HWY 567 / Pipe Creek Road

Libby North

Corridor Study

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Libby North Corridor Planning Study

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Volume I

Montana Department of Transportation

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Table of Contents

List of Tables and Figures

Montana Department of Transportation

HWY 567 / Pipe Creek Road
Libby North
Corridor Study

Executive Summary

Highway (Hwy) 567 is located in northwest Montana and runs between the City of Libby and the community of Yaak. The 14-mile section of Hwy 567 that is included in this study is from Reference Post (RP) 6.1 near the Bobtail Cutoff Road to RP 20.1 near the Turner Mountain Road (see Figure 1). Hwy 567 is located in the Kootenai National Forest (designated as Forest Highway 67) and in the Cabinet-Yaak Mountains. The road provides access to Forest Service lands for skiing, hunting, camping, and hiking activities. The road has historically been used for logging and that use continues today.

In July 2006, the Montana Department of Transportation hired the consulting firm PB Americas, (formerly named Parsons Brinckerhoff, Quade and Douglas) to complete this corridor study for Hwy 567, located in northwest Montana, from RP 6.1 to RP 20.1. Lincoln County Commissioners, the United States Forest Service (USFS), and Federal Highway Administration (FHWA) are partners in this study process.

This document discusses the findings and recommendations for the Libby North Corridor Study conducted by PB Americas (PB) for Montana Department of Transportation (MDT) between July 2006 and June 2007. The purpose of this study is to develop a comprehensive, long-range plan for managing and improving the Hwy 567 corridor (locally known as Pipe Creek Road). The existing corridor geometrics are challenging in terms of both vertical and horizontal alignments through a mountainous terrain and abutting Pipe Creek at various points along the route. In addition, the corridor lies just outside the designated Cabinet-Yaak Grizzly Bear Recovery Zone, but within a grizzly bear habitat distribution area. Consequently, the corridor study evaluates the feasibility of improving the corridor including assessing a range of low-level safety type improvements through major reconstruction.

The corridor study process evaluated existing and future conditions of the corridor and made recommendations for improving Hwy 567 within the study limits. Activities included:

- researching existing conditions;
- documenting existing and projected environmental, geotechnical and land use conditions;
- forecasting future growth;
- identifying corridor issues;
- identifying goals and analyzing improvement options for the corridor from several perspectives including constructability, financial feasibility, and public acceptance; and
- recommending improvements and management strategies for the existing and long-term safety and operation of the corridor.

The process involved a collaborative effort with local jurisdictions, other agencies and the public in identifying transportation problems and the most efficient and effective solutions to them. The process provided a means for facilitating resolution of major issues before specific project programming and development begin.

Study Objectives and Corridor Needs

Objectives for the study were identified at the beginning of the study process and were refined as needed during the course of the study.

Objectives of the study included the following:

- Document existing conditions –roadway and environmental
- Project future growth
- Identify corridor issues
- Develop corridor goals and possible improvement options
- Analyze future transportation improvements based on impacts, constructability, public acceptance, and financial feasibility

- Recommend improvement options and management strategies for long-term safety and operation of the corridor

The needs and additional objectives for the corridor identified during the study process are:

- Improve safety conditions and decrease accidents
  - Improve geometric elements
  - Address inconsistent roadway widths
  - Improve winter driving and maintenance conditions

- Minimize impacts to the threatened and endangered species
  - Maintain existing wildlife linkage zones

- Maintain character of corridor (mountain roadway)
  - Balance the needs of all users (residents, emergency responders, logging, truckers, recreational)
  - Provide a roadway that is an asset to Libby and Yaak

Strategies for Identifying Corridor Problems

The following strategies were utilized to identify problems within the study corridor:

A. Review of existing MDT reports – Existing reports that MDT has prepared for the corridor were reviewed and include the following:

   - Preliminary Field Report dated January 21, 2003
   - MDT Accident Analysis Reports generated for the corridor from January 1, 1995 through March 31, 2006

   The analysis showed that accident trends within the corridor are higher than the statewide average for similar type routes. Also the overall trend is loss of control on curves, usually during snowy, slushy or icy roadway conditions. More than half of the accidents that occurred within the corridor occurred at night.

B. Stakeholder interviews – A list of stakeholders to be interviewed was developed by MDT, Lincoln County, and the Forest Service. From this list, 13 project stakeholders were interviewed. During the stakeholder interviews safety and environmental concerns were discussed with resource agency staff, business owners, non-profit organizations and a local government official.

   Those who were interviewed were:

Name	**Affiliation**
Bruce Zwang	Turner Mountain Resort
Bill Patten	St. John's Lutheran Hospital
Jay Ramlo	Property Owner
Ron Higgins	Lincoln County School Superintendent
Jerry Wolcot	Plum Creek Timberland, Inc.
Scott Erickson	Rosauers Grocery
Bill Martin	Cabinet Resource Group
Michael Garrity	Alliance for Wild Rockies, Helena
Louisa Wilcox	Natural Resource Defense Council, Bozeman
Malcolm Edwards	Libby Ranger District
Sarah Canepa	Yaak Valley Forest Council, Troy
Rod Kramer	Adventure Cycling, Missoula
Tony Barget	Mayor of Libby

C. Engineering review of the existing corridor compared to current design standards – The existing roadway alignment was compared to current standards and areas that do not meet current standards have been identified.

   The issues identified included horizontal and vertical curves that do not meet standards, areas with sight distance (clear zone) deficiencies, side slopes that do not currently have adequate guard rail and/or shoulder. Where shoulders do exist, the widths do not meet safety standards.

D. Public and agency coordination – Coordination with the general public and the resource agencies occurred throughout the study.

   Feedback from the public and agencies was used to identify corridor problems as well as potential solutions. Several meetings occurred; these are listed in detail in Section 8.

E. Geotechnical Study – A Preliminary Geotechnical Report was completed as part of this study.

   Findings of this report have been included in this Corridor Study and the report is included in full as Appendix B. Slope stabilization and encroachment of the existing roadway into Pipe Creek are two of the key issues identified in the report. Slope stabilization and rockfall mitigation techniques, which could include slope flattening, rock bolting and netting, rockfall catchment ditches and barrier fences, will be required along the roadway if it becomes a construction project. The actual placement and selection of appropriate mitigation measures will depend on a complete field investigation and geotechnical study during a design phase if the road is programmed for a highway improvement project in the future.

F. Preliminary Biological Resources Investigation – A Preliminary Biological Resources Investigation was completed as part of this study to identify the biological resources near the corridor.

   Results of the investigation have been included in this Corridor Study and are detailed in Appendix C. Numerous species of wildlife and vegetation are described in the roadway corridor, as well as the aquatic resources and wetlands.

G. Preliminary Wildlife Habitat Linkage Analysis – A Preliminary Wildlife Habitat Linkage Analysis was completed as part of this study to identify the wildlife linkage zones near the corridor. Results of the investigation have been included in this Corridor Study.

   Three wildlife linkage areas were identified within the corridor, but due to projected 2030 traffic volumes, traffic that may result from recommended roadway improvements are not anticipated to be an impediment to wildlife movements.

Problems Identified in the Corridor

The following problems for Hwy 567 between RP 6.1 and RP 20.1 have been identified during this corridor study. Each of these problems is described in the paragraphs that follow. Specific locations of these problem areas are identified on the Roadway Inventory Plans (Volume II of this Corridor Plan).

- Narrow and inconsistent roadway width throughout the corridor
- Lack of adequate signing and striping
- Substandard horizontal and vertical curvature
- Substandard side slopes (both cut and fill)
- Lack of or deteriorating guardrail
- Dense vegetation next to the roadway limits the ability of the sun to melt the snow and ice
- Rocks falling onto the road creating a hazard for motorists

Narrow Roadway Width throughout the Corridor

The existing roadway has an average width of 20 feet. Current standards for this type of facility recommend a roadway width of 24 feet The narrowness of the Hwy 567 roadway makes snow removal and storage difficult in the winter months and also does not allow much room if there is a stalled vehicle. It also poses a problem for routine maintenance activities. The inconsistent roadway width, the roadway varies in width from 15 feet to 26 feet, does not allow for consistent driver expectancy. For example, the changes in width along the roadway may cause the driver to slow down quickly as the road narrows. The lack of roadway shoulders is also a direct result of the narrow roadway, and can be hazardous at times since there is insufficient room for vehicles to pull off the road in the event of an emergency.

Lack of Adequate Signing and Striping

The existing roadway does not have any paint striping and few signs where there are sharp curves or steep slopes. One of the suggestions, from a member of the public, was to paint a centerline in the roadway to keep cars on the proper side of the road.

Substandard Horizontal and Vertical Curvature

Hwy 567 was originally built as a logging road and was not intended for public use. Many of the existing horizontal and vertical curves do not meet current design standards. The horizontal curve near RP 11 has been identified as a particular problem area because of the sharpness of the curve. Accident data indicates that this area has a higher frequency of accidents than other areas of the corridor.

Substandard Side Slopes (both cut and fill)

Much of the corridor has side slopes that are steep and do not meet current standards. This poses a safety issue for vehicles if they run off the road.

Lack of or deteriorating guardrail

In areas where side slopes can not be graded to meet current standards, shielding with guardrail should be considered. Much of the existing corridor does not have guardrail and in places where guardrail does exist in many cases it is in a poor condition. MDT is planning on replacing the existing guardrail between RP 10.8 and RP 11.2, it is anticipated this replacement will be completed in 2008.

Dense vegetation next to the roadway limiting the ability of the sun to melt the snow and ice

Hwy 567 is located in the Kootenai National Forest and is surrounded by dense vegetation on both sides of the roadway. Tall trees located close to the edge of the road limit the amount of sunlight that hits the road, particularly in the winter. This lack of sunlight means that ice and snow take longer to melt. This is an issue all along the study corridor.

Rocks falling onto the road creating a hazard for motorists

There are locations along the corridor where rocks are falling onto the roadway. This creates a hazard for motorists, particularly because the road is narrow and driving around the rocks puts the motorist into the opposing lane of traffic.

Improvement Options

To minimize impacts to the environment, the environmental issues within the project corridor were identified and located. Detailed discussion of environmental issues in the corridor is included in Chapter 4 of this Corridor Study. The development of alternatives, or options, and the screening process is intended to find the environmentally least damaging option that still fixes the corridor problems.

Several improvement options were developed to address the problems identified in the corridor and are listed below. A detailed description of each option is included in Chapter 6.

- Improvement Option 1 – Full Reconstruction
- Improvement Option 2 – Rehabilitation with minor widening to 24 feet
- Improvement Option 3 – Rehabilitation with no minor widening
- Improvement Option 4 – Spot Improvements

- Improvement Option 5 – Snow Storage Option
- Improvement Option 6 – Rehabilitation with Minor Realignments

Management Strategies

As part of this study various resource management strategies were discussed which are not included as part of the improvement options mentioned above. Following is a summary of these strategies:

- Snow Removal – Rather than widening the roadway prism to allow for snow storage, the project team investigated an option of purchasing modern snow removal equipment that throws the snow away from the road. This equipment is very expensive and exceeds budget limitations for Lincoln County snow removal. This is a strategy that Lincoln County can implement at any time in the future if it becomes financially feasible.
- Grizzly Bears – One of the problems identified by the resource agencies during this study is the fact that bears like to eat trash and other human food which puts them in harms way. Better management of trash or other items bears like to eat could help to reduce this problem and would lessen the chances of Grizzly Bears interacting with humans and being killed. This strategy was discussed at the final public meeting for this study. Local communities and others are also encouraged to promote this management strategy. A type of neighborhood watch program was also discussed to discourage poachers from killing Grizzly Bears. Details of this strategy were not discussed but the concept is to have residents watch out for the protection of the Grizzly Bears by discouraging and reporting poaching activities to the proper authorities.

Recommended Corridor Improvements

As a result of the discussion at the Alternatives Workshop, a new option was developed and recommended for implementation within the corridor. Improvement Option 6 is described in detail in Section 6.6 and includes the following elements:

- From RP 6.1 to RP 7 the road is already widened in this section.
- From RP 7 to RP 17 rehabilitate and minor widening of the roadway to a 24 foot top width (see Figure 15).
- At RP 8 and RP 11 realign the road centerline to increase safety (see Figure 16).
- From RP 17 to RP 20.1 rehabilitate and minor widening of the roadway to a 22 foot top width to reduce impacts to the natural environment (see Figure 17). A design option from RP 17 - 19 that was evaluated during the Alternatives Screening Agency Workshop included reduction of the top width to 22 feet. This roadway width was discussed as a possible means for future consideration, to reduce impacts to the natural environment. A design option from RP 19 – 20.1 that was evaluated during the Alternatives Screening Agency Workshop included reduction of the top width to 20 feet. This narrower roadway width was discussed as a possible means for future consideration, to reduce impacts to the natural environment.
- Design Values identified in AASHTO's Geometric Design of Very Low Volume Roads may be used to identify and justify design criteria exceptions that could be used to reduce impacts to the natural environment – see Design Criteria Table 13.
- Install warning signs as shown in Table 15 and Figure 11.
- Use 6 inch pavement striping to reduce speeds.
- Flatten side slopes or install guardrail as shown in Table 14 and Figure 9.
- Create a "V-ditch" where possible to help with snow storage.
- The actual method used to rehabilitate the existing pavement (full depth reclamation, foam mix, cold in place recycle, or some other method) will be determined at a later date after sufficient testing of the existing roadbed has been made, and given the nature of the facility. The cost estimate prepared for this option includes costs to cover whatever rehabilitation method is chosen.

The estimated cost of Option 6 is $15.5 million in 2006 dollars as shown in the cost estimate. The detailed cost estimate in Appendix F also includes a cost breakdown for various segments of the corridor for this option,

allowing for a phased implementation approach as funding allows. Current funding availability is approximately $5,600,000. The following table summarizes the cost breakdown for Option 6.

Summary of Costs

	Roadway - 2006 Dollars	Right of Way - 2006 Dollars	Total - 2006 Dollars	Total - 2012 Dollars	Total Cost including 12% Indirect Cost Recovery - 2012 Dollars
Option 1 - Full Reconstruction	$ 22,711,542	$ 2,015,490	**$ 24,727,032**		
Option 2- Rehab with widening to 24'	$ 9,832,487	$ 333,500	**$ 10,165,987**		
Option 3 - Rehab with no widening	$ 5,604,001	$ 94,041	**$ 5,698,042**		
Option 4 - Spot Improvments	$ 187,501	$ -	**$ 187,501**		
Option 5 - Snow Storage Widening	$ 444,778	$ 5,750	**$ 450,528**		
Option 6 - Corridor Plan	$ 15,280,000	$ 219,000	**$ 15,500,000**	**18,510,000**	**20,730,000**
Corridor Plan Re-align RP 8	$ 890,000	$ 6,000	**$ 900,000**	**1,070,000**	**1,200,000**
Corridor Plan Re-align RP 11	$ 1,110,000	$ 6,000	**$ 1,110,000**	**1,330,000**	**1,490,000**
Corridor Plan Segment 1 - RP 7 to RP 12	$ 4,970,000	$ 52,000	**$ 5,020,000**	**5,990,000**	**6,710,000**
Corridor Plan Segment 2 - RP 12 to RP 17	$ 4,910,000	$ 161,000	**$ 5,070,000**	**6,050,000**	**6,780,000**
Corridor Plan Segment 3 - RP 17 to RP 20.1	$ 6,330,000	$ 6,000	**$ 6,330,000**	**7,560,000**	**8,470,000**

Notes: 1) Costs inflated by 3% per year to obtain 2012 costs 2) Indirect Cost Recovery rate estimated, and may vary from year to year

Option 6 Advantages:

- Corrects the major horizontal, vertical, and roadside deficiencies identified.
- Addresses safety concerns identified by providing improved pavement condition, consistent roadway width, safer curves, and guardrail.
- Less expensive than a full reconstruction - Option 1 (see Appendix F for detailed cost estimate breakdown).
- Is in line with public perception regarding the nature of the road.
- Provides room for snow storage to address the problem identified by Lincoln County Maintenance.
- Can adequately handle anticipated traffic volumes.
- Takes steps to minimize impacts to surrounding natural environment. These steps could include such things as improvements to the curve at RP 11 to address the debris that currently ends up in the adjacent stream due to recurring rock fall at RP 11, wider striping to assist in driving speeds decreasing, and minimizing impacts to wildlife linkage zones.

Option 6 Disadvantages:

- Potential minor impacts to the surrounding natural environment, including parts of the Grizzly Bear distribution area (GBDA), Wildlife Linkage zones (WLZ), and Pipe Creek (see sheet 3 in the "Roadway Inventory" sheets in Volume 2 where portions of Hwy 567 Pipe Creek Road are within the GBDA, and WLZ. Because development is anticipated to remain low in density and projected traffic volumes are well below the threshold of 4,000 vehicles per day (see Section 4.10.5), it is anticipated that minimal influence to the WLZ or GBDA will result from Option 6, and there will still be some minor impacts to wildlife from daily traffic.
- Will require closing the road periodically during construction, closures will be temporary and coordinated with Lincoln County and the USFS.

Next Steps

The following identifies the next steps that will occur for Hwy 567 corridor from RP 6.1 to RP 20.1.

- MDT will confirm project scope with the County
- MDT will program recommended project based on available funding
- The environmental study process will be completed, then the project will move into detailed design and construction of improvements
- Construction is expected to begin once funding becomes available

As part of the Project programming Public Involvement will be continuous throughout programming Project and environmental review process.

1.0 Introduction

1.1 Purpose

The purpose of this study is to develop a comprehensive, long-range plan for managing and improving the corridor. It was a collaborative process with local jurisdictions, other agencies and the public in identifying transportation problems and the most efficient and effective solutions to them. The process also provided a means for facilitating resolution of major issues before specific project programming and development begin.

The existing geometrics are challenging in terms of both vertical and horizontal alignments through a mountainous terrain and abutting Pipe Creek at various points along the route. Consequently, the corridor study evaluated the feasibility of improving the corridor including assessing a range of low-level safety type improvements through major reconstruction. Activities included researching existing conditions; documenting existing and projected environmental, geotechnical and land use conditions; forecasting future growth; identifying goals and analyzing alternatives for the corridor from several perspectives, constructability, financial feasibility, and public acceptance; and recommending improvements and management strategies for the existing and long-term safety and operation of the corridor.

This document discusses the findings and recommendations for the Libby North Corridor conducted by PB Americas, (formerly Parsons Brinckerhoff Quade and Douglas) for Montana Department of Transportation (MDT) between July 2006 and June 2007. The corridor study process evaluated existing conditions of the Highway (Hwy) 567 (locally known as Pipe Creek Road) corridor and made recommendations for improving Hwy 567 within the study limits.

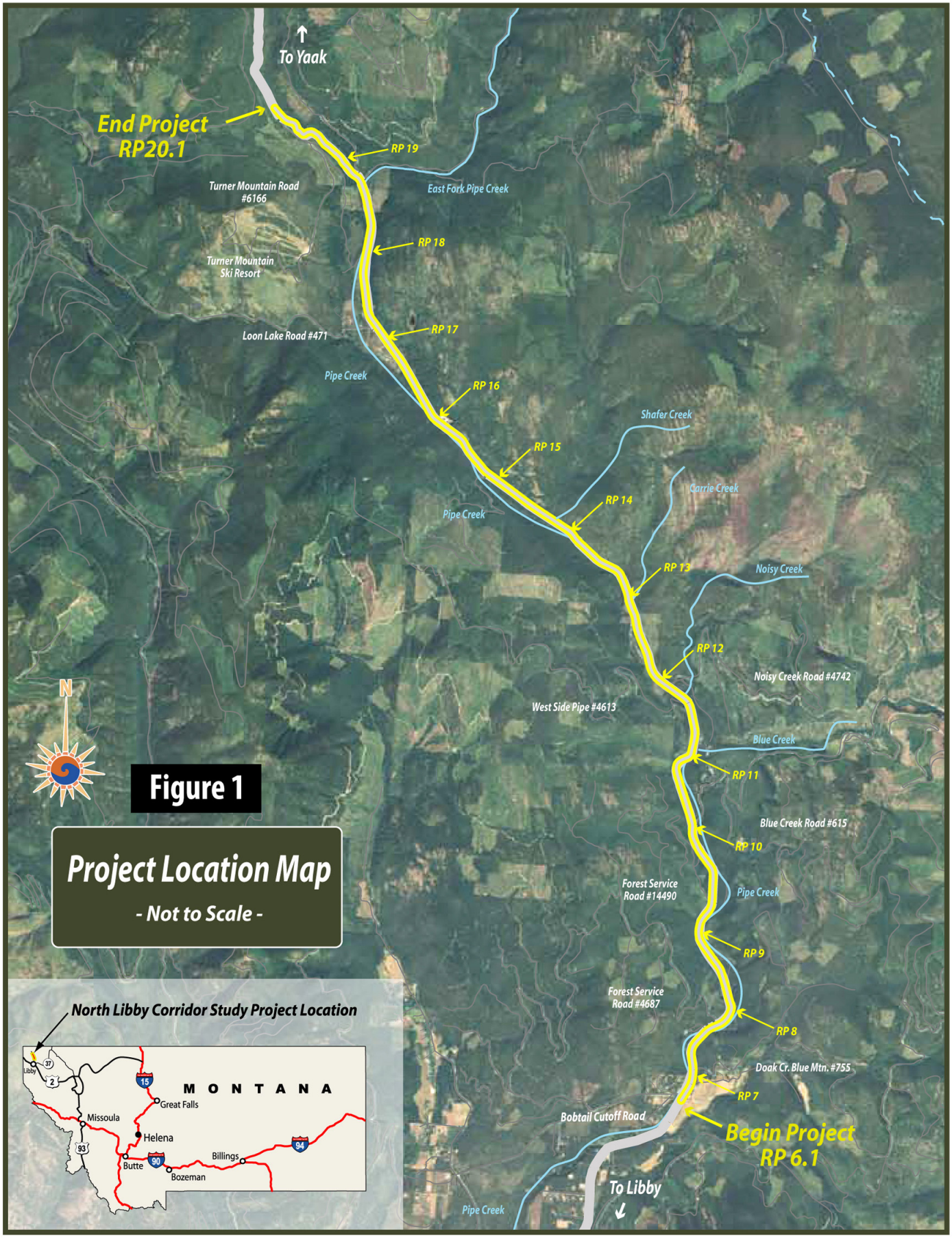
1.2 Location

Hwy 567 is located in northwest Montana and runs between the City of Libby and the community of Yaak. The 14-mile section of Hwy 567 included in this study is from RP 6.1 near the Bobtail Cutoff Road to RP 20.1 near the Turner Mountain Road (see Figure 1). Hwy 567 is located in the Kootenai National Forest (designated as Forest Highway 67) in the Cabinet-Yaak Mountains. The road provides access to Forest Service lands for skiing, hunting, camping, and hiking activities. The road has historically been used for logging and that use continues today.

1.3 Study Background and Area

Hwy 567 is a two-lane roadway functionally classified as a rural major collector and is part of the Montana Secondary Highway System, see Figure 2 for existing typical cross-section. Lincoln County, the U.S. Forest Service, and MDT all desired an evaluation of the existing conditions of the road to determine what, if any, improvements should be made. In July 2006 MDT retained PB to complete this Libby North Corridor Study.

The study area begins at RP 6.1 (Bobtail Cutoff Road) and runs 14 miles to RP 20.1 (Turner Mountain Road). The study area is 100 meters (328 feet) wide centered off the centerline of the Hwy 567 Present Traveled Way (PTW). A wider study area was used to analyze wildlife and other environmental resources due to a need to assess habitat and indirect impacts.


To Yaak
End Project
RP20.1
RP 19
Turner Mountain Road
#6166
East Fork Pipe Creek
RP 18
Turner Mountain
Ski Resort
RP 17
Loon Lake Road #471
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 1
Project Location Map
- Not to Scale -
North Libby Corridor Study Project Location
MONTANA
Libby
Great Falls
Missoula
Helena
Butte
Billings
Bozeman

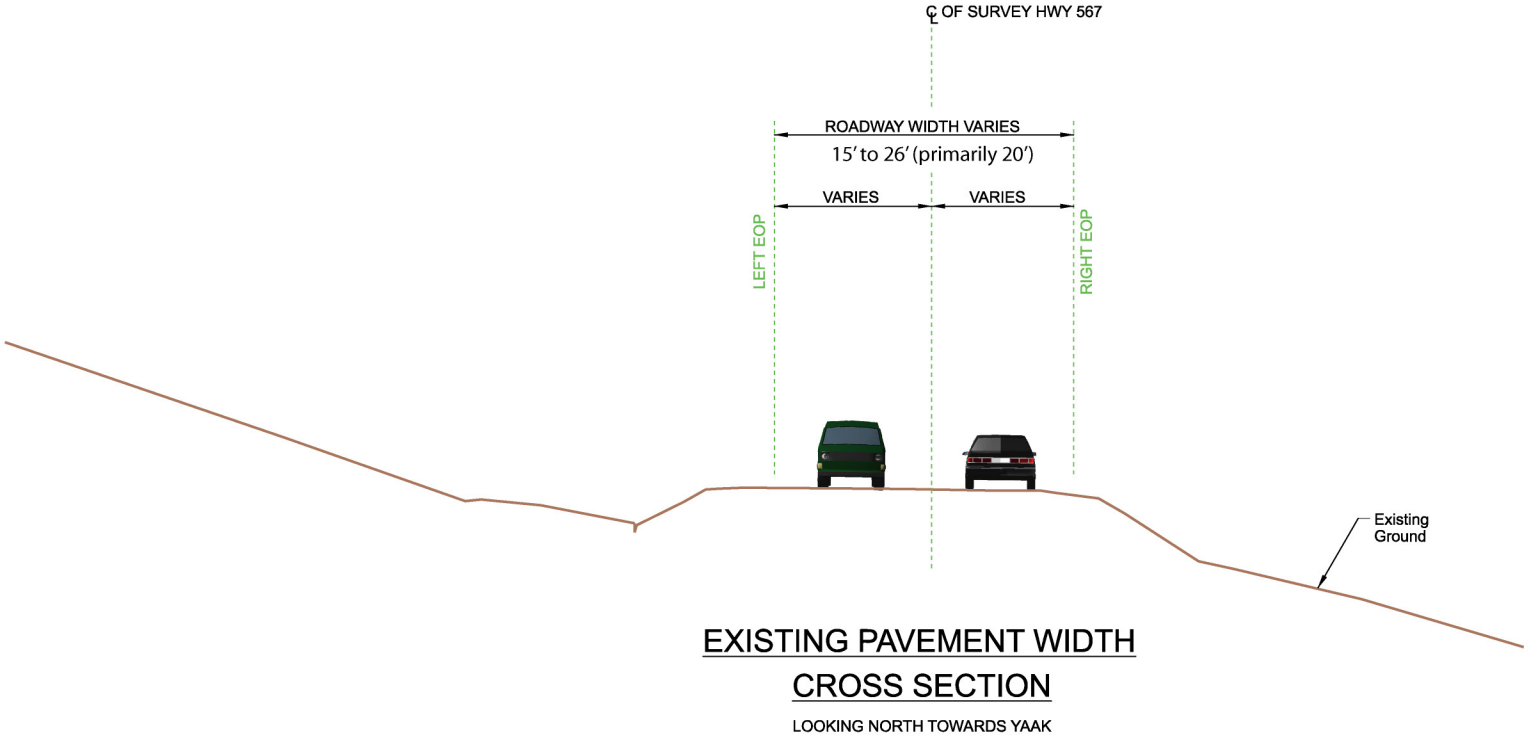


Figure 2

Existing Typical Cross-Section

2.0 Study Objectives and Corridor Needs

The study objectives discussed here were identified at the beginning of the study process. These goals and objectives were further refined and are outlined later in this document to identify high level needs based on findings through the study process, analysis and public and agency input.

Objectives of the study included the following:

- Document existing conditions –roadway and environmental
- Project future growth
- Identify corridor issues
- Develop corridor goals and possible improvement options
- Analyze future transportation improvements based on impacts, constructability, public acceptance, and financial feasibility
- Recommend improvement options and management strategies for long-term safety and operation of the corridor

The needs and additional objectives for the corridor identified during the study process are:

- Improve safety conditions and decrease accidents
  - Improve geometric elements
  - Address inconsistent roadway widths
  - Improve winter driving and maintenance conditions

- Minimize impacts to the threatened and endangered species
  - Maintain existing wildlife linkage zones

- Maintain character of corridor (mountain roadway)
  - Balance the needs of all users (residents, emergency responders, logging, truckers, recreational)
  - Provide a roadway that is an asset to Libby and Yaak

This study has identified corridor problems and potential solutions and has developed a recommended implementation option to address the problems which currently exist in the Hwy 567 corridor. Public and agency coordination has been an important part of this study.

3.0 Existing Roadway and Drainage Characteristics

3.1 Highway 567 Roadway Users

The primary users of Hwy 567 are the local land owners along Pipe Creek, Yaak residents commuting to Libby, logging trucks, and recreational users accessing Turner Mountain Ski Resort and other Forest Service owned lands. The road is used year around for recreation. Generally, during the non-winter months, campers, bikers, hikers, and hunters travel the road. During the winter months skiers, snowmobile riders, snow-shoe hikers, and those involved in other types of recreation travel the road.

Hwy 567 is a transportation link between Yaak and Libby. The road is the most direct route for emergency services to access Yaak from Libby. There is an additional access along Hwy 508, west of Libby. The difference in distance between the two routes is 21 miles and the Hwy 508 route takes only slightly longer to travel depending on weather conditions. During winter months especially Hwy 567 as an emergency response route between Yaak and Libby can be challenging. Consequently, emergency vehicles will sometimes access Yaak

from Troy if an incident is in or near the Turner Mountain Ski area or when Hwy 567 is not maintained North of Turner Mountain Ski Area. [1]

3.2 Existing Traffic

In 2004, approximately 160 vehicles per day traveled Hwy 567. This traffic volume does not exceed the current capacity of the roadway. A typical two lane secondary type roadway has the capacity of approximately 12,000 vehicles per day. However, given the terrain and variable roadway widths, and character of the existing roadway, a more realistic capacity for Hwy 567 would be approximately 4,000 to 5,000 vehicles per day. The corridor does not currently experience delays or congestion during the peak travel periods. Therefore, Hwy 567 does not require additional capacity.

3.3 Right of Way and Jurisdiction

The existing road is located mostly on Forest Service property, with a few sections of the roadway located on private property. Approximately 83 percent of the land within a 5-mile radius of the study corridor is under USFS ownership. Plum Creek Timber Company has holdings of about 12 percent while smaller private tracts occur in small clusters immediately adjacent to the roadway. Portions of Hwy 567 are currently located within a Forest Service easement, which is on average 20 meters (66 feet) wide. Property ownership is shown in Volume II: Roadway Inventory Drawings. Current maintenance of the roadway within the study area is provided by the Forest Service although Lincoln County plows snow through the winter time.

3.4 Physical Characteristics

Hwy 567 was originally constructed as a logging road with a gravel surface. The road is currently paved with two lanes. Sections of the roadway are narrow and curves on the road are sharp and do not meet the 70 kph (45 mph) design standard. The roadway has a number of locations with substandard stopping sight distances which make driving hazardous, especially during winter months. Photographs of the study corridor are located in Appendix A, as well as within the Preliminary Geotechnical Corridor Study Report in Appendix B.

Over time the Forest Service has improved the road with bituminous surface treatments, asphalt and chip seal overlays. Some sections of the pavement are failing and some sections of the shoulders are sloughing off. Sections of guardrail are damaged and have fallen over. A pavement conditions report for the study area has recommended major rehabilitation of the driving surface given the existing poor road conditions.

Hwy 567 follows the course of Pipe Creek. Pipe Creek crosses under the road at various points along the corridor. The terrain is heavily forested on both sides of the road and the terrain varies from gently rolling to mountainous. A few big cuts and fills occur where the road approaches Pipe Creek. Forest Service roads that provide access to recreational and logging areas intersect Pipe Creek Road at various locations along the corridor.

3.5 Design Standards

Table 1 lists the existing geometry criteria evaluated for the Libby North Corridor, these criteria are ones used generally for rural collector roads. The criterions were used to evaluate whether the road meets current design standards.

[1] Source: Personal Communication between Mark McGill, Lincoln County EMS and Lani Eggertsen-Goff, PB, September 2007.

Table 1 - Existing Geometrics Evaluation Criteria

Design Element			Manual Section	Design Criteria
Design Controls	Design Forecast Year		8.4	2030
	Design Speed	Mountainous	8.3	45 mph (70km/h)
	Level of Service		8.4	B
Roadway Elements	Design Year Traffic	Current AADT	N/A	350
		DHV		44
	Roadway Width (Travel Lanes & Shoulders)		11.2	28 ft (8.4 m)
	Cross Slope	Travel Lane	11.2	2%
		Shoulder		2%
	Median Width		11.3	N/A
Earth Cut Section	Inslope		11.4	4:1 (6.0 ft - 2.0 m)
	Ditch	Width	11.4	10 ft (3.0 m)
		Slope		20:1
	Back Slope; Cut Depth at Slope Stake	0'-5' (0-1.5m)	11.4	5:1
		5' - 10' (1.5m - 3.0m)		3:1
		10' - 15' (3.0m - 4.5m)		2:1
		15' - 20' (4.5m - 6.0m)		1.5:1
		> 20' (6.0m)		1.5:1
Earth Fill Slopes	Fill Height at Slope Stake	0'-10' (0-3.0)	11.4	4:1
		10' - 20' (3.0m - 6.0m)		3:1
		20' - 30' (6.0m - 9.0m)		3:1
		> 30'(9.0m)		2:1
Alignment Elements	DESIGN SPEED		N/A	45 mph (70km/h)
	Stopping Sight Distance		8.6	360 ft (105m)
	Passing Sight Distance		8.6	1625 ft (490m)
	Minimum Radius (e=8.0%)		9.2	590 ft (175m)
	Superelevation Rate		9.3	emax = 8.0%
	Vertical Curvature (k-value)	Crest	10.5	61 (17 metric)
		Sag		79 (23 metric)
	Maximum Grade	Mountainous	10.3	10%
	Minimum Vertical Clearance		10.6	16.5 ft (5.05m)

(1) All Information listed here was taken from Figure 12-5 "Geometric Design Criteria for Rural Collector Roads" Montana Department of Transportation Road Design Manual Chapter 12.

3.6 Roadway Deficiencies

The existing physical and geometric characteristics of Hwy 567 were evaluated for the study area to identify areas that do not meet the following MDT design standards:

- geometric
- sight distance
- horizontal and vertical approach
- roadside/clear zone

This analysis was necessary to identify areas with safety concerns and substandard operations which potentially lead to decreased driver safety and accidents. To identify the substandard areas, an MDT survey file of the roadway was used with Geopak Civil Design software package. A best fit horizontal and vertical alignment was developed relative to the surveyed center of the road. The horizontal and vertical alignments were evaluated based upon the MDT design criteria of a rural collector road. The findings of the analysis are summarized below.

3.6.1 Horizontal Alignment

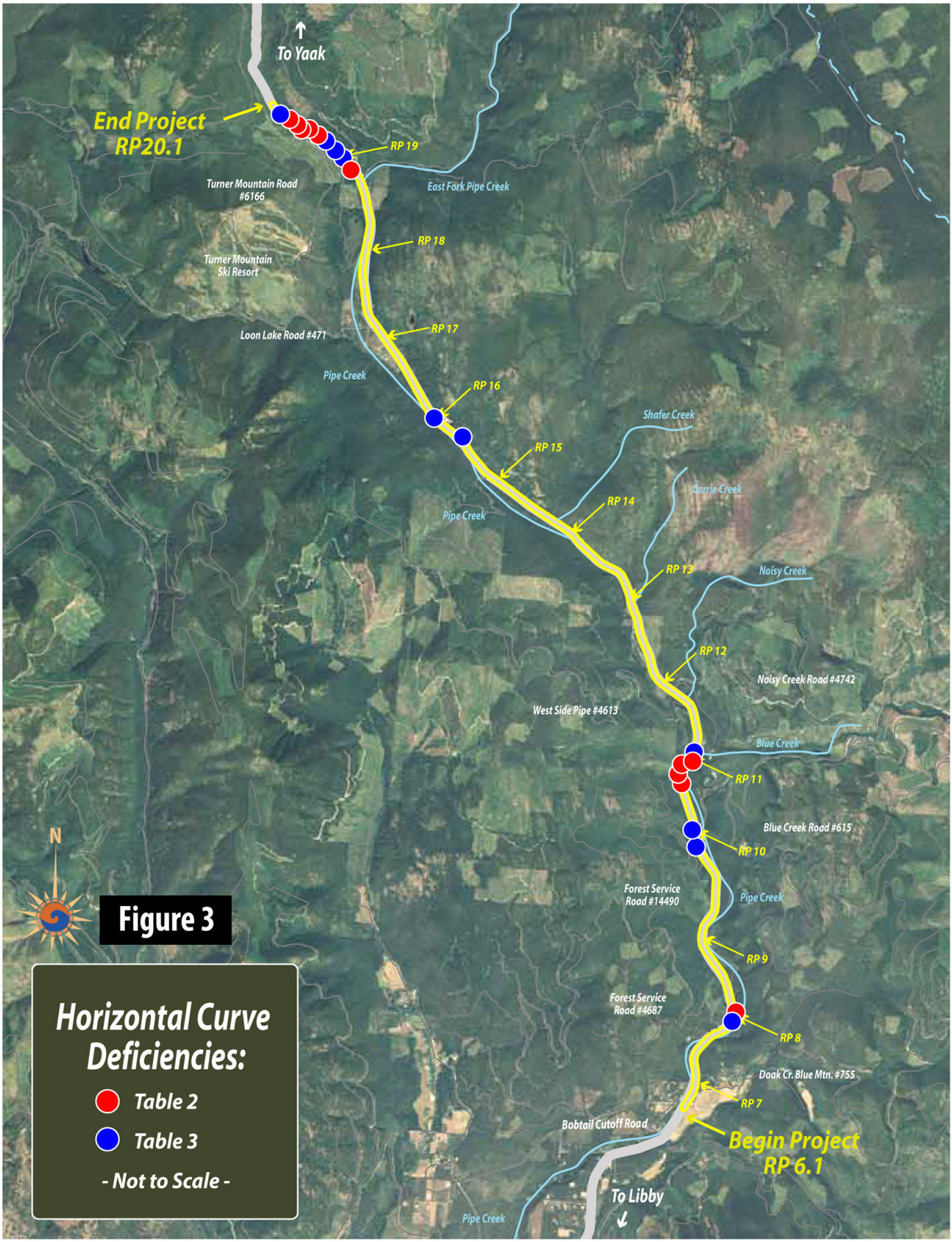
In many areas along the corridor the analysis showed the existing horizontal alignment currently meets MDT design standards. However, in a few locations the horizontal alignment curves did not meet the MDT design standards. The locations and deficiencies are identified in Tables 2 and 3 and Figure 3.

Table 2-- Horizontal Alignment Substandard Curves

Reference Post	Deficiency Description
8	The horizontal curve is too sharp for 70 kph (45 mph). It is acceptable for 60 kph (37 mph)
10.7 and 10.8	Three curves in this section are too sharp for 70 kph (45 mph). They are acceptable for 60 kph (37 mph).
11.0	The horizontal curve is too sharp for 70 kph (45 mph). It is acceptable for 50 kph (30 mph).
19.1	The horizontal curve is too sharp for 70 kph (45 mph). It is acceptable for 60 kph (37 mph)
19.5 to 19.9	A series of curves in this section are too sharp for 70 kph (45 mph). They are acceptable for 40 kph (25 mph), with the sharpest acceptable for 30 kph (20 mph),

Table 3 – Horizontal Alignment Substandard Sight Distance

Reference Post	Deficiency Description
8	Insufficient Horizontal Stopping Sight Distance (SSD) for 70 kph (45 mph). SSD is acceptable for 50 kph (30 mph).
9.7	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 60 kph (37 mph).
10	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 60 kph (37 mph).
11	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 40 kph (25 mph).
16	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 60 kph (37 mph).
19.1-19.9	A series of curves in this section has insufficient Horizontal (SSD) for 70 kph (45 mph). The SSD for the majority of these curves is acceptable for 60 kph (37 mph) with three having SSDs acceptable for only 40 kph (25 mph).


To Yaak
End Project
RP20.1
RP 19
Turner Mountain Road
#6166
East Fork Pipe Creek
RP 18
Turner Mountain
Ski Resort
RP 17
Loon Lake Road #471
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 3
Horizontal Curve
Deficiencies:
Table 2
Table 3
- Not to Scale -

3.6.2 Clear and Roadside Zone

The deficiencies analysis identified areas with substandard clear zones. The clear zone is the area of the road that a normal driver could use to recover from going off the side of the road. It is typically measured from the outer edge of the traveled way. The deficiencies analysis revealed a number of clear zone issues along this road. A majority of these areas have fill slopes that are too high for the steepness of the slope. MDT design standards recommend that these situations warrant shielding with guardrail. Areas that were identified with clear zone/roadside deficiencies are shown on Figure 4 and in Tables 4, 5 and 6.

Table 4 -- Substandard Clear/Roadside Zones

REFERENCE POST	SIDE OF ROAD	DEFICIENCY	WARRANTS GUARDRAIL
7.8 to 8.1	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.1 to 8.3	Both	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.3 to 8.4	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.5 to 8.6	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.7 to 9.0	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
9.6 to 9.8	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
9.9 to 10.0	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
10.5 to 10.6	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
11.0 to 11.1	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
11.5 to 11.6	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
12.1 to 12.3	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
12.6 to 12.9	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
13.8 to 13.82	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
15.2 to 15.3	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
15.3 to 15.6	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
15.9 to 16.2	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
16.6 to 16.7	Both	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
17.7 to 17.8	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
18.0 to 18.3	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
18.7 to 18.9	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
18.8 to 20.0	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes

Table 5 identifies areas that have cut ditch inslopes steeper than 4:1, and/or steep (greater than 3:1) cut backslopes, non traversable and not obstacle free (areas where tree hazards are too close to the road) start within the clear zone (3.0 meter (10 foot) minimum) of the traveled way.

Table 5 -- Cut Slopes/Ditch Slopes in Clear Zone Location Clear zone is 14 feet for a 4:1 ditch inslope

RP 8.1 to RP 8.2 west side – 2:1 (4:1 standard) ditch inslope used within the clear zone.
RP 8.2 to RP 8.4 both sides –2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 8.6 to RP 8.7 west side–2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 8.8 to RP 9.0 west side –2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 9.4 to RP 9.42 west side –2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 9.6 to RP 9.7 west side–2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 9.9 to RP 10.0 west side-ditch inslope varies from 3:1 to 2:1, and steeper than 3:1 cut backslopes, with tree hazards begins too close to the road.
RP 10.9 to RP 11.1 west side–2:1 or steeper cut backslope with rock hazards begins too close to the road.
RP 13.0 to RP 13.2 east side–2:1 or steeper cut backslope with hazards begins too close to the road.

Table 6 identifies the miscellaneous guardrail problems along the study corridor.

Table 6 -- Miscellaneous Guardrail Problem Locations

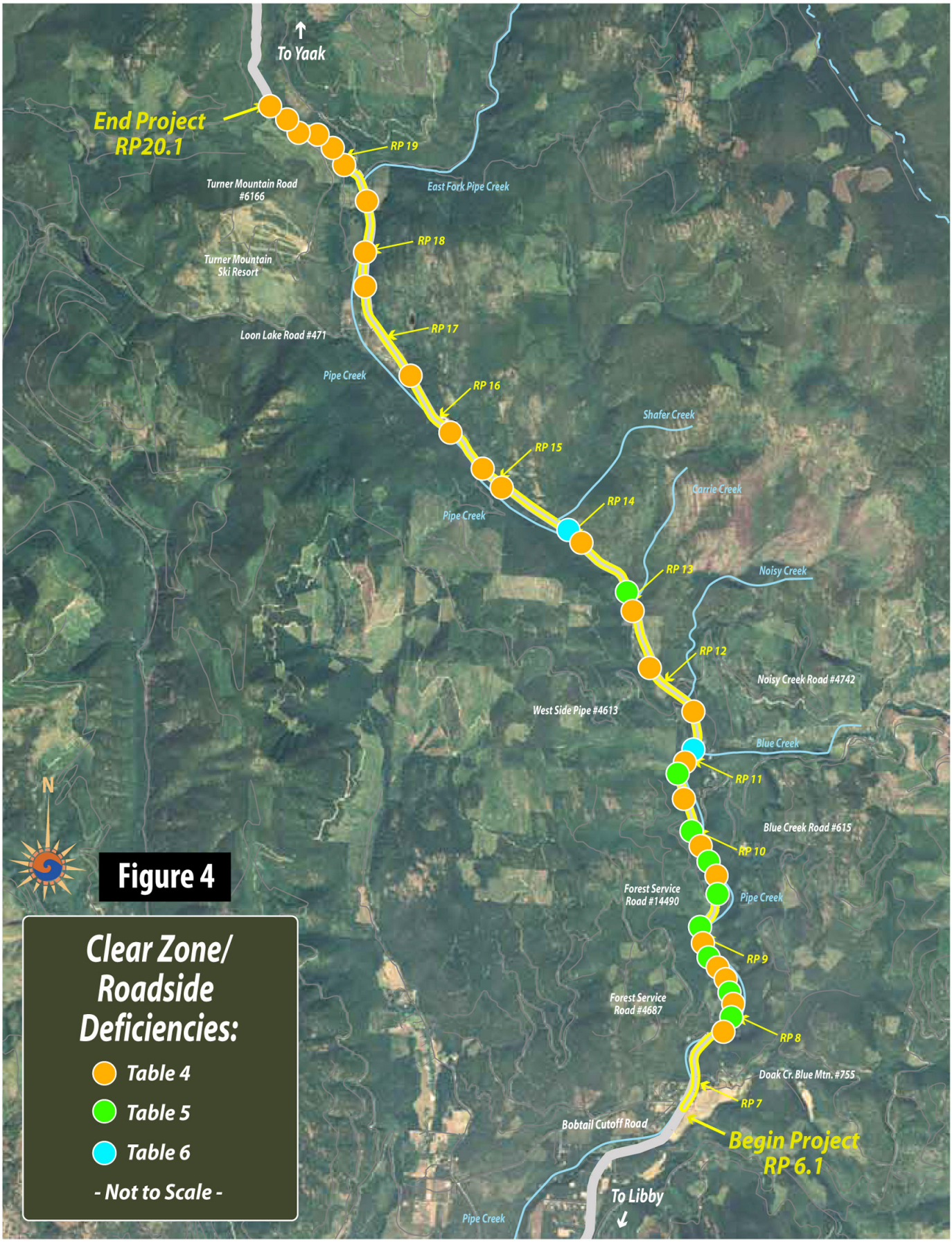
RP 11 – Damaged guardrail will be repaired during MDT Safety Project in 2008
RP 14.2 – Guardrail lengths are inadequate

3.6.3 Vertical Alignment

A best fit vertical alignment showed that most roadway grades are within acceptable limits, but a few vertical curves did not meet 70 kph (45 mph) stopping sight distance requirements. These vertical curves are shown in Table 7. "K" is a rate of vertical curvature used in AASHTO standards to determine the minimum length of a vertical curve for a given design speed and stopping sight distance.

Table 7 -- Vertical Alignment Substandard Curves

Reference Post #	Deficiency Description
RP 8.1	Sag vertical curve has a stopping sight distance (SSD) of 85m should be 105 m (K of 18 should be 23)
RP 8.7	Crest vertical curve has a SSD 85m should be 105m (K of 14 should be 17)
RP 9.7	Sag vertical curve has a SSD of 65m should be 105m (K of 16 should be 23)
RP 10.9	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 12.7	Sag vertical curve has a SSD of 85m should be 105m (K of 18 should be 23)
RP 12.8	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 12.84	Crest vertical curve has a SSD of 85m should be 105m (K of 13 should be 17)
RP 13.0	Crest vertical curve has a SSD of 85m should be 105m (K of 11 should be 17)
RP 14.3	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 14.7	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 15.2	Sag vertical curve has a SSD of 35m should be 105m (K of 7 should be 23)
RP 16.0	Crest vertical curve has a SSD of 50m should be 105m (K of 5 should be 17)
RP 16.1	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 16.14	Crest vertical curve has a SSD of 65m should be 105m (K of 7 should be 17)
RP 16.2	Sag vertical curve has a SSD of 65m should be 105m (K of 14 should be 23)
RP 16.7	Sag vertical curve has a SSD of 85m should be 105m (K of 18 should be 23)
RP 16.73	Crest vertical curve has a SSD of 50m should be 105m (K of 6 should be 17)
RP 18.3	Crest vertical curve has a SSD of 85m should be 105m (K of 12 should be 17)
RP 18.4	Crest vertical curve has a SSD of 50m should be 105m (K of 4 should be 17)
RP 18.48	Sag vertical curve has a SSD of 65m should be 105m (K of 14 should be 23)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Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 4
Clear Zone/
Roadside
Deficiencies:
Table 4
Table 5
Table 6
- Not to Scale -

3.6.4 Pavement Width

An analysis of the existing pavement widths showed that most of the alignment has an average width of 6.1 meters (20 feet), which is substandard for a rural collector. The width of a 10 foot lane width only allows for two ten foot lanes with no shoulders, unless the pavement width is greater than 20 feet. The actual pavement width varies between 15 feet in a few sections of the corridor and is as wide as 26 feet in some sections.

3.7 Geotechnical

A preliminary geotechnical field review was performed to determine the geotechnical issues along the corridor. Segments of the current alignment encroach on Pipe Creek, and in several areas this encroachment is accompanied by steep cut slopes on the opposite side of the roadway. Some of these cut slopes are in glacial till while others are in the steeply dipping bedrock. Any reconstruction design will need to address the slope stability issues in both the glacial till and rock cut slopes, and rockfall issues in the rock cut slopes. The glacial till slopes are subject to surface erosion and surface slope failure especially during spring break-up. The rock cut slopes are subject to failure when the existing bedding planes and joint patterns are undercut during construction.

Any reconstruction/realignment at RP 11 should be designed to mitigate the rockfall hazard at this location. Any rock cuts that will create a new rockfall should be designed with adequate catchment in the ditch and any other measures required to stabilize the slope (i.e. rock bolts, slope mesh, etc.). A detailed subsurface investigation will be required to design the geotechnical features of this corridor if it becomes a construction project.

The existing roadway from approximately RP 18.4 to 19.5 is located on a steep grade, has steep cuts and fills and is very curvy with short turn radiuses. The use of retaining walls in both cut and fill areas may be needed if reconstruction is proposed to meet current design standards. Slope stability analysis is needed for cut and fill areas and the retaining walls in this section of roadway. A more detailed analysis can be found in Appendix B.

3.8 Drainage

The study area is located within the Pipe Creek drainage. The drainage has a number of creeks and tributaries. Pipe Creek is the largest stream in the drainage with Noisy Creek, Schafer Creek, and East Pipe Creek as tributaries to Pipe Creek. Run off from Hwy 567 currently goes into the adjacent streams.

3.9 Hydraulic Structures

An analysis of the capacity of the existing culverts and bridges was performed for Pipe Creek and other drainage crossings to determine potential areas of concern for flooding. A hydrologic analysis of the streams was not performed. Federal Emergency Management Administration (FEMA) has mapped flood zones of "type A (Areas of 100-year flood; base flood elevations and flood hazard factors not determined" [2] all along Pipecreek within the study corridor. These flood zones often intersect or are in very close proximity to the existing Hwy 567. At locations where the roadway crosses or intersects flood zones all applicable State and Federal regulations that apply to these flood zones would be complied with in the event any construction or rehabilitation of the roadway occurs within flood zones.

However, based on a lack of historical flooding events, and the sizes of the existing channel, the presumption is that the existing culverts and bridges are adequately sized to accommodate flows in Pipe Creek and other drainage crossings. A stream hydrologic analysis would be recommended if a project is identified in the corridor. An appropriate hydraulic study will be completed if a project is implemented within the Libby North Corridor area. Table 8 below shows the location, structure and capacity of the culverts and bridges.

The bridge located at RP 7.4, called the Timberlane Bridge, was inventoried by the US Forest Service and several deficiencies were identified. The recommended work shown in the Routine Road Bridge Inspection Report for the Timberlane Bridge in Appendix G would address the deficiencies identified and would cost less

[2] U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Rate Map, Lincoln County, Montana Panels 500, 525, 610 and 650.

than $30,000. The deficiencies identified are mainly cosmetic. The bridge is not functionally obsolete or structurally deficient.[3]

3.10 Crash Analysis

To gain a better understanding of the existing road conditions, a review of MDT crash data for the corridor was performed as part of this study. In addition to reviewing crash data, interviews were conducted to ask about non-reported accidents and problem areas. Five people were interviewed for the analysis (see Table 10). These people had first hand knowledge of the accident concerns on the corridor.

3.10.1 MDT Crash Analysis

The MDT Crash Data indicated there were 26 crashes from January 1, 1995 to March 31, 2006. As shown in Figure 5, 11 of the 26 accidents are clustered between RP 6.1 and RP 8.0. Average crash rates and severity index for the state and the study area are listed in Table 9. The average daily traffic volume from January 1, 1995 to December 31, 2004 was 157 vehicles.

Table 8 - Libby-Major Hydraulic Structures (larger than 24"CMP *)

Reference Post	Description	Drainage Crossed	Diameter (mm)	Upstream Invert (m)	Downstream Invert (m)	Length (m)	Slope (%)	Capacity (m3/s)	Capacity (cfs)
7.60	Bridge	Pipe Creek							
9.10	39" CMP Culvert	Road Drainage	990	824.122	821.963	19.689	10.97%	4.19	148.0
9.80	46" CMP Culvert	Road Drainage	1170	829.405	828.71	17.225	4.03%	3.96	139.8
9.90	33" CMP Culvert	Road Drainage	840	832.075	831.471	17.245	3.50%	1.53	54.0
10.70	36" CMP Culvert	Unknown	915	845.013	843.986	16.219	6.33%	2.58	91.1
11.80	Pipe Arch	Pipe Creek							
12.90	48" CMP Culvert	Carrier Creek	1220	887.487	887.037	12.328	3.65%	4.22	149.0
14.20	168" CMP Culvert	Shafer Creek	4270	900.077	899.72	17.459	2.04%	89.01	3143.4
15.20	36" CMP Culvert	Road Drainage	915	908.582	908.113	11.637	4.03%	2.06	72.7
16.70	36" CMP Culvert	Road Drainage	915	934.411	933.853	17.137	3.26%	1.85	65.3
18.80	129"CMP Culvert	East Fork Pipe Creek	3275	957.728	957.276	36.541	1.24%	34.21	1208.1
18.85	48" CMP Culvert	Road Drainage	1220	962.271	961.837	14.05	3.09%	3.88	137.0
18.86	150" CMP Culvert	Pipe Creek	3810	961.588	960.609	18.152	5.39%	106.77	3770.5
19.80	42" CMP Culvert	Road Drainage	1065	1034.006	1029.709	28.494	15.08%	5.97	210.8

* CMP = Corrigated Metal Pipe type culvert

Table 9 -- MDT Crash Data

STATEWIDE AVERAGE	RURAL STATE SECONDARY SYSTEM (Jan '95 – Dec '04)	STUDY AREA (Jan '95 – Dec '04)	STUDY AREA (Jan '05 – Mar '06)	STUDY AREA (Jan '95 – Mar '06)
All Vehicles Accident Rate	1.68	2.86		
All Vehicles Severity Index	2.39	2.91		
All Vehicles Severity Rate	4.02	8.32		
Total Recorded Accidents	**-**	**23**	**3**	**26**

[3] Personal communication between Wayne Noem, Secondary Roads Engineer, MDT and Lani Eggertsen-Goff, PB, October 9, 2007.

The following statistics and observations were obtained from MDT for the period January 1, 1995 through December 31, 2004.

Variations from Average Occurrence:

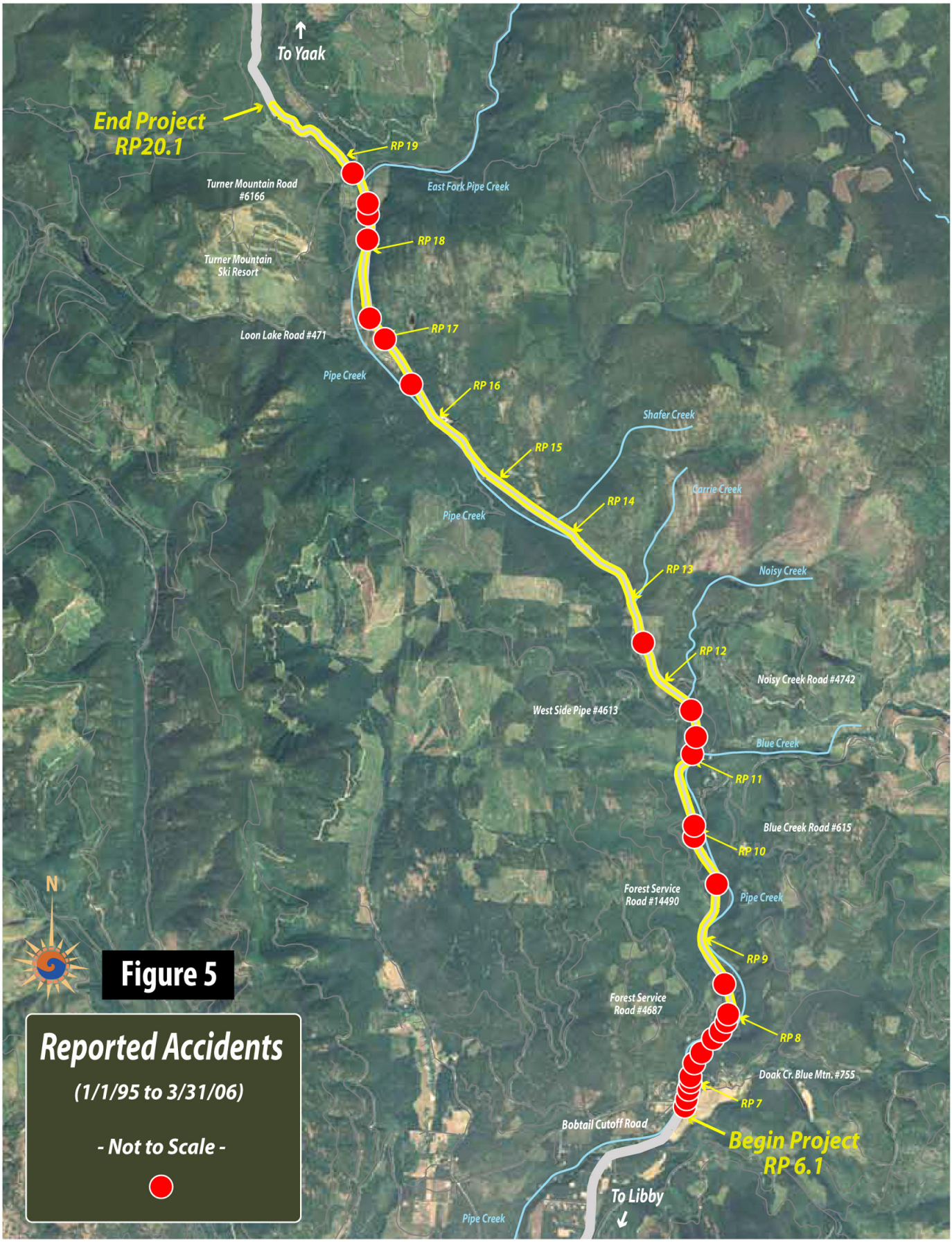
- 43.5% icy road conditions vs. 15.2% statewide average for rural state secondary
- 65.2% cloudy weather conditions vs. 32% statewide average for rural state secondary
- 17.4% snowy weather conditions vs. 6.7% statewide average for rural state secondary

The overall trend for this section of state secondary is loss of control on a curve, usually during snow/slush or icy roadway conditions. The snowy and icy conditions aggravate issues associated with a non-standard roadway alignment and width. Most of these crashes are single vehicle crashes and result in a collision with a roadside object or another vehicle. Also note that over 52% of the crashes in this section occurred at night.

3.10.1.1 Crash Summary

The following highlights the findings of the MDT Crash Analysis:

- Exceeding the speed limit or traveling too fast for the conditions attributed to almost half of the crashes on this road.
- Alcohol played a role in two of the 2005 crashes and a wild animal was involved in only one crash over the 11 year period.
- Eight (8) crashes involved a tree. Four (4) crashes involved a vehicle overturning with 3 of the 4 vehicles classified as small pickups.
- There were no reported fatalities on this road during the analysis years.
- Four (4) crashes occurred between reference posts 7.7 and 8.0. All of these crashes involved a single vehicle. These crashes were the result of inattentive driving and/or alcohol. Three (3) of these 4 crashes involved a tree and the remaining crash resulted in an overturned vehicle.
- There were two (2) crashes between reference posts 10.0 and 10.1. One of these crashes involved a northbound vehicle overturning on the east shoulder. This accident occurred at reference post 10.0. It is unclear if this one crash would warrant a barrier along the east shoulder. The other crash at this area involved a southbound vehicle running onto the embankment on the West.
- There were three (3) crashes between reference posts 11.0 and 11.4. All of these crashes involved southbound vehicles crossing the opposing lane and crashed into the East guardrail or overturned on the East shoulder. All of these crashes occurred during icy weather and two of these crashes involved vehicles traveling at speeds to fast for the conditions.
- Three (3) crashes occurred between reference posts 16.4 and 17.3. Two of these crashes involved an inattentive driver. Both vehicles were southbound and both vehicles hit a tree on the east shoulder. Both crashes occurred during clear weather. Loose gravel in the road contributed to one of these crashes. The other crash was a rear end collision during icy conditions.
- Four (4) crashes occurred between reference posts 18.20 and 18.80. All of these crashes involved a northbound vehicle and all involved snowy or rainy conditions. Excessive speed or inattentive driving contributed to three of the four crashes in this area.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RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 5
Reported Accidents
(1/1/95 to 3/31/06)
- Not to Scale -

3.10.2 Summary of Crash Analysis Interviews

Questions asked during interviews and the answers provided from the five individuals that were interviewed are described in Table 10. The information received from these five interviews was not sufficient to draw any solid conclusions, but the information from these frequent roadway users gave opinions of the road. More technical data and analysis follows in this document in later sections. In general, most of the respondents indicated that RP 11 is a dangerous curve and winter travel time is more hazardous because of snow pack and ice. Most of the comments indicated that many accidents go unreported and no specific location for collision with wildlife was identified.

Table 10 -- Summary of Crash Interviews

Affiliation	How often do you drive the corridor?	Have you witnessed an accident on the corridor?	Are you aware of specific problem areas for accidents?	Winter time travel?	Wildlife involved accidents?	Frequency of non-reported accidents?	Alcohol related accidents?	Additional comments
Lincoln County Emergency Services	Weekly	Lots of rollovers and slide offs. The last fatality was three years ago.*	RP 11	Witnessed more accidents during winter. Increased traffic has resulted in more accidents.	Wildlife strikes occur along the roadway but not aware of a specific problem area.	Happens frequently. Locals will help pull vehicles back onto the road. EMS once responded to a roll over empty vehicle; the driver had walked away and left the scene.	Most of the accidents involve alcohol.	Improved emergency response access and response time would be a benefit to the corridor. Winter travel conditions make emergency response slower and more risky.
Lincoln County Roads	Weekly	Witnessed and helped on slide offs. Never seen a fatality.	RP 11. Problems with narrow roadway, sharp curve.	Witnessed more accidents during winter. Often deep snow, freezing rain on roadway creates dangerous travel.	Not aware of a specific areas where wildlife strikes occur at a higher frequency. Wildlife is everywhere along the corridor.	Most slide offs are handled by the locals and are not reported.	Not familiar with alcohol related accidents but could see that it could be a problem.	Pipe creek is a major road. Because it is a narrow road there are problems with getting snow off the road. Needed improvements include more areas for snow storage. The road cannot be plowed with a truck, too dangerous.

Table 10 -- Summary of Crash Interviews

Affiliation	How often do you drive the corridor?	Have you witnessed an accident on the corridor?	Are you aware of specific problem areas for accidents?	Winter time travel?	Wildlife involved accidents?	Frequency of non-reported accidents?	Alcohol related accidents?	Additional comments
Montana Highway Patrol	Frequently	Not a high accident roadway. He has witnessed slide offs but no fatalities.	No comment given.	Icy conditions have resulted in vehicle loss of control. Vehicles often slide off.	No comment given.	This happens often. The driver is DUI or has no insurance and their family and friends help them out. Wildlife strikes are often cleaned up by locals before MHP comes across the accident.	Alcohol related accidents have not been a problem. The clientele at the Red Dog is not a rowdy crowd.	This is a safe road to travel. The roadway forces drivers to go slow. Need guardrail in areas with steep drop offs.
Comm. Truck Driver/Pipe Creek Land Owner	Daily	Never witnessed a serious accident. Seen many slide offs.	RP 11. Problems with sharp curve, falling rock, narrow roadway.	Witnessed more accidents during winter. Problems include narrow roadway, poor visibility, downed trees on roadway.	Not aware of a specific area where wildlife strike occur.	Majority of accidents not reported. Locals respond with assistance.	Alcohol related accidents are not a major problem.	Narrow roadway and poor road bed makes it hard for commercial trucks. Make the road so people can pass safely.
Forest Service Road Maint.	Monthly	Never witnessed an accident but has seen evidences of crashes.	RP 11. Has heard of several accidents and fatalities*.	Winter travel is problematic. Snow packed roads, freezing rain, narrow roadway. Increased traffic on Pipe Creek is making travel more risky.	Aware that wildlife strikes happen but not familiar with how often or location.	Not aware of frequency of non reported accidents.	No first hand knowledge or experience but he can imagine that alcohol has some factor in many of the accidents.	Clean trees away from roadway. Widening is needed for better snow removal.

* There have been no reported fatalities. These are undocumented personal accounts.

4.0 Environmental Conditions

4.1 Environmental Setting

This study corridor is located on a section of Hwy 567 that is heavily forested. Pipe Creek runs adjacent to the roadway through part of the study limits. This area is known for its wildlife habitat and natural beauty. To better understand the biological resources within the corridor a preliminary biological resources investigation was performed. In addition to biological resources, analysis was done of existing socio-economic data and included in the investigation report. The following sections summarize the environmental conditions of the corridor.

4.2 Demographics

According to the U.S. Census and Montana Department of Commerce in 1970 Lincoln County had a population of 18,000 residents. In 2005 Lincoln County population had grown to 19,193 residents. In 2030 the population of Lincoln County is projected to reach 22,850. In 1980 in Lincoln County there were 7,018 households. By 2004 approximately 9,300 households were located in Lincoln County. The number of households in Lincoln County in 2030 is projected to be approximately 10,000. [4] [5] According to the Montana Bureau of Economic Analysis,[6] Lincoln County had 7,539 jobs in 1969 and in 2004 the number of jobs had risen to 8,908. In 2030 the number of jobs in Lincoln County is projected to be approximately 10,000 jobs. The average income per household in Lincoln County in 2030 is projected to be $62,195.

Exhibits A-C – Demographics

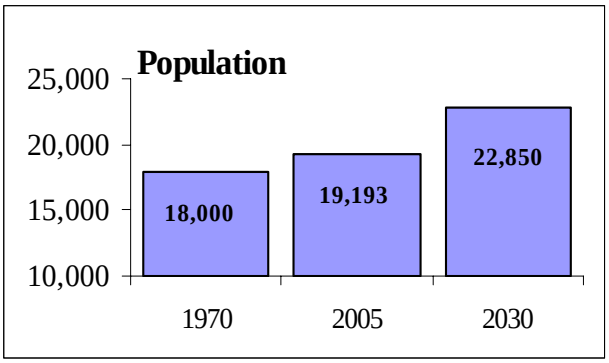

Exhibit A: Lincoln County Population

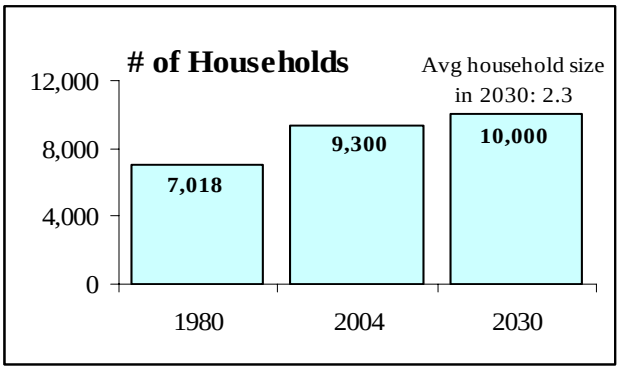

Exhibit B: Number of Households in Lincoln County

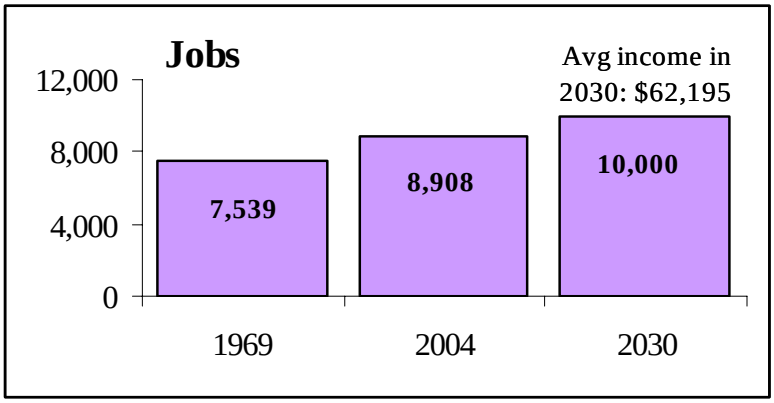

Exhibit C: Lincoln County Employment

[4] US Census Bureau, http://factfinder.census.gov/home/saff/main.html?_lang=en
[5] State of Montana, Department of Commerce, http://www.ceic.mt.gov
[6] http://www.bber.umt.edu/content/?x=1069

In 2004, the top 10 private employers in Lincoln County were identified as the following:

- Genesis Inc.
- Harlow's School Bus Service
- Libby Care Center
- McDonalds (Libby)
- Mountain View Manor
- Owens and Hurst Lumber
- Plum Creek Timber
- Rosauer's Supermarkets
- St John's Lutheran Hospital
- Stein's IGA

Of the above mentioned employers, all but Plum Creek Timber are located outside the Hwy 567 study area, i.e., the one company that owns land in the study area is Plum Creek Timber Company. This company maintains a logging business with an office located in the City of Libby and uses Hwy 567 to access their property and logging areas along the study corridor.

The City of Libby has slightly different trends in population, employment and number of households than Lincoln County trends. The 2006 census lists a population of 2,662, down from the population in 1973 of 3,205. Projections for the year 2030 for cities are not available.[7] The year 2000 statistics list 1,061 employed and 601 single-family owner-occupied homes within the City of Libby.[8]

4.3 Development

Lincoln County does not have land use planning or zoning in the Hwy 567 area. The County allows residential developments, which are required to have a minimum of one acre and septic approval. Developments are subject to State regulations regarding water availability and septic tank suitability. According to Lincoln County, a large scale public waste water handling system or public water system is not proposed or expected in the near future for the Pipe Creek area. Therefore, future residential developments would continue to be large lots with septic tanks and private water systems. With the majority of the private land holdings in the corridor (except Plum Creek) having been developed or in the process of being developed, additional residential development is limited.

Some residential development is possible mostly on land controlled by Plum Creek Timber Company, estimated to own approximately 12 percent of the land within a 5-mile radius of the corridor. According to Lincoln County, the Timber Company has recently expressed interest in subdividing some of their property into residential lots and plans to sell these lots to individual owners.

The County is currently evaluating the planning and zoning regulations and will decide sometime in 2008 the next steps for a "Growth Policy" for the County. According to the County, this policy will identify areas of planned future growth. In areas where services are limited the amount of expected growth would be minimal.

4.4 U.S. Forest Service Land

The U.S. Forest Service is responsible for the public lands planning and administration in the study area. Recreational facilities and forest management are subject to Forest Service regulations. The Kootenai National Forest is currently revising the Forest Management Plan. The Forest Management Plan determines the allowable uses on Forest Service owned property and guides the Forest Service's future decisions with respect to allowable uses, habitat conservation, recreation, and economic use of the forest resources.

The draft land management plan identifies the Pipe Creek area as General Forest Use. The Turner Ski area is located on FS lands, and operated by KWS. This land is owned by the U.S. Forest Service and managed as a

[7] http://ceic.commerce.state.mt.us/PL2000_place.asp
[8] http://factfinder.census.gov/home/saff/main.html?_lang=en

Primary Recreation Area. An area of the forest located to the east of Hwy 567 is planned for winter motorized snowmobile use.

The U.S. Forest Service has identified certain habitat and wildlife that warrant protection. This includes the Bull Trout, Canada lynx, Gray wolf, and Grizzly Bear and other sensitive or endangered species. Directly north of the study area, is the designated Cabinet Yaak Grizzly Bear Recover Zone. The study area is not located in the Grizzly Bear Recovery Zone but is located in the Grizzly Bear Distribution Area. The U.S. Fish Wildlife Service, the U.S. Forest Service and other agencies originally proposed the Cabinet Yaak Grizzly Bear Recovery Zone when Grizzly Bears were first listed as a threatened species. This zone is intended to facilitate the recovery of Grizzly Bears. Land management policies in the recovery zone are required to fully comply with the recovery of Grizzly Bears. The Grizzly Bear distribution area is also considered occupied bear habitat. For further discussion regarding implications of the Cabinet Yaak Grizzly Bear Recovery Zone and distribution area, refer to Section 4.10.1 Grizzly Bear.

4.5 Recreation

4.5.1 Existing Recreational Facilities

The U.S. Forest Service has a number of recreational facilities in the Pipe Creek area. During the summer months, a number of facilities provide opportunities for hiking, biking, fishing, equestrian use, camping, and hunting while the winter months allow for skiing at Turner Mountain, snowmobiling, and cross country skiing. The existing recreational facilities that can be accessed by using Hwy 567 are identified in Table 11. These recreation facilities are also considered potential Section 4(f) resources. Many of the trails are illustrated on Sheet 3 in Volume II.

Table 11 - Existing Recreational Facilities and Potential Section 4(f) Resources

Type	Name	Use	Season
Trails	Flat Iron Summit Trail	Cross Country Skiing	Winter
	Rainbow Ridge Trail	Cross Country Skiing	Winter
	East Fork Pipe Creek Loop	Snowmobile	Winter
	Quartz Creek Trail	Snowmobile	Winter
	Timberlane Trail	Cross Country Skiing	Winter
	Flat Iron Mountain Trail	Hiking, Equestrian, Biking	Spring/Summer/Fall
	Purcell Trail #7	Hiking, Equestrian, Biking	Spring/Summer/Fall
	Upper Pipe Trail #225	Hiking, Equestrian, Biking	Spring/Summer/Fall
	Schafer Creek Trail	Hiking, Equestrian, Biking	Spring/Summer/Fall
	Noisy Creek Trail	Hiking, Equestrian, Biking	Spring/Summer/Fall
Camping	Loon Lake Campground	Overnight Camping	Spring/Summer/Fall
	Timberlane Campground	Overnight Camping	Spring/Summer/Fall
	Big Creek Baldy Lookout	Overnight Camping	Spring/Summer/Fall
Ski Resort	Turner Mountain Resort	Downhill Skiing	Winter

4.5.2 Planned Recreational Facilities

At this time, the Forest Service and local government are not planning to expand the recreational facilities in the Pipe Creek area. The Turner Mountain ski area is not expected to expand. A resort community is not expected as part of the Turner Mountain ski area.

4.5.3 Special Events

In addition to the normal events that might occur in the Kootenai National Forest, two local community biking events occur every summer – the STOKER bicycle tour of the Libby area; and the Turner Burner, which is a mountain biking race at Turner Mountain Ski Resort. The STOKER tour is a 98-mile, 350 participant tour which uses Pipe Creek road between Libby and Yaak. The Turner Burner is a local down hill mountain bike race.

4.6 Water Quality

Pipe Creek is not a 303(d) listed stream and is therefore in good water quality condition. Maintaining the water quality is a concern for Pipe Creek. The use of Magnesium Chloride for snow melting is unlikely to threaten the water quality in Pipe Creek. The Department of Environmental Quality (DEQ) recommends the use of Magnesium Chloride in place of sodium chloride or sand for winter road maintenance.[9] Sand is not currently used in winter maintence of Pipe Creek Road. Snow that is removed from the roadway should not be pushed or blown into the creek. The DEQ recommends adherence to MDT's Winter Maintenance Guidelines for the roadway. DEQ also recommends the following:

- Bridges should not allow sanding material to drop through the deck and go directly into the creek
- Use curb and gutter on the bridges to channel runoff away from the bridge and creek. There is already curb and gutter on the existing Pipe Creek bridge (Timberlane Bridge – page 16), and the cost estimates include any repairs the existing curb and gutter require
- Prevent the removal of an excessive number of trees adjacent to the stream which could potentially increase the water temperature in Pipe Creek
- Move Pipe Creek Road away from the creek to avoid roadway runoff and sediments entering the creek
- Use design features on the roadway that will capture runoff and sediment and prevent it from directly entering the creek
- Minimize riparian loss and stabilize side slopes
- Avoid disturbing existing stream banks

4.7 Utilities

Power along Pipe Creek Road is provided by the Flathead Electric Company. Power extends north from Libby to the Timberlane Campground at RP 7.4 which is located about a half mile past the Blue Mountain road intersection with Pipe Creek. The remaining section of the study area is not serviced with power. The power in the lower section is overhead and is mostly located on the north side of the road. The overhead power crosses Pipe Creek at the Timberlane Campground. The utilities that were identified in a survey are illustrated in Volume II. A public waste handling and public drinking water system is not located within the study area. Cabin developments are serviced by wells and septic tanks. Propane is used for heating.

Telephone service along Pipe Creek road is provided by Frontier Communications. In the project area, telephone service is located between Bobtail Cutoff road and the Blue Mountain Road at RP 6.9. Telephone service does not extend further north along the corridor.

4.8 Cultural Resources and Tribes

A cultural resources inventory and evaluation report was completed in January 2004 for a section of the Hwy 567/Pipe Creek study area. This is illustrated on Sheet 3 in Volume II. The evaluation was completed as part of a previous NEPA project that considered reconstructing a section of Hwy 567 between RP 6.1 (Bobtail Cutoff Road) to RP 14.1 (Loon Lake Road). The cultural resource report identified the environmental and cultural setting of Pipe Creek and inventoried twelve historical and cultural resource properties. Of the twelve cultural resource properties, ten properties lie at least partially on Forest Service lands while the remaining two are on private property. Only one of the twelve is eligible for the NRHP (National Registry) and four other properties were determined to be contributing elements. The one eligible property inventoried is the original Pipe Creek Mainline logging road which is only located in a few places since most of the original road was eliminated with the construction of new roads and developments. The study also did not cover the area of Pipe Creek between RP

[9] Personal communication between Robert Ray, Non-point Source Program Manager, MDEQ and Lani Eggertsen-Goff, PB, September 26, 2007.

14 (Loon Lake Road) to RP 20.1 (Turner Mountain Road), which is now part of this current corridor study. Although the northern portion of the corridor was not part of the January 2004 report, a general search of the NRIS database was conducted as part of this corridor study and coordination with the appropriate agencies occurred. No specific sites within the northern portion of the corridor study area were identified. An updated cultural resources survey would need to extend from RP 6.1 (Bobtail Cutoff Road), or the chosen southern terminus of a future proposed project, to RP 20.1 (Turner Mountain Road).

As a NEPA/MEPA requirement, a cultural resources survey will need to be performed with any proposed project along Hwy 567. The area has a number of historic and prehistoric sites. According to the Forest Service, the area is a high priority zone for prehistoric sites. Due to agreements with the Tribes, the area is of special interest to the Confederated Salish and Kootenai Tribes (CSKT). Informal tribal consultation has occurred as part of this study, however, formal consultation with the Tribes would be needed as part of any project along Pipe Creek even though the area is outside of the CSKT reservation.

4.9 General Vegetation

Pipe Creek Road in the study corridor traverses heavily timbered forest land over much of its length. A variety of coniferous forest habitat types are represented in the corridor, with slope, aspect, elevation, proximity to water, and disturbance regime being key variables affecting forest composition. Lodgepole pine *(Pinus contorta)* and Douglas-fir (*Pseudotsuga menziesii*) forest types are common in the corridor, as are mixed species stands of western Larch *(Larix occidentalis)*, Douglas-fir, lodgepole pine, ponderosa pine *(Pinus ponderosa)*, grand fir (*Abies grandis*) and white pine (*Pinus monticola*). Other conifers in the corridor include western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), subalpine fir (*Abies lasiocarpa*), and Engelmann spruce *(Picea engelmannii)*.

Timber harvest in the corridor during the latter half of the previous century has had a significant impact on forest communities both immediately adjacent to the highway and throughout the Pipe Creek watershed. Today, the landscape is a mosaic of undisturbed mature forest and regeneration stands of varying ages and composition. Fire, both natural and prescribed, has also played a role in determining forest composition in the corridor over time.

Roadside ditches and cut slopes immediately adjacent to the roadway are generally well vegetated with such grass species as timothy *(Phleum pratense)*, smooth brome *(Bromus inermis)*, orchard grass *(Dactylis glomerata)*, and Kentucky bluegrass (*Poa pratensis*). The primary weedy species noted in disturbed roadside areas during the field reconnaissance include spotted knapweed (*Centaurea maculosa)*, and common tansy (*Tanacetum vulgare)*. Other common herbaceous and woody species noted in the corridor adjacent to the highway include: Oregon grape (*Berberis repens*), kinnikinik (*Arctostaphylos uva-ursi*), pine grass (*Calamagrostis rubescens*), thimbleberry (*Rubus parviflorus*), snowberry (*Symphoricarpos albus)*, serviceberry *(Amelanchier alnifolia)*, chokecherry (*Prunus virginiana*), ninebark (*Physocarpus malvaceus*), woods rose *(Rosa woodsii)*, and ceanothus (*Ceanothis velutinus*). Riparian and wetland species noted on site are discussed later in this study, as are sensitive species known to occur in the corridor.

4.10 Wildlife

Of the 108 mammal species known for the state, 62 are suspected or known to occur in Lincoln County (Foresman 2001). Mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), moose (*Alces alces*), black bear (*Ursus americanus*), mountain lion (*Puma concolor*), American beaver (*Castor Canadensis*), porcupine (*Erethizon dorsatum*), striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), deer mouse (*Peromyscus maniculatus*), bushy-tailed woodrat (*Neotoma cinerea*), red squirrel (*Tamiasciurus hudsonicus*), and meadow vole (*Microtus pennsylvanicus)* are common mammals occupying habitats in the general area and probably occur occasionally within the project corridor. White-tailed deer, moose, red squirrels and chipmunks (*Tamias sp.*) were all observed in habitats immediately adjacent to the roadway during the field reconnaissance, as well as black bear and elk scat. Bushy-tailed woodrat activity was noted underneath the Pipe Creek Bridge just south of the entrance to Timberlane Campground.

4.10.1 Grizzly Bear

The corridor is also located in the designated "Grizzly Bear Habitat Distribution Area", which means the study area is located within known Grizzly Bear habitat. However, the study area is located just outside the designated "Cabinet-Yaak Grizzly Bear Recovery Zone". The Recovery Zone is a large area where Forest land management policies are required to facilitate the restoration of Grizzly Bears. The Recovery and Cabinet-Yaak Grizzly Bear Recovery Zones are illustrated on sheet 3 in Volume II. Grizzly Bear and Bull Trout are threatened species and are protected under Section 7 of the Endangered Species Act. Other protected wildlife in the corridor include the lynx, and wolf.

Due to recent litigation and the threatened listing of the Grizzly Bear, a primary concern in making improvements to the Pipe Creek corridor is the potential of having impacts to Grizzly Bears and habitat. The population of Grizzly Bears is declining in the Cabinet-Yaak ecosystem, which has been mostly caused by human indirect and direct impacts. Only 30-40 bears are estimated to remain in the entire Cabinet-Yaak ecosystem. In 2005 a female Grizzly Bear was shot in the Pipe Creek drainage, and a male Grizzly Bear was removed because of management concerns.

Grizzly Bears are threatened and are protected against "take" anywhere they occur. The legal definition of "take" is codified in Section 3 of the Endangered Species Act (ESA); "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Most of these terms are commonly understood. However, the terms "harm" and "harass" have been further defined by United States Fish and Wildlife Service (USFWS) regulations at 50 CFR S.17.3, as follows:

> "Harass means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm means an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation when it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering."

A situation or proposal that may lead to a "take" is not always easy to define. Projects that increase traffic speed or traffic volumes on rural forest roads and that are located in Grizzly Bear territory are likely to cause concerns about possible adverse effects and "take" relative to grizzlies. Consultation with the USFWS will be necessary if it is determined that a proposed project will affect Grizzly Bears or other federally-listed species. If a proposed project is likely to result in adverse effects to listed species, USFWS will issue a biological opinion in which it is determined: 1) whether or not those adverse effects would be likely to jeopardize the continued existence of that species; 2) whether or not any critical habitat would be destroyed or adversely modified; 3) whether "take" of any listed species is anticipated from the project; and 4) what measures must be taken to minimize that amount of "take."

A court case relevant to this Corridor Study is the Revett Silver Company's Rock Creek Mine lawsuit. The 2003 Rock Creek Mine lawsuit involves land that is located in the Cabinet-Yaak ecosystem. The lawsuit focuses on impacts to bears and other protected fish and wildlife. The Court ruled that the population in the Cabinet-Yaak ecosystem is in peril and the USFWS was arbitrary or capricious in determining that the mine would not jeopardize Grizzly Bears or Bull Trout. The litigants argued that the indirect impacts associated with the mine and human activity will deleteriously impact the bear population, a bear population that can not sustain additional loss. The Court agreed and halted the project. In the meantime, the Rock Creek Mine has submitted an approximately $30 million mitigation package that includes enforcement, education, dedication of bear habitat conservation property, and other items. This could change the outcome of the lawsuit and it could be a potential example for future mitigation possibilities. MDT has explored the possibilities of participation in other agency or private party mitigation plans for credit, this was discussed during agency meetings and may be worth further exploration based on interests of MDT and other agencies.

With regards to the Grizzly Bear situation in Pipe Creek, research has shown that the upper areas of the Pipe Creek drainage are included within the home ranges for several Grizzly Bears and the lower areas in the

drainage are not frequently visited by bears. The higher areas for home range are roughly from RP 17 and over to the Yaak. The lower areas are RP 17 and below to RP 6.1.

Improvement projects proposed on Pipe Creek Road that are identified for the areas higher in the drainage could have more impact on bears and result in greater likelihood for a "take" than improvement projects proposed in the lower areas of the Pipe Creek drainage. A full reconstruct and widening of Pipe Creek Road could result in a "take" of Grizzly Bears. On the other hand, a project simply proposing roadway striping on Pipe Creek Road is not likely to be a problem. Spot improvements, depending on the extent and location in the drainage, may be feasible without adverse effects to grizzlies. To receive the best input and direction from USFWS, the improvement options were recommended to be grouped together. The group of improvements will be evaluated with respect to the indirect and direct impacts to bears.

The USFWS will evaluate all the options advanced into projects and determine if Grizzly Bear "take" is likely to occur due to the project. Relevant factors could include, but are not limited to, traffic volumes, vehicle speed, and widening in areas that are sensitive to bears. The process is not black and white but rather would involve discretionary and professional judgment.

4.10.1.1General Conditions of Grizzly Bear

According to data obtained by USFWS, the Grizzly Bear population in the Cabinet-Yaak Mountains is at a high risk of extinction. For Grizzly Bears population size is the most powerful predictor of survivability. Grizzly populations less than 50-100 adults are at a high risk of extinction. The number of bears in the Cabinet-Yaak Mountains is between 30-40 bears. To minimize near term extinction, USFWS recommends adding additional 12 female bears to the Cabinet-Yaak Mountains between 2004 and 2010.

4.10.2 Bull Trout

Threatened Bull Trout reside throughout the Pipe Creek drainage, which provides spawning and rearing habitat for this species. Critical habitat for the Bull Trout was designated in the Pipe Creek drainage last year. Critical habitat designation only applies to private property in this drainage, as USFS and Plum Creek Timber Company properties are exempt from designation as critical habitat for Bull Trout. Approximately four miles of Pipe Creek along the project corridor has been designated as critical habitat. If a proposed project is determined to affect Bull Trout or its habitat, consultation with USFWS is required.

If the proposed project would likely result in adverse effects to listed species (including Bull Trout or Bull Trout critical habitat), then USFWS would issue a biological opinion. The East Fork of Pipe Creek was indicated as the most important tributary of the five or six other tributaries. It was also recommended that the number of stream crossings needs to be identified as part of the study.

4.10.3 Lynx

The Pipe Creek drainage is known habitat for threatened Canada Lynx. Lynx are rarely seen but are known to be in the area. Impacts to Lynx would need to be evaluated for any improvement option proposal advanced into a project.

4.10.4 Wolf

The Cabinet-Yaak Mountains and Pipe Creek area are known habitat for endangered Gray Wolves. The wolf population is on the increase in the area. The Kootenai National Forest biologist indicated that a known wolf pack is currently in the Barron Creek and Blue Creek area which are near the Pipe Creek drainage area. Up to this year wolves have not been spotted in the Pipe Creek drainage but this year a dispersed female wolf has been seen to occupy the Pipe Creek drainage. It has been reported that this wolf may be moving with a male wolf. The dispersed female wolf was recently spotted between Shafer Creek and Noisy Creek in the Pipe Creek drainage. The wolves typically occupy a 250 square mile area. Wolves are spotted using radio collars and flight verification. Impacts to wolves have to be evaluated for projects to move forward.

4.10.5 Wildlife Habitat Linkage Zones

As part of the study, a wildlife habitat linkage analysis was conducted. The results of this analysis were compiled into a separate report which has been included in Appendix D. According to the report, wildlife habitat linkage zones are defined as:

> "The area between larger blocks of habitat where animals can live at certain seasons and where they can find the security they need to successfully move between these larger habitat blocks. Linkage zones are broad areas of seasonal habitat where animals can find food, shelter, and security".[10]

The results of the analysis indicated that there are three potential wildlife habitat linkage zones along Hwy 567. These zones are shown in Figure 6 and are generally described as follows:

- North of the Bobtail Cutoff Road (RP 8) to South of Blue Creek (RP11).
- North of Shafer Creek (RP 14.2) to south of the Seventeen Mile (RP 16.5) area.
- North of the Seventeen Mile development (RP 17.7) to the end of the study corridor (RP 20.1).

It should be noted that Hwy 567 north of the study corridor would likely be included as a potential wildlife linkage zone because of the large secure areas on either side of the road. The projected 2030 traffic volumes of 350 vehicles per day is far below the anticipated threshold of 4,000 vehicles per day identified as an impediment to wildlife movements. Research indicates that 2,000 to 3,000 vehicles per day may be problematic to wildlife habitat, contributing to habitat fragmentation and wildlife mortality, and 4,000 or greater vehicles per day may result in serious habitat fragmentation and wildlife mortality. Few additional human influence zones are anticipated in the future. The majority of private land holdings (except those of Plum Creek Timber Company) has been developed or is currently in the process of being developed.

4.11 Sensitive Species

Sensitive and rare plant and animal species are designated by the USFS, Bureau of Land Management (BLM), and Montana National Heritage Program (MTNHP) and are tracked by the MTNHP. Table 12 below lists fish and wildlife species currently included on the Kootenai National Forest sensitive species list which are known or suspected to occur within the study corridor. Those species on the Kootenai National Forest sensitive species list not known or suspected in the corridor are not included in the table.

Fifty sensitive plant species are currently listed on the Kootenai National Forest sensitive species list.[11] Of these, two species of moonwort, wavy moonwort (*Botrychium crenulatum*) and mountain moonwort (*Botrychium montanum*) are known from populations in the study corridor.[12] Of the 50 listed species, seven are known from the Pipe Creek drainage, while several others are suspected to occur there based on habitat availability.[13] A comprehensive list of plant species is not provided at this time, but all species would need to be evaluated in the future if MDT were to propose a project within the study corridor. While species designated as sensitive are not generally afforded the same protection as federally listed TandE species, extensive coordination with the USFS would be required to determine appropriate protective or mitigation measures should any sensitive plant populations fall within proposed construction limits. Site specific surveys for such plant species may be required.

[10] *Libby North Corridor Study: Preliminary Wildlife Habitat Linkage Analysis*; Post, Buckley, Schuh & Jernigan (PBS&J), pg 1, March 7, 2007

[11] U.S. Forest Service. 2002. *Draft Environmental Impact Statement, Pipestone Project. Kootenai National Forest, Libby Ranger District.* Lincoln County, Montana. May 2002

[12] Montana Natural Heritage Program. 2006. Data search for sensitive species occurrences in the vicinity of the Libby North Corridor Study project area. Helena, Montana

[13] Ibid.

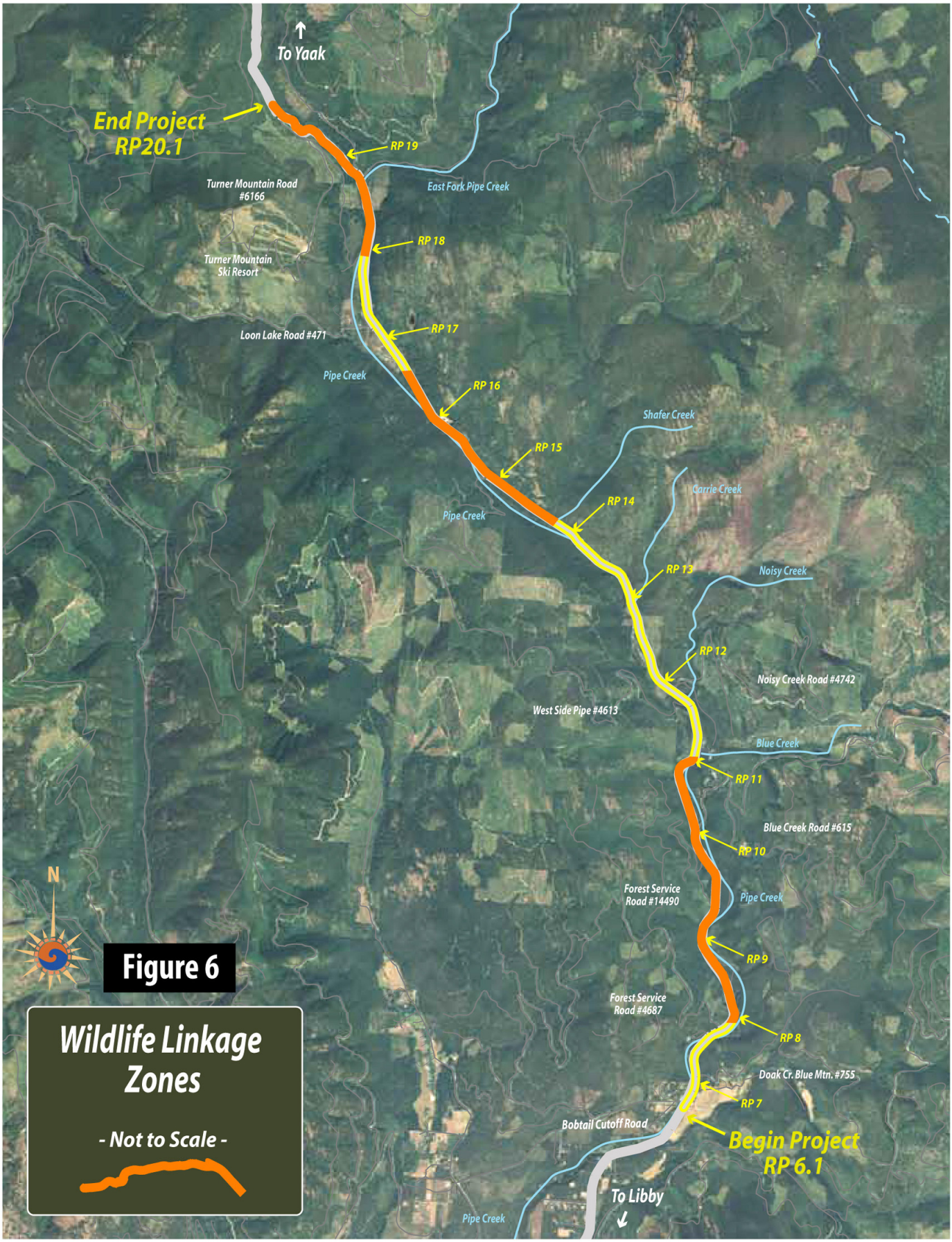
To Yaak
End Project
RP20.1
RP 19
Turner Mountain Road
#6166
East Fork Pipe Creek
RP 18
Turner Mountain
Ski Resort
RP 17
Loon Lake Road #471
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 6
Wildlife Linkage
Zones
- Not to Scale -

Table 12 - Animal Species of Concern that may occur in the Libby North Corridor Study Area (not including T&E species)

Species	2006 MTNHP Ranking	Potential Habitat in the Study Area	Known Distribution in Project Area
Bald Eagle (*Haliaeetus leucocephalus)*	G5, S3 LT, PDL(out of date as of 10/07)	Potential nesting and roosting sites and likely feeding opportunities along Pipe Creek	No known active nest sites in Pipe Creek study area.
Peregrine Falcon (*Falco peregrinus*)	G4, S2B S (USFS) S (BLM)	No potential nest sites in study area. Possible feeding opportunities along Pipe Creek for migrating individuals	Species is not known from the Pipe Creek drainage. Likely occurs during migration along the Kootenai River corridor south of the study area and potentially along Pipe Creek during migration as well.
Flammulated Owl (*Otus flammeolus*)	G4, S3B S (USFS) S (BLM)	Mature ponderosa pine and Douglas-fir forest.	Species known from locations immediately south of the study area in the Sheldon Mountain vicinity[1].
Black-backed Woodpecker *Picoides arcticus*	G5, S2 S (USFS) S (BLM)	Early successional burned coniferous forest habitat.	Species known from the Pipe Creek drainage. Recent prescribed fire in the drainage continues to provide suitable habitat.
Townsend's big-eared bat *(Corynorhinus townsendii)*	G4, S2 S (USFS) S (BLM)	Occasional forager along forest edges and over wetland habitat associated with Pipe Creek. No known maternity colonies or hibernacula within study corridor.	Species known from several locations on the Kootenai National Forest. Species is suspected to occur within the analysis area.
fisher *Martes pennanti*	G5, S3 S (USFS) S (BLM)	Possible resident or transient along Pipe Creek and associated dense riparian vegetation.	No records from immediate project area, but known on the Kootenai National Forest.
wolverine *Gulo gulo luscus*	G4T4, S3 S (USFS) S (BLM)	Generally restricted to boreal forests in western mountains in areas of sparse human habitation. Expected as transient in the immediate project area and resident in upslope areas; primarily in coniferous forest.	Two records from the Gold Hill area adjacent to the study corridor[1].
western toad *(Bufo boreas)*	G4, S2 S (USFS) S (BLM)	Shallow backwater and riparian areas of Pipe Creek.	Species documented on Kootenai National Forest
Coeur d'Alene Salamander (*Plethodon idahoensis*)	G4, S2 S (USFS) S (BLM)	Springs and seeps, waterfall spray zones, and stream edges	Species documented on Kootenai National Forest – not known from immediate study area.
torrent sculpin (*Cottus rhotheus)*	G5, S3 S (USFS)	Headwater streams in the Kootenai River drainage.	Documented in Pipe Creek
westslope cutthroat trout *(Oncorhynchus clarki lewisi)*	G4T3, S2 S (USFS) S (BLM)	Pipe Creek and perennial tributaries.	Documented in Pipe Creek

[1]USFS 2002

4.12 Aquatic Resources

All named streams within the study corridor were reviewed during the field reconnaissance and information for each was gleaned from available literature and other resources. The streams within the study area are illustrated on Sheet 3 of Volume II.

Section 303(d) of the federal Clean Water Act requires states to assess the condition of their waters to determine where water quality is impaired or threatened; the result of this assessment is reported on the state 303(d) list.

Neither Pipe Creek nor any of its tributaries in the study corridor are included on the current Montana State 303(d) list.[14]

4.12.1 Pipe Creek

A perennial tributary to the Kootenai River and Pipe Creek parallel Pipe Creek Road at varying distances over the entire length of the study corridor and cross under the roadway in three locations. The southern most crossing is a bridge structure located just south of the entrance road to Timberlane Campground. The second crossing of Pipe Creek is a large open bottom arch pipe at approximately RP 11.8. The northern most crossing in the study corridor is a newly constructed culvert near RP 18.9.

Pipe Creek is a typical cold mountain stream with low sinuosity and a cobble/gravel substrate. Over much of its length, Pipe Creek supports a narrow riparian wetland fringe along its banks that varies in width, but is rarely wider than twice the width of the stream channel.

Pipe Creek is considered a Core area (drainages containing the strongest remaining populations of Bull Trout in a restoration area) for Bull Trout in the Kootenai River drainage and the USFWS has also designated segments of Pipe Creek as critical habitat for this species. The Pipe Creek drainage is mainly comprised of the migratory life form of Bull Trout that occupy the Kootenai River as adults and then migrate upstream to spawn in Pipe Creek. Young Bull Trout may rear from one to several years in Pipe Creek before migrating downstream to the Kootenai where they spend a majority of their adult life.

Other fish species known to occur in Pipe Creek include brook trout (*Salvelinus fontinalis)*, rainbow trout (*Oncorhynchus mykiss)*, westslope cutthroat trout (*Oncorhynchus clarki lewisi)*, torrent sculpin (*Cottus rhotheus*), and longnose dace (*Rhinichthys cataractae*). Habitat conditions for all species have been impaired over time as a result of high levels of unstable substrates and fine sediment.[15]

4.12.2 East Fork Pipe Creek

A perennial tributary to Pipe Creek, East Fork Pipe creek crosses underneath the highway through a large open-bottom steel arch pipe near approximately RP 18.6. The confluence with Pipe Creek is just downstream from the roadway crossing. According to the Montana Fisheries Information System (MFISH), fish species known to occur in East Fork Pipe Creek include brook trout, rainbow trout, westslope cutthroat trout, and Bull Trout.[16]

4.12.3 Shafer Creek

A perennial tributary to Pipe Creek, Shafer Creek crosses underneath the highway through a large (approximately 10 foot) metal squash pipe near approximately RP 14.3. The confluence with Pipe Creek is several hundred feet downstream from the roadway crossing. Shafer Creek has a six to eight-foot wide channel, with mostly stable banks in the vicinity of the highway crossing and a gravel/cobble/small boulder substrate.

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[14] Montana Department of Environmental Quality (MTDEQ). 2006. *Draft 2006 Integrated 303(d) / 305 (b) Water Quality Report for Montana*. Helena, Montana.

[15] U.S. Forest Service. 2002. Draft Environmental Impact Statement, Pipestone Project. Kootenai National Forest, Libby Ranger District. Lincoln County, Montana. May 2002.

[16] Montana Fisheries Information System. 2006. Internet data search for fisheries information in the vicinity of the Libby North Corridor Study project area. Helena, Montana.

According to MFISH, fish species known to occur in Shafer Creek include rainbow trout and westslope cutthroat trout.[17] Bull Trout may also occur in the lower reaches of Shafer Creek during rearing.[18]

4.12.4 Carrie Creek

Carrie Creek as it is commonly referred to, is a perennial tributary to Pipe Creek that crosses underneath the highway through a small round metal culvert at approximately RP 12.9. Carrie Creek is the primary water source for a private seasonal cabin situated immediately downstream of the highway. Carrie Creek has a two to four-foot wide channel, with mostly stable banks in the vicinity of the highway crossing and a gravel/cobble/small boulder substrate. Westslope cutthroat are the only fish species known to occur in the lower reaches of this small creek.[19]

4.12.5 Noisy Creek and Blue Creek

Noisy and Blue creek are perennial tributaries to Pipe Creek that occur in the study corridor, but do not cross underneath the highway at this time. Both creeks are known to support westslope cutthroat trout and sculpin.[20]

4.13 Wetlands

As part of this existing conditions review of the study corridor, wetlands were observed and noted in the field; however, formal wetland delineation was not conducted at this time. Formal wetland delineation would be necessary for any proposed highway-related actions in the study corridor.

While the entire Pipe Creek drainage supports numerous small wetland potholes and lakes (i.e. Rainbow Lake, Loon Lake, Rice Lake, Tom Poole Lake), the only wetlands closely situated to the existing highway are fringe wetlands along Pipe Creek and its tributaries. Fringe wetlands adjacent to Pipe Creek vary in size from very narrow (1-2 feet wide) up to approximately twice the width of the creek (40-50 feet). Fringe wetlands associated with Shafer and Carrie Creek average three to five feet in width, while wetland habitat adjacent to the East Fork Pipe Creek averages 10 to 15 feet in width near the highway.

Fringe wetlands in the corridor are typically about 90 percent scrub/shrub and 10 percent emergent habitats. Common wetland species noted adjacent to Pipe Creek and its tributaries include alder (*Alnus incana)*, red-osier dogwood *(Cornus stolonifera)*, and willow *(Salix sp.)* in the shrub layer and sedge (*Carex sp*.), horsetail (*Equisetum arvense*), and reed canary grass (*Phalaris arundinacea*) in the herbaceous layer.

Functional Assessment of study corridor wetlands was not performed at this time as wetlands were not delineated; however, with the presence of Bull Trout (threatened species) in the drainage and high wildlife values in the corridor, ratings would likely be moderate to high for many of the assessed functions.

4.14 Air Quality

Hwy 567 is located north of Libby, a current PM-10 and PM-2.5 non-attainment area and therefore, federal transportation conformity requirements (40 CFR 93) do not apply. Recent technical studies indicate that PM-2.5 air pollution caused by re-entrained road dust or vehicle tailpipe emissions are minor. The Cabinet Mountain Wilderness area is in proximity to this project, however, road dust/vehicle exhaust is not considered to be a major contributor to regional haze visibility impairment.

Increased lane-width and paved shoulders will limit the amount of track-on/carry-on materials subject to re-entrainment. Paving major road entry ways will also reduce track-on/carry-on materials. Increased vehicle speeds/movements will reduce carbon monoxide tailpipe emissions. Reconstruction or rehabilitation of this facility will not likely result in any population growth concerns that would increase area source emissions[21].

[17] Ibid.
[18] USFS, 2002.
[19] Ibid.
[20] Ibid.
[21] Personal communication (Email) between Bob Habeck, Air Program Manager, MDEQ and Jean Riley, MDT, October 11, 2007.

5.0 Problems Identified in the Corridor

The following strategies were utilized to identify problems within the study corridor:

A. Review of existing MDT reports – Existing reports that MDT has prepared for the corridor were reviewed and include the following:
   - o Preliminary Field Report dated January 21, 2003
   - o MDT Accident Analysis Reports generated for the corridor from January 1, 1995 through March 31, 2006

   As the Preliminary Field Report and MDT Accident Analysis Reports were reviewed by PB, the analysis showed that accident trends within the corridor are higher than the statewide average for similar type routes. Also the overall trend is loss of control on curves, usually during snowy, slushy or icy roadway conditions. More than half of the accidents that occurred within the corridor occurred at night.

B. Stakeholder interviews – A list of stakeholders to be interviewed was developed by MDT, Lincoln County, and the Forest Service. From this list thirteen project stakeholders were interviewed. A summary of the interviews is included in Section 8.

   During the stakeholder interviews safety and environmental concerns were discussed with resource agency staff, business owners, non-profit organizations and a local government official. The interview results are described in further detail in Section 8 and Appendix E.

C. Engineering review of the existing corridor compared to current design standards – The existing roadway alignment was compared to current standards and areas that do not meet current standards have been identified.

   The detailed review by the consultant's engineer identified all locations along the corridor that do not currently meet design standards. The issues identified included horizontal and vertical curves that do not meet standards, areas with sight distance (clear zone) deficiencies, side slopes that do not currently have adequate guard rail and/or shoulder. These problems are described in more detail below and are illustrated in Volume II Roadway Inventory Plans.

D. Public and Resource Agency coordination – Coordination with the general public and the resource agencies occurred throughout the study. Feedback from the public and agencies was used to identify corridor problems as well as potential solutions.

   Members of the general public and resource agency staff were invited to participate in meetings to discuss the Libby Corridor and identify concerns and interests related to the Corridor Study process. The description of the meetings that occurred during the study are described in Section 8 and Appendix E.

E. Geotechnical Study – A Preliminary Geotechnical Report was completed as part of this study (see Appendix B). Findings of this study have been included in this Corridor Study.

   Findings of the Preliminary Geotechnical Report have been included in this Corridor Study and the report is included in full as Appendix B. Slope stabilization and encroachment of the existing roadway on Pipe Creek are two of the key issues identified in the report.

F. Preliminary Biological Resources Investigation – A Preliminary Biological Resources Investigation was completed as part of this study to identify the biological resources near the corridor. Results of the investigation have been included in this Corridor Study.

The Preliminary Biological Resources Investigation is included in full as Appendix C. Numerous species of wildlife and vegetation are described in the roadway corridor, as well as the aquatic resources and wetlands.

G. Preliminary Wildlife Habitat Linkage Analysis – A Preliminary Wildlife Habitat Linkage Analysis (see Appendix D) was completed as part of this study to identify the wildlife linkage zones near the corridor. Results of the investigation have been included in this Corridor Study.

Three wildlife linkage areas were identified within the corridor but due to projected 2030 traffic volumes, traffic that may result from recommended roadway improvements are not anticipated to be an impediment to wildlife movements.

The following problems for Hwy 567 between RP 6.1 and RP 20.1 have been identified during this corridor study. Each of these problems is described in the paragraphs that follow. Specific locations of these problem areas are identified on the Roadway Inventory Plans (Volume II).

- Narrow roadway width throughout the corridor
- Lack of adequate signing and striping
- Substandard horizontal and vertical curvature
- Substandard side slopes (both cut and fill)
- Lack of or deteriorating guardrail
- Dense vegetation next to the roadway limits the ability of the sun to melt the snow and ice
- Rocks falling onto the road creating a hazard for motorists

5.1 Narrow and Inconsistent Roadway Width throughout the Corridor

The existing roadway has an average width of 20 feet. Current standards for this type of facility recommend a roadway width of 24 feet. This narrow roadway makes snow removal and storage difficult in the winter months and also does not allow much room if there is a stalled vehicle. It also poses a problem for routine maintenance activities. The inconsistent roadway width, the roadway varies in width from 15 feet to 26 feet, does not allow for consistent driver expectancy. For example, the changes in width along the roadway may cause the driver to feel the need to slow down as the road narrows. The lack of roadway shoulders is a direct result of the narrow roadway. If shoulders do exist, the widths do not meet safety standards.

5.2 Lack of Adequate Signing and Striping

The existing roadway does not have any paint striping and few signs where there are sharp curves or steep slopes. One of the public suggestions was to paint a centerline in the roadway to keep cars on the proper side of the road.

5.3 Substandard Horizontal and Vertical Curvature

Hwy 567 was originally built as a logging road and was not intended for public use. Many of the existing horizontal and vertical curves do not meet current design standards. The horizontal curve near RP 11 has been identified as a particular problem area because of the sharpness of the curve. Accident data indicates that this area has a higher frequency of accidents than other areas of the corridor.

5.4 Substandard Side Slopes (both cut and fill)

Much of the corridor has side slopes that are steep and do not meet current standards. This poses a safety issue for vehicles if they run off the road.

5.5 Lack of or Deteriorating Guardrail

In areas where side slopes can not be graded to meet current standards, shielding with guardrail should be considered. Much of the existing corridor does not have guardrail and in places where guardrail does exist in many cases it is in a poor condition. MDT is planning on replacing the existing guardrail between RP 10.8 and RP 11.2, it is anticipated this replacement will be completed in 2008.

5.6 Dense Vegetation Next to the Roadway Limiting the Ability of the Sun to Melt the Snow and ice

Highway 567 is located in the Kootenai National Forest and is surrounded by dense vegetation on both sides of the roadway. Tall trees located close to the edge of the road limit the amount of sunlight that hits the road, particularly in the winter. This lack of sunlight means that ice and snow take longer to melt. This is an issue all along the study corridor.

5.7 Rocks Falling onto the Road Creating a Hazard for Motorists

There are locations along the corridor where rocks are falling onto the roadway. This creates a hazard for motorists, particularly because the road is narrow and driving around the rocks puts the motorist into the opposing lane of traffic.

6.0 Improvement Options

The alternatives development and screening process was intended to find the environmentally least damaging alternative while addressing the corridor problems. Several improvement options were developed to address the problems identified in the corridor.

During the alternatives development phase of the study five improvement options were created as described below. On May 8, 2007 an alternatives workshop was held in Libby, Montana to review the alternatives (improvement options) developed and to discuss other possible options. Those who attended the workshop included representatives from MDT, FHWA, Lincoln County, Kootenai National Forest, USFWS, and PB. The workshop also included a site visit to the corridor.

During the workshop each of the improvement options was discussed in detail. The general consensus of the group was that a consistent top width, up to 24 feet should be built where possible. Snow storage should be addressed, and flattening the curves at RP 8 and RP 11 should be included. As a result of the workshop, Option 6 was created and is recommended for implementation in the corridor.

6.1 Improvement Option 1 – Full Reconstruction

Improvement Option 1 would reconstruct the roadway the entire 14 miles from RP 6.1 to RP 20.1 to current MDT Standard for a secondary rural collector road. A typical cross-section for this alternative is shown in Figure 7 and would include the following:

- Total reconstruction of the roadway
- Pavement top width of 28 feet
- Flattened side slopes to meet MDT current standards and anticipated traffic volumes as shown in Design Criteria table (Table 13) or install guardrail in areas where slopes can not be flattened without excessive impacts to the surrounding natural environment.
- Flattening of horizontal and vertical curves to meet MDT standards for 45 mph design speed as shown in Table 13.
- Centerline and shoulder striping
- Signing that meets current standards

Option 1 Advantages:

- Brings the roadway up to current MDT safety standards with regards to the functional classification.
- Corrects horizontal, vertical, and roadside deficiencies identified.
- Addresses safety concerns identified.
- Provides room for snow storage to address the problems identified by Lincoln County Maintenance.
- Help reduce accidents by meeting Driver expectation of a constant width roadway.

Option 1 Disadvantages:

- Expensive ($24.7 million in 2006 dollars, including Right of Way – see Appendix F for detailed estimate breakdown)

- Most impactive to the surrounding natural environment, including parts of the Grizzly Bear distribution area, Wildlife Linkage zones, and Pipe Creek of all the options (see Sheet 3 in the "Roadway Inventory" sheets in Volume 2 to see the portions of Hwy 567 Pipe Creek Road that are within the Grizzly Bear distribution area and Wildlife Linkage zones. See sheets RD-00 through RD-63 for the location of Pipe Creek in relation to Hwy 567 Pipe Creek Road).
- Does not fit with public perception regarding the nature of the road.
- This type of facility is not needed to handle the anticipated traffic volumes (overkill).
- Would require closing the road periodically during construction, closures would be temporary and coordinated with Lincoln County and the USFS.

Option 1 was not advanced because of cost, impacts to surrounding natural environment, and public input.

Table 13 - Design Criteria

Design Element			Design Criteria - AASHTO Green Book (1)	Design Criteria - MDT (2)	Design Criteria - AASHTO Low Volume Roads (3)	Design Criteria - Pipe Creek Road
Design Controls	Functional Classification		Rural Collector Road	Rural Collector Road	Rural Collector Road	Rural Collector Road
	Design Forecast Year		2030	2030	2030	2030
	Design Speed	Mountainous	45 mph (70km/h) pg. 420	45 mph (70km/h)	45 mph (70km/h)	45 mph (70km/h)
	Level of Service		B	B	B	B
Roadway Elements	Design Year Traffic	Current AADT	350	350	350	350
		DHV	44	44	44	44
	Roadway Width (Travel Lanes & Shoulders)		22 ft (6.6 m) pg. 425	28 ft (8.4 m)	20 ft (6.0 m) pg. 18	24 ft (7.2 m) 22ft (6.6 m) 20 ft (6.0 m) 4
	Cross Slope	Travel Lane	1.5% - 2% pg. 421	2%	N/A	2%
		Shoulder	1.5% - 2% pg. 421	2%	N/A	2%
	Median Width		N/A	N/A	N/A	N/A
Earth Cut Section	Inslope		4:1 (3:1 in cut) pg. 425	4:1 (6 ft - 2.0 m)	N/A	4:1 (6 ft - 2.0 m)
	Ditch	Width	N/A	10 ft (3.0 m) Figure 12-5 or 0 ft (0.0 m) Figure 11.7M	N/A	0 ft (0.0 m)
		Slope	N/A	20:1	N/A	20:1
	Back Slope; Cut Depth at Slope Stake	0'-5' (0-1.5m)	N/A	5:1	N/A	5:1
		5' - 10' (1.5m - 3.0m)	N/A	3:1	N/A	3:1
		10' - 15' (3.0m - 4.5m)	N/A	2:1	N/A	2:1
		15' - 20' (4.5m - 6.0m)	N/A	1.5:1	N/A	1.5:1
		> 20' (6.0m)	N/A	1.5:1	N/A	1.5:1
Earth Fill Slopes	Fill Height at Slope Stake	0'-10' (0-3.0)	N/A	4:1	N/A	4:1
		10' - 20' (3.0m - 6.0m)	N/A	3:1	N/A	3:1
		20' - 30' (6.0m - 9.0m)	N/A	3:1	N/A	3:1
		> 30'(9.0m)	N/A	2:1	N/A	2:1
Alignment Elements	DESIGN SPEED		45 mph (70km/h) pg. 420	45 mph (70km/h)	45 mph (70km/h)	45 mph (70km/h)
	Stopping Sight Distance		360 ft (105m) pg. 112	360 ft (105m)	300 ft (90m) pg. 34	360 ft (105m) desirable or 300 ft (90m) min [5]
	Passing Sight Distance		1625 ft (485m) pg. 124	1625 ft (490m)	N/A	1625 ft (490m)
	Minimum Radius (e=8.0%)		587 ft (168m) pg. 169 - 170	590 ft (175m)	465 ft (125m) pg. 27	590 ft (175m) desirable or 465 ft (125m) min [5]
	Superelevation Rate		emax = 8.0% pg. 424	emax = 8.0%	emax = 8.0%	emax = 8.0%
	Vertical Curvature (k-value)	Crest	61 (17 metric) pg. 422	61 (17 metric)	42 (13 metric) pg. 39	61 (17 metric) desirable or 42 (13 metric) min [5]
		Sag	79 (23 metric) pg. 422	79 (23 metric)	79 (23 metric) pg. 38	79 (23 metric)
	Maximum Grade	Mountainous	10% pg. 423	10%	N/A	10%
	Minimum Vertical Clearance		14 ft (4.3 m) pg. 427	16.5 ft (5.05m)	N/A	16.5 ft (5.05m)

(1) Refers to AASHTO's "A Policy on Geometric Design of Highway and Streets" 2004
(2) All Information listed here was taken from Figure 12-5 "Geometric Design Criteria for Rural Collector Roads Montana Department of Transportation Road Design Manual Chapter 12 except where otherwise noted.
(3) Refers to AASHTO's "Guidelines for Geometric Design of Very Low-Volume Roads (ADT<= 400) 2001
(4) See Figures 11 through 13 for Roadway Width Locations.
(5) This Lower Design Value may be used in areas of re-alignment to reduce impacts to surrounding natural environment. See Figure 10 for re-alignment locations.

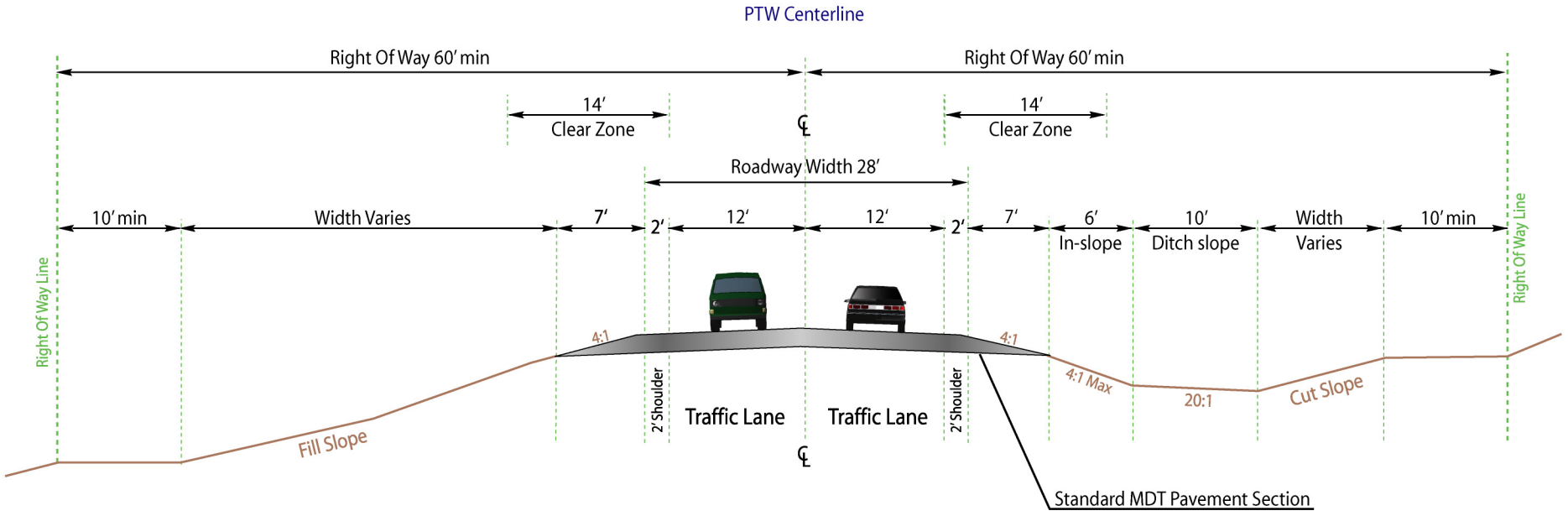


Figure 7

Improvement Option 1: Full Reconstruction Proposed Typical Cross-Section

6.2 Improvement Option 2 – Rehabilitation with minor widening to 24 feet

Improvement Option 2 would rehabilitate the existing roadway the entire 14 miles from RP 6.1 to RP 20.1. This option is shown in Figure 8 and would include the following:

- A 3.6" pavement overlay of the existing pavement.
- Minor widening of the existing pavement using the existing PTW to 24 feet total pavement width.
- Installing guardrail at selected locations (see Table 14 and Figure 9).
- Installing warning signs at selected locations (see Table 15 and Figure 11).
- Flattened side slopes to meet current standards or guardrail in areas where slopes can not efficiently be flattened.
- Pavement striping.

Option 2 Advantages:

- Corrects roadside deficiencies identified.
- Less expensive than a full reconstruction ($10.3 million in 2006 dollars, which includes the cost of obtaining additional right-of-way at selected locations - see Appendix F for detailed estimate breakdown).
- Is in line with public perception regarding the nature of the road.
- Provides room for snow storage to address the problems identified by Lincoln County Maintenance.
- Can adequately handle anticipated traffic volumes.
- Help reduce accidents by meeting Driver expectation of a constant width roadway.

Option 2 Disadvantages:

- Does not address horizontal and vertical geometric deficiencies identified.
- Impacts the surrounding natural environment, including parts of the Grizzly Bear distribution area, Wildlife Linkage zones, and Pipe Creek (see sheet 3 in the "Roadway Inventory" sheets in Volume 2 to see the portions of Hwy 567 Pipe Creek Road that are within the Grizzly Bear distribution area, and Wildlife Linkage zones. See sheets RD-00 through RD-63 for the location of Pipe Creek in relation to Hwy 567 Pipe Creek Road).
- Would require closing the road periodically during construction, closures would be temporary and coordinated with Lincoln County and the USFS.

Option 2 was not advanced because it did not address the safety issues caused by the deficient geometry identified at RP 8 and RP 11.

6.3 Improvement Option 3 – Rehabilitation with no minor widening

Improvement Option 3 would rehabilitate the existing roadway the entire 14 miles from RP 6.1 to RP 20.1. This Improvement Option is shown in Figure 10 and would include the following:

- A 3.6" pavement overlay
- No widening of the existing pavement width
- Installing guardrail at selected locations (see Table 14 and Figure 9)
- Installing warning signs at selected locations (see Table 15 and Figure 11)
- Flattened side slopes to meet current standards or guardrail in areas where slopes can not efficiently be flattened
- Pavement striping

Option 3 Advantages:

- Corrects roadside deficiencies identified.

- Less expensive than Options 1 or 2 ($5.7 million in 2006 dollars, which includes the cost of obtaining additional right-of-way at selected locations - see Appendix F for detailed estimate breakdown).
- Is in line with public perception regarding the nature of the road.
- Can adequately handle anticipated traffic volumes.
- Help reduce accidents by meeting Driver expectation of a constant width roadway.

Option 3 Disadvantages:

- Does not address horizontal and vertical geometric deficiencies identified.
- Impacts the surrounding natural environment, including parts of the Grizzly Bear distribution area, Wildlife Linkage zones, and Pipe Creek (see sheet 3 in the "Roadway Inventory" sheets in Volume 2 to see the portions of Hwy 567 Pipe Creek Road that are within the Grizzly Bear distribution area, and Wildlife Linkage zones. See sheets RD-00 through RD-63 for the location of Pipe Creek in relation to Hwy 567 Pipe Creek Road).
- Does not provide room for snow storage to address problems identified by Lincoln County Maintenance.
- Not feasible because some widening would need to be done to place the overlay.
- Would require closing the road periodically during construction, closures would be temporary and coordinated with Lincoln County and the USFS.

Option 3 was not advanced because it did not address the safety issues caused by the deficient geometry identified at RP 8 and RP 11, and it did not bring the existing pavement width up to MDT standards for this type of facility.

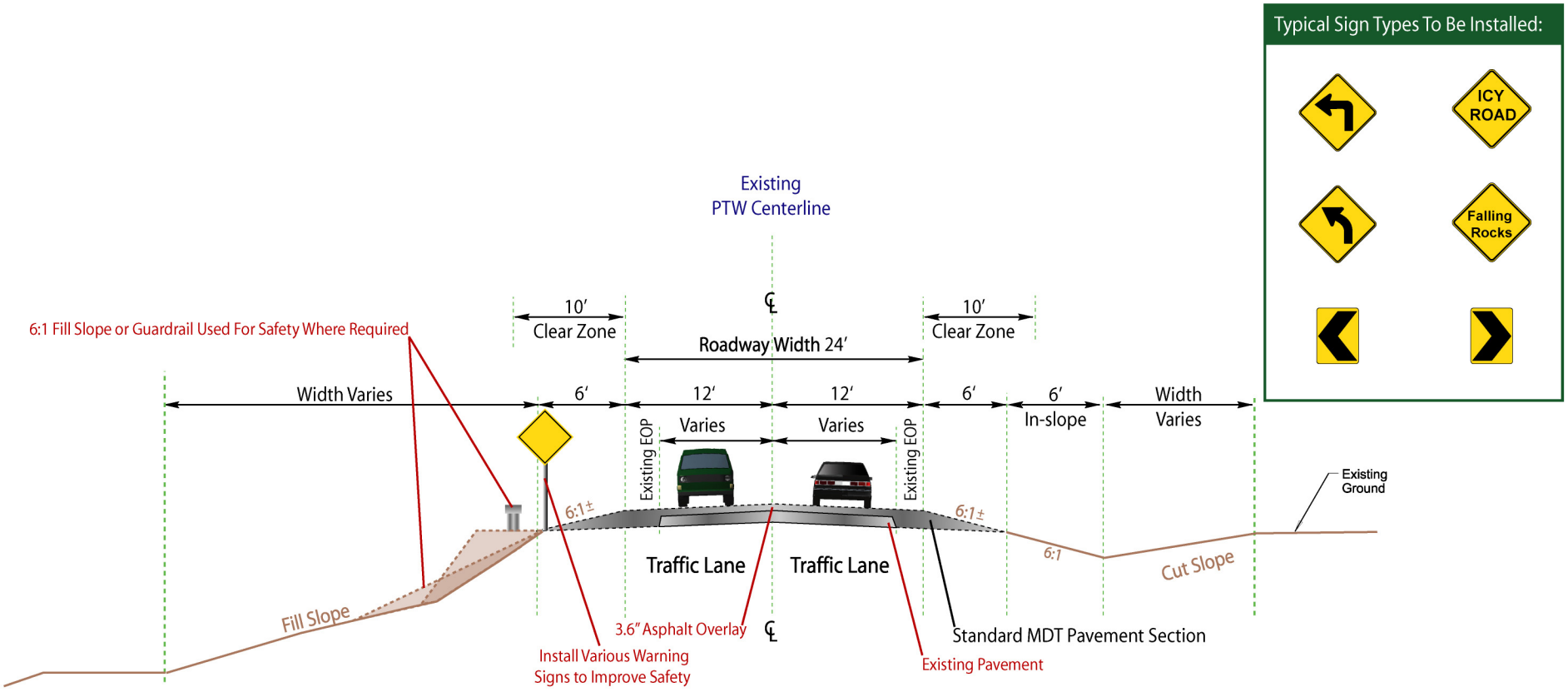
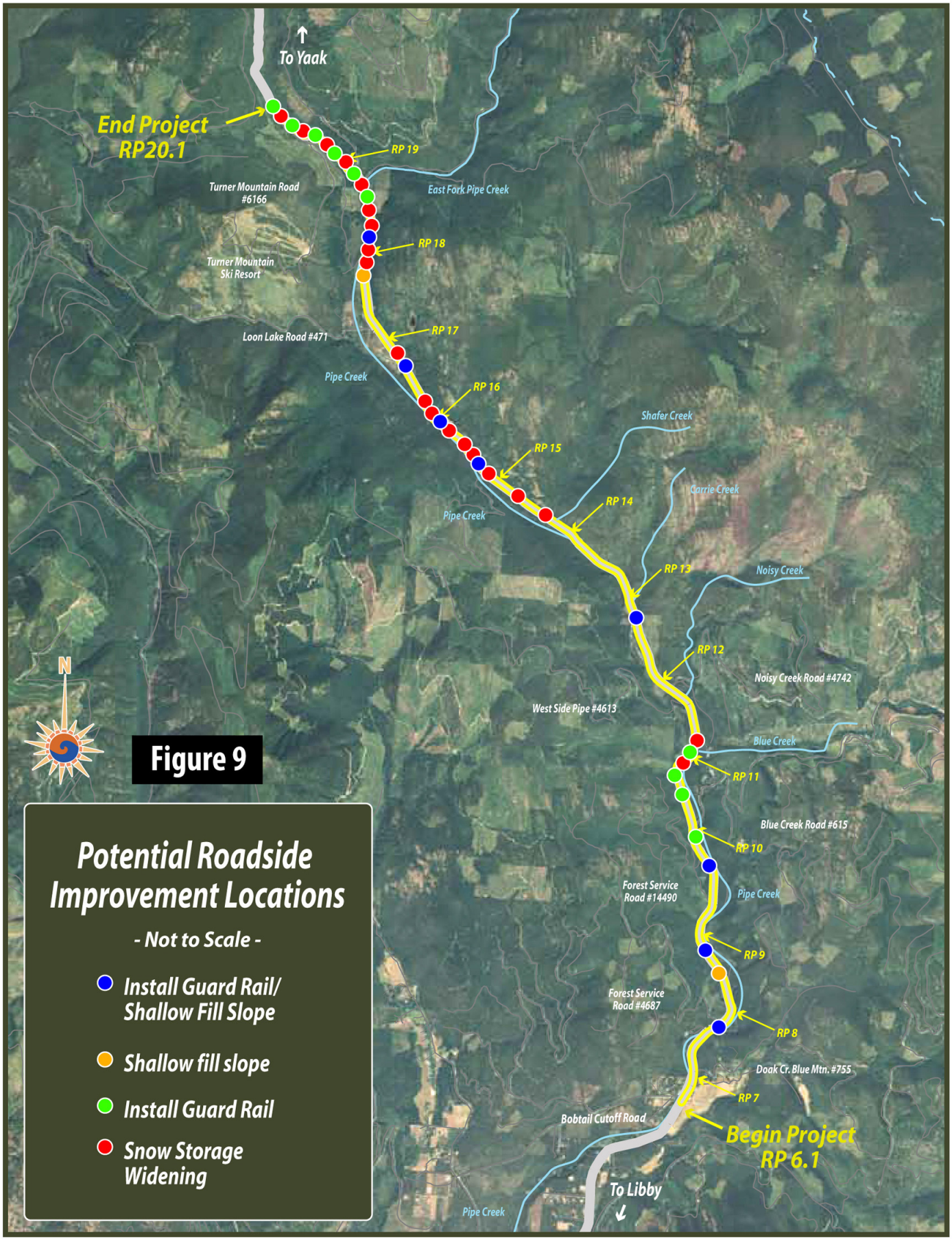


Figure 8

Improvement Option 2: 24' Widening Rehabilitation Proposed Typical Cross-Section


To Yaak
End Project
RP20.1
RP 19
Turner Mountain Road
#6166
East Fork Pipe Creek
RP 18
Turner Mountain
Ski Resort
Loon Lake Road #471
RP 17
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 9
Potential Roadside
Improvement Locations
- Not to Scale -
Install Guard Rail/
Shallow Fill Slope
Shallow fill slope
Install Guard Rail
Snow Storage
Widening

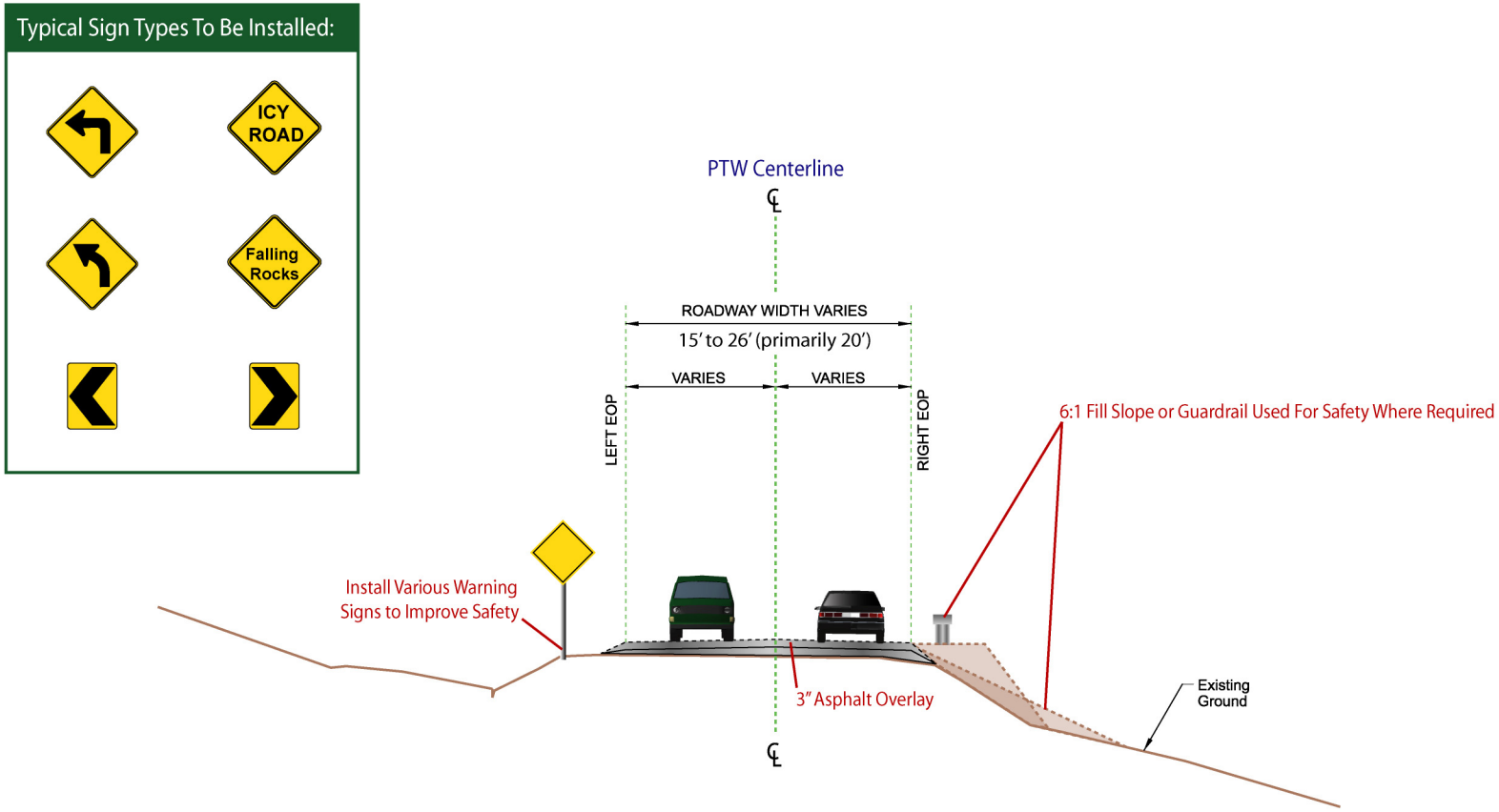


Figure 10

Improvement Option 3: Rehabilitation Proposed Typical Cross-Section

Table 14 - Locations for guardrail and slope modifications (also illustrated in Figure 9)

Location	Side	Action Proposed
RP 7.8 – RP 8.0	Right	Shallow Fill Slope
RP 8.0 – RP 8.1	Right	Install Guardrail
RP 8.6 -0RP 8.7	Right	Shallow Fill Slope
RP 8.75 – RP 8.8	Right	Install Guardrail
RP 8.8 0 RP 8.9	Right	Shallow Fill Slope
RP 9.6 – RP 9.7	Right	Install Guardrail
RP 9.7 – RP 9.8	Right	Shallow Fill Slope
RP 9.9 – RP 9.99	Right	Install Guardrail
RP 10.5 – RP 10.6	Right	Install Guardrail
RP 10.7 – RP 10.8	Right	Install Guardrail
RP 12.6 – RP 12.7	Left	Shallow Fill Slope
RP 12.7 – RP 12.8	Left	Install Guardrail
RP 12.8 – RP 12.9	Left	Shallow Fill Slope
RP 15.3 – RP 15.5	Left	Install Guardrail
RP 15.5 – RP 15.52	Left	Shallow Fill Slope
RP 15.52 – RP 15.6	Left	Install Guardrail
RP 15.9 – RP 16.1	Left	Shallow Fill Slope
RP 16.1 – RP 16.2	Left	Install Guardrail
RP 16.6 – RP 16.7	Right	Shallow Fill Slope
RP 16.6 – RP 16.7	Left	Install Guardrail
PR 17.7 – RP 17.8	Left	Shallow Fill Slope
RP 18.0 – RP 18.1	Left	Shallow Fill Slope
RP 18.1 – RP 18.3	Left	Install Guardrail
RP 18.7 – RP 18.9	Left	Install Guardrail
RP 18.8 – RP 20.1	Right	Install Guardrail

Table 15 – Warning sign locations (also illustrated in Figure 11)

Location	Side	Direction	Sign
RP 7.0	Right	North	Beware Falling Rocks
RP 7.1	Right	North	Icy Road
RP 7.8	Right	North	Turn Warning Sign (W1-1*) with 30 mph Speed Advisory
RP 8.0 +/-	Right	North and South	Series of Chevron Alignment Signs (W1-8)
RP 8.1	Left	South	Turn Warning Sign (W1-1) with 30 mph Speed Advisory
RP 9.6	Right	North	Curve Warning Sign (W1-2) with 30 mph Speed Advisory
RP 9.8	Left	South	Curve Warning Sign (W1-2) with 30 mph Speed Advisory
RP 9.8	Left	South	Curve Warning Sign (W1-2) with 30 mph Speed Advisory
RP 9.9	Right	North	Curve Warning Sign (W1-2) with 30 mph Speed Advisory
RP 10.1	Left	South	Curve Warning Sign (W1-2) with 30 mph Speed Advisory
RP 10.6	Right	North	Winding road Warning Sign (W1-5)
RP 10.8	Right	North	Curve Speed 25 mph Warning (W13-5)
RP 11.0 +/-	Right	North and South	Series of Chevron Alignment Signs (W1-8)
RP 11.1	Left	South	Curve Speed 25 mph Warning (W13-5)
RP 11.5	Left	South	Winding Road Warning Sign (w1-5)
RP 12.0	Left	South	Beware Falling Rocks
RP 15.9	Right	North	Curve Warning Sign (W1-2) with 35 mph Speed Advisory
RP 16.1	Left	South	Curve Warning Sign (W1-2) with 35 mph Speed Advisory
RP 18.7	Right	North	Winding Road Warning Sign (W1-5)
RP 18.8	Right	North	Speed Limit 25 mph (R2-1)
RP 20	Left	South	Speed Limit 25 mph (R2-1)
RP 20.1	Left	South	Winding Road Warning Sign (W1-5)
RP 20.5	Left	South	Icy Road
*All sign numbers refer to 2003 version of MUTCD			

6.4 Improvement Options 4 - Spot Improvements

Improvement Option 4, typical cross section illustrated in Figure 12, is the least expensive improvement option and also has the least impacts to the environment. The following elements are included as part of Improvement Option 4:

- Painted centerline stripe the entire 14 miles from RP 6.1 to RP 20.1
- Warning signs at locations identified in Table 15 and in Figure 11.

Option 4 Advantages:

- Least expensive option ($187,501 in 2006 dollars - see Appendix F for detailed estimate breakdown).
- No additional Right of Way needed.
- Is in line with public perception regarding the nature of the road.
- Least impactive to the natural environment.
- Can adequately handle anticipated traffic volumes.
- Could help reduce accidents by meeting Driver expectation of a constant width roadway.

Option 4 Disadvantages:

- Does not address horizontal and vertical geometric deficiencies identified.
- Does not correct roadside deficiencies identified.
- Does not provide room for snow storage to address the problems identified by Lincoln County Maintenance.
- Would require closing the road periodically during construction, closures would be temporary and coordinated with Lincoln County and the USFS.

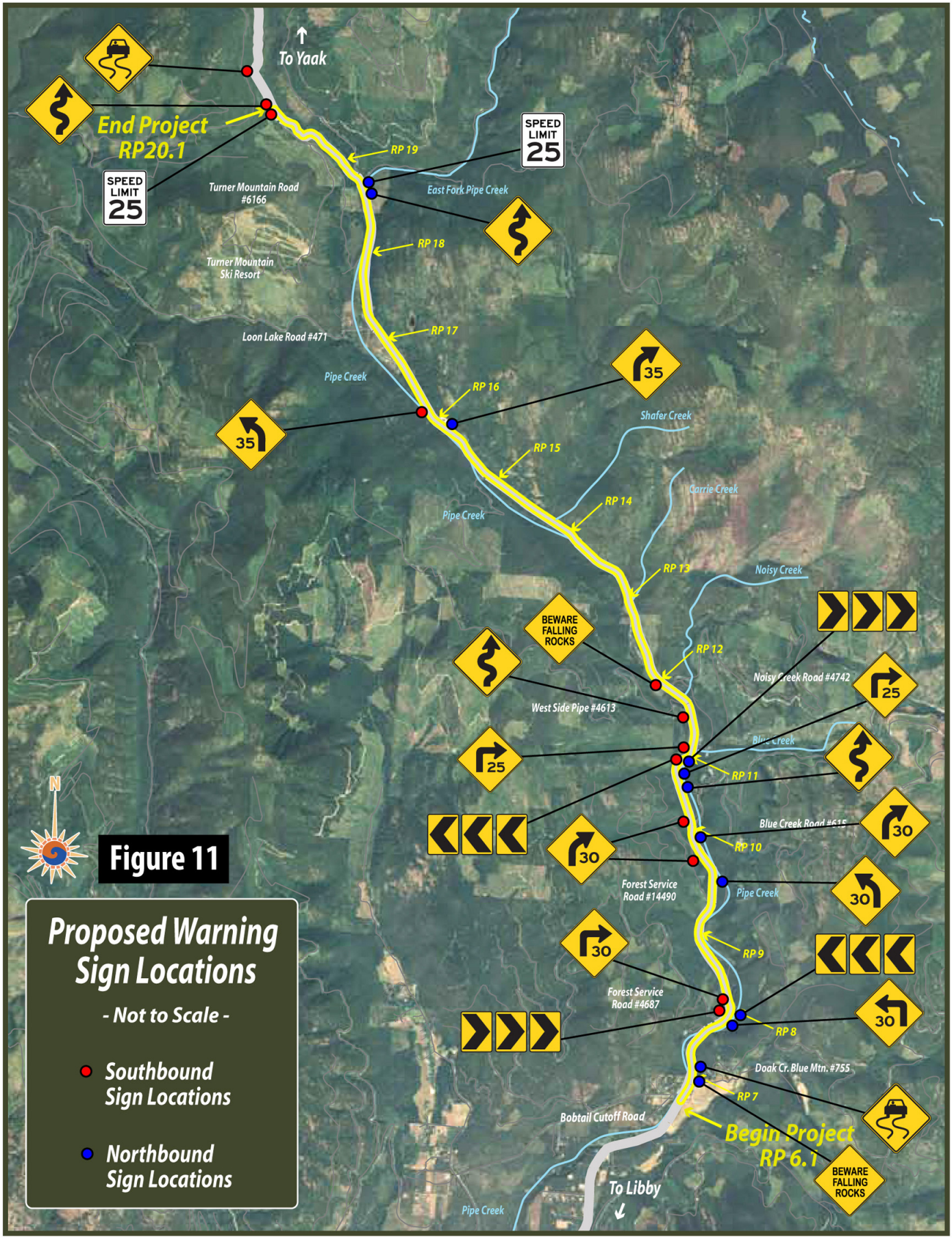
Option 4 was not advanced because it did not address the safety issues caused by the deficient geometry identified at RP 8 and RP 11, and it did not bring the existing pavement width up to MDT standards for this type of facility.

6.5 Improvement Option 5 - Snow Storage Option

One of the issues identified as part of this corridor study was the lack of snow storage area in the winter. The "Roadway Inventory" sheets in Volume 2 identify the locations which are a problem. Because there is not enough room to store the snow on the existing roadway, the plowed snow piles next to the sides of the road basically making Hwy 567 a one-lane road in certain locations. To fix this problem would require cutting into the hillside and creating a widened area where maintenance crews can store the snow in the winter. Figure 13 shows a proposed typical cross section to create more snow storage area. Table 16 and Figure 9 show areas where snow storage has been a problem and also shows estimated earthwork volumes.

Option 5 Advantages:

- Second Least expensive option ($450,528 in 2006 dollars including Right of Way costs - see Appendix F for detail estimate breakdown).
- Is in line with public perception regarding the nature of the road.
- Can adequately handle anticipated traffic volumes.
- Provides room for snow storage to address the problems identified by Lincoln County Maintenance.
- Easy for maintenance to clean out snow storage areas with readily available equipment.


To Yaak
End Project
RP20.1
SPEED LIMIT 25
SPEED LIMIT 25
RP 19
Turner Mountain Road #6166
East Fork Pipe Creek
RP 18
Turner Mountain Ski Resort
RP 17
Loon Lake Road #471
Pipe Creek
RP 16
35
35
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
BEWARE FALLING ROCKS
RP 12
Noisy Creek Road #4742
25
West Side Pipe #4613
25
Blue Creek
RP 11
30
Blue Creek Road #615
RP 10
30
Forest Service Road #14490
Pipe Creek
30
RP 9
30
Forest Service Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
BEWARE FALLING ROCKS
To Libby
Pipe Creek
N
Figure 11
Proposed Warning Sign Locations
- Not to Scale -
Southbound Sign Locations
Northbound Sign Locations

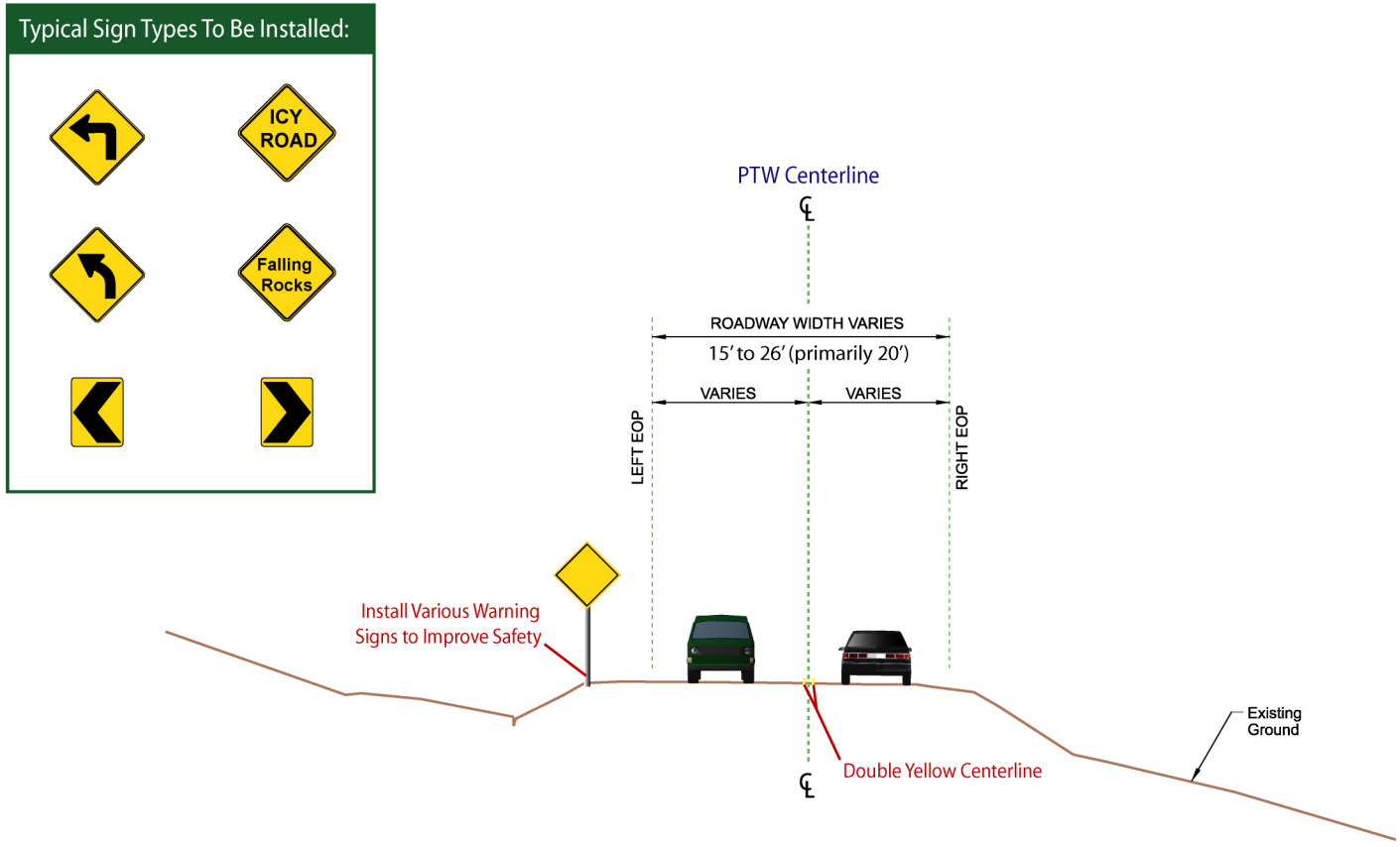


Figure 12

Improvement Option 4: Spot Improvements Proposed Typical Cross-Section

Option 5 Disadvantages:

- Does not address horizontal and vertical geometric deficiencies identified.
- Does not correct roadside deficiencies identified.
- Same anticipated impacts as Option 2 because of the cutting required to improve the snow storage, but without the safety improvements.
- Can easily be incorporated into previous options, for a better overall corridor product.
- Impacts the surrounding natural environment, including parts of the Grizzly Bear distribution area, Wildlife Linkage zones, and Pipe Creek (see sheet 3 in the "Roadway Inventory" sheets in Volume 2 to see the portions of Hwy 567 Pipe Creek Road that are within the Grizzly Bear distribution area, and Wildlife Linkage zones. See sheets RD-00 through RD-63 for the location of Pipe Creek in relation to Hwy 567 Pipe Creek Road).
- Construction activities would require occasional road closures these would be temporary and coordinated with Lincoln County and the USFS.

Option 5 was not advanced because its objectives could be better achieved under a scenario that also addresses the inadequate pavement widths, and the substandard geometric components.

Table 16 - Snow Storage Widening Locations (also illustrated in Figure 9)

Location	Side	Volume of Cut (yd3)
RP 10.9 – 11.1	Left	4100
RP 14.32 – RP 14.35	Right	900
RP 14.6 – 14.7	Right	900
RP 15.1 – RP 15.2	Right	400
RP 15.3 – RP 15.4	Right	650
RP 15.41 – RP 15.43	Right	1300
RP 15.46 – RP 15.54	Right	1725
RP 15.9 – RP 16.1	Right	2900
RP 16.15 – RP 16.17	Right	200
RP 16.7 – RP 16.8	Left and Right	500
RP 17.9 – RP 18.2	Right	5200
RP 18.32 – RP 18.36	Left and Right	620
RP 18.69 – RP 18.7	Right	150
RP 18.6 – RP 18.7	Right	250
RP 18.8 – RP 20.0	Left	5800
	TOTAL	25595

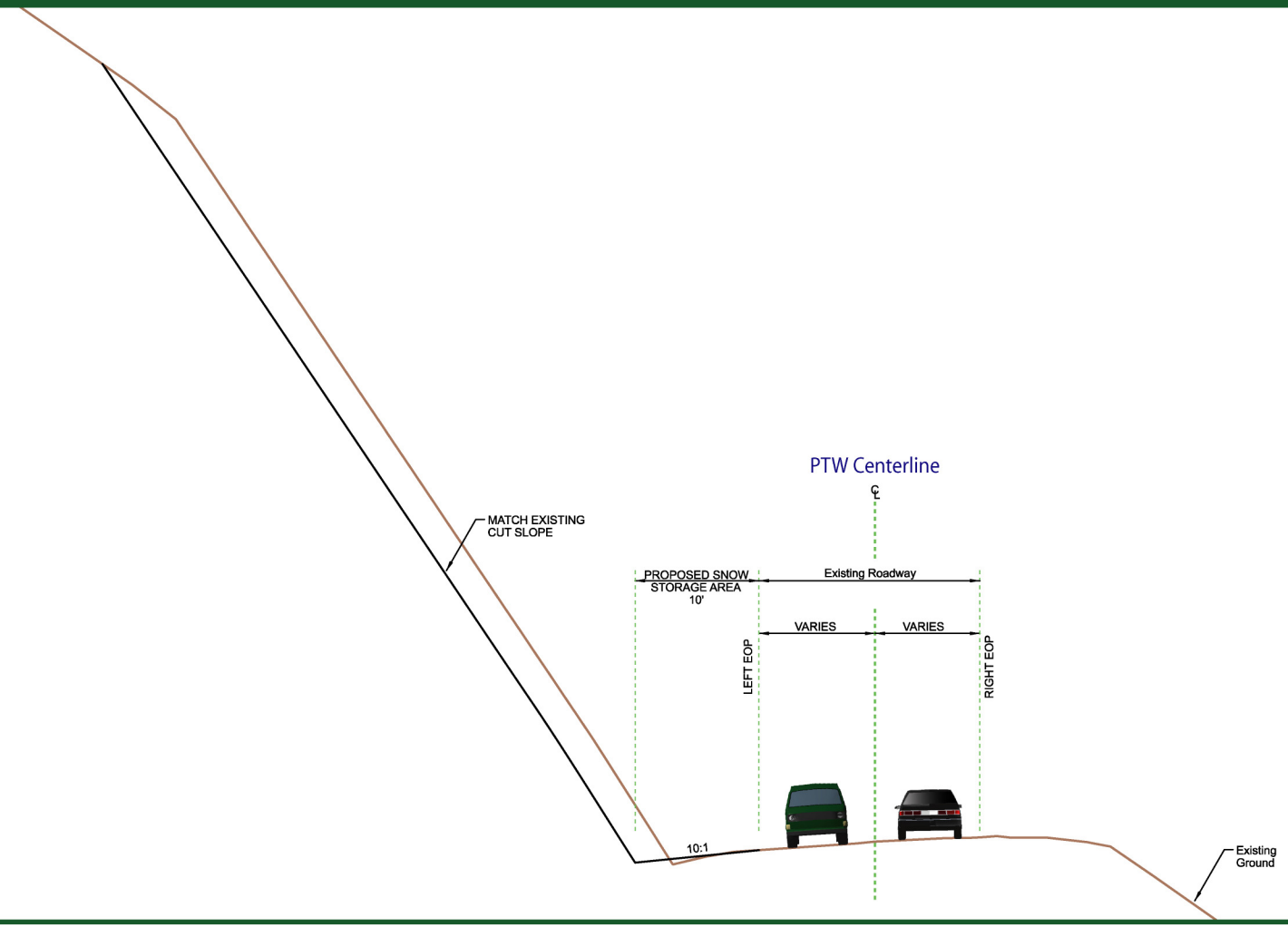


Figure 13

Improvement Option 5: Proposed Snow Storage Widening Typical Cross-Section

6.6 Improvement Option 6 – Rehabilitation with Minor Realignments (Recommended)

Improvement Option 6 is the recommended option for implementation, see Figure 13. This option consists of the following elements:

- From RP 6.1 to RP 7 the road is already widened in this section.
- From RP 7 to RP 19 rehabilitate and minor widening of the roadway to a 24 foot top width (see Figures 14 and 15).
- At RP 8 and RP 11 realign the road centerline to increase safety (see Figure 16)
- From RP 19 to RP 20.1 rehabilitate and minor widening of the roadway to a 22 foot top width to reduce impacts to the natural environment (see Figure 17). A design option from RP 17 - 19 that was evaluated during the Alternatives Screening Agency Workshop included reduction of the top width to 22 feet. This roadway width was discussed as a possible means for future consideration, to reduce impacts to the natural environment. A design option from RP 19 – 20.1 that was evaluated during the Alternatives Screening Agency Workshop included reduction of the top width to 20 feet. This narrower roadway width was discussed as a possible means for future consideration, to reduce impacts to the natural environment.
- Design Values identified in AASHTO's Geometric Design of Very Low Volume Roads may be used to identify and justify design criteria exceptions that could be used to reduce impacts to the natural environment – see Design Criteria Table 13.
- Install warning signs as shown in Table 15.
- Use 6 inch pavement striping to help reduce speeds.
- Flatten side slopes or install guardrail as shown in Table 14.
- Create a "V-ditch" where possible to help with snow storage.
- The actual method used to rehabilitate the existing pavement (full depth reclamation, foam mix, cold in place recycle, or some other method) will be determined at a later date after sufficient testing of the existing roadbed has been made, and given the nature of the facility. The cost estimate prepared for this option includes costs to cover whatever rehabilitation method is chosen.

Option 6 Advantages:

- Corrects major horizontal, vertical, and roadside deficiencies identified.
- Addresses safety concerns identified, by providing improved pavement condition, consistent roadway width, safer curves, and guardrail.
- Less expensive than a full reconstruction - Option 1 (Option 6 estimated costs would be $13.5 million in 2006 dollars, which includes the cost of obtaining additional right-of-way at selected locations - see Appendix F for detailed estimate breakdown).
- Is in line with public perception regarding the nature of the road.
- Provides room for snow storage to address the problem identified by Lincoln County Maintenance.
- Can adequately handle anticipated traffic volumes.
- Takes steps to minimize impacts to surrounding natural environment.
- Could help reduce accidents by meeting driver expectation of a constant width roadway.

Option 6 Disadvantages:

- Potential minor impacts to the surrounding natural environment, including parts of the Grizzly Bear distribution area (GBDA), Wildlife Linkage zones (WLZ), and Pipe Creek (see sheet 3 in the "Roadway Inventory" sheets in Volume 2 where portions of Hwy 567 Pipe Creek Road are within the GBDA, and WLZ). Because development is anticipated to remain low in density and projected traffic volumes are well below the threshold of 4,000 vehicles per day (see Section 4.10.5), it is anticipated that minimal influence to the WLZ or GBDA will result from Option 6, there will still be some minor impacts to wildlife from daily traffic.

- Would require closing the road periodically during construction, closures would be temporary and coordinated with Lincoln County and the USFS.

The summary below shows the comparative costs of each of the options.

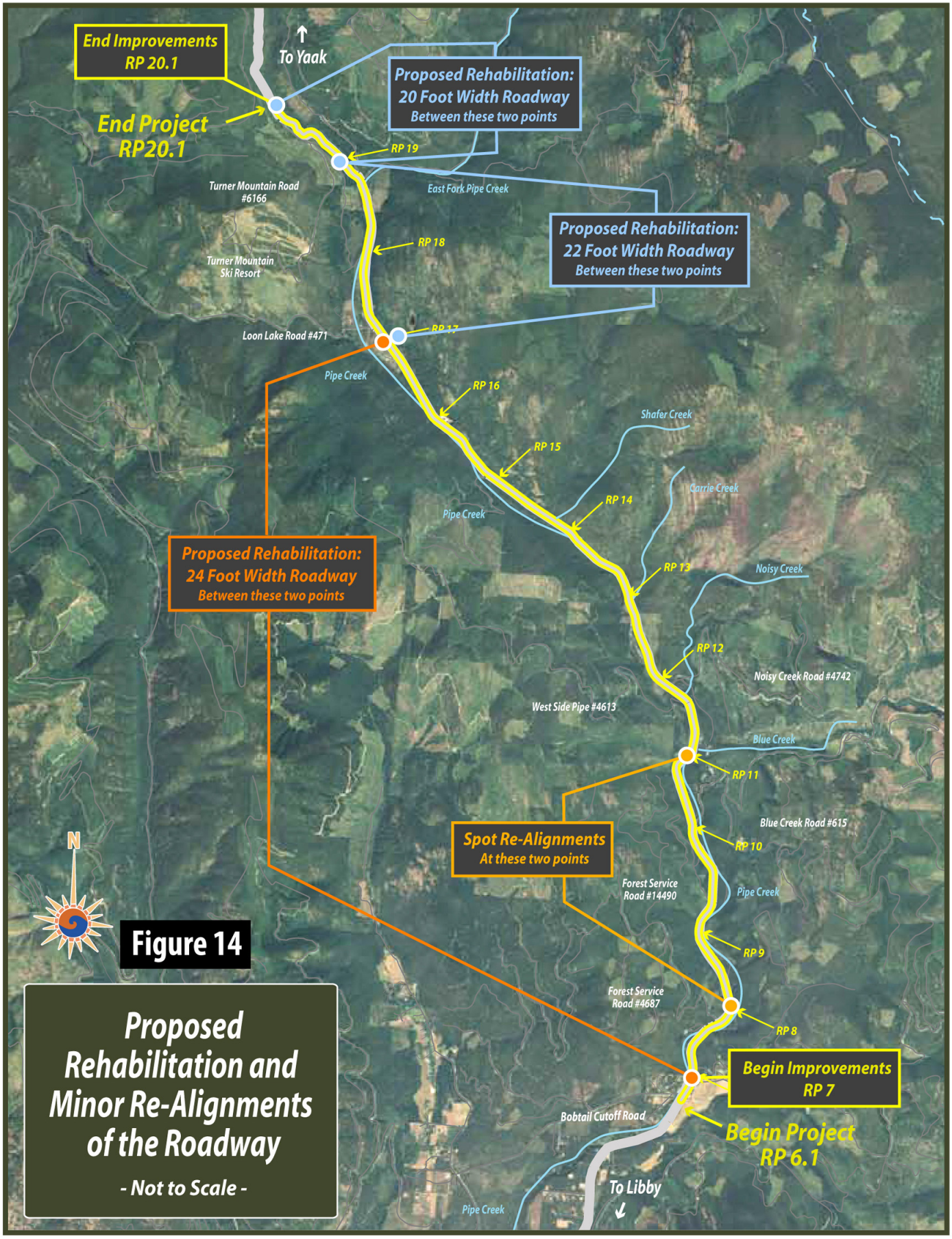
Summary of Costs		Total - 2006 Dollars
Option 1 - Full Reconstruction	$	24,727,032
Option 2- Rehab with widening to 24'	$	10,165,987
Option 3 - Rehab with no widening	$	5,698,042
Option 4 - Spot Improvments	$	187,501
Option 5 - Snow Storage Widening	$	450,528
Option 6 - Recommended in Corridor Study	$	15,500,000

6.7 Management Strategies

As part of this study various resource management strategies were discussed which are not included as part of the improvement options mentioned above. Following is a summary of these strategies:

- Snow Removal – Rather than widening the roadway prism to allow for snow storage, we investigated an option of purchasing modern snow removal equipment that throws the snow away from the road. This equipment is very expensive and exceeds budget limitations for Lincoln County snow removal. This is a strategy that Lincoln County can implement at any time in the future if it becomes financially feasible.

- Grizzly Bears – One of the problems identified by the resource agencies during this study is the fact that bears like to eat trash and other human food which puts them in harms way. Better management of trash or other items bears like to eat could help to reduce this problem and would lessen the chances of Grizzly Bears interacting with humans and being killed. This strategy would be discussed at the final public meeting for this study. Local communities and others are also encouraged to promote this management strategy.
  A type of neighborhood watch program was also discussed to discourage poachers from killing Grizzly Bears. Details of this strategy were not discussed but the concept is to have residents watch out for the protection of the Grizzly Bears by discouraging and reporting poaching activities to the proper authorities.


End Improvements
RP 20.1
To Yaak
Proposed Rehabilitation:
20 Foot Width Roadway
Between these two points
End Project
RP20.1
RP 19
Turner Mountain Road
#6166
East Fork Pipe Creek
Proposed Rehabilitation:
22 Foot Width Roadway
Between these two points
RP 18
Turner Mountain
Ski Resort
Loon Lake Road #471
RP 17
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
Proposed Rehabilitation:
24 Foot Width Roadway
Between these two points
RP 13
Noisy Creek
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Spot Re-Alignments
At these two points
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Begin Improvements
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 14
Proposed
Rehabilitation and
Minor Re-Alignments
of the Roadway
- Not to Scale -

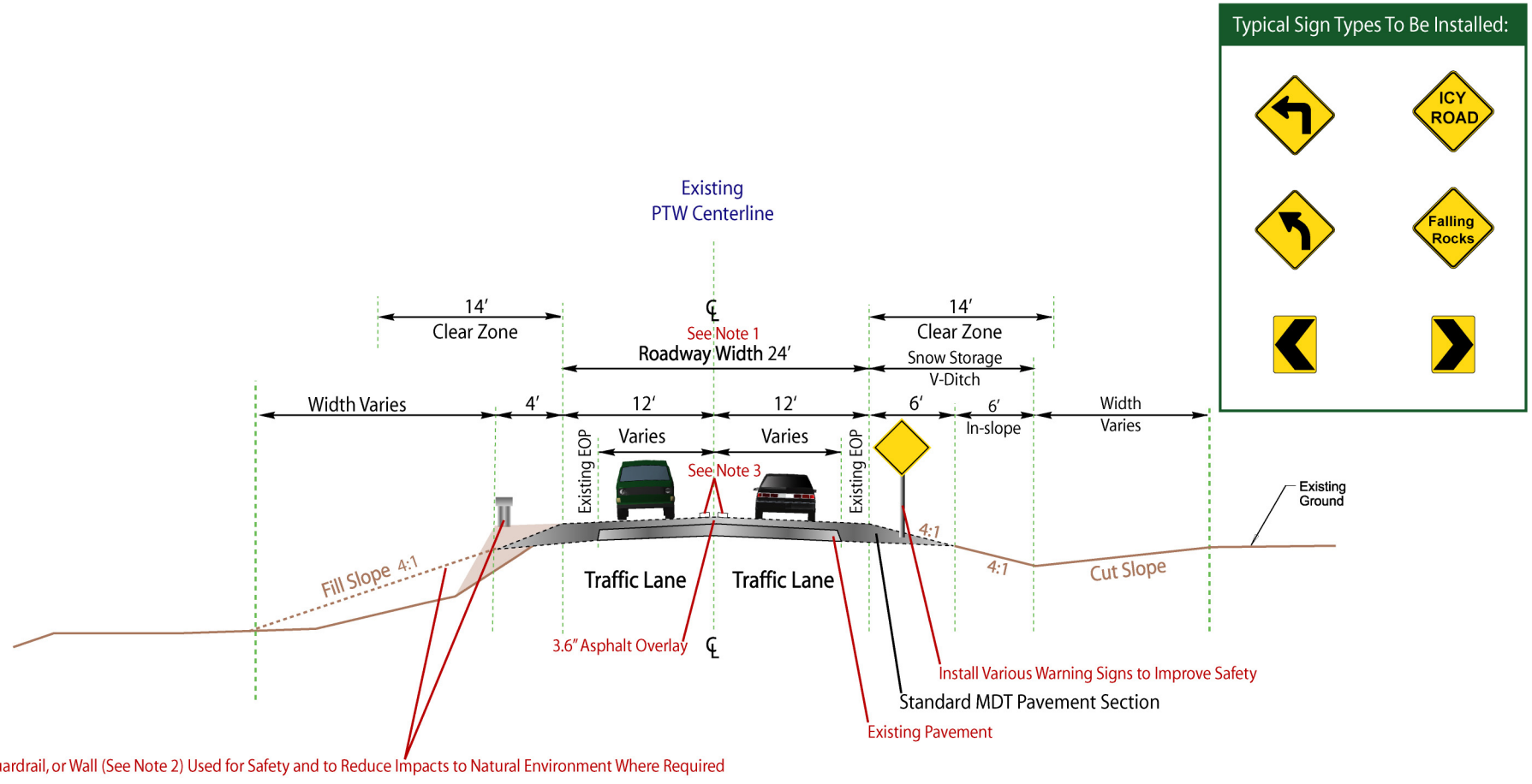


Figure 15

Improvement Option 6: Rehabilitation With Minor Widening From RP 7 to RP 19 Typical Cross-Section

Notes:
1. Design Option 1 is to use a 22′ Roadway Width from RP 17 to RP 19 to Decrease Impacts.
2. Use Guardrail with a Long Post to Reduce Deflection Distance Required Behind Guardrail.
3. Use 6″ Wide Paint Stripes to help reduce Speed.
4. Use a 45 MPH Design Speed

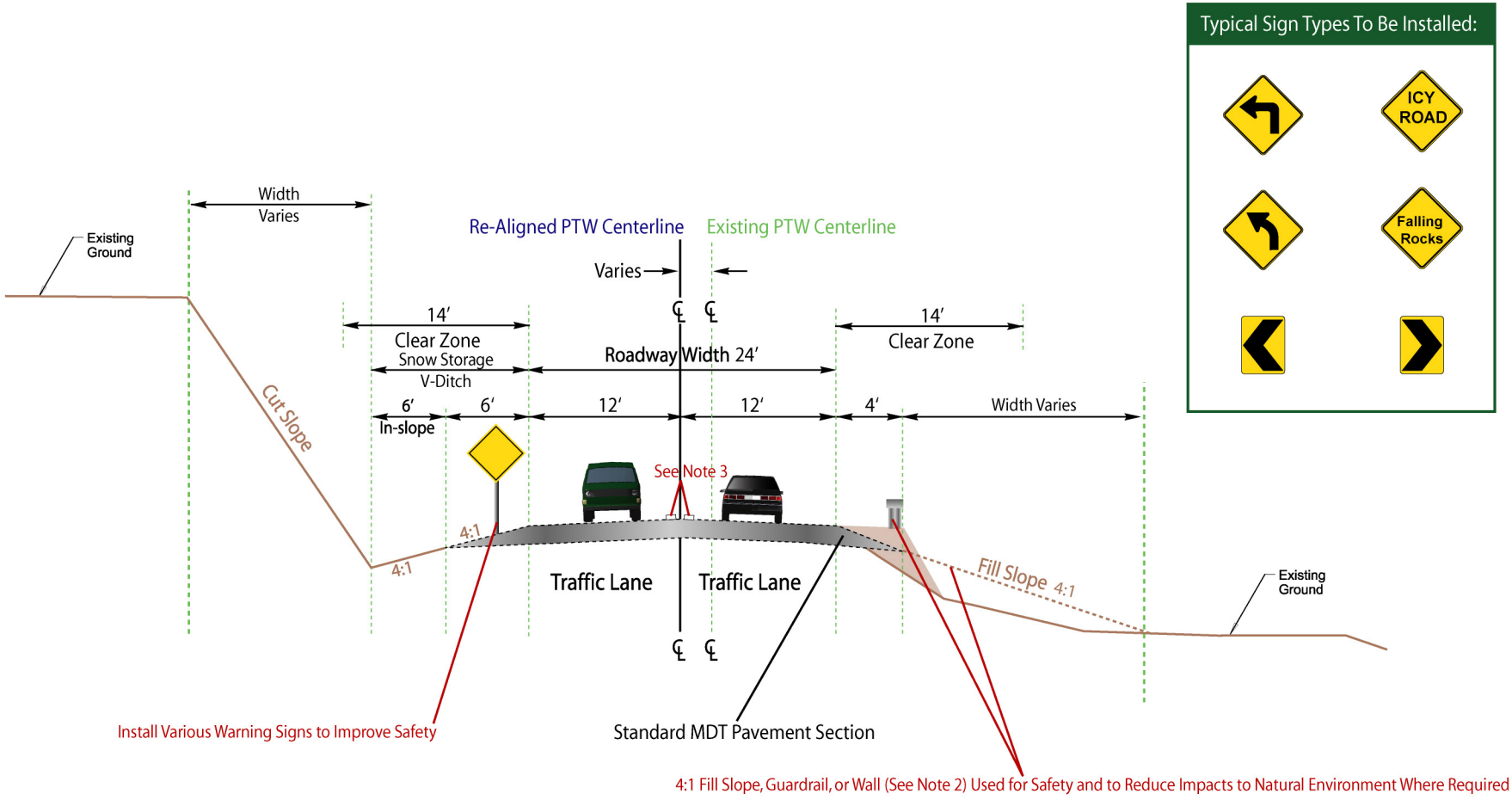


Figure 16

Improvement Option 6: Re-Alignment at RP 8 and RP 11 Typical Cross-Section

Notes:
1. Approximately 1000′ of Re-Alignment Needed at Both RP8 and RP11.
2. Use Guardrail with a Long Post to Reduce Deflection Distance Required Behind Guardrail.
3. Use 6″Wide Paint Stripes to help reduce Speed.
4. Use a 45 MPH Design Speed

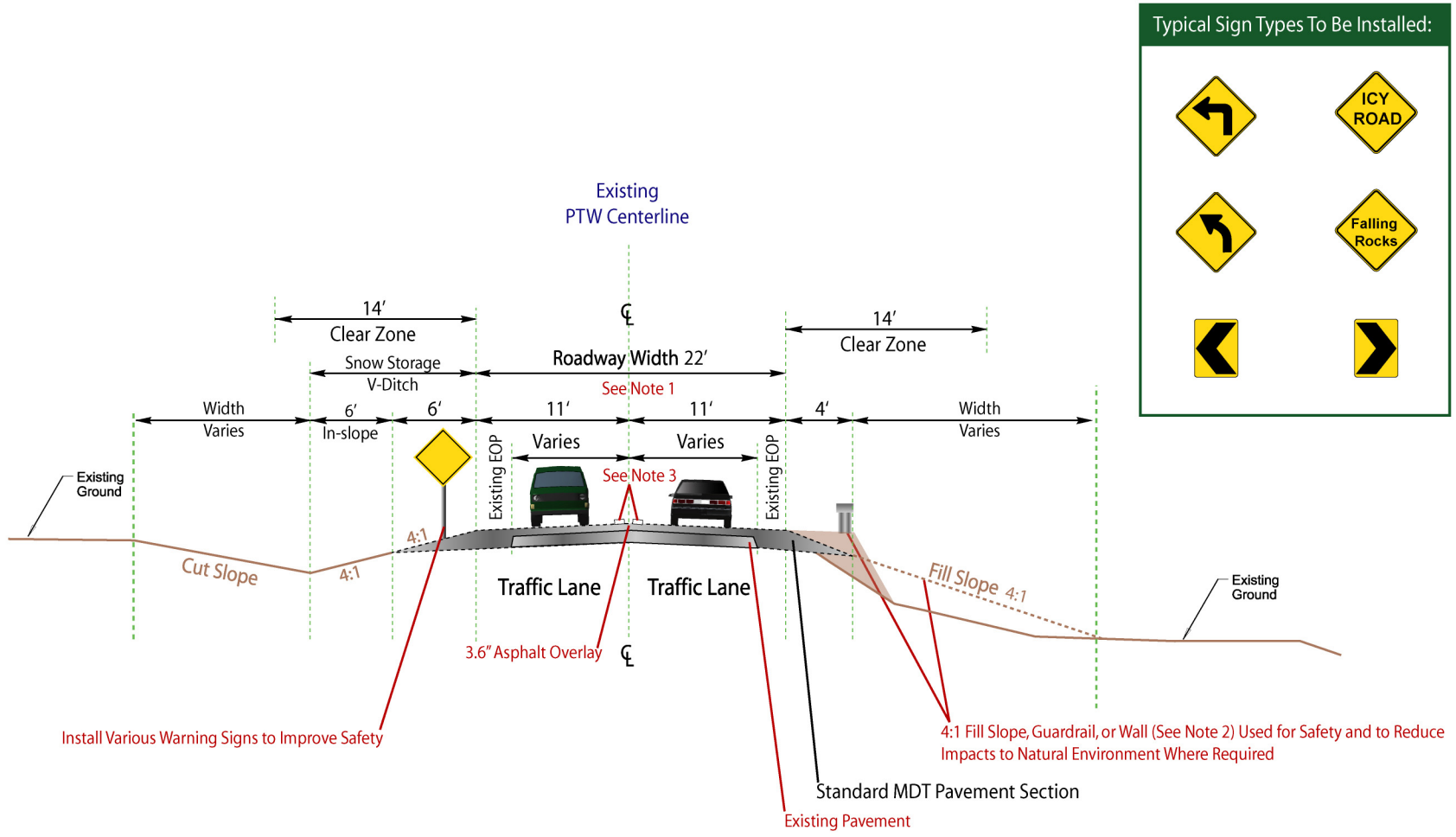


Figure 17

Improvement Option 6: Rehabilitation From RP 19 to RP 20.1 Typical Cross-Section

Notes:
1. Design Option 2 is to use a 20′ Roadway Width from RP 19 to RP 20.1 to Decrease Impacts.
2. Use Guardrail with a Long Post to Reduce Deflection Distance Required Behind Guardrail.
3. Use 6″ Wide Paint Stripes to help reduce Speed.
4. Use Design Speed of 25 MPH, Which is Appropriate for Existing Geometry to Reduce Impacts to Natural environment, with Appropriate Signing to Warn of Reduced Speed and Sharp Curvature.

7.0 Funding

As part of the state-designated Secondary Highway System the most prevalent source of funding for improvements along the Hwy 567 corridor is Surface Transportation Program-Secondary (STPS) funds.

7.1 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 is defined under 60-2-125, MCA as those highways that have been functionally classified by the MDT as either minor arterials or major collectors. These highways have been selected by the Montana Transportation Commission in cooperation with the county commissioners to be placed on the secondary highway system. Of the total received, 86.58% is Federal and 13.42% is State funds from the State Special Revenue Account. Eligible activities include reconstruction, rehabilitation, and miscellaneous improvements.

Secondary funds are distributed statewide (MCA 60-3-206) to each of five financial districts, based on a formula, which takes into account the land area, population, road mileage and bridge square footage. For the total funds available, a minimum of 65 percent are allocated for capital construction projects. The remainder of the funds may be used by MDT for secondary highway system pavement preservation. MDT and county commissions determine Secondary capital construction priorities for each district with final project approval by the Montana Transportation Commission. By state law the individual counties in a district and the state vote on Secondary funding priorities presented to the Montana Transportation Commission. The Counties and MDT take the input from citizens, small cities, and tribal governments during the selection process. Projects are let through a competitive bidding process.

Hwy 567 is Lincoln County's current secondary highway project priority, which has been approved by the Montana Transportation Commission. Approximately $5.6 million is available for construction of a project beyond 2011.

7.2 Public Lands Highways (PLH)

Federal Lands Highway Program (FLHP) is a coordinated Federal program that includes several funding categories including PLH funds which is a potential funding source for improvements along this corridor.

7.2.1 Discretionary

The PLH Discretionary Program provides funding for projects on highways that are within, adjacent to, or provide access to Federal public lands. As a discretionary program, the project selection authority rests with the Secretary of Transportation. However, this program has been earmarked by Congress under SAFETEA-LU. There are no matching fund requirements.

7.2.2 Forest Highway

The Forest Highway Program provides funding to projects on routes that have been officially designated as Forest Highways. Projects are selected through a cooperative process involving FHWA, the US Forest Service and MDT. Projects are developed by FHWA's Western Federal Lands Office. There are no matching fund requirements.

7.3 Potential funding sources for smaller scale improvements along this corridor include:

7.3.1 Highway Safety Improvement Program (HSIP)

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 Montana Transportation 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 Montana

Transportation Commission approves and awards the projects which are awarded through a competitive bidding process. Generally, the Federal share for the HSIP projects is 91.24% and the state is responsible for 8.76%.

There are two programs that receive HSIP funding: the Highway – Railway Crossing Program, which is not a consideration for Hwy 567 since there are no rail crossings along this corridor and the High Risk Rural Roads Program.

7.3.2 High Risk Rural Roads Program (HRRRP)

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 Montana Transportation 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. There is a current guardrail replacement project under development between RP 10.8 and 11.2 that is being funded through this source. Availability of additional funds through this program for Hwy 567 is limited due to other projects already prioritized within this program.

7.3.3 On-System Highway Bridge Replacement and Rehabilitation Program (HBRRP)

HBRRP funds are federally apportioned to Montana and allocated to two programs by the Montana Transportation Commission, On System and Off System Bridge programs. Projects eligible for funding under the On-System program include all highway bridges on the State system. In general, projects are funded with 86.58 percent Federal funds and 13.42 percent State funds. 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. The Montana Transportation Commission approves projects which are awarded through a competitive bidding process.

The only bridge on this study corridor crosses Pipe Creek at RP 7.4. According to MDT's Bridge Management System the structure is in good condition with a sufficiency rating of 77.7. Because this bridge is owned and maintained by the US Forest Service and in good condition it is not a priority or eligible for funding through this program.

8.0 Consultation and Coordination, Public Involvement

This section describes activities for public involvement conducted during the Libby Corridor Study process. The process was designed to be inclusive, comprehensive, open, transparent, and continuous throughout. The activities involved were designed to maximize public and agency comments. Activities included two public open house meetings and stakeholder interviews, which were supported by informational newsletters, a web site, state wide and local press releases, and public correspondence as needed. A mailing list was created to communicate with elected officials, landowners, stakeholders, and other interested parties.

8.1 Public Information Meeting

The goals of the first public meeting for the Libby Corridor Study were:

- To inform the public of the study and to explain how their input is needed to identify issues along the corridor.
- To obtain a better understanding of the roadway users, local interest of the road, and future needs of the corridor.
- To discuss potential improvements for the roadway.
- To provide education about corridor planning in general and specifically how it applies to this study.

Meeting Description and Context

Lincoln County requested the public meetings be a formal presentation given by the project team. The County also recommended that a question and answer period be allowed to generate public participation and an informal

open house setting could follow the question and answer period. The October 17, 2006 meeting followed the recommendations of Lincoln County.

The meeting was held October 17, 2006 from 6 p.m. to 8 p.m. at Libby City Hall in the Ponderosa Room, 952 E. Spruce Street. Those in attendance included property owners along the corridor, business owners, residents of Libby, and representatives from special interest groups. Copies of the sign-in sheets are included in the Appendix E as part of the meeting notes.

Public Notification

Letters were sent to property owners two weeks before the meeting. Additional notification was sent out by MDT's Public Involvement office in a state-wide press release, notification was posted on the study website, and paid advertising was placed in the *Montanian* and *The Western News:*

- The *Montanian* is published once a week on Wednesdays: Two ads ran; Wednesday September 20 and Wednesday October 11, 2006
- *The Western News* is published on Wednesdays and Fridays: Three ads ran; Wednesday, September 27; Wednesday October 4; and Friday October 13, 2006

A copy of the approved ad is in Appendix E. A local reporter misrepresented the starting time in an article she wrote about the upcoming meeting. Consequently, two attendees came to meeting before the actual start time. The reporter based her information on the press release but posted the time as one hour earlier. This article is in the appendix.

Meeting Format

A PowerPoint presentation was provided by PB with additional comments provided by MDT staff. A question and answer session followed the formal PowerPoint presentation. Then the public was invited to provide written comments on comment cards or write directly on aerial maps of the study corridor. This was the first public information meeting related to the Libby North Corridor Study. There were 23 people signed in and 5 written comments were received at the meeting. Some attendees indicated that they would mail their comment cards later. One additional comment card was received after the October 17 meeting.

A thirty minute formal PowerPoint presentation was given by Ron Clegg (PB) with assistance from Shane Stack, Lynn Zanto, and Jean Riley, all of MDT. Shane opened the meeting and provided background information related to the project. A copy of the PowerPoint presentation is included in the Appendix E. The PowerPoint presentation served as a guide for discussion, to provide information, and to stimulate public participation. The public provided comments and participated in the discussion. Following the presentation Ron opened the meeting to questions. A summary of the questions and answers follows below. The public was then invited to tables with the aerial maps and asked to write comments directly on the maps. Project staff members were available to answer questions and assist with writing comments.

Handouts provided to the public at the meeting include the newsletter, a study area map, the list of Frequently Asked Questions (FAQ) and comment forms. Project Team attendees at the meeting included Shane Stack (MDT), Lynn Zanto (MDT), Jean Riley (MDT), Tom Kahle (MDT), Ron Clegg (PB), Stewart Lamb (PB), and Pam Murray (PB).

Meeting Summary

A complete meeting summary can be found in Appendix E. The corridor planning process was explained and discussed.

Summary of Questions and Answers

The following is a summary of the questions and answers and the discussion that followed the formal presentation.

Questions asked by the Public:

- Why is the study just a 14-mile segment of the roadway?

  Shane indicated the project limits were defined in this way because the road can be more fully improved to RP 6.1. North of 20.1 is the Grizzly Bear recovery area, which because of the Silver Creek Mine lawsuit, transportation improvements will be difficult to achieve. It was indicated to the public that Western Federal lands has a project north of our corridor and the project is currently on hold until the outcomes of the corridor Study are finalized.

- What roadway design standards are required to be met? Can they be met on this road? Are there allowable exceptions? Can spot improvements be done?

  Shane discussed the federal requirements for roadway widening and improvements. He stated the widening standards would be a 12-foot road with 2-foot shoulders and a 4/1 slope for cuts and fills. A number of curves on the roadway do not meet federal requirements for sight distances and therefore they would need to be brought into conformance. Improvement projects would need to comply with federal environmental standards for protection of endangered species, which would require significant coordination with the Fish & Wildlife Service for Bull Trout, grizzlies, and other protected wildlife.

  Shane said the environmental constraints of the corridor are significant. A meeting was slated for October 19, 2006 with the regulatory agencies to determine the extent of the constraints. He indicated it would be a difficult and very costly task to fully reconstruct the corridor. Shane also talked about design exceptions because the public wanted to know if spot improvements could be done without having to bring the entire road up to standard. The public gave the example of the patch and seal project that the Forest Service did a few years ago. They said that project was a success and that it helped significantly. The public wanted to know if other similar things could be done. Their greatest concern is safety and if safety can be improved by spot improvements then maybe that is the best improvement project they can hope for given the high cost and environmental constraints.

  Shane indicated that design exceptions can be considered for the corridor. The process is somewhat cumbersome and a good justification will be required.

- In this planning process, will alternatives be identified? Will they be based on cost, environmental issues, safety issues, and maintenance options?

  Because this is a planning study we can look at all the potential improvement options that meet the needs of the corridor. We are at the point of identifying the issues and concerns and doing preliminary engineering and environmental analysis.

- Will this study address the whole road or just issues?

  This study addresses the issues and concerns that are identified in the study area. Recommendations will be made as a result of the study. Potential improvements will be considered if they are both feasible and warranted for the study area.

- What are the costs of making improvements?

  Shane indicated a ballpark cost of 25 to 35 million dollars for a full rebuild effort. The costs to do these projects are continuing to increase while the available funds are not increasing. Money for this project is made available on a competitive basis.

- If you use State only dollars, then what?

  It is difficult to obtain funds purely from the State. The problem is the lack of funds at the State level and the large number of projects that compete for those funds. If somehow State funds were obtained for the project and spot improvements were the recommended course of action, we would still be required to make improvements in accordance with MEPA which is similar to NEPA environmental federal standards.

- If a total reconstruct is so expensive are there enough funds for the project?

No funds are currently available for the full rebuild project. It might be easier to obtain funds for spot improvements that are not as expensive to construct. We will not lower the design speeds just to get something done.

- If the full reconstruct is too costly now then what can be done in the future?

  This is what the corridor planning study is trying to accomplish. Hopefully, we can identify a few options that are cost effective and address the needs of the corridor. The goal is to choose and spend wisely.

- After this feasibility study is completed, then what?

  It will probably take 5 to 7 years from now for the planning, environmental work and then construction could begin. The environmental document will take time, right-of- way acquisitions also take time. However, some short term improvements could happen as a result of this study that can help.

Issues and Comments by the Public

The following issues were identified as a result of the public meeting, from comment cards, and from comments written on the aerial maps

- Pipe Creek road is the most direct access for emergency services to the Yaak.
- A few issues were raised by a commercial trucker who uses the road daily and all year round:
  - The roadway safety is the most important concern. Winter time is the most dangerous time to travel. The road is in many areas is not wide enough. The roadway curves are dangerous. As a commercial driver, poor roadbed issues are hard on the equipment. There have been a number of close mishaps with other motorists. Increase in population is a concern for capacity on such a small roadway. If the road is only improved to Turner Mountain then the roadway north of there will be more of a hazard because is will continue to deteriorate. The road violated driver expectation in many areas. The road is "Not a good thing the way it is."
- If nothing is done the pavement in 5 years will be worse (very poor).
- The road has no center line to separate traffic. Most people drive in the middle of the road and oncoming traffic poses a danger as it drifts into existing traffic.
- There are a number of blind corners.
- In the winter time, the snow plow only plows one lane and it is very dangerous to have only one lane open with oncoming traffic. This is becoming a bigger problem all the time since the interest in the ski resort is growing.
- Snow storage and the removal of snow is an issue for the corridor.
- Recreational traffic with the desire to access the forest lands is increasing roadway traffic.
- The aesthetics of roadway improvements is a concern.
- Recent overlay by the Forest Service was a big improvement.
- Heavy water build up in spring just south of East Fork Pipe Creek
- If MDT waits too long to do anything on Pipe Creek the costs would be so high that projects could become unfeasible.
- Most people use the whole road because there is no center line.
- Issues identified near MP19-20
  - Need new guard rail
  - The roadway is narrow through this section
  - There are a number of short sight distances around curves.
  - The road often ices over in the shady spots
- Issues identified near MP 16
  - A narrow road with poor visibility and a blind hump.
- Issues identified near MP 13
  - A number of deer hits occurred in this area.
- Issues identified near MP 12-11
  - The roadway needs a wider clearing.

  - Current construction traffic is a problem in this area.
- Issues identified near MP 11
  - This area is known to have problems with rock fall.
- Issues identified near MP 9.5
  - This road is difficult to drive because the road leans away from curve.

Recommended Improvements by the Public

- The public indicated that striping the roadway would be a significant help to improving driving safety on the roadway.
- Use minimal standards and design exceptions to mitigate for potential impacts at various spot locations.
- A recommendation was made to clear the corridor by removing brush, trees that are located too close to the roadway.
- Do something to address the shady areas near MP 19-20 that allow icy conditions to occur on roadway.
- Roadway pavement and surface improvements needed throughout the corridor. The public liked what the Forest Service did in improving the road.
- Maintain top speed of roadway between 45mph and 55 mph.
- Improve snow removal and storage by allowing more than one lane to be open during the winter.
- Improve dangerous curves by improving sight distances.
- Improve the general safety of the corridor.
- New methods to remove snow like a snow-blower may work better than a plow.
- Parking is recommended for snowmobiles at the East Fork of Pipe Creek.
- The current alignment is good.
- A band-aid approach to roadway improvements may be good enough for the corridor.
- The winter roadway maintenance, sanding, and plowing are getting better in the last few years but the County needs more money to make it safe.
- Improve the roadway area near the resort first. The area gets lots of winter use for autos and snowmobiles

Stakeholder Interviews

After the meetings the week of October 17, 2006, a decision was made to perform stakeholder interviews. The following describes the process that occurred to accomplish this task.

Goals of the Stakeholder Interviews

- To inform the stakeholder of the study and to explain how their input is needed to identify issues specific to them or the group they represent.
- To obtain a better understanding of the stakeholder interest of the current roadway, and their future needs of the corridor.
- To discuss potential improvements for the roadway.

Stakeholder Interview Description

These stakeholders were individually chosen as a representative for a community sub-group for which they are a member or a leader. These sub-groups include the business community, environmental community, or as a local government/community at large representative. Interviews were conducted by telephone by members of the Libby Corridor Study team. The most frequently cited concerns for travel and safety on the roadway were the narrow width of the road, curves and conditions related to weather. The need for safe travel for emergency service vehicles for increasing number of residents and visitors to the area, concerns for preservation of the natural character of the area, and not impacting wildlife or the streams along the roadway were also common items discussed during the interviews.

The following people were interviewed for the Study:

Name	Affiliation
Bruce Zwang	Turner Mountain Resort
Bill Patten	St. John's Lutheran Hospital
Jay Ramlo	Property Owner
Ron Higgins	Lincoln County School Superintendent
Jerry Wolcot	Plum Creek Timberland, Inc.
Scott Erickson	Rosauers Grocery
Bill Martin	Cabinet Resource Group
Michael Garrity	Alliance for Wild Rockies, Helena
Louisa Wilcox	Natural Resource Defense Council, Bozeman
Malcolm Edwards	Libby Ranger District
Sarah Canepa	Yaak Valley Forest Council, Troy
Rod Kramer	Adventure Cycling, Missoula
Tony Barget	Mayor of Libby

Complete results of the interviews can be found in Appendix E.

8.2 Agency Meetings

Two agency meetings were held in October, the first on October 17 and the next on October 19, 2006. The meeting on October 17 was held to allow agency staff, county representatives to participate without having to travel to Helena for a larger agency meeting on October 19 in Helena. The October 17 meeting was held at the Libby City Hall just prior to the public meeting at the same location.

The following people were invited to participate in either one or both of the agency meetings:

Name	Agency/Affiliation	District/Regional Area
Rita Windom	Lincoln County Commissioner	
Tom Grabinski	Forest Service Supervisors Office, Libby	Kootenai National Forest
Lisa Axline	DNRC	Helena
Glenn Phillips	Montana Fish Wildlife & Parks	Helena
Steve Knapp	Montana Fish Wildlife & Parks	Helena
Allen Steinle	US Army Corps of Engineers	Helena
Steve Potts	US EPA – Montana Office	Helena
Tom Pettigew	US Forest Service, Eng. Division	Missoula
Scott Jackson	USFWS	Helena
Ted Burch	FHWA – Montana Division	Helena
Tom Kahle	MDT Planning	Helena
Jean Riley	MDT Environmental Services	Helena

Both agency meetings provided opportunity for the project team to receive input from the agencies regarding issues and concerns along the Pipe Creek corridor and for the agencies to provide a better understanding of land management plans or other constraints or regulations that might affect the corridor.

October 17, 2006 meeting participants included: Tom Kahle (MDT), Jean Riley (MDT), Rita Windom (Lincoln County), Tom Grabinski (U.S. Forest Service), Malcolm Edwards (U.S. Forest Service District Ranger), Becky Timmons (U.S. Forest Service), Frank Votapka (U.S. Forest Service), Ron Clegg (PB) and Stewart Lamb (PB).

October 19, 2006 meeting participants included: Tom Kahle, Jean Riley, Lynn Zanto (MDT), Wayne Noem (MDT), Bob Burkhardt (FHWA), Pat Basting (MDT) (Pat called in from Missoula via Teleconference), Jeff Ryan (DEQ), Scott Jackson (USFWS), Glen Phillips (MFWP), Ron Clegg and Stewart Lamb.

The discussion during the October 2006 meetings is summarized in the meeting notes in Appendix E. Input received during the meetings was used in the development of the improvement options and used in this Corridor Study Report.

A follow up "Alternatives Screening" meeting was held on May 8, 2007. Meeting participants included: Tom Kahle, Jean Riley, Lynn Zanto (MDT), Wayne Noem, Shane Stack (MDT), Rita Windom, Marc McCully (Lincoln County), Malcolm Edwards, Paul Stantus (US Forest Service), Tom Grabinski, Bob Burkhardt, Scott Jackson, Ron Clegg, Dennis Naillon (PB) and Lani Eggertsen-Goff (PB).

The main outcome of the morning meeting on May 8, 2007 at the Forest Service Supervisor's office in Libby, and the field trip that occurred in the afternoon along the study corridor, was that a new Option would be created. This would include a different combination of spot improvements, snow removal improvements and other variations to the Options presented initially to the group.

8.3 Public Information Meeting October 24, 2007

The October 24 meeting was held at the Libby City Hall. Lincoln County requested the public meetings have a formal presentation given by the project team. The County also recommended that a question and answer period be allowed to generate public participation and an informal open house could follow the question and answer period. The October 24 meeting followed the recommendations of Lincoln County. A PowerPoint presentation was provided by Ron Clegg at PB with an introduction provided by Shane Stack at MDT.

A question and answer session followed the formal PowerPoint presentation. Then the public was invited to provide written comments on comment cards. This was the second and final public information meeting related to the Libby North Corridor Study. There were 31 people signed in and one written comment was received at the meeting. Several attendees stated that they liked what they saw at the meeting and they just wish it could happen sooner. A complete summary of this meeting can be found in Appendix E, within the October 24, 2007 Technical Memorandum.

Copies of the Corridor Study were made available for public and agency review until November 30, 2007. Public and agency comments were addressed, see Appendix H for detailed comments and how the comments were addressed. This Corridor Study document was finalized in December 2007.

9.0 Next Steps

The following identifies the next steps that will occur for the Hwy 567 corridor from RP 6.1 to RP 20.1.

- MDT will confirm project scope with the County
- MDT will program recommended project based on available funding
- The environmental process will be completed, then the project will move into detailed design and construction of improvements
- Construction is expected to begin once funding becomes available

As part of the Project programming Public Involvement will be continuous throughout programming Project and environmental review process.

List of Preparers

This Libby North Corridor Study was prepared by the following individuals:

Montana Department of Transportation

Name	Title	Agency
Lynn Zanto	Supervisor, Statewide and Urban Planning	Montana Department of Transportation
Tom Kahle	Planner	Montana Department of Transportation
Jean Riley	Environmental Engineer	Montana Department of Transportation
Wayne Noem	Secondary Roads Engineer	Montana Department of Transportation
Shane Stack	Engineering Services Engineer	Montana Department of Transportation

Lincoln County

Name	Title	Agency
Rita Windom	County Commissioner	Study Partner
Marc McCully	Maintenance Supervisor	Alternatives Workshop participant

Resource and Regulatory Agencies

Name	Title	Agency
FEDERAL AGENCIES:		
Bob Burkhardt	Statewide Planning and Research Engineer	Federal Highways Administration
Craig Genzlinger	Statewide Tribal Coordinator	Federal Highways Administration
Tom Grabinski	Lands Officer/State Highway Project Coordinator	U.S. Forest Service-Libby
Malcolm Edwards	Libby District Ranger	U.S. Forest Service-Libby
Paul Stantus	Forest Engineer	U.S. Forest Service-Libby
Becky Timmons	Forest Archeologist	U.S. Forest Service-Libby
Scott Jackson	Fish and Wildlife Biologist	U.S. Fish and Wildlife Service
STATE AGENCIES:		
Jeff Ryan	Water Quality Specialist	Montana Dept. of Environmental Quality
Glen Phillips	Chief, Habitat Protection Bureau	Montana Dept. of Fish Wildlife and Parks

PB Americas

Name	Title	Project Role
Ron Clegg, P.E.	Area Manager/Client Relations Manager	Project Manager
John Barnhill	Graphic Designer	Graphic Design
Lani Eggertsen-Goff	Environmental Planner	Study Document Preparation, Wildlife Enhancement Credit System Technical Memorandum Preparation
Janine Flora	Project Administrator	Study Document Preparation
Ivan Hooper, P.E.	Traffic Engineer	Traffic Engineering Task Leader
Stewart Lamb	Environmental Planner	Land Use, Social and Demographics, Geographic Information System mapping
Pam Murray	Community Outreach	Community Outreach
Dennis Naillon	Civil Engineer	Engineering Task Leader

PBS&J

Name	Title	Project Role
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Michelle Arthur	Senior GIS Analyst	Wildlife Linkage mapping
Charlie Vandam	Senior Planner / Environmental Scientist	Wildlife Linkage Analysis

Tetra Tech, Inc..

Name	Title	Project Role
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Jeremy Dierking, E.I.	Geotechnical Engineer	Preliminary Geotechnical Study

Am Tech Services

Name	Title	Project Role
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