attachment A).

Additional projects were used to create each of the following three scenarios. The scenarios were tested against the Performance Measures for each goal to learn which strategies/projects might best meet the Bend's transportation needs.

- **Scenario A: Build New Corridors.** Scenario A includes projects that focus on constructing new roads and extending existing roads, building new bridges and crossings of barriers and adding key multi-use paths.
- **Scenario B: Widen and Enhance Existing Corridors.** Scenario B includes projects that focus on widening existing corridors and upgrading them to include missing walking and bicycling facilities, without major new roadways, bridges, or paths.
- **Scenario C: Maximize the Existing Transportation System.** Scenario C maximizes the existing system with increased use of transit, technology, and transportation demand programs, without major new capital improvement projects.

Step 2: Scenario Evaluation

The project team evaluated the Scenarios using a variety of tools to determine performance with the approved scenario evaluation performance measures, as listed in Table 1 (a detailed description of the methodology and results are included in Attachment E). Table 1 compares each Scenario to the Baseline Projects alone to give a relative score for each performance measure. This analysis does not give an absolute prediction of future conditions in Bend for each scenario, instead it focuses on the comparative conditions between Scenarios. The evaluation informs the team's assessment of the types of projects or programs that best address the City's transportation needs. When looking at the high-level findings from the entire evaluation, some major lessons emerged about how different types of citywide investments perform compared to the TSP goals. Those lessons are summarized as follows:

Summary Findings

- Future motor vehicle congestion (corridor demand to capacity ratios, vehicle hours of delay, travel time reliability, etc.) could be reduced by either connectivity investments (new roads)

² Needs were broadly identified by the public during the June 2018 Open House and confirmed by CTAC at meeting #4 as: Safety, Capacity, Connectivity, and Access. At CTAC meeting #5, committee members reviewed projects by those need categories (www.bendoregon.gov/CTAC). A list of the key needs is provided in Attachment E, Table 24.

³ [Bend Urban Area Transportation System Plan](#)

or roadway widening investments. Outside of reducing future congestion, each of those investment approaches would have different trade-offs for other performance measures:

- **Pros:** Connectivity projects would improve accessibility for walking and biking, improve system safety by addressing barriers, and may reduce vehicle miles travelled (VMT) by reducing out-of-direction travel. **Cons:** Connectivity projects are costly and will increase operation and maintenance costs. These new connectivity projects will also pass through some neighborhoods that currently do not experience through traffic. As drivers choose new connections, this increased use of the new connections could affect neighborhood livability in some areas.
- **Pros:** Roadway widening projects would enhance walking and bicycling facilities along improved roadways (safety and accessibility benefit) and focus regional traffic on arterial corridors. **Cons:** Corridor widening projects are costly and will increase operation and maintenance costs. Widening projects may also increase VMT, and may impact safety by creating higher volume/speed corridors that are difficult to cross.
- Improving walking and bicycling through Bend requires use of two related strategies: (1) filling key infrastructure gaps (sidewalks and bicycle facilities), and (2) improving overall connectivity by developing complete, connected corridors throughout the City (both along and crossing corridors).
- Demand for motor vehicle trips can be reduced by transit investments and by implementing policies and programs that encourage use of other modes (e.g., parking pricing and employer commute options).
- Concepts such as “mobility hubs”⁴ have the potential to improve mobility and reduce demand for motor vehicle trips by providing first/last mile travel choices that connect to a robust regional transit system. This type of investment may also provide an opportunity to leverage public/private partnerships.
- Forecasted growth suggests that managing congestion and safety on US 97 may require changes to corridor operation and access management, such as implementing ramp meters and closing at-grade connections. Modeling indicates that these changes would have few impacts to nearby city streets.

Table 1: Scenario Performance Relative to the Baseline Projects

Project Goals	Performance Measures	Scenario A	Scenario B	Scenario C
Increase System Capacity, Quality, and Connectivity for All Users	Demand to Capacity Ratio			
	Sidewalk System Completeness			
	Bicycle System Level of Traffic Stress			

⁴ Mobility hubs are physical places where different modes of travel and services converge, providing an integrated range of mobility services such as public transit, bike share, scooters, shuttles, and ride-share. This convergence of services helps to seamlessly link trips by different modes, including providing first/last mile services for regional transit connections.

Project Goals	Performance Measures	Scenario A	Scenario B	Scenario C
	Completeness of low-stress network	⬇️	⬆️	⬇️
Ensure Safety for All Users	Qualitative Assessment of Predicted Crash Rates	⬆️	⬆️	⬆️
Facilitate Housing Supply, Job Creation, and Economic Development to Meet Demand/Growth	Vehicle Hours of Delay	⬆️	⬆️	⬆️
	Peak Hour VMT on Rural Facilities (diversion)	⬇️	⬇️	⬇️
	Travel Time Reliability	⬆️	⬆️	⬇️
Protect Livability and Ensure Equity and Access	Transportation Equity	⬇️	⬇️	⬆️
	Transit Accessibility for Vulnerable Populations	⬇️	⬇️	⬆️
	Employment accessibility	⬆️	⬇️	⬆️
	Percentage of collector roads with average daily trips above 4,000	⬇️	⬆️	⬇️
Steward the Environment	VMT per capita	⬆️	⬇️	⬆️
Have a Regional Outlook and Future Focus	Arterial Roadway Miles with Demand to Capacity Ratio Deficiencies	⬆️	⬆️	⬆️
	Potential for alternative funding sources	⬇️	⬇️	⬆️
	Mode Split	⬇️	⬇️	⬆️
Implement a Comprehensive Funding and Implementation Plan	Cost (capital costs)	\$\$\$	\$\$\$	\$
	Roadway lane miles (indicator for operations and maintenance costs)	⬇️	⬇️	⬇️

Legend: ⬇️ = significant negative performance, ⬇️ = somewhat negative performance, ⬇️ = no significant change, ⬆️ = somewhat positive performance, ⬆️ = significant positive performance, \$ = less than \$200 million, \$\$ = \$200-500 million, \$\$\$ = more than \$500 million

Step 3: Recommendations for Developing the Citywide Hybrid Scenario

Drawing upon the findings from the scenario evaluation, the project team sorted projects from the scenarios into three categories:

- 1. Foundational projects:** The project team recommends that these projects advance as part of the Citywide Hybrid Scenario since they provide a clear benefit without disproportionate trade-offs. These projects are listed in Attachment B.
- 2. Projects recommended to be addressed outside of the Citywide Hybrid Scenario:** The project team recommends that these projects be addressed in one of the following ways:

- Through policy
- As neighborhood needs to be considered in Phase 2
- Needs to be addressed through annual programmatic investments
- Set aside because they did not address an identified transportation need.

These projects are listed in Attachment C.

3. **Needs with significant project options:** The evaluation process identified a few need areas with major challenges that could be addressed in several ways. These need areas were primarily related to locations that would be congested for motor vehicles in the future, and where potential improvements are large and complex projects with a range of tradeoffs. These need areas and options are listed in Attachment D. The project team recommends that CTAC discuss these tradeoffs to develop a recommended improvement approach.

Foundational Projects Recommended for the Citywide Hybrid Scenario

 ***Desired CTAC action: Revise this list as needed and recommend advancing these projects to the Citywide Hybrid Scenario.***

Several projects positively “moved the needle” on multiple performance measures, addressed identified needs, had limited competing alternatives, and are anticipated to have limited negative impacts or trade-offs. The project team recommends that CTAC consider adding these projects to the Baseline Projects for the Citywide Hybrid Scenario.

The recommended foundational projects are listed in Attachment B. These projects represent a range of investment types, including roadway capacity, safety, walking and biking, transit, demand management, and technology.

Projects Recommended to be Addressed Outside of the Citywide Framework

 ***Desired CTAC action: Revise this list as needed and recommend addressing these projects outside of the Citywide framework and/or setting them aside.***

The evaluation suggested that some projects may not fit into the Citywide Hybrid Scenario. Projects that are recommended to be addressed outside of the Citywide Framework generally fall into the following categories:

- Advance as neighborhood-level projects in Phase 2: These projects could have merit but did not address a Citywide need.
- Address through policy: Some projects are not likely to be warranted during the 20-year planning horizon but could be ready for project development or planning activities during the 20-year planning horizon (i.e. a northern bridge crossing of the Deschutes River) and should be captured with policy language.
- Address with programmatic investments: These would be on-going annual investments programs (i.e., a variety of smaller projects such as sidewalk infill) to help create complete, connected transportation systems.
- Set aside: These projects did not perform well when evaluated according to the performance measures, which reflect the transportation plan goals.

The projects recommended to be addressed outside of the Citywide Framework are listed in Attachment C. Identifying these projects narrows the range of options for CTAC to consider in identifying investment choices for the Citywide Framework.

Needs with Significant Project Options

 ***Desired CTAC action: Discuss options and narrow project ideas on December 4; recommend approaches to address each need on December 11.***

After accounting for the foundational projects and projects recommended to not advance to the Citywide Hybrid Scenario, three distinct need areas with major roadway capacity and congestion challenges emerged:

- a) **East-West Capacity in Central Bend:** Forecasted congestion on east-west corridors in Central Bend, where limited system connectivity would focus traffic on Reed Market Road and Colorado Avenue. This need is broken into three subsets for discussion: Century Drive to 3rd Street, 3rd Street to 27th Street, and the railway switchyard.
- b) **North-South Capacity in Eastern Bend:** Forecasted congestion on the Empire Avenue and 27th Street corridors could create potential diversion on the local urban and rural collector system.
- c) **South/Central US 97 Corridor Capacity and Safety:** Forecasted congestion would create travel time and safety issues on the US 97 corridor. This need was broken into three subsets for discussion: major capacity options, overcrossing, and alternate route options.

The project team identified different combinations of capital improvement projects from the three scenarios that could address each need. In addition, the team identified a policy alternative to capital projects. This would be to accept a higher level of motor vehicle congestion, along with implementing the Baseline and Foundational projects. This policy concept is typically referred to as changing mobility standards.

Mobility standards (or targets) establish the level of vehicle congestion that is generally accepted on Oregon Department of Transportation (ODOT) or City facilities. These mobility standards are used in managing growth (e.g., proposed developments may need to mitigate impacts on roadways where they would cause congestion to exceed the standard) and for developing roadway projects.

Mobility standards for the City and ODOT currently measure roadway and intersection performance in terms of peak hour volume to capacity ratio and average delay per vehicle. For ODOT facilities, mobility standards are targets for peak hour volume to capacity ratios in the 30th-highest volume hour of the year. The City's standard is for an average weekday condition. Changing these standards or targets could allow more congestion in the defined peak hours (essentially raising the bar). In addition, for the ODOT facilities, the standards or targets could be modified to always look at average weekday conditions instead of 30th-highest hour conditions, and the City or ODOT could look at the level of congestion in multiple hours (not just the peak hour of a day).

Changes to mobility standards to accept more congestion could be considered either alone or in combination with capital improvements in the need areas.

To help explain the tradeoffs for each set of project options, a subset of the performance measures was selected for comparison to the future Baseline (similar to the scenario evaluation) because they provided clear differentiation. The eight performance indicators are:

- Congestion (a combination of *demand to capacity ratio* and *vehicle hours of delay* performance measures)
- Safety
- Travel Time Reliability
- Employment Accessibility
- Mode Split
- VMT per capita
- Roadway Lane Miles (operations and maintenance cost)
- Capital Cost

Additional detail for the three need areas and the options are described in the need summary sheets in Attachment D.

List of Attachments

Attachment A: Baseline Project List and Map

Attachment B: Foundational Project List and Map

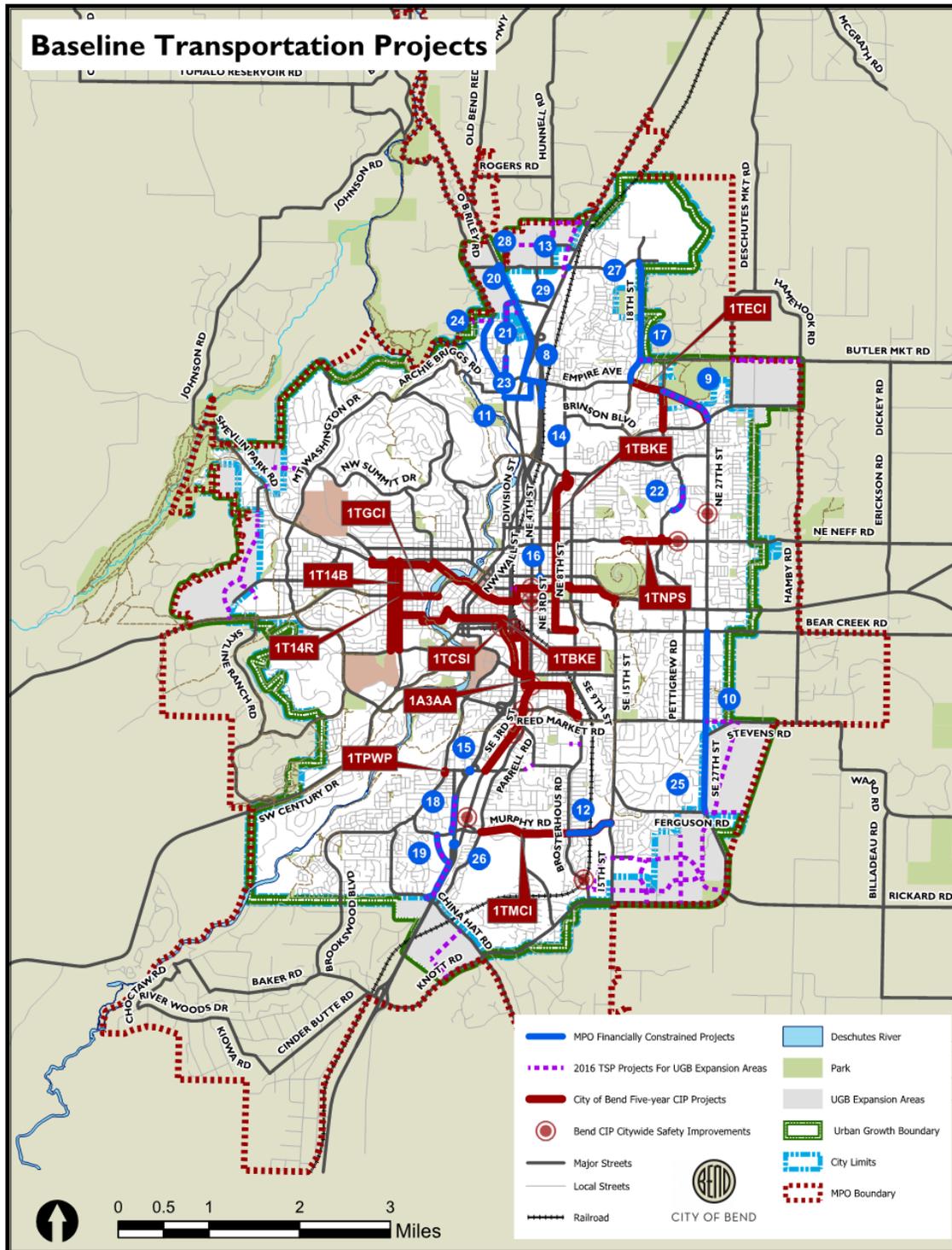
Attachment C: Projects Recommended to be Addressed Outside of the Citywide Framework

Attachment D: Needs with Significant Options

Attachment E: Detailed Technical Analysis

Attachment A: Baseline Project List and Map

Figure 1: Baseline (Bend MTP Financially Constrained and CIP) Projects¹



¹ Baseline includes the Expansion Area transportation network that was adopted in November 2016. Some modifications of the layout may occur, as the Expansion Areas are master planned.

Figure 2: Baseline (Bend Urban Area Transportation Systems Plan Rural Road Network Upgrade) Projects

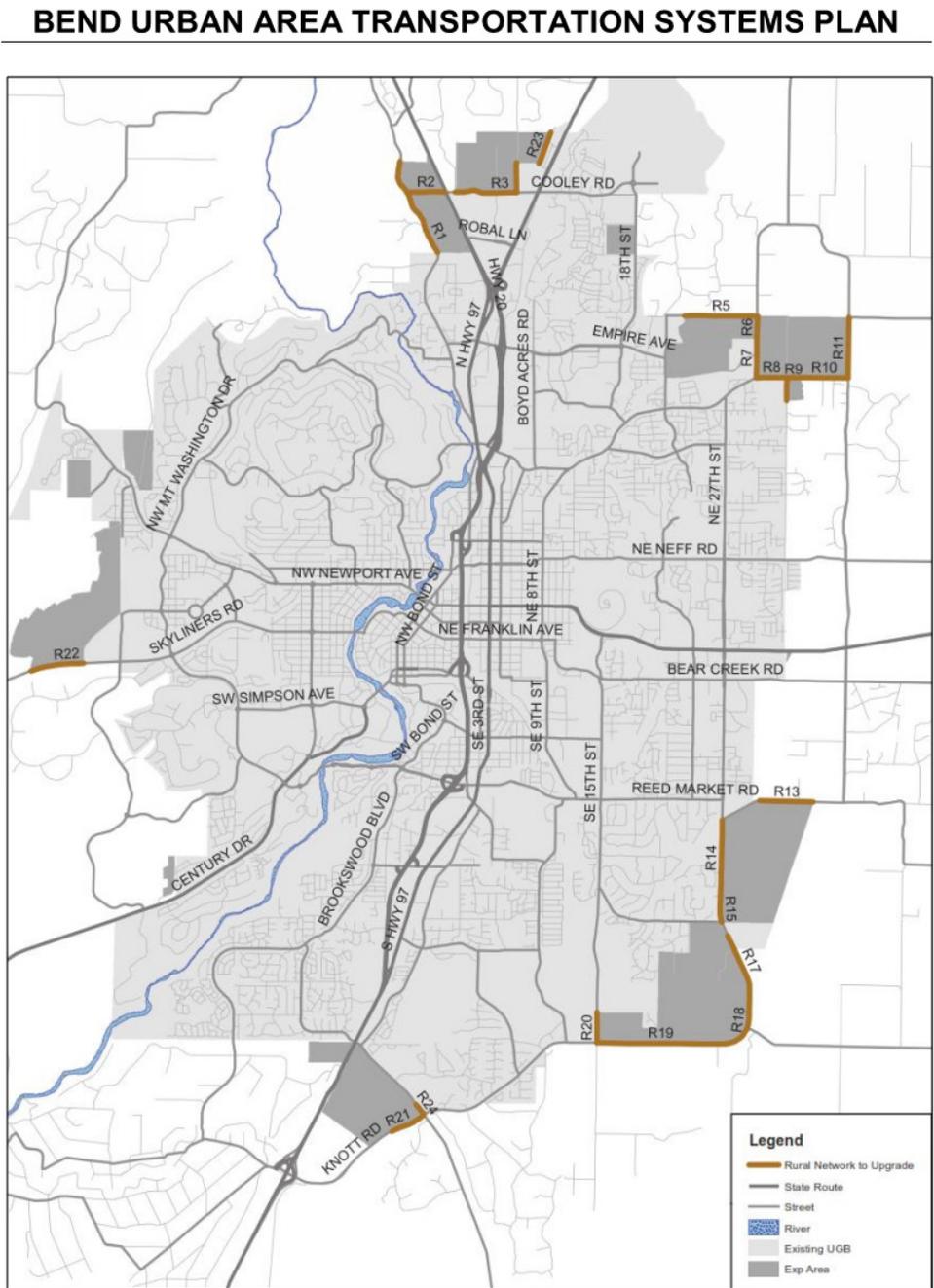


Figure 3: Baseline Scenario (Bend Urban Area Transportation Systems Plan New Roadway, Corridor and Intersection) Projects

BEND URBAN AREA TRANSPORTATION SYSTEMS PLAN

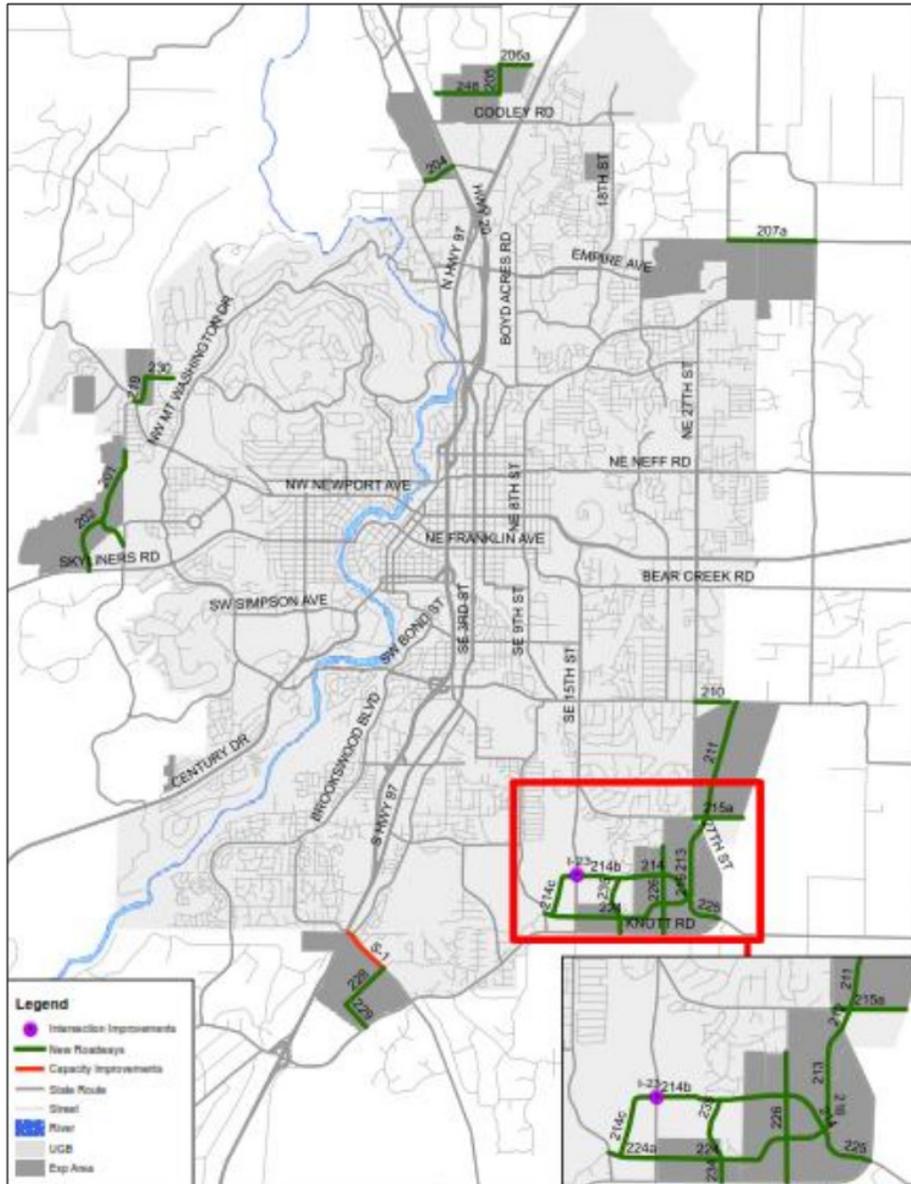


Table 1: Baseline Scenario (Financially Constrained) Project List

NUMBER	PROJECT	SOURCE
8	Empire Avenue: Widen to 5 lanes and install signal at southbound ramps	Bend MTP Financially Constrained Projects
9	Empire Avenue: Construct 2-lane extension	Bend MTP Financially Constrained Projects
10	Realign Stevens Road to connect directly to Reed Market Road	Bend MTP Financially Constrained Projects
11	O.B. Riley Road: Construct intersection control improvements	Bend MTP Financially Constrained Projects
12	Murphy Rd: Construct 2-lane extension	Bend MTP Financially Constrained Projects
13	US 97/Cooley Road area intersection and lane upgrade improvements	Bend MTP Financially Constrained Projects
14	Empire Ave: Widen existing ramp to 2 lanes	Bend MTP Financially Constrained Projects
15	US 97 Preliminary engineering and right-of-way acquisition for overcrossing or interchange	Bend MTP Financially Constrained Projects
17	Yeoman Road: Construct 2-lane extension	Bend MTP Financially Constrained Projects
18	New 2-lane North frontage road	Bend MTP Financially Constrained Projects
19	New 2-lane south frontage road	Bend MTP Financially Constrained Projects
20	Britta Street (north section): 2-lane road extension	Bend MTP Financially Constrained Projects
21	Britta Street: New 2-lane road extension	Bend MTP Financially Constrained Projects
22	Purcell Boulevard: New 2-lane road extension	Bend MTP Financially Constrained Projects
23	Mervin Samples Road to Sherman Road. Upgrade to 2-lane collector roadway and install traffic signal at US 20	Bend MTP Financially Constrained Projects
24	O.B. Riley Road. Upgrade to 3-lane arterial	Bend MTP Financially Constrained Projects
25	27th Street. Upgrade to 3-lane arterial	Bend MTP Financially Constrained Projects
26	US 97. Construct northbound on-ramps and southbound off-ramps	Bend MTP Financially Constrained Projects
27	18th Street. Complete 3-lane arterial corridor	Bend MTP Financially Constrained Projects
28	US 20. Construct intersection control improvements	Bend MTP Financially Constrained Projects
29	Add second southbound through lane on US 20	Bend MTP Financially Constrained Projects
1TMCI	Murphy Corridor Improvements	City of Bend Five-year CIP Projects
1TECI	Empire Corridor Improvements	City of Bend 2018-2023 CIP Projects

NUMBER	PROJECT	SOURCE
1TBKE	Bicycle Greenways	City of Bend 2018-2023 CIP Projects
1A3AA	South 3rd Street Pedestrian Improvements	City of Bend 2018-2023 CIP Projects
1TNPS	Neff and Purcell Intersection (Formerly Neff and Purcell Sidewalk)	City of Bend 2018-2023 CIP Projects
1TPWP	Powers and Brookwood Roundabout Phase II	City of Bend 2018-2023 CIP Projects
1TGCI	Galveston Corridor Improvements	City of Bend 2018-2023 CIP Projects
1T14B	14th Street Reconstruction Schedule B	City of Bend 2018-2023 CIP Projects
1T14R	14th Street Reconstruction	City of Bend 2018-2023 CIP Projects
1TCSI	Citywide Safety Improvements	City of Bend 2018-2023 CIP Projects
R1	O.B. Riley Road. Curb and sidewalk on east side, bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R2	Cooley Road. Curbs, sidewalks and bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R3	Cooley Rd. Curbs and sidewalk on north side, bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R4	Hunnell Road. Sidewalk on west side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R5	Yoeman Road. Curbs, sidewalks and bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R6	Deschutes Market Road. Curb and sidewalk on east side, bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R7	Deschutes Market Road. Curb and sidewalk on east side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R8	Butler Market Road. Curb and sidewalk on north side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R9	Butler Market Road. Curbs, sidewalks and bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R10	Butler Market Road. Curb and sidewalk on north side, bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R11	Butler Market Road. Curbs and sidewalks on both sides	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R12	Eagle Road. Curb, sidewalk, and bike lane on east side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades

NUMBER	PROJECT	SOURCE
R13	Stevens Road. Curbs, sidewalks, and bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R14	Southeast 27th Street. Curb, sidewalk, and bike lane on east side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R15	Southeast 27th Street. Curb and sidewalk on east side, bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R16	Southeast 27th Street. Curb and sidewalk on east side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R17	Southeast 27th Street. Curb and sidewalk on both sides	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R18	Southeast 27th Street. Curbs, sidewalks and bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R19	Knott Road. Curbs, sidewalks and bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R20	15th Street. Curb and sidewalk on east side, bike lanes both directions	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R21	Knott Road. Curb and sidewalk on north side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R22	Skyliners Road. Curb and sidewalk on north side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R23	Clausen Drive. Sidewalk on west side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R24	China Hat Road. Sidewalks on both sides	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R25	China Hat Road. Widen bridge to include sidewalks on both sides	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
R26	Deschutes Market Road. Widen bridge to include sidewalk on west side	Bend Urban Area Transportation Systems Plan, Rural Road Network Upgrades
201	Skyline Ranch Road Extension	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
202	Crossing Drive Extension	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
204	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
205	Hunnell Road Extension	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
206A	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections

NUMBER	PROJECT	SOURCE
207A	Yeoman Road Extension	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
210	New collector roadway to Stevens	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
211	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
212	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
213	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
214	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
214B	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
214C	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
215A	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
216	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
219	Skyline Ranch Road	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
224	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
224A	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
225	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
226	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
228	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
229	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
230	New collector roadway	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
234	Raintree Court Extension	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections

NUMBER	PROJECT	SOURCE
235	Raintree Court Extension North	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
248	Loco Road Extension	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
S-1	Corridor improvement, China Hat, widen from 2 to 3 lanes	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections
I-23	Roundabout at Murphy Road/Southeast 15th Street	Bend Urban Area Transportation Systems Plan, New Roadway, Corridor, and Intersections

Attachment B: Foundational Project List and Map

Table 1: Foundational Projects to Advance to the Hybrid Scenario

Numbers	Project Descriptions	Cost	Key Measures Improved
A-1	Hawthorne Avenue Grade-Separated Crossing at US 97 and railroad (with additional bicycle and pedestrian improvements from Harriman to 1st Street*)	\$\$\$\$	Safety, sidewalk system completeness, completeness of the low-stress network, employment accessibility
A-6	US 97 North Parkway Extension including all improvements in the FEIS improvements	\$\$\$\$\$\$\$	Safety, travel time reliability, congestion
A-8	Powers Road/US 97 interchange ¹	\$\$\$\$\$	Safety, travel time reliability, congestion
A-10	US 97 Bicycle and Pedestrian Overcrossing at Badger Road (with additional bicycle and pedestrian improvements to Blakely Road*)	\$\$\$\$	Safety, sidewalk system completeness, completeness of the low-stress network, employment accessibility
A-11	3rd Street Multi-Use Path (A-11)	\$\$\$	Safety, sidewalk system completeness, employment accessibility
A-12, A-14, C-6	Robal Road pedestrian and bicyclist improvements	\$\$\$\$\$	Safety, sidewalk system completeness, completeness of the low-stress network, employment accessibility
B-3	Wilson Avenue protected bicycle facilities	\$\$	Low stress bicycle network
B-6*	Bicyclist/Pedestrian railroad grade-separated crossing on 6th Street	\$\$\$\$	Low stress bicycle network
B-17, B-20, B-21, C-7	Intersection safety and capacity improvements	\$\$\$\$\$	Safety
B-18.a*	27th Street/Knott enhanced pedestrian and bicycle facilities	\$\$\$	Low stress bicycle network
B-19	Hamby Road widening (from Stevens Road to Butler Market Road), including a roundabout at US 20	\$\$\$\$\$\$\$	Safety
B-25	Widen Bond/Reed Market Roundabout	\$\$\$	Congestion
B-26	Railroad undercrossing on Brosterhaus	\$\$\$\$\$	Low stress bicycle network
B-27	Left turn lanes on Reed Market at 3rd Street	\$\$\$	Safety, congestion
C-2, C-3, C-13	High capacity transit on Newport/Greenwood and 3rd Street, with mobility hubs	\$\$\$\$	Mode split, employment accessibility, equity, VMT per capita, congestion
C-9	US 97 Northbound/Colorado Avenue	\$\$\$	Safety, congestion
C-10	Reduce turn movements at the Reed Market Road/US 97 northbound ramps	\$	Safety, congestion
C-16	TMA for key regional centers (consider a TDM policy for major employers/institutions*)	\$	Mode split, congestion, VMT per capita, congestion

¹ Pending feasibility from the US 97 Parkway Study

Numbers	Project Descriptions	Cost	Key Measures Improved
C-19	Improve traffic signal coordination on signalized corridors, including freight and transit signal priority on designated corridors	\$\$	Safety, congestion
C-20	Parking pricing downtown	\$\$	Mode split, congestion, VMT per capita
C-21	Traffic signal priority for freight and transit at signalized intersections on US 97	\$\$	Safety, congestion
LSN-1*	Olney/Wall traffic signal modification and rail crossing surfacing work	\$	Low stress bicycle network
LSN-2*	Butler Market bicycle facilities, west of Brinson Ave	\$\$\$	Low stress bicycle network
LSN-3*	Wilson from 15th Street to the railroad, with Wilson/3rd Street intersection improvements	\$\$	Low stress bicycle network
LSN-4*	Brosterhous from Parrell to Brentwood, with canal bridge	\$\$	Low stress bicycle network

* Project modified or added based on evaluation results. The Project Description column contains details.

Notes:

\$ - Less than \$500,000

\$\$ - \$500,000 to \$1 million

\$\$\$ - \$1 million to \$5 million

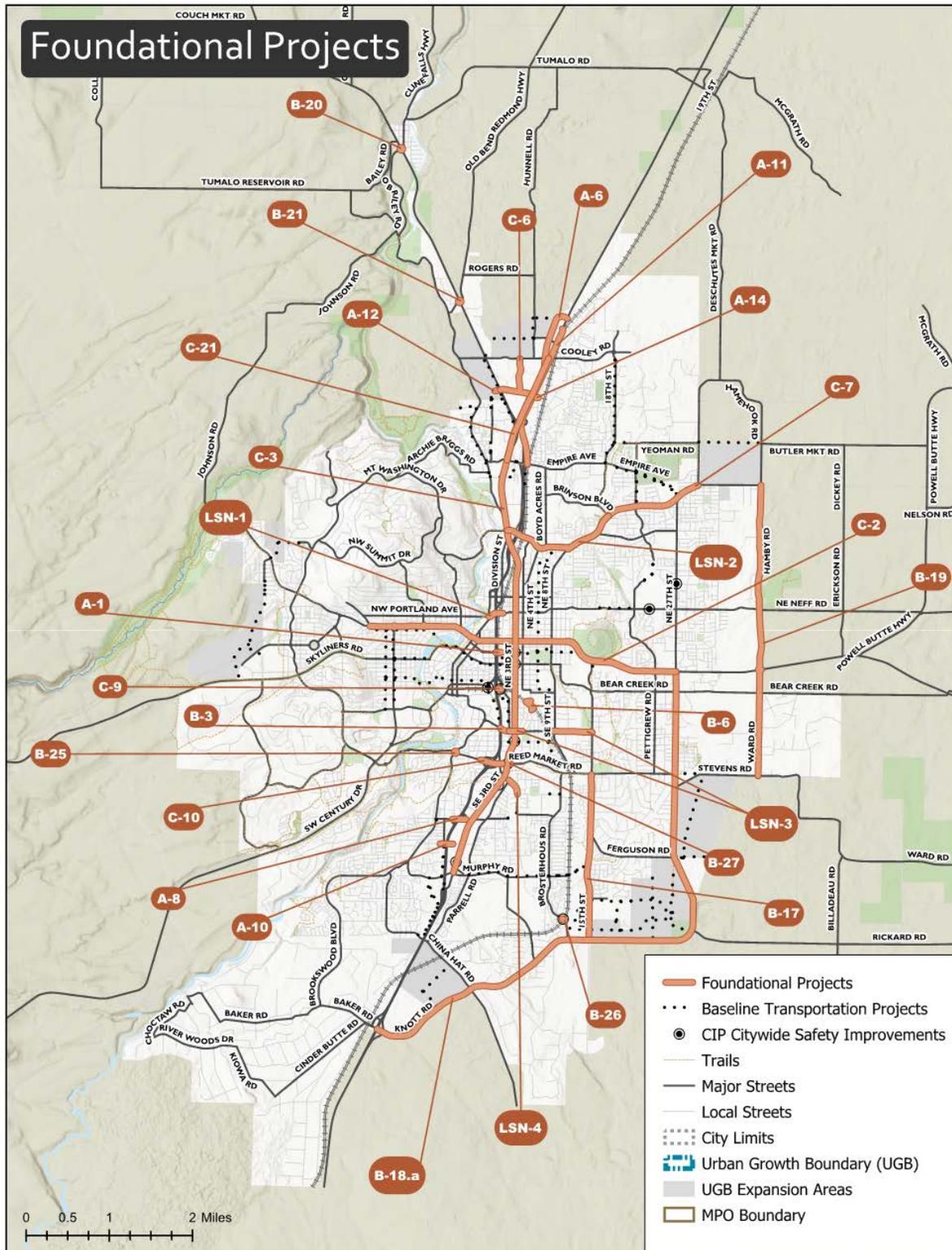
\$\$\$\$ - \$5 million to \$10 million

\$\$\$\$\$ - \$10 million to \$50 million

\$\$\$\$\$\$ - \$50 million to \$100 million

\$\$\$\$\$\$\$ - Greater than \$100 million

Figure 1: Foundational Project Map



Attachment C: Projects Recommended to be Addressed Outside of the Citywide Framework

Neighborhood Level Projects for Phase 2 Evaluation

Table 1: Projects to Address at the Neighborhood Level

Number	Project	Notes
A-15	Trail connection from Colorado Avenue towards Division Street	More suited for neighborhood discussion with downtown stakeholders
A-17	Aune Road Extension to 3rd Street	For bicyclists, this is best if paired with widening 3rd Street under the railroad (B-29)
B-1	Greenwood Avenue protected bike facility	This would require the remainder of Greenwood to be made low-stress, which could be difficult to implement due to road width and parking uses
B-2	Revere Avenue bicycle facilities	Establishing a low-stress bike connection on Olney would be more practical; consider LSN-1 instead
B-4	US 20 protected bicycle facilities	Bear Creek bicycle facilities (B-24) would provide an alternate and quieter route that may be more practical to achieve
B-5	Franklin Avenue protected bicycle undercrossing of US 97	Could be a key low-stress bicycle network (LSBN) route in place of Hawthorne Avenue
B-13	Neff Road protected bike facilities and enhanced crossing from 8th to Purcell.	This facility is impractical due to the width, slope, and curve of the road, and alternate routes exist
B-14	Greenwood Avenue enhanced crossings	Parts of this project are already programmed by ODOT, but surrounding road segments could be considered
B-23	Portland Avenue intersection improvements	This should include consideration of intersection at NW College
B-30	Protected bicyclist/pedestrian routes on Century Drive.	The Haul Road Trail and the Skyline Ranch Trail, plus recent 14th Street improvements, provide LTS 1 or 2 connectivity for bikes for almost all this project area, though this is not always a protected facility. Remaining sections that are high-stress: 14th from Portland to Newport, and an improved crossing to connect those two trails.
B-31	Portland Avenue-Olney Avenue protected bicycle facilities	This road is already LTS 2, but speed limit enforcement may improve safety
C-1	Greenwood Avenue road diet from Bond to 3rd Street	Would likely result in an LTS 3 facility, which is still high-stress for bicyclists
C-11	Convert Wall to southbound one-way from Bond to Newport	More suited for neighborhood discussion with downtown stakeholders

Policy Approach

Table 2: Projects to Advance through Policy

Number	Project	Rationale	Next Step
A-2	Cooley Road Extension	Limited traffic attraction	Consider in the future if the regional Redmond to Bend 19th Street Corridor Project is advanced
A-21	Grade separate rail crossings	Not a likely project for the citywide framework, but could be an action/policy to advance for future corridor planning	Address in policy within the TSP
C-8	Implement transit service on Butler Market	Not much attraction to transit on Butler	CET plan
C-14	Enhanced transit to Sunriver, LaPine, Tumalo/Sisters, Redmond	Does not move the needle for Bend	CET plan
C-17	20-mile-per-hour speed limit on streets in and approaching downtown	Not currently permissible by the City	Address in policy within the TSP
C-18	Increase transit service frequency to 10 minutes	Beyond Greenwood Avenue and 3rd Street, not sufficient demand to warrant 10-minute headways	CET Plan

Programmatic Approach

During the analysis, it became apparent that some of the future needs of Bend would be better served by a programmatic annual incremental improvement approach, as opposed to a patchwork of major capital projects. Two programmatic approaches were identified:

- Completing the low-stress bicycle network
- Creating a sidewalk infill program.

For bicycles, certain projects were identified as being high-performing projects for improving bicycle connectivity and critical regional investments for advancing the low-stress bicycle network. These key projects were identified as part of the foundational project list in Attachment B. Other bicycle-specific projects in the scenarios were identified as being desirable but not essential from a **regional** connectivity standpoint and are therefore identified in Table 1 for discussion at the neighborhood level in Phase 2 of the work program.

In addition, a number of bicycle projects at a local level would need to be implemented to create the complete low-stress bicycle network plan the City has developed. Due to the local and smaller scale nature of these projects, an annual investment program that provides the City with flexibility to prioritize projects each year and leverage the investments when possible with nearby projects or developments would be beneficial.

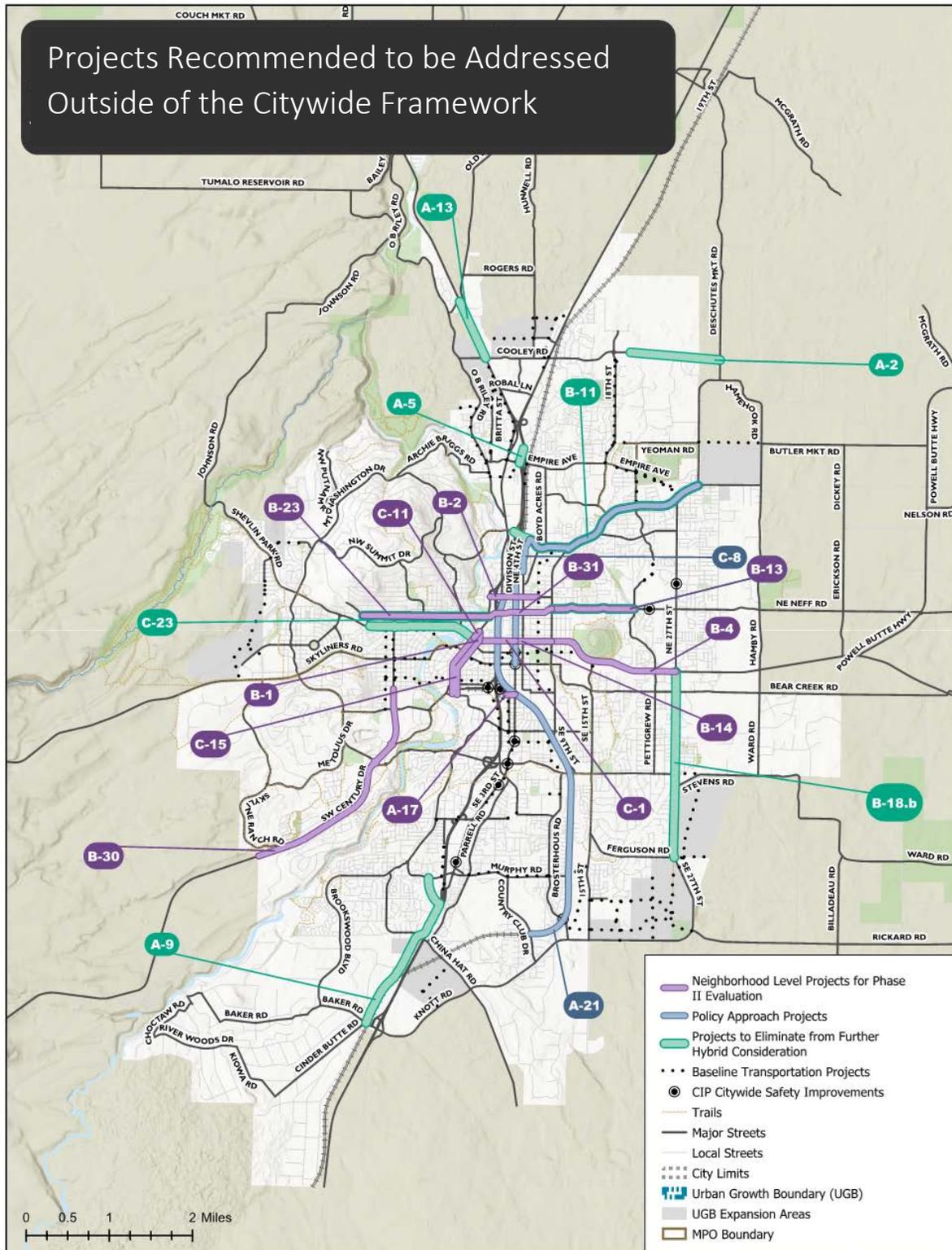
CTAC identified a need for sidewalk completeness. A number of the Foundational Projects would help complete the City's sidewalk network since all arterial and collector construction will include pedestrian facilities. However, the City is challenged to provide sidewalks on local streets where they are missing or in poor condition. Some sidewalk infill occurs as part of new development, as road frontage improvements. However, there is no other consistent and adequate funding for neighborhood-level sidewalk infill or reconstruction. A programmatic approach such as a shared local improvement district or annual investment program could begin to address the City's sidewalk infill needs.

Projects to Set Aside

Table 3: Projects to Set Aside

Number	Project	Rationale	Next Step
A-5	US 97/ Empire Avenue Southbound off-ramp	Not consistent with the US 97 North Parkway FEIS and no significant traffic attraction	US 97 Parkway Study may examine this further
A-9	US 97/Murphy frontage road	No traffic attraction	Eliminate from further consideration
A-13	US 20 Multi-Use Path (between Cooley Road and Old Bend-Redmond Highway)	No significant demand	Eliminate from further consideration
B-11	Butler Market Road widening	No traffic attraction	Eliminate from further consideration
B-13	Neff Road protected bike facilities and enhanced crossing from 8 th to Purcell (B-13)	LSN includes Revere Avenue as key route	Advance only piece of Neff from Lark Spur Trail to 12 th as part of the LSN
C-23	One way on Newport and Portland	Increases trip length and VMT, has impacts on downtown traffic	Eliminate from further consideration

Figure 1: Projects to Address Outside of the Citywide Framework



Attachment D: Needs with Significant Options

Legends for Attachment D:

\$ - Less than \$500,000

\$\$\$ - \$1 million to \$5 million

\$\$\$\$\$ - \$10 million to \$50 million

\$\$\$\$\$\$ - Greater than \$100 million

\$\$ - \$500,000 to \$1 million

\$\$\$\$ - \$5 million to \$10 million

\$\$\$\$\$\$ - \$50 million to \$100 million

 = significant negative performance

 = no significant change

 = significant positive performance

 = somewhat negative performance

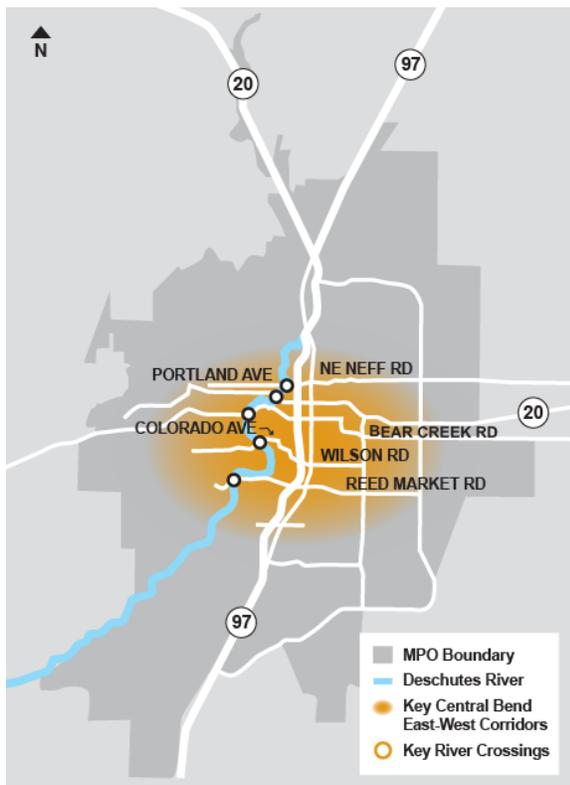
 = somewhat positive performance

East-West Capacity in Central Bend Need

Central Bend's east-west roadway capacity is limited by the current connections used to cross the Deschutes River, the railroad, and US 97. Many of these roadways are forecasted to be extremely congested by 2040. Even with the Baseline and recommended foundational projects, peak hour demand could exceed roadway capacity by up to 60 percent. The analysis indicates that this level of demand would result in significant congestion impacts, such as:

- Peak hour levels of congestion would spread to multiple hours of the day.
- Travel times across Bend during the congested hours would be significantly less reliable. For example, a driver planning a trip along Reed Market Road that takes 20 minutes under light traffic conditions would need to plan for a 33-minute trip to ensure on-time arrival.
- Traffic would likely back-up from US 97/Reed Market Road interchange onto US 97 during peak hours, causing safety and congestion impacts on US 97.
- The Burlington North Santa Fe (BNSF) railroad switchyard, near Reed Market Road, would continue to cause extensive delay and unreliability. This effect would be compounded with the level of forecasted congestion, limiting the ability of drivers to take alternate routes around a train crossing event and significantly increasing the time it would take for vehicle queues along Reed Market Road to clear after a train crossing event.

East-West Capacity in Central Bend Need Area



While none of the scenarios or projects fully addressed east-west capacity needs, the model indicates that several combinations of projects could improve east-west capacity in this area of Bend. The east-west capacity need is divided into three subsets for discussion: Century Drive to 3rd Street, 3rd Street to 27th Street, and Railway switchyard.

East-West Capacity in Central Bend Need: Century Drive to 3rd Street

East -West Capacity in Central Bend Need: Century Drive to 3 rd Street		
OPTION 1	OPTION 2	OPTION 3
Colorado Avenue Widening (B-8) Powers River Crossing (A-4)	Reed Market Widening from Century to 3rd (B-7, B-15) Reconstruct US 97/Reed Market Interchange	Only implement Baseline and foundational projects and adopt policies that allow for more congested conditions in some locations

Option 1: Widening the Colorado Avenue from Simpson to Arizona to 5 lanes would help reduce east-west congestion in the short term. In the long term, building a new Powers River Crossing could help reduce vehicle miles traveled (VMT) per capita by providing additional connectivity in southern Bend (reducing out-of-direction travel). It could also reduce congestion along the Reed Market corridor.

CHALLENGES: The Powers River Crossing would require mitigation of environmental and neighborhood impacts. Widening Colorado Avenue could impact bicycle and pedestrian safety, although appropriate design (e.g., flashing beacons and pedestrian median refuges) could mitigate this.

Option 2: Widening Reed Market Road to 5 lanes between Century Drive and 3rd Street would reduce congestion. The US 97/Reed Market Road interchange would need to be redesigned to accommodate the increase in volumes.

CHALLENGES: Widening Reed Market Road would contribute to an increase in VMT per capita. Widening Reed Market Road and modifying the interchange would require significant right-of-way acquisition and would be costly. Five-lane roadways typically have higher vehicle crash rates than 3-lane roadways. Wider roads would also make crossings more challenging and potentially less safe, although appropriate design (e.g., flashing beacons, pedestrian median refuges, under or over crossings) could mitigate this.

Option 3: Rely solely on the foundational (widening the Reed Market/Bond roundabout, adding turn lanes at Reed Market/3rd Street) and Baseline projects. Would likely require an acceptance of higher levels of congestion through new mobility standards.

CHALLENGES: As growth occurs, users would experience increased congestion and less reliable travel times.

Century Drive to 3rd Street Options Performance ¹			
PERFORMANCE INDICATORS	OPTION 1	OPTION 2	OPTION 3
Congestion ²			
Safety			
Travel Time Reliability			
Employment Accessibility			
VMT per Capita			
Roadway Lane Miles (O&M Cost)			
Capital Cost	\$\$\$\$\$\$\$	\$\$\$\$\$\$	\$\$\$

¹ Comparison against the Baseline

² Congestion summarizes the results from the following performance measures: demand-to-capacity ratio, vehicle hours of delay, and arterial roadway miles with demand-to-capacity ratio deficiencies.

East-West Capacity in Central Bend Need: 3rd Street to 27th Street

East -West Capacity in Central Bend Need: 3rd Street to 27th Street		
OPTION 1	OPTION 2	OPTION 3
Wilson Road Extension (A-19)	Reed Market Widening (B-16)	Only implement Baseline and foundational projects and adopt policies that allow for more congested conditions in some locations

Option 1: As a collector corridor, the Wilson Road Extension from 15th Street to Pettigrew would provide greater connectivity to the east and draw traffic away from the congested Reed Market corridor. This extension would provide an opportunity for enhanced pedestrian and bicycle access in the area.

CHALLENGES: Construction of the Wilson Road Extension would have neighborhood impacts to address.

Option 2: Reed Market widening from 3rd Street to 27th Street would provide significant congestion relief along Reed Market and other east-west corridors in Bend. Widening Reed Market would draw traffic from US 20, Bear Creek Road, and Wilson Road.

CHALLENGES: Widening Reed Market would have right-of-way and property acquisition challenges. Five-lane roadways typically have higher vehicle crash rates than 3-lane roadways. Wider roads would also make crossings more challenging and potentially less safe, although appropriate design (e.g., flashing beacons, pedestrian median refuges, under or over crossings) could mitigate this.

Option 3: Rely solely on the foundational and Baseline projects advancing to the hybrid, which would have limited benefit to the Reed Market Road corridor east of 3rd Street. This would likely require adopting mobility standards to accept higher levels of congestion.

CHALLENGES: As growth occurs, users would experience increased congestion and less reliable travel times.

3rd Street to 27th Street Options Performance ¹			
PERFORMANCE INDICATORS	OPTION 1	OPTION 2	OPTION 3
Congestion ²			
Safety			
Travel Time Reliability			
Employment Accessibility			
VMT per Capita			
Roadway Lane Miles (O&M Cost)			
Capital Cost ³	\$\$\$\$	\$\$\$\$\$\$	N/A

¹ Comparison against the Baseline

² Congestion summarizes the results from the following performance measures: demand-to-capacity ratio and vehicle hours of delay.

³ The cost for Option 3 is listed as not applicable (N/A) for this need area, as there are no foundational projects with significant motor vehicle capacity benefit in this need area. Option 2 is identified as higher cost than Option 1 due to the longer length of the improvement and the right-of-way acquisitions that would be required along the corridor to widen to 5 lanes.

East-West Capacity in Central Bend Need: Railway Switchyard

East -West Capacity in Central Bend Need: Railway Switchyard		
OPTION 1	OPTION 2	OPTION 3
Relocate BNSF Switchyard (C-24)	Reed Market Road railroad overcrossing (A-16)	Do not implement a specific project and accept switchyard-related congestion

Option 1: Trains maneuvering in the switchyard or parking can block Reed Market Road for extended periods of time. The City does not have the ability to regulate the times of day or duration of railroad crossing closures. These delays could be mitigated by relocating the BNSF switchyard outside of Bend.

CHALLENGES: Relocating the switchyard would be costly. The cost of relocation would likely fall to the City (not the railroad), even though the new switchyard would likely be outside of the City and MPO boundary. BNSF approval and partnership would be required to complete the project.

Option 2: Grade-separating Reed Market Road would improve reliability on Reed Market Road by removing conflicts with the railroad. This would improve safety and reliability for pedestrian, bicycle and vehicular traffic.

CHALLENGES: Grade-separation would be costly and could have significant connectivity impacts. Because the new overcrossing would need to meet clearance requirements over the railroad, Reed Market Road would likely not connect directly to American Lane and 9th Street.

Option 3: Rely solely on the foundational and Baseline projects advancing to the hybrid, which would have limited impact on the unreliability associated with the railway switchyard.

CHALLENGES: Users would continue to experience unreliable travel times associated with the railway switchyard use.

Railway Switchyard Options Performance ¹			
PERFORMANCE INDICATORS	OPTION 1	OPTION 2	OPTION 3
Congestion ²			
Safety			
Travel Time Reliability			
Employment Accessibility			
VMT per Capita			
Roadway Lane Miles (O&M Cost)			
Capital Cost ³	\$\$\$\$\$\$	\$\$\$\$\$	N/A

¹ Comparison against the Baseline

² Congestion summarizes the results from the following performance measures: demand-to-capacity ratio and vehicle hours of delay.

³ The cost for Option 3 is listed as N/A for this need area, as there are no foundational projects with significant benefit to the railroad crossing need.

North-South Capacity in Eastern Bend Need

In eastern Bend, there are only a handful of corridors that provide north-south connectivity. The travel model shows that capacity challenges would be most noticeable along 27th Street. Long stretches of 27th Street would be significantly over capacity by 2040, with demand exceeding capacity by nearly 20 percent in some locations, leading to multiple hours of congestion and spreading of traffic onto surrounding roadways. Along Empire Boulevard and 27th Street, this level of congestion would significantly affect travel time reliability and could make a 20-minute trip take up to nearly 40 minutes during congested times.

North-South Capacity in Eastern Bend Need	
OPTION 1	OPTION 2
Empire Boulevard/27th Street widening from Boyd Acres Road to Reed Market Road (B-12, B-18b, B-22)	Only implement Baseline and foundational projects and adopt policies that allow for more congested conditions in some locations

Option 1:

Widening Empire Boulevard and 27th Street to 5 lanes would reduce congestion and improve reliability. The added capacity would draw traffic from parallel corridors including Brinson Boulevard, Butler Market Road, Purcell Boulevard, 15th Street, and Hamby Road. This could represent both a congestion and safety/livability benefit on those corridors.

CHALLENGES: Five-lane roadways typically have higher vehicle crash rates than 3-lane roadways. Wider roads would also make crossings more challenging and potentially less safe, although appropriate design (e.g., flashing beacons, pedestrian median refuges, under or over crossings) could mitigate this. Widening Empire Boulevard and 27th Street could have right-of-way impacts and a high cost.

Option 2:

Relies solely on the foundational (safety/capacity improvements at key intersections along 15th Street and Hamby Road) and Baseline (including the Purcell connection near Holliday Avenue) projects. This would likely require adopting mobility standards to accept higher levels of congestion.

CHALLENGES: These projects would have limited benefits to north-south mobility and would not address regional congestion issues. As growth occurs, users would experience increased congestion and less reliable travel times.

North-South Capacity in Eastern Bend Option Performance ¹		
PERFORMANCE INDICATORS	OPTION 1	OPTION 2
Congestion ²		
Safety		
Travel Time Reliability		
Employment Accessibility		
VMT per Capita		
Roadway Lane Miles (O&M Cost)		
Capital Cost ³	\$\$\$\$\$\$\$	\$\$\$\$\$\$

¹ Comparison against the Baseline

² Congestion summarizes the results from the following performance measures: demand-to-capacity ratio and vehicle hours of delay.

³ The Capital Cost for Option 2 includes foundational projects that would add roadway capacity benefit to this area.

South/Central US 97 Corridor Capacity and Safety

Long stretches of US 97 from Murphy Road to Empire Boulevard are forecasted to be at or over capacity by 2040. In some places on south/central US 97, the travel model shows demand would exceed capacity by nearly 10% during a typical weekday peak hour, which means that drivers would experience longer periods of congestion on a typical weekday. This level of congestion would impact travel time reliability and could make a 15 minutes trip take more than 20 minutes during congested times. In addition, this level of demand could significantly degrade the operations and safety of the at-grade connections of local streets onto US 97 where on/off maneuvers would be more difficult with the high levels of traffic volume.

In addition to congestion and safety issues on average weekday, seasonal traffic peaks increase volumes on US 97 by 20% to 30%. The US 97 Parkway Study has evaluated this 30th-highest hour traffic demand condition, where demand could exceed capacity by 30% to 40%, in detail and found that there could be much more significant delay and travel time reliability impacts along US 97 where on-ramp merges or weaves between ramps would create back-ups on US 97. In addition, the seasonal peak demand would create congestion at the US 97 interchanges and nearby arterial intersections on 3rd Street, with traffic queues likely backing up along the off-ramps and onto the US 97 mainline, creating significant safety and congestion challenges.

South/Central US 97 Corridor Capacity and Safety Need



Several combinations of projects could improve south/central US 97 corridor capacity and safety in Bend. This need is broken into three subsets for discussion: major capacity options, overcrossing, and alternate route option.

South/Central US 97 Corridor Capacity & Safety Need: Major Capacity Options

South/Central US 97 Corridor Capacity and Safety Need: Major Capacity Options		
OPTION 1	OPTION 2	OPTION 3
Close at-grade US 97 access and add ramp metering (C-5, C-22)	Add auxiliary lanes to US 97 (B-10)	Only implement Baseline and foundational projects and adopt policies that allow for more congested conditions in some locations

Option 1: Ramp metering would clear congestion on the south/central Parkway to a manageable level, with only a short stretch of roadway still over capacity in 2040. The removal of at-grade access points along this stretch of roadway would be a safety improvement over the Baseline. While the ramp metering and access closures would divert some traffic off US 97 to the local network, that impact would be spread across the network and would not increase volume significantly at any one location.

CHALLENGES: Would spread traffic to less congested corridors and would reduce business access near the at-grade closures. Cost implications are currently unknown. Could lead to traffic operations challenges at ramp terminal intersections from queue spillback.

Option 2: The addition of a southbound auxiliary lane (from Empire Boulevard to Butler Market Road) would increase capacity and decrease congestion on the segment of US 97 between Empire Boulevard and Butler Market Road. Could provide a safety benefit by extending the merge distance for southbound vehicles. The Parkway Study may identify additional locations where an auxiliary lane would be feasible. This would likely require adopting mobility standards to accept higher levels of congestion.

CHALLENGES: Limited benefit area (congestion would persist outside of auxiliary lane locations).

Option 3: Relies solely on the foundational (Powers Interchange) and Baseline projects, which will not significantly impact south/central US 97 corridor capacity and safety. This would likely require adopting mobility standards to accept higher levels of congestion.

CHALLENGES: The Baseline and foundational projects would have minor impacts, without solving the larger regional capacity issues. As growth occurs, users would experience increased congestion and less reliable travel times.

South/Central US 97 Corridor Capacity and Safety Major Capacity Options Performance ¹

PERFORMANCE INDICATORS	OPTION 1	OPTION 2	OPTION 3
Congestion ²			
Safety			
Travel Time Reliability			
Employment Accessibility			
VMT per Capita			
Roadway Lane Miles (O&M Cost)			
Capital Cost ³	*	\$\$\$\$\$	\$\$\$\$\$

¹Comparison against the Baseline

²Congestion summarizes the results from the following performance measures: demand-to-capacity ratio and vehicle hours of delay.

³The Capital Cost for Option 3 includes foundational projects that would add roadway capacity benefit to this area.

*Note: The capital costs of ramp metering is not known until further evaluation is completed by US 97 Parkway Study.

South/Central US 97 Corridor Capacity & Safety Need: Overcrossing

South/Central US 97 Corridor Capacity and Safety Need: Overcrossing	
OPTION 1	OPTION 2
Ponderosa Street/China Hat Road overcrossing (A-3)	Only implement Baseline and foundational projects

Option 1: The Ponderosa Street/China Hat Road overcrossing would connect an area of large expected household growth with an area of large employment growth (as well as potential school sites). Benefits include bicycle and pedestrian connectivity, as well as improved safety and reliability along US 97.

CHALLENGES: While the China Hat overcrossing provides the above benefits, the removal of access to US 97 also has the potential to divert traffic to Parrell Road. This project could also be an expensive option for providing additional neighborhood connectivity over US 97.

Option 2: Rely solely on the foundational and Baseline projects, with no additional projects to address south-central US 97 capacity and safety needs at this location. This option would not necessarily trigger the need for alternate mobility targets, as the Ponderosa/China Hat intersection need is for connectivity and safety, not a capacity deficiency.

CHALLENGES: Reduced connectivity, particularly if Ponderosa Street/China Hat Road at-grade access was closed (if projects C-5 and C-22 are advanced).

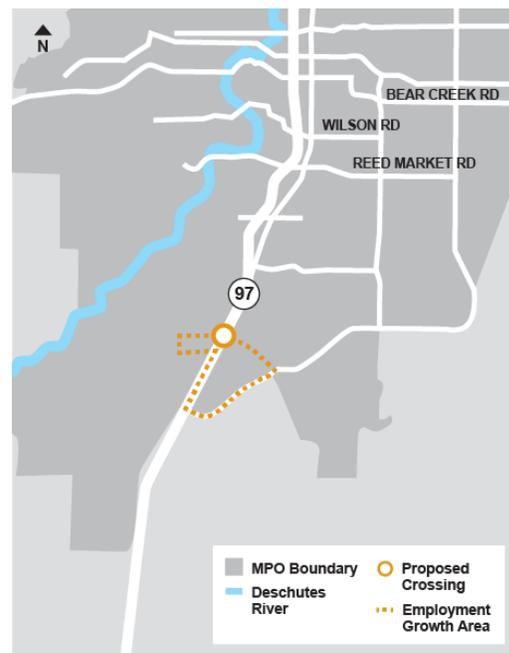
South/Central US 97 Corridor Capacity and Safety Overcrossing Option Performance ¹		
PERFORMANCE INDICATORS	OPTION 1	OPTION 2
Congestion ²	⬆️	⬇️
Safety	⬆️⬆️	⬇️
Travel Time Reliability	⬆️	⬇️
Employment Accessibility	⬆️⬆️	⬇️
VMT per Capita	⬆️	⬇️
Roadway Lane Miles (O&M Cost)	⬇️	⬇️
Capital Cost ³	\$\$\$\$	N/A

¹ Comparison against the Baseline

² Congestion summarizes the results from the following performance measures: demand-to-capacity ratio and vehicle hours of delay.

³ The cost for Option 2 is listed as N/A for this need area, as there are no foundational projects with significant benefit to the safety and connectivity need.

South/Central US 97 Corridor Capacity and Safety Crossing Option



South/Central US 97 Corridor Capacity & Safety Need: Alternate Route Option

South/Central US 97 Corridor Capacity and Safety Need: Alternate Route Option	
OPTION 1	OPTION 2
3rd Street widening under the railroad (B-29)	Only implement Baseline and foundational projects and adopt policies that allow for more congested conditions in some locations

Option 1: Widening 3rd Street under the railroad would improve 3rd Street operations and provide a less congested alternative to US 97. This option would also provide safer routes for pedestrians and bicyclists traveling on 3rd Street by providing a complete street under the railroad. Widening 3rd Street also has potential benefit to US 97 corridor management, where a full 5-lane alternate route is available for detours during incidents that require closure of US 97. If ramp-meters and access closures are advanced, having additional capacity along 3rd Street could benefit local trips.

CHALLENGES: This option would be relatively expensive and require coordination with the railroad. It is likely that a temporary rail line would need to be built around the undercrossing to maintain track operations during construction.

Option 2: Rely solely on the foundational and Baseline projects, with no additional projects to address south-central US 97 capacity and safety needs. This would likely require adopting mobility standards to accept higher levels of congestion.

CHALLENGES: As growth occurs, users would experience increased congestion along 3rd Street at the railroad undercrossing. The railroad undercrossing would continue to be a barrier for cyclists.

South/Central US 97 Corridor Capacity and Safety Alternate Route Option ¹		
PERFORMANCE INDICATORS	OPTION 1	OPTION 2
Congestion ²	▲	⊥
Safety	▲	⊥
Travel Time Reliability	▲	⊥
Employment Accessibility	▲	⊥
VMT per Capita	⊥	⊥
Roadway Lane Miles (O&M Cost)	▼	⊥
Capital Cost	\$\$\$\$\$	N/A

¹ Comparison against the Baseline

² Congestion summarizes the results from the following performance measures: demand-to-capacity ratio and vehicle hours of delay.

³ The cost for Option 2 is listed as N/A for this need area, as there are no foundational projects with significant benefit to the safety and connectivity need.

South/Central US 97 Corridor Capacity and Safety Need
Option 1 Improvement Area

