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PRELIMINARY MTP PROJECT LIST EVALUATION MEMORANDUM

DATE: February 26, 2024

TO: Bend MPO Technical Advisory Committee

FROM: Emily D'Antonio, Eileen Chai, Kayla Fleskes-Lane, PE & Aaron Berger, PE | DKS Associates

SUBJECT: Bend 2045 MTP Update: Draft MTP Project List Evaluation Memorandum Project #24068-000

INTRODUCTION

This memorandum documents the 2045 Draft MTP Project List evaluation and is intended to help the Technical Advisory Committee (TAC) determine whether:

- **Any new needs have been identified** that are not addressed or targeted by the 2045 Draft MTP Project List, which was developed based on previously documented needs.
- **Any current projects on the MTP list should be re-scoped** due to the changes in future needs compared to prior local planning studies.

Based on TAC discussion, existing projects may be flagged for potential re-scoping, or additional projects may be added to the 2045 Draft MTP Project List to create a Refined MTP Project List. New projects added to the MTP list will most likely be planning/corridor studies targeting newly identified needs. Capital projects to address these new needs would be the outcomes of the planning/corridor studies and would be first adopted in local plans, then added to the MTP Project List in subsequent MTP updates.

Projects included in the Refined 2045 MTP Project List will then be analyzed using the MTP evaluation criteria to help prioritize projects into phasing buckets to outline the timeframe within which each project is recommended for implementation. This phasing will then be paired with funding availability and feasibility to separate projects into financially constrained and aspirational lists.

This memorandum is divided into the following sections:

- **Summary of Findings** - Provides an overview of outcomes of the evaluation of the 2045 Draft MTP Project List, highlighting new or changing needs caused by the new horizon year (2045) and updates from the most recent local planning efforts.

- **Evaluation Methodology** – Description of tools and methods applied to evaluate the 2045 Draft MTP Project List against both previous and newly identified multi-modal transportation system needs for the MPA.
- **Active Transportation Evaluation and Findings** – Presents findings related to active transportation focused projects from the 2045 Draft MTP Project List and discusses any new or changing needs for people walking and biking.
- **Transit Evaluation and Findings** – Presents findings related to transit projects from the 2045 Draft MTP Project List and discusses any new or changing needs for people riding transit.
- **Motor Vehicle Evaluation and Findings** - Presents projects with a significant motor vehicle system enhancement component from the 2045 Draft MTP Project List and discusses any new or changing needs for people driving.
- **Attachments Summarizing the Draft MTP Project List** – Maps and tables presenting the 2045 Draft MTP Project List, separated into Active Transportation, Transit, and Motor Vehicle categories.

SUMMARY OF FINDINGS

The following list includes newly identified or changes to already identified Bend MPA transportation system needs based on the evaluation of the 2045 Draft MTP Project List:

- Only one project from a study completed since the adoption of the Bend TSP clearly impacts a designated Key Routes for Walking and Bicycling. This project is the **proposed new interchange connecting NE 18th Street to US 97** (Project 97.A in Attachment A). This new connection would attract more motor vehicle traffic to the portion of the NE 18th Street corridor designated as a Key Walking and Bicycling Route. The Key Routes project on 18th Street is recommended to be completed either before or in parallel with the NE 18th Street/US 97 interchange project.
- Community input on on-going projects such as the Olney Avenue Pedestrian and Bicyclist Improvements project indicates a **desire for higher levels of treatments for active transportation improvements** than was originally scoped for the Key Routes project identified in the Bend TSP. Cost estimates for the projects in this category that do not have a clearly defined scope should be re-considered during upcoming local planning efforts to better reflect community priorities.
- The 2045 Draft MTP Project List **does not provide sufficient transit coverage** to fully serve the new growth areas on the urban fringe of the Bend Metropolitan Planning Area (MPA). Many of the most critical motor vehicle needs, particularly needs related to east-west river crossings, cannot be fully resolved through new connections or corridor enhancements. Expanded transit service could provide relief to these congested corridors by shifting motor vehicle users to transit.
- **OB Riley Road** – The corridor capacity need identified in the prior local planning efforts consolidates to a smaller bottleneck issue at Archie Briggs due to lower land use growth assumptions in this area (e.g., Gopher Gulch). The multi-modal project identified for this corridor (Project C-3) should be considered for re-scoping during this MTP Update and subsequent City planning efforts.
- **Shevlin Park Road** – New traffic congestion need east of Skyline Ranch Road.

- **Neff Road** – Heightened congestion need between 8th Street and 27th Street, with potential of increasing neighborhood cut-through traffic. Considerations for addressing this congestion need include:
  - Widening the entire corridor is not a viable option, but intersection capacity spot improvements at locations like 8th Street/Neff Road will improve the corridor and reduce the risk of cut-through traffic on local streets
  - Upgrading the corridor to a Key Route for walking and biking will entice shifts to non-auto modes of travel
  - Travel Demand Management (TDM) programs partnering with the nearby large regional employers such as St Charles and Summit Health will encourage alternative modes of travel and can reduce the auto related congestion on the corridor
- **Hamby Road** – New traffic congestion need from Stevens Road to Bear Creek Road, driven by growth in the Stevens Ranch and Department of State Lands (DSL) areas.
- **Powers Road** – New congestion need between US 97 and Brookswood Boulevard.
- **East-West River Crossings** – This congestion issue was a key need identified in the City's TSP and was flagged for monitoring. Current travel demand model forecasts indicate that these crossings will experience traffic demand well beyond existing capacity, indicating a need to move forward with a study for new/enhanced river crossings.
- **27th Street** – This corridor was flagged for monitoring in the City's TSP, with the year 2040 analysis indicating a need for a five-lane cross section from Empire Boulevard to Ferguson Road. The 2045 Draft MTP Project List evaluation indicates that by the year 2045 Horizon, a five-lane cross section is only needed between St. Charles Hospital in the north and Reed Market Road in the south. The corridor-wide Average Daily Traffic (ADT) growth does indicate a need to improve the rural, two-lane, unimproved portions of 27th Street to three-lane, modernized cross sections with safe crossings to transit to enhance safety for all modes of travel.

EVALUATION METHODOLOGY

This section focuses on the following:

- **Methodology**
- **Analysis Tools and Performance Measures**
- **2045 Draft MTP Project List**

METHODOLOGY

Substantial planning efforts have already been conducted to develop the projects included in the 2045 Draft MTP Project List. However, all analysis used to develop, prioritize, and scope these projects has been based on a shorter planning horizon (2040 or earlier), including a separate set of land use assumptions. Therefore, the evaluation in this memorandum focuses primarily on the changes in future needs identified in the MTP Needs Memorandum and cross checks these changes against the 2045 Draft MTP Project List to identify any gaps or project re-scoping needs.

ANALYSIS TOOLS AND PERFORMANCE MEASURES

The primary analysis tool used to evaluate the 2045 Draft MTP Project List is the Bend-Redmond Model (BRM), a travel demand model developed and maintained by the ODOT Transportation Planning and Analysis Unit (TPAU), with support from the MPO and other local agencies. As discussed in the MTP Needs Memorandum, the BRM includes 2019 Base Year and 2045 Future Year land use scenarios. A 2045 Draft MTP Project List Scenario was developed using the same land use assumptions as the 2045 Committed Scenario. These assumptions are presented in the MTP Needs Memorandum. The 2045 Draft MTP Project List Scenario includes an updated roadway and transit network incorporating all active transportation, transit, and motor vehicle projects from the 2045 Draft MTP List that can be modeled within the structure of a trip-based travel demand model. The model results were used to provide quantitative measures throughout the MPA to determine whether projects were effectively addressing identified needs and to highlight new, increased, or decreased needs throughout the region.

The primary performance measures used to evaluate the effectiveness of the 2045 Draft MTP Project List are described by mode as follows:

- **Active Transportation**
  - ***Mode Split*** – percent change in share of all trips choosing bicycle and pedestrian modes, compared against 2019 and 2045 Committed conditions.
  - ***Change in Motor Vehicle Demand on Key Routes*** – increase/decrease in ADT on identified bicycle and pedestrian Key Routes compared against 2019 and 2045 Committed conditions.
- **Transit**
  - ***Mode Split*** – percent change in share of all trips choosing transit compared against 2019 and 2045 Committed conditions.
  - ***Transit Coverage (Households and Jobs within ¼ Mile of Transit Service)*** – Estimate of transit system coverage throughout the Bend MPA, compared against 2019 and 2045 Committed Conditions.
- **Motor Vehicles**
  - ***Demand to capacity (D/C) ratio*** – the ratio of peak hour vehicle demand over the capacity of a roadway, where a D/C >1.0 indicates severe levels of congestion. This measure is applied both at the corridor level and as a system measure summarized by roadway facility classification.
  - ***Vehicle hours of delay*** – Total hours of delay for all vehicles over the entire system within the MPA during the p.m. peak hour.
  - ***Vehicle miles traveled (VMT) per capita*** – Total daily vehicle miles traveled for household-based trips by light vehicles making a trip that starts/ends within the MPA, divided by the total population within the MPA.
  - ***Diversion potential*** – Total percentage of collector roads with an average daily traffic volume above 4,000 vehicles per day, indicating misuse of lower facility classes and risks of trip diversion onto local streets.

2045 DRAFT MTP PROJECT LIST

This memorandum breaks down the evaluation of the 2045 Draft MTP Project List into three modal focused sections: Active Transportation, Transit, and Motor Vehicle. There is significant modal overlap between many projects, particularly those that fall under the "Motor Vehicle" category as these usually include significant active transportation improvement elements. Each modal project list is further separated into "Connectivity" and "Corridor Enhancement" subcategories. Connectivity projects focus on new modal connections (e.g., new trails, new transit routes, or new roadways), while Corridor Enhancement projects focus on improvements to existing corridors (e.g., new bike lanes/sidewalks, decreased headways on existing transit lines, or added lanes). In addition, remaining projects are categorized as "Intersection" (intersection focused projects) and "Technology" (ITS projects), which do not strictly fall into any of other primary modal subcategories.

The 2045 Draft MTP Project List is mapped and summarized in attachments to this memorandum as follows:

- **Attachment A – Active Transportation**
  - ***Active Transportation Connectivity Projects***
  - ***Active Transportation Corridor Enhancement Projects***
- **Attachment B – Transit Projects**
  - ***Transit Connectivity Projects***
  - ***Transit Corridor Enhancement Projects***
- **Attachment C – Motor Vehicle Projects**
  - ***Motor Vehicle Connectivity Projects***
  - ***Motor Vehicle Enhancement Projects***
- **Attachment D – Intersection Projects**
- **Attachment E – Technology Projects**

ACTIVE TRANSPORTATION EVALUATION AND FINDINGS

This section presents the analysis and findings related to the Active Transportation needs and proposed projects within the Bend MPA, including:

- **Summary of Needs**
- **Evaluation Results**
- **New/Changing Active Transportation Needs**

SUMMARY OF NEEDS

As described in the MTP Needs Memorandum, bicycle and pedestrian system gaps and needs within the Bend MPA were identified through a series of local planning efforts. The Bend TSP identified Key Walking and Bicycling Routes throughout the City, many of which are expected to experience large increases in motor vehicle traffic by the year 2045. When enhanced, these Key Routes (shown in Figure 1) will address many of the most critical needs for people walking and biking within the City of Bend.

Beyond the Bend UGB, the on-going Deschutes County TSP Update has identified needs for dedicated bicycle facilities and complete sidewalks in Tumalo. From a more system-wide perspective, the County TSP noted that jurisdictional standards only require 3-to-5-foot shoulders, insufficient width to effectively serve bicycle travel. As the City of Bend continues to build out within the MPA, unincorporated Deschutes County roadway facilities brought into the urban area will become barriers and impedances to bicycle and pedestrian access to/from new growth areas.

ODOT planning efforts have identified critical gaps in the bicycle and pedestrian system at both the Baker/Knott and US 97 interchange and along US 97 north of the UGB at a potential future interchange connection to NE 18th Street.

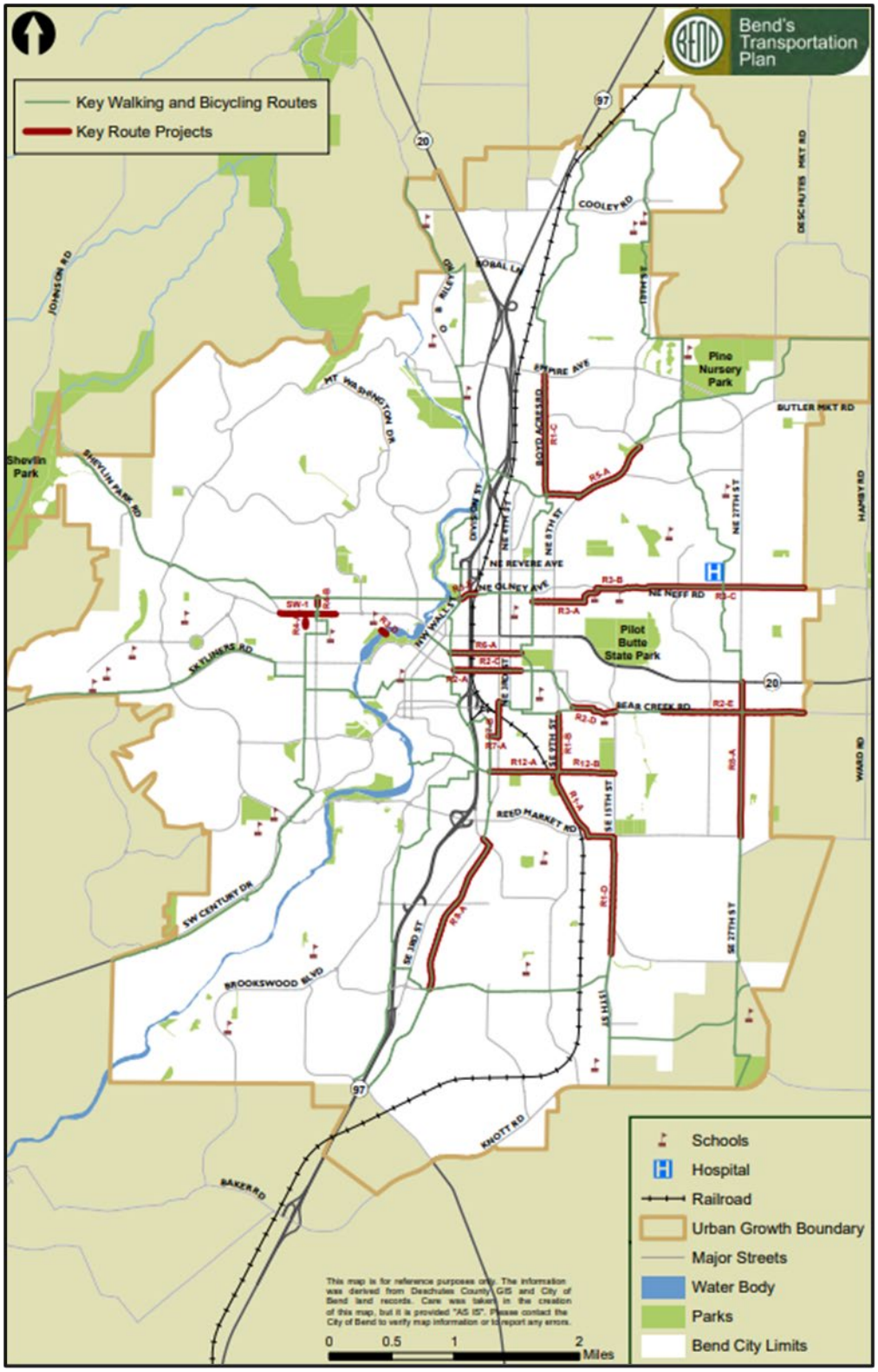

FIGURE 1: KEY ROUTES FOR WALKING AND BICYCLING

Source: Bend Transportation System Plan (2020), Figure 5-3b

EVALUATION RESULTS

The Active Transportation focused projects from the 2045 Draft MTP Project List are shown in Attachment A. These projects include the Key Routes projects from the Bend TSP. This section summarizes the key active transportation performance measures for the 2045 Draft MTP Project list, compared against the 2019 baseline and 2045 Committed conditions using the following performance measures:

- Mode Split
- Change in Motor Vehicle Demand on Key Routes

MODE SPLIT

The percentages of all person trips using walking and bicycle modes within the Bend MPA were calculated from the BRM. These percentages were based on trips that both begin and end within the Bend MPA. Table 1 documents these mode splits between the 2019 Base Year, the 2045 Committed, and the 2045 Draft MTP Project List.

TABLE 1: PERCENT WALKING AND BIKING TRIPS WITHIN THE BEND MPA

MODE	2019 BASE	2045 COMMITTED	2045 PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
PEDESTRIAN	10.2%	11.9%	12.4%	4.8%
BICYCLE	3.4%	3.4%	3.5%	2.3%

Both biking and walking trips within the Bend MPA show limited changes between the 2045 Committed and 2045 Draft MTP Project List scenarios. These limited changes reflect the BRM active transportation modeling constraints, as the model has no direct sensitivity to quality of bicycle or pedestrian facilities. Projects impacting the estimated change in mode split are Active Transportation or multi-model connectivity projects and new roadways or trails/paths that create more direct routes for walking and biking between different land uses.

CHANGE IN MOTOR VEHICLE DEMAND ON KEY ROUTES

As discussed in the MTP Needs Memorandum, daily motor vehicle traffic volumes are expected to increase along most of the Key Routes for Walking and Bicycling throughout the MPA under the 2045 Committed condition. The 2045 Draft MTP Project List includes multiple projects that change the estimated 2045 daily motor vehicle traffic along these Key Routes when compared against the 2045 Committed condition. Figure 2 highlights this comparison, showing the change in daily motor vehicle traffic volume between the 2045 Committed scenario and the 2045 Draft MTP Project List scenario along the designated Key Routes.

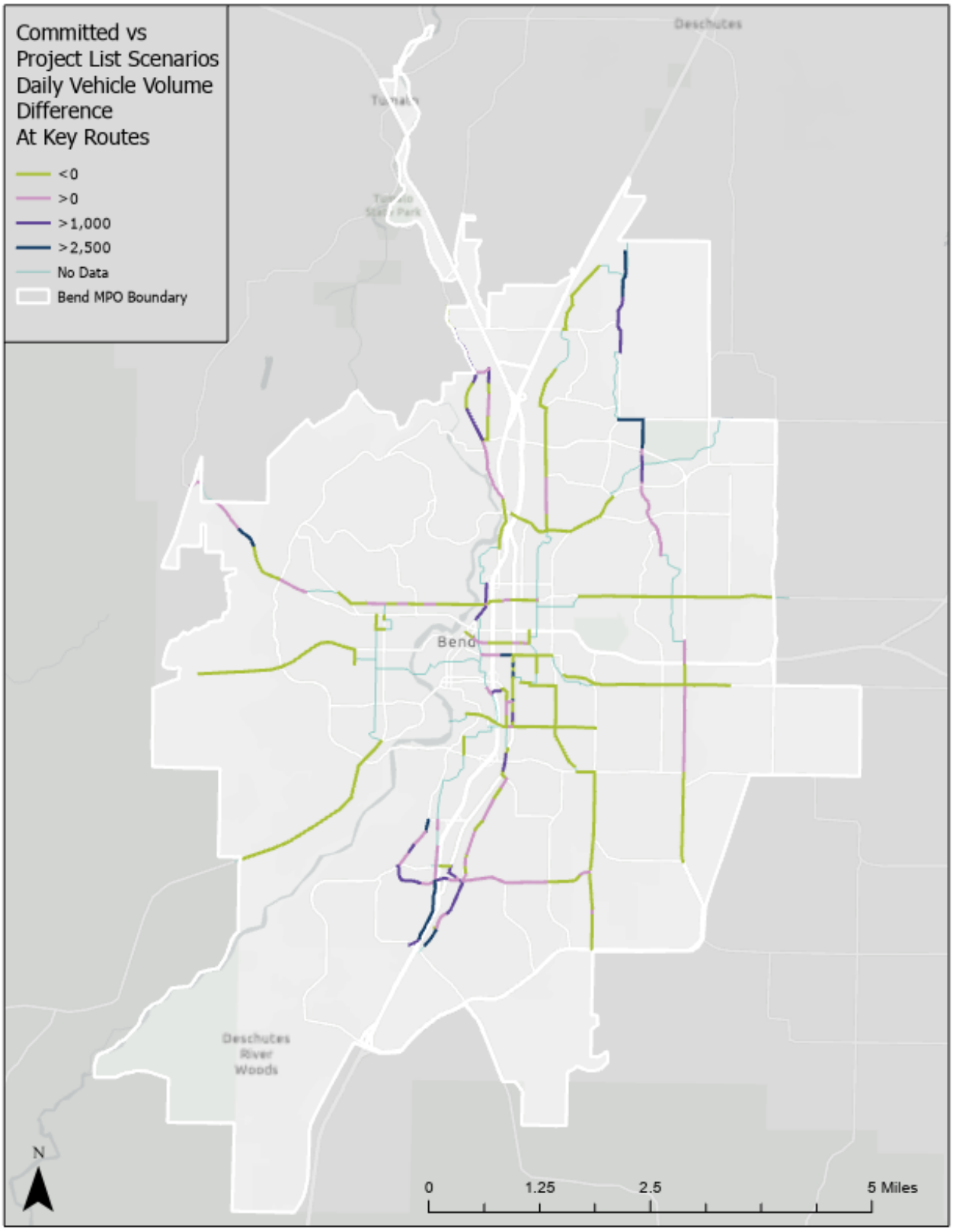

FIGURE 2: CHANGE IN DAILY VOLUME ALONG DESIGNATED KEY ROUTES BETWEEN COMMITTED AND PROJECT LIST SCENARIO

The most critical changes in daily motor vehicle traffic along Key Routes are summarized as follows:

- **Improved (Reduced Traffic)**
  - Skyliners Road (NW 17th St to NW Crossing Dr) – 19% reduction primarily due to the NW Crossing Extension (Project 202)
  - Shevlin Park Road (Mt Washington Dr to Skyline Ranch Rd) – 21% reduction due to new expansion area connections to the north (Projects 219 and 230)
  - Bear Creek Road (NE 15th St to Ward Rd) – 19% reduction due to new Stevens Road Re-alignment (Project C-65) and mode shifts driven by nearby transit route enhancements (Projects CET 6 and CET 7)
  - Hawthorne Ave (NW Harriman St to US 97) - 66% decrease due to closure of eastbound right turn onto US 97 at Hawthorne Ave (Project C2B)
  - SE 9th Street (SE Glenwood Dr to Reed Market Rd) – 11% decrease due to closure of 9th Street direct vehicle access onto Reed Market Rd as part of the Rail Crossing Improvement (Project C-44). Along this segment near Bend High, removal of the limited use left turn lane between Franklin and Glenwood Avenue could create space for bike lane separation, and this treatment is recommended for further consideration in the upcoming City of Bend TSP Update.
- **Degraded (Increased Traffic)**
  - NE Franklin Ave (NW Harriman St to NE 3rd St) – 60% increase due to closure of eastbound right turn onto US 97 at Hawthorne Ave (Project C2B). If the southbound right turn from the Parkway onto Hawthorne Avenue is ultimately closed due to the design of the new Hawthorne Pedestrian Overcrossing (Project 23494), additional traffic impacts may be experienced on this roadway segment. Potential treatments for this increase in traffic include crosswalk enhancements at the Franklin Ave/Harriman St intersection to limit left turns, which is recommended for consideration in the upcoming City of Bend TSP Update.
  - Parrell Rd (China Hat Rd to Murphy Rd) – 68% increase due to the closure of the China Hat Rd RI/RO access to US 97 as part of the China Hat/Ponderosa Overcrossing (Project C-58). The southern portions of the modernization project for Parrell Road (Project M-2) are recommended for prior or parallel implementation with Project C-58 to mitigate the effects of this traffic increase on active transportation and improve safety for all modes of travel on Parrell Road.
  - NE 18th St (NE Talus Pl to Egypt Dr) – 34% increase due to NE 18th St connection to new interchange at US 97 (Project 97.A).

NEW/CHANGING ACTIVE TRANSPORTATION NEEDS

From a high-level perspective, biking travel has been increasing in the Bend MPO area. E-bikes have been rapidly increasing in popularity, and this has reduced the effects of commute distance on mode choice. These changes to local bicycling behavior highlight the active transportation needs throughout the Bend MPO Area and represent an opportunity to for jurisdictions within the region to further encourage usage of non-auto modes of travel.

Based on the new 2045 horizon year system analysis results, the overall active transportation needs continue to align with the needs identified in prior planning efforts. The projects identified in

prior planning efforts align closely with the identified needs, and in many cases, multi-modal connectivity projects are effectively reducing vehicle travel on corridors designated as Key Routes for Walking and Bicycling. Only one project from a study completed since the completion of the Bend TSP clearly impacts a designated Key Route. This project is the proposed new interchange connecting NE 18th Street to US 97 (Project 97.A). This new connection would attract more traffic to the portion of the NE 18th Street corridor designated as a Key Walking and Bicycling Route. Project C-23 is intended to upgrade NE 18th Street to an urban arterial corridor, and this project is recommended to be linked to the NE 18th Street and US 97 Interchange (Project 97.A) with elements that incorporate upgrade NE 18th Street to a Key Route for walking and biking, mitigating the expected increase in motor vehicle traffic on this corridor.

Since the completion of the Bend TSP, community priorities have continued to focus on improving the active transportation system. While Key Routes address many of the most critical needs for people walking and biking within the City of Bend, public input on recent projects, particularly Key Routes for Walking and Biking project, have indicated that the community desires higher-quality, lower-stress facilities than what was initially assumed when scoping and budgeting the Key Route projects. For example, the on-going Olney Avenue Pedestrian and Bicyclist Improvements project conducted a detailed alternatives analysis. Through this analysis, only one of the three alternatives fit within the available project budget, while the higher cost, increased enhancement alternatives received more community support. Other Key Route project costs within the MTP should be evaluated to determine whether the proposed project budget continues to meet the intent of the Key Route. In addition, further study is needed to determine how increased traffic on Key Routes will impact LTS, particularly on key routes where the assumed solution is a buffered bike lane. This study would inform the upcoming Bend TSP Update and allow for more accurate scoping of Key Routes projects.

TRANSIT EVALUATION AND FINDINGS

This section presents the following analysis and findings related to the transit needs and proposed projects within the Bend MPA:

- **Summary of Needs**
- **Evaluation Results**
- **New/Changing Transit Needs**

SUMMARY OF NEEDS

As described in the MTP Needs Memorandum, prior local plans have identified the following key needs for transit within the Bend MPA:

- Expanded fixed route service, including reduced headways
- More service coverage and connections in Bend, especially the Old Mill and the NE and SE Bend and St. Charles area
- More direct connections to downtown from the east side.
- Expanded weekend service

- More frequent regional service, including connections to the airport
- Service to both existing and future developments in the outer growth areas of the Bend UGB
- More recreational service
- Additional buses
- Technology upgrades
- Better bicycle and pedestrian facilities near transit stops (such as bike parking, mobility hubs, safe crosswalks, and sidewalk infill).
- Improvement to PM peak hour transit travel time reliability on congested corridors, particularly the river crossings, US 20, US 97, and 27th Street

The projects in prior adopted plans are intended to address these needs, expanding transit access and reliability for all residents and employees within the Bend MPA.

EVALUATION RESULTS

The transit focused projects from the 2045 Draft MTP Project List are shown in Attachment B. This section summarizes key transit performance measures for 2045 Draft MTP Project list, compared against the 2019 baseline and 2045 Committed conditions, including:

- Mode Split
- Transit Coverage

MODE SPLIT

The percentages of all person-trips using transit within the Bend MPA were calculated from the BRM. These percentages were based off trips that both begin and end within the Bend MPA. Table 2 below documents these mode splits between the 2019 Base Year scenario, the 2045 Committed scenario, and the 2045 Draft MTP Project List scenario.

TABLE 2: PERCENT TRANSIT TRIPS WITHIN THE BEND MPA

MODE	2019 BASE	2045 COMMITTED	2045 PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
TRANSIT DEMAND	0.14%	0.15%	0.59%	400%

As shown in Table 2, the CET service enhancements, travel demand management programs, and the addition of mobility hubs within the 2045 Draft MTP Project List scenario quadruple transit ridership. However, the overall percentage of transit trips compared against all person trips throughout the MPA remains extremely low, highlighting the opportunity to achieve greater benefit to the system by attracting more riders.

Some programmatic opportunities to increase travel in transit type modes beyond currently identified projects could include vanpool/carpool incentives for large area employers, targeting businesses along corridors identified to have increasing motor vehicle congestion. Some of these types of programs already exist, such as the Enterprise program, but targeted funding to increase

the reach of these programs is lacking. More refined funding sources for these programs is recommended as a consideration in the upcoming Bend TSP Update.

TRANSIT COVERAGE

The addition of new transit projects included in the 2045 Draft MTP Project List increases the coverage of transit service within the Bend MPA, allowing greater access to households and jobs, as listed in Table 3. The geographic transit coverage buffers plotted against the MPA housing and employment growth areas are shown in Figure 3 and Figure 4.

TABLE 3: PERCENT OF MPA HOUSEHOLDS AND JOBS WITHIN 0.25 MILES OF TRANSIT SERVICE

MODE	2019 BASE	2045 COMMITTED	2045 PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
HOUSEHOLDS	49%	44%	50%	14%
JOBS	79%	55%	60%	9%

The number of households within a quarter mile of transit service or mobility hubs increased for the 2045 Draft MTP Project List due to a new fixed service route (Project CET-8). However, even with the new route, only 50% of households have walkable (0.25 miles or less) access to transit, similar to present day conditions. A substantial proportion of new residential growth within the Bend MPA is likely to be multi-family, high-density development, which is supportive of transit travel choices. But as shown in Figure 4, some of the largest residential growth areas, particularly in the southeast, fall outside the transit coverage area.

As shown in Figure 3, a substantial portion of the expected MPA job growth occurs outside of transit coverage, particularly the growth areas in the southeast and northeast. This results in only 60% of all MPA jobs falling within the 2045 Draft MTP Project List transit coverage area under future conditions. In addition, buses in the transit system are affected by motor vehicle congestion on many of the existing or planned routes, affecting travel times and reliability. Upcoming local plan updates (Deschutes County ITS Plan, CET Master Plan, Bend TSP Update) are recommended to consider ITS projects supporting transit signal priority. As a community, the Bend MPO Area does not have a transit culture. Developing a transit culture will require additional support, with Commute Options, incentives, direct marketing, and other strategies and tactics targeting transit ridership. The upcoming Bend TSP Update is recommended to consider identifying funding sources to support these types of strategies and tactics to increase transit ridership throughout the region.

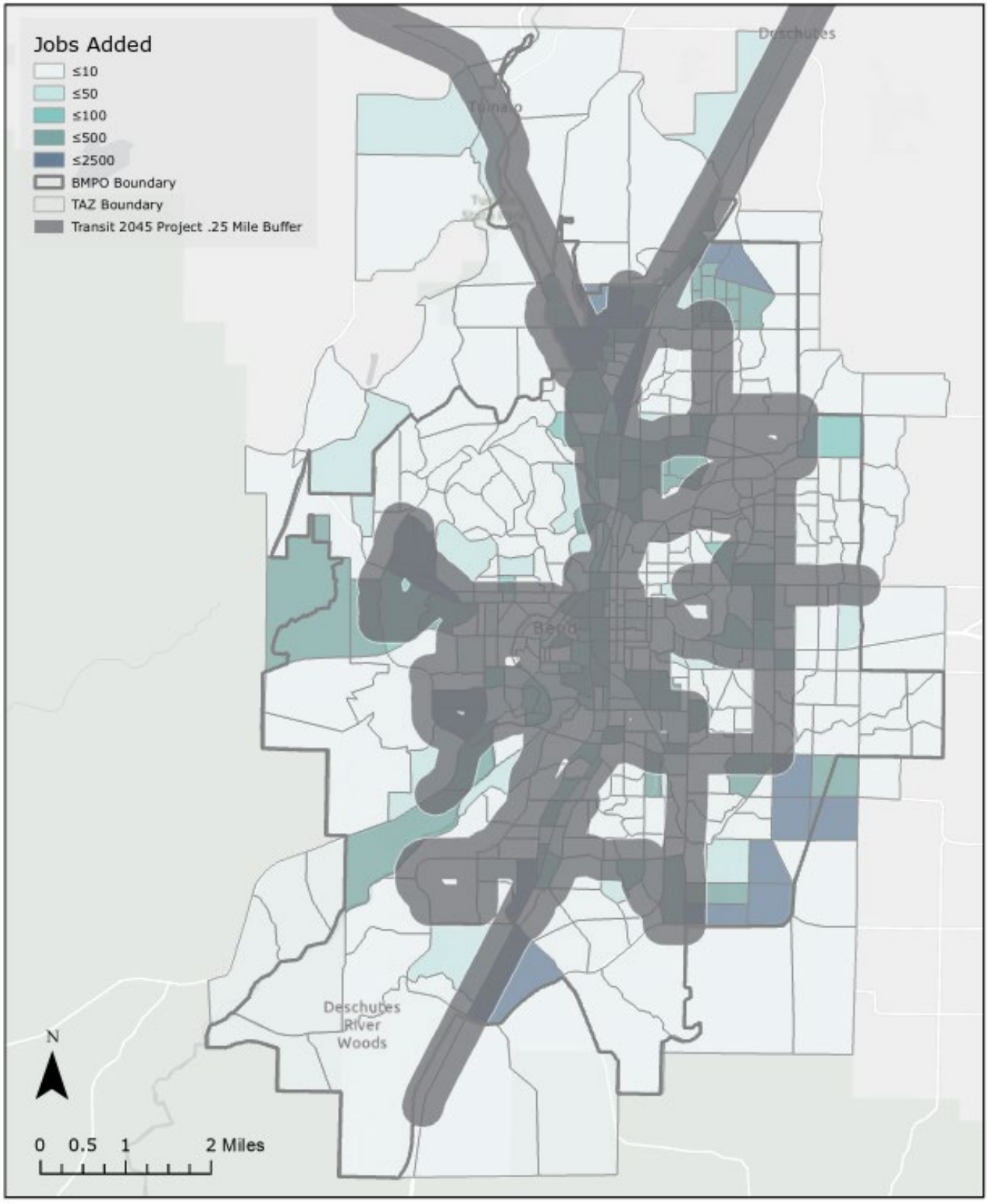

FIGURE 3. 2045 DRAFT MTP PROJECT LIST TRANSIT COVERAGE AND JOB GROWTH

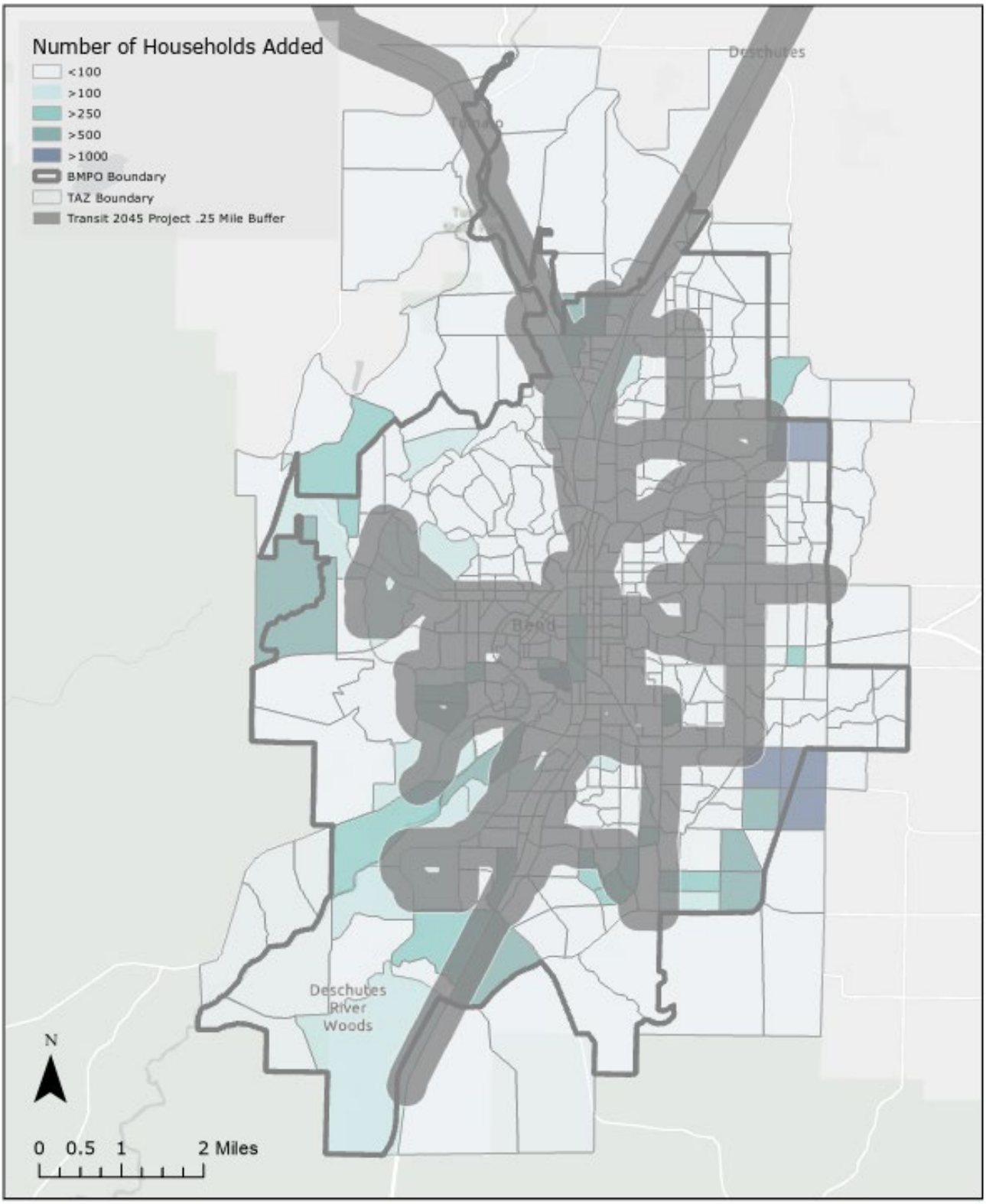

FIGURE 4. 2045 DRAFT MTP PROJECT LIST TRANSIT COVERAGE AND HOUSING GROWTH

NEW/CHANGING TRANSIT NEEDS

With the updated growth assumptions for the MPA expanding the planning horizon from 2040 to 2045, more high-density, transit-oriented growth is anticipated in the urban fringe areas of the Bend MPA. The 2045 Draft MTP Project List does not provide sufficient coverage to fully serve these new growth areas, limiting transit options for many areas across the MPA. Some of the most critical motor vehicle system needs, particularly needs related to east-west corridors, cannot be fully resolved through new connections or corridor enhancements. Expanded transit service has the potential to provide some relief to these congested corridors by shifting people from motor vehicles to transit.

MOTOR VEHICLE EVALUATION AND FINDINGS

This section presents the following analysis and findings related to the motor vehicle needs and proposed projects within the Bend MPA:

- **Summary of Needs**
- **Evaluation Results**
- **New/Changing Motor Vehicle Needs**

SUMMARY OF NEEDS

Several key needs for congestion mitigation were identified in the MTP Needs Memorandum, including the following:

- US 97
- East-west corridors
- North-south corridors
- Key intersection nodes between east-west and north-south corridors.

Under 2045 Committed conditions, the following corridors are forecasted to experience particularly elevated levels of congestion:

- NE Butler Market Road
- NW Galveston Ave
- NE Neff Road
- NW Portland Ave
- NE Newport Ave
- Powers Road
- SE Reed Market Road
- SE 15th Street
- 27th Street
- Ward Road
- SE Wilson Avenue

EVALUATION RESULTS

The motor vehicle/multi-modal focused projects from the 2045 Draft MTP Project List are shown in Attachment C (connectivity and corridor enhancement), Attachment D (intersections), and Attachment E (technology). This section summarizes the key motor vehicle performance measures for the 2045 Draft MTP Project List, compared against the 2019 baseline and 2045 Committed conditions, including:

- Corridor Congestion
- System Delay
- Vehicle Miles Traveled (VMT)
- Trip Diversion

CORRIDOR CONGESTION

The corridor levels of congestion throughout the Bend MPA were estimated using BRM model outputs, which were compiled in Demand to Capacity (D/C) ratios indicating capacity constraints throughout the system. Figure 5 compares the PM Peak Hour demand to capacity ratio results by corridor for the 2045 Draft MTP Project List and the 2045 Committed scenario.

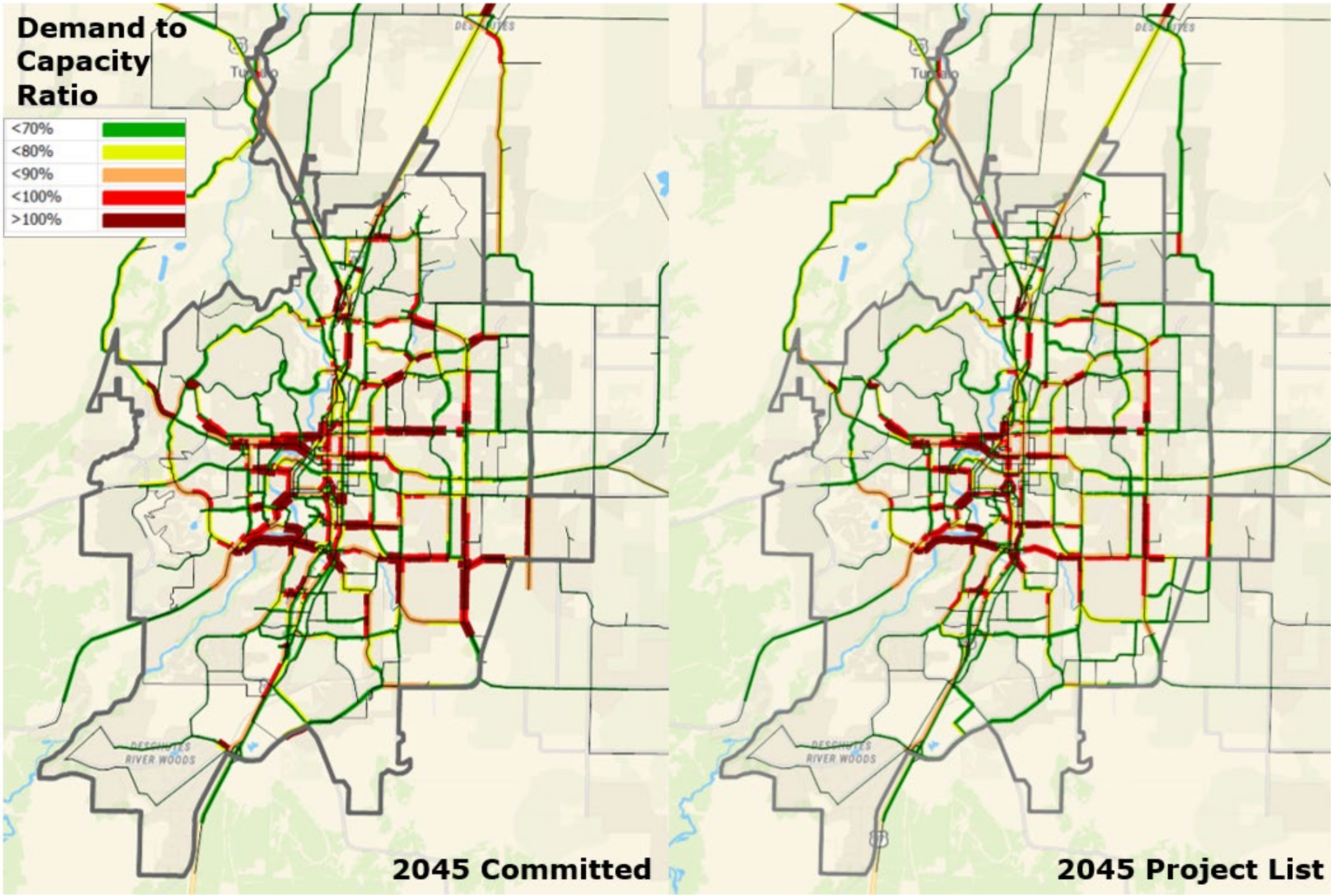

FIGURE 5: 2045 COMMITTED AND PROJECT LIST PM PEAK HOUR DEMAND/CAPACITY RATIOS

As shown in Figure 5, the 2045 Draft MTP Project List improves some of the congestion issues flagged in the MTP Needs Memorandum, including:

- US 97 Parkway - traffic operations improve, due mainly to restricted access (Projects C2A-C2H)
- North-south corridor – 27th Street improves south of Reed Market Road due to additional connectivity projects to the east
- Empire Boulevard/Butler Market Road – Improves due to Yeoman Road extension (Projects C-1 and C-76)

Congestion needs that remain include:

- All East-West river crossings
- Smaller portions of Butler Market Road
- NW Galveston Ave
- NE Neff Road
- NW Portland Ave
- NE Newport Ave
- Powers Road
- SE Reed Market Road
- SE 15th Street
- 27th Street
- Ward Road
- SE Wilson Avenue

Prior planning efforts have identified ramp metering on the Bend Parkway (US 97) as a key strategy to manage congestion on this critical statewide and regional connection through the City of Bend. To evaluate the congestion benefits/impacts of a ramp meter strategy on US 97, a separate BRM scenario was developed that included the 2045 Draft MTP Project List with ramp meters also modeled. The PM Peak Hour demand to capacity ratios for the ramp metering scenario are compared against the 2045 Draft MTP Project List results in Figure 6.

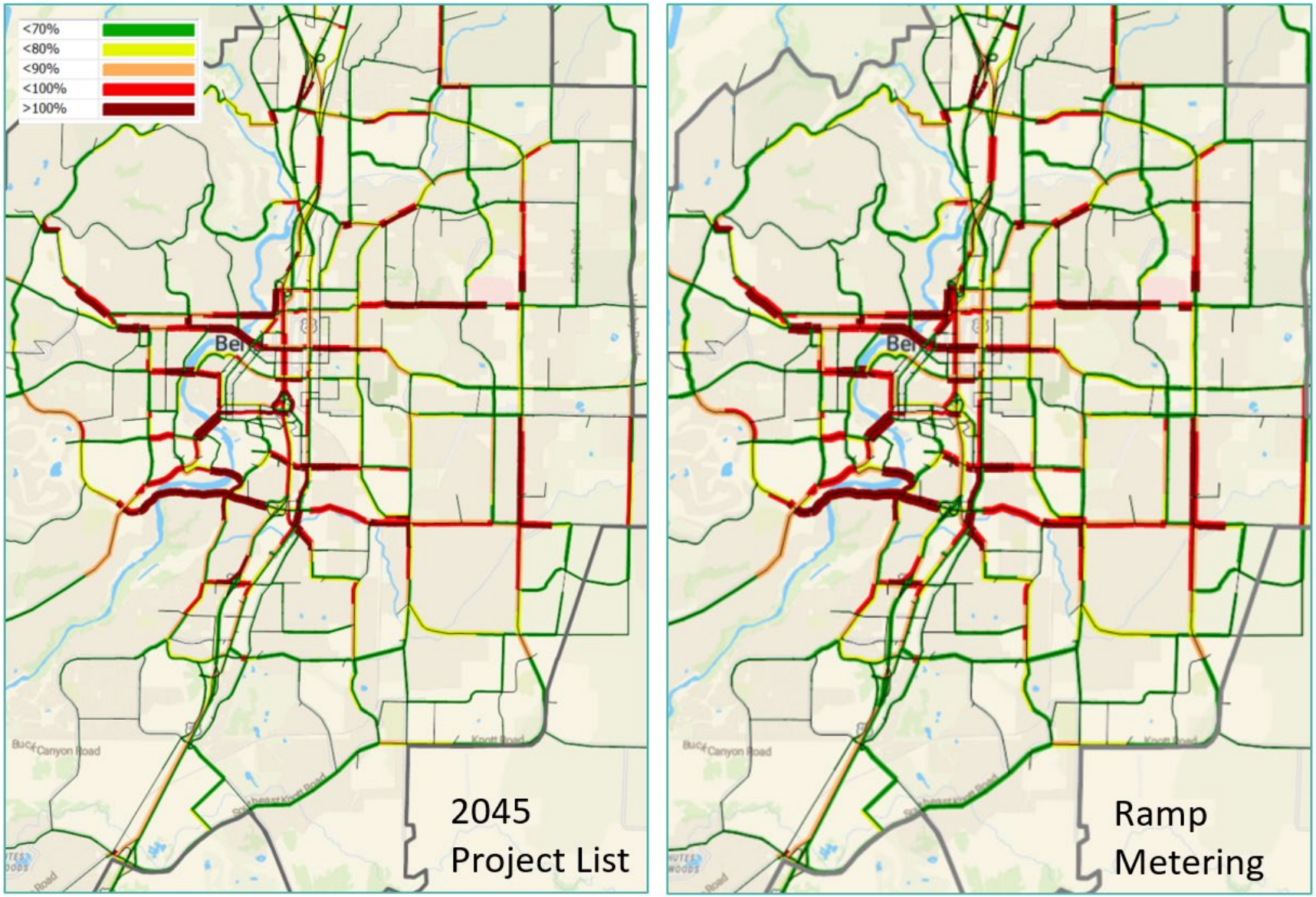

FIGURE 6: 2045 PM PEAK HOUR CONGESTION WITH/WITHOUT RAMP METERS

As shown in Figure 6, shifts in traffic from the ramp metering manage to keep the US 97 Parkway below capacity under 2045 conditions and improve traffic operations at the Colorado Interchange. Traffic congestion on 3rd Street increases as short trips are discouraged from using the Parkway due to ramp meter delay. In addition, traffic using the Colorado interchange shifts onto 3rd Street and Greenwood, increasing congestion between 3rd Street and Downtown Bend on this corridor. The remainder of the system operates very similar to conditions without ramp meters.

SYSTEM DELAY

The MPA area roadway system PM Peak Hour vehicle delay with the 2045 Draft MTP Project List is summarized in Table 4, and compared against 2019 and 2045 Committed conditions. The system delay is separated by facility jurisdiction (City of Bend, ODOT, Deschutes County).

TABLE 4: PM PEAK HOUR VEHICLE HOURS OF DELAY

ROADWAY JURISDICTION	2019 BASE	2045 COMMITTED	2045 PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
CITY OF BEND FACILITIES	144	612	450	-26%
ODOT FACILITIES	63	226	180	-20%
DESCHUTES COUNTY FACILITIES	2	24	15	-38%
TOTAL	210	862	645	-25%

As listed in Table 4, the 2045 Draft MTP Project List scenario is expected to significantly decrease overall delay. The connectivity and corridor enhancement projects that add motor vehicle capacity and alternate routes to the system drive this delay reduction.

As noted in the Transit section, changes in mode split are not significant at a regional scale, and therefore do not significantly contribute to the reductions in delay across the MPO Area. Shifts away from motor vehicle modes could provide further improvements in system delay, but to realize these improvements, targeted funding to strategic programs would be needed. Therefore, all local plans supporting jurisdictions within the MPO Area are recommended to consider establishing strategic mode shift programs with dedicated funding sources, or designating funding sources and implementation plans for already identified but unfunded programs.

VEHICLE MILES TRAVELED (VMT)

Vehicle Miles Traveled (VMT) is a way to measure of total motor vehicle travel within the system. Normalized to the population within the MPA, this measure indicates trends in both number of vehicle trips and average trip length, measures which reflect both land use planning implications on travel and approximated future year motor vehicle emissions. Table 5 summarizes the daily VMT results for trips originating from households within the Bend MPA under 2019, 2045 Committed,

and 2045 Draft MTP Project List conditions. These VMT results are normalized by the Bend MPA population estimates to create VMT per capita.

TABLE 5: DAILY VMT RESULTS

MEASURE	2019 BASE	2045 COMMITTED	2045 PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
DAILY VMT PER CAPITA	6.89	7.22	6.94	-4%

The VMT per capita results indicate that while the 2045 Draft MTP Project List does improve VMT over 2045 Committed conditions, compared against 2019 (approximation of present day) conditions, the future conditions show an increase of 0.7%. This increase occurs despite careful balancing of land use (housing and employment) in Bend MPA growth areas, enhancements to the transit system, and improvements to connectivity. Increased travel beyond the Bend MPA to/from Redmond is a likely factor counteracting reductions in VMT internal to Bend. The limited transit usage within the model provides an opportunity to reduce VMT per capita by targeting the vehicle trips per person portion of the measure, as increasing the transit mode share even to 3% of all trips would drop the VMT per capita well below 2019 levels. This important measure will be revisited in more detail during the Refined 2045 MTP Project List evaluation. Overall, the MTP does not set targets for regional mode split or VMT reduction, but rather reports this information to inform the local jurisdictions of the region's progress in these areas. Therefore, local jurisdictions are recommended to set their own targets for mode shift and VMT reduction both at the targeted corridor and system level in their upcoming local planning efforts.

TRIP DIVERSION

With congestion expected to continue to grow throughout the Bend MPA in the future, traffic may divert onto local streets in attempts to bypass system or corridor bottlenecks. To estimate the system-level risk of trip diversion, the percentage of collector roadways with Average Daily Traffic (ADT) of more than 4,000 was calculated from the BRM. Table 6 summarizes this measure for 2019, 2045 Committed, and 2045 Draft MTP Project List Conditions.

TABLE 6: TRIP DIVERSION POTENTIAL

MEASURE	2019 BASE	2045 COMMITTED	2045 PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
DIVERSION POTENTIAL[A]	7%	23%	19%	-4%

[A] Measured as a percent of collector roads with an average daily traffic volume above 4,000 vehicles per day.

As listed in Table 6, the 2045 Draft MTP Project List reduces the risk of trip diversion over the 2045 Committed condition, but still more than doubles the amount of high-volume collector facilities compared to present day. Cut-through traffic already occurs adjacent to varies congested corridors and hot-spots throughout the Bend MPO Area, particularly during construction projects. Corridors of particular concern for increasing local roadway trip diversion include segments along the following roadways:

- Neff Road
- Brosterhous Road
- 15th Street
- Wilson Avenue
- Portland Avenue
- Newport Avenue
- Powers Road

The Bend TSP considered funding and staffing a program to manage cut-through traffic, and this program has been at least partially implemented to support the construction efforts related to the Bond projects. The continued traffic growth throughout the Bend MPO Area indicates a need to expand the implementation of this program to consider non-construction related cut-through traffic under current conditions.

NEW/CHANGING MOTOR VEHICLE NEEDS

The new horizon year of 2045 and changes to land use based on recent growth trends and local planning activities have both created new needs and changed the scope of previously identified motor vehicle system needs. The combined impact of these changes is reflected in the following summary of changes in motor vehicle system needs between the prior and current MTP updates:

- **OB Riley Road** – The corridor capacity need identified in the prior MTP is reduced to a smaller bottleneck issue at Archie Briggs, due to lower land use growth assumptions near this area (e.g., Gopher Gulch). The multi-modal project identified for this corridor (Project C-3) should be considered for re-scoping during this MTP and subsequent City planning efforts.
- **Shevlin Park Road** – New traffic congestion need east of Skyline Ranch Road.
- **Neff Road** – Heightened congestion need between 8th Street and 27th Street, with potential of increasing neighborhood cut-through.
- **Hamby Road** – New traffic congestion need from Stevens Road to Bear Creek Road, driven by growth in the Stevens Ranch and DSL areas.
- **Powers Road** – New congestion need between US 97 and Brookswood Boulevard
- **East West River Crossings** – This congestion issue was a key need identified in the City's TSP and was flagged for monitoring. Current travel demand model forecasts indicate that these crossings will experience traffic demand well beyond existing capacity, indicating a need to move forward with a study for new/enhanced river crossings. This study should include best practices/strategies to manage the existing river crossings as well, particularly given the topographic and right-of-way constraints affecting many of the bridges and connecting facilities.

- **27th Street** – This corridor was flagged for monitoring in the City's TSP, with the year 2040 analysis indicating a need for a five-lane cross section from Empire Boulevard to Ferguson Road. The 2045 Draft MTP Project List evaluation indicates that by the year 2045 Horizon, a five-lane cross section is only needed from near St. Charles Hospital in the north to Reed Market Road in the south.

ATTACHMENTS

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ATTACHMENT D: INTERSECTION PROJECTS

ATTACHMENT E: TECHNOLOGY PROJECTS

ATTACHMENT A: ACTIVE TRANSPORTATION PROJECTS

TABLE 7: ACTIVE TRANSPORTATION CONNECTIVITY PROJECTS

MAP ID	PROJECT DESCRIPTION	DRAFT COST ESTIMATE[1]
20714	US 97: Multi-Use Trail	$5,977,172
23494	Hawthorne Ave Pedestrian Bike and Overcrossing	$24,450,000
A36	Complete Sidewalk in Unincorporated Communities	$$$
BP-1	Sidewalks on 7th Street (Tumalo)	$300,000
BP-10	Sidewalks on 8th Street (Tumalo)	$400,000
BP-2	Sidewalks on 4th Street (Tumalo)	$300,000
BP-3	Sidewalks at 2nd and Cook (Tumalo)	$1,700,000
BP-6	Sidewalks on 5th Street (Tumalo)	$500,000
M-12	Olney Avenue Bike Lanes and Undercrossing	$1,820,000
M-15A	Greenwood Undercrossing Sidewalk Widening	$7,883,975
M-15C	Franklin Avenue Underpass	$46,880,530
M-20	Knott Canal Crossing	$700,000
M-9A	Franklin Avenue Underpass Shared Use Path	$6,799,000
M-9C	Greenwood Undercrossing Sidewalk Widening and Shared Use Path	$2,978,400
P10	DRT North Trailhead	$320,000
P11	DRT Kirkaldy to Putnam	$59,713
P13	DRT Galveston to Miller's Landing	$3,000,000
P14	DRT South UGB and Bike/ Pedestrian Bridge	$1,000,000 - $5,000,000
P35	Riley Ranch Nature Reserve Bike/ Pedestrian Bridge	$1,200,000
P41	Arnold Canal Trail	$534,000
P44	Discovery West Trail	$1,600,000
P45	Hansen Park Trailhead	$250,000 - $1,000,000
P47	High Desert Park Trail	$213,600
P49	North Unit Canal Trail	$512,200
P50	Pilot Butte Canal Trail	$164,100
P55	Hansen to Big Sky Park Trail	$1,000,000 - $5,000,000
P56	Manzanita Trail	$40,000
P57	Neff and Hamby Road Crossings	$1,000,000 - $5,000,000
P6	COHCT from Blakely Road to Hansen Park	$660,900
P61	Riley Ranch Nature Reserve Neighborhood Access	<$250,000
P64	Shevlin Park North to Tumalo Creek Bike/ Pedestrian Bridge	$250,000 - $1,000,000
P67	TransCanada Trail	$250,000 - $1,000,000
P69	DRT Connector to Shelvin Park	$67,900
P7	COCHT from Hansen Park to Eastgate Park	$147,700
P75	Powerline Trail	$250,000 - $1,000,000
P77	South DRT Buck Canyon Trailhead	$1,000,000 - $5,000,000
P78	Tumalo Creek Trail	$250,000 - $1,000,000
P8	COCHT from Eastgate Park to the Badlands	$250,000 - $1,000,000
P9	DRT Putnam to Riley Ranch Nature Reserve Bike/ Pedestrian Bridge	$155,000
R2-A	NW Franklin Ave: Harriman Ave to Railroad Undercrossing	$176,000
R2-B	Franklin Ave Underpass: Hill St to 1st St	See M-15C
P7	COHCT from Hansen Park to Eastgate Park	$147,700
P75	Powerline Trail	$250,000 - $1,000,000

MAP ID	PROJECT DESCRIPTION	DRAFT COST ESTIMATE[1]
P77	South Deschutes River Trail Buck Canyon Trailhead	$1,000,000 - $5,000,000
P78	Tumalo Creek Trail	$250,000 - $1,000,000
P8	COCHT from Eastgate Park to the Badlands	$250,000 - $1,000,000
P9	DRT Putnam to Riley Ranch Nature Reserve Bike/ Pedestrian Bridge	$155,000
R2-A	NW Franklin Ave: Harriman Ave to Railroad Undercrossing	$176,000

1. Costs are from prior plan years and do not reflect 2023 dollars

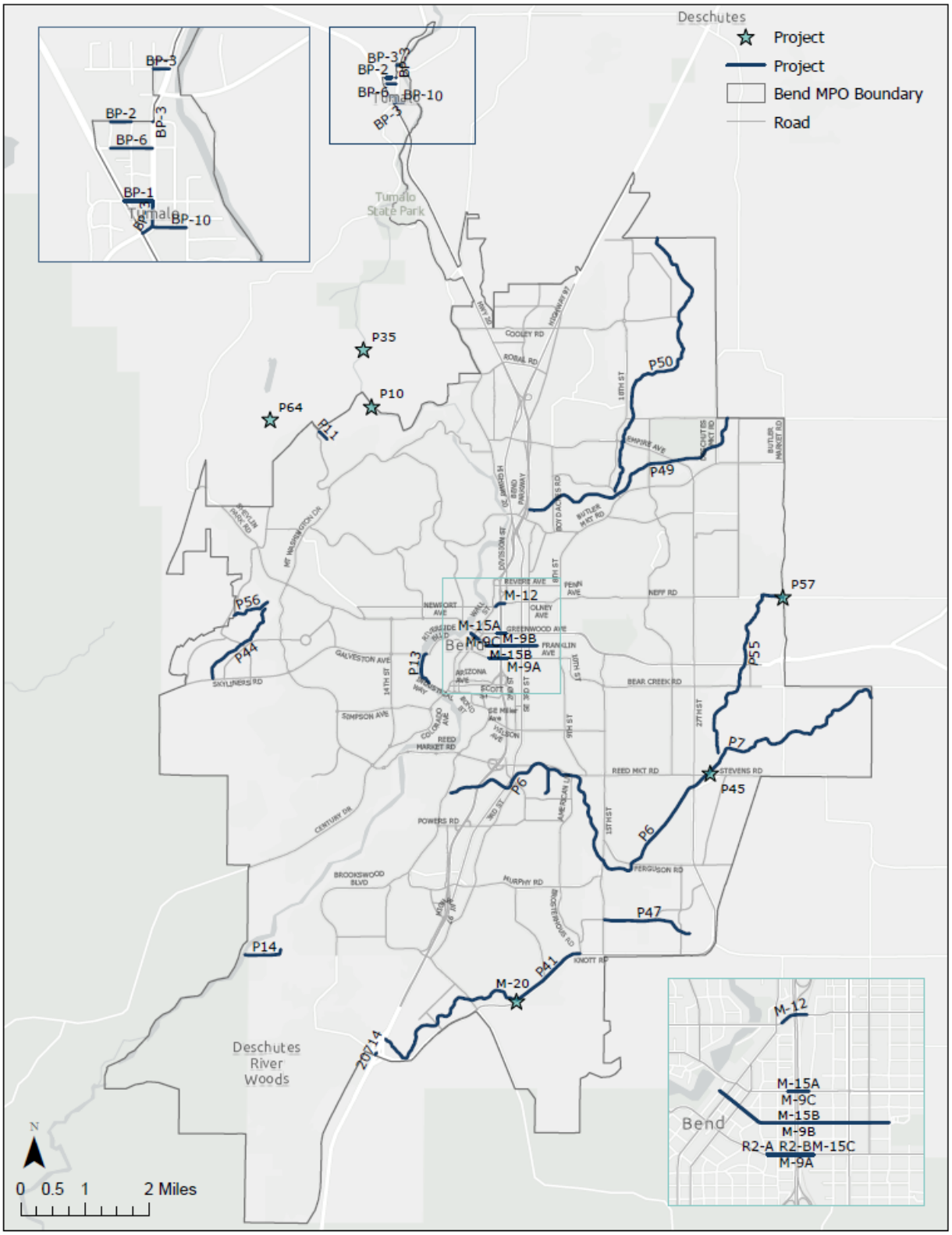

FIGURE 7. 2045 DRAFT MTP PROJECT LIST ACTIVE TRANSPORTATION CONNECTIVITY PROJECTS

TABLE 8: ACTIVE TRANSPORTATION CORRIDOR ENHANCEMENT PROJECTS

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
20391	US 20: Empire-Greenwood Improvements	$2,034,000
21489	US 20 3rd St-15th St Improvements	$6,426,900
22442	Sisters and Bend ADA Improvements	$17,633,346
C4A	Cooley Road Improvements	$3,000,000
C4B	Butler Market Road Improvements	$200,000
C4G	Canal/ Garfield Undercrossing	$1,250,000
C4H	Badger/ Pinebrook Overcrossing	$5,000,000-10,000,000
C4I	Murphy Road Improvements	$5,000,000-10,000,000
C4L	Robal Road Improvements	$1,000,000
C4P	Wilson Avenue Improvements	$860,000
M-1	Galveston Avenue Corridor Improvements	$3,900,000
M-10	Drake Park Pedestrian Bridge Improvements	$1,275,000
M-11	Archie Briggs Road Trail Improvements	$500,000
M-14	Butler Market Road Sidewalk Improvements	$3,100,000
M-16	Revere Avenue/ 2nd Street Intersection Improvement	$210,000
M-17	Olney Avenue Railroad Crossing Improvements	$500,000
M-18	Eagle Road Functional Urban Upgrade	$14,500,000
M-19	Knott Road Urban Upgrade from China Hat Road to 15th Street	$15,600,000
M-2	Parrell Road Urban Upgrade from China Hat Road to Brosterhous Road	$29,100,000
M-21	SE 27th Street rural road upgrade from Stevens Road to Ferguson Road	$1,300,000
M-22	SE 27th Street rural road upgrade from Ferguson Rd to Diamondback Ln	$600,000
M-23	SE 27th Street rural road upgrade from Diamondback Lane to access road	$100,000
M-24	SE 27th Street rural road upgrade from access road to Knott Road	$1,300,000
M-25	Knott Road rural road upgrade from 15th Street to Raintree Court	$500,000
M-26	Knott Road rural road upgrade from Raintree Court to SE 27th Street	$5,500,000
M-27	Knott Road rural road upgrade south of China Hat Road	$300,000
M-29	Cooley Road rural road upgrade from O.B. Riley Road to US 20	$1,300,000
M-3	Olney Avenue/2nd Street intersection improvement	$210,000
M-30	Cooley Road rural road upgrade from US 20 to Hunnell Road	$1,100,000
M-31	Hunnell Road rural road upgrade from Cooley Road to Loco Road	$200,000
M-32	Yeoman Rd rural road upgrade from the western terminus to Deschutes Market Rd	$2,500,000
M-33	Deschutes Market Road rural road upgrade from Yeoman Road to Canal	$500,000

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
M-34	Deschutes Market Rd rural road upgrade from Canal to Butler Market Rd	$400,000
M-36	Butler Market Road rural road upgrade from Eagle Road to Clyde Lane	$400,000
M-37	Butler Market Road rural road upgrade from Clyde Lane to Hamby Road	$1,100,000
M-38	Butler Market Rd rural road upgrade from Hamby Rd to Hamehook Rd	$1,100,000
M-39	Stevens Road rural road upgrade from Stevens realignment to Bend UGB	$1,900,000
M-4	Greenwood Avenue/2nd Street intersection improvement	$210,000
M-40	Clausen Drive rural road upgrade from Loco Road to Northern terminus	$200,000
M-41	China Hat Road rural road upgrade north of Knott Road	$200,000
M-42	China Hat Road Canal Bridge widening	$400,000
M-43	Deschutes Market Road canal bridge widening	$400,000
M-5	Franklin Avenue/2nd Street intersection improvement	$210,000
M-6	Franklin Avenue/4th Street intersection improvement	$210,000
M-7	Clay Avenue/3rd Street intersection improvement	$210,000
R10-A	O.B. Riley Road & Blakeley Road: North of Cooley Road to Knott Road	Cost captured in C-45, C-3, M-30.
R11-A	Murphy Road: Powers Road to 15th Street Shared Use Path	$2,179,000
R12-A	Wilson Ave: 2nd Street to SE 9th Street	Funded
R1-A	SE 9th St: Wilson Ave to Reed Market Rd	$1,155,000
R1-B	SE 9th St: Wilson Ave to Glenwood Ave	$3,000
R1-C	NE Boyd Acres Rd: Butler Market Rd to Empire Ave	$1,884,000
R1-D	SE 15th Street: Reed Mkt Rd to 300’ south of King Hezekiah	$1,185,000
R2-C	Franklin Ave: 1st St to 5th St	$16,000
R2-D	Bear Creek SRTS: Larkspur Trail to Coyner Trail	$385,000
R2-E	Bear Creek Rd: Cessna Ave to east UGB	$2,700,000
R3-A	Norton Ave: NE 6th St to NE 12th St	$196,000
R3-B	Hillside Trail: Connects NE 12th to Neff Rd	$241,000
R3-C	Neff Rd: NE 12th to Big Sky Park	$3,634,000
R3-E	Olney Avenue: Wall Street to railroad	$421,000
R4-A	NW 15th St: Lexington Ave to Milwaukie Ave	$110,000
R4-B	NW 14th St: Ogden Ave to Portland Ave	$110,000
R5-A	Butler Market Rd: Brinson Blvd to NE 6th St	$1,962,000
R7-A	3rd St: Crosswalk btw RR and Wilson Ave	$215,000
R7-B	3rd St: Crosswalk btw RR and Franklin Ave	$215,000
R7-C	3rd St: Underpass	$210,000
R8-A	27th St: Hwy 20 to Reed Mkt Rd - Shared use path	$4,815,000
RMRP2	Reed Market Road/ Chamberlain Street Improvements	$250,000
RMRP6A	3rd Street/ Brosterhous Road Safety Improvements	$130,000

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
US20 2	US 20/ NE 8th Street Improvements	$2,100,000

1. Costs are from prior plan years and do not reflect 2023 dollars

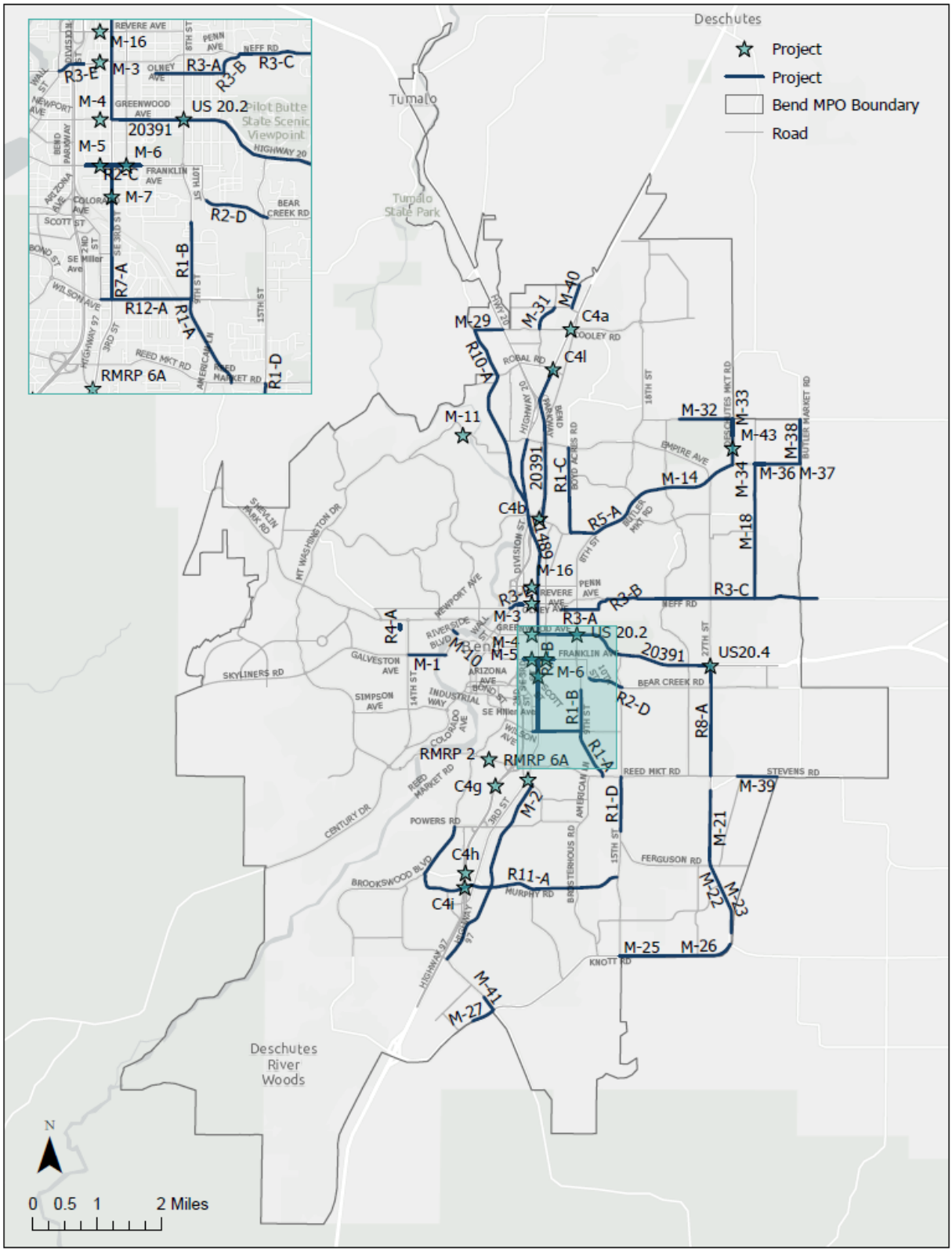

FIGURE 8. 2045 DRAFT MTP PROJECT LIST ACTIVE TRANSPORTATION CORRIDOR ENHANCEMENT PROJECTS

ATTACHMENT B: TRANSIT PROJECTS

TABLE 9. TRANSIT CONNECTIVITY PROJECTS

Cost Estimate: $7,500,000

MAP ID	PROJECT DESCRIPTION
MHND	North Downtown Mobility Hub
MHOMD	Old Mill District Mobility Hub
MHHS	Hawthorne Station Mobility Hub
MHEB	East Bend Mobility Hub
MHST	South 3rd Mobility Hub
MHNB	North Bend Mobility Hub
MHOSU	OSU Cascades Mobility Hub
MHCOC	Central Oregon Community College Mobility Hub

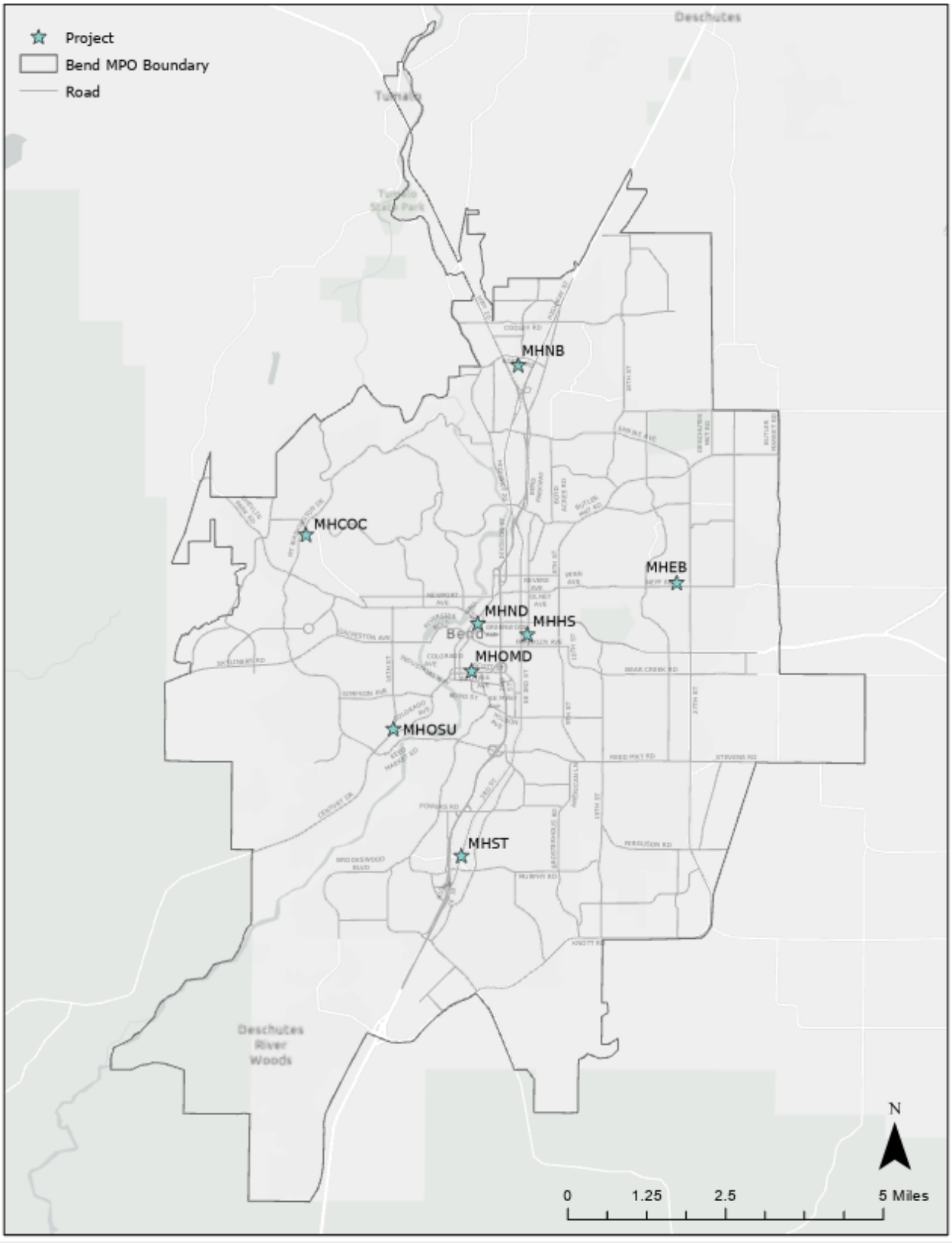

FIGURE 9. 2045 DRAFT MTP PROJECT LIST TRANSIT CONNECTIVITY PROJECTS

TABLE 10. TRANSIT SERVICE ENHANCEMENT PLAN 2045

2031-2040 Service Enhancement Cost: $24,582,000

MAP ID	PROJECT DESCRIPTION
CET 2	Bend Service Enhancement Route 2
CET 8	Bend Service Enhancement Route 8
CET 9	Bend Service Enhancement Route 9
CET 11	Bend Service Enhancement Route 11
CET 3	Bend Service Enhancement Route 3
CET 4	Bend Service Enhancement Route 4
CET 5	Bend Service Enhancement Route 5
CET 6	Bend Service Enhancement Route 6
CET 7	Bend Service Enhancement Route 7
000	Study for the Realignment of CET Routes to Service Mobility Hubs

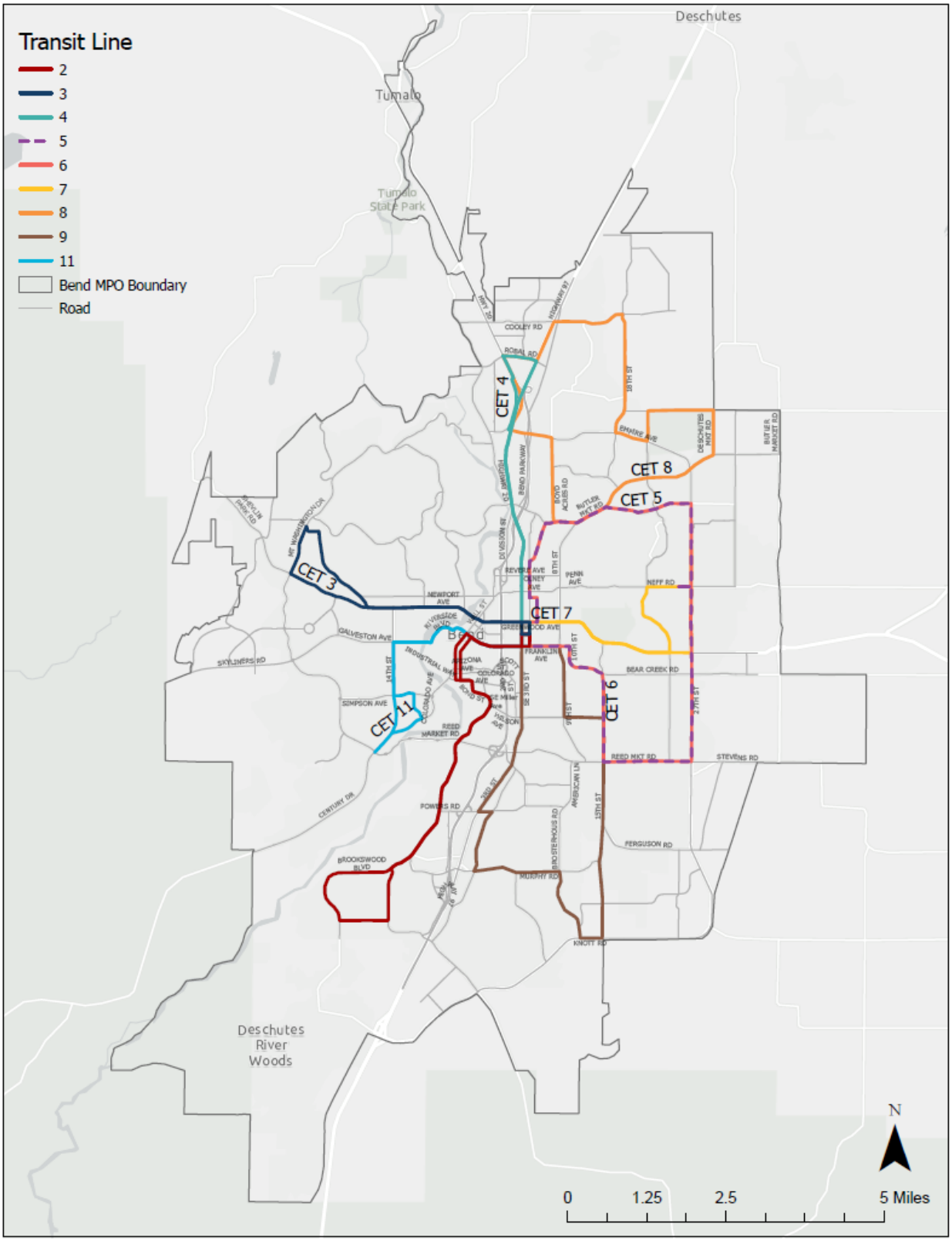

FIGURE 10. 2045 DRAFT MTP PROJECT LIST TRANSIT ROUTES

ATTACHMENT C: MOTOR VEHICLE PROJECTS

TABLE 11. MOTOR VEHICLE CONNECTIVITY PROJECTS

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
201	New collector - Skyline Ranch Rd from Shelvin Park to NW Xing	Funded
202	Crossing Drive Extension	Funded
219	Skyline Ranch Road Shevlin UGB Expansion Area	$2,700,000
230	New Road Shelvin UGB Expansion	$2,300,000
C-1	Yeoman Road Extension	$5,000,000
C-2	Purcell Boulevard Extension	Funded
C-24	Sisemore Street Extension	$2,400,000
C-25	Brentwood Ave extension from Whitetail St to American Ln	$2,300,000
C-48	New North Frontage Road near Murphy Road	$5,400,000
C-49	New South Frontage Road near Murphy Road	$13,800,000
C-5A	Aune Street extension (East)	$5,500,000
C-5B	Aune Street Extension (West)	$8,500,000
C-50	Britta Street extension (north section)	$2,700,000
C-51	Britta Street extension (south section)	$1,000,000
C-58	Ponderosa Street / China Hat Road overcrossing	$15,000,000
C-64	US 97 Frontage Road (Ponderosa to Baker Road)	$6,550,000
C-65	Stevens Road realignment	$4,700,000
C-66	Hunnell Road extension	$2,400,000
C-69	New Road in the Elbow UGB expansion area	$4,000,000
C-72	New Road in the Thumb UGB expansion area	$4,300,000
C-73	New Road in the Thumb UGB expansion area	$2,500,000
C-74	Loco Road extension	$5,300,000
C-75	New Road in Triangle UGB expansion area	$2,500,000
C-76	Yeoman Road Extension	$10,900,000
C-78	Collector between US20 and Hunnell Rd	$4,000,000
C-80	Robal Road extension from US 20 to O.B. Riley	$2,900,000
CC-18	Cooley Road Extension	$2,900,000
C-71	New Collector road between Ferguson and Knott	$9,000,000
SEAP	Local Road between SE Caldera Drive and Knott Road	$2,100,000
C-70	Extension of SE Caldera Drive between SE 15th and SE 27th	$7,400,000
SRMP	Extension of Wilderness Way	$3,900,000
SRMP	Eubanks Street collector between SE Ferguson and SE Stevens	$5,300,000
SRMP	SE Ferguson Road Extension	$2,600,000
SRT	Extension of the SE Ward Road Alignment	

1. Costs are from prior plan years and do not reflect 2023 dollars

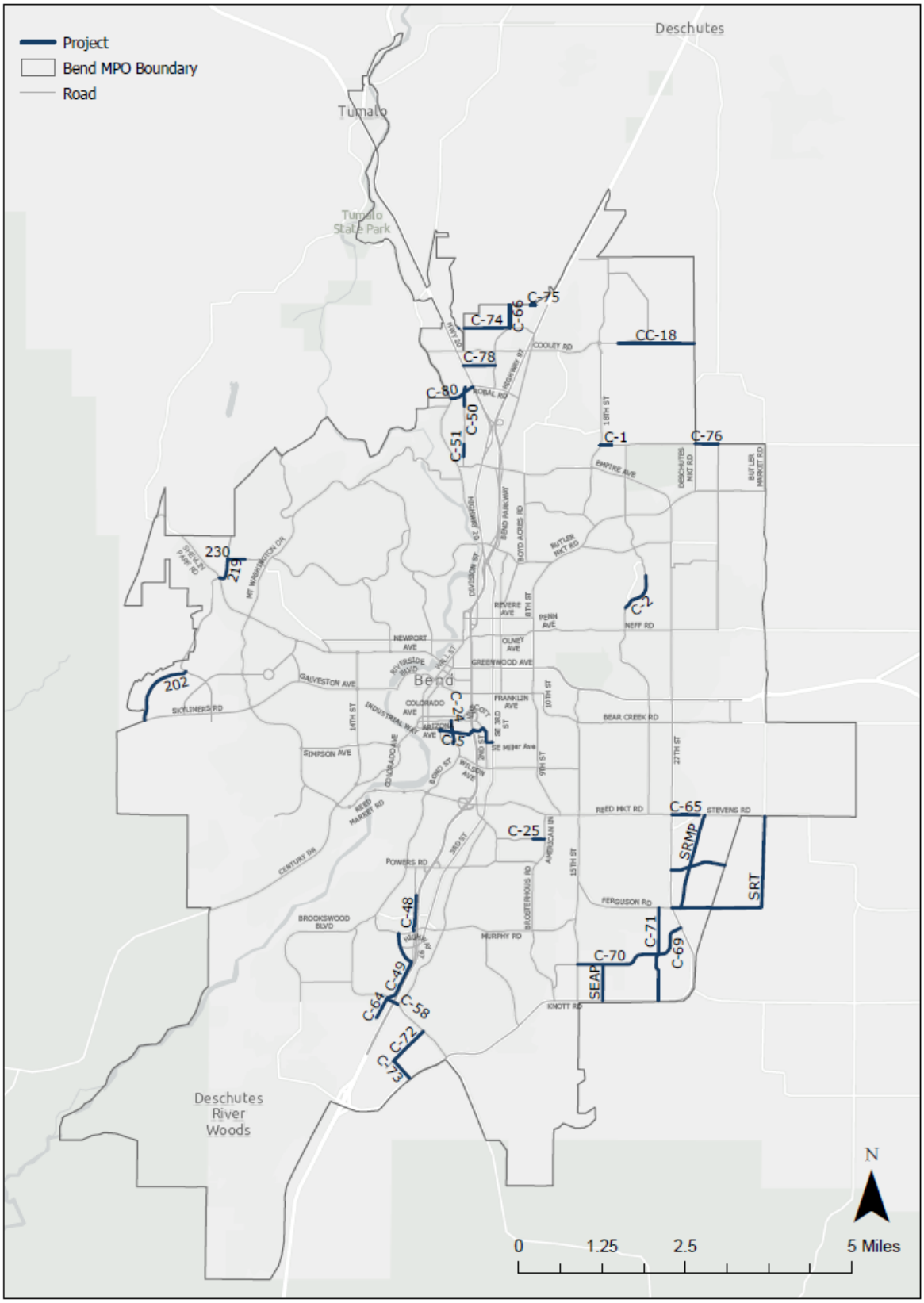

FIGURE 11. 2045 DRAFT MTP PROJECT LIST MOTOR VEHICLE CONNECTIVITY IMPROVEMENTS

TABLE 12. MOTOR VEHICLE CORRIDOR ENHANCEMENT PROJECTS

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
20378	Archie Briggs Road (Deschutes River) Bridges	$5,851,540
21756	US 20: Central Oregon Hwy Culverts Corridor	$532,916
22774	NE Norton Ave (Bend)	$579,000
22776	US 97: Redmond-Bend Phase 2	$9,310,000
97.A	Tight Urban Diamond Interchange US 97 North Interchange	TBD[2]
97.B	Realignment of 18th Street Relative to Juniper Ridge	TBD[2]
B-19	Hamby Road Corridor Safety Improvements	$51,000,000
BR-10	Old Deschutes Road Pilot Butte Canal Bridge Replacement	$400,000
C-13	Empire Avenue widening near US 97 interchange	$10,000,000
C-18	US 97 ramps at Murphy Road	$10,000,000
C-23	18th Street arterial corridor upgrade from Cooley to Butler Market	$7,800,000
C-3	O.B. Riley Road Corridor upgrade from Hardy to Archie Briggs	$6,700,000
C-31	Safety improvements to Empire Boulevard/27th Street Corridor from Boyd Acres Road to Reed Market Road	$41,800,000
C3A	Southbound Deceleration Lane Modification at Hawthorne Avenue	$1,000,000
C3C	Extend Revere Avenue northbound on-ramp acceleration lane	$1,000,000- 3,000,000
C3D	Acceleration lane modification for Colorado northbound on-ramp	$3,000,000- 5,000,000
C-40	US 97 North parkway extension (Phase 2)	$30,000,000
C-41	Powers Road interchange	$20,000,000
C-43	15th Street corridor safety and capacity improvements	$16,800,000
C-44	Reed Market rail crossing implementation	$25,000,000
C5	US 97 Shoulder-width improvements	$2,000,000-10,000,000
C-52	Mervin Samples Road / Sherman Road Collector Corridor upgrade	$6,100,000
C-53	27th Street Arterial Corridor upgrade from Bear Creek to Ferguson	$8,600,000
C-54	3rd Street railroad undercrossing widening	$13,700,000
C-55	Country Club Road Urban Upgrade from Knott to Murphy	$10,900,000
C-56	Powers Road urban upgrades from 3rd Street to Parrell Road	$1,000,000
C-57	Powers Road urban upgrades from Brookswood to 3rd	$4,200,000
C-6	Colorado Avenue corridor capacity improvements	$21,000,000
C-9	Revere Avenue interchange improvements	$8,500,000
CC-28	Bailey Road Widen and Overlay	$1,300,000
CC-29	Bear Creek Road Widen and Overlay	$3,200,000
CC-30	Cinder Butte Road Widen and Overlay	$1,300,000
CC-5	Rickard Road Widening	$2,300,000

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
F-7	China Hat Road Widen and Overlay	$900,000
I6	SE 3rd Corridor SE Cleveland Ave to SE Davis Ave Safety	
PHASE 1	US 97 Baker Interchange West Side Improvements	$14,800,000
PHASE 2	US 97 Baker Interchange Bridge and East Side Improvements	$23,200,000
RMRP1A	Reed Market Rd/ Brookswood Blvd Turn Lane Improvement Phase 1	$4,000,000
RMRP1B	Reed Market Rd/ Brookswood Blvd Turn Lane Improvement Phase 2	$700,000
RMRP3	Reed Market Road/ US 97 Southbound Ramps	$5,700,000
RMRP4A	US 97 Northbound Ramps/ Division Street: Traffic Signal	$4,000,000
RMRP4B	US 97 Northbound Ramps/ Division Street: Separate Northbound Entrance Ramp	$9,400,000
RMRP5	Reed Market Road/ 3rd Street protected intersection & turn lanes	$10,300,000
US20.3	US 20/ NE Purcell Boulevard Widening and Turn Lane Addition	
US20.4	US 20/ NE 27th Widening and Turn Lane Addition	
US20.5	US 20/ Hamby Road Right Turn Bypass lane addition	

1. Costs are from prior plan years and do not reflect 2023 dollars
2. Capital Cost Estimate not quantified in the Bend North Interchange Study Final Report

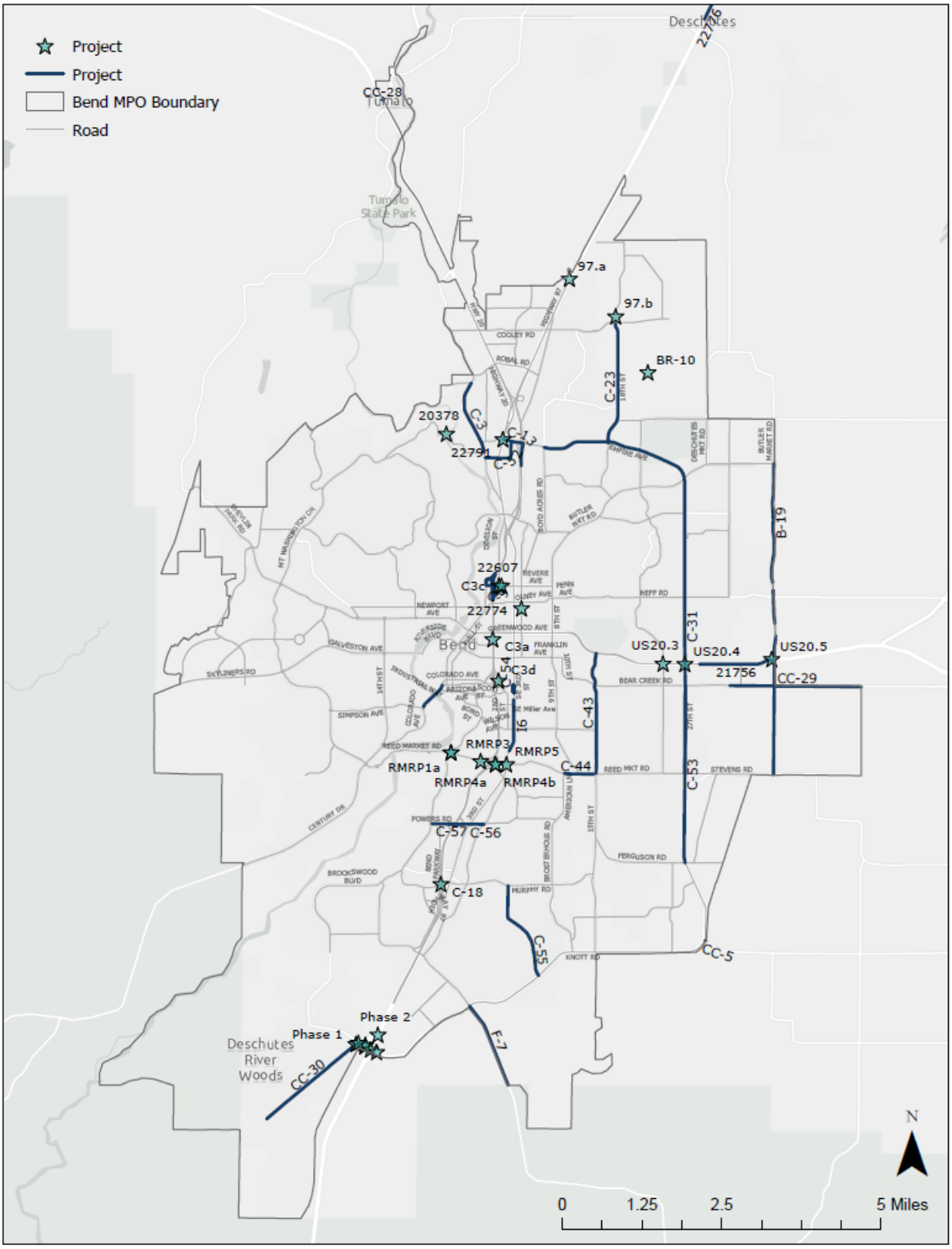

FIGURE 12. 2045 DRAFT MTP PROJECT LIST MOTOR VEHICLE CORRIDOR ENHANCEMENT PROJECTS

ATTACHMENT D: INTERSECTION PROJECTS

TABLE 13. INTERSECTION PROJECTS

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
1TNPS	Neff/ Purcell Intersection Improvements	Funded
6B	3rd Street/ Brosterhous Road Protected Intersection	$5,000,000-$10,000,000
C-14	Reed Market /15th intersection improvements	$1,100,000
C-15	Olney Avenue/8th Street intersection improvement	$3,700,000
C-16	Revere Avenue/8th Street intersection improvement	$3,700,000
C-21	Butler Market Road/US 20/US 97 Improvement.	$6,180,000
C-22	3rd Street/Wilson Avenue intersection improvement	Funded
C-26	US 20 intersection safety and capacity improvements	Funded
C-27	Butler Market intersection improvements from US 97 to 27th	$7,000,000
C-28	Revere Avenue/4th Street intersection improvement	$3,700,000
C-29	Olney Avenue/4th Street intersection improvement	$3,700,000
C2A	Lafayette Avenue/ US 97 Improvements	$2,000,000
C2B	Close Hawthorne Avenue right turn onto Parkway	$1,000,000
C2C	Close Truman Avenue RIRO intersections with Parkway	$1,000,000
C2D	Close Reed Lane RIRO intersection with Parkway	$1,000,000
C2E	Close Badger Road RIRO intersections with Parkway	$1,000,000
C2F	Close Pinebrook Blvd RIRO intersections with Parkway	$1,000,000
C2H	Close Rocking Horse RIRO intersections with Parkway	$1,000,000
C-33	Country Club /Knott intersection improvement	$3,700,000
C-34	Ferguson Road/15th Street intersection improvement	$3,700,000
C-35	NE 27th /Wells Acres intersection improvement	$3,700,000
C-39	Brosterhous /Knott intersection improvement	$3,700,000
C-45	O.B. Riley/Empire intersection improvement	$1,900,000
C-46	4th /Butler Market intersection improvement	$3,700,000
C-59	Hawthorne /3rd Intersection improvement	$3,800,000
C-60	Century Drive/Skyline Ranch Road roundabout	$3,700,000
C-61	Mt. Washington Drive/Metolius Drive roundabout	$3,700,000
C-63	China Hat Road/Knott Road Intersection Improvement	$3,700,000

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
C-7	Colorado/US 97 NB ramp intersection improvements	$4,300,000
C-79	Cooley Road/Hunnell Road Intersection Improvement	$3,700,000
C-8	Portland Avenue corridor project from College Way to Deschutes River	$17,700,000
CL-14	Cinder Butte Rd/ Cheyenne Rd intersection improvement	$200,000
CL-16	Cline Falls Hwy Cook Ave/Tumalo Rd intersection improvement	$1,800,000
CL-22	Baker Rd/ Brookswood Blvd intersection improvement	$1,400,000
S1	Butler Market & Hamby Intersection Improvement	TBD
S2	Butler Market Road & Hamehook Road	TBD
S-3	Pettigrew Road/Bear Creek Road safety improvement	$3,700,000
S-4	US 97/Powers Road interim improvements	$100,000
S-5	3rd/Miller intersection improvements and 3rd Street modifications study (Phase 1)	$100,000
S-6	3rd/Miller intersection improvements and 3rd Street modifications implementation (Phase 2)	$3,100,000
S-7	Empire Avenue/Jamison Street Turning Restrictions	$107,000

1. Costs are from prior plan years and do not reflect 2023 dollars

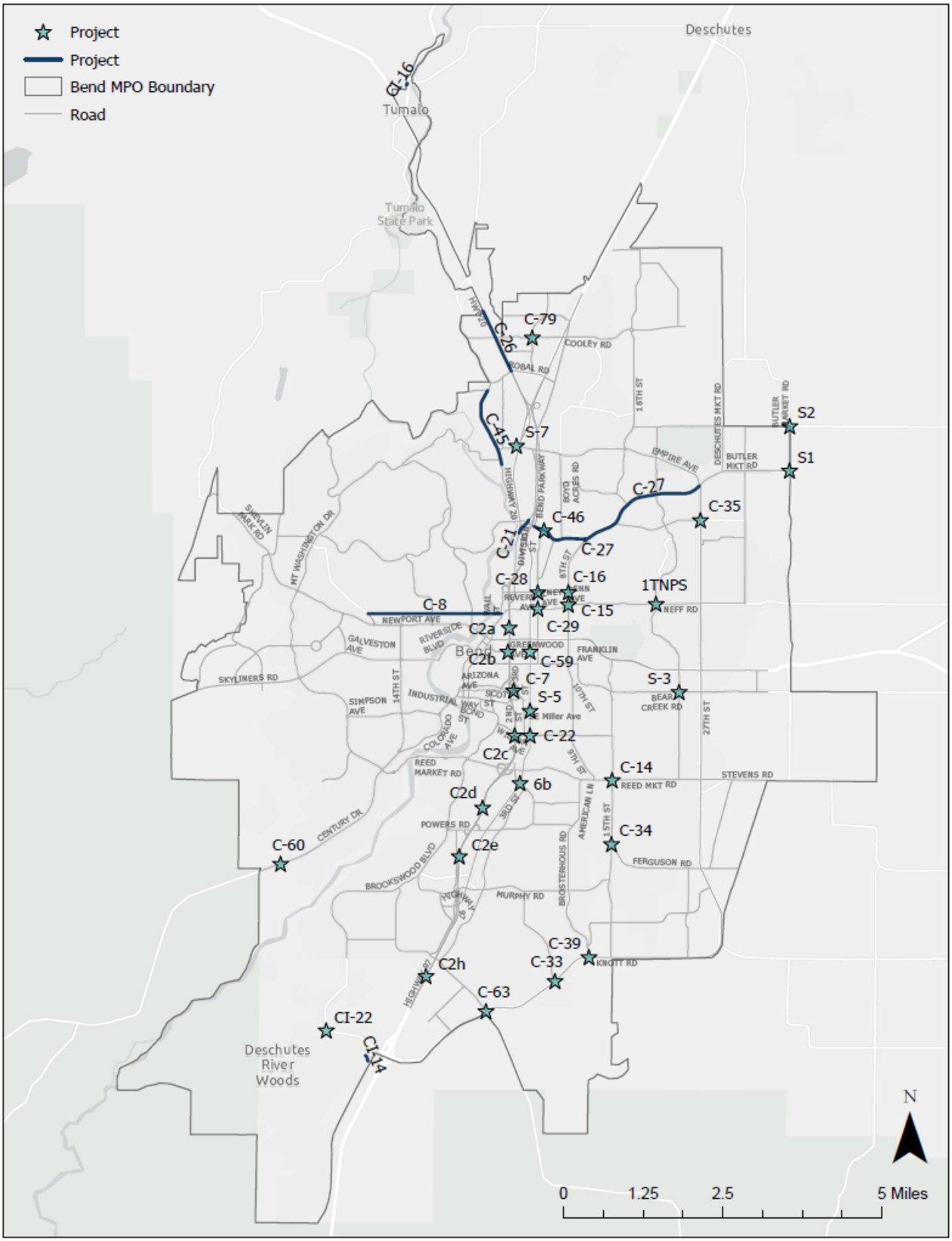

FIGURE 13. 2045 DRAFT MTP PROJECT LIST INTERSECTION PROJECTS

ATTACHMENT E: TECHNOLOGY PROJECTS

TABLE 14. TECHNOLOGY PROJECTS

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
101	3rd Street Safe and Smart Corridor	$1,390,000
102	US 97 Safe and Smart Corridor	$1,121,000
104	Hwy 20/ Greenwood Ave Smart Corridor	$2,991,000
105	27th Street Safe and Smart Corridor	$2,242,000
108	Wall Street and Bond Street Fiber Communications	$1,334,000
109	Century Drive Safety and Efficiency Improvements	$3,201,000
111	Hwy 97 Active Traffic Management (ATM) and Integrated Corridor Management	$2,867,000
112	Revere Ave Fiber Communications	
113	Neff Road Fiber Communications	$350,000
114	Empire Ave Fiber Communications	$1,276,000
115	Purcell Blvd Fiber Communications	$335,000
501	OID CAD 911 BUS Upgrade	
503	Rapid Response Situational Awareness Capabilities Responder Video System	$100,000
701	Regional Data Warehouse	$500,000-$750,000
802	Congestion Warning System	$250,000
803	In-Vehicle Communications for SPaT/MAP and ODOT CV Portal Integration	$300,000
22739	US 97: I-84 to California Border	$5,809,000
22742	US 20: from US101 to the Idaho border	$8,971,000
22767	Driver Feedback Signs (Deschutes County)	$1,032,873
C1	US 97 Install ramp meters	$15,000,000
C10	US 97 Traveler information signing	$2,000-30,000
C-36	3rd Street/Franklin Avenue signal modification	$500,000
C-37	3rd Street/Powers Road signal modification	$500,000
C-38	3rd Street/Badger Road signal modification	$500,000
C6	US 97 Weather warning system	$5,000-450,000
C7	US 97 Variable speed signs	$50,000-500,000
C9	US 97 Enhanced signal operations at ramp terminals	$50,000-500,000
DC-EM-01A	Coordinated Emergency Response - Radio System Link	TBD
DC-EM-02	Coordinated Emergency Response - Radio System Link	TBD
DC-EM-07	Responder Video System	TBD
DC-MC-06	Automated Maintenance Logging System	TBD
DC-PP-03	Intersection Collision Avoidance	TBD
DC-PP-04	Wildlife Detection	TBD
DC-PP-05	Ambulance Hospital Information System	TBD
DC-TM-02A	Region 4 TOC to 3rd St RWIS	TBD
DC-TM-06	Downtown Bend Parking Management System	TBD
DC-TM-07B	Hwy 20/Greenwood Ave from 3rd St to 8th St	TBD

MAP ID	PROJECT DESCRIPTION	DRAFT COST[1]
DC-TM-07D	Hwy 20/Greenwood/Newport - Travel Time Performance Measurements	TBD
DC-TM-11D	VMS: The Dalles-California Highway NB at Cooley	TBD
DC-TM-13A	27th/Empire/Knott Safety and Efficiency Improvements Video Monitoring	TBD
DC-TM-13B	Northeast Ring: 27th to Empire	TBD
DC-TM-14	ODOT Region 4 TOC Upgrade	TBD
DC-TM-16	Hwy 20 (Bend to Sisters) Safety and Efficiency Improvements	TBD
DC-TM-19A	Advanced Rail Warning System - Reed Market Road	TBD
DC-TM-19B	Advanced Rail Warning System - Bend and Redmond locations	TBD
DC-TM-19C	Advanced Rail Warning System - Additional Bend and Redmond locations	TBD
DC-TM-19D	Advanced Rail Warning System - Message signs and in-vehicle communications	TBD
DC-TM-30	State Highway 372/Colorado-Arizona Couplet	TBD
DC-TM-31	VMS: McKenzie-Bend Highway westbound at Cooley	TBD
DC-TM-32	Communications to Remote Traffic Signals	TBD
DC-TM-34	Franklin Avenue: 3rd Street to Bond Street Fiber Optic	TBD
DC-TM-40	Count Stations - Bridges	TBD
DC-TM-41	Count Stations - City Outskirts	TBD

1. Costs are from prior plan years and do not reflect 2023 dollars

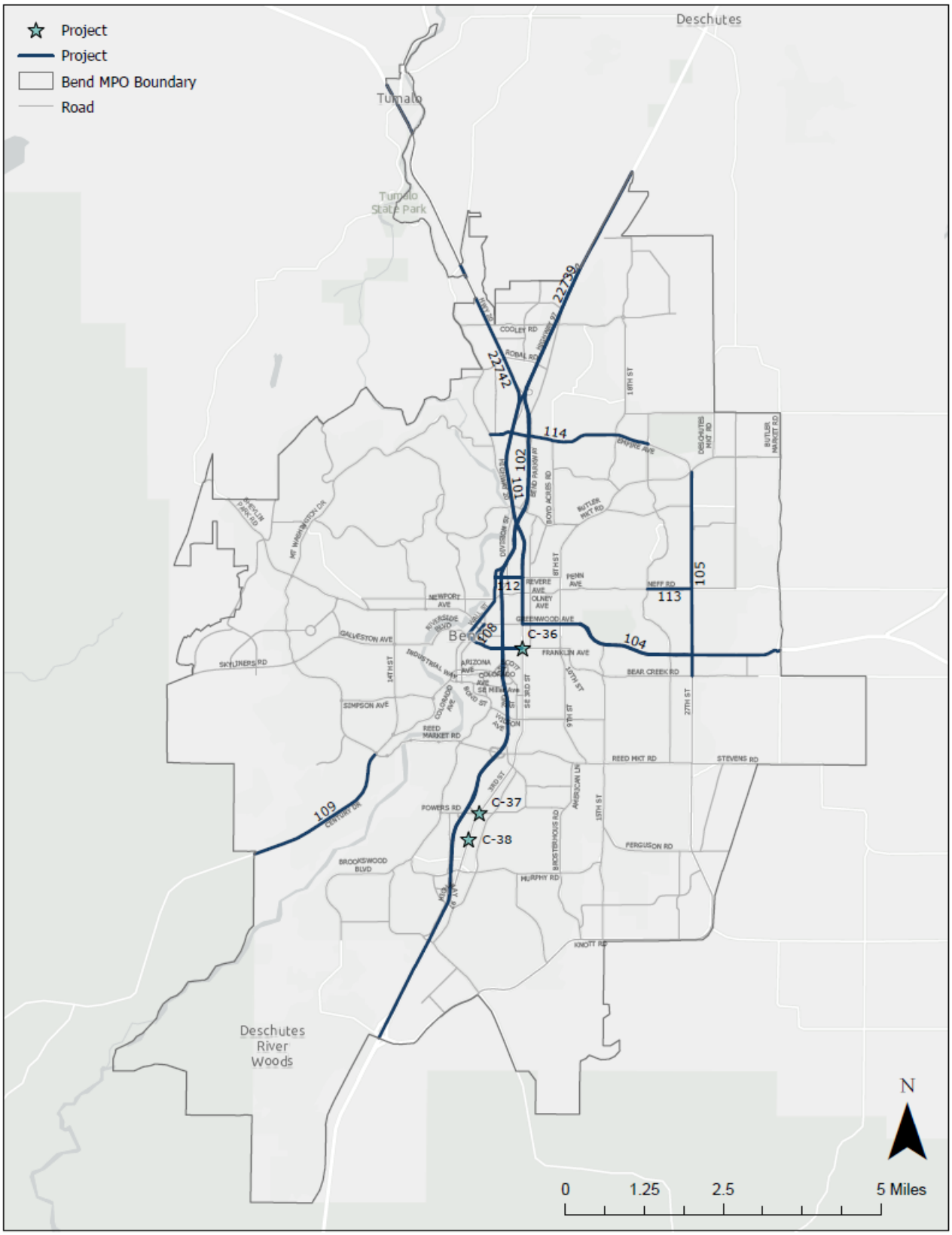

FIGURE 14. 2045 DRAFT MTP PROJECT LIST TECHNOLOGY PROJECTS