2011

Toston Missouri River Crossing Corridor

Pre-NEPA/MEPA Corridor Study

MONTANA MDT DEPARTMENT OF TRANSPORTATION

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    - *Comments Received from January through February 21, 2011*
- Comments Received Before Publication of the Draft Corridor Study
    - *Comments Received from December 23, 2009 through December 31, 2010*
- Public Meeting February 10, 2011
    - *Press Release Announcing Public Meeting*
    - *Newspaper Advertisement*
    - *Public Meeting Sign-In Sheet*
    - *Welcome and Display Boards*
    - *Presentation*

    - *Summary of Meeting Notes*
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- Corridor Setting Document
- Existing and Projected Conditions Report
- Corridor Needs and Objectives
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- US 287 Planning Level Cost Estimates

Abbreviations and Acronyms

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
CDM	Camp Dresser and McKee
CE	Construction Engineering
CTEP	Community Transportation Enhancement Program
CWA	Clean Water Act
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resources and Conservation
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
HBRRP	Highway Bridge Replacement and Rehabilitation Program
HPP	High Priority Projects
HRRR	High Risk Rural Roads Program
HSIP	Highway Safety Improvement Program
ICAP	Indirect Cost Accounting Procedures
MACO	Montana Association of Counties
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFWP	Montana Department of Fish, Wildlife, and Parks
MRL	Montana Rail Link
NBIS	National Bridge Inspection Standards
NEPA	National Environmental Policy Act
NHS	National Highway System
NRCS	U.S. Department of Agriculture National Resources Conservation Service
PE	Preliminary Engineering
PTW	Presently Travelled Way
ROW	Right-of-Way
RP	Reference Post
RRX	Railway Crossing Program
SPA	Montana Stream Protection Act
SR	Sufficiency Rating
STP	Surface Transportation Program
STPP	Surface Transportation Program
STPS	Surface Transportation Program Secondary Highways
STPU	Surface Transportation Program Urban Highways
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

Executive Summary

The Montana Department of Transportation (MDT) in cooperation with Broadwater County initiated a corridor study along US 287 near Toston, Montana, to assess and identify improvement options for the 2.8-mile segment, from Reference Post (RP) 86.3 to RP 89.1. This segment is the remaining section of roadway between Toston and Three Forks without planned improvements.

The corridor study, intended strictly as a planning study and not a design project, was developed through a collaborative process with MDT, Broadwater County and FHWA and involved focused outreach to the public, stakeholders and resource agencies. A full evaluation of known and publically available resource information was conducted. Activities that were completed for the development of the study included the following:

- Research and analysis of existing roadway conditions,
- Environmental Scan,
- Documentation of future conditions,
- Identification of public, stakeholder and resource agency concerns,
- Development of corridor needs and objectives,
- Identification and screening of short and long term improvement options taking into account costs, feasibility, public input, and impacts to environmental resources, and
- Identification of potential funding mechanisms for improvement options.

ES.1 Study Objectives and Corridor Needs

The following US 287 corridor needs and objectives were used in the development of improvement options found later in this study.

Need Number 1: Improve safety by removing obstacles, reducing traffic conflicts and addressing crash trends within the US 287 corridor study area.

Objectives

- Upgrade the sub-standard horizontal and vertical alignments to meet current MDT design criteria to the extent practicable.
- Provide adequate clear zones by upgrading shoulder widths and cut and fill slopes to meet current MDT design criteria to the extent practicable.
- Improve vehicle turning movements at public access points and private approaches by providing appropriate features commensurate with the types and volumes of traffic encountered at specific access locations to the extent practicable.

Need Number 2: Improve operation and functionality of the roadway.

Objectives

- Improve the surfacing width for consistency with other segments of US 287 and to meet current MDT design criteria to the extent practicable.
- Provide a roadway that accommodates existing and future capacity demands to the extent practicable.
- Provide modifications to the roadway horizontal alignment and vertical profile to meet current MDT design criteria to the extent practicable.
- Meet design and construction criteria relative to horizontal and vertical clearances from railroad service and track infrastructure.
- Consider non-motorized needs within the corridor.

Other objectives were also identified to capture items of importance not necessarily related to the above two described needs. These are presented below.

- Minimize the environmental resource impacts of improvement options to the extent practicable.
- Recognize and accommodate the diverse nature of corridor "thru" traffic such as recreational vehicles, passenger cars and semi-truck/trailers.
- Provide reasonable access to the town of Toston, Secondary Highway 285, and other public and private approaches.
- Maintain traffic and access within the corridor to the extent practicable during construction.
- Accommodate agricultural and other unique vehicle movements during construction.

ES.2 Corridor Issues

Based on the assessment of existing conditions within the study area and public and stakeholder input, roadway issues were identified. The issues included the alignment geometry (both horizontal and vertical), roadway prism fill slope, narrow roadway width, and higher crash trends compared to similar routes statewide. Additionally, the skew of some of the access points along US 287 connect at undesirably sharp angles. The identified issues are presented below:

Substandard Horizontal Curve

The existing horizontal curve at approximately RP 88.0 (MRL crossing) does not meet current design criteria. The horizontal alignment over MRL is perceived as a "sharp" curve to the average driver.

Substandard Vertical Curve

The vertical curves on and/or near the bridge crossings do not meet the current design criteria.

Roadside Clear Zone and Cut/Fill Slope

Throughout the study area, there are substandard fill and cut slopes which do not meet the current design criteria. Additionally, clear zone distances are not adequate at a number of locations throughout the study area. The clear zone is the area of the road that drivers could use in order to recover from going off the side of the road.

Roadway Width

The existing roadway width through the corridor varies from 28 feet to 32 feet. The varying width does not meet the current design criteria. According to the MDT National Highway System Route Segment Map reference, the recommended roadway width for US 287 is 40 feet or greater. Although the Route Segment Plan no longer defines a standard roadway width, it is anticipated the roadway width determination process will result in a selection of a 40 foot top width.

Crash Trends

Several crash trends within the corridor are higher than the statewide average for similar routes. This includes crash rates, severity indices, and severity rates for both vehicles and trucks.

Access Points

The location of intersections north and south of the bridge crossings are an issue within the study area because of inadequate sight distance and the proximity to the bridges. With the location of the Bunkhouse Bar and Secondary Highway 285/Radersburg Road south of the Missouri River Bridge, this intersection accommodates a mix of traffic types and volume. North of the MRL Bridge is an access location for the town of Toston. Both of these intersections cause concern due to the location and proximity to the bridges. Acceleration and deceleration of truck traffic are issues at these two locations.

ES.3 Improvement Options

Improvement options for US 287 were evaluated by reviewing existing engineering and environmental data, soliciting input from the public, stakeholders and resource agencies, and reviewing social, demographic and economic influences relative to the study area. Ten potential alignments were developed to address the needs and objectives identified for US 287 within the study area (see Figure 6-1). The ten alignments are representative of the type of alignments that could be developed to satisfy the long-term needs of US 287 within the study area. In addition to the long-term improvement options, five (5) short-term improvement options were also developed and are described in Section 6.4.

The development and locations of the ten potential alignments are best considered in terms of general corridor “paths”. Paths identified in the planning process need to be flexible to address or minimize potential impacts and accommodate the capacity needs as a future project moves forward from this study.

ES.4 Conclusion

The result of the corridor study is the determination that either the identified central corridor path or the eastern corridor path would be suitable for development of a new US 287 alignment (see Figure 6-4). Both paths will allow the roadway to be reconfigured to meet current design standards, to the extent practicable, and provide for long-term expansion needs. Because the pre-National Environmental Policy Act (NEPA)/Montana Environmental Policy Act (MEPA) study process is a high level planning study, design activities were not initiated, nor are exact future roadway configurations developed. The conclusion of the study is that there are no major impediments to developing a relocated US 287 roadway within either the central corridor area or the eastern corridor area.

Information contained in this corridor study can be used to document why certain options were removed from consideration. At the current time, funding has not been identified to complete any of the short-term or long-term recommendations contained in this study. To continue with the development of a project (or projects), the following steps are needed:

- Identify a funding source (or sources),
- Develop a formal environmental document (information from this study can be used to inform the environmental process),
- Initiate preliminary engineering activities
- Finalize design and prepare construction plans package, and
- Let construction contract.

Chapter 1 Introduction

1.1 Study Purpose

The Montana Department of Transportation (MDT) in cooperation with Broadwater County initiated the Toston Missouri River Crossing Corridor Planning Study along US 287 near Toston, Montana, to assess and identify improvement options for the 2.8-mile segment, from RP 86.3 to RP 89.1. This segment is the remaining section of roadway between Toston and Three Forks without planned improvements.

Traffic incidents and design geometrics have historically impeded traffic flow and heightened safety concerns on the two bridges over the Missouri River and Montana Rail Link (MRL), the surrounding roadways, and access points. Improvement options are needed to enhance safety and mobility through the US 287 corridor near Toston, while at the same time providing an appropriate level of access to adjacent lands and area residents. Figure 1-1 shows the corridor study area.

1.2 Corridor Study Process

MDT has established the Corridor Planning Process in order to link the current transportation planning processes and the National Environmental Policy Act (NEPA)/Montana Environmental Policy Act (MEPA). The NEPA/MEPA environmental review process is an approach to balance transportation decision making that takes into account the impacts on the human and natural environment with the need for safe and efficient transportation. The Corridor Planning Study is a pre-NEPA/MEPA process that allows for earlier planning-level coordination with the public, resource, and other agencies. Through this process, data and analysis are developed that can be used in the environmental review process if projects are forwarded from the study. The NEPA/MEPA process discloses the environmental, social and economic analysis and documents the information for the public and decision makers before decisions are made and carried out.

The Corridor Planning Study is developed strictly as a planning study to identify a package of short and long term improvement options for the corridor and does not include project level design. The results of the study may be used to assist in determining the level of environmental documentation required if a project is forwarded into project development. The information can be used in the NEPA/MEPA process and successful project development(s).

This report identifies both the technical and environmental conditions and issues that exist within the corridor, and identifies reasonable and feasible improvement options to increase safety and efficiency for the traveling public, while at the same time defining potential impacts to the surrounding environment resulting from potential improvement options.

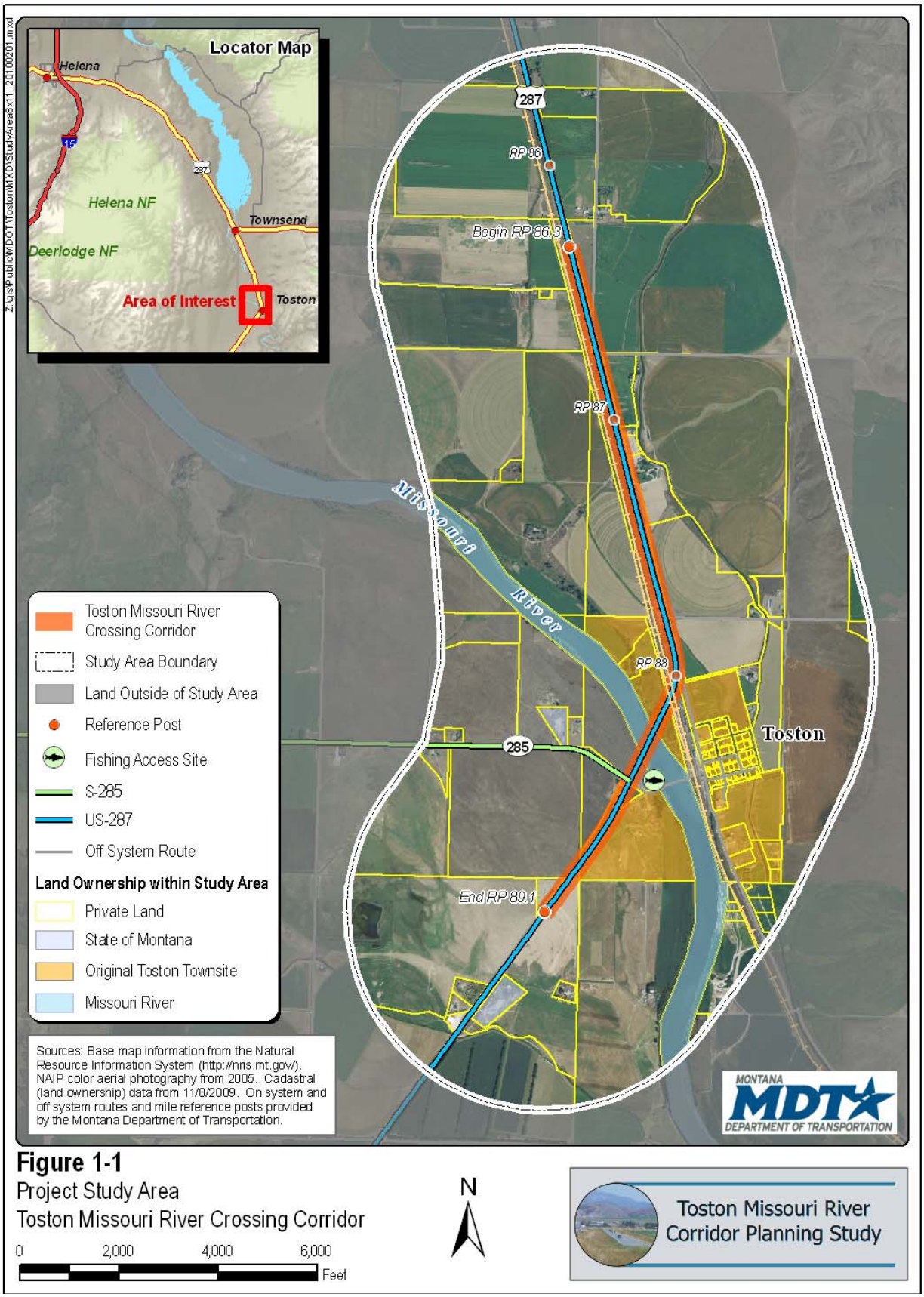


Figure 1-1
Project Study Area
Toston Missouri River Crossing Corridor

Chapter 2 Existing and Projected Conditions

The purpose of this chapter is to portray the existing and projected conditions throughout the corridor utilizing both technical and environmental factors. The findings contained herein help define the constraints in developing improvement options. The study area consists of 2.8 miles along US 287 near Toston, Montana, from RP 86.3 to 89.1, and spans a width of 4,000 feet east and west of the existing highway.

US 287 is functionally classified as a Rural Principal Arterial on the NHS Non-Interstate System and is a major north/south highway providing a vital link between I-90 and Helena, Montana and surrounding communities. Functional classification is a method by which roads and highways are classified according to the level of mobility and access they provide. A rural principal arterial network provides a high level of mobility at high speeds offering a link between interstates and other major highways. Highway functional classification is also used to establish guidelines for design and maintenance according to Federal and State guidelines. Roadway characteristics, projected conditions and deficiencies are discussed below.

2.1 Roadway Users

The primary use of the corridor is for through traffic, other users include local land owners, commuters, commercial truck drivers, and recreational users accessing the Missouri River area. This corridor is also used by bicyclists during the summer months. Secondary Highway 285 (S 285) intersects US 287 just south of the Missouri River Bridge and is primarily used by local traffic.

2.2 Traffic Volumes

Table 2.1 shows the traffic data for US 287 through the study area. There has been a steady increase in traffic volumes through the corridor during the past 10 years.

Table 2.1 Average Annual Daily Traffic

Location	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
US 287, RP 86, 1.0 mi N of S 285	2,600	3,060	2,830	3,370	3,720	3,140	3,710	3,700	3,940	3,280	3,280
US 287, RP 89, 0.5 mi S of S 285	2,390	2,690	2,690	3,160	3,500	2,960	3,530	3,520	3,570	3,110	3,160
Average	*2,495*	*2,875*	*2,760*	*3,265*	*3,610*	*3,050*	*3,620*	*3,610*	*3,755*	*3,195*	*3,250*

Source: MDT Data and Statistics Bureau, 2010.

The percentage of truck traffic through the corridor is 11.3%, according to the *Toston-North Preliminary Field Review Report* (October 23, 2009). The projected AADT for the year 2030 is 4,800 vehicles per day. This results in an average annual growth rate of 1.87% per year when calculated from the most recent year 2009 AADT of 3,250. If a more aggressive growth rate of 2.51% per year is used, an AADT for the year 2030 would approach approximately 5,470. This is based on a straight line growth projection using the most recent year AADT. A growth projection out to the year 2085 results in an AADT of 13,290 (using 1.87% per year) and 21,390 vpd (using 2.51% per year). The corridor traffic currently does not encounter delays or congestion during peak travel periods. Trucks and recreational vehicles are common modes of transportation through the corridor, which slows the flow of traffic, especially on grades where heavy vehicles struggle to maintain approximately the same speed as passenger cars.

2.3 Right-of-Way and Jurisdiction

The US 287 study area is located primarily within private property. The State of Montana maintains right-of-way on approximately 80 feet each side of the existing highway centerline. Two small sections of State of Montana land are within the study area boundary. MRL operates and leases the track and structures from BNSF Railway. Montana Rail Link (MRL) has double tracks located in the corridor with approximately 75 feet of right-of-way on either side of the track centerline. The Missouri River flows through the corridor, with the Montana Department of Natural Resources and Conservation (DNRC) having jurisdiction over the riverbed. Figure 1-1 in Chapter 1 shows the land ownership within the study area.

The Missouri River is a Section 10 Navigable Waterway. Section 10 of the Rivers and Harbors Appropriation Act of 1899 prohibits the obstruction or alteration of navigable waters of the United States. A Section 10 Permit is required if any work is to be done in, over, or under navigable waters of the United States. Coordination with U.S. Army Corps of Engineers (USACE) is essential to determine the appropriate type of permits needed for future development. USACE and the US Coast Guard bridge standards and requirements will need to be met for navigability requirements when considering potential improvement options and/or as projects are developed. As a project is forwarded from this study, resource agency coordination will include the USACE, Montana Department of Fish, Wildlife, and Parks (MFWP), and Montana Department of Environmental Quality (DEQ).

2.4 Physical Characteristics

The two-lane paved roadway is in a rural setting classified as level terrain. Level terrain describes a combination of grades and horizontal and vertical alignments that allow heavy vehicles to maintain approximately the same speed as passenger cars. The posted speed limit along the US 287 corridor is 70 mph and 65 mph at night, with a posted truck speed of 60 mph and 55 mph at night. The advisory speed limit on the bridge structures is 60 mph. In addition to six irrigation drainage crossings, three bridges are located within the study corridor. Two large structures span the Missouri River and MRL, and another bridge crosses Six Mile Creek north of the Missouri River. The existing bridge widths and alignment do not meet current standards (Section 2.6). The structure spanning the railroad was constructed on a horizontal curve.

US 287 in the study area primarily traverses farm and agricultural land. The landscape consists of grasses, with groves of trees interspersed within farm and pasture land. The terrain is relatively flat with no large cuts or fills, however there has been high fill placed to allow crossing of the railroad.

2.5 Design Criteria

The geometric design criteria for the Toston Missouri River Corridor Study are based on the current MDT design criteria for the NHS Non-Interstate Principal Arterials. The design speed for this corridor is 70 mph based on the Geometric Design Standards for a Non-Interstate NHS project in level terrain. The appropriate roadway width for the facility is determined according to the type of project, whether a reconstruction project or a pavement preservation project. Improvement options that include

reconstruction would be designed in accordance with the criteria shown in Table 2.2. According to the MDT National Highway System Route Segment Map reference, the recommended roadway width for US 287 is 40 feet or greater. Although the Route Segment Plan no longer defines a standard roadway width, it is anticipated the roadway width determination process will result in a selection of a 40 foot top width. The MDT Road Width Committee would determine the appropriate width during future project development. Note that Table 2.2 includes a varying width for the roadway shoulders.

TABLE 2.2 GEOMETRIC DESIGN CRITERIA FOR RURAL PRINCIPAL ARTERIALS (National Highway System - Non Interstate) U.S. Customary

Design Element			Manual Section	Design Criteria
Design Controls	Design Forecast Year		8.4	2030
	Design Speed	Level	8.3	70 mph
	Level of Service		8.4	Level: B
Roadway Elements	Travel Lane Width		11.2	12'
	Shoulder Width		11.2	Varies*
	Cross Slope	Travel Lane	11.2	2%
		Shoulder		2%
	Median Width		11.3	Varies
Earth Cut Sections	Inslope		11.4	6:1 (Width: 10')
	Ditch	Width	11.4	10' Min.
		Slope		20:1 towards back slope
	Back Slope; Cut Depth at Slope Stake	0' - 5'	11.4	3:1
		5' - 10'		Level: 4:1
		10' - 15'		Level: 3:1
		15' - 20'		Level: 2:1
		> 20'		1.5:1
Earth Fill Slop	Fill Height at Slope Stake	0' - 10'	11.4	6:1
		10' - 20'		4:1
		20' - 30'		3:1
		> 30'		2:1
Alignment Elements	DESIGN SPEED		N/A	70 mph
	Stopping Sight Distance		8.6	730'
	Passing Sight Distance		8.6	2480'
	Minimum Radius (e=8.0%)		9.2	1820'
	Superelevation Rate		9.3	e_{max} = 8.0%
	Vertical Curvature (K-value)	Crest	10.5	247
		Sag		181
	Maximum Grade	Level	10.3	3%
	Minimum Vertical Clearance		10.6	17.0'

Source: Montana Department of Transportation Road Design Manual Chapter 12, Figure 12-3 "Geometric Design Criteria for Rural Principal Arterials"

2.6 Roadway Issues

The existing physical and geometric design of the roadway were evaluated for US 287 within the study area to identify areas that do not meet current MDT design standards as shown in Table 2.2. The following areas were identified:

- Roadway geometry – substandard horizontal and vertical alignments
- Roadside clear zone – substandard fill and cut slopes
- Guardrails – Six Mile Creek crossing

MDT roadway geometric files were examined with the Microstation/GeoPak Civil Design software package and available project as-built drawings were reviewed to conduct this analysis. The horizontal and vertical alignments were evaluated based on MDT design criteria for a rural principal arterial road. The findings of the analysis are summarized below.

2.6.1 Horizontal Alignment

Horizontal alignment is comprised of elements including curvature, superelevation, and sight distance which have an influence on traffic operation and safety. These parameters are directly related to the design speed. The MDT Road Design Manual specifies general design principles and controls which determine the overall operational characteristics of the roadway and enhance the aesthetic appearance of the highway. Some general horizontal guidelines include:

- The alignment should have consistency and avoid sudden changes from gently to sharply curving alignment. ***The "sharp" curve on the railroad crossing does not meet this guideline.***
- Sharp curves on long, high fills should be avoided as it is difficult for drivers to perceive the length of the horizontal curve. ***The "sharp" curve on the railroad crossing does not meet this guideline.***
- Special consideration should be made at the intersections of the horizontal alignment with other roadways. ***There are intersections at the north and south ends of the bridge structures that are perceived by the public as being intersections of concern. The intersections include S 285 and the approach north of the bridge for the town of Toston.***
- Roadway design is important to ensure the driver has clear visibility of the alignment. ***Specifically at the location of the bridge crossings, driver visibility is hindered due to the curvature on the bridge.***

According to the existing roadway geometrics available via MDT as-built bridge plans, the existing curve at approximately RP 88.0 (MRL crossing) does not meet current design criteria. The existing horizontal curve radius is 1,432.5'. The following horizontal alignment issues exist:

1. For a 70 mph design speed, the minimum curve radius is 1,820' with an 8% superelevation rate. The existing curve radius (1,432.5') and superelevation (7.5%) do not meet the current design criteria. Superelevation is the amount of cross slope or "bank" a roadway has in order to counterbalance the outward pull of a vehicle traveling around a curve.

2. A spiral curve is required for any curve radius less than 3,820'. A spiral curve is used to transition between a tangent section and a simple curve. A spiral curve does not exist on the current roadway alignment.

The horizontal alignment issues on the bridge crossing over MRL tracks are perceived as a "sharp" curve to the average driver.

Horizontal sight distance is the ability to see the inside of a horizontal curve with limited sight obstructions. Longitudinal barriers such as guardrail and bridge rails may cause sight distance restrictions at horizontal curves, as is the case on the bridge crossing along the corridor. The segments of US 287 north and south of the bridge have adequate sight distance. Although horizontal sight distance requirements are met, the public has perceived sight distance obstructions due to stopped or slowed vehicles turning at intersections located north and south of the bridge ends. Signage has been another perceived sight obstruction, specifically at the intersection of S 285 and US 287.

2.6.2 Vertical Alignment

The vertical alignment is a measure of elevation change of a roadway. The length and steepness of grades directly affects the operational characteristics of the roadway. The MDT Road Design Manual lists recommendations for maximum grades on principal arterials according to the type of terrain in the area. The maximum grade recommended for level terrain is 3%. The existing roadway does not exceed the maximum grade. However, the vertical curves near the bridge crossings do not meet the current design standards. The following vertical alignment issues exist:

1. The MRL Bridge has a vertical *crest* curve k-value of 210.97 which does not meet the minimum k-value of 247, therefore not providing adequate stopping sight distance.

2. South of the Missouri River Bridge, the vertical *sag* curve has a k-value of 114.3 which does not meet the minimum k-value of 181, therefore nor providing adequate stopping sight distance.

2.6.3 Roadside Safety (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. The area may consist of a shoulder, a recoverable slope, a non-

recoverable slope, and/or a recovery area. The desired width varies depending on traffic volumes, speeds, and roadside geometry. The corridor was analyzed and determined to have substandard fill and cut slopes which do not meet current roadside clear zone requirements. In the location of the bridge crossings, there are no clear zone width application requirements as the guardrail acts as a safety barrier.

2.7 Pavement

Pavement preservation will occur throughout the study area in order to maintain adequate roadway conditions, extend the existing pavement life, and to provide additional skid resistance. An asphalt resurfacing project is planned for the near future within the corridor study area with limits from RP 86.3 to RP 89.1. This scheduled project will serve as a short term improvement opportunity in the study area, and consists of a milling, filling, seal and cover.

The existing roadway surface width does not allow adequate width for rumble strips per MDT Rumble Strip Policy. FHWA guidance recommends 4 feet or greater of shoulder beyond the rumble strips.

The MDT Roadway Width Committee evaluates and confirms the appropriateness of the suggested pavement width on a project-by-project basis. It is anticipated the Roadway Width Committee would recommend a roadway top width of 40 feet or greater. Table 2.3 below shows the roadway width and surfacing thickness through the corridor, based on the MDT Road Log.

Table 2.3 Existing Roadway Surface

Location (Reference Post)	Top Thickness[1] (in)	Bottom Thickness[2] (in)	Top Width[3] (ft)
RP 86.3 to 87.7	5.5	12.0	32
RP 87.7 to 88.0	2.0	12.0	32
RP 88.0 to 88.2	2.0	12.0	28
RP 88.2 to 88.4	2.0	15.0	28
RP 88.4 to 88.7	3.5	15.0	30
RP 88.7 to 89.1	2.0	15.0	30

1: Asphalt

2: Base Course

3: Outside to outside of shoulder

Source: MDT Road Log

MDT collects pavement condition data for Montana's roadways. The Ride Index for the corridor was determined to be 77.8. Based on a 0-100 scale, a ride index of 80 to 100 is categorized as "good"; 60 to 79.9 is "fair"; and 0 to 59.9 is "poor". Based on the current pavement condition, US 287 is classified as "fair".

2.8 Turn Lanes

There are no designated turn lanes on US 287 within the study area. Public comments identify a desire to have turning lanes on US 287 in the form of a southbound left-turn lane at the Toston Frontage Road intersection (i.e. north of the MRL Bridge), and also a southbound left-turn lane and a southbound right-

turn lane at the S 285 / US 287 intersection (i.e. south of the Missouri River Bridge). Due to geometric constraints, there is not enough length available to fully develop a left-turn and/or right-turn lane at the S 285 / US 287 intersection in its present location without the approval of a design exception(s). The presence of turning lanes would alleviate roadway congestion and improve traffic safety while vehicles access the town of Toston, the Fishing Access Site, the Bunkhouse Bar, and S 285.

2.9 Geotechnical

Based on the existing geotechnical information, soil resource report, and well logs prepared and examined for the Townsend-South project (CN1420001), the study area has no substantial geotechnical issues. A detailed geotechnical investigation report was not developed for this corridor study.

Gravel borrow located within the corridor is rated fair to poor, indicating any large amounts of borrow will likely need to be obtained off site. Surficial soil has a fair percentage of clay and silt, with a low to moderate frost susceptibility, and moderate plasticity. It can be expected that embankment foundation treatment (typically a combination of well drained well graded gravel and geotextile) will be needed for a major portion of the project where poor soil is encountered. A special borrow subbase may be needed for support of the paving section, especially in locations where the roadway may be widened.

Water well logs in the study area indicate groundwater elevations between 10 and 45 feet below surface, and will fluctuate with proximity to river elevations as well as irrigation locations. The water well logs do not indicate that bedrock was encountered at a depth likely to influence bridge foundation considerations. It appears the majority of material encountered was sand and gravel, with lesser amounts of silt and clay and occasional boulders. The study area is located in a low to moderate seismic risk area. Seismicity will need to be considered for any bridge foundation design.

2.10 Drainage

Several irrigation ditches and canals exist throughout the corridor with the United States Army Corps of Engineers (USACE) having jurisdiction on those canals and ditches returning flow to the Missouri River. With the study area predominately under farm and agriculture use, drainage is a key factor to consider in the development of improvement options.

2.11 Hydraulic Structures

A hydraulic analysis of the existing culverts and bridge capacities was not performed for the drainage crossings to determine potential flooding areas of concern for this study. Based on a lack of historical flooding occurrences, it is presumed irrigation ditches, culverts, and bridges are adequately sized. A full hydraulic analysis would be recommended if an improvement option is implemented within the study area. Table 2.4 shows the hydraulic structures throughout the corridor.

Table 2.4 Hydraulic Structures		
Approximate Reference Post (RP)	Drainage	Size
86.60	Culvert	24"
86.80	Unnamed Irrigation Ditch Crossing	18"
87.00	Culvert	18"
87.20	Sixmile Creek Crossing	Single-Span Bridge
87.70	Big Springs Ditch Crossing	4' x 6' Box Culvert
87.85	Culvert	24"
88.30	Missouri River Crossing	Multi-Span Bridge
88.90	Unnamed Irrigation Ditch Crossing	30"

**Based on MDT mapping. Hydraulics Report will confirm location & size if a project develops.*

2.12 Bridge Crossings

Three bridge crossings on US 287 are located within the study area. They include the Missouri River Bridge, MRL Bridge, and the Six Mile Creek Bridge. The Missouri River and MRL Bridges were assessed by the MDT in 2009, and the Six Mile Creek Bridge was assessed in 2010. The assessments determined the Sufficiency Rating (SR) for each structure. The Sufficiency Rating formula is a method of evaluating highway bridge data to obtain a numeric value indicating the sufficiency of the bridge to remain in service. The result of this method is the percentage in which 100 is an entirely sufficient bridge and 0 is an entirely deficient bridge. In order to receive funding through the Highway Bridge Program (HBP), structures must be *Structurally Deficient* or *Functionally Obsolete* and have an SR of 80% or below. Structures with an SR of 0 to 49.9% are eligible for replacement, and structures 50 to 80 are eligible for rehabilitation unless otherwise approved by the FHWA.

The following criteria determine whether or not a structure is structurally deficient or functionally obsolete:

1. Structurally Deficient. A condition of **4 or less** for any of the following:
    - Deck Rating
    - Superstructure Rating
    - Substructure Rating

    Or, an appraisal of 2 or less for the following:
    - Structure Rating
    - Waterway Adequacy
2. Functionally Obsolete. An appraisal of **3 or less** for the following:
    - Deck Geometry

- Under Clearance
- Approach Roadway Alignment

Or, an appraisal of 3 for the following:

- Structure Rating
- Waterway Adequacy

All three structures are not structurally deficient, but the MRL Bridge is functionally obsolete and eligible for rehabilitation at the present time. Table 2.5 shows the sufficiency ratings of the three bridge crossings.

Table 2.5 Bridge Sufficiency Rating (SR)

Structurally Deficient SR Criteria		Missouri River	MRL	Six Mile Creek
Deck Rating	≤ 4	6	7	5
Superstructure Rating	≤ 4	7	7	7
Substructure Rating	≤ 4	7	7	7
Structure Rating	≤ 2	7	7	6
Waterway Adequacy	≤ 2	8	-	8
Functionally Obsolete SR Criteria				
Structure Rating	≠ 3	7	7	6
Deck Geometry	≤ 3	4	4	5
Under Clearance	≤ 3	-	5	-
Waterway Adequacy	≠ 3	8	-	8
Approach Roadway Alignment	≤ 3	8	3	8
Design Loading		5 MS 18 (HS 20)	5 MS (HS 20)	2 M 13.5 (H 15)
Sufficiency Rating		63	58	68.6
Structure Status		*Not Deficient*	*Functionally Obsolete - Eligible for Rehabilitation*	*Not Deficient*

Table 2.5 is based on the most current bridge inspection reports. As improvement options develop, the most current data available should be considered. Based on the above ratings and available bridge assessment reports, the three structures have the capacity to carry legal loads. Bridge management simulations were conducted by MDT to determine the remaining service life and maintenance requirements for the structures. Table 2.6 shows the current age of each of the three bridges, along with the estimated year of deficiency if no routine maintenance is performed for each structure in the foreseeable future.

Table 2.6 Bridge Management

	Missouri River	MRL	Six Mile Creek
Current Age	55	55	79
Year bridge will become deficient and eligible for replacement if no maintenance is done	2050	2028	2023

According to the current American Association of State Highway and Transportation Officials (AASHTO) Bridge Design Code, the three bridges are located in Seismic Zone 3. Seismic zones range from 1, lowest seismic risk, to 4, highest seismic risk. Seismic zones reflect the variation in seismic risk across the country and are used to permit different requirements for methods of analysis, minimum support lengths, column design details, and foundation and abutment design procedures.

All three bridges were designed and constructed before seismic load considerations were incorporated into bridge designs. Six Mile Creek Bridge is a single span structure with low seismic vulnerabilities. Single span bridges generally perform adequately to seismic loads. Both the Missouri River Bridge and MRL Bridge have seismic vulnerabilities that include high rocker bearings, minimal bearing support, substructure details that allow brittle failure, and undersized foundations for seismic loads. Past performance of bridges with similar details of the MRL and Missouri River Bridges indicate these two structures will not perform well under seismic loading.

2.12.1 Missouri River Bridge

The Missouri River Bridge is a two lane structure located at RP 88.3. Constructed in 1955 on a horizontal tangent, the bridge is 690 feet long and 28 feet wide with steel beams supported by five cylindrical reinforced concrete piers. Continuous steel girders support the main span with concrete T-beam end spans. The bridge rail has been retrofitted with a concrete barrier.

A Level II bridge scour analysis for the Missouri River Bridge was conducted in August 2000. The structure was determined to be at Low Risk for scour and moved to a National Bridge Inspection Standards (NBIS) Code 5. Annual peak discharge data was collected for 56 years at the U.S. Geological Survey (USGS) streamflow gaging station for “Missouri River at Toston, Montana”. Selected flood-frequency data for the 56-year period at the gage yield the results shown in Table 2.7.

Table 2.7 Missouri River Bridge Flood Frequency

Drainage Area (Sq. Mi.)	100-year (cfs)	500-year (cfs)
14,669	40,000	47,200

Source: USGS, Station No. 06054500

The largest recorded peak discharge at the gage was 34,000 cfs in 1997. The next two largest peak discharges occurred in 1948 (32,000 cfs) and in 1913 (29,800 cfs).

A skid test was completed by the MDT on the bridge deck with the results shown in Table 2.8. A skid test is important because it measures the amount of pavement friction and determines bridge surface susceptibility to vehicles skidding on the bridge deck.

Table 2.8 Missouri River Bridge - Skid Test Results		
Reference Post (RP)	Left Lane SN Avg.	Right Lane SN Avg.
88.405	40.6	40.1
88.367	38.6	39.1
88.325	40.1	38.9

Testing was completed at 40 MPH
SN < 30 indicates poor skid resistance
30<SN<40 skid resistance transitional may be adequate depending on traffic and geometry
40<SN skid resistance adequate

The skid test results are primarily within the transitional zone, with some results being adequate. Since this bridge is on a horizontal tangent, an asphalt overlay could be used to improve skid resistance.

In 2006, an underwater inspection was conducted on the Missouri River Bridge. It was determined the substructures are in good condition. There are no major defects below the high waterline and no considerable general or local scour present at the bridge site. There are very shallow 1' deep scour cones around each column, which is exposing the column pedestal at each pier. However, the footings are not exposed.

Based on the above ratings, the Missouri River Bridge is categorized as ***not structurally deficient*** and ***not functionally obsolete***. The vertical sag curve on the south end of the bridge does not meet current MDT design criteria and does not provide adequate stopping sight distance.

2.12.2 MRL Bridge

The MRL Bridge is a two lane structure located at RP 88.0. Constructed in 1955 on a horizontal curve, the bridge is 385.5 feet long and 28 feet wide. Continuous steel girders support the main span with concrete T-beam end spans. The bridge rail has been retrofitted with a concrete barrier.

A skid test was completed by the MDT on the bridge deck with the results shown in Table 2.9. A skid test is important because it measures the amount of pavement friction and determines bridge surface susceptibility to vehicles skidding on the bridge deck.

Table 2.9 Montana Rail Link Bridge - Skid Test Results		
Reference Post (RP)	Left Lane SN Avg.	Right Lane SN Avg.
88.055	35.7	33.5
88.014	33.4	34.5

Testing was completed at 40 MPH
SN < 30 indicates poor skid resistance
30<SN<40 skid resistance transitional may be adequate depending on traffic and geometry
40<SN skid resistance adequate

The skid test results are within the transitional zone. Options to increase skid resistance for this bridge include a thin epoxy overlay or a concrete overlay. An asphalt overlay is not recommended since the bridge is on a curve where it would be more susceptible to abrasion.

Based on the above ratings, the MRL Bridge is categorized as ***not structurally deficient*** but ***is functionally obsolete*** and ***eligible for rehabilitation***. The vertical crest curve on the MRL Bridge does not meet current MDT criteria and does not provide adequate stopping sight distance.

With the location of the railroad within the study area, certain guidelines must be followed in order to meet railroad requirements. Requirements for roadway structures over the railroad include the following:

- According to railroad operation, the preferred overhead structure would span the entire railroad right of way.
- The minimum permanent vertical clearance is 23'-3 ½" measured from the top of the highest rail to the lowest obstruction under the structure.
- With the presence of double tracks, the standard distance from the centerline of each track alignment is 20 feet. Currently, the distance is 14 feet. Therefore, in the situation where a new bridge is needed, a longer bridge would need to be constructed in order to meet the current design criteria.

As improvement options are developed, consideration will be given to the requirements and parameters in relation to the railroad infrastructure.

From the as-built bridge plans, the curve data for the bridge over MRL indicates a curve radius of 1,432.5'. This does not meet the minimum curve radius requirement of 1,820' for a design speed of 70 mph. A flashing curve speed warning sign of 60 mph is located on each end of the curve to address this condition.

2.12.3 Six Mile Creek Bridge

The Six Mile Creek Bridge is a two lane structure located at RP 87.22, originally constructed in 1931 and reconstructed in 1939. The bridge is 23 feet long and 36 feet wide. The bridge type is a concrete flat slab with a 5" asphalt overlay. The existing bridge rail consists of concrete post and rail that does not meet current design criteria. The guardrail will be upgraded with an upcoming pavement preservation project. The Six Mile Creek Bridge is ***not structurally deficient*** and ***not functionally obsolete***.

2.13 Crash Analysis

In 2009, the MDT Traffic and Safety Bureau conducted a crash analysis along US 287 from RP 86.1 to RP 89.1, which covers the corridor study area boundary. The crash analysis included 10 years of crash data from January 1, 1999 to December 31, 2008. The analysis compared the study area with the average crash rates on Non-Interstate National Highway System routes statewide. The results are shown in Table 2.10.

Table 2.10 US 287 Crash Statistics (RP 86.1 - RP 89.1) *(from January 1, 1999 - December 31, 2008)*		
Statewide Average	**NINHS Routes**	**Study Area**
All Vehicles Crash Rate	1.07	1.32
All Vehicles Severity Index	2.20	2.64
All Vehicles Severity Rate	2.36	4.28
Truck Crash Rate	0.92	1.01
Truck Severity Index	2.29	3.75
Truck Severity Rate	2.11	3.94
Truck Crashes		4
Total Recorded Crashes		59

Source: MDT Traffic and Safety Bureau, 2009.

Crash rates are defined as the number of crashes per million vehicle miles. Severity index is defined as the ratio of the sum of the level of crash degree to the total number of crashes. Severity rate is defined as the crash rate multiplied by the severity index. Statewide average truck crash rate, truck severity index and truck severity rate are for the years 2003 through 2007. MDT's crash analysis report identified the following:

- An accident cluster was identified between RP 87.6 and RP 88.0. The curve warning signs were upgraded; flashers and centerline rumble strips were installed in 2006. The centerline rumble strips were not applied over the bridge decks.
- There was a 23.7% occurrence of vehicles hitting the guardrail face and/or guardrail end compared to the 4.9% statewide average for rural Non-Interstate National Highways.
- There were 59 crashes in a 10-year period from January 1, 1999 to December 31, 2008. The main trends were single vehicle run-off-the-road crashes and wild animal-vehicle crashes. There were four fatal crashes (5 fatalities), indicating the high severity rate for the corridor.
- In 2006, there was an accident cluster between RP 88.3 to RP 88.8, but no addressable trend.
- There have been 45 single vehicle crashes, with 14 involving guardrail, 10 involving wild animals, one domestic animal (cow), and 12 vehicles which overturned.
- Of the 59 crashes, 26 occurred on the bridge near RP 88 (MRL Bridge). Of these 26 crashes, 8 occurred during dark-not lighted conditions. Thirteen of the 26 crashes occurred during icy roadway conditions.

A review of the MDT Maintenance Animal Incident Database for the time period from January 1998 through June 2009 indicates that animal-vehicle collisions have occurred multiple times throughout that period on US 287 between RP 86.0 and RP 90.0. White-tail and mule deer account for the vast majority of the recorded wildlife mortality along the highway within the study area. Approximately 50 animal carcasses were recorded within the 4-mile highway corridor over that 10-year time period. The carcass locations are relatively evenly dispersed throughout the study area on either side of the existing structure over the railroad tracks and the river. This indicates that the animals are moving between

cover and food sources and crossing the highway at will. While there are some game trails present within the study area, there is no evidence of an exceptionally high-use highway crossing location within the study area. It is presumed that animals may occasionally make use of the existing structure and opportunistically move under the highway along the river corridor at the bridge location.

2.14 Railroad

The presence of MRL within the study area is a key factor to consider in developing improvement options. Guidelines have been established defining construction requirements and development standards near railroad facilities. The existing conditions meet railroad requirements. As improvement options move forward, consideration will be made to comply with specified railroad requirements.

2.15 Utilities

Several utilities exist throughout the study area, primarily along US 287 and MRL corridors. Utilities include power (overhead and underground), telephone, and fiber optics. As improvement options move forward, it will be important to recognize potential impacts improvement options may or may not have on the utilities within the study area. Utility adjustments and/or relocations may delay projects if they are not identified in the project development process. Consideration was given to utilities as improvement options were developed.

2.16 Access Points

There are 23 access points along the highway, 12 east and 11 west. The Radersburg Road (S 285) intersection with US 287, south of the Missouri River Bridge encounters both local and thru traffic. The location of the Bunkhouse Bar, southwest of the Missouri River Bridge, is another key access in the study area. The large approach to the Bunkhouse Bar has little definition, no curb and gutter, and it is frequently used by the traveling public and local traffic. All approaches and access points will be considered as improvement options develop. Table 2.12 contains a listing of existing private and public approaches by approximate RP locations.

Table 2.11 Private and Public Approach Locations

(RP)	Side	Use	(RP)	Side	Use	(RP)	Side	Use
86.12	East	Private	87.21	West	Private	88.45	West	Public (S 285)
86.12	West	Private	87.30	East	Private	88.45 - 88.51	West	Private
86.23	East	Private	87.74	East	Toston Bypass	88.56	West	Private
86.49	West	Private	87.74	West	Private	88.68	East	Private
86.65	East	Public (Flynn Ln)	87.76	West	Private	88.83	East	Private
86.76	East	Public (Sixmile Rd)	87.81	West	Private	88.83	West	Private
87.10	East	Private	88.39	West	Private	88.87	East	Private
87.21	East	Private	88.45	East	Public (Radersburg Rd)			

2.17 Environmental Setting

An Environmental Scan Report was prepared for this Corridor Study (Appendix B) to identify potential impacts, mitigation, and permitting requirements that may result if improvement options are forwarded from this study. In compliance with NEPA/MEPA regulations, all state actions and all federally funded

projects require a level of analysis to determine whether improvement options can be developed to avoid, minimize, or mitigate potential impacts to social, economic and environmental resources. The following environmental elements may potentially be impacted (see Appendix B – Environmental Scan for more detail) and are summarized below:

- **Surface Waters** - The Missouri River is impaired according to the revised 2002, 303(d) impaired water body list. As improvement options develop, the requirements of DEQ's Total Maximum Daily Loads (TMDL) standards and the Water Quality Restoration Plan will be considered. Consideration will also be given to stormwater and spill control on any bridge structures. Coordination with U.S. Army Corps of Engineers (USACE) is essential to determine the appropriate type of permits needed for future development. USACE and the US Coast Guard bridge standards and requirements will need to be met for navigability requirements when considering potential improvement options and/or as projects are developed. As a project is forwarded from this study, resource agency coordination will include the USACE, MFWP, and DEQ.

- **Irrigation** - Irrigation ditches are under local jurisdiction while USACE has jurisdiction on canals returning flow to the Missouri River. The ditches are considered self mitigating at this point. As improvement options develop, irrigation ditches impacted and/or designated for replacement will be evaluated.

- **Recreation** - The Toston Fishing Access site will be given consideration relevant to operational and environmental impacts as improvement options are developed. As a project is forwarded from this study, stakeholder coordination will include MFWP, the Pat Barnes Missouri River Chapter of Trout Unlimited, and public outreach.

- **Cultural Resources & Tribe** - Tribal concerns do not exist within the study area. The cultural resources identified in Appendix B should not be considered a comprehensive list because a cultural resource inventory has not been completed. Any improvement options within the corridor could impact historic properties. A thorough cultural resource inventory would be required prior to implementing a corridor improvement option.

- **Wildlife** - If a project is forwarded from this study, recommendations for facilitation of wildlife movement and minimization of habitat disturbance through the study area will need to be considered during project development. Depending on the presence of migratory bird nests on structures or within vegetation potentially affected by improvement options, certain activities which have the potential to directly affect an occupied nest, especially structure and vegetation (trees and shrubs) removal, may be subject to timing restrictions during the breeding season.

- **Threatened & Endangered Species and Species of Concern** - A search of the Montana Natural Heritage Program species of special concern database revealed the gray wolf, bald eagle, bobolink, plains spadefoot, and Annual Indian paintbrush occupy ranges within or overlapping the study area. The Swainson's Hawk is listed as a potential species of concern. As of January

2011, the gray wolf has been relisted and considered threatened or "non-essential experimental" under the Endangered Species Act (ESA). Due to regular status changes and updates to the ESA, a thorough investigation of species and their related status classifications is required prior to construction activities as a project is forwarded from this study. Appropriate conservation measures for the conservation of sensitive species will be considered during project development.

- **Aquatic Resources** - Montana Stream Protection Act (SPA 124 Permit) protects and preserves fish and wildlife resources as well as maintaining the natural state of streams and rivers. Any project that affects the bed or banks of a stream, including the construction or modification of a facility affecting the natural existing shape of any stream or its banks, requires a SPA 124 Permit through MFWP.

- **Wetlands** - Field work and future wetland delineations will be required for compliance with Clean Water Act (CWA) 404 regulations if improvement options are forwarded into project design. Impacts to wetland areas should be avoided and minimized through improvement options. Any unavoidable wetland impacts must be quantified and compensated for through mitigation in accordance with USACE regulatory requirements. If improvement options are forwarded from the study, permits will be required for any wetland impacts from the USACE. If wetlands are impacted, mitigation will be required.

- **Historic Properties** - Section 106 of the National Historic Preservation Act requires agencies to comply with federal guidelines if improvement options may adversely affect historic properties. A cultural resource survey would need to be conducted within the study area with concurrence from the Montana State Historic Preservation Office to determine eligibility of additional historic properties. Impacts to historic properties should be avoided if practicable and feasible, or if avoidance is not possible, adverse affects would require mitigation. Any impacts to historic properties also influence Section 4(f) analysis.

- **Noise** - Noise contours would be evaluated on a case-by-case basis. If improvement options are forwarded from the study, the study area should be evaluated for impact to nearby residential properties.

- **Section 4(f) and 6 (f)** - Section 4(f) of the 1966 Department of Transportation Act (49 USC 303) applies if Federal transportation funds are used on a project and provides for the protection of publicly owned parks, recreation lands, historic sites, wildlife or waterfowl refuges, and any historic site of national, state, or local significance. If Section 4(f) properties are impacted, a Section 4(f) evaluation will be completed to demonstrate compliance. Under the requirements of Section 4(f), FHWA is required to consider avoidance alternatives to impacting Section 4(f) resources. If a feasible and prudent avoidance alternative to impacting a Section 4(f) resource exists, FHWA is obligated to select that alternative. If no feasible and prudent avoidance alternatives exist, FHWA is obligated to consider the alternative that results in the least harm to

Section 4(f) resources. The National Land and Water Conservation Fund Act, Section 6(f), is intended to preserve, develop, and assure the quality and quantity of outdoor recreation resources. According to Montana Department of Fish, Wildlife, and Parks Land and Water Conservation Fund list, Section 6(f) properties do not exist within the study area.

- **Floodplain** - Executive Order 11988, Floodplain Management, requires federal agencies to avoid direct or indirect support of floodplain development whenever an improvement option is developed. EO 11988 and 23 CFR 650 Part A requires an evaluation of improvement options to determine the extent of any encroachment into the base floodplain. The Broadwater County Floodplain Administrator is responsible for administering and enforcing the floodplain management requirements. As improvement options are developed, consideration will be given to minimize risk of floodplain loss. Evaluations will need to be completed on any new bridge crossing to determine risk and impacts.

- **Soils** - The Farmland Protection Policy Act of 1981 was established to minimize the impact federal actions have on any unnecessary and irreversible conversion of farmland to nonagricultural uses and the compatibility with policies to protect farmland. Due to the large proportion of prime farmland within the study area, there is potential for farmlands to be impacted as improvement options develop. The US Department of Agriculture National Resources Conservation Science (NRCS) has established form AD-1006, Farmland Conversion Impact Rating which evaluates the potential impact on agricultural land if converted to non-farm use. If a project is forwarded from this study the assessment form would be required in the environmental review process.

- **Noxious Weeds** - If improvement options are forwarded into project development the improvement options must adhere to all relevant federal, state, and local noxious weed laws and policies. Coordination with the Broadwater County Weed Supervisor should commence during project development and at the time of construction to establish specific guidance for noxious weed control relative to the improvement options.

Chapter 3 Consultation, Coordination and Public Involvement

An overarching goal of the Corridor Study Planning process was to have ongoing public involvement. Education and public outreach were an essential part of achieving this goal. A Public Involvement Plan (Appendix C) was developed to identify public involvement activities needed to gain insight and build consensus about existing and future corridor needs. The purpose of the Plan was to ensure a proactive public involvement process that provides opportunities for the public to be involved in all phases of the corridor study process.

3.1 Public Information Meetings

The purpose of the first meeting was to inform the public on the corridor study and solicit comments and concerns about the study. The purpose of the second public meeting was to inform the public on the progress of the study and solicit comments and concerns about the west, central, and east corridor areas. A third and final public meeting was held to present the findings of the corridor study and to solicit comments from the public on the conclusions and recommendations contained in the report.

3.1.1 Meeting Description and Context

The first public meeting for the Toston Missouri River Crossing Corridor Planning Study was held on Tuesday, February 16, 2010, from 6:00 pm to 8:30 pm at the Townsend High School Community Room. A total of 28 members of the public attended this first public meeting. This number does not include those individuals on the Planning Team or the Broadwater County Commission. Of the 28 members of the public in attendance, eleven individuals were neither on the corridor landowner list or the list of Toston residents.

The second public meeting for the Toston Missouri River Crossing Corridor Planning Study was held on Wednesday, October 13, 2010, from 6:00 pm to 8:00 pm at the Townsend High School Community Room. A total of 15 members of the public attended this second public meeting. This number does not include those individuals on the Planning Team or the Broadwater County Commission.

The third and final public meeting for the Toston Missouri River Crossing Corridor Planning Study was held on Thursday, February 10, 2011, from 6:00 pm to 8:00 pm at the Townsend High School Community Room. A total of 38 members of the public signed in at the meeting, and others were present but didn't sign in. This number does not include those individuals on the Planning Team or the Broadwater County Commission.

3.1.2 Public Notification

Meeting announcements were advertised in the *Townsend Star* and the *Independent Record* as display ads three weeks and one week prior to the meeting. The ads announced the meeting location, time, and date, the format and purpose of the meeting, and the locations where documents may be reviewed. Additional notification was sent out to the corridor landowner list, stakeholder list, and Toston residents

by Camp Dresser and McKee (CDM). A copy of the approved ad is in Appendix A – Consultation, Coordination and Public Involvement.

3.1.3 Meeting Format

The first public meeting began with a PowerPoint presentation introducing the corridor planning study, a description of NEPA/MEPA, and the approach for the study. An overview of the corridor was presented including the importance of the highway classification, traffic volumes, crash statistics, and bridge crossings over the railroad and Missouri River. Graphics of known environmental resources and potential constraints were shown to represent potential areas of concerns throughout the corridor. After CDM's presentation, the floor was open for any questions.

The second public meeting began with a PowerPoint presentation reviewing the goals, purpose, needs and objectives of the Corridor Study. Additionally, the suitability analysis, corridor concept areas, and potential alignment options were presented. After CDM's presentation, the floor was opened for questions. Handouts provided at the meetings are provided in Appendix A.

The third and final public meeting utilized a brief Powerpoint presentation to describe the second level of screening that was used to screen potential alignments, the selection of two corridor areas being forwarded for future consideration (should funding become available), and the presenting of the short-term improvements identified for consideration in the zero-to-five year timeframe. An overall discussion of available funding also occurred. After the presentation, questions were solicited from the audience.

3.1.4 Issues and Comments by the Public

Following the PowerPoint presentation at the first public meeting, questions and discussion items were fielded. The results of the questions and discussion topics evolving from the meeting are presented below:

- Consideration should be given for a 50-year planning horizon for the planning study versus a 20-year study.
- Thought should be given to holding future public meetings in Toston at the Fire Hall.
- There are several school bus and postal routes through the corridor. Thought and consideration should be made to these routes and the affect they have on the function and flow of the corridor.
- There is a lot of activity south of the bridge with the Fire Department and the Bunkhouse Bar.
- There are several restrictions at the bridge approaches. In particular, geometric and pavement issues on both ends of the bridge.
- Visual obstructions are caused by several signs posted at the intersection of S 285 and US 287. Special comment being given when making a left turn from S 285 onto US 287.

- The sight distance at the south end of the bridge should be further investigated. It was thought that the original construction resulted in the grade being 5 feet lower in this location, likely adversely affecting the sight distance.

- Reference was made to the Laurel Bridge and icy road conditions. That structure is on a long curve and can be very dangerous during winter conditions. Such winter conditions and the bridge should be given significant consideration.

- Bicycle and pedestrian facilities should be addressed throughout the corridor. Bicycle and pedestrian usage is permitted along all public roads within Montana.

- The location of the Bunkhouse Bar and the Fire Station at the south end of the bridge has resulted in an important access point within the corridor.

The meeting concluded with an opportunity for the public to look at the display boards and graphics and provide any comments, suggestions, and/or concerns to the Planning Team members. The public was encouraged to write on the display boards and offer additional information. The following topics were discussed with Planning Team members:

- There has been discussion of potentially opening a dumpster site south of S 285 in an old gravel pit location. This would increase traffic and safety concerns on S 285 and the intersection with US 287.

- Suggest a preferred bike route to detour cyclists over the railroad and the Missouri River on the historic Toston Bridge. The route would be more scenic and safer for bicyclists. Introduce a beautification aspect to the study to encourage the alternative bike route.

- Consider placing a new bridge at RP 88 in the location of the old sugar beet farm.

- In addition to the crash data, there is interest to see the number of fatalities through the corridor.

- A landowner has observed the Fishing Access Site gets light to moderate use. The main use is either the Toston Dam to the Fishing Access Site or the Fishing Access Site to York Island or Townsend.

- A main irrigation canal is located at approximately RP 88.

- There have been numerous sightings of wildlife within the corridor. Particularly, antelope, elk, mule deer, whitetail deer, mountain lions, and black bear.

- In the *Note* section of the Wildlife Corridor Areas graphic, consider replacing the words *are* and *throughout* with *may be* and *within/near*, respectively.

- The Osprey nest located near the Fishing Access Site has not been shown on the Wildlife Corridor Areas graphic. Consider showing this location on the graphic. The Environmental Scan

Report documents the presence of Osprey within the corridor and its protection under the Migratory Bird Treaty Act.

- A landowner indicated an area on the Animal Species of Concern graphic indicating a known area in which bald eagles have a winter roost area.
- A member of the public indicated that MDT received a revocable easement from the railroad that allows them to have the bridge crossing over the tracks. The individual thought that the railroad could revoke the easement at any time, which concerns this individual if time and expense for a new bridge is made but the railroad can prohibit any future construction.
- Involve the safety of postal carriers into future planning throughout the corridor.
- Further investigate where land use classifications come from.
- The abandoned mine displayed on the Hazardous Material graphic was remediated in the summer of 2009.

The results of the questions and discussion topics evolving from the second public meeting are presented below:

- Were economic development opportunities considered in developing the east corridor?
- Were impacts to pivot systems considered in the east corridor area?
- How and when will the project develop precise costs?
- Overall support for the central corridor.
- The Radersburg Road junction needs to be moved because its current location is dangerous.
- How high do traffic volumes need to get to consider a 4-lane roadway?
- There is a 5-lane section to the north and south of the corridor study area. Additionally there is a 5-lane bridge to the south of the corridor study area. With this project, MDT should look into designing bridges with 5 lanes for future expansion.

In addition to verbal comments received during the October 13, 2010 meeting, seven survey/comment forms were submitted at the second public meeting. All seven survey forms noted the favored alignment to be in the central corridor area. Reasons for choosing the central corridor include least overall impact, one owner of land in the central corridor recognized the potential business opportunity, and least overall cost.

Twenty-one comments were received following the October 13, 2010 second public meeting. Comments received include 19 comment/survey forms, one letter, one email and two phone calls. Because notification of the meeting was sent to landowners prior to the meeting, three land owners

submitted comments prior to the meeting. Comments generally followed a pattern of favoring the central corridor area, although some comments preferred the east and west corridor areas. Some individuals thought there was no need for changing the current bridge crossings. Those who chose the central corridor area generally noted the least amount of impacts to residents and surrounding landowners and the most cost-effective option as reasons for choosing the central corridor area.

The results of the public outreach and resulting discussion(s) from the third and final public meeting are presented below:

- How are land values and costs estimated?
- Where did the traffic data originate?
- Are bridge widths related to traffic volumes?
- The Townsend-South EA references 8,000 vehicles per day (vpd) out to the planning horizon and a growth rate of 4.9%. What are the data sources? What were the count locations? Funding available from Townsend-South EA?
- Isn't a 4-lane bridge necessary?
- Where will fill material go?
- Was growth and development in the county taken into consideration in the report?
- If the bridge life is 75 years, would a 5-lane be needed by that time?
- There is a need for a southbound left turn to Toston.
- Highway sign obstructions are a concern.
- High speeds are a safety concern.
- Pedestrian and bicycle crossing needs should be incorporated.
- A flashing light should be installed at the bus stop across from the Bunkhouse Bar.

In addition to verbal comments received during the third and final public meeting, one written comment form was submitted at the meeting. After the third public meeting and before the deadline for written comments (February 21, 2011) nineteen written comments were received. Meeting notes from the third public meeting are included in Appendix A, along with all of the written comments received between February 10, 2011 and February 21, 2011 (the deadline for receipt of written comments). Because notification of the meeting was sent to landowners prior to the meeting, two land owners submitted comments prior to the meeting. Comments generally followed a pattern of favoring the central corridor area.

3.3 Stakeholder Involvement

A stakeholder contact list was developed to include individuals, businesses, or groups identified by Broadwater County, MDT, and/or the Consultant based on their knowledge of the study area and their usage within the study area.

The intent of developing the stakeholder list was to identify those individuals and groups to actively seek out and engage in the various phases of the study. The following groups or businesses were included in the initial list, and study newsletters were sent out to each group as they were developed:

- City of Townsend
- Broadwater County Commissioners
- Montana Rail Link (leased from BNSF Railway)
- BNSF Railway
- Broadwater County contract planner
- Broadwater County Development Corporation (BCDC)
- Townsend School District
- US 287 User's Group
- Water User's Group (Missouri River)
- Toston Irrigation District
- Madison-Missouri River Fund
- Pat Barnes Chapter of Trout Unlimited
- Montana Fish, Wildlife, and Parks (Fishing Access Site)
- County Fire Departments and Emergency Medical Personnel
- County Sheriff and Montana State Highway Patrol
- Landowners in the Corridor

3.4 Resource Agency Workshop

A resource agency workshop was held on March 16, 2010. The resource agency meeting was held to solicit input and gather information from the resource agencies regarding resource areas within the study area. Each agency was sent an Environmental Scan prior to the meeting in order to set the stage for further discussion. In addition to the Planning Team, the agencies involved in this study included DNRC, MFWP, US Fish & Wildlife Service (USFWS), DEQ, US Environmental Protection Agency (EPA), and USACE.

The consultant presented an overview of the study, a summary of the pre-NEPA/MEPA corridor study process, and a summary of the public engagement during the first public meeting. Open discussion was gathered on various resource areas that the agencies felt needed to be further investigated and addressed. Meeting notes from this meeting can be found in Appendix A.

3.5 Other Public Involvement Efforts

Three newsletters were produced that described the work in progress, results achieved, preliminary recommendations and other topics. In addition to mailing each newsletter to study area property owners and stakeholders, the newsletters were also available as handouts during public meetings and at MDT offices. A website was established to provide up-to-date information regarding the study as well as an opportunity to provide comments on the study. The website www.mdt.mt.gov/pubinvolve/toston was maintained by MDT. A toll free comment line at 1-800-714-7296 was also provided by MDT. The newsletters are included in Appendix A.

Chapter 4 Corridor Needs and Objectives

Needs and Objectives for the US 287 corridor within the study area were identified after a comprehensive review of existing data, plans, resource agency and stakeholder coordination, and public comments. The discussion and analysis leading to the development of these needs and objectives recognized the diverse nature of the corridor users and took into account social and economic conditions. The following needs and objectives were used in the development of improvement options identified in Chapter 6.

Need Number 1: Improve safety by removing obstacles, reducing traffic conflicts and addressing crash trends within the US 287 corridor study area.

Objectives

- Upgrade the sub-standard horizontal and vertical alignments to meet current MDT design criteria to the extent practicable.
- Provide adequate clear zones by upgrading shoulder widths and cut and fill slopes to meet current MDT design criteria to the extent practicable.
- Improve vehicle turning movements at public access points and private approaches by providing appropriate features commensurate with the types and volumes of traffic encountered at specific access locations to the extent practicable.

Need Number 2: Improve operation and functionality of the roadway.

Objectives

- Improve the surfacing width for consistency with other segments of US 287 and to meet current MDT design criteria to the extent practicable.
- Provide a roadway that accommodates existing and future capacity demands to the extent practicable.
- Provide modifications to the roadway horizontal alignment and vertical profile to meet current MDT design criteria to the extent practicable.
- Meet design and construction criteria relative to horizontal and vertical clearances from railroad service and track infrastructure.
- Consider non-motorized needs within the corridor.

Other objectives were also identified to capture items of importance not necessarily related to the above two described needs. These are presented below.

- Minimize the environmental resource impacts of improvement options to the extent practicable.

- Recognize and accommodate the diverse nature of corridor “thru” traffic such as recreational vehicles, passenger cars and semi-truck/trailers.
- Provide reasonable access to the town of Toston, Secondary Highway 285, and other public and private approaches.
- Maintain traffic and access within the corridor to the extent practicable during construction.
- Accommodate agricultural and other unique vehicle movements during construction.

Chapter 5 Alignment Identification

A component of this corridor study was the documentation of the many resources found within the study area. The identified resources included environmental resources, as well as other resources important to the public such as land use, business access and the perpetuation of agricultural uses. To assess the variety of resources and their overall influence in identifying potential improvement options, a "suitability analysis" was completed using the ArcGIS Spatial Analyst Extension.

5.1 Suitability Analysis Purpose and Process

The purpose of the suitability analysis was to create a broad view assessment of areas within the study area that may be most suitable for a potential US 287 roadway re-alignment. Work completed for the study consisted of the identification of resources present in the study area. Not all of the physical characteristics and environmental resources noted in Table 5.1 lent themselves for inclusion in the suitability analysis using the ArcGIS Spatial Analyst Extension. As an example, demographic information regarding Broadwater County was not considered a "resource" that could be quantified in the analysis for determination of impacts. In fact, there were many characteristics identified that would not lend themselves for inclusion into the GIS based model, so these were noted and excepted out as appropriate from the analysis. Those resources that have been incorporated into the suitability analysis in some fashion are shown in Table 5.1.

Table 5.1 Physical Characteristics & Environmental Resources Considered in Suitability Analysis

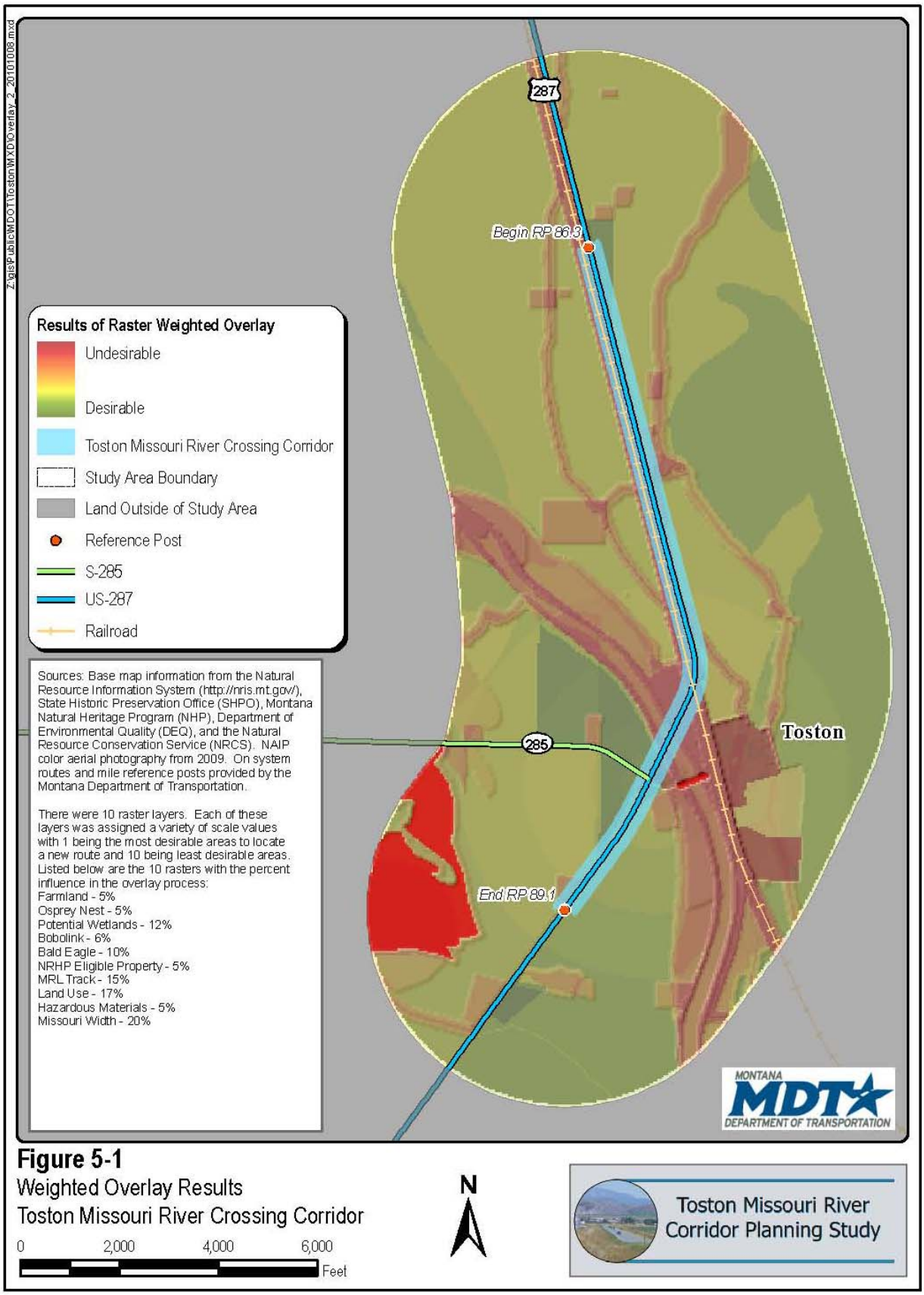
Right-of-Way and Jurisdictions	Land Ownership	Wildlife
Drainage	Surface Waters	Sensitive Species
Hydraulic Structures	Irrigation	Wetlands
Railroad	Recreation	Floodplain
Land Use	Cultural Resources & Tribes	Geology and Soils
Section 4(f) and 6(f)	Agricultural Properties	

The ArcGIS Spatial Analyst Extension was used as a tool to portray and analyze suitable areas for a relocated US 287 corridor. The Spatial Analyst Extension relied on resource data previously defined in Chapter 2 and Appendix B (Environmental Scan), and was utilized as inputs into the GIS platform. Since all of the data sets are not of the same type and function, they inherently have different value scales. To make the suitability analysis meaningful and to a unified scale for executing the model, a weighted overlay process was utilized (Appendix C). In this process, scale values were created for each resource area to define the "class of suitability" – a value of 1 being most suitable and a value of 10 being least suitable. For areas that had to be totally avoided (i.e. total avoid), the class of suitability was defined as

“RESTRICTED” and given a rating value greater than 10. In addition to assigning the class of suitability for the individual resource area data sets, it was also necessary to assign the “percent influence” to the overall data set in relation to other data sets.

The suitability analysis relied on the ratings and percent influence. A weighted overlay graphic was prepared that took into account all the inputs made into the model. From the weighted overlay graphic, a color coded representation was produced to display model results by using intense reds (undesirable areas) and soft greens (desirable areas). The color ranges allowed for the identification of potential areas that are more suitable for US 287 corridor locations than others. The weighted overlay scoring results and associated color schemes are shown on Figure 5-1.

Figure 5-1 allowed for a visual analysis to determine areas that were more suitable than others for potential US 287 roadway corridor relocation. In the graphic, green areas are most suitable, while red areas are least suitable. The results of this exercise allowed for identification of areas for further analysis of potential US 287 roadway corridor locations.


Z:\gis\Public\MDOT\Toston\MXD\Overlay_2_20101006.mxd
287
Begin RP 86.3
285
Toston
End RP 89.1
Results of Raster Weighted Overlay
Undesirable
Desirable
Toston Missouri River Crossing Corridor
Study Area Boundary
Land Outside of Study Area
Reference Post
S-285
US-287
Railroad
Sources: Base map information from the Natural Resource Information System (http://nris.mt.gov/), State Historic Preservation Office (SHPO), Montana Natural Heritage Program (NHP), Department of Environmental Quality (DEQ), and the Natural Resource Conservation Service (NRCS). NAIP color aerial photography from 2009. On system routes and mile reference posts provided by the Montana Department of Transportation.
There were 10 raster layers. Each of these layers was assigned a variety of scale values with 1 being the most desirable areas to locate a new route and 10 being least desirable areas. Listed below are the 10 rasters with the percent influence in the overlay process:
Farmland - 5%
Osprey Nest - 5%
Potential Wetlands - 12%
Bobolink - 6%
Bald Eagle - 10%
NRHP Eligible Property - 5%
MRL Track - 15%
Land Use - 17%
Hazardous Materials - 5%
Missouri Width - 20%
MONTANA
MDT
DEPARTMENT OF TRANSPORTATION
Figure 5-1
Weighted Overlay Results
Toston Missouri River Crossing Corridor
0
2,000
4,000
6,000
Feet
N
Toston Missouri River
Corridor Planning Study

5.2 Preliminary Roadway Alignments Based on Suitability Analysis

When the suitability analysis was completed, the results were reviewed both in data and graphical form. Ten potential roadway alignments were identified that were reasonable and could be developed in accordance with MDT and FHWA design criteria. The alignments are shown graphically on Figure 5-2. Two alignments were developed in the area west of the existing roadway and are labeled as alignments A and B. Six potential alignments were developed in close proximity to the existing roadway and were labeled as alignments C, D, E, F, G and H. These alignments were either just west of the present travelled way (PTW), along the PTW, and/or just east of the PTW. Two alignments were also explored east of the Toston townsite referred to as alignments I and J. Table 5.2 contains a general description of each alignment and its location. It is important to understand that there are many variations on the ten developed alignments, and that the ten described herein were done so to show logical alignment areas for initial consideration that could satisfy the needs and objectives for US 287 within the study area. The process further screens the alignments to a more manageable number, and areas are designated as general corridor "paths" rather than exact centerline alignments.

Table 5.2 Description of Ten Potential Alignments

Alignment ID	General Description of Alignment (see Figure 5-2)
A	Farthest westerly alignment. Results in a gentle, sweeping curve that is closest to a tangential alignment between RP 86.3 and RP 89.1. Located to the west of the Bunkhouse Bar, and directly through Broadwater County property preliminary planned for development. Would pass over the existing MRL tracks to the north with embankment and transition down to existing roadway grade.
B	Second westerly alignment located between existing PTW and Alignment A. Would pass directly in front of Bunkhouse Bar. Would pass over the existing MRL tracks to the north with embankment and transition down to existing roadway grade.
C	Alignment C is a variation of the existing PTW. The alignment utilizes a bridge crossing of the Missouri River slightly west of the existing bridge crossing. Roadway and two bridges would be on a tangent across the river and MRL, and then wrap into the PTW.
D	Alignment D follows the PTW, however the roadway and bridge over the MRL is carried forward on a tangent before wrapping back to the PTW.
E	Alignment E is slightly offset to the east of the existing bridge crossing of the Missouri River. The roadway and bridge crossings are carried through on a tangent, and extend out into the irrigated cropland before wrapping back to the PTW extended to the north. It generally follows the existing irrigation ditch.
F	Alignment F is located just east of the existing bridge crossing of the Missouri River. The existing horizontal curve in front of the Bunkhouse Bar is adjusted slightly to create a longer, sweeping curve. The alignment is carried through on a tangent across the river and bridge, and then wrapped back to the PTW.
G	Alignment G is located just east of the existing bridge crossing of the Missouri River. The existing horizontal curve in front of the

	Bunkhouse Bar is retained, but moved to the north of its present location. The alignment is carried through on a tangent across the river and bridge, and then wrapped back to the PTW.
H	Alignment H is located just east of the existing bridge crossing of the Missouri River. The existing horizontal curve in front of the Bunkhouse Bar is totally removed, and the new alignment is carried through on a tangent across the river and bridge, and then wrapped back to the PTW.
I	Alignment I routes to the east of the Toston townsite by deviating from the PTW near RP 89.0. The relocated route crosses both the river and the MRL tracks at a 90 degree angle, before traversing to the east of the irrigation canal and back to the PTW near RP 86.0.
J	Alignment J is a variation on alignment I and generally traverses closer to Toston on the east. It ties into the PTW on the north end farther away from Toston near RP 86.3.

The creation of these alignments were reviewed for reasonableness and then entered into the weighted overlay model to be used during the screening process described in Chapter 6.

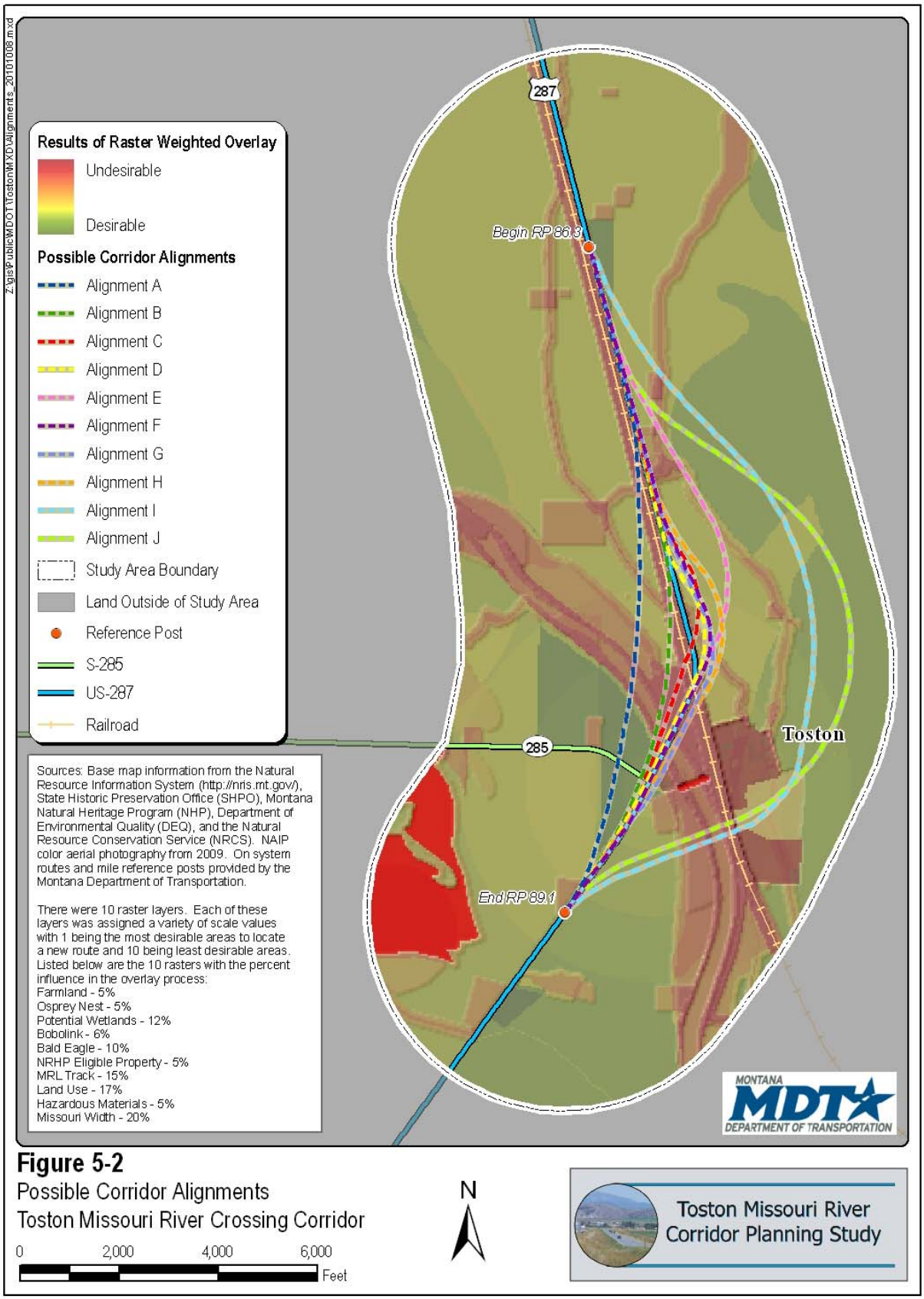


Figure 5-2
Possible Corridor Alignments
Toston Missouri River Crossing Corridor

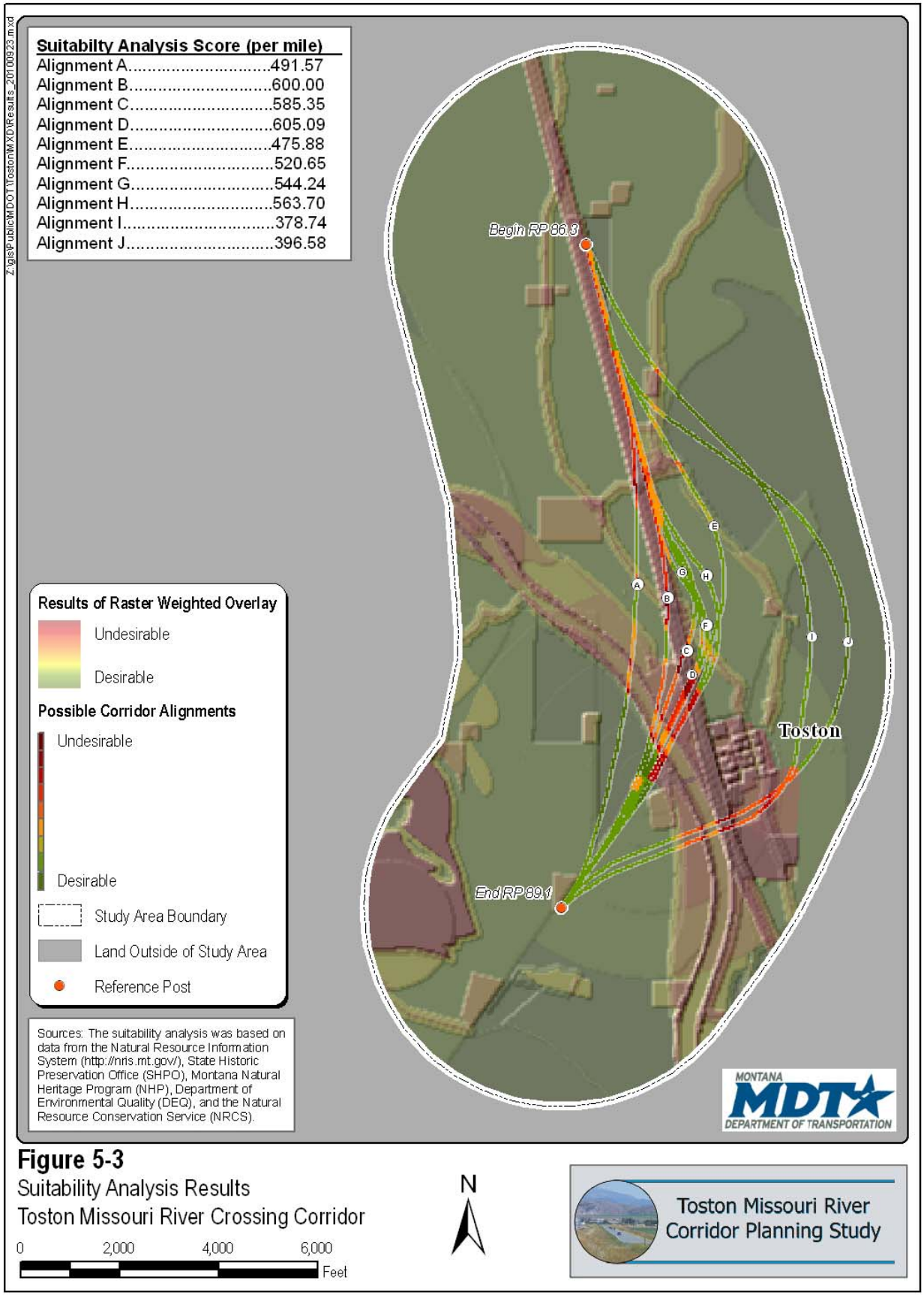


Figure 5-3
Suitability Analysis Results
Toston Missouri River Crossing Corridor

Chapter 6 Improvement Options

6.1 Issues and Deficiencies

Based on the assessment of US 287 corridor conditions within the study area, roadway issues and deficiencies were identified including the alignment geometry (both horizontal and vertical), roadway prism fill slope, narrow roadway width, and higher crash trends compared to similar routes statewide. Additionally, the skew of some of the access points along US 287 are less than desired. The identified issues are presented below.

6.1.1 Substandard Horizontal Curve

The existing horizontal curve at approximately RP 88.0 (MRL crossing) does not meet current design criteria. The existing horizontal curve radius is 1,432.5'. The following horizontal alignment issues exist:

1. For a 70 mph design speed, the minimum curve radius is 1,820' with an 8% superelevation rate. The existing curve radius (1,432.5') and superelevation (7.5%) do not meet the current design criteria.

2. A spiral curve is required for any curve radius less than 3,820'. A spiral curve does not exist on the current roadway alignment.

The horizontal alignment issues over MRL are perceived as a "sharp" curve to the average driver.

6.1.2 Substandard Vertical Curve

The maximum grade recommended for level terrain is 3%. The existing roadway does not exceed the maximum grade. However, the vertical curves on and/or near the bridge crossings do not meet the current design criteria. The following vertical alignment issues exist:

1. The MRL Bridge has a vertical *crest* curve k-value of 210.97 which does not meet the minimum k-value of 247, therefore not providing adequate stopping sight distance.

2. South of the Missouri River Bridge, the vertical *sag* curve has a k-value of 114.3 which does not meet the minimum k-value of 181, therefore not providing adequate stopping sight distance.

6.1.3 Roadside Clear Zone

Throughout the study area, there are substandard fill and cut slopes which do not meet current design criteria. Additionally, clear zone distances are not adequate at a number of locations throughout the study area. The clear zone is the area of the road that drivers could use in order to recover from going off the side of the road.

6.1.4 Roadway Width

The existing roadway width through the study area varies from 28 feet to 32 feet. The varying width does not meet the current design criteria. According to the MDT National Highway System Route Segment Map reference, the recommended roadway width for US 287 is 40 feet or greater. The MDT Roadway Width Committee evaluates and confirms the appropriateness of the suggested Route Segment Map width on a project by project basis. The narrow roadway width results in insufficient shoulder widths. Public comments have suggested high bicyclist traffic through the corridor in the summer months. This has not been confirmed as bicycle counts are not available. The narrow roadway and shoulder widths could pose a safety concern in regards to bicycle traffic if present. The bridge structures have a roadway width of 28 feet which does not meet current design standards. Under the current shoulder width, rumble strips cannot be installed without a design exception per MDT policy.

6.1.5 Crash Trends

Several crash trends within the study area are higher than the statewide average for similar routes. This includes crash rates, severity indices and severity rates for both vehicles and trucks. Crash clusters have been identified between RP 87.6 to RP 88.0 and RP 88.3 to RP 88.8. Review of 10 years of crash data shows the main crash types in the study area were single run-off-the-road crashes and animal-vehicle crashes. Nearly half of the crashes in the 10-year period occurred on the MRL Bridge, primarily due to dark-not lighted conditions or icy roadway conditions. There have also been crashes involving guardrail on the bridge crossings.

6.1.6 Access Points

The location of intersections north and south of the bridge crossings are of concern within the study area. With the location of the Bunkhouse Bar and Secondary Highway 285/Radersburg Road south of the Missouri River Bridge, this intersection accommodates a mix of traffic types and volume. North of the MRL Bridge is an access location for the town of Toston. Both of these intersections cause concern due to the location and proximity to the bridges. Acceleration and deceleration of truck traffic is a safety issue at these two locations because of vehicles turning to and from access points. A skewed intersection exists at the northern edge of the corridor, at Flynn Lane.

6.2 Improvement Option Development

Options for realigning US 287 were evaluated by reviewing all existing engineering and environmental resource data, soliciting input from the public, stakeholders and resource agencies, and reviewing social, demographic and political influences relative to the study area. As was described in Chapter 5, ten potential alignments were developed to address the needs and objectives for US 287 within the study area. The ten alignments are representative of the type of alignments that could be developed to satisfy the long-term needs of US 287 within the study area. In addition to these long-term alignment options, five (5) short-term recommendations were also developed and are described in Section 6.4.

The development and locations of the ten potential alignments are best considered in terms of general corridor “paths”. At this time, exact centerline locations are not known, so “paths” represent the

approximate location of potential alignment options. Traffic volume forecasts based on past data review and future growth forecasts are complicated due to the different “design life” to be used on US 287 in the study area. State roadways are designed for the 20-year horizon, and in the case of this corridor, the design year for the roadway is the year 2030. However bridges are designed for a 75-year design life. For this study the year 2085 is the selected design year for the bridge structures. Traffic volume forecasts out to the year 2030 for the roadway range from 4,800 AADT (using 1.87% percent growth per year) to 5,470 AADT (using 2.51% growth per year). Either of these growth scenarios can be accommodated with a two-lane roadway typical section (i.e. one travel lane in each direction). Turn bays at the Toston Frontage Road and the S-285 intersections should be considered assuming that they can be developed to meet MDT and FHWA design criteria.

Forecasts out to the year 2085, however, are difficult due to the variability with precision over time. Growth projections out to the year 2085 suggest a range of AADT between 13,290 (using 1.87% per year) and 21,390 (using 2.51% per year). This range in AADT values makes it premature at this time to identify the bridge geometries as requiring three lanes (for the low AADT forecast) or five lanes (for the high AADT forecast). What needs to be recognized from these values is that there needs to be flexibility in whatever future corridor “path” is ultimately selected for design development. At this juncture it is not paramount to pinpoint whether three lanes or five lanes are required for the bridge crossings - only that the selected corridor area can accommodate either of these widths as development activities commence.

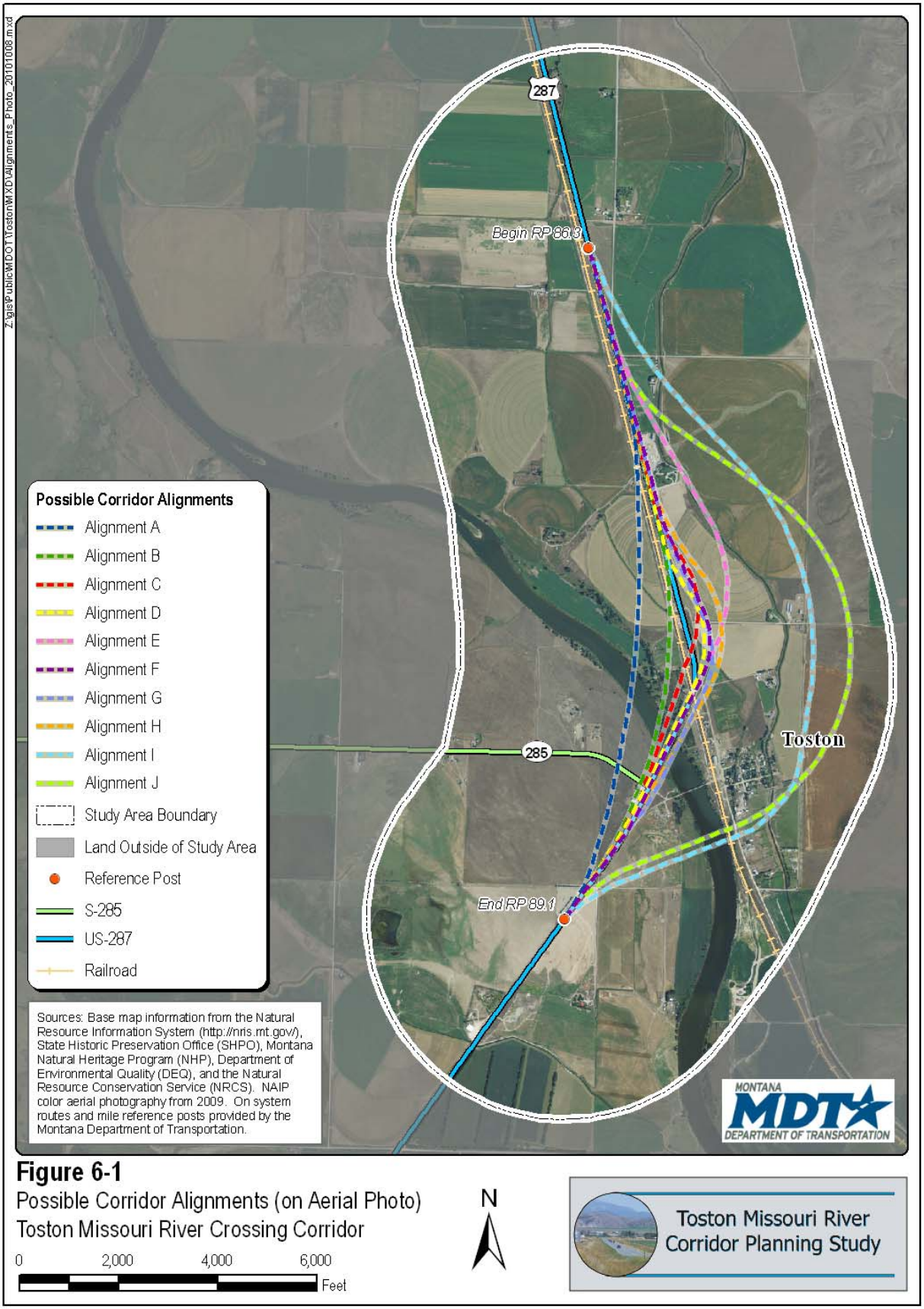


Figure 6-1
Possible Corridor Alignments (on Aerial Photo)
Toston Missouri River Crossing Corridor

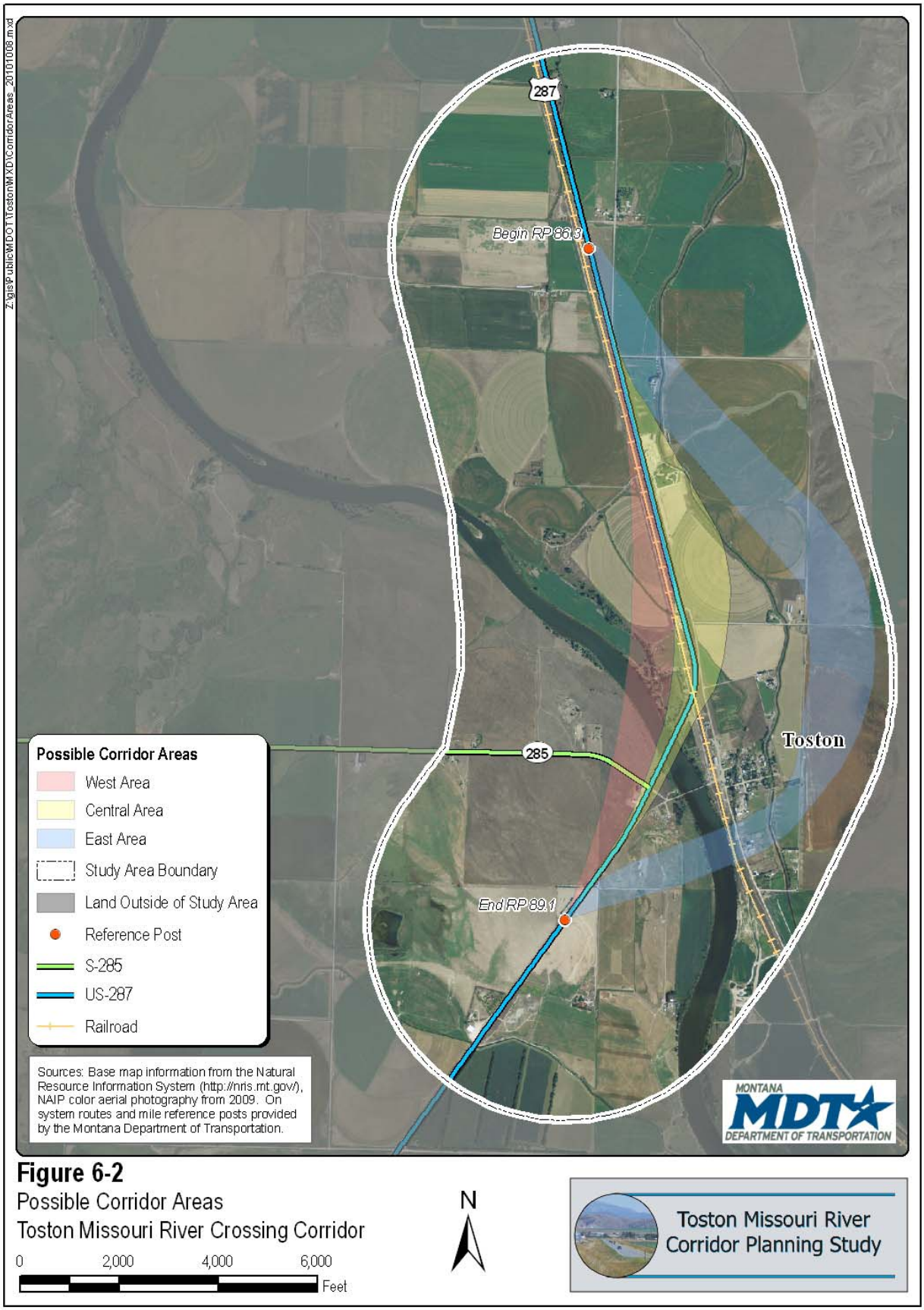


Figure 6-2
Possible Corridor Areas
Toston Missouri River Crossing Corridor

6.3 Improvement Option Screening Process

Screening criteria were developed to assist in the evaluation of the ten (10) potential alignments of US 287 between RP 86.3 and RP 89.1. Screening criteria provide a means of reducing the range of potential alignments for consideration by comparing them both quantitatively and qualitatively with a set of specific measures. The screening process consisted of two screening steps: the "first level" screening was a high level screen that was utilized to identify improvement options that could be dropped from further consideration. The "second level" screening criteria was more detailed and resulted in the selection of two general corridor "paths" to move forward as a project is developed.

The criteria outlined below is the "first level" screening that was utilized to determine if an improvement option was practicable, feasible, and should be carried forward for further consideration in the second level of screening. The screening system described in Section 6.3.1 illustrates how each improvement options' ability to meet the screening criteria was scored. Concurrent to this first level of screening was a quantitative and qualitative assessment to ensure that the developed alignments would be able to satisfy the needs and objectives previously developed for US 287 within the study area. This review concluded that all ten alignments being screened would meet the needs and objectives of US 287 within the study area.

6.3.1 First Level Screening Criteria

The screening criteria were developed based on input from the Planning Team. The first level of screening evaluated 10 alignment options against three (3) broad criteria. Each option was evaluated by the following:

1. Planning level cost estimate (construction cost only)
2. Potential impacts via suitability analysis (weighted overlay results)
3. Public preference

The options were then compared to one another to identify which options were most practicable to be carried forward to the second level of screening.

Table 6.1 Initial Screening Criteria Rating Factors

○	◐	●
Low Cost Low Impact High Public Preference	Medium Cost Medium Impact Medium Public Preference	High Cost High Impact Low Public Preference

6.3.1.1 Planning Level Cost Estimate (Construction Cost Only)

High level planning cost estimates were prepared for each of the ten potential alignments. The planning level cost estimates were for construction costs only (i.e. did not include right-of-way costs, project development costs, inflation, etc.). To develop the planning level cost estimates, a "per mile" roadway cost of $2.5 million dollars was utilized. In addition, new bridge construction costs were varied and ranged from $150 per square foot of bridge (for simple perpendicular crossings) to $300 per square foot of bridge (for complex, highly skewed crossings). The results of the planning level cost estimates are shown in Table 6.2. The rating factors were measured against costs according to the following thresholds, which were developed based on the low and high cost of the ten alignments, with ranges calculated for three possible factors. The three possible ranges were developed by examining the ten costs and grouping costs based on the closeness of the estimates with each other. For these ranges, two alignments were near or below $16 Million, five alignments were near or below $19 Million, and the remaining were greater than $19 Million.

Range of Planning Level Costs	Rating Factor
Less than $16,000,000	○
Between $16,000,000 and $19,000,000	◐
Greater than $19,000,000	●

Table 6.2 Planning Level Cost Estimates (Construction Cost Only)

Alignment ID	Total Planning Level Cost	Rating
Alignment A	$25,000,000	●
Alignment B	$29,900,000	●
Alignment C	$19,700,000	●
Alignment D	$18,500,000	◐
Alignment E	$18,700,000	◐
Alignment F	$18,500,000	◐
Alignment G	$18,600,000	◐
Alignment H	$18,700,000	◐
Alignment I	$15,200,000	○
Alignment J	$15,600,000	○

6.3.1.2 Potential Impacts via Suitability Analysis (Weighted Overlay Results)

The suitability analysis (Chapter 5) was utilized to quantify potential resource impacts for each of the alignments. The suitability analysis noted resource areas within the study area as documented in the Environmental Scan (Appendix B). The Planning Team assigned various resource areas "point values" and gave a "percent influence" to arrive at a composite rating system known as the "weighted overlay score". The results of the weighted overlay score were reviewed and a suitability analysis score was developed based on the value assigned to each cell along an alignment. In this analysis, the total score along an alignment is the product of each individual cell's value added cumulatively along the entire alignment length. For each individual cell, the value ranges from 1 (low resource impact) to 9 (high resource impact). To make this comparison relative to a common unit, the final suitability analysis score was divided by the total alignment length, in miles, to obtain a suitability analysis score per mile. Table 6.3 shows the results of this analysis, along with the assigned rating factor. Figure 5-3 located in Chapter 5 shows a graphic of each alignment color coded for impacts along each alignment. The rating factors were measured against this score according to the following thresholds, which were developed based on the low and high score (per mile) with ranges calculated for the three factors. The ranges were calculated by identifying the quartile points of the differences between the high value (605.09) and the low value (378.74). Based on this analysis, the ¼ quartile point was 435, and the ¾ quartile point was 550, and the ranges below were developed accordingly as noted:

Range of Suitability Analysis Scores	Rating Factor
Less than 435	○
Between 435 - 550	◐
Greater than 550	●

Table 6.3 Suitability Analysis Results – Weighted Overlay Score

Alignment ID	Approximate Length (miles)	Suitability Analysis Score	Suitability Analysis Score (per mile)	Rating
Alignment A	2.61	1283	491.57	◐
Alignment B	2.67	1602	600.00	●
Alignment C	2.73	1598	585.35	●
Alignment D	2.75	1664	605.09	●
Alignment E	2.82	1342	475.88	◐
Alignment F	2.76	1437	520.65	◐

Alignment G	2.78	1513	544.24	◐
Alignment H	2.81	1584	563.70	●
Alignment I	3.34	1265	378.74	○
Alignment J	3.51	1392	396.58	○

6.3.1.3 Public Preference

The final criteria considered in the first level screening process was whether the alignment had the support of the public. Public preference is an important screening criteria because if the public does not support an alternative early in the planning process there is a likelihood that the alignment will not be supported as a project moves forward. Public preference was solicited on general corridor areas via a corridor survey. The survey asked the public to check a box that delineated their preference for a west area, central area, or east area. The general areas are shown on Figure 6-2. Table 6.4 shows the results of this analysis. From a public preference perspective, the rating factors are measured against the corridor survey results and public comments received as follows:

Range of Public Preference	Rating Factor
High Public Preference	○
Medium Public Preference	◐
Low Public Preference	●

Table 6.4 Public Preference

Alignment ID	Rating
Alignment A	●
Alignment B	●
Alignment C	◐
Alignment D	◐
Alignment E	●
Alignment F	○
Alignment G	○

Alignment H	○
Alignment I	●
Alignment J	●

6.3.1.4 First Level Screening Results

The results of the first level screening are found in Table 6.5. The table uses the three initial screening criteria to arrive at a numerical value (higher the numerical score the lower the rating) for each alignment such that potential options considered for further analysis were reduced to a manageable number. The numerical values assigned to the rating factors are listed below:

Numerical Value	Rating Factor
0.00	○
0.50	◐
1.00	●

Table 6.5 First Level Screening Criteria Results

	Alignment Designation (see Figure 6-1)									
	WEST		CENTRAL						EAST	
	A	B	C	D	E	F	G	H	I	J
Planning Level Cost Estimate	●	●	●	◐	◐	◐	◐	◐	○	○
Potential Impacts via Suitability Analysis (Weighted Overlay Analysis)	◐	●	●	●	◐	◐	◐	●	○	○
Public Preference	●	●	◐	◐	●	○	○	○	●	●
Total	2.50	3.00	2.50	2.00	2.00	1.00	1.00	1.5	1.00	1.00

Based on the results shown in Table 6.5, the average numerical value was 1.75. Alignments F, G and H were carried forward for further consideration as they rated less than 1.75. Also, based on the rankings of alignments I and J, they also were carried forward as a combined, hybrid alignment referred to as alignment K (see Figure 6-3). The hybrid alignment K was pursued because of public comment received

on modifications desired for alignments I and J. Thus, four alignments were identified to be carried forward to the next level of screening. Alignments C, D and E, located within the central corridor, were screened out to due to their composite rankings in Table 6.5 and potential constructability issues during construction relative to maintaining traffic on the existing bridge and providing access to area residents and emergency response vehicles.

Alignment A and B in the western corridor area were not carried forward due to their poor rating during the first level of screening as shown in Table 6.5, their overall higher dollar cost to develop, the public opposition to the visual impacts of the westerly corridor, and the constructability issues associated with carrying the roadway over the railroad grades on a very high skew. The identification of constructability issues related to the development of the roadway over the rail infrastructure was a major factor in the decision to drop these alignments.

6.3.2 Second Level Screening Criteria

The second level of screening built upon the first level and was more detailed and specific to the four (4) alignments identified for further consideration. This second level screening evaluated whether or not the alignments met the needs and objectives for the corridor that were identified for this study with a higher level of detail. During the first level screening the evaluation included the ability of the ten alignments to meet current design criteria. The second level screening of the four alignments built upon this evaluation be examining travel patterns unique to the study area, types of vehicles to be expected, and access concerns for each of the routes. Costs and impacts to resources and individual parcels were evaluated to arrive at the recommendations. The second level screening was measured against the following factors, with results and analyses presented in Table 6.6:

1. Does the alignment meet the corridor needs and objectives?
2. Environmental / Resource impacts
3. Construction / Right-of-Way (ROW) costs (in 2010 dollars)
4. ROW impacts
5. Constructability
6. Length of the alignment
7. Public preference

6.3.2.1 Does the Alignment Meet the Corridor Needs & Objectives?

Table 6.6 shows whether or not the alignments satisfied the needs and objectives previously defined for the corridor. The analysis of the four alignments concluded that all of the alignments satisfy the needs and objectives for US 287 within the study area of improving safety, improving operation and functionality, and other objectives. All four (4) alignments show improvement over the existing alignment for US 287 in the study area.

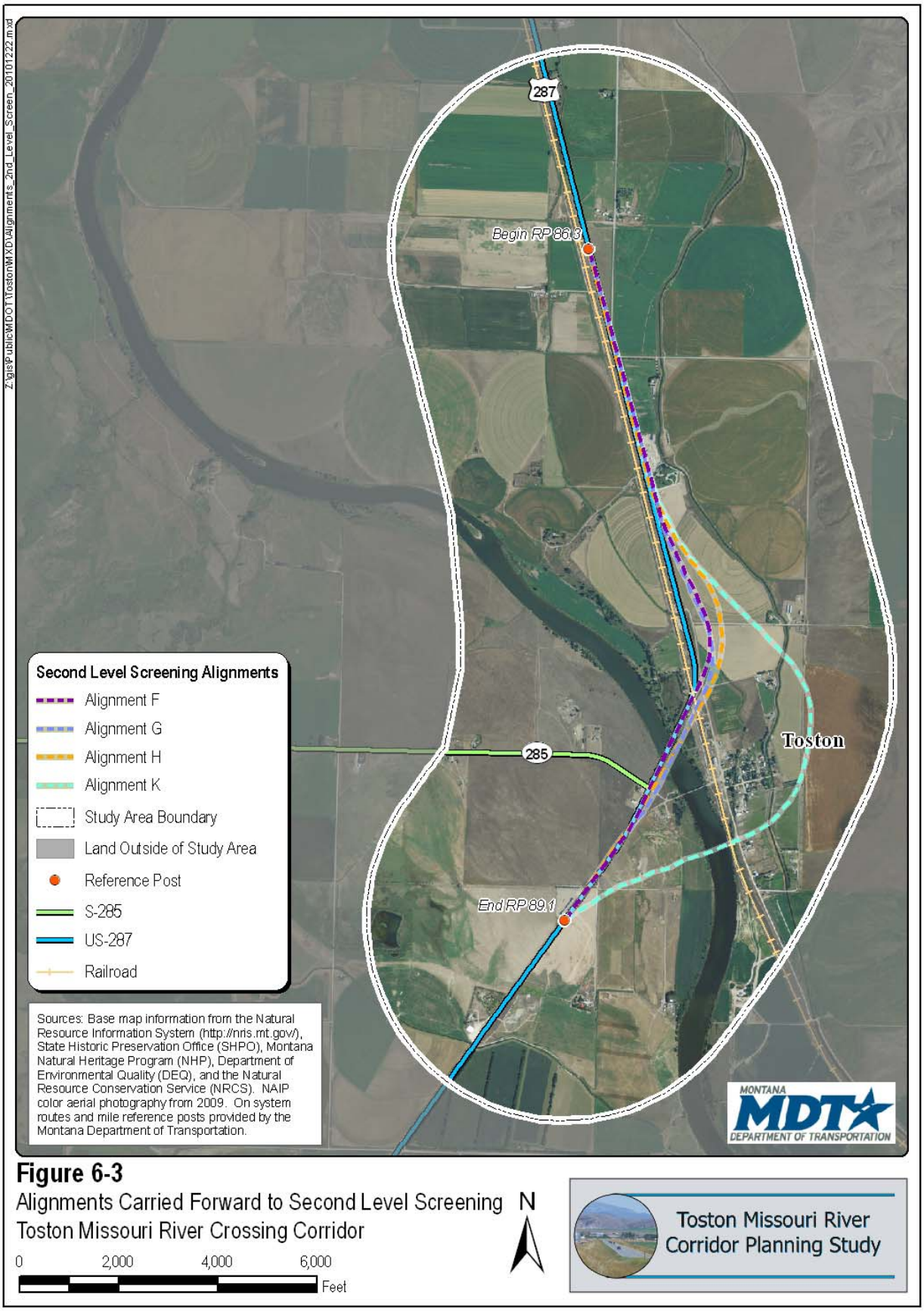


Figure 6-3

Alignments Carried Forward to Second Level Screening

Toston Missouri River Crossing Corridor

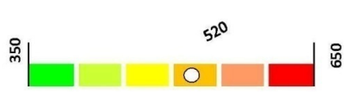
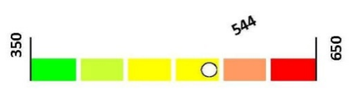
Table 6.6 Second Level Screening Criteria Factors				
Screening Factors	**Central Corridor Area**			**Eastern Corridor Area**
	Alignment F	**Alignment G**	**Alignment H**	**Alignment K**
Does the alignment meet the corridor needs and objectives? (YES or NO)				
Improve safety by reducing traffic conflicts and potential crashes within the US 287 corridor study area	YES	YES	YES	YES
Improve operation and functionality of the roadway	YES	YES	YES	YES
Other				
Recognize and accommodate the diverse nature of corridor "thru" traffic such as recreational vehicles, farm equipment and semi-truck/trailers	YES	YES	YES	YES
Provide reasonable access to the town of Toston, Secondary Highway 285, and other public and private approaches	YES	YES	YES	YES
Accommodate agricultural and other unique vehicle movements during construction	YES	YES	YES	YES
Environmental / Resource Impacts				
1. Suitability Analysis Results (per mile) *(NOTE: Lower value equates to lower overall environmental / resource impacts. Bar scale limits of 350 (Low) and 650 (High) based on previous analysis of ten alignments.)*	520 	544 	564 	390 
4(f) Impacts? *(NOTE: All alignments have some level of environmental resource impact, but impacts to 4(f) property differ among alignments.)*	YES (0.98 acres in the northwest corner of the 4(f) fishing access site property is impacted. The total acreage of the property is 4.24 acres.)	YES (1.94 acres in the western half of the 4(f) fishing access site property is impacted. The total acreage of the property is 4.24 acres.)	YES (1.98 acres in the western half of the 4(f) fishing access site property is impacted. The total acreage of the property is 4.24 acres.)	NO
Construction/ROW Cost (in 2010 dollars)				
1. Roadway *(Includes road construction costs per mile, and ROW costs per acre for irrigated farmland and rural pasture land.)*	$6.6 Million	$6.7 Million	$6.8 Million	$8.0 Million
2. Bridges *(Bridge construction costs for second level of screening based on two bridge width scenarios: 3 travel lanes resulting in 52 feet total width at $150/SF and 5 travel lanes resulting in 76 feet total width at $250/SF for alignments F, G, and H only, and $150/SF for alignment K.)*	$11.2-27.2 Million (depending on lane configurations)	$10.6–25.9 Million (depending on lane configurations)	$10.1-24.5 Million (depending on lane configurations)	$8.5-12.5 Million (depending on lane configurations)

Table 6.6 Second Level Screening Criteria Factors				
Screening Factors	**Central Corridor Area**			**Eastern Corridor Area**
	Alignment F	**Alignment G**	**Alignment H**	**Alignment K**
RANGE OF COSTS FOR PLANNING PURPOSE *(Range of total costs for each alignment developed by adding a 20 percent contingency to calculated "total costs")*	$18 - $41 Million (depending on lane configurations)	$17 - $39 Million (depending on lane configurations)	$17 - $38 Million (depending on lane configurations)	$16 - $25 Million (depending on lane configurations)
Potential ROW Impacts				
1. Number of Privately Owned Parcels Impacted?	3	6	7	10
2. Number of Structures Impacted?	0	0	0	1 (Potential impact to outbuilding)
3. Irrigation Facilities Impacted?	Yes (Crosses irrigation ditch once and impacts the outer edge of a single irrigation pivot - modifications to pivot possible)	Yes (Crosses irrigation ditch once and impacts the outer edge of a single irrigation pivot – modification to pivot possible)	Yes (Crosses irrigation ditch once and impacts a single irrigation pivot – takes cropland out of production)	Yes (Crosses irrigation ditch three times and impacts two irrigation pivots)
Big Springs Ditch *(NOTE: Length is affected length of irrigation crossing within the new right-of-way that will need to be piped or bridged – i.e. ROW to ROW along the canal centerline.)*	Crosses the Big Springs Ditch in one location (250 feet in length)	Crosses the Big Springs Ditch in one location (233 feet in length)	Crosses the Big Springs Ditch in one location (190 feet in length)	Crosses the Big Springs Ditch in one location, and the crossing would be underneath the proposed bridge crossing (164 feet in length)
Broadwater-Missouri Canal *(NOTE: Length is affected length of irrigation crossing within the new right-of-way that will need to be piped or bridged – i.e. ROW to ROW along the canal centerline.)*	No impact	No impact	No impact	Crosses the canal in two locations (245 feet and 193 feet in length)
Constructability				
1. Bridges	Skewed crossing (Higher bridge construction costs and more complex construction requirements)	Skewed crossing (Higher bridge construction costs and more complex construction requirements)	Skewed crossing (Higher bridge construction costs and more complex construction requirements)	Perpendicular crossing
Does the length of the alignment result in additional maintenance needs compared to other options?				
1. Additional maintenance needs (~length) compared to present travel way	.01 miles	.03 miles	.06 miles	.59 miles
How well is the alignment accepted by the public? (HIGH, MODERATE, LOW)				
1. Public preference based on comments received	YES (All alignments in the central corridor were favorably received by the public)	YES (All alignments in the central corridor were favorably received by the public)	YES (All alignments in the central corridor were favorably received by the public)	NO (Eastern corridor alignments were not well received by the public)

Table 6.6 Second Level Screening Criteria Factors				
Screening Factors	**Central Corridor Area**			**Eastern Corridor Area**
	Alignment F	**Alignment G**	**Alignment H**	**Alignment K**
RECOMMENDATION				
	CARRY FORWARD *Pros:* ▪ Public preference ▪ Least added mileage ▪ Least impact to irrigated farmland ▪ Improves over existing conditions *Cons:* ▪ Longest bridge length of four alignments ▪ Highest cost of four alignments under consideration ($18 - $41 Million, depending on lane configurations) ▪ Least (23.1%) impact to 4(f) fishing access site of central options	**CARRY FORWARD** *Pros:* ▪ Public preference ▪ Close to existing PTW, results in lowest overall impacts ▪ Least impact to irrigated farmland ▪ Improves over existing conditions *Cons:* ▪ 45.7% impact to 4(f) fishing access site ▪ Cost slightly more than Alignment H ($17 - $39 Million, depending on lane configurations)	**SCREEN OUT** *Pros:* ▪ Improves over existing conditions ▪ Gentler horizontal alignment with larger curves ▪ Cost slightly less than Alignment F and G ($17 - $38 Million, depending on lane configurations) *Cons:* ▪ Removes adjacent irrigated cropland from production ▪ 46.7% impact to 4(f) fishing access site	**CARRY FORWARD** *Pros:* ▪ Improves over existing conditions ▪ Lowest cost of all alignments ($16 - $25 Million, depending on lane configurations) ▪ Lowest suitability analysis score ▪ Shortest bridge lengths of four alignments *Cons:* ▪ Affects two irrigation pivots and associated cropland. ▪ Public opposition ▪ Lengthens route by 0.59 miles compared to existing

6.3.2.2 Environmental / Resource Impacts

The suitability analysis that was described in Chapter 5 resulted in an "impact score per mile" that quantified each alignment's relative impact to environmental and other resources. This impact is quantifiable through the usage of the ArcGIS software platform. In addition to the suitability impact results that are shown in Table 6.6, three of the four alignments have a varying potential ROW impact to the 4(f) property in the study area and have been quantified in Table 6.6. Alignment K has no impact to the Section 4(f) site.

6.3.2.3 Construction / ROW Cost (in 2010 dollars)

The costs presented in Table 6.6 are more refined than those developed for the first level screening. The costs reflect the planning level roadway costs (based on $2.5 million per mile) and a planning level bridge construction cost (based on $150 per square foot to $250 per square foot of bridge deck area - depending on bridge span length and span skew) to arrive at the planning level cost estimates for each alignment. Note that for bridge costs, two different bridge width scenarios were calculated for the cost range: a 3-lane section (52 feet in bridge deck width) and a 5-lane section (76 feet in bridge deck width). For the latter section (5-lane bridge width), $250 per square foot was used for alignments F, G, and H due to the span length and span skew to the railroad. For alignments F, G, and H, the area between the Missouri River Bridge and the Montana Rail Link Bridge is assumed to be a roadway section approximately 800 feet in length on a high fill.

Ranges of planning level costs were calculated by taking the computed planning level construction costs and inflating the value by a 20 percent contingency factor. This contingency factor was used to account for preliminary engineering (PE) costs, construction engineering (CE) costs and indirect cost accounting procedures (ICAP) costs.

6.3.2.4 ROW Impacts

Right-of-way impacts were evaluated based on the potential new ROW needed for each of the four alignments. The ROW impacts during design are based on the actual touch-down points of the roadway prism (i.e. the construction limits). For purposes of this study, ROW impacts are based on the ROW widths typically required for this type of roadway facility (80 feet each side of centerline). ROW impacts were broken down by the number of parcels impacted, the number of structures impacted, and the number of irrigation facilities impacted. For irrigation facility impacts, the length of the irrigation ditch impact was computed based on the portion of affected ditch found within the right-of-way limits. In practice, the width of the roadway and the height of the fill over the crossing are needed to accurately calculate the length of ditch affected.

6.3.2.5 Constructability

An additional consideration in the second level screening was to determine whether there would be any constructability issues. Bridge crossings for alignments F, G and H are on skews to the river and railroad tracks which have increased complexity when compared to the perpendicular bridge crossing associated with alignment K. With the skewed nature of the crossings over the MRL tracks and the criteria in place for pier placement, the length of this free span over the tracks will be approaching 160 feet, which is the

maximum length of the economically preferred free span pre-stressed concrete beam. This has been considered to potential constructability issues with alignments F, G and H relevant to the bridge crossings when compared to alignment K.

6.3.2.6 Length of Alignment

All alignment options include additional lane-miles of roadway that will result in additional long-term maintenance cost and responsibility. Alignment K results in an added length to US 287 of 0.59 miles over the current roadway. This is viewed as a disadvantage from a maintenance / cost perspective, and also vehicle travel times (i.e. longer length equals longer travel time). Alignments F, G and H result in additional lengths of 0.01 miles, 0.03 miles, and 0.06 miles, respectively, compared to the current US 287 alignment.

6.3.2.7 Public Preference

Public preference was gauged through evaluation of the corridor survey distributed to all the landowners in the study area, and available on the study website, as well as public comments received. Alignments within the central corridor (i.e. alignments F, G and H) had a high public preference, while alignments in the eastern corridor had a low public preference. Over 50 surveys were returned, and 98 percent of the survey respondents preferred development of a realigned US 287 within the central corridor area.

6.3.3 Recommendation for Alignments to Carry Forward

After review and analysis of all the information, it is recommended to carry forward two alignment paths for further consideration as a project moves forward from this study. The two alignment paths are a composite of central and eastern alignments with alignments F and G making up the central alignment path and alignment K (originally alignments I & J) making up the eastern alignment path. The eastern path, although having low public preference, is the least environmentally damaging practicable alternative with no 4(f) impacts and thus will be considered further as a project moves forward from this study. At the current time, there is no funding identified to complete any of the short-term or long-term recommendations contained in this study. To continue with the development of a project (or projects), the following steps are needed:

- Identify a funding source (or sources),
- Develop a formal environmental document (information from this study can be used to inform the environmental process),
- Initiate preliminary engineering activities,
- Finalize design and prepare construction plans package, and
- Let construction contract.

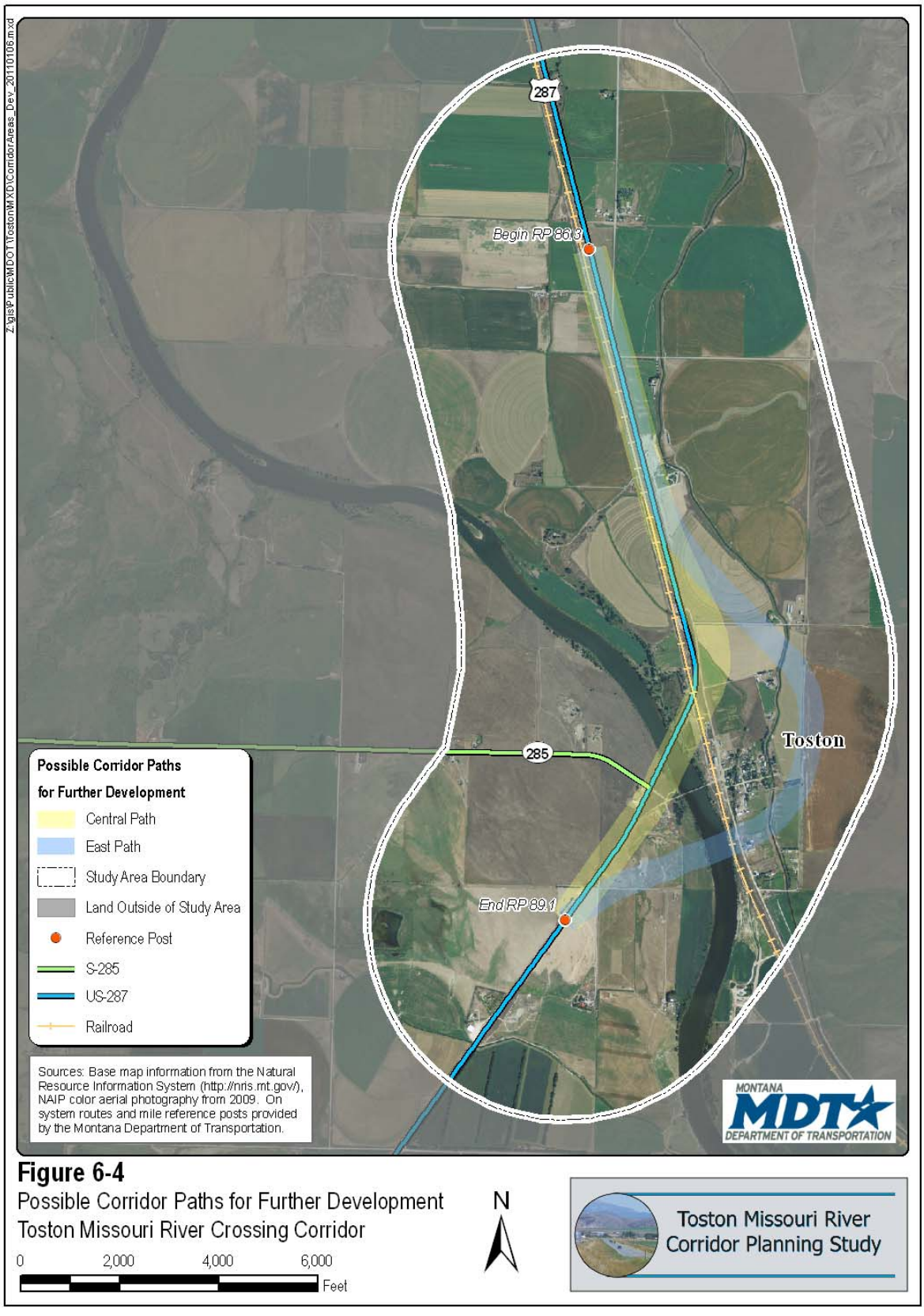


Figure 6-4
Possible Corridor Paths for Further Development
Toston Missouri River Crossing Corridor

6.4 Short Term "Spot" Recommendations

Any major reconstruction activity associated with the re-alignment of US 287 is a long-term prospect. At the present time there is no identified funding that would enable this major project to occur in the near future. Project development activities alone can often take many years to develop for a major reconstruction project, and generally will start once funding is identified with the environmental documentation process. It is appropriate to identify short-term projects that may improve conditions within the study area in the interim. The following five projects, identified as "short-term (ST)", have been developed as potential improvements that could be implemented in the next 3-5+ years, if funding is available, to improve conditions as the longer term roadway re-alignment project funding is identified.

Project ST-1: Add Southbound Left Turn Bay to US 287 at Toston Frontage Road

A southbound left-turn bay can be developed on US 287 at the Toston Frontage Road intersection and north of the existing MRL Bridge. Field observations and public comments have documented the occurrence of turning vehicles at this approach from the north. Toston residents utilize this approach to the townsite when coming from the north. A designated southbound left-turn bay could be developed without geometric restrictions due to the bridge crossings at this location.

Estimated Cost: $150,000
Potential Funding Sources: NHS, STP, HSIP, HPP

Project ST-2: Address Sight Distance Obstructions - Intersection of US 287 and S 285

Current sign placement related to advertisements, coupled with the profile of S 285 as it ties into US 287, results in visual conflicts for drivers as they wait to turn onto US 287. It is recommended that the signage found within the NW quadrant of the intersection be relocated to improve sight distance for those drivers waiting on the west leg of the intersection (i.e. S 285). This is a short term recommendation that will improve driver comfort and function.

Estimated Cost: $10,000
Potential Funding Sources: NHS, STPS, HSIP

Project ST-3: US 287 Shoulder Widening

The absence of wide roadway shoulders adjacent to the travel lanes within the study area presents a safety concern with larger vehicle passage and occasional vehicles stopped on the side of the road. Additionally, the public input has indicated the presence of tourism related bicycle traffic in the summer. A shoulder widening project could be considered along the entire length of the study area to widen the roadway shoulders to a 4-foot minimum width on each side of the travel lane. This would affect the roadway prism in-slope and necessitate a full evaluation of drainage patterns and potential impacts to the railroad. No new right-of-way acquisition is expected with this improvement option.

Estimated Cost: $475,000
Potential Funding Sources: NHS, STP, HSIP, HPP

Project ST-4: S 285 Realignment

Re-aligning the junction of S 285 farther to the south. As described in recommendation ST-2, sight distance issues are present at the intersection of S 285 and US 287 due to sign placement and the profile of S 285. The curvature of the S 285 alignment has resulted in several crashes in recent years, and the curve could be smoothed out to a gentler, sweeping curve by moving S 285 farther south from the PTW. This would have an additional, equal benefit of providing greater separation between the south bridge end and the S 285 tie in point. The reconfiguration of the S 285 roadway would necessitate right-of-way acquisition from two property owners and a reconfiguration of the development planned by Broadwater County near the Bunkhouse Bar.

Estimated Cost: $750,000

Potential Funding Sources: STP, HSIP, HPP

Project ST-5: US 287 and S 285 Intersection Reconfiguration

Recognizing that recommended project ST-4 may be longer term and subject to landowner participation, a reconfiguration of the intersection of US 287 and S 285 is beneficial to improve overall geometrics. A reconfiguration of the intersection should include enlarging the approach radii to improve large vehicle turning movements, and also better aligning the west and east approach legs. Near the Bunkhouse Bar, better definition would help with turning movements into and out of the parking lot, as currently the approach and parking lot are one in the same. Better definition of the approach to the parking lot could result in moving the access to the parking lot farther south from the intersection. This project also includes the addition of a flashing signal at the intersection.

Estimated Cost: $400,000

Potential Funding Sources: NHS, STP, HPP

Table 6.7 Short Term "Spot" Improvements			
Project ID	**Short Descriptor**	**Project Features**	**Timeframe**
ST-1	Add SB 287 Left Turn Bay to US 287 at Toston Frontage Road	Add SB left-turn bay on US 287, at the intersection with the Toston Frontage Road	Short (0 – 3 years)
ST-2	Address Sight Distance Obstructions - Intersection of US 287 and S 285	Relocate private advertisement signs within NW quadrant of intersection of US 287 and S 285 to improve sight distance	Short (0 – 3 years)
ST-3	US 287 Shoulder Widening	Widen shoulders on both sides US 287 within the study corridor to a 4-foot minimum	Medium (3 – 5 years)
ST-4	S 285 Realignment	Shift S 285 alignment south of existing PTW and introduce larger horizontal curvature, resulting in a movement of US 287 and S 285 intersection farther south of Missouri River Bridge end	Long (> 5 years)
ST-5	US 287 and S 285 Intersection Reconfiguration	Pending progress on ST-4, reconfigure intersection of US 287 and S 285 by enlarging radii and aligning minor approach legs. Also, better define approach to Bunkhouse Bar parking lot by relocating farther south from existing. Add flashing signal at the intersection.	Medium (3 – 5 years)

Chapter 7 Funding Mechanisms

7.1 Introduction

MDT administers a number of programs that are funded from state and federal sources. Because US 287 is on a designated federal-aid highway system, there are a number of potential funding programs that may be used to fund all or portions of any future improvements.

Each year, in accordance with 60-2-127, Montana Code Annotated (MCA), 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

7.2 Federal Funding Sources

The following summary of major Federal transportation funding categories received by the State through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)-enacted on August 10, 2005, includes state developed implementation/sub-programs that may be potential sources for any projects developed along US 287 in the study area. In order to receive project funding under these programs, projects must be included in the State Transportation Improvement Program (STIP).

7.2.1 National Highway System (NHS)

The purpose of the National Highway System (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 National Highway System includes all Interstate routes, a large percentage of urban and rural principal arterials, the defense strategic highway network, and strategic highway connectors.

Allocations and Matching Requirements

NHS funds are Federally apportioned to Montana and allocated based on system performance by the Montana Transportation Commission. The Federal share for NHS projects is 86.58% and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account.

Eligibility and Planning Considerations

Activities eligible for the National Highway System funding include construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the NHS. Operational improvements as well as highway safety improvements are also eligible. Other miscellaneous activities that may qualify for NHS funding include research, planning, carpool projects, bikeways, and pedestrian walkways. The Transportation Commission establishes priorities for the use of National Highway System funds and projects are let through a competitive bidding process. US 287 is on the National Highway System.

The Butte District, which the Toston Bridge corridor is a part of, is anticipated to receive an average of about $15,550,000 annually of NH funds during the next four years. Current Butte District priorities already under development total an estimated construction cost of $75,530,000 of which approximately $20,775,000 is for improvements along segments of the US 287 corridor outside of this study area. Given the estimated planning level cost of $21,000,000 to $28,000,000 to reconstruct the bridge and associated roadway work, NH funding for this level of improvement is highly unlikely over the short term, but may be available toward the end of the planning horizon depending on other National Highway System Needs within the Butte District.

7.2.2 Surface Transportation Program (STP)

Surface Transportation Program (STP) funds are Federally apportioned to Montana and allocated by the Montana Transportation Commission to various programs including the Surface Transportation Program Primary Highways (STPP), Surface Transportation Program Secondary Highways (STPS), and the Surface Transportation Program Urban Highways (STPU).

*7.2.2.1 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 highways 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 [MCA 60-2-125(3)].

Allocations and Matching Requirements

Primary funds are distributed statewide (MCA 60-3-205) to each of five financial districts, including the Butte District. The Commission distributes STPP funding based on system performance. Of the total received, 86.58% is federal and 13.42% is State funds from the Highway State Special Revenue Account.

Eligibility and Planning Considerations

Eligible activities for the use of Primary funds include construction, reconstruction, resurfacing, restoration and operational improvements. The Montana Transportation Commission establishes priorities for the use of primary funds and projects are let through a competitive bidding process.

** State funding programs developed to distribute Federal funding within Montana*

*7.2.2.2 Secondary Highway System (STPS)**

The Federal and State funds available under this program are used to finance transportation projects on the state-designated Secondary Highway System. The Secondary Highway System includes highways that have been functionally classified by MDT as either rural minor arterials or rural major collectors and that have been selected by the Montana Transportation Commission in cooperation with the boards of county commissioners, to be placed on the secondary highway system [MCA 60-2-125(4)].

Allocations and Matching Requirements

Secondary funds are distributed statewide (MCA 60-3-206) to each of five financial districts, including the Butte District, based on a formula, which takes into account the land area, population, road mileage and bridge square footage. Federal funds for secondary highways must be matched by non-federal funds. Of the total received 86.58% is Federal and 13.42 % is non-federal match. Normally, the match on these funds is from the Highway State Special Revenue Account.

Eligibility and Planning Considerations

Eligible activities for the use of Secondary funds fall under three major types of improvements: Reconstruction, Rehabilitation, and Pavement Preservation. The Reconstruction and Rehabilitation categories are allocated a minimum of 65% of the program funds with the remaining 35% dedicated to Pavement Preservation. Secondary funds can also be used for any project that is eligible for STP under Title 23, U.S.C.

MDT and county commissions determine Secondary capital construction priorities for each district with final project approval by the Transportation Commission. By state law the individual counties in a district and the state vote on Secondary funding priorities presented to the Commission. The Counties and MDT take the input from citizens, small cities, and tribal governments during the annual priorities process. Projects are let through a competitive bidding process.

** State funding programs developed to distribute Federal funding within Montana*

*7.2.2.3 Community Transportation Enhancement Program (CTEP)**

Federal law requires that at least 10% of STP funds must be spent on transportation enhancement projects. The Montana Transportation Commission created the Community Transportation Enhancement Program in cooperation with the Montana Association of Counties (MACO) and the League of Cities and Towns to comply with this Federal requirement.

Allocations and Matching Requirements

CTEP is a unique program that distributes funding to local and tribal governments based on a population formula and provides project selection authority to local and tribal governments. The Transportation Commission provides final approval to CTEP projects within the State's right-of-way. The Federal share for CTEP projects is 86.58% and the Local and tribal governments are responsible for the remaining 13.42%.

Eligibility and Planning Considerations

Eligible CTEP categories include:

- Pedestrian and bicycle facilities
- Historic preservation
- Acquisition of scenic easements and historic or scenic sites

- Archeological planning and research
- Mitigation of water pollution due to highway runoff or reduce vehicle-caused
- Wildlife mortality while maintaining habitat connectivity
- Scenic or historic highway programs including provisions of tourist and welcome center facilities
- Landscaping and other scenic beautification
- Preservation of abandoned railway corridors (including the conversion and use for bicycle or pedestrian trails)
- Control and removal of outdoor advertising
- Establishment of transportation museums
- Provisions of safety and educational activities for pedestrians and bicyclists

Projects addressing these categories and that are linked to the transportation system by proximity, function or impact, and where required, meet the "historic" criteria, may be eligible for enhancement funding.

Projects must be submitted by the local government to MDT, even when the project has been developed by another organization or interest group. Project proposals must include evidence of public involvement in the identification and ranking of enhancement projects. Local governments are encouraged to use their planning boards, where they exist, for the facilitation of public participation; or a special enhancement committee. MDT staff reviews each project proposal for completeness and eligibility and submits them to the Transportation Commission and the federal Highway Administration for approval.

** State funding programs developed to distribute Federal funding within Montana*

7.2.3 Highway Safety Improvement Program (HSIP)

Allocations and Matching Requirements

HSIP is a new core funding program established by SAFETEA-LU. HSIP funds are Federally apportioned to Montana and allocated to safety improvement projects identified in the strategic highway safety improvement plan by the Commission. 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 Commission approves and awards the projects which are let through a competitive bidding process. Generally, the Federal share for the HSIP projects is 90% and the State is responsible for 10%.

Eligibility and Planning Considerations

There are two set aside programs that receive HSIP funding: the Highway – Railway Crossing Program and the High Risk Rural Roads Program.

7.2.3.1 Highway – Railway Crossing Program (RRX)

Funds are Federally apportioned to Montana and allocated by the Commission for projects that will reduce the number of fatalities and injuries at public highway-rail grade crossings; through the elimination of hazards and/or the installation/upgrade of protective devices.

7.2.3.2 High Risk Rural Roads Program (HRRR)

Funds are set aside from the Highway Safety Improvement Program funds apportioned to Montana for construction and operational improvements on high-risk rural roads. These funds are allocated to HRRRP projects by the Commission. If Montana certifies that it has met all of the needs on high risk rural roads, these set aside funds may be used on any safety improvement project under the HSIP. Montana's set aside requirement for HRRRP is approximately $700,000 per year.

7.2.4 Highway Bridge Replacement and Rehabilitation Program (HBRRP)

Allocations and Matching Requirements

HBRRP funds are Federally apportioned to Montana and allocated to two programs by the Montana Transportation Commission. In general, projects are funded with 86.58% Federal and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account. The Montana Transportation Commission approves projects which are then let to contract through a competitive bidding process.

Eligibility and Planning Considerations

7.2.4.1 On-System Bridge Replacement and Rehabilitation Program

The On-System Bridge Program receives 65% percent of the Federal HBRRP funds. Projects eligible for funding under the On-System Bridge Program include all highway bridges on the State system. The bridges are eligible for rehabilitation or replacement. In addition, painting and seismic retrofitting are also eligible under this program. MDT's Bridge Bureau assigns a priority for replacement or rehabilitation of structurally deficient and functionally obsolete structures based upon sufficiency ratings assigned to each bridge. A structurally deficient bridge is eligible for rehabilitating or replacement; a functionally obsolete bridge is eligible only for rehabilitation; and a bridge rated as sufficient is not eligible for funding under this program.

7.2.5 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. Receiving Congressionally Directed funds has been a viable mechanism for local governments to secure federal funding for projects. 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."*

Chapter 8 Corridor Study Conclusion

The segment of US 287 crossing the Missouri River between RP 86.3 and RP 89.1 was evaluated at a planning level to obtain a better understanding of the corridor limitations and needs, and to determine what improvement if any could be pursued. This section of US 287 is the only remaining section between Three Forks and Townsend without planned improvements. MDT initiated the development of this pre-NEPA/MEPA corridor study, with the full cooperation of Broadwater County, to identify and evaluate improvement options to address the needs on this segment of US 287.

After a comprehensive review of publically available information relative to environmental resources and existing infrastructure, coupled with focused outreach with the public, stakeholders, and various resource agencies, ten (10) potential alignments were developed for relocating US 287 in the study area. The ten alignments fell within one of three corridor areas. The west corridor area was located west of the existing US 287 alignment. The central corridor area was located adjacent to the existing US 287 alignment and was predominately on the east side of the roadway. The east corridor area traversed southeast of Toston and resulted in the longest potential roadway realignment of the three corridor areas.

Two levels of screening were used to provide qualitative and quantitative analysis of potential options. Ten alignments were screened down to four alignments to further evaluate in the second level of screening. The second level screening criteria included costs, public preferences, environmental resource impacts, constructability, and the ability of the alignments to meet the needs and objectives identified for the study area. Public preference was for a new alignment somewhere in the central corridor area. There was no support from the public to develop an alignment in the western corridor area. Although there was little public support to re-route US 287 to the east of Toston, the alignment ranked as the least environmentally damaging alternative based on the resource inventory available.

The results of the study suggest that there are no major impediments to developing a relocated US 287 roadway within either the central corridor area or the eastern corridor area. The conclusion of the corridor study is that either the central corridor path or the eastern corridor path would be suitable for development of a new US 287 alignment in the study area. Both corridor paths will allow the roadway to be reconfigured to meet current design standards, to the extent practicable, and provide for long-term expansion needs. Design activities and determination of roadway configurations are not part of the pre-NEPA/MEPA Corridor Planning process.

Information contained in this corridor study can be used to document why certain options were removed from consideration. As funding becomes available, MDT in cooperation of Broadwater County may elect to enter into the next phase of project development.

8.1 Next Steps

At the current time, there is no funding identified to complete any of the short-term or long-term recommendations contained in this study. To continue with the development of a project (or projects), the following steps are needed:

- Identify a funding source (or sources),
- Develop a formal environmental document (information from this study can be used to inform the environmental process),
- Initiate preliminary engineering activities,
- Finalize design and prepare construction plans package, and
- Let construction contract.

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Chapter 10 Study Team

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