Alternatives Analysis

for

STPP 69-1(9)22

Boulder-South

(CN 2019)

in

Jefferson County, Montana

December 2009

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ANALYSIS•ADVOCACY•ADVANTAGE

MONTANA MDT DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation Federal Highway Administration

EXECUTIVE SUMMARY

Background

The Montana Department of Transportation (MDT), in coordination with the Federal Highway Administration (FHWA), initiated an Alternatives Analysis to compare potential alternatives in the Boulder-South Corridor. MDT and FHWA's intentions are to conduct and document the Alternatives Analysis in a manner such that it can be built upon in future National and Montana Environmental Policy Act (NEPA/MEPA) environmental analyses.

This report summarizes the Boulder-South Alternatives Analysis. Key pieces of the analysis documented in this report include the following items:

- Current transportation problems in the corridor,
- Road improvement alternatives (including the No Build Alternative) under consideration,
- Rationale and history behind the development of alternatives (including public and agency involvement),
- Screening criteria used for comparing and evaluating the alternatives,
- Planning-level evaluation of alternatives under consideration in the corridor, and
- Recommendations and findings of the analysis.

Problems in the Boulder Corridor

There are two primary problems in the Boulder corridor. First, there are a high number of accidents over the portion of MT 69 from MP 31.8± to MP 37.5± as compared to the statewide average for similar facilities. Secondly, the physical roadway surface is deteriorating and is in need of repair.

Alternatives Considered in this Study

Five alternatives were considered for this study. They are briefly described below.

- **No Build**
  No improvements would be provided under this alternative.
- **Spot Improvements / Speed Reduction / Enforcement**
  This alternative would provide minor improvements along the existing MT 69 alignment, including construction of pullout locations and roadway re-surfacing. A reduction in the posted speed limit and an increase in speed enforcement are also considered under this alternative, although it should be noted that these actions are outside MDT / FHWA jurisdiction. For ease, this alternative will be referenced as the Spot Improvements alternative throughout the remainder of this document.
- **Existing Alignment**
  This alternative would include rehabilitation / reconstruction and widening of the existing alignment generally in accordance with current MDT standards, including flatter side slopes and wider shoulders.

- **Eastern Alignment**
  Under this alternative, a new alignment would be constructed to the east of the Boulder River generally following a Jefferson County Road. The roadway would generally be constructed in accordance with current MDT standards.
- **Western Alignment**
  Under this alternative, a new alignment would be constructed to the west of the existing alignment following steep topography. The roadway would generally be constructed in accordance with current MDT standards.

Alternatives Screening Criteria

A three-part screen was established to assess each of the five alternatives, as follows:

Screen 1: Does the alternative address the problems in the corridor?
In order to pass this screen, an alternative must improve safety performance, as well as the physical condition of the facility.

Screen 2: Are there fatal flaws relating to natural resource impacts or regulatory compliance?
Under this screen, a fatal flaw is defined as an impact to a natural resource that cannot be mitigated to a level below significance in the NEPA/MEPA context. Resource areas considered include drainages and water bodies, wildlife and habitat, floodplains, water quality and fisheries, and wetlands, as well as cumulative impacts expected to result from each alternative.

Screen 3: Is the alternative reasonable and practicable?
In order to pass screen three, an alternative must be reasonable and practicable from economic, technical, and logistical standpoints. Specific considerations included under this screen include capital and maintenance costs, opportunity costs, constructability concerns, technical considerations, relative social / political support, access issues, and ease of right-of-way acquisition.

Analysis of Alternatives

Table ES 1 presents the results of the screening process with respect to each of the five alternatives. It should be noted that each alternative was assessed under each screen in order to provide a more thorough and objective assessment. In order to pass the entire screening process, however, an alternative must pass each of the three individual screens; failure to pass a single screen results in overall failure of an alternative.

Table ES 1 Results of Screening Process

Screen	Screen Component	No Build	Spot Improvements	Existing Alignment	Eastern Alignment	Western Alignment
Screen One Does the Alternative Address Corridor Problems?		Incidence of crashes expected to increase without new roadway template.		Wider shoulders and flatter side slopes would reduce incidence of crashes. New roadway would have multi-year design life.		
Screen Two Are There Fatal Flaws Relating to Natural Resource Impacts or Regulatory Compliance?		No new impacts	Impacts would occur, but none that are anticipated to preclude regulatory compliance. Assuming standard avoidance, minimization, and mitigation measures would be utilized, no fatal flaws have been identified.			
Screen Three Is the Alternative Reasonable and Practicable?	**Construction Cost***	NA	$1.6 million	$20 million	$27.5 million	$68.5 million
	Opportunity Costs	Deteriorating roadway would cause travel inefficiencies.	Reduced speed limit would inconvenience drivers.	None	Slightly longer route would result in minor travel delays.	Longer route and mountainous topography would cause travel delays and reduce route efficiency.
	Constructability	NA	Some challenges relating to close proximity of Boulder River and wetland areas.			Substantial challenges relating to steep topography.
	Social / Political Support	Strong Support	Strong Support	Some Opposition	Strong Opposition	Potential Opposition
	Access	NA	All access points would be perpetuated	All access points would be perpetuated	Difficult to perpetuate access	Difficult to perpetuate access
	Right-of-Way Acquisition	None	1 acre	10 acres	100 acres	77 acres
RESULT		**Fail**	**Fail**	**Pass**	**Fail**	**Fail**

Note: Orange shaded cells indicate failure of individual screen component, leading to overall failure of alternative.

*Maintenance costs for eastern and western alignments would be approximately double those for existing alignment as a result of two paved roadways through corridor.

Recommendations

Based on the results of the screening process, this study has identified rehabilitation / reconstruction and widening of the existing alignment as the only reasonable and practicable alternative that would address the problems in the Boulder corridor. While social and environmental impacts would be expected with this alternative, practicable avoidance, minimization and mitigation measures would be incorporated as the design process evolves.

Accordingly, this study recommends elimination of the No Build, Spot Improvements, Eastern Alignment, and Western Alignment alternatives from further consideration.

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1.0 INTRODUCTION

A portion of Montana State Primary Route 69 (MT 69) south of Boulder, in Jefferson County, was nominated for rehabilitation / reconstruction and widening by the Montana Department of Transportation (MDT) in May 2004 in order to address safety concerns in the corridor. At the time, MDT intended to prepare an Environmental Assessment in accordance with National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA) regulations.

Through public and agency involvement activities since that time, members of the public and resource agencies voiced concern regarding rehabilitation / reconstruction and widening of the existing alignment and suggested other potential options. In the interest of narrowing the field of potential options to be evaluated under NEPA/MEPA, MDT has conducted a planning-level analysis of alternatives in the MT 69 corridor, as documented in this report.

As noted in Federal Highway Administration (FHWA) guidance on linking transportation planning and NEPA processes, transportation planning can be used to limit alternative solutions to be evaluated during the NEPA/MEPA process. A planning study may be incorporated by reference into a NEPA/MEPA document, and can thereby provide a basis for early screening of alternatives. Preliminary screening of alternatives allows exclusive focus on reasonable alternatives during the NEPA/MEPA process, which provides cost and time savings.

Preliminary alternatives screening is also recognized as a valid methodology with regard to permitting under Section 404 of the Clean Water Act (Section 404), which is applicable where discharge of dredged or fill material into wetlands and other Waters of the U.S. are anticipated. Implementing regulations state that discharge of dredged or fill material is not permitted if there is a practicable alternative which would have less adverse impact on the aquatic ecosystem (40 CFR 230.10). Following an initial determination of practicability, the least environmentally damaging alternative should be selected.

This report documents the early alternatives screening process used in the MT 69 corridor with the intent of fulfilling future NEPA/MEPA and Section 404 requirements. The report identifies the primary factors for project nomination in the corridor, documents the rationale and history behind the development of alternatives, defines a set of screening criteria based on NEPA/MEPA and Section 404 implementing guidelines, and presents a planning-level evaluation of alternatives under consideration in the corridor.

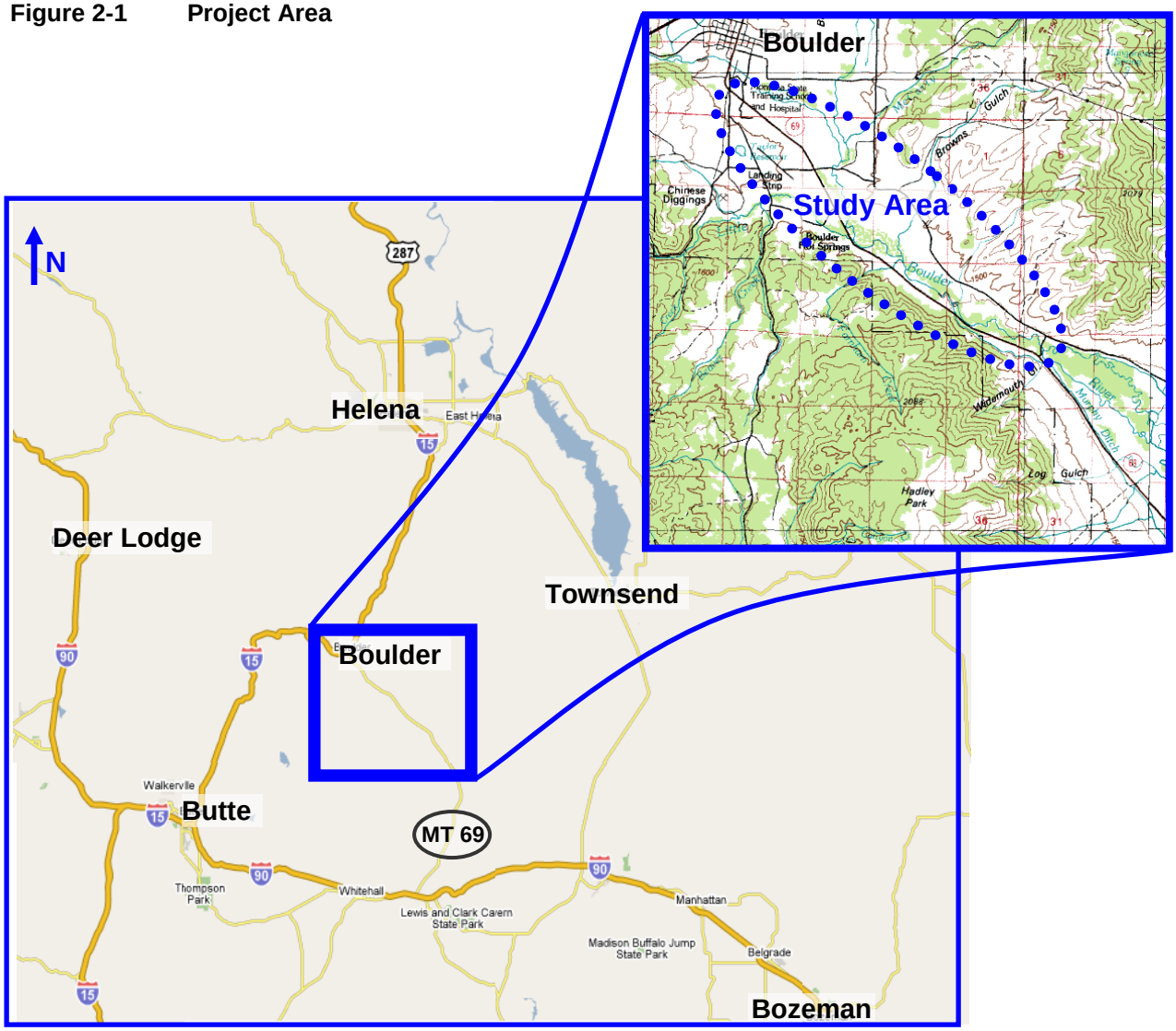
2.0 PROJECT AREA DESCRIPTION

As shown in Figure 2-1, the proposed project is located within the following legal description(s):

Township	Range	Section(s)
5 N	3 W	18, 19
5 N	4 W	2, 3, 4, 10, 11, 13, 14, 24
6 N	4 W	32, 33

The project area begins at MP 31.8± and extends to the north approximately six miles, ending at MP 37.5± just south of Boulder.

Figure 2-1 Project Area



Note: Figure not to scale.

The existing MT 69 alignment generally follows the Boulder River with wetlands on either side of the road and a substantial rock outcropping adjacent to the western side of the road near MP 34±. A representative portion of the road is shown in Figure 2-2.

Figure 2-2 Existing Roadway Along Boulder River

MT 69 is a state primary highway. It is used by rural residents traveling between home and work, as well as regional users traveling between Helena, Butte, Three Forks, and Bozeman. MT 69 is also an interstate truck route, and currently serves a substantial number of regional, national, and international freight carriers.

3.0 CORRIDOR PROBLEM STATEMENT

As shown in Table 3.1, the all-vehicle crash rate for the portion of MT 69 from MP 31.8± to MP 37.5± over the period January 1, 1998 through December 31, 2007 was approximately 44 percent greater than the statewide average crash rate for rural state primary highway systems. Over the same period, the all-vehicle severity rate was over 17 percent greater than the statewide average. Additionally, the percentage of crashes involving trucks over this portion of MT 69 was approximately 27 percent greater than the percentage of crashes involving trucks for all rural state primary highways over the same time period. There have been 23 injuries and one fatality during the period from 1998 through 2007.

Table 3.1 Crash History Comparison

Criteria	Rural State Primary Highways (1998-2007)	MT 69 MP 31.8± – 37.5± (1998-2007)
Weighted AADT	NA	1,199
Total Number of Crashes	15,495	51
Crash Rate (All Vehicles)	1.42	2.04
Severity Index (All Vehicles)	2.41	1.96
Severity Rate (All Vehicles)	3.41	4.00
Total Number of Crashes Involving Trucks	1,193	5
Percentage of Crashes Involving Trucks	7.7%	9.8%
Snow, Slush, and Ice Pavement Conditions at Time of Crash (All Vehicles)	3,080	9
Dark Not Lighted at Time of Crash (All Vehicles)	4,887	15

Source: Montana Department of Transportation, 2008

Single vehicle off-road accidents resulting in overturn are of particular concern in this corridor. Of all crashes that occurred during the period January 1, 1998 through December 31, 2007, nearly 73 percent (37 out of 51) involved single vehicles. Of these, nearly 30 percent (11 out of 37) resulted in overturn. An additional crash involving two vehicles also resulted in overturn.

Speed was indicated as a factor in six of the 51 total crashes in the reporting period in this corridor, with one-third of rollover crashes citing speed as a factor. Of the 12 rollovers, five occurred on a curve, seven occurred under dark conditions, and four occurred in snow, rain, or ice conditions.

Conflicts with wild and domestic animals is another concern in the project corridor. Of all crashes over the period January 1, 1998 through December 31, 2007, just over 21 percent (or 15 crashes out of 51 total crashes) involved collisions with animals. Of these 15 crashes, one-third (or 5 out of 15) involved domestic animals, while the remaining two-thirds (or 10 out of 15) involved wild animals.

The portion of MT 69 between MP 31.8± and MP 35± experiences periodic icing due to shading from the rock outcropping, which likely contributes to the incidence of crashes. Nine of the 28 accidents over this portion of the corridor occurred under icy or snowy roadway conditions.

In addition to the high incidence of crashes on MT 69, the roadway has also outlived its design life. This means that the pavement surfacing and roadway base have begun to deteriorate and will continue to do so if no improvements are made.

4.0 RANGE OF COMMON SOLUTIONS

This chapter presents common solutions used to address poor highway safety performance. Specifically, three categories of improvement options are introduced, including speed limit reduction / enforcement, spot improvements, and geometric improvements. As discussed below, these are typical measures used to correct the problems identified in Chapter 3.

Speed Limit Reduction / Enforcement

In some cases, excessive speeds can create unsafe conditions. Where excessive speeds are believed to be a factor, speed studies can be conducted to determine how fast vehicles are traveling and whether an adjustment should be made to the posted speed limit.

In cases where it appears that the posted speed limit is appropriate, enforcement measures may be used to attempt to bring more drivers into compliance with the legal limit. Due to the current narrow paved width and lack of shoulders in the Boulder corridor, speed limit enforcement is difficult.

Spot Improvements

The intent of spot improvements is to provide measurable safety benefits in a particular location without undergoing a major reconstruction project. Spot improvements are often specific to a particular roadway, but can include construction of pullout locations to allow emergency and law enforcement stopping, pavement resurfacing to extend the life of a roadway, and trimming of vegetation to improve sight distance.

Geometric Improvements

Highways constructed several decades ago often do not meet current MDT design standards with regard to geometric roadway features, including horizontal and vertical curves, paved widths, and side slopes. Corrected horizontal and vertical alignments and roadway templates can result in improved safety performance. Depending on the extent of non-standard geometric features, this type of improvement can take the form of either a targeted rehabilitation or a full roadway reconstruction to address more widespread concerns. When more than 25 percent of a roadway requires rehabilitation, it is MDT policy to completely reconstruct the entire roadway length. The following provides an overview of the current geometric issues in the corridor.

Horizontal and Vertical Curves

Nonstandard horizontal and vertical curves can contribute to unsafe conditions on a roadway. Sharp horizontal curves and short vertical curves are often targeted during reconstruction projects as a means to improve safety. In the Boulder corridor, all horizontal or vertical curves meet or nearly meet current MDT standards.

Clear Zone

The clear zone is defined as the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a recovery area. The desired width is dependent upon traffic volumes, speeds and roadside geometry.

Obstacles within the clear zone create hazards for errant vehicles. A roadside obstacle is generally defined as any roadside feature that cannot be safely impacted by a run-off-the-road vehicle. Roadside obstacles include both fixed objects (e.g., trees, signs, boulders) and non-traversable roadside features (e.g., rivers).

Where a roadside obstacle is located within the clear zone, highway design should incorporate the most practical and cost-effective treatment for the site conditions. As listed in the MDT Road Design Manual, the range of treatments in order of preference includes:

1. eliminate the obstacle (flatten embankment, remove rock outcroppings, etc.);
2. relocate the obstacle;
3. where applicable, make the obstacle breakaway (sign posts, luminaire supports);
4. shield the obstacle with a roadside barrier; or
5. do nothing.

The selected treatment should be based upon the traffic volumes, roadway geometry, proximity of the obstacle to traveled way, nature of the hazard, costs for remedial action, and accident experience.

Guardrail is considered one type of roadside barrier. Because roadside barriers are themselves a hazard to errant vehicles, guardrail is typically installed when the relative severity of impacting the barrier is considered less than the relative severity associated with impacting the obstacle. In appropriate situations after careful consideration, however, MDT sometimes uses guardrail in resource avoidance and minimization efforts.

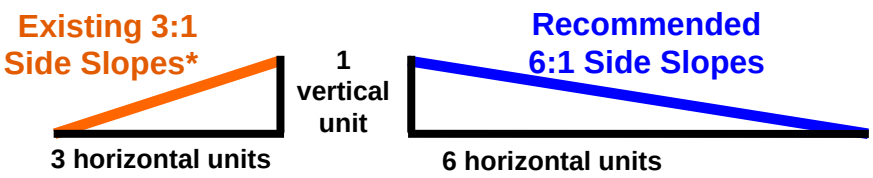
There are a number of obstacles within the MT 69 clear zone, including a rock outcropping located near MP 34± and the Boulder River, which runs adjacent to the roadway through the majority of the project corridor. The appropriateness of guardrail application in this corridor would generally be determined later in the design phase of the project.

Side Slopes

Based on statewide and national data, steep side slopes can be correlated with the incidence of overturning vehicles. When highways are reconstructed or rehabilitated, steep side slopes are often flattened to meet current standards in order to improve safety performance.

The existing MT 69 alignment has steeper side slopes than recommended under current MDT design standards. Figure 4-1 presents a schematic drawing showing existing side slopes and recommended side slopes.

Figure 4-1 Existing and Recommended Side Slopes



As noted in Chapter 14 of the MDT Road Design Manual, a 3:1 slope is considered to be traversable, but non-recoverable. This means that a run-off-the-road vehicle could safely negotiate the slope without overturning, but would not be able to successfully return to the roadway. Slopes steeper than 3:1 are considered critical, meaning that they cannot be safely traversed by a run-off-the-road vehicle and would therefore likely result in overturn.

Slopes throughout the study area are very near the traversability threshold. Although the existing slopes are generally 3:1 and therefore are theoretically defined as being traversable, 30 percent of all single-vehicle crashes result in overturn according to crash data for this corridor. It is likely that the current side slope conditions on MT 69 contribute to the incidence of crashes resulting in overturn.

Roadway Width

Shoulder width has been shown to affect safety performance. Wider shoulders generally allow errant vehicles to correct their path and return to the travel lane without leaving the paved surface. Additionally, wider shoulders provide an opportunity for vehicles to pull over in emergency situations and enable speed limit enforcement by providing locations for law enforcement officers to pull over speeding drivers. A wider top width can also improve sight distance, allowing drivers to detect objects and animals in the roadway.

The current MT 69 roadway is approximately 26 feet wide, which is narrower than the 32-foot width recommended by the MDT Route Segment Plan. Since 1996, it has been MDT policy to add two feet of width on reconstruction projects in order to provide sufficient width for a future overlay with standard slopes and still maintain Route Segment Plan width. Following this policy, the total recommended roadway width in the MT 69 corridor is 34 feet, including two 12-foot travel lanes and two five-foot shoulders.

As depicted in Figure 4-2, the existing roadway has very narrow shoulders, while wider shoulders are recommended throughout the corridor. As noted in the American Association of State Highway and Transportation Officials' (AASHTO) Policy on Geometric Design of Highways and Streets, although it is desirable that a shoulder be wide enough for a vehicle to be driven completely off the traveled way, narrower shoulders are better than none at all. When a vehicle making an emergency stop can drive onto the shoulder to occupy only one to four feet of a traveled way of adequate width, the remaining traveled way width can be used by passing vehicles.

Figure 4-2 Existing and Recommended Paved Width

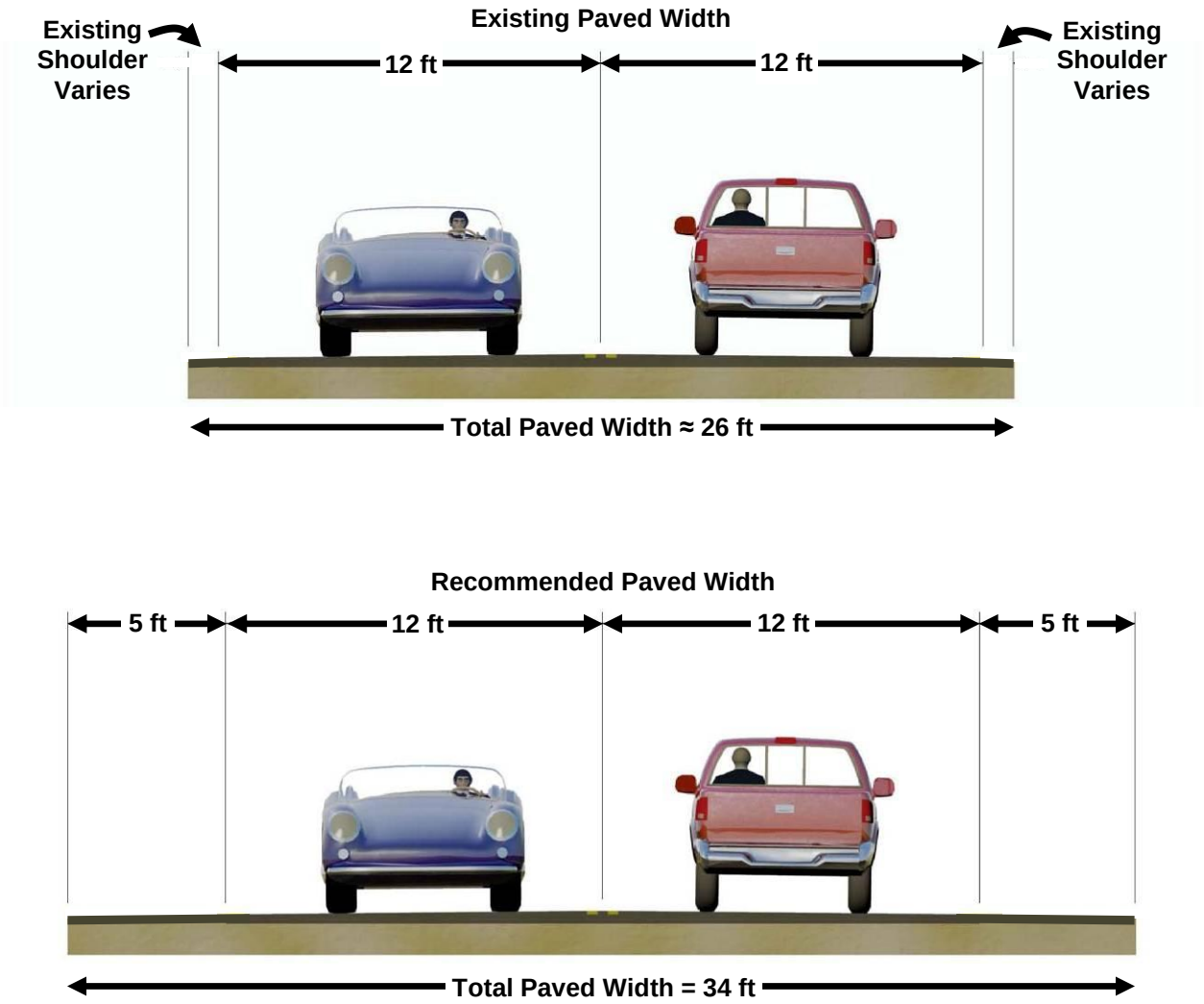
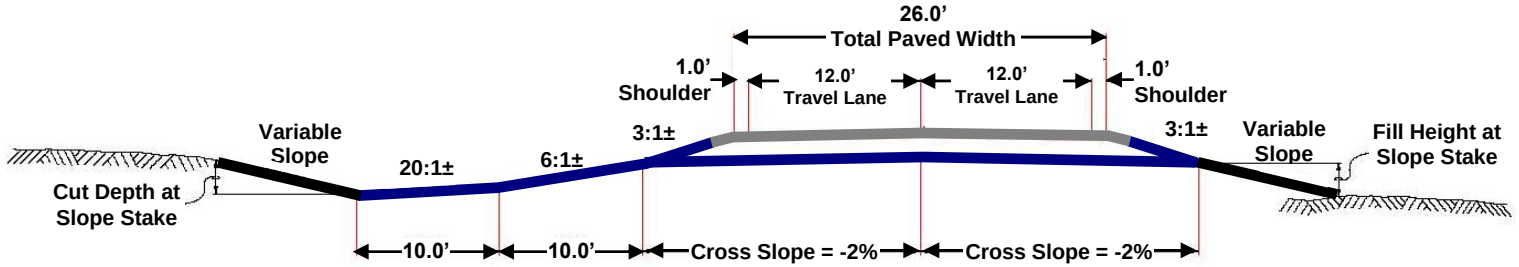


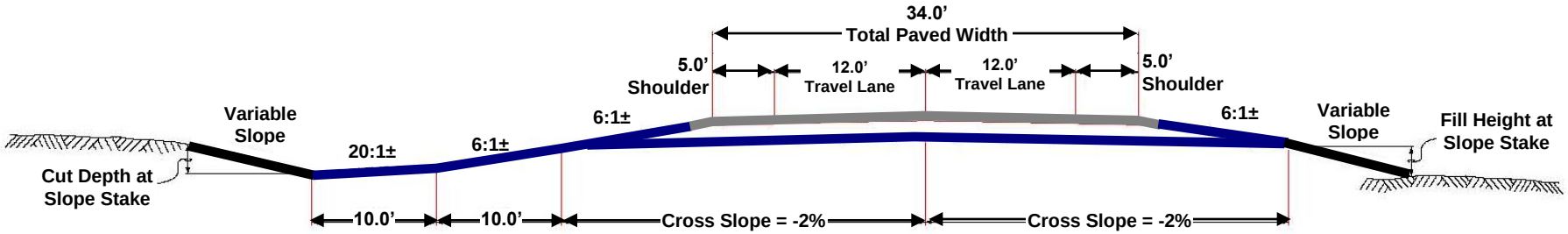
Figure 4-3 presents hypothetical cross sections for the existing and proposed roadways. Differences between the two include wider shoulders and flatter side slopes for the proposed cross section as compared to the existing cross section. It should be noted that there is some variance in cross section elements on the existing roadway over the length of the project corridor. It should also be noted that the proposed cross section does not account for any adjustments to the vertical elevation of the roadway; the necessity of a grade raise would be determined later in the design of the project.

Figure 4-3 Existing and Proposed Cross Sections

Existing Cross Section



Proposed Cross Section



5.0 DEVELOPMENT OF ALTERNATIVES

This chapter describes the five alternatives considered in this study. Alternatives are presented in chronological order according to their development during this process.

Existing Alignment Alternative

MT 69 was nominated for rehabilitation / reconstruction and widening in order to preserve the driving surface of the existing roadway and improve safety performance on the highway. Rehabilitation / reconstruction and widening of the existing alignment was the first alternative considered in the corridor.

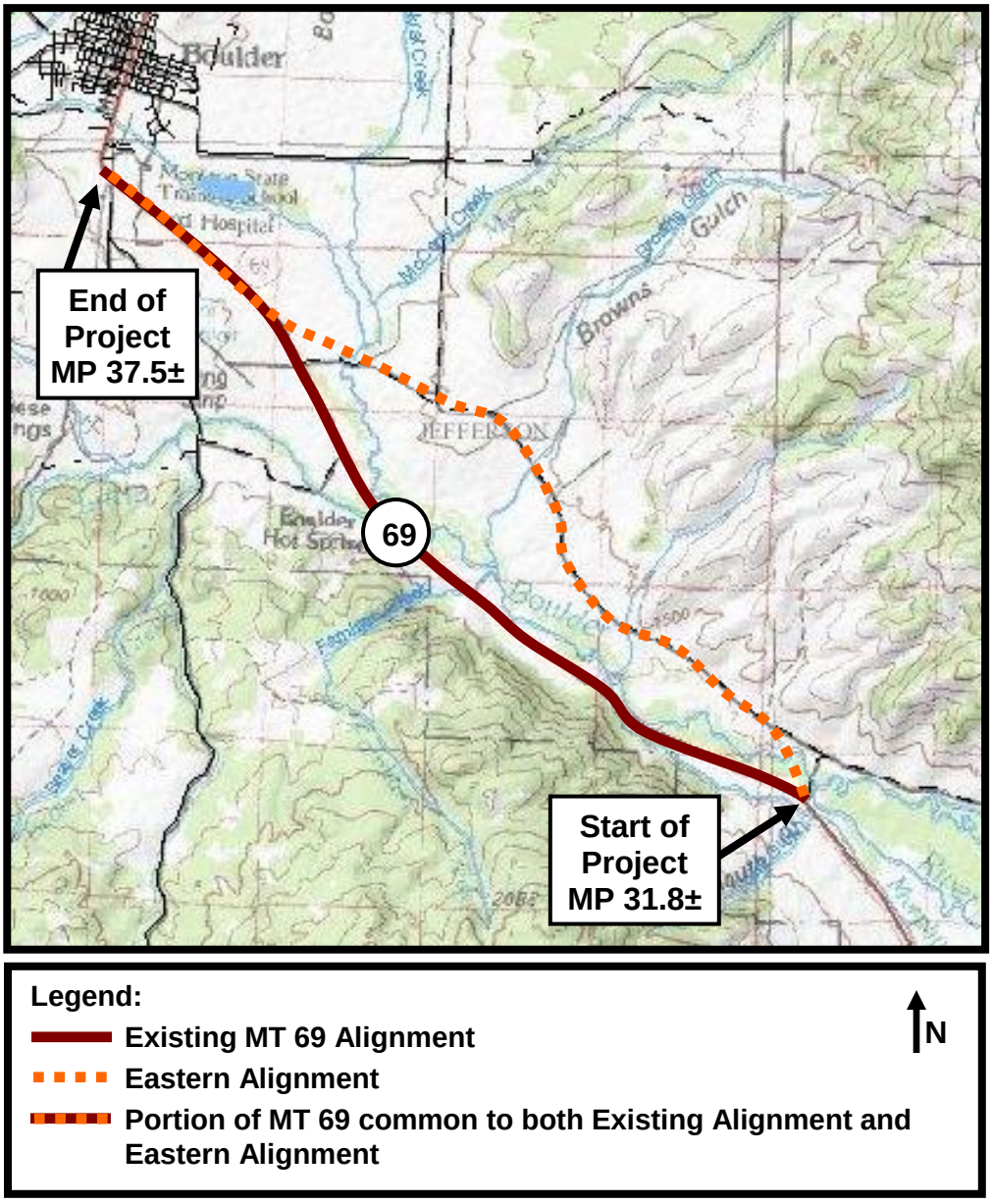
This alternative would widen MT 69 generally following the existing alignment, but allowing for minor alignment shifts intended to minimize impacts to natural resources. A minor alignment shift is defined as generally overlapping or closely paralleling the existing alignment within a few feet of the roadway centerline. Under this alternative, non-standard geometric features would be corrected, including shoulders and side slopes. The paved width would be widened to 34 feet, as previously illustrated in Figures 4-2 and 4-3. It should be noted that Figure 4-3 does not account for any alterations to the existing grade level, which may be required for rehabilitation / reconstruction and widening of the existing alignment. A grade raise would result in a wider overall footprint than depicted in Figure 4-3.

Eastern Alignment Alternative

In weighing rehabilitation / reconstruction and widening of the existing roadway, MDT took into consideration the challenges associated with providing the necessary improvements along an alignment constricted by the Boulder River; numerous wetlands which make construction more complex, costly, and difficult to permit; and rock outcrops which cause shading and icing problems in inclement winter weather.

Although new alignments are generally not proposed for safety improvement projects, MDT initiated the development of a conceptual alignment that would generally follow an existing Jefferson County road east of the Boulder River in coordination with Jefferson County commissioners. It was thought that this eastern alignment may be easier to construct, provide a safer route for drivers, result in fewer wetland and river impacts, and experience less icing as compared to the existing roadway. The existing and eastern alignments are illustrated in Figure 5-1.

Figure 5-1 Existing and Eastern Alignments



Note: Figure not to scale. MP locations approximated.

Under this alternative, the new roadway would be constructed in accordance with current MDT geometric standards, including 6:1 side slopes and a 34-foot paved width, as previously illustrated in Figures 4-2 and 4-3.

It should be noted that construction of a new eastern alignment would create two paved roadways through the corridor since the existing MT 69 roadway would continue to be maintained as a local access roadway.

No Build Alternative

An early scoping meeting was held on June 1, 2005 in Boulder, during which the existing and eastern alignment alternatives were presented. Approximately 100 people attended the meeting and the majority of those in attendance expressed their strong disapproval of any new alignment east of the river, as noted in the summary of public involvement activities, meeting transcript, and written comments, which are included in Appendices A, B, and C.

As an alternative to a new alignment, several members of the public expressed support for a No Build alternative in which no improvements would be made in the corridor. A No Build alternative is therefore included in this study.

A No Build alternative would maintain existing conditions along the entire length of the project corridor by providing routine maintenance. There would be no opportunity for geometric improvements or roadway widening. Existing vegetation would remain in place, posing a continuing sight distance impediment. The roadway would continue to experience deterioration as a result of exceeding its design life.

Spot Improvements / Speed Limit Reduction / Enforcement Alternative

At the June 2005 public meeting, attendees' chief complaint was that vehicles, particularly trucks, were traveling above the posted speed limit and that enforcement measures were not sufficient to deter this behavior. It was suggested that reducing the posted speed limit or providing greater enforcement of the existing speed limit would improve safety in the Boulder corridor. In an effort to improve speed limit enforcement given the existing narrow shoulder width, members of the public suggested construction of pullout locations at regular intervals through the corridor.

During agency involvement activities conducted in 2008 and 2009, resource agencies also supported this option as an alternative to rehabilitation / reconstruction and widening of the existing alignment based on the assumption that strategic placement of pullouts may result in fewer impacts to wetlands than roadway widening through the entire corridor. Refer to Appendix A for a summary of public and agency involvement activities conducted to date. Agency correspondence is included in Appendix F, and minutes from agency meetings are included in Appendix G.

In response to public and resource agency requests, a Spot Improvements / Speed Limit Reduction / Enforcement alternative was developed for this study. This alternative would provide specific pullout locations through the corridor in order to provide opportunities for emergency and law enforcement stops. Additionally, the roadway would be resurfaced in order to extend the design life of the facility, but the existing travel width and side slopes would remain unchanged. This alternative also includes consideration of a lowered posted speed limit, as well as trimming of vegetation to improve sight distance. For ease, this alternative will be referenced as the Spot Improvements alternative throughout the remainder of this document. It should be noted that MDT does not have the authority to either establish or enforce speed limits. While construction of pullout locations may facilitate greater opportunity for the Montana

Highway Patrol to stop speeding vehicles, the success of this effort relies heavily on the level of enforcement provided by the Highway Patrol.

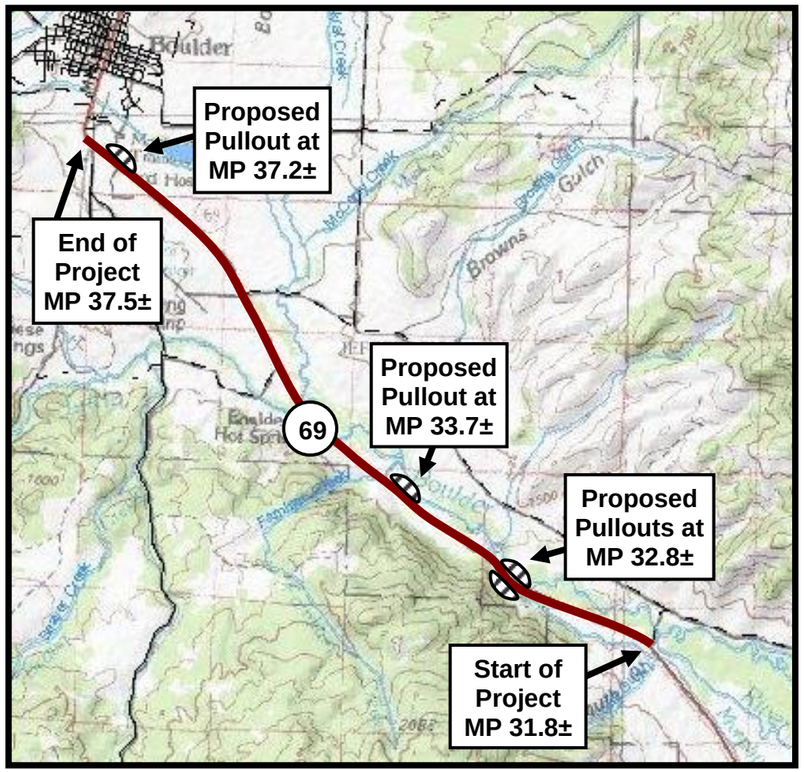
Under this alternative, pullout locations were identified primarily based on physical constraints in the corridor. Although enforcement efforts are most successful when there are relatively continuous pullout opportunities, pullout locations were identified only in areas that would result in minimal wetland impacts in response to resource agency requests. Pullouts were also identified in locations with adequate sight distance to allow safe acceleration and re-entry into the travel lane.

The AASHTO Policy on Geometric Design of Highways and Streets recommends a minimum turnout length of 170 m (560 ft) including taper lengths for an approach speed of 100 kilometers per hour (or approximately 60 miles per hour), and a maximum turnout length of 200 m (660 ft) to avoid use of the turnout as a passing lane. The minimum turnout width should be 3.6 m (11.8 ft), although a width of 5.0 m (16.4 ft) is considered desirable. The turnout location should also provide a minimum sight distance of 300 m (1000 ft) in each direction and a firm, smooth surface. Similarly, for truck turnouts, the MDT Road Design Manual recommends a turnout length of approximately 210 m (690 ft) including taper lengths, although it notes that dimensions may be dictated by site conditions.

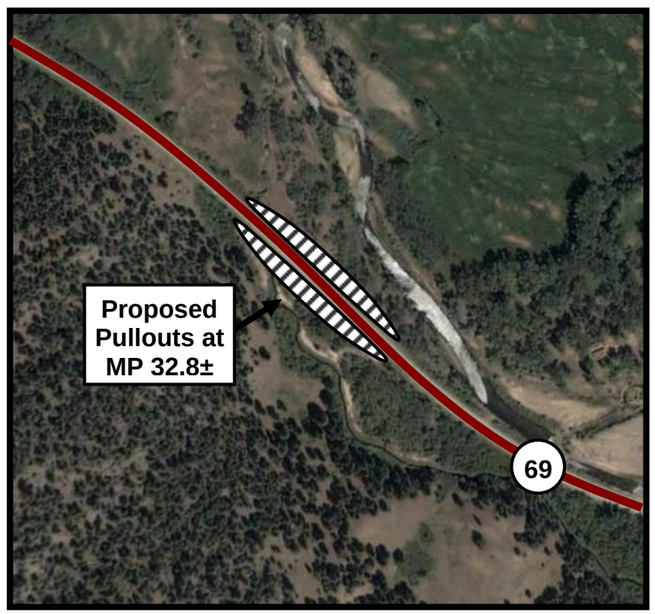
Due to the close proximity of the Boulder River and associated wetland areas, there are very few opportunities for adequate pullout locations within the project limits without resulting in wetland impacts. Although there are a number of private and farmfield approaches through the corridor that rise above adjacent wetland areas, wetland impacts would be expected to result on either side of the majority of these approaches if the recommended AASHTO and MDT length guidelines were followed. Therefore, in most cases, approaches were not identified as appropriate pullout locations.

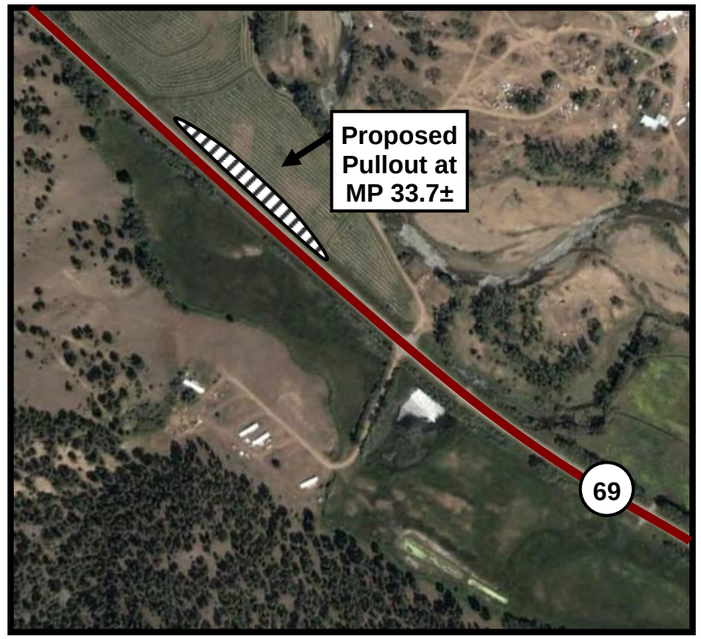
Four potential pullout locations were identified, as depicted in Figure 5-2. The pullouts are designed to be 600 feet in length and only six feet in width in order to minimize wetland impacts.

Figure 5-2 Proposed Pullout Locations



Note: Figure not to scale. MP locations approximated.





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Western Alignment Alternative

During agency involvement activities in 2008 and 2009, resource agencies voiced concern about potential impacts to the Boulder River, adjacent wetlands, and wildlife habitat that may result from rehabilitation / reconstruction and widening of the existing MT 69 alignment. Resource agencies requested consideration of alignment shifts off the existing alignment over a portion or portions of the project to avoid construction in areas closest to the Boulder River and associated wetland and floodplain areas.

In response to this request, the corridor was reviewed to determine if major alignment shifts away from the existing alignment over portions of the corridor would be feasible in order to minimize potential river, wetland, and floodplain impacts. An alignment shift immediately to the west over the portion of the corridor from MP 31.8± to 34.5± would impact farmlands and the Murphy Ditch. An alignment shift to the east would impact wet meadows between the existing alignment and the Boulder River. From MP 34.5 to 36.0, alignment shifts to the west would impact existing pasture land and wetland areas. Further west, an alignment shift would impact the Boulder Hot Springs and additional wetland areas. To the east, the roadway alignment is constrained by the Boulder River. From MP 36.0 to 37.4, an alignment shift to the west would impact the fairground, airport, and wetland areas. It should be noted that alignment shifts would involve new blocks of wetland impacts, whereas rehabilitation / reconstruction and widening of the existing alignment would impact linear slivers of wetland areas. Based on this corridor review, it was determined that major alignment shifts over relatively short portions of the corridor would not appreciably reduce wetland impacts, and may result in new impacts to other resources.

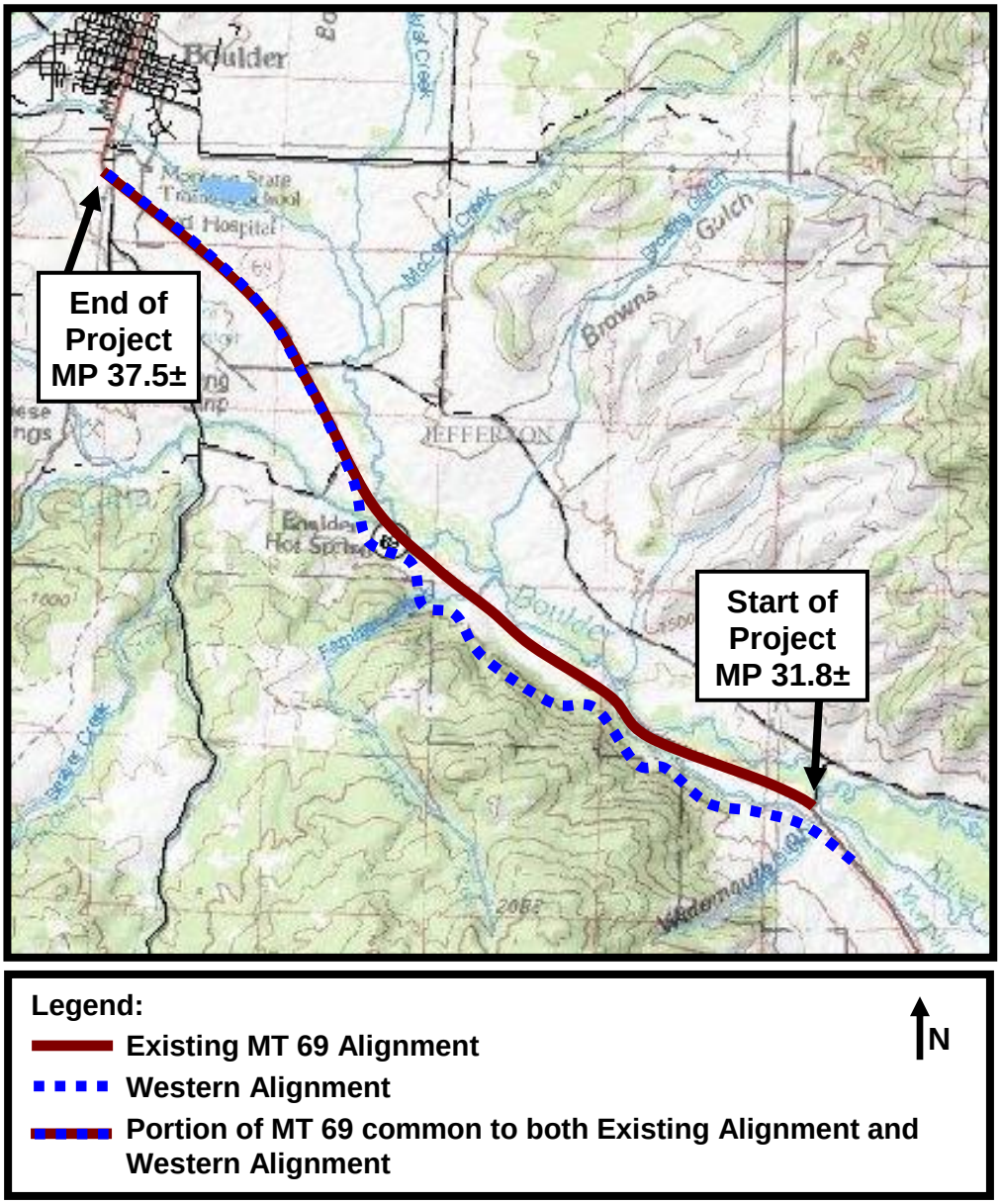
With the understanding that many members of the public expressed strong opposition to an eastern alignment, resource agencies also requested consideration of an alignment completely outside of the Boulder River floodplain to the west of the existing roadway over the entire project limits. Refer to Appendix G for minutes from the resource agency meetings conducted to date. As a result of this request, a western alignment was developed at a conceptual level, assuming construction in accordance with current MDT geometric standards, including 6:1 side slopes and a 34-foot paved width, as previously illustrated in Figures 4-2 and 4-3. It should be noted that in some locations along the western alignment, rock cuts would be required, necessitating some variance from the proposed typical section. In these cases, the total roadway footprint would likely be narrower than presented in Figure 4-3.

There is a sharp rise in elevation to the west of the existing roadway. In order to avoid construction within low-lying wetland areas throughout the valley floor, a western alignment would need to climb several hundred feet in elevation and traverse rough terrain. This proposed western alignment is illustrated in Figures 5-3 and 5-4. Although wetland areas could potentially be avoided by following the base of the hills along the valley floor, this would require a greater number of horizontal curves to accommodate the serpentine formation of the hillside, further reducing the efficiency and drivability of the roadway.

The western alignment does not include consideration of climbing lanes, although they may be required given the steep grades. Determining the need for climbing lanes is usually conducted later in the design phase. If climbing lanes were needed, they would increase the cost of this alternative substantially.

It should be noted that construction of a new western alignment would create two paved roadways through the corridor since the existing MT 69 roadway would continue to be maintained as a local access roadway.

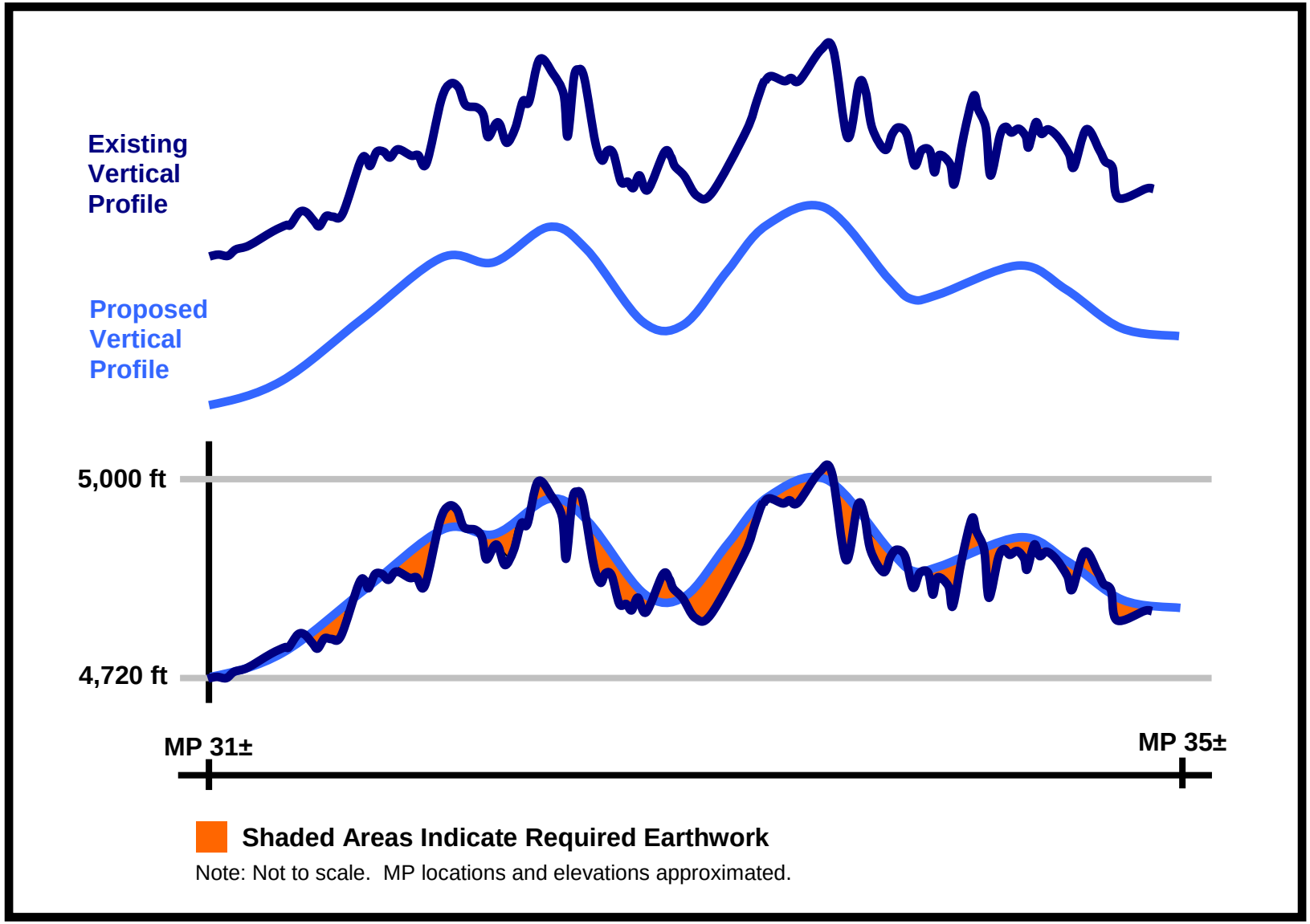
Figure 5-3 Existing and Western Alignments



Note: Figure not to scale. MP locations approximated.

As shown in Figure 5-3, the western alignment would include a number of horizontal curves. The proposed roadway was designed to curve in this manner in order to optimize the vertical alignment and to minimize the amount of cut and fill that would be required. Despite this effort, a substantial amount of earthwork would still be required due to the mountainous terrain, as depicted in Figure 5-4.

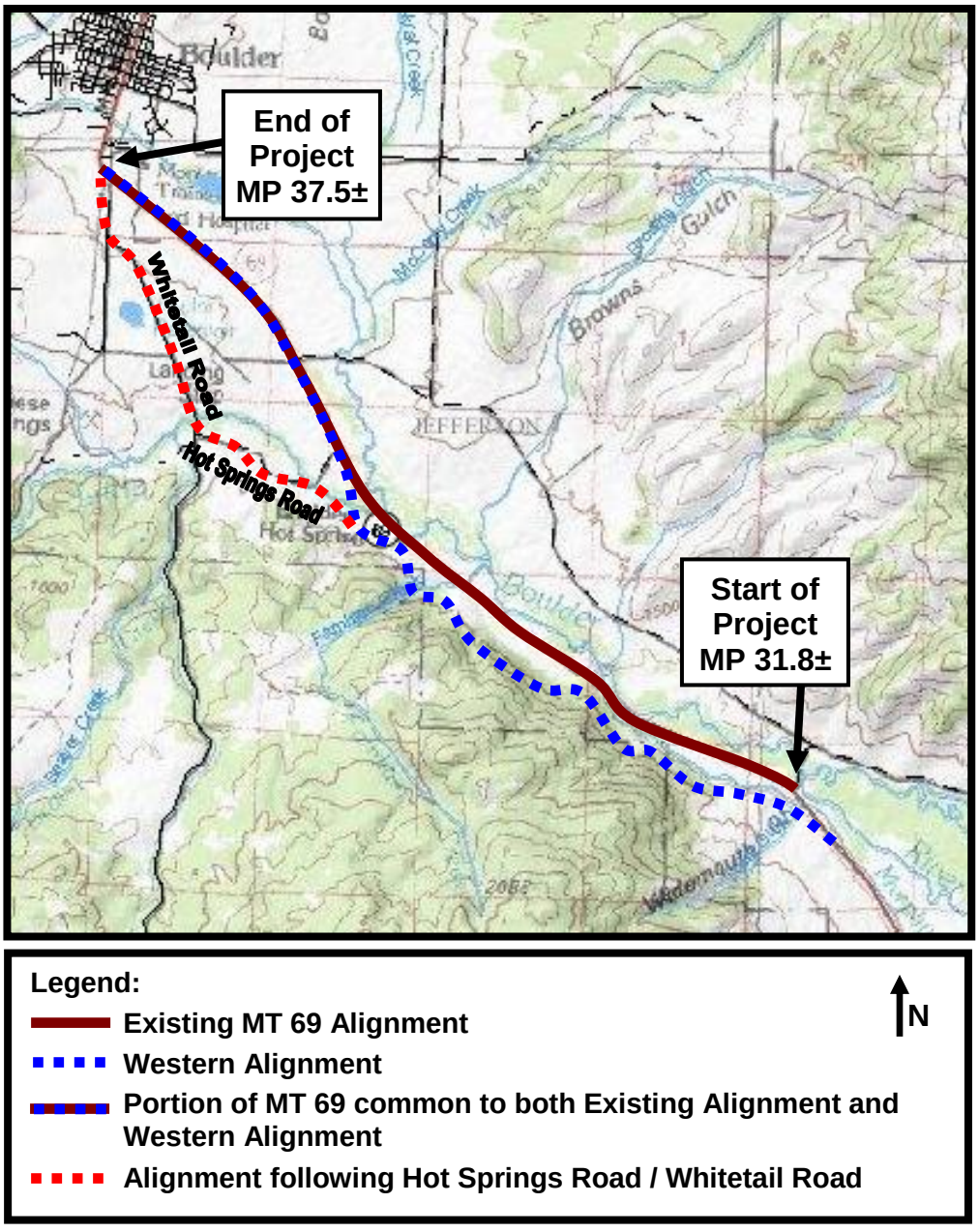
Figure 5-4 Proposed Vertical Profile for Western Alignment



In designing the western alignment, there was some initial consideration given to following Hot Springs Road and Whitetail Road farther to the west in the hopes of further minimizing wetland impacts, as opposed to tying back into the existing alignment near MP 35±. By doing so, the western alignment would essentially bypass the entire Boulder River floodplain over the project limits, as illustrated in Figure 5-5.

Following these existing county roadways to the west would extend the total length of the project, and would still impact wetland areas and require crossing the Little Boulder River. This alignment would also impact farmlands, and potentially impact the county fairgrounds and the airport. For these reasons, this alignment was not explored further.

Figure 5-5 Alignment Following Hot Springs Road / Whitetail Road



Note: Figure not to scale. MP locations approximated.

6.0 ALTERNATIVES SCREENING CRITERIA

A three-part screening process was developed in order to evaluate the alternatives at a pre-NEPA/MEPA planning level. While inability to pass any one of these screens would typically be cause for elimination of an alternative, each alternative is passed through each screen to provide a more thorough and objective analysis in preparation for future NEPA/MEPA analyses. In order to pass the overall screening process, however, an alternative must pass each of the three individual screens. These three screens are described in more detail below, and analysis follows in the next chapter.

Screen 1: Does the alternative address the problems in the corridor?

As described in the Chapter 3, the primary concerns in the MT 69 corridor are the relatively high number of single vehicle crashes resulting in overturn, animal-vehicle conflicts, and a deteriorating roadway facility. In order to pass the first screen, an alternative would need to directly address these issues.

Screen 2: Are there fatal flaws relating to natural resource impacts or regulatory compliance?

This screen is intended to identify fatal flaws relating to anticipated natural resource impacts. In this context, a fatal flaw is defined as a natural resource impact that cannot be mitigated to a level below significance in the NEPA/MEPA context.

Screen 3: Is the alternative reasonable and practicable?

In order to be considered viable, an alternative must be reasonable and practicable. Reasonable alternatives are described in Council on Environmental Quality (CEQ) guidelines as including "those that are practical or feasible from the technical and economic standpoint and using common sense." Additionally, an alternative is considered unreasonable if it does not satisfy the purpose and need for the project.

Practicability is a concept defined in relation to permitting under Section 404. Implementing regulations for Individual Permits state that discharge of dredged or fill material into Waters of the U.S. is not permitted if there is a practicable alternative which would have less adverse impact on the aquatic ecosystem (40 CFR 230.10). Accordingly, impracticable alternatives can be eliminated from further consideration. Practicability is determined based on factors including cost, existing technology, and logistics in light of overall project purposes.

In a joint memorandum regarding Section 404 Guidelines, the Environmental Protection Agency (EPA) and the Department of the Army state that "[t]he determination of what constitutes an unreasonable expense should generally consider whether the projected cost is substantially greater than costs normally associated with the particular type of project." Further, Section 404 Guidelines state that "[i]f an alleged alternative is unreasonably expensive to the applicant, the alternative is not practicable." Cost is an important consideration in the determination of practicability and therefore will be given considerable weight in this analysis.

In addition to cost, existing technology and logistics are measures of practicability. New or untested technologies are not required to be employed in order to minimize impacts. Further, logistical factors including constructability, social and political concerns, and ease of right-of-way acquisition are important considerations in the determination of an alternative's practicability. If an alternative presents too great an impediment based on any of these factors, it could be considered impracticable and eliminated from further consideration. Such impediments could include absence of community and/or political support and condemnation proceedings where necessity could not be established, as defined under eminent domain laws.

Once each alternative has been tested against these three screens, they will be compared to determine what, if any, alternatives should be forwarded, and what, if any, should be eliminated from further consideration in the NEPA/MEPA process.

7.0 ANALYSIS OF ALTERNATIVES

This chapter discusses the evaluation of alternatives according to the defined screening process. Under each screen, alternatives are not discussed in chronological order as in Chapter 5, but rather in order of relative level of construction involvement, with the No Build alternative discussed first and new alignments discussed last.

Screen 1: Does the alternative address the problems in the corridor?

While this project was initially nominated due to deteriorating roadway condition, the primary concern in the corridor is the high incidence of single-vehicle rollover crashes and animal-vehicle conflicts. Thus, the preferred improvement alternative must address the condition of the driving surface itself, as well as safety concerns through the corridor.

Following the Zegeer method (FHWA, 1987), a safety and operational crash model was developed in order to assess the effect of varying roadway templates on safety performance. Six roadway templates were compared, including the existing roadway and roadways with four-foot and five-foot shoulders assuming existing side slopes (generally 3:1), as well as templates with varying shoulder widths and new side slopes (flatter than 4:1). Four-foot shoulders correlate to the paved roadway width recommended under the Route Segment Plan, while five-foot shoulders follow MDT's policy of adding two additional feet for future overlay purposes. Current year (2008) AADT served as a baseline comparison, with design year (2032) AADT projected for each of the roadway templates. The model output was calibrated to exactly match the number of crashes over the ten-year period from January 1, 1998 through December 31, 2007 (as listed for current year 2008).

Each roadway template was assigned a hazard rating, which was determined based on factors including width of portion of clear zone outside pavement edge; presence of guardrail, exposed trees, poles, or other objects; side slopes; and relative recoverability, with higher numbers representing greater overall roadway hazards.

A hazard rating of five was assigned to the existing roadway template and roadway templates with four-foot and five-foot shoulder widths, given the following assumptions:

- Portion of clear zone outside pavement edge between five and ten feet from pavement edge
- Side slopes generally 3:1 (considered virtually non-recoverable)
- May have guardrail zero to five feet from pavement edge
- May have exposed trees, poles, or other objects within ten feet from pavement edge

A hazard rating of two was assigned to all other roadway templates, with the following assumptions:

- Portion of clear zone outside pavement edge between 20 and 25 feet from pavement edge
- Side slopes flatter than 4:1 (considered recoverable)
- No objects within ten feet from pavement edge

The results of this modeling effort are presented in Table 7.1.

Table 7.1 Results of Safety and Operational Crash Model

Parameter		Existing Roadway 1-ft Shoulder (2008)	Existing Side Slopes (Generally 3:1)			New Side Slopes (Flatter than 4:1)		
			Existing Roadway 1-ft Shoulder (2032)	4-ft Shoulder (2032)	5-ft Shoulder (2032)	Existing Roadway 1-ft Shoulder (2032)	4-ft Shoulder (2032)	5-ft Shoulder (2032)
Input Values	AADT	900	1,170	1,170	1,170	1,170	1,170	1,170
	Lane Width (ft)	12	12	12	12	12	12	12
	Paved Shoulder Width (ft)	1	1	4	5	1	4	5
	Unpaved Shoulder Width (ft)	0	0	0	0	0	0	0
	Hazard Rating	5	5	5	5	2	2	2
Crash Comparison	Total Crashes (10 years)	36.4	46.9	39.0	36.7	27.2	22.6	21.2
	Total Crashes (10 years) Calibrated**	51.0	65.8	54.7	51.4	38.1	31.7	29.8
	Total Crashes (per year)	10.2	13.2	10.9	10.3	7.6	6.3	6.0
	Percent Change in Total Crashes (per year) Compared to Existing Roadway (2008)	NA	29% Higher	7% Higher	1% Higher	25% Lower	38% Lower	41% Lower

** Calibration Multiplier = 1.402 (Actual crashes/predicted crashes)
Source: MDT, 2009.

As shown in Table 7.1, there is a marked difference in safety performance between the existing and new roadway templates. With no improvements, the existing roadway is predicted to experience 29 percent more crashes in 2032 as compared to 2008. A new roadway with existing side slopes (generally 3:1) and wider shoulders ranging from four to five feet is expected to result in one to seven percent more crashes per year as compared to the existing roadway in 2008. This indicates that additional shoulder width alone does not result in substantial improvements in safety performance.

A new roadway template with existing shoulders (one foot in width) and flatter side slopes would result in 25 percent fewer crashes per year, while new roadway templates with flatter slide slopes combined with wider shoulders ranging from four to five feet in width are expected to result in a 38 to 41 percent reduction in crashes in 2032 as compared to the existing roadway in 2008. These results show that while flatter side slopes alone provide safety benefits, the greatest benefit results from a combination of flatter side slopes and greater shoulder widths.

It should be noted that while guardrail is assumed over discrete portions of the roadway under a hazard rating of five, the model does not define a hazard rating for instances where guardrail borders the entire length of the roadway in question. While steeper side slopes in combination with guardrail can reduce impacts to adjacent lands, guardrail is considered to be a roadside obstacle for run-off-the-road vehicles. Any object in or near the path of a vehicle can contribute to crash severity should the vehicle leave the travel lane.

No Build

This alternative **fails** to pass the first screen because it would not address any of the problems in the corridor. By maintaining the existing roadway template, there would be no improvement in the incidence of single vehicle crashes or animal-vehicle conflicts. Steep side slopes would continue to enable rollover accidents if a vehicle were to stray from the travel lane. Narrow shoulders and dense vegetation closely paralleling the roadway would continue to pose a sight distance impediment. As shown in the crash model, the number of crashes is predicted to increase over the next twenty years if no improvements are made to the existing roadway. Additionally, this alternative would not improve the physical condition of the roadway facility, and therefore the roadway would continue to experience deterioration as a result of exceeding its design life.

Spot Improvements

This alternative was developed based on the public perception that travel speeds are too high in this corridor. While excessive speeds can create unsafe conditions in some instances, a number of studies have shown that reducing posted speed limits alone does not substantially affect driver behavior. FHWA, the Institute of Transportation Engineers (ITE), the Transportation Research Board (TRB), and others have found that motorists tend to drive at a speed they feel is reasonable and prudent for the conditions, regardless of the posted speed limit. Posted speed limits are generally set at the speed at which 85 percent of traffic is moving. This 85th percentile speed is generally acceptable to most drivers and therefore results in the highest voluntary compliance. Lowering the posted speed limit alone is generally an ineffective measure. Consistent enforcement efforts are needed to successfully lower speeds below the 85th percentile speed.

Although residents in the MT 69 corridor south of Boulder perceive that a majority of vehicles exceed the posted speed limit on MT 69, recent data suggests otherwise. A speed study conducted in February 2009 on MT 69 from the town of Boulder to MP 35.0 shows that 85 percent of vehicles traveled at or below 71 miles per hour (mph) over the portion of the corridor with a posted speed limit of 70 mph. As noted in Chapter 3, speed was indicated as a factor in just seven of the 51 total crashes in the reporting period in this corridor. Just one-third of the rollover crashes included speed as a factor. Thus, even if the posted speed limit was reduced and the Montana Highway Patrol implemented greater speed enforcement measures, this alternative would address less than 14 percent of all crashes in the corridor.

The 2009 speed study shows that approximately 15 percent of vehicles travel at speeds exceeding the posted speed limit. Improved enforcement may bring more drivers into compliance with the speed limit in this corridor. Enforcement of posted speed limits on MT 69 is currently difficult given the narrow shoulders through the corridor. Law enforcement personnel are generally unable to pull drivers over for speeding or other infractions due to lack of any space to pull over a vehicle.

Enforcement efforts are most successful when there are relatively continuous pullout opportunities, with continuous shoulders providing the most effective enforcement opportunities. In response to public and agency requests, however, the spot improvement alternative was developed for this study to only include intermittent pullout locations. In the interest of minimizing project impacts, pullout locations were identified only in areas expected to result in minimal impacts to wetlands.

Because shoulder widths and side slopes would remain the same over the corridor, the high incidence of single vehicle crashes resulting in overturn is projected to worsen over time, as noted in Table 7.1. The four proposed pullout locations would provide some opportunity for emergency stops and may help enforcement efforts. Speed limit enforcement is most successful, however, when there are continuous shoulders along each side of a roadway. As noted above, speed was a factor in only a minority of crashes. Even if enforcement efforts were improved through the construction of pullout locations, speed limit enforcement alone likely would not appreciably affect the high incidence of crashes in the corridor. For these reasons, this alternative **fails** to address the primary concerns in the corridor.

Existing Alignment

Rehabilitation / reconstruction and widening of the existing alignment would successfully address the problems in the corridor, therefore **passes** the first screen. By providing a new roadway template with flatter side slopes and wider shoulders, this alternative is projected to reduce the incidence of crashes and animal-vehicle conflicts by at least 30 percent from the existing conditions, provide sufficient opportunity for emergency and enforcement stops, and would provide a new facility with a multi-year design life.

Although some members of the public have requested that no improvements be made in the Boulder corridor, MDT and FHWA have a responsibility to provide a safe and efficient roadway facility. As documented in this report, the crash rates (both in number and in severity) along the existing MT 69 route are substantially higher than on other similar routes across the state, resulting in 23 injuries and one fatality during the period from 1998 through 2007. Given the location of accidents, it can be concluded that most crashes are the result of roadway geometry,

with driver error, speed, and adverse weather conditions also playing a role. By providing a wider paved width and flatter side slopes, this alternative is expected to reduce the number of single vehicle crashes resulting in overturn, as well as the total number of crashes in the corridor.

Eastern and Western Alignments

A new alignment would successfully address the problems in the corridor, and therefore the eastern and western alignment alternatives **pass** the first screen. By providing a new facility that meets current MDT design standards, these alternatives would likely reduce the incidence of crashes and animal-vehicle conflicts in the corridor, provide sufficient opportunity for emergency and enforcement stops along the new route, and would provide a new facility with a multi-year design life.

Table 7.2 presents the results of the first screen.

Table 7.2 Results of First Screen

Component of Screen One	Alternatives				
	No Build	Spot Improvements	Existing Alignment	Eastern Alignment	Western Alignment
Single Vehicle Crashes Resulting in Overturn	Number of crashes predicted to increase without new roadway template	Number of crashes predicted to increase without new roadway template	Flatter side slopes and wider shoulders would reduce the number of single vehicle crashes resulting in overturn.		
Animal-Vehicle Conflicts	No Improvement	Trimming vegetation would improve sight distance somewhat.	Wider shoulders and thinner vegetation cover would improve sight distance and likely reduce the number of animal-vehicle conflicts.		
Deteriorating Roadway	No Improvement	New surfacing would extend the life of the roadway.	A new roadway facility would have a multi-year design life.		
Screening Result	**FAIL**	**FAIL**	**PASS**	**PASS**	**PASS**

Note: Orange shaded cells indicate failure of individual screen component, leading to failure of overall screen.

Screen 2: Are there fatal flaws relating to natural resource impacts or regulatory compliance?

A number of regulatory entities have permitting jurisdiction with regard to this project, including the Montana Department of Environmental Quality (DEQ), the U.S. Army Corps of Engineers (USACE), Montana Fish, Wildlife & Parks (FWP), the Department of Natural Resources and Conservation (DNRC), and Jefferson County. This screen considers whether there are any fatal flaws posed by anticipated impacts resulting from each of the five alternatives under consideration. Resources discussed under this screen include water bodies, wildlife habitat and migration patterns, floodplains, and wetlands, which are of particular concern given the orientation and location of the Boulder corridor.

It should be noted that this screen is not intended to compare the relative level of natural resource impacts resulting from one alternative to those resulting from another alternative. Rather, the intent of this screen is to focus exclusively on potential fatal flaws that could preclude regulatory compliance and prohibit project implementation.

Minimal field work was conducted for this effort; the analysis in this report is generally qualitative in nature and is primarily based on available database searches. These searches include a review of the Natural Resource Information System (NRIS), Natural Resource Conservation Service (NRCS), and the Montana Natural Heritage Program (MNHP). Information was also drawn from communication with MNHP biologists and resource agencies, as well as walking and windshield surveys of the corridor. Each resource area is discussed separately below.

Drainages and Water Body Crossings

Any construction project modifying the natural existing shape and form of any stream in Montana, its banks, or its tributaries must provide a Montana Stream Protection Act (SPA) 124 Notification to FWP.

There are several rivers and streams located within the project area, including the Boulder River, Little Boulder River, Muskrat Creek, McCarty Creek, Farnham Creek, Beaver Creek, and a number of unnamed intermittent streams, as depicted in Figure 7-1.

No Build

There would be no new impacts under the No Build alternative, thus **passing** this component of screen two.

Spot Improvements

There would be no impacts under this alternative, thus **passing** this component of screen two.

Existing Alignment

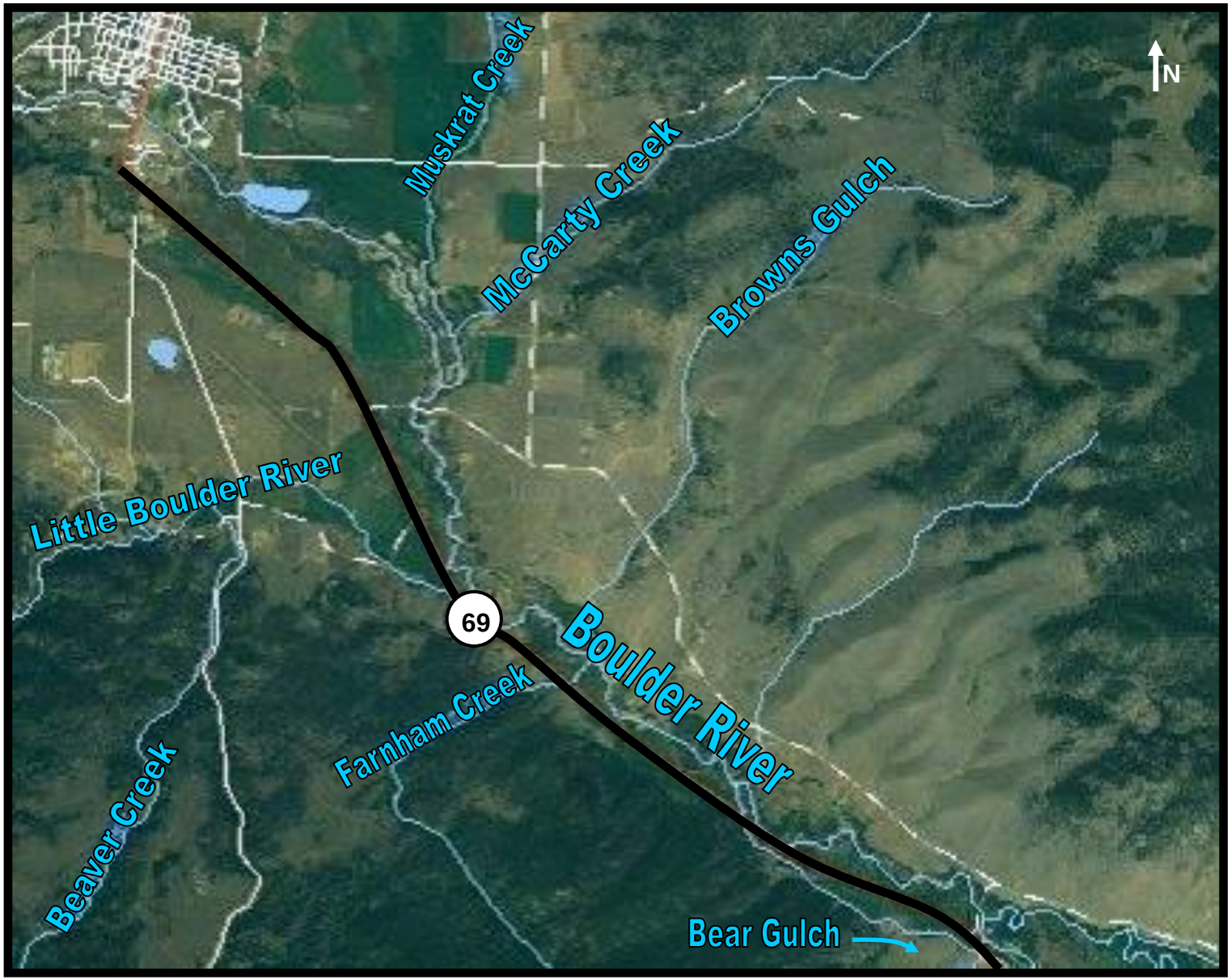
Rehabilitation / reconstruction and widening of the existing alignment would not impact any new drainages in the MT 69 corridor. The roadway would essentially follow the existing alignment, and would not result in any new stream crossings.

There are 55 culverts located along the existing MT 69 alignment. All existing culverts would be replaced by longer culverts to accommodate rehabilitation / reconstruction and widening on the existing alignment. Reconstruction of the existing alignment would not involve relocation of the Boulder River, Little Boulder River, or any of the unnamed perennial streams. Due to widening of the existing roadway, some encroachment into the river channel may occur; riprap, retaining walls, or other bank stabilization measures would likely be required in some locations. Based on MDT's experience with past projects, impacts to water bodies are not anticipated to preclude regulatory compliance. This alternative **passes** this component of screen two.

Eastern and Western Alignments

New alignments would result in several new stream crossings. Based on the location of intermittent streams, it was determined that a minimum of 27 culverts would be required along an eastern alignment, while a western alignment would require placement of seven new culverts. Construction of a new alignment would not involve relocation of the Boulder River, Little Boulder River, or any of the unnamed perennial streams. Riprap or other bank stabilization measures would likely be required in some locations. Based on MDT's experience with past projects, new impacts to intermittent streams are not anticipated to be immitigable or to preclude regulatory compliance. These alternatives **pass** this component of screen two.

Figure 7-1 Rivers and Streams within Corridor

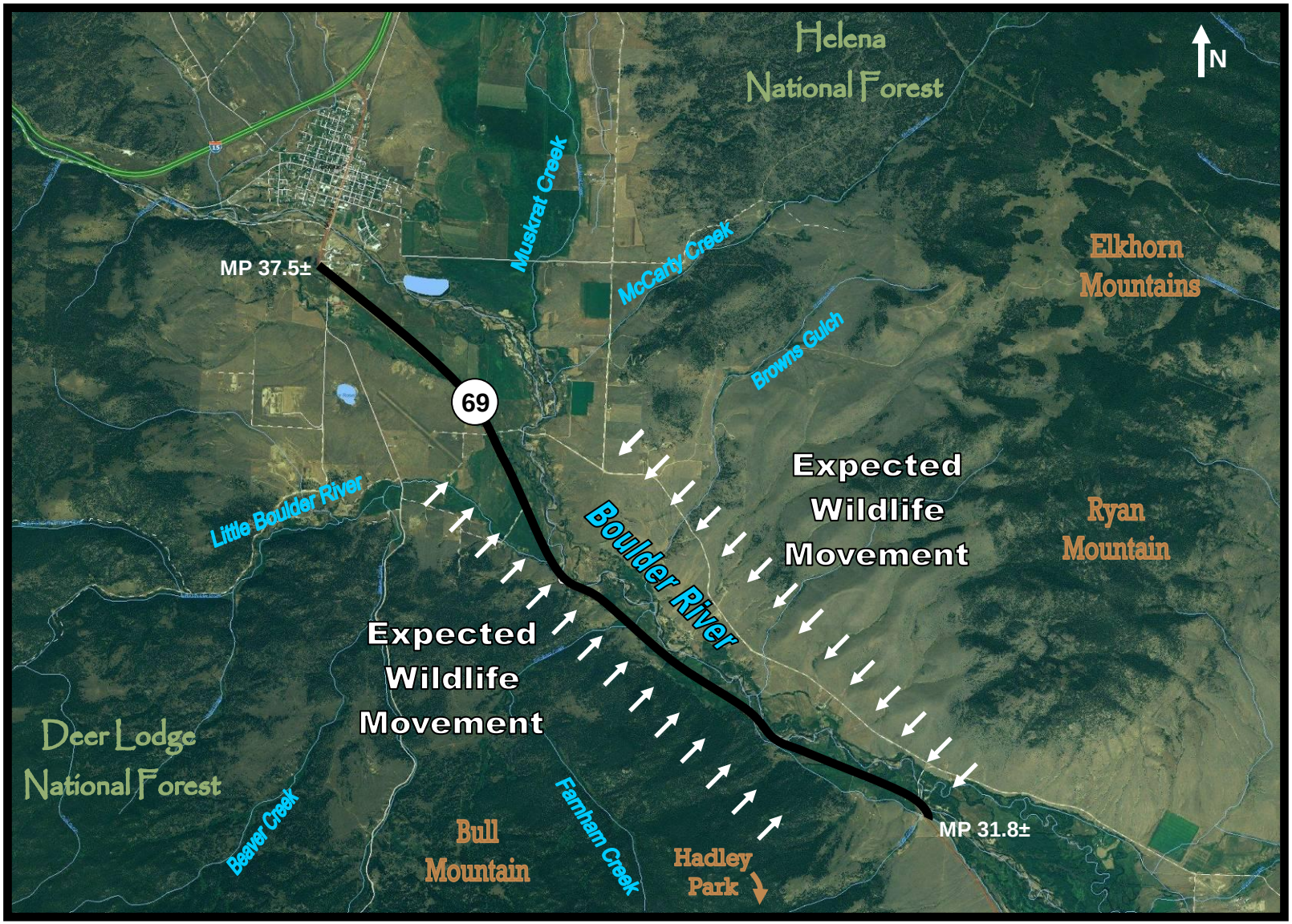


Wildlife Habitat and Migration Patterns

Currently, there is an abundance of high quality wildlife habitat along the Boulder River and associated with the numerous wetland areas adjacent to MT 69. The corridor provides good browse, water, cover, and travel habitat and attracts wildlife from high elevation areas surrounding the river corridor. The project area shows signs of high and consistent use by deer, elk, moose, and coyotes, with small mammal activity likely as well. Generally, it is expected that wildlife access the river from the Elk Horn Mountains and the Helena National Forest to the east, and from the Deer Lodge National Forest to the west. Through correspondence, resource agencies have noted that wildlife movement between Ryan Mountain in the Elkhorn Mountains and Hadley Park in the Bull Mountains towards the south end of the highway project would be expected. Additionally, movement would likely occur in the vicinity of Brown's Gulch and the Bull Mountains. Expected wildlife movement is illustrated in Figure 7-2.

It should be noted that no federally-listed species were identified from the NRIS database search. A bald eagle nest was reported by an MDT biologist and was observed in the field in April 2009 to the northwest of MT 69 near Hot Springs Road. No plant or wildlife species of concern were observed during field surveys.

Figure 7-2 Expected Wildlife Migration Patterns



No Build

No new impacts to wildlife habitat or migration patterns are expected to result from the No Build alternative. As traffic volumes increase over time, there may be an associated increase in animal-vehicle collisions. No fatal flaws were identified for this alternative, and therefore it **passes** this component of screen two.

Spot Improvements

Construction of pullout locations in two locations on MT 69 is expected to result in minimal impacts to wetlands and wildlife habitat. Trimming of vegetation is expected to impact wildlife habitat directly adjacent to the existing MT 69 alignment, but may also improve drivers' ability to identify and avoid animals crossing the roadway, thereby potentially reducing animal-vehicle conflicts. For the reasons described under screen one, it is unlikely that this alternative would affect driver speed; accordingly, apart from improvements in sight distance, it is unlikely that this alternative would substantially affect the number or frequency of animal-vehicle collisions. Migration patterns are not expected to be altered. Due to the limited nature of the proposed improvements, impacts are not anticipated to be immitigable or to preclude regulatory compliance, thus this alternative **passes** this component of screen two.

Existing Alignment

Reconstruction and widening of MT 69 is expected to result in direct impacts to linear slivers of wetland areas and wildlife habitat running parallel to the existing alignment. Migration patterns likely would not be altered. It should be noted that a wider, flatter roadway template would improve sight distance, allowing drivers to detect animals earlier and thereby potentially reducing the number of animal-vehicle conflicts. Based on MDT's experience with past projects, impacts to wildlife habitat and migration patterns are not anticipated to be immitigable or to preclude regulatory compliance. Therefore, this alternative **passes** this component of screen two.

Eastern and Western Alignments

At the two points of intersection with the existing MT 69 alignment, construction of a new alignment is expected to result in impacts to new blocks of wetland areas. Additionally, large land areas would be impacted during construction. For an alignment roughly following the county road to the east of MT 69, the existing gravel road would be paved and widened. An eastern alignment would diverge in some places from the existing county road, resulting in new impacts. A western alignment would run through entirely virgin territory, creating a new roadway through previously undisturbed forest and wetland areas.

Construction of a highway to the east of MT 69 would create a new paved surface between the Boulder River and the mountains to the east, resulting in a new impediment to wildlife migration patterns between high elevations and the river corridor. Similarly, construction of a highway to the west of MT 69 would create a new paved roadway acting as an impediment to wildlife movements. Construction of a new roadway alignment would require wildlife to cross two roadways within the corridor. Although a new roadway template generally constructed in accordance with current MDT standards would reduce the overall number of crashes as compared to the existing roadway, a new alignment would further fragment the

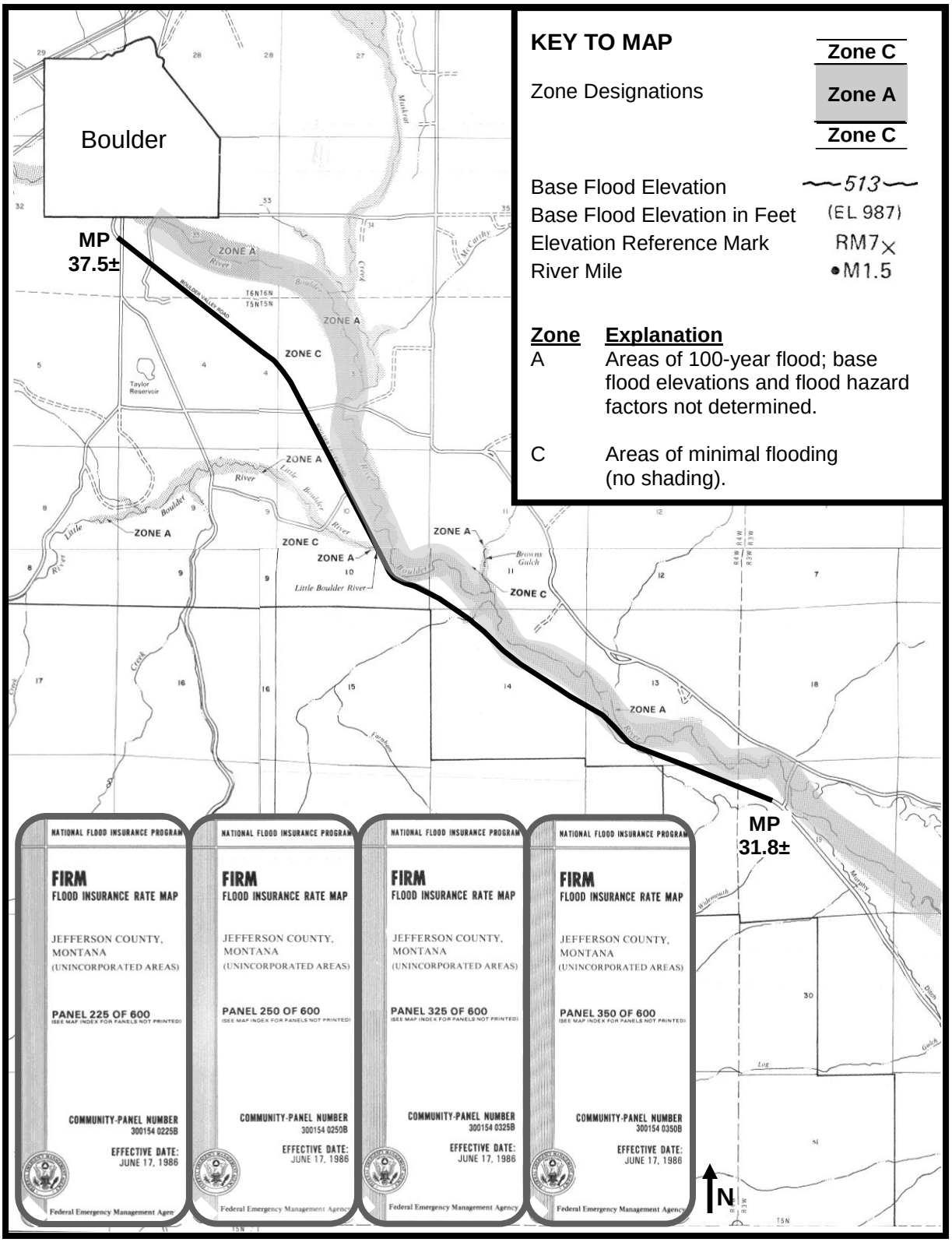
Boulder valley and could create new conflict points with wildlife. Impacts are not anticipated to preclude regulatory compliance, thus these alternatives **pass** this component of screen two.

Floodplains

Projects involving construction within a designated 100-year floodplain must comply with the Montana Floodplain and Floodway Management Act. As applicable, a Floodplain Development Permit for this project would be sought from the Jefferson County Floodplain Administrator or from DNRC.

The Boulder River floodplain closely parallels MT 69 through much of the corridor, as depicted in Figure 7-3.

Figure 7-3 100-Year Floodplain Mapping



Note: Figure not to scale. MP locations are approximated.

No Build

Under the No Build alternative, there would be no new impacts to the Boulder River floodplain, thus **passing** this component of screen two.

Spot Improvements

Pullouts would require some construction work within the floodplain area at concentrated intervals through the corridor. Due to the limited nature of the proposed improvements, impacts are not anticipated to be immitigable or to preclude regulatory compliance, thus this alternative **passes** this component of screen two.

Existing Alignment

Reconstruction efforts on the existing alignment would be located almost entirely within the Boulder River floodplain. Impacts would be expected parallel to each side of the existing MT 69 roadway. Based on MDT's experience with past projects, impacts are to floodplains are not anticipated to be immitigable or to preclude regulatory compliance. Therefore, this alternative **passes** this component of screen two.

Eastern and Western Alignments

As noted above, construction of a new alignment is expected to result in impacts within the floodplain at the two points of intersection with the existing MT 69 alignment. The majority of any new alignment, however, would run outside the Boulder River floodplain, whether the alignment was located to the east or the west of the existing roadway. Impacts are not anticipated to be immitigable or to preclude regulatory compliance, thus this alternative **passes** this component of screen two.

Water Quality and Fisheries

Any construction project modifying the natural existing shape and form of any stream in Montana, its banks, or its tributaries must provide a Montana Stream Protection Act (SPA) 124 Notification to FWP. Additionally, projects resulting in short-term or temporary violations of state surface water quality standards for turbidity must secure a 318 authorization from DEQ. The authorization may be waived by FWP during its review process under the SPA.

The Boulder River supports several native fish species, as well as brook, brown, and rainbow trout. Several small trout were observed in shallow areas of the Boulder River and in ditches near their confluences with the Boulder River. No population estimates or quantitative surveys were conducted. Based on site visits, fish habitat in the Boulder River appears to be of good diversity and quality.

No Build

Under the No Build alternative, there would be no new impacts to water quality or fisheries within the corridor, thus **passing** this component of screen two.

Spot Improvements

Construction of pullouts through the corridor could result in temporary impacts to fisheries and water quality. Pullout locations have been proposed in areas that do not directly border the Boulder River or wetland areas in order to minimize such impacts, although minor

impacts would be expected as a result of the increase in impervious surface area. Due to the limited nature of the proposed improvements, impacts are anticipated to be minor, thus this alternative **passes** this component of screen two.

Existing Alignment

Rehabilitation / reconstruction and widening of the existing alignment would result in construction activities within and in close proximity to the Boulder River. The Boulder River is TMDL impaired due to mining waste and agricultural run-off. Resource agencies have voiced concerns regarding "slickins," or mine tailings that have settled in the riverbed over time. In-stream construction activities associated with placement of new structures, culverts, and bank stabilization measures could potentially disturb these particles, thereby negatively impacting water quality and fisheries. It should also be noted that all 55 existing culverts would be replaced by longer culverts to accommodate rehabilitation / reconstruction and widening on the existing alignment, which would likely result in permanent loss of channel. It should also be noted that minor impacts would be expected as a result of the increase in impervious surface area. Based on MDT's experience with past projects, impacts are not anticipated to immitigable or to preclude regulatory compliance, thus this alternative **passes** this component of screen two.

Eastern and Western Alignments

Construction of a new alignment would impact the Boulder River at the points where the new roadway leaves and rejoins the existing alignment. A minimum of 27 culverts would be required along an eastern alignment, while a western alignment would require placement of seven new culverts. The majority of these would cross intermittent streams, which do not support fish populations. New structures and culverts would result in construction activities within and in close proximity to the Boulder River, the Little Boulder River, and minor drainages. Such activities could potentially affect water quality and fisheries due to the multiple crossings of channels required by two alignments in the drainage. It should also be noted that minor impacts would be expected as a result of the increase in impervious surface area. Impacts are not anticipated to be immitigable or to preclude regulatory compliance, thus this alternative **passes** this component of screen two.

Wetlands

Projects involving the discharge or placement of dredged or fill material into Waters of the United States, including wetlands, must comply with the Federal Clean Water Act and secure a Section 404 permit through the USACE. The United States Environmental Protection Agency (EPA) also has regulatory review and enforcement functions under the law.

Wetland complexes border both sides of the existing MT 69 alignment through a majority of the corridor. This network of wetlands is mainly associated with the low-lying Boulder River floodplain. Wetlands recede to the east and west of the existing roadway as elevations rise from the river corridor to more mountainous terrain.

Wetland delineations were conducted exclusively along the existing MT 69 alignment. Wetlands were not delineated along the portions of the eastern and western alignments that do not overlap with the existing alignment. Further, no National Wetland Inventory (NWI) mapping is

available within the general project area. During an agency meeting on December 17, 2008, resource agencies requested more accurate quantification of wetland impacts along new alignments than can be provided through review of common aerial imagery. Minutes from this agency meeting are provided in Appendix G.

In response to this agency request, color-infrared images of the corridor were examined and are presented in Figures 7-4 through 7-6. Color-infrared technology captures near-infrared wavelengths, which are otherwise invisible to the human eye. The resulting images make it easier to distinguish land features as compared to traditional aerial images. In color-infrared imagery, leaves of healthy, growing vegetation reflect a high degree of near-infrared wavelengths, and appear red or pink. These highly-vegetated pink areas are often associated with wetlands.

No Build

The No Build alternative would result in no new impacts to wetlands within the corridor, thus **passing** this component of screen two.

Spot Improvements

Only minor impacts to wetlands would likely occur from construction of pullout locations. As noted previously, pullout locations have been proposed in areas not directly bordering the river or wetland areas in order to minimize such impacts. As such, impacts are not anticipated to be substantial or immitigable, or to preclude regulatory compliance, thus this alternative **passes** this component of screen two.

Existing Alignment

Rehabilitation / reconstruction and widening of MT 69 is expected to result in linear wetland impacts paralleling both sides of the roadway through the majority of the corridor. Based on wetland delineations and preliminary design efforts, it is estimated that approximately 20 acres of wetlands would be impacted under this alternative. Wetland impacts could potentially be reduced using avoidance, minimization, and mitigation measures later in the design phase of the project. Based on wetland mitigation potential within the watershed and MDT's experience with past projects, impacts are not anticipated to be immitigable or to preclude regulatory compliance. Therefore this alternative **passes** this component of screen two.

Eastern and Western Alignments

Figure 7-4 presents color infrared imagery over the full extent of the project limits. Figures 7-5 and 7-6 present portions of the eastern and western alignments where wetland impacts are anticipated based on wetland delineations, color infrared imagery, and field verification. Black boxes are defined as "areas of anticipated impact" and are intended to highlight areas where the new roadway footprint coincides with pink shaded areas on the color infrared imagery along the portions of the new eastern and western alignments that do not overlap with the existing alignment. Field verification was used to determine the degree to which pink areas within these areas of anticipated impact actually exhibit wetland characteristics. Areas of anticipated impact are not intended to show the exact extent of wetland impacts, but rather to simply note the location where field verification was conducted. It should also be

noted that under the eastern and western alignment alternatives, wetland impacts would also be expected to occur along the overlapping portions with the existing alignment, although wetland delineations were used to calculate impacts over these lengths.

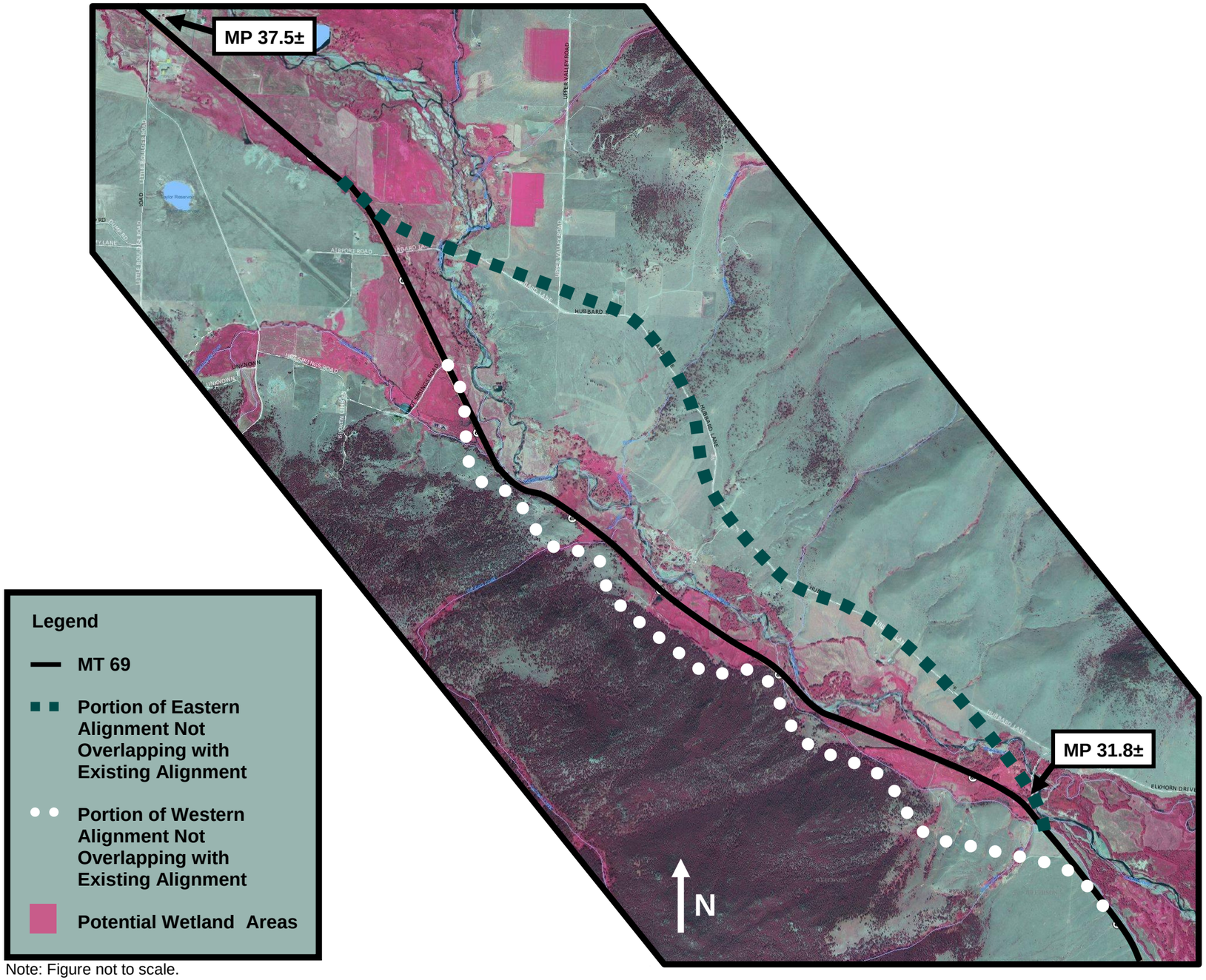
As confirmed during windshield and walking surveys conducted in April 2009, wetland areas are scattered in a varied mosaic with dry, upland areas through the Boulder River floodplain. At the points where a new eastern alignment would leave and rejoin the existing alignment, portions of meadows and agricultural fields are seasonally inundated with standing water, forming wetland areas. Wetland fringes also border the Boulder River. Adjacent riparian areas support stands of aspen, which as a whole would not be classified as wetlands.

Of the anticipated areas of impact identified in Figure 7-5 for the eastern alignment, it was determined that only approximately 30 to 40 percent of the areas would likely be classified as wetlands. Additionally, there would likely be wetland impacts associated with this alternative over the portion of the eastern alignment overlapping with the existing alignment. Based on the proposed roadway footprint, it was determined that approximately six to eight acres of wetland impacts would be expected to result from this alternative over the entire project limits.

At the northern point of intersection between a new western alignment and the existing alignment as depicted in Figure 7-6, it was determined through field verification that wetlands exist over virtually all of the anticipated area of impact. Additionally, it is anticipated that there would likely be some wetland impacts associated with drainage crossings as well as impacts resulting over portions of the western alignment overlapping with the existing alignment. Based on the proposed roadway footprint, it was determined that approximately 14 to 15 acres of wetland impacts would be expected to result from this alternative over the entire project limits. It should be reiterated that wetland delineations were not conducted for new alignments and wetland impact estimates are approximate in nature.

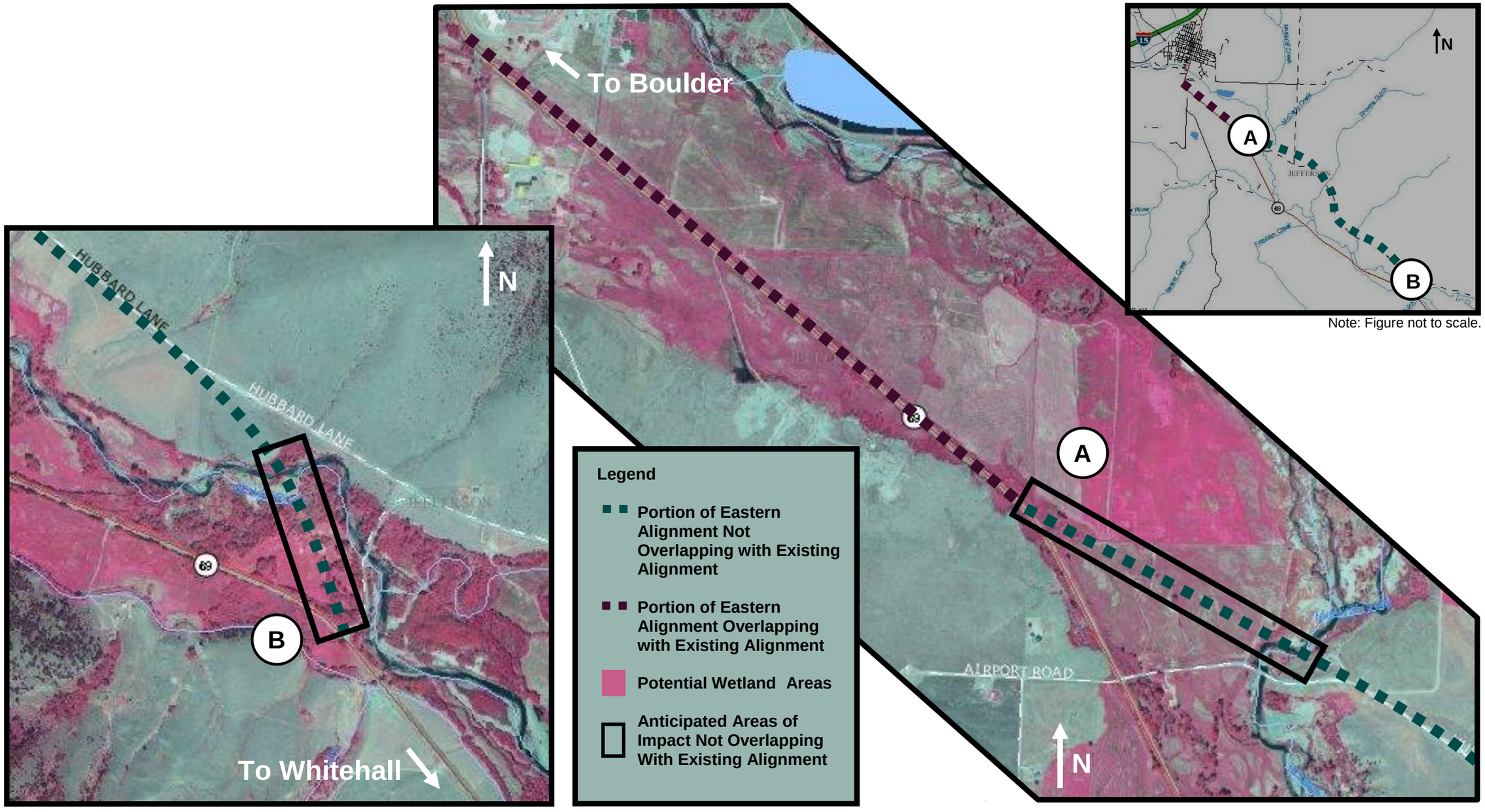
Avoidance, minimization, and mitigation opportunities are available along the new alignments. Impacts are not anticipated to be immitigable or to preclude regulatory compliance, thus these alternatives **pass** this component of screen two.

Figure 7-4 Infrared Mapping of Corridor



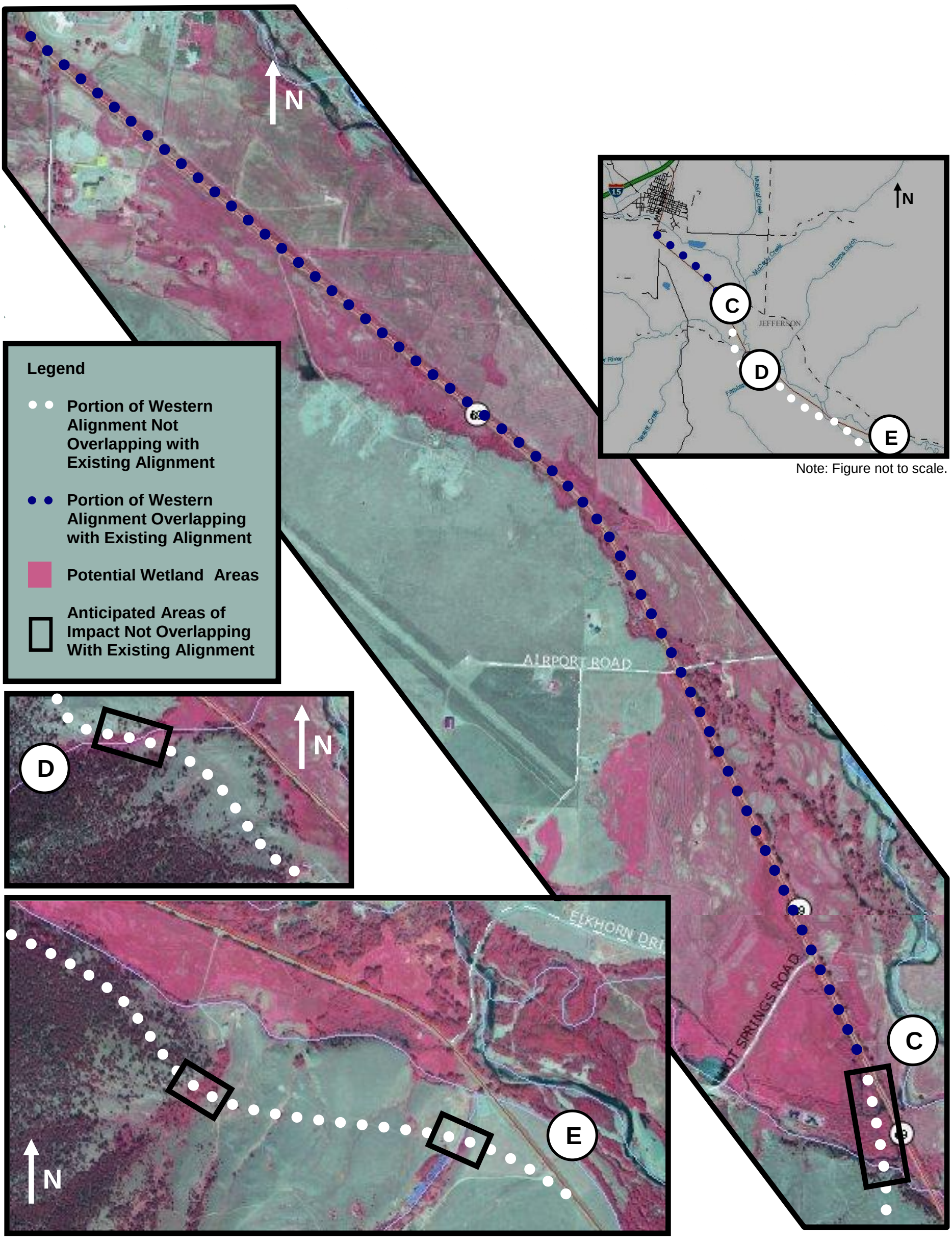
Note: Figure not to scale.

Figure 7-5 Expected Wetland Impacts on Eastern Alignment



Note: Figure not to scale.

Figure 7-6 Expected Wetland Impacts on Western Alignment



Note: Figure not to scale.

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Cumulative Impacts

The existing MT 69 roadway alignment was originally constructed in the 1940s and 1950s adjacent to the Boulder River and within the 100-year floodplain. At the time of original construction, there would have been impacts to a wide expanse of wildlife habitat and wetland areas within the general footprint of the roadway over the length of the corridor. Additionally, construction of the roadway would likely have impacted the dynamics and morphology of the Boulder River channel as well as wildlife migration patterns by creating a man-made impediment to such natural movements.

It is important to consider the additive nature of impacts resulting from the proposed project in connection with impacts resulting from past projects. Cumulative impacts expected to result from each of the alternatives are discussed below.

No Build

Because the No Build alternative would result in no new impacts to any environmental resources, no cumulative impacts are anticipated. This alternative **passes** this component of screen two.

Spot Improvements

Overall, this alternative is expected to result in only minor impacts to resources in the project area. Some additional wetland impacts may result from construction of pullout locations beyond those previously impacted by the existing roadway; these impacts would be mitigated to the extent practicable. This alternative **passes** this component of screen two.

Existing Alignment

Rehabilitation / reconstruction and widening of the existing MT 69 alignment is expected to result in additional impacts to wetlands and wildlife habitat beyond those associated with the existing roadway. While this alternative would likely result in the greatest number of impacted wetland acres as compared to other alternatives, impacts are expected to be concentrated in linear slivers along the existing alignment and would be mitigated to the extent practicable. This alternative may also result in additional bank stabilization measures along the Boulder River. Following minimization, mitigation, and avoidance efforts, anticipated impacts can be considered incrementally greater than those previously resulting from the original construction of MT 69. While cumulative impacts would occur, no fatal flaws were identified under this screen and therefore this alternative **passes** this component of screen two.

Eastern and Western Alignments

The new eastern and western alignment alternatives would result in construction of a second paved roadway through the Boulder corridor. While the existing MT 69 roadway acts as an impediment for wildlife movement, construction of a second paved roadway would impede wildlife movement to an even greater degree, requiring wildlife to cross two paved roadways in the corridor. Further, new swaths of currently undisturbed land would be impacted, further fragmenting wildlife habitat and resulting in new blocks of wetland impacts. Construction of new alignments would also result in new crossings over the Boulder and Little Boulder Rivers and new conveyances over minor drainages with resulting cumulative channel

impacts. Construction of new alignments may also include placement of bank stabilization measures, with associated cumulative impacts to fisheries and water quality. While cumulative impacts would occur, no fatal flaws were identified under this screen and therefore this alternative **passes** this component of screen two.

Summary of Second Screen

Table 7.3 presents a summary of potential impacts to environmental resources resulting from each of the five alternatives. It should be noted that additional field work would be required in order to verify anticipated impacts. The information in Table 7.3 is intended for order-of-magnitude comparison purposes in measuring the relative difference in anticipated impacts between each alternative.

Table 7.3 Results of Second Screen

Component of Screen Two	Potential Impacts Expected to Result From Alternatives				
	No Build	**Spot Improvements**	**Existing Alignment**	**Eastern Alignment**	**Western Alignment**
Drainages and Water Body Crossings	No new impacts	No new crossings	No new crossings; bank stabilization measures may be required	Impacts at 27 new crossings; bank stabilization measures may be required	Impacts at seven new crossings; bank stabilization measures may be required
Wildlife Habitat and Migration Patterns	No new impacts	Impacts at pullout construction locations	Some impacts to habitat throughout corridor due to widening	Large impacts to habitat and new impediment to wildlife movements	Large impacts to habitat and new impediment to wildlife movements
Floodplains	No new impacts	Impacts at pullout construction locations	Linear impacts throughout corridor	Impacts at points where new roadway leaves and rejoins existing roadway	Impacts at points where new roadway leaves and rejoins existing roadway
Water Quality and Fisheries	No new impacts	Impacts at pullout construction locations	Some impacts associated with new culverts and structures	Some impacts associated with new culverts and structures	Some impacts associated with new culverts and structures
Wetlands*	No new impacts	Impacts at pullout construction locations	Linear impacts throughout corridor due to widening (Approximately 20 acres)	Impacts at points where new roadway leaves and rejoins existing roadway and along portion overlapping with existing alignment (Approximately 6 to 8 acres)	Impacts at northern intersection with existing roadway, at drainage crossings, and along portion overlapping with existing alignment (Approximately 14 to 15 acres)
Cumulative Impacts	No new impacts	Some cumulative impacts to wetlands and floodplain; minimal impacts overall	Greatest cumulative impacts to wetlands and floodplains	Greatest cumulative impacts to wildlife habitat / migration patterns	
Fatal Flaws Relating to Natural Resource Impacts or Regulatory Compliance	**None Identified**	**None Identified**	**None Identified**	**None Identified**	
Screening Result	**PASS**	**PASS**	**PASS**	**PASS**	**PASS**

*Wetland impacts are approximate in nature. Wetland delineations were not conducted along portions of new alignments not overlapping with existing alignment.

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Screen 3: Is the alternative reasonable and practicable?

Under this screen, the reasonableness and practicability of each alternative is considered in relation to the regulatory implications discussed in Chapter 6 of this document. As noted in Chapter 6, the definitions of reasonableness and practicability share overlapping concepts with regard to economic and technical considerations. For ease of analysis, the discussion in this section has been divided into three sections detailing economic, technical, and logistical considerations.

Economic Considerations

Cost of Construction

Table 7.4 provides a summary of planning-level costs associated with the various improvement alternatives. The cost estimates are useful for the purpose of comparing the order of magnitude differences relative to each alternative. Planning-level cost calculations are provided in Appendix H.

Table 7.4 Planning-Level Cost Comparison

Alternative	Approximate Construction Cost	Notes
No Build	NA	No construction costs area associated with this alternative.
Spot Improvements	$1.6 million	Estimate based on construction of pullouts and resurfacing of the existing roadway.
Existing Alignment*	$20 million	Estimate assumes rehabilitation / reconstruction and widening of existing alignment.
Eastern Alignment*	$27.5 million	Although traversing relatively flat terrain, the eastern alignment would require two new multi-span bridges. It should be noted that the eastern alignment would no longer utilize the Red Bridge, which was recently reconstructed at a cost of approximately $783,000.
Western Alignment*	$68.5 million	The western alignment would traverse difficult terrain. Four new multi-span bridges and extensive earthwork would be required.

*Maintenance costs for eastern and western alignments would be approximately double those for the existing alignment due to two paved roadways through the corridor.

No Build

There would be no associated capital cost for this alternative, although maintenance costs are expected to increase over time due to the deteriorating roadway surface. This alternative **passes** this component of screen three.

Spot Improvements

The capital cost for this alternative is relatively low at approximately $1.6 million. This alternative **passes** this component of screen three.

Existing Alignment

This alternative would cost approximately $20 million, which is reasonable in light of the scope of the project. This alternative **passes** this component of screen three.

Eastern and Western Alignments

The construction cost for a new eastern alignment would be approximately $27.5 million, or roughly $7.5 million more than rehabilitation / reconstruction and widening of the existing alignment. Construction of a western alignment is prohibitive at approximately $68.5 million, or approximately $48.5 million more costly as rehabilitation / reconstruction and widening of the existing roadway.

It should also be noted that maintenance costs associated with a new alignment would be nearly double those for the existing alignment because MDT would be required to maintain two roadways over the length of the corridor. Although Jefferson County originally offered to maintain the existing roadway in the event that a new eastern alignment was constructed, this offer was rescinded in light of strong public opposition to the eastern alignment.

These alternatives **fail** this component of screen three.

Opportunity Costs

When considering the impacts of infrastructure spending, it is important to consider the cost of delaying improvements, or providing no improvements to the transportation facilities, as well as the real costs to the providers of goods and services if the most efficient transportation routes are congested, in disrepair, or are unsafe. Unimproved and failing infrastructure imposes a direct cost on those goods and service providers who use the highway system to access Montana communities. They must choose either longer routes or accept the liability of traveling on these undesirable routes and pass on the costs to the consumer. Providing no improvements in this corridor would be inconsistent with the mission of MDT and FHWA to provide safe and efficient roadways for people and commerce.

No Build

As noted above, the lack of improvements passes on a real cost to the traveling public and commercial shippers utilizing this corridor. This alternative **fails** this component of screen three.

Spot Improvements

Under this alternative, the roadway would be resurfaced to extend the life of the facility. Although a reduction in the posted speed limit may inconvenience the traveling public and commercial operations, it would likely add less than a minute of travel time depending on the new posted speed limit. Again, it should be noted that it is not within MDT/FHWA jurisdiction to either establish or enforce speed limits. This alternative **passes** this component of screen three.

Existing Alignment

Rehabilitation / reconstruction and widening of the existing route would provide all of the necessary safety and operational improvements necessary to make the route useful and

competitive for the traveling public and commercial shippers, and **passes** this component of screen three.

Eastern Alignment

A new eastern alignment would provide adequate safety and operational improvements in the corridor. Although an eastern alignment would be somewhat longer in length than the existing route, it would travel relatively level terrain and is expected to result in less than a half a minute of additional travel time. This alternative **passes** this component of screen three.

Western Alignment

Because a western alignment would traverse mountainous terrain, travel speeds would be lower than those on the existing route. Horizontal curves coupled with steep grades ranging up to eight percent would substantially slow commercial truck speeds, thereby slowing any following passenger vehicles. Additionally, the overall length of the roadway would be extended by just over a mile. Accordingly, it would likely take three to four minutes longer to travel the length of the corridor via a western route, representing an increase in travel time of 50 to 70 percent over this roadway segment. Resulting travel delays could negatively affect the efficiency of commercial trucking operations, as well as local and regional travelers. This alternative therefore **fails** this component of screen three.

Technical Considerations

No new or untested technologies would be required to be employed under any of the alternatives. Although there would be some technical challenges associated with attempts to reduce impacts to wetlands and the Boulder River channel, similar avoidance, minimization, and mitigation measures have been used successfully in past projects. Accordingly, all five alternatives under consideration **pass** this component of screen three.

Logistical Considerations

Constructability

No Build

The No Build alternative would have no constructability issues, thus **passes** this component of screen three.

Spot Improvements

Pullouts would be proposed only in areas where impacts to sensitive resources are not anticipated. This does pose some difficulty for construction due to the additional limitations on staging areas and tightened construction limits, but not to an extraordinary extent. This alternative **passes** this component of screen three.

Existing Alignment

Rehabilitation / reconstruction and widening of the existing alignment would be constrained by the close proximity of the Boulder River and adjacent wetland areas and efforts would be made to minimize impacts to these resources. The natural constraints pose some difficulty for construction due to the additional limitations on staging areas and tightened construction

limits throughout the corridor, but not to an extraordinary extent. This alternative **passes** this component of screen three.

Eastern Alignment

The terrain to the east of the Boulder River is relatively flat. While construction of an eastern alignment would involve new structures, the majority of the alignment would not pose substantial construction challenges. This alternative **passes** this component of screen three.

Western Alignment

A western alignment would be extremely difficult to construct. The terrain to the west of the existing alignment rises sharply, forming mountainous peaks and valleys. A substantial amount of earthwork would be required. Grades would likely range up to eight percent. Four structures would be required in order to span deep ravines along the alignment. While construction is possible, this alignment would not normally be pursued due to extraordinary construction challenges, thus this alternative **fails** this component of screen three.

Social / Political Concerns

No Build

While this alternative fails to address the safety concerns of the traveling public, it was recommended by a number of public participants and is a necessary part of any future NEPA/MEPA analysis and will be forwarded. This alternative **passes** the social/political component of screen three.

Spot Improvements

This alternative was proposed by the public and resource agencies involved with the study; therefore, it **passes** the social/political component of screen three.

Existing Alignment

Although some members of the public have requested that no improvements be made in the Boulder corridor, rehabilitation / reconstruction and widening of the existing alignment is publicly favored over construction of new alignments. This alternative **passes** the social/political component of screen three.

Eastern and Western Alignments

A new roadway alignment generally constructed to meet current MDT standards would provide safety benefits to the traveling public. As noted previously, however, there is strong public opposition to construction of an eastern alignment. Neighboring residents have quality of life concerns regarding increased noise and traffic levels on an eastern alignment, as well as concerns regarding the loss of private land due to new right-of-way required for a new alignment. The existing county road is used extensively by agricultural vehicles and for moving livestock, as well as for recreational purposes. Members of the public would prefer that it remain a rural access roadway. A new eastern alignment has also met with political opposition. Through correspondence, the Jefferson County Commission and Planning Board separately expressed their concern over a new alignment and favored rehabilitation / reconstruction and widening along the existing MT 69 alignment in letters dated July 6 and July 14, 2005, respectively. It is currently assumed that a western

alignment would meet similar objections, thus eastern and western alignment alternatives **fail** the social/political component of screen three.

Access

Table 7.5 lists existing access points located along MT 69.

Table 7.5 MT 69 Access Points

Mile Post	Approach Type (Left-hand side, traveling north)	Approach Type (Right-hand side, traveling north)
31.78	Farm/Field	Farm/Field
32.05	Private	Farm/Field
32.36	Farm/Field	Farm/Field
32.48	Farm/Field	
32.67		Farm/Field
33.06	Farm/Field	Farm/Field
33.25	Farm/Field	Farm/Field
33.41	Farm/Field	Farm/Field
33.57	Private	Farm/Field
34.02	Farm/Field	Farm/Field
34.19		Farm/Field
34.48	Private	
35.06	Private (Boulder Hotsprings)	Farm/Field
35.60	Private	Private (Hubbard Lane)
36.58	Farm/Field	Farm/Field
36.74	Farm/Field	
37.00	Farm/Field	Public (paved)
37.09	Farm/Field	
37.26	Public	
37.37		Public

No Build

All existing access points would be perpetuated under this alternative and therefore it **passes** this component of screen three.

Spot Improvements

All existing access points would be perpetuated under this alternative and therefore it **passes** this component of screen three.

Existing Alignment

All existing access points would be perpetuated under this alternative and therefore it **passes** this component of screen three.

Eastern and Western Alignments

Construction of a new alignment would directly impact local access. Given the physical constraints in the corridor, it would be very difficult to perpetuate access to a new roadway alignment. Providing access from existing approach roadways to an eastern alignment would be restricted by the Boulder River, while access to a western alignment would be constrained by steep topography. These alternatives **fail** this component of screen three.

Ease of Right-of-Way Acquisition

No Build

There would be no right-of-way issues with the No Build alternative, thus **passing** this component of screen three.

Spot Improvements

Minimal amounts of new right-of-way would be required and it is not anticipated that acquisition would be challenged. This alternative **passes** this component of screen three.

Existing Alignment

Approximately 10 acres of new right-of-way would be needed for rehabilitation / reconstruction and widening of the existing roadway. No right-of-way acquisition difficulties are anticipated, thus this alternative **passes** this component of screen three.

Eastern Alignment

Approximately 100 acres of new right-of-way would be needed for construction of an eastern alignment, most of which is currently in private ownership (including easements for the existing county road). This acquisition and the construction of a new roadway would likely result in a direct impact to some farming operations, movement of cattle, future building plans, and the historic use of the existing county road. As documented in the transcript of the June 2005 public meeting, many residents who own property to the east of the existing alignment noted that they would not be willing sellers of any needed right-of-way for a new alignment. State Representative Scott Mendenhall expressed his concern that the state would have a difficult time justifying the acquisition of property on the east side of the river if it would be at all feasible to reconstruct the existing MT 69 alignment.

Should landowners refuse to sell needed right-of-way for a new roadway alignment, MDT could pursue exercise of eminent domain, which is defined as the right of the state to take private property for public use (MCA § 60-1-103(11)). Under Montana law, MDT would need to show that the taking of land by exercise of the right of eminent domain is necessary to the public use (MCA § 70-31-111). Because the existing route currently serves the purpose that a new alignment would serve, it may be difficult to prove such a necessity. Given the expressed opposition to this alternative, and the public's stated refusal to sell right-of-way, the eastern alignment alternative **fails** this component of screen three.

Western Alignment

Approximately 77 acres of new right-of-way would be needed for a new western alignment, which could result in impacts to farmland, forested areas, and wetlands. Although landowner sentiments are not known over this portion of the corridor, there may be similar obstacles to right-of-way acquisition to the west of the existing roadway. While public sentiment is not

as clear on this alignment at this stage, it is assumed that right-of-way acquisition would be difficult, and necessity equally difficult to prove. The standing of the western alignment alternative is **uncertain** with regard to this component of screen three.

Summary of Third Screen

Table 7.6 presents the results of the third screen. Each alternative was assessed in terms of reasonableness and practicability. Specifically, the factors of cost, technology, constructability, social/political concerns, and ease of right-of-way acquisition were considered.

The No Build alternative would require no capital expenditure and no new right-of-way acquisition. Although this alternative is generally supported by the public, travel would be hindered over time due to the deteriorating roadway facility and the associated opportunity costs related to a roadway in disrepair.

The Spot Improvement alternative is relatively low in cost and is generally supported by members of the public. Minimal new right-of-way acreage would be required for this alternative. Although construction of pullout locations would be constrained due to nearby wetland areas, there are no substantial constructability concerns.

Rehabilitation / reconstruction and widening of the existing alignment represents a reasonable and practicable alternative, with no identifiable fatal flaws. Apart from the No Build and Spot Improvement alternatives, it is the least costly. While the Boulder River and adjacent wetlands would present some constructability challenges, these can be addressed using existing technologies without substantial difficulties.

The new eastern alignment fails under this screen because of cost, constructability, and social/political concerns. An eastern alignment would be approximately $7.5 million more costly than rehabilitation / reconstruction and widening of the existing alignment. Furthermore, an eastern alignment faces strong public and political opposition. Right-of-way acquisition would be very difficult. If landowners were unwilling sellers of right-of-way, MDT may have difficulty proving necessity under eminent domain proceedings.

The new western alignment would be excessively costly at approximately $68.5 million. Rough terrain would present substantial constructability challenges. Although this alternative was not presented at the June 2005 public meeting, it is possible that area residents would oppose a western alignment as well, given the general sentiments that MT 69 should remain in its current location. There may be associated right-of-way acquisition difficulties.

Table 7.6 Results of Third Screen

Components of Screen Three			No Build	Spot Improvements	Existing Alignment	Eastern Alignment	Western Alignment
Reasonableness	**Technical Standpoint**		NA	Some Challenges	Some Challenges	Some Challenges	Some Challenges
	Economic Standpoint		No Cost	Second Lowest Cost	Moderate Cost	Second Highest Cost	Highest Cost
Practicability	**Economic Considerations**	**Construction Cost***	NA	$1.6 million	$20 million	$27.5 million	$68.5 million
		Opportunity Costs	Lack of Improvements Results in Travel Inefficiencies	Speed Reduction Could Inconvenience Travelers	No Opportunity Costs	Less Than One Minute of Additional Travel Time	Three to Four Minutes (50 to 70 Percent) Additional Travel Time
	Technical Considerations		NA	Some Challenges	Some Challenges	Some Challenges	Some Challenges
	Logistical Considerations	**Constructability**	NA	Some Challenges	Some Challenges	Some Challenges	Substantial Challenges
		Social / Political Concerns	Strong Support	Strong Support	Some Opposition	Strong Opposition	Potential Opposition
		Access	NA	All access points would be perpetuated	All access points would be perpetuated	Difficult to perpetuate access	Difficult to perpetuate access
		Right-of-Way Acquisition	NA	Minimal acres No Anticipated Difficulties	10 acres No Anticipated Difficulties	100 acres Substantial Challenges	77 acres Potential Challenges
Screening Result			**FAIL**	**PASS**	**PASS**	**FAIL**	**FAIL**

Note: Orange shaded cells indicate failure of individual screen component, leading to failure of overall screen.

*Maintenance costs for eastern and western alignments would be approximately double those for existing alignment as a result of two paved roadways through corridor.

8.0 CONCLUSION

Based on this preliminary evaluation of the five proposed alternatives, two have been eliminated based on their inability to address the problems in the corridor. The No Build alternative would fail to make any improvements in the corridor. While the Spot Improvements alternative would provide intermittent opportunities for emergency and law enforcement stops and would include resurfacing to extend the physical life of the roadway, it would not reduce the number of single vehicle crashes resulting in overturn, which is of primary concern on MT 69. This would fail in future NEPA/MEPA analyses due to its inability to satisfy purpose and need.

New alignment alternatives were eliminated based on their impracticability and unreasonableness resulting from excessive cost, considerable constructability challenges, known and anticipated right-of-way acquisition difficulties, and strong social and political obstacles. The concept of a new alignment in the Boulder corridor was met with strong opposition by members of the public and local officials. Further, landowners adjacent to the existing county road noted they would be unwilling to voluntarily sell their land to MDT. In addition to public opposition, the eastern alignment would be approximately $7.5 million costlier than rehabilitation / reconstruction and widening of the existing roadway. A western alignment would be excessively costly at approximately $68.5 million and would be difficult to construct given the rough terrain to the west of the existing alignment. Table 8.1 summarizes these findings.

For these reasons, rehabilitation / reconstruction and widening of the existing MT 69 alignment is the only reasonable and practicable alternative that addresses the problems in the Boulder corridor. As noted in Chapter 6, this alternative is expected to result in impacts to the Boulder River, wetlands, and wildlife habitat. Design efforts will strive to minimize impacts to these resources as much as practicable and will be explored in coordination with appropriate resource agencies during future NEPA/MEPA analyses.

Table 8.1 Summary Comparison Matrix

Screen	Screen Component	No Build	Spot Improvements	Existing Alignment	Eastern Alignment	Western Alignment
Screen One Does the Alternative Address Corridor Problems?		Incidence of crashes expected to increase without new roadway template.		Wider shoulders and flatter side slopes would reduce incidence of crashes. New roadway would have multi-year design life.		
Screen Two Are There Fatal Flaws Relating to Natural Resource Impacts or Regulatory Compliance?		No new impacts	Impacts would occur, but none that are anticipated to preclude regulatory compliance. No fatal flaws were identified. Standard avoidance, minimization, and mitigation measures would be utilized.			
Screen Three Is the Alternative Reasonable and Practicable?	**Construction Cost***	NA	$1.6 million	$20 million	$27.5 million	$68.5 million
	Opportunity Costs	Deteriorating roadway would cause travel inefficiencies.	Reduced speed limit would inconvenience drivers.	None	Slightly longer route would result in minor travel delays.	Longer route and mountainous topography would cause travel delays and reduce route efficiency.
	Constructability	NA	Some challenges relating to close proximity of Boulder River and wetland areas.			Substantial challenges relating to steep topography.
	Social / Political Support	Strong Support	Strong Support	Some Opposition	Strong Opposition	Potential Opposition
	Access	NA	All access points would be perpetuated	All access points would be perpetuated	Difficult to perpetuate access	Difficult to perpetuate access
	Right-of-Way Acquisition	None	1 acre	10 acres	100 acres	77 acres
RESULT		**FAIL**	**FAIL**	**PASS**	**FAIL**	**FAIL**

Note: Orange shaded cells indicate failure of individual screen component, leading to overall failure of alternative.
*Maintenance costs for eastern and western alignments would be approximately double those for existing alignment as a result of two paved roadways through corridor.