US 191 Corridor Study

Four Corners to Beaver Creek

APPENDIX 4:

Improvement Options Memorandum

Appendix A: Cost Estimates

US 191 Corridor Study

Four Corners to Beaver Creek

Improvement Options

Technical Memorandum

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Montana Department of Transportation

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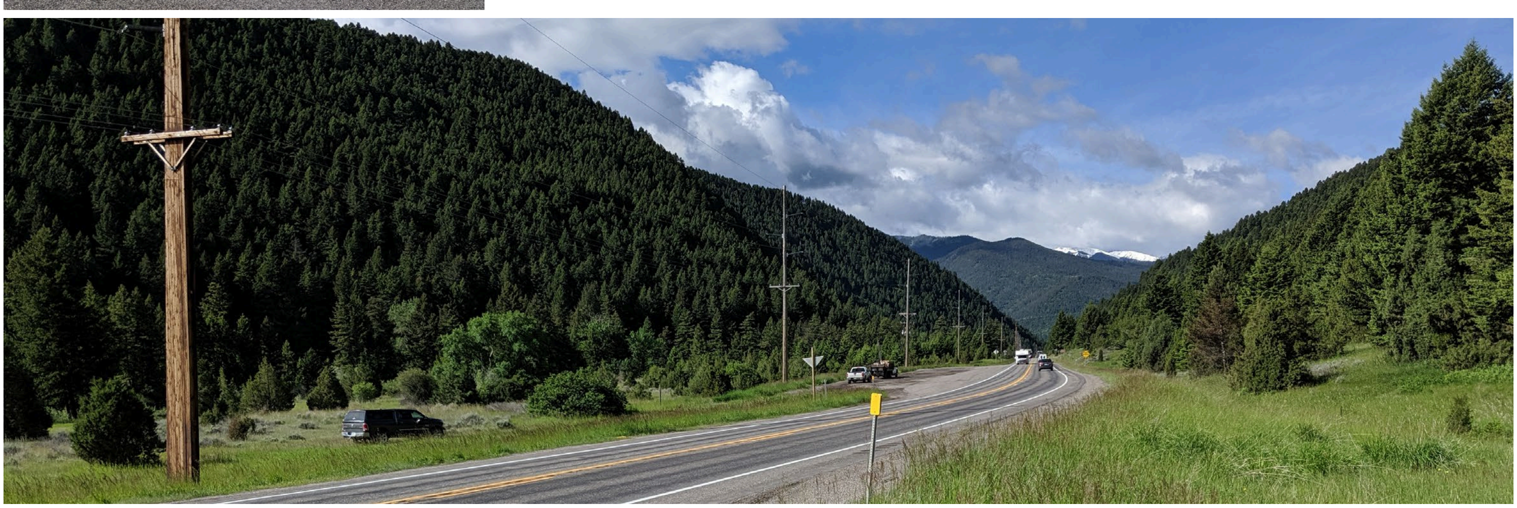

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Improvement Options

1.0. INTRODUCTION

The Montana Department of Transportation (MDT) is working on a corridor planning study for US Highway 191 (US 191) between Four Corners and Beaver Creek Road south of Big Sky Canyon Village. The purpose of the *US Highway 191 Corridor Study* is to develop a comprehensive long-range plan for managing the corridor and to identify feasible options to address identified needs. The study is a collaborative process between MDT, the Federal Highway Administration (FHWA), local jurisdictions, resource agencies, and the public.

The intent of this *Improvement Options Technical Memorandum* is to identify and evaluate options for improving US 191. Potential improvement options are intended to address issues or areas of concern defined in the *Existing and Projected Conditions Technical Memorandum*[1] prepared for the study corridor. Recommended improvement options considered in this report reflect input from stakeholders and the public, as well as a thorough evaluation of the existing conditions of US 191 within the study area. The following steps were applied:

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

1.1. Needs and Objectives

Each potential improvement option was evaluated to determine if it addressed one or more needs and objectives of the corridor. Improvement options identified in this study attempt to address the needs and objectives to the extent feasible within the other limiting considerations listed below.

Need 1: Improve the Safety of the Corridor

- Reduce fatalities and serious injuries in support of Vision Zero.
- Improve roadway elements to meet current design standards.
- Reduce animal-vehicle conflicts.
- Reduce roadside hazards.
- Reduce vehicle conflicts.

Need 2: Improve the Operations of the Corridor

- Accommodate existing and future travel demands.
- Provide reasonable access to adjacent lands.
- Improve non-motorized mobility and accessibility.
- Improve travel demand management.
- Accommodate wildlife movement.

Other Considerations

- Impacts to environmental resources
- Local and regional planning
- Temporary construction impacts

- Funding availability
- Construction feasibility and physical constraints
- Corridor context, function, and use
- Maintenance cost and responsibility

1.2. Projects Under Development

MDT has a number of projects planned along the study corridor. These projects are expected to be developed within the next five years. Other projects, developed by Gallatin County and private developers, are also expected to be completed in the coming years. These projects will primarily address roadway maintenance needs as well as needs associated with current and planned future developments. A summary of these planned projects is provided below.

MDT Planned Projects

The *Montana 2020-2024 Statewide Transportation Improvement Program*[2] identifies the following projects on US 191 to be funded over the next five years:

- **Turnbay – North of Gallatin Gateway (Reference Post [RP] 76.8):** Intersection improvements at the intersection of US 191 and Gooch Hill Road. Improvements include a right-turn lane on US 191 for northbound vehicles at Gooch Hill Road.
- **SF 179 Gallatin Canyon VMS:** Safety improvements through Gallatin Canyon. Improvements include installation of permanent variable messaging signs (VMS) to notify drivers of real-time roadway conditions and emergency situations. Preliminary locations for the VMS boards are in the Big Sky area (RP 47 - 48) and near Gateway South Road (RP 70.3 – 71.5).
- **S of Spanish Creek – S (RP 61.4 to 65.2):** Pavement rehabilitation on a 3.8-mile segment of US 191 between Storm Castle Road and Cascade Creek Road.
- **Bridge Decks Hwy 64 Big Sky:** Bridge rehabilitation on Montana Highway 64 (MT 64), Bridge #5905 on US 191 over the Gallatin River (RP 49.8) is included in this project. The bridge deck is to be resurfaced (mill and overlay).
- **HSIP Program:** Miscellaneous safety improvements across the MDT Butte District. Specific projects have not yet been defined, projects may or may not be completed on US 191 through this program.

Other Planned Projects

In addition to the projects programmed by MDT, the following projects are expected to be completed on US 191 within the study area:

- **MT 64 TIGER Grant:** Gallatin County, on behalf of Big Sky, will complete a project at the MT 64/US 191 intersection. The project will be fully funded by a TIGER grant. The project will include installation of northbound lead left-turn phasing at the existing signal. Several other roadway improvement projects will be funded by the TIGER grant but occur on MT 64, not the study corridor.
- **Gateway Village Subdivision:** Installation of a two-way left-turn lane between Cottonwood Road and Mill Street (RP 75.83 to 76.20) and additional approaches to serve the planned subdivision. The project is scheduled for 2020.

2.0. IMPROVEMENT OPTIONS

This section contains descriptions and an evaluation of improvement options intended to address defined needs and objectives for the US 191 corridor and identified areas of concern. The options are grouped as small-scale spot improvements, minor and systematic corridor-wide improvements, improvements to address the needs of alternate transportation modes, and large-scale roadway reconstruction improvements. The recommended improvements can be developed as stand-alone projects, or, in some cases, combined as larger projects as appropriate. There may be cost savings and efficiencies gained by packaging improvement options together.

Implementation Agency/Partners

Successful implementation of improvements may require cooperation and effort from multiple entities. Depending on the improvement option, a variety of agencies and stakeholders may have the resources, funds, jurisdiction, or special expertise necessary to accomplish the improvement options. The various implementation agencies and partners include MDT, federal and state agencies, transit operators, school districts, local task forces and community groups, private landowners and developers, wildlife organizations, and other parties with interest or authority.

Timeframe

The timing and ability to implement improvement options depends on a number of factors, including the availability of funding, right-of-way needs, and other project delivery elements. Implementation timeframes were estimated for each improvement option based on potential anticipated project delivery. These implementation timeframes are not a commitment to developing the recommendations, rather, they are intended to recognize the need, complexity, and potential funding sources for the options. Implementation timeframes were defined as follows:

- **Short-term:** Implementation is feasible within a 0- to 5-year period.
- **Mid-term:** Implementation is feasible within a 5- to 10-year period.
- **Long-term:** Implementation is feasible within a 10- to 20-year period.
- **As needed:** Implementation could occur based on observed need at any time as needed.

Estimated Cost

Planning-level cost estimates were developed for each improvement option in accordance with procedures outlined by MDT[3]. The costs include estimates for construction, engineering, right-of-way, utilities, drainage, and indirect costs. In addition, an inflationary factor of three percent per year was applied to the planning-level costs to account for an estimated year of expenditure. Contingencies were added to account for unknown factors at the planning-level stage, however actual costs may vary due to changed conditions at the time of construction. **Appendix A** contains additional planning-level cost estimate information for each option.

Potential Funding Sources

The ability to advance recommendations from this study and develop projects on US 191 depends on the availability of existing and future federal, state, local, and private funding sources. Projects identified in this study may be eligible for funding through a variety of programs and sources, including those listed below. Currently, no funding has been identified to complete any of the recommended improvement options contained in this study.

- National Highway Performance Program (NH)
- Transportation Alternatives Program (TA)
- Highway Safety Improvement Program (HSIP)
- Federal Lands Access Program (FLAP)

- Transit Funding
- State and Local Maintenance Funds
- Local Road, Bridge, and Special Revenue Funds
- Private Funding Sources

Project Development Considerations

Improvement options forwarded from this study will be subject to MDT's standard project development process. This process typically includes project-specific design activities such as stakeholder coordination, environmental impact analysis and permitting, utility conflict mitigation, traffic and safety analysis, hydraulic and geotechnical investigations, and right-of-way acquisition based on project location and design features.[4] For projects initiated outside of MDT that may substantially and permanently impact the transportation system (e.g. new developments), the MDT System Impact Action Process (SIAP) may apply. Notable project development considerations are listed for each option such as potential stakeholder interests, resources and site features, indirect effects, and other factors to be addressed during project development.

If improvements are forwarded from this study, detailed analysis would be required during the project development process to quantify specific resource impacts and identify associated permits, laws, and regulations that may apply. Information contained in this report may be used to support future project development and environmental documentation. A list of regulatory and resources agencies that may be consulted during project development as well as associated permits, laws, regulations, and guidelines administered by those agencies are listed in **Table 1**.

Table 1: Regulatory and Resource Agencies and Responsibilities

Regulatory Entity	Responsibilities/Authorizations	Resources Affected
Federal Highway Administration (FHWA)	• National Environmental Policy Act (NEPA) • Section 4(f) of Department of Transportation Act • Uniform Relocation Assistance Act	All Resources
United States Fish and Wildlife Service (USFWS)	• NEPA • Endangered Species Act • Bald and Golden Eagle Protection Act • Migratory Bird Treaty Act • Birds of Conservation Concern	Wildlife, Habitat, Protected Species
United States Forest Service (USFS)	• NEPA	Lands under USFS Jurisdiction
Bureau of Land Management (BLM)	• NEPA	Public Lands
United States Army Corps of Engineers (USACE)	• NEPA • Clean Water Act (CWA) Section 404 Permit	Wetlands, Streambed, Streambanks, Irrigation Canals/Ditches
US Environmental Protection Agency (EPA)	• NEPA • Resource Conservation and Recovery Act (RCRA) • Clean Air Act (CAA) • CWA	Surface Waters, Irrigation Features, Wetlands, Hazardous Materials
Montana Department of Environmental Quality (DEQ)	• Montana Environmental Policy Act (MEPA) • Montana Water Quality Act • 401 Water Quality Certification • Short-term Water Quality Standard for Turbidity (318 Authorization) • Montana Pollutant Discharge Elimination System (MPDES) General Permit	Wetlands, Streambed, Streambanks, Floodplains, Stormwater Discharges into Surface Waters

Regulatory Entity	Responsibilities/Authorizations	Resources Affected
	• CAA • RCRA	
Montana Fish, Wildlife & Parks (FWP)	• MEPA • Stream Protection Act (SPA) 124 Authorization • Land and Water Conservation Fund (LWCF) - Section 6(f)	Streambed, Streambanks, LWCF Properties
Montana Department of Natural Resources & Conservation (DNRC)	• MEPA • Montana Land Use License or Easement on Navigable Waters	State Lands, Groundwater, Surface Waters, Irrigation Features, Wetlands, Floodplains
State Historic Preservation Office (SHPO)	• MEPA • National Historic Preservation Act (NHPA) Section 106 Coordination/Consultation	Historic/Cultural Resources
Gallatin County and Local Communities	• Local Planning Documents • Gallatin County Floodplain Regulations	All Resources

2.1. Spot Improvements

The improvement options contained in this section address traffic operations, safety, and roadway geometrics at several intersections and spot locations along the corridor. About 21 percent of crashes reported over the past 10 years (2009-2018) occurred at an intersection or were related to an intersection. As more growth is expected in the future, several locations within the study area may experience additional safety concerns and poor intersection operations.

An analysis of traffic conditions and operations for both current and future year conditions was previously completed to document congestion and levels of service (LOS) for the highway and at key intersections. Input from the public and stakeholders indicates that it can be difficult and/or dangerous to enter and exit the highway due to high traffic volumes and minimal gaps in traffic, especially during peak travel times. The use of traffic control periodically along the highway could help regulate and facilitate access to US 191 from approaches. The implementation of standard-sized turnouts along the highway can also help ease congestion and improve safety. Comments from emergency service providers confirmed that traffic control and larger, more frequent turnouts along the highway would be beneficial for emergency services and would ease highway access.

A detailed crash analysis for the 10-year crash analysis period spanning January 1, 2009, to December 31, 2018, was completed. Historic crash trends and safety concerns are noted where relevant to development of the improvement options. To address safety trends, geometric improvements may be necessary. Potential geometric spot improvements may include realignment of intersection legs, additional turn bays, substandard curve modification, and bridge widening. A list of areas that do not meet current MDT standards is contained in the *Existing and Projected Conditions Report.*

Note that some of the following improvement options involve the addition of traffic control, which could involve roundabouts, traffic signals, or other innovative intersection designs. For a traffic signal to be considered, an intersection must meet at least one of eight signal warrants as required by the *Manual on Uniform Traffic Control Devices* (MUTCD).[5] Intersections could be monitored for warrants as development occurs to determine if traffic control modifications are necessary.

<u>S1. Four Corners Intersection (RP 81.9)</u>

Gas stations are located on three of the four quadrants of the Four Corners intersection (US 191/MT 84/MT 85), and a bar/restaurant is located in the fourth. The driveways for these businesses are set back less than 100 feet from the stop bar on all approach legs except along Jackrabbit Lane. Conflicts can occur when driveways are located too close to intersections. It is desirable to minimize the number of conflict points created with existing and future driveways since more conflict points can increase the risk of a crash occurring.

Over 100 crashes were reported at the Four Corners intersection over the 10-year analysis period. The most common crash types were rear end (43), right angle (32), sideswipe (13), and left turn (8). These crash types are common at signalized intersections and in areas with heavy congestion. Eliminating left turns out of driveways near the intersection, installing centerline medians, or consolidating/closing approaches can be effective means to decrease crash potential and help increase safety. Access control plans have been previously prepared for all legs of the intersection; implementation and enforcement of these plans within a half-mile of the intersection could help improve safety at the intersection (see **C7** and **C8**).

Under existing traffic conditions, this intersection operates at a LOS C during all peak hours except the August PM peak hour (LOS D). Under projected traffic conditions, the Four Corners intersection is predicted to operate at LOS F during the AM and PM peak hours. The eastbound approach (from Ennis) generates the highest delay during all peak hours. The northbound approach (from Big Sky) generates the second highest delay during all peak hours. The westbound left also generates a significant amount of delay during the peak hours. A second westbound left-turn lane could help improve operations during the peak hours. However, if a second left-turn lane is added, the two-lane section in the southbound direction on the south approach leg should be continued to avoid lane deprivation issues. Pedestrian accommodations, such as modified crosswalks and pedestrian signal heads, could also be included at this intersection if improvements are made (see **A3**).

Recommendation: Modify business access; install second westbound left-turn lane; add pedestrian crossing treatments	
Project Development Considerations: • Business owners may not support modified access • Second westbound left-turn lane may require southbound widening on US 191 • Hazardous materials and historic/cultural properties	**Implementation Agency/Partners:** • MDT **Timeframe:** Mid-term **Estimated Cost:** $2.5M **Potential Funding Sources:** NH, HSIP, TA

S2. 3rd Street to 2nd Street (RP 81.4 – 81.3)

A crash trend was identified in the section of US 191 between 3rd Street and 2nd Street. There were 24 crashes reported in this section of US 191 over the 10-year analysis period. The most common crash types were rear end (8), fixed object (8), and wild animal (5) crashes. All of the fixed object crashes were collision with the guardrail along this section. Of the 24 crashes, 4 caused minor injuries and 2 caused possible injuries.

In this section, the highway tapers from a three-lane typical section to a two-lane typical section back to a three-lane typical section. The two-lane section is due to constraints with the bridge over the Spain-Ferris Ditch (RP 81.5), which is not wide enough to accommodate three or more lanes. This roadway configuration does not include left-turn lanes at the 3rd and 2nd Street intersections. There is also a small coffee stand in the southwest quadrant of the US 191/2nd Street intersection with a second driveway about 175 feet south of the 2nd Street intersection. Replacement or widening of the bridge based on future needs of the highway (see **R1**) could help improve safety through this section.

Recommendation: Replace or widen bridge based on future needs of the highway	
Project Development Considerations: • Irrigation features, farmland, wetlands, vegetation, habitat, wildlife, protected species, and historic/cultural properties	**Implementation Agency/Partners:** • MDT
	Timeframe: Mid-term
	Estimated Cost: $2.2M
	Potential Funding Sources: NH

S3. Bozeman Hot Springs/Cobb Hill/Lower Rainbow Road (RP 81.1 – 81.0)

The section of US 191 between the Bozeman Hot Springs driveway (RP 81.1) and Lower Rainbow Road (RP 81.0) has been identified as an area for improvement based on crash trends. Over the 10-year crash analysis period, 12 crashes were reported in this section. About half of the crashes caused injury, with one possible, two minor, and two serious injury crashes reported. The majority of the crashes occurred under dark lighting conditions (9), with two additional crashes occurring at dusk. The crash types reported include sideswipe (2), rear-end (2), left turn opposite direction (2), fixed object (1), rollover (1), and right angle (1). Half of the crashes also involved an impaired driver.

Through this section, there are four approaches, including two on the left side of the road and two on the right. These approaches do not align with each other. Cobb Hill Road intersects US 191 at about RP 81.05 but splits off for a private driveway and has a second approach just to the north at RP 81.15. To address safety concerns in this section, multiple approaches could be consolidated and realigned to meet at a single approach. If approaches are consolidated, the intersections should also be evaluated for additional traffic control. Intersection lighting could also be installed to help address the cluster of crashes occurring at dark. There is currently a streetlamp at Lower Rainbow Road, though the functionality is unknown.

Recommendation: Consolidate approaches and realign intersection; improve intersection/ roadway lighting	
Project Development Considerations: • Additional right-of-way may be required for intersection realignment • Farmland, wetlands, vegetation, habitat, wildlife, protected species, and historic/cultural properties	**Implementation Agency/Partners:** • MDT • Gallatin County • Private
	Timeframe: Mid-term
	Estimated Cost: $810,000
	Potential Funding Sources: NH, HSIP, Local, Private

S4. Violet Road/Upper Rainbow Road (RP 80.1)

The intersection of Violet Road/Upper Rainbow Road/US 191 is one of two main ingress/egress points for the Elk Grove Subdivision, a 300-lot single family home subdivision on the east side of US 191. The Blackwood Road/US 191 intersection is another access point for the subdivision about a half-mile south. The Violet Road/Upper Rainbow Road intersection also serves homes and businesses on the west side of US 191. Over the 10-year crash analysis period two property damage only crashes were reported at the intersection.

Traffic data for this intersection was not collected as part of the corridor study planning effort so it is unknown if additional traffic control is warranted at this time. The intersection should be monitored to determine if additional traffic control is needed in the future, particularly if new development occurs.

Recommendation: Install additional traffic control as warranted	
Project Development Considerations: • Installation of a traffic signal would require a warrant analysis • Additional right-of-way may be required for roundabout • Farmland, vegetation, habitat, wildlife, protected species, and historic/cultural properties	**Implementation Agency/Partners:** • MDT • Gallatin County • Private
	Timeframe: Long-term
	Estimated Cost: $2.1M (traffic signal) $4.5M (roundabout)
	Potential Funding Sources: NH, HSIP, Local, Private

S5. Zachariah Lane (RP 77.8)

The intersection of US 191/Zachariah Lane is currently stop controlled on the minor approach legs. The west leg of the intersection is a private driveway that serves six residences and farmland. The east leg of Zachariah Lane serves several homes in a low-density residential development area. In the southeast quadrant of the intersection, there is an existing business (The Garden Barn) and rural fire hydrant hookups. Access to The Garden Barn is provided on the east side of US 191 about 170 feet from the intersection as well as via a back access on Zachariah Lane about 250 feet from the intersection. The fire hydrant hookups are located about 200 feet from the intersection. Feedback from the Fire Department indicated that it can be difficult to turn on to US 191 from Zachariah Lane with the firetrucks, especially during peak travel times.

Over the 10-year analysis period, 8 crashes were reported near the intersection. Half of the crashes were wild animal crashes that occurred under dark-not lighted conditions. Only one of the crashes was reported as being related to the intersection and weather conditions were reported as a contributing circumstance.

In the future, increased development and/or traffic volumes may warrant a northbound right-turn lane at the intersection. At this time, traffic control does not appear to be warranted at the intersection, however, if conditions change, the intersection could be monitored for signal warrants. Relocating the main access point for the Garden Barn to Zachariah Lane would allow space for a turn lane and reduce conflict points. Intersection lighting at this location may be desirable as six of the eight crashes at this intersection occurred under dark-not lighted conditions. Consideration of firetrucks using the intersection should also be made.

Recommendation: Consolidate approaches; improve intersection lighting; install turn lane as warranted	
Project Development Considerations: • Installation of turn lane is subject to traffic volume criteria as outlined in MDT guidelines • Farmland, irrigation features, wetlands, vegetation, habitat, wildlife, protected species, and historic/cultural properties	**Implementation Agency/Partners:** • MDT • Gallatin County • Private
	Timeframe: Mid-term
	Estimated Cost: $480,000

	Potential Funding Sources: NH, HSIP, Local, Private

S6. Mill Street/Rabel Lane (RP 76.3)

Mill Street serves the Gallatin Gateway school, fire station, and community center, as well as several businesses and homes on the west side of US 191. To the east, this intersection serves the Post Office, various businesses, and residences. Over the 10-year analysis period, 5 crashes were recorded at this intersection, 2 of which were minor/possible injury crashes. The crash types reported were head on, right angle, right turn, and left turn.

This intersection is shown to operate at failing conditions during the morning and evening peak hours under existing conditions. With future growth in the area, deteriorating traffic operations are anticipated. Intersection traffic control, such as a roundabout, traffic signal, or other innovative intersection design, could be installed at this location to improve traffic operations. Additionally, a preemptive traffic device at this intersection could provide safer access to the highway for the Gallatin Gateway Fire Department.

<table>
<tr><td colspan="2">Recommendation: Install additional traffic control as warranted</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Installation of a traffic signal would require a warrant analysis
• Additional right-of-way may be required for roundabout
• Farmland, vegetation, habitat, wildlife, protected species, hazardous materials, and historic/cultural properties</td><td>Implementation Agency/Partners:
• MDT
• Gallatin County</td></tr>
<tr><td>Timeframe: Mid-term</td></tr>
<tr><td>Estimated Cost: $910,000 (traffic signal)
$2.3M (roundabout)</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP, Local</td></tr>
</table>

S7. Cottonwood Road (RP 75.7)

The intersection of Cottonwood Road/Jays Way/US 191 is located at the south end of Gallatin Gateway. The Montana Reclaimed Lumber Co. is located in the northwest quadrant of the intersection and the Buffalo Jump Sports Bar and Grill is located in the northeast quadrant. The parking lot at the Buffalo Jump is used as a carpool lot for Big Sky commuters. Construction workers and Yellowstone Club employees are known to use this lot. Cottonwood Road is used by many drivers as an alternate route between Bozeman and Gallatin Gateway.

Over the 10-year crash analysis period, 7 crashes were reported at the intersection. The crash types reported at the intersection included rear end, right angle, and fixed object. One of the rear end crashes resulted in a fatality, the other six crashes resulted in property damage only.

The intersection currently has left-turn bays on both legs of US 191. The approaches of Cottonwood Road to the east and Jays Way to the west are offset by approximately 30 feet. A new development, Gateway Subdivision, is planned north of the intersection. The subdivision is planned to have 600 parcels. Traffic mitigation for this subdivision requires the developer to install a two-way left turn lane (TWLTL) between Cottonwood Road and Mill Street (RP 75.83 to 76.20). With increasing development in the areas around the intersection, additional traffic control may be warranted at the intersection within the planning horizon. If additional traffic control is installed, the minor approaches should be better realigned.

<table>
<tr><td colspan="2">Recommendation: Install additional traffic control and realign intersection as warranted</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Installation of a traffic signal would require a warrant analysis
Additional right-of-way may be required for roundabout and realignment
Farmland, vegetation, habitat, wildlife, protected species, and historic/cultural properties</td><td>Implementation Agency/Partners:
MDT
Gallatin County
Private</td></tr>
<tr><td>Timeframe: Long-term</td></tr>
<tr><td>Estimated Cost: $1.5M (traffic signal)
$4.7M (roundabout)</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP, Local, Private</td></tr>
</table>

S8. Lava Lake (RP 61.4)

The Lava Lake Trailhead is located on a sharp, substandard s-curve on US 191. Due to site constraints, access to the trailhead/parking lot is only allowed from the southbound direction. Drivers wishing to access the trailhead from the northbound direction must pass the access point and use a turnout located about 0.4 mile north of the trailhead to turn around.

There is also a large turnout located on the south side curve. The turnout is used as overflow parking for the Lava Lake trailhead as well as access for the Gallatin River Trail. The Gallatin River Trail is located along the eastern bank of the river north of the turnout. To access the trail, users must cross under the bridge along a narrow footpath. This location also has a small boat ramp and is commonly used as a put-in by kayakers and as a take-out for rafts, especially during high water seasons. Users who wish to access the Lava Lake Trailhead from the turnout must walk along the narrow bridge to the access road. The bridge is the oldest bridge on US 191 within the study area, being constructed in 1950. It is currently in fair condition and is a candidate for resurfacing.

Over the 10-year crash analysis period, 16 crashes were recorded at the turnout/parking lot and access road. Most were fixed object crashes. One crash resulted in a serious injury and one resulted in a possible injury; the rest of the crashes caused property damage only. No pedestrians were involved in crashes at this location.

The Lava Lake site is heavily constrained by the topography of the canyon. Major roadway realignment and modifications at this location would likely require substantial and costly earthwork and infrastructure improvements. To improve safety at the site, the existing bridge could be replaced with a wider structure in conjunction with some horizontal curve flattening. Cutting back the side slope on the north side of the curve could also help improve sight distance. If feasible, the Cascade Creek Road intersection to the north should be realigned and a northbound left-turn lane added to the new structure to eliminate the need for the turnaround to the north.

A pedestrian bridge has been recommended by the Gallatin River Task Force (GRTF) spanning the Gallatin River from the turnout to the trailhead on the other side of the river, although funding for a project has not yet been secured. Turnouts/parking areas could be accommodated using the space that the turnout currently occupies. Providing alternate river access, especially relocating the boat ramp to the opposite side of the river (e.g. river right), could help reduce traffic conflicts at this location. Warnings signs could also be installed in advance of the intersection alerting drivers of heavy pedestrian activity and turning movements. Additionally, better definition of the parking area entrance/exit could reduce conflicts.

Recommendation: Reconfigure access to Lava Lake trailhead; flatten horizontal curve; reconstruct bridge	
Project Development Considerations: • Additional right-of-way or easement may be required • Farmland, surface waters, wetlands, vegetation, habitat, wildlife, protected species, recreational sites, and historic/cultural properties	**Implementation Agency/Partners:** • MDT • FWP • US Forest Service (USFS) • GRTF
	Timeframe: Mid- to Long-term
	Estimated Cost: $10.4M (bridge/curve) $1.3M (pedestrian bridge) $560,000 (parking area)
	Potential Funding Sources: NH, HSIP, FLAP

S9. Big Sky Trail Guardrail Improvements

The Big Sky Trail shared use path is located on the west side of US 191 beginning just before the junction of MT 64 (RP 48) and ending at Beaver Creek Road (RP 45.3). The path is separated from the roadway by guardrail, which was requested by the public to provide pedestrian protection at the time the path was installed. During the winter, the path is not plowed and is used by multiple users, both motorized and non-motorized. Buildup of snow around the guardrail at intersections can block intersection sight triangles during the winter months. Since the guardrail was installed, 18 fixed object crashes have occurred in this section of US 191, 13 of which involved collision with the guardrail. Of the 13 crashes involving guardrail, 7 were collisions at an intersection and 9 were reported as collisions with the guardrail end (as opposed to guardrail face). To improve safety, alternative guardrail end terminal treatments could be added to meet current design standards and aid winter maintenance efforts.

Recommendation: Install alternative guardrail end treatments	
Project Development Considerations: • None identified	**Implementation Agency/Partners:** • MDT
	Timeframe: Short-term
	Estimated Cost: $50,000
	Potential Funding Sources: HSIP, Maintenance

S10. Weigh Station

A permanent MDT Motor Carries Services (MCS) scale site exists near the Four Corners intersection. The scale site is used by MCS to inspect the weight of vehicles traveling on the highway to ensure that the roadway is not compromised by an overweight vehicle. Permits issued by MCS are required for oversize and overweight vehicles. The *Four Corners MCS Scale Site Traffic Study*[6] was conducted in 2015 to evaluate the operations and safety of the site. Concerns regarding safety, intersection and corridor operations, scale site congestion, and driver confusion were mentioned and evaluated in the study. Although minor site modifications were recommended in the study, MCS anticipates that relocation and expansion of the site will be necessary to accommodate future traffic demands.

It is desirable by MCS to construct two scale sites, each serving one direction of traffic. In most cases, this would eliminate left turns into and out of the weigh station, improving both safety and operations. If two sites are constructed, one site could include a permanent scale and a maintenance building, while the other would include only a portable scale. The portable scale site would likely only be used during peak seasons for freight. Potential locations to be further considered and evaluated for feasibility of a new scale site are discussed in this section:

S10-a. South of Williams Road

MDT currently owns a piece of land just south of Williams Road (RP 72) on the west side of US 191. The site is currently used as an MDT maintenance section house and sand/salt stockpile. The potential exists to relocate the stockpile and construct a new weigh station at the existing site. Conversely, a new weigh station could be constructed south of the Bush Etherington Ditch on the south side of the stockpile site. This site is relatively flat and is located just north of the mouth of the Gallatin Canyon. Controlling truck loads before entering the canyon is desirable.

If this section of roadway is expanded to four or five lanes (see **R3**), there may be safety concerns associated with constructing a weigh station at this location if trucks have to cross several lanes of traffic to enter or exit the station. Constructing two sites on opposite sides of the highway may help remedy this situation, although southbound trucks continuing east or west would still encounter turning issues. There is also potential to construct a temporary scale site north of Four Corners if property becomes available.

S10-b. Spanish Creek Area

Another potential location for a new weigh station is South of Spanish Creek Road (RP 68.7). There is about one mile of open space that could be used for a weigh station. This location is just south of the mouth of the Gallatin Canyon. A few houses exist on the eastern side of US 191 and the Gallatin River. This area is also used for access to the Gallatin River for fishing. Two recreational approaches exist at RP 68.3 and RP 67.6.

Similar to **S10-a**, if additional lanes are added through this section, safety concerns may arise. Additionally, constructing a weigh station in this location may compete with the potential for adding additional lanes (see **R5-a**) due to limited space. If there is not enough room to construct two weigh stations at this location, the stations could be offset, with one located further north at a recreational turnout that FWP uses seasonally for game checks (RP 70.3). It should be noted that the further south a weigh station is constructed on this corridor, the more difficult and inconvenient it would be for truck drivers who do not intend to travel the Gallatin Canyon. This may result in truck drivers bypassing the scale site.

S10-c. South of Study Area

Currently, the weigh station at the Four Corners intersection serves all cardinal directions and accommodates bi-directional entry and exit maneuvers. During a typical day, the scale is open to both north and southbound movements. However, during periods of high traffic, the scale is closed for northbound truck traffic. Another weigh station, south of the study area was suggested by the public and stakeholders to serve northbound vehicles. If this option is pursued, the weigh station at the beginning of the corridor, either in its current location or relocated, could service only southbound vehicles while a second weigh station further south could service only northbound vehicles. By having two weigh stations, one at each end of the Gallatin Canyon, MCS could control truck and heavy vehicle traffic through the canyon and help preserve the recreational and scenic aspects of the corridor.

Recommendation: Relocate weigh station	
Project Development Considerations: • Additional right-of-way or easement may be required • Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, protected species, hazardous materials, and historic/cultural properties depending on location of weigh station • Additional evaluations would be needed during project development to determine specific siting requirements • Weigh station siting may compete with the potential for adding additional lanes due to space limitations • Construction of directional weigh stations (one on each side of the highway) may improve access but increase cost	**Implementation Agency/Partners:** • MDT **Timeframe:** Mid- to Long-term **Estimated Cost:** $5.6M (S10-a) $7.8M (S10-b) $4.9M (S10-c) **Potential Funding Sources:** NH

S11. Turn Lanes at Spot Locations

This improvement option includes constructing auxiliary turn lanes at intersections along US 191 as warranted. Guidelines for turn lanes are contained in Chapter 28 of the MDT *Traffic Engineering Manual*[7]. Turn lanes may be warranted based on the speed of the highway, hourly traffic volumes, and hourly turning volumes. Evidence of a crash trend may also indicate the need for a turn lane. When considering right-turn lanes, specific attention should be given to visibility on the side street as decelerating vehicles in the auxiliary lane can create a moving sight obstruction for drivers on the side street.

Potential locations to monitor for turn lane warrants were gathered from public comments and past planning documents. Additional evaluation of traffic conditions may be necessary to determine if turn lanes are warranted at the following locations:

- Axtell-Anceny Road (RP 78.5)
- Zachariah Lane (RP 77.8)
- Cottonwood Road (RP 75.7)
- Hawk Hill Road (RP 74.6)
- Ruby Mountain Way (RP 74.5)
- Little Bear Road (RP 74.1)
- Low Bench Road (RP 73.9)
- Williams Road (RP 72.7)
- Gateway South Road (RP 70.4)
- Rockhaven Camp (RP 66.9)
- Indian Ridge Trailhead (RP 64.7)
- Lava Lake Trailhead (RP 61.4)
- Golden Gate (RP 50.5)

At some locations along the corridor, there are small sections of widened shoulders in advance of residential approaches. These widened shoulders were provided by MDT at various approaches during pavement preservation job NH 50-2(67)70 in 2011. These sections of widened pavement are not striped as dedicated right-turn lanes but effectively serve the same purpose. Public comments suggest that these small sections of widened pavement are being used as cell phone turnouts by drivers. Some homeowner's associations have installed "No Parking" signs but have suggested signage to prevent parking in the shoulder at these locations.

<table>
<tr><td colspan="2">Recommendation: Install turn lanes at spot locations as warranted</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Additional right-of-way or easement may be required
Installation of turn lane is subject to traffic volume criteria as outlined in MDT guidelines
Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, protected species, and historic/cultural properties</td><td>Implementation Agency/Partners:
MDT
Gallatin County
Private</td></tr>
<tr><td>Timeframe: Mid- to Long-term</td></tr>
<tr><td>Estimated Cost: $230,000 to $1.1M</td></tr>
<tr><td>Potential Funding Sources: NH, Local, Private</td></tr>
</table>

S12. Turnouts for Slow-moving Vehicles

Turnouts allow slow-moving vehicles to exit the traffic stream as queues form behind them. When used, turnouts can help improve traffic flow. There are currently 21 signed turnouts along the study corridor, all of which occur within the Gallatin Canyon. Public input suggests that turnouts are infrequently used by slow-moving vehicles. Input from heavy vehicle operators and bus drivers indicates that the turnouts are oftentimes difficult to use because they are too short to safely exit the highway in addition to concerns about reentering the traffic stream. Some of the turnouts are used by recreationists for access to the Gallatin River, trailheads, and climbing areas. Parked vehicles in the turnouts can contribute to the reduced ability for slow-moving vehicles to use turnouts. Designated parking for recreational access (see **S13**) could help reduce parking in turnouts for slow-moving vehicles.

To increase use of existing turnouts by slow-moving vehicles, some could be lengthened and/or widened so trucks, buses, and other large vehicles can more easily exit the highway and to provide designated parking areas. The extent of lengthening and widening in each location would be dependent on site constraints. Additional signage throughout the corridor is also required to be compliant with the MUTCD. Static signage (MUTCD Signs R4-13 and R4-14) is required at each turnout location to remind drivers that slow-moving vehicles must use turnouts. Currently, signage (MUTCD Sign R4-12) only occurs at the northern and southern entrances to the canyon. Signage could include reminders for slow-moving vehicles to use turnouts as well as advanced signing for upcoming turnouts.

New turnouts could also be constructed. There are several locations where informal turnouts have been established by recreationists and other roadway users (see **S13**). There is opportunity to formalize existing locations, if turnouts can safely be accommodated. The American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets (Greenbook)*[8] states that proper design of turnouts should consider length, including entry and exit tapers, width, and location with respect to sight distance. Turnouts should also be located so that approaching drivers have a clear view of the entire turnout in order to determine whether a turnout is available for use.

Based on the 60 miles per hour (mph) speed limit on US 191, turnouts should be at least 550 feet long (including entry and exit tapers). Taper lengths generally range from 50 to 100 feet. Turnouts shorter than 200 feet are not recommended, even with low approach speeds. The available sight distance should be at least 1,000 feet on the approach to the turnout. The minimum width of a turnout is 12 feet with widths of 16 feet being desirable. Additional length, width, and signage would be needed to accommodate parking in combination with turnout function.

Aerial photography and GIS mapping were used to determine whether the turnouts on the corridor meet AASHTO standards. It was found that all existing designated turnouts on the corridor satisfy the 200-foot minimum length, but only the Lava Lake turnout meets the 550-foot length recommendation. Additionally, all of the turnouts meet and exceed the minimum width requirements of 12 feet.

The following are potential locations reviewed for turnout improvements based on preliminary review of roadway geometrics, terrain, safety, and known use areas.

- Gallatin Tower (RP 62.2) – *improve safety*
- House Rock (RP 62) – *improve safety*
- Screaming Left (RP 59.2) – *remove turnout signing*
- RP 52.8 – *new turnout roadside left*
- RP 51.1 – *new turnout roadside right*
- Golden Gate (RP 50.6) – *lengthen turnout for residential use/improve safety*

<table>
<tr><td colspan="2">Recommendation: Construct/modify turnouts as appropriate to improve function and safety; add signage at each location indicating slow-moving vehicles must use turnouts</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Additional right-of-way or easements may be required
• Sight distance and physical constraints adjacent to the roadway may present limitations for new turnouts
• Surface waters, irrigation features, floodplains, wetlands, vegetation, habitat, wildlife, protected species, recreational sites, and historic/cultural properties</td><td>Implementation Agency/Partners:
• MDT</td></tr>
<tr><td>Timeframe: Short- to long-term</td></tr>
<tr><td>Estimated Cost: $80,000 to $1.1M each (turnout); $600 (signage)</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP</td></tr>
</table>

S13. Recreational Access

Vehicle turnouts along the highway are often used for recreational access along the Gallatin River within the canyon. In some cases, informal pullouts are starting to become established at river access points by sustained public use. There is opportunity to formalize these high-use pullouts by paving them, developing dedicated ingress/egress points, and providing designated parking, which may help reduce parking in turnouts for slow-moving vehicles (see **S12**). The *Gallatin Canyon River Access Site Assessment*[9] mapped over 70 recreational approaches used for river access and identified potential treatment options for each site within the study corridor. FWP, USFS, and GRTF should be consulted to determine appropriate locations for formalized approaches or improved river access. In some cases, it might also be appropriate to close or consolidate existing recreational approaches due to safety concerns. Note that all formalized turnouts should be constructed to current standards. The following are potential locations to modify for recreational access:

- Mouth of Canyon (RP 70.6) – *formalize*
- Upstream of Spanish Creek (RP 67.5) – *new*
- Gallatin National Forest Sign (RP 66.5) – *formalize across highway*
- Low Water Take-out (RP 63.1) – *new*
- Downstream of Mad Mile (RP 62.5) – *new*
- Ender Spot (RP 58.3) – *close*
- No Tell (RP 57.6) – *close/move*
- Karst Camp (RP 54.2) – *new*
- Durnam Meadow (RP 53.7) – *new*

- Portal Creek (RP 53.2) – *new*
- Deer Creek (RP 51.5) – *new*
- Baetis Alley (RP 51) – *new*

Other amenities, such as year-round toilets, recreational maps, and other corridor-specific information, at turnouts at the beginning and end of the Gallatin Canyon have also been requested by the public. The intent of these amenities would be to enhance user comfort and help inform visitors about the canyon with respect to recreation as well as area history and the environmental surroundings. However, improvements of this type are consistent with those of a rest area, which would require an evaluation per the *Montana Rest Area Plan*[10] guidelines for construction of new rest areas based on network spacing needs.

Additional concerns brought forward by the public and stakeholders related to recreational access include the need for advanced signing of trailheads and signing reminding drivers to use turnouts for wildlife viewing. There are several trailheads located along the study corridor including Indian Ridge, Hellroaring Creek, and Lava Lake. Advanced signing notifying drivers of the upcoming turn for these recreational areas may help with wayfinding. Another concern from the public includes incidents of drivers stopping in the driving lane to get out of their vehicles and take pictures of wildlife and scenery. While this is common in Yellowstone National Park, the study corridor is not part of the park and it is a safety hazard for users to stop in the driving lane, especially on blind corners. Additional signage reminding motorists to use the turnouts may help alleviate some of these concerns.

<table>
<tr><td colspan="2">Recommendation: Formalize and improve recreational access at existing high-use locations; install additional advance warning signage as appropriate</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Additional right-of-way or easement may be needed to expand parking at recreational approaches
Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, recreational sites, and historic/cultural properties</td><td>Implementation Agency/Partners:
MDT
USFS
FWP
GRTF</td></tr>
<tr><td>Timeframe: Short- to Long-term</td></tr>
<tr><td>Estimated Cost: $70,000 (modified)
$840,000 (new)
$5,000 (close)</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP, TA, FLAP</td></tr>
</table>

S14. Bridge Replacements

There are nine bridges along the study corridor, seven of which cross streams/rivers and two that span irrigation ditches/canals. All of the bridges meet minimum design standards to remain in place. However, only two (RP 57.3 and RP 48.0) meet design standards for new bridge construction based on their width, design load, and condition ratings, and they are recommended to remain in place. Since some of the bridges are not wide enough, there is insufficient room for standard shoulders or for future roadway expansion.

Replacement or widening of bridges along the highway may be needed to improve safety and accommodate additional travel lanes as recommended with roadway reconstruction (see **Section 2.4**). The following list shows recommended bridge improvements for five bridges along the corridor. Note that the bridge over the Farmer's Canal (RP 77.7) is planned for removal and replacement with a box culvert and the bridge over the Gallatin River at RP 61.3 should be replaced in conjunction with roadway improvements (see **S8**).

While widening/replacement of the bridges may occur as a stand-alone project, it may be more cost effective to include with future roadway expansion as noted. During project development, selection of an appropriate structure would depend on constructability and site constraints, hydraulic considerations, geotechnical conditions, environmental impacts, costs, and other considerations. Width assumed for cost estimates is based on long-term roadway reconstruction configuration, as noted in the list below.

- RP 81.5 – Spain Ferris Ditch (5913): Replace with 5-lane structure
- RP 76.7 – South Cottonwood Creek (5911): Replace with 5-lane structure
- RP 70.5 – Gallatin River (5910): Replace with 4-lane structure
- RP 68.2 – Spanish Creek (5909): Replace with 4-lane structure
- RP 49.8– Gallatin River (5905): Replace with 3-lane structure

<table>
<tr><td colspan="2">Recommendation: Replace or widen existing bridges to meet current standards</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Additional right-of-way or easement may be required
Surface waters, irrigation features, floodplains, wetlands, vegetation, habitat, wildlife, fisheries, protected species, recreational sites and historic/cultural properties
Replacement structure type, size, and location would be determined during project development</td><td>Implementation Agency/Partners:
MDT
Gallatin County
Private</td></tr>
<tr><td>Timeframe: Short- to Long-term</td></tr>
<tr><td>Estimated Cost: $1.1M (RP 81.5)
$1.1M (RP 76.7)
$8.9M (RP 70.5)
$1.7M (RP 68.2)
$4.6M (RP 49.8)</td></tr>
<tr><td>Potential Funding Sources: NH</td></tr>
</table>

S15. Rockfall Hazard Mitigation

Rockfall hazard sites were identified in the *Rock Slope Asset Management Program* (RAMP) database administered by MDT. The database indicates that there are currently 14 areas within the Gallatin Canyon with rockfall slope conditions ranging from "fair" to "poor." These sites were identified based on their potential to impact the safety of the traveling public but also their potential to cause disruptions to traffic. Since a good detour does not exist for US 191 through the Gallatin Canyon, a rockfall event causing road closure could severely impact local and regional travel.

This improvement option includes completing rockfall hazard mitigation at the sites identified in the RAMP database to improve roadside clear zone and decrease the potential for rockfall events. Mitigation activities may include blasting, scaling, rock bolting, netting and drapery, rockfall retention structures/fences, and improved or reconfigured roadside ditch configurations. Conceptual mitigation designs and associated costs have been prepared for the sites on US 191 identified in the RAMP database. Note that site specific needs may change these costs significantly. The sites are located at the following locations:

- RP 63.1
- RP 62.6
- RP 62.1
- RP 61.4
- RP 61.2
- RP 60.8
- RP 59.3
- RP 57.8
- RP 55.7
- RP 52.9
- RP 52.8
- RP 52.4
- RP 52.1
- RP 50.7

Recommendation: Conduct rockfall hazard mitigation	
Project Development Considerations: • Temporary road closure/detours may be required during blasting and other mitigation activities • Geologic resources, surface waters, vegetation, habitat, wildlife, fisheries, protected species, and historic/cultural properties	**Implementation Agency/Partners:** • MDT
	Timeframe: Mid- to Long-term
	Estimated Cost: \$24.5M (improve all sites one condition state) \$59.8M (improve all sites to good condition)
	Potential Funding Sources: NH, HSIP

S16. Advance Warning Signs

This improvement option would install advance warning signs at locations along US 191 where substandard roadway elements occur. Approximately 18 percent of horizontal curves (16) within the study area do not meet minimum design standards for a National Highway System (NHS) Non-Interstate route (<50 mph design speed). Signage for substandard curves may include retroreflective signing and/or flashing/feedback signs. The following locations have been identified as potential locations for warning signs:

- RP 61.2
- RP 56.3
- RP 55.8 and 55.7

Recommendation: Install curve warning signs for substandard roadway elements	
Project Development Considerations: • None identified	**Implementation Agency/Partners:** • MDT
	Timeframe: Short-term
	Estimated Cost: Varies
	Potential Funding Sources: HSIP, Maintenance

S17. Substandard Curve Modifications at Spot Locations

This improvement option includes spot reconstruction of horizontal and vertical curves that do not meet minimum design standards to address crash trends. Substandard curves not listed here could also be reviewed in coordination with other roadway improvement projects and flattened as determined necessary and feasible. Before flattening curves into canyon hillsides, geotechnical, environmental, and other investigations would need to be conducted to determine construction feasibility, slope stability, specific environmental resource impacts, and other limitations.

S17-a. North of Spanish Creek (RP 69.2 to 68.5)

Between RP 69.2 and 68.5, the US 191 alignment has three 60-mph horizontal curves. The hillside and vegetation on the roadside can obstruct driver sight lines. Over the 10-year crash analysis period, 30 crashes were reported in this section. The primary crash types included roll over, fixed object, sideswipe, and rear-end. About half of the crashes occurred when road conditions were poor, and eight crashes caused injuries. To help improve safety through this section, two of the curves could be flattened (RP 68.8 and 68.6). Potential impacts to slope stability and nearby houses would need to be evaluated during project development.

S17-b. Rockhaven Camp (RP 66.9 to 66.5)

The curve just after Rockhaven Camp (RP 66.9 to 66.5) meets standards for a 50-mph design speed. There is also a vertical curve leading into the horizontal curve that meets standards for an 80-mph design speed. However, the combination of the two curves creates sight distance issues at this location, especially for drivers trying to exit the Rockhaven Camp driveway. Rockhaven Camp is located northeast of the curve, and the camp has a high ropes course that is visible from the highway. Public comment has indicated that passersby are often observed watching people on the course while driving. At the south end of the curve, there is an informal recreation access point at the Gallatin National Forest Sign. Drivers often park on the west side of the highway and cross US 191 to access the Gallatin River on the east side of the highway. A northbound passing zone also starts at the north end of the curve while a southbound passing zone starts at the south end of the curve.

Over the 10-year crash analysis period, 20 crashes were reported in this location. The primary crash types included roll overs, fixed object, and head on crashes. About half of the crashes occurred under adverse road conditions and four of the crashes caused injuries.

To improve safety along this section, the vertical curve could be flattened, as determined feasible. Although the horizontal curve is generally constrained physically, safety could be improved by removing the passing zones on either end of the curve or by moving the passing zones further from the curve. The river access could also be closed and moved to the east side of the highway to reduce the need for pedestrians to cross the highway on a curve with limited sight distance (see **S13**). Additional warning signs, including flashers, could also be added warning drivers to slow down and exercise caution.

S17-c. Greek Creek (RP 57.6)

There is a large horizontal curve (45-mph design speed) at approximately RP 57.6 that follows a bend in the Gallatin River. While there are relatively few crashes along the curve, there are several crashes at the beginning and end of the curve. On each end of the curve there is a turnout. On the north end of the curve, at RP 58.0, there is a second substandard horizontal curve. The curve at RP 58.0 could be flattened to provide a better approach angle leading into the large curve and improve safety.

S17-d. North of Goose Creek (RP 52.0)

There is a substandard horizontal curve that meets standards for a 45-mph design speed at RP 52.0, just north of Goose Creek. Over the 10-year crash analysis period, 17 crashes occurred along this curve. The majority of crashes were rollover and fixed object crashes occurring on roadside right (i.e., the east side of the highway). Three of the crashes caused minor or possible injuries and 12 of the 17 crashes occurred under adverse road conditions.

<table>
<tr><td colspan="2">Recommendation: Reconstruct horizontal and vertical curves at spot locations that do not meet minimum design standards</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Additional right-of-way, easement, or property acquisition may be required
Physical and environmental constraints may limit viability of flattening curves
Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, geologic features, wildlife, fisheries, protected species, recreational sites, and historic/cultural properties</td><td>Implementation Agency/Partners:
MDT</td></tr>
<tr><td>Timeframe: Mid- to Long-term</td></tr>
<tr><td>Estimated Cost: $5.5M (S17-a)
$4.4M (S17-b)
$2.4M (S17-c)
$1.7M (S17-d)</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP</td></tr>
</table>

S18. Emergency Call Boxes

There is little to no cell coverage within the Gallatin Canyon. To bring cell service to the canyon is difficult and expensive due to the topography and rigorous approval processes required for cell phone towers on USFS lands.[11] Additionally, the introduction of cell service may lead to increased usage of cell phones while driving which could contribute to distracted driving related crashes.

To aid in emergency situations and dispatch emergency services, the Big Sky Rotary Club installed five emergency call boxes along US 191, three of which are in the study area. Those call boxes are located at Lava Lake (RP 61), Moose Creek (RP 56), and Karst's Camp (RP 55). Signage for the call boxes is located at the call sites with little advance notice. Signage could be installed at each end of the Gallatin Canyon notifying the traveling public of call box locations along the corridor, as well as advance warning signs telling drivers where to pull off the highway to access the call boxes. If desired, more call boxes could also be installed where feasible.

<table>
<tr><td colspan="2">Recommendation: Install signage to notify drivers of upcoming call boxes; install additional call boxes as needed</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• None identified.</td><td>Implementation Agency/Partners:
• MDT
• Big Sky Rotary Club</td></tr>
<tr><td>Timeframe: Short- to Mid-term</td></tr>
<tr><td>Estimated Cost: $800 each (sign)
$16,000 each (call box)</td></tr>
<tr><td>Potential Funding Sources: HSIP, Private</td></tr>
</table>

2.2. Corridor-Wide Improvements

The improvement options contained in this section address traffic operations, safety, and roadway geometrics at the corridor-wide level. These improvements are more systematic and do not require major reconstruction of the roadway. The options include low-cost options such as revising striping and pavement markings, installing or replacing guardrail, adjusting speed limits, or consolidating mailboxes. Larger scale options, such as shoulder widening, access management, or wildlife-vehicle conflict mitigation, are applicable to the entire corridor but may be more cost effective to complete in coordination with spot improvements or major roadway reconstruction. Other improvement options provided in this section are generic to the entire corridor and do not directly address operations or roadway geometrics. These improvement options are, however, important to addressing the overall needs and objectives for the corridor including improved safety, reduced environmental impacts, and enhanced corridor maintenance practices.

C1. Highway Maintenance Practices

The MDT *Maintenance Operations and Procedures Manual*[12] provides information regarding maintenance practices, procedures, and responsibilities on MDT owned roadways. US 191 is under the jurisdiction of the Big Sky/Gallatin Gateway MDT Maintenance Section, a subsection of the Bozeman Maintenance Division. The Maintenance Section is responsible for the upkeep of the highway system including repairs to the surface, bridge repair, facility maintenance, pavement markings, signing, winter maintenance, right-of- way issues, issuances of permits, and administrative functions. Guidelines for these maintenance practices are discussed in Section C of the manual.

A substantial amount of MDT's efforts is directed toward operating and maintaining existing transportation facilities. MDT also continues to research and apply new technologies, materials, and equipment to improve winter driving conditions in Montana. Although there was relatively little public concern over maintenance of US 191, a few areas for improvement were noted by resource agencies and by the project team during field review. These concerns include reducing sediment loading in the Gallatin River, vegetation management, and additional winter maintenance. Note some of these practices may also be applicable during construction activities in addition to ongoing maintenance activities.

Highways running immediately adjacent to rivers have the potential to impair water quality with non-point source pollutants including sediment loading and water temperature modification. Probable sources of pollutants are from both maintenance activities for existing infrastructure and active construction projects. While the Gallatin River from Yellowstone National Park Boundary to Spanish Creek currently supports all beneficial uses, there is a higher risk of being impaired by these pollutants as it runs though the canyon from RP 45.3 to RP 70.5. Additionally, the Gallatin River from Spanish Creek to its mouth (the Missouri River), South Cottonwood Creek, Storm Castle Creek, and the West Fork Gallatin River are identified as impaired or threatened waters within the study area.[13]

Sedimentation and siltation sources include erosion from borrow ditches and fill slopes, bridge deck drainage, and traction sand applied to road surfaces during winter months. Elevated temperatures are often caused by vegetation removal along riverbanks and loss of riparian habitat. By implementing MDT's *Erosion and Sediment Control Best Management Practices Manual*[14] and *Permanent Erosion and Sediment Control Design Guidelines*[15] the negative effects of these pollutants can be minimized in both the short and long term to ensure the Gallatin River continues to meet state water quality standards.

During revision of the *Custer Gallatin National Forest Plan*[16], a study was conducted to determine if any of the rivers within the Gallatin-Custer National Forest are found eligible as a wild and scenic river. The Gallatin River was found eligible with the identified outstanding remarkable values (ORV) of recreation, scenery, and heritage. A preliminary classification of Recreational River has been identified for the Gallatin River. If the Gallatin River is classified as a wild and scenic river in the future, additional requirements related to planning, design, construction, and maintenance may be applicable.[17]

During the winter, especially after large snowstorms, management of snow can be difficult. Snow fencing, whether permanent or temporary, could help provide additional snow storage and improve driver visibility throughout the corridor. In particular, the Spanish Creek area between RP 68.1 and 66.8 is susceptible to snow drifting. In this location, there are trees along the roadside that are depositing snow close to the roadway. Although living snow fences are commonly used for snow management, the trees/shrubs must be offset from the road beyond the settlement zone to prevent buildup of snow on the roadside which may inhibit driver sight distance. In the Spanish Creek area, the trees somewhat function as a living snow fence but are located too close to the roadway presenting notable sight distance issues. The potential for vegetation removal to improve driver visibility is discussed in **C9**.

In some locations, buildup of snow from plowing activities was observed at the ends of guardrail and at the corners of intersections. If snow builds up too high, it can obstruct the driver's sight line from side streets, turnouts, and driveways. If the driver's sight line is obstructed, it can be challenging for drivers to enter the highway.

Although the turnouts on US 191 are well plowed, there can still be a layer of snow and ice on the turnouts due to limited use. The snow and ice can make turnouts difficult to use in the wintertime. To help gain more use of turnouts (see **C2**), exploring ways to deice turnouts could be beneficial. In the same regard, deicing bridge decks throughout the corridor may also help improve safety.

MDT will pursue opportunities with the neighboring states of Wyoming and Idaho to develop, communicate, and implement compatible maintenance and construction strategies for routes connecting to the US 191 corridor to facilitate consistency in snow removal, traffic control during construction, and other activities that cross state lines.

Recommendation: Address highway maintenance issues and continue to research and implement best practices	
Project Development Considerations: • Stormwater, surface waters, water quality, fisheries, wildlife, vegetation, and protected species	**Implementation Agency/Partners:** • MDT
	Timeframe: As needed
	Estimated Cost: Varies annually, estimated at $366,000 in 2019
	Potential Funding Sources: Maintenance

C2. Passing/No-Passing Zones

Passing opportunities are provided along the corridor in areas where roadway geometrics allow. No-passing zones are designated by solid yellow lines and are established in areas with insufficient passing sight distance or near public approaches. Passing opportunities are limited by terrain and the volume of opposing vehicles. As traffic volumes increase, the effectiveness of passing zones decreases. A total of 30 passing zones, 15 northbound and 15 southbound, exist along the corridor. Currently, all but two passing zones appear to be in accordance with MDT guidelines for length.

An engineering study should be completed to evaluate passing zones and determine if removal or addition of no-passing zones is warranted. Locations to examine include those where passing zones are short, as well as locations where passing may be unsafe. For example, the area around Luhn Lane (RP 64.4 to 63.5) allows for passing in both directions. The location is generally flat, straight, and free from sight obstructions. However, this location passes more than 30 approaches, five of which are public approaches. Since MDT guidelines note that no passing zones should be established in areas near public approaches, passing zones in this location may not be appropriate.

Recommendation: Evaluate and modify existing passing/no-passing signing and striping for compliance with current standards	
Project Development Considerations: • May result in increased driver frustration due to decreased passing opportunities	**Implementation Agency/Partners:** • MDT
	Timeframe: Short-term
	Estimated Cost: $13,000 per mile
	Potential Funding Sources: NH, HSIP, Maintenance

C3. Shoulder Widening

The corridor generally consists of two 12-foot travel lanes with shoulders of varying widths. The MDT *Geometric Design Standards*[18] recommend a minimum travel lane width of 12 feet on rural NHS routes. The MDT *NHS Route Segment Plan*[19] suggests a width of 40 feet or greater for the corridor. To satisfy the 40-foot minimum recommended roadway width, 8-foot shoulders would be necessary. Within the Gallatin Canyon, 8-foot shoulders are likely not feasible due to the topography and other physical constraints. However, providing widened shoulders, where possible, could help improve safety. With widening projects, side slopes could be constructed to standards, where feasible. The inclusion of shoulder rumble strips/stripes should also be included as appropriate.

MDT commonly receives complaints regarding vehicles parked on shoulders on US 191. Concerns that widening shoulders through the canyon may encourage more of this behavior have also been noted. Parking concerns, and enforcement of no-parking zones should be addressed during project development.

C3-a. US 191/MT 84/MT 85 to Gateway South Road (RP 81.9 to 75.7)

South of the Four Corners intersection, US 191 is typically 32 feet in width consisting of two 12-foot travel lanes and 4- to 6-foot shoulders. Recently reconstructed segments generally include standard 8-foot shoulders. Widening the shoulders to the recommended eight feet would improve the roadside clear zone and improve the chances of drivers being able to recover in run-off-the-road situations. Wider shoulders make it easier for a driver to steer the vehicle back onto the road at a shallower angle, reducing the chances that the driver will overcorrect and travel into oncoming traffic. Note that this segment is recommended for larger reconstruction as part of options **R1** and **R2**.

C3-b. Gateway South Road to MT 64 (RP 75.7 to 48.0)

Though the Gallatin Canyon, the roadway generally consists of two 12-foot travel lanes with 2-foot shoulders. Widening the shoulders to eight feet may be difficult throughout the canyon due to environmental constraints and limited available space. However, it may be possible to widen the shoulders to four feet, or greater, in most places throughout the canyon. Widened shoulders would increase space for roadside clear zones and could help improve safety by reducing run-off-the-road crashes. In areas with steep side slopes and where run-off-the-road crashes are known to occur, installation of guardrail could also help improve safety (see **C4**). Note that portions of this segment are recommended for larger reconstruction as part options **R3**, **R4**, and **R5**.

<table>
<tr><td colspan="2">Recommendation: Widen roadway shoulders where feasible</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Increased potential for roadside parking and higher vehicle speeds
Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, and historic/cultural properties
Physical constraints may prohibit widening in some areas</td><td>Implementation Agency/Partners:
MDT</td></tr>
<tr><td>Timeframe: Mid- to Long-term</td></tr>
<tr><td>Estimated Cost: $1.3M per mile (C3-a)
$1.8M per mile (C3-b)</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP</td></tr>
</table>

C4. Guardrail Improvements

Work was recently done during the summer of 2019 to upgrade and replace guardrail in the Gallatin Canyon between the Hellroaring Creek Trailhead and Moose Creek Campground. Guardrail through the remainder of the canyon should be upgraded and replaced as appropriate. This would involve upgrading to current standards, replacing damaged or old guardrail, and reviewing locations where guardrail can be added, or removed.

At the mouth of the canyon, between approximately RP 70 and 69, there are steep side slopes leading directly to the Gallatin River with no guardrail. There are also locations along the corridor where pedestrians have been observed walking along the roadside to access fishing sites or to watch rafters and kayakers. To separate pedestrians from vehicles, the guardrail could be modified with space added behind for pedestrians. This is especially true downstream of the Gallatin River “mad mile” (RP 62.1 to 61.9) where several turnouts are used by photographers capturing rafting runs through this river stretch. Note that guardrail can be a roadside hazard, so it is prudent that guardrail is placed in locations only where it is needed to protect vehicles from higher risk hazards behind the guardrail.

<table>
<tr><td colspan="2">Recommendation: Add, remove, repair, and upgrade guardrail as appropriate through the Gallatin Canyon</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Surface waters, wetlands, vegetation, habitat, wildlife, fisheries, and protected species</td><td>Implementation Agency/Partners:
• MDT</td></tr>
<tr><td>Timeframe: Short- to Mid-term</td></tr>
<tr><td>Estimated Cost: Varies</td></tr>
<tr><td>Potential Funding Sources: Maintenance</td></tr>
</table>

C5. Speed Considerations

The speed limit on US 191 varies from 45 mph to 70 mph in various locations. There are several speed limit changes along the corridor. In some locations, the posted speeds differ for passenger cars and trucks. The speed limit also varies based on daytime and nighttime conditions. Public comments indicated that multiple changes in speed limits can be confusing and seem illogical for drivers.

Decisions about rational speed limits are based, in part, on speed studies. During a speed study, data is collected and analyzed to identify the 85th percentile speed, or the speed at which 85 percent of the people drove at or below during ideal conditions. The 85th percentile speed is typically used as a starting point for setting a rational limit and is considered to be the maximum safe speed for that location. Speed limit investigations should be conducted in cooperation with MDT and local officials to determine the appropriate speed limit along the corridor in response to a local government request. Ultimately, the Transportation Commission is responsible for setting the speed limit for the highway.

Installation of variable speed limit (VSL) signs within the canyon may help to increase safety and provide clear speed guidance for drivers. While many motorists assume that posted speed limits apply at all times and drive at that speed in all conditions, the posted speed is not appropriate under all conditions such as times during adverse weather. VSL signs can be used to adapt the posted speed limit based on the current environmental and traffic related conditions. Common purposes for deploying VSLs include:[20]

- **Weather-Related VSLs** are used on roads where fog, ice, rain, snow, or other factors often influence safety. When weather conditions deteriorate to the point that hazardous conditions are impending, the operating agency reduces the speed limit to one that helps minimize the likelihood of crashes.
- **Congestion-Related VSLs** are used when traffic volumes are building and congestion is likely. When volumes and/or speed exceed a predetermined threshold, the strategy is deployed. The intent is to handle more traffic volume at a slower, but not stop-and-go, speed.
- **Wildlife-Related VSLs** are used during periods of time when wildlife movements or occupancy near the roadway is known or expected, e.g. seasonally. Lowering speed limits seasonally in areas where wildlife is routinely near or crossing the highway may help slow down drivers and potentially reduce wildlife-vehicle conflicts.

Since weather and road conditions in the canyon often vary and change quickly, many of the crashes reported over the 10-year analysis period were related to adverse weather or road conditions. About 59 percent of crashes in the canyon (between Gateway South Road to MT 64 [RP 70.4 to 48.0]) occurred under poor road conditions (snow, ice, frost, slush, or wet). Likewise, about 25 percent of crashes in the canyon occurred under poor weather conditions (rain, snow, or fog). Congestion is also common in the canyon due to lower roadway capacity and fewer passing opportunities. It can be dangerous for vehicles traveling at the posted speed limit to turn a corner and meet a platoon of slow-moving vehicles. Reducing the speed limit during periods of high congestion, may help reduce rear-end crashes (about 10 percent of crashes in the canyon) and other congestion-related crashes.

Recommendation: Install VSL signage through the Gallatin Canyon; conduct speed studies in response to a local government request	
Project Development Considerations: • VSL signage may be initially confusing to drivers since it has not yet been used in Montana • Effectiveness of signage is dependent on enforcement	**Implementation Agency/Partners:** • MDT
	Timeframe: Mid-term
	Estimated Cost: $350,000
	Potential Funding Sources: HSIP, Local

C6. Mailbox Relocation

There are several residences along the corridor with private mailboxes. Some of the mailboxes are placed sporadically on the highway shoulder across from driveways, while others are grouped together at small turnouts. When postal workers and residents pull off the highway to retrieve mail, it can present a safety issue and impede traffic flow, especially if there is not enough room for the driver to pull completely out of the travel lane. Safety is also a concern for residents who have to cross the highway by foot to access their mailbox.

Consolidating individual mailboxes to cluster mailbox units would move the mailboxes to side streets outside the highway right-of-way and require postal workers to exit the highway to deliver mail. Re-entering the highway may be difficult given high traffic volumes, however. If cluster mailboxes are not a viable solution, singular mailboxes could be moved and consolidated to existing turnouts with enough space to completely exit the travel lane and safely exit the vehicle to retrieve mail.

Recommendation: Consolidate individual mailboxes and move clusters to mailbox turnouts or side streets	
Project Development Considerations: • None identified	**Implementation Agency/Partners:** • MDT • Gallatin County • US Postal Service • Private
	Timeframe: As needed
	Estimated Cost: Unknown
	Potential Funding Sources: HSIP, Maintenance, Local, Private

C7. Access Management

A total of 386 approaches were identified along the US 191 study corridor. Of these, 79 were considered public roadways, 196 were private approaches, 49 were farm field approaches, 40 were approaches used for recreational access, and 22 were designated turnouts. Many of the approaches are permitted through MDT, however, some unpermitted approaches exist along the corridor especially through the Gallatin Canyon. As projects are completed, MDT could verify that all approaches in the project area are properly approved.

Landowners and developers who propose new approaches or modifications to existing approaches on US 191 should refer to the MDT *Approach Manual for Landowners and Developers*.[21] All new or modified approaches require either an MDT-issued approach permit or a right-of-way agreement. Changes in the use of property abutting the highway or change in use of an existing approach also require a new approach permit. The appropriate MDT District Office (Butte District and the Bozeman Division) will determine whether an approach permit can be granted on US 191 or if the MDT SIAP is necessary.

Appropriate management of access within a highway corridor can help improve traffic flow and reduce driveway related crashes. Good access management practices include enforcing minimum spacing distance standards between adjacent approaches and minimizing or eliminating direct access to the highway if a reasonable alternative access to a local street system currently exists. For US 191, a minimum spacing of 660 feet is required for unsignalized approaches and one-half mile for signalized approaches. Reasonable access should be maintained for all existing parcels adjacent to the highway, but some existing direct approaches could be relocated, combined, or eliminated if alternate reasonable access is available or can be provided.

To achieve this level of access management, it may be necessary to provide frontage roads in order to consolidate several approaches. It may also be appropriate to realign closely spaced approaches, so they meet at a single approach. Funneling traffic to a single approach may increase the volume at an intersection which may warrant traffic control now or in the future. Access management could occur during the project development process and as needed due to safety or operational concerns.

<table>
<tr><td colspan="2">Recommendation: Manage existing approaches as needed</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Additional right-of-way or easement may be required
• Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, hazardous materials, and historic/cultural properties</td><td>Implementation Agency/Partners:
• MDT
• Gallatin County
• Private</td></tr>
<tr><td>Timeframe: As needed</td></tr>
<tr><td>Estimated Cost: Unknown</td></tr>
<tr><td>Potential Funding Sources: NH, HSIP, Local, Private</td></tr>
</table>

C8. Access Control Plan

An Access Control Resolution has previously been adopted for the segment of US 191 from Four Corners (RP 81.9) to Gateway South Road (RP 70.5). This resolution designates the defined segment as a controlled access highway which allows MDT to implement limited access control. The next step to manage existing access and future approaches is to develop an Access Control Plan[22]. The purpose of an Access Control Plan is to improve safety, preserve function and mobility, and manage existing and future approaches in a consistent manner.

An Access Control Plan includes specific recommendations as to the number, location, and spacing of both public and private approaches allowed to access the highway directly. It also includes frontage roads, lane treatments, intersection control, and other features necessary to address identified traffic issues. A series of guidelines are typically developed to supplement the plan, including development guidance as well as details regarding the treatment of additional access requests following implementation of the plan.

Recommendation: Develop and execute an Access Control Plan between RP 81.9 and 70.5	
Project Development Considerations: • Additional right-of-way or easement may be required • Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, hazardous materials, and historic/cultural properties	**Implementation Agency/Partners:** • MDT • Gallatin County • Private **Timeframe:** Short-term **Estimated Cost:** $150,000 **Potential Funding Sources:** NH, HSIP, Local, Private

C9. Vegetation Management Plan

Areas of unmaintained or dense vegetation were identified throughout the US 191 corridor, especially within the Gallatin Canyon. Vegetation within the clear zone can contribute to decreased sight distances. Several locations, including horizontal curves throughout the canyon, were noted as having sight distance issues due to trees blocking sight lines. Before vegetation removal activities are initiated, a *Vegetation Management Plan* could be developed for the entire corridor. The goals of the *Vegetation Management Plan* would include improved sight distance for driver detection of animals in the clear zone, maintenance of quality wildlife habitat along the corridor, providing cover for animal movements across the highway in appropriate locations, maintenance of riparian zone integrity and wetland function, improved winter maintenance and snow removal activities, and sediment/runoff control along the Gallatin River and its tributaries adjacent to the highway. Vegetation management may include vegetation removal, revegetation, or planting of new vegetation, depending on location.

Recommendation: Develop and implement Vegetation Management Plan	
Project Development Considerations: • Surface waters, irrigation features, wetlands, vegetation, habitat, wildlife, fisheries, protected species • Vegetation removal would have to comply with USFS and other regulatory agency restrictions and requirements	**Implementation Agency/Partners:** • MDT • Gallatin County • USFS **Timeframe:** Mid-term **Estimated Cost:** $70,000 **Potential Funding Sources:** Maintenance, Local, Other Agencies

C10. Wildlife-Vehicle Conflict Mitigation and Wildlife Movement Accommodation

Strategies to reduce wildlife-vehicle conflicts and accommodate wildlife movements were assessed through a variety of measures. Carcass data between January 1, 2009, and December 31, 2018 were obtained for the corridor and reviewed to identify areas with concentrations of reported animal mortalities. This information was evaluated alongside formal crash report data over the same time period, which includes wild animal crash reports from Montana Highway Patrol (MHP) and local city/county law enforcement.

Comments received from resource agencies and the *Wildlife-Vehicle Collision Reduction Study*[23] were consulted to develop potential improvement options to benefit wildlife movements and help reduce wildlife-vehicle collision potential for the travelling public. Wildlife connectivity was also reviewed on a high level by comparing carcass locations to available mapping of species ranges and distributions.

Wildlife-vehicle conflicts commonly occur throughout the study area and present a danger to human safety as well as wildlife survival. Industry accepted mitigation strategies attempting to reduce wildlife-vehicle conflict include influencing driver behavior, influencing animal behavior, reducing wildlife population size, and physically separating animals from the roadway. The following improvement options may help reduce the number and severity of these types of collisions and/or accommodate wildlife movements across the highway:

- **Grade-separated crossings** can include overpasses and underpasses. Overpasses are generally covered with vegetation and are primarily designed to serve wildlife species. Underpasses include both culverts and bridges and may facilitate passage for fish and amphibians in a riverine environment in combination with wildlife passage but may also be designed specifically to serve terrestrial wildlife. Grade-separated structures with associated fencing are considered the most effective means to address wildlife-vehicle conflict while accommodating wildlife movements.

- **Wildlife fencing** is usually considered in tandem with grade-separated crossing structures, animal detection systems, and wildlife signage measures. Fencing can limit wildlife access in certain areas, while funneling movement to designated crossing locations. Electric mats or other means to prevent animals from entering the barrier fence are typically employed in association with the fencing. Wildlife friendly fencing can also be used at the right-of-way boundary to facilitate at-grade wildlife movements across the highway as appropriate.

- **Animal detection systems** use sensors to detect animals near roadways. When an animal is detected, warning signals and/or signs are activated in real- time to alert drivers that an animal may be on or near the roadway. Animal detection systems may be used in combination with wildlife fencing, electric mats, or other features depending on location and configuration.

- **Wildlife signage** indicating the regular presence of wildlife in the area is intended to alert drivers regarding the potential for animal conflicts based on previously identified crash patterns, known wildlife movements, and crossing activity. Static signage has proven to be relatively ineffective at reducing wildlife-vehicle collisions. Seasonally appropriate signage, variable messaging, lighted signs for nighttime visibility, and more precise locational signage may be considered more effective types of signing than traditional static signing.

Grade separation, fencing, real-time animal detection, and strategic signing may have merit in areas of the corridor. MDT will evaluate site-specific wildlife accommodations based on need and feasibility on a case-by-case basis. Any improvement project implemented by MDT within the study corridor will include evaluation of wildlife needs, current and planned development impacts to habitat, and the feasibility of wildlife accommodations as part of MDT's *Wildlife Accommodation Process* and MDT's standard transportation project development process. Consideration for accommodations will be given in locations where animals are known to frequently cross or attempt to cross the highway, where wildlife movements across the highway are identified as a priority area, and in locations with concentrations of wildlife-vehicle conflicts. The following locations have been identified through preliminary planning-level analysis as general areas of wildlife-vehicle conflict:

- RP 82 to 64 – *deer crossing & mortality*
- RP 76 to 70 – *elk crossing & mortality*
- RP 67 to 49 – *moose mortality*
- RP 55 to 48 – *bighorn sheep on the roadway & mortality*
- RP 50 to 45 – *elk crossing & mortality*

MDT will also continue to coordinate wildlife and transportation issues with agency partners and to discuss wildlife issues, challenges, and opportunities at multi-stakeholder forums, including regular meetings with the Montana Wildlife & Transportation Steering Committee (MWTSC). The committee is comprised of representatives from MDT, FWP, and Montanans for Safe Wildlife Passage and is dedicated to providing collaborative leadership and strategic direction on wildlife and transportation issues across Montana. MDT will consider the potential for targeted wildlife study and standalone wildlife accommodation projects within the corridor based on MWTSC efforts or through partnerships with other interested stakeholders resulting in identification of data collection gaps, research needs, and funding opportunities.

Additionally, resource agencies, non-profit organizations, and private landowners may pursue opportunities within and outside of the highway corridor, independent of MDT efforts. These efforts could include public outreach and educational campaigns, comment and input on private development proposals within wildlife movement areas, and projects to protect habitat and facilitate wildlife movement on adjoining lands. Coordination of these efforts could complement the planning for wildlife accommodations on the highway, increasing their feasibility and the likelihood of long-term success.

<table>
<tr><td colspan="2">Recommendation: Install appropriate wildlife accommodations resulting from MDT project development process; coordinate with MWTSC and other organizations to identify partnership opportunities that will advance wildlife accommodation priorities</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Additional right-of-way or easement may be required, depending on accommodation
Surface waters, irrigation features, wetlands, vegetation, habitat, wildlife, fisheries, protected species, and historic/cultural properties</td><td>Implementation Agency/Partners:
MDT
USFS
FWP
Gallatin County
Montana Water Trust
Various Wildlife Organizations</td></tr>
<tr><td>Timeframe: Short- to Long-term</td></tr>
<tr><td>Estimated Cost: $500,000 (Underpass)
$4.2M (Overpass)
$80,000 per mile (Fencing)
$630,000 per mile (Animal Detection)
Varies (Wildlife Signage)</td></tr>
<tr><td>Potential Funding Sources: Other Programmed Projects (NH, HSIP), Other Agencies, Private</td></tr>
</table>

2.3. Alternate Transportation Modes

To accommodate pedestrians and bicyclists, there are currently two shared use paths adjacent to US 191 within the study area: Gateway Shared Use Path and Big Sky Trail Shared Use Path. Protected pedestrian highway crossing opportunities on US 191 are limited to the pedestrian underpass at the Mill Street/Rabel Lane intersection. Aside from the shared use paths, there are no dedicated bicycle facilities within the corridor. Narrow bridges along the corridor serve as pinch points for bicyclists using the shoulders (see **S14**).

Preservation and maintenance activities are essential to extending the life of a pedestrian and bicycle facilities. There are a variety of activities involved in maintenance of non-motorized facilities including snow removal, striping, sweeping, repairs, and pavement preservation. Funding for pedestrian and bicycle facility construction and maintenance activities can come from a number of sources, including private, local, state, and federal. All parties (governmental and private) can play a role in applying for grants and securing funding from non-traditional sources. The MDT funding program applicable to this improvement option is the Transportation Alternatives (TA) Program. Funding from this program would have to be pursued by Gallatin County or others via the TA nomination process. Shared use path facilities would need to abide by applicable policies and design standards.

As US 191 continues to experience increasing traffic volumes and congestion, providing public transportation has become critical. Since adding capacity for the highway, especially through the Gallatin Canyon, is expensive and potentially infeasible in places due to environmental constraints, the use of public transportation is important in getting residents, commuters, and visitors through the corridor and reducing the overall number of private vehicle trips. Transit also helps increase mobility for those who don't or can't drive. Current transit options include the Skyline Bus, West Yellowstone Foundation Bus, Yellowstone Club Bus, and several other private and shared ride services from Bozeman to West Yellowstone including transportation in and around Big Sky. Desires for additional transit opportunities for visitors and commuters between Bozeman, Big Sky, and West Yellowstone have been expressed.

A1. Four Corners to Gallatin Gateway Shared Use Path

The Gateway shared use path extends along the east side of US 191 beginning at the intersection of Zachariah Lane (RP 77.8) and ending at Mill Street/Rabel Lane (RP 76.3). The path crosses under US 191 to Mill Street (RP 76.3). Local desire exists to complete the path connection into Four Corners, approximately four miles. Sustained public use has created an informal trail adjacent to the shoulder on the west side of US 191. There is opportunity to formally develop the informal trail on the west side of the highway with an underpass at Zachariah Lane, or to continue the path along the east side of the highway. Highway crossing treatments may also be necessary to facilitate safe access to the path.

The path was completed using funds from the Community Transportation Enhancement Program (CTEP) – a program no longer active. In all CTEP projects, the receiving entity (Gallatin County) is responsible for maintaining or causing the maintenance of the path for the life of the path. In 2015, an MDT site assessment concluded that the path has major oxidation, transverse cracking, edge raveling, and minor potholes, and it needs major crack sealing and a fog seal.[24] If/when the path is completed, all parties involved should have a clear understanding of funding and maintenance responsibilities.

<table>
<tr><td colspan="2">Recommendation: Extend the existing shared use path from its terminus at Zachariah Lane to the Four Corners intersection</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Additional right-of-way may be required
• Irrigation features, farmland, wetlands, vegetation, habitat, wildlife, protected species, and historic/cultural properties
• Funding and responsibility for maintenance</td><td>Implementation Agency/Partners:
• MDT
• Gallatin County
• Private</td></tr>
<tr><td>Timeframe: Mid-term</td></tr>
<tr><td>Estimated Cost: $3.5M</td></tr>
<tr><td>Potential Funding Sources: TA, Local, Private</td></tr>
</table>

A2. Four Corners Intersection Pedestrian Improvements (RP 81.9)

There are sidewalks on all corners of the Four Corners intersection. On the north, east, and west legs, the sidewalks connect to shared use paths on one or both sides of the roadway. The shared use path connection on the south leg is incomplete (see **A1**). There are pedestrian signal heads on all legs of the intersection. The crosswalks on the east and south legs are traditional parallel line crosswalks. The crosswalks on the north and west legs are marked with longitudinal lines parallel to traffic flow (i.e., piano key markings). The crossing distance on the north and south legs is about 100 feet whereas the east and west legs have a crossing distance of about 80 feet. Input from the public indicates that crossing the intersection is difficult and the crossing distance is too large for the given crossing time. When traffic data was collected at this intersection in August and December of 2019, the number of pedestrians counted at this intersection ranged from 8 to 14 pedestrians per day.

To improve pedestrian accommodations at this intersection, the pedestrian signals could be upgraded to include audible beacons and LED countdowns. Retiming the pedestrian signals to be consistent with current design standards is also recommended. Installing consistent crosswalk markings on all legs of the intersection could also be beneficial. Patterned or colored crosswalks could be utilized to increase visibility and deter drivers from stopping on the crosswalks. Pedestrian refuge islands and curb bulb-outs could also be explored at this intersection, but these design options are likely to be infeasible due to site constraints. The installation of these types of improvements may also be difficult to keep clear of snow during the winter. As a general note, keeping sidewalks and crosswalks at the intersection clear of snow and ice would help improve pedestrian safety during the winter months.

<table>
<tr><td colspan="2">Recommendation: Install pedestrian accommodations at the intersection</td></tr>
<tr><td rowspan="4">Project Development Considerations:
Refuge islands and bulbouts may be infeasible due to site constraints
Winter maintenance practices may limit feasibility for some improvements</td><td>Implementation Agency/Partners:
MDT</td></tr>
<tr><td>Timeframe: Mid-term</td></tr>
<tr><td>Estimated Cost: $230,000</td></tr>
<tr><td>Potential Funding Sources: TA</td></tr>
</table>

A3. Beaver Creek Road Pedestrian Crossing (RP 45.3)

This intersection serves Ophir School/Lone Peak High School, Jake's Horses (a horseback riding service), and several private residences. This intersection is often used as a crossing point for pedestrians as well as horseback riders to access the Gallatin River and recreational trails east of US 191. Over the 10-year analysis period, zero crashes were recorded at this intersection. Operational issues appear to be constrained to peak hour traffic at the school, based on observations.

Just to the south (RP 45.2), US 191 crosses Beaver Creek via a large culvert. Pedestrians from Ophir School often cross Beaver Creek and US 191 in order to access Porcupine Creek Road and the Gallatin River for educational activities. Historically there was space along the highway shoulder to walk across Beaver Creek. When the roadway was recently expanded to accommodate a southbound left-turn lane, the shoulder was narrowed leaving little room for pedestrians. Today, pedestrians typically cross along a narrow strip of land on top of the culvert and outside of the guardrail.

Montana FWP and GRTF have indicated a desire to replace the culvert with a bridge to facilitate better fish passage and provide for pedestrian accommodations. This area is adjacent to the Gallatin Wildlife Management Area and has been identified as an area of known wildlife crossings. There has also been preliminary planning to connect the Ophir School area to Porcupine Creek Road. In order to facilitate this connection, US 191 and Beaver Creek must both be crossed. An enhanced pedestrian crossing, including high visibility signing and/or flashing beacon, could be installed at the Beaver Creek Road intersection to facilitate this connection across the highway and connect to the improvements being undertaken by other agencies.

Recommendation: Install enhanced pedestrian crossing if warranted	
Project Development Considerations: • A pedestrian crossing study would need to be conducted	**Implementation Agency/Partners:** • MDT • FWP • GRTF
	Timeframe: Short-term
	Estimated Cost: \$9,000 (signing) \$65,000 (beacon)
	Potential Funding Sources: TA

A4. Skyline Bus

The Skyline Bus, operated by the Big Sky Transportation District (BSTD), is a year-round, scheduled, public transit service between Bozeman and Big Sky. During the winter, 13 buses travel from Bozeman to Big Sky, and 14 buses travel from Big Sky to Bozeman each day. During the summer, the Skyline bus makes six round trips each day. During the shoulder seasons (mid-April to late-May and late-September to late-November), there are two roundtrips per day. The bus service is primarily used by commuters but is also used by visitors and recreationists. The bus service is currently focused to serve morning and evening commutes with a few midday travel opportunities.

With the continued growth in Big Sky, and the lack of affordable housing, more and more employees are expected to commute on a daily basis from the greater Bozeman area to Big Sky. To accommodate these passengers and offer more frequent service, BSTD anticipates the need for 18 roundtrip buses each day during the winter season, 8 roundtrip buses during the summer season, and 4 roundtrip buses during the shoulder seasons.

Although it is outside the area considered for this corridor study, expanded local service in the Big Sky area would also be necessary to encourage residents, commuters, and visitors to use public transportation instead of a private vehicle. This would require expansion of the transportation district/service areas as well as providing higher frequency service within Big Sky.

The recently awarded TIGER grant for improvements to MT 64 includes the addition of four motorcoaches and six vans to the existing fleet. To accommodate the desired expanded services as discussed above, BSTD anticipates the need to purchase an additional three motorcoaches.

Recommendation: Add additional Skyline bus trips between Bozeman and Big Sky; purchase additional motorcoaches	
Project Development Considerations: • Bus service improvements would be dependent on capital and operational funding secured by transit operator	**Implementation Agency/Partners:** • BSTD • Private
	Timeframe: Short- to Mid-term
	Estimated Cost: \$1.8M (capital purchase) \$350,000 per year (operations)
	Potential Funding Sources: Transit Programs, Local, Private

A5. Bus Stop Turnouts

Public concern was raised regarding the safety of public transit and school bus passengers while loading and unloading. Experiences of vehicles illegally passing stopped buses and concerns for the impedance of traffic were noted. Designate bus stop turnouts may help improve safety for loading and unloading operations. These turnouts could also be outfitted with ADA-compliant shelters, if desired. If bus turnouts are pursued, coordination with transit operators and school districts should occur to ensure optimal placement of turnouts. Note, too, that some transit operators prefer in-lane stops over turnouts due to the difficulties of entering the traffic stream from the turnout.

Recommendation: Install bus stop turnouts	
Project Development Considerations: • Additional right-of-way or easement may be required • Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, hazardous materials, and historic/cultural properties depending on location of bus stops	**Implementation Agency/Partners:** • MDT • Transit Operators • School Districts **Timeframe:** Mid-term **Estimated Cost:** $140,000 each **Potential Funding Sources:** NH, Transit Programs, Local

A6. Airport – Big Sky Shuttles

The Bozeman Yellowstone International Airport is located about 10 mile north of Four Corners. The airport provides year-round air service. Karst Stage, North of Yellowstone, and Big Sky Shuttle currently charter transportation services for seasonal visitors between the Bozeman International Airport, Big Sky, and West Yellowstone. These shuttle services primarily use US 191 to provide access to visitor destinations from the airport.

The Skyline bus does not currently offer airport service as service is currently not allowed by the airport. BSTD anticipates needing five to six scheduled airport pick up times per day to transport visitors and residents between the Bozeman Yellowstone International Airport and Big Sky. Continued, and expanded, operation of airport to Big Sky bus services could be pursued to reduce the number of single occupant trips on US 191.

Recommendation: Expand bus service to Airport	
Project Development Considerations: • Bus service expansion would be dependent on capital and operational funding administered by transit operators • Transit service is currently not allowed at the airport	**Implementation Agency/Partners:** • Transit Operators • Bozeman Yellowstone International Airport **Timeframe:** Short- to Mid-term **Estimated Cost:** Unknown **Potential Funding Sources:** Transit Programs, Local

A7. Park-and-Ride/Carpool Lots

According to the 2018 *Big Sky Housing Action Plan*[25], almost 50 percent of workers in Big Sky commute from other locations, primarily northern parts of Gallatin County such as Bozeman and Belgrade. Although public transportation can reduce the number of personal vehicle trips, the service may not be convenient for some riders due to timing and other transportation needs at the destination.

Besides public transit, another solution to reduce vehicle trips is to encourage carpooling. Providing designated parking lots for carpooling or encouraging local businesses to offer carpool incentive programs to their employees, can help promote the use of carpools along the US 191 corridor.

Stakeholder input indicates that a park-and-ride or carpool lot is needed in the Four Corners area. Currently the parking lot at Cardinal Distributing (northwest of US 191/MT 85/MT 84 intersection) is used as a park-and-ride lot for the Skyline Bus. However, the landowner has indicated desire to sell the lot. If the weigh station at Four Corners is relocated (see **S10**), the current site could possibly be redeveloped into a park-and-ride/carpool lot if feasible. There is also a carpool lot located at the Buffalo Jump south of Gallatin Gateway used by construction workers and other commuters. Designated bus stops and/or carpool lots could also be constructed at future large developments along the US 191 corridor.

<table>
<tr><td colspan="2">Recommendation: Construct a park-and-ride/carpool lot in the Four Corners area and as warranted with future large developments along corridor</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Additional right-of-way or easement may be required
• Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, hazardous materials, and historic/cultural properties depending on location of park-and-ride lots</td><td>Implementation Agency/Partners:
• MDT
• Transit Operators
• Gallatin County
• Private</td></tr>
<tr><td>Timeframe: Mid-term</td></tr>
<tr><td>Estimated Cost: $390,000</td></tr>
<tr><td>Potential Funding Sources: Transit Programs, Local, Private</td></tr>
</table>

2.4. Roadway Reconstruction

The following improvement options aim to increase capacity and improve traffic operations on US 191. Previous analysis conducted for the corridor shows that portions of the highway currently exhibit, or are projected to exhibit, poor levels of service that are below current standards. Since substantially reducing vehicular traffic is unlikely over the planning horizon, the performance of the highway can be improved by increasing roadway capacity. Roadway capacity can be increased by reducing access density, providing additional passing opportunities, and adding additional travel or turn lanes.

These options will require major reconstruction of the highway and are more costly and may have greater impacts than previously listed options. For this reason, the corridor has been broken up into several smaller sections based on roadway context, existing/future traffic demands, and logical project limits. It is envisioned that these improvements could be implemented over the long term when funding becomes available. There may also be opportunity to combine these options with some of those discussed previously.

R1. US 191/MT 84/MT 85 to Blackwood Road (RP 81.9 to 79.5)

Blackwood Road is the southern boundary for the Four Corners Community on the east side of US 191; on the west side, the boundary extends to Axtell-Anceny Road. The majority of the development within the community is located north of Blackwood Road. This section of US 191 transitions from a four-lane facility at the Four Corners intersection, to a three-lane facility through most of Four Corners, then to a two-lane facility with dedicated left-turn bays at major intersections. According to 2018 annual average daily traffic (AADT) volumes, the traffic on US 191 drops from about 17,300 vehicles per day (vpd) south of the Four Corners intersection to about 11,000 vpd just north of Blackwood Road. This section of the study corridor experiences the most traffic within the study area and serves a large number of homes and businesses. There are nearly 60 approaches through this section, 15 of which are named, public approaches and the remainder are private or farm field approaches.

Providing additional continuous northbound and southbound lanes in each direction through this section would accommodate greater volumes of traffic, reduce congestion and peak hour travel times, and increase passing opportunities. A center TWLTL could be constructed through this section to provide space for turning movements. This option allows for higher roadway capacity and increased unopposed passing opportunities. The Spain Ferris Ditch bridge (RP 81.5) would need to be widened/replaced with this option (see **S14**).

Recommendation: Construct additional lane in each direction with center TWLTL	
Project Development Considerations: • Additional right-of-way or easements may be required • Surface waters, irrigation features, farmland, floodplains, wetlands, vegetation, habitat, wildlife, fisheries, protected species, hazardous substances, and historic/cultural properties	**Implementation Agency/Partners:** • MDT **Timeframe:** Long-term **Estimated Cost:** $21.1M **Potential Funding Sources:** NH

R2. Blackwood Road to Cottonwood Road (RP 79.5 to 75.7)

The section of US 191 between Blackwood Road and Cottonwood Road has approximately 10,500 vpd. The highway frontage between Blackwood Road and Zachariah Lane has a handful of existing businesses and appears to be prime land for future commercial development. On the west side of US 191, Zachariah Lane and Cottonwood Road are part of the Gallatin Gateway community boundary. Most of the community's commercial and residential development exists between these two roadways. There are approximately 45 approaches along this segment.

Providing an additional travel lane in each the northbound and southbound direction through this section would provide additional capacity for anticipated future development, reduce congestion, increase passing opportunities, and ease access on and off the highway. A center TWLTL could be constructed between Zachariah Lane and Cottonwood Road to provide space for safe turning movements. The bridge across South Cottonwood Creek (RP 76.7) would need to be widened/replaced with this option (see **S14**).

Recommendation: Construct additional lane in each direction with center TWLTL between Zachariah Lane and Cottonwood Road	
Project Development Considerations: • Additional right-of-way or easements may be required • Surface waters, irrigation features, floodplains, wetlands, vegetation, farmland, habitat, wildlife, fisheries, protected species, hazardous substances, and historic/cultural properties	**Implementation Agency/Partners:** • MDT **Timeframe:** Long-term **Estimated Cost:** $31.6M **Potential Funding Sources:** NH

R3. Cottonwood Road to Wilson Creek Road (RP 75.7 to 73.5)

US 191 between Cottonwood Road and Wilson Creek Road currently carries about 8,000 vpd. US 191 in this section is a two-lane facility with intermittent dedicated left-turn bays at major intersections through this section. The segment between Cottonwood Road and Hawk Hill Road is straight with few approaches. Between Hawk Hill Road and Wilson Creek Road, US 191 curves west and provides access to several small subdivisions at seven named, public roadways. The approaches generally stem from the right or left side of the roadway but do not align at standard four-legged intersections.

It is anticipated that this section of US 191 could experience additional development in the future. A center TWLTL or dedicated left-turn bays could be constructed in this section to facilitate access for existing and future developments. At a minimum, a center TWLTL between Hawk Hill Road and Wilson Creek Road would provide turning opportunities for residences in this area.

Recommendation: Construct a consistent three-lane configuration with center TWLTL or dedicated left-turn bays	
Project Development Considerations: • Surface waters, irrigation features, farmland, floodplains, wetlands, vegetation, habitat, wildlife, fisheries, protected species, and historic/cultural properties	**Implementation Agency/Partners:** • MDT **Timeframe:** Long-term **Estimated Cost:** $13.5M **Potential Funding Sources:** NH

R4. Wilson Creek Road to Gateway South Road (RP 73.5 to 70.5)

Development in this area is sparse. There are some residences and a handful of commercial operations in this section, but most surrounding land in this area is farmland. There are 20 approaches along this segment, 2 of which are public roadways (Williams Road and Kleinschmidt Road). At the Williams Road intersection there is a gravel pit in the northeast quadrant (RP 72.3) and the MDT Section House/Stockpile in the southwest quadrant (RP 72). Of the existing approaches, 12 are farm field approaches which are infrequently used.

Between Wilson Creek Road and Gateway South Road, US 191 provides several passing opportunities including striped passing zones and a single passing lane in the northbound direction between RP 70.6 and 71.5. This segment provides the first and last unopposed passing opportunity as drivers emerge/enter the north end of the Gallatin Canyon, respectively. By providing additional lanes through this section, drivers would have the opportunity to pass slow moving vehicles that they would otherwise not be able to pass within the canyon. Replacing the northbound passing lane between RP 70.6 and 71.5 with a continuous travel lane could also help reduce some of the safety issues currently experienced in this area. Reconstruction of this segment would require widening/replacing the bridge across the Gallatin River at RP 70.5 (see **R4**).

Recommendation: Construct a passing lane in each direction with left-turn bays at major intersections	
Project Development Considerations: • Surface waters, irrigation features, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, recreational sites, and historic/cultural properties	**Implementation Agency/Partners:** • MDT **Timeframe:** Long-term **Estimated Cost:** $30.2M **Potential Funding Sources:** NH

R5. Gallatin Canyon (RP 70.5 to 48.0)

Within the Gallatin Canyon, the highway follows the river throughout the narrow canyon. Space is generally limited for expansion due to the proximity of the Gallatin River on one side and steep hillside on the other. There is one travel lane in each direction with some spots that have been widened to accommodate turn bays for high-volume approaches. There are limited passing opportunities within this segment. MDT has developed several turnouts to provide opportunities for slow-moving vehicles use in order to allow following vehicles to pass but they can be infrequently used (see **S12**).

During 2018, the Gallatin Canyon experienced about 7,600 to 8,100 vehicles on an average day. Volume are projected to approach 14,000 vpd within the planning horizon (2040). To accommodate these volumes, additional capacity/passing opportunities may be necessary. Constructing additional lanes in the canyon may require roadway realignment to flatten horizontal curves and reduce sight distance issues. Note that substantial realignment of the horizontal curvature through the Gallatin Canyon would likely involve rockface blasting, retaining walls along the river, and potentially cantilevered roadway segments.

While a minimum of 1,000 feet (excluding tapers) is needed for a passing lane according to the AASHTO Greenbook, an added lane should be long enough to provide a substantial reduction in traffic platooning. The optimal length is usually 0.5 to 2.0 miles long (plus tapers), depending on traffic volumes. The length of the tapers is dependent on the width of the travel lane and the design speed. With additional traffic anticipated in the future, passing lanes of 1.0 to 2.0 miles are desirable.

There are over 130 approaches along this section of US 191. Many of the approaches are turnouts and other approaches used for recreational access. There are 17 public approaches and 77 private approaches used for residences and commercial operations. In the areas where public and private approaches are more frequent, the addition of a TWLTL or dedicated left-turn bays would be appropriate to accommodate frequent turning movements. In some locations, it may be appropriate to consolidate several closely spaced private approaches to a single approach in order to reduce the number of turn bays needed (see **C7**).

R5-a. Spanish Creek Road to Sheep Rock (RP 68.7 to 67.0)

Within this section there are nine approaches serving a variety of residences, businesses, farm fields and recreational access. The Gallatin River parallels the east side of US 191 through this section. Along the west side of the highway the land is relatively flat and open. If the centerline of the roadway were to be shifted west, an additional passing lane in each direction could be accommodated in this section. There is also opportunity to straighten curves in this section with a new roadway alignment. The bridge across Spanish Creek (RP 68.2) would need to be widened/replaced with this option (see **S14**).

R5-b. Shenango Creek to Storm Castle (RP 64.8 to 63.5)

This section has 45 closely spaced approaches, six of which are public approaches. There are also two approaches to recreational areas, the Old Hell Roaring Trailhead and the USFS Storm Castle river access. The remaining approaches are private driveways for residences and commercial businesses. There is currently a passing zone striped through this section which presents safety concerns due to the numerous approaches (see **C2**). To improve safety and facilitate access for the residences in this area, a center TWLTL could be implemented in this section, particularly through the Luhn Lane area. Alternatively, the approaches could be consolidated by creating a frontage road and dedicated left-turn bays could be provided on US 191 at a single approach for the frontage road. While the roadway south of the Luhn Lane area narrows, there appears to be enough room to accommodate left-turn bays for the trailhead and river access.

R5-c. Karst Camp to Portal Creek (RP 55.4 to 53.1)

This section of US 191 has 28 existing approaches, 3 of which are public. There are also designated turnouts and recreational accesses. The majority of the approaches are private driveways for residences and commercial businesses. Although space is somewhat limited through this section of the canyon, there is some open space where residences are currently located. There is opportunity to construct a center TWLTL or dedicated left-turn bays to facilitate access to these residences and businesses. Currently, there is a left-turn lane in the northbound direction for Karst Stage Loop which serves several residences as well as Montana Whitewater Rafting Company. There is also some evidence of efforts to consolidate approaches through this section by implementing a frontage road. Further consolidation of approaches in this section could be more cost effective to implement than a center TWLTL.

R5-d. Jack Smith Bridge to Dudley Creek (RP 49.8 to 48.3)

This section has 14 existing approaches, 2 of which are public approaches (Dudley Creek and Lower Dudley Creek). Since there are relatively few approaches in this section and there is some open space, a passing lane could be constructed in the northbound direction. Providing a passing lane in the northbound direction would provide a passing opportunity for vehicles before entering the heart of canyon where passing opportunities are currently limited. However, the topography of this section may require roadway realignment to straighten curves and increase driver sight distance. Note that this is also a location where bighorn sheep are known to frequently occupy and impacts to wildlife and/or habitat may pose challenges to implementing this option.

<table>
<tr><td colspan="2">Recommendation: Reconstruct the corridor at incremental locations within the canyon</td></tr>
<tr><td rowspan="4">Project Development Considerations:
• Additional right-of-way or easements may be required
• Surface waters, floodplains, farmland, wetlands, vegetation, habitat, wildlife, fisheries, protected species, recreational sites, and historic/cultural properties</td><td>Implementation Agency/Partners:
• MDT</td></tr>
<tr><td>Timeframe: Long-term</td></tr>
<tr><td>Estimated Cost: $20.5M (R5-a)
$11.5M (R5-b)
$19.2M (R5-c)
$11.9M (R5-d)</td></tr>
<tr><td>Potential Funding Sources: NH</td></tr>
</table>

2.5. Options Eliminated from Further Consideration

Through public and stakeholder involvement efforts, several other concerns not addressed previously were expressed. Improvement options were explored and considered by the project team to address these concerns. Ultimately, these options were eliminated from further consideration because they are either outside the purview of the *US 191 Corridor Study,* or the options were determined infeasible. The intent of this study is to provide feasible improvement options to address the needs and objectives identified for the US 191 corridor over the 20-year planning horizon. The following provides a discussion of the options that were considered but not advanced as part of this study.

Scenic Byway Designation

Several members of the public encouraged designation of US 191 as a Scenic Byway in hopes that it would help to impose truck restrictions on the highway and protect the environmental resources in the corridor. While a designation of this type cannot prohibit use by truck traffic on the highway, it could help with conservation and preservation of the corridor. However, per ARM 18.14.205, all land abutting the scenic-historic byway must be either in tribal government ownership, within the boundaries of an Indian reservation, or in public ownership[26]. There are several parcels along US 191 through the Gallatin Canyon which are privately owned, thereby making US 191 currently ineligible for state scenic byway designation. However, local governments can enact zoning regulations stipulating acceptable land uses, which could help preserve the valued aesthetic qualities of the corridor.

Enforcement

Input received from the public and stakeholders indicated that more enforcement is needed within the study area. Aggressive driving was one of the top concerns brought forward by the public. Drivers in the corridor are often observed not obeying the posted speed limits, tailgating, passing in no passing zones, passing stopped buses, and generally driving in an otherwise reckless or aggressive manner. Other desires include additional enforcement of driver impairment, the slow-moving vehicle law (Montana Code Annotated [MCA] 61-8-311), and truck related laws/restrictions.

The corridor is currently patrolled by several agencies including the Gallatin and Madison County Sherriff's Offices, USFS, FWP, MHP, and others. While there are often several patrols throughout the corridor, enforcement in the Gallatin Canyon can be difficult and dangerous due to lack of shoulders and limited sight distances. High traffic volumes and the topography of the Gallatin Canyon can make it difficult for patrols to pull over a vehicle several cars ahead or to exit the traffic stream and turn around to pull over a vehicle traveling in the opposite direction.[27]

It is outside the scope of this corridor study to recommend increased enforcement. However, there are roadway improvements that can be implemented to make enforcement easier for officers. These improvements include: widening shoulders (see **C3**) and lengthening turnouts (see **S12** and **S13**) to improve the safety and ability to make enforcement stops; opening the weigh station (see **S10**) to enforce truck restrictions; and providing alternative transportation to reduce impaired driving (see **A4**).

Truck Restrictions

Public comments expressed desires to more effectively manage truck traffic on US 191, noting noise, speed, safety, and environmental concerns. Public suggestions to remedy these concerns included encouraging trucks to use Interstate 15, prohibiting hazardous material transport, banning trucks from the corridor, limiting hours of operation for trucks on the corridor, and increasing enforcement.

As an NHS route and federal aid highway, it would violate both state and federal laws to indefinitely restrict truck traffic on US 191. The freight and heavy vehicle traffic operating on US 191 consists mainly of commercial truck traffic, construction vehicles, and small delivery trucks. The US 191 corridor serves as a major freight corridor for both cross-country goods movement as well as for local deliveries to the communities along the corridor. Traffic data collected in both August and December of 2019 indicates roughly one-third of the heavy vehicle traffic on US 191 exits the highway and travels towards Big Sky on MT 64.

Having a fully operational weigh station (see **S10**) would help increase enforcement of truck loads and the use of compression brakes along the corridor. By law (MCA 61-9-321) commercial vehicles with compression brakes must be equipped with mufflers. However, the general use of compression brakes cannot be prohibited in Montana. Currently, there is signage in the Karst Camp area (RP 55) reiterating the compression brake muffler law. However, input from MDT Maintenance indicates the signage is no longer installed throughout the state and signs are being removed as dictated by damage and wear.

Alternate Routes

Due to limited space and environmental constraints within the Gallatin Canyon, opportunities for roadway expansion along the current alignment are limited. Instead of expanding the highway on its current alignment, and to preserve the beauty and recreational values of the Gallatin Canyon, alternative routes and new alignments were proposed by the public. Public comments recommended opening Jack Creek Road, encouraging drivers and trucks to use alternate routes, and constructing a new parallel route outside of the Gallatin Canyon.

Jack Creek Road is a private 30-mile road connecting Ennis and Big Sky. The road is currently owned and maintained by Moonlight Basin Resort. Access to Jack Creek Road is granted via membership to the Madison Valley Ski Club with permission from Moonlight Basin Ranch. Access is granted on a year-to-year basis with no expressed or implied warranties of continued access in years to come. Presently, nighttime access to the road is prohibited.

By opening Jack Creek Road for public use, US 287 (west of US 191, through Ennis) could be used as an alternate route to the Big Sky area. Opening Jack Creek Road could also provide an alternate route for emergency access within the Gallatin Canyon. However, the decision to open Jack Creek Road for public access would be at the discretion of the roadway owner. If opened, the roadway would be considered a county road under the jurisdiction of Madison County, not MDT. It is likely that opening Jack Creek Road would shift some traffic pressure from US 191 to US 287, but would not adequately address the traffic concerns pertaining to recreational traffic through the canyon or local commercial delivery services in the Four Corners, Gallatin Gateway, and Big Sky areas.

A bypass route was also suggested to provide additional capacity and to alleviate truck concerns on US 191. US 89 to the east, and US 287 and Interstate 15 to the west, are viable existing alternate routes. Conversely, construction of a new parallel route outside the Gallatin Canyon was also suggested. In order to complete an alternate route, a tunnel system would likely be required due to the topography of the canyon and the bordering mountain ranges. A project of this scale is likely to be cost prohibitive and would not adequately address traffic and safety concerns on the existing corridor.

2.6. Summary of Recommended Improvements

This memorandum identifies improvement options for the US 191 corridor between RP 81.9 and 45.3. The improvement options were based on the evaluation of several factors, including but not limited to field review, engineering analysis of as-built drawings, traffic data analysis, crash data analysis, consultation with resource agencies, and information provided by the general public.

The recommended improvements are intended to offer a range of potential mitigation strategies for corridor issues and areas of concern. Small-scale improvements were identified and may be as simple as adding advance warning signs at intersections. Larger, more complex reconstruction improvements are also envisioned. It may be feasible and cost-effective to combine improvement options during project development for ease of implementation and other efficiencies. A summary of recommended improvements is provided in **Table 2** and shown graphically in **Figures 1** and **2**.

Table 2: Recommended Improvements

Recommendation		Description	Implementation Agency / Partners	Timeframe[1]	Cost Estimate[2]	Potential Funding Sources
Spot Improvements						
S1	**Four Corners Intersection (RP 81.9)**	Modify business access; install second westbound left-turn lane; add pedestrian crossing treatments	MDT	Mid-term	$2.5M	NH, HSIP, TA
S2	**3rd Street to 2nd Street (RP 81.4 – 81.3)**	Replace or widen bridge based on future needs of the highway	MDT	Mid-term	$2.2M	NH
S3	**Bozeman Hot Springs/Cobb Hill/Lower Rainbow Road (RP 81.1 – 81.0)**	Consolidate approaches and realign intersection; improve intersection/ roadway lighting	MDT, Gallatin County, Private	Mid-term	$810,000	NH, HSIP, Local, Private
S4	**Violet Road/Upper Rainbow Road (RP 80.1)**	Install traffic control as warranted	MDT, Gallatin County, Private	Long-term	$2.1M to $4.5M	NH, HSIP, Local, Private
S5	**Zachariah Lane (RP 77.8)**	Consolidate approaches; improve intersection lighting; install turn lane as warranted	MDT, Gallatin County, Private	Mid-term	$480,000	NH, HSIP, Local, Private

	Recommendation	Description	Implementation Agency / Partners	Timeframe[1]	Cost Estimate[2]	Potential Funding Sources
S6	**Mill Street/Rabel Lane (RP 76.3)**	Install traffic control as warranted	MDT, Gallatin County	Mid-term	$910,000 to $2.3M	NH, HSIP, Local
S7	**Cottonwood Road (RP 75.7)**	Install additional traffic control and realign intersection as warranted	MDT, Gallatin County, Private	Long-term	$1.5M to $4.7M	NH, HSIP, Local, Private
S8	**Lava Lake (RP 61.4)**	Reconfigure access to Lava Lake trailhead; flatten horizontal curve; reconstruct bridge	MDT, FWP, USFS, GRTF	Mid- to long-term	$560,000 to $10.4M	NH, HSIP, FLAP
S9	**Big Sky Trail Guardrail Improvements**	Install alternative guardrail end treatments	MDT	Short-term	$50,000	HSIP, Maintenance
S10	**Weigh Station**	Relocate weigh station	MDT	Mid- to long-term	$4.9M to $7.8M	NH
S10-a	*South of Williams Road*	*Construct a weigh station on each side of the highway*	*MDT*	*Mid- to long-term*	*$5.6M*	*NH*
S10-b	*Spanish Creek Area*	*Construct a weigh station on one or both sides of US 191*	*MDT*	*Mid- to long-term*	*$7.8M*	*NH*
S10-c	*South of Study Area*	*Construct a second weigh station south of the study area to serve northbound vehicles*	*MDT*	*Mid- to long-term*	*$4.9M*	*NH*
S11	**Turn Lanes at Spot Locations**	Install turn lanes at spot locations as warranted	MDT, Gallatin County, Private	Mid- to long-term	$230,000 to $1.1M	NH, Local, Private
S12	**Turnouts for Slow-moving Vehicles**	Construct/modify turnouts as appropriate to improve function and safety; add signage at each location indicating slow-moving vehicles must use turnouts	MDT	Short- to long-term	$600 to $1.1M	NH, HSIP
S13	**Recreational Access**	Formalize and improve recreational access at existing high-use locations; install additional advance warning signage as appropriate	MDT, USFS, FWP, GRTF	Short- to long-term	$5,000 to $840,000	NH, HSIP, TA, FLAP
S14	**Bridge Replacements**	Replace or widen existing bridges to meet current standards	MDT	Short- to long-term	$1.1M to $8.9M	NH
S15	**Rockfall Hazard Mitigation**	Conduct rockfall hazard mitigation	MDT	Mid- to long-term	$24.5M to $59.8	NH, HSIP
S16	**Advance Warning Signs**	Install curve warning signs for substandard roadway elements	MDT	Short-term	Varies	HSIP, Maintenance
S17	**Substandard Curve Modifications at Spot Locations**	Reconstruct horizontal and vertical curves at spot locations that do not meet minimum design standards	MDT	Mid- to long-term	$1.7M to $5.5M	NH, HSIP
S17-a	*North of Spanish Creek (RP 69.2 to 68.5)*	*Flatten two substandard horizontal curves*	*MDT*	*Mid- to long-term*	*$5.5M*	*NH, HSIP*
S17-b	*Rockhaven Camp (RP 66.9 to 66.5)*	*Flatten vertical curve; modify passing zones; relocate river access; install warning signage*	*MDT*	*Mid- to long-term*	*$4.4M*	*NH, HSIP*
S17-c	*Greek Creek (RP 57.6)*	*Flatten horizontal curve*	*MDT*	*Mid- to long-term*	*$2.4M*	*NH, HSIP*
S17-d	*North of Goose Creek (RP 52.0)*	*Flatten substandard horizontal curve*	*MDT*	*Mid- to long-term*	*$1.7M*	*NH, HSIP*
S18	**Emergency Call Boxes**	Install signage to notify drivers of upcoming call boxes; install additional call boxes as needed	MDT, Big Sky Rotary Club	Short- to mid-term	$600 to $16,000	HSIP, Private
		Corridor-Wide Improvements				

	Recommendation	Description	Implementation Agency / Partners	Timeframe[1]	Cost Estimate[2]	Potential Funding Sources
C1	**Highway Maintenance Practices**	Address highway maintenance issues and continue to research and implement best practices	MDT	As needed	Varies Annually	Maintenance
C2	**Passing/No-Passing Zones**	Evaluate and modify existing passing/no-passing signing and striping for compliance with current standards	MDT	Short-term	$13,000 / mi	NH, HSIP, Maintenance
C3	**Shoulder Widening**	Widen roadway shoulders where feasible	MDT	Mid- to long-term	$1.3M to $1.8M / mi	NH, HSIP
C3-a	*US 191/MT 84/MT 85 to Gateway South Road (RP 81.9 to 75.7)*	*8-foot shoulders*	*MDT*	*Mid- to long-term*	*$1.3M / mi*	*NH, HSIP*
C3-b	*Gateway South Road to MT 64 (RP 75.7 to 48.0)*	*4-foot shoulders*	*MDT*	*Mid- to long-term*	*$1.8M / mi*	*NH, HSIP*
C4	**Guardrail Improvements**	Add, remove, repair, and upgrade guardrail as appropriate through the Gallatin Canyon	MDT	Short- to mid-term	Varies	Maintenance
C5	**Speed Considerations**	Install VSL signage through the Gallatin Canyon; conduct speed studies in response to a local government request	MDT, Gallatin County	Mid-term	$350,000	HSIP, Local
C6	**Mailbox Relocation**	Consolidate individual mailboxes and move clusters to mailbox turnouts or side streets	MDT, Gallatin County, U.S. Postal Service, Private	As needed	Unknown	HSIP, Maintenance, Local, Private
C7	**Access Management**	Manage existing approaches as needed	MDT, Gallatin County, Private	As needed	Unknown	NH, HSIP, Local, Private
C8	**Access Control Plan**	Develop and execute Access Control Plan between RP 81.9 and 70.5	MDT, Gallatin County, Private	Short-term	$150,000	NH, HSIP, Local, Private
C9	**Vegetation Management Plan**	Develop and implement Vegetation Management Plan	MDT, Gallatin County, USFS	Mid-term	$70,000	Maintenance, Local, Other Agencies
C10	**Wildlife-Vehicle Conflict Management**	Install appropriate wildlife accommodations resulting from MDT project nomination/ development process and through opportunities identified through the Montana Wildlife and Transportation Steering Committee	MDT, USFS, FWP, Gallatin County, Montana Water Trust, Various Wildlife Organizations	Short- to long-term	$80,000 to $4.2M	Other Programmed Projects (NH, HSIP), Other Agencies, Private
	Alternate Transportation Modes					
A1	**Four Corners to Gallatin Gateway Shared Use Path**	Extend the existing shared use path from its terminus at Zachariah Lane to the Four Corners intersection	MDT, Gallatin County, Private	Mid-term	$3.5M	TA, Local, Private
A2	**Four Corners Intersection Pedestrian Improvements (RP 81.9)**	Install pedestrian accommodations at the intersection	MDT	Mid-term	$230,000	TA
A3	**Beaver Creek Road Pedestrian Crossing (RP 45.3)**	Install enhanced pedestrian crossing if warranted	MDT, FWP, GRTF	Short-term	$9,000 to $65,000	TA

	Recommendation	Description	Implementation Agency / Partners	Timeframe[1]	Cost Estimate[2]	Potential Funding Sources
A4	**Skyline Bus**	Add additional Skyline bus trips between Bozeman and Big Sky; purchase additional motorcoaches	BSTD, Private	Short- to mid-term	$1.8M (capital) & $350,000/yr	Transit Programs, Local, Private
A5	**Bus Stop Turnouts**	Install bus stop turnouts	MDT, Transit Operators, School Districts	Mid-term	$140,000	NH, Transit Programs, Local
A6	**Airport – Big Sky Shuttles**	Expand bus service to Airport	Transit Operators, Bozeman Yellowstone International Airport	Short- to mid-term	Unknown	Transit Programs, Local
A7	**Park-and-Ride/Carpool Lots**	Construct a park-and-ride/carpool lot in the Four Corners area and as warranted with future large developments along corridor	MDT, Transit Operators, Gallatin County, Private	Mid-term	$390,000	Transit Programs, Local, Private
		Roadway Reconstruction				
R1	**US 191/MT 84/MT 85 to Blackwood Road (RP 81.9 to 79.5)**	Construct additional lane in each direction with center TWLTL	MDT	Long-term	$21.1M	NH
R2	**Blackwood Road to Cottonwood Road (RP 79.5 to 75.7)**	Construct additional lane in each direction with center TWLTL between Zachariah Lane and Cottonwood Road	MDT	Long-term	$31.6M	NH
R3	**Cottonwood Road to Wilson Creek Road (RP 75.7 to 73.5)**	Construct a consistent three-lane configuration with center TWLTL or dedicated left-turn bays	MDT	Long-term	$13.5M	NH
R4	**Wilson Creek Road to Gateway South Road (RP 73.5 to 70.5)**	Construct a passing lane in each direction with left-turn bays at major intersections	MDT	Long-term	$30.2M	NH
R5	**Gallatin Canyon (RP 70.5 to 48.0)**	Reconstruct the corridor at incremental locations within the canyon	MDT	Long-term	$11.5M to $20.5M	NH
R5-a	*Spanish Creek Road to Sheep Rock (RP 68.7 to 67.0)*	*Construct a passing lane in each direction*	*MDT*	*Long-term*	*$20.5M*	*NH*
R5-b	*Shenango Creek to Storm Castle (RP 64.8 to 63.5)*	*Construct center TWLTL*	*MDT*	*Long-term*	*$11.5M*	*NH*
R5-c	*Karst Camp to Portal Creek (RP 55.4 to 53.1)*	*Construct center TWLTL or left-turn bays*	*MDT*	*Long-term*	*$19.2M*	*NH*
R5-d	*Jack Smith Bridge to Dudley Creek (RP 49.8 to 48.3)*	*Construct a passing lane in the northbound direction*	*MDT*	*Long-term*	*$11.9M*	*NH*

[1] **Timeframes**: The timing and ability to implement improvement options depends on factors including the availability of funding, right-of-way needs, and other project delivery elements. Implementation timeframes are not a commitment to developing recommendations.

- **Short-term:** Implementation is feasible within a 0- to 5-year period.
- **Mid-term:** Implementation is feasible within a 5- to 10-year period.
- **Long-term:** Implementation is feasible within a 10- to 20-year period.
- **As needed:** Implementation could occur based on observed need at any time as needed.

[2] **Cost Estimates** include construction, engineering, right-of-way, utilities, drainage, and indirect costs. In addition, an inflationary factor of three percent per year was applied to the planning-level costs to account for an estimated year of

expenditure. Contingencies were added to account for unknown factors at the planning-level stage, however actual costs may vary due to changed conditions at the time of construction.

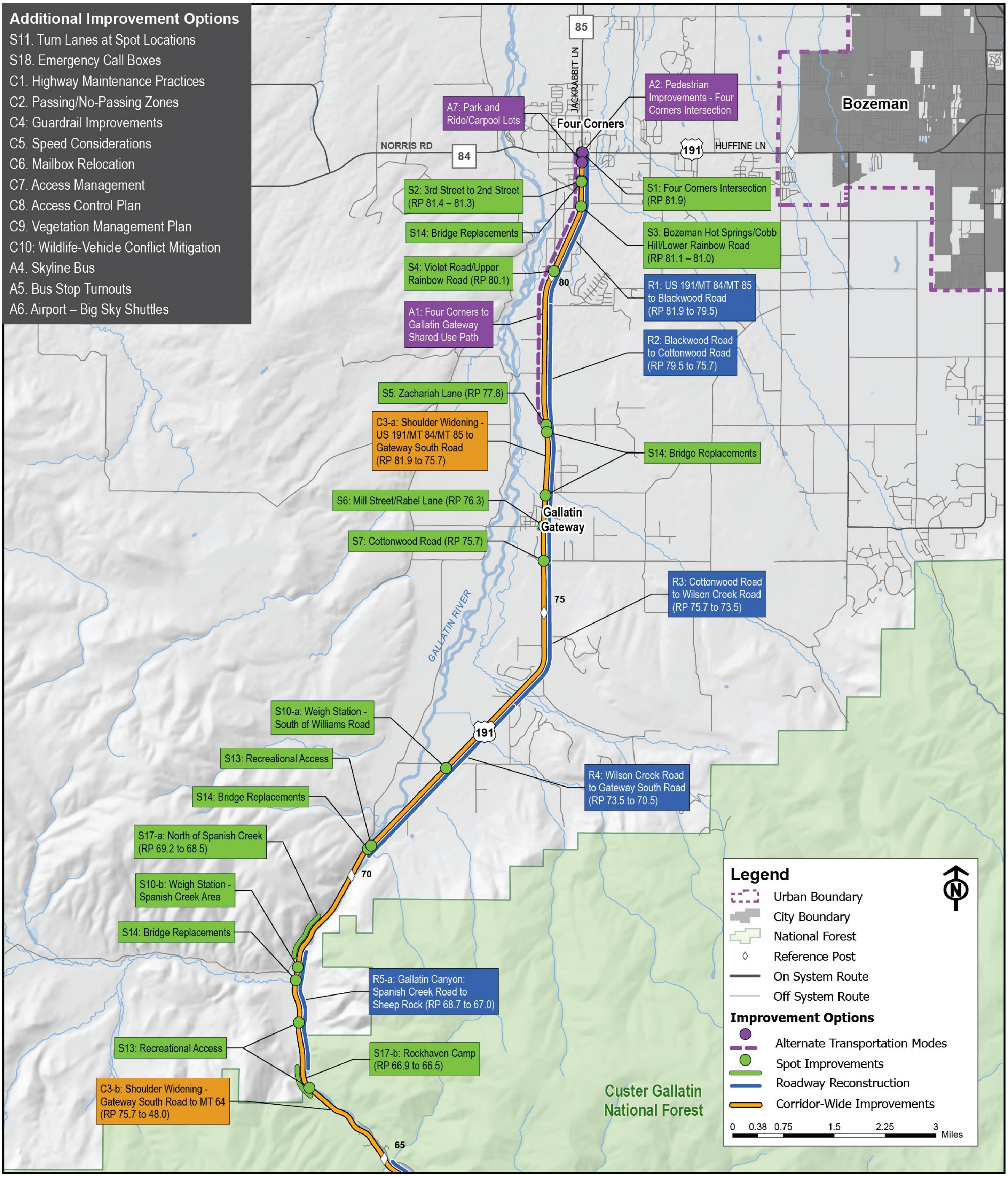

Figure 1: Recommended Improvements (RP 81.9 to 65.0)

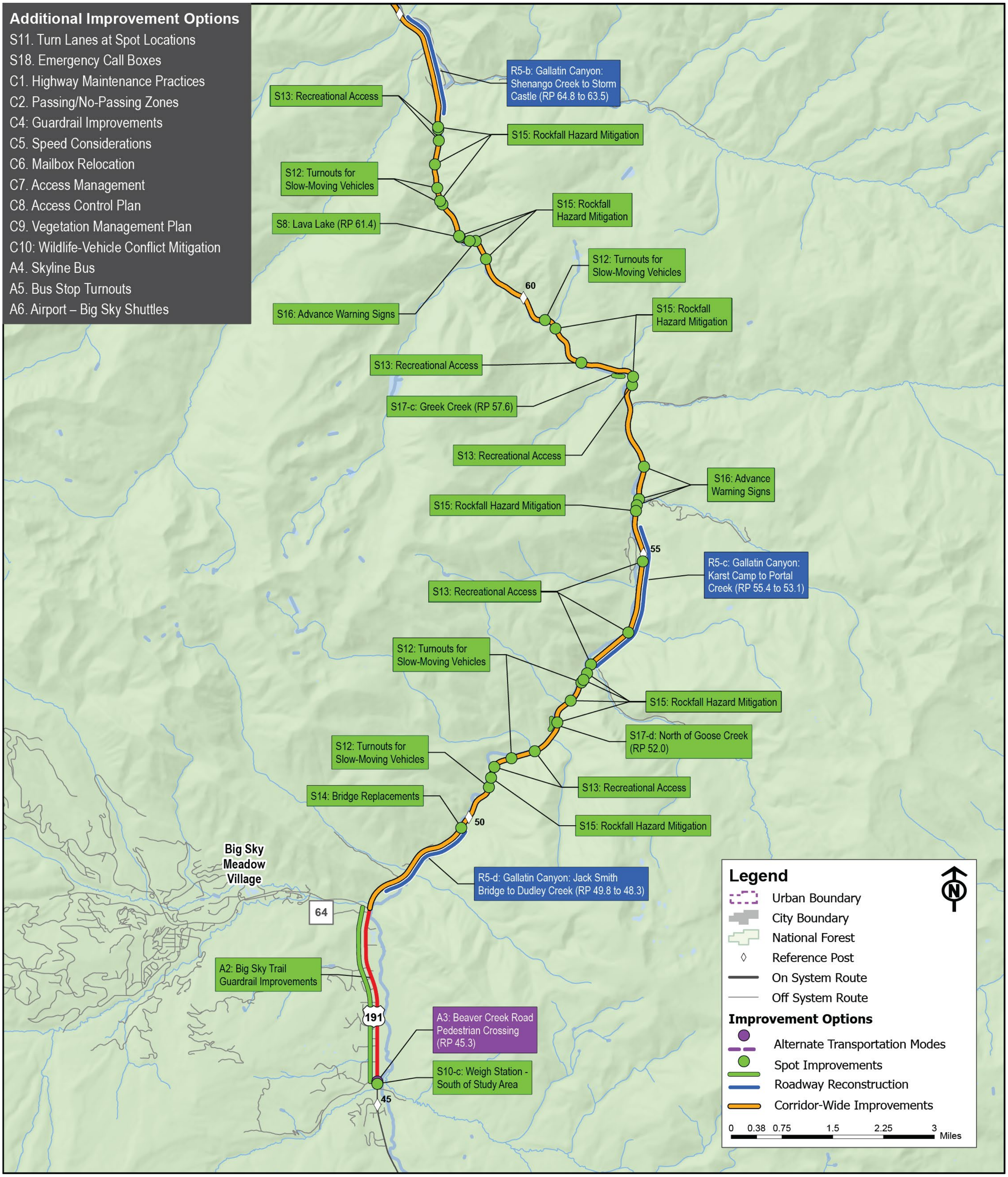

Figure 2: Recommended Improvements (RP 65.0 to 45.3)

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Appendix A:

Cost Estimates

APPENDIX A

Planning Level Cost Estimates

Planning-level costs were developed for each improvement option in accordance with procedures outlined by the MDT Cost Estimation Procedure for Highway Design Projects (Nov 2016). Costs include estimates for construction, engineering, right-of-way, utilities, drainage, and indirect costs. Construction cost estimates were based on unit quantity estimates and price information determined from the MDT Preliminary Estimating Tool (PET) and MDT Road Design Cost Estimate Spreadsheet (Jun 2016). Cost ranges are provided in some cases, indicating unknown factors at the particular planning level stage.

NOTES:

Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

An inflationary factor of three percent per year was applied to the planning level costs to account for an estimated year of expenditure.

SPOT IMPROVEMENTS

S1. Four Corners Intersection (RP 81.9) $ 2,500,000 TOT

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)		CUYD	1223.9	$ 6.25	$ 7,649
CRUSHED AGGREGATE COURSE		CUYD	6304.4	$ 27.41	$ 172,805
COVER - TYPE 1		SQYD	12105.0	$ 0.62	$ 7,505
PLANT MIX BIT SURF GR S-3/4 IN		TON	3240.5	$ 31.96	$ 103,565
ASPHALT CEMENT PG 64-28		TON	175.0	$ 500.31	$ 87,547
EMULS ASPHALT CRS-2P		TON	21.7	$ 447.71	$ 9,715
SIDEWALK-CONCRETE 4"		SQYD	1008.9	$ 80.00	$ 80,711
SIDEWALK-CONCRETE 6"		SQYD	252.2	$ 122.40	$ 30,872
CURB AND GUTTER-CONC		LNFT	2270.0	$ 29.36	$ 66,647
SIG PEDESTRIAN TYPE 2		EACH	8.0	$ 973.94	$ 7,792
PORT CEM CONC PAVE 11 IN COLORED		SQYD	610.9	$ 126.00	$ 76,971
SIGNS - URBAN		MILE	0.2	$ 52,000.00	$ 11,178
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.2	$ 20,000.00	$ 4,299
DRAINAGE PIPE - URBAN		MILE	0.2	$ 240,000.00	$ 51,591
MISCELLANEOUS ITEMS				25%	$ 179,712
	Subtotal 1				$ 898,559
TRAFFIC CONTROL				5%	$ 44,928
	Subtotal 2				$ 943,487
MOBILIZATION				10%	$ 94,349
	Subtotal 3				$ 1,037,836
CONTINGENCY (LOW RISK)				30%	$ 311,351
	Subtotal 4				$ 1,349,187
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 464,007
	Subtotal 5				$ 1,813,194
CONSTRUCTION ENGINEERING (CE)				10%	$ 181,319
PRELIMINARY ENGINEERING (PE)				10%	$ 181,319
	Subtotal 6				$ 2,175,833
INDIRECT COSTS (IDC)				10.91%	$ 237,383
	TOTAL				**$ 2,413,216**

S2. 3rd Street to 2nd Street (RP 81.4 - 81.3) $ 2,200,000 TOT

LENGTH (FT)	430
WIDTH (FT)	78
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	3254.9	$ 6.25	$ 20,343
CRUSHED AGGREGATE COURSE	CUYD	2238.9	$ 27.41	$ 61,368
COVER - TYPE 1	SQYD	3717.0	$ 0.62	$ 2,305
PLANT MIX BIT SURF GR S-3/4 IN	TON	1031.3	$ 31.96	$ 32,960
ASPHALT CEMENT PG 64-28	TON	55.7	$ 500.31	$ 27,862
EMULS ASPHALT CRS-2P	TON	6.7	$ 447.71	$ 3,000

GUARD RAIL-STEEL		LNFT	21.4	$ 23.50	$ 504
GD RAIL-STL INT RDWY TERM SECT		LNFT	2.1	$ 53.12	$ 114
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.1	$ 8,000.00	$ 650
DRAINAGE PIPE - RURAL		MILE	0.1	$ 82,000.00	$ 6,659
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$ 20,000
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	3900.0	$ 120.00	$ 468,000
MISCELLANEOUS ITEMS				25%	$ 160,941
	Subtotal 1				$ 804,705
TRAFFIC CONTROL				5%	$ 40,235
	Subtotal 2				$ 844,940
MOBILIZATION				10%	$ 84,494
	Subtotal 3				$ 929,434
CONTINGENCY (LOW RISK)				30%	$ 278,830
	Subtotal 4				$ 1,208,265
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 415,542
	Subtotal 5				$ 1,623,806
CONSTRUCTION ENGINEERING (CE)				10%	$ 162,381
PRELIMINARY ENGINEERING (PE)				10%	$ 162,381
	Subtotal 6				$ 1,948,568
INDIRECT COSTS (IDC)				10.91%	$ 212,589
	TOTAL				**$ 2,161,157**

S3. Bozeman Hot Springs/Cobb Hill/Lower Rainbow Road (RP 81.1 - 81.0) — $ 810,000 TOT

LENGTH (FT)	1000
WIDTH (FT)	24
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)		CUYD	7135.4	$ 6.25	$ 44,597
CRUSHED AGGREGATE COURSE		CUYD	2221.3	$ 27.41	$ 60,886
COVER - TYPE 1		SQYD	2667.0	$ 0.62	$ 1,654
PLANT MIX BIT SURF GR S-3/4 IN		TON	798.8	$ 31.96	$ 25,529
ASPHALT CEMENT PG 64-28		TON	43.1	$ 500.31	$ 21,581
EMULS ASPHALT CRS-2P		TON	4.8	$ 447.71	$ 2,149
DRAINAGE PIPE - RURAL		MILE	0.2	$ 82,000.00	$ 15,530
LIGHTS		MILE	0.2	$ 175,000.00	$ 29,750
MISCELLANEOUS ITEMS				25%	$ 50,419
	Subtotal 1				$ 252,094
TRAFFIC CONTROL				5%	$ 12,605
	Subtotal 2				$ 264,698
MOBILIZATION				10%	$ 26,470
	Subtotal 3				$ 291,168
CONTINGENCY (MEDIUM RISK)				55%	$ 160,143
	Subtotal 4				$ 451,311
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 155,213
	Subtotal 5				$ 606,524
CONSTRUCTION ENGINEERING (CE)				10%	$ 60,652
PRELIMINARY ENGINEERING (PE)				10%	$ 60,652
	Subtotal 6				$ 727,829
INDIRECT COSTS (IDC)				10.91%	$ 79,406
	TOTAL				**$ 807,235**

S4. Violet Road/Upper Rainbow Road (RP 80.1)

Traffic Signal — $ 2,100,000 TOT

LENGTH (FT)	1000
WIDTH (FT)	54
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
CRUSHED AGGREGATE COURSE	CUYD	3888.0	$ 27.41	$ 106,569
COVER - TYPE 1	SQYD	6000.0	$ 0.62	$ 3,720
PLANT MIX BIT SURF GR S-3/4 IN	TON	1691.1	$ 31.96	$ 54,049
ASPHALT CEMENT PG 64-28	TON	91.3	$ 500.31	$ 45,689

EMULS ASPHALT CRS-2P		TON	10.8	$ 447.71	$	4,835
SIGNS - RURAL		MILE	0.2	$ 8,000.00	$	1,515
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.2	$ 8,000.00	$	1,515
DRAINAGE PIPE - RURAL		MILE	0.2	$ 82,000.00	$	15,530
SIGNALS		LS	1.0	$ 225,000.00	$	225,000
MISCELLANEOUS ITEMS				25%	$	114,606
	Subtotal 1				$	573,029
TRAFFIC CONTROL				5%	$	28,651
	Subtotal 2				$	601,681
MOBILIZATION				10%	$	60,168
	Subtotal 3				$	661,849
CONTINGENCY (LOW RISK)				30%	$	198,555
	Subtotal 4				$	860,403
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	693,581
	Subtotal 5				$	1,553,984
CONSTRUCTION ENGINEERING (CE)				10%	$	155,398
PRELIMINARY ENGINEERING (PE)				10%	$	155,398
	Subtotal 6				$	1,864,781
INDIRECT COSTS (IDC)				10.91%	$	203,448
	TOTAL				**$**	**2,068,229**

Roundabout **$ 4,500,000 TOT**

LENGTH (FT)	2400
WIDTH (FT)	54
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
CRUSHED AGGREGATE COURSE		CUYD	9331.1	$ 27.41	$	255,766
COVER - TYPE 1		SQYD	14400.0	$ 0.62	$	8,928
PLANT MIX BIT SURF GR S-3/4 IN		TON	4058.8	$ 31.96	$	129,718
ASPHALT CEMENT PG 64-28		TON	219.2	$ 500.31	$	109,654
EMULS ASPHALT CRS-2P		TON	25.8	$ 447.71	$	11,551
SIGNS - RURAL		MILE	0.5	$ 8,000.00	$	3,636
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.5	$ 8,000.00	$	3,636
DRAINAGE PIPE - RURAL		MILE	0.5	$ 82,000.00	$	37,273
CONCRETE ROUNDABOUTS - ONE LANE		LS	1.0	$ 425,000.00	$	425,000
MISCELLANEOUS ITEMS				25%	$	246,291
	Subtotal 1				$	1,231,453
TRAFFIC CONTROL				5%	$	61,573
	Subtotal 2				$	1,293,026
MOBILIZATION				10%	$	129,303
	Subtotal 3				$	1,422,328
CONTINGENCY (LOW RISK)				30%	$	426,698
	Subtotal 4				$	1,849,027
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	1,490,521
	Subtotal 5				$	3,339,548
CONSTRUCTION ENGINEERING (CE)				10%	$	333,955
PRELIMINARY ENGINEERING (PE)				10%	$	333,955
	Subtotal 6				$	4,007,457
INDIRECT COSTS (IDC)				10.91%	$	437,214
	TOTAL				**$**	**4,444,671**

S5. Zachariah Lane (RP 77.8) **$ 480,000 TOT**

LENGTH (FT)	500
WIDTH (FT)	54
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	1477.1	$ 6.25	$	9,232
CRUSHED AGGREGATE COURSE	CUYD	1944.0	$ 27.41	$	53,285
COVER - TYPE 1	SQYD	3000.0	$ 0.62	$	1,860
PLANT MIX BIT SURF GR S-3/4 IN	TON	845.6	$ 31.96	$	27,025
ASPHALT CEMENT PG 64-28	TON	45.7	$ 500.31	$	22,845
EMULS ASPHALT CRS-2P	TON	5.4	$ 447.71	$	2,418

SIGNS - RURAL		MILE	0.1	$ 8,000.00	$	758
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.1	$ 8,000.00	$	758
DRAINAGE PIPE - RURAL		MILE	0.1	$ 82,000.00	$	7,765
LIGHTS		MILE	0.1	$ 175,000.00	$	16,572
MISCELLANEOUS ITEMS				25%	$	35,629
	Subtotal 1				$	178,144
TRAFFIC CONTROL				5%	$	8,907
	Subtotal 2				$	187,052
MOBILIZATION				10%	$	18,705
	Subtotal 3				$	205,757
CONTINGENCY (LOW RISK)				30%	$	61,727
	Subtotal 4				$	267,484
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$	91,992
	Subtotal 5				$	359,476
CONSTRUCTION ENGINEERING (CE)				10%	$	35,948
PRELIMINARY ENGINEERING (PE)				10%	$	35,948
	Subtotal 6				$	431,371
INDIRECT COSTS (IDC)				10.91%	$	47,063
	TOTAL				**$**	**478,433**

S6. Mill Street/Rabel Lane (RP 76.3)

Traffic Signal — $ 910,000 TOT

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
SIGNALS		LS	1.0	$ 225,000.00	$	225,000
MISCELLANEOUS ITEMS				25%	$	56,250
	Subtotal 1				$	281,250
TRAFFIC CONTROL				5%	$	14,063
	Subtotal 2				$	295,313
MOBILIZATION				10%	$	29,531
	Subtotal 3				$	324,844
CONTINGENCY (MEDIUM RISK)				55%	$	178,664
	Subtotal 4				$	503,508
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$	173,165
	Subtotal 5				$	676,672
CONSTRUCTION ENGINEERING (CE)				10%	$	67,667
PRELIMINARY ENGINEERING (PE)				10%	$	67,667
	Subtotal 6				$	812,007
INDIRECT COSTS (IDC)				10.91%	$	88,590
	TOTAL				**$**	**900,597**

Roundabout — $ 2,300,000 TOT

LENGTH (FT)	1320
WIDTH (FT)	40
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
CRUSHED AGGREGATE COURSE		CUYD	4105.4	$ 27.41	$	112,530
COVER - TYPE 1		SQYD	5867.0	$ 0.62	$	3,638
PLANT MIX BIT SURF GR S-3/4 IN		TON	1682.6	$ 31.96	$	53,777
ASPHALT CEMENT PG 64-28		TON	90.9	$ 500.31	$	45,459
EMULS ASPHALT CRS-2P		TON	10.5	$ 447.71	$	4,701
SIGNS - RURAL		MILE	0.3	$ 8,000.00	$	2,000
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.3	$ 8,000.00	$	2,000
DRAINAGE PIPE - RURAL		MILE	0.3	$ 82,000.00	$	20,500
CONCRETE ROUNDABOUTS - ONE LANE		LS	1.0	$ 425,000.00	$	425,000
MISCELLANEOUS ITEMS				25%	$	139,269
	Subtotal 1				$	696,343
TRAFFIC CONTROL				5%	$	34,817
	Subtotal 2				$	731,160
MOBILIZATION				10%	$	73,116
	Subtotal 3				$	804,276
CONTINGENCY (MEDIUM RISK)				55%	$	442,352
	Subtotal 4				$	1,246,627
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$	428,736

	Subtotal 5				$ 1,675,363
CONSTRUCTION ENGINEERING (CE)				10%	$ 167,536
PRELIMINARY ENGINEERING (PE)				10%	$ 167,536
	Subtotal 6				$ 2,010,435
INDIRECT COSTS (IDC)				10.91%	$ 219,338
	TOTAL				**$ 2,229,774**

S7. Cottonwood Road (RP 75.7)

Traffic Signal — $ 1,500,000 TOT

Minor approach realignment

LENGTH (FT)	300
WIDTH (FT)	24
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	2140.6	$ 6.25	$ 13,379
CRUSHED AGGREGATE COURSE	CUYD	666.4	$ 27.41	$ 18,266
COVER - TYPE 1	SQYD	800.0	$ 0.62	$ 496
PLANT MIX BIT SURF GR S-3/4 IN	TON	239.6	$ 31.96	$ 7,659
ASPHALT CEMENT PG 64-28	TON	12.9	$ 500.31	$ 6,474
EMULS ASPHALT CRS-2P	TON	1.5	$ 447.71	$ 672
SIGNS - RURAL	MILE	0.1	$ 8,000.00	$ 455
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.1	$ 8,000.00	$ 455
DRAINAGE PIPE - RURAL	MILE	0.1	$ 82,000.00	$ 4,659
SIGNALS	LS	1.0	$ 225,000.00	$ 225,000
MISCELLANEOUS ITEMS			25%	$ 69,378
Subtotal 1				$ 346,892
TRAFFIC CONTROL			5%	$ 17,345
Subtotal 2				$ 364,236
MOBILIZATION			10%	$ 36,424
Subtotal 3				$ 400,660
CONTINGENCY (MEDIUM RISK)			55%	$ 220,363
Subtotal 4				$ 621,023
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$ 500,614
Subtotal 5				$ 1,121,636
CONSTRUCTION ENGINEERING (CE)			10%	$ 112,164
PRELIMINARY ENGINEERING (PE)			10%	$ 112,164
Subtotal 6				$ 1,345,964
INDIRECT COSTS (IDC)			10.91%	$ 146,845
TOTAL				**$ 1,492,808**

Roundabout — $ 4,700,000 TOT

LENGTH (FT)	2400
WIDTH (FT)	40
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
CRUSHED AGGREGATE COURSE	CUYD	7464.4	$ 27.41	$ 204,600
COVER - TYPE 1	SQYD	10667.0	$ 0.62	$ 6,614
PLANT MIX BIT SURF GR S-3/4 IN	TON	3059.3	$ 31.96	$ 97,776
ASPHALT CEMENT PG 64-28	TON	165.2	$ 500.31	$ 82,653
EMULS ASPHALT CRS-2P	TON	19.1	$ 447.71	$ 8,551
SIGNS - RURAL	MILE	0.5	$ 8,000.00	$ 3,636
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.5	$ 8,000.00	$ 3,636
DRAINAGE PIPE - RURAL	MILE	0.5	$ 82,000.00	$ 37,273
CONCRETE ROUNDABOUTS - ONE LANE	LS	1.0	$ 425,000.00	$ 425,000
MISCELLANEOUS ITEMS			25%	$ 217,435
Subtotal 1				$ 1,087,174
TRAFFIC CONTROL			5%	$ 54,359
Subtotal 2				$ 1,141,532
MOBILIZATION			10%	$ 114,153
Subtotal 3				$ 1,255,686
CONTINGENCY (MEDIUM RISK)			55%	$ 690,627

Subtotal 4				$ 1,946,313
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$ 1,568,944
Subtotal 5				$ 3,515,257
CONSTRUCTION ENGINEERING (CE)			10%	$ 351,526
PRELIMINARY ENGINEERING (PE)			10%	$ 351,526
Subtotal 6				$ 4,218,308
INDIRECT COSTS (IDC)			10.91%	$ 460,217
TOTAL				**$ 4,678,526**

S8. Lava Lake (RP 61.4)

Replace Existing Bridge - Flatten Curve & Add Warning Signs — $ 10,400,000 TOT

	Bridge	Reconstruction
LENGTH (FT)	250	1320
WIDTH (FT)	46	46
SURFACING (IN)		5
BASE (IN)		18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (W/ BLASTING)	CUYD	5298.9	$ 20.00	$ 105,979
CRUSHED AGGREGATE COURSE	CUYD	4545.4	$ 27.41	$ 124,591
COVER - TYPE 1	SQYD	6747.0	$ 0.62	$ 4,183
PLANT MIX BIT SURF GR S-3/4 IN	TON	1918.2	$ 31.96	$ 61,306
ASPHALT CEMENT PG 64-28	TON	103.6	$ 500.31	$ 51,824
EMULS ASPHALT CRS-2P	TON	12.1	$ 447.71	$ 5,417
GUARD RAIL-STEEL	LNFT	66.0	$ 23.50	$ 1,551
GD RAIL-STL INT RDWY TERM SECT	LNFT	6.6	$ 53.12	$ 351
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.25	$ 8,000.00	$ 2,000
DRAINAGE PIPE - RURAL	MILE	0.25	$ 82,000.00	$ 20,500
REMOVE SMALL SINGLE SPAN BRIDGE	LS	1.0	$ 20,000.00	$ 20,000
NEW BRIDGE LARGER THAN 100 LINEAL FEET	SQFT	11500.0	$ 114.00	$ 1,311,000
MISCELLANEOUS ITEMS			25%	$ 427,175
Subtotal 1				$ 2,135,876
TRAFFIC CONTROL			5%	$ 106,794
Subtotal 2				$ 2,242,670
MOBILIZATION			10%	$ 224,267
Subtotal 3				$ 2,466,937
CONTINGENCY (HIGH RISK)			75%	$ 1,850,203
Subtotal 4				$ 4,317,140
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$ 3,480,095
Subtotal 5				$ 7,797,235
CONSTRUCTION ENGINEERING (CE)			10%	$ 779,723
PRELIMINARY ENGINEERING (PE)			10%	$ 779,723
Subtotal 6				$ 9,356,682
INDIRECT COSTS (IDC)			10.91%	$ 1,020,814
TOTAL				**$ 10,377,496**

Pedestrian Bridge to Trailhead — $ 1,300,000

LENGTH (FT)	150
WIDTH (FT)	10

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
NEW BRIDGE LARGER THAN 100 LINEAL FEET	SQFT	1500.0	$ 114.00	$ 171,000
MISCELLANEOUS ITEMS			50%	$ 85,500
Subtotal 1				$ 256,500
TRAFFIC CONTROL			5%	$ 12,825
Subtotal 2				$ 269,325
MOBILIZATION			10%	$ 26,933
Subtotal 3				$ 296,258
CONTINGENCY (HIGH RISK)			75%	$ 222,193
Subtotal 4				$ 518,451
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$ 417,929
Subtotal 5				$ 936,379
CONSTRUCTION ENGINEERING (CE)			10%	$ 93,638
PRELIMINARY ENGINEERING (PE)			10%	$ 93,638
Subtotal 6				$ 1,123,655

INDIRECT COSTS (IDC)				10.91%	$ 122,591
	TOTAL				**$ 1,246,246**

Modify Turnout/Parking Area **$ 560,000**

LENGTH (FT)	200
WIDTH (FT)	300
SURFACING (IN)	4
BASE (IN)	6

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (CANYON)		CUYD	978.8	$ 12.50	$ 12,235
CRUSHED AGGREGATE COURSE		CUYD	1155.5	$ 27.41	$ 31,673
COVER - TYPE 1		SQYD	6667.0	$ 0.62	$ 4,134
PLANT MIX BIT SURF GR S-3/4 IN		TON	1444.1	$ 31.96	$ 46,153
ASPHALT CEMENT PG 64-28		TON	78.0	$ 500.31	$ 39,014
EMULS ASPHALT CRS-2P		TON	11.9	$ 447.71	$ 5,328
MISCELLANEOUS ITEMS				25%	$ 34,634
	Subtotal 1				$ 173,169
TRAFFIC CONTROL				5%	$ 8,658
	Subtotal 2				$ 181,828
MOBILIZATION				10%	$ 18,183
	Subtotal 3				$ 200,011
CONTINGENCY (MEDIUM RISK)				55%	$ 110,006
	Subtotal 4				$ 310,017
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 106,620
	Subtotal 5				$ 416,636
CONSTRUCTION ENGINEERING (CE)				10%	$ 41,664
PRELIMINARY ENGINEERING (PE)				10%	$ 41,664
	Subtotal 6				$ 499,964
INDIRECT COSTS (IDC)				10.91%	$ 54,546
	TOTAL				**$ 554,510**

S9. Big Sky Trail Guardrail Improvements **$ 50,000** **TOT**

LENGTH (FT)	10,200

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
MGS INTERSECTING RDWAY TERMINAL SECTION		LNFT	510.0	$ 54.02	$ 27,550
	Subtotal 1				$ 27,550
CONTINGENCY (MEDIUM RISK)				55%	$ 15,153
	Subtotal 2				$ 42,703
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$ 6,801
	TOTAL				**$ 49,504**

S10. Weigh Station

S10-a. South of Williams Road **$ 5,600,000** **TOT**

LENGTH (FT)	4175
WIDTH (FT)	150
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY / STA	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)		CUYD	35402.3	$ 6.25	$ 221,264
CRUSHED AGGREGATE COURSE		CUYD	11786.6	$ 27.41	$ 323,072
COVER - TYPE 1		SQYD	17145.0	$ 0.62	$ 10,630
PLANT MIX BIT SURF GR S-3/4 IN		TON	4897.0	$ 31.96	$ 156,509
ASPHALT CEMENT PG 64-28		TON	264.4	$ 500.31	$ 132,302
EMULS ASPHALT CRS-2P		TON	30.7	$ 447.71	$ 13,745
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.7	$ 8,000.00	$ 5,485
DRAINAGE PIPE - RURAL		MILE	0.7	$ 82,000.00	$ 56,220
SIGNS - RURAL		MILE	0.7	$ 8,000.00	$ 5,485
PERMANENT SCALE AND PIT		EACH	1.0	$ 200,000.00	$ 200,000
MAINTENANCE BUILDING		EACH	1.0	$ 100,000.00	$ 100,000
MISCELLANEOUS ITEMS				25%	$ 306,178
	Subtotal 1				$ 1,530,890

TRAFFIC CONTROL				5%	$	76,544
	Subtotal 2				$	1,607,434
MOBILIZATION				10%	$	160,743
	Subtotal 3				$	1,768,178
CONTINGENCY (LOW RISK)				30%	$	530,453
	Subtotal 4				$	2,298,631
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	1,852,952
	Subtotal 5				$	4,151,583
CONSTRUCTION ENGINEERING (CE)				10%	$	415,158
PRELIMINARY ENGINEERING (PE)				10%	$	415,158
	Subtotal 6				$	4,981,900
INDIRECT COSTS (IDC)				10.91%	$	543,525
	TOTAL				**$**	**5,525,425**

S10-b. Spanish Creek Area — $ 7,800,000 TOT

LENGTH (FT)	4175
WIDTH (FT)	150
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY / STA	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	35402.3	$ 12.50	$	442,528
CRUSHED AGGREGATE COURSE	CUYD	11786.6	$ 27.41	$	323,072
COVER - TYPE 1	SQYD	17145.0	$ 0.62	$	10,630
PLANT MIX BIT SURF GR S-3/4 IN	TON	4897.0	$ 31.96	$	156,509
ASPHALT CEMENT PG 64-28	TON	264.4	$ 500.31	$	132,302
EMULS ASPHALT CRS-2P	TON	30.7	$ 447.71	$	13,745
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.7	$ 8,000.00	$	5,485
DRAINAGE PIPE - RURAL	MILE	0.7	$ 82,000.00	$	56,220
SIGNS - RURAL	MILE	0.7	$ 8,000.00	$	5,485
PERMANENT SCALE AND PIT	EACH	1.0	$ 200,000.00	$	200,000
MAINTENANCE BUILDING	EACH	1.0	$ 100,000.00	$	100,000
MISCELLANEOUS ITEMS			25%	$	361,494
Subtotal 1				$	1,807,470
TRAFFIC CONTROL			5%	$	90,374
Subtotal 2				$	1,897,844
MOBILIZATION			10%	$	189,784
Subtotal 3				$	2,087,628
CONTINGENCY (MEDIUM RISK)			55%	$	1,148,195
Subtotal 4				$	3,235,823
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$	2,608,434
Subtotal 5				$	5,844,257
CONSTRUCTION ENGINEERING (CE)			10%	$	584,426
PRELIMINARY ENGINEERING (PE)			10%	$	584,426
Subtotal 6				$	7,013,108
INDIRECT COSTS (IDC)			10.91%	$	765,130
TOTAL				**$**	**7,778,238**

S10-c. South of Study Area — $ 4,900,000 TOT

LENGTH (FT)	1675
WIDTH (FT)	150
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY / STA	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	17563.7	$ 12.50	$	219,546
CRUSHED AGGREGATE COURSE	CUYD	6233.4	$ 27.41	$	170,858
COVER - TYPE 1	SQYD	10478.0	$ 0.62	$	6,496
PLANT MIX BIT SURF GR S-3/4 IN	TON	2900.1	$ 31.96	$	92,686
ASPHALT CEMENT PG 64-28	TON	156.6	$ 500.31	$	78,351
EMULS ASPHALT CRS-2P	TON	18.8	$ 447.71	$	8,417
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.2	$ 8,000.00	$	1,697
DRAINAGE PIPE - RURAL	MILE	0.2	$ 82,000.00	$	17,394
SIGNS - RURAL	MILE	0.2	$ 8,000.00	$	1,697
PERMANENT SCALE AND PIT	EACH	1.0	$ 200,000.00	$	200,000
MAINTENANCE BUILDING	EACH	1.0	$ 100,000.00	$	100,000

MISCELLANEOUS ITEMS				25%	$ 224,285
	Subtotal 1				$ 1,121,427
TRAFFIC CONTROL				5%	$ 56,071
	Subtotal 2				$ 1,177,498
MOBILIZATION				10%	$ 117,750
	Subtotal 3				$ 1,295,248
CONTINGENCY (MEDIUM RISK)				55%	$ 712,387
	Subtotal 4				$ 2,007,635
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 1,618,377
	Subtotal 5				$ 3,626,012
CONSTRUCTION ENGINEERING (CE)				10%	$ 362,601
PRELIMINARY ENGINEERING (PE)				10%	$ 362,601
	Subtotal 6				$ 4,351,214
INDIRECT COSTS (IDC)				10.91%	$ 474,717
	TOTAL				**$ 4,825,932**

S11. Turn Lanes at Spot Locations

Low Range Estimate — $ 230,000 EA

LENGTH (FT)	563
WIDTH (FT)	12
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	3058.1	$ 6.25	$ 19,113
CRUSHED AGGREGATE COURSE	CUYD	875.3	$ 27.41	$ 23,991
COVER - TYPE 1	SQYD	751.0	$ 0.62	$ 466
PLANT MIX BIT SURF GR S-3/4 IN	TON	248.8	$ 31.96	$ 7,950
ASPHALT CEMENT PG 64-28	TON	13.4	$ 500.31	$ 6,721
EMULS ASPHALT CRS-2P	TON	1.4	$ 447.71	$ 627
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.11	$ 8,000.00	$ 853
DRAINAGE PIPE - RURAL	MILE	0.11	$ 82,000.00	$ 8,744
MISCELLANEOUS ITEMS			25%	$ 17,116
Subtotal 1				$ 85,580
TRAFFIC CONTROL			5%	$ 4,279
Subtotal 2				$ 89,858
MOBILIZATION			10%	$ 8,986
Subtotal 3				$ 98,844
CONTINGENCY (LOW RISK)			30%	$ 29,653
Subtotal 4				$ 128,498
INFLATION (MID-TERM)	% PER YEAR	10.0	3%	$ 44,192
Subtotal 5				$ 172,690
CONSTRUCTION ENGINEERING (CE)			10%	$ 17,269
PRELIMINARY ENGINEERING (PE)			10%	$ 17,269
Subtotal 6				$ 207,228
INDIRECT COSTS (IDC)			10.91%	$ 22,609
TOTAL				**$ 229,837**

High Range Estimate — $ 1,100,000 EA

LENGTH (FT)	931
WIDTH (FT)	12
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	2387.1	$ 12.50	$ 29,839
CRUSHED AGGREGATE COURSE	CUYD	3516.2	$ 27.41	$ 96,380
COVER - TYPE 1	SQYD	5380.0	$ 0.62	$ 3,336
PLANT MIX BIT SURF GR S-3/4 IN	TON	1519.1	$ 31.96	$ 48,550
ASPHALT CEMENT PG 64-28	TON	82.0	$ 500.31	$ 41,040
EMULS ASPHALT CRS-2P	TON	9.7	$ 447.71	$ 4,343
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.18	$ 8,000.00	$ 1,411
DRAINAGE PIPE - RURAL	MILE	0.18	$ 82,000.00	$ 14,459
MISCELLANEOUS ITEMS			25%	$ 59,839
Subtotal 1				$ 299,196

TRAFFIC CONTROL				5%	$ 14,960
	Subtotal 2				$ 314,156
MOBILIZATION				10%	$ 31,416
	Subtotal 3				$ 345,571
CONTINGENCY (LOW RISK)				30%	$ 103,671
	Subtotal 4				$ 449,243
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 362,140
	Subtotal 5				$ 811,383
CONSTRUCTION ENGINEERING (CE)				10%	$ 81,138
PRELIMINARY ENGINEERING (PE)				10%	$ 81,138
	Subtotal 6				$ 973,659
INDIRECT COSTS (IDC)				10.91%	$ 106,226
	TOTAL				**$ 1,079,885**

S12. Turnouts for Slow-moving Vehicles

Low Range Estimate $ 80,000 EA

LENGTH (FT)	100
WIDTH (FT)	16
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	600.0	$ 12.50	$ 7,500
CRUSHED AGGREGATE COURSE	CUYD	177.7	$ 27.41	$ 4,870
COVER - TYPE 1	SQYD	178.0	$ 0.62	$ 110
PLANT MIX BIT SURF GR S-3/4 IN	TON	56.1	$ 31.96	$ 1,792
ASPHALT CEMENT PG 64-28	TON	3.0	$ 500.31	$ 1,515
EMULS ASPHALT CRS-2P	TON	0.4	$ 447.71	$ 179
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.02	$ 8,000.00	$ 152
DRAINAGE PIPE - RURAL	MILE	0.02	$ 82,000.00	$ 1,553
MISCELLANEOUS ITEMS			25%	$ 4,418
Subtotal 1				$ 22,089
TRAFFIC CONTROL			5%	$ 1,104
Subtotal 2				$ 23,194
MOBILIZATION			10%	$ 2,319
Subtotal 3				$ 25,513
CONTINGENCY (MEDIUM RISK)			55%	$ 14,032
Subtotal 4				$ 39,545
INFLATION (MID-TERM)	% PER YEAR	10.0	3%	$ 13,600
Subtotal 5				$ 53,146
CONSTRUCTION ENGINEERING (CE)			10%	$ 5,315
PRELIMINARY ENGINEERING (PE)			10%	$ 5,315
Subtotal 6				$ 63,775
INDIRECT COSTS (IDC)			10.91%	$ 6,958
TOTAL				**$ 70,733**

High Range Estimate $ 1,100,000 EA

LENGTH (FT)	550
WIDTH (FT)	36
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (W/ BLASTING)	CUYD	4861.5	$ 20.00	$ 97,231
CRUSHED AGGREGATE COURSE	CUYD	1588.4	$ 27.41	$ 43,537
COVER - TYPE 1	SQYD	2200.0	$ 0.62	$ 1,364
PLANT MIX BIT SURF GR S-3/4 IN	TON	635.7	$ 31.96	$ 20,315
ASPHALT CEMENT PG 64-28	TON	34.3	$ 500.31	$ 17,173
EMULS ASPHALT CRS-2P	TON	4.0	$ 447.71	$ 1,791
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.10	$ 8,000.00	$ 833
DRAINAGE PIPE - RURAL	MILE	0.10	$ 82,000.00	$ 8,542
MISCELLANEOUS ITEMS			25%	$ 47,697
Subtotal 1				$ 238,483
TRAFFIC CONTROL			5%	$ 11,924
Subtotal 2				$ 250,407

MOBILIZATION				10%	$	25,041
	Subtotal 3				$	275,448
CONTINGENCY (MEDIUM RISK)				55%	$	151,497
	Subtotal 4				$	426,945
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	344,165
	Subtotal 5				$	771,110
CONSTRUCTION ENGINEERING (CE)				10%	$	77,111
PRELIMINARY ENGINEERING (PE)				10%	$	77,111
	Subtotal 6				$	925,332
INDIRECT COSTS (IDC)				10.91%	$	100,954
	TOTAL				**$**	**1,026,285**

Signage **$ 600 EA**

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
SIGNS - ALUM SHEET INVR IV		SQFT	9.0	$ 25.11	$	226
POLES TREATED WOOD 4 IN		LNFT	12.0	$ 11.16	$	134
	Subtotal 1				$	360
CONTINGENCY (LOW RISK)				30%	$	108
	Subtotal 2				$	468
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$	75
	TOTAL				**$**	**542**

S13. Recreational Access

Modified Access **$ 70,000 EA**

LENGTH (FT)	100
WIDTH (FT)	16
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)		CUYD	600.0	$ 12.50	$	7,500
CRUSHED AGGREGATE COURSE		CUYD	177.7	$ 27.41	$	4,870
COVER - TYPE 1		SQYD	178.0	$ 0.62	$	110
PLANT MIX BIT SURF GR S-3/4 IN		TON	56.1	$ 31.96	$	1,792
ASPHALT CEMENT PG 64-28		TON	3.0	$ 500.31	$	1,515
EMULS ASPHALT CRS-2P		TON	0.4	$ 447.71	$	179
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.02	$ 8,000.00	$	152
DRAINAGE PIPE - RURAL		MILE	0.02	$ 82,000.00	$	1,553
MISCELLANEOUS ITEMS				25%	$	4,418
	Subtotal 1				$	22,089
TRAFFIC CONTROL				5%	$	1,104
	Subtotal 2				$	23,194
MOBILIZATION				10%	$	2,319
	Subtotal 3				$	25,513
CONTINGENCY (HIGH RISK)				75%	$	19,135
	Subtotal 4				$	44,648
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$	7,111
	Subtotal 5				$	51,759
CONSTRUCTION ENGINEERING (CE)				10%	$	5,176
PRELIMINARY ENGINEERING (PE)				10%	$	5,176
	Subtotal 6				$	62,111
INDIRECT COSTS (IDC)				10.91%	$	6,776
	TOTAL				**$**	**68,887**

New Access **$ 840,000 EA**

LENGTH (FT)	550
WIDTH (FT)	36
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	4861.5	$ 12.50	$	60,769
CRUSHED AGGREGATE COURSE	CUYD	1588.4	$ 27.41	$	43,537
COVER - TYPE 1	SQYD	2200.0	$ 0.62	$	1,364

PLANT MIX BIT SURF GR S-3/4 IN		TON	635.7	$ 31.96	$ 20,315
ASPHALT CEMENT PG 64-28		TON	34.3	$ 500.31	$ 17,173
EMULS ASPHALT CRS-2P		TON	4.0	$ 447.71	$ 1,791
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.10	$ 8,000.00	$ 833
DRAINAGE PIPE - RURAL		MILE	0.10	$ 82,000.00	$ 8,542
MISCELLANEOUS ITEMS				25%	$ 38,581
	Subtotal 1				$ 192,906
TRAFFIC CONTROL				5%	$ 9,645
	Subtotal 2				$ 202,552
MOBILIZATION				10%	$ 20,255
	Subtotal 3				$ 222,807
CONTINGENCY (MEDIUM RISK)				55%	$ 122,544
	Subtotal 4				$ 345,351
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 278,391
	Subtotal 5				$ 623,742
CONSTRUCTION ENGINEERING (CE)				10%	$ 62,374
PRELIMINARY ENGINEERING (PE)				10%	$ 62,374
	Subtotal 6				$ 748,490
INDIRECT COSTS (IDC)				10.91%	$ 81,660
	TOTAL				**$ 830,151**

Close Existing Recreational Access **$ 5,000**

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
CLOSE ACCESS POINT	EACH	1.0	$ 5,000.00	$ 5,000

S14. Bridge Replacements

Spain-Ferris Ditch (5913) **RP 81.5** **$ 1,110,000 TOT**

LENGTH (FT)	24
WIDTH (FT)	78

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	1872.0	$ 120.00	$ 224,640
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$ 20,000
MISCELLANEOUS ITEMS				25%	$ 61,160
	Subtotal 1				$ 305,800
TRAFFIC CONTROL				5%	$ 15,290
	Subtotal 2				$ 321,090
MOBILIZATION				10%	$ 32,109
	Subtotal 3				$ 353,199
CONTINGENCY (LOW RISK)				30%	$ 105,960
	Subtotal 4				$ 459,159
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 370,133
	Subtotal 5				$ 829,292
CONSTRUCTION ENGINEERING (CE)				10%	$ 82,929
PRELIMINARY ENGINEERING (PE)				10%	$ 82,929
	Subtotal 6				$ 995,150
INDIRECT COSTS (IDC)				10.91%	$ 108,571
	TOTAL				**$ 1,103,721**

South Cottonwood Creek (5911) **RP 76.7** **$ 1,110,000**

LENGTH (FT)	24
WIDTH (FT)	78

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	1872.0	$ 120.00	$ 224,640
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$ 20,000
MISCELLANEOUS ITEMS				25%	$ 61,160
	Subtotal 1				$ 305,800
TRAFFIC CONTROL				5%	$ 15,290
	Subtotal 2				$ 321,090
MOBILIZATION				10%	$ 32,109
	Subtotal 3				$ 353,199
CONTINGENCY (LOW RISK)				30%	$ 105,960
	Subtotal 4				$ 459,159

INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 370,133
	Subtotal 5				$ 829,292
CONSTRUCTION ENGINEERING (CE)				10%	$ 82,929
PRELIMINARY ENGINEERING (PE)				10%	$ 82,929
	Subtotal 6				$ 995,150
INDIRECT COSTS (IDC)				10.91%	$ 108,571
	TOTAL				**$ 1,103,721**

Gallatin River (5910) **RP 70.5** **$ 8,900,000**

LENGTH (FT)	266
WIDTH (FT)	64

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
NEW BRIDGE LARGER THAN 100 LINEAL FEET		SQFT	17024	$ 114.00	$ 1,940,736
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$ 20,000
MISCELLANEOUS ITEMS				25%	$ 490,184
	Subtotal 1				$ 2,450,920
TRAFFIC CONTROL				5%	$ 122,546
	Subtotal 2				$ 2,573,466
MOBILIZATION				10%	$ 257,347
	Subtotal 3				$ 2,830,813
CONTINGENCY (LOW RISK)				30%	$ 849,244
	Subtotal 4				$ 3,680,056
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 2,966,535
	Subtotal 5				$ 6,646,591
CONSTRUCTION ENGINEERING (CE)				10%	$ 664,659
PRELIMINARY ENGINEERING (PE)				10%	$ 664,659
	Subtotal 6				$ 7,975,909
INDIRECT COSTS (IDC)				10.91%	$ 870,172
	TOTAL				**$ 8,846,081**

Spanish Creek (5909) **RP 68.2** **$ 1,700,000**

LENGTH (FT)	70
WIDTH (FT)	64

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	4480.0	$ 120.00	$ 537,600
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$ 20,000
MISCELLANEOUS ITEMS				25%	$ 139,400
	Subtotal 1				$ 697,000
TRAFFIC CONTROL				5%	$ 34,850
	Subtotal 2				$ 731,850
MOBILIZATION				10%	$ 73,185
	Subtotal 3				$ 805,035
CONTINGENCY (LOW RISK)				30%	$ 241,511
	Subtotal 4				$ 1,046,546
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$ 166,688
	Subtotal 5				$ 1,213,233
CONSTRUCTION ENGINEERING (CE)				10%	$ 121,323
PRELIMINARY ENGINEERING (PE)				10%	$ 121,323
	Subtotal 6				$ 1,455,880
INDIRECT COSTS (IDC)				10.91%	$ 158,836
	TOTAL				**$ 1,614,716**

Gallatin River (5905) **RP 49.8** **$ 4,600,000**

LENGTH (FT)	160
WIDTH (FT)	52

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	8320.0	$ 120.00	$ 998,400
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$ 20,000
MISCELLANEOUS ITEMS				25%	$ 254,600
	Subtotal 1				$ 1,273,000
TRAFFIC CONTROL				5%	$ 63,650
	Subtotal 2				$ 1,336,650

MOBILIZATION				10%	$	133,665
	Subtotal 3				$	1,470,315
CONTINGENCY (LOW RISK)				30%	$	441,095
	Subtotal 4				$	1,911,410
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	1,540,809
	Subtotal 5				$	3,452,218
CONSTRUCTION ENGINEERING (CE)				10%	$	345,222
PRELIMINARY ENGINEERING (PE)				10%	$	345,222
	Subtotal 6				$	4,142,662
INDIRECT COSTS (IDC)				10.91%	$	451,964
	TOTAL				**$**	**4,594,626**

S15. Rockfall Hazard Mitigation

RAMP 951 (RP 63.1)		**2017 DOLLARS**
IMPROVE ONE CONDITION STATE	$	600,000
IMPROVE TO GOOD CONDITION	$	600,000
RAMP 950 (RP 62.6)		
IMPROVE ONE CONDITION STATE	$	520,000
IMPROVE TO GOOD CONDITION	$	1,000,000
RAMP 949 (RP 62.1)		
IMPROVE ONE CONDITION STATE	$	1,200,000
IMPROVE TO GOOD CONDITION	$	3,600,000
RAMP 948 (RP 61.4)		
IMPROVE ONE CONDITION STATE	$	850,000
IMPROVE TO GOOD CONDITION	$	2,600,000
RAMP 947 (RP 61.2)		
IMPROVE ONE CONDITION STATE	$	380,000
IMPROVE TO GOOD CONDITION	$	1,100,000
RAMP 946 (RP 60.8)		
IMPROVE ONE CONDITION STATE	$	1,900,000
IMPROVE TO GOOD CONDITION	$	7,400,000
RAMP 945 (RP 59.3)		
IMPROVE ONE CONDITION STATE	$	245,000
IMPROVE TO GOOD CONDITION	$	770,000
RAMP 942 (RP 57.8)		
IMPROVE ONE CONDITION STATE	$	2,500,000
IMPROVE TO GOOD CONDITION	$	2,500,000
RAMP 939 (RP 55.7)		
IMPROVE ONE CONDITION STATE	$	245,000
IMPROVE TO GOOD CONDITION	$	490,000
RAMP 937 (RP 52.9)		
IMPROVE ONE CONDITION STATE	$	424,000
IMPROVE TO GOOD CONDITION	$	1,300,000
RAMP 936 (RP 52.8)		
IMPROVE ONE CONDITION STATE	$	440,000
IMPROVE TO GOOD CONDITION	$	1,300,000
RAMP 935 (RP 52.4)		
IMPROVE ONE CONDITION STATE	$	1,000,000
IMPROVE TO GOOD CONDITION	$	2,100,000
RAMP 934 (RP 52.1)		
IMPROVE ONE CONDITION STATE	$	265,000
IMPROVE TO GOOD CONDITION	$	800,000
RAMP 933 (RP 50.7)		
IMPROVE ONE CONDITION STATE	$	490,000

IMPROVE TO GOOD CONDITION				$ 1,500,000

Improve One Condition State — **$ 24,500,000 TOT**

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
	Subtotal 1				$ 11,059,000
CONTINGENCY (LOW RISK)				30%	$ 3,317,700
	Subtotal 2				$ 14,376,700
INFLATION (MID-TERM)		% PER YEAR	13.0	3%	$ 10,053,669
	TOTAL				**$ 24,430,369**

Improve to Good Condition — **$ 59,800,000 TOT**

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
	Subtotal 1				$ 27,060,000
CONTINGENCY (LOW RISK)				30%	$ 8,118,000
	Subtotal 2				$ 35,178,000
INFLATION (MID-TERM)		% PER YEAR	13.0	3%	$ 24,600,079
	TOTAL				**$ 59,778,079**

S16. Advance Warning Signs — VARIES

S17. Substandard Curve Modifcations

S17-a. North of Spanish Creek — RP 69.2-68.5 — $ 5,500,000 TOT

LENGTH (FT)	2500
WIDTH (FT)	32
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (W/ BLASTING)		CUYD	31017.2	$ 20.00	$ 620,343
CRUSHED AGGREGATE COURSE		CUYD	6664.4	$ 27.41	$ 182,670
COVER - TYPE 1		SQYD	8889.0	$ 0.62	$ 5,511
PLANT MIX BIT SURF GR S-3/4 IN		TON	2591.9	$ 31.96	$ 82,836
ASPHALT CEMENT PG 64-28		TON	140.0	$ 500.31	$ 70,024
EMULS ASPHALT CRS-2P		TON	15.9	$ 447.71	$ 7,119
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.5	$ 8,000.00	$ 3,788
DRAINAGE PIPE - RURAL		MILE	0.5	$ 82,000.00	$ 38,826
MISCELLANEOUS ITEMS				25%	$ 252,779
	Subtotal 1				$ 1,263,896
TRAFFIC CONTROL				5%	$ 63,195
	Subtotal 2				$ 1,327,091
MOBILIZATION				10%	$ 132,709
	Subtotal 3				$ 1,459,800
CONTINGENCY (MEDIUM RISK)				55%	$ 802,890
	Subtotal 4				$ 2,262,690
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 1,823,980
	Subtotal 5				$ 4,086,670
CONSTRUCTION ENGINEERING (CE)				10%	$ 408,667
PRELIMINARY ENGINEERING (PE)				10%	$ 408,667
	Subtotal 6				$ 4,904,004
INDIRECT COSTS (IDC)				10.91%	$ 535,027
	TOTAL				**$ 5,439,031**

S17-b. Rockhaven Camp — RP 66.9-66.5 — $ 4,400,000 TOT

LENGTH (FT)	2000
WIDTH (FT)	32
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (W/ BLASTING)	CUYD	24813.7	$ 20.00	$ 496,275
CRUSHED AGGREGATE COURSE	CUYD	5331.5	$ 27.41	$ 146,136
COVER - TYPE 1	SQYD	7112.0	$ 0.62	$ 4,409
PLANT MIX BIT SURF GR S-3/4 IN	TON	2073.5	$ 31.96	$ 66,269

ASPHALT CEMENT PG 64-28		TON	112.0	$ 500.31	$ 56,019
EMULS ASPHALT CRS-2P		TON	12.7	$ 447.71	$ 5,686
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.4	$ 8,000.00	$ 3,030
DRAINAGE PIPE - RURAL		MILE	0.4	$ 82,000.00	$ 31,061
MISCELLANEOUS ITEMS				25%	$ 202,221
	Subtotal 1				$ 1,011,106
TRAFFIC CONTROL				5%	$ 50,555
	Subtotal 2				$ 1,061,662
MOBILIZATION				10%	$ 106,166
	Subtotal 3				$ 1,167,828
CONTINGENCY (MEDIUM RISK)				55%	$ 642,305
	Subtotal 4				$ 1,810,133
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 1,459,169
	Subtotal 5				$ 3,269,302
CONSTRUCTION ENGINEERING (CE)				10%	$ 326,930
PRELIMINARY ENGINEERING (PE)				10%	$ 326,930
	Subtotal 6				$ 3,923,162
INDIRECT COSTS (IDC)				10.91%	$ 428,017
	TOTAL				**$ 4,351,180**

S17-c. Greek Creek — RP 57.6 — $ 2,400,000 TOT

LENGTH (FT)	1100
WIDTH (FT)	32
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (W/ BLASTING)		CUYD	13647.6	$ 20.00	$ 272,951
CRUSHED AGGREGATE COURSE		CUYD	2932.3	$ 27.41	$ 80,375
COVER - TYPE 1		SQYD	3912.0	$ 0.62	$ 2,425
PLANT MIX BIT SURF GR S-3/4 IN		TON	1140.4	$ 31.96	$ 36,448
ASPHALT CEMENT PG 64-28		TON	61.6	$ 500.31	$ 30,811
EMULS ASPHALT CRS-2P		TON	7.0	$ 447.71	$ 3,134
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.2	$ 8,000.00	$ 1,667
DRAINAGE PIPE - RURAL		MILE	0.2	$ 82,000.00	$ 17,083
MISCELLANEOUS ITEMS				25%	$ 111,223
	Subtotal 1				$ 556,117
TRAFFIC CONTROL				5%	$ 27,806
	Subtotal 2				$ 583,923
MOBILIZATION				10%	$ 58,392
	Subtotal 3				$ 642,315
CONTINGENCY (MEDIUM RISK)				55%	$ 353,273
	Subtotal 4				$ 995,589
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 802,555
	Subtotal 5				$ 1,798,144
CONSTRUCTION ENGINEERING (CE)				10%	$ 179,814
PRELIMINARY ENGINEERING (PE)				10%	$ 179,814
	Subtotal 6				$ 2,157,773
INDIRECT COSTS (IDC)				10.91%	$ 235,413
	TOTAL				**$ 2,393,186**

S17-d. North of Goose Creek — RP 52.0 — $ 1,700,000 TOT

LENGTH (FT)	750
WIDTH (FT)	32
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (W/ BLASTING)	CUYD	9305.2	$ 20.00	$ 186,103
CRUSHED AGGREGATE COURSE	CUYD	1999.3	$ 27.41	$ 54,801
COVER - TYPE 1	SQYD	2667.0	$ 0.62	$ 1,654
PLANT MIX BIT SURF GR S-3/4 IN	TON	777.6	$ 31.96	$ 24,851
ASPHALT CEMENT PG 64-28	TON	42.0	$ 500.31	$ 21,007
EMULS ASPHALT CRS-2P	TON	4.8	$ 447.71	$ 2,149
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	0.1	$ 8,000.00	$ 1,136
DRAINAGE PIPE - RURAL	MILE	0.1	$ 82,000.00	$ 11,648

MISCELLANEOUS ITEMS				25%	$	75,837
	Subtotal 1				$	379,186
TRAFFIC CONTROL				5%	$	18,959
	Subtotal 2				$	398,145
MOBILIZATION				10%	$	39,815
	Subtotal 3				$	437,960
CONTINGENCY (MEDIUM RISK)				55%	$	240,878
	Subtotal 4				$	678,838
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	547,219
	Subtotal 5				$	1,226,056
CONSTRUCTION ENGINEERING (CE)				10%	$	122,606
PRELIMINARY ENGINEERING (PE)				10%	$	122,606
	Subtotal 6				$	1,471,267
INDIRECT COSTS (IDC)				10.91%	$	160,515
	TOTAL				**$**	**1,631,783**

S18. Emergency Call Boxes

Signage — $ 600 EA

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
SIGNS - ALUM SHEET INVR IV	SQFT	9.0	$ 25.11	$ 226
POLES TREATED WOOD 4 IN	LNFT	12.0	$ 11.16	$ 134
Subtotal 1				$ 360
CONTINGENCY (LOW RISK)			30%	$ 108
Subtotal 2				$ 468
INFLATION (SHORT-TERM)	% PER YEAR	5.0	3%	$ 75
TOTAL				**$ 542**

New Call Box — $ 16,000

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EMERGENCY CALL BOX	EACH	1.0	$ 7,500.00	$ 7,500
Subtotal 1				$ 7,500
CONTINGENCY (MEDIUM RISK)			55%	$ 4,125
Subtotal 2				$ 11,625
INFLATION (MID-TERM)	% PER YEAR	10.0	3%	$ 3,998
TOTAL				**$ 15,623**

CORRIDOR IMPROVEMENTS

C1. Highway Maintenance Practices — VARIES

C2. Passing/No Passing Zones — $ 13,000 PER MI

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	1.0	$ 8,000.00	$ 8,000
Subtotal 1				$ 8,000
CONTINGENCY (LOW RISK)			30%	$ 2,400
Subtotal 2				$ 10,400
INFLATION (SHORT-TERM)	% PER YEAR	5.0	3%	$ 1,656
TOTAL				**$ 12,056**

C3. Shoulder Widening

C3-a. US 191/MT 84/MT 85 to Gateway South Road (RP 81.9 to 75.7) — $ 1,300,000 PER MI

8-foot shoulders

LENGTH (MI)	1.0
WIDTH (FT)	8
SURFACING (IN)	5
BASE (IN)	12

TYPE	UNITS	QUANTITY	UNIT PRICE	COST / MI
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	15186.2	$ 6.25	$ 94,914
CRUSHED AGGREGATE COURSE	CUYD	4020.3	$ 27.41	$ 110,196
COVER - TYPE 1	SQYD	4694.0	$ 0.62	$ 2,910
PLANT MIX BIT SURF GR S-3/4 IN	TON	1704.7	$ 31.96	$ 54,482

ASPHALT CEMENT PG 64-28		TON	92.1	$	500.31	$	46,056	
EMULS ASPHALT CRS-2P		TON	8.4	$	447.71	$	3,761	
MISCELLANEOUS ITEMS					25%	$	78,080	
	Subtotal 1					$	390,399	
TRAFFIC CONTROL					5%	$	19,520	
	Subtotal 2					$	409,919	
MOBILIZATION					10%	$	40,992	
	Subtotal 3					$	450,911	
CONTINGENCY (MEDIUM RISK)					55%	$	248,001	
	Subtotal 4					$	698,912	
INFLATION (MID-TERM)		% PER YEAR	10.0		3%	$	240,367	
	Subtotal 5					$	939,280	
CONSTRUCTION ENGINEERING (CE)					10%	$	93,928	
PRELIMINARY ENGINEERING (PE)					10%	$	93,928	
	Subtotal 6					$	1,127,136	
INDIRECT COSTS (IDC)					10.91%	$	122,971	
	TOTAL					**$**	**1,250,106**	

C3-b. Gateway South Road to MT 64 (RP 75.7 to 48.0) **$ 1,800,000 PER MI**

4-foot shoulders

LENGTH (MI)	1.0
WIDTH (FT)	4
SURFACING (IN)	5
BASE (IN)	12

TYPE		UNITS	QUANTITY		UNIT PRICE		COST / MI
EXCAVATION-UNCLASSIFIED (CANYON)		CUYD	12970.0	$	12.50	$	162,124
CRUSHED AGGREGATE COURSE		CUYD	3238.1	$	27.41	$	88,756
COVER - TYPE 1		SQYD	2347.0	$	0.62	$	1,455
PLANT MIX BIT SURF GR S-3/4 IN		TON	1076.5	$	31.96	$	34,404
ASPHALT CEMENT PG 64-28		TON	58.1	$	500.31	$	29,083
EMULS ASPHALT CRS-2P		TON	4.2	$	447.71	$	1,880
GUARD RAIL-STEEL		LNFT	264.0	$	23.50	$	6,204
GD RAIL-STL INT RDWY TERM SECT		LNFT	26.4	$	53.12	$	1,402
MISCELLANEOUS ITEMS					25%	$	81,327
	Subtotal 1					$	406,637
TRAFFIC CONTROL					5%	$	20,332
	Subtotal 2					$	426,969
MOBILIZATION					10%	$	42,697
	Subtotal 3					$	469,666
CONTINGENCY (MEDIUM RISK)					55%	$	258,316
	Subtotal 4					$	727,982
INFLATION (LONG-TERM)		% PER YEAR	20.0		3%	$	586,834
	Subtotal 5					$	1,314,816
CONSTRUCTION ENGINEERING (CE)					10%	$	131,482
PRELIMINARY ENGINEERING (PE)					10%	$	131,482
	Subtotal 6					$	1,577,779
INDIRECT COSTS (IDC)					10.91%	$	172,136
	TOTAL					**$**	**1,749,914**

C4. Guardrail Improvements **VARIES**

C5. Speed Considerations **$ 350,000 TOT**

TYPE		UNITS	QUANTITY		UNIT PRICE		COST
VARIABLE SPEED LIMIT SIGN		EA	5.0	$	20,000.00	$	100,000
INTEGRATED WEATHER MONITORING SYSTEM		EA	1.0	$	50,000.00	$	50,000
	Subtotal 1					$	150,000
CONTINGENCY (MEDIUM RISK)					55%	$	82,500
	Subtotal 2					$	232,500
INFLATION (MID-TERM)		% PER YEAR	10.0		3%	$	79,961
	Subtotal 3					$	312,461
INDIRECT COSTS (IDC)					10.91%	$	34,089
	TOTAL					**$**	**346,550**

C6. Mailbox Relocation **UNKNOWN**

C7. Access Management **UNKNOWN**

C8. Access Control Plan — $ 150,000 TOT

TYPE		UNITS	QUANTITY	UNIT PRICE	COST / MI
ACCESS CONTROL PLAN		EACH	1.0	$ 125,000.00	$ 125,000
	Subtotal 2				$ 125,000
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$ 19,909
	TOTAL				**$ 144,909**

C9. Vegetation Management Plan — $ 70,000 TOT

TYPE		UNITS	QUANTITY	UNIT PRICE	COST / MI
VEGETATION MANAGEMENT PLAN		EACH	1.0	$ 50,000.00	$ 50,000
	Subtotal 2				$ 50,000
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 17,196
	TOTAL				**$ 67,196**

C10. Wildlife-Vehicle Conflict Mitigation

Grade Separated Crossing Structure (Underpass) — $ 500,000 EA

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
BRIDGE OVER WILDLIFE CROSSING		SQFT	960.0	$ 250	$ 240,000
	Subtotal 1				$ 240,000
CONTINGENCY (MEDIUM RISK)				55%	$ 132,000
	Subtotal 2				$ 372,000
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 127,937
	TOTAL				**$ 499,937**

Grade Separated Crossing Structure (Overpass) — $ 4,200,000 EA

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
WILDLIFE OVERPASS STRUCTURE		EACH	1.0	$ 1,500,000	$ 1,500,000
	Subtotal 1				$ 1,500,000
CONTINGENCY (MEDIUM RISK)				55%	$ 825,000
	Subtotal 2				$ 2,325,000
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$ 1,874,209
	TOTAL				**$ 4,199,209**

Wildlife Fencing — $ 80,000 PER MI

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
FENCE - WILDLIFE		MILE	1.0	$ 34,848	$ 34,848
	Subtotal 1				$ 34,848
CONTINGENCY (MEDIUM RISK)				55%	$ 19,166
	Subtotal 2				$ 54,014
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 18,576
	TOTAL				**$ 72,591**

Animal Detection System — $ 630,000 PER MI

TYPE		UNITS	QUANTITY	UNIT PRICE	COST
ANIMAL DETECTION SYSTEM		MILE	1.0	$ 300,000.00	$ 300,000
	Subtotal 1				$ 300,000
CONTINGENCY (MEDIUM RISK)				55%	$ 165,000
	Subtotal 2				$ 465,000
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$ 159,921
	TOTAL				**$ 624,921**

Wildlife Signage — VARIES

ALTERNATIVE TRANSPORTATION MODES

A1. Four Corners to Gallatin Gateway Shared Use Path — $ 3,500,000 TOT

LENGTH (MI)	4.15
WIDTH (FT)	10

SURFACING (IN)	2
BASE (IN)	6

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	20703.7	$ 6.25	$ 129,398
CRUSHED AGGREGATE COURSE	CUYD	6374.1	$ 27.41	$ 174,714
COVER - TYPE 1	SQYD	24347.0	$ 0.62	$ 15,095
PLANT MIX BIT SURF GR S-3/4 IN	TON	2904.8	$ 31.96	$ 92,836
ASPHALT CEMENT PG 64-28	TON	156.9	$ 500.31	$ 78,479
EMULS ASPHALT CRS-2P	TON	43.5	$ 447.71	$ 19,475
DRAINAGE PIPE - RURAL	MILE	4.2	$ 82,000.00	$ 340,300
MISCELLANEOUS ITEMS			25%	$ 212,574
Subtotal 1				$ 1,062,872
TRAFFIC CONTROL			5%	$ 53,144
Subtotal 2				$ 1,116,015
MOBILIZATION			10%	$ 111,602
Subtotal 3				$ 1,227,617
CONTINGENCY (MEDIUM RISK)			55%	$ 675,189
Subtotal 4				$ 1,902,806
INFLATION (MID-TERM)	% PER YEAR	10.0	3%	$ 654,406
Subtotal 5				$ 2,557,212
CONSTRUCTION ENGINEERING (CE)			10%	$ 255,721
PRELIMINARY ENGINEERING (PE)			10%	$ 255,721
Subtotal 6				$ 3,068,655
INDIRECT COSTS (IDC)			10.91%	$ 334,790
TOTAL				**$ 3,403,445**

A2. Four Corners Intersection Pedestrian Improvements (RP 81.9) — $ 230,000 TOT

LENGTH (FT)	350
WIDTH (FT)	10
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
SIG PEDESTRIAN TYPE 2	EACH	8.0	$ 973.94	$ 7,792
PORT CEM CONC PAVE 11 IN COLORED	SQYD	610.9	$ 126.00	$ 76,971
Subtotal 1				$ 84,762
TRAFFIC CONTROL			5%	$ 4,238
Subtotal 2				$ 89,001
MOBILIZATION			10%	$ 8,900
Subtotal 3				$ 97,901
CONTINGENCY (LOW RISK)			30%	$ 29,370
Subtotal 4				$ 127,271
INFLATION (MID-TERM)	% PER YEAR	10.0	3%	$ 43,770
Subtotal 5				$ 171,041
CONSTRUCTION ENGINEERING (CE)			10%	$ 17,104
PRELIMINARY ENGINEERING (PE)			10%	$ 17,104
Subtotal 6				$ 205,249
INDIRECT COSTS (IDC)			10.91%	$ 22,393
TOTAL				**$ 227,642**

A3. Beaver Creek Road Pedestrian Crossing (RP 45.3)

HIGH VISIBILITY SIGNING — $ 9,000 TOT

TYPE	UNITS	QUANTITY	UNIT PRICE	COST
HIGH VISIBILITY SIGNING	EACH	4.0	$ 1,000	$ 4,000
CONTINGENCY (HIGH RISK)			75%	$ 3,000
Subtotal 1				$ 7,000
INFLATION (SHORT-TERM)	% PER YEAR	5.0	3%	$ 1,115
TOTAL				**$ 8,115**

PEDESTRIAN BEACON — $ 65,000 TOT

PEDESTRIAN BEACON	EACH	2.0	$ 15,000.00	$ 30,000
ADVANCE WARNING SIGNING	EACH	2.0	$ 1,000	$ 2,000
CONTINGENCY (HIGH RISK)			75%	$ 24,000

	Subtotal 1				$	56,000
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$	8,919
	TOTAL				**$**	**64,919**

A4. Skyline Bus

Capital Purchase — $ 1,800,000 TOT

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
MOTORCOACH		EACH	3.0	$ 500,000.00	$	1,500,000
	Subtotal 1				$	1,500,000
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$	238,911
	TOTAL				**$**	**1,738,911**

Operating Budget — $ 350,000 PER YR

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
EXPANDED OPERATIONS (BOZ. TO BIG SKY)		TOT	1.0	$ 300,000.00	$	300,000
	Subtotal 1				$	300,000
INFLATION (SHORT-TERM)		% PER YEAR	5.0	3%	$	47,782
	TOTAL				**$**	**347,782**

A5. Bus Stop Turnouts — $ 140,000 EA

LENGTH (FT)	250
WIDTH (FT)	15
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)		CUYD	1464.4	$ 6.25	$	9,153
CRUSHED AGGREGATE COURSE		CUYD	430.3	$ 27.41	$	11,795
COVER - TYPE 1		SQYD	417.0	$ 0.62	$	259
PLANT MIX BIT SURF GR S-3/4 IN		TON	132.8	$ 31.96	$	4,243
ASPHALT CEMENT PG 64-28		TON	7.2	$ 500.31	$	3,587
EMULS ASPHALT CRS-2P		TON	0.8	$ 447.71	$	358
MISCELLANEOUS ITEMS				25%	$	7,349
	Subtotal 1				$	36,744
TRAFFIC CONTROL				5%	$	1,837
	Subtotal 2				$	38,581
MOBILIZATION				10%	$	3,858
	Subtotal 3				$	42,439
CONTINGENCY (HIGH RISK)				75%	$	31,829
	Subtotal 4				$	74,268
INFLATION (MID-TERM)		% PER YEAR	10.0	3%	$	25,542
	Subtotal 5				$	99,810
CONSTRUCTION ENGINEERING (CE)				10%	$	9,981
PRELIMINARY ENGINEERING (PE)				10%	$	9,981
	Subtotal 6				$	119,772
INDIRECT COSTS (IDC)				10.91%	$	13,067
	TOTAL				**$**	**132,839**

A6. Airport - Big Sky Shuttles — UNKNOWN

A7. Park-and-Ride/Carpool Lots — $ 390,000 TOT

Four Corners Park and Ride (100 spaces)

LENGTH (FT)	300
WIDTH (FT)	150
SURFACING (IN)	3
BASE (IN)	6

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	2671.3	$ 6.25	$	16,695
CRUSHED AGGREGATE COURSE	CUYD	871.4	$ 27.41	$	23,885
COVER - TYPE 1	SQYD	5000.0	$ 0.62	$	3,100
PLANT MIX BIT SURF GR S-3/4 IN	TON	812.3	$ 31.96	$	25,961
ASPHALT CEMENT PG 64-28	TON	43.9	$ 500.31	$	21,946

EMULS ASPHALT CRS-2P		TON	9.0	$	447.71	$	4,029	
MISCELLANEOUS ITEMS					25%	$	23,904	
	Subtotal 1					$	119,520	
TRAFFIC CONTROL					5%	$	5,976	
	Subtotal 2					$	125,496	
MOBILIZATION					10%	$	12,550	
	Subtotal 3					$	138,045	
CONTINGENCY (MEDIUM RISK)					55%	$	75,925	
	Subtotal 4					$	213,971	
INFLATION (MID-TERM)		% PER YEAR	10.0		3%	$	73,588	
	Subtotal 5					$	287,558	
CONSTRUCTION ENGINEERING (CE)					10%	$	28,756	
PRELIMINARY ENGINEERING (PE)					10%	$	28,756	
	Subtotal 6					$	345,070	
INDIRECT COSTS (IDC)					10.91%	$	37,647	
	TOTAL					**$**	**382,717**	

ROADWAY RECONSTRUCTION

R1. US 191/MT 84/MT 85 to Blackwood Road (RP 81.9 to 79.5) $ 21,100,000 TOT

LENGTH (MI)	2.4
WIDTH (FT)	78
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY		UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)		CUYD	67333.7	$	6.25	$	420,835
CRUSHED AGGREGATE COURSE		CUYD	66164.3	$	27.41	$	1,813,563
COVER - TYPE 1		SQYD	109824.0	$	0.62	$	68,091
PLANT MIX BIT SURF GR S-3/4 IN		TON	30476.6	$	31.96	$	974,033
ASPHALT CEMENT PG 64-28		TON	1645.7	$	500.31	$	823,379
EMULS ASPHALT CRS-2P		TON	196.1	$	447.71	$	87,796
SIGNS - RURAL		MILE	2.4	$	8,000.00	$	19,200
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	2.4	$	8,000.00	$	19,200
DRAINAGE PIPE - RURAL		MILE	2.4	$	82,000.00	$	196,800
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	1872.0	$	120.00	$	224,640
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$	20,000.00	$	20,000
MISCELLANEOUS ITEMS					25%	$	1,166,884
	Subtotal 1					$	5,834,421
TRAFFIC CONTROL					5%	$	291,721
	Subtotal 2					$	6,126,142
MOBILIZATION					10%	$	612,614
	Subtotal 3					$	6,738,757
CONTINGENCY (LOW RISK)					30%	$	2,021,627
	Subtotal 4					$	8,760,384
INFLATION (LONG-TERM)		% PER YEAR	20.0		3%	$	7,061,844
	Subtotal 5					$	15,822,227
CONSTRUCTION ENGINEERING (CE)					10%	$	1,582,223
PRELIMINARY ENGINEERING (PE)					10%	$	1,582,223
	Subtotal 6					$	18,986,673
INDIRECT COSTS (IDC)					10.91%	$	2,071,446
	TOTAL					**$**	**21,058,119**

R2. Blackwood Road to Cottonwood Road (RP 79.5 to 75.7) $ 31,600,000 TOT

LENGTH (MI)	3.8
WIDTH (FT)	78
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY		UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	137449.6	$	6.25	$	859,060
CRUSHED AGGREGATE COURSE	CUYD	97368.1	$	27.41	$	2,668,859
COVER - TYPE 1	SQYD	159104.0	$	0.62	$	98,644
PLANT MIX BIT SURF GR S-3/4 IN	TON	44296.9	$	31.96	$	1,415,728
ASPHALT CEMENT PG 64-28	TON	2392.0	$	500.31	$	1,196,757

EMULS ASPHALT CRS-2P		TON	284.1	$ 447.71	$	127,194
SIGNS - RURAL		MILE	3.8	$ 8,000.00	$	30,400
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	3.8	$ 8,000.00	$	30,400
DRAINAGE PIPE - RURAL		MILE	3.8	$ 82,000.00	$	311,600
NEW BRIDGE 100 LINEAL FEET OR LESS		SQFT	1872.0	$ 120.00	$	224,640
REMOVE SMALL SINGLE SPAN BRIDGE		LS	1.0	$ 20,000.00	$	20,000
MISCELLANEOUS ITEMS				25%	$	1,745,821
	Subtotal 1				$	8,729,103
TRAFFIC CONTROL				5%	$	436,455
	Subtotal 2				$	9,165,559
MOBILIZATION				10%	$	916,556
	Subtotal 3				$	10,082,114
CONTINGENCY (LOW RISK)				30%	$	3,024,634
	Subtotal 4				$	13,106,749
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	10,565,497
	Subtotal 5				$	23,672,246
CONSTRUCTION ENGINEERING (CE)				10%	$	2,367,225
PRELIMINARY ENGINEERING (PE)				10%	$	2,367,225
	Subtotal 6				$	28,406,695
INDIRECT COSTS (IDC)				10.91%	$	3,099,170
	TOTAL				**$**	**31,505,866**

R3. Cottonwood Road to Wilson Creek Road (RP 75.7 to 73.5) $ 13,500,000 TOT

LENGTH (MI)	2.2
WIDTH (FT)	54
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)		CUYD	44120.3	$ 6.25	$	275,752
CRUSHED AGGREGATE COURSE		CUYD	45162.6	$ 27.41	$	1,237,906
COVER - TYPE 1		SQYD	69696.0	$ 0.62	$	43,212
PLANT MIX BIT SURF GR S-3/4 IN		TON	19644.4	$ 31.96	$	627,834
ASPHALT CEMENT PG 64-28		TON	1060.8	$ 500.31	$	530,727
EMULS ASPHALT CRS-2P		TON	124.5	$ 447.71	$	55,740
SIGNS - RURAL		MILE	2.2	$ 8,000.00	$	17,600
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	2.2	$ 8,000.00	$	17,600
DRAINAGE PIPE - RURAL		MILE	2.2	$ 82,000.00	$	180,400
MISCELLANEOUS ITEMS				25%	$	746,693
	Subtotal 1				$	3,733,464
TRAFFIC CONTROL				5%	$	186,673
	Subtotal 2				$	3,920,137
MOBILIZATION				10%	$	392,014
	Subtotal 3				$	4,312,150
CONTINGENCY (LOW RISK)				30%	$	1,293,645
	Subtotal 4				$	5,605,795
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	4,518,895
	Subtotal 5				$	10,124,690
CONSTRUCTION ENGINEERING (CE)				10%	$	1,012,469
PRELIMINARY ENGINEERING (PE)				10%	$	1,012,469
	Subtotal 6				$	12,149,628
INDIRECT COSTS (IDC)				10.91%	$	1,325,524
	TOTAL				**$**	**13,475,153**

R4. Wilson Creek Road to Gateway South Road (RP 73.5 to 70.5) $ 30,200,000 TOT

LENGTH (MI)	3.0
WIDTH (FT)	64
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (STANDARD)	CUYD	77386.5	$ 6.25	$	483,666
CRUSHED AGGREGATE COURSE	CUYD	70385.3	$ 27.41	$	1,929,262
COVER - TYPE 1	SQYD	112640.0	$ 0.62	$	69,837
PLANT MIX BIT SURF GR S-3/4 IN	TON	31499.5	$ 31.96	$	1,006,723
ASPHALT CEMENT PG 64-28	TON	1701.0	$ 500.31	$	851,013

EMULS ASPHALT CRS-2P	TON	201.2	$ 447.71	$	90,079
SIGNS - RURAL	MILE	3.0	$ 8,000.00	$	24,000
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	3.0	$ 8,000.00	$	24,000
DRAINAGE PIPE - RURAL	MILE	3.0	$ 82,000.00	$	246,000
NEW BRIDGE LARGER THAN 100 LINEAL FEET	SQFT	17024.0	$ 114.00	$	1,940,736
REMOVE SMALL SINGLE SPAN BRIDGE	LS	1.0	$ 20,000.00	$	20,000
MISCELLANEOUS ITEMS			25%	$	1,671,329
Subtotal 1				$	8,356,643
TRAFFIC CONTROL			5%	$	417,832
Subtotal 2				$	8,774,476
MOBILIZATION			10%	$	877,448
Subtotal 3				$	9,651,923
CONTINGENCY (LOW RISK)			30%	$	2,895,577
Subtotal 4				$	12,547,500
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$	10,114,681
Subtotal 5				$	22,662,181
CONSTRUCTION ENGINEERING (CE)			10%	$	2,266,218
PRELIMINARY ENGINEERING (PE)			10%	$	2,266,218
Subtotal 6				$	27,194,617
INDIRECT COSTS (IDC)			10.91%	$	2,966,933
TOTAL				**$**	**30,161,550**

R5. Gallatin Canyon (RP 70.5 to 48.0)

R5-a. Spanish Creek Road to Sheep Rock (RP 68.7 to 67.0) — $ 20,500,000 TOT

(Passing lane in both directions)

LENGTH (MI)	1.7
WIDTH (FT)	56
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	76947.5	$ 12.50	$	961,844
CRUSHED AGGREGATE COURSE	CUYD	37890.4	$ 27.41	$	1,038,575
COVER - TYPE 1	SQYD	59840.0	$ 0.62	$	37,101
PLANT MIX BIT SURF GR S-3/4 IN	TON	16781.7	$ 31.96	$	536,344
ASPHALT CEMENT PG 64-28	TON	906.2	$ 500.31	$	453,387
EMULS ASPHALT CRS-2P	TON	106.9	$ 447.71	$	47,860
SIGNS - RURAL	MILE	1.7	$ 8,000.00	$	13,600
STRIPING & PAVEMENT MARKINGS - RURAL	MILE	1.7	$ 8,000.00	$	13,600
DRAINAGE PIPE - RURAL	MILE	1.7	$ 82,000.00	$	139,400
NEW BRIDGE 100 LINEAL FEET OR LESS	SQFT	4480.0	$ 120.00	$	537,600
REMOVE SMALL SINGLE SPAN BRIDGE	LS	1.0	$ 20,000.00	$	20,000
MISCELLANEOUS ITEMS			25%	$	949,828
Subtotal 1				$	4,749,138
TRAFFIC CONTROL			5%	$	237,457
Subtotal 2				$	4,986,595
MOBILIZATION			10%	$	498,660
Subtotal 3				$	5,485,255
CONTINGENCY (MEDIUM RISK)			55%	$	3,016,890
Subtotal 4				$	8,502,145
INFLATION (LONG-TERM)	% PER YEAR	20.0	3%	$	6,853,675
Subtotal 5				$	15,355,820
CONSTRUCTION ENGINEERING (CE)			10%	$	1,535,582
PRELIMINARY ENGINEERING (PE)			10%	$	1,535,582
Subtotal 6				$	18,426,983
INDIRECT COSTS (IDC)			10.91%	$	2,010,384
TOTAL				**$**	**20,437,367**

R5-b. Shenango Creek to Storm Castle (RP 64.8 to 63.5) — $ 11,500,000 TOT

(Center TWLTL)

LENGTH (MI)	1.3
WIDTH (FT)	50
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)	CUYD	40130.2	$ 12.50	$	501,627

CRUSHED AGGREGATE COURSE		CUYD	25161.6	$ 27.41	$	689,681
COVER - TYPE 1		SQYD	38134.0	$ 0.62	$	23,643
TRAFFIC GRAVEL		CUYD	2542.2	$ 21.67	$	55,090
PLANT MIX BIT SURF GR S-3/4 IN		TON	10791.4	$ 31.96	$	344,892
HYDRATED LIME		TON	152.0	$ 202.33	$	30,754
ASPHALT CEMENT PG 64-28		TON	582.7	$ 500.31	$	291,547
EMULS ASPHALT CRS-2P		TON	68.1	$ 447.71	$	30,489
COLD MILLING		SQYD	18304.0	$ 1.74	$	31,849
SIGNS - RURAL		MILE	1.3	$ 8,000.00	$	10,400
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	1.3	$ 8,000.00	$	10,400
DRAINAGE PIPE - RURAL		MILE	1.3	$ 82,000.00	$	106,600
MISCELLANEOUS ITEMS				25%	$	531,743
	Subtotal 1				$	2,658,715
TRAFFIC CONTROL				5%	$	132,936
	Subtotal 2				$	2,791,651
MOBILIZATION				10%	$	279,165
	Subtotal 3				$	3,070,816
CONTINGENCY (MEDIUM RISK)				55%	$	1,688,949
	Subtotal 4				$	4,759,765
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	3,836,900
	Subtotal 5				$	8,596,664
CONSTRUCTION ENGINEERING (CE)				10%	$	859,666
PRELIMINARY ENGINEERING (PE)				10%	$	859,666
	Subtotal 6				$	10,315,997
INDIRECT COSTS (IDC)				10.91%	$	1,125,475
	TOTAL				**$**	**11,441,472**

R5-c. Karst Camp to Portal Creek (RP 55.4 to 53.1) $ 19,200,000 TOT

(Center TWLTL)

LENGTH (MI)	2.3
WIDTH (FT)	50
SURFACING (IN)	5
BASE (IN)	18

TYPE		UNITS	QUANTITY	UNIT PRICE		COST
EXCAVATION-UNCLASSIFIED (CANYON)		CUYD	70999.6	$ 12.50	$	887,494
CRUSHED AGGREGATE COURSE		CUYD	44516.8	$ 27.41	$	1,220,204
COVER - TYPE 1		SQYD	67467.0	$ 0.62	$	41,830
PLANT MIX BIT SURF GR S-3/4 IN		TON	19092.4	$ 31.96	$	610,193
ASPHALT CEMENT PG 64-28		TON	1031.0	$ 500.31	$	515,814
EMULS ASPHALT CRS-2P		TON	120.5	$ 447.71	$	53,949
SIGNS - RURAL		MILE	2.3	$ 8,000.00	$	18,400
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	2.3	$ 8,000.00	$	18,400
DRAINAGE PIPE - RURAL		MILE	2.3	$ 82,000.00	$	188,600
MISCELLANEOUS ITEMS				25%	$	888,721
	Subtotal 1				$	4,443,606
TRAFFIC CONTROL				5%	$	222,180
	Subtotal 2				$	4,665,786
MOBILIZATION				10%	$	466,579
	Subtotal 3				$	5,132,364
CONTINGENCY (MEDIUM RISK)				55%	$	2,822,800
	Subtotal 4				$	7,955,165
INFLATION (LONG-TERM)		% PER YEAR	20.0	3%	$	6,412,748
	Subtotal 5				$	14,367,913
CONSTRUCTION ENGINEERING (CE)				10%	$	1,436,791
PRELIMINARY ENGINEERING (PE)				10%	$	1,436,791
	Subtotal 6				$	17,241,495
INDIRECT COSTS (IDC)				10.91%	$	1,881,047
	TOTAL				**$**	**19,122,542**

R5-d. Jack Smith Bridge to Dudley Creek (RP 49.8 to 48.3) $ 11,900,000 TOT

(Passing lane northbound direction)

LENGTH (MI)	1.5
WIDTH (FT)	48
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	QUANTITY	UNIT PRICE	COST / MI

EXCAVATION-UNCLASSIFIED (CANYON)		CUYD	41749.7	$	12.50	$	521,871
CRUSHED AGGREGATE COURSE		CUYD	28152.7	$	27.41	$	771,665
COVER - TYPE 1		SQYD	42240.0	$	0.62	$	26,189
PLANT MIX BIT SURF GR S-3/4 IN		TON	11980.4	$	31.96	$	382,893
ASPHALT CEMENT PG 64-28		TON	646.9	$	500.31	$	323,671
EMULS ASPHALT CRS-2P		TON	75.4	$	447.71	$	33,757
SIGNS - RURAL		MILE	1.5	$	8,000.00	$	12,000
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	1.5	$	8,000.00	$	12,000
DRAINAGE PIPE - RURAL		MILE	1.5	$	82,000.00	$	123,000
MISCELLANEOUS ITEMS					25%	$	551,762
	Subtotal 1					$	2,758,808
TRAFFIC CONTROL					5%	$	137,940
	Subtotal 2					$	2,896,748
MOBILIZATION					10%	$	289,675
	Subtotal 3					$	3,186,423
CONTINGENCY (MEDIUM RISK)					55%	$	1,752,533
	Subtotal 4					$	4,938,956
INFLATION (LONG-TERM)		% PER YEAR	20.0		3%	$	3,981,348
	Subtotal 5					$	8,920,304
CONSTRUCTION ENGINEERING (CE)					10%	$	892,030
PRELIMINARY ENGINEERING (PE)					10%	$	892,030
	Subtotal 6					$	10,704,365
INDIRECT COSTS (IDC)					10.91%	$	1,167,846
	TOTAL					**$**	**11,872,211**