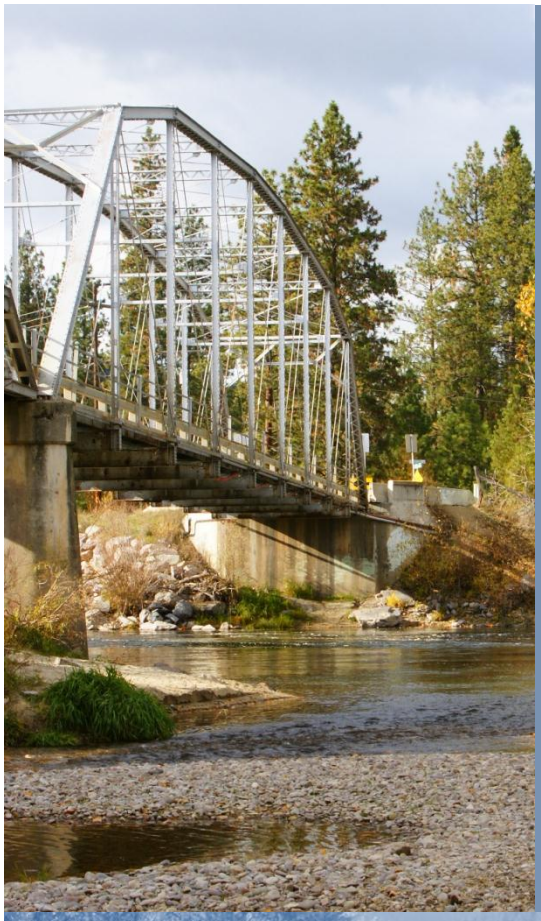


DRAFT REPORT

Maclay Bridge Planning Study

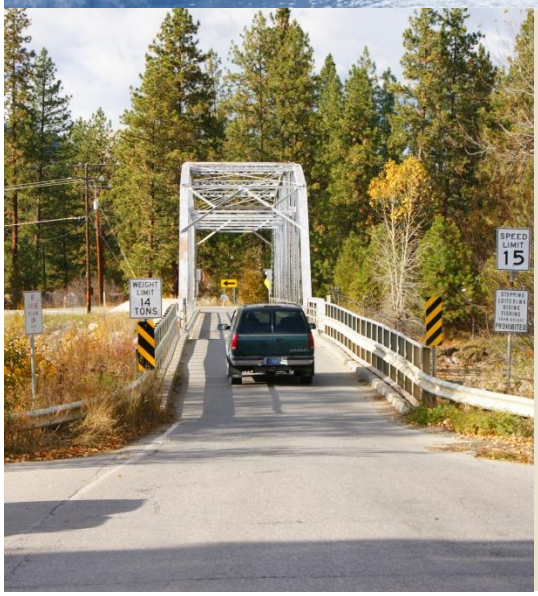
Prepared for:

Missoula County

Missoula, Montana

Montana Department of Transportation

Helena, Montana



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ABBREVIATIONS / ACRONYMS

AASHTO	American Association of State Highway Transportation Officials
ADT	Average Daily Traffic
AADT	Average Annual Daily Traffic
AAGR	Average Annual Growth Rate
APE	Area of Potential Effect
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CLOMR	Conditional Letter of Map Revision
CRABS	Cultural Resources Annotated Bibliography Search
CRIS	Cultural Resources Information System
DHV	Design Hourly Vehicle
DNRC	Department of Natural Resources and Conservation (Montana)
DOI	Department of Interior (United States)
EA	Environmental Assessment
ESA	Endangered Species Act
FAS	Fishing Access Site
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
LOMR	Letter of Map Revision
LRTP	Long Range Transportation Plan
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Funds
MAAQS	Montana Ambient Air Quality Standards
MATP	Missoula Active Transportation Plan
MDEQ	Montana Department of Environmental Quality
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFWP	Montana Department of Fish, Wildlife, and Parks
MNHP	Montana Natural Heritage Program

mph	Miles per Hour
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
mton	Metric Ton
MUTD	Missoula Urban Transportation District
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPL	National Priority List
NPS	National Park Service
NRCS	Natural Resource Conservation Service (United States Department of Agriculture)
NRHP	National Register of Historic Places
NRIS	Natural Resource Information System (State of Montana)
OPG	Office of Planning and Grants (Missoula County)
PM	Particulate Matter
RDM	Road Design Manual
TDM	Travel Demand Model
TDP	Transit Development Plan
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TPCC	Transportation Policy Coordinating Committee
USACOE	U.S. Army Corps of Engineers
UFDA	Urban Fringe Development Area
UPN	Uniform Project Number
UPWP	Unified Planning Work Program
URSA	Urban Service Area
USACOE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
UST	Underground Storage Tank
vpd	Vehicles per Day
Section 4(f)	Section 4(f) of the 1966 Department of Transportation Act
Section 6(f)	Section 6(f) of the National Land and Water Conservation Funds Act

EXECUTIVE SUMMARY

The *Maclay Bridge Planning Study* was initiated at the request of the Missoula County Commissioners. The replacement of the Maclay Bridge with a new bridge has been considered as far back as 1994, when an Environmental Assessment (EA) for the *Maclay Bridge Site Selection Study* was completed. The results of the study identified a new bridge located at the extension of South Avenue as the Preferred Alternative. A Finding of No Significant Impact (FONSI) on the 1994 EA was never issued by the Federal Highway Administration (FHWA) and the Preferred Alternative from the EA was not advanced at the request of Missoula County. Missoula County had intended to use special project demonstration funds from Congress to implement the project but was unsuccessful in obtaining the funding. The Maclay Bridge replacement project was inactive until the County nominated it to receive funding from MDT's Off-System Bridge Program in 2002.

Since 2002, the Maclay Bridge replacement has steadily risen in priority for MDT's Off-System Bridge Program funds both for Missoula County and the Montana Department of Transportation's (MDT) Missoula District. In 2010, Missoula County was notified by MDT that the project development process could commence, and in August of that year, Missoula County and MDT personnel conducted a preliminary field review for the subject bridge at the new South Avenue location.

Missoula County decided to delay the project, and asked MDT for funding and technical assistance to undertake a high-level planning effort known as a pre-National Environmental Policy Act (NEPA)/Montana Environmental Policy Act (MEPA) planning study to allow for additional public involvement. The pre-NEPA/MEPA planning study allows for earlier planning-level coordination with community members, stakeholders, environmental resource agencies, and other interested parties – outside of the typical project development process.

The pre-NEPA/MEPA planning study is not a design or construction project; nor is it a decision document. The planning study identifies reasonable options to address safety, geometric and environmental concerns based on needs to increase safety and efficiency for the traveling public. The *Maclay Bridge Planning Study* ensured a proactive public involvement process that provided numerous opportunities for the public to be engaged in all phases of the planning study.

In order to narrow the set of options or strategies with the greatest capacity to address identified areas of concern, a screening process was used that correlated very closely with the needs and objectives of the study. Through this process the South 1 Alignment option (3E.1) best met the needs identified for the transportation system within the vicinity of the Maclay Bridge. Ultimately, it is the discretion of the Missoula County Commission to select an option that they are most comfortable with and that balances the transportation needs of the greater community.

The results of the study may be used to determine the level and scope of environmental review required if a project is forwarded into a subsequent NEPA/MEPA process by Missoula County.

ES.1 EXISTING AND PROJECTED CONDITIONS

Areas of concern and other considerations within the vicinity of the Maclay Bridge were identified through review of available reports, field observations, public databases, and other resources. They are summarized below:

TRANSPORTATION SYSTEM CONSIDERATIONS

- **Traffic -** Existing and projected traffic volumes exceed the AASHTO standard for a single-lane bridge (traffic volume < 100 vehicles per day).
- **Safety -** A number of crash trends and areas of concern exist within the vicinity of the Maclay Bridge. In particular, there were seventeen reported crashes at the intersection of River Pines Drive and Riverside Drive (on the west side of the bridge) and six reported crashes on the east side where North Avenue intersects the bridge.
- **Travel Time -** Without the existing Maclay Bridge in service, travel times to areas on the west side of the Bitterroot River are longer for private vehicles and emergency service responders.
- **Horizontal Alignment -** Three horizontal curves do not meet current Missoula County or MDT standards. Two of the sub-standard horizontal curves lead into and out of each side of the existing bridge.
- **Clear Zones -** Numerous locations have features within the horizontal clear zone and are unprotected. Southwest of the existing bridge the roadway fill slope is between two- and four-feet from the edge of the travel lane. In addition, trees and utility poles are in the area. The roadway fill slope is steep and lined with riprap.
- **Bridge**
    - The existing bridge is “functionally obsolete” due to the approach geometry on both ends of the bridge, and the narrow single-lane bridge width.
    - The single-lane bridge width of 14 feet does not meet current AASHTO, Missoula County or MDT standards for width given existing and projected traffic volumes.
    - The existing bridge is “load restricted” due to its original design, which now prevents some heavy vehicles from crossing. It also places limitations on how some vehicles cross the structure.
    - The Maclay Bridge is fracture critical, indicating if one part of the truss should fail, the entire bridge span may fail. With proper inspection and maintenance, the bridge is considered safe.
    - There are no bicycle or pedestrian features on the bridge.
    - The bridge is a composite of varying ages and types of load-bearing steel used throughout the structure.
    - Channel scour was not part of the original design in the 1940’s, and the existing bridge piers are located in the river channel on unknown materials.
- **Parking -** Parking concerns are evident based on numerous resolutions passed by the Missoula County Commission and numerous “911 calls” to the area.
- **Approaches**
    - Roadway widths on River Pines Road do not incorporate shoulders.
    - Bicycle and pedestrian facilities are absent on River Pines Road.

ENVIRONMENTAL CONSIDERATIONS

Numerous environmental considerations were noted. Prime farmland, water resources, wetlands, floodplains (and floodway), hazardous substances, air quality, fish and wildlife, vegetation, and cultural and archaeological resources are located within the vicinity of the Maclay Bridge.

OTHER CONSIDERATIONS

The following other considerations were noted through analysis and public comments:

- Travel speeds on North Avenue, River Pines Road and South Avenue.
- Traffic growth through the neighborhood in recent years, and the potential for that to continue.
- Safety and the potential for increased vehicle crashes.
- Noise impacts due to increasing vehicular traffic through the area.
- Community values and the desire to maintain the rural character of the area and limit traffic growth.
    - The *Target Range Neighborhood Plan* emphasizes the importance of continued County maintenance of the structure to preserve access for local and Missoula Valley residents seeking recreational opportunities on nearby lands.
    - The *Target Range Neighborhood Plan* does not identify the need for a new bridge.
- Undesirable behavior related to individuals jumping off the bridge structure and/or recreating on the river islands, sand bars, and bridge scour hole.

ES.2 NEEDS AND OBJECTIVES

Needs and objectives were derived based on a comprehensive review of existing data and input from resource agencies, stakeholders and the public and were used to develop options. The needs and objectives reflect the existing social, environmental, and engineering conditions described in the Existing and Projected Conditions Report (**Appendix 3**) and recognize the local and regional use of the river crossing and the surrounding transportation system.

Need Number 1:

Improve the safety and operation of the river crossing and connecting roadway network.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Improve sub-standard elements of facilities to meet current applicable design standards.
- Reduce delay and vehicle restriction for emergency responders under existing and future traffic demands.
- Manage travel speeds and provide adequate clear zones to improve operations.

Need Number 2:

Provide a long-term river crossing and connecting roadway network that accommodates planned growth in the Maclay Bridge area.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Accommodate existing and future capacity demands.
- Address non-motorized facilities consistent with local planning efforts.
- Provide connectivity to neighborhood residents, and regional users accessing recreational lands to the west of the Bitterroot River.

Need Number 3:

Minimize adverse impacts from options to the environmental, cultural, scenic and recreational characteristics of the study area.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Minimize adverse impacts to the Bitterroot River from potential options.
- Minimize adverse impacts to the wildlife and aquatic organisms from potential options.

- Provide reasonable access to recreational sites in the study area (Kelly Island Fishing Access Site, Lolo National Forest, and Missoula County Parks).
- Avoid or otherwise minimize adverse impacts to historic, cultural, and archaeological resources that may result from implementation of options.

Need Number 4:

Minimize adverse impacts from options to the neighborhood characteristics of the study area.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Implement improvements with special sensitivity to area schools.
- Minimize impacts to existing residents and businesses in the area.
- Recognize the historic value of the Maclay Bridge to the community and the role it plays in local regional events.

Other Considerations (To the Extent Practicable)

- Options should be sensitive to the availability of funding for recurring maintenance obligations or for the construction of new improvements.

The subject of parking, vandalism, illegal activity, and enforcement, along with perpetuating access to recreational sites directly adjacent to the Maclay Bridge, are areas of concern generally outside the scope of this Maclay Bridge Planning Study. However, they are areas of concern that have been documented and commented on by members of the public.

ES.3 OPTIONS

Twenty eight options were identified and classified into four broad based categories. The first category included options that improved safety and operations on the existing bridge. Category two included options that would rehabilitate the existing bridge. Category three included options depicting a new bridge constructed at various locations, and category four was to do nothing. These options are listed below. The seven options identified as being appropriate for future consideration are shown in bold text and are more fully described in **Chapter 5**.

- Option 1 – Improve Safety and Operations on the Existing Bridge
    - 1A: Enhance Traffic Operations and Safety on and Near the Structure
    - 1B: Maintain Current Usage and Add Pedestrian/Bicyclist Facilities
    - 1C: Implement Additional Restrictions on Bridge Use
    - 1D: Close Bridge to Vehicles and Retain Use for Non-Motorized Travel Modes
    - 1E: Retain Bridge for Two-Way Travel and Provide New Bridge Elsewhere for Two-Way Travel
    - 1F: New One-Lane Bridge at a New Location and Retain Existing Bridge for Non-Motorized Uses
    - **1G: New One-Lane Bridge at a New Location for One-Way Travel and Retain Existing Bridge for One-Way Travel**
    - 1H: Close Bridge and Remove Structure
- Option 2 - Rehabilitate the Existing Bridge
    - 2A: Minor Rehabilitation (Structure Only)
    - 2B: Major Rehabilitation (Structure Only)
    - **2C: Minor Rehabilitation (includes Approaches)**
    - **2D: Major Rehabilitation (includes Approaches)**

- Option 3 - Build New Bridge
    - 3A.1: Build on Existing Alignment at North Avenue
    - **3A.2: Build Near Existing Alignment - North 1 Alignment**
    - 3A.3: Build Near Existing Alignment - North 2 Alignment
    - 3B.1: Build Bridge on Northern Alignment - South 3rd Street West Extension
    - 3B.2: Build Bridge on Northern Alignment - Spurgin Road Extension
    - 3C.1: Build Bridge on Mount Avenue - Mount 1 Alignment
    - **3C.2: Build Bridge on Mount Avenue - Mount 2 Alignment**
    - 3D.1: Build Bridge on Edward Avenue - Edward 1 Alignment
    - 3D.2: Build Bridge on Edward Avenue - Edward 2 Alignment
    - **3E.1: Build Bridge on South Avenue - South 1 Alignment**
    - **3E.2: Build Bridge on South Avenue - South 2 Alignment**
    - 3F.1: Build Bridge on Sundown Road - Sundown 1 Alignment
    - 3F.2: Build Bridge on Sundown Road- Sundown 2 Alignment
    - 3G.1: Build Bridge on Southern Alignment - Humble Road-Blue Mountain Road
    - 3H.1: New Bridge at a New Location Not Identified in the 1994 EA

- Option 4 – Do Nothing

ES.4 CONCLUSIONS AND NEXT STEPS

The study evaluated the Maclay Bridge river crossing and the surrounding transportation system to gain a better understanding of system needs, objectives, constraints and opportunities, and funding availability. In addition to analyzing applicable data from MDT, Missoula County, and resource agencies, a comprehensive public involvement process was conducted to gather relevant information from community members and stakeholders groups. This information led to a set of options to be considered by the Missoula County Commissioners.

The study identified several options that would address the operational characteristics, safety and physical conditions of the existing facility. However, based on the screening and ranking process, only one option rose to the top as the best alternative to ensure that, over the foreseeable future, the facility meets applicable MDT and local design standards and provides the desired improvements in safety and operations for the traveling public. Option 3E.1, South 1 Alignment delivers a transportation facility that meets current and future demands, addresses safety on the bridge and the sub-standard roadway approaches to the bridge, and provides connectivity to neighborhood residents and regional users accessing recreational lands to the west of Bitterroot River.

The Missoula County Commissioners may elect to proceed with one of the other options discussed in this study; however, three options (1G, 2C and 2D) may not be eligible for MDT's Off-System Bridge Program funding. For these options, Missoula County would need to use local funds and follow their own internal project development process.

A matrix summary of potential costs and funding eligibility for MDT's Off-System Bridge Program for the seven options identified as being appropriate for future consideration is included on the following page.

Matrix Summary of Costs and Funding Eligibility [a]

Option ID	Comprehensive Cost	Eligible for Off-System Bridge Program Funds?	Reasoning for Funding Eligibility
OPTION 1 - IMPROVE SAFETY AND OPERATIONS ON THE EXISTING BRIDGE			
1G - New One-Lane Bridge at a New Location & Retain Existing Bridge for One-Way Travel	$6,050,000 to $8,450,000	POSSIBLE	Additional study is needed to determine eligibility. The comprehensive cost is shown as a range due to uncertainty on the potential scope of improvements to the existing Maclay Bridge.
OPTION 2 - REHABILITATE THE BRIDGE			
2C - Minor Rehabilitation (includes Approaches)	$1,150,000 to $1,500,000	NO	This option does not meet the Safety objective of the MDT Off-system Bridge Program.
2D - Major Rehabilitation (includes Approaches)	$1,500,000 to $3,900,000	NO	This option does not meet the Safety objective of the MDT Off-system Bridge Program.
OPTION 3 - BUILD NEW BRIDGE [b]			
3A.2 - North 1 Alignment	$5,300,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.
3C.2 - Mount 2 Alignment	$9,000,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.
3E.1 - South 1 Alignment	$7,300,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.
3E.2 - South 2 Alignment	$7,450,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.

[a] "Comprehensive Costs" in this table include construction, preliminary engineering, incidental and indirect costs, inflation (3 percent per year for five years) and right-of-way costs.

[b] The comprehensive cost estimates envision a new bridge and limited approach work to tie into the existing roads. This would meet the intent of MDT's Off-System Bridge Program by addressing bridge related safety issues. Roadway reconstruction outside of bridge approach tie-in points are likely not eligible for MDT's Off-System Bridge Program funding.

Chapter 1
INTRODUCTION

1.1. PURPOSE

Missoula County, in cooperation with the Montana Department of Transportation (MDT) and the Federal Highway Administration (FHWA), initiated a planning study of the Maclay Bridge over the Bitterroot River to determine the potential needs of the river crossing and connecting roadways within the area. The Maclay Bridge, also known as the North Avenue Bridge, is a single-lane structure that crosses the Bitterroot River approximately 2.75 miles west of Reserve Street. North Avenue connects to the existing bridge as the eastern approach, and River Pines Road serves as its western approach. A vicinity map showing the location of the Maclay Bridge and the surrounding area is shown as **Figure 1**.

Missoula County had previously nominated the Maclay Bridge for replacement under the Montana Department of Transportation Off-System Bridge Program (formerly known as the *Highway Bridge Replacement and Rehabilitation Program*). In 2006, the Maclay Bridge was Missoula County's number one priority.

Prior to proceeding with project development activities associated with a river crossing in the area of the Maclay Bridge, local leaders and elected officials, in conjunction with the aforementioned sponsors, agreed to develop this planning study to engage the public and take a fresh look at safety and operational elements of the Maclay Bridge and connecting roadways.

1.2. PROCESS

The *Maclay Bridge Planning Study* is a pre-National Environmental Policy Act (NEPA)/Montana Environmental Policy Act (MEPA) study that allows for early planning-level coordination with community members, stakeholders, environmental resource agencies, and other interested parties. The NEPA/MEPA environmental review process is an approach to balance transportation decision making that takes into account the need for safe and efficient transportation and the impacts on the human and natural environment. The study does not replace the NEPA/MEPA process.

The results of the study may be used to assist in determining the level and scope of environmental review required if a project is forwarded into a subsequent NEPA/MEPA process. It is also used to give information to the Missoula County Commissioners regarding identified areas of concern, transportation needs and objectives, the range of options considered, and public sentiment regarding potential options. The study assists in facilitating a smooth and efficient transition from transportation planning to future project development/environmental review, if a project is forwarded.

The *Maclay Bridge Planning Study* is a planning-level study and is not a design or construction project. It is not a decision document. The planning study identified options to address safety, geometric and environmental concerns based on needs of the river crossing and connecting roadways presented by the community, study partners, resource agencies, and other interested parties, and to increase safety and efficiency for the traveling public.

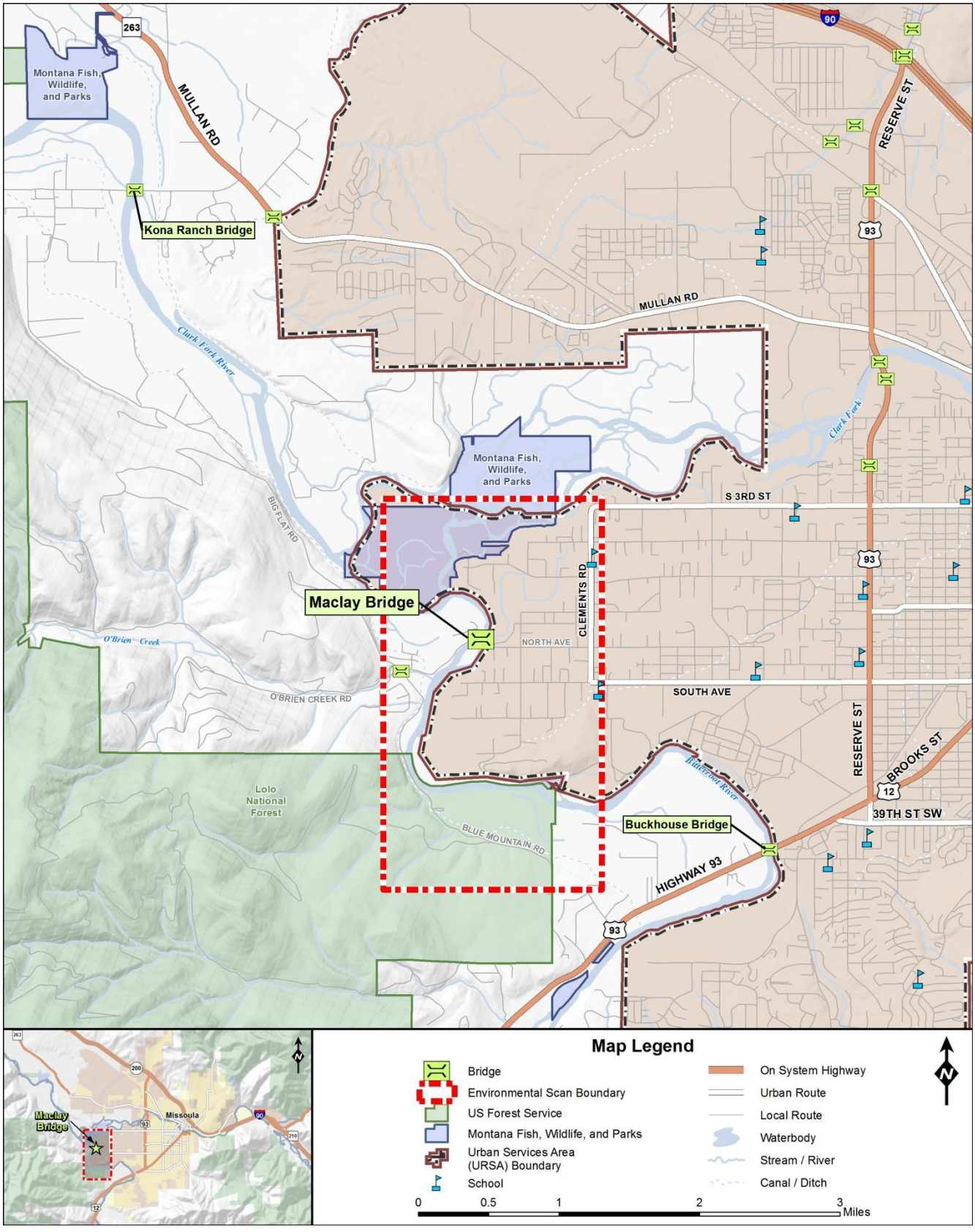

Figure 1: Vicinity Map

1.3. PREVIOUS PLANNING EFFORTS

In 1994, an Environmental Assessment (EA) for the *Maclay Bridge Site Selection Study*[1] was completed. The EA defined the purpose and need for a project for the river crossing, identified potential alternatives, and assessed the impacts of the various alternatives to address the project's purpose and need. Sixteen (16) alternatives were initially considered in the EA including:

- Bridge rehabilitation or bridge replacement (one-lane structure) at the current location;
- Numerous alternatives that would provide a new two-lane bridge elsewhere; and
- A "No Build" alternative.

Through a screening process, four alternatives were advanced for further consideration and a "Preferred Alternative" was identified. The Preferred Alternative was described in the EA as follows:

> *"A new two-lane (one lane for each direction of traffic) bridge constructed over the Bitterroot River which connects River Pines Road on the west side to South Avenue West on the east side. The Preferred Alternative includes increasing the number of lanes on the bridge from one lane (existing) to two lanes (proposed). The bridge cross section includes adequate shoulders for bicycle travel and a separated pedestrian walkway."*

The 1994 EA was completed and approved for circulation, however, a decision document (i.e. FONSI) was not issued. FHWA views a signed FONSI as the NEPA decision document for a project evaluated and advanced with an EA. During this timeframe, Missoula County had hoped to use special project demonstration funds from Congress to implement the project but was unsuccessful in obtaining the funding. The Maclay Bridge replacement project was inactive until the County nominated it to receive funding from MDT's Off-System Bridge Program in 2002.

Many of the underlying issues previously identified as deficiencies (and reasons for proposing transportation improvements) in the 1994 EA and subsequent safety inspections remain (**Appendix 3, Existing and Projected Conditions Report**). This, coupled with the community's ongoing interest in the Maclay Bridge and possible changes in traffic patterns resulting from potential options, served as the reason for initiating the *Maclay Bridge Planning Study*.

1.4. PREVIOUS MAINTENANCE EFFORTS

Minor maintenance activities have been performed on the bridge at various times since the completion of the 1994 EA. These maintenance activities are summarized below:

- The west bridge abutment was armored with material in anticipation of high water conditions during Spring run-off (April, 1997);
- The existing timber deck was replaced with corrugated steel decking and an asphalt overlay. In addition, bearings were replaced and/or added, and steel curbing was placed to prevent vehicular damage to pedestrian rail and truss elements (2003);
- The expansion joints at the west abutment were modified, as the expansion joints installed with the 2003 deck replacement were found to be inadequate and in need of repair (2004); and
- The expansion joint between the main truss and the pony truss was modified, as the expansion joint installed with the 2003 deck replacement were found to be inadequate and in need of repair (2005).

[1] Maclay Bridge Site Selection Study Environmental Assessment, Carter & Burgess Inc., April 1994

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Chapter 2
PUBLIC AND AGENCY PARTICIPATION

An important aspect of the planning study process was to provide opportunities for ongoing and meaningful public involvement. Education and public outreach were essential parts of achieving this goal. A *Community and Agency Participation Plan (CAPP)* was developed to identify public involvement activities needed to gain insight and seek consensus about existing and future transportation needs. The purpose of the plan was to ensure a proactive public involvement process that provided opportunities for the public to be involved in all phases of the planning study process. Specific public outreach measures are noted in this chapter. Meeting content, such as press releases, advertisements, agendas, presentations, minutes, etc., for all of the described activities, are provided in **Appendix 1 (Consultation, Coordination and Public Involvement)**.

2.1. PUBLIC INVOLVEMENT

2.1.1. Informational Meetings

Planning studies typically include two informational meetings. For the Maclay Bridge Planning Study, four informational meetings were held. All of the meetings were held in Missoula at locations in or near areas served by the Maclay Bridge. Press releases were distributed to area media outlets, and meeting announcements were advertised in local newspapers (*Missoulian* and *Missoula Independent Press*) twice prior to each meeting (at one week and three week intervals). The ads announced the meeting location, time and date, purpose of the meeting, and the locations where documents may be reviewed.

2.1.1.1. First Informational Meeting

Eighty-nine members of the public signed the attendance sheet for the first informational meeting held on April 24th, 2012 at Big Sky High School. The purpose of the meeting was to inform interested parties about the scope and purpose of the planning study, and to solicit input on the existing conditions and concerns within the study area that may be relevant to the planning effort. The meeting began with a Powerpoint presentation about the study process and purpose, and was followed by a question and answer period. Topics, concerns and statements were offered by numerous attendees, including these notable comments:

- Who ultimately makes the decision on what to do about the bridge?
- Community support needs to be considered when developing recommendations.
- The term “functionally obsolete” paints a bad picture of the bridge when in reality the bridge is structurally sound.
- Traffic projections should include adjustments for zoning and growth.
- Zoning and land use should be looked at along both sides of the Bitterroot River.
- If changes are made, the effects to traffic along South Avenue should be examined.
- Construction costs should be an important consideration in developing recommendations.
- Replacing the bridge seems to be part of ultimately building a west-side bypass.
- Replacing the bridge will induce growth in the area.
- The results of the 1994 EA are outdated and may be inaccurate.
- The desires of the community need to be incorporated into the study.

2.1.1.2. Second Informational Meeting

Seventy-five members of the public signed the attendance sheet for the second informational meeting held on July 10th, 2012 at Target Range Elementary School. The purpose of the meeting was to inform interested parties about the existing and projected conditions in the Maclay Bridge vicinity, resource considerations in the environmental scan boundary area, and preliminary areas of concern. A Powerpoint presentation summarizing the information was given, followed by small group work sessions. After the small group work sessions, meeting attendees reconvened into a larger audience to hear the salient points of each group's discussions. Topics that were covered in each of the small groups included the following:

- Safety;
- Traffic volume growth;
- Non-motorized transportation;
- Parking;
- Roadway/bridge widths;
- Social; and
- Environmental considerations.

The goal of the small group work session was to:

- Provide a means for those that are interested to be part of the planning process;
- Receive comments on information contained in the Existing and Projected Conditions Report (E & P Report) and Environmental Scan; and
- Gather comments from participants, supplemented by findings of the E & P Report and Environmental Scan, to formulate a set of transportation system needs and objectives which could then be used to develop potential options.

2.1.1.3. Third Informational Meeting

Eighty-one members of the public signed the attendance sheet for the third informational meeting held on September 27th, 2012 at Big Sky High School. The purpose of the meeting was to review the draft needs and objectives, and the draft options under consideration, with the public. A Powerpoint presentation was given, followed by a comment period in which participants were asked to step up to a podium and provide their comment in 3 minutes or less. The more notable concerns and statements offered at the meeting included:

- What happens if the old bridge is removed? Who pays for removal costs?
- Have you considered the impact to wetlands and flood plains at the end of South Avenue?
- Do you know the cost of a new bridge at a South Avenue location? It would have to be put on pillars to avoid the flood plain and associated wetlands.
- If a new bridge was built, who pays for the approaches to the bridge, especially if considerable road work is necessary? Does it come from Federal, state or local funds?
- What is the life expectancy of the existing bridge under rehabilitation?
- Do you know the origin of the steel, and how strong it is? That would influence the rehabilitation potential in the future.
- Is the style and width of a new bridge known?

2.1.1.4. Fourth Informational Meeting

XXXXX members of the public signed the attendance sheet for the fourth informational meeting held on January 31th, 2013 at the Guest House Inn and Suites Conference Center. The purpose of the meeting was to review the screening process and the draft planning study report. A Powerpoint presentation was given, followed by a comment period in which participants were asked to step up to a podium and give their comment in 4 minutes or less. Topics, concerns and statements were offered by numerous attendees, with the more notable as follows:

- XXXXX
- XXXXX

2.1.2. Other Public Involvement Efforts

One flyer and three newsletters were produced that described the work in progress, results achieved, screening process, and other topics. The publications were made available at the informational meetings and were posted to the study website. In addition, copies were mailed to the following stakeholders:

- Missoula County Commission
- Missoula Emergency Services
- Missoula County Public Schools
- Target Range School District
- Mountain Home Montana
- MT Department of Fish, Wildlife and Parks
- US Forest Service
- Target Range Homeowners Association
- Missoula Rural Fire District
- Maclay Bridge Alliance
- Maclay Bridge Common Sense Coalition
- Community Medical Center
- Hidden Heights Homeowners Association
- Target Range Water and Sewer District

A website (http://mdt.mt.gov/pubinvolve/maclay) provided up-to-date information regarding the study as well as an opportunity to provide comments on the study. Draft documents were posted for public review and comment during the study process. Informational announcements were posted to the website to encourage public involvement in the study.

An email distribution list was created and maintained over the duration of the study. Advance notification of the informational meetings was made to those on the email distribution list before the meeting date. The number of individuals on the list grew to 108 people during the course of the study.

2.2. STAKEHOLDER PARTICIPATION

A stakeholder contact list was developed to include individuals, businesses, or groups identified by Missoula County, MDT, and/or the Consultant based on knowledge of the study area. The intent of developing the stakeholder list was to identify those individuals and groups to actively seek out and engage in the various phases of the study (**Appendix 3, Community and Agency Participation Plan**). Individual meetings were held with two of the stakeholder groups, the Maclay Bridge Common Sense Coalition and the Maclay Bridge Alliance, on September 4, 2012, during the morning and afternoon, respectively. The purpose of these meetings was to gather input and hear stakeholder concerns on the planning study process and associated deliverables (i.e. memorandums and reports).

2.3. RESOURCE AGENCY WORKSHOP

A resource agency workshop was held on May 21, 2012, at MDT Headquarters in Helena. A remote location was also made available in Missoula for those unable to attend in Helena. The resource agency workshop was held to provide an overview of the study and process, and confirm content and accuracy of the Environmental Scan document. Each agency was sent a draft Environmental Scan prior to the workshop in order to set the stage for further discussion. The agencies involved in the workshop included the following:

- Environmental Protection Agency (EPA)
- Montana Department of Environmental Quality (MDEQ)
- Montana Fish, Wildlife and Parks (MFWP)
- Montana Department of Natural Resources and Conservation (DNRC)
- US Army Corps of Engineers (USACOE)
- US Fish and Wildlife Service (USFWS)

The workshop included an overview of the study and a summary of the pre-NEPA/MEPA planning study process. Open discussion was held on various resource areas that the agencies felt needed to be further identified, supplemented or considered. These notable comments were heard at the resource agency workshop:

- **Floodplain/Hydraulics** - The Bitterroot River has migrated to the west over the years. Riprap was put in as mitigation in the 70's and 80's. The bridge is at a pinch point in the floodplain. In the case of a replacement bridge, Missoula County would have a "no increase" requirement for the 100-year base flood elevation. An exception may be allowed if a CLOMR (Conditional Letter of Map Revision) is prepared, reviewed and approved by FEMA. After the CLOMR, a LOMR (Letter of Map Revision) would have to be completed. This process can be very time consuming, and would allow for a 0.5 foot increase of the 100-year base flood elevation, and only after hydraulic modeling shows it would not affect adjacent property.
- **Bridge Deck Drainage** - Drainage from the bridge currently flows off the deck structure. Impacts resulting from drainage off of a new bridge deck should be considered. Bridge deck drainage should be channeled off the bridge and possibly detained/retained before discharge.
- **Bridge Span** - If a new bridge is constructed, the largest span practicable should be utilized to minimize impacts within the floodplain.
- **Induced Growth** - An evaluation of impacts related to induced growth should be conducted if a project is developed.
- **Vehicle / Wildlife Conflicts** - Impacts to potential vehicle / wildlife collisions should be analyzed if speeds are increased as a result of a project identified from the study.

2.4. PLANNING TEAM MEETINGS

A study planning team was established with representatives from Missoula County, MDT, and FHWA. The team met regularly (approximately every three weeks) during the twelve-month study to discuss study progress, analysis methodologies and results, draft technical memorandums and reports, and other issues and concerns. The planning team served in an advisory role and reviewed study documentation before publication. In addition, representatives of the Maclay Bridge Alliance and the Maclay Bridge Common Sense Coalition regularly attended the meetings. They were observers of the process but did not have direct input into the planning team meetings. Their attendance was noted and reflected in the meeting minutes throughout the duration of the study.

2.5. PUBLIC AND AGENCY COMMENT PERIOD

The public and agency comment period for the draft planning study report extended from January 30, 2013 to February 22, 2013. XXXX written comments were received during the comment period. Written comments and responses are presented at the beginning of **Appendix 1 (Consultation, Coordination and Public Involvement)**.

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Chapter 3
EXISTING AND PROJECTED CONDITIONS

This chapter presents the existing and projected road and bridge conditions, and environmental factors, for the Maclay Bridge planning area. These conditions and factors were utilized as part of the planning analysis to identify known issues and areas of concern. If an option is forwarded from this study to project development, this general information may be used to support future, detailed "project level" analysis.

3.1. LOCAL PLANNING DOCUMENTS

Missoula County and the City of Missoula have a cooperative agreement in place to conduct planning based on the shared environmental, economic, aesthetic, and social values of city and county residents. The agreement created a City-County Office of Planning and Grants (OPG) which is responsible for land use permitting, long range planning, transportation planning, historic preservation, housing, and a variety of other programs. Numerous planning documents exist that guide or supplement Missoula County's Growth Policy. The planning documents listed below were reviewed to provide a context for the Maclay Bridge Planning Study. The Existing and Projected Conditions Report (**Appendix 3**) contains more information from these planning documents and considerations that may be important to the development of options for the Maclay Bridge.

- 2008 Missoula Long Range Transportation Plan
- 2012 Missoula Long Range Transportation Plan
- Missoula 2011 Active Transportation Plan (MATP)
- Missoula Transit Development Plan
- 2012 Missoula County Parks and Trails Master Plan
- Missoula Urban Area Open Space Plan 2006 Update
- 2004 Master Parks and Recreation Plan for the Greater Missoula Area
- Missoula County Growth Policy
- Missoula Urban Comprehensive Plan: 1998 Update
- Missoula Urban Fringe Development Area (UFDA) Project
- Target Range Neighborhood Plan
- Lolo National Forest Plan

3.2. EXISTING TRANSPORTATION CONDITIONS

3.2.1. EXISTING ROADWAY USERS

Primary users of the Maclay Bridge river crossing are local residents from the Target Range and Orchard Homes neighborhoods (east of the Bitterroot River), land owners west of the Bitterroot River, and city and county residents accessing recreational uses along the Bitterroot River and USFS lands. Additionally, this river crossing is used by pedestrians, bicyclists, emergency services providers, and school buses.

3.2.2. Existing Traffic Volumes

Historic traffic data for area roadways was obtained from MDT's Bureau of Data & Statistics. **Table 1** shows the most recent 20 years of traffic data for two count stations in the area: one located on River Pines Road just west of the Maclay Bridge and one located on North Avenue just west of Clements Road. The traffic data in **Table 1** is representative of the average annual daily traffic (AADT) volume, in vehicles per day (vpd).

Table 1 shows the 2010 AADT volumes were 2,610 vpd (on River Pines Road) and 2,000 vpd (on North Avenue. 2010 is the most recent year for which traffic count data is available for both locations shown in **Table 1**.

Table 1: Average Annual Daily Traffic

Street	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
River Pines Rd	300 ft W of Maclay Bridge	1610	1580	1840	2060	2190	2230	(a)	(a)	(a)	2230
North Ave	300 ft W of Clements Rd	1610	(a)	2200	(a)	1960	(a)	1980	(a)	1790	(a)

Street	Location	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
River Pines Rd	300 ft W of Maclay Bridge	2300	2060	2300	2130	2410	2460	(a)	2380	2610	2360
North Ave	300 ft W of Clements Rd	1660	(a)	2010	(a)	2140	(a)	(a)	(a)	2000	(a)

Source: MDT Data and Statistics Bureau, Traffic Data Collection Section, 2012
(a) Data unavailable

3.2.3. Projected Traffic Volumes

Projected transportation conditions were analyzed to estimate how traffic volumes and transportation characteristics may change compared to existing conditions. The analysis was based on existing volumes projected out to the year 2040. While there are several methods available to project traffic volumes, the preferred method is to use the adopted Travel Demand Model (TDM) used by Missoula County and MDT, as it provides the best representation of the "built" environment found within the area. The TDM incorporates land use planning found within the Missoula County Growth Policy, including zoning, and also reflects the preferred growth scenario found within the Urban Fringe Development Area (UFDA). Additionally, the TDM is the tool utilized for the Missoula Area Transportation Plan (2008 and 2012 Updates).

3.2.3.1. Future Traffic Modeling

The TDM is a tool to predict future traffic growth. The TDM was developed using year 2010 AADT information to determine baseline conditions. Future land use information from the Missoula County Growth Policy, including zoning, was applied to the model to project year 2040 conditions. For planning purposes, the TDM was used for future year projections and option analysis. The TDM utilizes existing housing and employment data, with the existing transportation network, to represent the "built environment" found within the area.

Table 2 provides a summary of traffic count locations within the study analysis area. These results are also shown in **Figure 2**.

Table 2: 2040 AADT Traffic Modeling Projections

Street	Location	2010 AADT	2010 TDM	2040 TDM	TDM % Diff	Projected 2040 AADT [a]
Big Flat Rd	100 ft W of O'Brien Ck Rd	1,870	2,199	7,691	249.7%	6,550
Blue Mountain Rd	500 ft N of Hwy 93	2,360	2,628	6,091	131.8%	5,450
Blue Mountain Rd	S of South Side Rd	1,370	1,674	5,346	219.4%	4,400
Brooks St	Bitterroot River Bridge	26,530	26,157	45,368	73.4%	46,000
Clements Rd	300 ft N of North Av	3,140	2,615	4,914	87.9%	5,900
Clements Rd	300 ft S of North Av	2,750	1,811	2,549	40.8%	3,850
Clements Rd	500 ft S of S 3rd W	2,350	1,914	3,677	92.1%	4,500
Kona Ranch Rd	Kona Ranch Bridge	[b]	1,723	6,471	275.6%	[b]
Mullan Rd	E of Snowdrift Ln	3,950	4,284	9,870	130.4%	9,100
North Av	300 ft W of Clements Rd	2,000	1,318	3,118	136.6%	4,750
Reserve St	Between Dearborn & South Av	33,580	32,617	45,425	39.3%	46,750
Reserve St	Between OlofsonDr& S 3rd W	38,010	38,985	51,443	32.0%	50,150
Reserve St	Between South Av & Central Av	36,740	36,953	47,510	28.6%	47,250
Reserve St	S of LarkenwoodDr	37,930	39,255	52,411	33.5%	50,650
River Pines Rd	300 ft W of Maclay Bridge	2,610	2,779	6,039	117.3%	5,650
S 3rd W	W of Reserve	7,620	6,690	11,596	73.3%	13,200
S 7th W	150 ft W of Reserve	1,320	1,901	4,664	145.3%	3,250
S 7th W	300 ft E of Clements Rd	350	345	699	102.6%	700
South Av	Between 31st and 33rd	6,610	6,491	8,187	26.1%	8,350
South Av	Between Humble & Pleasant	1,770	2,210	3,638	64.6%	2,900
South Av	Between Reserve & 26th	15,010	14,914	16,255	9.0%	16,350
South Av	E of Clements Rd	4,350	4,952	6,141	24.0%	5,400
South Av	W of Clements Rd	4,710	5,379	7,453	38.6%	6,550
Spurgin Rd	250 ft W of Reserve	2,000	2,401	3,086	28.5%	2,550
Spurgin Rd	300 ft E of Clements Rd	980	1,033	1,285	24.4%	1,200

Source: MDT Multi Modal Planning Bureau, Statewide & Urban Planning Section, 2012; Missoula Office of Planning and Grants, Transportation Division.

[a] Projected AADT's rounded to nearest 50 vpd.

[b] Data unavailable

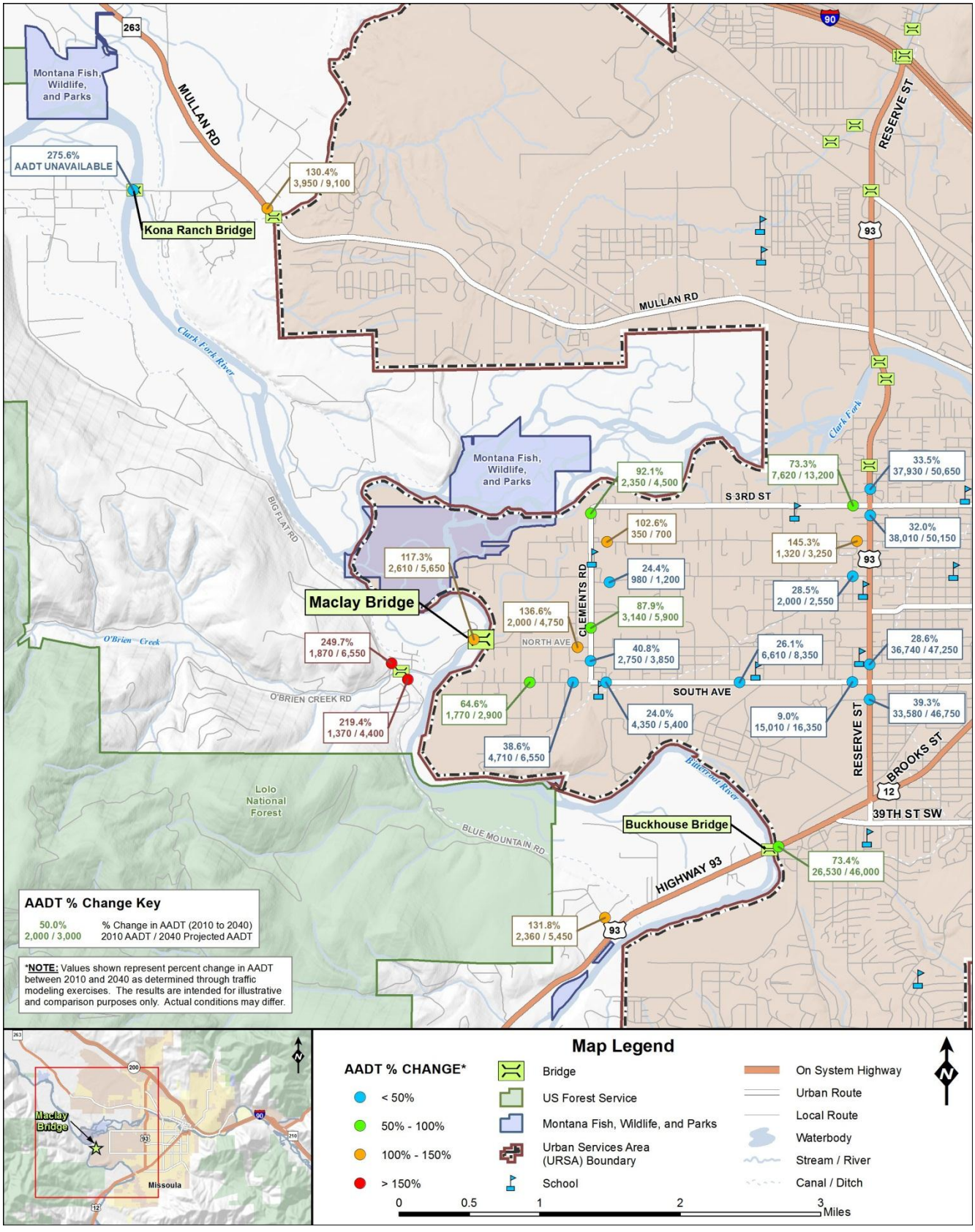

Figure 2: Percent Change in AADT

3.2.4. Crash Analysis

The MDT Traffic and Safety Bureau provided crash data for the ten-year period from January 1, 2002 to December 31, 2011. The crash data was provided for the following areas:

- Township 13 North, Range 20 West, Section 26
- Township 13 North, Range 20 West, Section 27
- Township 13 North, Range 20 West, Section 34
- Township 13 North, Range 20 West, Section 35

According to the MDT crash database, there were 131 total crashes reported within these identified areas during the ten-year period. Reportable crashes are defined as those with a fatality, an injury, or property damage only exceeding $1,000 in damages.

As part of the crash analysis, crash investigation reports were reviewed to help identify specific locations and contributing factors. A location map of the reported crashes is shown in **Figure 3**. Based on the crash data, a number of crash clusters and trends were identified as listed below, and are more fully discussed in the Existing and Projected Conditions Report (**Appendix 3**).

- Big Flat Road
    - Single vehicle crashes along the horizontal curve approximately 0.15 miles north of the intersection with River Pines Road.
- Blue Mountain Road
    - Single vehicle crashes along the sharp horizontal curve approximately 0.3 miles south of the intersection with River Pines Road.
    - Single vehicle crashes along the horizontal curves located approximately 0.5 to 0.9 miles south of the intersection with River Pines Road.
- North Avenue
    - Crashes with inattentive driving and failure to yield listed as contributing circumstances between Humble Road and the Maclay Bridge.
- River Pines Drive
    - Single vehicle crashes at or near the intersection with Riverside Drive under “dark not lit” conditions.
    - Single vehicle crashes along the horizontal curves located approximately 0.15 to 0.30 miles southwest of the intersection with Riverside Drive.
    - Crashes between the intersection with Big Flat Road and the sharp horizontal curve located approximately 0.25 miles east of Big Flat Road.
- South Avenue
    - Single vehicle crashes between the intersections with Pauline Drive and Woodlawn Avenue under “dark not lit” conditions.

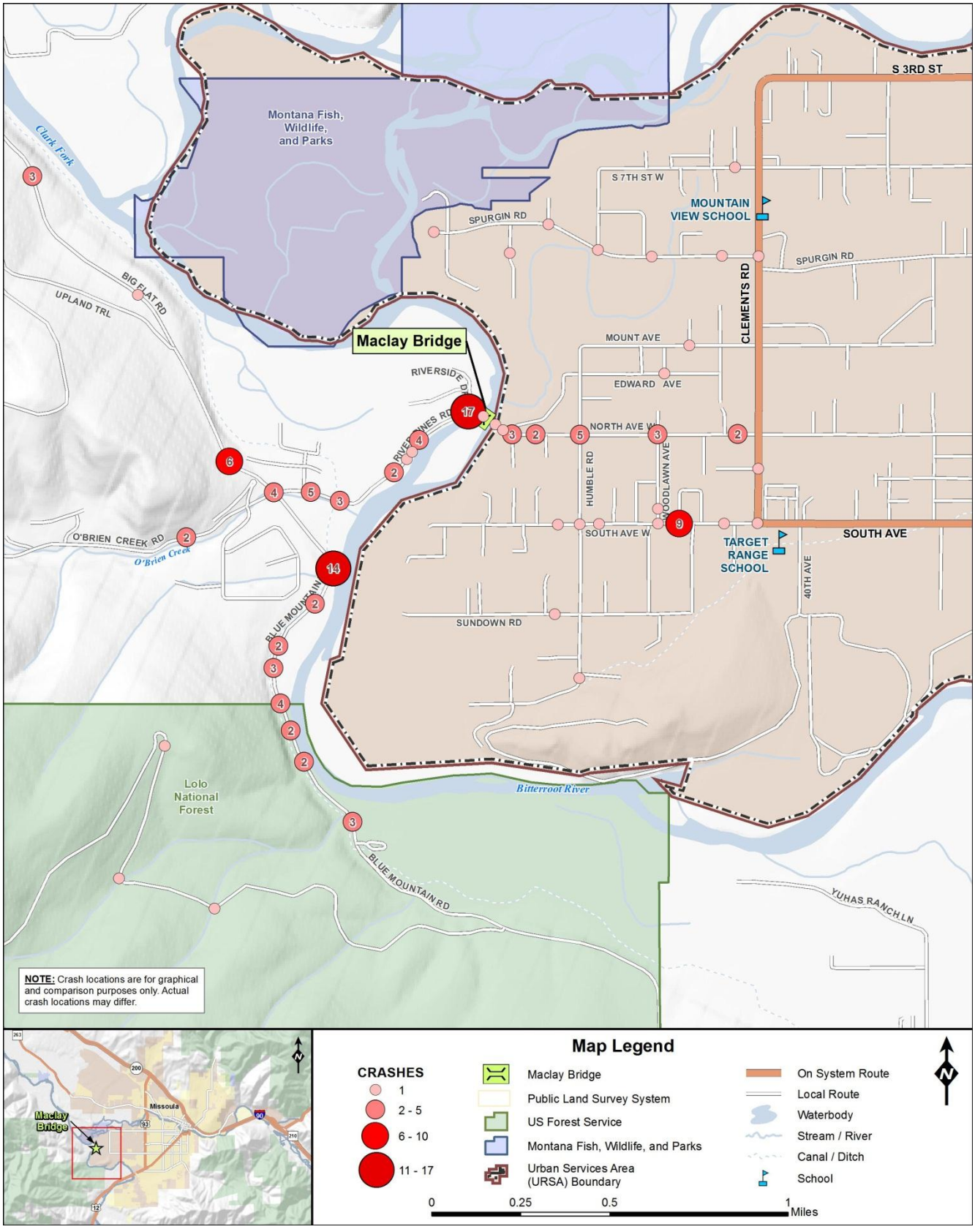

Figure 3: Crash Locations (01/01/2002 – 12/31/2011)

3.2.5. Travel Times

A “travel time” evaluation was conducted to determine the approximate time it would take to travel within the Maclay Bridge area from three selected emergency service provider locations. The travel time evaluation was completed during the middle of a weekday, during off-peak travel hours. Travel times along three distinct routes from east of the Bitterroot River to the intersection of Big Flat Road/Blue Mountain Road/O’Brien Creek Road/River Pines Road were calculated. Each route crossed the Bitterroot River using one of three crossings: the Maclay Bridge, the Kona Ranch Bridge, or the Buckhouse Bridge.

The three origins that were identified for this analysis included the following:

- Missoula Rural Fire Station #1 – Located on South Avenue
- Community Medical Center – Located on South Avenue
- Missoula Rural Fire Station #6 – Located on Mullan Road

The results of the evaluation suggests that if the Maclay Bridge river crossing is inaccessible, the time it would take to reach the subject intersection of Big Flat Road/Blue Mountain Road/O’Brien Creek Road/River Pines Road from most of the locations of interest increases. For example, if the Maclay Bridge was out of service, it was estimated to take approximately 18.58 minutes longer using the Kona Bridge or 4.47 minutes longer using the Buckhouse Bridge when travelling between Community Medical Hospital and the subject intersection. In terms of emergency service, this means that travel times would likely be longer if the Maclay Bridge crossing is out of service.

3.2.6. Design Standards

Design standards are an important consideration when assessing existing areas of concern, as well as for planning new infrastructure. Depending on funding source, different sets of design standards may be applicable to the river crossing. One set of standards are the design standards in place by Missoula County. These standards, found in the Missoula County *Public Works Manual 2010*, set forth road design considerations for various roadway classifications.

AASHTO design standards may also be applicable since Missoula County does not have any specific “bridge related” standards to measure against. AASHTO bridge width standards allow a single-lane bridge only for very low volume roads in which traffic is less than 100 vpd.

Finally, an additional set of design standards, and those that may be considered in design if Federal or State funds were used for any type of project identified through this planning effort, are the standards and guidelines found in MDT’s *Road Design Manual (*RDM*)*. The RDM specifies general design principles and controls which determine the overall operational characteristics of the roadway.

For most “off-system” locations such as the Maclay Bridge (i.e. not on a State-highway), local conditions and context to the surrounding land uses would be considered in developing geometric features such as road width, acceptable curves, and the need for non-motorized facilities.

3.2.7. Roadway Geometrics

Existing roadway geometrics were evaluated and compared to current Missoula County standards. The analysis was conducted based on a review of public information, bridge drawings, Geographic Information Systems (GIS) data, and field observations. As-built drawings for area roadways were not available. As such, a field review was conducted in April 2012 to confirm and supplement information, as well as to identify additional areas of concern within the Maclay Bridge area.

3.2.7.1. Horizontal Alignment

Elements comprising horizontal alignment include curvature, superelevation (i.e. the "bank" on the road), and sight distance. These horizontal alignment elements influence traffic operation and safety. Missoula County roadway standards for a collector roadway were used as a basis to evaluate existing design concerns along River Pines Road and North Avenue. Missoula County's standards for horizontal curves are defined in terms of curve radius, and for a collector roadway, the minimum required radius is 525 feet.

Three horizontal curves were identified that do not meet current Missoula County standards. The presence of sub-standard curvature may contribute to crash numbers and severity.

3.2.7.2. Vertical Alignment

Vertical alignment is a measure of elevation change of a roadway. The length and steepness of grades directly affects the operational characteristics of the roadway. In addition, the available stopping sight distance for the vertical alignment, and specifically the vertical curvature, also directly affects the operational characteristics of the roadway.

Missoula County roadway standards for a collector roadway define a maximum allowable vertical grade of 6.0 percent. Both roadways connecting to the Maclay Bridge were estimated to have grades that do not exceed the Missoula County standard of 6.0 percent for a collector roadway or the current MDT design standards.

3.2.7.3. Roadside Clear Zone

The roadside clear zone, starting at the edge of the traveled way and extending away from the roadway, is the total roadside border area available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or recovery area. The desired clear zone width varies depending on traffic volumes, speeds, and roadside geometry.

Within the Maclay Bridge area, there were locations identified that do not meet the Missoula County horizontal clearance requirements for a collector roadway. The most notable area is located along River Pines Road, just southwest of the existing bridge. At this location, the top of roadway fill slope is between 2 and 4 feet from the edge of the travel lane. In addition, trees and utility poles are found within this area. The roadway fill slope in this area is steep and lined with riprap to the river.

3.2.8. Bridge Considerations

The dominant transportation feature located within the study area is the Maclay Bridge. It has been the subject of past technical and planning level analysis, and was analyzed in detail during the development of the 1994 *Maclay Bridge Site Selection Study EA*. A copy of the most recent Bridge Inspection Report completed by MDT is included in the Existing and Projected Conditions Report (**Appendix 3)**.

Since the 2011 Bridge Inspection Report was prepared, the posted load limit was reduced from 14 tons to 11 tons based on analysis by MDT engineers. The two primary vehicles impacted by this reduction were school buses and fire trucks. School buses are generally within the 11 ton limit, as they weigh approximately 19,000 pounds when empty and 22,000 pounds when loaded. Fully loaded school buses are near or at the 11 ton limit. School buses are allowed across the bridge, as long as they do not exceed the posted 15 mph speed limit.

An agreement exists that allows the local rural fire department to operate their Type I fire engines (i.e. overweight vehicles) across the bridge, as long as they straddle the centerline of the bridge and travel no more than 5 mph.

The 2011 Bridge Inspection Report noted some areas of concern related to a variety of bridge features, such as:

- Transverse cracking in deck asphalt surfacing;
- Paint loss and rusting on various features, such as floor beams, bottom chords, and steel stringers;
- Minor cracking and spalling on concrete pier wall and abutments; and
- Moveable roller bearings are not functional and are out of alignment.

Additionally, the following concerns were identified during the public process and confirmed in the field:

- The current structure exhibits spalling and cracked concrete and exposed rebar;
- Rust and steel pitting is observed under the bridge on some load bearing members and the deck;
- The bridge is a composite of varying ages and types of load-bearing steel used throughout the structure; and
- The strength of the steel is unknown in much of the bridge, as it has never been tested.

3.2.8.1. Sufficiency Rating

An important consideration in the evaluation of roadway bridges is the sufficiency rating associated with the structure. The sufficiency rating formula is the industry standard of evaluating highway bridge data to obtain a numeric value indicating the sufficiency of the bridge to remain in service. The sufficiency rating is expressed by a value ranging from 0 to 100 with 100 being an entirely sufficient bridge and 0 being an entirely deficient bridge. To receive funding through the Off-System Bridge Program, structures must be classified as "Structurally Deficient" or "Functionally Obsolete" and have a sufficiency rating of 80 or below. Structures with a sufficiency rating of 0 to 49.9 are eligible for replacement, and structures at 50 to 80 are eligible for rehabilitation unless otherwise approved for replacement by the FHWA.

Based on the most recent Bridge Inspection Report, the Maclay Bridge was determined to be functionally obsolete, but not structurally deficient. Its sufficiency rating is calculated to be 27.3, which is less than 49.9, thereby making the bridge eligible for replacement.

A functionally obsolete bridge is one that was built to standards that are not used today. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand, or those that may be occasionally flooded. Functionally obsolete bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. American Association of State Highway Transportation Officials (AASHTO) standards specify single-lane bridges are appropriate on routes with AADT volumes less than 100 vpd. For the Maclay Bridge, the appraisal values for the "Deck Geometry" and the "Approach Roadway Alignment" are such that the bridge is categorized as being functionally obsolete. This is based on the single-lane width of the bridge being sub-standard for the current traffic volumes, and the sub-standard curves on both approaches to the bridge.

An analysis of off-system bridge data for Montana indicates that 98.3 percent of all off-system bridges have a sufficiency rating higher than the Maclay Bridge.

3.2.8.2. Bridge Health Index

The "Health Index" is a variable based on "weighting" bridge components to establish a clear, dependable communication of bridge performance information to management, elected officials, and the public. The Bridge Health Index is a 0-100 ranking system for bridge maintenance with 100 being a "best" condition and 0 indicating a "worst" condition. The health index provides an indication of how individual bridge components rank on the 0-100 condition scale. To generate a health index rating for the entire bridge,

weighted values are assigned to the individual bridge components according to the economic consequences of their failure. Thus, components whose failure has relatively little economic effect, such as railings, receive less weight than those whose failure could close the bridge, such as girders. The Health Index number provides a performance measure and management tool for bridge maintenance.

The health index is not an FHWA directive for assessing bridges, rather, it was developed by the California Department of Transportation (Caltrans) and its computations are now included in bridge management software used by state highway agencies. Guidance provided by Caltrans indicates the health index concept for a single bridge be evaluated in context with a statewide network of bridges. Based on the recent October 31, 2011 bridge inspection, the Maclay Bridge was given a health index of 89.91. Montana's statewide off-system bridge data indicates that 72.9 percent of all off-system bridges have a health index higher than the Maclay Bridge health index. This health index value places the Maclay Bridge near the bottom quartile (i.e. lowest 25 percent) of all off-system bridges.

3.2.8.3. Fracture Critical Status

The Maclay Bridge is fracture critical. Truss bridges are typically fracture critical. If one part of the truss should fail, the entire bridge span may fail. As a bridge ages and traffic increases, the steel in the truss may begin to weaken because of fatigue. The bridge requires special "fracture critical" inspections to reduce the chance of failure. With proper inspection and maintenance, the bridge is considered safe. An inspection that shows a problem could result in immediate closure. No immediate concern has been identified for the Maclay Bridge due to its fracture critical status.

3.2.9. Parking Considerations and Citations

Over the past 30 years, Missoula County has passed numerous resolutions that restrict parking within the vicinity of the Maclay Bridge. Research of past resolutions indicates that parking concerns have existed since at least 1979.

A review of Missoula County "911 Calls" was also completed. In a search of the call records for the Orchard Homes and Target Range areas for June, July and August of 2010 and 2011, numerous citations were issued in response to activities near the Macay Bridge. These citations included the following categories:

- Criminal Mischief, Curfew and Loitering, Disorderly Conduct, Disturbance, Suspicious Activity
- Extra Patrol
- Hazardous Vehicle
- Other Hazard

During this time period, there were 109 calls made for the area located at the east end of the existing bridge (4680 North Avenue West). Of these calls, 42 were for "hazardous vehicle", which is primarily related to parking concerns. The review of the provided 911 calls, coupled with the many parking resolutions passed over the four decades by Missoula County, indicate parking is a concern in the vicinity of the Maclay Bridge.

3.2.10. Roadway Surfacing

Existing roadway surfacing characteristics were determined through field measurements for River Pines Road, the Maclay Bridge, and North Avenue. Items measured included the surface width, lane width, shoulder width, and the presence of non-motorized features. **Table 3** shows the existing roadway and bridge widths.

Table 3: Existing Road and Bridge Surfacing

Location		Lanes	Surface Width(ft)	Lane Width(ft)	Shoulder Width(ft)
North Ave W	Clements Rd to Maclay Bridge	2	31	11	1 (north) / 8 (south)
Maclay Bridge	On Bridge	1	14	14	0
River Pines Rd	Maclay Bridge to Blue Mountain Road	2	22	11	0

Source: Estimated based on field measurements

3.2.11. Access Points

Access points were identified through a review of available GIS data, aerial photography and field observation. There are approximately 47 access points along River Pines Road and North Avenue. The vast majority of the access points are private approaches. There are 10 public approaches along these two segments within the study area. The prevalence of access points along a roadway can contribute to decreased safety as turning movements into and out of the access points may create conflict points.

3.2.12. Right-of-Way

Existing right-of-way widths along River Pines Road and North Avenue are between 60 and 80 feet. New right-of-way, easements and/or construction permits from adjoining landowners will be required if options extend beyond existing right-of-way limits based on legal land survey.

A Montana Department of Natural Resources and Conservation (DNRC) land use license or easement would be required between the low water marks of the river for options involving the construction of a bridge at a new location.

3.2.13. Hydraulics

The Bitterroot River is the primary surface water feature within the study area. If a project is developed that impacts the Bitterroot River, mitigation will be required depending on the type of impacts anticipated and agency permitting requirements.

The Big Flat Irrigation Ditch crosses River Pines Road west of the Maclay Bridge. A small Missoula Irrigation District ditch parallels South Avenue and the ditch crosses South Avenue west of Humble Road and west of Clements Road.

3.2.14. Floodplain Considerations

The Maclay Bridge river crossing is located within a detailed delineated floodplain (FIRM panel 30063C1455). Accordingly, any bridge rehabilitation, reconstruction, or relocation would require a formal floodplain permit.

Executive Order (EO) 11988, Floodplain Management, requires federal agencies to avoid direct or indirect support of floodplain development whenever a practicable alternative exists. EO 11988 and 23 CFR 650 Part A requires an evaluation of project alternatives to determine the extent of any encroachment into the base floodplain. The base flood (100-year flood) is the regulatory standard used by federal agencies and most states to administer floodplain management programs. A “floodplain” is defined as lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, with a one percent or greater chance of flooding in a given year. As described in the Federal Highways Administration’s (FHWA) floodplain regulation (23 CFR 650 Part A), floodplains provide natural and beneficial values serving as areas for fish, wildlife, plants, open space, natural flood moderation, water quality maintenance, and groundwater recharge.

Missoula County floodplain regulations require the low chord of any "new" bridge to be 2 feet above the 100-year flood elevation. Federal Emergency Management Agency (FEMA) regulations require that if a project results in an increase of the published base flood elevation, a conditional letter of map revision (CLOMR) must be approved.

A CLOMR requires that FEMA approve the hydraulic model and revisions to the base flood elevation. A detailed floodplain model would be required to determine the proposed bridge opening and the effect on the base floodplain elevation. The existing Flood Insurance Study (FIS) model would be obtained and used, however, some new river cross sections would be required. This process can take a year or more.

3.2.14.1. Preliminary Hydrology

The Bitterroot River at the Maclay Bridge drains 2,814 square miles of area and consists mostly of forested mountainous terrain within a wide populated valley. The design flood for a reconstruction or relocation option would likely be the 100-year event due to the delineated floodplain and the risk to adjacent landowners. The 10, 50 and 500-year floods would also need to be modeled to meet CLOMR requirements. **Table 4** contains preliminary hydrology values as computed by MDT. This information is useful to identify general "order of magnitude" flows and compare the published FIS values against USGS calculated results.

Table 4: Preliminary Hydrology for Bitterroot River

Source	Area (sq mi)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)	Q500 (cfs)
USGS [a]	2,814	14,500	20,000	23,400	27,300	30,000	32,500	38,000
FIS [b]	2,842			20,900		29,700	31,800	42,000

[a] USGS gage number 12352500
[b] The Flood Insurance Study (FIS) flows would likely be used for future design // Q = Flood flow in cubic feet per second (cfs)

3.2.14.2. Channel Characteristics

The Bitterroot River is meandering near the existing bridge, even though aerial photographs show that the banks have moved very little since the 1976 flood event, which was considered a historic flood year across Montana. The existing river crossing washed out at least two times since 1935. River Pines Road, located on the west side of the Bitterroot River, has rock riprap on its fill slope for approximately 750 feet upstream of the bridge. The FIS shows a 5-foot deep scour hole at the bridge, and about a foot of backwater for the base flood. Based on review of four aerial photographs from the years 1935 and 1961 (USFS), and 2003 and 2011 (USDA), it appears the scour hole has grown westward towards the west bank of the river. Scour holes can develop for a variety of reasons (i.e. poor angle of attack of the stream on the bridge, inadequate waterway opening under the bridge, etc.) and are of concern as scour holes can eventually reach the bottom of footings and undermine bridge supports (columns and/or abutments). Channel scour was not part of the original design requirements in the 1940's. The existing bridge piers are located in the river channel on unknown materials.

Gravel and sand bar development has been observed but not studied both upstream and below the existing bridge. It appears the channel has been altered with the deposition of material upstream of the bridge (changing the shape of the channel changes stream flow). Increased water velocities also remove material from the stream bed. If too much material is washed away, the piers in the channel may become unstable.

Backwater is a concern as it can flood adjacent properties and change the flow regime just upstream of the bridge. There is a large island upstream from the existing bridge that has been there for a long time based on the size of the trees. Ice is considered to be light and debris is moderate at this location on the Bitterroot River. Although not studied, it appears that the existing bridge configuration has constricted the

Bitterroot River when compared to its normal, free flow natural state. If a project is developed, this should be analyzed via detailed hydrologic and hydraulic modeling effort at some future time.

3.3. UTILITIES

The existing Maclay Bridge carries an eight-inch natural gas line. There are overhead utility lines along the south side of South Avenue and along River Pines Road. There are also buried phone lines along both roads. Near the easterly bridge approach, there is a NorthWestern Energy natural gas substation that serves as a primary feeder hub for gas infrastructure on both sides of the Bitterroot River. If a project is forwarded that affects the existing Maclay Bridge the gas main may be impacted.

3.4. ENVIRONMENTAL SETTING

This section summarizes the Environmental Scan (**Appendix 2**). The primary objective of the Environmental Scan is to determine the potential constraints and opportunities within the Environmental Scan boundary. As a planning level scan, the information is obtained from various reports, websites and other documentation. This scan is not a detailed environmental investigation. Refer to the Environmental Scan for more detailed information.

3.4.1. GEOGRAPHIC SETTING

The Maclay Bridge river crossing is located at the western end of the Missoula Valley at the confluence of the Clark Fork and Bitterroot Rivers and encompasses lands in both the City of Missoula and Missoula County, Montana. The topography east of the Bitterroot River is generally level, while the area west of the Bitterroot River is comprised of foothills for the Bitterroot Mountains. Surface elevations over most of the area average about 3,120 feet above sea level with elevations exceeding 3,500 feet in the McCauley Butte area and in foothill areas.

3.4.1.1. Land Ownership and Land Management

Most of the lands in the vicinity of the Maclay Bridge are privately owned with the exception of the Kelly Island Fishing Access Site, located near the confluence of the Clark Fork and Bitterroot Rivers, which is state-owned and managed by the MFWP. Some county-owned parcels and Lolo National Forest lands also exist in the area. Both the Five Valleys Land Trust and Rocky Mountain Elk Foundation hold conservation easements on some private lands within the general vicinity.

3.4.1.2. Land Use

Land use in the area consists mostly of suburban residential properties on one-half acre or larger parcels, a few commercial uses, two schools and recreational/open spaces. The area also contains agricultural uses on irrigated lands ranging in size from one acre to 50 acres.

3.4.2. PHYSICAL RESOURCES

3.4.2.1. Geologic Resources

According to Montana Bureau of Mines and Geology mapping, the area contains alluvial materials associated with modern channels and floodplains along with glacial lake deposits and volcanic bedrock in some portions. The foothills and mountains in the area are comprised mainly of Precambrian rocks of various formations.

3.4.2.2. Soils and Prime Farmland

Information regarding areas of prime farmland in the area was compiled from the US Department of Agriculture, Natural Resource Conservation Service (NRCS). Using the NRCS's Web Soil Survey website, several soil map units in the area have been classified as prime farmland if irrigated and farmland of local importance.

If a project is advanced using federal funds, coordination with the NRCS will be required to determine if the Farmland Protection Policy Act (FPPA) of 1981 (Title 7 United States Code, Chapter 73, Sections 4201-4209) applies and necessary NRCS processing requirements. Projects planned and completed without the assistance of a Federal agency are not subject to the FPPA.

3.4.2.3. Water Resources

SURFACE WATERS

Surface waters in the area include the Bitterroot River, the Clark Fork River, and O'Brien Creek. Information on these surface waters within the area was obtained from the Montana Department of Environmental Quality's (MDEQ) website. Section 303, subsection "d" of the Clean Water Act requires the State of Montana develop a list, subject to U.S. Environmental Protection Agency (USEPA) approval, of water bodies that do not meet water quality standards. When water quality fails to meet state water quality standards, MDEQ determines the causes and sources of the pollutants in a sub-basin assessment and sets maximum pollutant levels, called total maximum daily loads (TMDL).

A TMDL sets maximum pollutant levels in a watershed. The TMDL's become the basis for implementation plans to restore the water quality to a level that supports its designated beneficial uses. The implementation plans identify and describe pollutant controls and management measures to be undertaken (such as best management practices), the mechanisms by which the selected measures would be put into action, and the individuals and entities responsible for implementation projects.

The Bitterroot River and the Clark Fork River are both listed as a 303(d) water body within the area. Probable causes of impairment include nutrients, siltation/sediment, and thermal modification.

Placement of fill or excavation within these surface waters would be subject to regulation by the U.S. Army Corps of Engineers (USACOE) under Section 404 of the Clean Water Act and the Montana Stream Protection Act (SPA). Other water-related permits may also be necessary.

IRRIGATION FEATURES

The area contains irrigation features and infrastructure associated with the Big Flat Irrigation District and the Missoula Irrigation District. Any potential impacts to irrigation facilities will need to be examined to determine if the irrigation facilities are considered waters of the U.S. and subject to jurisdiction by the U.S. Army Corps of Engineers (USACOE) or need approvals from the U.S. Department of the Interior Bureau of Reclamation (facilities associated with the Big Flat Irrigation District were developed as a unit of the U.S. Department of Reclamation's Missoula Valley Project and were constructed in the late 1940's).

GROUNDWATER

The Missoula aquifer, which most of the urban area population relies on, is a shallow unconfined aquifer formed in coarse alluvial material (sands and gravels) extending from the Clark Fork River at Hellgate Canyon westward across the valley to the Bitterroot River. The Missoula aquifer was designated as a Sole Source Aquifer by the USEPA in 1988. Following the designation, the Missoula Valley Water Quality District was formed in 1993. An Aquifer Protection Ordinance, administered by the Water Quality District, was adopted in 1994.

3.4.2.4. Wetlands

The USACOE defines wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marches, bogs, and similar areas.

A wetlands survey was conducted for the Maclay Bridge EA in 1993 which identified riverine and areas of emergent and forested/shrub wetlands along the Bitterroot River. This survey is outdated and new wetland impact evaluations must be conducted if a project is forwarded. Wetland impacts should be avoided to the greatest extent practicable. All unavoidable wetland impacts would need to be mitigated as required by the USACOE.

3.4.2.5. Hazardous Material

The Montana Natural Resource Information System (NRIS) database was searched for underground storage tank (UST) sites, leaking underground storage tank (LUST) sites, abandoned mine sites, remediation response sites, landfills, National Priority List (NPL) sites, hazardous waste, crude oil pipelines, and toxic release inventory sites in the area.

The following sites where initially identified as locations with potential contamination impacts:

- Eight underground storage tank locations;
- One leaking underground storage tank location; and
- One petroleum release compensation site.

Further evaluation may be needed at specific sites to determine the potential for encountering contamination if a project requiring soil excavation is forwarded. This evaluation may include reviewing MDEQ files for specific sites and/or conducting subsurface investigation activities to determine the extent of soil and groundwater contamination at locations of interest. If contaminated soils or groundwater is encountered during construction, handling and disposing of the contaminated material would need to be conducted in accordance with State, Federal, and local laws and rules.

3.4.2.6. Air Quality

EPA designates communities that do not meet National Ambient Air Quality Standards (NAAQS) as “non-attainment areas”. “Nonattainment areas” are localities where air pollution levels persistently exceed the NAAQS or MAAQS (Montana Ambient Air Quality Standards), or that contribute to ambient air quality in a nearby area that fails to meet standards. States are then required to develop a plan to control source emissions and ensure future attainment of NAAQS. An area that has been designated as non-attainment in the past, but now complies with the NAAQS is classified as a “maintenance” area.

The Maclay Bridge area is located in a non-attainment area for PM-10 and a maintenance area for carbon monoxide.

Transportation conformity considerations will apply in this area if projects forwarded use federal or state funds to ensure that any proposed activities will not cause or contribute to any new violations of the NAAQS; increase the frequency or severity of NAAQS violations; or delay timely attainment of the NAAQS or any required interim milestone.

If a project forwarded uses federal of state funds, an evaluation will also be required to determine if there is any potential for Mobile Source Air Toxics Rule (MSAT) effects.

3.4.2.7. Noise

Should a project be advanced with federal funds, it will be necessary to establish whether the project is a "Type I Project" as defined in 23 CFR 772.5(h). Type I projects involve:

- Construction of a highway on a new location;
- The physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes; or
- The potential for creating a traffic noise impact (e.g., idling vehicles at rest areas, weigh stations).

A detailed noise analysis would be required for a Type I project. If it is determined that the project is not Type I, it is then considered a Type III project which does not require a noise analysis or consideration of noise abatement. Type II projects are retrofit noise abatement projects.

If a project is forwarded, future construction activities may cause localized, short-duration noise impacts.

3.4.3. Visual Resources

Visual resources refer to the landscape character (what is seen), visual sensitivity (human preferences and values regarding what is seen), scenic integrity (degree of intactness and wholeness in landscape character), and landscape visibility (relative distance of seen areas) of a geographically defined view shed. The landscape throughout the area contains an array of biological, scientific, historic, wildlife, ecological, and cultural resources mixed with a remote location.

The Bitterroot River riparian corridor, the Kelly Island Fishing Access Site, Lolo National Forest land, and a large conservation easement in the McCauley Butte area provide areas of natural open space.

3.4.4. Biological Resources

Existing information on wildlife, fisheries and special status species known to occur or that may potentially occur in the area was reviewed from a variety of sources including the U.S. Fish and Wildlife Service (USFWS), the MFWP, the Montana Natural Heritage Program (MNHP), and other resource documents. This limited survey is not intended to be a complete and accurate biological survey of the study area. A complete biological survey of the area would be needed before potential selection of a specific project site, if a project is forwarded.

3.4.4.1. Wildlife and Fish

General fish and wildlife resources would need to be surveyed during any future project development process. MFWP should be contacted during the project development process for local expertise regarding the wildlife and fisheries resources of the area. If a project is forwarded from the option(s), encroachment into the waterway and the associated riparian habitat should be minimized to the extent practicable.

Wildlife Resources

The most common forms of wildlife found on the developed lands in the area include species adapted to suburban life and some level of human disturbance as well as other species that make use of river and its riparian areas as permanent habitat and movement corridors. These include mule and white-tailed deer, small mammals (like coyote, red fox, squirrels, raccoons, skunks, beaver, mink), and a variety of rodents. Additionally, there are areas of winter range for elk, mule deer, and white-tailed deer located in the mountains and foothills in the area. Other species like moose, black bear, and mountain lion may occasionally pass through the riparian corridors and forested lands in the area.

Numerous species of birds occur in this portion of the Missoula area including ospreys, sandhill cranes, wild turkey, ringed-neck pheasant, a variety of raptors (osprey, bald eagles, falcons, and hawks), owls, woodpeckers, migratory waterfowl, and many neo-tropical migratory birds (flycatchers, warblers, vireos, grosbeaks, and orioles).

Amphibians and reptiles occurring in the area include spotted frog, leopard frog, bull frog, western yellow-bellied racer, western garter snake, and western painted turtle.

AQUATIC RESOURCES

The major surface waters found within the area include the Bitterroot River, Clark Fork River, O'Brien Creek, and the Big Flat Ditch. All of these waters, except for the Big Flat Ditch, are managed as fisheries by the MFWP. The Bitterroot and Clark Fork Rivers have been rated as Outstanding for their fisheries resource value by MFWP. Both streams receive recreational angler use year-round for sport fishing although restrictions exist relative to fishing for certain species. O'Brien Creek has a Moderate rating for its fisheries resource value and is open to use by anglers on a seasonal basis.

According to maps developed by the USFWS, the Bitterroot and Clark Fork Rivers and O'Brien Creek are designated as Bull Trout Critical Habitat (BTCH).

3.4.4.2. Threatened and Endangered Wildlife Species

The federal list of endangered and threatened species is maintained by the USFWS. Species on this list receive protection under the Endangered Species Act (ESA). An 'endangered' species is one that is in danger of extinction throughout all of a significant portion of its range. A 'threatened' species is one that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The USFWS also maintains a list of species that are candidates or proposed for possible addition to the federal list.

The endangered, threatened, proposed, and candidate species list for Montana Counties (March 2012) was obtained from the USFWS website. This list identifies the counties where one would reasonably expect the species to occur, not necessarily every county where the species is listed. **Table 5** shows the listed species that could potentially occur within Missoula County and provides information about habitats where these species typically occur.

Table 5: USFWS Endangered, Threatened, Proposed, and Candidate Wildlife Species

Common Name	Scientific Name	USFWS Status	Habitat Requirements
Bull Trout	*Salvelinusconfluentus*	Threatened, Critical Habitat Designated	Bull trout are found in the Clark Fork and Flathead drainages of western Montana. Sub-adult and adult fluvial bull trout reside in larger streams and rivers and spawn in smaller tributary streams, whereas adfluvial bull trout reside in lakes and spawn in tributaries. Within the Maclay Bridge area, the Bitterroot River, Clark Fork River, and O'Brien Creek are designated as Critical Habitat for bull trout.
Grizzly Bear	*Ursusarctoshorribilus*	Threatened	In Montana, Grizzly Bears primarily use meadows, seeps, riparian zones, mixed shrub fields, closed timber, open timber, sidehill parks, snow chutes, and alpine slabrock habitats. Grizzly bear habitat and recovery zones in Missoula County include the Seeley, Swan, and Jocko Valleys, lower Mission Valley, and portions of the upper Rattlesnake watershed.
Canada Lynx	*Lynx Canadensis*	Threatened, Critical Habitat Designated	West of the Divide, Canada Lynx generally occur in subalpine forests at elevations between 4,000 to 7,000 feet in stands composed of pure lodgepole pine but also mixed stands of fir, pine, larch, and hardwoods. Habitat for the species does not exist in the Maclay Bridge area.
Wolverine	*Gulogulolus cus*	Candidate	Wolverines live in remote and inhospitable places away from human populations. In the northern Rocky Mountains, wolverines are restricted to high mountain environments near the treeline, where conditions are cold year-round and snow cover persists well into the month of May. Habitat for the species does not exist in the Maclay Bridge area.
Yellow Billed Cuckoo (Western Population)	*Coccyzusamericanus*	Candidate	Western cuckoos breed in large blocks of riparian habitats, particularly woodlands with cottonwoods and willows. This candidate species requires patches of at least 25 acres of dense, riparian forest with a canopy cover. This habitat may be present in the Maclay Bridge area.

Source: USFWS, List of Endangered, Threatened, Proposed and Candidate Species Montana Counties.

An evaluation of potential impacts to all endangered, threatened, proposed, or candidate species will need to be completed during the project development process.

3.4.4.3. Montana Animal Species of Concern

Wildlife species of concern are native Montana animals that are considered to be "at risk" due to declining population trends, threats to their habitats, and/or restricted distribution. Designation of a species as a Montana Animal Species of Concern (or Potential Species of Concern) is not a statutory or regulatory classification. The designation as a Species of Concern provides a basis for resource managers and decision-makers to make proactive decisions regarding species conservation and data collection priorities. Each Species of Concern is assigned a state numeric rank ranging from S1 (highest risk, greatest concern) to S5 (demonstrably secure, least concern) reflecting the degree of risk to each species based on available information. Other state ranks applied to Species of Concern include: SU (unrankable due to insufficient information), SH (historically occurred), and SX (believed to be extinct). State ranks may be followed by modifiers, such as B (breeding), N (non-breeding), or M (migratory).

Table 6 lists the animal species of special concern by the Montana Heritage Program in the study area. The results of the data search reflect the current status of their data collection efforts. These results are not intended as a final statement on sensitive species within a given area, or as a substitute for on-site surveys. If a project is forwarded from the option(s), on-site surveys will need to be completed during the project development process.

Table 6: Montana Animal Species of Concern

Common Name	Scientific Name	State Rank	MNHP Known Occurrences in Maclay Bridge Area
Westslope Cutthroat Trout	*Oncorhynchus clarkia lewisi*	S2	Yes
Hoary Bat	*Lasluruscinereus*	S3	Yes
Fisher	*Martespennanti*	S3	Possible on Lolo National Forest
Black-backed Woodpecker	*Picoidesarcticus*	S3	Yes
Western Skink	*Eumecesskiltonianus*	S3	Yes
Fringed Myotis	*Myotisthysanodes*	S3	Yes
Grasshopper Sparrow	*Ammodramussavannarum*	S3B	Yes
Cassin's Finch	*Carpodacyscassinii*	S3	Yes
Pileated Woodpecker	*Dryocopuspileatus*	S3	Yes
Lewis's Woodpecker	*Melanerpeslewis*	S2B	Yes
Flammulated Owl	*Otusflammeolus*	S3B	No
Bald Eagle	*Halieetusleucocephalus*		Yes
Great Blue Heron	*Ardeaherodias*	S3	Yes

Source: Montana Natural Heritage Program, Animal and Plant Species of Concern Searchable Database.

3.4.4.4. Vegetation

This portion of the Missoula Valley contains isolated remnants of native vegetation. Areas of native dry grasslands, open ponderosa pine forest, and riparian deciduous forests and associated wetlands exist along the Bitterroot and Clark Fork Rivers. Vegetation in developed areas consists of ornamental trees and shrubs, lawns, and flowerbeds associated with residential landscapes. The area also contains areas of cultivated lands.

THREATENED AND ENDANGERED PLANT SPECIES

The online database of threatened, endangered, proposed, and candidate plant species maintained by the USFWS identifies two plants—Water Howellia and Whitebark Pine—as potentially occurring in Missoula County. Water Howellia is a threatened plant species and the Whitebark Pine is a candidate species for listing. **Table 7** presents habitat requirements for each of these species. Known occurrences and habitat requirements suggest these plants are unlikely to occur in the area.

Table 7: USFWS Endangered, Threatened, Proposed, and Candidate Plant Species

Common Name	Scientific Name	USFWS Status	Habitat Requirements
Water Howellia	*Howelliaaquaticus*	Threatened	Water howellia is a winter annual aquatic plant that grows in small, vernal, freshwater wetlands that have an annual cycle of filling up with water over the fall, winter and early spring, followed by drying during the summer. The wetlands typically consist of small shallow ponds within a matrix of forest vegetation and are usually bordered in part by deciduous trees. Known occurrences of the species in Montana are all within the Swan River drainage in the northeastern portion of Missoula County.
Whitebark Pine	*Pinusalbicaulis*	Candidate	Whitebark pine typically occurs in isolated stands on cold and windy high-elevation or high-latitude sites in western North America. This habitat does not exist in the Maclay Bridge area.

Source: USFWS, List of Endangered, Threatened, Proposed and Candidate Species Montana Counties.

As with listed wildlife species, consultation with the USFWS will be necessary and an evaluation of potential impacts to all listed, candidate, and proposed plant species must be completed if a project is forwarded.

PLANT SPECIES OF CONCERN

The file search of the MNHP database lists one plant species of concern—Toothcup (*Rotalaramosior*)—in the area. Toothcup is a rare plant identified from only a limited number of wetland sites in western Montana.

The results of the MNHP database search are not intended as a final statement on sensitive species within a given area, or as a substitute for on-site surveys. If a project is forwarded, a determination will need to be made if there is a need for any on-site surveys for plant species of concern during the project development process.

NOXIOUS WEEDS

Noxious weeds degrade habitat, choke streams, crowd native plants, create fire hazards, poison and injure livestock and humans, and fouls recreation sites. Areas with a history of disturbance are at particular risk of weed encroachment. There are 32 noxious weeds in Montana, as designated by the Montana Statewide Noxious Weed List (effective April 15, 2008). According to the Montana Invaders Database, there are documented occurrences of 20 noxious weed species in Missoula County since 1875. The area will need to be surveyed for noxious weeds. County Weed Control Supervisors should be contacted regarding specific measures for weed control during project development.

3.4.5. CULTURAL AND ARCHAEOLOGICAL RESOURCES

Section 106 of the National Historic Preservation Act (36 CFR 800) establishes requirements for taking into account the effects of proposed Federal, Federally assisted or Federally licensed undertakings on any district, site, building, structure or object included in or eligible for inclusion in the National Register of Historic Places (NRHP).

A Cultural Resources Information System (CRIS) and Cultural Resources Annotated Bibliography (CRABS) file search was conducted for the area. The CRABS file search indicates 26 cultural resource surveys have been conducted on lands within or near the area between 1978 and 2010. The CRIS file search identified 28 recorded properties within the area including one National Register-listed site—the Fort Missoula Complex (24MO0266).

If a project is forwarded from the Planning Study, a cultural resource survey of the Area of Potential Effect (APE) for the project as specified in Section 106 of the National Historic Preservation Act would need to be conducted. Section 106 outlines a process to identify historic properties that could be affected by the undertaking, assess the effects of the project and investigate methods to avoid, minimize or mitigate any adverse effects on previously recorded and newly discovered historic or archaeological resources.

3.4.5.1. 4(f) Resources

A review was conducted to determine the presence of Section 4(f) properties along the corridor. Section 4(f) refers to the original section within the Department of Transportation Act of 1966 (49 U.S.C. 303), which sets the requirements for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. A table and graphic showing 4(f) resources is included in the Environmental Scan (**Appendix 2**). **Table 8** summarizes potential Section 4(f) resources found within the Maclay Bridge area.

Prior to approving a project that “uses” a Section 4(f) resource, FHWA must find that there is no prudent or feasible alternative that completely avoids 4(f) resources. “Use” can occur when land is permanently incorporated into a transportation facility or when there is a temporary occupancy of the land that is adverse to a 4(f) resource. Constructive “use” can also occur when a project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under 4(f) are “substantially impacted”.

Section 4(f) does not apply to projects that do not use federal transportation funding.

Table 8: Summary of Potential Section 4(f) Resources

Name	Type of 4(f) Resource	Comments /Location
Kelly Island FAS	Public Recreation Site	666-acres site located at confluence of Bitterroot and Clark Fork Rivers, owned and managed by MFWP
Rosecrest Park [(a)]	Greenway Park	9.6 acres located south Spurgin Road between Clement Road and 37th Avenue. Contains soft-surface non-motorized pathway. County ownership
Schmautz Park [(a)]	Neighborhood Park	4.2 acre, developed parcel (play equipment & picnic shelter) located north of North Avenue and west of 42nd Avenue. County ownership
Target Range School Playground **Target Range School (24MO0589)**	Neighborhood Park Historic School	10 acre area containing sports fields, basketball courts, and play equipment. Target Range School is listed on National Register.
Dinsmore River Four	Conservation Park	Bitterroot River island habitat located south of existing Maclay Bridge County ownership
Double R Acres	Conservation Park	Clark Fork River riparian habitat adjoining Kelly Island FAS. County ownership
O'Brien Cr. Meadows Common Area	Conservation Park	O'Brien Creek riparian area located near intersection of Big Flat Road and O'Brien Creek Road. County ownership. Identified in Missoula County Parks and Conservation Lands Plan (1997)
Capi Court Park [(a)]	Unimproved County Park	North of Spurgin Road and east of Sierra Drive
Five Valley Land Trust Conservation Easements	Wildlife Habitat/Public Use	Various locations along Bitterroot River
Lolo National Forest Lands	Public Multiple-use Property	Southwestern portion of Environmental Scan Area, part of Blue Mountain Recreation Area
Rice Property (24MO05I7)	Historic Residence and Outbuildings	Consensus determination of eligibility for National Register
Maclay Property (24MO05I9)	Historic Residence and Outbuildings	Recommended as eligible for National Register
Maclay Bridge (24MO052I)	Historic Vehicular/Foot Bridge	Determined eligible for National Register. Owned by Missoula County
Big Flat Ditch (24MO0587) **Missoula Irrigation District Ditches (24MO0520)**	Historic Irrigation Systems	Consensus determination of eligibility for National Register

Sources: 1) Montana Historical Society, CRIS File Search Results, 3/21/2102; 2) Missoula County Parks and Conservation Lands Plan, 1997.; 3) Missoula County, Final Draft Parks and Trails Master Plan, 2012.

(a) Capi Court, Rosecrest Park, and Schmautz Park are county parks that are the result of subdivision park and open spaces requirements from the Missoula County Subdivision Regulations, section 3-080.

3.4.5.2. 6(f) Resources

Section 6(f) of the Land and Water Conservation Fund Act (LWCF) (16USC, Section 4601 et. seq.) provides funds for buying or developing public use recreational lands through grants to local and state governments. Section 6(f)(3) of the Act prevents conversion of lands purchased or developed with LWCF funds to non-recreation uses, unless the Secretary of the Department of Interior (DOI), through the National Park Service (NPS), approves the conversion.

A review of the LWCF grants in Missoula County maintained by MFWP shows that Kelly Island Fishing Access Site (FAS) is the only property in the area acquired/improved under Section 6(f) of the LWCF.

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Chapter 4
NEEDS AND OBJECTIVES

Needs and objectives were derived based on a comprehensive review of existing data and input from resource agencies, stakeholders and the public and were used to develop options. The following needs and objectives reflect the existing social, environmental, and engineering conditions described in the Existing and Projected Conditions Report (**Appendix 3**) and recognize the local and regional use of the Maclay Bridge and the surrounding transportation system.

4.1. NEED NUMBER 1:

Improve the safety and operation of the river crossing and connecting roadway network.

The single-lane bridge on a two-way, two-lane roadway does not accommodate simultaneous travel in two directions. Several crash trends have been previously identified at the bridge or on roadways leading to the bridge. Trends relative to safety are caused by a variety of factors, including poor roadway alignment, inadequate sight distance, and illegally parked cars.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Improve sub-standard elements of facilities to meet current applicable design standards.
- Reduce delay and vehicle restriction for emergency responders under existing and future traffic demands.
- Manage travel speeds and provide adequate clear zones to improve operations.

4.2. NEED NUMBER 2:

Provide a long-term river crossing and connecting roadway network that accommodates planned growth in the Maclay Bridge area.

The Maclay Bridge is used by local and regional travelers including pedestrians, bicyclists, emergency response providers, and school buses. Depending on future growth characteristics as depicted in local adopted planning documents, the Maclay Bridge will realize increased passenger and vehicular traffic.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Accommodate existing and future capacity demands.
- Address non-motorized facilities consistent with local planning efforts.
- Provide connectivity to neighborhood residents, and regional users accessing recreational lands to the west of the Bitterroot River.

4.3. NEED NUMBER 3:

Minimize adverse impacts from options to the environmental, cultural, scenic and recreational characteristics of the study area.

The area around the Maclay Bridge provides access to residential, agricultural and recreational lands. Because of the location along the Bitterroot River, wildlife and aquatic connectivity are areas of concern. Improvements should be considered that provide both wildlife and aquatic connectivity. All improvements

should be reviewed for their potential impact to the environmental, scenic, cultural, recreational and agricultural aspects of the corridor.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Minimize adverse impacts to the Bitterroot River from potential options.
- Minimize adverse impacts to the wildlife and aquatic organisms from potential options.
- Provide reasonable access to recreational sites in the study area (Kelly Island Fishing Access Site, Lolo National Forest, and Missoula County Parks).
- Avoid or otherwise minimize adverse impacts to historic, cultural, and archaeological resources that may result from implementation of options.

4.4. NEED NUMBER 4:

Minimize adverse impacts from options to the neighborhood characteristics of the study area.

OBJECTIVES (TO THE EXTENT PRACTICABLE)

- Implement improvements with special sensitivity to area schools.
- Minimize impacts to existing residents and businesses in the area.
- Recognize the historic value of the Maclay Bridge to the community and the role it plays in local regional events.

4.5. OTHER CONSIDERATIONS (TO THE EXTENT PRACTICABLE)

- Options should be sensitive to the availability of funding for recurring maintenance obligations or for the construction of new improvements.

The subject of parking, vandalism, illegal activity, and enforcement, along with perpetuating access to recreational sites directly adjacent to the Maclay Bridge, are areas of concern generally outside the scope of this Maclay Bridge Planning Study. However, they are areas of concern that have been documented and commented on by members of the public.

Chapter 5
OPTION IDENTIFICATION

5.1. OPTION IDENTIFICATION

A full range of options were developed for analysis based on the identified transportation system needs and objectives. The needs and objectives were developed through an evaluation of the information contained in the Existing and Projected Conditions Report (**Appendix 3**).

Broad categories of options are identified below. Each broad category has various types of options and is discussed in more detail later in this chapter:

- Option 1 – Improve Safety and Operations on the Existing Bridge
- Option 2 – Rehabilitate the Existing Bridge
- Option 3 – Build New Bridge
- Option 4 – Do Nothing

5.1.1. Option 1: Improve Safety and Operations on the Existing Bridge

A range of options were identified that would improve safety and operations at the Maclay Bridge. These options include enhancing traffic operations and safety on and near the existing bridge, and implementing new restrictions on the use of the bridge. These options would not change the alignment of the approaches to the existing structure or the roadways leading to the Maclay Bridge.

Under this option Missoula County would continue to perform routine maintenance activities on the existing bridge to keep the structure in service under its load limitation for use by local residents, school buses, and emergency service vehicles. Some sub-options include the bridge being removed, or left for non-motorized uses. In these cases maintenance may not be required with the same frequency as if the bridge was left in service for vehicular traffic.

5.1.1.1. Option 1A–Enhance Traffic Operations and Safety on and near the Existing Structure

This option would involve a variety of periodic maintenance activities to improve use for local residents, school buses, and emergency vehicles. There would be no changes to the configuration or alignment of the approaches to the existing structure or roadways within the area beyond the safety improvements currently being implemented by the County and MDT. To help manage traffic flows across the bridge, new metering devices would be installed along each approach to regulate traffic flows by direction and address vehicles having to back up so oncoming traffic can get off the bridge. This option would include street lighting at the westerly approach to the bridge, with appropriate signage on both ends to warn of the change in roadway alignment. Pedestrian and bicyclist travel through the area would continue to occur on the existing bridge and its adjoining roadways.

5.1.1.2. Option 1B–Maintain Current Usage and Add Pedestrian/Bicyclist Facilities

This option would construct separated pedestrian/bicyclist facilities in the vicinity of Maclay Bridge and make limited improvements for non-motorized users on the approaches to the bridge to enhance safety for non-motorized users. These limited improvements could consist of shoulder widening on River Pines Road, signing and striping on both sides of the bridge, and pavement markings. A new, separated non-motorized bridge would be necessary adjacent to the existing Maclay Bridge.

5.1.1.3. Option 1C–Implement Additional Restrictions on Bridge Use

This option would involve placing additional operational restrictions on the use of the Maclay Bridge. These restrictions may include measures such as:

- Restricting vehicle use of the structure to one travel direction (i.e. a one-way route);
- Further reducing travel speeds;
- Prohibition of use by all large trucks, school buses, and emergency vehicles; or
- Increased enforcement of parking ordinance (no tolerance policy).

There would be no changes to the alignment of the approaches or roadways within the area beyond the safety improvements currently being implemented by the County and MDT.

5.1.1.4. Option 1D–Close Bridge to Vehicles and Retain Use for Non-Motorized Travel Modes

This option would close the Maclay Bridge to vehicular traffic but allow the structure to remain in service as a river crossing for pedestrians and bicyclists and other non-motorized transportation modes. Vehicle access across the Bitterroot River would be accommodated by other existing bridges and roadways in the area (Kona Ranch Bridge via Mullen Road or Blue Mountain Road via US Highway 93). Further investment by the County in active transportation facilities in the Maclay Bridge area would likely be necessary on River Pines Road and North Avenue to provide system continuity.

The permanent closure of the bridge to vehicles would eliminate through traffic on North Avenue and River Pines Road and inconvenience local residents and visitors seeking recreational opportunities on nearby public lands.

5.1.1.5. Option 1E–Retain Bridge for Two-Way Travel and Provide New Bridge Elsewhere for Two-Way Travel

This option would involve keeping the existing bridge in service for vehicular traffic but providing another structure somewhere else in the area to help meet existing and projected travel demands. The new, 2-lane structure would provide for two-way travel; however the existing Maclay Bridge would remain as-is.

5.1.1.6. Option 1F– New One-Lane Bridge at a New Location & Retain Existing Bridge for Non-Motorized Uses

The concept of a new one-lane bridge at a South Avenue Extension was put forth by the public. The function of this bridge would be similar to that of the existing bridge on North Avenue, carrying two-way vehicular traffic across a new one-lane bridge at South Avenue. The existing Maclay Bridge could remain as an exclusive non-motorized facility.

5.1.1.7. Option 1G–New One-Lane Bridge at a New Location for One-Way Travel and Retain Existing Bridge for One-Way Travel

Building upon the concept described in **Section 5.1.1.6**, the concept of a “one-way” couplet of roadways was discussed. In this concept, the existing Maclay Bridge would remain and be used for one-way travel only (i.e. westbound or eastbound travel only). In addition, a new single lane bridge at the extension of South Avenue would also be used for one-way travel (in the opposite direction from that of the existing Maclay Bridge).

5.1.1.8. Option 1H–Close Bridge and Remove Structure

This concept involves closing the Maclay Bridge and removing the structure. No replacement bridge would be provided in the area. With no river crossing in the vicinity of the Maclay Bridge, vehicles which currently use the bridge would be required to divert to Blue Mountain Road and US Highway 93 or to Mullan Road using the Kona Ranch Bridge. This would require roadway closures with barricades and the provision of adequate turnaround areas for vehicles near the ends of the existing bridge. Utilities installed on the bridge would need to be relocated. The river crossing would no longer be available to users of non-motorized transportation modes. The existing Maclay Bridge easement area, particularly the area east of bridge, offers potential for providing parking area and enhancing river access.

The permanent closure of the bridge would eliminate through traffic on North Avenue and River Pines Road and inconvenience local residents and visitors seeking recreational opportunities on nearby public lands.

5.1.2. Option 2: Rehabilitate the Existing Bridge

Rehabilitation options were developed that include both the structure only and also the structure with approach work. Rehabilitation does not address the functionally obsolete or fracture critical status of the existing structure.

5.1.2.1. Option 2A–Minor Rehabilitation (Structure Only)

The goal of a minor rehabilitation would be to extend the life of the bridge by performing minor upgrades and repairing deterioration and damage. Ongoing inspections and related maintenance activities would still be needed. Missoula County would continue to perform routine maintenance activities to keep the structure in service under its load limitation for use by local residents, school buses and emergency service vehicles. With repair and maintenance the bridge life could be extended depending on the rate of deterioration, aggressiveness of ongoing repair and maintenance work, and barring major damage from flooding and/or vehicles. It would not eliminate inherent safety concerns. The context and frequency of maintenance and repair activities would probably increase over time. An engineering analysis may be appropriate to better understand the ability of the bridge to pass flood events. Minor rehabilitation would typically include rehabilitation work tasks such as:

- Tighten and/or replace loose bolts;
- Spot painting of structural steel;
- Upgrade bearings and expansion devices;
- Crack sealing of asphalt surfacing to prolong surface;
- Minor repairs and upgrades to the truss and floor system to increase load capacity;
- Patch deteriorated or spalled concrete; and/or
- Safety improvements such as adding a pedestrian rail.

Minor rehabilitation work is not a “one time only” application. Minor rehabilitation activities may be required on a frequency of every two-to-three years over the life of the bridge. Rehabilitation efforts on the existing bridge have been performed at least four times over the last 18 years (April, 1997 and during the summers of 2003, 2004 and 2005 – see Existing and Projected Conditions Report [**Appendix 3**]).

With minor rehabilitation, the posted vehicle weight limit restriction could be increased from the current 11 tons to around 13 tons.

5.1.2.2. Option 2B–Major Rehabilitation (Structure Only)

The goal of a major rehabilitation would be to extend the life of the bridge to something similar to that of a new bridge. The scope of the rehabilitation would require an in-depth engineering study. Major rehabilitation work could allow the bridge to handle full legal loads so there would be no need for a load posting. Like minor rehabilitation, ongoing inspections and related maintenance activities would still be needed. This option requires a long term financial commitment to the existing bridge due to the increase in life span. The ultimate life span of the bridge would be dependent on the rate of deterioration, aggressiveness of ongoing repair and maintenance work, and barring major damage from flooding and/or vehicles. A major rehabilitation does not eliminate the necessity for periodic maintenance.

Since the extent of the needed rehabilitation is unknown, major rehabilitation work requires an engineering study of the truss, floor system, abutments, and piers. This typically requires more engineering development time. The cost of a major rehabilitation can be similar to the cost of a new bridge.

Major rehabilitation of the existing bridge to attain longer life and higher load ratings would likely consist of the following specific work features:

- Sand blast rusted steel members and re-paint as needed;
- Replace steel stringers and floor beams as determined necessary;
- Upgrade truss members as determined necessary;
- Evaluate abutments and piers for repair or replacement;
- Replace bearing devices; and/or
- Replace the short span pony truss with a new one lane truss.

Rehabilitating the main truss would likely require removing the main truss from the river, rebuilding or repairing offsite and installation. With major rehabilitation, the posted vehicle weight limit restriction could be increased from the current 11 tons to around 25 tons.

5.1.2.3. Option 2C–Minor Rehabilitation (includes Approaches)

This option is similar in scope to option 2A for the existing structure and also includes modifications to the bridge approaches to bring them up to current standards. Similar to the North 1 option described later in this chapter, approach alignment work would begin on North Avenue at its intersection with Edward Avenue. The alignment of River Pines Road west of the river would be improved to eliminate the 90-degree curve at the west end of the existing bridge and would extend beyond the west end of the current bridge.

5.1.2.4. Option 2D–Major Rehabilitation (includes Approaches)

This option is similar in scope to option 2B for the existing structure and also includes modifications to the bridge approaches to bring them up to current standards. Similar to the North 1 option described later in this chapter, approach alignment work would begin on North Avenue at its intersection with Edward Avenue. The alignment of River Pines Road west of the river would be improved to eliminate the 90-degree curve at the west end of the existing bridge and would extend beyond the west end of the current bridge.

5.1.3. Option 3: Build New Bridge

Options for a new bridge and associated roadway were identified at 14 possible locations. The locations were selected based on their inclusion in the previous Environmental Assessment (1994) and a field and aerial mapping review of other possible locations. Details on the possible length and width of the new bridges and corresponding roadways were assumed as part of the screening process for cost estimating purposes (**Appendix 3, Screening Assessment Memorandum**), however exact configurations are design level details that would be decided during preliminary engineering and environmental document development. Any new bridge would need to meet current design standards in place and recognized by the participating agencies. Depending on mitigation requirements resulting from the permitting process for a new bridge, Missoula County may have to make decisions relative to the long-term use of the structure. An example is if a new bridge was built at a new location and the permitting process does not dictate the removal of the existing Maclay Bridge, Missoula County would have to decide whether to remove the structure or allow it to remain for non-vehicular uses.

5.1.3.1. Option 3A - At North Avenue

Option 3A includes options to build a new structure at or near the existing North Avenue alignment.

5.1.3.1.1. Build on Existing Alignment

Option 3A.1 - Build on Existing Alignment

One option for a replacement bridge would be to rebuild a 2-lane bridge on the present alignment. This option would not change the alignment of the approaches to the existing structure or the roadways leading to the Maclay Bridge. This option is for the construction of a new bridge at the present location of the existing bridge, with minimal roadway work.

5.1.3.1.2. Build near Existing Alignment

Option 3A.2 - North 1 Alignment

This option provides a new bridge parallel to and just upstream from the existing Maclay Bridge. The alignment begins on North Avenue at its intersection with Edward Avenue. The alignment of River Pines Road west of the river would be improved to eliminate the 90-degree curve at the west end of the existing bridge. Approach work on the west side of the river would extend beyond the west end of the current bridge. This option would require the removal of the existing structure.

Option 3A.3 - North 2 Alignment

This alignment extends North Avenue due west from Edward Avenue to River Pines Road about 825' southwest of the existing Maclay Bridge. The alignment would cross the island in the Bitterroot River just upstream from the existing bridge.

5.1.3.2. Option 3B - At a New Location

A total of 16 alternatives were considered in the 1994 EA for the *Maclay Bridge Site Selection Study* which included 13 locations for a bridge on a new alignment in the general area. The new bridge locations and associated alignments considered included:

- An alignment extending South 3rd Avenue across the river;
- An alignment extending Spurgin Road across the river;
- 2 alignments extending Mount Avenue across the river;
- 2 alignments extending Edwards Avenue across the river;
- 2 alignments along North Avenue near the existing bridge (described earlier in section 5.1.3.1.2);
- 2 alignments extending South Avenue across the river;

- 2 alignments extending Sundown Road across the river; and
- An alignment extending Humble Road across the river to Blue Mountain Road.

Figure 4 shows the locations of the alignments considered in the 1994 EA.

Figure 4: Bridge Alignments Considered in 1994 EA

The graphics from the 1994 EA illustrating these potential alignments were schematic in nature and were intended to illustrate the location concepts for a new bridge and roadway connections. The bridge alignments described in the 1994 EA are discussed in the following sections.

5.1.3.2.1. Build Bridge on Northern Alignment

OPTION 3B.1 - SOUTH 3RD STREET WEST EXTENSION

This potential alignment extends from the intersection of South 3rd Street West and Clements Road west towards the Clark Fork River and continues southwesterly along the Clark Fork before turning to the south near the intersection of South 7th Street West and Humble Road. From this point, the alignment continues southwesterly across Spurgin Road and follows a tangent (straight) alignment across the Bitterroot River to end at the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection.

OPTION 3B.2 - SPURGIN ROAD EXTENSION

This alignment begins near the intersection of Spurgin Road and Sierra Drive. After a long horizontal curve, the alignment continues southwesterly through agricultural lands before crossing the Bitterroot

River on a tangent (straight) alignment that ends at the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection. This option would follow the same alignment as the South 3rd Street West alignment at the river crossing and west of river.

5.1.3.2.2. Build Bridge on Mount Avenue Alignment

OPTION 3C.1 - MOUNT 1

This alignment begins near the intersection of Mount Avenue and Humble Road and continues west across the Bitterroot River. After crossing the river, this option follows a tangent alignment and ends at the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection.

OPTION 3C.2 - MOUNT 2

This alignment begins at the same location as the Mount 1 alignment. However, the proposed alignment immediately proceeds in a southwesterly direction alternative across the Bitterroot River and joins River Pines Road at the west end of the existing Maclay Bridge.

5.1.3.2.3. Build Bridge on Edward Avenue Alignment

OPTION 3D.1 - EDWARD 1

This alignment option begins near the intersection of Edwards Avenue and Humble Road and proceeds westerly across the Bitterroot River before turning southwesterly and continuing to the intersection of River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road.

OPTION 3D.2 - EDWARD 2

This alignment starts near the intersection of Edwards Avenue and Humble Road. After proceeding westerly for a short distance along an extension of Edwards Avenue, the alignment quickly transitions to a southwesterly direction across the Bitterroot River and joins River Pines Road at the west end of the existing Maclay Bridge.

5.1.3.2.4. Build Bridge on South Avenue Alignment

OPTION 3E.1 - SOUTH 1

This alignment involves extending South Avenue in a northwesterly direction across the Bitterroot River to join with River Pines Road. This alignment begins on South Avenue west of Hanson Drive (the current terminus) and continues northwesterly to join River Pines Road about 0.2 miles east of the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection.

OPTION 3E.2 - SOUTH 2

This alignment would extend from South Avenue west of Hanson Drive (the current terminus) due west across the Bitterroot River to meet Blue Mountain Road at a location about 600 feet southeast of the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection.

5.1.3.2.5. Build Bridge on Sundown Road Alignment

OPTION 3F.1 - SUNDOWN 1

This alignment begins at the existing western terminus of Sundown Road and extends northwesterly across the Bitterroot River to join Blue Mountain Road at the sharp curve located about 0.25 miles southeast of the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection.

OPTION 3F.2 - SUNDOWN 2

This alignment begins at the existing western terminus of Sundown Road and extends due west across the river to meet Blue Mountain Road at a location about 0.43 miles south of the River Pines Road/O'Brien Creek Road/Big Flat Road/Blue Mountain Road intersection.

5.1.3.2.6. Build Bridge on Southern Alignment

OPTION 3G.1 - HUMBLE ROAD-BLUE MOUNTAIN ROAD

This alignment option begins at the current western terminus of Humble Road and continues west and south to cross the Bitterroot River to Maclay Flats. From that point, the alignment extends southeasterly across Maclay Flats before turning south to join a north-south section of Blue Mountain Road. The southern end of the alignment is located about 0.78 miles from the intersection of Blue Mountain Road and US Highway 93.

5.1.3.2.7. New Bridge at a New Location Not Identified in the 1994 EA

OPTION 3H.1 – NEW LOCATION NOT IDENTIFIED IN THE 1994 EA

The study area was examined to determine if another, more suitable location could be identified for a new bridge crossing at a location other than those identified in the 1994 EA. It was concluded that no such location existed, and that those alignments identified in the original 1994 EA represented the complete array of possible new bridge locations. The alignments in the 1994 EA were determined to represent the complete array of practicable locations for a new bridge crossing.

5.1.4. OPTION 4: DO NOTHING

5.1.4.1. Option 4A–Do Nothing

This option represents the current situation for the Maclay Bridge and its surroundings. The bridge would remain in its present configuration and traffic operations at and near the Maclay Bridge would be unchanged. Missoula County would continue to perform routine maintenance activities to keep the structure in service under its load limitation (11 tons). There would be no changes to the configuration or alignment of the approaches to the existing structure or roadways within the area beyond the safety improvements currently being implemented by the County and MDT. Pedestrian and bicyclist travel through the area would continue to occur on the existing roadway or other facilities in the Maclay Bridge area.

Chapter 6
OPTIONS CARRIED FORWARD

6.1. OPTION SCREENING

Screening is used to describe the process for reviewing a range of conceptual options or strategies and determining which ones to carry forward for more evaluation and study. The primary function of screening is to determine feasible and practicable options that address the identified needs and objectives.

Items or considerations used to evaluate options are referred to as screening criteria. Screening may be carried out through one or more iterations (levels) with the screening criteria for each level becoming more specific. Screening may rely upon qualitative or quantitative screening criteria. Qualitative criteria refer to subjective evaluations often based on ratings (yes/no, excellent to poor, high to low, or pass/fail). Quantitative criteria refer to items that can be readily calculated or quantified through analysis like construction costs, right-of-way needs/relocations, or general areas of impact.

The *Maclay Bridge Planning Study* utilized a first and second level screening process. The first level screening was used to identify options that fail to meet the critical aspects of the study's needs and objectives or that may have had "fatal flaws" with respect to other key factors (i.e. a potential option may consist of a new roadway alignment that traverses directly through a conservation easement that is prohibited from development of any type). The first level screening provided an initial evaluation of a wide range of potential options or strategies. The results of the first level screening narrowed the set of options or strategies to those with the greatest capacity to address identified areas of concern and satisfy the study needs and objectives.

The second level screening built upon the first level screening by taking the options that were carried forward from the first level and performing an evaluation against certain needs and objectives. The second level screening was more extensive in that more elements based on parameters such as cost, traffic, environmental impacts, etc., were be used to screen the options.

6.1.1. First Level Screening

The first level screening criteria consisted of two questions to establish how well potential options met basic safety performance and connectivity needs as follows:

- *Would the option improve safety on the bridge and its approaches?*
- *Does the option provide an efficient connection with the street network/road system in the area?*

The first level screening assessment allowed for a simple YES or NO answer to the two questions. The analysis was qualitative and intended to identify options that complied with the identified needs and objectives. Options not meeting the identified needs and objectives as determined thru this first level screening were eliminated in accordance with 23 CFR, which allows for the elimination of alternatives from further consideration due to lack of demonstration of meeting needs and objectives.

Table 9 summarizes the first level screening criteria, identifies why they are important screening considerations, and relates each consideration to a specific identified need for the planning study. To advance to the second screening level, an option had to receive a 'YES' answer to the screening questions indicating the fundamental safety and connectivity needs required to serve the overall transportation system would be met.

Table 9: First Level Screening – General Compliance with Identified Needs/Objectives

Screening Assessment	Screening Question	Correlation to Need
SAFETY PERFORMANCE. This criterion screens against the option's potential to improve the overall safety performance on the bridge and its approaches.	Q1. Would the option improve safety on the bridge and its approaches?	**NEED #1**
CONNECTIVITY. This criterion screens against whether or not the option provides an efficient connection to the transportation network within the area.	Q2. Does the option provide an efficient connection with the street network/road system in the area?	**NEED #2**

6.1.1.1. First Level Screening Questions

6.1.1.1.1. Safety Performance

This criterion screened against an option's potential to improve the overall safety performance on the bridge and its approaches by implementing measures to address identified deficiencies or safety concerns. The Existing and Projected Conditions Report highlighted a variety of safety concerns associated with the existing bridge, including substandard horizontal curves and the presence of unshielded obstacles and/or non-recoverable slopes on its approaches. The crash analysis conducted for this study identified several crash clusters on the road network in the Maclay Bridge area and highlighted common contributing circumstances at each location. For purposes of first level screening, safety related to motorized uses such as vehicular traffic, motorcycles, and emergency response vehicles. It also relates to non-motorized users such as bicyclists and pedestrians. Although some public comments have correlated safety to recreational use of the river and its banks, these were not explicitly tied to the features of the transportation system that can be documented and addressed through this planning study (i.e. geometrics, clear zones, travel speeds, etc.) and are therefore not considered in the screening process.

The following screening question, which relates directly to Need Number 1, was asked:

Q1. WOULD THE OPTION IMPROVE SAFETY ON THE BRIDGE AND ITS APPROACHES?

To receive a YES answer to this question, options should address identified safety deficiencies and improve or correct sub-standard elements of the bridge and its approaches that pose safety concerns for the traveling public. It was assumed that options providing bridges on new locations would be engineered to design standards that would provide a desirable level of safety. Several questions inherent to improving safety were explored during the screening process. These questions determined whether question 1 received a YES or NO response. The sub-questions included the following:

- ***Would the option improve sub-standard elements [deficiencies] on the bridge?*** Sub-standard elements of the bridge include the bridge deck width and load-restricted condition. Options that would rectify or improve these conditions are considered desirable. The Existing and Projected Conditions Report (**Appendix 3**) contains additional information on existing bridge deficiencies.
- ***Would the option reduce or remove vehicle restrictions on the bridge?*** Vehicle restrictions on the bridge presently include a posted load limit of 11 tons, one direction of travel at a time, and speed restrictions for larger emergency vehicles and school buses. Options that would eliminate the vehicle restrictions on the bridge are considered desirable.
- ***Would the option reduce crashes resulting from approaches to the bridge?*** Deficiencies on the approaches include roadway areas with sub-standard horizontal alignment, lack of roadway shoulders, steep roadside slopes, obstructions in the clear zone, and lack of lighting. Crash clusters have been identified and documented previously. Improvements to the bridge's approaches to meet current design standards are considered desirable and a positive step to reduce identified crash trends.

6.1.1.1.2. Connectivity Considerations

This screening criterion addressed whether or not the option provided an efficient connection to the existing and/or future road network within the area. Roadway connections that enhance the ability of the network to serve users and accommodate efficient travel through the community are desirable. The following screening question, which relates directly to Need Number 2, was asked:

Q2. DOES THE OPTION PROVIDE AN EFFICIENT CONNECTION WITH THE STREET NETWORK/ROAD SYSTEM IN THE AREA?

Options that provide linkages to roadways with higher functional classifications (minor arterials, urban collectors, or rural major collectors) merited a YES response. A grid system of roadways is desirable, and the hierarchy of roadways in Missoula County encourages travel connectivity to reduce travel time and emissions, while recognizing access needs vary between different users. Options that provided undesirable system linkages or result in long, out-of-direction travel to make network connections were given a NO response.

6.1.1.2. Options Carried Forward from First Level Screening

Seven options were carried forward as a result of the first level screening process (summarized in **Table 10** on the following page). All of the options considered during the first level screening process are discussed in more detail in **Chapter 5**. Detailed information on the first level screening assessment and results can be found in the Screening Assessment Memorandum contained in **Appendix 3**. The options that were carried forward for the second level screening are listed below.

- Option 1G: New One-Lane Bridge at a New Location for One-Way Travel and Retain Existing Bridge for One-Way Travel
- Option 2C: Minor Rehabilitation (includes Approaches)
- Option 2D: Major Rehabilitation (includes Approaches)
- Option 3A.2: Build Near Existing Alignment - North 1 Alignment
- Option 3C.2: Build Bridge on Mount Avenue - Mount 2 Alignment
- Option 3E.1: Build Bridge on South Avenue - South 1 Alignment
- Option 3E.2: Build Bridge on South Avenue - South 2 Alignment

Option 1A – Enhance Traffic Operations and Safety on and Near the Structure was removed from further screening after the completion of the first level screen. This was based on the option being primarily a "traffic management system (TSM)" strategy that could be applied as a component of all the other options being considered. In other words, as a TSM option, the scope of improvements are relatively minor in nature and are intended to provide subtle improvements to the transportation system that include signing, lighting, pavement markings, etc. These small scale improvements could be considered with any remaining options going forward.

Table 10: First Level Screening Results

RANGE OF OPTIONS CONSIDERED	*Q1. Would the option improve safety on the bridge and its approaches ?*	*Q2. Would the option provide an efficient connection with the street network/road system in the area?*	*ADVANCE TO SECOND LEVEL SCREENING? (See Note 1)*
1A (Enhance Operations and Safety on or near Bridge)	REMOVED FROM FURTHER SCREENING		
1B (Maintain Vehicle Use & Add Ped/Bike Facility)	NO	YES	NO
1C (Add More Restrictions)	NO	YES	NO
1D (Close Bridge Use for Ped/Bike)	YES	NO	NO
1E (Retain & Add New Bridge)	NO	YES	NO
1F (Add New 1 – Lane Bridge / Retain Old for Ped/Bike)	NO	YES	NO
1G (Add New 1 – Lane Bridge / Retain Old for 1-Way)	YES	YES	**YES**
1H (Close & Remove Bridge)	YES	NO	NO
2A (Minor Rehab -Structure Only)	NO	YES	NO
2B (Major Rehab -Structure Only)	NO	YES	NO
2C (Minor Rehab -Includes Approaches)	YES	YES	**YES**
2D (Major Rehab -Includes Approaches)	YES	YES	**YES**
3A.1 (Exist Location)	NO	YES	NO
3A.2 (North 1)	YES	YES	**YES**
3A.3 (North 2)	NO	YES	NO
3B.1 (S 3rd St W)	YES	NO	NO
3B.2 (Spurgin Rd)	YES	NO	NO
3C.1 (Mount 1)	YES	NO	NO
3C.2 (Mount 2)	YES	YES	**YES**
3D.1 (Edward 1)	YES	NO	NO
3D.2 (Edward 2)	YES	NO	NO
3E.1 (South 1)	YES	YES	**YES**
3E.2 (South 2)	YES	YES	**YES**
3F.1 (Sundown 1)	YES	NO	NO
3F.2 (Sundown 2)	YES	NO	NO
3G.1 (Humble Rd – Blue Mtn Rd)	YES	NO	NO
3H.1 (Other Locations)	YES	NO	NO
4A (Do Nothing)	NO	YES	NO

NOTE 1: To advance to second level screening, option must rate YES for both screening criteria.

6.1.2. Second Level Screening

Second level screening criteria were developed to evaluate and rank the seven options carried forward from the first level screening process. The criteria were generated to correlate to the identified needs and objectives previously articulated. Care was exercised to develop criteria that could be evaluated given the limited amount of information available and presented in the E&P Report (**Appendix 3**). For example, developing a criterion that quantifies "acreage of potential wetland impacts" is only relevant if wetland delineations have occurred and the locations of wetlands are known. For the second level screening process, sixteen screening criteria were developed to evaluate and rank options. The criteria are listed in **Table 11**, and fall under the following major types:

- Operational and Safety Screening Criteria (4 Total)
- Connectivity and Growth (3 Total)
- Constructability and Cost Screening Criteria (2 Total)
- Resource Impacts Screening Criteria (3 Total)
- Neighborhood/Social Screening Criteria (4 Total)

Table 11 summarizes the second level screening criteria, identifies why they are important screening considerations, and relates each consideration to a specific identified need for this planning study.

Table 11: Second Level Screening – General Compliance with Identified Needs/Objectives

Screening Consideration	Reason and Support for Screening Consideration	Relates to Need #?
OPERATIONAL AND SAFETY SCREENING CRITERIA		
OS1. Would the option improve sub-standard elements on the bridge?	**SAFETY & OPERATIONS.** This criterion determines the option's potential to address the substandard elements found on the bridge. A major substandard element of the existing bridge is the bridge deck width, which results in only one travel lane being available.	**NEED #1**
OS2. Would the option improve vehicle load restrictions on the bridge?	**SAFETY & OPERATIONS.** This criterion determines whether or not the option improves or resolves load restrictions on vehicle use of the bridge. The existing bridge has a posted load limit of 11 tons, which prohibits some vehicles from crossing the bridge and requires restrictions on others.	**NEED #1**
OS3. Would the option accommodate bicyclists/pedestrians on the bridge and its approaches?	**CONNECTIVITY & GROWTH.** This criterion indicates whether or not the option accommodates bicyclists and pedestrians on the bridge and its approaches. Safe bicycle and pedestrian facilities implies a space for bicyclist or pedestrian use.	**NEED #2**
OS4. Would the option reduce crashes resulting from approaches to the bridge?	**SAFETY & OPERATIONS.** This criterion indicates whether or not the option would reduce crashes on the approaches to the bridge. A review of the crash history on area roadways shows substandard elements (deficiencies) on approaches contribute to the crashes. These substandard elements include horizontal alignment concerns, lack of road shoulders, steep roadside slopes, obstructions in clear zone, lack of lighting.	**NEED #1**
OS5. Would the option accommodate future capacity demands?	**CONNECTIVITY & GROWTH.** This criterion determines whether or not the option would accommodate future capacity demands. Future capacity demands include things like providing a roadway wide enough for simultaneous bi–direction travel, and offering a crossing without limitations or restrictions due to horizontal and vertical clearances.	**NEED #2**
OS6. Would the option help reduce or eliminate vehicle delays at the river crossing?	**SAFETY & OPERATIONS.** This criterion determines whether or not the option would reduce or eliminate vehicle delays at the river crossing. The current bridge allows for traffic to cross the structure in one direction at a time. This delays vehicles waiting to cross in the opposing direction. These vehicles may occasionally include emergency responders.	**NEED #1**

Screening Consideration	Reason and Support for Screening Consideration	Relates to Need #?
OS7. Does the option provide an efficient grid connection to the major road/street network in the Missoula area?	**CONNECTIVITY & GROWTH.** This criterion indicates whether or not the option would provide an efficient grid connection to the major road/street network in the Missoula area by measuring the total length of travel between two points (in both directions). An efficient connection to an established grid network is an important consideration of the transportation system in terms of reducing out-of-direction travel, thus reducing travel time, travel costs, and controlling emissions.	**NEED #2**
CONSTRUCTABILITY AND COST SCREENING CRITERIA		
CC1. Planning level construction costs.	**COST.** This criterion details the option's high level planning costs to provide a reasonable measure of costs for comparison. Does not include highly variable costs like those associated with right-of-way acquisition, project development activities, environmental mitigation, or inflation.	**N/A**
CC2. Annual maintenance costs.	**COST.** This criterion is intended to provide some indication of annual maintenance costs for each option, over a 20-year horizon.	**N/A**
RESOURCE IMPACTS SCREENING CRITERIA		
R 1. Effects on aquatic resources?	**ENVIRONMENTAL IMPACTS.** This criterion differentiates between options based on their potential effects to aquatic resources by considering the extent of work in the delineated floodplain.	**NEED #3**
R 2. Will the options have impacts to protected 4 (f) or Section 106 resources?	**SECTION 4(f) IMPACTS.** This criterion determines whether the options have the potential for impacting resources that are protected by Section 4(f) or fall under Section 106 of the National Historic Preservation Act (36 CFR 800).	**NEED #3**
R 3. Will the options affect lands held under conservation easements?	**LAND IMPACTS.** This criterion determines whether the options have potential to affect lands held under conservation easements, and would require crossing those lands. Sizable areas of private land along the Bitterroot River are held under conservation easements by the Five Valleys Land Trust. Such easements may limit the ability to construct improvements on these protected lands.	**NEED #3**
NEIGHBORHOOD/SOCIAL SCREENING CRITERIA		
NS1. Number of privately owned parcels Impacted?	**NEIGHBORHOOD & SOCIAL.** This criterion assesses how many individual privately-owned parcels would be crossed or potentially impacted by the alignment associated with each option. The criterion is suggestive of the potential extent of R/W acquisition associated with each option.	**NEED #4**
NS2. Number of structures impacted?	**NEIGHBORHOOD & SOCIAL.** This criterion identifies whether or not structures may be impacted by each option. For purposes of this criterion, structures only consist of residences. Impacts to existing structures helps assess the potential for relocations or right-of-way impact mitigations associated with the options.	**NEED #4**
NS3. R/W needs?	**NEIGHBORHOOD & SOCIAL.** This criterion estimates how much new right-of-way may be required with each option. An assumed new right-of-way width was chosen for the option's alignments, and any known existing right-of-way is subtracted out, yielding a potential new right-of-way need.	**NEED #4**
NS4. Does the option compare favorably with year 2040 "no action" model traffic volume increases in front of Target Range School?	**NEIGHBORHOOD & SOCIAL.** This criterion measures the potential for traffic volume changes in front of the Target Range School.	**NEED #4**

6.1.2.1. Second Level Screening Questions

6.1.2.1.1. OS1 – Would the Option Improve Sub-Standard Elements on the Bridge?

A major substandard element of the existing bridge is the bridge deck width, which results in only one travel lane being available. This screening criterion determined the option's potential to address the substandard elements found on the bridge. The 2011 Bridge Inspection Report and the public listed other areas of concern as contained in the Existing and Projected Conditions Report (pages 26-30). Any option that resulted in two lanes (one lane for each direction) on the bridge would meet current design standards and would therefore not exhibit sub-standard elements, meriting a YES response. Other options that retain a one-lane configuration or do not provide additional bridge width would not rectify the substandard bridge condition and would receive a NO answer.

6.1.2.1.2. OS2 – Would the Option Improve Vehicle Load Restrictions on the Bridge?

This screening criterion determined whether or not the option improved or resolved load restrictions on vehicle use of the bridge. The existing bridge has a posted load limit of 11 tons. Inherent to the load restrictions, there are also speed restrictions in place for some of the larger vehicles using the bridge, such as emergency vehicles and school buses (note that these vehicles must also travel in the center of the bridge deck as they cross). Options that could eliminate or improve the existing load restriction up to at least a 25-ton-limit merited a YES answer. Those options that resulted in something less than at least a 25-ton-limit merit a NO answer.

6.1.2.1.3. OS3 – Would the Option Accommodate Bicyclists/Pedestrians on the Bridge and its Approaches?

This screening criterion indicated whether or not the option accommodated bicyclists and pedestrians on the bridge and its approaches. Safe bicycle and pedestrian facilities implies a space for bicyclist or pedestrian use. Exact widths and types of space are unknown, as this is a design-level detail. However whether or not an option can provide bicycle/pedestrian mobility can be reasonably estimated for the options. Options that could provide space for bicycle and pedestrian travel merited a YES answer. Those options that would not allow for provision of space for bicycle and pedestrian merited a NO answer. If an option could provide space on the approaches, but not across the bridge, a NO response was given, as that scenario results in a discontinuous facility for non-motorized use. New structures could be designed to provide space for bicycle and pedestrians.

6.1.2.1.4. OS4 – Would the Option Reduce Crashes Resulting from Approaches to the Bridge?

This screening criterion indicated whether or not the option would reduce crashes on the approaches to the bridge. A review of the crash history on area roadways shows substandard elements (deficiencies) on approaches contribute to the crashes. These substandard elements include horizontal alignment concerns, lack of road shoulders, steep roadside slopes, obstructions in clear zone, lack of lighting. Options that could reduce crashes resulting on approaches to the bridge, whether existing or new, merited a YES answer. Those options that would not reduce crashes on approaches to the bridge merited a NO answer.

6.1.2.1.5. OS5 – Would the Option Accommodate Future Capacity Demands?

This screening criterion determined whether or not the option would accommodate future capacity demands. Future capacity demands include things like providing a roadway wide enough for simultaneous bi–direction travel, and offering a crossing without limitations or restrictions due to horizontal and vertical clearances. The idea is to provide a facility that will readily accommodate increasing traffic demands due to area growth over the next 20-plus years. Providing sufficient capacity is important to the development of an efficient future transportation network in Missoula area. Options that

would accommodate future capacity demands on the bridge merited a YES answer. Those options that would maintain the status quo, or would not accommodate future capacity demands, merited a NO answer.

6.1.2.1.6. OS6 – Would the Option Help Reduce or Eliminate Vehicle Delays at the River Crossing?

This screening criterion determined whether or not the option would reduce or eliminate vehicle delays at the river crossing. The current bridge allows for traffic to cross the structure in one direction at a time. This delays vehicles waiting to cross in the opposing direction. These vehicles may occasionally include emergency responders. Options that provide a new bridge crossing with two lanes would reduce or eliminate vehicle delays, and merited a YES answer. Those options that would retain the one-lane, two-way bridge, or consist of two one-way bridges (existing bridge and new location), would not reduce or eliminate vehicle delays and merited a NO answer.

6.1.2.1.7. OS7 – Does the Option Provide an Efficient Grid Connection to the Major Road / Street Network in the Missoula Area?

This screening criterion indicates whether or not the option would provide an efficient grid connection to the major road/street network in the Missoula area by measuring the total length of travel between two points (in both directions). The length of travel between the intersections of South Avenue/Clements Road and Big Flat Road/ River Pines Road/Blue Mountain Road/O'Brien Creek Road was measured. This screening consideration determines whether the option provides a relatively direct linkage to the roadway grid system, and whether the length of travel with each option is less or more, for comparison purposes. An efficient connection to an established grid network is an important consideration of the transportation system in terms of reducing out-of-direction travel, thus reducing travel time, travel costs, and controlling emissions. A point ranking system was used where the option exhibiting the longest length of travel between the two subject intersections, in both directions, received the highest number of points (7 possible) and the shortest length of travel between the two subject intersections, in both directions, received the lowest number of points (1 possible).

6.1.2.1.8. CC1 – Planning Level Construction Costs?

High level planning cost estimates provided a reasonable measure to help compare the general magnitude of capital construction costs among the options under consideration. For screening purposes, the estimates reflected only the cost of construction and did not include highly variable costs like those associated with right-of-way acquisition, project development activities (preliminary engineering, indirect and incidental costs, etc.), environmental mitigation, or inflation. Variable costs were captured for the seven options after the screening process was completed, and are reflected in **Table 15**, and **Appendix 3** (**Final Planning Level Costs Estimates – Seven Options**). Necessary items that were considered to arrive at the high level planning cost included the following:

- Approximate bridge length (assumes bridge would have to be longer than the river's edge bank width);
- Approximate bridge width (assumes minimum width of 28 feet for two-way / 16 feet for one-way);
- Degree of skew of the bridge crossing (higher skew is more difficult to design, construct, and permit);
- Approximate bridge approach (i.e. road) length; and
- Approximate bridge approach width (assumes 40 feet minimum roadway width).

A minimum width for new bridge construction was assumed to be 28 feet, as this is the narrowest typical section that can be utilized as discussed in the Existing and Projected Conditions Report (**Appendix 3**). For the one-way new bridge option, the minimum bridge width would be 16 feet. For bridge lengths, it was

assumed that any new bridge would have to be longer than the bank widths by 20 feet on each side. This criterion also relies on the potential length of new approach road required for each option, and makes a determination of whether or not a substantial upgrade to approaches is required.

A point ranking system was used where the option exhibiting the highest planning level cost received the most points (7 possible) and the option exhibiting the lowest planning level cost received the fewest points (1 possible).

6.1.2.1.9. CC2 – Annualized Maintenance Costs?

This criterion provided an indication of estimated annual maintenance costs for each option. The potential maintenance costs for the approach roads were calculated as an annual maintenance cost in present day dollars (2012) by using an average maintenance cost of $4,300 per lane mile (based on query of statewide average maintenance costs). For bridge maintenance costs, a review of past expenditures provided by Missoula County for the Maclay Bridge over a twenty-year period was completed. During the time period between 1993 and 2013, $147,000 will have been expended on the Maclay Bridge. This equals approximately $7,350 per year, or $1.50 per square foot, for bridge maintenance activities on the existing Maclay Bridge. Potential bridge maintenance costs were developed based on this cost per square foot, and applied to those options that retain the existing bridge as part of the option.

A point ranking system was used where the option exhibiting the highest annualized maintenance cost received the highest number of points (7 possible) and the option exhibiting the lowest annualized maintenance cost received the lowest number of points (1 possible).

6.1.2.1.10. R1 – Effects on Aquatic Resources?

This criterion differentiates between options based on their potential effects to aquatic resources by considering the extent of work in the delineated floodplain. Information on the delineated floodplain is available draft digital FIRM (DFIRM) panel 1455E in a GIS database format, and was previously shown in the study's Environmental Scan. A point ranking system was used where the option exhibiting the longest crossing of the delineated 100-year floodplain received the highest number of points (7 possible) and the shortest crossing of the 100-year delineated floodplain received the lowest number of points (1 possible).

6.1.2.1.11. R2 – Will the Options have Impacts to Protected 4(f) or Section 106 Resources?

This criterion determined whether the options have the potential for impacting resources that are protected by Section 4(f) or fall under Section 106 of the National Historic Preservation Act (36 CFR 800). Section 4(f) resources include public parks, recreation areas, or wildlife and waterfowl refuges of national, State, or local significance, or land from a historic site of national, State, or local significance. Section 106 of the National Historic Preservation Act (36 CFR 800) establishes requirements for taking into account the effects of proposed Federal, Federally-assisted or Federally-licensed undertakings on any district, site, building, structure or object included in or eligible for inclusion in the NRHP. For the Maclay Bridge Planning Study, these resources include historic residences/outbuildings, a historic school building, and historic irrigation features. Section 4(f) and 106 resources were identified in the study's Environmental Scan.

Options that would have the potential for impacting 4(f) or Section 106 resources merited a HIGH answer. Those options that would not have the potential for impacting 4(f) or Section 106 resources merited a LOW answer.

6.1.2.1.12. R3 – Will the Options affect Lands Held under Conservation Easements?

This criterion determined whether the options have potential to affect lands held under conservation easements, and would require crossing those lands. Sizable areas of private land along the Bitterroot River are held under conservation easements by the Five Valleys Land Trust. Conservation easements exist for the purposes of preserving open space, protecting fish or wildlife habitat, or limiting the extent and density of development. Options that would have the potential for crossing lands held under conservation easements merited a HIGH answer. Those options that would not have the potential for crossing lands held under conservation easements merited a LOW answer.

6.1.2.1.13. NS1 – Number of Privately Owned Parcels Impacted?

This criterion assessed how many individual privately-owned parcels would be crossed or potentially impacted by the alignment associated with each option. The criterion estimates the potential extent of right-of-way (R/W) acquisition associated with each option. The number of privately-owned parcels crossed by an alignment was based on review of the Montana Cadastral Mapping database (accessed November 12, 2012 at http://giscoordination.mt.gov/cadastral/msdi.asp). Parcels crossed by the proposed alignment and falling within an assumed, standard 80' R/W width were counted. An exception to this is option 1.G (new one-lane bridge retain existing bridge for on-way travel). For option 1.G it was assumed that the new one-way configuration would necessitate a 60' R/W width.

A point ranking system was used where the option exhibiting the most number of privately owned parcels impacted received the highest number of points (7 possible) and the least number of privately owned parcels impacted received the lowest number of points (1 possible).

6.1.2.1.14. NS2 – Number of Structures Impacted?

This criterion identified whether or not structures may be impacted by each option. For purposes of this criterion, structures only consisted of residences. Impacts to existing structures helps assess the potential for relocations or right-of-way impact mitigations associated with the options. The number of structures potentially impacted was based on review of recent aerial photography (BingMapsAerial - © 2012 Microsoft Corporation, accessed November 12, 2012 at http://www.bing.com/maps/#). Structures are assumed to be impacted if they occur within a typical 80' R/W corridor. An exception to this is option 1.G. For option 1.G it was assumed that the new one-way configuration would necessitate a 60' R/W width. Options that would potentially impact structures given the assumptions above merited a HIGH answer, while those that would not potentially impact structures were given a LOW answer.

6.1.2.1.15. NS3 – R/W Needs?

This criterion estimated how much new right-of-way may be required with each option. An assumed new 80' R/W width was used for the option's alignments, and any known existing right-of-way was subtracted out, yielding a potential new right-of-way need. An exception to this was option 1.G. For option 1.G it was assumed that the new one-way configuration would necessitate a 60' R/W width. Existing available right-of-way was measured from the Montana Cadastral Mapping database (accessed November 12, 2012 at http://giscoordination.mt.gov/cadastral/msdi.asp). The area crossing the Bitterroot River was also subtracted out from each option, as that requires a permit for crossing navigable waters from the Montana DNRC.

A point ranking system was used where the option exhibiting the most needed right-of-way received the highest number of points (7 possible) and the option exhibiting the least needed right-of-way received the lowest number of points (1 possible).

6.1.2.1.16. NS4 – Does the Option Compare Favorably with Year 2040 "No Action" Model Traffic Volume Increases in front of the Target Range School?

This criterion measured the potential for traffic volume changes in front of the Target Range School. Target Range School is located on South Avenue, just east of Clements Road. Public comments expressed concerns about decreased safety in the vicinity of schools due to more traffic and increased travel speeds that could result from some options. The Missoula MPO travel demand model was used to compare future year 2040 "No Action" conditions to the options being considered that may affect traffic distribution. A point ranking system was developed based on the percent increase (or decrease) associated with each options modeled year 2040 traffic volumes as compared to the modeled year 2040 "No Action" traffic volumes. Options 2.C and 2.D do not have any changes, as the improvements contemplated under rehabilitation of the bridge do not affect capacity, thus not influencing the model. The option exhibiting the greatest percent change in traffic model volumes directly in front of Target Range School received the highest number of points (7 possible) and the option exhibiting the least change in traffic model volumes directly in front of Target Range School received the lowest number of points (1 possible).

6.1.2.2. Second Level Screening Rating Factors

As presented in **Section 6.1.2.1**, rating factors for some screening criteria were developed to assist in evaluations and quantify how well an option may meet the identified question and thus, the corresponding need or objective. **Table 12** describes the impact rating factors. Low/high and yes/no rating factors were developed and assigned to those screening criteria as applicable. In some cases, the rating factors were not used as the type of screening criteria may better have lent itself to an "order of ranking", between 1 and 7, due to there being seven options carried forward from the first level screening process. This is further defined in **Appendix 3**. The lower an individual or cumulative point value was, the more desirable or better the criterion (or option) is considered.

Table 12: Second Level Screening Criteria Rating Factors

Potential Influence (type of criteria)	Rating (value)	Rating (value)	Screening Consideration
Impact (non-quantitative)	LOW (assigned point value = 1)	HIGH (assigned point value = 7)	R2 (protected resources); R3 (conservation easements); NS2 (structures)
Improve / Accommodate / Reduce / Provide / Increase (non-quantitative)	YES (assigned point value = 1)	NO (assigned point value = 7)	OS1 (sub-standard elements); OS2 (vehicle load restrictions); OS3 (bicyclists/pedestrian); OS4 (reduce crashes); OS5 (future traffic); OS6 (reduce delay); NS4 (traffic volumes)
Impact / Accommodate (quantitative)	Order of Ranking (1 – 7)		OS7 (efficient connections); CC1 (construction costs); CC2 (maintenance costs); R1 (aquatic resources); NS1 (private parcels); NS3 (r/w)

6.1.2.3. Second Level Screening Summary

Sixteen second level screening criteria were developed for the evaluation of the seven options forwarded for consideration through the first level screening process. The second level criteria address each of the needs, and many of the objectives, previously identified during the course of the study. Efforts were made not to "double count" the particular item being screened, and all criteria were treated equal in that no "weighting" occurred – thus no one criterion is more important than the other.

The results of the second level screening process are shown below. Assigned point values and rankings are depicted in **Table 13**. The point ranking was developed such that those options with the fewest points ranked most favorably, while those with the most points ranked poorest.

- 3E.1 - South 1 Alignment (32 POINTS)
- 3E.2 - South 2 Alignment (39 POINTS)
- 3C.2 - Mount 2 Alignment (44 POINTS)
- 3A.2 - North 1 Alignment (52 POINTS)
- 1G - New One-Lane Bridge at a New Location & Retain Existing Bridge for One-Way Travel (68 POINTS)
- 2D - Major Rehabilitation (includes Approaches) (70 POINTS)
- 2C - Minor Rehabilitation (includes Approaches) (73 POINTS)

Appendix 3 (Screening Assessment Memorandum) contains more detailed information on the screening process and results for each option.

Table 13: Second Level Screening Point Values and Rankings

Second Level Screening Question ID	POINT ASSIGNMENTS FOR OPTIONS CONSIDERED						
	OPTION 1 - IMPROVE SAFETY AND OPERATIONS ON EXISTING BRIDGE	OPTION 2 - REHABILITATE THE BRIDGE		OPTION 3 - BUILD NEW BRIDGE			
	1G Add new 1 –lane bridge Retain old for 1-way travel	2C Minor Rehab (includes Approaches)	2D Major Rehab (includes Approaches)	3A.2 North 1	3C.2 Mount 2	3E.1 South 1	3E.2 South 2
OS1	7	7	7	1	1	1	1
OS2	7	7	1	1	1	1	1
OS3	7	7	7	1	1	1	1
OS4	7	1	1	1	1	1	1
OS5	1	7	7	1	1	1	1
OS6	7	7	7	1	1	1	1
OS7	3	5	5	5	7	1	2
CC1	3	1	2	4	7	5	6
CC2	6	7	3	5	2	1	4
R 1	7	5	5	5	1	2	3
R 2	1	1	7	7	7	1	1
R 3	1	1	1	1	1	1	1
NS1	1	6	6	6	4	2	3
NS2	1	7	7	7	1	1	1
NS3	4	2	2	2	7	5	6
NS4	5	2	2	4	1	7	6
TOTAL TABULATED POINTS	**68**	**73**	**70**	**52**	**44**	**32**	**39**
RANKING	**5**	**7**	**6**	**4**	**3**	**1**	**2**

6.2. ADDITIONAL INFORMATION ON OPTIONS CARRIED FORWARD

The result of the first level screening process determined 7 of the 28 options met the needs and objectives. The seven options were previously described in **Chapter 5**. The seven options are all potential transportation system treatments that Missoula County may consider if they decide to pursue a project. Based on the point values assigned during the second level screening process, Option 3E.1 – South 1 Alignment clearly rates better than the others. This option is described separately in **Section 6.3** of this chapter.

Planning level cost estimates were prepared for each of the seven options. The estimates are slightly different than the construction cost estimates utilized in the screening process as the revised estimates include the addition of preliminary engineering (PE) costs, and incidental and indirect costs (IDICs).

The revised planning level costs do not include detailed right-of-way acquisition or utility relocation costs. This is important to consider because if a project is developed, it may be necessary to acquire additional right-of-way to meet current standards. The appropriate right-of-way is 80 feet (for two-way, two-lane travel) and 60 feet (for one-way, one-lane travel). Existing right-of-way widths vary throughout the corridor. Right-of-way acquisition is estimated to cost approximately $1,500 to $10,000 per acre, depending on the properties' proximity to the Bitterroot River.

6.2.1. OPTION 3E.1 - SOUTH 1 ALIGNMENT

The South 1 alignment provides a relatively direct connection between Reserve Street and River Pines Road. The crossing of the river as envisioned would result in a modest skew of 30 degrees. The estimated length of roadway needed with this option is 620 feet, with the majority of this being on the east side of the Bitterroot River. On the west side, the bridge approach would tie into River Pines Road with very little road construction. The new bridge length would be about 650 feet.

PLANNING LEVEL COST ESTIMATE

The planning level cost estimate for this alignment is $6,300,000. This includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

RIGHT-OF-WAY CONSIDERATIONS AND POTENTIAL COSTS

The South 1 alignment could potentially impact four privately owned parcels, resulting in new right-of-way needs of 1.5 acres. The potential cost of acquiring the right-of-way could range between $2,250 and $15,000.

Because this option had the lowest point total at the conclusion of the screening process, and therefore ranked as most favorable, it is described in greater detail later in this chapter in **Section 6.3**.

6.2.2. OPTION 3E.2 - SOUTH 2 ALIGNMENT

The South 2 alignments ranked the second best at the end of the screening process. Many of the impacts and nuances of this alignment are similar to the South 1 alignment, described later in this chapter. The South 2 alignment provides a relatively direct connection between Reserve Street and River Pines Road. The crossing of the river as envisioned would result in a fairly high skew of 37 degrees. High skew bridges are more difficult to design, permit and construct. The estimated length of roadway needed with this option is almost twice as much as the South 1 option (1,430 feet versus 620 feet). The option would require more right-of-way than South 1 (2.3 acres versus 1.5 acres), and would also potentially impact one more privately owned parcel (5 parcels versus 4 parcels).

PLANNING LEVEL COST ESTIMATE

The planning level cost estimate for this alignment is $6,400,000. This includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

RIGHT-OF-WAY CONSIDERATIONS AND POTENTIAL COSTS

The South 2 alignment could potentially impact five privately owned parcels, resulting in new right-of-way needs of 2.3 acres. The potential cost of acquiring the right-of-way could range between $3,450 and $23,000.

6.2.3. OPTION 3C.2 - MOUNT 2 ALIGNMENT

The Mount 2 alignment begins near the intersection of Mount Avenue and Humble Road, immediately proceeds in a southwesterly direction across the Bitterroot River and joins River Pines Road at the west end of the existing Maclay Bridge. The alignment traverses a large tract of agricultural land. From an efficiency viewpoint, Mount Avenue does not afford a direct east-west linkage to the major streets within the area (such as Reserve Street). Thus out-of-direction travel is realized as it forms a “tee” intersection with Clements Road. Mount Avenue is functionally classified as a local street.

The Mount 2 alignment would result in approximately 1,200 feet of new roadway construction, and a bridge length of approximately 625 feet. Most notable regarding a new crossing at this location is that the bridge would be highly skewed to the river channel at approximately 45 degrees.

PLANNING LEVEL COST ESTIMATE

The planning level cost estimate for this alignment is $7,700,000. This includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

RIGHT-OF-WAY CONSIDERATIONS AND POTENTIAL COSTS

The Mount 2 alignment could potentially impact six privately owned parcels, resulting in new right-of-way needs of 2.4 acres. Of the seven options, this option has the largest area of right-of-way acquisition needed. The potential cost of acquiring the right-of-way could range between $3,750 and $24,000.

6.2.4. OPTION 3A.2 - NORTH 1 ALIGNMENT

The North 1 alignment provides a new bridge parallel to and just upstream from the existing Maclay Bridge. The alignment begins on North Avenue at its intersection with Edward Avenue. The alignment of River Pines Road west of the river would be improved to eliminate the 90-degree curve at the west end of the existing bridge. This alignment would have a major impact on the utility substation just east of the existing bridge. Likewise, to modify River Pines Road to meet current standards and shift the road away from the river, the roadway would have to be relocated slightly farther to the west.

The North 1 alignment would result in approximately 1,650 feet of new road construction - the majority of which would be on the west side of the river. The new bridge crossing would be on the order of 400 feet, and would be at a relatively modest skew to the river of approximately 20 degrees. Overall travel patterns would remain similar to that of the existing bridge, and would still connect higher classification roadways (i.e. collector roads) as are currently in place.

PLANNING LEVEL COST ESTIMATE

The planning level cost estimate for this alignment is $4,400,000. This includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

RIGHT-OF-WAY CONSIDERATIONS AND POTENTIAL COSTS

The North 1 alignment could potentially impact twelve privately owned parcels, and result in the acquisition of one residential structure. Total new right-of-way needed is on the order of 0.4 acres, which

ties for the least amount of needed right-of-way (with the two rehabilitation options). The potential cost of acquiring just the right-of-way could range between $600 and $4,000. The acquisition of a private residence could be upwards of $200,000.

6.2.5. Option 1G - New One-Lane Bridge at a New Location & Retain Existing Bridge for One-Way Travel

A pair of one-way roads and bridges is envisioned under Option 1G. The option assumes that the existing single-lane bridge would be in place at its present location, along with a new single-lane bridge at a South Avenue location. This has commonly been referred to as a one-way couplet, although this option as described does not meet the true definition of a couplet as the two roadways are not directly adjacent and parallel to each other. The direction of travel with this option is unknown and would be at the discretion of Missoula County. Two one-way bridges could serve to better distribute traffic impacts throughout the neighborhood, and also improve response times for emergency service providers. Right-of-way widths for one-way roadways would be less than that for a two-way roadway, resulting in lower costs and potentially fewer overall impacts.

Most likely the direction of travel for the one-way concept would be east-to-west for a new South Avenue bridge, and west-to-east for the existing Maclay Bridge. This would allow emergency responders to travel unimpeded from Fire Station #1 to access the west side of the river. Capacity concerns of the existing bridge could be alleviated as generally future traffic volumes out to the planning horizon would be split, with half on a new South Avenue location and half on the existing Maclay Bridge location.

A series of one-way roads does have inherent problems related to traffic flow and non-motorized uses. Typically, speeds are faster on one-way roads – even if posted the same as a two-way facility. This can present a problem for pedestrians and bicyclists wishing to cross a route. On one hand, non-motorized users only have to look in one direction to cross the roadway, but on the other these users are faced with faster speeds. Speeds can be mitigated with proper design and traffic calming features.

Planning Level Cost Estimate

The planning level cost estimate for this option is $3,900,000. The cost includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

Right-of-Way Considerations and Potential Costs

Option 1G could potentially impact three privately owned parcels, which is the fewest of the seven options identified for consideration. The resulting new right-of-way required is 1.1 acres. This is the only option for which a 60-foot right-of-way width was selected for the calculations (for the new South Avenue location). The potential cost of acquiring the right-of-way could range between $1,650 and $11,000.

6.2.6. Option 2D - Major Rehabilitation (includes Approaches)

The goal of a major rehabilitation would be to extend the life of the bridge to something similar to that of a new bridge. Major rehabilitation work could allow the bridge to handle full legal loads so that there would be no need for a limited load posting. This option requires a long term financial commitment to the existing bridge due to the increase in life span. The ultimate life span of the bridge would be dependent on the rate of deterioration, aggressiveness of ongoing repair work, and barring major damage from flooding and/or vehicles.

Major rehabilitation of the structure would be completed in concert with improvements to the approaches to bring them up to current standards. Approach work would be similar to that envisioned under the North 1 alignment, thus impacts would likely be similar. A major drawback of major rehabilitation of the structure is that the fundamental geometric deficiencies would still remain relative to the bridge deck width (i.e.

single travel lane for two-way traffic). Sub-standard conditions for the approaches can be fixed; however the sub-standard conditions for the existing Maclay Bridge cannot. Thus, major rehabilitation of the existing Maclay Bridge only resolves the load limitations, but nothing else. As traffic volumes grow, the existing Maclay Bridge may not be suitable from a capacity or operational standpoint. Although minor transportation management system (TSM) treatments such as lighting, better signing, traffic metering devices, etc. may help in the short term, the long term growth in traffic and the large unknowns associated with a major rehabilitation introduces a high amount of risk relative to elevated project costs.

Conditions of the river channel at the existing bridge location are unknown relative to the suitability of the bridge footings and their placement within the channel.

PLANNING LEVEL COST ESTIMATE

The planning level cost estimate for this option ranges from $1,100,000 to $3,200,000. The range is due to the uncertainties over the scope and level of effort required with a major rehabilitation. A concise bridge inspection would be required to provide an accurate identification of bridge conditions, work needed to address any and all bridge deficiencies to increase safety and capacity and associated costs. The range of costs includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

RIGHT-OF-WAY CONSIDERATIONS AND POTENTIAL COSTS

Similar to the North 1 alignment, this option could potentially impact twelve privately owned parcels, and result in the acquisition of one residential structure. Total new right-of-way needed is on the order of 0.4 acres, which ties for the least amount of needed right-of-way (with North 1 and the minor rehabilitation options). The potential cost of acquiring just the right-of-way could range between $600 and $4,000. The acquisition of a private residence could be upwards of $200,000.

6.2.7. OPTION 2C - MINOR REHABILITATION (INCLUDES APPROACHES)

The goal of a minor rehabilitation would be to extend the life of the bridge by performing minor upgrades and repairing deterioration and damage. Missoula County would continue to perform routine maintenance activities to keep the structure in service under its load limitation for use by local residents, school buses and emergency service vehicles. This option would not address the fundamental geometric deficiencies relative to the bridge deck width (i.e. single travel lane for two-way traffic). Many of the constraints noted in the major rehabilitation option described earlier would be applicable to this option. With minor rehabilitation, the posted vehicle weight limit restriction could be increased from the current 11 tons to around 13 tons.

PLANNING LEVEL COST ESTIMATE

The planning level cost estimate for this option ranges from $810,000 to $1,100,000. The range is due to the uncertainties over the scope and level of effort required with a minor rehabilitation. A concise bridge inspection would be required to provide an accurate identification of bridge conditions, work needed to address any and all bridge deficiencies to increase safety and capacity, and associated costs. The range of costs includes estimated construction costs (with contingencies), preliminary engineering costs (10%) and indirect and incidental costs (10%).

RIGHT-OF-WAY CONSIDERATIONS AND POTENTIAL COSTS

Similar to the North 1 and Major Rehabilitation options, this option could potentially impact twelve privately owned parcels, and result in the acquisition of one residential structure. Total new right-of-way needed is about 0.4 acres, which ties for the least amount of needed right-of-way (with North 1 and the major rehabilitation options). The potential cost of acquiring just the right-of-way could range between $600 and $4,000. The acquisition of a private residence could be upwards of $200,000.

6.3. OPTION 3E.1 (SOUTH 1) CONSIDERATIONS

The South 1 alignment is described in greater detail in this section. This option warrants further discussion than the other six options due to several considerations:

- The option ranked the best at the conclusion of the screening process since it addressed operational and safety concerns presented in the needs & objectives that limited resource and neighborhood/social impacts.
- The public has repeatedly asked for the traffic and cost impacts associated with the South 1 option.

6.3.1.1. Description

The alignment shown in **Figure 5** and described earlier shows the minimum amount of improvement for a new bridge crossing at South Avenue. The South 1 alignment could potentially impact four privately owned parcels, resulting in new right-of-way needs of 1.5 acres. No private residences would need to be acquired. The planning level cost estimate for this alignment is $6,300,000.

Figure 5: South 1 General Alignment

6.3.1.2. Future Traffic Impacts

The Missoula TDM was used to help predict future traffic growth for the year 2040. The basis for the TDM is more fully explained in **Section 3.2.3** of this report. The TDM helped quantify potential traffic volume changes if a new bridge crossing was placed at a South Avenue extension. For these purposes, year 2040 projected traffic volumes were compared for the No Action condition against the South 1 option. The No Action condition is if no changes were made to the transportation network out to the year 2040, other than periodic maintenance activities at the existing Maclay Bridge and surrounding roadways. The reason for this comparison was to document potential traffic volume changes on area roadways resulting from a new bridge at South Avenue over and above what would normally be expected. **Table 14** provides a summary of the projected volume change for the year 2040 as a result of a new South Avenue bridge. The results are also shown graphically in **Figure 6**.

Table 14: Year 2040 AADT Traffic Modeling Projections (No Action vs. South 1)

Street	Location	# of Lanes (Context)	No Action Projected 2040 AADT [a]	South 1 Projected 2040 AADT [a]	General Daily Capacity AADT [e]	AADT Change
Big Flat Rd	100 ft W of O'Brien Ck Rd	2 (Rural)	6,550	6,850	6,000	300
Blue Mountain Rd	500 ft N of Hwy 93	2 (Rural)	5,450	5,050	6,000	-400
Blue Mountain Rd	S of South Side Rd	2 (Rural)	4,400	4,050	6,000	-350
Brooks St	Bitterroot River Bridge	4+ (Urban)	46,000	45,350	31,900	-650
Clements Rd	300 ft N of North Av	2 (Urban)	5,900	5,700	7,300	-200
Clements Rd	300 ft S of North Av	2 (Urban)	3,850	5,950	7,300	2,100
Clements Rd	500 ft S of S 3rd W	2 (Urban)	4,500	4,400	7,300	-100
Kona Ranch Rd [c]	Kona Ranch Bridge	2 (Rural)	6,450	6,750	6,000	300
Mullan Rd	E of Snowdrift Ln	2 (Rural)	9,100	9,350	6,000	250
North Av	300 ft W of Clements Rd	2 (Urban)	4,750	1,250	7,300	-3,500
Reserve St	Between Dearborn & South Av	4+ (Urban)	46,750	47,000	31,900	250
Reserve St	Between OlofsonDr& S 3rd W	4+ (Urban)	50,150	50,000	31,900	-150
Reserve St	Between South Av & Central Av	4+ (Urban)	47,250	47,350	31,900	100
Reserve St	S of LarkenwoodDr	4+ (Urban)	50,650	50,400	31,900	-250
River Pines Rd	300 ft W of Maclay Bridge	2 (Rural)	5,650	0	6,000	-5,650
S 3rd W	W of Reserve	2 (Urban)	13,200	13,150	7,300	-50
S 7th W	150 ft W of Reserve	2 (Urban)	3,250	3,300	7,300	50
S 7th W	300 ft E of Clements Rd	2 (Urban)	700	700	7,300	0
South Av	Between 31st and 33rd	2 (Urban)	8,350	9,150	11,700	800
South Av	Between Humble & Pleasant	2 (Urban)	2,900	5,150	7,300	2,250
South Av	Between Reserve & 26th	2+ (Urban)	16,350	16,850	17,700	500
South Av	E of Clements Rd	2 (Urban)	5,400	6,350	7,300	950
South Av [d]	New Bridge	2 (Urban)	-	7,200	7,300	-
South Av	W of Clements Rd	2 (Urban)	6,550	9,250	7,300	2,700
Spurgin Rd	250 ft W of Reserve	2 (Rural)	2,550	2,550	6,000	0
Spurgin Rd	300 ft E of Clements Rd	2 (Rural)	1,200	1,200	6,000	0

Source: MDT Multi Modal Planning Bureau, Statewide & Urban Planning Section, 2012; Missoula Office of Planning and Grants, Transportation Division.

[a] Projected AADT's rounded to nearest 50 vpd.

[b] Percentages based on difference in actual TDM volumes, and not on the "rounded" volumes.

[c] TDM volume used as no actual "on-the-ground" counts are available to adjust.

[d] New bridge link - TDM volume used as no actual "on-the-ground" counts are available to adjust.

[e] General daily capacities (AADT) from Table 6-1 of 2008 Missoula Long Range Transportation Plan. Based on road lane configuration, functional classification and whether road is in rural or urban locale.

The data depicted in **Table 14** shows that a new bridge crossing at South Avenue would increase traffic in some locations and reduce traffic in other locations. For example, by removing the existing Maclay Bridge, North Avenue just west of Clements Road could potentially see a traffic volume drop of 3,500 vpd, during the projected year 2040. Conversely, South Avenue just west of Clements Road may see a rise in traffic of 2,700 vpd, during the projected year 2040. These numbers are not surprising given the removal of the Maclay Bridge in the TDM and the addition of a new two-way, two-lane bridge at South Avenue. The two locations referenced above are the locations that realize the largest change in traffic volumes.

South Avenue in general would see an increase in traffic volumes with the South 1 option as compared to a No Action scenario, with the largest increase west of Clements Road. On South Avenue, directly in front of Target Range School (i.e. east of Clements Road), the predicted traffic volume may rise 950 vpd, with a new South Avenue bridge over that which could be anticipated in the year 2040 without the new bridge.

Clements Road, just south of North Avenue, could realize an increase of 2,100 vpd, due to vehicles not being able to utilize the Maclay Bridge, and therefore having to travel south on Clements Road to access the new South Avenue bridge and points to the west.

An additional observation from the TDM is that with a new South Avenue Bridge, the year 2040 traffic volume drops across the Buckhouse Bridge (on Brooks Street) by 650 vpd. This implies that with a new South Avenue Bridge, a slight amount of traffic would route across the new bridge that may otherwise route across the Buckhouse Bridge. This phenomenon is not seen at the Kona Ranch Road Bridge.

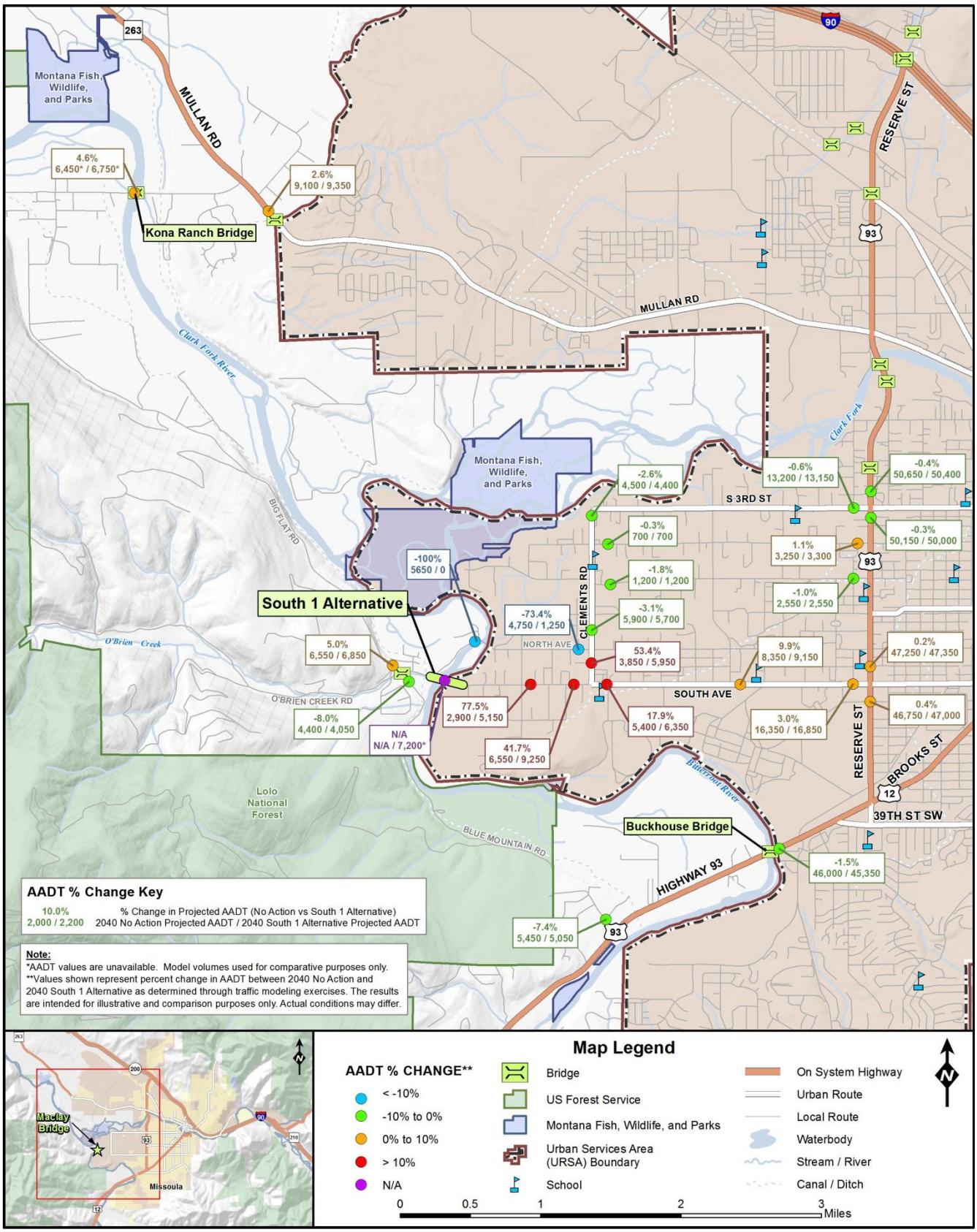

Figure 6: Change in Projected Year 2040 AADT (No Action vs. South 1)

6.3.1.3. Other Design Consideration

Reviewing the output of the TDM, and acknowledging the numerous comments provided during the study's 12-month development, questions have been asked about future roadway improvements, the impacts to schools and non-motorized users, and effects to the area's "quality of life". Some of these can be quantified, while some cannot. For the South 1 option there will need to be a great deal of discretion provided by Missoula County relative to design standards to mitigate potential impacts, if a project is developed.

For example, the minimum bridge width as previously documented for a new bridge at South Avenue would be 28 feet. This would provide for two, 12-foot travel lanes and two, 2-foot shoulders. This is a narrow width that would have a tendency to slow traffic down. The wider the bridge becomes, the harder it is to control travel speeds without additional measures, such as traffic calming (i.e. traffic circles or speed tables on the approaches to the bridge), heightened enforcement, or geometric design tools to institute deflection on the immediate approaches to the structure. The placement of non-motorized facilities such as sidewalks, on-street bicycle lanes, and shared-use paths can also help define the roadside environment. These items can result in a wider bridge to accommodate all amenities.

The same can be said for the roadways leading up to the bridge. The standard as previously noted (**Appendix 3, Existing and Projected Conditions Report**) is for a 40-foot roadway width. Typically this would include two, 12-foot travel lanes and two, 8-foot shoulders. A configuration less that this width could be achieved for South Avenue by planning for something similar to what is on North Avenue. Again this would be less than the "standard", but Missoula County would need to evaluate these design parameters in context with community concerns and available funding. The placement of roundabouts at major intersections may also regulate traffic flows and serve to reduce travel speeds.

The need for roadway improvements all the way from a new South Avenue Bridge to Reserve Street may not be necessary. The potential additional traffic impacts directly related to a new South Avenue Bridge are confined primarily to South Avenue west of Clements Road. East of Clements Road the traffic volume increases expected as a result of the proposal are not large compared to the year 2040 No Action conditions. Accordingly, it is unlikely that a new South Avenue Bridge necessitates roadway reconstruction east of Clements Road. What is uncertain, however, is whether South Avenue west of Clements Road would require roadway improvements. The data in **Table 14** suggests that without a new bridge at South Avenue the year 2040 AADT volumes may be close to 6,550 vpd. With a new bridge, the volume may grow to around 9,250 vpd. As currently configured, South Avenue west of Clements Road may be able to accommodate up to 7,300 vpd according to the theoretical roadway planning capacities found in the *2008 Missoula Long Range Transportation Plan (Table 6-1)*.

Roadway improvements between Clements Road and the proposed tie-in point for the new bridge approach (i.e. the end of South Avenue just west of Hanson Drive) could be contemplated in the future if traffic volumes grow to a level that cannot be accommodated with the existing road or through aggressive traffic calming such as traffic circles or roundabouts at the intersections. These are decisions to be made at the project level if and when a project is undertaken. To gain extra capacity, improvements such as left or right turn lanes at major intersections may be necessary to achieve potential capacities up to 9,600 vpd. Traffic volumes should be monitored to determine the usage of the route and if the upper volumes are realized.

If roadway reconstruction was desired from the currently envisioned tie-in point to Clements Road - a length of approximately 4,800 feet - the construction costs alone could be on the order of $1.6 million. Elevating this cost to include preliminary engineering (PE), and incidental and indirect costs (IDICs), this value could approach $1.9 million.

Chapter 7
FUNDING MECHANISMS

MDT administers a number of programs that are funded from State and Federal sources. Local and/or private funding sources may also be available to implement a bridge option. For options associated with the replacement of the Maclay Bridge, the likely funding source falls under MDT's Off-System Bridge Program (formerly known as the Highway Bridge Replacement and Rehabilitation Program).

Each year, in accordance with 60-2-127, Montana Code Annotated (MCA), the Montana Transportation Commission allocates a portion of available federal-aid highway funds for construction purposes and for projects located on various systems in the state as described throughout this chapter.

7.1. FEDERAL FUNDING SOURCES

The following summary of major Federal transportation funding categories received by the State through the Moving Ahead for Progress in the 21st Century Act (MAP-21) enacted on July 6, 2012, includes state developed implementation / sub-programs that may be potential sources for any project developed to replace the Maclay Bridge. In order to receive project funding under these programs, projects must be included in the State Transportation Improvement Program (STIP).

7.1.1. SURFACE TRANSPORTATION PROGRAM (STP)

STP funds are Federally apportioned to Montana and allocated by the Montana Transportation Commission to various programs.

7.1.1.1. Off-System Bridge Program[2]

Funds for the program are derived from the Federal gas tax, which is outside Federal general revenue sources and doesn't impact or add to the Federal deficit. Funds are Federally apportioned to Montana under the provisions of the current highway bill, MAP-21. MAP-21 requires a minimum percentage of the funding be used for off-system bridges.

ALLOCATIONS AND MATCHING REQUIREMENTS

Off-system bridge funds are distributed statewide. The Commission distributes off-system bridge funding based on off-system bridge inspections, need and County priorities. Of the total received, 86.58 percent is Federal and the State is responsible for the remaining 13.42%. The State share is funded through the Highway State Special Revenue Account.

ELIGIBILITY AND PLANNING CONSIDERATIONS

Under MAP-21 eligibility is defined by MDT. MDT's Off-System Bridge Program has the objective of addressing safety. As noted in the key findings, there are safety issues with the existing Maclay Bridge – the traffic level of this single-lane bridge as well as Emergency Services access to residents west of the river are considered safety issues. Identified crash trends also contribute to safety concerns. A project must address the safety issues to be eligible for Off-System Bridge Program funds.

[2] State funding programs developed to distribute Federal funding within Montana

7.1.2. Federal Lands and Tribal Transportation Program

This program is a three part program consisting of the Federal Lands Transportation Program, Tribal Transportation Program and the Federal Lands Access Program. The Federal Lands Transportation Program is administered by FHWA and the federal land management agencies. The Tribal Transportation Program is administered by the BIA and the appropriate tribal agency.

7.1.2.1. FEDERAL LANDS ACCESS PROGRAM

This program is administered by Western Federal Land Highway Division of the FHWA in consultation with MDT and MACO who represent the local governments. Projects are funded in Montana to the ratio of 87.58% federal funds and 13.42% matching funds.

All public roadways are eligible under the following criteria:

- Roadway jurisdiction or maintenance is by a state government, local government or tribal government; and
- The route must provide direct access to or run adjacent to federal lands.

7.1.3. Transportation Alternatives (TA) Program

The Transportation Alternatives (TA) program requires MDT to obligate 50% of the funds within the state based on population, using a competitive application process, while the other 50% may be obligated in any area of the state. Funds may be obligated for projects submitted by:

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

Eligibility and Planning Considerations

Eligible categories include:

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

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

COMPETITIVE PROCESS:

The State and any Metropolitan Planning Organizations required to obligate Transportation Alternative funds must develop a competitive process to allow eligible applicants an opportunity to submit projects for funding. As a new program and process under MAP-21, the competitive process will be developed as soon as possible.

7.2. STATE FUNDING SOURCES

7.2.1. TREASURE STATE ENDOWMENT PROGRAM (TSEP)

Treasure State Endowment Program (TSEP) funds may be used in conjunction with MDT's Off-System Bridge Program funds. TSEP is a state-funded program that is designed to help address the "affordability" problem of infrastructure need by providing grants to lower the cost of constructing public facilities projects. The program helps local governments with constructing or upgrading drinking water systems, wastewater treatment facilities, sanitary or storm sewer systems, solid waste disposal and separation systems, and bridges. The program was authorized by Montana's voters with the passage of Legislative Referendum 110 on June 2, 1992. The law has been codified as Sections 90-6-701 through 90-6-710, MCA. The TSEP program is administered by the Montana Department of Commerce.

ALLOCATIONS AND MATCHING REQUIREMENTS

In order to be eligible for a TSEP project grant, matching funds must be provided by the applicant to assist in financing the total project cost. Applicants are generally eligible to request a grant that is no greater than 50% of the eligible project expenses. In cases of extreme financial hardship and where very serious deficiencies exist that would affect the public's health or safety, an applicant may be eligible to receive a Hardship Grant from 51% up to 75% of the eligible project expenses in order to help reduce user costs to a more affordable level.

ELIGIBILITY AND PLANNING CONSIDERATIONS

Requests for matching grants for bridge projects are limited to a maximum of $500,000 per application unless the county can clearly demonstrate that extenuating circumstances exist. An amount greater than $500,000 may be allowed for bridge projects if the applicant submits an application for only one bridge and the total cost of the bridge project is greater than $1,000,000. Only one application per applicant each funding cycle is permitted.

7.3. LOCAL / PRIVATE FUNDING SOURCES

Local governments generate revenue through a variety of funding mechanisms. Typically, several local programs related to transportation exist for budgeting purposes and to disperse revenues. These programs are tailored to fulfill specific transportation functions or provide particular services.

7.3.1. Missoula County

7.3.1.1. Road Fund

The County Road Fund provides for the construction, maintenance, and repair of all county roads outside the corporate limits of cities and towns in Missoula County. Revenue for this fund comes from intergovernmental transfers (i.e., State gas tax apportionment and motor vehicle taxes), and a mill levy assessed against county residents living outside cities and towns. The county mill levy has a ceiling limit of 15 mills.

County Road Fund monies are primarily used for maintenance with little allocated for new road construction. It should be noted that only a small percentage of the total miles on the county road system are located in the study area. Projects eligible for financing through this fund will be competing for available revenues on a county-wide basis.

7.3.1.2. Special Revenue Fund

Special revenue funds may be used by the county to budget and distribute revenues legally restricted to a specific purpose. Several such funds that benefit the transportation system are discussed briefly in the following paragraphs.

7.3.1.2.1. Capital Improvements Fund

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

7.3.1.2.2. Rural Special Improvement District (RSID) Revolving Fund

This fund is used to administer and distribute monies for specified RSID projects. Revenue for this fund is generated primarily through a mill levy and through motor vehicle taxes and fees. A mill levy is assessed only when delinquent bond payments dictate such an action.

7.3.1.2.3. Special Bond Funds

A fund of this type may be established by the county on an as-needed basis for a particularly expensive project. The voters must approve authorization for a special bond fund. The county is not currently using this mechanism.

7.3.2. Private Funding Sources and Alternatives

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

7.3.2.1. Development Financing

The developer provides the land for a transportation project and in return, local government provides the capital, construction, and necessary traffic control. Alternatively, developer constructs necessary roadway improvements as a condition for access approval. Such a financing measure can be made voluntary or mandatory for developers.

7.3.2.2. Cost Sharing

The private sector pays some of the operating and capital costs for constructing transportation facilities required by development actions.

7.3.2.3. Transportation Corporations

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

7.3.2.4. Road Districts

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

7.3.2.5. Private Donations

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

7.3.2.6. General Obligation (G.O.) Bonds

The sale of general obligation bonds could be used to finance a specific set of major highway improvements. A G.O. bond sale, subject to voter approval, would provide the financing initially required for major improvements to the transportation system. The advantage of this funding method is that when the bond is retired, the obligation of the taxpaying public is also retired. State statutes limiting the level of bonded indebtedness for cities and counties restrict the use of G.O. bonds. The present property tax situation in Montana, and recent adverse citizen responses to proposed tax increases by local government, would suggest that the public may not be receptive to the use of this funding alternative.

7.3.2.7. Development Exactions/Impact Fees

Exaction of fees or other considerations from developers in return for allowing development to occur can be an excellent mechanism for improving the transportation infrastructure. Developer exactions and fees allow growth to pay for itself. The developers of new properties should be required to provide at least a portion of the added transportation system capacity necessitated by their development, or to make some cash contribution to the agency responsible for implementing the needed system improvements.

Establishment of an equitable fee structure would be required to assess developers based upon the level of impact to the transportation system expected from each project. Such a fee structure could be based upon the number of additional vehicle trips generated, or upon a fundamental measure such as square footage of floor space. Once the mechanism is in place, all new development would be reviewed by the local government and fees assessed accordingly.

7.4. FUNDING ELIGIBILITY

Due to the nature of the potential improvements, and the sub-standard conditions of the existing Maclay Bridge, not all of the seven options will be eligible for MDT's Off-System Bridge Program. **Table 15** summarizes the options, potential costs, and Off-System Bridge Program funding eligibility.

Table 15: Summary of Costs and Funding Eligibility [a]

Option ID	Comprehensive Cost	Eligible for Off-System Bridge Program Funds?	Reasoning for Funding Eligibility
OPTION 1 - IMPROVE SAFETY AND OPERATIONS ON THE EXISTING BRIDGE			
1G - New One-Lane Bridge at a New Location & Retain Existing Bridge for One-Way Travel	$6,050,000 to $8,450,000	POSSIBLE	Additional study is needed to determine eligibility. The comprehensive cost is shown as a range due to uncertainty on the potential scope of improvements to the existing Maclay Bridge.
OPTION 2 - REHABILITATE THE BRIDGE			
2C - Minor Rehabilitation (includes Approaches)	$1,150,000 to $1,500,000	NO	This option does not meet the Safety objective of the MDT Off-system Bridge Program.
2D - Major Rehabilitation (includes Approaches)	$1,500,000 to $3,900,000	NO	This option does not meet the Safety objective of the MDT Off-system Bridge Program.
OPTION 3 - BUILD NEW BRIDGE [b]			
3A.2 - North 1 Alignment	$5,300,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.
3C.2 - Mount 2 Alignment	$9,000,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.
3E.1 - South 1 Alignment	$7,300,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.
3E.2 - South 2 Alignment	$7,450,000	YES	This option meets the Safety objective of the MDT Off-System Bridge Program.

[a] "Comprehensive Costs" in this table include construction, preliminary engineering, incidental and indirect costs, inflation (3 percent per year for five years) and right-of-way costs.

[b] The comprehensive cost estimates envision a new bridge and limited approach work to tie into the existing roads. This would meet the intent of MDT's Off-System Bridge Program by addressing bridge related safety issues. Roadway reconstruction outside of bridge approach tie-in points are likely not eligible for MDT's Off-System Bridge Program funding.

Chapter 8
PLANNING STUDY CONCLUSION

The study evaluated the Maclay Bridge river crossing and the surrounding transportation system to gain a better understanding of system needs, objectives, constraints and opportunities, and funding availability. In addition to analyzing applicable data from MDT, Missoula County, and resource agencies; a comprehensive public involvement process was conducted to gather relevant information from community members and stakeholders groups. This information led to a set of options to be considered by the Missoula County Commissioners.

The study identified several options that would address the operational characteristics, safety and physical conditions of the existing facility. However, based on the screening and ranking process, only one option rose to the top as the best alternative to ensure that, over the foreseeable future, the facility meets applicable MDT and local design standards and provides the desired improvements in safety and operations for the traveling public. Option 3E.1, South 1 Alignment delivers a transportation facility that meets current and future demands, addresses safety on the bridge and the sub-standard roadway approaches to the bridge, and provides connectivity to neighborhood residents and regional users accessing recreational lands to the west of Bitterroot River.

The Missoula County Commissioners may elect to proceed with one of the other options discussed in this study; however, three options (1G, 2C and 2D) may not be eligible for MDT's Off-System Bridge Program funding. For these options, Missoula County would need to use local funds and follow their own internal project development process.

8.1. PURPOSE AND NEED

The purpose of a future project is to have a river crossing in the Maclay Bridge area to enhance the operational characteristics, increase safety and improve physical conditions that provides for safety and operations for the traveling public over the foreseeable future.

To accomplish this purpose, the proposed options and resultant project must:

- Incorporate physical changes to the river crossing, road approaches and its adjoining environment so the facility complies with MDT's and Missoula County's geometric design standards for a collector roadway; and
- Provide a transportation facility that meets current and future demands.

8.2. NEXT STEPS

The ability to develop a project is dependent on the availability of existing and future federal, state, local, and private funding sources. At the current time funding has been identified but not secured to proceed with a project. Should the Missoula County Commission elect to proceed with a project to replace the Maclay Bridge river crossing, the following steps are needed:

- Identify the option that best meets the safety, environmental, and social needs in the area identified in the study;
- Identify and secure a funding source or sources; and

- Follow MDT guidelines for project nomination and development, including a public involvement process and environmental documentation that describes any potential impacts and mitigation measures from any proposed action.

Should Missoula County elect to proceed with the three options that may not be eligible for MDT's Off-System Bridge Program (i.e. options 1G, 2C and 2D), they would need to use local funds and follow their own internal project development process.

The "Purpose and Need" statement for any future project should be consistent with the needs and objectives contained in this study. Should this study lead to a project (or projects), compliance with NEPA (if federal funding is utilized) and MEPA (regardless of funding source) will be required. Further, this Planning Study will be used as the basis for determining the impacts and subsequent mitigation for the improvement options in future NEPA documents. Any project developed will need to be in compliance with CFR Title 23 Part 771 and ARM 18, sub-chapter 2 which sets forth the requirements for documenting environmental impacts on highway projects.

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