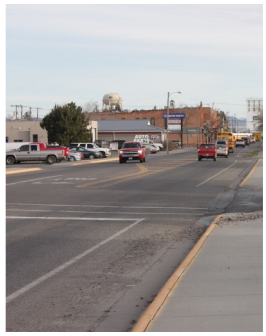
BELGRADE to BOZEMAN corridor FRONTAGE ROAD study

May 31, 2017



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ACKNOWLEDGEMENTS

Many individuals cooperated and aided in the successful completion of this study. The following people provided guidance and support throughout the course of this study.

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ABBREVIATIONS/ACRONYMS

AADT	Average Annual Daily Traffic
ADA	Americans with Disabilities Act
CAGR	Compound Average Growth Rate
CAPS	Crucial Area Planning System
CMAQ	Congestion Mitigation and Air Quality Improvement Program
FAS	Fishing Access Site
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FWP	Fish, Wildlife, and Parks
GIS	Geographic Information System
GO	General Obligation
HSIP	Highway Safety Improvement Program
HSSR	Highway State Special Reserve Account
LOS	Level of Service
LWCF	Land and Water Conservation Fund
MACI	Montana Air and Congestion Initiative
MAP-21	Moving Ahead for Progress in the 21st Century Act
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
mph	Miles per Hour
MRL	Montana Rail Link
MS4	Municipal Separate Storm Sewer System
MSATs	Mobile Source Air Toxics
NEPA	National Environmental Policy Act
NH	National Highway
NHPP	National Highway Performance Program
NHS	National Highway System
NRCS	Natural Resources Conservation Services
PAIP	Public and Agency Involvement Plan
PROST	Parks, Recreation, Open Space and Trails
PMS	Pavement Management System
RP	Reference Post
SOC	Species of Concern
STP	Surface Transportation Program
STPP	Surface Transportation Program Primary Highways
STPU	Surface Transportation Program Urban
TA	Transportation Alternatives
TMDL	Total Maximum Daily Loads
TMP	Transportation Master Plan
UPP	Urban Pavement Preservation (Program)
USFWS	United States Fish and Wildlife Service
vpd	Vehicles per Day

EXECUTIVE SUMMARY

The Montana Department of Transportation (MDT), in partnership with the Federal Highway Administration (FHWA) and in coordination with the City of Belgrade, City of Bozeman, and Gallatin County, initiated the *Belgrade to Bozeman Frontage Road Corridor Study* to evaluate the Frontage Road between Belgrade and Bozeman, Montana. The purpose of the study was to determine potential improvement options to address safety, mobility, and operational concerns within the study corridor based on needs and objectives identified by the public, the study partners, and resource agencies. The study area includes Main Street, the Frontage Road and North 7th Avenue between the intersections of Jackrabbit Lane in Belgrade to the westbound interstate on/off ramp in Bozeman. Additionally, the Valley Center Spur Road connecting the Frontage Road and Valley Center Road is included within the study area.

The study examined geometric characteristics, crash history, land uses, physical constraints, environmental resources, and existing and projected operational characteristics within the study area. A package of feasible improvement options was developed to address the transportation needs of the corridor over the next 20 years. The improvement options will help the study partners target the most critical needs and guide the allocation of resources.

The study is a planning document, and not a design or construction project. MDT, FHWA, the City of Belgrade, the City of Bozeman, and Gallatin County used a collaborative process to develop the study, which included conducting focused outreach to the public, stakeholders, and resource agencies. Known and publicly available resource information was evaluated. Activities completed for development of the study include the following:

- Research and analysis of existing roadway conditions;
- Research and synthesis of known environmental resources and applicable regulations in the study area;
- Identification and documentation of projected conditions;
- Identification of corridor issues and areas of concern;
- Consultation and coordination with local officials, stakeholders, resource agencies, and the public;
- Identification of corridor needs and objectives;
- Development of corridor improvement options with consideration of costs, available funding, feasibility, public input, and known environmental resource constraints; and
- Documentation of potential funding mechanisms for improvement options.

ES.1. Corridor Areas of Concern

Assessment of existing conditions within the study area, and public and stakeholder input, helped identify roadway issues and areas of concern. The issues identified included existing roadway elements, traffic operations, safety, and environmental considerations. The identified areas of concern are listed below.

ES.1.1. Transportation System

Physical Features and Characteristics

- The majority of the Frontage Road sits within railroad right-of-way through easement.

- There is a crude oil pipeline along the study corridor beginning at approximately reference post (RP) 25.5. The pipeline travels along the study corridor until approximately RP 2.8. A natural gas pipeline also crosses the study corridor at approximately RP 26.7and RP 1.8.
- A BNSF owned (Montana Rail Link leased) railroad parallels the southern side of the Frontage Road.
- There are gaps in the sidewalk network within both Belgrade and Bozeman.
- Eight of the 14 passing zones were found to be less than 1,000 feet in length.
- Many areas within the study area have poor drainage due to flat topography.
- The bridge located at RP 26.6 has a structure condition of "poor" which means it is a candidate for repair or replacement.
- Local planning documents conflict on long-term non-motorized infrastructure within the study corridor.
- The corridor generally consists of one 12-foot travel lane in each direction with narrow shoulders.

Traffic Operations

- Traffic volumes along the corridor range from 5,250 to 12,520 vehicles per day (vpd).
- On average, heavy traffic accounts for approximately 4.5 percent of vehicles along the corridor.
- The intersection with Broadway Street, Oregon Street, and Griffin Drive are projected to have failing operations in the future.
- The corridor operations are projected to operate at a Level of Service (LOS) C.
- During the school year, Main Street between Jackrabbit and Broadway Street experiences operational issues after school release.

Safety

- There were 382 reported crashes along the study corridor during the six-year analysis period.
- Eighty-seven percent of crashes within the urban areas involved multiple vehicles.
- Fifty-eight percent of crashes within the rural areas involved multiple vehicles.
- There were three fatal crashes resulting in three fatalities and eight incapacitating injury crashes resulting in ten incapacitating injuries.
- There were three crashes involving a bicyclist and two crashes involving a pedestrian.

ES.1.2. Environmental Considerations

Physical Environment

- There are public water supply wells located within the study area.
- There are four perennial and one unnamed intermittent/ephemeral streams within the study area.
- There are three primary irrigation ditch crossings of the Frontage Road in the study area.

Biological Environment

- Noxious and exotic plant species may be located within the study area.
- There are four streams within the study area that support fish species.

Social and Cultural Environment

- There are 4(f) and 6(f) resources within the study area.
- Two historic properties face the Frontage Road.
- There are six irrigation ditches that are historic and likely eligible for registration.

- There are at least 39 historic-age properties within Belgrade that face the Frontage Road (Main Street).

ES.2. Corridor Needs and Objectives

Needs and objectives were developed based on a review of existing data, local plans, and input from resource agencies, stakeholders, and the public. The needs and objectives will be used to guide future improvement option implementation. The following needs and objectives reflect the social, environmental, and engineering conditions described in the *Existing and Projected Conditions Report* and recognize the local and regional use of the corridor.

Need 1: Improve the Safety of the corridor for All Users

Objectives (To the Extent Practicable)

- Reduce the frequency and severity of all crashes.
- Improve roadway elements to meet current design standards.
- Reduce conflicts for all modes.

Need 2: Improve the Operations of the Roadway

Objectives (To the Extent Practicable)

- Reduce corridor and intersection congestion for existing and future demands.
- Improve operations to meet acceptable LOS guidelines.
- Accommodate alternative transportation modes.

Other Considerations

- Local and regional planning consistency
- Funding availability
- Construction feasibility and physical constraints
- Truck movements
- Maintenance costs and responsibility
- Railroad coordination
- Impacts to aquatic resources
- Impacts to environmental resources

ES.3. Improvement Options

Improvement options for the Frontage Road were identified based on the evaluation of several factors. These factors included, but were not limited to, field review, engineering analysis of as-built drawings, crash data analysis, consultation with various resource agencies, and information provided by the public. The recommended improvement options are intended to offer a range of potential mitigation strategies for corridor issues and areas of concern. Small-scale improvement options identified may be as simple as modifying signing and striping. Larger, more complex, reconstruction improvements were also envisioned. Strategies to mitigate potential impacts would be more fully explored during project development activities. **Table ES.1** contains a summary of the potential improvements, along with planning level cost estimates and potential funding sources.

Planning-level cost estimates were developed for each improvement option. The costs include estimates for right-of-way, preliminary engineering, construction engineering, construction, and indirect costs. In addition, an inflationary factor of three percent per year was applied to the planning level costs to account for estimated year of expenditure. Cost ranges are provided in some cases, indicating unknown factors at the planning level stage. **Appendix 5** contains planning level cost estimates, including all assumptions.

Table ES.1. Recommended Improvement Options

	IMPROVEMENT OPTION	DESCRIPTION	IMPLEMENTATION TIMEFRAME	COST ESTIMATE	POTENTIAL FUNDING SOURCE
INTERSECTION IMPROVEMENTS					
1.	Broadway Street Intersection Improvements	Installation of a traffic signal or single lane roundabout at the intersection of Main Street and Broadway Street.	Mid-term	$1.6M (Traffic signal with left-turn lanes) $1.3M (Traffic signal without left-turn lanes) $2.3M (Single lane roundabout)	• NH • MACI • STPU • Local
2.	Oregon Street Intersection Improvements	Installation of additional traffic control (all-way stop, traffic signal, or single lane roundabout) at the intersection of Main Street and Oregon Street.	Mid-term	$0.8M (All-way stop) $1.8M (Traffic signal) $2.4M (Single lane roundabout)	• NH • MACI • STPU • Local
3.	Airport Road Intersection Improvements	Installation of an eastbound left-turn lane and/or traffic signal at the intersection of Frontage Road and Airport Road.	When warranted	0.9M (Left-turn lane) $1.7M (Traffic signal with left-turn lane)	• STPP • Local • Private
4.	Nelson Road Intersection Improvements	Installation of a traffic signal at the intersection of Frontage Road and Nelson Road.	When warranted	$900,000	• STPP • MACI • Local
SPOT IMPROVEMENTS					
5.	Evaluate School Traffic in Belgrade	Detailed investigation into possible mitigation options to improve traffic operations related to school traffic.	Short-term	$30,000	• Local
6.	Complete Sidewalk Network along Main Street in Belgrade	Construction of sidewalks, curb, gutter, and storm drain along Main Street within Belgrade.	Mid-term	$1.5M	• NH • TA • Local
7.	Complete Sidewalk Network along North 7th Avenue in Bozeman	Construction of sidewalks, curb, gutter, and storm drain along North 7th Avenue within Bozeman.	Mid-term	$500,000	• STPP • TA • Local
CORRIDOR IMPROVEMENTS					
8.	Passing Zone Modifications	Evaluate and modify existing passing and no-passing signing and striping to meet current standards.	Short-term	$30,000	• STPP • HSIP
9.	Install Centerline Rumble Strips	Construct centerline rumble strips along the rural portions of the corridor as appropriate.	Short-term	$30,000	• STPP • HSIP
10.	Develop Separated Shared-use Path	Investigate opportunities for the development of a shared-use path between Bozeman and Belgrade.	Mid- to Long-term	$820,000 to $1.1M per mile	• TA • Local • Private
11.	Roadway Reconstruction	Reconstruct the corridor to include one travel lane in each direction, center left-turn lane (where appropriate), and eight-foot shoulders.	Long-term	$5.4M (Segment 1) $5.0M (Segment 2) $7.8M (Segment 3) $6.9M (Segment 4) $4.4M (Segment 5)	• NH • STPP • HSIP

ES.4. CONCLUSION

The ability to develop and implement the recommended improvement options ultimately depends on availability of funding, right-of-way needs, and other project priorities. At this time, there is no funding identified to complete any of the recommended improvement options contained in this study. To continue with the development of a project or projects, the following steps are needed:

- Identify and secure a funding source(s).
- Include project in applicable transportation improvement plan.
- For MDT-led projects, follow MDT guidelines for project nomination and development, including a public involvement process and environmental documentation.
- For projects that are developed by others and may impact MDT routes, coordinate with MDT via the System Impact Action Process.

Should this study lead to a project or projects, compliance with NEPA (if federal funding is used) and MEPA (if a state action) will be required. The purpose and need statement for any future project should be consistent with the needs and objectives contained in this study. Furthermore, this study will be used as the basis for determining the impacts and subsequent mitigation for the improvement options in future NEPA/MEPA documentation. Any project develop will have to comply with requirements for documenting environmental impacts on highway projects.

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1. INTRODUCTION

The Montana Department of Transportation (MDT), in partnership with the Federal Highway Administration (FHWA) and in coordination with the City of Belgrade, City of Bozeman, and Gallatin County, initiated the Belgrade to Bozeman Frontage Road Corridor Study to evaluate the Frontage Road between Belgrade and Bozeman, Montana. The purpose of the study was to determine potential improvements to address safety, mobility, and operational concerns with the study corridor based on needs and objectives identified by the public, the study partners, and resource agencies.

The study corridor consists of approximately 10 miles of roadway. The corridor includes 1.4 miles of Main Street from Jackrabbit Lane to Airway Boulevard, 5.9 miles of Primary 205 (Frontage Road) from Airway Boulevard to Springhill Road, and 2.7 miles of Primary 118 (7th Avenue North) from Springhill Road to the west bound ramps of Interstate 90 (I-90). East Valley Center Spur Road is also included as part of the study corridor. **Figure 1** presents the location of the corridor.

The study corridor is divided into multiple highway segments. Between Jackrabbit Lane and Airway Boulevard, the roadway is designated as N-205 and is classified as a principal arterial on the Non-Interstate National Highway System (NHS). The remaining portion is classified as a minor arterial on the primary highway system. **Table 1.1** summarizes the designations of the study corridor.

Table 1.1: Study Corridor Segments

MDT DEPARTMENT ROUTE ID	DESCRIPTION	BEGIN RP	END RP	HIGHWAY SYSTEM	FUNCTIONAL CLASSIFICATION
N-205	Jackrabbit Lane to Airway Boulevard	19.7	21.1	NHS	Principal Arterial
P-205	Airway Boulevard to Springhill Road	21.1	27.0	Primary	Minor Arterial
P-118	Springhill Road to I-90 Exit 306 WB ramps	4.0	1.3	Primary	Minor Arterial
L-16-2074N	East Valley Center Spur Road	N/A	N/A	Local	Local

1.1. PROCESS

The *Belgrade to Bozeman Frontage Road Corridor Study* is a pre-National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA) study that allows for early planning-level coordination with the public, stakeholders, environmental resource agencies, and other interested parties. The NEPA/MEPA environmental review process is an approach to balance transportation decision-making that takes into account the need for safe and efficient transportation and the impact on the human and natural environment.

The study does not replace the NEPA/MEPA process. The results of the study may be used to help determine the level and scope of environmental review required should a project be forwarded into a subsequent NEPA/MEPA process. The study will assist in facilitating a smooth and efficient transition from transportation planning to future project development/environmental review, if a project is moved forward. This study identifies both known technical issues and environmental conditions within the corridor, and it identifies reasonable and feasible improvements to increase safety and efficiency for the traveling public. Additionally, it defines potential impacts on the surrounding environment resulting from various improvement options. The pre-NEPA/MEPA process discloses potential environmental impacts and technical constraints, identifies potential mitigation measures that can be implemented, and documents the information for the public and decision-makers before decisions are made and carried forward. This study is a planning-level study to determine various improvement options within the study area. It is not a design or construction project.

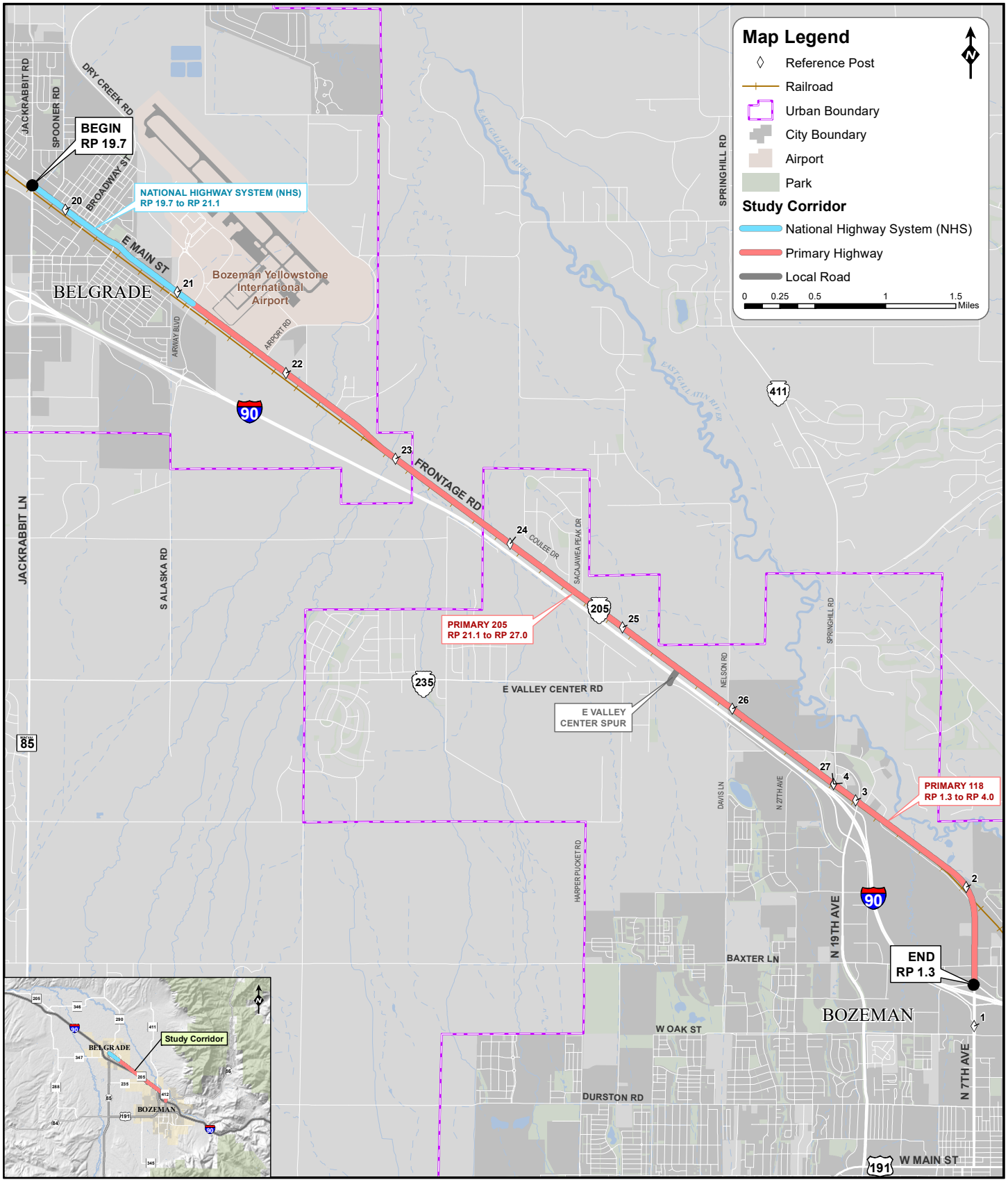

Figure 1.1: Study Corridor

2. PUBLIC AND STAKEHOLDER OUTREACH

An important aspect of the planning process is to provide opportunities for ongoing and meaningful public involvement. Education and public outreach are essential parts of achieving this goal. A *Public and Agency Involvement Plan* (PAIP) was developed to identify public involvement activities needed to gain insights on and to seek consensus about existing and future transportation needs. The purpose of the PAIP was to ensure a proactive process that provided opportunities for the public to be involved in all phases of the planning study process. Specific public outreach measures are noted in this chapter. Meeting content, such as press releases, advertisements, agendas, presentations, minutes, etc., are provided for all the described activities in **Appendix 2**.

2.1. PUBLIC INVOLVEMENT

Three public informational meetings were held over the course of the study process. Press releases were distributed to area media outlets, and meeting announcements were advertised in the local newspapers (Belgrade News and Bozeman Daily Chronicle) twice before each public meeting (at one and three week intervals). The ads announced the meeting location, time, date, purpose of the meeting, and the locations where documents could be reviewed.

2.1.1. Informational Meeting One

The first informational meeting was held on August 25th, 2016, in the Hyalite Room of the Best Western Plus GranTree Inn in Bozeman. Thirty-three people signed the attendance sheet at the meeting. Approximately six others were present but did not sign-in, bringing the estimated total attendance to thirty-nine individuals.

The purpose of the meeting was to inform interested parties about the scope and purpose of the planning study, to solicit input on the existing conditions, and to understand roadway concerns in the study area that may be relevant to the planning effort. The meeting began with a presentation that focused on the purposes of a corridor planning study, the study area being analyzed, and the anticipated schedule. The presentation was followed by a question-and-answer period. The following is a summary of comments made during the meeting:

- Support was expressed for a shared-use path between Belgrade and Bozeman.
- Widening roadway shoulders should occur regardless of if there is a separated path.
- A shared-use path is too expensive for the limited number of people who would use it.
- The recent speed limit change to 50 mph has been a positive change.

2.1.2. Informational Meeting Two

The second informational meeting was held on November 1st, 2016 in the Lewis/Madison Room of the Best Western Plus GranTree Inn in Bozeman. Fifty-two people signed the attendance sheet at the meeting. Approximately eight others were present but did not sign-in, bringing the estimated total attendance to sixty individuals.

The meeting began with an open house allowing participants to review display boards of the existing and projected conditions of the corridor. A presentation was given following the open house which provided more detail on the existing and projected conditions. The presentation was followed by a question-and-answer period. The following is a summary of comments made during the meeting:

- Support for a shared-use path was expressed from the public and from local transportation-oriented groups.

- A shared-use path would serve a different purpose than widened shoulders.
- A shared-use path may be able to be developed earlier than reconstruction of the roadway to include widened shoulders.

2.1.3. Informational Meeting Three

The third informational meeting was held on April 18, 2017 in the Lewis/Madison Room of the Best Western Plus GranTree Inn in Bozeman. Twenty-five people signed the attendance sheet at the meeting. Approximately ten others were present but did not sign-in, bringing the estimated total attendance to thirty-five individuals.

The purpose of the meeting was to present the recommended improvement options developed for the corridor and to gather community feedback on the draft corridor planning study report. The meeting began with an open house allowing participants to review display boards of the recommended improvement options for the corridor. A presentation was given following the open house. The presentation focused on the corridor study process and the recommendations for the corridor. The presentation was followed by a question-and-answer period. The following is a summary of the comments made during the meeting:

- Support for a shared-use path was expressed from the public.
- A shared-use path would be safer for non-motorized users than widened shoulders.
- The intersection with Airport Road needs an eastbound left-turn lane.

2.1.4. Other Public Involvement Efforts

A website (www.mdt.mt.gov/belgradetobozeman) was developed to provide up-to-date information regarding the study, as well as an opportunity to provide comments. Draft documents were posted for public review and comment during the study process. Informational announcements were posted on the website to encourage public participation in the study.

A story map was created to inform the public about the status of the study. Comments were solicited using the WikiMapping platform. This platform allows users to associate a location with their comment. A total of 55 specific comments were received via this platform, with an additional 78 likes/dislikes made on those comments. These comments are contained in **Appendix 1**.

Three newsletters were distributed that described the work in progress, results achieved, preliminary improvement options, and other topics. These newsletters were made available at the informational meetings, were mailed directly to adjacent landowners, and were posted to the study website.

2.2. Resource Agency Workshop

A resource agency workshop was held on October 20th, 2016. The purpose of the workshop was to provide an overview of the study and process, and to confirm content and accuracy of the *Environmental Scan* **(Appendix 3)**. Each agency invited to participate in the workshop was sent a draft *Environmental Scan* for review. The following agencies were invited to participate:

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Montana Fish, Wildlife, and Parks
- Montana Department of Environmental Quality

One agency, Montana Fish, Wildlife, and Parks (FWP), attended the workshop. Follow-up contact was made with each resource agency to solicit comments on the draft *Environmental Scan*. The draft report

was also sent to the resource agencies prior to the public and agency review period. No comments were made by the agencies.

2.3. Advisory Committee

An Advisory Committee (AC) was established with representatives from the City of Belgrade, City of Bozeman, Gallatin County, MDT, and FHWA. The AC met regularly (approximately monthly) during the 12-month study to discuss study progress, analysis methodologies and results, draft technical memorandums and reports, and other issues and concerns. The AC served in an advisory role and reviewed study documentation and deliverables before publication.

2.4. Public and Agency Review

The draft *Corridor Study* report was made available for public and agency review on April 14th, 2017. The review period extended between April 14th and May 14th. During the review period, a total of 64 comments were received. The comments/response matrix is provided in **Appendix 1**.

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3. EXISTING AND PROJECTED CONDITIONS

This chapter presents the existing and projected roadway conditions and social, economic, and environmental factors that influence the Belgrade to Bozeman Frontage Road corridor. These conditions were used in the planning analysis to identify known issues and areas of concern. The analysis is based on existing and historic traffic data, field measurements and observations, roadway as-built plans, aerial imagery, geographic information system (GIS) data, and publicly available environmental information and demographics. If an improvement option is forwarded from this study to project development, this general information may be used to support future, detailed, project-level analyses.

3.1. PLANNING WITHIN THE CORRIDOR

A number of documents help guide planning activities for lands within the study area. Transportation planning is the responsibility of the City of Belgrade, City of Bozeman, Gallatin County, and MDT. The planning documents listed below were reviewed to provide context for the study.

- Bozeman Transportation Master Plan (2017)
- Greater Bozeman Area Long Range Transportation Plan (2007 Update)
- Bozeman Parks, Recreation, Open Space and Trails (PROST) Plan
- Belgrade Area Transportation Plan (June 2002)
- North Park Properties Concept Land Use Plan Master Plan
- Gallatin Field Airport 2007 Master Plan Update
- Streamline Transit Coordination Plans
- 2016 Montana Rail Grade Separation Study

The *Existing and Projected Conditions Report* contains more information from these planning documents and considerations that may be important to the development of improvement options for the study area (**Appendix 4**). Additionally, federal regulations would have to be followed should changes occur to the Federal-aid highway system.

3.2. TRANSPORTATION SYSTEM

The Frontage Road serves as a key route connecting Belgrade and Bozeman and supports both local and regional travel demand. The following sections discuss the transportation-specific aspects of the study corridor. Information obtained from publicly available sources, field observations, data collection efforts, GIS data, and as-built drawings were used to evaluate the transportation system.

3.2.1. Physical Features and Characteristics

The roadway was constructed at various times, beginning in 1922. The roadway consists of two travel lanes, one in each direction. The south side of the roadway is generally constrained by a railroad mainline owned by BNSF Railway and leased by Montana Rail Link (MRL). West of Airway Boulevard, the corridor is more urban in nature with a mix of commercial, industrial, and residential development on both the north and south sides of the corridor. Between Airway Boulevard and Springhill Road, the surrounding land use is primarily agricultural with occasional residential areas. East of Springhill Road, the corridor transitions back to an urban character.

3.2.1.1. Posted Speed Limits

The posted speed limits within the study area vary from 25 mph within the Belgrade urban area to 50 mph along the rural portions of the corridor. The posted speed limits are shown in **Figure 3.1**.

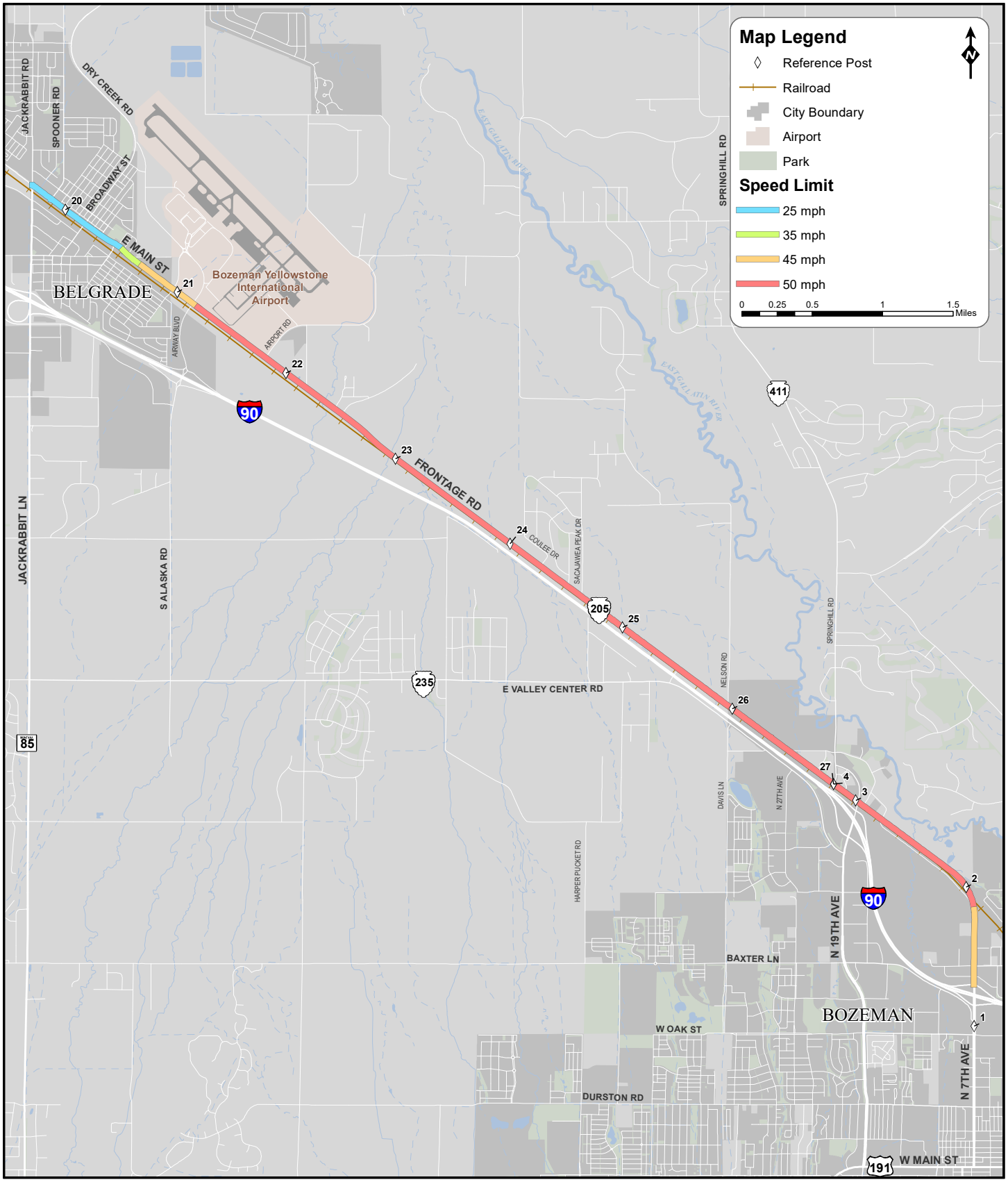

Figure 3.1: Posted Speed Limits

A speed study was conducted by MDT in September 2014. The speed study evaluated vehicle speeds between Airport Road and the railroad overpass on North 7th Avenue. The results of the speed study showed that the existing speed limit of 60 mph was consistent with the 85th percentile of measured speeds.

Comments were received from the City of Belgrade, Gallatin County, and the City of Bozeman regarding the speed study. The agencies recommended speed limits be set to 60 mph, 55 mph, and 50 mph, respectively. At the October 2015 Transportation Commission meeting, it was agreed to extend the 45-mph zone to the east of Airway Boulevard and to post a speed limit of 50 mph from east of Airway Boulevard to south of the railroad overpass.

3.2.1.2. Roadway Surfacing

The roadway surface width varies along the study corridor. The majority of the corridor has a paved surface width of 24 feet, which includes one travel lane in each direction and little or no shoulders. Through Belgrade, the roadway has shoulders/on-street parking and includes a center two-way left-turn lane between Jackrabbit Lane and North Quaw Boulevard. The segment of the corridor reconstructed as part of the East Belgrade Interchange project is also wider with shoulders and turn-lanes at major intersections. Shoulders are also present as the corridor transitions into Bozeman near the Cherry River Fishing Access Site (FAS).

MDT annually measures pavement condition in the corridor. The collected data are analyzed within MDT's Pavement Management System (PMS). To evaluate the level of distress in the pavement, indices are calculated to identify the degree of cracking, rutting, and road smoothness (ride). MDT uses the PMS to identify timing and types of treatments needed to extend pavement life. The pavement condition indices reported are based on a 0-to-100 scale, where 100 represents “in new” condition.

The most important performance measure is the overall performance index (OPI), as this index is a combination of all performance indices. An OPI of 80 to 100 is considered “good,” 60 to 79.9 is “fair,” and 0 to 59.9 is “poor.” The various pavement condition performance measures generally indicate fair or poor performance. The OPI ranges between 52.1 and 59.9, indicating poor pavement conditions. Note that some locations along the study corridor have been recently reconstructed and are not reflected in these conditions.

3.2.1.3. Access and Right-of-way

Access

Access points were identified through a review of available GIS data accessed in October 2016, and aerial photography from 2015. Based on this review, there are approximately 111 access points along the corridor. Of these, 36 are public roadways, 71 are private approaches, and 4 are farm field approaches. **Table 3.1** shows the number and density of approaches for the various roadway segments. Locations with a high density of approaches may indicate an area where a center left-turn lane may be desirable. The density of approaches per quarter mile is also shown in **Figure 3.2**.

The angle of approaches is also of importance. The angle of approach is the angle at which the approaching road intersects the major road. Desirably, roadways should intersect at or as close to 90 degrees as practical. Intersection skews greater than 30 degrees from perpendicular are undesirable, as the driver’s line of sight for one of the sight triangles becomes restricted. Accordingly, the approach angle should be between 60 degrees and 120 degrees. There were six access points that intersect the corridor at a skewed angle. Four of the six skewed approaches are public roadways.

Table 3.1: Access Points

SEGMENT	BEGIN RP	END RP	LENGTH (mi)	ACCESS POINTS			DENSITY (per mile)	SKEWED (<60° ANGLE)
				PUBLIC	PRIVATE	FARM		
Jackrabbit Lane to Quaw Boulevard	19.7	20.0	0.33	4	5	0	27.3	1 (public)
Quaw Boulevard to Davis Street	20.0	20.3	0.29	5	7	0	41.4	0
Davis Street to Airway Boulevard	20.3	21.1	0.83	7	11	0	21.7	2 (public)
Airway Boulevard to Airport Road	21.1	21.8	0.66	1	0	0	1.5	0
Airport Road to East of Dollar Drive	21.8	23.1	1.25	3	9	2	11.2	1 (public)
East of Dollar Drive	23.1	24.0	0.90	0	2	0	2.2	0
East of Dollar Drive to Nelson Road	24.0	25.9	1.93	5	13	1	9.8	2 (private)
Nelson Road to Springhill Road	25.9	27.0	0.93	2	4	1	7.5	0
Springhill Road to Cherry River Fishing Access	4.0	2.2	1.10	4	6	0	9.1	0
Cherry River Fishing Access to South End of Railroad Overpass	2.2	1.8	0.22	0	0	0	0.0	0
South End of Railroad Overpass to Interstate 90 WB Ramps	1.8	1.3	0.47	5	14	0	40.4	0
		TOTAL	**8.91**	**36**	**71**	**4**	**12.5**	**6**

Right-of-Way

The majority of the Frontage Road is within railroad right-of-way through an easement granted by BNSF Railway (MRL leased) for that purpose. Exceptions exist in Belgrade and Bozeman proper, where right-of-way is generally owned by MDT. Additional investigation regarding railroad easements will be necessary depending on the location of potential improvement options within the corridor. MRL has stated that no additional easements shall be granted south of the existing roadway easement. MRL is open to granting additional roadway easements up to the northerly extent of their existing right-of-way. Aside from the Frontage Road itself, there appears to be private encroachments on the railroad right-of-way and MDT easements. Some of these encroachments may be affected by potential improvement options within the corridor.

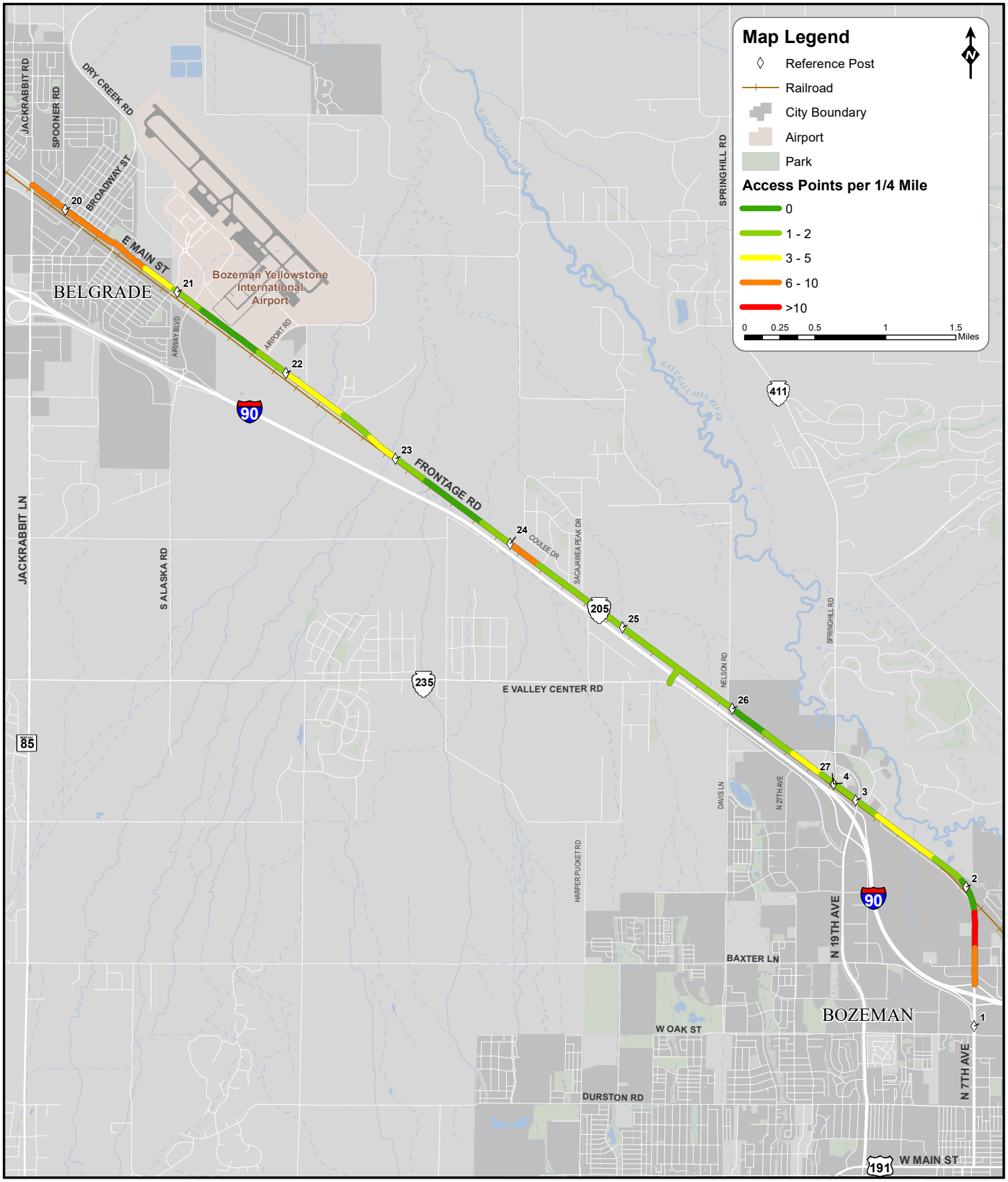

Figure 3.2: Access Density

3.2.1.4. Utilities

Northwestern Energy distributes natural gas and operates electric power generation, transmission, and distribution in the study corridor. Century Link, Charter Communications and Montana Opticom provide fiber optic communication services including telephone and internet. Charter Communications is the sole cable television provider. The City of Bozeman and City of Belgrade have buried water and sewer infrastructure in place on both ends of the corridor.

The Yellowstone Pipeline Company has a 10-inch pipe conveying crude oil and enters the study corridor from the north at approximately reference post (RP) 25.5. The pipeline travels along the corridor until approximately RP 2.8 where it crosses the highway. The crude oil pipeline crosses again at RP 1.8.

A natural gas pipeline (size unknown) crosses the study corridor at approximately RP 26.7 and at RP 1.8. Due to legal protections regarding the terms of use and data sharing agreements, up-to-date mapping of these pipelines is not available. If improvements are proposed in these general areas, additional research and coordination with the owners will need to occur to identify if the pipelines currently exist at these locations and what, if any, potential conflicts exist with the pipelines.

3.2.1.5. Winter Operations

The study corridor is considered a Level I and Level I-A winter maintenance area according to the *MDT Maintenance Operations and Procedures Manual*[1]. A Level I winter maintenance area includes roadways within or adjacent to a 3-mile radius to towns or cities with an average daily traffic greater than 5,000 vehicles per day (vpd). Level I routes are eligible to receive up to 24 hours-per-day coverage during a winter storm event. A Level I-A winter maintenance area includes roads outside of the 3-mile radius buffer which carry more than 3,000 vpd. Level I-A routes are eligible for 19 hours-per-day coverage, typically between 5:00 AM and 12:00 AM, during a winter storm event. Coverage is at the discretion of MDT's Bozeman Area Maintenance Chief. The primary objective is to keep one lane in each direction open to traffic. Snow packed and/or icy surfaces are acceptable but they may be treated with abrasives or abrasive/chemical combination.

3.2.1.6. Railroads

A BNSF owned (MRL leased) railroad parallels the southern side of the Frontage Road. The track is referred to as the MRL (2nd Subdivision). The track averages 21 daily trains, and the 90th percentile is 26 daily trains. There are five public and three private at-grade crossings adjacent to the study corridor. Daily rail traffic effects vehicle traffic operations at and near these at-grade crossings.

Based on data collected on July 29th, 2016 as part of this planning study, it was observed that 23 trains crossed at the Jackrabbit Lane crossing. Of these trains, 7 were traveling westbound and the remaining 16 were traveling eastbound. It took an average of 107 seconds for the trains to clear the Jackrabbit Lane crossing.

The existing distance from roadway center line to railroad centerline is approximately 115 feet between Sundown Creek Road east of Belgrade and the Railroad Viaduct along North 7th Avenue north of Bozeman. Areas of the corridor closer to and within the cities of Belgrade and Bozeman have a greater distance between the roadway and railroad. MRL has given direction that the horizontal distance from the southernmost edge of roadway to the railway is not to be reduced with the planned slope flattening project (UPN 8031). Any improvement option(s) identified for those portions paralleling close to the tracks must not move the southern edge of the roadway shoulder any closer to the tracks.

3.2.1.7. Passing Zones

Passing opportunities are provided along the corridor in areas where roadway geometrics allow. No passing zones are established in areas where there is insufficient passing sight distance or near public approaches. The following information summarizes the guidelines for no-passing zones as contained in the *MDT Traffic Engineering Manual*[2].

- For determining a no-passing zone, the distance along a driver's line-of-sight is measured from a 3.5-foot height of eye to a 3.5-foot height of object.
- For 2-lane rural highways on the National Highway System (NHS), the no-passing zone design speed will be 70 mph. For a rural 2-lane primary highway, the design speed is 60 mph.
- The minimum passing sight distance required for a no-passing zone 1,200 feet and 1,000 feet for 70 and 60 mph design speeds, respectively.
- The minimum length for a no-passing zone is 500 feet.
- If the length between successive no-passing zones in the same direction of travel is less than 1,000 feet, then the gap between the no-passing zones should be closed.
- A no-passing zone should be marked in advance of intersections at a minimum distance of 500 feet.

Figure 3.3 shows the passing zones along the corridor as documented through on-site field review, aerial imagery, and *Google Street View* imagery. A total of 14 passing zones, seven eastbound and seven westbound, exist along the study corridor. Eight of the fourteen passing zones are less than 1,000 feet in length.

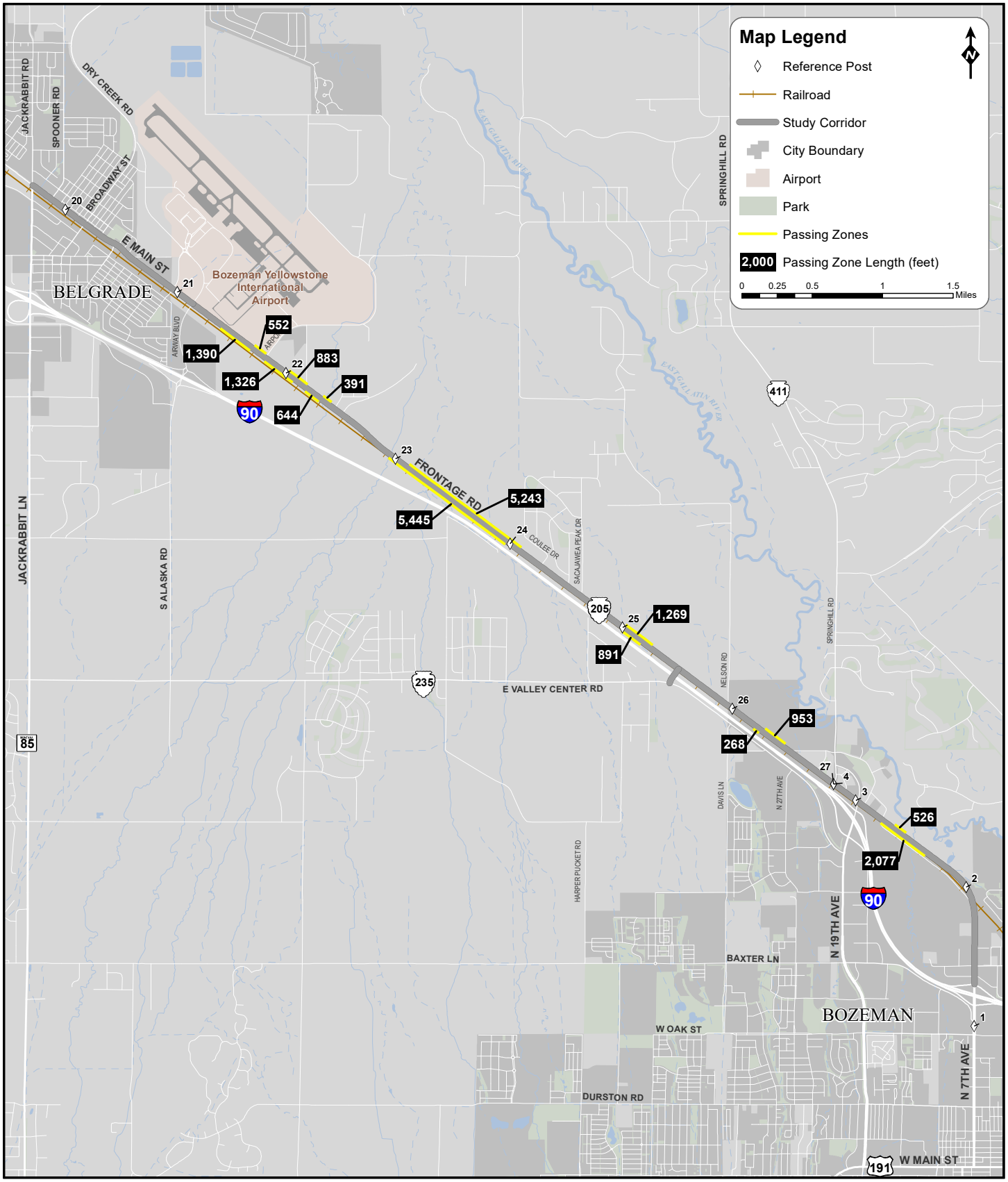

Figure 3.3: Passing Zones

3.2.1.8. Drainage Conditions

Due to the varied nature of the corridor (urban and rural), drainage conditions along the study corridor vary from curb and gutter with storm sewer to simple drainage ditches. Within Belgrade, curb and gutter is used to direct and control storm water. It was noted during the field review that many areas within Belgrade have poor drainage as evidenced by standing water in multiple locations. In addition to storm water control, many other hydraulic structures are in place along the study corridor.

3.2.1.9. Bridges

MDT's Highway Bridge Program emphasizes asset management and preservation. This emphasis promotes a "right treatment at the right time" philosophy in prioritizing and selecting projects on MDTs bridge system. MDT has defined the bridge program objectives and performance measures. The objectives and measures are intended to identify the right treatments for Montana's bridge assets, as well as promoting cost-effective bridge preservation, appropriate safety-related work, and economic growth.

There are two bridges along the study corridor. **Table 3.2** presents the bridge locations and condition ratings. The bridge at RP 26.6 has a structure condition of "poor" which means it is a candidate for repair or replacement. The bridge located at RP 2.1 over the railroad tracks has a structure condition of "good" which indicates it is a candidate for continued preservation. Both bridges have bridge deck ratings of "fair-1", which means they are candidates for healer/sealer treatments.

Table 3.2 also lists the width of each bridge within the study area. According to the *MDT Bridge Design Standards*[3], the bridge at RP 26.6 has a total bridge width narrower than the recommended standard for new bridges. The bridge at RP 2.1 has a width that meets standards for new bridges. Bridges to remain in place that do not meet the recommended width may be considered for additional signing or widening depending on further engineering analysis.

Table 3.2: Bridge Locations and Condition

LOCATION	FEATURE CROSSED	YEAR BUILT	WIDTH (ft)	LENGTH (ft)	STRUCTURE CONDITION	DECK CONDITION
RP 26.6 (P-205)	Unknown Creek	1950	29.5	42.6	POOR	FAIR-1
RP 2.1 (P-118)	Railroad Track	1993	42.3	391.0	GOOD	FAIR-1

Source: MDT Bridge Management System, 2016

3.2.1.10. Other Transportation Modes

Other transportation modes include any mode that does not use an automobile. These can include, but are not limited to, bicycles, walking, transit services, and other non-motorized forms of transportation. The following discusses these other transportation modes relative to the study corridor.

Non-motorized

Sidewalks are in place on both sides of the study corridor from Jackrabbit Lane to Kennedy Street in Belgrade. From Kennedy Street to the east of the Central Valley Fire Station, the north side of Main Street is striped as a buffered pedestrian area. There is sidewalk on the north side of Main Street from east of the Central Valley Fire Station to approximately Oregon Street. Multiple gaps in the sidewalk network exist within Belgrade south of Kennedy Street.

With the construction of the East Belgrade Interchange, sidewalks were constructed from Gallatin Field Road to east of Airway Boulevard. Between Redwing Road and the end of the study corridor, sidewalks are in place at spot locations on both sides of North 7th Avenue. There is approximately 310

feet of separated shared-use path constructed south of the Gallatin Veterinary Hospital and north of the Frontage Road east of the intersection with Campbell Road.

Local planning documents conflict on long-term non-motorized infrastructure recommendations for the Frontage Road. The following summarizes the relevant local plans, and their corresponding recommendations.

- **Bozeman Transportation Master Plan (2017):** Recommends construction of a shared-use on the north side of the Frontage Road within the TMP planning limits (approximately five miles in length).
- **Greater Bozeman Area LRTP (2007 Update):** Recommends expanded shoulders on each side of the Frontage Road with a minimum width of 4-feet, in conjunction with future roadway improvements.
- **Bozeman PROST Plan:** Identifies a separated shared-use path running the length of the Frontage Road within the City planning limits, and numerous trail connections to the north connecting to residential neighborhoods, the East Gallatin River, and the Cherry River FAS.
- **Belgrade Transportation Plan:** Recommends a ten-foot wide path with an all-weather surface on the south side of old Highway 10 between Belgrade and Bozeman within either the railroad or the Interstate rights-of-way.

The Union Pacific Railroad and BNSF Railway have guidelines for projects within railroad right-of-way. MRL, as a lessee, is required to seek BNSF concurrence as the underlying landowner on any easement for roadway purposes granted to MDT, and MRL seeks to avoid roadway designs which do not conform to BNSF's standards. The guidelines are intended to limit potential impacts on existing and future railroad operations. Compliance with the guidelines is required to expedite review and approval of design and construction projects. Any development of trails within or near the railroad would likely require coordination with the railroad. The following guidelines exist for trails parallel to tracks[4]:

- The Railroad does not allow trails parallel to the track on railroad right-of-way and does not permit the use of railroad access roads for trail use.
- Railroad structures cannot be used to serve trail traffic or support a structure serving trail traffic.
- Fences or barriers such as vegetation, ditches, and/or berms shall separate trails that are outside the railroad right-of-way and running parallel to the track to stop trespassers from entering the railroad right-of-way.

Transit

Public transit services are not present along this study corridor. The closest public transit is Streamline's Greenline route which services Jackrabbit Lane in Belgrade. Streamline is the only public bus service in the Livingston, Belgrade, Four Corners, and Bozeman areas.

3.2.2. Traffic Operations

An evaluation of traffic operations for the study corridor was completed using available data provided by MDT, as well as field-collected data. Turning-movement counts were conducted by MDT at nine major intersections within the study area over a 24-hour period. Mainline traffic volume data for existing and historic conditions were available at multiple locations within the study area. Visual observations were made for driver behavior, vehicle queuing, and general traffic characteristics. The following sections provide details about the existing and projected traffic characteristics for the study corridor. Detailed data are available in **Appendix 4**.

3.2.2.1. Traffic Volumes

Traffic volumes along the study corridor are collected annually as part of MDT's traffic data collection program. A total of 10 data collection sites are located along the study corridor. The data collected at each site is used to determine an average annual daily traffic (AADT) volume. AADT represents the average number of vehicles that pass a given point on a typical day of the year. Existing AADT volume on the study corridor ranged from a low of 5,250 vpd west of Broadway Street in Belgrade, to a high of 12,520 vpd south of Griffin Drive in Bozeman.

Projected Conditions

Historic and projected future conditions were evaluated to help identify an appropriate growth rate for the study corridor. The selection of an appropriate growth rate for the area is important for forecasting future traffic conditions and to help identify corridor needs. This section presents two methodologies for determining projected traffic conditions. The first approach utilizes available historic traffic data to define how conditions have changed in the past. The second approach uses a travel demand model to project how changes to area land use might affect traffic conditions in the future. The following sections discuss these methodologies in more detail.

Historic Traffic and Growth Rates

The historic traffic growth method utilized the AADT data available from MDT. Historic growth rates for the study corridor are used to help project future traffic conditions. Past growth is typically used as an indicator for future growth. Traffic volumes can vary greatly over short periods of time. As such, an analysis of multiple years of historic data is needed to more accurately project future conditions.

AADT data for the past 20 years (1996 through 2015) were used to determine a compound average growth rate (CAGR) for the count sites along the study corridor. Traffic has shown moderate growth over the past 20 years. Between 1996 and 2015, traffic was shown to increase at an average annual rate of 1.0 percent along the study corridor. However, volumes are generally shown to decrease between 2014 and 2015 due to the opening of the East Belgrade Interchange. During this one year period, volumes dropped by just over 20 percent on average along the study corridor. Prior to the East Belgrade Interchange opening, traffic volumes grew at an average annual rate of 1.2 percent between 1995 and 2014. **Table 3.3** tabulates the change in traffic volumes since the East Belgrade Interchange was constructed. It is expected that traffic volumes will start to increase again after the initial reduction in volumes due the change in travel patterns from the new interchange.

Table 3.3: AADT Change between 2014 and 2015

LOCATION	2014 AADT	2015 AADT	% DIFFERENCE
East of Jackrabbit Lane	9,460	8,348	-11.8%
West of Broadway Street	7,210	5,250	-27.2%
East of Broadway Street	9,980	8,670	-13.1%
East of Madison Avenue	11,510	9,550	-17.0%
West of Valley Center Spur Road	11,360	7,478	-34.2%
West of Springhill Road	10,100	5,760	-43.0%
East of Springhill Road	8,370	5,300	-36.7%
North of Red Wing Drive	8,160	6,090	-25.4%
North of Griffin Drive	9,540	9,930	4.1%
South of Griffin Drive	14,410	12,520	-13.1%
		Average for Corridor	**-21.2%**

Travel Demand Model

A travel demand model was developed for Gallatin County as part of the *Bozeman Transportation Master Plan*. The model uses the transportation network and land use assignments to determine the number of trips for roadway segments. The model was initially developed and calibrate to existing conditions. To project future conditions, future land use assignments were completed using a combination of socioeconomic data and vetted through a workshop with staff from the City of Bozeman, Gallatin County, and MDT.

Future traffic volumes are estimated by projecting land use changes and applying those changes to the existing conditions model. In addition to land use changes, changes to the road network can be applied. Future projections were made out to the year 2040. The model projected a CAGR of 1.3 percent for the study corridor.

Projected Growth Summary

Over the past 20 years, the study corridor has experienced a CAGR of approximately 1.0 percent. The historic growth is influenced by the recent construction of the East Belgrade Interchange. As such, the travel demand model was used as a tool to help predict future conditions. The model suggests a CAGR of 1.3 percent for the study corridor.

Factoring in historic growth along with the results of the travel demand model, it was determined that a CAGR of 1.3 percent would be appropriate for the study corridor. As such, a 1.3 percent average annual growth rate was applied to existing traffic volumes for the projected operational analysis contained in this report. Projected AADT for the study corridor are shown in **Table 3.4**.

Table 3.4: Existing and Projected Traffic Volumes

SITE	LOCATION	2015 AADT	2040 AADT*
16-3-014	East of Jackrabbit Lane	8,348	11,350
16-3-015	West of Broadway Street	5,250	7,250
16-3-016	East of Broadway Street	8,670	11,970
16-3-017	East of Madison Avenue	9,550	13,190
16-3-032	West of Valley Center Spur Road	7,478	10,330
16-3A-017	West of Springhill Road	5,760	7,960
16-3A-016	East of Springhill Road	5,300	7,320
16-3B-119	North of Red Wing Drive	6,090	8,410
16-3B-019	North of Griffin Drive	9,930	13,710
16-3B-020	South of Griffin Drive	12,520	17,290

** Projected based on an average annual growth rate of 1.3 percent.*

Heavy Vehicle Traffic

An analysis of heavy vehicle traffic along the study corridor was made using the 24-hour turning movement count data. The turning movement count data include breakouts for vehicle type. For this analysis, vehicles classified as single-unit trucks and articulated trucks were considered heavy vehicles. Based on the turning movement counts, the percent of heavy vehicles at the major intersections ranges from just over two percent to almost seven percent of all vehicle traffic. On average, heavy vehicle traffic accounts for approximately 4.5 percent of traffic along the corridor.

School-related Traffic

Traffic data was originally collected during the summer months, while school was not in session. To supplement the data, additional field observations were made to evaluate the effects traffic related to

Belgrade High School had on the study corridor. Observations were made in early November 2016 during school pick-up and drop-off times. The field review showed that traffic operates relatively smoothly throughout most of the day. However, when students are released from school in the afternoon, traffic congestion and operational issues were observed related to school bus traffic and vehicles attempting to turn left onto Jackrabbit Lane.

3.2.2.2. Major Intersections

The study corridor has multiple intersections of varying volume. Nine intersections were identified as major intersections which merit more in-depth investigation. Vehicle turning movement data was collected at each of the nine intersections over a 24-hour period. Each turning movement count was adjusted based on seasonal traffic adjustment factors published by MDT[5]. The data was used to evaluate intersection operations and peak hour conditions.

The operational conditions of the intersections are characterized by the Level of Service (LOS). The LOS is based on an alphabetic scale which represents the full range of operating conditions. This scale is defined based on the vehicle delay experienced at the intersection. The scale ranges from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion.

Figures 3.4 and **3.5** present the traffic volumes and operations graphically. The following discusses the general operational characteristics of the nine major intersections along the study corridor. More detailed information on the intersection operational analysis is provided in **Appendix 4**.

1. Jackrabbit Lane

The intersection with Jackrabbit Lane is currently signalized. The eastbound approach consists of dedicated right-turn, through, and left-turn lanes. The westbound approach consists of a dedicated left-turn lane and a shared through/right-turn lane. Both the northbound and southbound approaches consist of dedicated left-turn and through lanes along with right-turn slip lanes.

The adjacent railroad pre-empts the traffic signal when a train approaches Jackrabbit Lane. Approximately 60 seconds before the train reaches Jackrabbit Lane, all northbound movements are given green signals and all other movements are given red signals. The northbound phase lasts for approximately 45 seconds, after which the east and westbound movements are given green signals. The traffic signal remains in this phase until the train has cleared the level crossing and the barrier gates have been raised.

Under existing traffic conditions, this intersection operates at a LOS of C during the AM and PM peak hours. Under projected conditions, the intersection is shown to remain at a LOS of C during the peak hours.

2. Broadway Street

The intersection with Broadway Street is a four-legged all-way stop controlled intersection. All of the approaches consist of a single shared lane allowing all movements. On-street parking is available on the north side of Main Street and on both sides of Broadway Street on the north approach. Angle parking is available on the south side of Main Street on the east approach. The MRL railroad line is located approximately 180 feet south of the northbound stop bar.

Under existing traffic conditions, the intersection operates at a LOS of A and C during the AM and PM peak hours, respectively. Under projected conditions, the intersection is shown to operate at a LOS of B and F during the respective peak hours. The failing projected PM peak hour is mainly a result of heavy westbound through and left-turn movements.

3. Oregon Street

The intersection of Oregon Street is a three-legged stop controlled intersection. The northbound approach is stop controlled and consists of channelized through/left- and right-turn lanes. There is a median dividing the right-turn and through/left-turn lanes. There is also a median dividing the southbound and northbound lanes. The eastbound and westbound approaches consist of single lanes with free movements. An entrance approach for a gas station is located on the north side of the intersection.

Under existing traffic conditions, the intersection operates at a LOS of C and D during the AM and PM peak hours, respectively. Under projected conditions, the intersection is shown to operate at a LOS of C and F during the respective peak hours. The intersection is shown to experience excessive delay for the northbound left-turn movement during the PM peak hour.

4. Airway Boulevard

The intersection with Airway Boulevard was recently reconstructed with the East Belgrade Interchange project. The intersection was reconstructed to include a traffic signal. All approaches at the intersection include dedicated right-turn, through, and left-turn lanes. The traffic signal operates with protected/permissive left-turn movements along all approaches. The intersection is shown to operate at a LOS of C or better during the peak hours under existing and projected conditions.

5. Airport Road

The intersection with Airport Road was reconfigured with the East Belgrade Interchange project. Prior to the East Belgrade Interchange project, the intersection was a four-legged intersection. The project resulted in the removal of the south approach leg which was previously used to access the Knife River Gravel Pit. The intersection is now a three-legged intersection with stop control along the north approach. There are no dedicated turn lanes along any approach. The intersection is shown to operate at a LOS C during the peak hours under existing and projected conditions. Concern has been expressed about the lack of a dedicated eastbound left-turn lane.

6. East Valley Center Spur Road

The intersection with East Valley Center Spur Road is a stop controlled four legged junction. However, the north leg is a closed private approach. The eastbound leg of the intersection consists of a dedicated right-turn, through, and left-turn lanes. The westbound leg consists of a dedicated left-turn bay and a shared through/right lane. The north-bound approach consists of a shared left/right-turn lane. The MRL rail line crosses East Valley Center Spur Road immediately south of the intersection. The at-grade crossing is controlled with an automatic crossing gate. The traffic control at the intersection is scheduled to be upgraded to signal control in the near future. As such, signalized traffic control was used for all projected traffic conditions.

Under existing traffic conditions (stop control along the northbound approach), the intersection operates at a LOS of C during the peak hours. Under projected conditions (traffic signal), the intersection is shown to operate at a LOS of B during the peak hours.

7. Nelson Road

The intersection with Nelson Road is a three-legged intersection with stop control along Nelson Road. The eastbound approach consists of a dedicated left-turn lane and a through lane. The westbound approach consists of a dedicated right-turn lane and a through lane. The southbound approach has a shared left/right-turn lane.

Under existing traffic conditions, the intersection operates at a LOS of B during the peak hours. Under projected conditions, the intersection is shown to operate at a LOS of C during the peak hours.

A traffic study was conducted in December 2016 to evaluate if traffic signal warrants were met. The results of the study showed that a traffic signal is not currently warranted at the intersection.

8. Springhill Road

The intersection with Springhill Road is a three-legged intersection. The intersection is controlled by a traffic signal. The southbound approach consists of dedicated left- and right-turn lanes. The eastbound approach consists of a dedicated left-turn lane and a through lane. The westbound approach includes a dedicated right-turn lane and a through lane. The intersection operates at a LOS B during the AM and PM peak hours under existing and projected conditions.

9. Griffin Drive

Griffin Drive and 7th Avenue intersect at an urban four-legged signal controlled intersection. The northbound approach consists of a shared through/left-turn lane and a dedicated right-turn lane. The southbound approach has a shared through/left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches are single lanes which allow for all movements.

The traffic signal does not provide for protected left-turn movements along any approach and allows for permissive left-turn movements only. Under existing traffic conditions, the intersection operates at a LOS of C and D during the AM and PM peak hours, respectively. Under projected conditions, the intersection is shown to operate at a LOS of D and F during the respective peak hours. The intersection experiences delay due to the southbound and westbound left-turn movements.

A traffic and geometric analysis was completed for this intersection by MDT in October 2016[6]. The purpose of the analysis was to identify improvements to signal timing and geometrics to address operational concerns. A recommendation was made to reconstruct the intersection to include dual westbound left-turn lanes and to realign the northbound and southbound legs to include left-turn lanes. The intersection is planned for reconstruction in 2019.

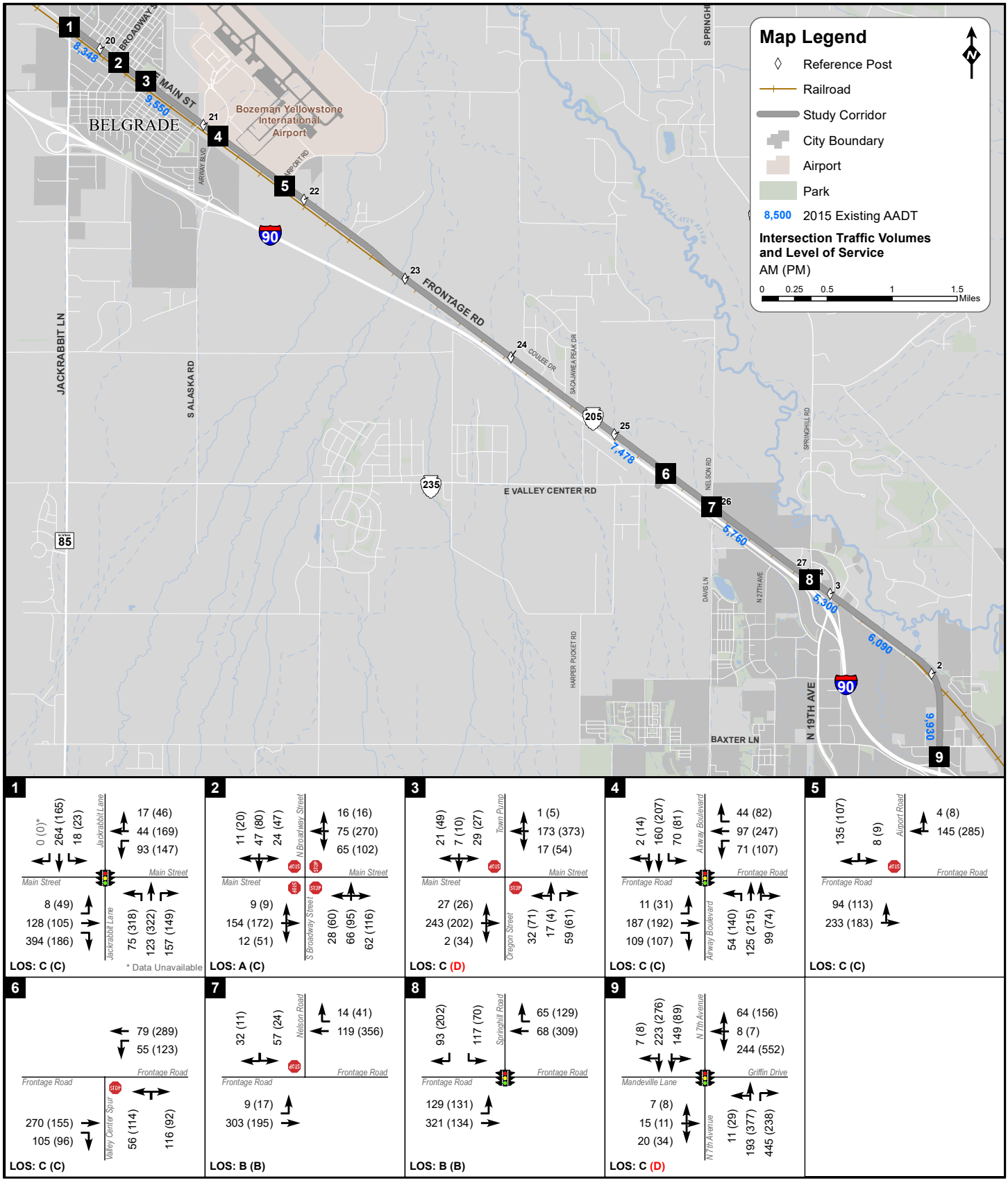

Figure 3.4: Existing Traffic Operations

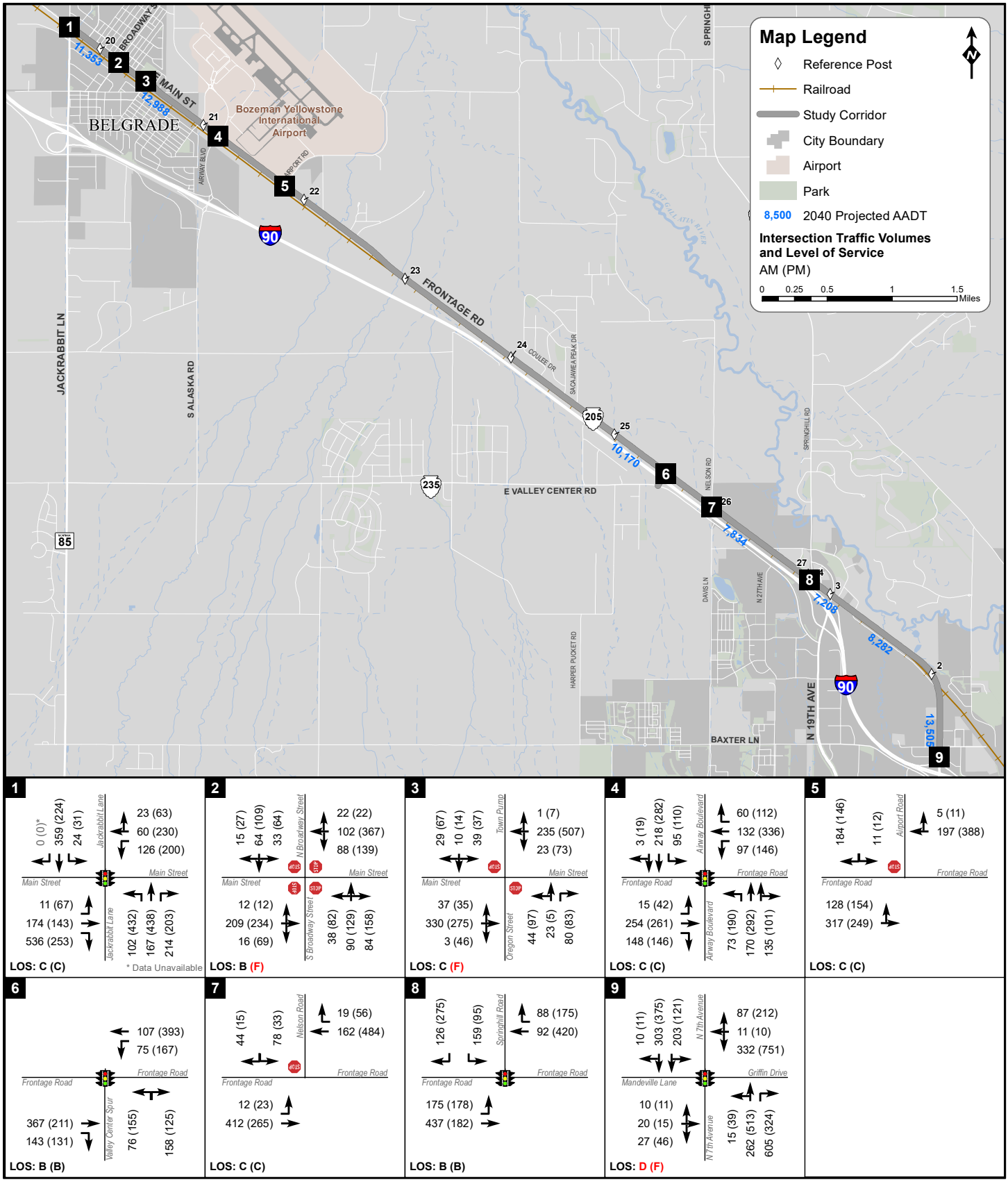

Figure 3.5: Projected Traffic Operations

3.2.2.3. Roadway Segments

The traffic operations of the study corridor were evaluated by dividing the corridor into roadway segments. The segments were generally defined between major intersections. Two categories of roadway segments can be used to describe each portion of the study corridor: urban and rural. Urban segments are characterized by frequent access points and intersections. Operations on urban segments are controlled by the intersections within the segment (see **Section 3.2.2.2**). The portions of the corridor between Jackrabbit Lane and Airway Boulevard and between the railroad overpass and the Interstate 90 ramps were considered urban in nature.

Rural segments are defined as having few access points or intersections. The operations on rural segments are controlled by driver's behavior on the segment. The corridor between Airway Boulevard and the railroad overpass is generally more rural. The operational characteristics of the rural portion of the corridor were evaluated in terms of LOS.

Operations on the rural segments of the study corridor are likely controlled by the speed of traffic due to limited passing opportunities. It was assumed that the free flow speed for all segments is 55 miles per hour based on the existing speed limits and past speed studies conducted along the corridor. Each segment was further broken down into eastbound and westbound direction for peak hour operational analysis. The following discusses the operations of each rural roadway segment. More detailed information is provided in **Appendix 4**.

Airway Boulevard to Airport Road

Airway Boulevard and Airport Road are approximately 0.8 miles apart. There are no approaches within this segment. The percent of the segment that is striped as no passing is 84 and 59 percent in the westbound and eastbound directions, respectively. Under existing conditions, the LOS for this segment is B and C in the westbound direction and B and B in the eastbound direction during the AM and PM peak hours, respectively. Under projected traffic conditions, the LOS is C for both directions of travel during the peak hours.

Airport Road to East Valley Center Spur Road

Airport Road and East Valley Center Spur Road are approximately 3.7 miles apart. The approach density on this segment is nine approaches per mile. The percent of the segment that is striped as no passing is 60 and 57 percent in the west and eastbound directions, respectively. Under existing conditions, the LOS for this segment is B in both directions during both peak hours. Under projected traffic conditions, the LOS is B and C in the west and eastbound directions during the AM peak hour and C for both directions during the PM peak hour.

East Valley Center Spur Road to Nelson Road

East Valley Center Road and Nelson Road are approximately 0.4 miles apart. The approach density on this segment is two approaches per mile. The percent of the segment that is striped as no passing is 100 percent in both the west and eastbound directions. Under existing traffic conditions, the LOS for this segment is B for both directions during the AM peak hour and C and B for the west and eastbound directions, respectively, during the PM peak hour. Under projected traffic conditions, the LOS remains the same as under existing traffic conditions.

Nelson Road to Springhill Road

Nelson Road and Springhill Road are approximately 0.9 miles apart. The approach density on this segment is six approaches per mile. The percent of the segment that is striped as no passing is 81 and 95 percent in the west and eastbound directions. Under existing traffic conditions, the LOS for this segment is B in both directions during the AM peak hour and C and B for the west and eastbound directions, respectively, during the PM peak hour. Under projected traffic conditions, the segment LOS

is C and B for the west and eastbound directions during the AM peak hour and C in both directions during the PM peak hour.

Springhill Road to Rail Road Overpass

The distance from Springhill Road to the south side of the rail road overpass is approximately 1.4 miles. The approach density for this section is seven approaches per mile. The percent of the segment that is striped no passing is 93 and 73 percent for the west and eastbound directions, respectively. Under existing traffic conditions, the AM peak hour LOS is B for both directions. During the PM peak hour, the LOS is C and B for the west and eastbound directions, respectively. Under projected traffic conditions, the segment LOS is C in both directions during both the AM and PM peak hours.

3.2.3. Geometric Conditions

Existing roadway geometrics were evaluated and compared to current MDT standards. The analysis was conducted based on a review of public information, MDT as-built drawings, GIS data, and field observations. The use of as-built drawings was limited due to the drawings being unavailable for some segments and out dated for other segments of the corridor.

3.2.3.1. Design Criteria

The *MDT Road Design Manual* specifies general design principles and controls that determine the overall operational characteristics of the roadway and enhance its aesthetic appearance. The geometric design criteria for the study corridor are based on the current MDT design criteria for principal arterials on the NHS and minor arterial non-NHS routes. Standards for rural and urban conditions for both classifications are appropriate for the corridor.

The portion of the corridor through Belgrade is an urban NHS principal arterial. Between Belgrade and Airway Boulevard, the roadway is likely a rural NHS principal arterial. East of Airway Boulevard to Bozeman, the roadway is a rural minor arterial. Through Bozeman, the roadway is an urban minor arterial. Depending on classification, design speeds may vary from as low as 35 mph in the urban areas, up to 70 mph in the rural areas. Further evaluation of design speed and terrain type may be necessary during the project development process.

3.2.3.2. Roadway Alignment

Roadway alignment can be viewed as a combination of two primary components: horizontal alignment and vertical alignment. Horizontal alignment is a measure of the degree of turns and bends in the road, and includes consideration of horizontal curvature, superelevation, curve type, and entering and passing sight distance. Geometric design criteria specific to horizontal alignment are based upon the functional classification of the roadway. Vertical alignment is a measure of the elevation change on a roadway, and includes consideration of grade, vertical curve length, vertical curve type (either a sag curve or a crest curve), and rate of curvature (K-value). K-value is the horizontal distance needed to produce a one percent change in gradient and is directly correlated to the roadway design speed and stopping sight distance.

Limited as-built information was available for the study corridor. The majority of the as-builts were from 1921 and 1933. The roadway has seen various reconstruction projects since that time. This includes the urban roadway section between Jackrabbit Lane and Grogan Street (in Belgrade), the recently completed East Belgrade Interchange and connecting roads, interim intersection improvements at Valley Center Spur Road, improvements to the intersection with Nelson Road, and the bridge crossing the MRL tracks (constructed in 1993). All of these improvements brought the roadway and associated infrastructure up to standards current at the time.

Because of the relatively straight horizontal alignment that parallels the MRL tracks, and the relatively flat nature of the surrounding topography, it is likely that the roadway meets current geometric design

standards for horizontal and vertical alignment. As improvement options are developed, detailed on-site investigation should be performed to confirm alignment standards are met.

3.2.3.3. Roadside Clear Zone

The roadside clear zone, starting at the edge of the traveled way, is the total roadside border area available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a recovery area. The desired clear zone width varies depending on traffic volumes, speeds and roadside geometry. Clear zones are evaluated individually based on the roadside cross section. According to MDT, clear zone should be attained by removing or shielding obstacles, if costs are reasonable.

In certain instances within the study area, it may be impractical to protect or remove certain obstacles within the clear zone. As improvement options develop, roadside clear zones should be designated, to a practical extent, to meet current MDT design standards.

3.2.4. Safety

Crash data were provided by the MDT Traffic and Safety Bureau for the six-year period between January 1, 2010 and December 31, 2015. The crash reports are a summation of information collected at the scene of the crash provided by responding officers. Some of the information contained in the crash reports may be subjective. Any crash records from other law enforcement agencies that were not reported to or by the Montana Highway Patrol were not contained in the database and are not included in this analysis.

The crash locations were plotted using latitude and longitude assigned to each record. The crashes were plotted and grouped based on if they occurred at an intersection or along a roadway segment. The crash records were reviewed to identify trends, contributing factors, and characteristics which are summarized on the following pages. The location of crashes are shown in **Figure 3.6**.

According to the records, there were 382 crashes reported along the study corridor during the six-year analysis period. There were three fatal crashes, resulting in three fatalities, and eight incapacitating injury crashes, resulting in ten incapacitating injuries.

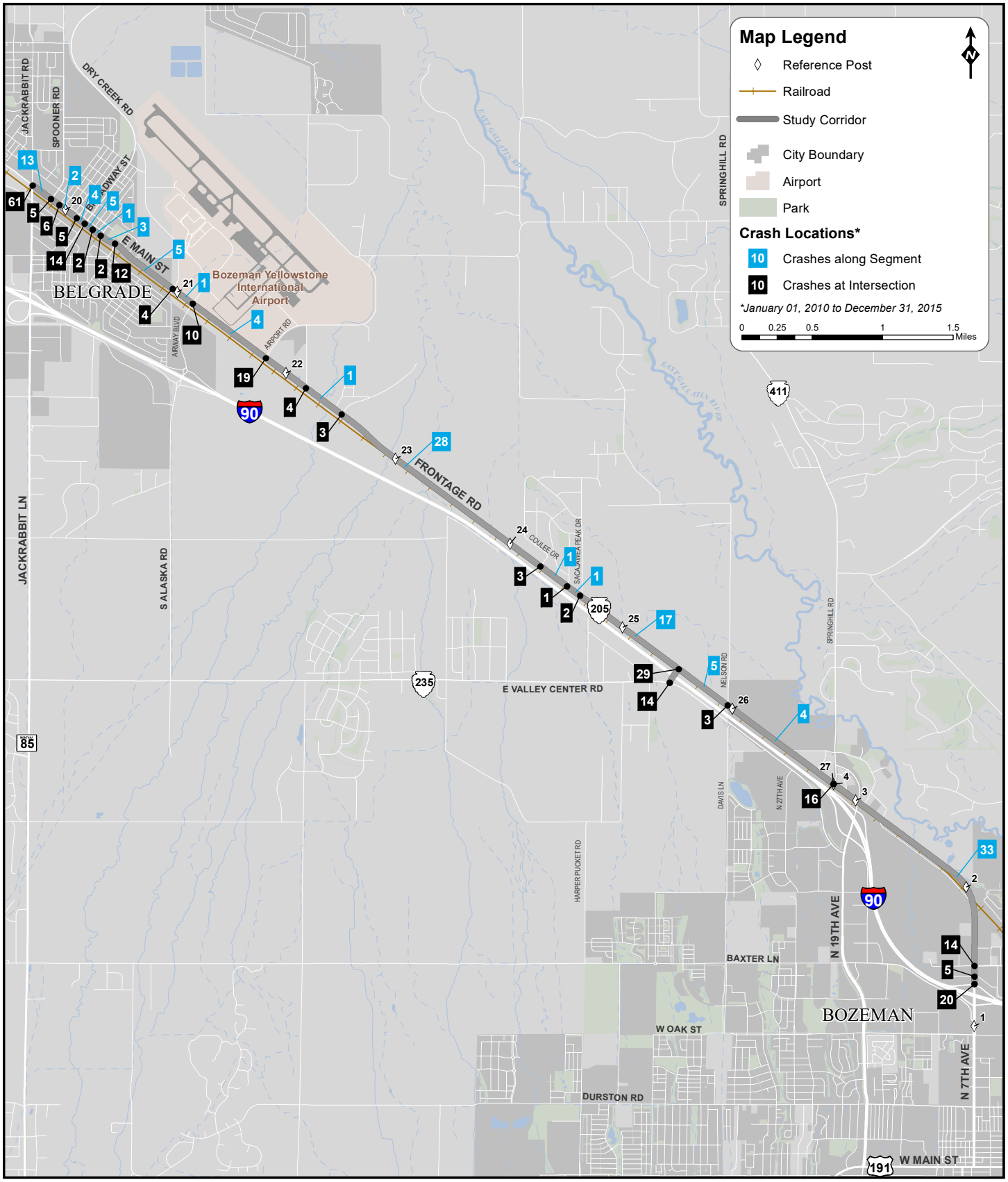

Figure 3.6: Crash Locations

3.2.4.1. Safety Trends, Contributing Factors, and Crash Clusters

Crash type can be grouped into two categories, multi- and single-vehicle crashes. Multi-vehicle crashes are those that involve two or more vehicles, single-vehicle crashes involve only one vehicle. Multi-vehicle crashes accounted for 73 percent of all crashes. Single vehicle crashes accounted for the remaining 27 percent. The most common crash type was rear-end crashes, accounting for 39 percent of all reported crashes. The most common single vehicle crash was fixed object crashes, accounting for 12 percent of total crashes. Crash types are shown in **Figure 3.7**.

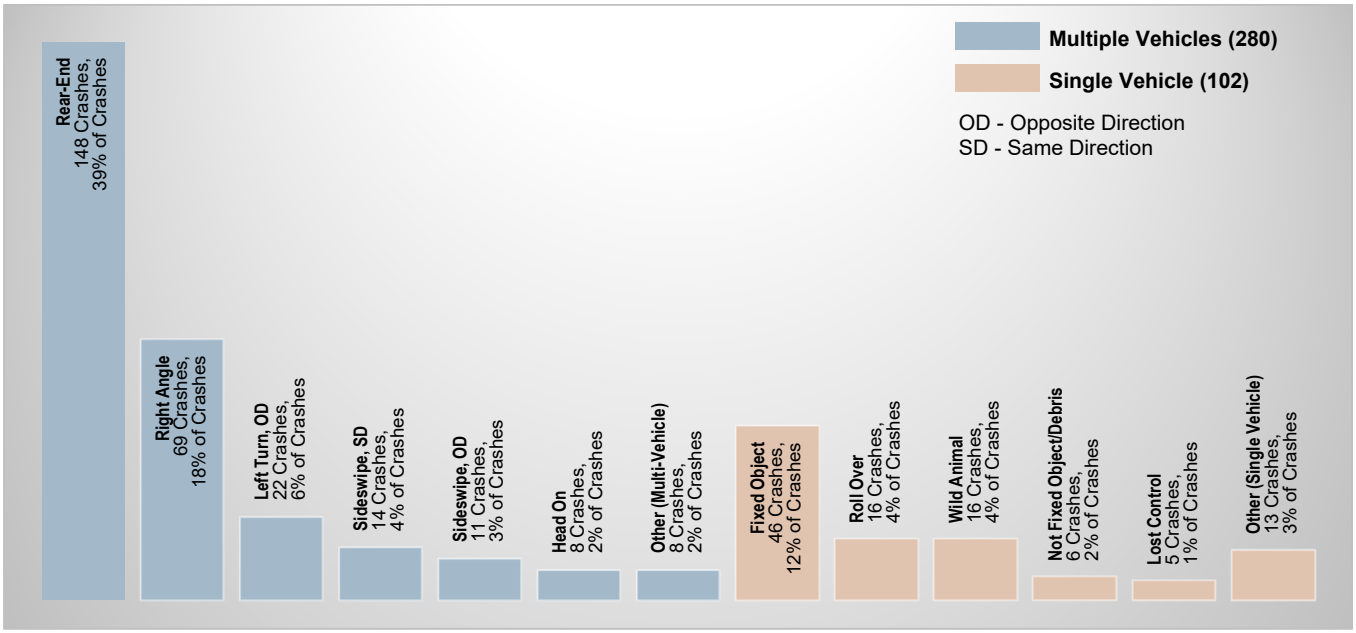

Figure 3.7: Crashes by Type

It was found that 57 percent of crashes occurred under clear weather conditions, 66 percent occurred on dry roads, and 73 percent occurred during daylight conditions.

A total of 679 drivers were involved in crashes within the study area during the crash analysis time period. Of all drivers involved in crashes, males accounted for 53 percent of those involved in crashes, females accounted for 45 percent of drivers, while the remaining 2 percent were reported as unknown gender. With respect to driver's age, drivers under the age of 20 years accounted for 15 percent of drivers.

The most common day for crashes was Thursday, accounting for 20 percent of total crashes. Crashes occurring on Saturday and Sunday accounted for 12 and 5 percent of crashes, respectively. Data regarding the month of the year in which crashes occurred showed that December had the most crashes, accounting for 13 percent of total crashes. April had the fewest crashes, accounting for 6 percent of all crashes. The winter months, November through February, accounted for a combined 39 percent of all crashes. With respect to time-of-day in which crashes occurred, 35 percent occurred between 3:00 PM and 7:00 PM.

There were three crashes involving a bicyclist. One bicycle crash resulted in a fatality, one resulted in a non-incapacitating evident injury, and the third resulted in no injury. There were two reported crashes involving pedestrians. One resulted in no injuries while the severity of the other was reported as unknown.

3.3. Environmental Setting

This section provides a summary of the *Environmental Scan*. The primary objective of the *Environmental Scan* is to provide a planning-level overview of resources and to determine potential constraints and opportunities within the study area. As a planning-level scan, the information was obtained from various publicly available reports, websites, and other documentation, as well as a "windshield survey" conducted by MDT staff. The scan is not a detailed environmental investigation. Information in the *Environmental Scan* is accurate as of May 2015. Further analysis may be necessary during project development. Refer to **Appendix 2** for more detailed information.

If improvement options are forwarded from this study into project development, an analysis for compliance with NEPA/MEPA will be completed as part of the project development process. Information provided in the Environmental Scan may be included in the NEPA/MEPA process at that time.

3.3.1. Physical Environment

The following subsections present an overview of items related to the physical environment.

3.3.1.1. Soil Resources and Prime Farmland

Information obtained on soils is used to determine the presence of prime and unique farmland in the study area to demonstrate compliance with the Farmland Protection Policy Act (FPPA). Farmland includes prime farmland, some prime if irrigated farmland, unique farmland, and farmland (other than prime or unique farmland) that is of statewide or local importance.

Soil surveys of the study area are available from the United States Department of Agriculture Natural Resources Conservation Services (NRCS). NRCS soil surveys indicate the presence of farmland of state or local importance, or prime farmland if irrigated within the study area. From approximately RP 22.5 to the east, the study area has a high percentage of farmland of state or local importance or prime farmland if irrigated. Some of this land has already been developed and is no longer subject to the FPPA.

If a federally funded improvement option forwarded from this study requires acquisition of land from these areas, MDT will have to complete a CPA-106 Farmland Conservation Impact Rating Form for Linear Projects and coordinate with NRCS. NRCS will use information from that form to keep an inventory of the prime and important farmlands within the state.

3.3.1.2. Geologic Resources

In the study area well rounded, poorly graded boulder gravel and sand, with some thin beds of clayey silt, are commonly encountered. Many gravel pits are adjacent to the study area. The majority of soils along the corridor are sandy gravel with cobbles and minor amounts of clay and silt. The soils west of Aajker Creek exhibit high corrosion potential for steel, and variable potential to the east. Corrosion potential for concrete is generally low throughout the study area.

Additionally, the Gallatin Valley consistently has an organic lean clay layer, which can be problematic for construction and long-term stability if not accounted for during design. The organic clay soils as the topmost layer should help to promote quick revegetation. If an area lacking a topsoil layer is encountered, the sandy gravel layer will be exposed and extra care will be required to provide vegetative soil stabilization.

Improvements brought forward from the study will be subject to a more detailed analysis of the aforementioned geotechnical risk factors. Part of this detailed analysis may involve taking advance borings to evaluate soil characteristics at exact project locations. This is standard procedure for most

MDT road projects. The design of any improvements should consider specific requirements that come from the detailed analysis.

3.3.1.3. Surface Water

Topographic maps and GIS data were reviewed to identify the location of surface water bodies such as rivers, streams, lakes, and reservoirs within the study area. There are five streams and three irrigation ditch crossings within the study area.

Effects on water bodies near the study area will have to be identified and coordinated with applicable agencies during any future project design. Permitting may be required for improvement options involving construction in or near waterways. Coordination with federal, state, and local agencies would be necessary to determine the appropriate permits based on choice of improvement options forwarded from this study. Impacts should be avoided and minimized to the maximum extent practicable.

3.3.1.4. Total Maximum Daily Loads

The Montana Department of Environmental Quality lists both Hyalite Creek and Mandeville Creek as having impairments. Both water bodies are category 4A, defined as waters where one or more applicable beneficial uses are impaired or threatened, and a total maximum daily load (TMDL) has been completed to address the factors causing the impairment or threat. For Hyalite Creek inside the study area, probable sources of impairment are irrigated crop production, leaking underground storage tanks, managed pasture grazing, and natural sources. Mandeville Creek probable sources of impairment are municipal point source discharges, municipal (urbanized high-density area), and residential districts. Currently the probable sources of impairments are not listed as being associated with road construction activities. That said, if improvement options are advanced, it will be necessary to reevaluate the 303(d)/305(b) integrated report for changes to listed impairments along with possible changes to TMDLs on a project level if a project is forwarded from this study.

3.3.1.5. Storm Water

The eastern end of the corridor is located within the Bozeman Municipal Separate Storm Sewer System (MS4) area. Under the current Small MS4 General Permit, new development or redevelopment projects greater than or equal to one acre in size must implement, when practicable, low impact development practices that infiltrate, evapo-transpire, or capture for reuse the runoff generated from the first half-inch of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation.

The City of Bozeman and MDT both manage MS4 programs that overlap the study area. Each program has specific requirements based on their individual Storm Water Management Plans. These and other MS4 issues will need to be further evaluated during any future project design. The current MS4 permit is in the process of being reissued and MDT has applied for an Individual MS4 permit. As such, it is likely the permit requirements will be slightly different in the future.

3.3.1.6. Groundwater

Within the study area, there are numerous domestic wells and seven public water supply wells. Wells can be a costly item to mitigate if they are not avoided. Mitigation of a well usually involves drilling a new well for the owner in a new location that will not be impacted by the potential project. Well costs are based on per foot price; the deeper and higher volume needed results in a higher cost. In addition, there is a 100-foot setback requirement for public water supply wells in which no source of pollutant can be located. Public water supply wells can also be deeper and require a higher volume of water to be discharged. This can translate into a more expensive well to replace, along with affecting larger number of users compared to a private well if impacted. Impacts on existing wells should be considered if a project is forwarded from this study.

3.3.1.7. Wetlands

Based on review of available information, potential wetlands are present within the study area. Future wetland delineations would be required if improvement options are forwarded from this study that could potentially impact wetlands. Future projects in the study area would need to incorporated project design features to avoid and minimize adverse impacts to wetlands to the maximum extent practicable. Unavoidable impact to wetlands must be compensated through mitigation in accordance United States Army Corps of Engineers regulatory requirements and/or requirements of Executive Order 11990. The need for any stream or wetland mitigation would be identified and secured prior to the permitting process if a project was forwarded from this study.

3.3.1.8. Floodplains and Floodways

Federal Emergency Management Agency-issued flood maps for Gallatin County indicate that flood plain zones exist within or are adjacent to the study area. If roadway improvements or developments could involve placement of fill within the regulatory flood plain then a flood plain permit would be required. Project development would then require coordination with Gallatin County to minimize flood plain impacts and obtain necessary floodplain permits for project construction. As only Zone X (outside the 500-year flood) cross into the study area, this should not impact possible improvements but should be reevaluated if a project is forwarded.

3.3.1.9. Irrigation

Irrigated agriculture land exists within the study area. Depending on the improvement option(s) proposed during the study, there is potential to impact irrigation facilities. Impacts to irrigation facilities should be avoided when practicable. Future modifications to existing irrigation canals, ditches, or pressurized systems could require redesigning and constructing in consultation with the owners to minimize impacts to agricultural operations. If there is impact to irrigation structures, there could be additional costs above typical project costs associated with the redesign or moving of the irrigation structure(s). The available Water Resources Survey data indicate that there is an abundance of water rights and agriculture land use throughout the study area. There are irrigation structures not easily identified at the high-level review appropriate for this study. An in-depth review for irrigation structures would occur at the project development stage to identify possible impacts if a project is forwarded from this study.

3.3.1.10. Air Quality

The study area is not located in a non-attainment area for any of the criteria pollutants. Additionally, there are currently no non-attainment areas nearby. As a result, special design considerations are likely not required in future project design to accommodate National Ambient Air Quality Standard non-attainment issues.

Depending on the scope of improvements forwarded in the study area, an evaluation of mobile source air toxics (MSATs) may be required. MSATs are compounds emitted from highway vehicle and off-road equipment, which are known or suspected to cause cancer or other serious health and environmental effects.

3.3.1.11. Hazardous Substances

There were no abandoned mines sites, National Priority List sites, oil and gas production wells, or toxic release inventory sites identified within the study area. At this time, none of the hazardous substances sites are expected to be “must avoid” locations or drivers of the ultimate project design. However, if a project were to overlap a hazardous substance site, a soil investigation would likely be needed. If contaminated soils are present, a special provision regarding handling contaminated soils is recommended to be included in project documentation. In addition, the contaminated soils could result in the need for remediation.

3.3.2. Biological Environment

The following information applies to the biological environment within the study area and reflects a baseline natural resource condition. Depending on the level of detail available through the high-level baseline scan, some of the information is presented at the country level, some at the study area level, and some at the corridor level.

3.3.2.1. Vegetation

According to the Montana Natural Heritage Program Land Cover Report, the dominate land cover type in the study area is a combination of high and light intensity residential development which is shown by human land use being 71 percent of land cover. Typically, any drainages within the study area are lined with deciduous riparian vegetation and some wetlands. The majority of the different land types in the study area are either moderately or highly disturbed.

If improvement options are forwarded from the study, practice outlined in MDT standard specifications should be followed to minimize adverse impact to vegetation and facilitate establishment of final stabilization of disturbed areas. Removal of mature trees and shrubs should be limited to the extent practicable.

3.3.2.2. Noxious Weeds

The Invaders Database System lists 262 exotic plant species and 49 noxious weed species in Gallatin County, some of which may be present in the study area. Gallatin County has weed management criteria in place that can be found on their website.

Reseeding of disturbed areas with desirable native plant species will help to reduce the spread and establishment of noxious weeds and to re-establish permanent vegetation. If improvements are forwarded from this study, field surveys for noxious weeds should take place prior to any ground disturbance and coordination with the Gallatin County Weed Board should occur. Proposed projects should incorporate the practices outlined in MDT standard specifications to minimize adverse impacts.

3.3.2.3. General Wildlife Species

The following subsections present an overview of the mammals, fish, birds, and amphibians and reptiles that may be found in or near the study area.

Mammals

Wildlife species inhabiting or traversing the study area are typical of those that occur in moderately developed areas of southwest Montana. Since many species in this area are habituated to somewhat disturbed areas and are tolerant of moderate levels of development, species present in this area are predominately, though not exclusively, generalists. Mammal species present, but not limited to, the study area include whitetail and mule deer, coyote, red fox, porcupine, raccoon, striped skunk, badger, beaver, muskrat, Richardson's ground squirrel, deer mouse, vole species, and a variety of bat species. Black bear, bobcat, mountain lion, and wolf may also occur as transients through the study area on occasion. Moose may occasionally occur along the drainages and riparian areas in proximity to the study area.

Whitetail and mule deer are prevalent in the study area, traversing between the riparian corridors and agricultural fields for daily resource needs, and a resident migrants. A review of the MDT Maintenance Animal Incident Database between January 1st, 2009 and December 31st, 2013, indicates that 27 animal carcasses were collected throughout the length of the corridor. The reported carcasses were all deer, mostly whitetail deer. If improvement options are forwarded from this study, the need for and viability of wildlife crossing mitigation measures should be explored during the project development phase.

Fisheries

There are four perennial streams in the study area listed as providing suitable habitat for an array of cold-water species. Other unnamed stream crossings exist that could also support fish species within the study area. Permitting from regulatory agencies for any future study areas improvements will require incorporation of design measures to facilitate aquatic species passage.

Birds

The MNHP Natural Heritage Tracker database indicates a variety of birds have been documented with the potential to occur and nest in the study area. These species include representative songbirds, birds of prey, waterfowl, owls, and shorebirds. Additionally, game birds including the gray (Hungarian) partridge, pheasant, and sharp-tailed grouse have habitat present in the study area. The study area provides marginal habitat for migratory birds which may nest in the mature trees or move through the area as seasonal migrants.

Multiple bald eagle nest which occur within the general proximity of the study area. However, currently the half-mile buffer areas around these nests do not cross into the study area. The study area is not typical golden eagle habitat, so the presence of golden eagle nests is unlikely.

Any improvements forwarded form this study should consider potential constraints that may result from nesting/breeding periods of migratory birds and presence of unknown or future bald and golden eagle nest. If a project is forwarded that involves tree and shrub removal and/or structure replacement or rehabilitation must be conducted in compliance with the Migratory Bird Treaty Act, which may entail a timing restriction between April 15th and August 15th.

Amphibians and Reptiles

The presence of amphibians and reptiles in the study area is likely limited by a lack of suitable habitat and level of development. Common species may occur in low numbers along irrigation facilities, drainages, and within wetland areas. Any improvements forwarded from the study should take into consideration and minimize impacts to amphibian and reptile habitat where practicable.

Crucial Area Planning System

The Montana FWP Crucial Planning System (CAPS) is a resource intended to provide non-regulatory information during early planning stages of projects, conservation opportunities, and environmental review. The finest data resolution within CAPS is at the square-mile section scale or water body. Use of these data layers at a more localized scale is not appropriate and may lead to inaccurate interpretations since the classification may or may not apply to the entire square-mile section.

CAPS provides general and specific recommendations for transportation projects for both terrestrial and aquatic species and habitats. These recommendations from CAPS can have a generic application to possible project locations moving forward from the study. Coordination with FWP wildlife biologists should occur if a project is forwarded from this study.

3.3.2.4. Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) maintains the federal list of threatened and endangered species. Species on this list receive protection under the Endangered Species Act. An “endangered” species is in danger of extinction throughout all or a significant portion of its range. A “threatened” species is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species that are candidates or proposed for possible addition to the federal list. As of May 2015, the following six threatened, endangered, proposed, or candidate species are listed as occurring in Gallatin County according to USFWS:

- Greater Sage-Grouse (Candidate)

- Sprague's Pipit (Candidate)
- Whitebark Pine (Candidate)
- Grizzly Bear (Threatened)
- Canada Lynx (Threatened and Critical Habitat)
- Ute Ladies' Tresses (Threatened)

The Montana Natural Heritage Program – Natural Heritage Map Viewer database records and maps documented observations of species in a known location. According to the database, there are no records of any threatened, endangered, proposed, or candidate species within the study area. Due to the lack of suitable habitat resulting from the level of development in the study area, density of roads, and presence of the interstate and railroad, it is not anticipated that any of the listed species occurring in Gallatin County would normally occur in the study area. It is anticipated that any project forwarded from this study would result in a "no effect" determination for listed species in Gallatin County.

If improvements are forwarded from this study, an evaluation of potential effects to threatened and endangered species will need to be completed during the project development process. As the federal status of protected species changes over time, reevaluation of the listed status and afforded protection to each species should be completed prior to issuing a determination of effect relative to potential impacts.

3.3.2.5. Species of Concern

A search of the MNHP species of special concern database in May 2015 revealed eleven species of concern in Gallatin County that have the potential to occur and breed in the study area based on presence of suitable habitat. These species are as follows:

Mammals

- **Little Brown Myotis** – Documented presence in study area; found in variety of habitats including structures

Birds

- **Bobolink** – Historic record 1911; far western edge of range; tall grass specialist, "old" hay fields.
- **Bald Eagle** – Four active nests located between 1.0 and 3.0 miles from the study area.
- **Great Blue Heron** – Cottonwood galleries in riparian corridors of rivers and lakes; urban wetlands.
- **Pacific Wren** – Large uncut stands of old-growth and mature coniferous forests; riparian cottonwoods and aspens.
- **Veery** – Riparian forests with moderate disturbance and denser understory; willow thickets and cottonwood galleries along streams and lakes.

Insects

- **Hooked Snowfly** – Found along creeks and rivers; small winter stonefly; shredder-detritivore; 1977 last record

Mussels/Clams

- **Western Pearlshell Mussel** – East Gallatin River north of Bozeman; cold running streams, low-mod gradient, stable sand or gravel substrates.

Plants

- **Small Drop Seed** – Historic record 1941; dry packed soil at road crossing of railroad track in Belgrade area.
- **Slender Wedgegrass** – Historic record unknown; prefers wet sites often in disturbance-prone settings.
- **Rocky Mountain Twinpod** – Historic record 1899; sandstone ledges in Bozeman area.

A thorough field investigation for the presence and extent of these species should be conducted if improvement options are forwarded from this study. If present, special conditions that apply to the project design and/or during construction such as timing restrictions should be considered to avoid or minimize impacts to these species.

3.3.3. Social and Cultural Environment

The following subsections present an overview of the social and cultural environment within the study area.

3.3.3.1. Population Demographics and Economic Conditions

Under NEPA/MEPA and associated implementing regulations, state and federal agencies are required to assess potential social and economic impacts resulting from proposed actions. FHWA guidelines recommend consideration of impacts to neighborhoods and community cohesion, social groups including minority populations, and local and/or regional economies, as well as growth and development that may be induced by transportation improvements. Demographic and economic information presented in this section is intended to assist in identifying human populations that might be affected by improvements within the study area.

Title VI of the United States Civil Rights Act of 1964, as amended (USC 2000(d)) and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, require that no minority, or by extension, low-income person shall be disproportionately adversely impacted by any project receiving federal funds. For transportation projects, this means that no particular minority or low-income person may be disproportionately isolated, displaces, or otherwise subjected to adverse effects. If a project is forwarded from the improvement option(s), environmental justice will need to be further evaluated during the project development process.

According to the United States Census Bureau's estimate, Gallatin County had a population of 94,720 people in 2013, and was the 3rd most populous county in Montana. Bozeman, the 4th largest city in the state, had a population of 39,860, with Belgrade coming in 13th at 7,620. Gallatin County has experienced large growth in population over the last 25 years, from around 50,000 in 1990 to nearly 95,000 in 2015 and that trend is likely to continue. Montana State University, Big Sky Resort, Yellowstone National Park, and a thriving high tech industry are the key drivers of population and economic growth in Gallatin County, Gallatin County population growth has outpaced Montana over the last 15 years and that trend is projected to continue.

The distribution of ethnicity in Gallatin County is primarily white/Caucasian (95.4 percent). Hispanic or Latino individuals comprise 3.1 percent of the population. Gallatin County has a slightly less diverse ethnic distribution as compared to the Montana average. There are no American Indian Reservations within a short distance of Gallatin County, which could be an indicator for the lower diversity seen in Gallatin County as compared to Montana.

Gallatin County residents are younger on average than the average Montana resident. The median age of 32.8 years is relatively young, but this is explained in part by considering that Bozeman is home to Montana State University, and has a large population of 18 to 25 year-olds. Bozeman has a median

age of 27.3 years while Belgrade's median age is 28.6, both of which pull Gallatin County's average lower.

Gallatin County's labor market has shown strong performance as evidenced by its 3.2 percent unemployment rate. The county is one of many in Montana showing strong labor market conditions and low unemployment, especially as compared to the rest of the United States. The high-tech industry accounts for 12.1 percent of employment in Gallatin County. Retail trade and arts, entertainment, and accommodation industries employ 13.1 percent and 13.6 percent, respectively, of the employed population (16 years and over) of Gallatin County.

A factor for the high retail and entertainment numbers is the large amount of tourism and subsequent out-of-state dollars spend in Gallatin County. As the largest urban center in southwest Montana, Bozeman serves as a hub for people travelling to Yellowstone National Park as well as Big Sky Resort. Both Yellowstone and Big Sky attract many tourists each year in both winter and summer seasons whereas in many Montana destinations, tourism is largely a summer occurrence. A large part of Bozeman's economy is in some way related to Montana State University. Growth in enrollment is expected to continue and the economic effects are likely to increase in coming years.

Median household income for Gallatin County is $52,833, which is above state average. Bozeman proper has a median household income of $44,615 while Belgrade's median household income is $38,343, both lower than state averages. Bozeman's perceived high quality of life and college town labor market could play a role in this fact. The poverty level is 14.1 percent in Gallatin County, which is slightly lower than Montana. Bozeman however, has a poverty rate of 21.2 percent, which is well above the Montana average, due in part to college students.

Gallatin County has one of the strongest economies in Montana and the outlook for future growth is positive. The development of the high-tech sector has created many well-paying jobs and Montana State University continues to grow. Additionally, strong non-resident travel numbers have solidified Bozeman and Gallatin County as one of Montana's best performing economies after the recession. Gallatin County's economy is predicted to remain strong in the coming years. Even though the Gallatin County median income is above the Montana average further investigation should take place to determine the possibility of low-income person(s) being disproportionately isolated, displaced, or otherwise subjected to adverse effect by any forwarded improvements on a project-by-project basis.

3.3.3.2. Land Ownership

Ownership of land in the study area is predominantly private, with some interspersed state and federal owners. The specific public landowners are the FWP, Montana State Trust, and MDT. The FWP land, which is on the east end of the study area, is a fishing access site. Directly across Frontage Road from the FWP land is the Montana State Trust lands. The remainder of the state-owned land is MDT land, which is the roadway around which the study area is structured. Much of the private land throughout the study area is residential or agricultural. Commercial land use is seen at a higher frequency near the cities of Belgrade and Bozeman. Gallatin Field – Bozeman Yellowstone International Airport has a sizable amount of land adjacent to the east side of Belgrade.

Mixed land use arises from the varied land ownership throughout the study area. These land uses include commercial, industrial, crop/pasture, and mixed urban. Even though there is a large amount of privately owned land in the study area, the need to purchase right-of-way for possible improvements is minimal as most improvements expected to be brought forward would not require additional right-of-way. In Addition, the corridor parallels Montana Rail Link tracks for a large portion of the study area. The railroads have strict policies on working near or in their right-of-way, which could add time constraints to projects along with limiting the ability to acquire right-of-way on the south side of

Frontage Road. If improvements are forwarded from this study, land use at and adjacent to possible projects will need to be considered during design.

3.3.3.3. Recreational Resources

Gallatin County and the Belgrade/Bozeman area offer a variety of year-round outdoor activities including fishing, hiking, hunting, boating, and swimming in the summer. In the winter, snowmobiling, ice-skating, downhill skiing, and cross-country skiing occur in the surrounding area. There is a collection of city parks within Bozeman, but none of them are within the study area. The city of Belgrade has one city park within the study area.

Recreational resource information was gathered through review of FWP resource lists for Gallatin County. Recreational areas may be protected under Section 4(f) of the US Department of Transportation Act of 1966, which was enacted to protect publicly owned parks, recreation areas, wildlife and waterfowl refuges, and public and private historic sites of local, state, and national significance. Federally funded transportation projects cannot impact Section 4(f)-protected properties unless there are no feasible and prudent avoidance alternatives and all possible planning to minimize harm has occurred.

From a high-level evaluation, there appears to be two recreational-related potential 4(f) resources that could potentially be impacted from possible improvements with the study area. These are the Belgrade Lewis and Clark Park located at approximately RP 20.4 and Cherry River Fishing Access Site located at approximately RP 2.25. In addition, there is a linear parcel adjacent to the Las Campanas Subdivision along the northeast side of Interstate 90 between Sunnyside Park and Alaska Road owned by the city of Belgrade. This parcel of land is currently used as a pedestrian path and dog trail. MDT has previously corresponded with city of Belgrade officials who agree that this park was not significant; therefore, section 4(f) does not apply. Acquiring right-of-way from potential 4(f) lands would need to go through the evaluation process described above which could add time and costs to a project.

According to the FWP National Land and Water Conservation Fund Act (LWCFA) Sites by County, there are two Section 6(f) resources within the study area. The Cherry River fishing access site and Belgrade's Lewis and Clark Park have both received LWCFA funds. These 6(f) resources should be taken into consideration for any potential forwarded projects, as converting to a non-recreational resource will be both difficult and time-consuming.

Reevaluation of 4(f) and 6(f) resources would be completed if a project was forwarded from this study. If future resources are discovered, efforts should be made to avoid adverse impacts to, or right-of-way acquisition from, these community recreational resources.

3.3.3.4. Cultural Resources

A file search of the study area through the Montana State Historic Preservation Office revealed four cultural resources and historical properties. These properties include the Northern Pacific Railway, Farmers' Canal Co., Spain-Ferris Ditch Co., and Mammoth Ditch Co.

In addition to the known historic resources, other potentially historic resources exist in the study area. An examination of the Montana Cadastral Survey information for the designated corridor indicates that at least 39 historic-age properties face onto Frontage Road. Twenty of the properties are residences and 19 are commercial businesses. Furthermore, a historic district potentially exists along Main Street in Belgrade.

In addition to the historic properties, there are two cemeteries located within the corridor study area. The Holy Cross Cemetery is located at the intersection of North 7th Avenue and Mandeville Drive. The Sunset Memorial Gardens cemetery is located approximately at RP 25.4.

Direct and indirect impacts (such as visual, noise, and access impacts) to eligible or listed properties would need to be considered if improvement options are carried forward. If a project is forwarded from this study, a cultural resource survey for unrecorded historic and archaeological properties with the area of potential effect will need to be completed during the project development process.

3.3.3.5. Noise

Traffic noise may have to be evaluated for planned improvements to the study corridor. Noise analysis is necessary for "Type I" projects. If the roadway improvements are limited (e.g., the horizontal and vertical alignments are not changes, and the highway remains a two-lane facility), then the project would not be considered a Type I project.

If the improvements planned for the road would include a substantial shift in the horizontal or vertical alignments, increasing the number of through-lanes, passing lanes, or turning lanes, or increasing the traffic speed and volume, then the project would be considered a Type I project, which would require a detailed noise analysis. The analysis would include measuring ambient noise levels at selected receivers and modeling design-year noise levels using projected traffic volumes.

Noise abatement measures would be considered for the project if noise levels would approach or substantially exceed the noise abatement criteria. The noise abatement measures must be considered reasonable and feasible before implementation. If noise abatement measures were deemed necessary, they could increase costs of proposed future Type I roadway improvements. Construction activities in the study area may cause localized, short-duration noise impacts. These impacts can be minimized by using standard MDT specifications for the control of noise sources during construction.

3.3.3.6. Visual Resources

The visual resources of an area include landforms, vegetation, water features, and physical modifications caused by human activities that give the landscape its visual character and aesthetic qualities. Visual resources are typically assessed based on the landscape character (what is seen), visual sensitivity (human preferences and values regarding what is seen), and landscape quality (relative distance to seen areas) of geographically defines view shed. There are no properties or corridors within the study area listed on the Department of Interior's National Landscape Monument System.

3.4. Areas of Concern and Consideration

This section provides a list and description of areas of concern and consideration along the study corridor. These areas were identified through review of as-built drawings, field review, public databases, and other resources. More discussion has been provided in the previous sections, and it is reiterated here as appropriate.

3.4.1. Transportation System

Physical Features and Characteristics

- The roadway surfacing is generally considered in poor condition.
- The majority of the Frontage Road sits within railroad right-of-way through easement. Additional investigation regarding railroad easements will be necessary depending on the location of potential improvement options within the corridor.
- There is a crude oil pipeline along the study corridor beginning at approximately RP 25.5. The pipeline travels along the study corridor until approximately RP 2.8 where it crosses Primary 118 then crosses again at RP 1.8 of Primary 118. A natural gas pipeline also crosses the study corridor at approximately RP 26.7 of the Frontage Road and RP 1.8 of Primary 118.

- A BNSF owned (MRL leased) railroad parallels the southern side of the Frontage Road. Any improvement option(s) identified for portions of the corridor paralleling close to the tracks must not move the southern edge of the roadway shoulder any closer to the tracks.
- There are gaps in the sidewalk network within Belgrade east of Kennedy Street and within Bozeman south of the railroad overpass.
- A total of 14 passing zones, seven eastbound and seven westbound, exist along the study corridor. Eight of the passing zones are less than 1,000 feet in length.
- Many areas of the study corridor, particularly within Belgrade, have poor drainage due to flat slopes and topography.
- The bridge located at RP 26.6 has a structure condition of "poor" which means it is a candidate for repair or replacement. The bridge also has a width narrower than the recommended standard for new bridges. The bridge located at RP 2.1 over the railroad tracks has a structure condition of "good" which indicates it is a candidate for continued preservation. Both bridges have bridge deck ratings of "fair-1", which means they are candidates for healer/sealer treatments.
- Local planning documents conflict on long-term non-motorized infrastructure for the Frontage Road. Guidelines for the railway state that trails parallel to the track on railroad right-of-way are not permitted.
- The corridor generally consists of one 12-foot travel lane in each direction with narrow shoulders.

Traffic Operations

- Existing AADT volume on the study corridor ranged from a low of 5,250 vpd west of Broadway Street in Belgrade, to a high of 12,520 vpd south of Griffin Drive in Bozeman. Volumes are projected to grow at an average annual rate of 1.3 percent.
- On average, heavy vehicle traffic accounts for approximately 4.5 percent of vehicles along the study corridor.
- The intersections with Broadway Street, Oregon Street, and Griffin Drive are projected to have failing operations in the future.
- The corridor operates, or is projected to operate, at a LOS of C. Standards recommend a LOS of B for the rural portions of the corridor and a desirable LOS of B and minimal LOS of C for the urban portions.
- During the school year, Main Street between Jackrabbit Lane and Broadway Street experiences congestion due to students leaving the schools.

Geometric Conditions

- The corridor is divided into segments classified as both urban and rural NHS principal arterials and minor arterial roadways.
- The horizontal and vertical alignments are generally flat with little to no deflection.

Safety

- There were 382 crashes along the study corridor during the six-year analysis period. Approximately 52 percent of crashes occurred within the cities of Belgrade and Bozeman.
- Corridor-wide, 75 percent of reported crashes involved multiple vehicles. The most common crash type was rear-end crashes, which accounted for almost 40 percent of all reported crashes.
- Over 87 percent of crashes in Belgrade or Bozeman involved multiple vehicles. Within the rural areas, multiple vehicle crashes accounted for 58 percent of crashes.

- There were three fatal crashes resulting in three fatalities and eight incapacitating injury crashes resulting in ten incapacitating injuries.
- There were three crashes involving a bicyclist and two crashes involving a pedestrian.

3.4.2. Environmental Considerations

Physical Environment

- The majority of the study area is either farmland of local or statewide importance, prime farmland if irrigated, or prime farmland. Much of the designated farmland areas have been developed in or near the urban areas of Belgrade and Bozeman.
- Study area soils are considered to have moderate frost susceptibility. Moisture-sensitive soils occur in the study area. There is an organic lean clay layer in the Gallatin Valley which can be problematic for construction and long-term stability if not taken into consideration during design. This organic clay layer ranges from zero to eight feet thick.
- There are four perennial streams that are located in the study area; Hyalite Creek, Aajker / McDonald Creek, Baxter Creek and Mandeville Creek. One unnamed intermittent/ephemeral stream is also present and parallels and/or crosses the Frontage Road at various locations.
- Narrow emergent wetland fringe is common along the banks of irrigation ditches/canals crossing the Frontage Road within the study area boundary.
- Approximately 60 private wells are located within the study area, with hundreds more immediately adjacent to and outside of the boundary. These wells are primarily used for domestic water followed by irrigation. Seven public water supply wells are found within the study area boundary.
- There are three primary irrigation ditch crossings of the Frontage Road in the study area. These crossings are Mammoth Ditch (RP 19.8), Spain Ferris Fork Ditch (RP 21.0) and Dry Creek (RP 22.3).
- Outside of the study area and to the north, numerous lateral ditches are present, providing diverted irrigation water to farmland in the area.
- There are no floodplain zones located within the study area. There are three floodplain zones, however, just to the north of the study area associated with the East Gallatin River.
- There are five active underground storage tank sites, two active leaking underground tank sites, two petroleum pipelines, and one remediation response site located within the study area. Several other hazardous sites are located outside of the study area of all types. Additionally, there are three open cut permits for sand and gravel pits. None of the hazardous substances sites discussed are expected to be “must avoid” locations or drivers of any ultimate project design.

Biological Environment

- Several noxious weeds have been observed in the study area. Gallatin County has weed management criteria in place.
- The study area and vicinity are home to a number of wildlife species, and are considered primary, general, secondary, transient and/or winter range for white-tailed deer, mule deer, black bear, moose, and other small mammals. Additionally, there are four streams in the area that support fish species.
- Due to the lack of suitable habitat resulting from the level of development in the study area, density of roads and presence of the Interstate and railroad, it is not anticipated that any of the threatened, endangered or species of concern listed in Gallatin County would normally occur in the study area.

Social and Cultural Environment

- Future land use growth areas for residential, commercial, and industrial use are located north of the study area between Belgrade and Bozeman.
- Recreational resources within the study area include the Lewis and Clark Park in Belgrade, and the Cherry River FAS.
- Section 6(f) grants were used for both of the recreational sites noted above.
- Two historic properties face onto the Frontage Road; one has since been obliterated (Northern Pacific Railway's Low Line) and the other has been previously recorded (Northern Pacific Railway).
- There are six irrigation ditches that are historic and likely eligible for registration.
- There are at least 39 historic-age properties within Belgrade that face the Frontage Road; 20 of the properties are residences and 19 are commercial businesses. Thus, it is likely that a historic district potentially exists along Main Street in Belgrade.

4. CORRIDOR NEEDS AND OBJECTIVES

Needs and objectives were developed based on a review of existing data, local plans, and input from resource agencies, stakeholders, and the public. The needs and objectives explain why an improvement option, or options, may be necessary. The process to develop the needs and objectives includes analysis of the social, environmental, and engineering conditions and recognizes the characteristics of the corridor.

The following needs and objectives were used to develop improvement options. Improvement options identified in this study may lead to future transportation projects that would improve safety and operations or address infrastructure concerns. The purpose and need statement for any future project should be consistent with the needs and objectives contained in this study. However, not all of the needs and objectives at the corridor level must be included in a project-level purpose and need statement.

NEED 1: IMPROVE THE SAFETY OF THE CORRIDOR FOR ALL USERS

Objectives (to the extent Practicable)

- Reduce the frequency and severity of all crashes.
- Improve roadway elements to meet current design standards.
- Reduce conflicts for all modes.

NEED 2: IMPROVE THE OPERATIONS OF THE ROADWAY

Objectives (to the extent Practicable)

- Reduce corridor and intersection congestion for existing and future demands.
- Improve operations to meet acceptable LOS guidelines.
- Accommodate alternative transportation modes.

OTHER CONSIDERATIONS

- Local and regional planning consistency
- Funding availability
- Construction feasibility and physical constraints
- Truck movements
- Maintenance costs and responsibility
- Railroad coordination
- Impacts to aquatic resources
- Impacts to environmental resources

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5. IMPROVEMENT OPTIONS

Improvement options were identified to address previously defined issues or areas of concern. They are intended to satisfy the corridor needs and objectives outlined in **Chapter 4**. The improvements options reflect input from stakeholders and the public, as well as a thorough evaluation of the existing and projected conditions for the study corridor. The following steps were applied to develop improvement options:

1. Review roadway issues and areas of concern based on field review, engineering analysis of as-built drawings, crash data analysis, consultation with resource agencies, and information provided by the public.
2. Analyze the information gathered to develop a range of improvement options that are consistent with the needs and objectives of the corridor.

The following sections discuss the recommended improvement options, associated planning-level cost estimates, and potential implementation timeframes.

5.1. PROJECT IMPLEMENTATION

Implementation of improvement options depends on the availability of funding, right-of-way needs, and other project delivery elements. Estimated implementation timeframes were developed for each improvement option based on anticipated project delivery. Implementation timeframes were defined as follows:

- **Short-term:** Implementation is recommended within a 0- to 5-year period.
- **Mid-term:** Implementation is recommended within a 5- to 10-year period.
- **Long-term:** Implementation is recommended within a 10- to 20-year period.

Planning level cost estimates are listed in 2016 dollars for each improvement option. The costs include estimates for preliminary engineering, right-of-way, utilities, drainage, construction engineering, construction, and indirect costs. In addition, an inflationary factor of three percent per year was applied to the planning level costs to account for estimated year of expenditure. Cost ranges are provided in some cases, indicating unknown factors at the planning level stage. **Appendix 5** contains planning level cost estimate worksheets for each option.

Also included is a list of potentially eligible funding sources and likely agency responsibility. No funding has been identified for any of the recommended improvement options. Refer to **Section 6** for more information on funding mechanisms.

Limitations/constraints and resource considerations were identified for each improvement option. Potential barriers such as right-of-way, physical features, and environmental conditions may influence the project development process and could add additional time and cost. Project-level analysis would be required for any improvements forwarded from this study. Information contained in this report may be used to support future project development and environmental documentation.

5.2. MDT PROJECTS UNDER DEVELOPMENT

There are three projects currently under development by MDT along the study corridor. One is to flatten slopes and provide turn lanes between RP 23.0 and RP 24.6; the second is to install traffic signals at the intersections of the East Valley Center Spur Road with the Frontage Road and with East

Valley Center Road; the third is to make modifications to the intersection of North 7th Avenue and Griffin Drive. The following provides a summary of these planned projects.

Slope Flattening Belgrade – RP 23.0 to RP 24.6 (UPN 8031)

A project is planned to reconstruct the Frontage Road from the Hyalite Creek crossing (RP 23.0) to east of Sacajawea Peak Drive (RP 24.6). The reconstruction project will include wider shoulders (eight feet wide), flatter side slopes, a center left-turn lane, and turn bays at major approaches. Also included will be shoulder rumble strips and centerline rumble strips on the two-lane segment.

The project is intended to address single-vehicle roadway departure crashes by providing a recoverable clear zone. Widened shoulders and rumble strips are also intended to help reduce the number and severity of roadway departure crashes. Installation of turn lanes is a hazard mitigation measure that provides separation for slowing or stopping turning traffic from the high speed through traffic. It is anticipated that this project would be let in 2018.

East Valley Center Spur Intersections Improvements (UPN 9190)

The intersection of the Frontage Road and East Valley Center Spur Road is a four-legged intersection (north leg is currently a closed private approach) with stop control on the minor approach legs. The west leg consists of dedicated right-turn, through, and left-turn lanes while the east leg consists of a dedicated left-turn bay and a shared through/right-turn lane. The south leg has a single shared-use lane.

The intersection of East Valley Center Spur Road and East Valley Center Road is a three-legged intersection with stop control along the north leg. The west leg has a dedicated left-turn lane, the east leg is a shared through/right-turn lane, and the north leg has dedicated left- and right-turn lanes.

The two intersections are separated by approximately 550 feet. Interstate 90 crosses over the East Valley Center Spur Road between the two intersections. Immediately south of the intersection with the Frontage Road is an at-grade MRL rail line crossing. The at-grade crossing is controlled with an automatic crossing gate.

A project is under development to install traffic signals at both ends of the East Valley Center Spur Road (at the intersection with the Frontage Road and at the intersection with East Valley Center Road). The project would also include geometric improvements to the intersections, including a westbound right-turn lane on Valley Center Road. The project is intended to address safety and operational concerns at the intersections. Signal timing will be developed to coordinate with the railroad crossing. The letting date for this project is currently unknown.

Griffin Drive Intersection Improvements (UPN 9312)

The intersection of North 7th Avenue and Griffin Drive is an urban four-legged signal controlled intersection. The south approach consists of a shared through/left-turn lane and a dedicated right-turn lane. The north approach has a shared through/left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches are single lanes which allow for all movements.

The traffic signal allows for permissive left-turn movements only and does not provide for protected left-turn movements along any approach. The intersection operates at a LOS C and D during the AM and PM peak hours, respectively, under existing conditions. The intersection is projected to operate at a LOS of D and F during the respective peak hours in 2040. The intersection experiences delay due to the southbound and westbound left-turn movements.

A traffic and geometric analysis was completed for this intersection by MDT in October, 2016[6]. The purpose of the analysis was to identify improvements to signal timing and geometrics to address operational concerns. A recommendation was made to reconstruct the intersection to include dual

westbound left-turn lanes and to realign the northbound and southbound legs to include left-turn lanes. Also included would be upgrades to the traffic signal. It is anticipated that this project would be let in May 2019.

5.3. Recommended Improvement Options

This section contains descriptions of potential improvement options developed for the Frontage Road corridor. These improvement options are intended to address areas of concern identified in the *Existing and Projected Conditions Report* (see **Appendix 4**). The options are grouped into improvements for intersections, spot locations, and corridor-wide. The improvements can either be developed as stand-alone projects, or, in some cases, combined as larger improvements. There may be cost savings and efficiencies by packaging improvement options together.

5.3.1. Intersection Improvements

1. Broadway Street Intersection Improvements

The intersection of Main Street and Broadway Street is a four-legged all-way stop controlled intersection. All of the approaches consist of a single shared lane allowing all movements and include on-street parking. The MRL railroad line is located approximately 180 feet south of the northbound stop bar.

Under existing traffic conditions, the intersection operates at a LOS of A and C during the AM and PM peak hours, respectively. Under projected conditions, the intersection is shown to operate at a LOS of B and F during the respective peak hours. The failing projected peak hour is mainly a result of heavy westbound through and left-turn movements.

Potential changes to traffic control could include construction of a traffic signal (with and without left-turn lanes) or a single-lane roundabout. Installation of a single-lane roundabout would provide the greatest improvements to intersection operations and safety. However, construction of a roundabout may be difficult due to limited available right-of-way and proximity to the at-grade railroad crossing. Installation of a traffic signal would also provide operational benefits over the existing configuration and would generally within existing constraints better than a single-lane roundabout. Construction of left-turn lanes or a roundabout would likely require the removal of on-street parking along the approach legs. Additional off-street parking may be accommodated south of the intersection if necessary.

Signal preemption by an approaching train would be required to ensure that vehicles on the south approach are able to clear the crossing before the train arrives. During the time when a train is present, eastbound right-turning traffic may cause blockage of through movements at the intersection. A queue length analysis should be conducted during project development to determine appropriate turn-bay lengths (if necessary), and to evaluate how train crossings may affect intersection operations.

- **Estimated Cost:**
  - $1.6M (signal with left-turn lanes)
  - $1.3M (signal without left-turn lanes)
  - $2.3M (roundabout)
- **Implementation Timeframe:**
  - Mid-term
- **Potential Funding Source:**
  - NH
  - MACI
  - STPU
  - Local

2. Oregon Street Intersection Improvements

The intersection of Main Street and Oregon Street is a four-legged stop controlled intersection. An at-grade railroad crossing is located approximately 260 feet south of the intersection. A pedestrian trail crossing is located approximately 75 feet west of the intersection. Under existing traffic conditions, the intersection operates at a LOS of C and D during the AM and PM peak hours due to delay experienced along the south leg. The intersection is projected to operate at a LOS of C and F during the respective peak hours in 2040. The intersection is shown to experience excessive delay for the northbound left-turn movement during the PM peak hour.

Changes to traffic control at the intersection, such as reconfiguring to an all-way stop, installation of a traffic signal, or construction of a single lane roundabout, were explored. Installation of a traffic signal or roundabout would likely require roadway reconstruction and realignment due to the constraints of the gas station to the north. The existing northern approach currently serves as an entrance to the gas station and is within the gas station right-of-way. Modifications to provide a standard north approach leg would require that the intersection be shifted to the south outside of the constraints of the gas station. An alternative option may be to close the entrance to the gas station by removing the north approach leg and forcing all access to utilize the existing approach on Aspen Lane. This is likely an unpopular option for the gas station and may affect circulation for the pumps and for fuel deliveries.

All three scenarios would reduce vehicle delay along the northbound approach leg. The all-way stop and traffic signal configurations would create some induced delay along the east and west approach legs (currently free-flowing), however. The all-way stop configuration is also projected to fail during the future PM peak hour due to heavy westbound traffic. The all-way stop configuration may be undesirable due to the heavy amount of eastbound and westbound traffic compared to the northbound and southbound directions.

Signal preemption by an approaching train would be required to ensure that queued vehicles on the south approach are able to clear the at-grade crossing before the train arrives. During the time when a train is present, eastbound right-turning traffic may cause blockage of through movements at the intersection.

- **Estimated Cost:**
  - $800,000 (all-way stop)
  - $1.8M (traffic signal)
  - $2.4M (roundabout)
- **Implementation Timeframe:**
  - Mid-term
- **Potential Funding Source:**
  - NH
  - MACI
  - STPU
  - Local

3. Airport Road Intersection Improvements

The intersection with Airport Road is a three-legged intersection with stop control along the north approach. The intersection previously had a south approach leg which was removed with construction of the East Belgrade Interchange. The intersection currently operates at a LOS C during the AM and PM peak hours. Future projections show the intersection continuing to operate at a LOS C in 2040.

There are currently no dedicated turn lanes at the intersection. The intersection experiences a high percentage of eastbound left-turn movements and high conflicting volumes from the westbound

direction. Peak hour volumes indicate the intersection meets current guidelines to consider a left-turn treatment[7]. Public comments have indicated a desire to install a dedicated eastbound left-turn lane due to the high volume of left-turning traffic.

The Belgrade City-County Planning Board has indicated that there are future development plans north of the intersection that are expected to be served by Airport Road. If traffic conditions change as the result of future development, the intersection may need to be evaluated for changes to traffic control through the MDT System Impact Process.

- **Estimated Cost:**
  - $900,000 (left-turn lane)
  - $1.7M (traffic signal with left-turn lane)
- **Implementation Timeframe:**
  - When warranted
- **Potential Funding Source:**
  - STPP
  - Local
  - Private

4. Nelson Road Intersection Improvements

The intersection of Frontage Road and Nelson Road is a three-legged intersection with stop control along Nelson Road. Recent construction of a new MDT facility at the intersection has raised concerns about increased traffic volumes. Heavy vehicle traffic is expected to increase, especially during winter months when winter maintenance vehicles are utilizing MDT's facility.

To mitigate possible congestion and safety concerns, installation of a traffic signal at the intersection is recommended when signal warrants are met. A traffic study was conducted in December 2016 to evaluate if warrants are currently met. The results of the study showed that a traffic signal is not currently warranted at the intersection. The intersection should be re-evaluated if conditions change in the future.

- **Estimated Cost:**
  - $900,000
- **Implementation Timeframe:**
  - When warranted
- **Potential Funding Source:**
  - STPP
  - MACI
  - Local

5.3.2. Spot Improvements

5. Evaluate School Traffic in Belgrade

Traffic related to Belgrade High School creates congestion and operational issues along Main Street between Jackrabbit Lane and Broadway Street. Traffic operates relatively smoothly along Main Street throughout most of the day. However, when students are released from school in the afternoon, traffic congestion and operational issues were observed.

Detailed investigation into possible mitigation options, such as staggered release of students, alternate exit points from the school parking lots, re-routing of bus traffic, etc., may yield viable solutions to the congestion problem. A cursory field review was conducted as part of this corridor study; however, additional investigation is needed to identify recommendations to improve traffic operations. This

investigation could be completed during the planned update to *Belgrade's Long Range Transportation Plan*.

- **Estimated Cost:**
  - $30,000
- **Implementation Timeframe:**
  - Short-term
- **Potential Funding Source:**
  - Local

6. Complete Sidewalk Network along Main Street in Belgrade

There are multiple gaps in the sidewalk network within Belgrade. Between Jackrabbit Lane and Kennedy Street there is generally sidewalk on both sides of Main Street, with the exception of small gaps on the south side of the road along some business approaches. The north side of Main Street has pavement striped as a buffered pedestrian area between Kennedy Street and the Central Valley Fire Station. Between the fire station and Aspen Street there is sidewalk on the north side of Main Street. No sidewalk is present on the south side of Main Street to the east of Kennedy Street. Sidewalk was constructed with the East Belgrade Interchange between Gallatin Field to east of Airway Boulevard.

Evidence of pedestrian traffic was noted in the form of social trails in areas where sidewalk does not currently exist. It is recommended that the sidewalk network be completed within Belgrade to provide for safe pedestrian travel. Installation of sidewalk would also allow for construction of curb, gutter, and storm drainage to help direct and control storm water.

- **Estimated Cost:**
  - $1.5M
- **Implementation Timeframe:**
  - Mid-term
- **Potential Funding Source:**
  - NH
  - TA
  - Local

7. Complete Sidewalk Network along North 7th Avenue in Bozeman

Sidewalk connectivity between Redwing Drive and the Interstate 90 westbound ramps is intermittent on both the east and west sides of North 7th Avenue. Social trails are present between Griffin Drive and Nikles/Wheat Drive. It is recommended that the sidewalk network be completed along North 7th Avenue between Interstate 90 and the south approach for Red Wing Drive. Installation of sidewalk would also allow for construction of curb, gutter, and storm drainage to help direct and control storm water.

- **Estimated Cost:**
  - $500,000
- **Implementation Timeframe:**
  - Mid-term
- **Potential Funding Source:**
  - STPP
  - TA
  - Local

5.3.3. Corridor Improvements

8. Passing Zone Modifications

Passing opportunities are provided by passing zones designated with dashed yellow centerlines. Passing zones are located in areas with adequate sight distance and away from public approaches. A total of 14 passing zones, seven eastbound and seven westbound, exist along the study corridor. Eight of the 14 passing zones are less than 1,000 feet in length, the minimum recommended length according to the *MDT Traffic Engineering Manual*[2]. It is recommended that passing zones be evaluated and modified to meet existing standards.

- **Estimated Cost:**
  - $30,000
- **Implementation Timeframe:**
  - Short-term
- **Potential Funding Source:**
  - STPP
  - HSIP

9. Install Centerline Rumble Strips

Centerline rumble strips provide audible and vibratory warning as a means to alert drivers crossing the roadway centerline. Installation of centerline rumble strips have been shown to reduce head-on and opposite direction sideswipe crashes. Centerline rumble strips currently exist on the west end of the corridor between Airway Boulevard and RP 23.2. Centerline rumble strips are also included in the existing slope flattening project between RP 23.0 and RP 24.6 (see **Section 5.2** for more detail). Installation of centerline rumble strips on the remaining rural portion of the corridor is recommended, as appropriate.

- **Estimated Cost:**
  - $30,000
- **Implementation Timeframe:**
  - Short-term
- **Potential Funding Source:**
  - HSIP
  - STPP

10. Develop Separated Shared-use Path

Public and stakeholder input indicates the desire to construct a separated shared-use path between Belgrade and Bozeman. A separated path is envisioned to connect the urban areas of Belgrade and Bozeman to provide for non-motorized use.

A substantial portion of the Frontage Road is located on railroad right-of-way through easement. It is unlikely that a separated path could be developed south of the existing Frontage Road adjacent to the railroad. Preference has been expressed to develop the separated path north of the Frontage Road. Regardless of whether a separated path is constructed within the roadway easement, or if it would be constructed totally, or partially, outside of the railroad right-of-way, additional land acquisition and/or easement is required. Coordination with the railroad will be needed during project development.

Note that Option 11 discussed later recommends a long-term improvement to reconstruct the corridor to include eight-foot shoulders. Such shoulders are intended to improve safety for all users and would improve mobility for non-motorized users. A separated path may further enhance safety and mobility; initiating the development of a separated path would fall to local entities to prioritize and secure

funding. Due to funding limitations, this facility may be constructed in segments; each segment will require logical termini. Timing for construction of the facility would be dependent upon a complete funding package for each segment being built.

- **Estimated Cost:**
  - $820,000 to $1.1M per mile
- **Implementation Timeframe:**
  - Mid- to Long-term
- **Potential Funding Source:**
  - TA
  - Local
  - Private

11. Roadway Reconstruction

The study corridor consists of multiple roadway segments with varying typical sections and adjacent land use. Reconstruction is needed to address operational issues, improve safety, and to accommodate existing and future demands. The corridor was broken into multiple segments based on logical breaks for project development. An evaluation was made of multiple roadway typical sections given existing and projected demands, safety, and project development constraints. The typical sections were developed based on existing standards. The following sections discuss the corridor reconstruction recommendations for each segment.

Segment 1 – North Quaw Boulevard to Gallatin Field Road

This segment consists of the urban portion of the corridor through Belgrade. This portion of the corridor has commercial, industrial, and residential developed lands. Reconstruction of this segment is envisioned to consist of one travel lane in each direction, continuation of the center left-turn lane (or turn bays at the major intersections) where appropriate, eight-foot shoulder/parking, sidewalks, curb, gutter, and storm drainage. Between North Quaw Boulevard and North Davis Street the corridor is generally constrained to the north and south by existing development. This segment would connect to the portion reconstructed with the East Belgrade Interchange project.

- **Estimated Cost:**
  - $5.4M
- **Implementation Timeframe:**
  - Long-term
- **Potential Funding Source:**
  - NH
  - HSIP

Segment 2 – Airport Road to RP 23.0

This segment of the Frontage Road is rural with mixed residential and agricultural lands to the north. The railroad parallels the roadway to the south. Reconstruction of this segment is envisioned to connect the East Belgrade Interchange project with the planned slope flattening project (see **Section 5.1.1**). Reconstruction would include one travel lane in each direction and eight-foot shoulders.

- **Estimated Cost:**
  - $5.0M
- **Implementation Timeframe:**
  - Long-term
- **Potential Funding Source:**
  - STPP

- HSIP

Segment 3 – RP 24.6 to Springhill Road

This segment is similar to Segment 2; the roadway is rural in nature with mixed agricultural and residential lands to the north, and the railroad to the south. As with Segment 2, reconstruction is envisioned to include one travel lane in each direction and eight-foot shoulders. This segment would connect the planned slope flattening project (see **Section 5.2**) with the Springhill Road intersection where the corridor begins to transition into urban Bozeman.

- **Estimated Cost:**
  - $7.8M
- **Implementation Timeframe:**
  - Long-term
- **Potential Funding Source:**
  - STPP
  - HSIP

Segment 4 – Springhill Road to Railroad Overpass

This segment of the Frontage Road serves as a transition between rural and urban environments. Lands to the north include some commercial, residential, and recreational lands. To the south, the corridor is constrained by the railroad. Reconstruction of this segment is recommended to include one travel lane in each direction, eight-foot shoulders, and a center left-turn lane where appropriate. New development is planned south of the Frontage Road which could result in modifications to the northern Red Wing Drive access.

- **Estimated Cost:**
  - $6.9M
- **Implementation Timeframe:**
  - Long-term
- **Potential Funding Source:**
  - STPP
  - HSIP

Segment 5 – Railroad Overpass to Interstate 90

This segment consists of North 7th Avenue on the north end of Bozeman. The context of the area is urban with mixed commercial and industrial developed lands on both sides of the corridor. The roadway transitions to include a center left-turn lane south of the railroad overpass. The roadway currently has narrow shoulders and has intermittent sidewalks, curb, and gutter. It is recommended that this segment be reconstructed to an urban roadway complete with one travel lane in each direction, center left-turn lane or turn bays at major intersections, eight-foot shoulders, curb, gutter, storm drainage, and sidewalks.

- **Estimated Cost:**
  - $4.4M
- **Implementation Timeframe:**
  - Long-term
- **Potential Funding Source:**
  - STPP
  - HSIP

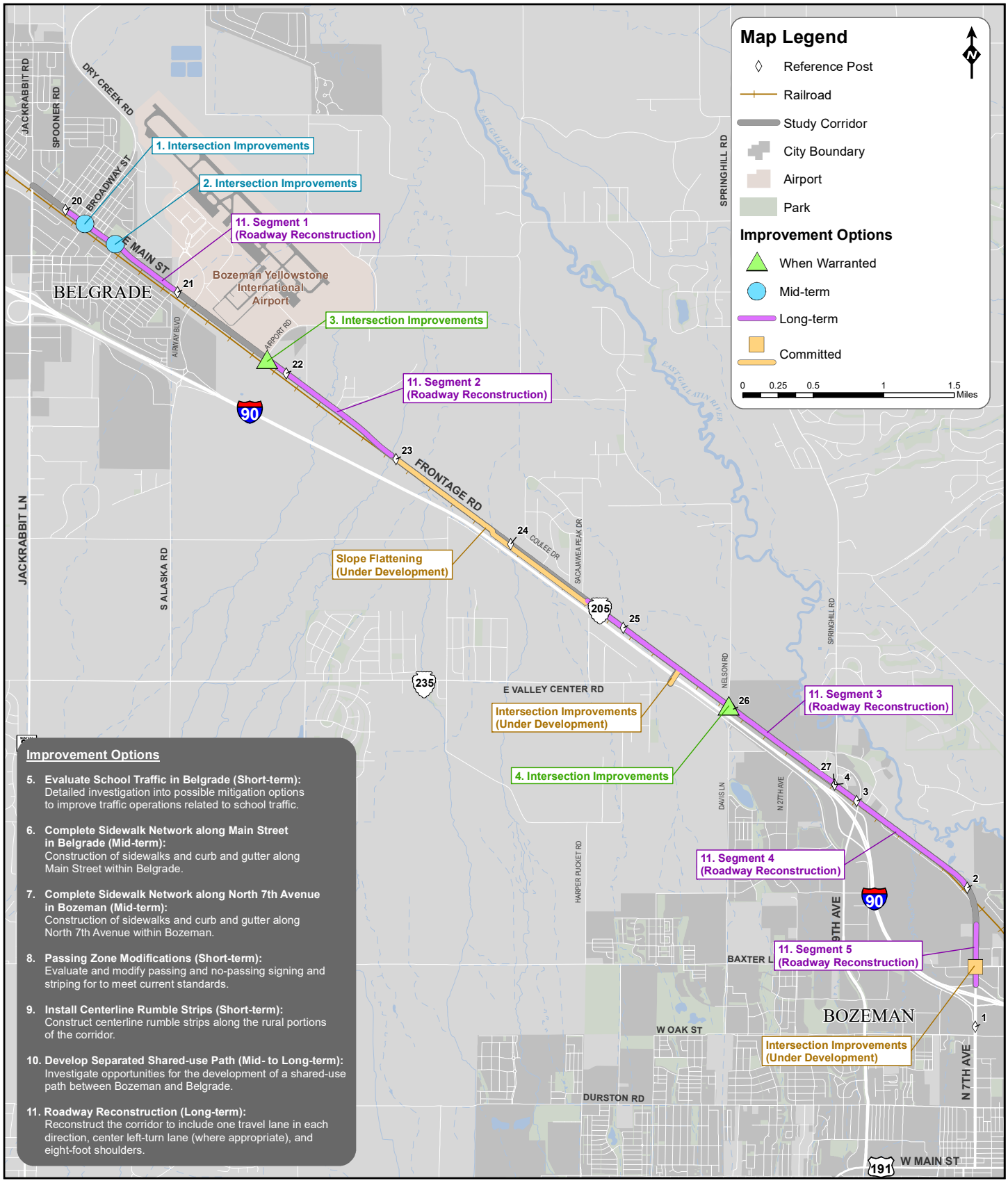
5.4. SUMMARY

This chapter identifies improvement options for the Frontage Road between Jackrabbit Lane in Belgrade and I-90 in Bozeman. The improvement options were based on the evaluation of several factors including, but not limited to: engineering analysis of as-built drawings, crash data analysis, consultation with resource agencies, and information provided by the public.

The potential improvements are intended to offer a range of potential mitigation strategies for corridor issues and areas of concern. Small scale improvement options were identified as low-cost options for addressing identified areas of concern. Larger, more complex reconstruction improvements are also envisioned. The potential may exist to combine improvement options during project development for ease of implementation and other efficiencies. A summary of the recommended improvement options is provided in **Table 5.1** and shown graphically in **Figure 5.1**.

Table 5.1: Recommended Improvement Options

	IMPROVEMENT OPTION	DESCRIPTION	IMPLEMENTATION TIMEFRAME	COST ESTIMATE	POTENTIAL FUNDING SOURCE
INTERSECTION IMPROVEMENTS					
1.	Broadway Street Intersection Improvements	Installation of a traffic signal or single lane roundabout at the intersection of Main Street and Broadway Street.	Mid-term	$1.6M (Traffic signal with left-turn lanes) $1.3M (Traffic signal without left-turn lanes) $2.3M (Single lane roundabout)	• NH • MACI • STPU • Local
2.	Oregon Street Intersection Improvements	Installation of additional traffic control (all-way stop, traffic signal, or single lane roundabout) at the intersection of Main Street and Oregon Street.	Mid-term	$0.8M (All-way stop) $1.8M (Traffic signal) $2.4M (Single lane roundabout)	• NH • MACI • STPU • Local
3.	Airport Road Intersection Improvements	Installation of an eastbound left-turn lane and/or traffic signal at the intersection of Frontage Road and Airport Road.	When warranted	0.9M (Left-turn lane) $1.7M (Traffic signal with left-turn lane)	• STPP • Local • Private
4.	Nelson Road Intersection Improvements	Installation of a traffic signal at the intersection of Frontage Road and Nelson Road.	When warranted	$900,000	• STPP • MACI • Local
SPOT IMPROVEMENTS					
5.	Evaluate School Traffic in Belgrade	Detailed investigation into possible mitigation options to improve traffic operations related to school traffic.	Short-term	$30,000	• Local
6.	Complete Sidewalk Network along Main Street in Belgrade	Construction of sidewalks, curb, gutter, and storm drain along Main Street within Belgrade.	Mid-term	$1.5M	• NH • TA • Local
7.	Complete Sidewalk Network along North 7th Avenue in Bozeman	Construction of sidewalks, curb, gutter, and storm drain along North 7th Avenue within Bozeman.	Mid-term	$500,000	• STPP • TA • Local
CORRIDOR IMPROVEMENTS					
8.	Passing Zone Modifications	Evaluate and modify existing passing and no-passing signing and striping to meet current standards.	Short-term	$30,000	• STPP • HSIP
9.	Install Centerline Rumble Strips	Construct centerline rumble strips along the rural portions of the corridor as appropriate.	Short-term	$30,000	• STPP • HSIP
10.	Develop Separated Shared-use Path	Investigate opportunities for the development of a shared-use path between Bozeman and Belgrade.	Mid- to Long-term	$820,000 to $1.1M per mile	• TA • Local • Private
11.	Roadway Reconstruction	Reconstruct the corridor to include one travel lane in each direction, center left-turn lane (where appropriate), and eight-foot shoulders.	Long-term	$5.4M (Segment 1) $5.0M (Segment 2) $7.8M (Segment 3) $6.9M (Segment 4) $4.4M (Segment 5)	• NH • STPP • HSIP



Improvement Options

5. **Evaluate School Traffic in Belgrade (Short-term):** Detailed investigation into possible mitigation options to improve traffic operations related to school traffic.
6. **Complete Sidewalk Network along Main Street in Belgrade (Mid-term):** Construction of sidewalks and curb and gutter along Main Street within Belgrade.
7. **Complete Sidewalk Network along North 7th Avenue in Bozeman (Mid-term):** Construction of sidewalks and curb and gutter along North 7th Avenue within Bozeman.
8. **Passing Zone Modifications (Short-term):** Evaluate and modify passing and no-passing signing and striping for to meet current standards.
9. **Install Centerline Rumble Strips (Short-term):** Construct centerline rumble strips along the rural portions of the corridor.
10. **Develop Separated Shared-use Path (Mid- to Long-term):** Investigate opportunities for the development of a shared-use path between Bozeman and Belgrade.
11. **Roadway Reconstruction (Long-term):** Reconstruct the corridor to include one travel lane in each direction, center left-turn lane (where appropriate), and eight-foot shoulders.

Figure 5.1: Recommended Improvement Options

6. FUNDING MECHANISMS

This chapter identified mechanisms that may be used to fund improvements to the study corridor. Included is a list of funding sources developed for the distribution of federal and state transportation funding. MDT administers a number of programs that are funded from state and federal sources. Each year, in accordance with Montana Code Annotated (MCA) 60-2-127, the Montana Transportation Commission allocates a portion of available Federal-aid highway funds for construction purposes and for projects located on the various systems in the state as described throughout this chapter. This includes federal funds the state receives under the Fixing America's Surface Transportation Act (FAST Act).

The list of funding mechanisms discussed in this chapter also include local funding sources available through the cities and county, as well as potential private sources. Additional funding sources are possible, but those discussed in this chapter reflect the most probable sources at this time. A narrative description of each potential funding source is provided, including the source of revenue, required match, purpose for which funds are intended, means by which the funds are distributed, and the agency or jurisdiction responsible for establishing priorities for use of the funds.

Funding has not been dedicated to any of the recommended improvement options at this time. Considering the current funding limits of the funding programs discussed herein, and the cost of recommended improvements to the corridor, additional funding from alternative sources may be required if all of the transportation needs are to be met over the planning horizon.

6.1. FEDERAL FUNDING SOURCES

The following is a summary of major federal transportation funding categories received by the state through Titles 23 and 49 United States Code (USC), including state developed implementation/sub-programs that may be potential sources for projects. In order to receive funding under these programs, projects must be included in the Surface Transportation Improvement Program and/or the local jurisdiction's Capital Improvement Plans (where relevant).

6.1.1. National Highway Performance Program

The National Highway Performance Program (NHPP) provides funding for the NHS, including the Interstate System and NHS roads and bridges. The purpose of the NHS is to provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, intermodal transportation facilities, and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel. The NHS includes all Interstate routes, a large percentage of urban and rural principal arterials, the defense strategic highway network, and strategic highway connectors.

NHPP funds are federally apportioned to Montana and allocated to Districts by the Montana Transportation Commission. Based on system performance, the funds are allocated to three programs; Interstate Maintenance, National Highway, and NHPP Bridge.

Activates eligible for NHS funding include construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the NHS roadway; construction, replacement, rehabilitation, preservation, and protection of bridges on the NHS; and projects or part of a program supporting national goals for improving Infrastructure condition, safety, mobility, or freight movements on the NHS. Operational improvements, as well as highway safety improvements, are also eligible. Other miscellaneous activities that may qualify for NHS funding include bikeways and pedestrian walkways, environmental

mitigation, restoration and pollution control, infrastructure-based intelligent transportation systems, traffic and traveler monitoring and control, and construction of intra- or inter-city bus terminals serving the NHS. The Montana Transportation Commission establishes priorities for the use of NHPP funds, and projects are let through a competitive bidding process.

National Highway (NH)

The federal share for non-interstate NHS projects is 86.58 percent, and the state is responsible for the remaining 13.42 percent. The state share is funded through the Highway State Special Revenue Account (HSSR).

The Butte District receives approximately $20 million in annual NH funding. Current Butte District priorities under development total an estimated construction cost of $105 million. Given the estimated range of planning level costs, NH funding for improvements is highly unlikely over the short term, but may be available toward the end of the planning horizon depending on other NHS needs within the Butte District.

6.1.2. Surface Transportation Block Grant Program

Surface Transportation Block Grant Program funds are federally apportioned to Montana and they are allocated to various programs by the Montana Transportation Commission. The federal share for these projects is 86.58 percent, with the non-federal share typically funded through HSSR.

Primary Highway System (STPP)

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Primary Highway System. The Primary Highway System includes highway that have been functionally classified by MDT as either principal or minor arterials and that have been selected by the Montana Transportation Commission to be placed on the Primary Highway System as per MCA 60-2-125(3).

Primary funds are distributed statewide to each of five financial districts. The Montana Transportation Commission distributes STPP funding based on system performance. Of the total received, 86.58 percent is Federal and 13.42 percent is State funds from the Highway State Special Revenue Account.

STPP funds are eligible for a wide range of transportation improvement projects and activities, ranging from roadway reconstruction and rehabilitation, to bridge construction and inspection, to highway and transit safety infrastructure, environmental mitigation, carpooling, and bicycle and pedestrian transportation facilities.

Urban Highway System (STPU)

The Federal and State funds available under this program are used to finance transportation projects on Montana's Urban Highways System, as per MCA 60-3-211. STPU allocations are based on a per capita distribution and are recalculated each decade following the US Census. STPU funds are primarily used for resurfacing, rehabilitation, or reconstruction of existing facilities; operational improvements; bicycle facilities; pedestrian walkways, and carpool projects.

State law guides the allocation of urban funds to projects on the Urban Highway System in Montana's urban areas (population of 5,000 or greater) through a statutory formula based on each area's population compared to the total population in all urban areas. Of the total received, 86.58 percent is federal, and 13.43 percent is non-federal match, typically provided from the Special State Revenue Account for highway projects.

Urban funds are used primarily for major street construction, reconstruction, and traffic operation projects on the 430 miles of state-designated Urban Highway System, but they can also be used for any project that is eligible for STBG under Title 23 USC. Priorities for the use of urban funds are

established at the local level through local planning processes with final approval by the Montana Transportation Commission. Belgrade and Bozeman receive approximately $315,600 and $960,003 in annual STPU funding, respectively.

STP Bridge Program

The Federal and State funds available under this program are used to finance bridge projects for on-system and off-system routes in Montana. Title 23 USC requires that a minimum amount (equal to 15 percent of Montana's 2009 Federal Bridge Program apportionment) be set aside for off-system bridge projects. The remainder of the Bridge Program funding is established at the discretion of the State. Bridge Program funds are primarily used for bridge rehabilitation or reconstruction activities on primary, secondary, urban, or off-system routes. Projects are identified based on bridge condition and performance metrics.

Set-aside Program

The Set-aside Program, previously Transportation Alternatives (TA) Programs under the Moving Ahead for Progress in the 21st Century Act (MAP-21), requires MDT to obligate 50 percent of the funds within the state based on population, using a competitive process, while the other 50 percent may be obligated in any area of the state. The federal share for this program is 86.58 percent and the state is responsible for the remaining 13.42 percent. The state share is funded through the HSSRA if the project is on-system, the sponsor provides the match if the project is off-system.

Funds may be obligated for projects submitted by:

- Local governments,
- Transit agencies,
- Natural resource or public land agencies,
- School districts, schools, or local education authorities,
- Tribal governments, and
- Other local government entities with responsibility for recreational trails for eligible use of these funds.

Eligible categories include:

- On-road and off-road trail facilities for pedestrians and bicyclists, including ADA improvements;
- Historic preservation and rehabilitation of transportation facilities;
- Archeological activities relating to impact for a transportation project;
- Any environmental mitigation activity, including prevention and abatement to address highway related storm water runoff and to reduce vehicle/animal collisions including habitat connectivity;
- Turnouts, overlooks, and viewing areas;
- Conversion/use of abandoned railroad corridors for trails for non-motorized users;
- Inventory, control, and removal of outdoor advertising;
- Vegetation management in transportation right-of-way for safety, erosion control, and controlling invasive species;
- Construction, maintenance, and restoration of trail and development and rehabilitation of trailside and trailhead facilities;
- Development and dissemination of publications and operations of trail safety and trail environmental protection programs;
- Education funds for publications, monitoring, and patrol programs and for trail-related training;

- Planning, design, and construction of projects that will substantially improve the ability of students to walk and bicycle to school; and
- Non-infrastructure-related activities to encourage walking and bicycling to school, including public awareness campaigns, outreach to press and community leaders, traffic education and enforcement school vicinities, student sessions on bicycle and pedestrian safety, health, and environment, and funding for training.

The state is required to allocate TA funds through a competitive process which allows eligible applicants an opportunity to submit projects for funding. MDT's process emphasized safety, ADA, relationships to state and community planning efforts, existing community facilities, and project readiness.

6.1.3. Highway Safety Improvement Program

Highway Safety Improvement Program (HSIP) funds are apportioned to Montana for allocation to safety improvement projects approved by the Montana Transportation Commission and are consistent with the strategic HSIP. Projects described in the state Strategic Highway Safety Plan must correct or improve a hazardous road location or feature, or address a highway safety problem. The Montana Transportation Commission approves and awards the projects, which are let through a competitive bidding process. Generally, the federal share for the HSIP projects is 90 percent with the non-federal share typically funded through the HSSR account.

HSIP funds are distributed at a statewide level through MDT's Traffic Safety Section as needs and improvements are identified. This is unlike other federal funding sources where an annual allocation is distributed for each District to prioritize. HSIP funding availability depends on competing safety needs and trends throughout the state.

6.1.4. Montana Air and Congestion Initiative

The Montana Air and Congestion Initiative (MACI) Discretionary Program provides funding for projects in areas designated non-attainment or recognized as being "high-risk" for becoming non-attainment. Since 1998, MDT has used MACI Discretionary funds to get ahead of the curve for carbon monoxide and PM10 problems in non-attainment and high-risk communities across Montana. District administrators and local governments nominate projects cooperatively. Projects are prioritized and selected based on air-quality benefits and other factors. The most beneficial projects to address these pollutants have been sweepers and flushers, intersection improvements, and signal synchronization projects.

6.1.5. Congressionally Directed Funds

Congressionally directed funds may be received through either highway program authorization or annual appropriations processes. These funds are generally described as "demonstration" or "earmark" funds. Discretionary funds are typically awarded through a federal application process or Congressional direction. If a local sponsored project receives these types of funds, MDT will administer the funds in accordance with the Montana Transportation Commission Policy #5 – Policy Resolution Regarding Congressionally Directed Funding: Including Demonstration Projects, High Priority Projects, and Project Earmarks.

6.2. State Funding Sources

6.2.1. State Fuel Tax

The state of Montana assesses a tax of $0.2775 per gallon on gasoline and diesel fuel used for transportation purposes. According to state law, each incorporated city and town within the state receives an allocation of the total tax funds based upon the following:

1. The ratio of the population within each city and town to the total population in all cities and towns in the state.
2. The ratio of the street mileage within each city and town to the total street mileage in all incorporated cities and towns in the state (the street mileage is exclusive of the Federal-aid Interstate and Primary Systems).

State law also establishes that each county be allocated a percentage of the total tax funds based upon the following:

1. The ratio of the rural population of each county to the total rural population in the state, excluding the population of all incorporated cities or towns within the county and state.
2. The ratio of the rural road mileage in each county to the total rural road mileage in the state, less the certified mileage of all cities or towns within the county and state.
3. The ratio of the land area in each county to the total land area of the state.

For State Fiscal Year 2017, the cities of Belgrade and Bozeman received $134,451 and $693,945 in fuel tax funds, respectively. Gallatin County received $328,092 in fuel tax funds. The amounts vary annually, but the current levels provide a reasonable base for projections throughout the planning period.

All fuel tax funds allocated to the city and county governments must be used for the construction, reconstruction, maintenance, and report of rural roads or city streets and alleys. The funds may also be used for the share that the city or county might otherwise expend for proportionate matching of federal funds allocated for the construction of roads or streets that are part of the primary, secondary, or urban system. Priorities for the use of these funds is established by each recipient jurisdiction.

6.2.2. State Special Revenue/State Funded Construction

The State Funded Construction Program, which is funded entirely with State funds from the Highway State Special Revenue Account, provides funding for projects that are not eligible for Federal funds. This program is totally State funded, requiring no match. This program funds projects to preserve the condition and extend the service life of highway. Eligibility requirements are that the highways be maintained by the State. MDT staff nominates the projects based on pavement preservation needs. The Districts establish priorities and the Montana Transportation Commission approves the program.

6.3. Local Funding Sources

Local governments generate revenue through a variety of funding mechanisms. Typically, several programs related to transportation exist for budgeting purposes and to disperse revenues. These programs are tailored to fulfill specific transportation functions or provide particular services. The following text summarized programs that are or could be used to finance transportation improvements by the Cities of Belgrade and Bozeman and Gallatin County.

6.3.1. Capital Improvements Fund

This fund is used to finance major capital improvements to county infrastructure. Revenues are generated by loans from other county funds and must be repaid within ten years. Major road construction projects are eligible for this type of financing.

6.3.2. Special Improvement District Revolving Fund

A special improvement district (SID) fund provides financing to satisfy bond payments for SIDs in need of additional funds. The city of Belgrade can establish street SIDs with bond repayment to be made by the adjoining landowners receiving the benefit of the improvement. The city of Belgrade has provided labor and equipment for past projects through the General Fund, with an SID paying the materials.

6.3.3. Street Maintenance Assessment

Every parcel within city limits are assessed for street maintenance, with a square footage cap based on the type of property (residential versus commercial). Revenues generated from the assessment fund maintenance activities on public roadways. Street maintenance includes, but is not limited to, the following: sprinkling, graveling, oiling, chip sealing, seal coating, overlaying, treating, general cleaning, sweeping, flushing, snow and ice removal, and leaf and debris removal.

6.3.4. Street Impact Fees

The City of Bozeman collects impact fees that help fund transportation improvements. Review and recommendations for expending impact fee monies come through the City's Impact Fee Advisory Committee. The actual dollar amount collected varies from year to year based on the economy and development market, but has averages approximately $2.9M over the five-year period from 2012 to 2016. Fiscal Year 2016 collections realized a record for the program at $4.2M.

6.3.5. Arterial and Collector District

The City of Bozeman created the Arterial and Collector District in 2015 as a mechanism to collect revenue for funding the "local share" in advance of projects of critical importance. The District also provides funding via Payback District to recover the "local share" once an adjacent project is developed. The first year of assessment was Fiscal Year 2016, and the District was based on a three-year phase-in to an annual total assessment of $2.0M by Fiscal Year 2018. After 2018, only modest growth will be expected based on annexation activity. For planning purposes, an amount of $2.2M was carried forward as a reasonable future annual revenue amount for this program.

6.4. Private Funding Sources

Private financing of roadway improvements, in the form of right-of-way donations and cash contributions, has been successful for many years. In recent years, the private sector has recognized that better access and improved facilities can be profitable due to increase in land values and commercial development possibilities. Several forms of private financing for transportation improvements used in other parts of the United States are described in this section.

Cost Sharing

Developers may be required to construct transportation facilities as for mitigation of impacts to the roadway network.

Transportation Corporations

These private entities are non-profit, tax-exempt organizations under the control of state and local government. They are created to stimulate private financing of highway improvements.

Road Districts
These are areas created by a petition of affected landowners, which enables issuance of bonds for financing local transportation projects.

Private Donations
The private donation of money, property, or services to mitigate identified development impacts is the most common type of private transportation funding. Private donations are effective in areas where financial conditions do not permit a local government to implement a transportation improvement itself.

Private Ownership
This method of financing is an arrangement where a private enterprise constructs and maintains a transportation facility, and the government agrees to pay for public use of the facility. Payment for public use of the facility is often accomplished through leasing agreements (wherein the facility is rented from the owner), or through access fees whereby the owner is paid a specified sim depending upon the level of public use.

Privatization
Privatization is either the temporary or long-term transfer of a public property of publicly owned rights belonging to a transportation agency to a private business. This transfer is made in return for a payment that can be applied toward construction or maintenance of transportation facilities.

General Obligation Bonds
The sale of General Obligation (GO) bonds can be used to finance a specific set of major highway improvements. A GO bond sale, subject to voter approval, provides the financing initially required for major improvements to the transportation system. The advantage of this funding method is that when the bond is retired, the obligation of the taxpaying public is also retired. State statutes limiting the level of bonded indebtedness for cities and counties restrict the use of GO bonds. The present property tax situation in Montana, and recent adverse citizen responses to proposed tax increases by local governments, suggests that the public may not be receptive to the use of this funding alternative.

Multi-Jurisdictional Service District
The State Legislature authorized this funding option in 1985. This procedure requires the establishment of a special district, somewhat like an SID, which has the flexibility to extend across city and county boundaries. Through this mechanism, an urban transportation district could be established to fund a specific highway improvement that crossed municipal boundaries (e.g., corporate limits, urban limits, or county lines). This type of fund is structured similar to an SID with bond backed by local government issued to cover the cost of a proposed improvement. Revenue to pay for the bonds would be raised through assessments against property owners in the service district.

Local Improvement District
This funding option is only applicable to counties wishing to establish a local improvement district for road improvements. While similar to an SID, this funding option has the benefit of allowing counties to initiate a local improvement district through a more streamlined process than that associated with the development of an SID.

6.5. Future Potential Funding Sources

Local Sales Tax
If authorizing legislation were to be approved, local governments would be able to initiate local option taxes as a potential funding source for transportation improvements. One local option tax would be a local sales tax.

Wheel Tax

If initiated, a tax per wheel on vehicles licensed in counties could generate substantial revenue. The cost to each user of the transportation network would be proportional to the number and type of vehicles owned.

Local Options Motor Fuel Tax

A local option fuel tax is another means of raising revenue for the construction, reconstruction, maintenance, and repair of public streets and roads. This local tax may be imposed by the people of the county or by the adoption of a resolution by the county commissioners and referred to the people. An advantage of a local motor fuel tax, as with a wheel tax, is that it taxes only the users of the transportation system, and the tax paid by such individuals is directly proportional to their use of the facilities. The revenue from a motor fuel tax must be distributed proportionately among the county and its member municipalities based on vehicle registration.

Excise Taxes

Excise Taxes are similar to sales taxes with the exception that items taxed are those considered indulgent. The demand for items on which there is an excise tax is generally large; therefore, there is potential to raise a substantial amount of local revenue. Products on which an excise tax could be imposed for additional local revenue include such items as tobacco, alcohol, and various forms of entertainment. A potential problem with excise taxes arises when the tax causes inter-area competition.

Development Impact Fees

Another way funds can be generated for transportation improvements is by assessing a fee to the developers of property. The fee is based on the impact the development is likely to have on the transportation network.

Value Capture Taxes

Value capture taxes are a way to raise revenue following development of transportation improvements. Whereas development fees are assessed to make necessary transportation improvements, value capture taxes impose a fee on businesses that benefit due to their location along improved, highly traveled routes, which assumes improvement have been made. Value capture taxes may be a means to enter into other forms of funding future improvements. One method to consider would be cash flow management that makes wise use of existing revenue rather than continuing to introduce new sources.

7. CONCLUSIONS AND NEXT STEPS

The Frontage Road between Jackrabbit Lane in Belgrade and I-90 in Bozeman was evaluated at a planning level to obtain an understanding of corridor needs, objectives, constraints, and opportunities. MDT initiated the development of this pre-NEPA/MEPA study, with the cooperation of FHWA, the cities of Belgrade and Bozeman, and Gallatin County, to plan for long-term corridor needs and to develop a package of improvement options to address identified needs. The study examined the geometric characteristics, crash history, land uses, physical constraints, environmental resources, and existing and projected operational characteristics of the corridor.

Publicly available information relative to environmental resources and existing infrastructure, coupled with focused outreach to the public, stakeholders, and various resource agencies, was reviewed to identify improvement options for the corridor. The improvement options include short- and long-term recommendations intended to address the transportation needs of the corridor over the planning horizon (2040). These recommendations will assist the study partners in targeting the most critical needs and allocation of resources.

7.1. NEXT STEPS

The ability to develop and implement the recommended improvement options ultimately depends on availability of funding, right-of-way needs, and other project priorities. At this time, there is not funding identified to complete any of the recommended improvement options contained in this study. To continue with the development of a project or projects, the following steps are needed:

- Identify and secure a funding source(s)
- Include project in applicable transportation improvement plan
- For MDT-led projects, follow MDT guidelines for project nomination and development, including a public involvement process and environmental documentation.
- For projects that are developed by others and may impact MDT routes, coordinate with MDT via the System Impact Action Process

Should this corridor planning study lead to a project or projects, compliance with NEPA (if federal funding is used) and MEPA (if a state action) will be required. The purpose and need statement for any future project should be consistent with the needs and objectives contained in this study. Furthermore, this corridor planning study will be used as the basis for determining the impacts and subsequent mitigation for the improvement options in future NEPA/MEPA documentation. Any project develop will have to comply with CFR Title 23 Part 771 and ARM 18, sub-chapter 2, which sets forth the requirements for documenting environmental impacts on highway projects.

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