RAPID TRIP 2045

Metropolitan Transportation Plan

Rapid City Area MPO

Rapid City Metropolitan Transportation Plan

Rapid City Area Metropolitan Planning Organization

June 2020

HDR

RAPID CITY AREA
Metropolitan Planning Organization

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Abbreviations and Acronyms

AADT	Average Annual Daily Traffic
ACS	American Community Survey
ADT	Average Daily Traffic
AWSC	All Way Stop Control
CAC	Citizen's Advisory Committee
CAV	Connected and Autonomous Vehicles
CFR	Code of Federal Regulations
DHSS	Department of Health and Human Services
E+C	Existing plus Committed
EA	Environmental Assessments
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPC	Executive Policy Committee
ESA	Endangered Species Act
FAST Act	Fixing America's Surface Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIS	Flood Insurance Study
FTA	Federal Transit Administration
GIS	Geographic Information System
HCS	Highway Capacity Software
HSIP	Highway Safety Improvement Program
IPaC	Information for Planning and Consultation
LOS	Level of Service
LOTTR	Level of Travel Time Reliability
LWCF	Land and Water Conservation Fund
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MTP	Metropolitan Transportation Plan
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act

NHPP	National Highway Performance Program
NHS	National Highway System
NPDRMS	National Performance Management Research Data Set
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
PCI	Pavement Condition Index
PHED	Peak Hour Excessive Delay
PM	Performance Measure
RCAMPO	Rapid City Area Metropolitan Planning Organization
ROW	Right-of-Way
SAT	Study Advisory Team
SDDENR	South Dakota Department of Natural Resources
SDDOT	South Dakota Department of Transportation
SHPO	State Historic Preservation Office
SOV	Single Occupant Vehicle
STBG	Surface Transportation Block Grant Program
STBG-TA	Surface Transportation Block Grant Program for Transportation Alternatives
TA	Transportation Alternatives
TAZ	Transportation Analysis Zone
TCC	Technical Coordinating Committee
TDM	Travel Demand Model
TIP	Transportation Improvement Program
TMC	Turning Movement Count
TWSC	Two Way Stop Control
USDOT	United States Department of Transportation
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled

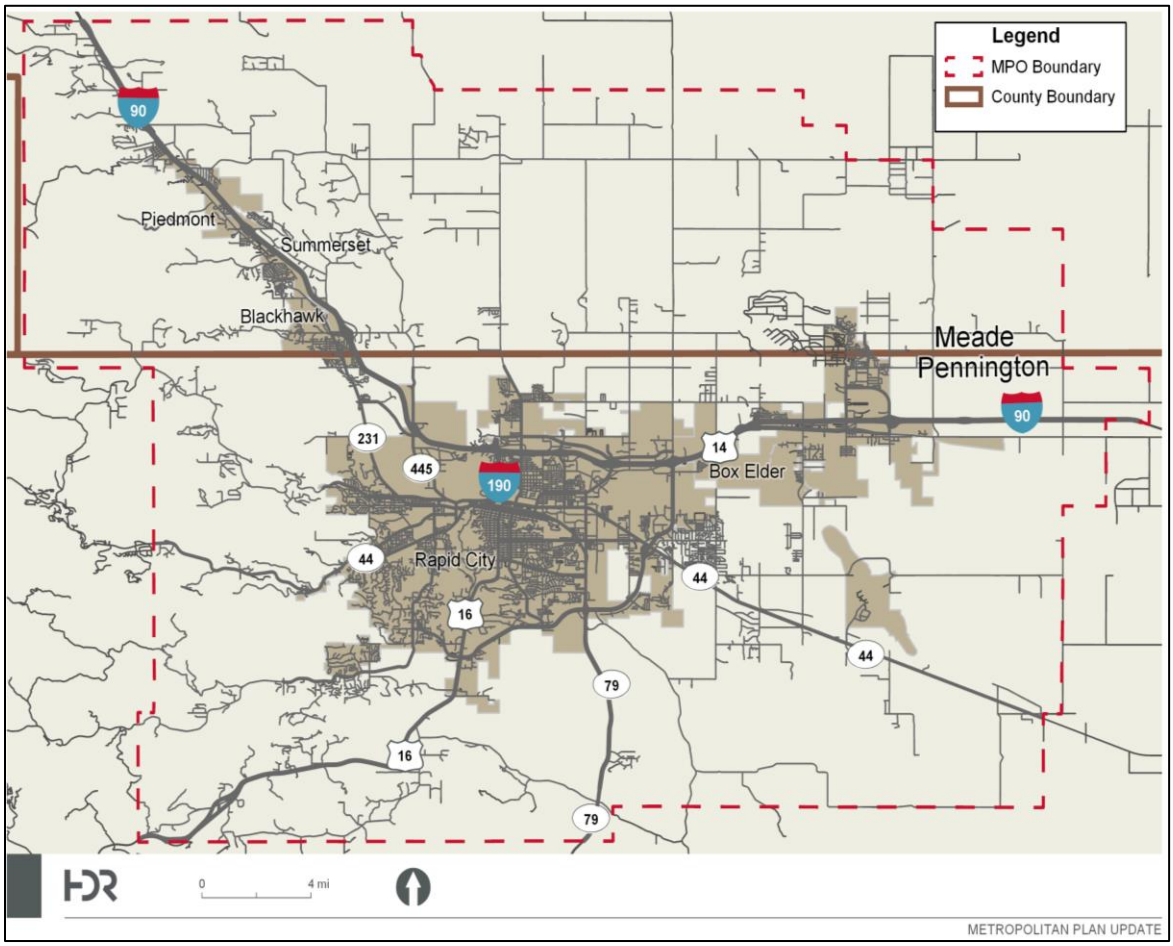
Executive Summary

Introduction

The Rapid City Area is a vibrant region with a diverse range of multi-modal transportation needs. Coupled with these multi-modal needs, continued growth in the region will require thoughtful planning to maintain an efficient transportation system that balances multi-modal options, economic vitality, and overall quality of life that Rapid City area residents enjoy today.

The Rapid City Area Metropolitan Planning Organization (RCAMPO) is the transportation policy-making organization that provides a comprehensive, cooperative, and continuing program of transportation planning in the Rapid City, SD urbanized area. The RCAMPO consists of representatives from local jurisdictions and transportation authorities that work together to produce plans for all aspects of transportation, including highways, transit, bicycle, pedestrian, public participation, and agency coordination. Federal funding for transportation projects and programs in the region are channeled through the RCAMPO.

Figure: The Rapid City MPO Area



Rapid Trip 2045 is the Rapid City Area Metropolitan Planning Organization's long range plan for the regional transportation system. This Metropolitan Transportation Plan (MTP) was developed through a collaborative effort between member jurisdictions, and used a performance measurement approach to review the current multi-modal operations of the existing transportation system; community input gathered during the plan's creation was leveraged to develop a set of fiscally-constrained projects for future implementation.

The MTP is a comprehensive, multi-modal study of the Rapid City region's transportation system. Using a performance-based transportation planning approach, the MTP describes the performance of the existing transportation system, identifies the system's needs, discusses historic transportation funding trends and anticipates future funding availability, and presents a Fiscally Constrained Plan for the MPO area for the next 25 years.

MTP Process

The MTP is multimodal in nature, and incorporates both the *Bicycle and Pedestrian Plan* and the *Transit Feasibility Study* into a comprehensive transportation plan for the region. These other two modal-specific plans provide significant detail into system goals, existing system performance, future system opportunities, and recommended projects and strategies for implementation. Thus, the role of the MTP is to provide a more in-depth review of the street and roadway system needs, while integrating each of these other two studies into a multimodal implementation plan for the Rapid City area.

As part of the plan update process for the MTP, the MPO's travel demand model (TDM) was updated. The TDM is an important transportation planning tool that is used to inform transportation decision-making through the use of mathematical models that use land use and future development to predict future traffic conditions and network performance. More information on the TDM update can be found in **Appendix A**. The results from the model runs are used to analyze the existing and future transportation network to identify where congestion and deficiencies might occur and mitigation strategies may need to be implemented.

This MTP followed a Performance Based Planning process. Federal legislation enacted in the Moving Ahead for Progress in the 21st Century (MAP-21), and continued with the Fixing America's Surface Transportation (FAST) Act, requires states and MPO's to adopt transportation system performance targets that align with national goals. To plan for and monitor the progress made towards these state and MPO performance targets, the Federal Highway Administration (FHWA) advises the use of Transportation Performance Management techniques (TPM) in the transportation planning process. The FHWA defines TPM as "a strategic approach that uses system information to make investment and policy decision to achieve national performance goals." The benefits of using TPM techniques are[1]:

[1] Federal Highway Administration, Transportation Performance Management. https://www.fhwa.dot.gov/tpm/about/tpm.cfm

- Provides key information to help decision makers to understand the consequences of investment decisions across transportation assets or modes
- Improves communications between decision makers, stakeholders and the traveling public
- Ensures targets and measures are developed in cooperative partnerships and based on data and objective information

Using a performance-based planning approach allows the RCAMPO to link the vision for the regional transportation system with Federal planning requirements, existing transportation performance, and State and Local policy that guides decision-making. The emphasis on continual monitoring of the transportation system allows the MPO to track its progress towards its regional vision while meeting Local, State, and Federal transportation performance goals.

For more detail on RCAMPO performance-based planning, including goals, objectives, and performance measures, see **Chapter 6.**

Another important tool used in the MTP process is public input and involvement. Multiple opportunities for public involvement and public comment were provided to gain insight from the users of the transportation network. The feedback and input from the system users aids in determining where current system issues or deficiencies may be located as well as confirmation that the plan aligns with community values and needs. Additional information regarding the public involvement process can be found in **Chapter 2.0** and **Appendix B**.

MTP Plan Elements

The Rapid Trip 2045 MTP evaluates the existing transportation systems and provides a vision for identified improvements and strategies for the 25 year planning horizon. The plan includes 12 chapters broken down as follows:

- 1.0 – Plan Overview
- 2.0 – Community Involvement
- 3.0 – Regional Trends
- 4.0 – Existing Conditions
- 5.0 – Future System Performance
- 6.0 – Transportation Goals and Objectives
- 7.0 – Financial Analysis
- 8.0 – 2045 Needs Plan
- 9.0 – Potential Strategies
- 10.0 – Environmental Review
- 11.0 – Project Selection and Prioritization
- 12.0 – 2045 Fiscally Constrained Plan

1.0 Plan Overview

1.1 Introduction

1.1.1 Rapid City Area Overview

The Rapid City Area is a vibrant region with a diverse range of multi-modal transportation needs. Coupled with these multi-modal needs, continued growth in the region will require thoughtful planning to maintain an efficient transportation system that balances multi-modal options, economic vitality, and overall quality of life that Rapid City Area residents enjoy today.

Rapid Trip 2045 is the Rapid City Area Metropolitan Planning Organization's (RCAMPO) long range plan for the regional transportation system. This plan was developed through a collaborative effort among member jurisdictions. The plan used a performance measurement approach to review the current multi-modal operations of the existing transportation system. Community input gathered during the plan's creation was leveraged to develop a set of fiscally constrained projects for future implementation.

1.1.2 What is the RCAMPO?

The RCAMPO is the transportation policy-making organization that provides a comprehensive, cooperative, and continuing program of transportation planning in the Rapid City, South Dakota, urbanized area. The RCAMPO consists of representatives from local jurisdictions and transportation authorities who work together to produce plans for all aspects of transportation, including highways, transit, bicycle, pedestrian, public participation, and agency coordination. Federal funding for transportation projects and programs in the region are channeled through the RCAMPO.

The RCAMPO was founded in 1977, when the population of the urbanized area reached 50,000. Since its inception, the duties of the RCAMPO have evolved beyond comprehensive growth planning and traffic studies for member jurisdictions. It addresses the federal, state, and local transportation planning requirements of the region, while ensuring existing and future expenditures for transportation projects and programs remain based on a comprehensive, cooperative, and continuing planning process.

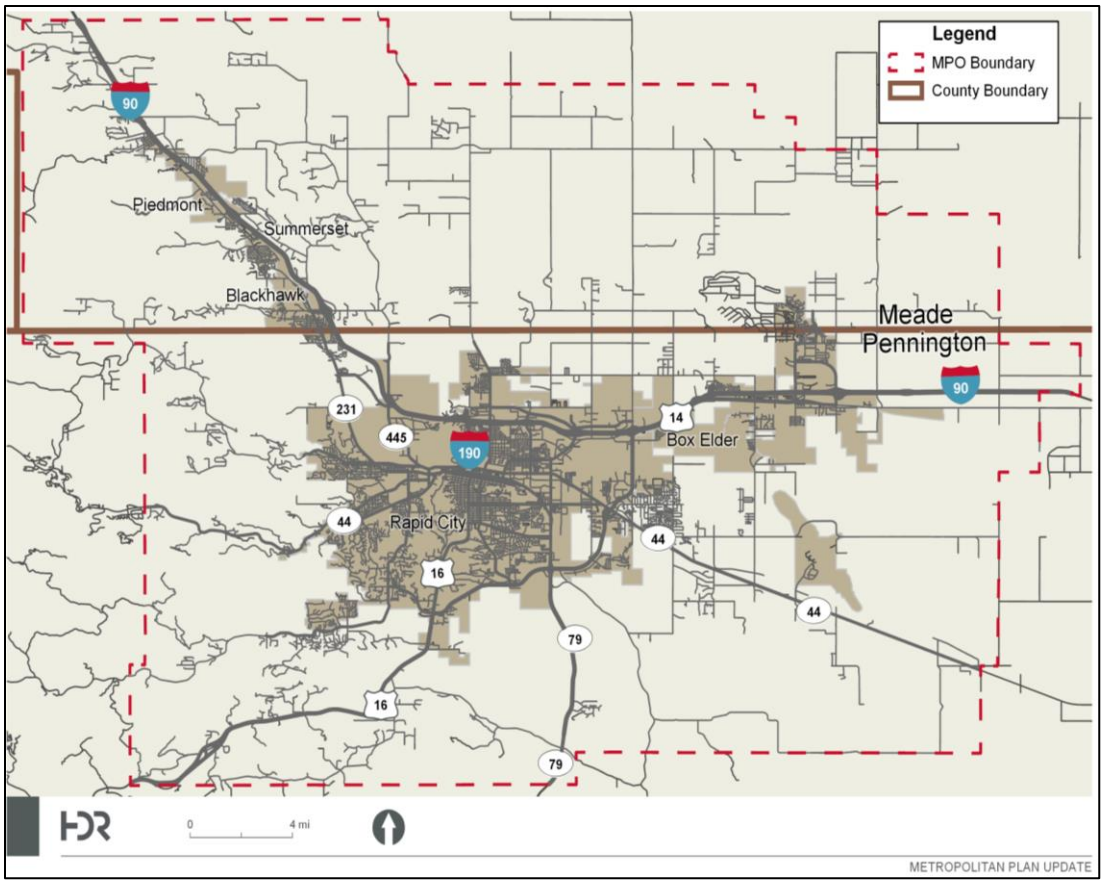
The extent of the RCAMPO boundaries are shown in **Figure 1-1**. The RCAMPO consists of nine member agencies, listed below, as well as the unincorporated areas of Black Hawk and the developing areas of Pennington and Meade Counties:

- City of Rapid City
- City of Piedmont
- Rapid Transit
- City of Box Elder
- Pennington County
- Ellsworth Air Force Base
- City of Summerset
- Meade County
- South Dakota Department of Transportation (SDDOT)

Three committees advise and govern the RCAMPO:

- **Citizen's Advisory Committee (CAC)**: The CAC is the public participation forum for all transportation products and plans. The CAC is represented by various community groups and individuals from within the Metropolitan Transportation Planning area. The CAC advises the Technical Coordinating Committee (TCC) and Policy Board in the planning process.
- **Technical Coordinating Committee (TCC)**: The TCC assists and advises the policy board on all technical matters as they relate to transportation process elements. The TCC is represented by metropolitan planning organization (MPO) staff and other participating agencies responsible for, or affected by, the implementation of transportation plans, products, or improvements. The TCC does not have the authority to adopt transportation products or plans.
- **Executive Policy Committee (EPC):** The EPC is the policy board for the Metropolitan Transportation Planning process. Responsibilities of the EPC include making transportation planning and improvement decisions, as well as reviewing recommendations set forth by the CAC and TCC prior to making decisions.

Figure 1-1: The Rapid City MPO Area



1.1.3 The Metropolitan Transportation Plan

A Metropolitan Transportation Plan (MTP) is the document that serves as a roadmap for the future transportation system of an MPO. MPOs are required, under federal legislation, to maintain an MTP and update it every 5 years. These plans are required to have a minimum planning horizon of 20 years while supporting the federal metropolitan transportation planning factors listed below:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
2. Increase the safety of the transportation system for motorized and non-motorized users.
3. Increase the security of the transportation system for motorized and non-motorized users.
4. Increase accessibility and mobility of people and freight.
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
7. Promote efficient system management and operation.
8. Emphasize the preservation of the existing transportation system.
9. Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.
10. Enhance travel and tourism.[2]

1.2 The MTP for the Rapid City Area

This MTP is a comprehensive, multi-modal study of the Rapid City region's transportation system. Using a performance-based transportation planning approach, this MTP describes the performance of the existing transportation system, identifies the system's needs, discusses historic transportation funding trends and anticipates future funding availability, and presents a Fiscally Constrained Plan for the MPO area for the next 25 years.

1.2.1 Supporting Regional Studies

This MTP is multimodal in nature and incorporates both the Rapid City Area's *Bicycle and Pedestrian Master Plan* and the *Transit Feasibility Study* into a comprehensive transportation plan for the region. These other two modal-specific plans provide significant detail into system goals, existing system performance, future system opportunities, and recommended projects and strategies for implementation. Thus, the role of this MTP is to provide a more in-depth

[2] 23 CFR § 450.306

review of the street and roadway system needs, while integrating each of these other two studies into a multimodal implementation plan for the Rapid City Area.

1.2.2 Regional Travel Demand

As part of the plan update process for the Rapid City MTP, the MPO's travel demand model (TDM) is being updated. The TDM is an important transportation planning tool that is used to inform transportation decision-making through the use of mathematical models that predict future traffic conditions. More information on the TDM update can be found in **Appendix A**.

1.2.3 Performance-Based Transportation Planning

Federal legislation enacted in the Moving Ahead for Progress in the 21st Century (MAP-21), and continued with the Fixing America's Surface Transportation (FAST) Act, requires states and MPOs to adopt transportation system performance targets that align with national goals. To plan for and monitor the progress made towards these state and MPO performance targets, the Federal Highway Administration (FHWA) advises the use of Transportation Performance Management techniques (TPM) in the transportation planning process. The FHWA defines TPM as "a strategic approach that uses system information to make investment and policy decision to achieve national performance goals." The benefits of using TPM techniques are[3]:

- Provides key information to help decision-makers to understand the consequences of investment decisions across transportation assets or modes.
- Improves communications between decision-makers, stakeholders, and the traveling public.
- Ensures targets and measures are developed in cooperative partnerships and based on data and objective information.

Using a performance-based planning approach allows the RCAMPO to link the vision for the regional transportation system with federal planning requirements, existing transportation performance, and state and local policy that guides decision-making. The emphasis on continual monitoring of the transportation system allows the MPO to track its progress towards its regional vision while meeting local, state, and federal transportation performance goals.

For more detail on RCAMPO performance-based planning, including goals, objectives, and performance measures, see **Chapter 6.** The methods and assumptions used in developing the MTP can be found in **Appendix G.**

[3] Federal Highway Administration, Transportation Performance Management. https://www.fhwa.dot.gov/tpm/about/tpm.cfm

2.0 Community Involvement

2.1 Overview

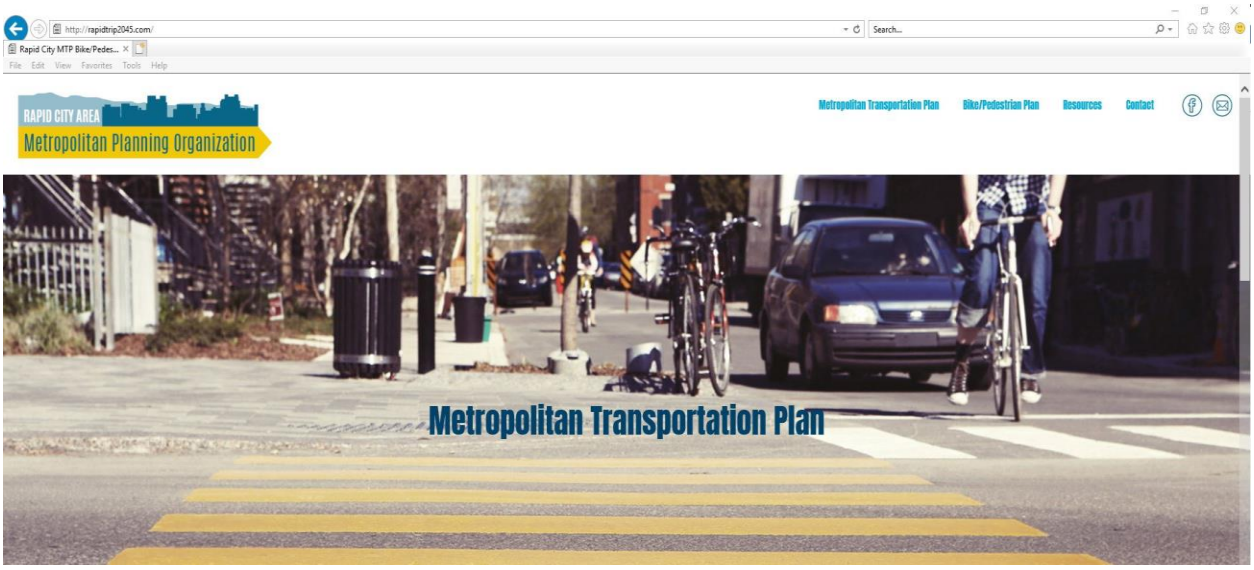
The RCAMPO developed the *Participation Plan for the Rapid City Area Metropolitan Planning Organization Transportation Planning Process* document to guide the actions of the RCAMPO through policies, to ensure opportunities exist for the public and other interested parties to be involved in transportation planning activities, pursuant to Title 23 CFR 450.316 of Subpart C – Metropolitan Planning and Programming. The participation policy addresses federal mandates including, but not limited to, general requirements under the FAST Act, participation by federal land management/resource agencies, Title VI of the Civil Rights Act of 1964, and the Americans with Disabilities Act of 1990. The fundamental goal of public participation is to assure that the decisions regarding a proposed plan or project are made only after the public is aware of and has had the opportunity to comment on the proposal. Specific goals of the RCAMPO public participation process are:

Educate and present information
Solicit public input
Facilitate information flow between the public and decision-makers

- Consider public concerns in decision-making

2.2 MTP Community Involvement

The MTP (formerly the Long Range Transportation Plan) is a federally required planning product that follows the process and approvals as required by CFR 450.316(a)(1)(ix) It is coordinated with the Statewide Planning Public Involvement Process and will be accomplished by a minimum of two transportation planning committee meetings. The MTP project provided a dedicated project website (www.rapidtrip2045.com); posted information/notice of events on the RCAMPO's social media pages; conducted three project public involvement meetings/ opportunities at various stages of the project assembled a Study Advisory Team (SAT) comprised of the MPO member agencies, the FHWA, and public stakeholders/interest groups to provide input and review plan elements; and coordinated with federal and state resource agencies. A summary of each public involvement event follows.



RapidTrip2045 Website (www.rapidtrip2045.com)

2.2.1 Public Meeting/Open House No. 1

The project team hosted a public meeting/open house on October 29, 2019, at the Rapid City Council Chambers at City Hall to present an overview of the project and gather feedback from the public and stakeholders. Approximately 47 attendees signed in for the meeting, including members of the consultant team, city staff, FHWA, and SDDOT staff. It is estimated that approximately 15 additional attendees were at the meeting who entered through a second entrance after the presentation was underway and did not sign in. A brief presentation was provided to present the details and scope of the project and review the existing analysis completed to date. Following the presentation, an interactive maps and markers exercise was conducted to gain public feedback on the existing and future transportation system needs. Comments from the public could be submitted in multiple ways including submission of a comment form, notes attached to the maps/markers exercise, email, or via the project website. In general, discussions at the meeting focused on transit and bicycle and pedestrian issues/needs. Concerns were also presented regarding the Highway 16/16B/Catron Boulevard intersection and intersections near the South Dakota School of Mines campus.

The written comment period associated with Public Meeting/Open House No. 1 began the evening of the meeting/open house and lasted through November 15, 2019. A total of four comment forms were received during the open house. Additionally, a typewritten comment, multiple text messages to the MPO, and an emailed comment were received. Two comments were also received via the project website. The maps and markers exercise generated approximately 56 comments/suggestions with regard to improvement to the transportation system. A full summary of Public Meeting/Open House No. 1, including all written comments, is provided in **Appendix B**.

Photo from Public Meeting/Open House No. 1 – October 29, 2019.

2.2.2 Public Meeting No. 2

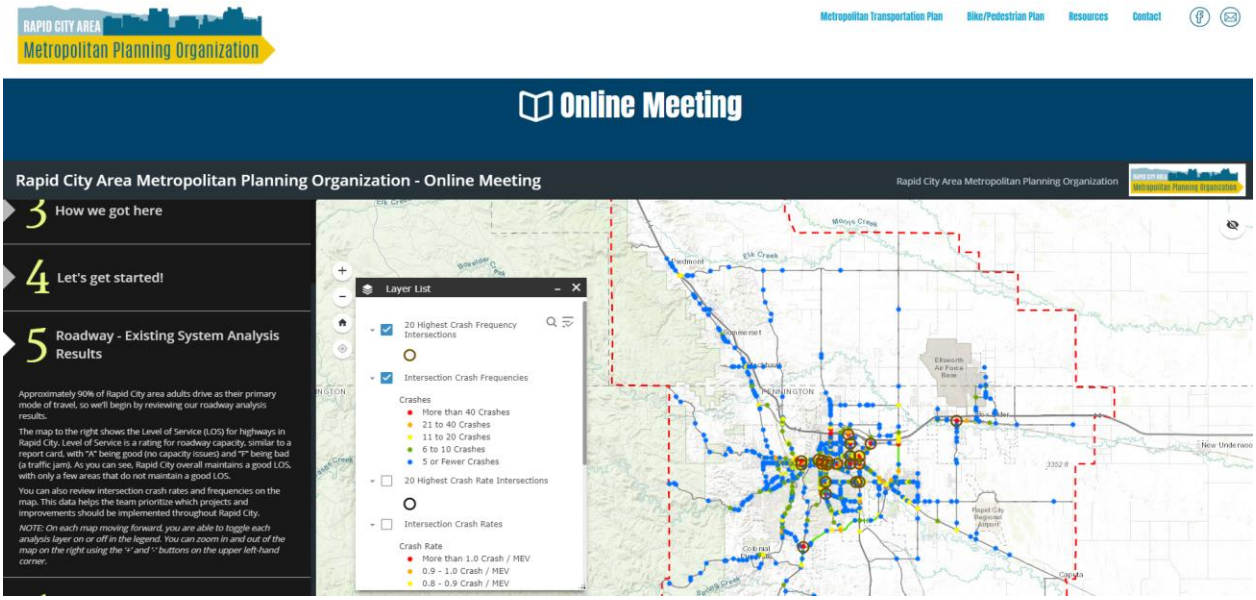
As a result of the rapid onset of the COVID-19 pandemic, and because of limitations on public gatherings recommended by the Centers for Disease Control and local guidelines, an interactive online public meeting was conducted in lieu of a traditional in-person meeting. The online meeting ran from April 20, 2020 through May 1, 2020. The meeting was hosted on the project website and took attendees through a 14-step interactive process to inform them about the project, to provide opportunities for comment and input on needed improvements through mapping activities, and to prioritize the types of improvements and strategies to address system deficiencies. Specific areas which were addressed included the roadway network, the bicycle and pedestrian network, and the transit system. The mapping activities allowed participants to place suggested improvements or strategies at a desired location where the participant believed there were deficiencies or limitations on the current transportation system. The prioritization activities allowed participants to rank the importance of a specific type of improvement or strategy in addressing system shortfalls. Participants also were able to make general comments with regard to the presented materials or with regard to the project as a whole.

Based on the information received from the project website traffic, the following data regarding meeting participation were collected:

- Page views total: 410
- Unique page views: 265
- Average time on page: 1:13

- Total users: 246
- Total sessions: 282
  - Mobile: 139
  - Desktop: 150
  - Tablet: 10
- Sessions by acquisition:
  - Direct: 202
  - Social: 73 (66 from Facebook, 7 from Twitter)
  - Referral: 18 (16 referrals from rapidcityareampo.org)
  - Organic Search: 18

A total of 10 comments were received for the roadway mapping activity, 14 respondents participated in the roadway prioritization activity, 17 respondents participated in the bicycle/pedestrian activity, and 20 locations were identified for either bicycle or pedestrian related improvements. A total of 8 participants provided input on the transit system and 3 online meeting participants have requested to be included on project-related emails. A full summary of Public Meeting No. 2 is provided in **Appendix B**



2.2.3 Public Meeting No. 3

Public Meeting No. 3 is anticipated to cover the DRAFT Plan and allow for public comments. The meeting will be conducted after the DRAFT Document Presentation to the MPO committees scheduled for June 11, 2020, and prior to the FINAL Document Presentation scheduled for mid-August 2020. Upon Public Meeting No. 3 being conducted, a meeting summary will be provided.

3.0 Regional Trends

3.1.1 Population Growth

The population of the Rapid City Metropolitan Statistical Area (MSA), which includes all of Pennington and Meade Counties, is 145,291.[4] Compared to 2010 population of 126,802, the MSA population has grown 16.18 percent, or 1.89 percent per year, over the 8-year period.

Historical growth for the City of Rapid City, Pennington County, and Meade County are presented in **Table 3-1**. The data in **Table 3-1** illustrate population growth trends between the urban and rural areas of the region. Between 2010 and 2018, Meade County exhibited the highest annual growth rate at 1.34 percent, while Rapid City grew at a rate of 1.32 percent per year and Pennington County grew at a rate of 1.28 percent per year.

Table 3-1: Historic Population Growth for the City of Rapid City, Meade County, and Pennington County

Year	*Rapid City*	*Meade County*	*Pennington County*
1940	*13,844*	*9,735*	*23,799*
1950	*25,310*	*11,516*	*34,053*
1960	*42,399*	*12,044*	*58,195*
1970	*43,836*	*16,618*	*59,349*
1980	*46,492*	*20,717*	*70,361*
1990	*54,523*	*21,878*	*81,343*
2000	*59,607*	*24,543*	*88,565*
2010	*67,956*	*25,434*	*100,948*
2018	*75,443*	*28,294*	*111,729*
Average Annual Growth Rate (1940-2010)	*2.30%*	*1.38%*	*2.09%*
Annual Average Annual Growth Rate (2010-2018)	*1.32%*	*1.34%*	*1.28%*

Source: United States Census Bureau

3.1.2 Demographics

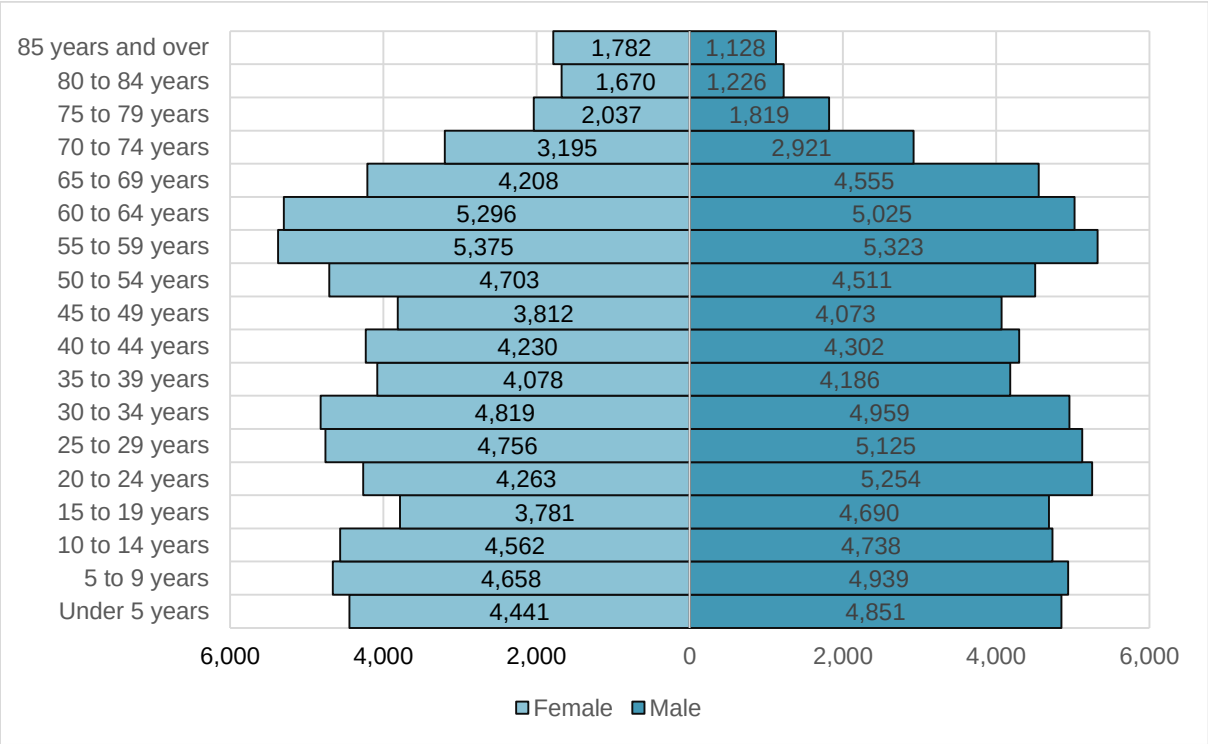
The current demographic snapshot of the Rapid City Metropolitan area is:

- Median Age: 40.0 Years
  - Male: 38.4 Years
  - Female: 41.7 Years
- Share of Population by Sex
  - Male: 50.7 percent
  - Female: 49.3 percent
- Race:
  - White: 81.16 percent
  - Black or African American: 1.18 percent
  - American Indian and Alaska Native: 7.08 percent
  - Asian: 1.20 percent
  - Native Hawaiian or Other Pacific Islander: 0.06 percent
  - Hispanic or Latino: 4.51 percent
  - Some Other Race: 0.59 percent
  - Two or More Races: 4.23 percent

[4] 2018 American Community Survey 5-Year Estimates

Figure 3-1 is a population pyramid based on the 2018 population for the Rapid City metropolitan area. The largest proportion of male and female residents fall into the age range of 55 to 59 years, while the smallest proportion of males are in the 85 years and over range. For females in the metropolitan area, the smallest proportion of female resident range in age from 80 to 84 years.

Figure 3-1: Population Pyramid for the Rapid City Metropolitan Area



Source: ACS 2018 5-Year Estimates

3.1.3 Income and Employment

Income data for the Rapid City metropolitan region indicates that the median household income is $55,714 while the median income for families is $69,503, in 2018 dollars. The metropolitan region's median household and family income levels are close to those for the State of South Dakota but are lower than the national median household and family income levels, as shown in **Table 3-2**. Regarding poverty, 12.2 percent of the metropolitan region's population is considered as living below the poverty line, which marks a decrease from the 2010 level of 12.7 percent.

Table 3-2: Comparison of Household and Family Income, 2018

	Household Income	*Family Income*
Rapid City MSA	*$55,714*	*$69,503*
South Dakota	*$56,499*	*$72,706*
US	*$60,293*	*$73,965*

Source: ACS 2018 5-Year Estimates

Figure 3-2: Household Income, 2018

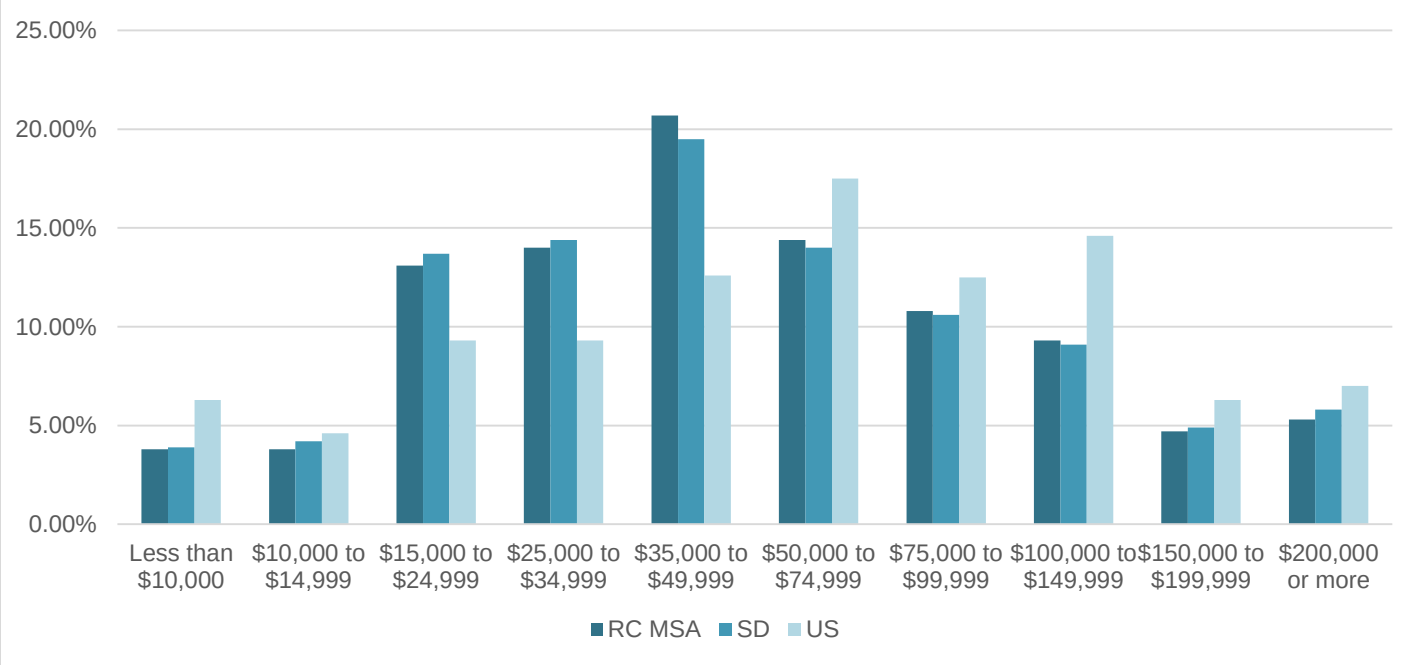
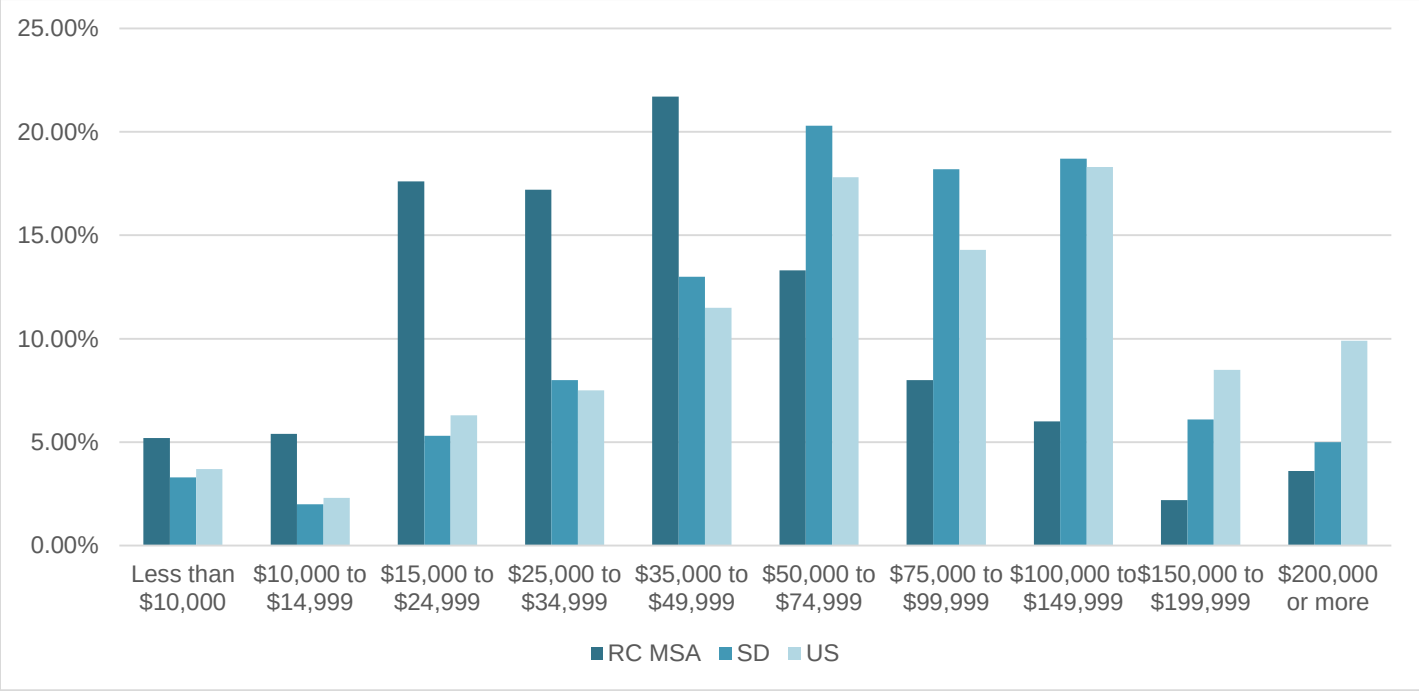


Figure 3-2 and **Figure 3-3** present the breakdown of household and family incomes for the Rapid City MSA and how they compare to the State of South Dakota and the United States.

Figure 3-3: Family Income, 2018



Source: ACS 2018 5-Year Estimates

The 2018 unemployment rate for the Rapid City metropolitan region is 3.3 percent of a labor force totaling 115,020 individuals; the current labor force participation rate is 67.1 percent. This unemployment rate is slightly lower than the State of South Dakota unemployment rate of 3.5 percent and significantly lower than the national unemployment rate of 5.9 percent.

3.1.4 Housing

The number of housing units in the Rapid City metropolitan region is 65,185, while the median value of owner-occupied units is $181,600 and median rent value is $830.

Of the 65,185 housing units in the Rapid City metropolitan region, 41,312 are owner-occupied while renters occupy 17,139 units. The homeowner vacancy rate is 1.2 percent while the rental unit vacancy rate is 7.1 percent. Single-family homes comprise 65.56 percent of housing stock while 21.92 percent of housing units are multi-family. The remaining 12.52 percent of the regional housing stock is manufactured homes or other home types.

3.1.5 Journey to Work

Commuting data sourced from the American Community Survey (ACS) 2018 5-Year Estimates shows that the predominant mode for Rapid City metropolitan region commutes is the private vehicle. This is true for the State of South Dakota, and the United States as well. The share of commute trips made by private vehicles is higher in the Rapid City Area (at 90.3 percent) compared to the entire country at 85.5 percent. The public transit mode shares for the Rapid City metropolitan region and the State of South Dakota are substantially lower than the nation as a whole. 2.8 percent of commute trips in the Rapid City metropolitan area are made by walking compared to 3.5 percent and 2.7 percent of commuters within the State of South Dakota and the United States, respectively. **Table 3-3** compares the overall commute mode shares for the Rapid City metropolitan area, the State of South Dakota, and the United States.

Table 3-3: Comparison of Commute Mode Share

Mode	*Rapid City MSA*	*South Dakota*	*United States*
Car, truck, or van	*90.30%*	*89.00%*	*85.50%*
Drove alone	*81.30%*	*80.30%*	*76.40%*
Carpooled	*9.00%*	*8.70%*	*9.10%*
Public transportation (excluding taxicab)	*0.50%*	*0.60%*	*5.00%*
Walked	*2.80%*	*3.50%*	*2.70%*
Bicycle	*0.30%*	*0.40%*	*0.60%*
Taxicab, motorcycle, or other means	*0.80%*	*0.80%*	*1.20%*
Worked at home	*5.30%*	*5.70%*	*4.90%*

Source: ACS 2018 5-Year Estimates

The average commute time in the Rapid City metropolitan region is 18.6 minutes, which is 8 minutes shorter than the average national commute. Overall, the mean commute time in the Rapid City metropolitan region is just under 19 minutes as shown in **Table 3-4**, with roughly 60 percent of commuters in the region needing less than 20 minutes to get to their place of

employment. Commutes of 45 minutes or more account for only 6.4 percent of Rapid City MSA commutes.

Table 3-4: Length of Commute to Work, Rapid City Metropolitan Statistical Area

Rapid City MSA		
Commute Length	**Total**	**Percent Share**
Less than 10 minutes	14,180	19.30%
10 to 14 minutes	14,841	20.20%
15 to 19 minutes	16,384	22.30%
20 to 24 minutes	12,196	16.60%
25 to 29 minutes	4,114	5.60%
30 to 34 minutes	5,363	7.30%
35 to 44 minutes	1,763	2.40%
45 to 59 minutes	2,204	3.00%
60 or more minutes	2,498	3.40%
Mean travel time to work (minutes)	18.6	

Source: ACS 2018 5-Year Estimates

3.1.6 Commuting (LEHD)

Inflow/outflow analysis sourced from the U.S. Census Bureau's Longitudinal Household-Employer Dynamics (LEHD) program provides an overview of commuting inflows and outflows for the Rapid City MSA, which allows for a better understanding of where individuals live and work within the MSA and surrounding region. Because of data limitations, the most recent LEHD available for the Rapid City MSA was 2016.

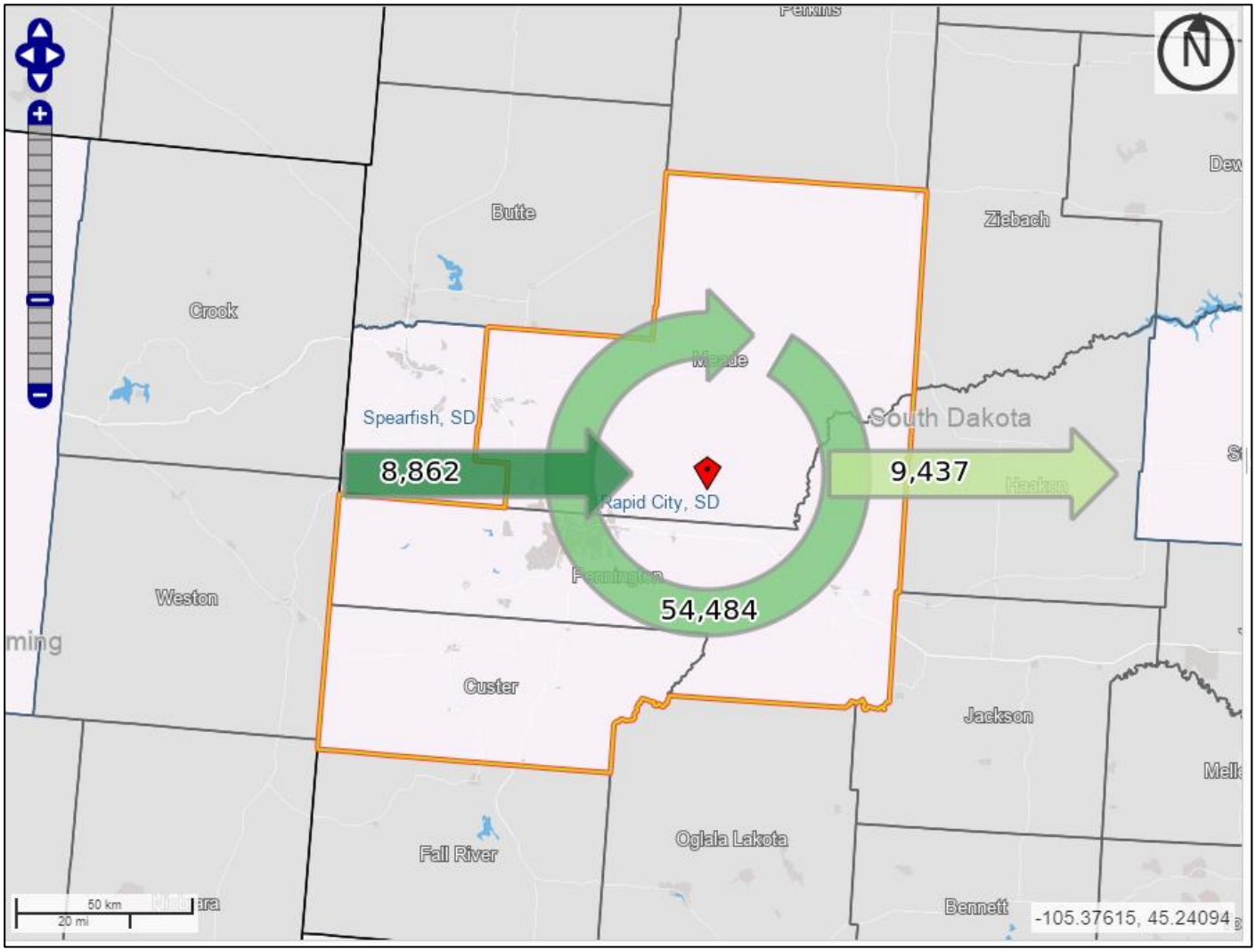
The Rapid City metropolitan region is considered a net exporter of labor as the share of individuals living in the metropolitan region but working outside of it exceeds the share of individuals that live outside the region and commute into it for work. As **Table 3-5** shows, 8,862 individuals working within the MSA do not live within it whereas 9,437 individuals live within the MSA but commute out of it for their employment. This net movement of 575 workers out of the MSA each day constitutes a net export of labor. As shown, the vast majority (over 54,000) of workers in the region also live in the region. **Figure 3-4** illustrates this movement of labor based on 2016 data from the LEHD program.

Table 3-5: Results of LEHD Inflow/Outflow for the Rapid City Metropolitan Statistical Area, 2016

Inflow/Outflow	Count	Share
Employed and Live In Rapid City MSA	54,484	86%
Employed but Don't Live within Rapid City MSA	8,862	14%
Live in Rapid City MSA but Employed Outside of MSA	9,437	

Source: U.S Census Bureau, Longitudinal Employer-Household Dynamics Program.

Figure 3-4: LEHD Inflow/Outflow Results for the Rapid City Metropolitan Statistical Area, 2016



Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics Program

3.1.7 Household and Employment Growth by Neighborhood Trends

The neighborhoods comprising the RCAMPO region were used as the basis for forecasting socioeconomic growth between the years 2018 and 2045. Specifically, growth trends for the number of housing units and employment for each neighborhood were projected. **Figure 3-5** shows the location of each of the neighborhoods in the MPO region.

The growth trends for Rapid City neighborhood households are presented in **Table 3-6**. The total number of households was projected to increase from a 2018 level of 48,992 to 58,498 in 2045. This marks an increase of 9,500 units, or an annual growth rate of 0.66 percent.

The neighborhoods seeing the highest projected growth are Airport, Elk Vale Road, Northeast, and Spring Creek. The Downtown/Skyline Drive neighborhood was projected to lose 384 units

between 2018 and 2045, resulting in an annual growth rate of -0.21 percent. Additional low household growth neighborhoods include Nemo Road, North Rapid, Ellsworth, and West Rapid.

Figure 3-5: Rapid City MPO Neighborhoods

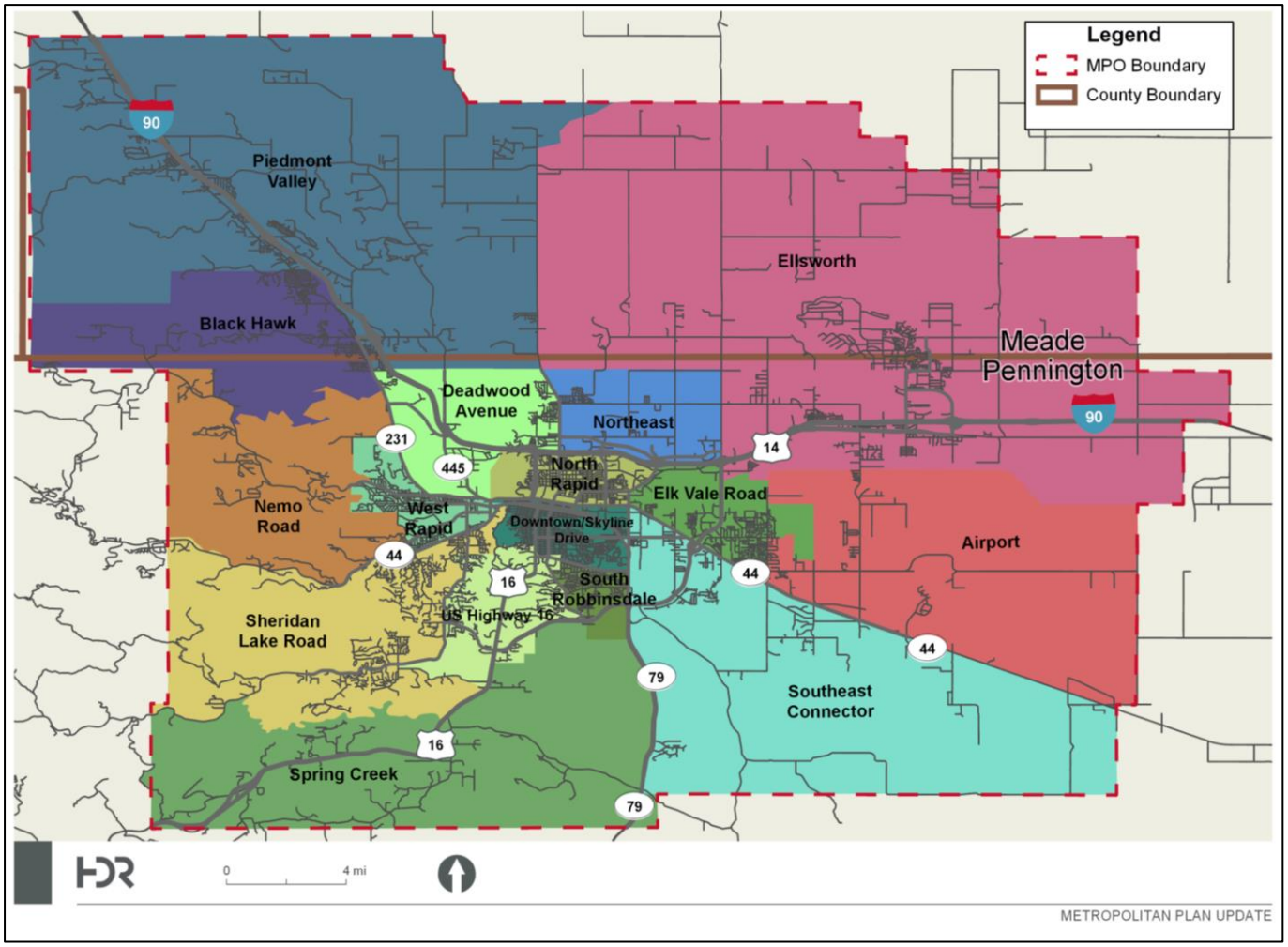


Table 3-6: Household Growth in RCAMPO by Neighborhood, 2018-2045

Neighborhood	2018 Total	2045 Total	Total Change	Compound Annual Growth
Elk Vale Road	3,570	6,998	3,428	2.52%
Southeast Connector	1,852	2,979	1,127	1.78%
Northeast	849	1,870	1,021	2.97%
Spring Creek	798	1,642	844	2.71%
Airport	1,020	1,779	759	2.08%
US Highway 16	5,041	5,656	615	0.43%
Deadwood Avenue	1,930	2,405	475	0.82%
South Robbinsdale	3,345	3,684	339	0.36%
Piedmont Valley	2,711	2,996	285	0.37%
West Rapid	4,762	5,022	260	0.20%
Sheridan Lake Road	4,316	4,575	259	0.22%
Ellsworth	3,954	4,170	216	0.20%
Black Hawk	2,094	2,276	182	0.31%
North Rapid	4,859	4,927	68	0.05%
Nemo Road	832	844	12	0.05%
Downtown/Skyline Drive	7,059	6,675	(384)	-0.21%

Source: RCAMPO

Employment growth for Rapid City neighborhoods is projected to increase by 20,137 jobs between 2018 and 2045, at a rate of 0.96 percent per year. The US Highway 16 neighborhood is projected to see the largest total growth between 2018 and 2045 at 4,860 jobs while Spring Creek is projected to see the highest annual growth rate at 4.66 percent per year. The Airport, Nemo Road, Piedmont Valley, and Sheridan Lake Road are all projected to lose employment over the 27-year period. The projected employment growth trends are summarized in **Table 3-7**.

Table 3-7: Employment Growth in Rapid City MPO Area by Neighborhood, 2018-2045

Neighborhood	2018 Total	2045 Total	Total Change	Compound Annual Growth
US Highway 16	4,576	9,436	4,860	2.72%
Ellsworth	3,529	7,010	3,481	2.57%
Elk Vale Road	5,295	8,410	3,115	1.73%
Northeast	6,415	8,863	2,448	1.20%
Downtown/Skyline Drive	12,113	14,302	2,189	0.62%
Southeast Connector	6,455	8,504	2,049	1.03%
South Robbinsdale	1,087	2,879	1,792	3.67%
Spring Creek	637	2,181	1,544	4.66%
Deadwood Avenue	6,806	7,702	896	0.46%
North Rapid	8,439	9,000	561	0.24%
West Rapid	5,074	5,213	139	0.10%
Black Hawk	741	766	25	0.12%
Nemo Road	385	288	(97)	-1.07%
Piedmont Valley	2,392	2,213	(179)	-0.29%
Sheridan Lake Road	2,137	1,070	(1,067)	-2.53%
Airport	2,569	950	(1,619)	-3.62%
Total	68,650	88,787	20,137	0.96%

Source: RCAMPO

4.0 Existing Conditions

This MTP focuses on how various elements of the transportation system currently operate. The assessment is multimodal in nature, addressing current performance of vehicular movement, bicycle and pedestrian system, transit, and multimodal safety. Understanding current system performance ultimately supports the RCAMPO's goal of meeting performance measurement requirements.

4.1 Planning-Level Traffic Operations

A planning-level volume-to-capacity analysis was conducted to evaluate the traffic operations of the regional roadway network. The analysis included all functionally classified streets within the RCAMPO boundaries. The Planning-Level Traffic Operations analysis used available average daily traffic (ADT) volumes provided by the MPO to estimate typical peak hour levels of service (LOS).

The volume-to-capacity approach is based on the methodology found in the Highway Capacity Manual. Capacity is defined as the maximum number of vehicles that can pass through a given point or segment in a given amount of time (typically hourly or daily), and accounts for roadway conditions such as the number of lanes and intersection control/signalization conditions. LOS for a given segment can be assessed by comparing the segment's traffic volume and its estimated capacity. In most urban corridors, signalized intersections (rather than the segment itself) are the factor that determines a corridor's vehicular capacity. **Table 4-1** provides the LOS criteria and descriptions for signalized intersections.

Table 4-1: Level of Service Delays and Flow Descriptions for Signalized Intersections

Level of Service	*Average Control Delay (seconds/vehicle)*	*Draft Rapid City Volume-to-Capacity Ratio*	*General Description*
A	*≤10*	*0.7*	*Free Flow*
B	*>10 – 20*		*Stable Flow (slight delays)*
C	*>20 – 35*	*0.71-0.8*	*Stable flow (acceptable delays)*
D	*>35 – 55*	*0.81-0.9*	*Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)*
E	*>55 – 80*	*0.91-1.0*	*Unstable flow (intolerable delay)*
F	*>80*	*> 1.0*	*Forced flow (congested and queues fail to clear)*

Sources: Highway Capacity Manual 2010, Highway Capacity Manual volume 6, HDR.

The daily capacities used in the analysis (shown in **Table 4-2**) are adapted from data available from the Florida Department of Transportation (FDOT) for urban areas. The FDOT methodology is rooted in the Highway Capacity Manual, and provides planning-level estimates for daily arterial and freeway capacities. The capacities are organized to provide general daily volumes:

- By functional class, with the assumption that higher-class facilities get more green time at traffic signals and thus have more capacity.
- By general number of lanes, including adjustments for the presence of left-turn lanes.

Table 4-2: Draft Daily Capacities by Facility Type, Rapid City Area

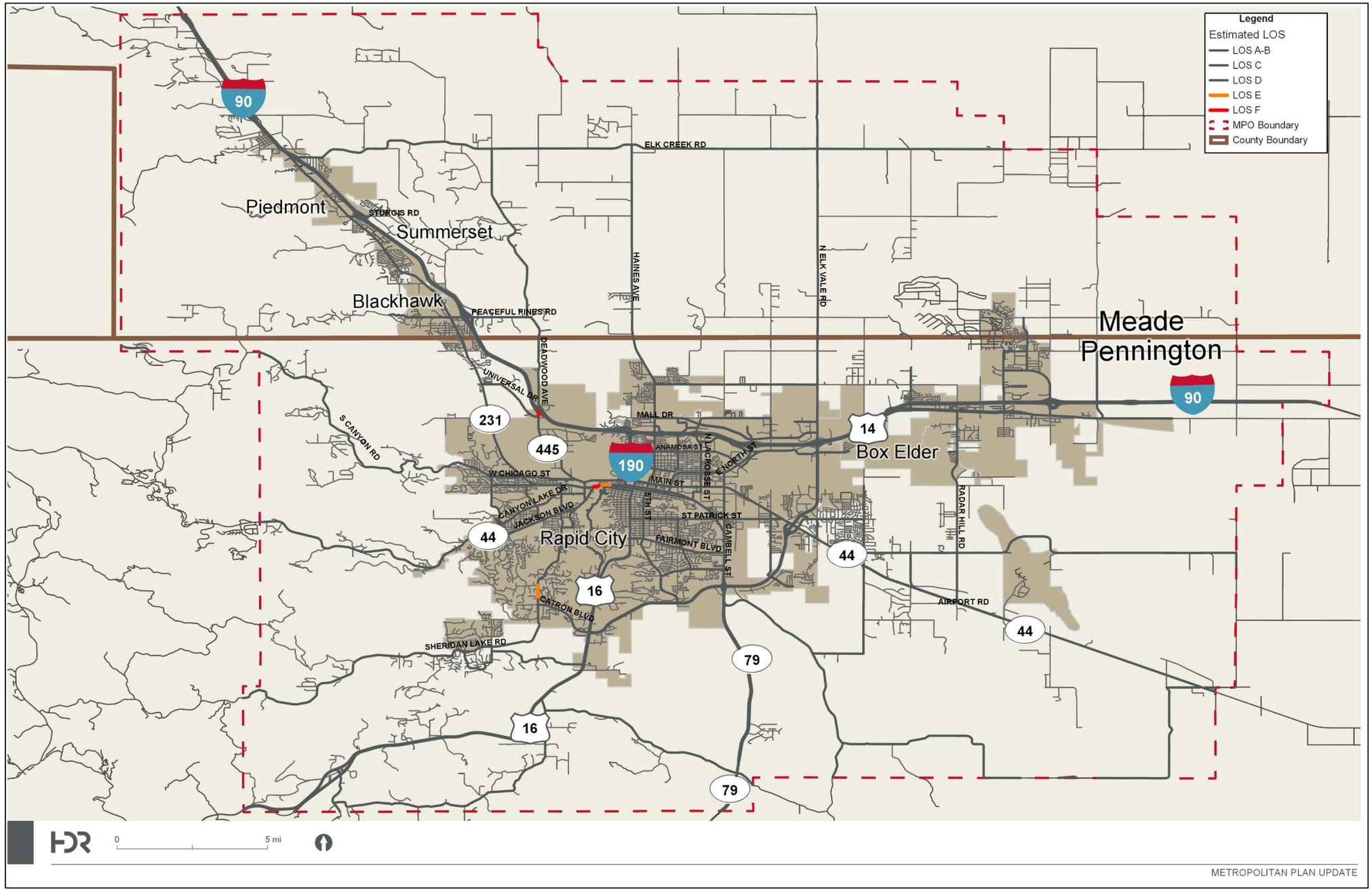
Facility Type	Cross-Section	LOS E/F Daily Capacity
Interstate	4-lane	84,600
	6-lane	130,600
	8-lane	176,600
Principal Arterial	2-lane	14,160
	2-lane with LTs	17,700
	4-lane	29,850
	4-lane with LTs	39,800
	6-lane with LTs	59,900
Minor Arterial	2-lane	12,744
	2-lane with LTs	15,930
	4-lane	26,865
	4-lane with LTs	35,820
	6-lane with LTs	53,910
Collector / Local	2-lane	9,600
	2-lane with LTs	12,000
	4-lane	20,237
	4-lane with LTs	26,983

Sources: 2012 Florida DOT Quality/Level of Service Handbook Tables, HDR

It should be noted that while this methodology is appropriate for a planning-level, regional analysis, several factors such signal density, freeway merging/diverging, and unique temporal traffic patterns are not well-captured with this methodology. As such, adjustments can be made to provide corridor-specific corrections to the capacities shown in **Table 4-2**.

The intent of the planning-level approach is to highlight roadway corridors that likely experience recurring congestion during peak hours. **Figure 4-1** displays the results of the volume-to-capacity analysis.

Figure 4-1: Estimated 2018 LOS in the Rapid City Area MPO Region



As illustrated in **Figure 4-1**, the roadways experiencing significant congestion in the Rapid City MPO area are:

- Sheridan Lake Road, from Chateau Ridge to Corral Drive.
- West Main Street, from Jackson Boulevard to St. Joseph Street.
- Deadwood Avenue, from Universal Drive to the I-90 ramp.

4.2 Travel Reliability

Recurring, peak period congestion has traditionally been a focus of transportation plans and studies. Travel reliability has become a bigger focus area for state departments of transportation (DOTs) and MPOs with the introduction of federal performance measures, and the recognition of the role system reliability plays in the modern economy. The FHWA definition of travel reliability is "the consistency or dependability in travel times, as measured from day to day and/or across different times of the day."[5] This concept is illustrated for an example corridor in **Figure 4-2** below. In the example corridor:

- The typical free flow (uncongested) travel time is 12 minutes.
- The typical peak period (congested) travel time averages 18 minutes during afternoon peak hours.

As shown in **Figure 4-2**, on days when traffic collisions and weather phenomena occur, the average corridor travel time of 18 minutes can rise to a peak of 25 minutes.

The occasional holiday also impacts travel times when fewer people commute, resulting in peak travel times below the average corridor travel time of 18 minutes.

Figure 4-2 illustrates how travel times can vary over a peak period, and more specifically how non-recurring travel delays can ultimately lead to travel in a corridor being deemed unreliable.

A travel reliability analysis evaluates Interstate and non-Interstate National Highway System (NHS) corridor travel times across the RCAMPO roadway network to assess how much travel times typically change day by day. Reliability is important because beyond its impact to traffic flow, it can adversely impact freight and commerce activities in the RCAMPO region. The travel reliability analysis looks at individual corridors and summarizes them into the travel reliability of the entire system. Corridors with poor travel reliability can thus be identified through this process, and potential improvements can be considered that might improve corridor reliability.

4.2.1 Federal Performance Measures—Travel Reliability

To evaluate travel time reliability for the RCAMPO region, the National Performance Management Research Dataset (NPMRDS) was used. The use of this data allowed the identification of how the NHS roadway network performs in terms of travel reliability as well as delineating corridors that are unreliable.

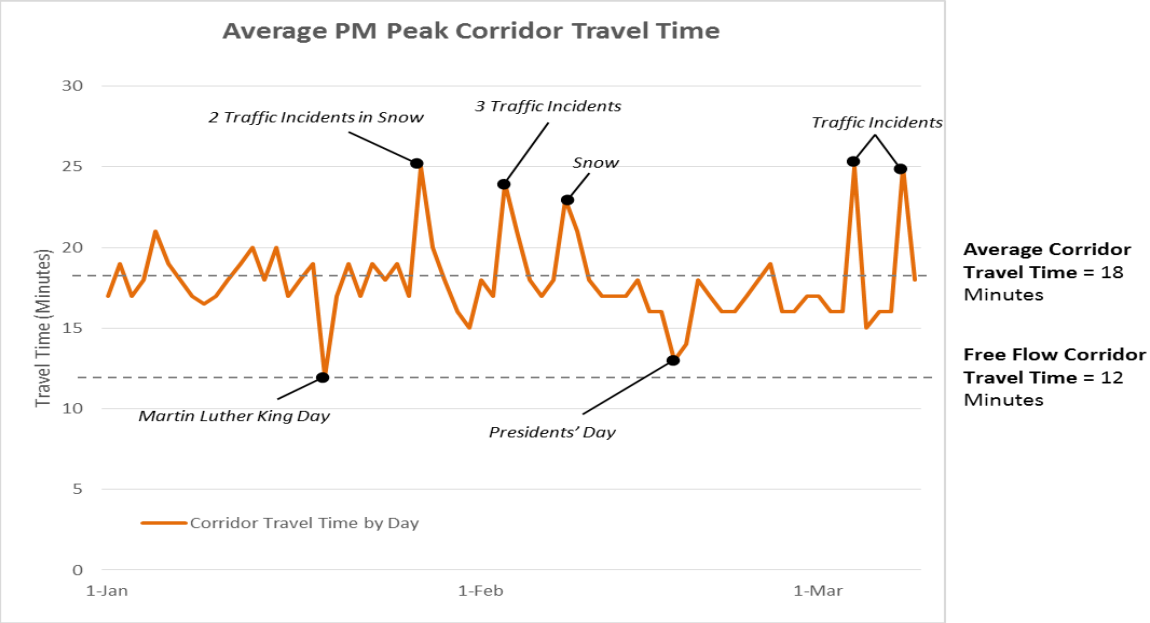
[5] Federal Highway Administration, https://ops.fhwa.dot.gov/perf_measurement/reliability_measures/index.htm

The FHWA maintains specific performance measures for reporting travel reliability at the state and MPO level. These Federal Travel Reliability Performance Measures are:

- Percentage of person-miles traveled on the Interstate that are reliable.
- Percentage of person-miles traveled on the non-Interstate NHS that are reliable.

The metric used to report travel reliability is Level of Travel Time Reliability (LOTTR). LOTTR is defined as a ratio of longer travel times (80th percentile) to a normal travel time (50th percentile). The travel times are compared for 15-minute intervals across the year. The LOTTR is calculated for four analysis periods: Morning (AM) Weekday, Midday Weekday, Afternoon (PM) Weekday, and Weekends. A segment is deemed unreliable if any of these four time periods has a LOTTR of 1.50 or higher.

Figure 4-2: Illustration of Travel Reliability in a Corridor



Source: FHWA

Comparing the LOTTR data for 2017 and 2018 indicate the following patterns:

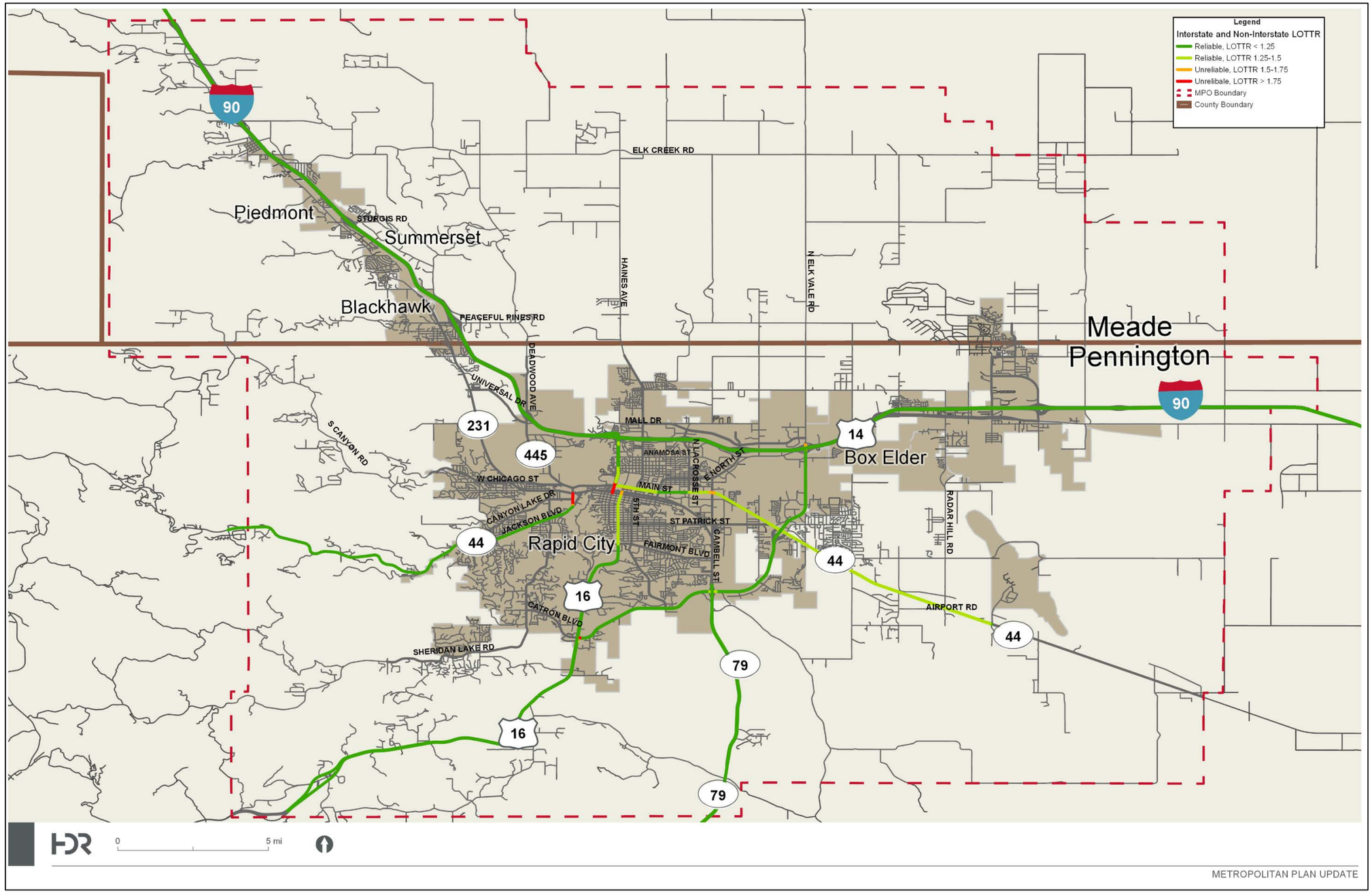
- AM travel reliability has increased slightly from 2017 to 2018 for several corridors.
- PM travel reliability has decreased slightly in some corridors from 2017 to 2018.

The corridors where the LOTTR analysis indicates travel reliability issues (LOTTR ≥ 1.50) for 2018 are:

- Mountain View Road, from Jackson Boulevard to W Main Street
- Mount Rushmore Road from St. Joseph Street to Main Street
- West Boulevard from St. Joseph Street to I 90
- N Elk Vale Road at I 90

Figure 4-3 displays the LOTTR for 2018 for the worst period.

Figure 4-3: LOTTR for the Worst Period, 2018.



As the NPMRDS data indicates, the RCAMPO meets its federal targets for travel reliability for both the Interstate system and the non-Interstate NHS. To meet these targets, the percentage of person-miles traveled with LOTTRs below 1.50 must be 90 percent or above on the Interstate System and 85 percent or above on the non-Interstate NHS.[6] It should be noted that these travel reliability targets are the statewide targets established by SDDOT, which the RCAMPO elected to support.

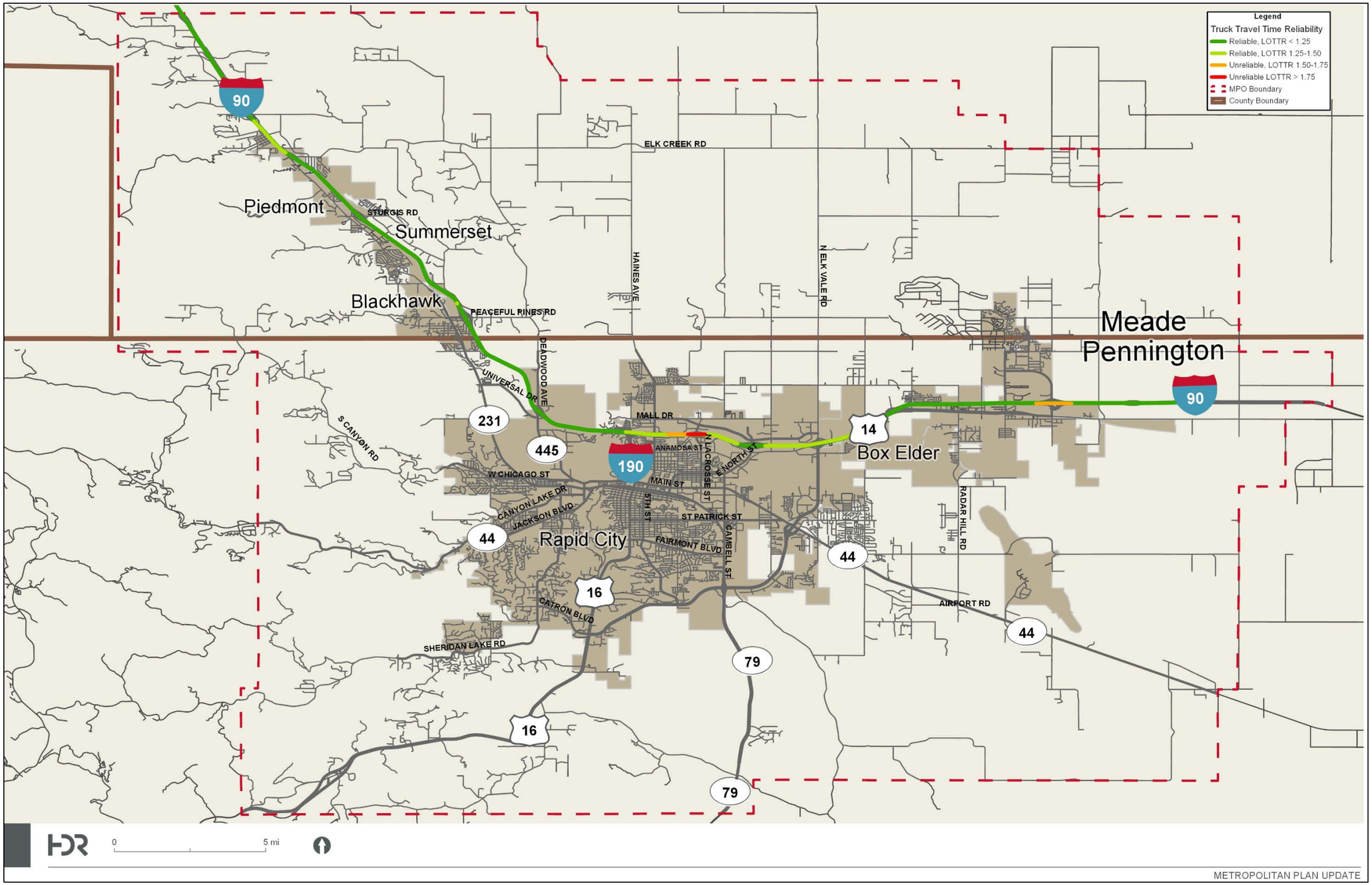
4.2.2 Freight Reliability

The Federal performance measure related to freight is the Truck Travel Time Reliability (TTTR) metric. This metric is only reported on the Interstate system and compares the ratio of longer truck travel times (95th percentile) to a normal travel time (50th percentile). Similar to the LOTTR, the travel times are compared for 15-minute intervals across the year. The TTTR is calculated for five analysis periods—AM Weekday, Midday Weekday, PM Weekday, Overnight, and Weekends. The RCAMPO has set a target of 1.50 or lower; therefore, a segment is deemed TTTR unreliable if any of these five time periods has a TTTR of more than 1.50. Similar to the LOTTR travel reliability for passenger vehicles, the MPO is able to set its own target for freight reliability but chose to support the target of 1.50 identified by the SDDOT.

Based on the NPMRDS data, the segment of interstate in the RCAMPO boundaries with the least reliability is I-90 west bound between Haines Avenue and N Lacrosse Street. **Figure 4-4** displays the LOTTR for 2018 for the worst period.

[6] Rapid City Area Transportation Improvement Program (Fiscal Years 2019-2022), Final, August 2018.

Figure 4-4: TTTR for the Worst Period, 2018



4.3 Traffic Safety

A traffic safety analysis was conducted with crash data sourced from the South Dakota Department of Public Safety (SD DPS).[7] The data includes all motor vehicle crashes—including motor vehicle crashes with pedestrians and bicyclists—that occurred over a 5-year period, from 2014 to 2018. For the purpose of this analysis, several variables were identified based on federal safety performance measures, which are discussed below. The analysis consists of three elements:

1. Crash Frequency—total number of crashes occurring at intersections within the RCAMPO region.
2. Crash Rates—the number of crashes occurring at intersections per million entering vehicles.
3. Overview of the 2014 South Dakota Strategic Highway Safety Plan (SHSP).

Based on the analysis of these elements, specific intersections of safety concern were identified so that the RCAMPO can plan appropriate improvements to enhance traffic safety for all road users. An overview of bicycle and pedestrian crash incidences are also presented for this purpose.

4.3.1 Federal Performance Measures for Traffic Safety

This analysis was framed to assist the MPO in addressing the required federal safety performance measures. By identifying intersections with the highest amount of crashes, the region can focus on improvements in these critical locations that can improve overall regional safety. Those federal performance measures are[8]:

- **Number of Fatalities**: The total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year.
    - **SDDOT Target**: 130.0 or less
- **Rate of Fatalities**: The ratio of total number of fatalities to the number of vehicle miles traveled (VMT; in 100 Million VMT) in a calendar year.
    - **SDDOT Target**: 1.34 or less
- **Number of Serious Injuries**: The total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year.
    - **SDDOT Target**: 759.0 or less
- **Rate of Serious Injuries**: The ratio of total number of serious injuries to the number of VMT (in 100 Million VMT) in a calendar year.
    - **SDDOT Target**: 7.90 or less

[7] South Dakota Department of Public Safety, *Office of Accident Records,* 2014-2018
[8] Federal Highway Administration Safety Performance Management, https://safety.fhwa.dot.gov/hsip/spm/

- **Number of Non-motorized Fatalities and Non-motorized Serious Injuries**: The combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year.
    - **SDDOT Target**[9]: 43.0 or less

It should be noted that the SDDOT established performance measure targets in its 2017 Highway Safety Improvement Program and the Rapid City MPO supports these targets.

4.3.2 Crash Frequency

To delineate areas of traffic safety concern within the RCAMPO region, the most frequent crash intersections were identified. Based on the crash data available, the top 20 highest crash frequency intersections from the 5-year period were determined. **Crash frequency** is defined as the total number of crashes that occurred at an intersection. Crash frequency is important as it indicates locations of the RCAMPO region that record frequent crash events, but it does not consider traffic exposure which can lead to an under-emphasis of intersections with lower volumes and an overemphasis of intersections with higher traffic volumes. The highest crash frequency intersections are presented in **Figure 4-5**.

Table 4-3 is a crash frequency ranking that identifies the top 20 crash frequency intersections, and shows the crashes at those top 20 intersections by injury severity. Injury severity is delineated into[10]:

- **Fatal Injury**: An injury resulting in death, or an injury caused death occurring within 30 days of the crash.
- **Incapacitating Injury**: Any injury, other than fatal, that prevents the injured person from walking, driving, or continuing the activities they were capable of performing prior to the crash.
- **Non-Incapacitating Injury**: Any injury, other than a fatal or incapacitating injury, that is evident to observers at the crash scene.
- **Possible Injury**: Any injury reported that is not a fatal injury, incapacitating injury, or non-incapacitating injury.
- **Property Damage Only**: A reported crash with no injuries.

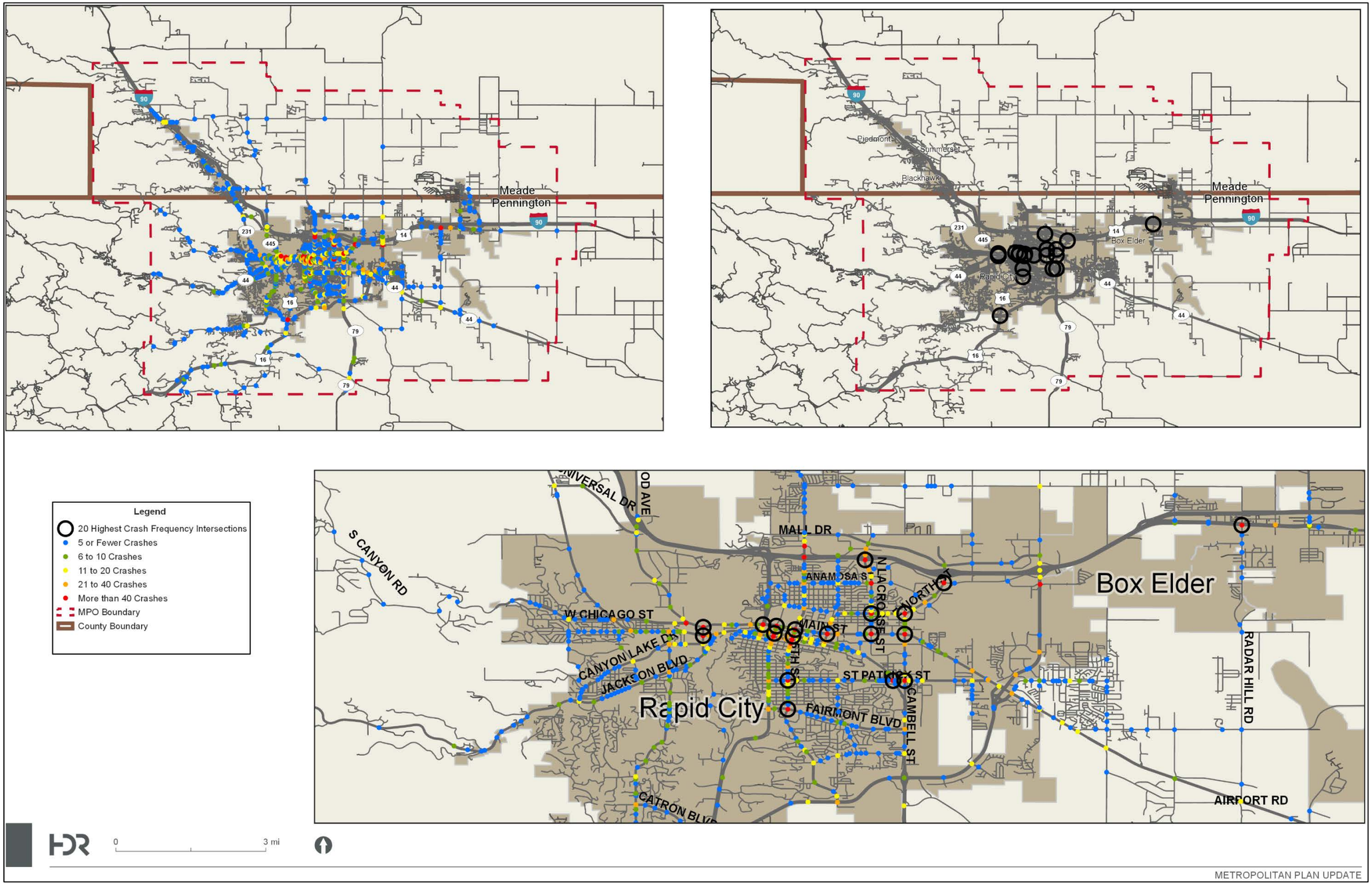
[9] South Dakota Highway Safety Improvement Program, 2017 Annual Report, https://safety.fhwa.dot.gov/hsip/reports/pdf/2017/sd.pdf
[10] KABCO Injury Classification Scale and Definitions by State, https://safety.fhwa.dot.gov/hsip/spm/conversion_tbl/pdfs/kabco_ctable_by_state.pdf

Table 4-3: Crash Frequency Rankings for RCAMPO Intersections, 2014-2018

Rank	Intersection	Crashes (5 years)							Crash Rate (Crashes / MEV*)
		Total	Fatal Injury	*Major Injury	*Minor Injury	Possible Injury	Property Damage Only	Daily Entering Volume	
1	Cambell St & Omaha St	98	0	2	12	21	63	45,659	1.176
2	North St & Cambell St	93	0	0	7	13	73	36,875	1.382
3	5th St & Main St	83	0	1	12	10	60	31,942	1.424
4	Catron Blvd & US Hwy 16	80	0	2	14	18	44	19,285	2.273
5	5th St & Omaha St	78	0	0	14	11	53	51,453	0.831
6	Mountain View Rd & W Main St	70	0	0	9	15	45	39,867	0.962
7	Main St & Mount Rushmore Rd	69	0	1	6	10	52	28,689	1.318
8	Omaha St & Mountain View Rd	64	0	0	5	10	49	31,883	1.1
9	E North St & Lacrosse St	64	0	0	10	14	40	32,619	1.075
10	Omaha St & West Blvd	62	0	0	9	8	44	50,606	0.671
11	St Patrick St & St Joseph St	57	0	1	7	11	38	22,239	1.404
12	5th St & St Patrick St	54	0	0	7	8	39	28,129	1.052
13	E North St Eglin St	54	0	2	6	10	36	28,842	1.026
14	Cambell St & St Patrick St	53	0	2	4	11	36	35,259	0.824
15	East Blvd & Omaha St	52	0	1	10	8	33	34,191	0.833
16	I 90 ramp terminal & Lacrosse St	51	1	0	9	8	33	16,491	1.695
17	Omaha St & Mount Rushmore Rd	50	0	1	9	8	32	41,376	0.662
18	Lacrosse St & Omaha St	48	0	0	12	5	31	28,783	0.914
19	5th St & Cathedral Blvd & Fairmont Blvd	47	0	3	8	8	28	25,985	0.991
20	Anamosa St & Lacrosse St	47	0	3	9	4	31	30,769	0.837

*****Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury

Figure 4-5: Intersection Crash Frequencies for the Rapid City Area MPO Region



4.3.3 Fatal and Incapacitating Crashes

Figure 4-6 presents the locations of all crashes over the 5-year time period of 2014-2018 that had an injury severity recorded as “Fatal” or “Incapacitating.” Based on the data sourced from the SD DPS, 34 percent of all crashes resulting in fatal injuries occurred on roads functionally classified as arterial, while 41 percent of all crashes resulting in incapacitating injuries also occurred on arterial roads. Eighty percent of the crashes with injury severity of either fatal or incapacitating injury occurred on roads functionally classified as collector or above. **Table 4-4** shows the summary of fatal and incapacitating injuries by functional classification.

Table 4-4: Functional Classifications of Roadways with Fatal and Incapacitating Injuries

	Local Road	*Collector Road*	*Arterial*	*Interstate*	*Total*
Fatal Injury	*9*	*7*	*17*	*16*	*49*
Incapacitating Injury	*68*	*54*	*148*	*86*	*356*

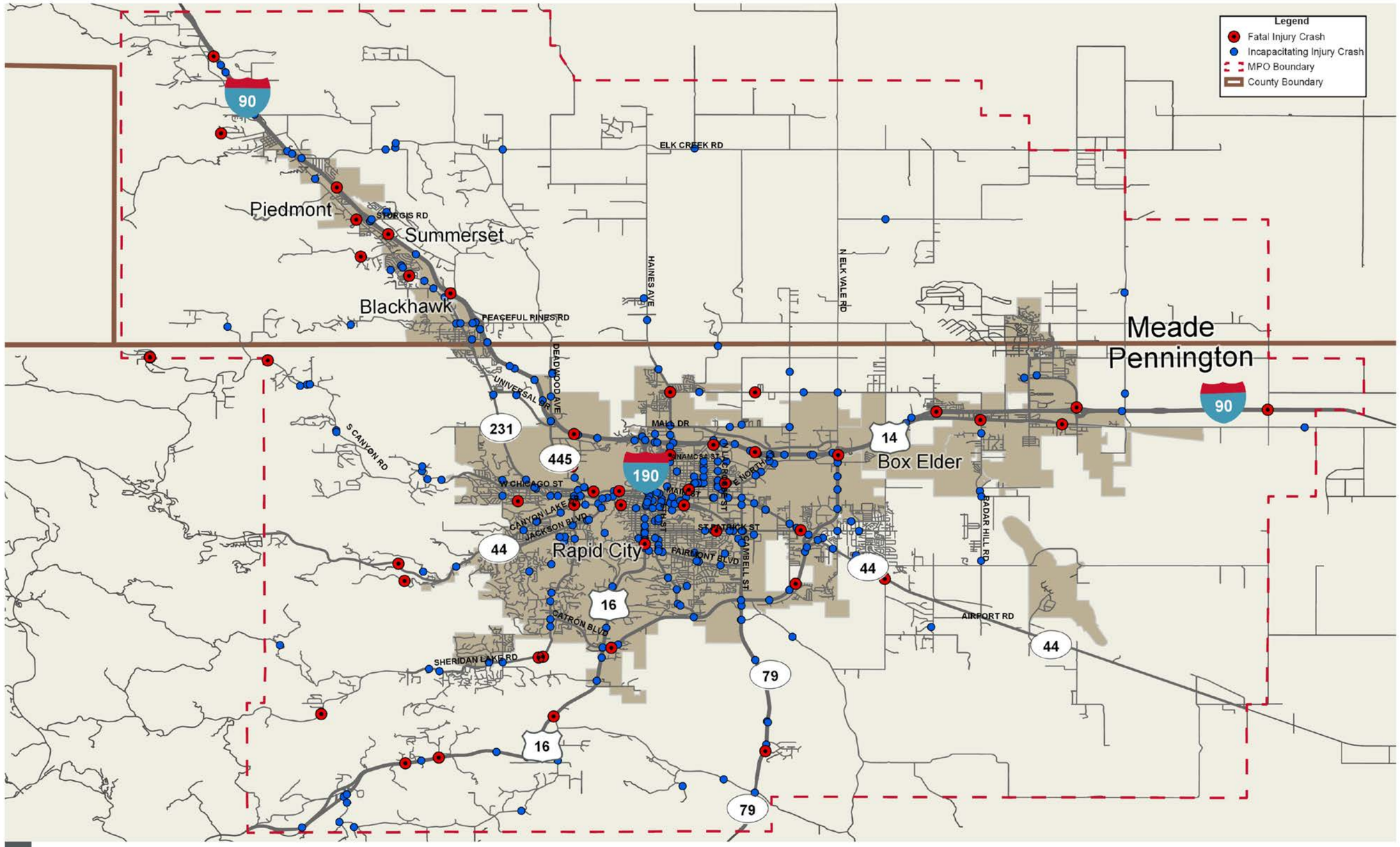
4.3.4 Crashes by Year and Injury Severity

All crashes occurring between 2014 and 2018 are categorized by year and injury severity in **Table 4-5**. The bulk of crashes recorded over the 5-year period resulted in no injury, while a possible injury occurred in roughly 14 percent of all crashes.

Table 4-5: RCAMPO Vehicular Crashes by Year and Severity

Year	*Fatal*	*Incapacitating Injury*	*Non-Incapacitating Injury*	*Possible Injury*	*No Injury*	*Unknown*	*Total*
2014	*13*	*92*	*256*	*268*	*1,451*	*1*	*2,081*
2015	*9*	*84*	*276*	*259*	*1,332*	*0*	*1,960*
2016	*7*	*57*	*286*	*252*	*1,211*	*0*	*1,813*
2017	*11*	*67*	*256*	*295*	*1,361*	*0*	*1,990*
2018	*9*	*56*	*211*	*290*	*1,546*	*0*	*2,112*
Total	*49*	*356*	*1,285*	*1,364*	*6,901*	*1*	*9,956*

Figure 4-6: 5-Year Fatal and Incapacitating Crashes, 2014-2018



4.3.5 Highest Crash Rate Intersections

A crash rate was calculated to further assess traffic safety conditions within the RCAMPO boundaries. **Crash rate** is the calculation of the number of vehicular crashes per million entering vehicles and normalizes crash frequencies based on traffic exposure. The method used for calculating crash rates utilized the crash data sourced from SD DPS, roadway data (including traffic counts for functionally classified roads) from the Rapid City MPO, and the South Dakota Department of Transportation (SDDOT) when MPO traffic counts were not available. Intersections along roadways classified collector, arterial, and interstate ramps were included. For urban local roads without available traffic counts, traffic volumes were estimated to be 1,500 ADT.

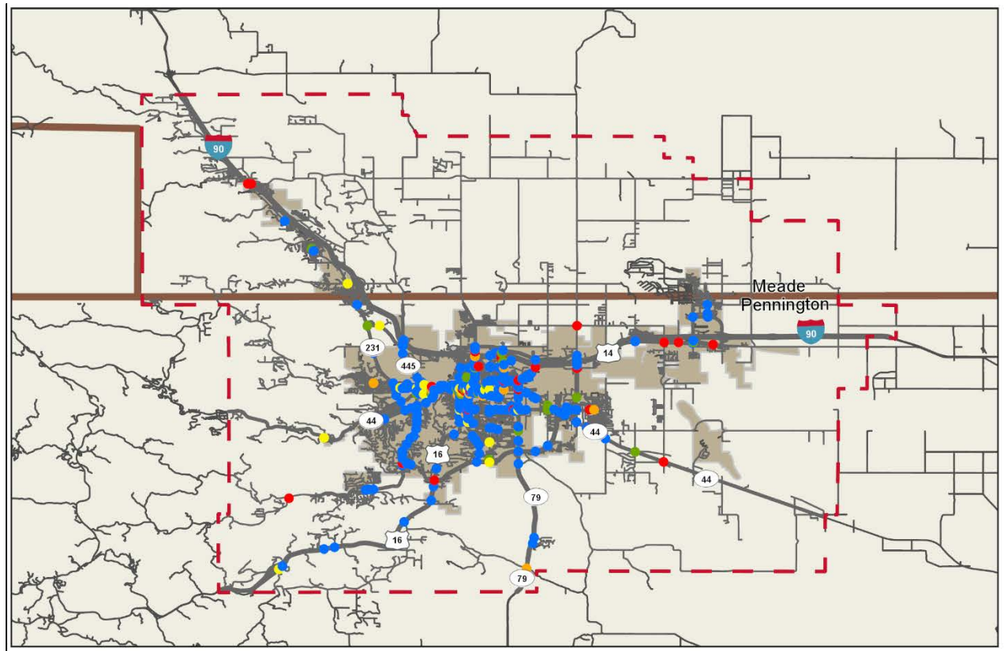
Crash rates are based on the daily entering volumes at each intersection, which were estimated based on the data discussed above. The daily entering volumes that were calculated give insight into roadway usage and the average number of vehicles using each intersection during typical weekday travel. This high-level overview provides a snapshot of traffic safety and its relationship with roadway usage throughout the RCAMPO boundaries in normal conditions. **Table 4-6** shows the highest 20 intersections for crash rate and **Figure 4-7** illustrates crash rate by intersection. The average crash rate for all functionally classified intersections during the 5-year analysis timeframe was 0.72 crashes per million entering vehicles (MEV).

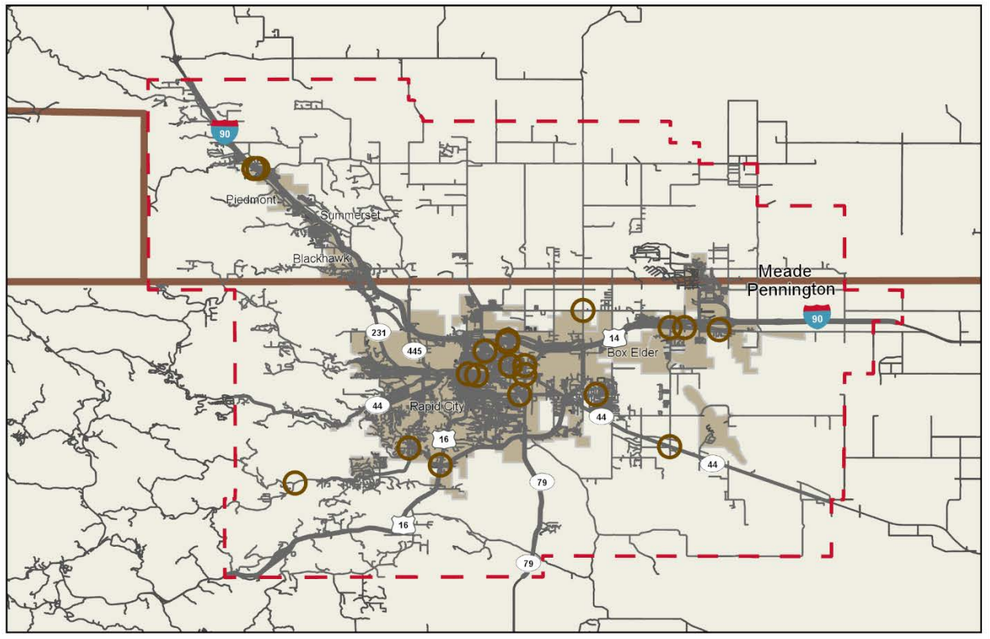
Table 4-6: Intersection Crash Rates at Functionally-Classified Intersections

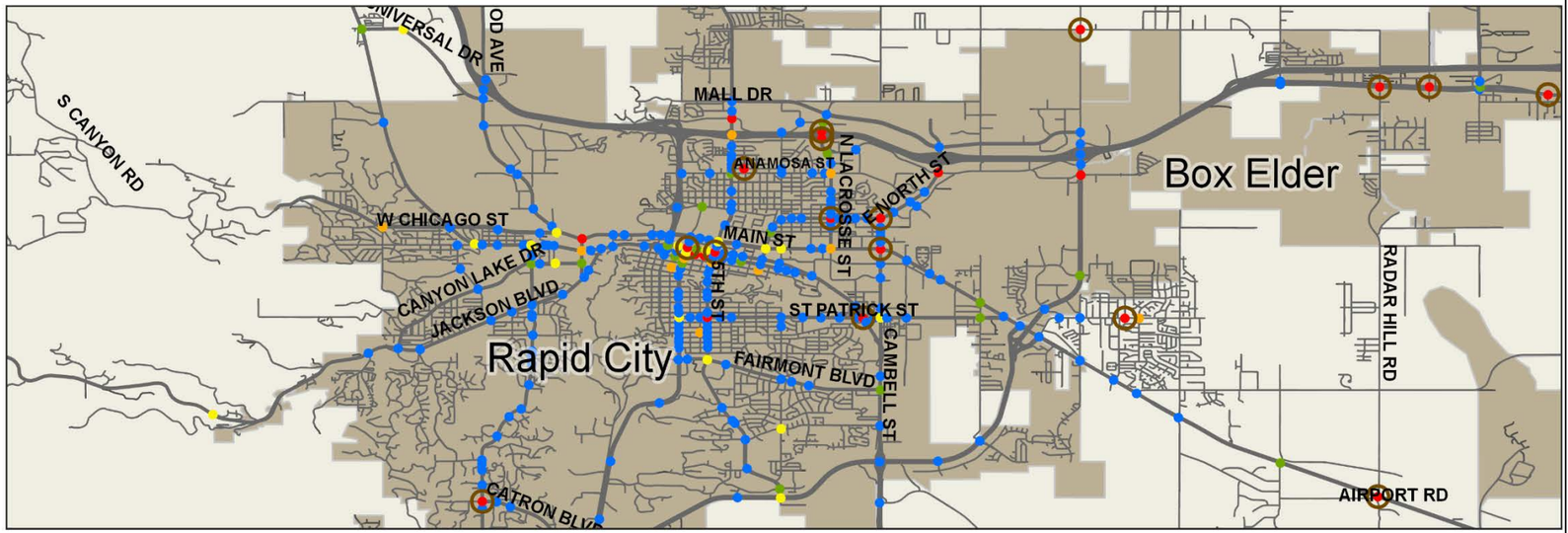
Crash Rate Rank	Intersection Name	Crashes	Daily Entering Volume	Crash Rate (Crashes / MEV*)
1	*Catron Blvd & US Hwy 16*	*80*	*19,285*	*2.273*
2	*Service Rd & Elk Creek Rd*	*14*	*4,325*	*1.774*
3	*N Lacrosse St & I-90 Ramp S*	*51*	*16,491*	*1.695*
4	*SD Hwy 1416 & Cottonwood Dr*	*7*	*2,450*	*1.566*
5	*SD Hwy 1416 & Southgate Dr*	*31*	*11,057*	*1.536*
6	*Main St & 5th St*	*83*	*31,942*	*1.424*
7	*E St. Patrick St & E St. Joseph St*	*57*	*22,239*	*1.404*
8	*N Cambell St & E North St*	*93*	*36,875*	*1.382*
9	*SD Hwy 44 & Radar Hill Rd*	*11*	*4,470*	*1.348*
10	*N Lacrosse St & I-90 Ramp N*	*39*	*15,917*	*1.343*
11	*Twilight Dr & Degeest Dr*	*12*	*4,908*	*1.340*
12	*Main St & Mount Rushmore Rd*	*69*	*28,689*	*1.318*
13	*Cambell St & E Omaha St*	*98*	*45,659*	*1.176*
14	*Sheridan Lake Rd & Catron Blvd*	*25*	*12,063*	*1.136*
15	*E North St & N Lacrosse St*	*64*	*31,883*	*1.100*
16	*W Omaha St & Mountain View Rd*	*64*	*32,619*	*1.075*
17	*E North St & Eglin St*	*54*	*28,129*	*1.052*
18	*Cheyenne Blvd & Eglin St*	*46*	*23,983*	*1.051*
19	*St. Joseph St & 6th St*	*31*	*16,411*	*1.035*
20	*St. Patrick St & 5th St*	*54*	*28,842*	*1.026*

*MEV= million entering vehicles

Figure 4-7: Intersection Crash Rates for the Rapid City Area MPO Region







Legend

- 20 Highest Crash Rate Intersections
- Less than 0.7 Crash / MEV
- 0.7 - 0.8 Crash / MEV
- 0.8 - 0.9 Crash / MEV
- 0.9 - 1.0 Crash / MEV
- More than 1.0 Crash / MEV
- MPO Boundary
- County Boundary

0 3 mi

4.3.6 Bicycle and Pedestrian Crashes

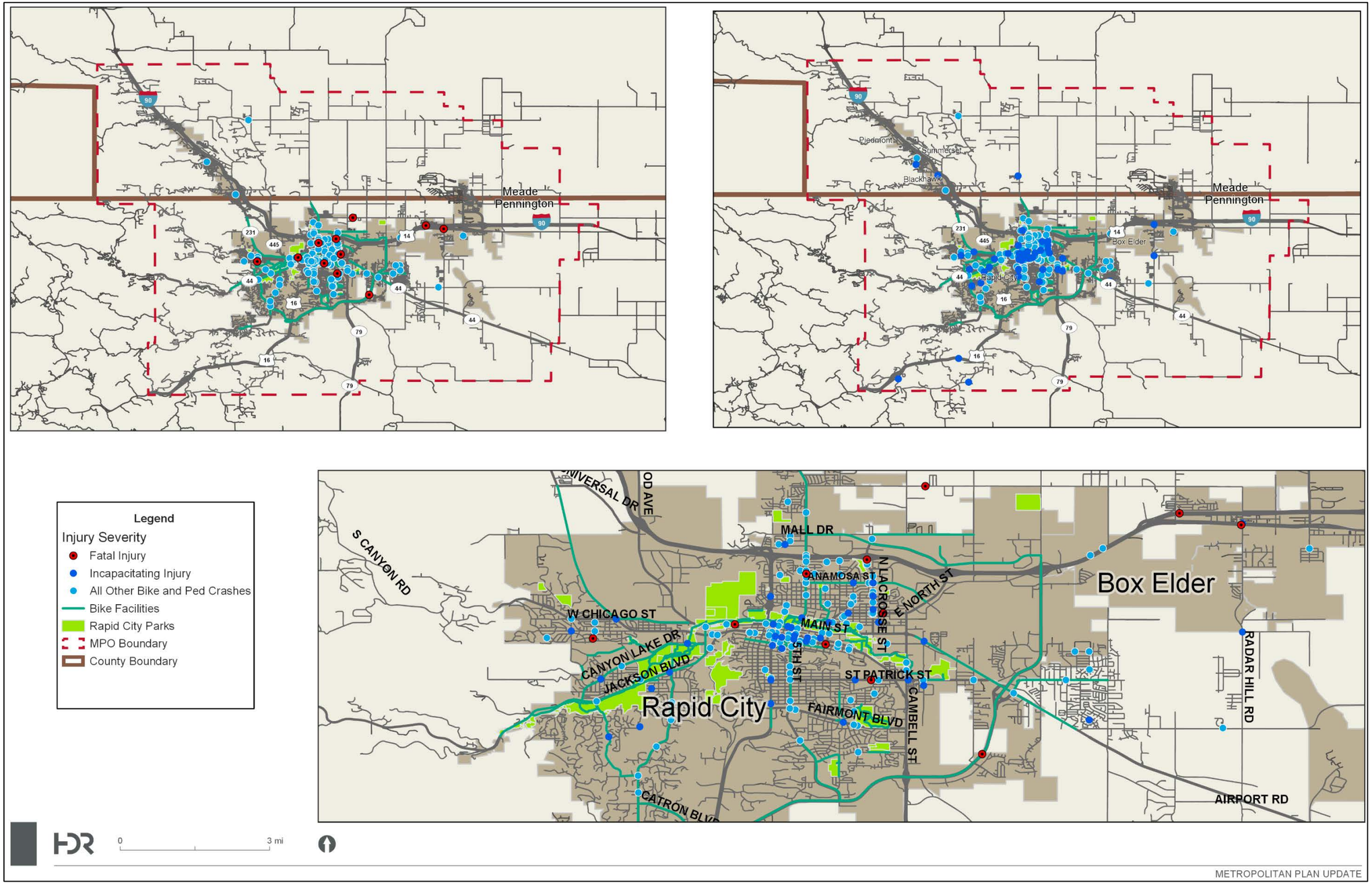
Table 4-7 presents the numbers of bicycle and pedestrian crashes by injury severity for the 5-year period of 2014-2018. The data in **Table 4-7** indicates the majority of bicycle and pedestrian crashes resulted in non-incapacitating injuries, while the total number of crashes involving bicyclists and/or pedestrians was 221. **Figure 4-8** below displays the locations of all bicycle and pedestrian crashes recorded from 2014 to 2018. As **Figure 4-8** shows, a substantial amount of bicycle and pedestrian crashes resulting in fatal or incapacitating injuries occurred in the downtown area of Rapid City.

Table 4-7: Rapid City MPO Bicycle and Pedestrian-Related Crashes by Injury Severity

Year	Fatal	Incapacitating	Non-Incapacitating	Possible	No Injury	Unknown	Total
2014	1	12	18	12	1	0	44
2015	3	9	15	7	0	0	34
2016	2	8	23	10	0	0	43
2017	3	8	27	12	1	0	51
2018	2	10	21	16	0	0	49
Total	11	47	104	57	2	0	221

Source: South Dakota Department of Public Safety, Office of Accident Records, 2014-2018

Figure 4-8: 5-Year Bicycle and Pedestrian Crashes, 2014-2018



4.3.7 South Dakota Strategic Highway Safety Plan

The Metropolitan Transportation Plan will incorporate the goals and direction provided by South Dakota's SHSP. Pursuant to FHWA's Highway Safety Improvement Plan (HSIP) guidelines, state departments of transportation are required to develop a statewide plan that establishes goals, objectives, and key areas of emphasis for highway safety. South Dakota's most recent SHSP, published in 2014, identifies various strategies and options aimed at reducing the fatal and serious injury crash rate by 15 percent by 2020. The SHSP is guided by the safety vision statement *Every Life Counts: Partnering to Save Lives* and delineated key strategies to accomplish the 15 percent reduction and reach the safety vision mentioned above:

Education

- Improve driver education and awareness.
    - *Stay in Your Lane*, driving under the influence (DUI), motorcycle awareness, seatbelt awareness, statewide and local speeding education, young driver education.

Enforcement

- Enforce traffic safety laws and support effective arrest and prosecution of offenses.
    - Fund the South Dakota Department of Public Safety a chemist position for testing DUI blood samples at the state health laboratory.
    - Review options for creating a Tribal Law Enforcement or Traffic Liaison to address drinking and driving on tribal lands.
    - Fund a Department of Public Safety mobile courtroom and blood testing facility.
    - Consider use of safety funding to support additional prosecutors for DUI cases.

Engineering

- Implement infrastructure safety improvements that have demonstrated effectiveness at reducing and preventing lane-departure and intersection-related crashes.
    - Provide improved shoulder treatments, curve delineations, pavement markings, and centerline and edge line rumble strips.
    - Develop innovative intersection design and traffic signal modifications.
    - Develop user-friendly roadway design, traffic controls, and construction and maintenance policies to reduce motorcycle crash frequencies.
    - Provide roadway design and traffic controls that support appropriate vehicle speeds.
    - Review transportation plans for new and expanding high schools; provide or update School Zone signs.

Emergency Medical Services

- Provide timely and professional emergency response and trauma care to crash victims.
    - Support rural emergency response to maintain staff level resources and training
    - Provide adequate signing for local roads to enhance/sustain response times.

Project Planning Partnerships

- Capitalize on multidisciplinary safety knowledge at the federal, state, local, and tribal government levels to develop safety projects.
    - Establish a Fatal Crash Investigation Team.
    - Develop tribal partnerships to collaborate on funding enforcement activities on reservations; conduct regional roadway safety inspections, roadway safety audits, county signing projects, and tribal safety summits.
    - Plan multi-state peer exchange for DOTs, Local Technical Assistance Program (LTAP), and FHWA traffic safety personnel for developing ideas for planning, selecting, and constructing safety projects as well as using HSIP monies.
    - Establish local safety system partnerships.
    - Utilize Safetravelusa.com/511 to provide data feeds to Dynamic Message Signs.
    - Develop applications for additional mobile devices.
    - Provide more environmental sensor/cameras for traveler information.
    - Develop alternate methods of reporting roadway conditions.

Research and Data

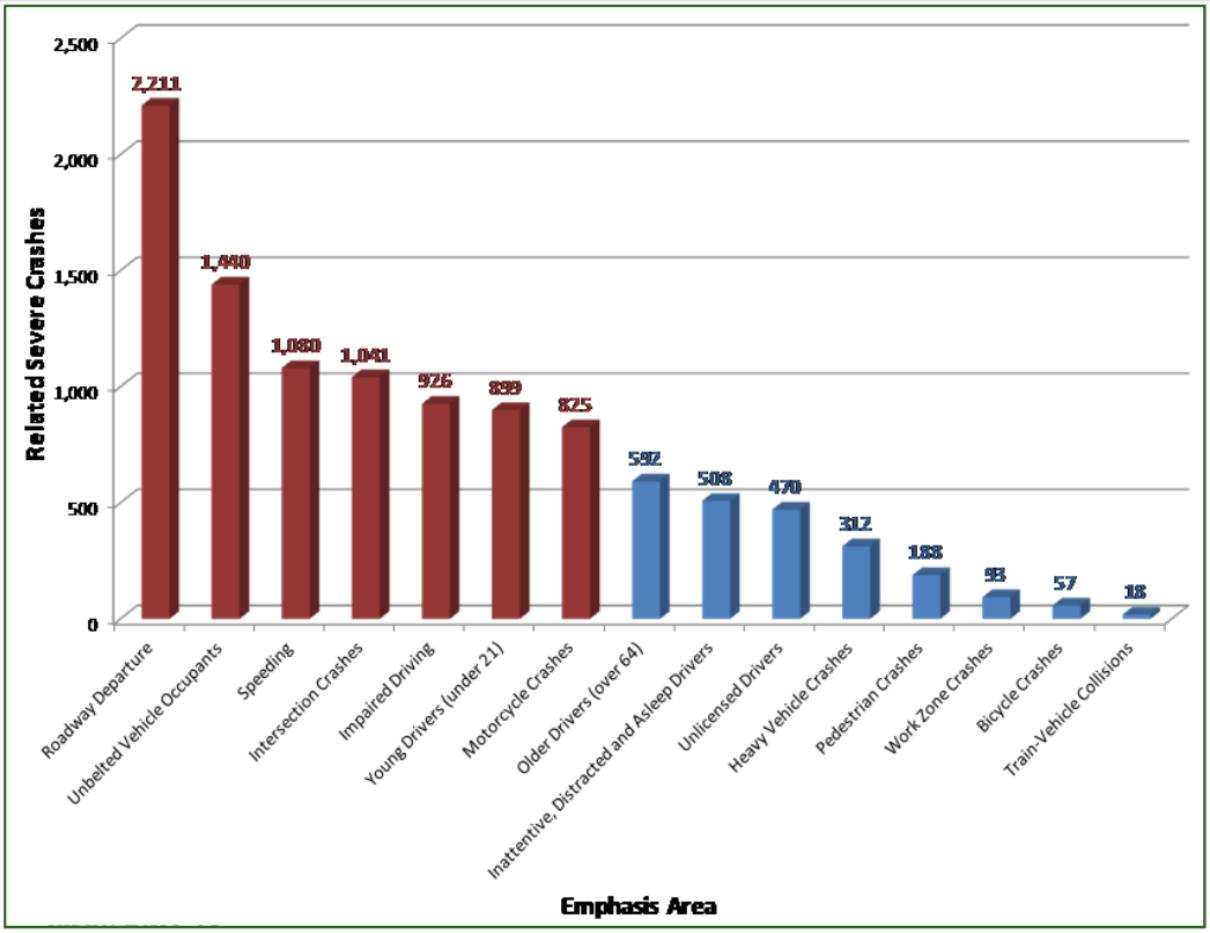
- Improve crash data analysis for more complete problem identification.
    - Conduct research and data to identify common attributes of crash causal factors related to crashes and their severity.
    - Conduct factual research related to public attitudes towards safety issues and legislative initiatives.

4.3.8 South Dakota Statewide Fatal and Incapacitating Injury Crash Emphasis Areas

The South Dakota DOT analyzed fatal and incapacitating injury crashes across the state based on 5-year data starting in 2007. The compiled fatal and incapacitating injury crash data indicates the seven highest emphasis areas for this severity of crashes statewide are: Roadway Departures, Intersections, Motorcycles, Unbelted Vehicle Occupants, Speeding-Related, Drug-

and Alcohol-Related, and Young Drivers. **Figure 4-9** below presents all key emphasis areas identified by SDDOT as part of the SHSP.

Figure 4-9: South Dakota Fatal Crashes and Key Emphasis Areas



Source: South Dakota DOT, Office of Traffic Safety, Feb. 2014

4.4 Transit System Overview

Transit service for the RCAMPO is offered by two public providers—Rapid Transit and Prairie Hills Transit. Rapid Transit operates fixed route and demand response services within the city of Rapid City. Rapid Transit also operates a seasonal "City View Trolley" that provides seasonal tours of points of interest in Rapid City. Prairie Hills Transit offers a hybrid deviated fixed route/demand response within its service area comprised of Meade County, from Sturgis and Piedmont to Rapid City. Prairie Hills Transit also serves western Pennington County.

- Rapid Transit's six fixed routes operate Monday through Friday from 6:20 AM to 5:50 PM and Saturdays from 9:50 AM to 4:40 PM.
- Demand response services operate Monday through Friday from 6:20 AM 5:50 PM and Saturdays from 8:00 AM to 6:00 PM.
- Rapid Transit's seasonal trolley serves riders from 10:00 AM to 5:00 PM June through August.
- Prairie Hills Transit hours of operation are from 7:00 AM to 5:00 PM on Monday, Tuesday, Wednesday, and Friday.

Table 4-8 displays key performance measures of Rapid Transit's fixed route service from 2013 to 2017. Between 2013 and 2017, the number of passenger trips taken on fixed routes experienced an overall decline from 2013 to 2016 and then saw a significant increase of nearly 50,000 trips between 2016 and 2017. Operating revenues increased gradually, with a peak of just over $1 million in 2015, while passenger revenues for fixed route service decreased between 2013 and 2017.

Table 4-9 displays key performance measures for Rapid Transit's demand response services for the years 2013 to 2017. The number of demand response trips taken between 2013 and 2017 increased from slightly. Operating expenses for demand response service fluctuated during this 5-year period, with annual expenses rising to a peak of $1.1 million in 2016 and then declining to $1.04 million in 2017. Passenger revenues followed this trend, seeing an increase each year from 2013 to 2016, then declining in 2017.

Table 4-10 displays key performance measures for Prairie Hills Transit's demand response service for the years 2013-2017. As shown, the number of trips taken between 2014 and 2017 increased by nearly 1,000 between 2014 and 2015 before a significant decrease in 2016; by 2017, the number of trips increased substantially. The 4-year period saw an overall decrease in operating expenses from a high of $1.5 million in 2014 to a low of $1.306 million in 2016. Passenger revenues for Prairie Hills Transit declined each year from 2014 to 2016, with a low of $65,526 in 2016 before increasing to $80,824 in 2017.

Table 4-8: Fixed Route Operating Statistics, Rapid Transit

Measure	2013	2014	2015	2016	2017
Passenger Trips	304,599	287,623	291,206	295,060	348,210
Revenue Hours	20,328	19,490	19,452	19,755	21,043
Revenue Miles	294,439	294,080	290,101	289,699	289,031
Operating Expense	941,516	986,199	1,009,286	988,280	997,384
Passenger Revenue	239,430	251,235	229,542	226,710	174,897

Table 4-9: Demand Response Service Operating Statistics, Rapid Transit

Measure	2013	2014	2015	2016	2017
Passenger Trips	83,572	79,261	84,594	87,280	87,409
Revenue Hours	25,785	25,750	25,655	22,148	22,056
Revenue Miles	279,165	247,369	268,521	271,425	269,557
Operating Expense	1,061,779	1,112,051	1,115,526	1,107,993	1,042,327
Passenger Revenue	187,160	176,674	192,552	207,756	203,037

Table 4-10: Demand Response Service Operating Statistics, Prairie Hills

Measure	2013	2014	2015	2016	2017
Passenger Trips	Data not available	94,520	95,503	91,176	106,875
Revenue Hours		36,073	32,569	32,208	37,844
Revenue Miles		496,092	483,407	493,658	567,266
Operating Expense		1,515,874	1,381,181	1,306,132	1,317,406
Passenger Revenue		89,784	74,329	65,526	80,824

In addition to the public transit providers, there are several private non-profit organizations offering transit services in the RCAMPO boundaries. These providers include:

- **Chair Lift**: A relatively new demand response service in the Rapid City Area that runs Monday through Friday, opened to any resident age 65 or older. The service offers accessible vehicles and does not require 24-hour notice for rides.
- **Black Hills Works**: Program-specific transportation service offered Monday through Sunday, 24 hours a day.
- **The Club for Boys**: Program-specific service from Rapid City schools to the Club for Boys facility.
- **YMCA**: Program-specific service from the majority of Rapid City public schools to the YMCA facility.

- **Youth and Family Services**: Program-specific transportation to and from home and school, with the primary users being low-income children.
- **Senior Companions**: Demand response service for seniors and low-income residents age 55 or older. Senior Companions is operated on a volunteer basis and utilizes volunteer's personal vehicles for service

4.4.1 Recent MPO Transit Studies

The RCAMPO completed a Transit Feasibility Study in 2018 to determine if an expansion of the existing transit service is necessary to support residents, as well as explore which types of transit services and programs would best fit the needs of the region. In addition to the Transit Feasibility Study, the MPO also published a *Coordinated Public Transit Human Services Plan* in March 2019. This plan identified transit issues facing the community and provided a series of recommendations for increasing residential mobility and accessibility. Both the Transit Feasibility Study and Coordinated Public Transit Human Services plan identified specific gaps in the existing transit system, which are presented below:

- Limited transit service.
- High demand for service later at night, on Sundays, and to areas outside of Rapid City limits.
- Transit service is too expensive for many of the area's residents

Current Transit System Opportunities and Alternatives

Based on the findings and public input presented in the Transit Feasibility Study and Coordinated Public Transit Human Services Plan, there are a series of opportunities available for the RCAMPO in fostering a more efficient and equitable transit system. These opportunities and alternatives include:

Opportunities

- Ride matching, carpools, and vanpools amongst public, private, and nonprofit organizations for longer distance commutes across the MPO region.
- Voucher programs administered by public and/or private organizations to subsidize travel costs for lower income residents, providing more mobility options for work commutes and errands.

Alternatives

- Special group trips that link popular destinations, such as local supermarkets or employment centers, to expand transit service in the area.
- Lifeline services that provide transit in rural areas that currently have little or no transit service.
- Expanded demand-response service, either through a Dial-a-Ride arrangement or traditional on-demand bus service.

- Commuter express bus routes that provide transit service between an origin and major employment center destination.
- Expanded regional service region to include new routes.

4.5 Bicycle and Pedestrian

The adoption of a Bicycle and Pedestrian Master Plan in 2011 formalized the RCAMPO's intent to develop an efficient network of facilities for pedestrians and cyclists, offering alternatives to vehicle travel through enhanced connections to destinations, and promoting improved public health through activity based transportation in the region.

Currently, the bicycle and pedestrian network maintains numerous bicycle and pedestrian facilities, including sidewalks, cycle tracks, shared-lanes, and dedicated bicycle lanes. Continued investment in these facilities can aid the MPO in maintaining a welcoming environment for both pedestrians and bicyclists, and benefit the overall transportation system by allowing residents ample opportunity to take trips utilizing these modal options instead of a private vehicle.

While the Black Hills region offers myriad recreational opportunities for bicyclists, the use of this transportation mode for commuting purposes remains low, as American Community Survey (ACS) data for 2017 indicates that 0.4% of Rapid City residents commute to work via this mode. Compared with walking, which comprised 3.7% of work commutes, and transit, with 0.6% of work commutes in 2017, bicycling was the least utilized mode for completing these types of trips.

4.5.1 Current Bicycle and Pedestrian Facilities

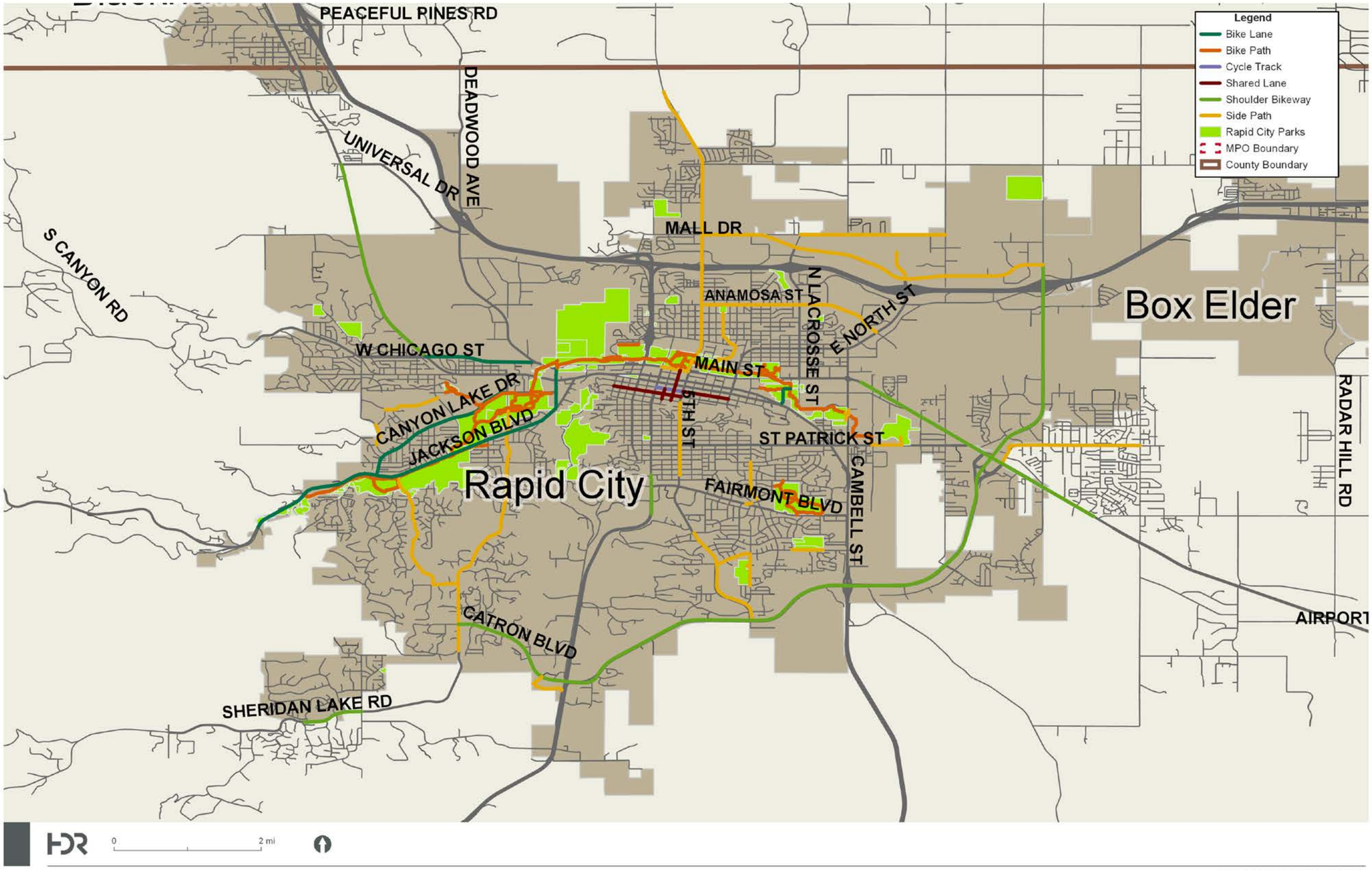
The bulk of existing bicycle facilities in the RCAMPO boundaries are side paths, which total 26.33 miles. These facilities are separated from roadways, and offer both bicyclists and pedestrians a wider path and increased safety due to the separation from motor vehicles. The total number of miles of shoulder bikeways is 18.47, and these facilities are the second most common. Regarding planned investments in bicycle facilities, the MPO has identified 28.25 miles of bike lanes and an additional 28.01 miles of shared used path. One type of bicycle facility that is planned for but does not yet exist in the area is a signed shared roadway, with 15.24 miles identified. **Table 4-11** displays the breakdown of all existing and proposed bicycle facilities in the RCAMPO region.

Table 4-11: Existing Bicycle Facilities and Length

Facility Type	Length
Bike Lane	9.68
Bike Path	16.42
Cycle Track	0.28
Shared Lane	1.79
Shoulder Bikeway	18.47
Side Path	26.33
Total Existing Mileage	72.97

Sidewalks are a critical facility for any urban transportation network as they allow for pedestrian connections and encourage active transportation through connecting with other modes of transportation. Furthermore, sidewalks have shown to generate increased economic activity in commercial and mixed-use areas as they facilitate increased foot traffic. Currently, sidewalk data is only available for collector and arterial roads in the RCAMPO region; based on the existing data for this facility, it was found that there are 97.2 miles of sidewalk in the MPO area alongside collector and arterial streets, with 61.01 miles being on both sides of their corresponding road, and 36.19 miles being on only one side of their corresponding road. **Figure 4-10** displays the locations of these facilities.

Figure 4-10: Existing Bicycle and Pedestrian Facilities



4.6 Intercity Transportation

In addition to the highway links that connect the Rapid City Area to other parts of the state and country, there are additional modes of travel for intercity travel to and from the Rapid City Area.

4.6.1 Aviation

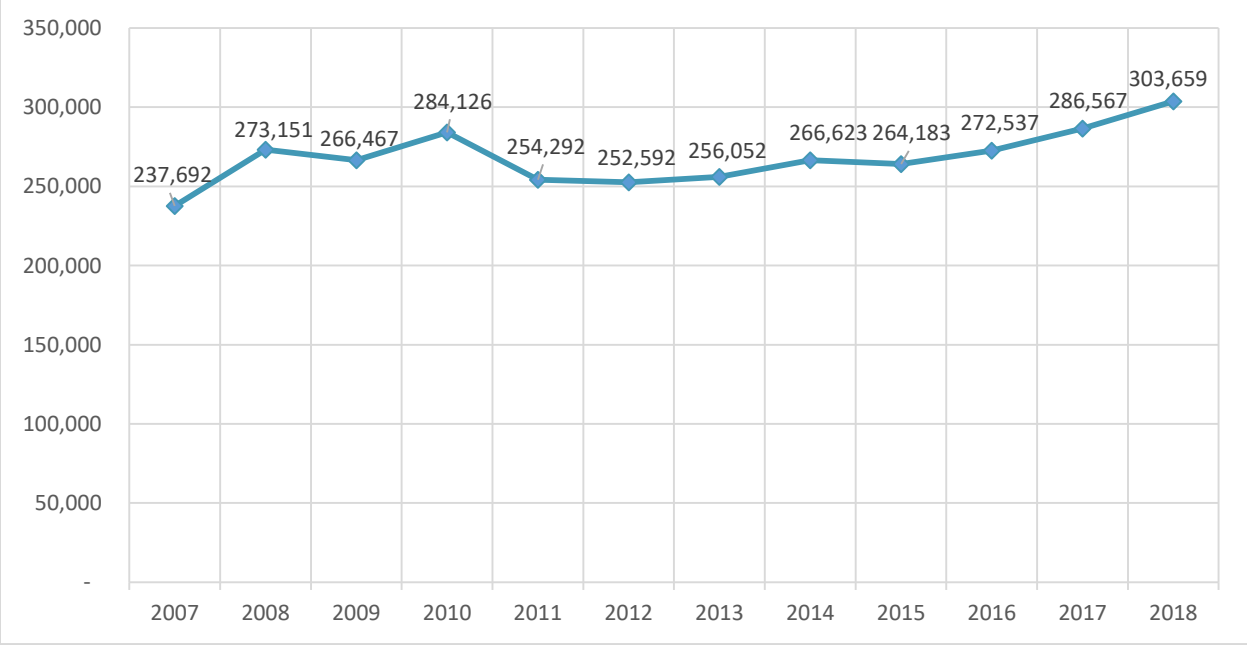
The Rapid City Regional Airport is the home of commercial and general aviation within the Rapid City MPO area and is the second largest airport in the state. The airport plays a fundamental role in the region's transportation network, connecting travelers with the Black Hills and other major tourist sites in Western South Dakota.

The airlines currently operating out of the Rapid City Regional Airport are:

- Allegiant Air: Flights to Las Vegas, NV and Phoenix, AZ
- American Airlines: Flights to Charlotte, NC, Chicago, IL, Dallas, TX, and Phoenix, AZ
- Delta Airlines: Flights to Atlanta, GA, Minneapolis, MN, and Salt Lake City, UT
- United Airlines: Flights to Chicago, IL, Denver, CO and Houston, TX[11]

Figure 4-11 displays the annual enplanements at Rapid City Regional airport for the period 2007-2017. As indicated by the figure, annual enplanements grew from a 2007 level of 237,692 to 303,659 in 2018. The general trend shows overall growth, with a fluctuation in enplanements from year to year.

Figure 4-11: Annual Enplanements for the Rapid City Regional Airport, 2007-2018[12]



[11] Seasonal flights to Newark, NJ, Los Angeles, CA, and San Francisco, CA
[12] Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) data

4.6.2 Intercity Bus Service:

The RCAMPO region's intercity bus service is operated by Jefferson Lines, with passenger pick-ups and drop-offs conducted at the Milo Barber Transportation Center in downtown Rapid City. Jefferson Lines serves as the regional intercity bus carrier, connecting Rapid City with other communities in South Dakota, such as Pierre, Sioux Falls, and Brookings, as well as Gillette, WY and Billings, MT. Jefferson Lines main service area includes the central and northwest United States, from Arkansas to Washington State.

4.7 Freight System

Freight activities play an important role in the Rapid City Area regional economy and facilitating an efficient movement of goods on local and national highways is of paramount importance. To gain a better understanding of how highway freight volumes are expected to change in the RCAMPO boundaries over the next 25 years, freight forecast data was obtained from the Federal Highway Administration's Freight Analysis Framework (FAF) database. This data estimates the movement of commodities on the national highway system by using average truck payloads and assigning them to individual highways for forecasting purposes. Additional data points used by the FAF include functional classifications, number of lanes, and other pertinent highway characteristics to project future increases in tonnage moving along U.S. highways.

The results of the assessment of the FAF data for the region found that:

- Truck volumes are predicted to increase substantially over the planning horizon. FAF data indicate a predicted 125% increase in truck vehicle miles traveled (VMT) between 2012 and 2045. **Figure 4-12** illustrates current truck volumes from FAF.
- Commodity tonnage increases are predicted to also increase over the planning horizon. FAF data predict a 66% increase in commodity tonnage between 2012 and 2045. **Figure 4-13** illustrates current commodity flows from FAF.

This marks a significant increase in freight activity traveling along highways in the region, and has implications on public expenditures related to roadway maintenance and expansion, as well as the operational capabilities of the roadway network to support this increased amount of traffic.

Figure 4-12: Daily Truck Flows, 2012

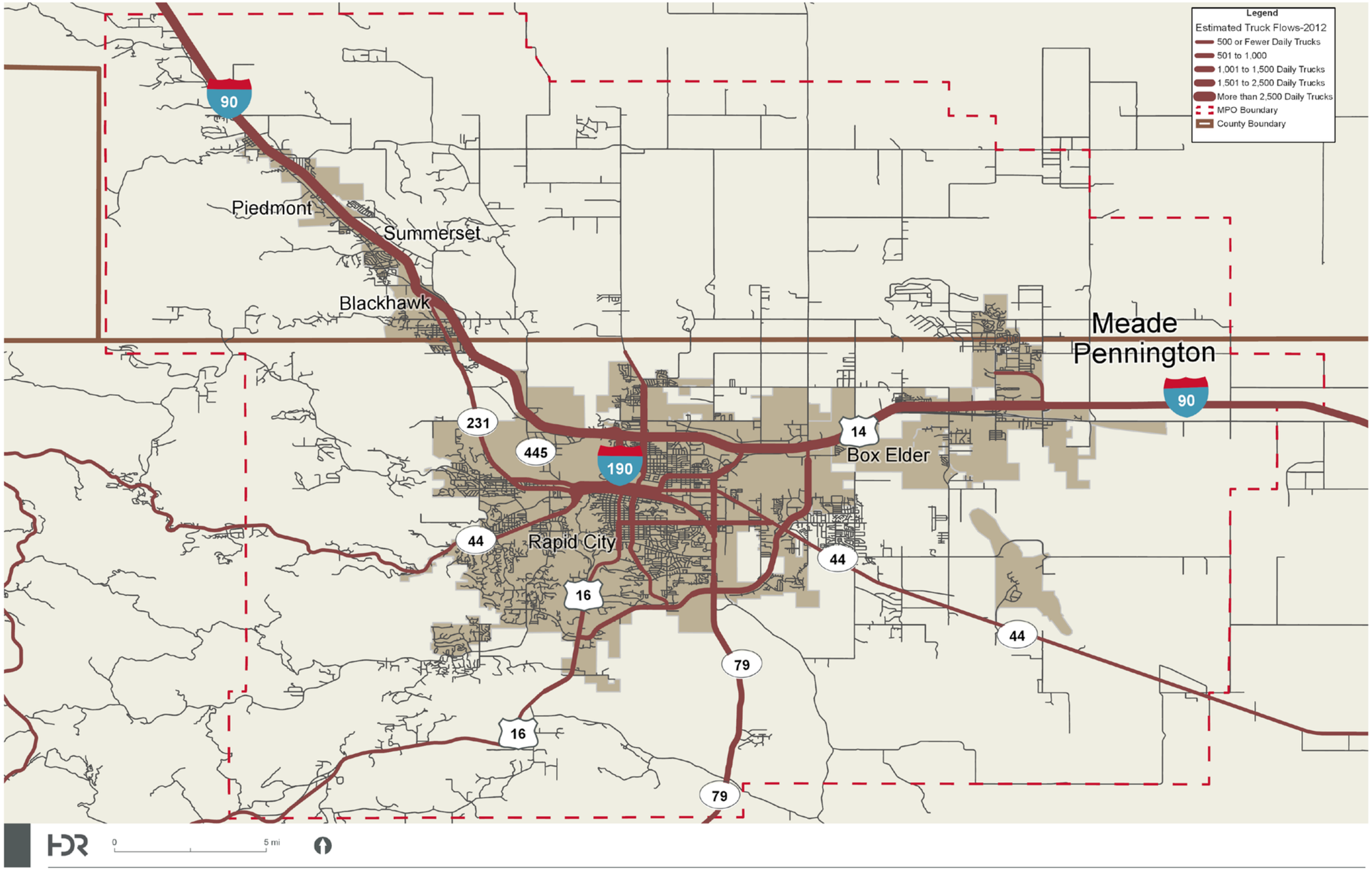
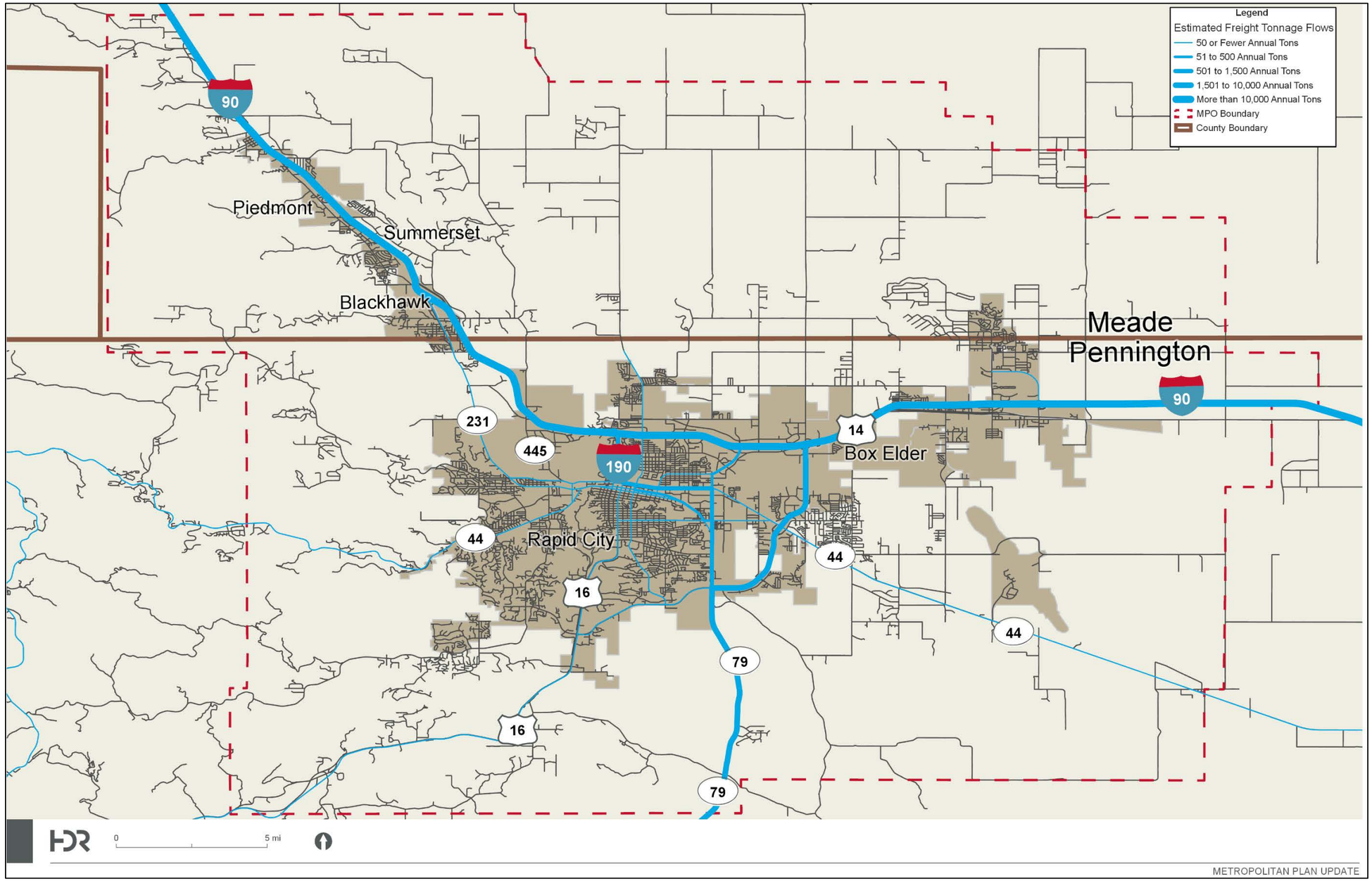


Figure 4-13: Current Commodity Flows, 2012



5.0 Future System Performance

In addition to assessing current transportation system conditions, a key part of the transportation plan is looking ahead and anticipating transportation system needs through 2045. As the Rapid City Area continues to grow during the planning horizon, demand for all modes of travel will increase in the area. Projecting the performance of the future transportation system relies on an understanding of the system's current operations as well as the dynamic factors that impact growth trends and development patterns of the region. These growth trends will drive how we travel in the future. This chapter of the MTP describes how future system performance was projected and how projected demographic and employment changes are expected to impact future travel demand. The chapter concludes with a discussion of the multi-modal opportunities available to the MPO in realizing the vision for the region's future transportation system.

5.1 A Changing Region

The Regional Profile presented in Chapter 3 demonstrates historically steady growth throughout the MPO area over the past several decades. The steady growth in population, households, and employment are the underlying basis for projecting future growth patterns in the region through the year 2045.

A demographic analysis conducted for the MPO area identified household and employment figures for the base year 2018 and applied historical growth rates to estimate household and employment levels for the future year 2045. **Table 5-1** shows the resulting future year 2045 projections.

Table 5-1: Projected Household and Employment Growth, 2018-2045

Measure	*2018*	*2045*	*Change*
Households	*49,008*	*59,456*	*+21%*
Employment	*67,337*	*97,713*	*+45%*

Source: RCAMPO

The results of the analysis indicate that the number of households in the region is expected to increase by roughly 20%, from a base year 2018 level of 49,008 to 59,456 in future year 2045. Regional employment was estimated to increase from a base year 2018 level of 67,337 to a future year 2045 level of 97,713; this marks an increase of 45% over the 28-year period.

While understanding the overall changes in growth and development between 2018 and 2045 are critical to estimating future traffic operations and performance, it cannot be assumed that this growth will occur evenly throughout the region. **Figures 5-1** and **5-2** illustrate the projected growth in households and employment by Transportation Analysis Zone (TAZ).

Figure 5-1: Household Growth by TAZ, 2018-2045

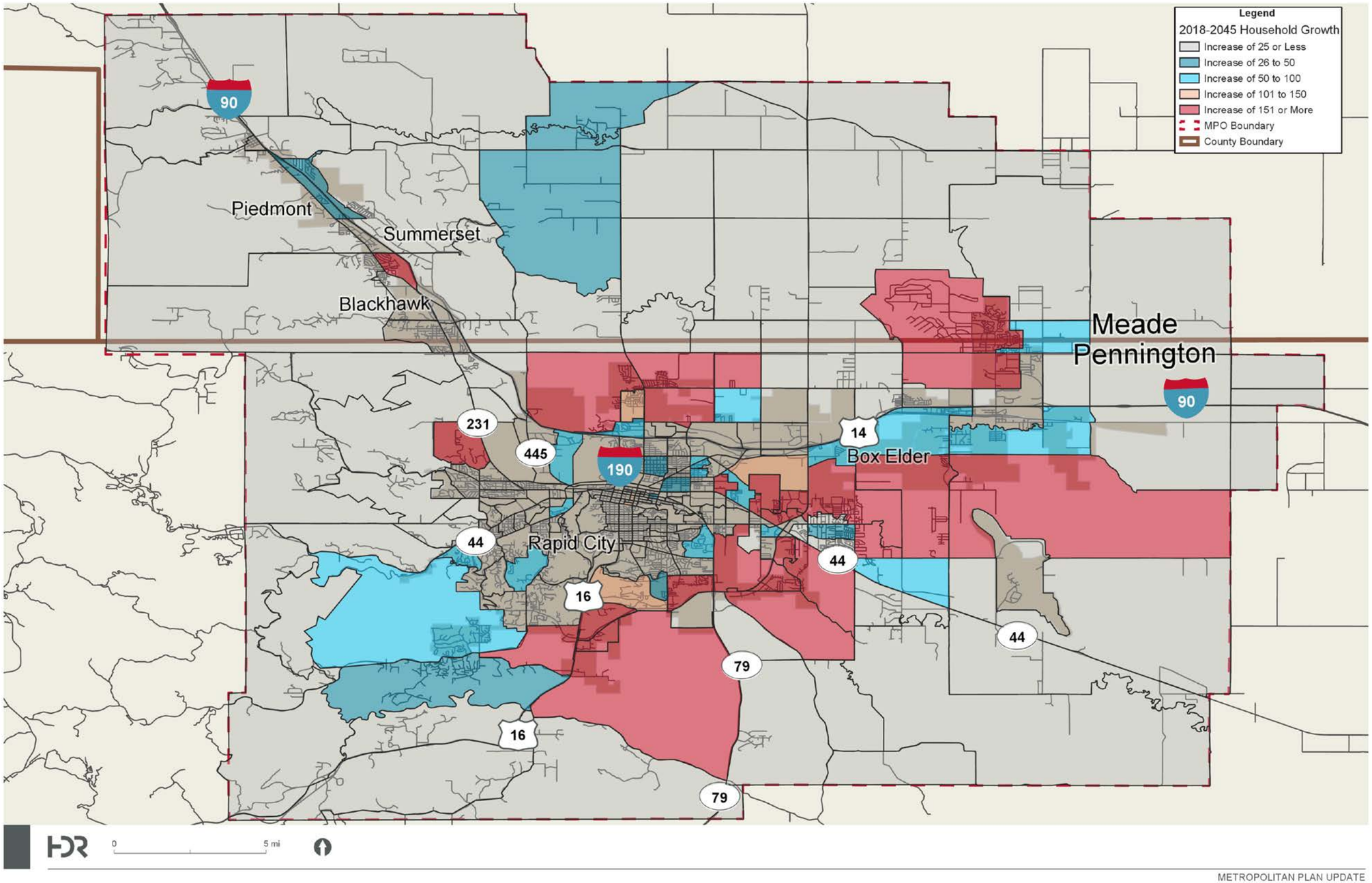
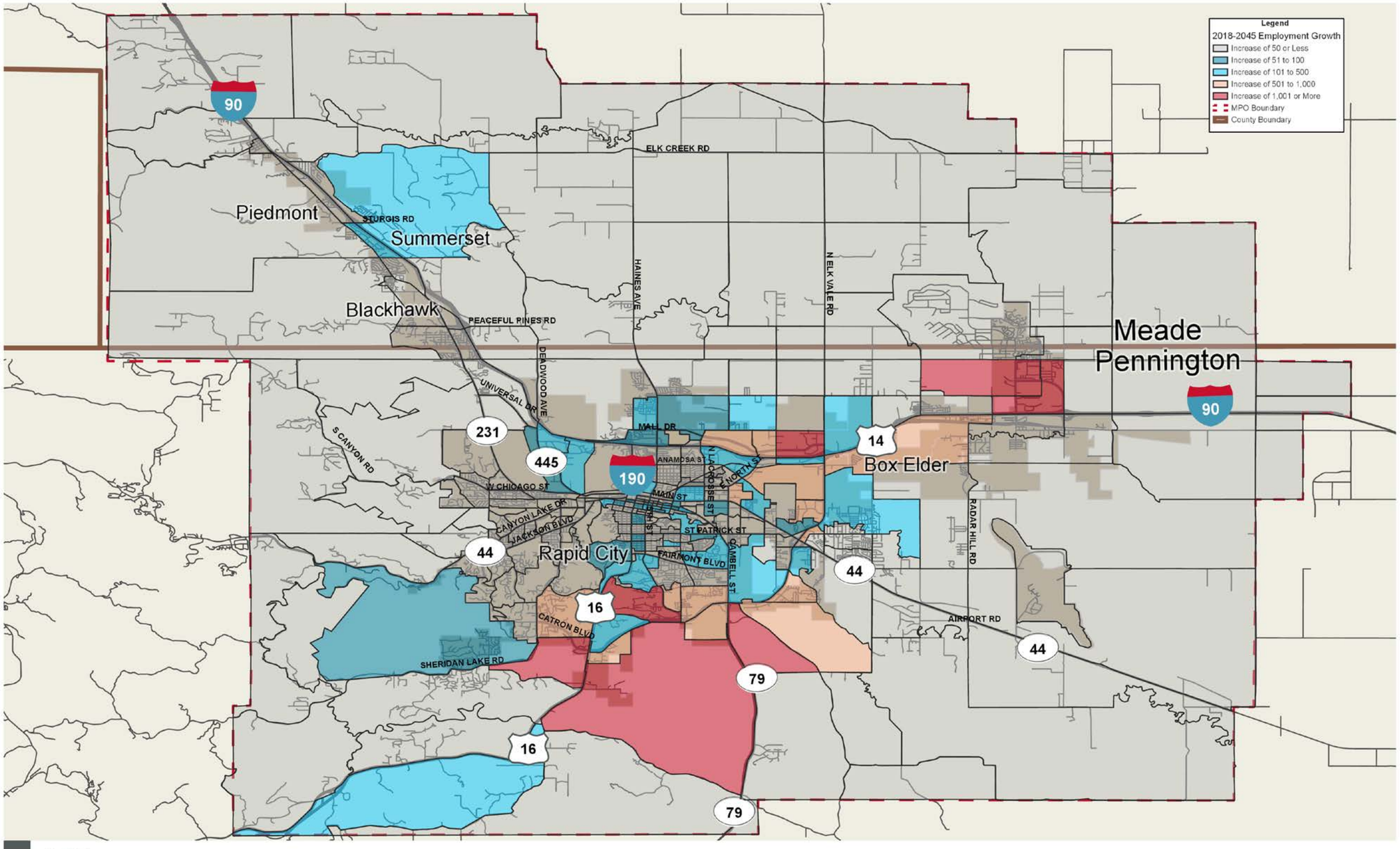


Figure 5-2: Employment Growth by TAZ, 2018-2045



5.2 Travel Demand Model

The RCAMPO's Travel Demand Model (TDM) was updated as part of the MTP planning process to represent base year 2018 conditions. This TDM is a simulation of travel in the Rapid City Area that uses socio-economic data like the location of housing and jobs, and transportation system and network characteristics. The TDM is first calibrated against current conditions, and once it does a reasonably good job of explaining current travel patterns, is then adjusted to account for anticipated future land development growth to predict future conditions of the MPO's roadway system. For more information on the TDM, refer to **Appendix A**.

5.2.1 Future Year 2045 Existing Plus Committed Baseline

To understand what the 2045 roadway network would look like with no improvements beyond those currently included in the four-year Transportation Improvement Program (TIP), a baseline "existing plus committed" (E+C) scenario was developed based on the roadway projects that are currently under construction, or programmed in the MPO's Transportation Improvement Program (TIP). Projects are considered "committed" when the planning and engineering work required of them is complete and the necessary funding to construct them will be available over the next four years. The major E+C roadway projects assumed to be implemented by 2045 are:

- I-90 Exist 59/LaCrosse Street interchange reconstruction and roadway widening (Rapid City)
- Omaha Street roadway widening (Rapid City)
- Pennington County Road 14-16/Radar Hill Road intersection reconstruction (Box Elder)
- Sheridan Lake Road/Catron Boulevard intersection improvements and roadway widening (Rapid City)

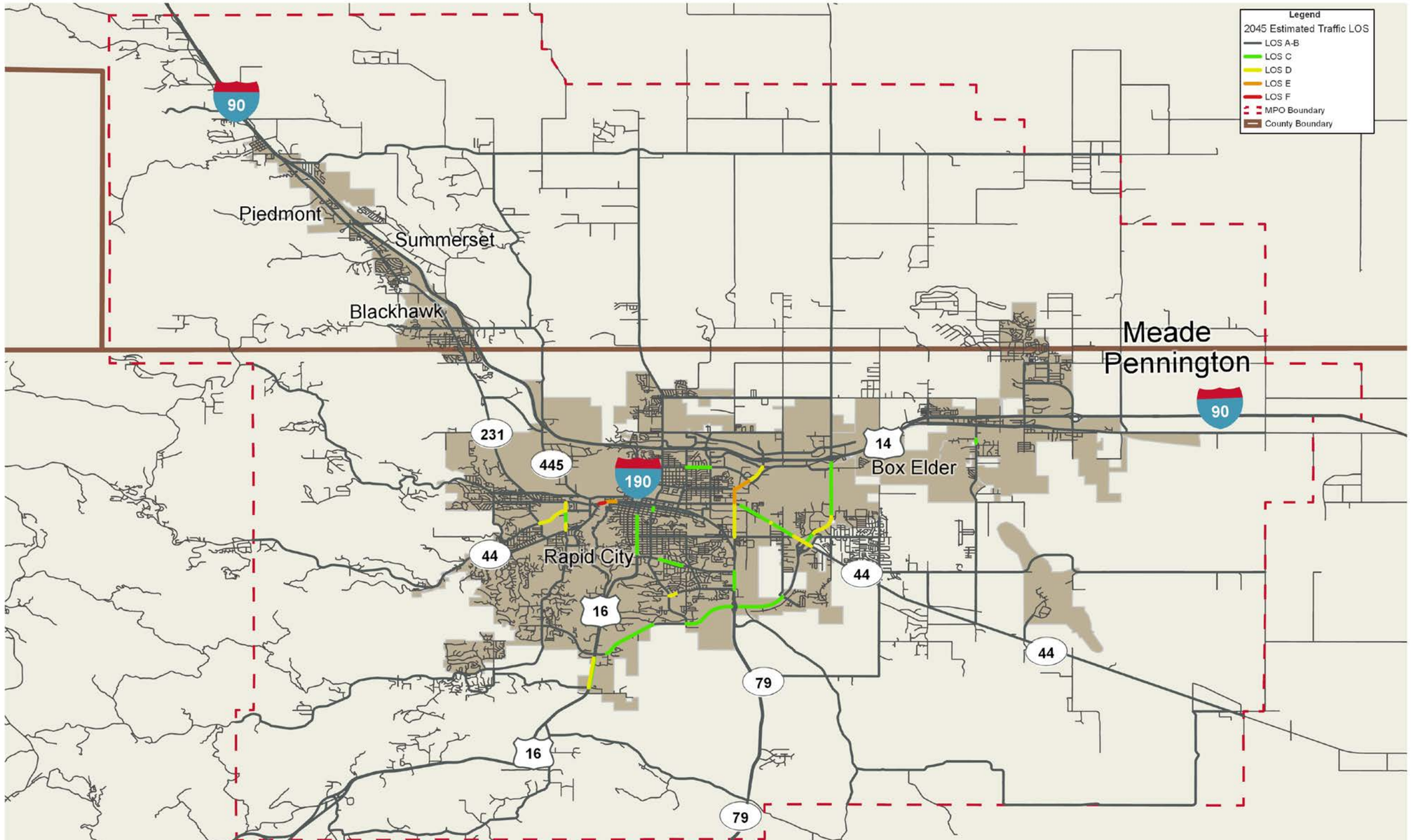
5.2.2 Future E+C Traffic Operations

Future year 2045 peak hour traffic operations were delineated based on future year traffic forecasts. These future year 2045 traffic forecasts were identified by comparing base year 2018 modeled traffic flows and future year 2045 modeled traffic flows. Using the capacity approach detailed in Chapter 4, the future year 2045 peak hour traffic operations presented in **Figure 5-3** were calculated.

The Existed Plus Committed baseline serves as a "no build" scenario where the only roadway improvements assumed to be constructed between 2018 and 2045 are those programmed for funding in the MPO's current TIP document. Estimating future E+C traffic operations allows for the identification of potential roadway capacity issues that could impact future travel, in addition to guiding the development of project prioritization metrics and strategies. The corridors exhibiting future year LOS E or F are:

- East North Street, from East Omaha Street to East Anamosa Street
- West Main Street, from Jackson Boulevard to West Street

Figure 5-3: Future Year 2045 Estimated Traffic Level of Service



5.2.3 Future E+C System Performance

In addition to the Future E+C scenario traffic operations, Future E+C system performance metrics were identified to demonstrate how the future travel would impact future travel in the region. These metrics are summarized in **Table 5-2** and include:

- **Total System Trips**: Daily trips represent the number of vehicle trips estimated by the TDM. Trips are a function of households and employment, and were estimated to increase by 23% during the 28-year forecast period.
- **Vehicle Miles Traveled (VMT) Growth**: VMT represents the total distance people drive in the Rapid City Area. VMT is a calculation of the number of study area trips multiplied by each trip's length in distance. VMT is forecasted to grow by 28%, more than trip growth, which means in the future the average trip will be longer distance than it is today.
    - Average trip lengths, which are estimated by comparing VMT to total trips for 2018 and 2045, are forecasted to increase by 4%.
- **Vehicle Hours Traveled (VHT) Growth**: VHT represents the total time spent driving in vehicles across the Rapid City Area. VHT is a calculation of the number of study area trips multiplied by each trip's time duration. VHT is forecasted to grow by 29%, more than trip growth, which means in the future the average trip will take more time than it does today.
    - Average system speeds, which are estimated by comparing VMT to VHT for each time period, are forecasted decrease slightly by 1%.

Table 5-2: Rapid City MPO Regional Travel Demand Model System Statistics

Measure	*2018*	*2045*	*Change*
Trips	*527,910*	*649,244*	*+23%*
VMT*	*2,239,928*	*2,876,137*	*+28%*
VHT*	*48,225*	*62,370*	*+29%*
Average Trip Length (miles)	*4.24*	*4.43*	*+4%*
Average System Speed (MPH)	*46.45*	*46.11*	*-1%*

5.3 Multi-Modal Opportunities

The anticipated future growth for the Rapid City Area has also helped guide the identification of future bicycle, pedestrian, and transit improvement opportunities for the region. The *Bicycle and Pedestrian Plan* is identifying a range of potential access improvements based on existing needs and emerging future growth areas. Similarly, the *Transit Feasibility Study* has developed a plan to address the current and future mobility needs of the region.

6.0 Transportation Vision and Priorities

Defining the vision for the future transportation system of the Rapid City region is rooted in the goals and objectives. Through the identification of these goals and objectives, the values for how the Rapid City community wants its transportation system to perform are translated into a clear set of guiding principles. The goals of objectives provide a measurable means of assessing progress. The 2045 MTP goal areas and objectives are based on:

- Public input gathered through RCAMPO's ongoing and continuous public engagement efforts, including the public outreach phase of this MTP update and described in Chapter 2
- National transportation goals, including the 10 Metropolitan Planning Factors
- State goals articulated in statewide plans developed by the South Dakota Department of Transportation

6.1 MTP Goal Areas

The goals that guided the development of the MTP were focused on the following areas:

- Safety
- System Preservation
- Multi-Modal Mobility and Accessibility
- System Efficiency and Reliability
- Economic Prosperity
- Environmental Sustainability and Resiliency

6.2 MTP Objectives and Connection to National and State Transportation Goals

Objectives for each MTP goal area were developed so that clear actions for implementing the MTP can be identified and progress towards these goals can be measured. **Table 6-1** presents the MTP objectives by their associated goal area as well as each objective's connection to the Federal metropolitan planning factors and South Dakota DOT's Long Range Transportation Plan goals.

Table 6-1: MTP Goal Areas and Relation to Federal Planning Factors, Performance Measures, and State Transportation Goals

Goal	Objectives	1 - Economic Vitality	2 - Safety	3 - Security	4 - Accessibility and Mobility for People and Freight	5 - Environment and Energy Conservation, Quality of Life, Economic Development	6 - System Integration and Connectivity for People and Freight	7 - Efficient Operation and Management	8 - Preserve the existing transportation system	9 - System Resiliency and Reliability; reduce or mitigate stormwater impacts	10 - Enhance Travel and Tourism	Support for Federal Performance Measures	SDDOT LRTP Goals
Safety	Reduce rate and frequency of all crashes		◢									• Number of Fatalities • Rate of Fatalities • Number of Serious Injuries • Rate of Serious Injuries • Number of Non-motorized Fatalities and Non-motorized Serious Injuries	Promote transportation safety
	Reduce rate and frequency of fatal and severe crashes		◢										
	Reduce rate and frequency of bike and pedestrian crashes		◢										
System Preservation	Ensure sufficient financial resources are available for maintaining all Federal-aid bridges and roads								◢			• NHS pavements in Good condition • NHS pavements in Poor condition • NHS bridges in Good condition • NHS bridges in Poor condition	Preserve and maintain South Dakota's transportation system Promote transportation facility enhancements within our authority and financial constraints
Multi-Modal Mobility and Accessibility	Increase the connectivity of the bicycle and pedestrian system				◢	◢	◢						Provide mobility and transportation choices
	Provide quality transit services to encourage increased transit ridership				◢	◢	◢						
	Improve multi-modal connections to major destinations in the region	◢			◢	◢	◢						
System Efficiency and Reliability	Regional recurring peak hour congestion is limited				◢			◢	◢			• Percent of reliable person-miles traveled on the Interstate. • Percent of reliable person-miles traveled on the non-Interstate NHS. • Percentage of Interstate system mileage providing for reliable truck travel time.	Promote transportation efficiencies within and among all transportation modes.
	Travel reliability on the Interstate and non-Interstate NHS is improved				◢			◢	◢				
	Freight travel is reliable and supported in the regional planning process				◢			◢	◢				

Table 6-1: MTP Goal Areas and Relation to Federal Planning Factors, Performance Measures, and State Transportation Goals (continued)

Goal	Objectives	1 - Economic Vitality	2 - Safety	3 - Security	4 - Accessibility and Mobility for People and Freight	5 - Environment and Energy Conservation, Quality of Life, Economic Development	6 - System Integration and Connectivity for People and Freight	7 - Efficient Operation and Management	8 - Preserve the existing transportation system	9 - System Resiliency and Reliability; reduce or mitigate stormwater impacts	10 - Enhance Travel and Tourism	Support for Federal Performance Measures	SDDOT LRTP Goals
Economic Prosperity	*Regional impediments to freight are removed*	◢			◢	◢	◢						*Support economic growth and tourism*
	Access to regional tourism is maintained	◢				◢					◢		*Preserve South Dakota's quality of life*
	Transportation strategies and policies support regional economic development goals	◢				◢							*Support access and connectivity to important facilities like grain elevators, ethanol plants, pipeline terminals, wind energy facilities, airports, freight terminals, large employment and retail generators, and intermodal facilities*
Environmental Sustainability and Resiliency	*Transportation projects limit impacts on the natural environment*					◢							
	Identify transportation strategies that improve system resiliency against natural and manmade disasters		◢			◢				◢			*Promote transportation security*
	Transportation projects limit impacts on Rapid City Area neighborhoods					◢							
	Transportation impacts on open space and agricultural land are limited					◢				◢			

6.3 Project Prioritization Approach

The performance-based planning approach outlined in Chapter 1 was used to identify a project prioritization approach. The approach taken to prioritizing transportation projects throughout the region was multi-modal in nature, and was developed based on feedback received during public engagement activities, the MPO's performance measure requirements, and guidance from the MPO, EPC, and local jurisdictions.

Projects were first categorized by mode (roadway, bicycle and pedestrian, or transit) then scored across the series of metrics. Each project's individual metric scores were summed for an overall prioritized score. This approach scored potential strategies and projects for the plan so that the highest priority projects would best reflect the community vision, and ultimately support the performance measures for the region. Based on this overall score, the projects were ranked and prioritized for inclusion in the Fiscally Constrained Plan presented in **Chapter 12.**

6.3.1 Screening Approach for Roadway Projects

Roadway projects were further categorized into two different types: system addition projects and system improvement projects. System addition projects are those that construct new roads while system improvement projects are those identified as occurring on the existing system. These two roadway project types have different attributes and could not easily be scored on a consistent basis, due to their differing nature.

6.3.2 System Improvement Project Prioritization Approach

System Improvement projects were sourced from community and stakeholder input during plan engagement events, system issues identified during the existing and future conditions analysis, and projects carried over from the previous 2040 Long Range Transportation Plan. These projects were prioritized based on the full range of transportation objectives as they relate to the 10 different criteria shown in **Table 6-2**. The location of the system improvement projects are shown in **Figure 6-1**.

MTP Project Categories

System Improvement Projects

Projects that are identified on existing urban streets. These could include widening projects, new traffic signals, or management projects like turn lanes, enhanced bicycle and pedestrian facilities or technology improvements.

System Addition Projects

Projects that are identified in new corridors or currently unpaved corridors. These projects are new, paved roadways identified for growth areas.

Table 6-2. Prioritization Approach for System Improvement Projects

Goal Area	Prioritization Approach Metrics
Safety	The project improves safety at a high-crash or high-crash rate intersection
	The project provides a safer treatment for non-motorized users
Multi-Modal Mobility and Accessibility	The project completes a planned bicycle or pedestrian facility that connects to regional bicycle and pedestrian system
	The project improves traffic mobility or provides a new bicycle, pedestrian, or transit connection to designated growth areas in the region
System Efficiency and Reliability	The project improves traffic operations for a location operating at LOS D or worse in 2045
	The project improves reliability for a corridor identified as having reliability issues
	The project improves reliability in a designated freight corridor
Economic Prosperity	The project benefits access to a tourism location
Environmental Sustainability and Resiliency	The project limits impacts on the natural environment
	The project limits impacts to the built environment and surrounding neighborhoods
	Project limits impacts on Environmental Justice populations

6.3.3 System Addition Project Prioritization Approach

System addition projects were sourced from the current Major Street Plan updated as a part of the 2045 MTP, the 2020-2023 TIP, and the 2020-2023 SDDOT STIP. The screening approach for system addition corridor projects was limited by the fact that these corridors are in currently undeveloped areas, and many of the transportation objectives outlined in this chapter could not be measured against these project. These projects were thus prioritized based on some guiding principles that tied back to the performance-based planning approach. **Table 6-3** summarizes the prioritization approach used for system addition projects while **Figure 6-2** shows the location of the system addition projects.

Table 6-3. Prioritization Approach for System Addition Corridor Projects

Vision-Based Guiding Principle	Prioritization Approach
Place Corridor Additions Near Anticipated Growth Areas	Project's level of 2045 ADT predicted to occur in the corridor
	Project location is within a designated high-growth corridor
Prioritize Corridor Additions for Infill and Contiguous Development Areas	Project is located in designated infill area defined by the Tier 1 utility service area
Develop New Corridors that Relieve Existing Congestion	Project diverts traffic from a congested corridor
Preserve Open Space	Transportation impacts on open space and agricultural land are limited
Limit Impacts to Natural Resources	Transportation impacts on environmental resources

More details on the prioritization scoring approach are shown in the Project Prioritization **Appendix C**.

7.0 Financial Analysis

7.1 Overview

This chapter serves as an overview of the historic funding levels for the various transportation improvements in the RCAMPO region, specifically projects included in the regional TIP. This analysis includes Federal, State, and Local funding sources and will be used to establish fiscal constraint for the MTP.

7.2 Time Frames

Forecasted costs and revenues are categorized into three distinct time frames:

- **Short-Term**: Years 2021-2025
- **Mid-Term**: Years 2026-2035
- **Long-Term**: Years 2036-2045

“Year of Expenditure” is used to present future year revenues and costs.

7.3 Federal Programs and Funding Levels

Historically, the RCAMPO has received transportation funds from a variety of Federal programs. These Federal programs typically provide the bulk of transportation dollars available to the MPO each year, and have certain requirements for the types of projects the funds can be spent on. The major Federal programs the MPO has received transportation monies from include:

- **Surface Transportation Block Grant Program (STBG)**: Flexible funding that may be used for the improvement of conditions and performance of any Federal-aid highway, bridge and/or tunnel project on a public roadway, pedestrian and bicycle infrastructure, and transit capital project. STBG projects are typically funded with an 80% Federal and 20% State and Local share.
- **Surface Transportation Block Grant Program funding for Transportation Alternatives (TA)**: STBG-TA, or just “TA”, is a funding program designed to provide Federal monies for projects that provide “transportation alternatives” such as pedestrian and bicycle facilities, recreational trails, safe routes to schools, historic preservation, and environmental mitigation. Similar to the STBG program, TA projects are typically funded with an 80% Federal and 20% State or Local share.
- **National Highway Performance Program (NHPP)**: NHPP funds are authorized by the FHWA for use on projects that support the condition and performance of the National Highway System (NHS), construct new facilities on the NHS, or ensure that investments of Federal transportation funds in highway construction support progress towards meeting performance targets established in State’s asset management plans for the NHS. NHPP projects on the Interstate system are typically funded with a 90% Federal and 10% State share while non-Interstate projects are typically funded with an 80% Federal and 20% State share, and a sliding scale applies.
- **Highway Safety Improvement Plan (HSIP)**: HSIP funds are available for transportation projects that achieve safety outcomes, specifically, significant reductions in traffic fatalities and serious injuries. Projects on any public road, including non-State owned

and Tribal roads are eligible. HSIP projects are funded with a 90% Federal and 10% State share.

- **FTA Section 5307 Urbanized Area Formula Program**: Section 5307 funding provides Federal monies for transit capital and operating assistance, as well as transportation-related planning.
- **FTA Section 5310 Enhanced Mobility for Seniors and Individuals with Disabilities**: Section 5310 funds for the purpose of assisting nonprofit groups meet the mobility needs of seniors and people with disabilities when the existing service is unable to meet the needs of those populations.
- **FTA Section 5311 Formula Grants for Rural Areas**: Section 5311 provides funds for capital, planning, and operating assistance to support public transportation in rural areas of populations less than 50,000 where many residents rely on public transit for meeting their transportation needs.
- **FTA Section 5339 Bus and Bus Related Facilities**: Section 5339 is a competitive, formula based program that provides federal funds for the purchase and rehabilitation of buses and related equipment as well as the construction of bus-related facilities. Projects funded by Section 5339 funds are typically an 80% Federal and 20% State or Local match.

7.4 Assumptions for STBG Sub-Allocation

7.4.1 Historical Federal Funding Levels

A review of past years' TIP documents was conducted so that the historical Federal funding levels could be identified, and a basis for forecasting future funds sourced from these Federal programs could be established.

Table 7-1 contains the historic Federal, State, and Local funding levels the RCAMPO has received from the STBG and STBG-TA programs between Fiscal Year (FY) 2010 and FY2020.

Table 7-1: Historical STBG and STBG-TA Funding Levels ($ millions) for the RCAMPO

Year	STP/STGB			STBG-TA		
	Federal	State	Local	Federal	State	Local
2010	$5.001	$2.393	$0.028	$0	$0	$0
2011	$17.086	$4.135	$0.156	$0	$0	$0
2012	$2.045	$0.650	$0.000	$0	$0	$0
2013	$4.678	$1.093	$0.500	$0	$0	$0
2014	$15.538	$0.165	$0.062	$0	$0	$0
2015	$3.539	$3.267	$0.062	$0	$0	$0.427
2016	$2.509	$0.094	$2.806	$0.621	$0	$0.458
2017	$2.509	$0.094	$2.353	$0	$0	$0.061
2018	$17.776	$2.875	$7.294	$0	$0	$0
2019	$5.434	$0.094	$4.128	$0.216	$0	$0.048
2020	$4.715	$0.152	$5.109	$0	$0	$0
Annual Average in 2020$	$7.952	$1.505	$2.105	$0.080	$0	$0.096
Annual Average in YOE $	$7.348	$1.365	$2.045	$0.076	$0	$0.090

Table 7-2 contains the Federal, State, and Local funding levels for the NHPP and HSIP programs that the RCAMPO received between FY2010 and FY2020.

Table 7-2: Historical Federal Funding Levels ($ millions)—NHPP and HSIP

Year	NHPP			HSIP		
	Federal	State	Local	Federal	State	Local
2010	$13.288	$3.481	$0	$0.000	$0.000	$0.000
2011	$4.022	$0.399	$0	$2.185	$0.030	$0.256
2012	$6.803	$0.585	$0	$0.844	$0.030	$0.011
2013	$6.416	$0.000	$0	$0.800	$0.036	$0.000
2014	$24.250	$9.024	$0	$3.401	$0.119	$0.000
2015	$17.979	$2.540	$0	$1.087	$0.061	$0.028
2016	$6.653	$1.826	$0	$1.892	$0.051	$0.100
2017	$37.376	$6.651	$0	$2.242	$0.158	$0.006
2018	$4.036	$0.644	$0	$3.778	$0.000	$0.019
2019	$15.576	$3.930	$0	$4.507	$0.435	$0.005
2020	$27.728	$5.142	$0	$6.613	$1.051	$0.005
Annual Average in 2020$	$15.866	$3.313	$0	$2.605	$0.183	$0.043
Annual Average in YOE$	$14.920	$3.111	$0	$2.486	$0.179	$0.039

7.5 Future Year Forecasts for Federal Funding Levels

The Federal funding levels identified through the TIP review were forecasted to the year 2045, based on an assumed annual growth of 1.5% beyond the current TIP. **Table 7-3** presents the projected future Federal funding levels for the RCAMPO by time period.

Table 7-3: Future Year Federal Funding Level Forecasts ($ millions) by Time Period

Time Period / Years		NHPP[13]	STBG	HSIP	STBG-TA
Short-term	*2021-2025*	*$82.973*	*$41.584*	*$13.625*	*$0.418*
Mid-term	*2026-2035*	*$185.680*	*$93.057*	*$30.490*	*$0.934*
Long-term	*2036-2045*	*$215.489*	*$107.996*	*$35.385*	*$1.084*
Grand Total		*$484.143*	*$242.636*	*$79.500*	*$2.437*

7.6 Projected Operations and Maintenance Spending

MPOs are directed to consider operation and maintenance (O&M) of the system as part of fiscal constraint, in addition to capital projects. O&M costs represent what is required to operate and maintain existing transportation facilities. To support this assessment, MPOs are charged with providing credible cost estimates in the TIP. The table below was developed in consultation with SDDOT and the local governments. The O&M costs are included in each entity's budget and are fiscally constrained. **Table 7-4** provides estimated O&M spending for each jurisdiction.

Table 7-4: Estimated O&M Spending ($ millions) by Jurisdiction

Jurisdiction	2014	2015	2016	2017	2018	2019	2020
SDDOT	*$2.500*	*$2.500*	*$2.100*	*$2.100*	*$2.100*	*$2.100*	*$2.100*
Box Elder	*$0.100*	*$0.100*	*$0.750*	*$0.750*	*$0.950*	*$0.950*	*$0.950*
Rapid City	*$5.298*	*$5.298*	*$6.119*	*$6.119*	*$6.119*	*$6.119*	*$6.119*
Summerset	*$0.000*	*$0.080*	*$0.075*	*$0.075*	*$0.075*	*$0.075*	*$0.075*
Meade	*$5.086*	*$5.086*	*$5.086*	*$5.086*	*$5.086*	*$5.086*	*$5.086*
Pennington	*$8.673*	*$8.673*	*$8.673*	*$8.673*	*$8.673*	*$8.673*	*$8.673*
Total	*$21.657*	*$21.737*	*$22.803*	*$22.803*	*$23.003*	*$23.003*	*$23.003*

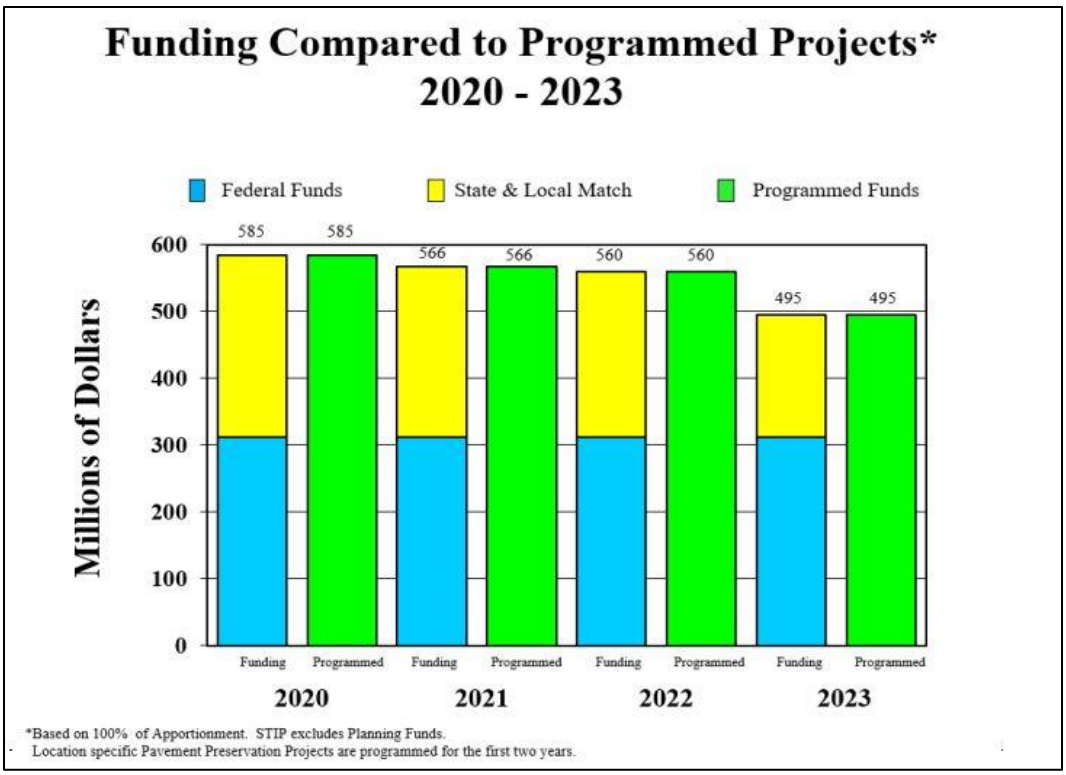
7.7 South Dakota Department of Transportation Projects

The MPO does not guide funding on the state roadway system. While this chapter provides a historical snapshot of NHPP funding, future levels of NHPP and other non-NHS state funding in the region will be based on future state system roadway needs. The state is also responsible for maintaining the entire state system outside of the Rapid City Area, so projects within the RCAMPO area will need to be prioritized against projects across the state. This section provides a summary of currently programmed state projects from the 2020-2023 State Transportation Improvement Program (STIP).

[13] It should be noted that future NHPP funding and all funding for state routes will be based on identified needs on state facilities through 2045.

Figure 7-1 shows SDDOT's Federal, state, and local funding levels for the years 2020-2023 as well as the total amounts of funding programmed for state transportation projects each year. SDDOT assumes an inflation factor of 1.5% per year in their financial projections.

Figure 7-1: SDDOT Funding Levels for State Transportation Projects



Source: South Dakota Department of Transportation

Table 7-5: List of SDDOT Projects Programmed for the MPO Region, 2020-2023

Project Number	County	Length	Location	Type	Federal Funds Share for MPO Area	Total Cost for MPO Area	Fiscal Year Programmed
IM 0041(171)	Meade Pennington	15.5	Various Routes in the Rapid City Area	Pavement Restoration	0.905	1.105	2020
IM-NH 0041(170)	Lawrence Meade Pennington	33.9	Various Routes in the Rapid City Area	Rout and Seal	0.096	0.117	2020
PH 0040(317)	Lawrence Meade Pennington	0	Various Locations in the Rapid City Region	Interstate Median Protection	0.416	0.416	2020
PH 8041(20)	Meade Pennington	1	Nemo Rd - Horizontal curve at Pennington/Meade Co line	PE, CE, ROW, Grading	3.007	3.342	2021
P 6480(04)	Pennington	9.7	Sheridan Lake Road from Jct. of US385 to Alberta Rd	Grading, Base Course, C&G, AC Surfacing	4.453	9.500	2020
IM 0902(112)59	Pennington	0	I90 - Exit 59, (LaCrosse Street)	Interchange Reconstruction	10.893	12.756	2020
IM 0901(181)0	Lawrence Pennington	0	I-90 - Rapid City Region	Crossroad Improvements	0.450	0.506	2020
P 0044(200)65	Pennington	9.5	SD44 - Fm 1.2 W of Base Line Rd to Rapid Creek	Mill & AC Resurfacing, Pipe Work	2.371	2.964	2020
IM 0041(171)	Meade Pennington	15.5	Various Routes in the Rapid City Area	Pavement Restoration	0.905	1.105	2020
IM-NH 0041(170)	Lawrence Meade Pennington	33.9	Various Routes in the Rapid City Area	Rout and Seal	0.096	0.117	2020
PH-PS 3230(05) PH 3269(02)	Pennington	0	Box Elder - Pennington Co Rd	Intersection Reconstruction, Add Turn Lanes	3.287	3.651	2020
PH 0040(317)	Lawrence Meade Pennington	0	Various Locations in the Rapid City Region	Interstate Median Protection	0.416	0.416	2020
PH 0040(339)	Custer Fall River Harding Lawrence Pennington	0	Various Locations in the Rapid City Region	Transverse Rumble Strips at Stop Controlled Intersections	0.020	0.022	2020
IM 0902(178)67	Pennington	11.1	I90 E&W - Fm Exit 67 to Exit 78 Interstate Fence	Interstate Fence	0.236	0.260	2020
PH 0016(91)61	Pennington	0	US16 - Intersection of US16 & Neck Yoke Rd	PE	0.0	0.104	2020
NH 0016(93)64	Pennington	0	US16/US16B - Intersection	PE	0.0	0.208	2020
NH 0044(167)44 P 0231(13)79	Pennington	1.2	SD44 (Omaha St)	Urban Grading, Storm Sewer, Widening, Sidewalk	11.097	13.541	2020
P 0445(00)74	Pennington	0.3	SD445 - Deadwood Ave and Krebs Dr	Left Turn Lane	0.262	0.320	2020
BRF 1575(00)19-1	Pennington	0.2	Structure on E Main	Structure Preservation	0	0.891	2020
NH 0044(00)46	Pennington	3.4	SD44 - Fm LaCrosse St to Covington St in Rapid City	ADA Curb Ramp, Intersection Improvements	0	5.132	2021
P TAPU(15)	Pennington	0.5	Rapid City - Along I190 and SD44/Omaha	PE, CE, Construction of Shared Use Path	0.138	0.169	2021
P TAPU(09)	Pennington	0.9	On the east side of Cambell St. from the end of the side path south of Rocker Dr	PE, CE, Construction of Shared Use Path	0.470	0.573	2021
IM 1902(67)0	Pennington	0	I190 - Anamosa St Str over I190	Low Slump Dense Concrete Overlay	0.311	0.342	2023

Source: South Dakota Department of Transportation Statewide Transportation Improvement Program, 2020-2020

8.0 Potential Strategies

A series of potential strategies for the transportation system were developed based on the existing system conditions discussed in **Chapter 4** and the system needs identified in **Chapter 8**.

8.1 Strategy Development and Guiding Principles

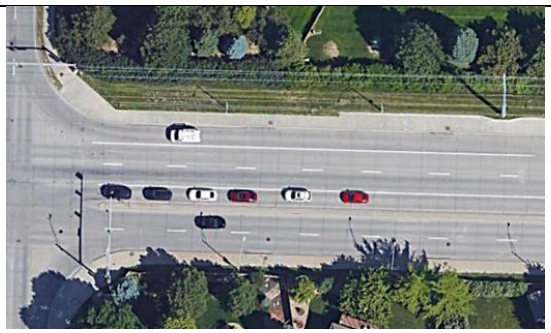
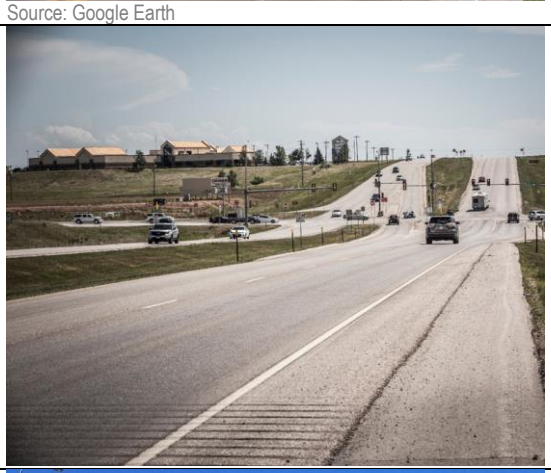
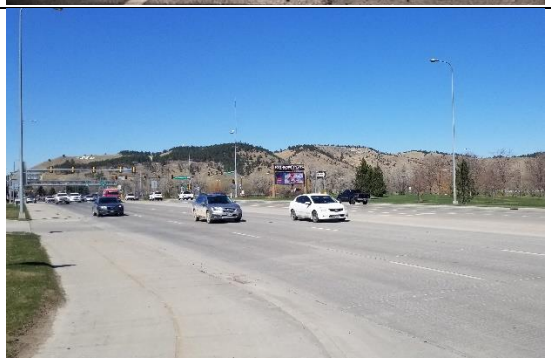
Strategies were developed based on public input received during the MTP's development as well as recommendations from past plans and studies related to regional transportation system. Strategies that were considered for that plan were based on the principles of context sensitive solutions. Strategies were selected based on not only providing appropriate transportation service levels, but also fitting in within their surrounding built and natural environment.

8.1.1 Strategies Considered

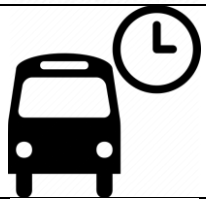
A range of strategies were considered throughout the process of identifying the final strategies presented in this Plan. The strategies, categorized by mode, area:

ROADWAY STRATEGIES

Medians	 Source: Google Earth	The median is the area between opposing lanes of traffic – the types include raised, flushed, and depressed. Medians work to separate opposing vehicle travel lanes in order to increase safety for drivers, passengers, and pedestrians.
New Traffic Signals		Signals move traffic, pedestrians, bicyclists, and transit vehicles more efficiently on existing streets by enhancing existing traffic signals, or adding traffic signals to intersections.
Traffic Signal Timing Optimization/Coordination	 Source: FHWA	Leading pedestrian intervals allow people walking to start crossing the street before the light turns green for automobiles. They are usually applied at major signalized intersections with high volumes of people walking.

Turn Lanes (Left or Right)	 Source: Google Earth	Exclusive left or right turn lanes are commonly used in higher class facilities. They provide a lane exclusively for the left or right turn. They remove queued turning vehicles from through traffic lanes, causing less delay.
Grade Separations	 Source: Google Earth	Grade separations aim to improve safety, improve network connectivity, and potentially improve travel efficiency by going over or under a barrier such as the Interstate or Railroad.
Expressway		An expressway is a multilane highway designed to increase traffic flow for high-speed traffic. They contain few to zero intersections, limited points of access or exit, and a divider between lanes for traffic moving in opposite directions. Freeways, parkways, and turnpikes are types of expressways.
Street Widening	 Source: Google Street View	Additional travel lanes through road and street widening can provide increased vehicle throughput and reduced travel delays in arterial corridors.

TRANSIT STRATEGIES

Increased Hours of Service		Longer hours of service, whether through extended morning, night, or weekend hours.
Increased Frequency of Service		Shorter wait times in between buses, such as buses arriving every 15 minutes instead of every 30 minutes.
Added or Extended Transit Routes		Add a new bus route, or extend existing bus routes into newer growth areas throughout the Rapid City Area.
Transit to Surrounding Communities		Create bus or vanpool services to surrounding communities such as Box Elder, Summerset, Black Hawk or Ellsworth Air Force Base.

Source: Rapid Transit

Bicycle and Pedestrian Strategies

A range of bicycle and pedestrian strategies were considered as a part of the *Bicycle and Pedestrian Plan*. More details on those strategies are available in that plan. The strategies considered for bicycle and pedestrians included

Bicycle and Pedestrian Strategies

- Bike Lanes
- Buffered Bike Lanes
- Trails-Shared-use paths, bike paths, sidepaths
- Separated Bikeways
- Sharrows and Shared Lane Markings
- Neighborhood Bikeway
- Sidewalks

Bicycle and Pedestrian Crossing Safety Strategies

- Marked Crosswalks
- High-Visibility Signs and Markings
- Curb Extensions/Bulbouts
- Median Islands
- Raised Crosswalks
- Raised Crosswalks at Channelized Right Turns
- Rectangular Rapid Flash Beacons (RRFB)
- Pedestrian Hybrid Beacon (PHB)/High Intensity Activated Crosswalk (HAWK)
- Grade-Sized Crossing
- Bike Boxes
- Intersection Markings
- Protected Intersections
- Wayfinding Signs
- Bicycle Signals
- Leading Pedestrian/Bicycle Intervals

8.2 Major Street Plan Update

As part of the Major Street Plan update, the existing Major Street plan was reviewed for elements which would impact the feasibility of implementing an identified corridor. Some of the elements reviewed included topography, alignment/constructability, and inconsistencies with other member agency transportation plans.

8.2.1 Topography

Based upon the function classification of the proposed network improvement (i.e. arterial/collector, etc.), maximum grades were established i.e. arterial at 8%, collector at 10% to determine if a currently planned road would exceed the maximum grade for its' respective classification. If the roadway exceeded this threshold, then it was noted to have a topography issue.

8.2.2 Alignment/Constructability

If a roadway segment had topography constraints at either end, but a section in between met design criteria, the constructible section was noted due to an alignment issue as either one or both ends would not meet design criteria. Additionally, if there were horizontal geometric constraints or general feasibility concerns with regard to substantial existing development, the roadway was noted as a possible alignment issue.

8.2.3 MTP Inconsistencies

This element identifies major street plan inconsistencies between different jurisdiction major street plans (i.e. RCAMPO vs. Meade County) most notably alignment issues. The RCAMPO Major Street Plan will be adjusted to meet the alignment of the street plan for the jurisdictional/funding authority having responsibility (i.e. the Meade County alignment will be shown for any roads within the MPO in Meade County).

Figure 8-1 shows the assessment of the Major Street Plan in support of MTP development.

8.3 Safety Countermeasures

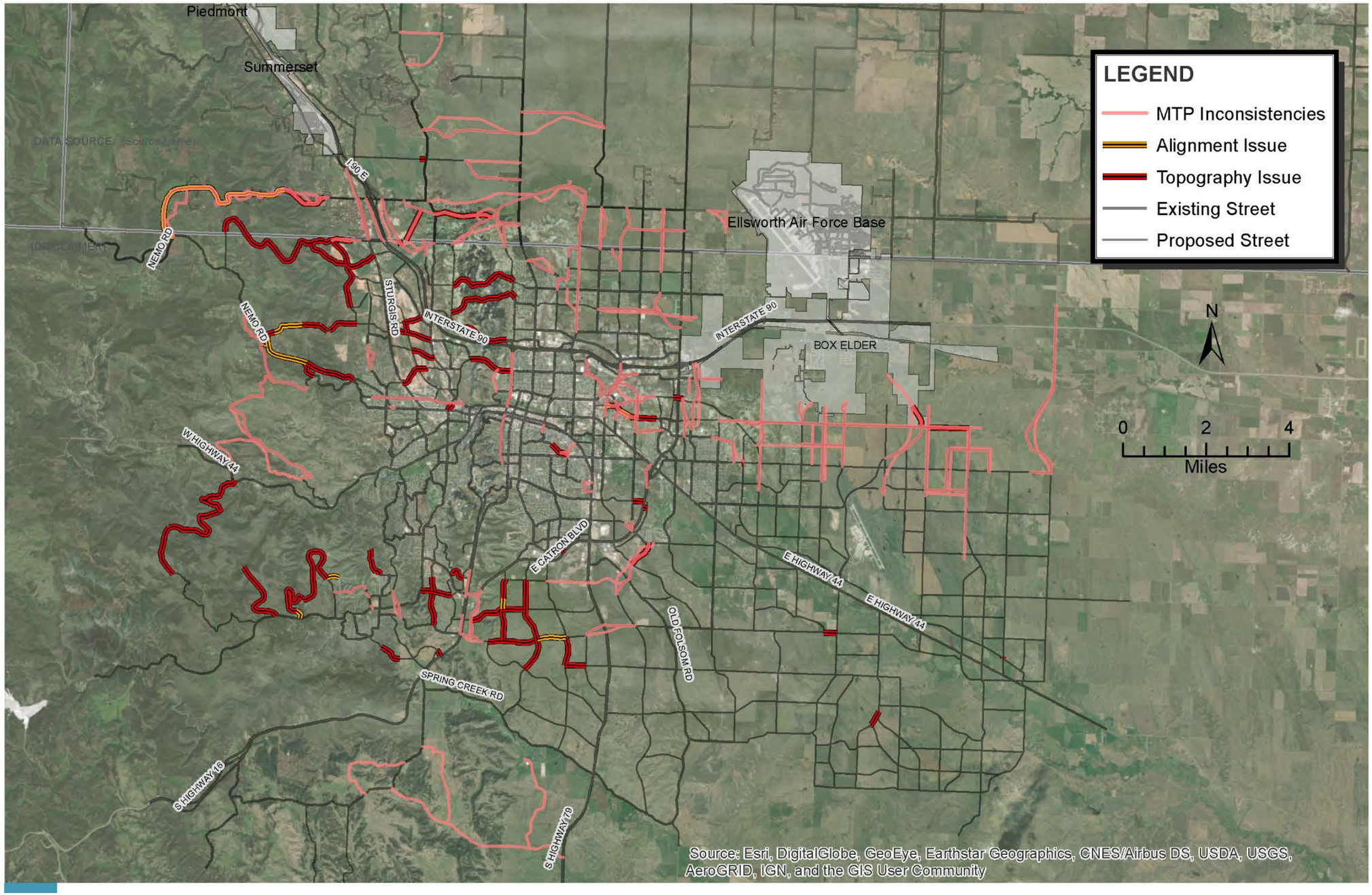
To fully integrate consideration of safety in the plan, potential safety countermeasures were assessed that might address traffic safety at the top 25 crash intersections identified in Chapter 4. Based on the intersection crash analysis, it was found that rear end and angle crashes were the most common crash types that occurred.

- One strategy to address the high number of rear end crashes is to improve signal head visibility at each intersection that experienced higher proportions of rear end collisions.
- The recommended safety strategy to reduce the number of angle crashes occurring at intersections is to update left-turn phasing to protected-only.
- It was noted that of the top 25 crash intersections, eight (8) are located on the Omaha Street corridor. A recommended strategy to reduce vehicular crash occurrences is to review and improve signal progressions and timings for each intersection along the corridor. This strategy is especially useful for addressing rear end crashes.

More details are provided in the safety countermeasures **Appendix D**, but the common appropriate crash strategies that were identified were:

- Improve signal head visibility.
- Add 3-inch yellow retroreflective sheeting to signal backplates.
- Implement systemic signing and visibility improvements at signalized intersections.

Figure 8-1: Current Major Street Plan for the Rapid City Area MPO



9.0 Future System Needs Projects

The future system needs plan lays out the range of anticipated system needs between today and 2045. This chapter summarizes the range of current and future operational, safety, and growth corridor needs identified through a range of sources. These sources include:

- Major Street Plan Update
- Public and stakeholder input received during MTP development
- Technical analysis completed during MTP development
- Other studies completed in the region

Not all of the needs identified in this chapter are anticipated to be funded through the limited transportation funds the MPO has available. The process of reviewing the available funding identified in the Financial Analysis chapter and screening these future system needs projects to identify the list of fundable, priority projects for the MPO is termed “fiscal constraint”. The fiscally-constrained transportation plan is presented Chapter 12.

As discussed in Chapter 6, the projects added to the Future System Needs project list include both system addition projects (new project corridors) and system improvement projects (projects in existing corridors). The range of identified needs projects are identified in:

- **Figure 9-1**, which shows the area-wide view of the system improvement needs projects.
- **Figure 9-2**, which shows an urban scale view of the system improvement needs projects.
- **Figure 9-3**, which shows the system addition needs projects.

A table of all projects in the Future System Needs projects is provided in **Appendix H**.

Figure 9-1: System Improvement Projects

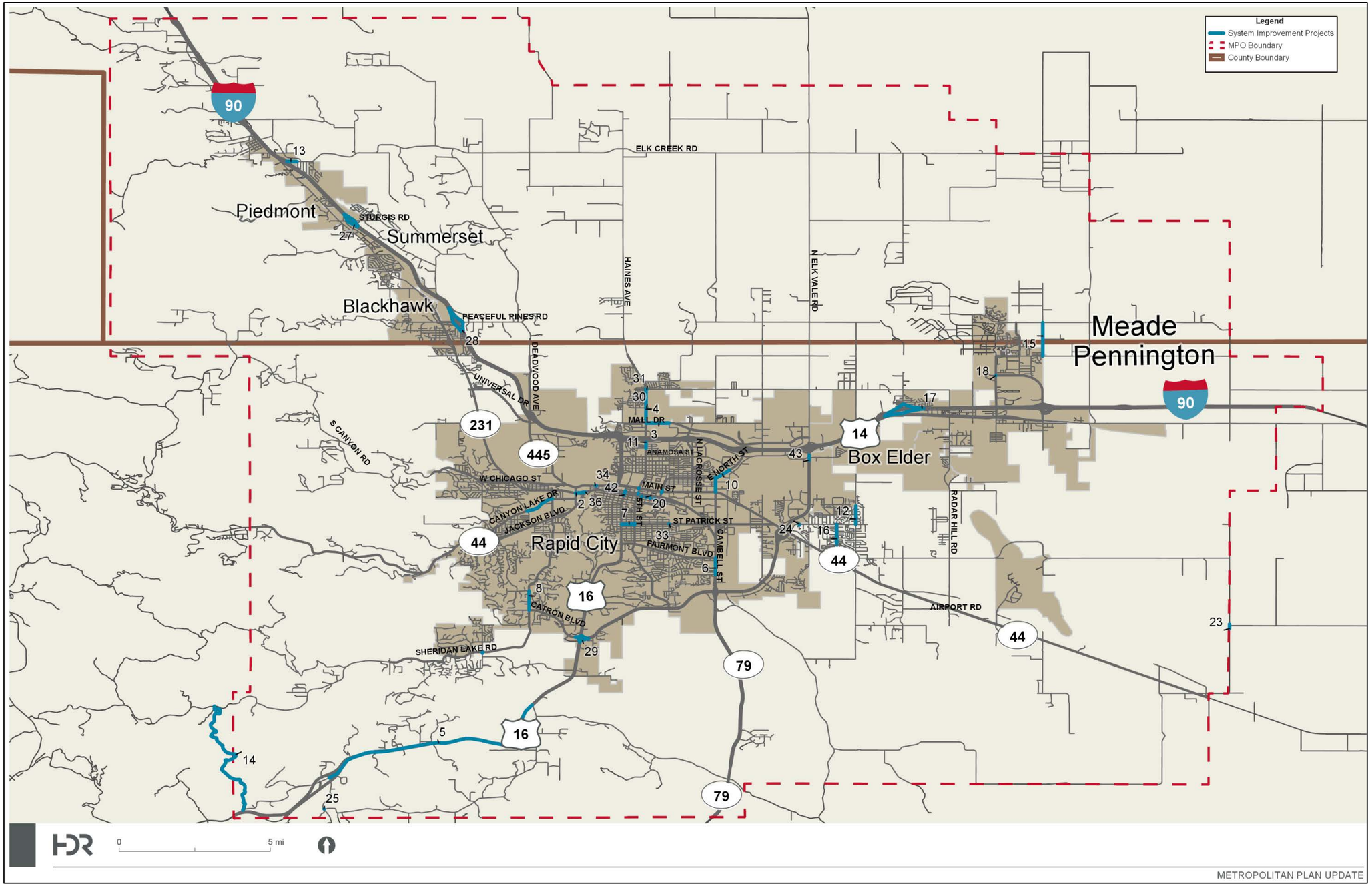


Figure 9-2: Inset of System Improvement Projects

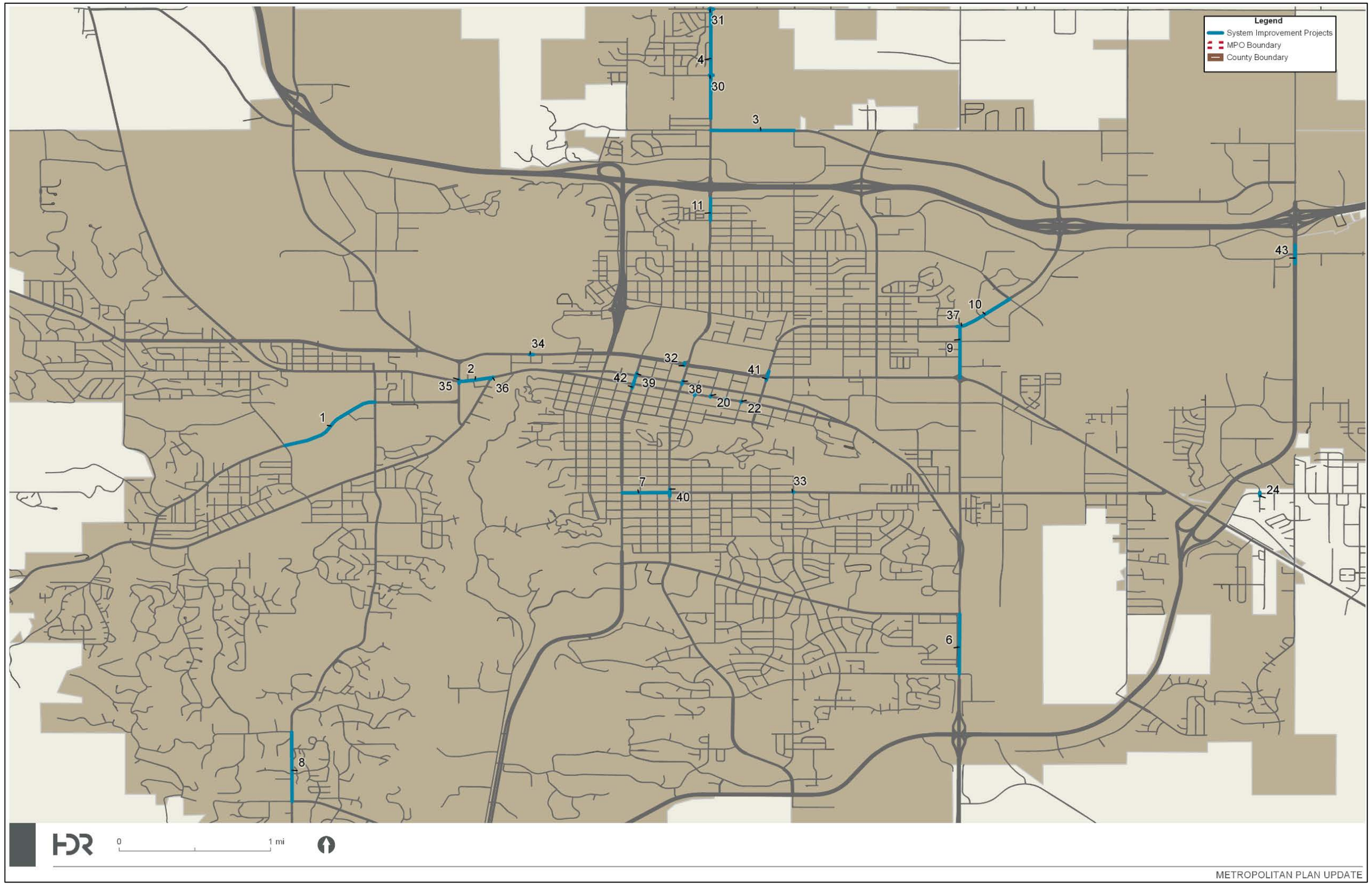
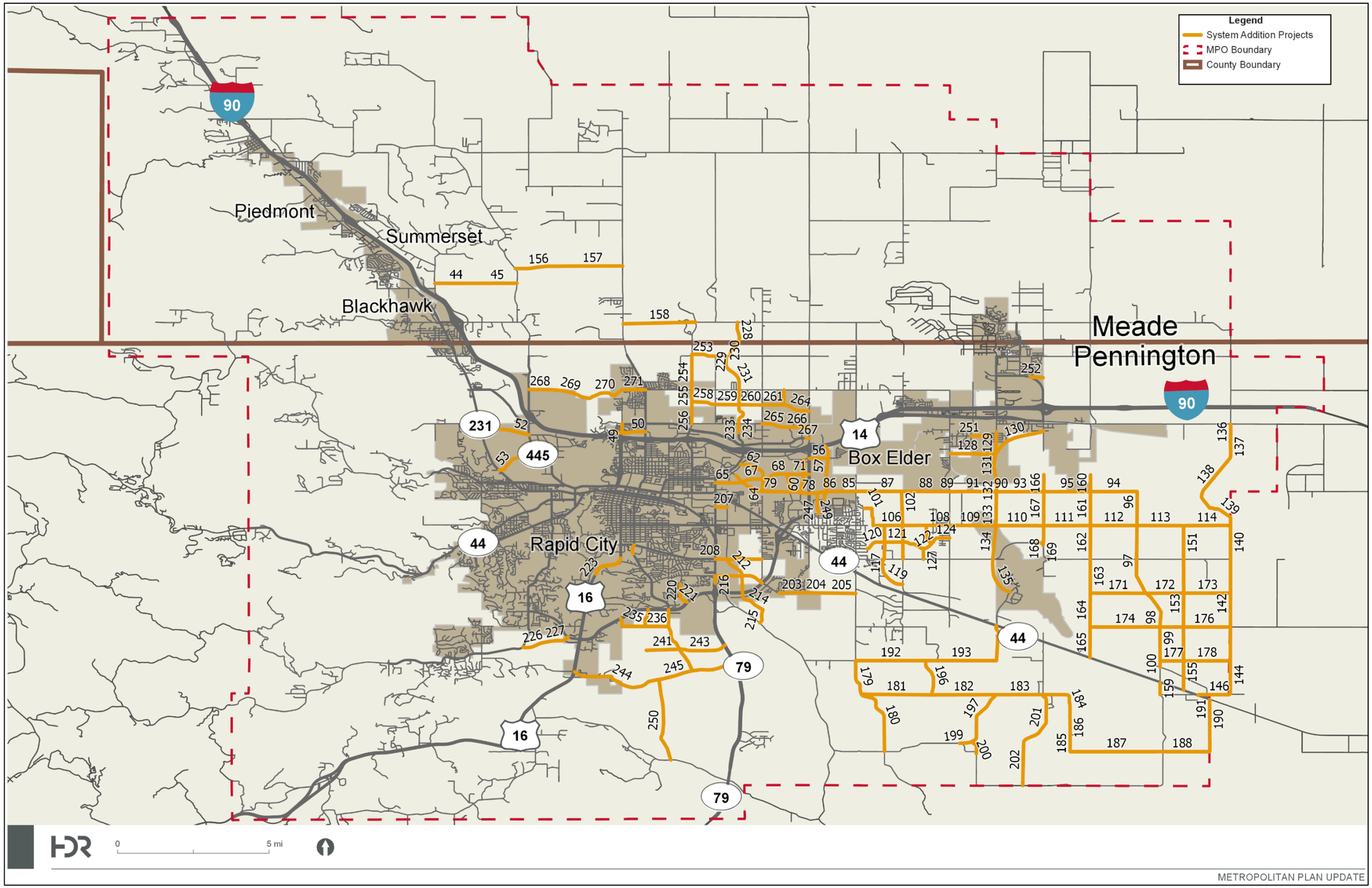


Figure 9-3: System Addition Projects



10.0 Environmental Review

To analyze potential resources within the Rapid City MPO Boundary, a desktop review of available data was conducted. The environmental resources screened were selected based on the characteristics of the MPO region, as well as input received from area resource agencies. The resources considered are generally consistent with the National Environmental Policy Act (NEPA), its implementing regulations, and Federal Highway Administration (FHWA) guidelines. The following sections summarize resources that are considered red flag environmental resources with separate regulat0ory drivers. Coordination with these agencies was completed as part of the environmental screening process. Further coordination would be required for each project. The following sections describe each resource category, along with the approach and limitation for each category. Resources agency documentation is included in **Appendix E.**

10.1 Archaeological and Historical Resources

Section 106 of the National Historic Preservation Act (NHPA) produced a regulatory framework, mandating review of Federally-funded and permitted projects to determine any potentially adverse impacts to historic resources. The Act requires projects to avoid impacts to National Register of Historic Places (NRHP) and potentially eligible properties, and, if impacts cannot be avoided, to minimize and mitigate impacts.

Approach: A record search using the National Register of Historic Places provided by the U.S. National Park Service was completed to identify potential historic and/or cultural resources. A Level I cultural literature search was not completed during this review because of the size of the MPO region. Within the Rapid City MPO boundary, there is potential for historic and cultural resources. Historic and cultural resources are regulated under Section 106 of the NHPA, and may require consultation between the FHWA, SDDOT and the South Dakota State Historic Preservation Office (SHPO).

The record search resulted in 36 sites located within the region that have been listed as eligible for the NRHP. Shapefiles of these sites were imported into ArcGIS and can be compared against future Project concepts to determine the potential for impacts to cultural resources. Because the NRHP only lists sites that are currently listed, a complete file search from SHPO would be required for each project.

Limitations: Early in project planning, the MPO should work with SDDOT to coordinate its intent to proceed with a particular roadway improvement project, and request that the SDDOT advise the MPO on the applicability of Section 106, the need to identify consulting parties, and for a Level I cultural resource literature search. When appropriate, the MPO should anticipate that a Level III identification effort will be conducted, including identification of archaeological, architectural, and traditional cultural properties subject to the effects of the project. When historic properties are identified, the MPO should anticipate that avoidance or mitigation of adverse effects to such properties may be required. Impacts to historic properties may be considered protected under Section 4(f).

Figure 10-1 identifies Cultural Resource Sites throughout the MPO area while **Figure 10-2** identifies the regional Cultural Resource Districts.

Figure 10-1: Regional Cultural Resource Site Map

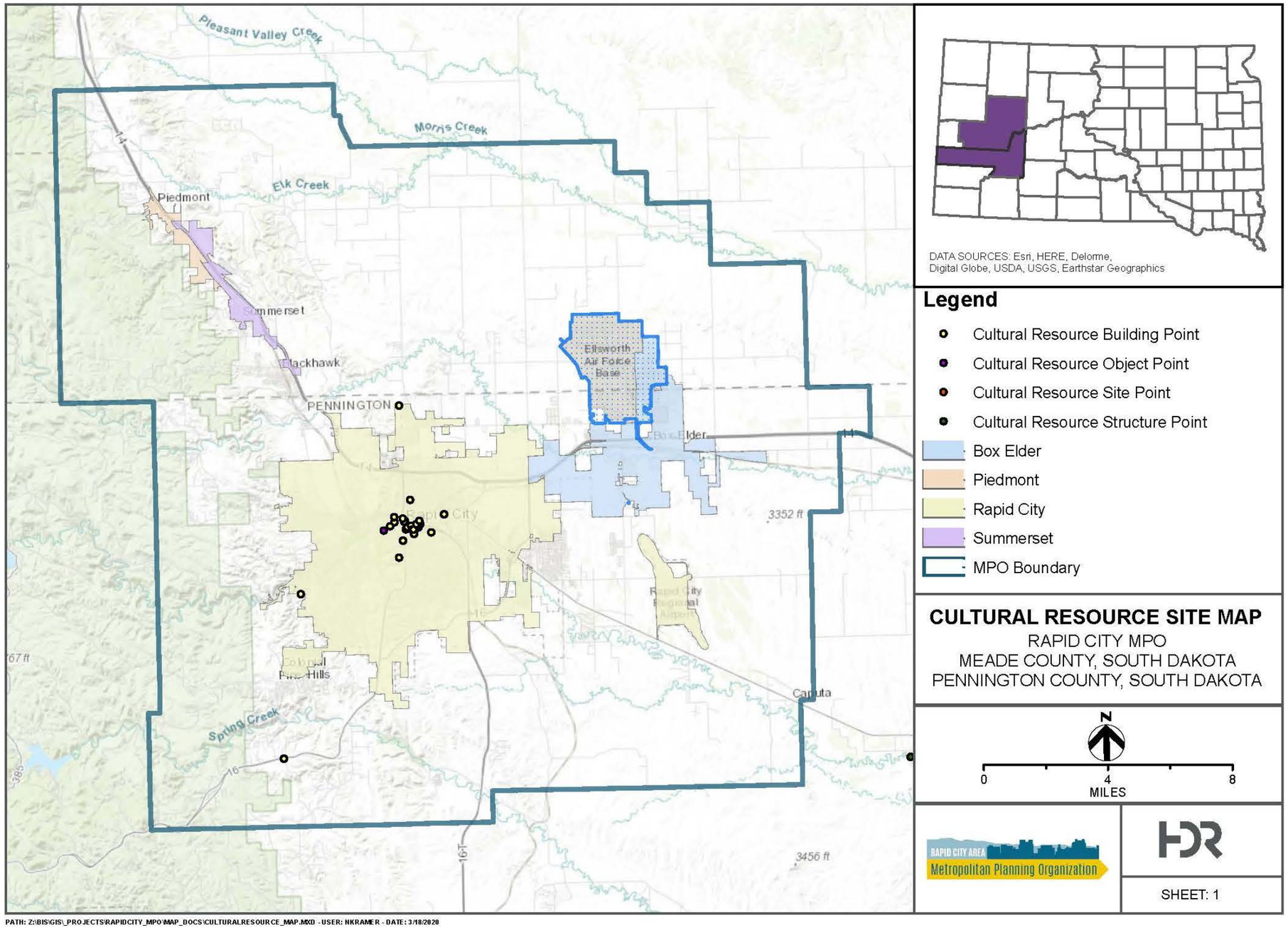
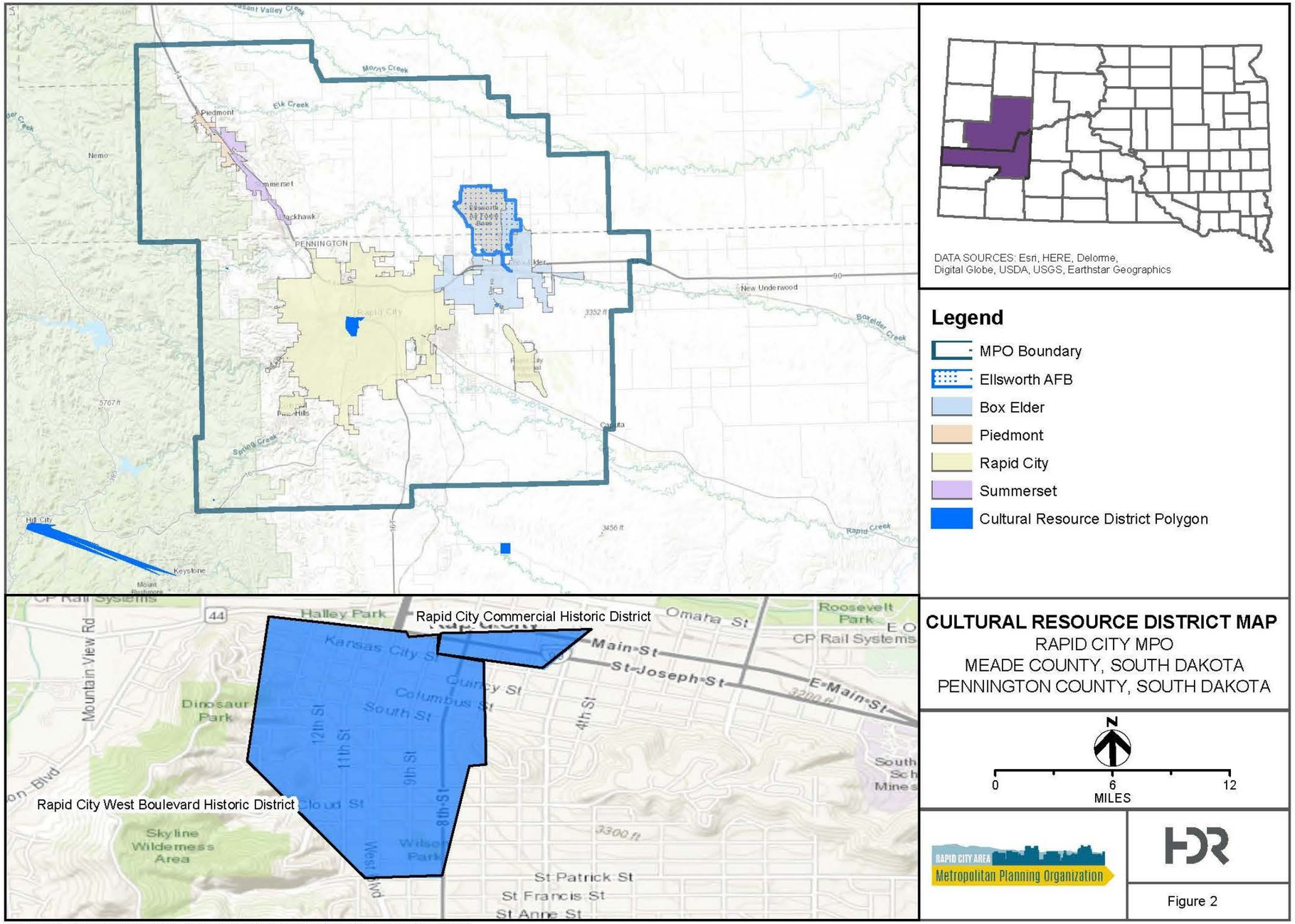


Figure 10-2: Regional Cultural Resource Districts



10.2 Wetlands and Waters of the U.S.

Waters of the U.S., including wetlands, are protected under Section 404 of the Clean Water Act and Executive Order 11990 Protection of Wetlands. These regulations require avoidance of all wetland impacts or, where avoidance is not practical, minimization to the greatest extent possible. When the objectives of a transportation project cannot be met without adverse impacts to wetlands, the preparation of a wetland mitigation plan that details how lost wetland functions will be recuperated is required.

Approach: For this MTP, National Wetlands Inventory (NWI) data and aerial imagery were reviewed within for the MPO area to determine potential project impacts. The review identified several wetlands within the city limits and adjacent to Rapid City. Because the NWI provides an estimate of wetlands based on soil type and aerial photography, these boundaries serve as guidance for further identification of wetland areas; wetland delineation would be required for each future project located in these areas.

Limitations: Wetlands and other waters of the U.S. will need to be considered for each project as they move from the planning stage to construction. Early in project planning, an onsite wetland delineation of the MPO area is recommended to confirm the boundaries of wetlands and other waters of the U.S. within the region and to coordinate with USACE to determine jurisdictional boundaries.

Inventoried wetlands located in the Rapid City Area are shown in **Figure 10-3.**

10.3 Wildlife/Threatened and Endangered Species

Various federal laws have been established to protect wildlife, including: the Endangered Species Act (ESA); the Migratory Bird Treaty Act (MBTA); and the Bald and Golden Eagle Protection Act (BGPA).

Approach: Fish and wildlife species listed under the ESA would need to be considered for each project. The list of species identified within the MPO area was sourced from U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system. Two species designated as endangered and two species designated as threatened exist within the MPO area. These include the whooping crane (endangered), least tern (endangered), northern long-eared bat (threatened) and Rufa red knot (threatened). According to IPaC, no critical habitat exists within the region.

To identify the potential presence of threatened and endangered species in the MPO area, aerial imagery was reviewed to locate potential habitat within the MPO area. The MPO area is highly developed with commercial, industrial, and residential land uses. Much of the region is developed and habitat for the least tern was not identified MPO boundary. The MPO area is partially located inside of the whooping crane migratory route. Additionally, the northern long-eared bat is a Federally-listed threatened species with a range encompassing the state of South Dakota; future environmental evaluations should consider the impacts to northern long-eared bat as projects are studied further.

Limitations: Consultation with USFWS would be required to determine which ESA-listed species have the potential habitat within each future project location. Coordination with South Dakota Department of Game, Fish, and Parks would be recommended regarding impacts to state-listed sensitive species. Additionally, coordination with USFWS would be required for any project on USFWS property.

Migration routes of the Whooping Crane are shown in **Figure 10-4.**

10.4 Parks and Recreation Properties

The Department of Transportation Act (DOT Act) of 1966 included a special provision – Section 4(f) – which is intended to protect publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites. Similarly, Section 6(f) protects state and locally sponsored projects that were funded as part of the Land and Water Conservation Fund (LWCF).

Approach: The LWCF website was reviewed to identify the use of Section 6(f) grants in the MPO area. Publicly owned parks and recreation areas are present within the MPO area. Public spaces within the City of Rapid City that have received LWCF grant money are subject to Section 6(f) regulations. Additionally, if the projects proposed in these alternatives receive FHWA funds, the projects will be subject to Section 4(f) consultation.

Limitations: There have been several grants received at a variety of the city of Rapid City public parks. Areas within the MPO area that could impact City parks or recreational trails would need to be further reviewed to determine potential for a Section 6(f) impact. Due to the use of LWCF grants, it is recommended that consultation occur with Rapid City Parks and Recreation or any other necessary entity early with each project to determine the location of improvements to determine whether the park area impacted will be subject to Section 6(f) or Section 4(f) regulations.

Figures 10-5 and **10-6** present the area's park locations and bicycle paths while **Figure 10-7** highlights the boundaries of the Black Hills National Forest.

10.5 Floodplain and Floodways

Floodplains are the lands on either side of a watercourse that are inundated when a channel exceeds its capacity. The National Flood Insurance Program (NFIP) encourages state and local governments to adopt sound floodplain management programs. The City has been a participating member of the Federal Emergency Management Agency (FEMA) Flood Insurance Program since 1998. The current Pennington County Flood Insurance Study (FIS) that includes the City is dated June 3, 2013.

The main floodways and floodplains within the MPO area are those associated with Rapid Creek, Box Elder Creek, Spring Creek, and Elk Creek and their tributaries.

Approach: FEMA flood maps were evaluated and floodplain and floodways were determined.

Limitations: If any projects would involve areas associated with FEMA or FIS, a floodplain permit may be required if the floodplain would be encroached upon. A Floodplain Development Application would be completed for the project and the City would obtain a Floodplain Development Permit.

Figure 10-8 shows the locations of floodplains throughout the Rapid City Area.

Figure 10-3: Wetlands in the Rapid City Area MPO Region

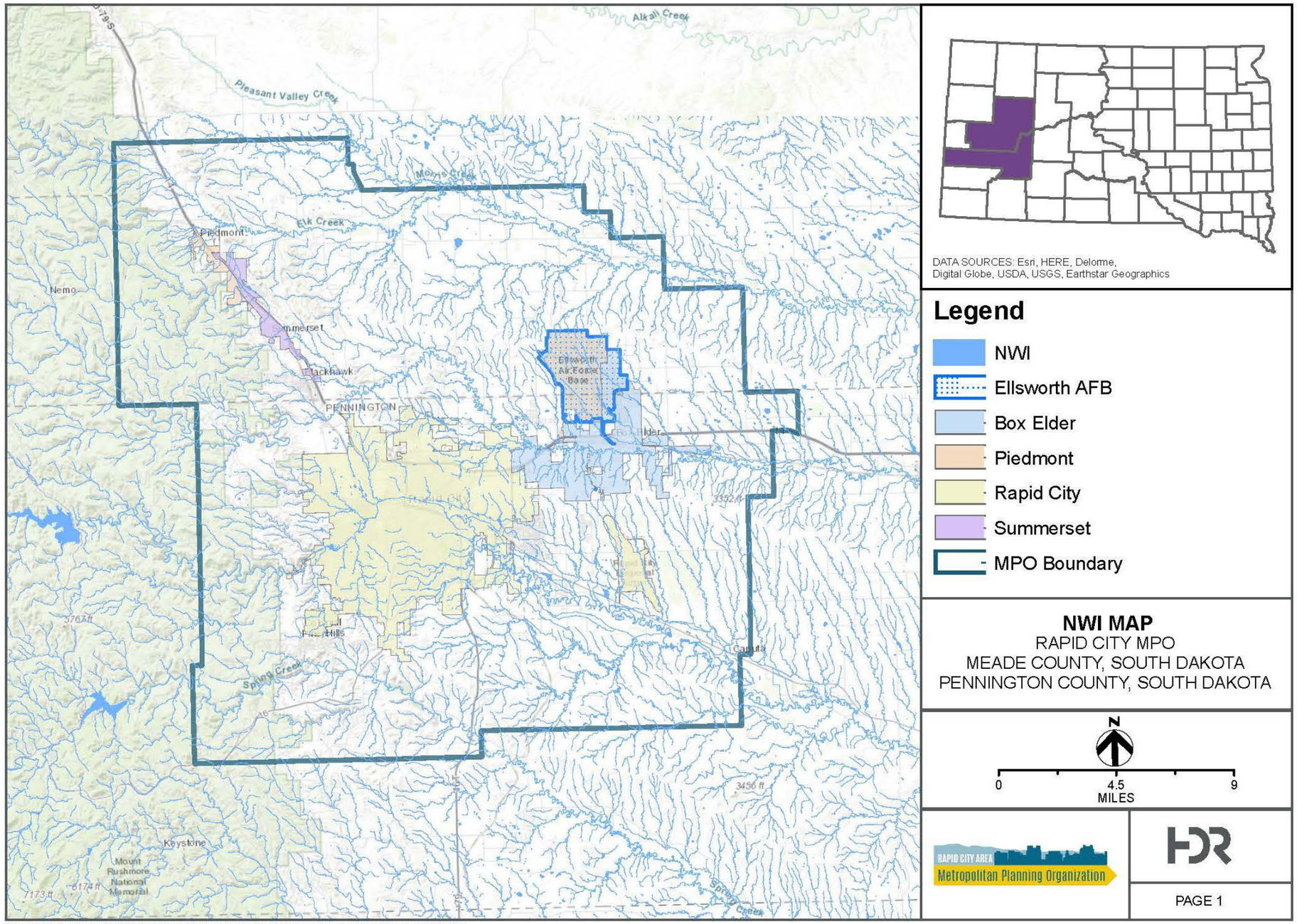


Figure 10-4: Migration Route of the Whooping Crane

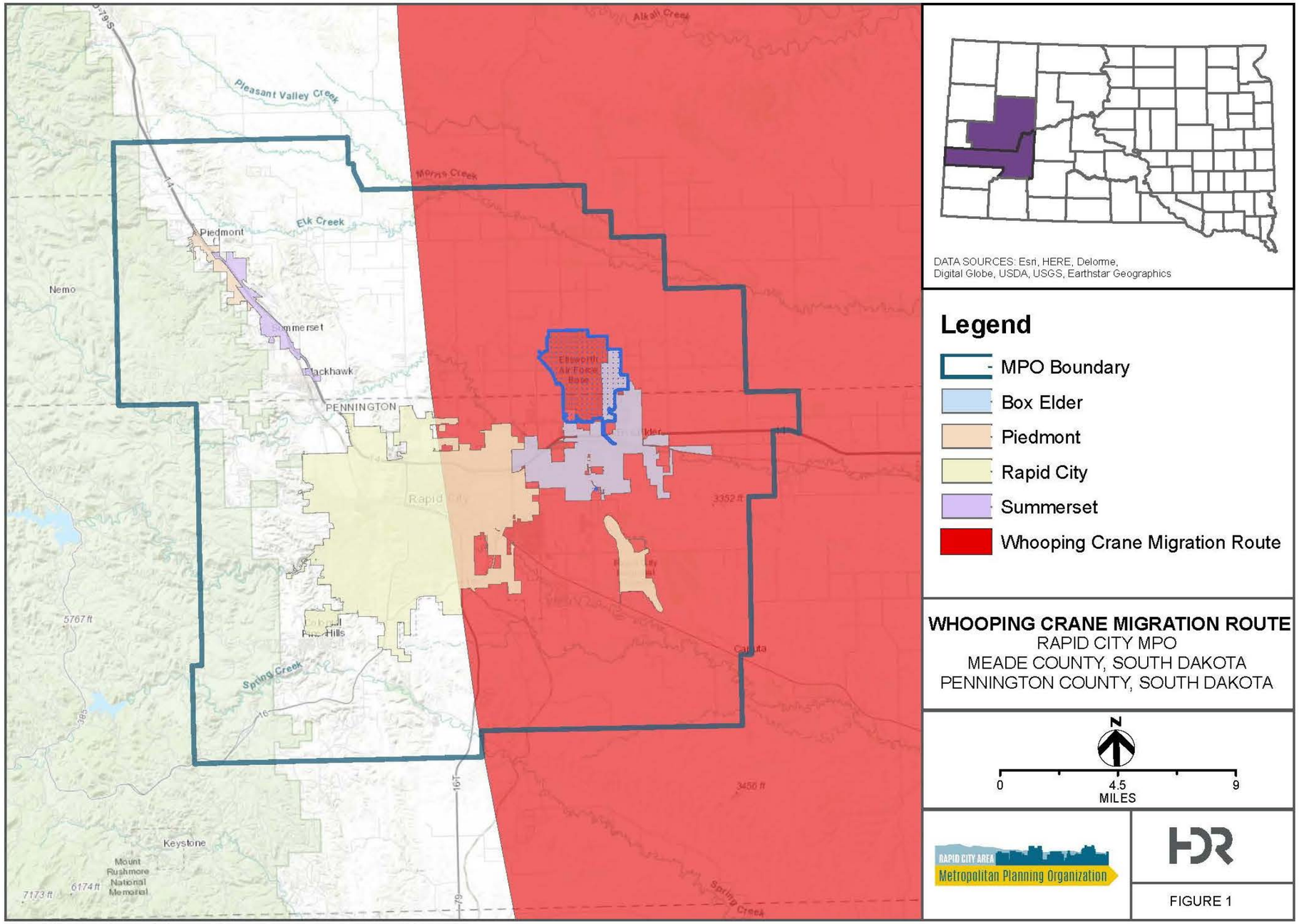


Figure 10-5: Parks of the Rapid City Area MPO Region

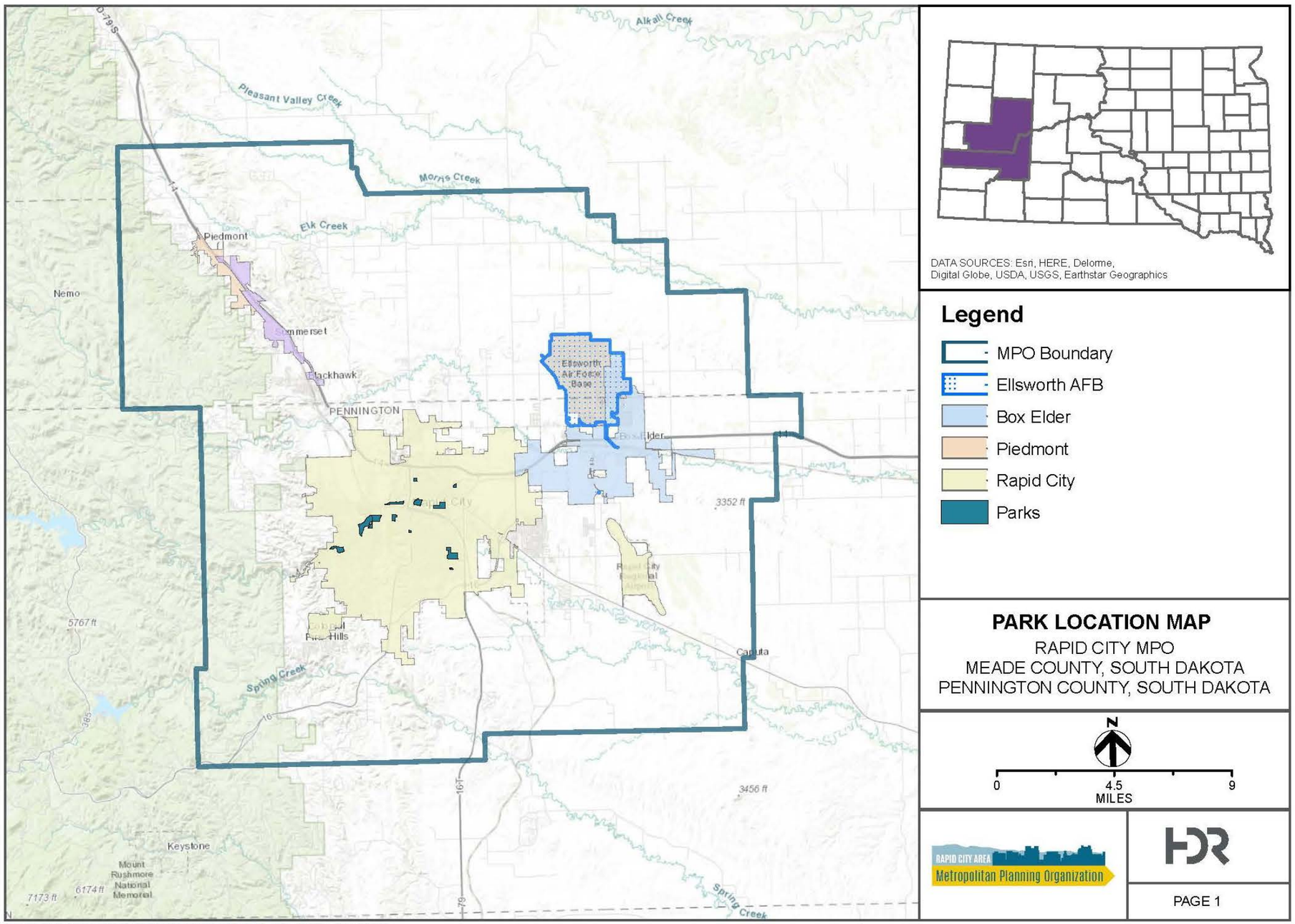


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Figure 10-6. Bike Paths in the Rapid City Area MPO Region

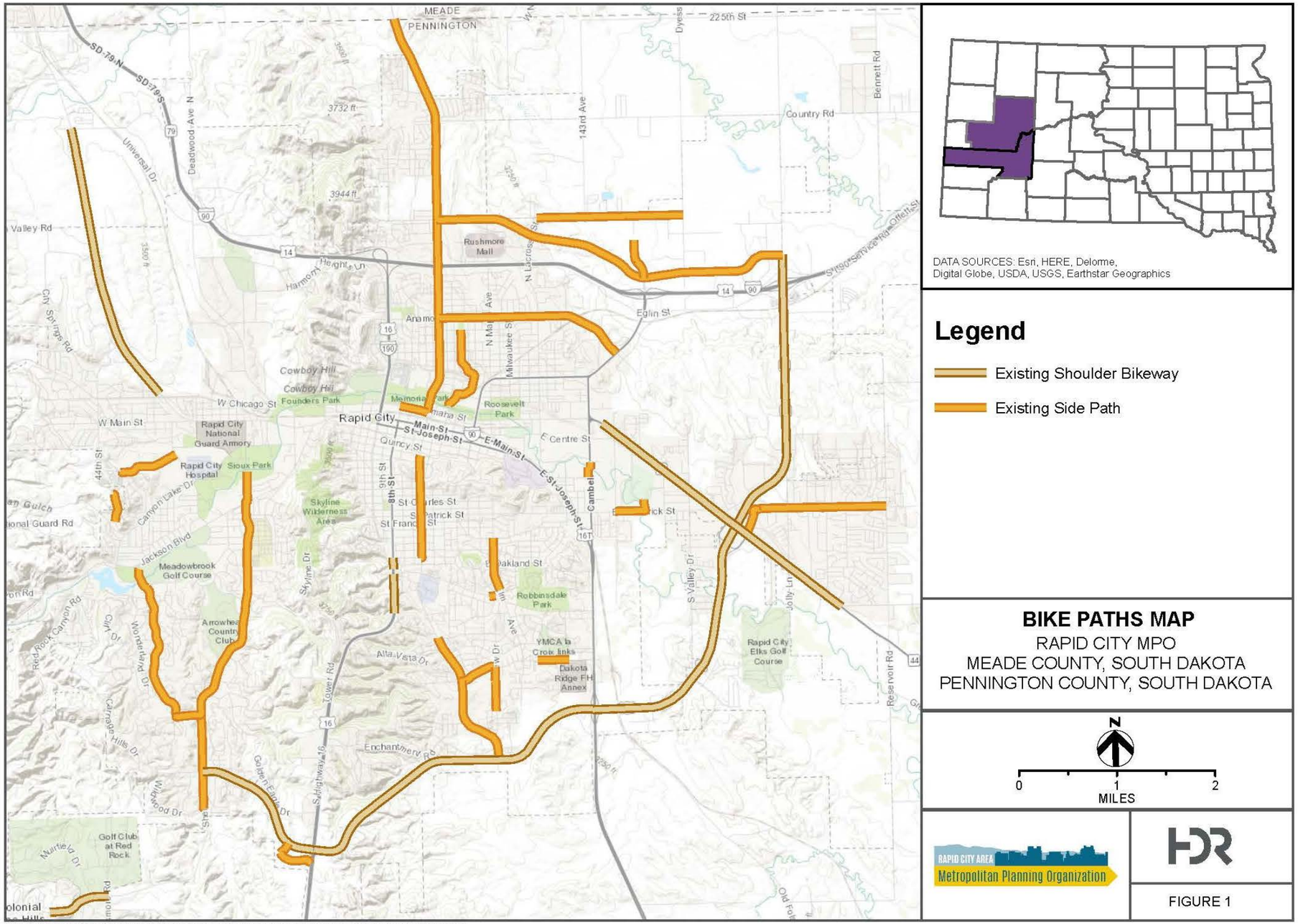

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Figure 10-7: Location of the Black Hills National Forest

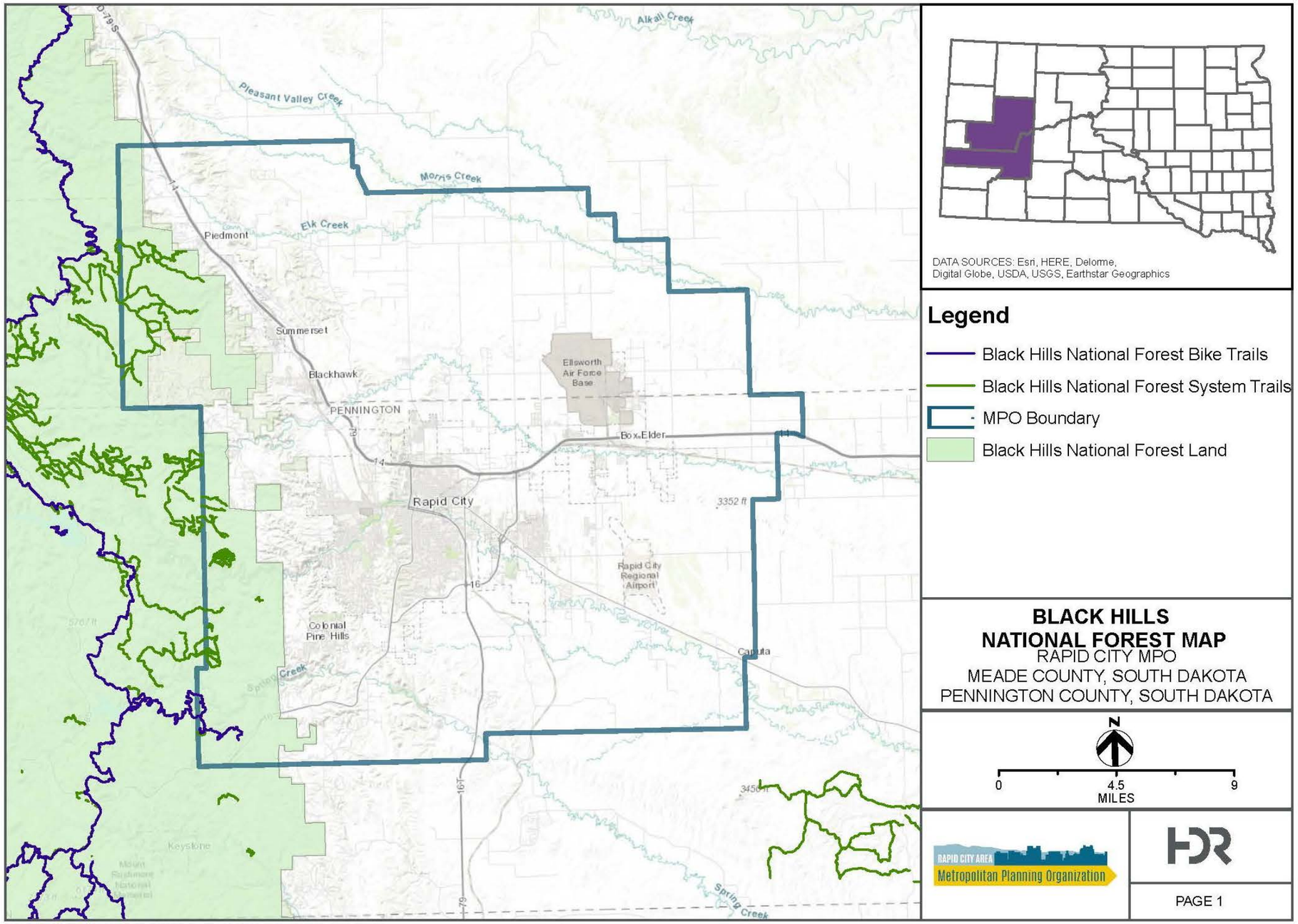
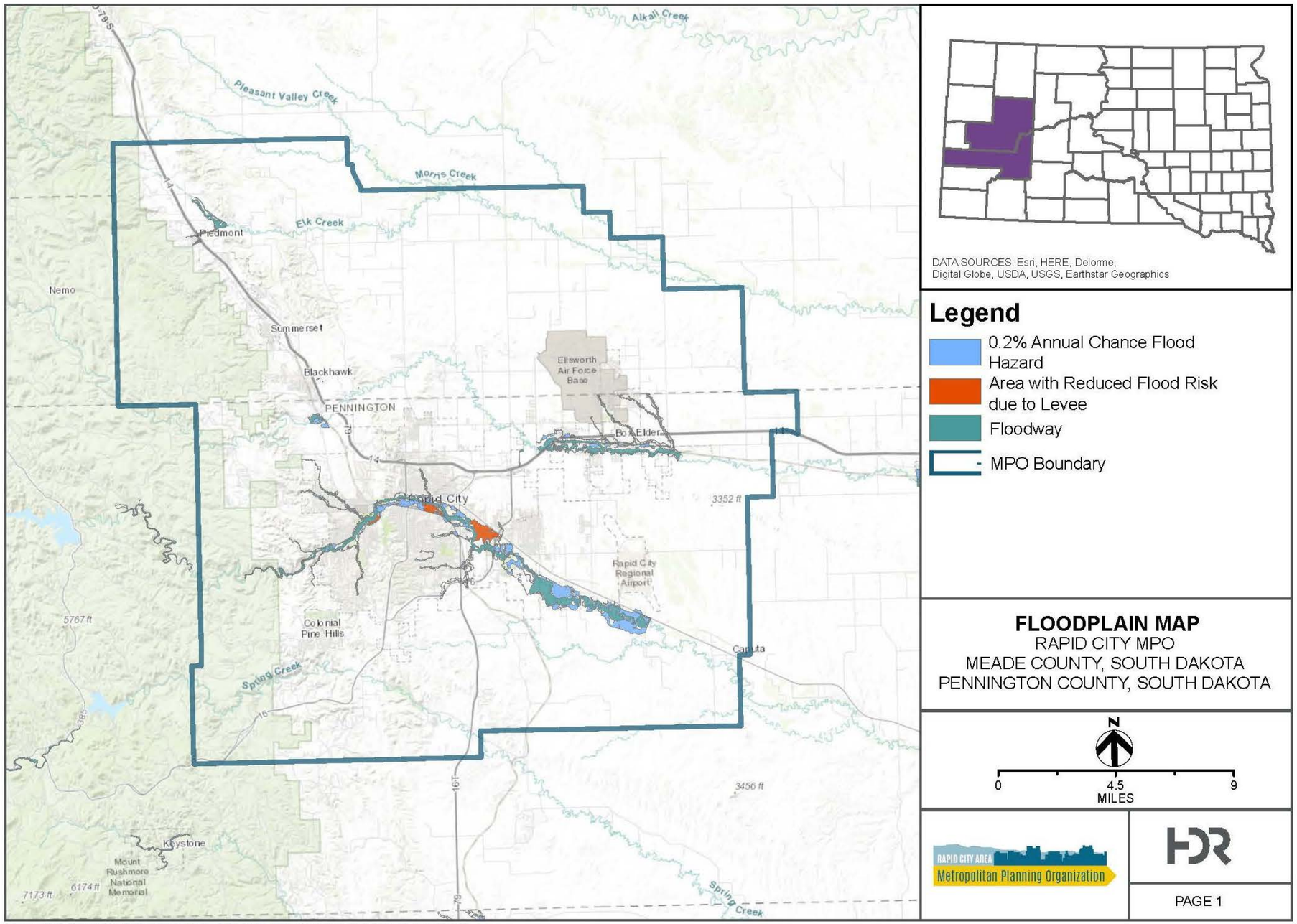


Figure 10-8: Location of Regional Floodplains



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10.6 Regulated/Hazardous Materials

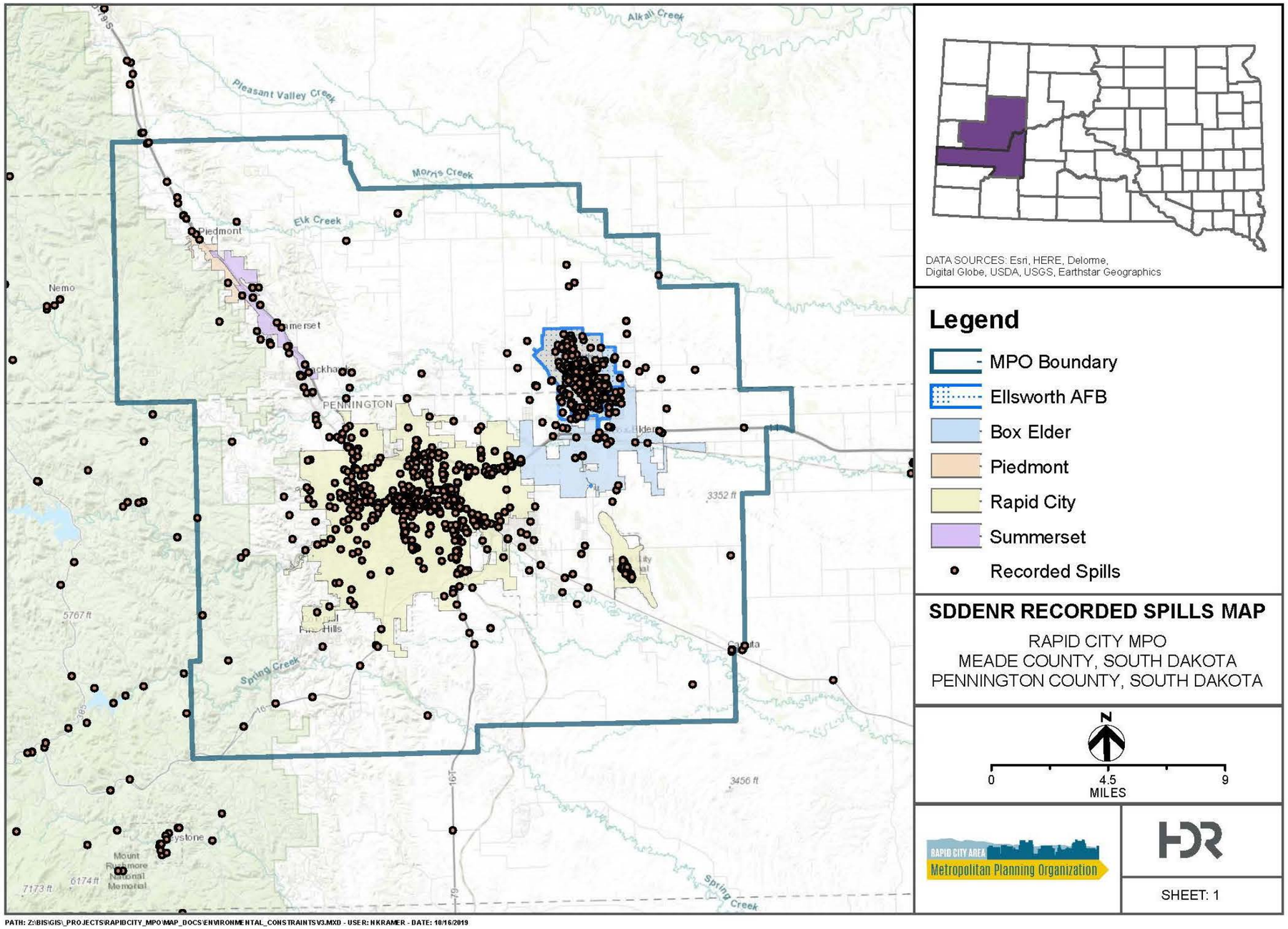
Hazardous materials include substances or materials that the EPA has determined to be capable of posing an unreasonable risk to health, safety, or property. Hazardous materials may exist within the MPO area at facilities that generate, store, or dispose of these substances, or at locations of past releases of these substances. Examples of hazardous materials include asbestos, lead based paint, heavy metals, dry-cleaning solvents, and petroleum hydrocarbons (for example, gasoline and diesel fuels), all of which could be harmful to human health and the environment.

Approach: The South Dakota Department of Natural Resources (SDDENR) Environmental Events Database website was reviewed for the region to identify any areas that could be of concern for project such as contaminated soils, hazardous waste site, and buried tanks concepts.

Limitations: Information for hazardous material should be reviewed at the time of a proposed project to identify any potential new hazards that may have occurred from the time of the study to a project.

Spill incidents that occurred in the area and recorded by SSDENR are shown in **Figure 10-9**.

Figure 10-9: SDDENR Recorded Spills in the Rapid City Area MPO Region



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10.7 Environmental Justice Populations

Environmental Justice is the approach to identifying and addressing potential disproportionately high and adverse effects of transportation programs, policies, and activities on minority and/or low-income populations. The goal is to achieve an equitable distribution of benefits and burdens.

In 1994, President Clinton issued Executive Order 12898, directing Federal agencies, to the greatest extent practicable, to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. In 1997, the Department of Transportation (USDOT) issued an Order to address Environmental Justice in minority populations and low-income populations to summarize and expand upon the requirements of Executive Order 12898 on Environmental Justice. This section describes how Environmental Justice populations were identified for Rapid City MPO.

10.7.1 Methodology

MINORITY POPULATIONS

FHWA defines a minority population as any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity. FHWA defines a minority as:[14]

- ***Black***: a person having origins in any of the black racial groups of Africa.
- ***Hispanic or Latino***: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
- ***Asian American***: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.
- ***American Indian and Alaskan Native***: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition.
- ***Native Hawaiian and Other Pacific Islander***: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

REFERENCE POPULATION

A reference population is necessary in order to determine whether potential project-related adverse impacts are disproportionately borne by one or more minority or low-income populations compared to the greater area. USDOT guidance for Environmental Justice (EJ) analysis and documentation[15] states:
"Potential environmental justice impacts are detected by locating minority populations and low-income populations in and near the project area, calculating their percentage in the area relative to a reference population, and determining whether there will be adverse impacts to them."

[14] FHWA Order 6640.23A
[15] U.S. DOT Environmental Justice in NEPA Documentation Process (American FactFinder, Step-by-Step Guide). April 3, 2012. Available at: https://secure.in.gov/indot/files/ES_EnvironmentalJusticeGuidance_2012.pdf

In this analysis, the MPO area population is compared to a reference population within the Rapid City U.S. Census Core Based Statistical Area (CBSA). And for a wider view, additional statistics listed compare the MPO area with Pennington County, Meade County and the state of South Dakota populations.

DEFINING MINORITY POPULATIONS

Per FHWA guidance, a readily identifiable group of minority persons was identified as any census tract with a "substantial" minority populations: where the percentage of minority population was at least one standard deviation (35%) higher than the average percentage of the minority population within the reference population (Rapid City CBSA). The minority population of the Rapid City CBSA is 20.9% of the total population; the threshold value used to determine a "substantial" minority population is 28.2% (20.9% multiplied by 1.35). Consequently, any census tract within the Study Area where the percentage of minorities is greater than 28.2% was identified as having a minority population.

DEFINING LOW-INCOME POPULATIONS

FHWA defines a low-income population as any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity. FHWA defines low-income as a person whose median household income is at or below the Department of Health and Human Services (DHSS) poverty guidelines. The best approximation for the number of people below the DHHS poverty guidelines in a particular area is the number of persons below the Census Bureau poverty thresholds in that area.

Similar to the minority population, a readily identifiable group of low-income population was identified as any census tract with a "substantial" low-income population: where the percentage of low-income population was at least one standard deviation (35%) higher than the average percentage of the low-income population in the reference population. The low-income population (or percent poverty) of the reference population (Rapid City core based statistical area) is 24.8% of the total population; the threshold value used to determine a "substantial" low-income population is 33.5%. Consequently, any Census block group within the Study Area where the percentage of low-income persons is greater than 33.5% was identified as having a low-income population.

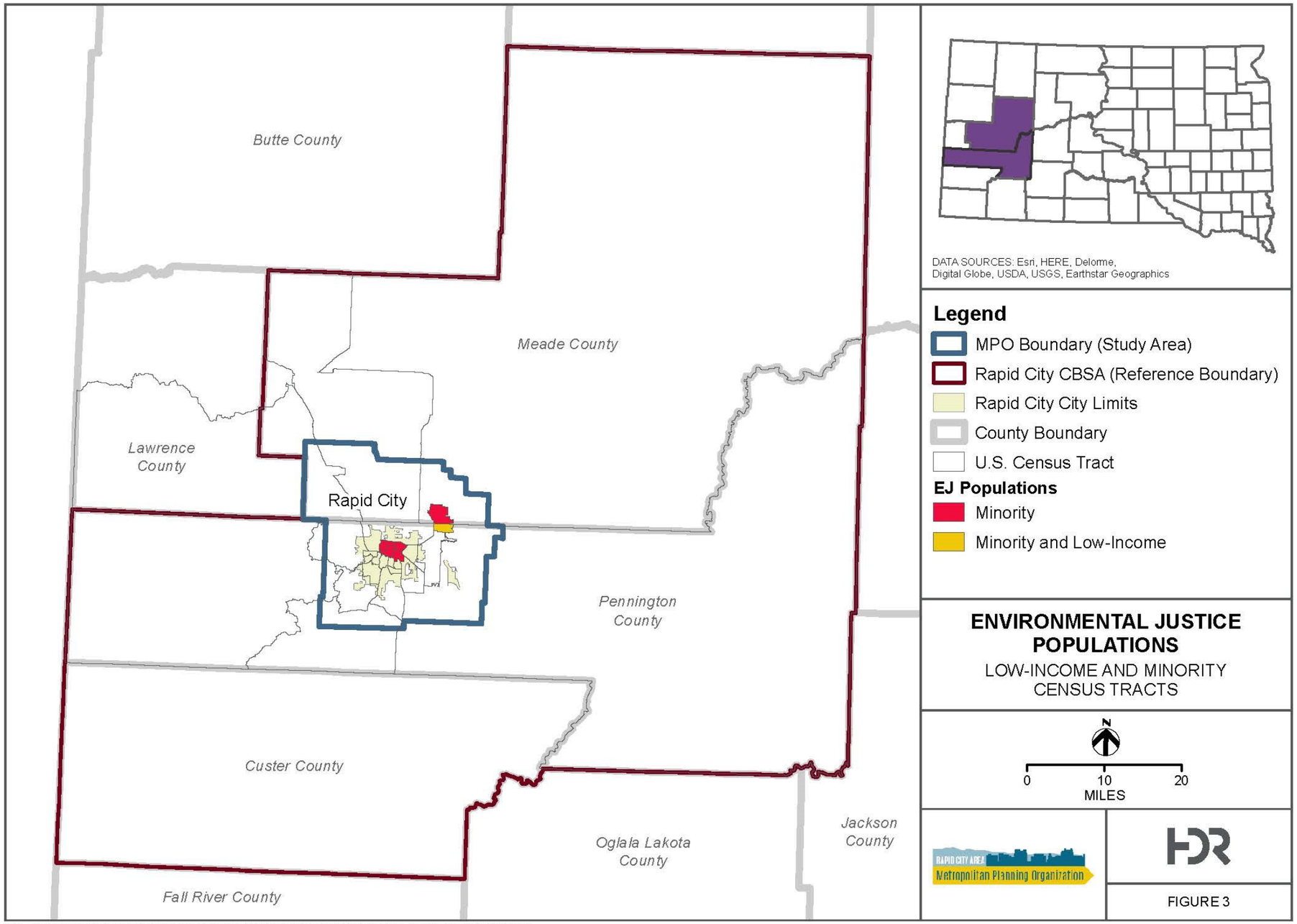
10.7.2 Data Sources

Esri 2019 U.S. demographic data was used to identify minority and low-income populations in the Study Area. Esri Demographics offers current-year updates and five-year projections of population, race and Hispanic origin, household income, and more. Annual demographic updates incorporate both traditional and new data sources to remain current. The estimate combine the best data from the U.S. Census Bureau's American Community Survey with other sources to enable better measures of change than are possible with ACS data alone.

10.7.3 Identified Environmental Justice Populations

Based on the methodology described above, the Environmental Justice populations defined for the Rapid City MPO area are shown in **Figure 10-10.**

Figure 10-10: Environmental Justice Populations in the Rapid City Area MPO Region



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10.8 Environmental Mitigation Activities

Avoidance and mitigation measures may need to be developed for the project in order to mitigate for adverse effects to environmental resources. The following summarizes potential avoidance, minimization, and mitigation measures for each resource.

- Archaeological and Historical Resources – Archaeological and historical resources would need to be identified and measures to avoid, minimize, or mitigate adverse effects would need to be developed. Archaeological and historical resources would also be considered Section 4(f) properties if eligible for the National Register of Historic Places (see also *Parks and Recreation Properties*).
- Wetlands and Waters of the U.S. - A formal field delineation of the entire Study Area would be completed to determine final impacts. Impacts on wetlands and other waters of the U.S. would be avoided if feasible, and then minimized to the extent possible. For wetlands and other waters of the U.S. that cannot be avoided, a USACE Section 404 Permit, with Section 401 Water Quality Certification from SDDENR, would be obtained for authorization of fill activities in jurisdictional wetlands or other waters of the U.S. Wetland mitigation would need to be identified, if required, for impacts as part of the Section 404 permitting process.
- Water Quality – If needed, a Stormwater Pollution Prevention Plan (SWPPP) would be developed and National Pollutant Discharge Elimination System (NPDES) permits would be obtained prior to construction to reduce impacts to water quality. Per the SWPPP and NPDES permits, best management practices (BMPs) would be implemented to protect water quality including, but not limited to sediment and erosion controls, filter runoff in vegetated swales before reaching surface water, re-vegetate disturbed areas as soon as possible after construction, and service and stage equipment away from surface water.
- Wildlife/Threatened and Endangered Species – Measures to minimize impacts to vegetation and wildlife would be coordinated with the SD GFP and USFWS as needed. Impacts to threatened or endangered species would be avoided, or if unavoidable impacts would occur coordination with USFWS on appropriate mitigation measures would take place.
- Parks and Recreation Properties – Section 4(f) resources, including parks and recreation areas, would be identified within the study area. Impacts from the project on these properties would be avoided, if possible. If the project alternative would result in a “use” of a Section 4(f) property, then coordination would need to occur with the official with jurisdiction. Section 6(f) properties would be identified within the study area and avoided, if possible. If avoidance is not possible, coordination with the SDGFP would be required.
- Floodplains and Floodways – Impacts to designated floodplain zones within the study area would be evaluated. If encroachments to floodplain zones cannot be avoided, a Floodplain Permit would be coordinated with the local floodplain administrator.
- Regulated/Hazardous Materials – Construction BMPs may be included to minimize impacts from regulated/hazardous materials on the project. The contractor would be alert for large areas of soil staining, buried drums, or USTs and coordinate with SDDENR if any obvious contamination is found prior to continuing work in those areas.

The final fiscally-constrained projects will be screened against the criteria above.

11.0 2045 Fiscally Constrained Plan

As shown in Chapter 7, the primary sources of federal funding received by the MPO are:

- Surface Transportation Block Grant Program (STBG)
- Surface Transportation Block Grant Program funding for Transportation Alternatives (TA)
- National Highway Performance Program (NHPP)
- Highway Safety Improvement Plan (HSIP)
- FTA Section 5307 Urbanized Area Formula Program
- FTA Section 5310 Enhanced Mobility for Seniors and Individuals with Disabilities
- FTA Section 5311 Formula Grants for Rural Areas
- FTA Section 5339 Bus and Bus Related Facilities

This chapter matches up those anticipated funding revenues with the range of Future needs-based projects in **Chapter 9** to create a fiscally-constrained plan.

11.1 Future Funding Levels

The primary source of federal funding for roadway projects that are not State system projects is STBG funding. They are the primary focus of evaluation for much of this chapter, as they provide a flexible funding source for many Rapid City Area MPO projects. TA funds provide funding for a range of bicycle, pedestrian, and other enhancement projects. HSIP funds are used for safety projects. HNPP projects are used for National Highway System projects on the state system, and are allocated according to state discretion.

To add additional resolution to the fiscally-constrained plan, the mid-term period (2026-2035) was broken down into near phase (2026-2030) and far phase (2031-2035). The MTP promotes all projects currently in the 2020-2023 TIP into the MTP, thus funding and project phasing for the remaining MTP projects starts in 2024. The current TIP is documented in **Appendix F**. This allowed some differentiation of projects that could potentially get promoted into future TIPs during the five-year life cycle of this MTP. **Table 11-1** summarizes the funding levels projected to potentially be available for these four primary roadway funding sources.

Table 11-1: Estimated Future Funding Levels by Program

Time Period / Years		STBG	TAP	HSIP	NHPP*
Short-Term	2024-2025	$17,005,776	$170,770	$5,571,966	$33,932,349
Mid-Term (Near)	2026-2030	$44,797,300	$449,850	$14,677,896	$89,385,962
Mid-Term (Far)	2031-2035	$48,259,415	$484,616	$15,812,263	$96,294,067
Long-Term	2036-2045	$107,996,116	$1,084,487	$35,385,075	$215,489,254
		$218,058,607	$2,189,724	$71,447,200	$435,101,633

* These are estimates based on historical trends, funds are based on specific future state system needs, and are part of a statewide pool not guaranteed for Rapid City area.

11.2 Draft Future Roadway Projects

The future roadway plan is a combination of currently-programmed projects from the 2020-2023 TIP, future projects anticipated to be funded by STBG funds, and NHPP-funded projects on the Interstate and other National Highway System routes. Potential safety projects were identified in

the safety section of Chapter 8, depending on the availability of HSIP and / or local funding to implement them.

Projects were promoted into the fiscally-constrained roadway plan based on how well they fit with the overall goals and objectives of the plan, as outlined in the prioritization approach from **Chapter 6**. The highest priority projects for both system improvement and system additions were promoted into the fiscally-constrained plan.

The remainder of this chapter describes the projects included in the fiscally-constrained project list, potential funding sources and project sponsors.

11.2.1 State of Good Repair Considerations

One of the important elements of the MTP and fiscal constraint is recognizing that a significant portion of future funding levels will need to be dedicated to operating, maintaining, and preserving the transportation system. This plan has accounted for future O&M needs, recognizing that the majority of local transportation expenditures go to operating and maintaining the existing system, including pavement and bridges. The plan also recognizes that there will be rehabilitation and reconstruction projects in the future that will utilize federal monies. As such, sufficient future funding balances have been left to account for these future state of good repair projects that are not explicitly called-out in this plan.

The draft fiscally-constrained roadway project list is shown in **Table 11-2**, with anticipated project timing shown in **Figure 11-1** (regional scale) **and Figure 11-2** (urban scale).

11.2.2 STBG Analysis

A comparison of funding levels and draft fiscally-constrained costs for projects with anticipated STBG participation shows that:

- The highest priority system improvement and system addition projects can be included and at least partially funded with projected future STBG funds.
- Sufficient projected STBG funding is maintained for system preservation projects.

Table 11-3 shows the anticipated STBG federal funding costs by period, and a summary of the anticipated balance to support pavement and bridge preservation.

Table 11-2: Draft Fiscally-Constrained Roadway Projects

Project ID	Corridor	From	To	Project Type	Cost (2020$)	Cost (YOE$)	Federal Share (YOE $)	Non-Federal Share (YOE $)	Funding Source	Potential Sponsors
Short-Term Projects (2024-2025)										
8	Sheridan Lake Rd	Catron Blvd	Corral Dr	Capacity Improvement	$3,000,000	$3,300,000	$2,640,000	$660,000	STBG	Rapid City
Short-Term Totals					$3,000,000	$3,300,000	$2,640,000	$660,000		
Mid-Term (Near) Projects (2026-2030)										
29	US 16	at Catron Blvd	Catron Blvd	Intersection / Interchange	$32,000,000	$37,500,000	$37,500,000		NHPP	Rapid City / SDDOT
5	US 16	Rockerville Rd	Neck Yoke Rd	Safety / Intersections	$9,150,000	$10,700,000	$10,700,000		NHPP	SDDOT
55	I-90	at Exit 46 / Elk Creek Rd		Interchange Reconstruction	$20,000,000	$23,450,000	$23,450,000		NHPP	SDDOT
35	W Main St	at Mountain View Rd		Safety Improvements	$50,000	$50,000	$40,000	$10,000	STBG or HSIP	Rapid City
39	Main St	at Mount Rushmore Rd		Safety Improvements	$350,000	$400,000	$320,000	$80,000	STBG or HSIP	Rapid City
40	5th St	at St Patrick St		Safety Improvements	$350,000	$400,000	$320,000	$80,000	STBG or HSIP	Rapid City
226 / 227	Les Hollers Rd	Catron Blvd	Sheridan Lake Blvd	New Corridor	$5,350,000	$6,250,000	$5,000,000	$1,250,000	STBG	Rapid City / Pennington County
235 / 236	South Growth Area Rd	Elk Vale Rd	5th Street	New Corridor	$6,150,000	$7,200,000	$5,760,000	$1,440,000	STBG	Rapid City / Pennington County
238	5th Street Extension	Elk Vale Rd	South Growth Area Road	New Corridor	$2,500,000	$2,950,000	$2,360,000	$590,000	STBG	Rapid City / Pennington County
220/ 221	Elm Ave	Field View Dr	Elk Vale Rd	New Corridor	$3,000,000	$3,500,000	$2,800,000	$700,000	STBG	Rapid City
73 / 74 / 76	Anamosa St	Menards	Philadelphia St	New Corridor	$1,200,000	$1,400,000	$1,120,000	$280,000	STBG	Rapid City
213	Creek Dr	Minnesota Ave	Elk Vale Rd	New Corridor	$2,500,000	$2,950,000	$2,360,000	$590,000	STBG	Rapid City
67	Philadelphia St	Anamosa St	Valley Dr	New Corridor	$2,300,000	$2,700,000	$2,160,000	$540,000	STBG	Rapid City
Mid-Term (Near) Totals					$84,900,000	$99,450,000	$45,690,000	$5,560,000		

Table 11-2. Draft Fiscally-Constrained Roadway Projects (continued)

Project ID	Corridor	From	To	Project Type	Cost (2020$)	Cost (YOE$)	Federal Share (YOE $)	Non-Federal Share (YOE $)	Funding Source	Potential Sponsor
Mid-Term (Far) Projects (2031-2035)										
17	I-90	at Exit 63 / Box Elder		Interchange	$20,000,000	$25,850,000	$25,850,000	$-	NHPP	SDDOT
6	Cambell St	Minnesota St	Fairmont Blvd	Capacity Improvement	$1,250,000	$1,600,000	$1,280,000	$320,000	STBG	Rapid City
25	S Rockerville Rd	At Neck Yoke Rd		Intersection Improvement	$50,000	$50,000	$40,000	$10,000	STBG	Pennington County
26	Sheridan Lake Rd	at Dunsmore Rd		Intersection Improvement	$400,000	$500,000	$400,000	$100,000	STBG	Pennington County
68 / 69 / 70 / 71	Philadelphia St	Valley Dr	Elk Vale Rd	New Corridor	$5,200,000	$6,750,000	$5,400,000	$1,350,000	STBG	Rapid City
217 / 218 / 219	Minnesota Ave	Cambell St	Elk Vale Rd	New Corridor	$8,050,000	$10,400,000	$8,320,000	$2,080,000	STBG	Rapid City
62 / 63	Valley Dr	Creek Dr	Philadelphia St	New Corridor	$3,800,000	$4,900,000	$3,920,000	$980,000	STBG	Rapid City
78 / 79 / 80 / 81	Anamosa St	Valley Dr	Elk Vale Rd	New Corridor	$5,030,000	$6,500,000	$5,200,000	$1,300,000	STBG	Rapid City
64	Valley Dr	Philadelphia St	Anamosa St	New Corridor	$1,850,000	$2,400,000	$1,920,000	$480,000	STBG	Rapid City
61	Concourse Dr	Philadelphia St	Anamosa St	New Corridor	$2,700,000	$3,500,000	$2,800,000	$700,000	STBG	Rapid City
59 / 60	Turbine Dr	Eglin St	Anamosa St	New Corridor	$4,900,000	$6,350,000	$5,080,000	$1,270,000	STBG	Rapid City
Mid-Term (Far) Totals					$53,230,000	$68,800,000	$60,210,000	$8,590,000		

Table 11-2. Draft Fiscally-Constrained Roadway Projects (continued)

Project ID	Corridor	From	To	Project Type	Cost (2020$)	Cost (YOE$)	Federal Share (YOE $)	Non-Federal Share (YOE $)	Funding Source	Potential Sponsor
Long Term Projects (2036-2045)										
9	Cambell St	E Omaha	E North	Capacity Improvement	$7,300,000	$10,950,000	$8,760,000	$2,190,000	STBG	
10	North St	Cambell St	Anamosa St	Capacity Improvement	$1,250,000	$1,900,000	$1,520,000	$380,000	STBG	
14	Boulder Hill Rd	Boulder Hill Rd	Silver Mountain Rd	Intersection Improvement	$200,000	$300,000	$240,000	$60,000	STBG	
208 / 209 / 210 / 211	Fairmont Blvd	Cambell St	Elk Vale Rd	New Corridor	$5,200,000	$7,800,000	$6,240,000	$1,560,000	STBG	
57	Degeest Dr	Cheyenne Blvd	Bernice St	New Corridor	$4,950,000	$7,450,000	$5,960,000	$1,490,000	STBG	Rapid City / Box Elder
82 / 83 / 84	Anamosa St	Elk Vale Rd	Degeest Dr	New Corridor	$1,800,000	$2,700,000	$2,160,000	$540,000	STBG	
85/86	Anamosa St	Degeest Dr	E 53rd	New Corridor	$5,000,000	$7,500,000	$6,000,000	$1,500,000	STBG	
239	5th Street Extension	South Growth Area Roads		New Corridor	$3,650,000	$5,500,000	$4,400,000	$1,100,000	STBG	
265 / 266	Seger Dr	Dyes Ave	Elk Vale Rd	New Corridor	$5,100,000	$7,650,000	$6,120,000	$1,530,000	STBG	
237	South Growth Area Road	Elk Vale Rd	South Growth Area Road	New Corridor	$2,600,000	$3,900,000	$3,120,000	$780,000	STBG	
Long Term Totals					$37,050,000	$55,650,000	$44,520,000	$11,130,000		

Figure 11-1: Implementation Timing for the MTP Fiscally Constrained Plan

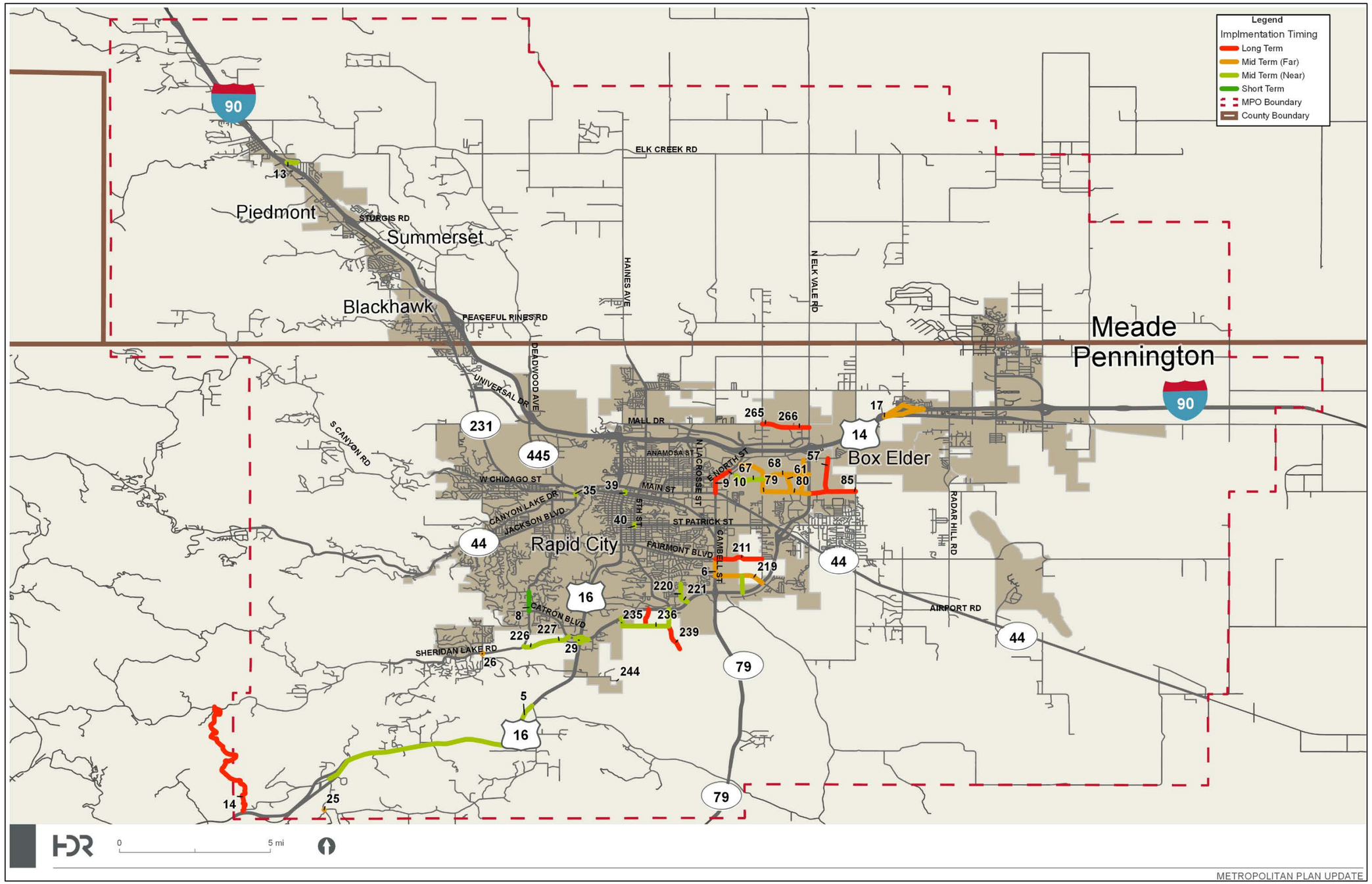

Figure 11-2: Implementation Timing for the Fiscally Constrained Plan

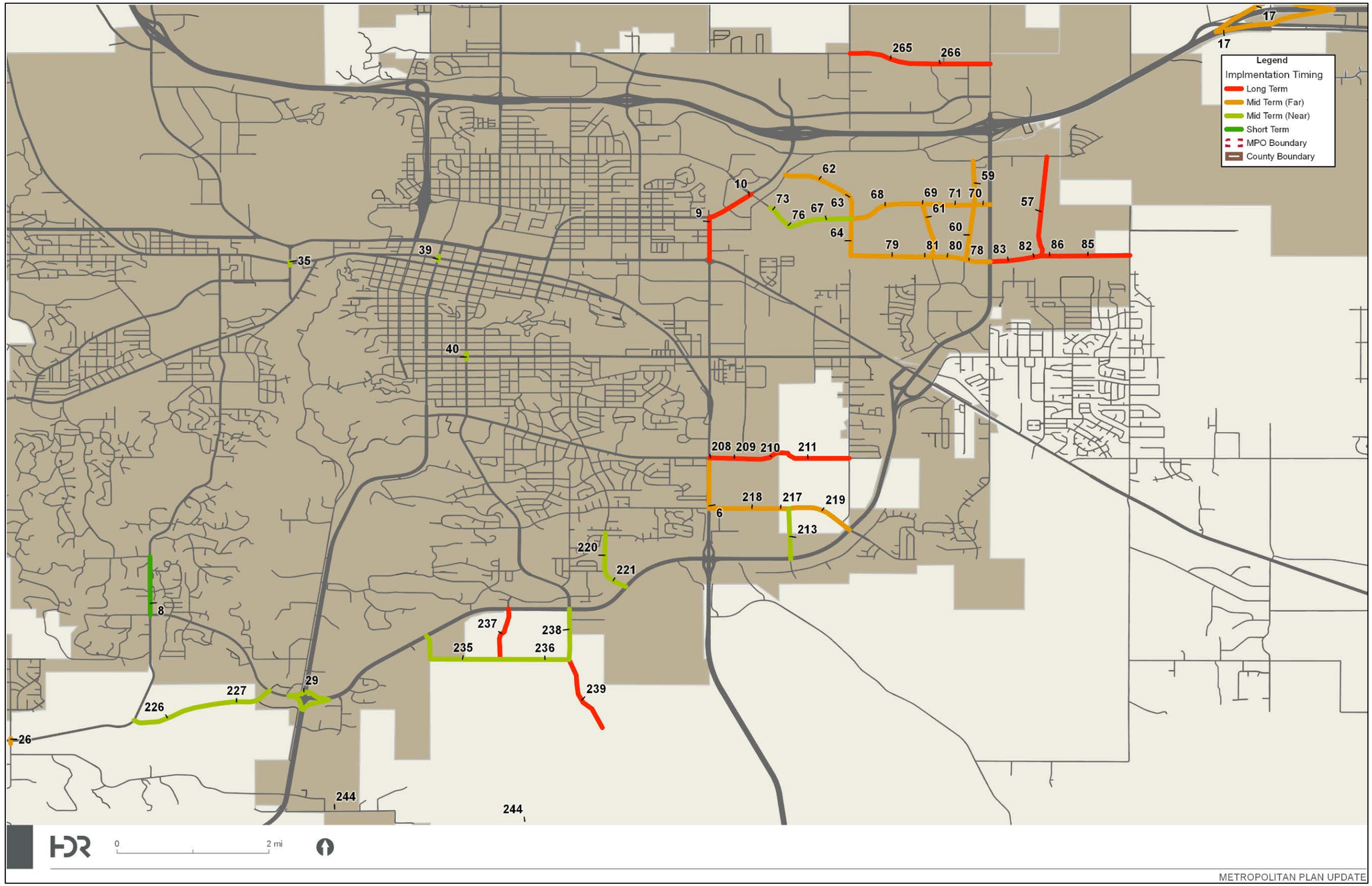

Table 11-3: STBG Costs by Period and Balance for Pavement and Bridge Projects

Period	Years	STBG Federal Costs	Remaining Balance for Pavement and Bridge Projects
Short Term	2024-2025	$2,640,000	$14,365,776
Mid Term (Near)	2026-2030	$22,240,000	$23,237,300
Mid Term (Far)	2031-2035	$34,360,000	$13,899,415
Long Term	2036-2045	$44,520,000	$63,476,116
Totals		$103,760,000	$114,978,607

11.2.3 NHPP Analysis

For the NHPP projects called out in the MTP, the year of expenditure costs are lower than potentially-available revenues identified in **Chapter 6**. This recognizes that SDDOT needs to balance its spending across the entire state, and that some additional project needs in the Rapid City area might emerge during the planning horizon that were not explicitly identified in this project list.

Table 11-4: NHPP Costs by Period and Remaining Balance

Period	Years	NHPP Federal Costs	Remaining Balance from Projections
Short Term	2024-2025		$33,932,349
Mid Term (Near)	2026-2030	$71,650,000	$17,735,962
Mid Term (Far)	2031-2035	$25,850,000	$70,444,067
Long Term	2036-2045		$215,489,254
Totals		$97,500,000	$337,601,633

11.3 Draft Future Bicycle and Pedestrian Projects

The *Bicycle and Pedestrian Plan* provides details on the development of the bicycle and pedestrian projects for the MTP. Those projects are shown in Table 11-5.

Table 11-5: Draft Fiscally-Constrained Bicycle and Pedestrian Projects

BICYCLE AND PEDESTRIAN PROJECT TABLE TO BE INCLUDED IN FINAL DRAFT

11.4 Draft Transit Projects

The *Transit Feasibility Study* provides the details on development of the transit projects for the MTP. Those projects are shown in **Table 11-6**.

Table 11-6: Draft Fiscally-Constrained Transit Projects

Fiscal Year	Funding Category	County	Location	Type	Federal Funds	State Funds	Local Funds	Total
2020	*Federal (Sec 5307)*	*Pennington*	*Rapid Transit System*	*Operating and Capital Assistance for Fixed Route and ADA paratransit service*	*$1,253,708.00*	*$37,837.00*	*$1,016,994.00*	$2,308,539.00
2020	*Federal (Sec 5310)*	*Pennington / Meade*	*Various agencies in the Rapid City Metropolitan Planning Area*	*Passenger vehicles for non-profit agencies that provide services to Seniors and Persons with Disabilities*	*$190,382.06*	*$0.00*	*$38,076.41*	$228,458.47
2020	*Federal (Sec 5339)*	*Pennington*	*Rapid City Metro*	*Capital Assistance*	*$121,574.00*	*$0.00*	*$28,640.00*	$150,214.00
2021	*Federal (Sec 5307)*	*Pennington*	*Rapid Transit System*	*Operating and Capital Assistance for Fixed Route and ADA paratransit service*	*$1,278,782.00*	*$37,837.00*	*$1,037,283.00*	$2,353,902.00
2021	*Federal (Sec 5310)*	*Pennington / Meade*	*Various agencies in the Rapid City Metropolitan Planning Area*	*Passenger vehicles for non-profit agencies that provide services to Seniors and Persons with Disabilities*	*$190,382.06*	*$0.00*	*$38,076.41*	$228,458.47
2021	*Federal (Sec 5339)*	*Pennington*	*Rapid City Metro*	*Capital Assistance*	*$124,006.00*	*$0.00*	*$28,640.00*	$152,646.00
2022	*Federal (Sec 5307)*	*Pennington*	*Rapid Transit System*	*Operating and Capital Assistance for Fixed Route and ADA paratransit service*	*$1,304,358.00*	*$37,837.00*	*$1,058,029.00*	$2,400,224.00
2022	*Federal (Sec 5310)*	*Pennington / Meade*	*Various agencies in the Rapid City Metropolitan Planning Area*	*Passenger vehicles for non-profit agencies that provide services to Seniors and Persons with Disabilities*	*$190,382.06*	*$0.00*	*$38,076.41*	$228,458.47
2022	*Federal (Sec 5339)*	*Pennington*	*Rapid City Metro*	*Capital Assistance*	*$126,486.00*	*$0.00*	*$28,640.00*	$155,126.00
2023	*Federal (Sec 5307)*	*Pennington*	*Rapid Transit System*	*Operating and Capital Assistance for Fixed Route and ADA paratransit service*	*$1,330,445.00*	*$37,837.00*	*$1,079,189.00*	$2,447,471.00
2023	*Federal (Sec 5310)*	*Pennington / Meade*	*Various agencies in the Rapid City Metropolitan Planning Area*	*Passenger vehicles for non-profit agencies that provide services to Seniors and Persons with Disabilities*	*$190,382.06*	*$0.00*	*$38,076.41*	$228,458.47
2023	*Federal (Sec 5339)*	*Pennington*	*Rapid City Metro*	*Capital Assistance*	*$129,016.00*	*$0.00*	*$28,640.00*	*$157,656.00*

703 Main Street, Suite 200
Rapid City , SD 57701
605.791.6199

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